

Office of Chemical Safety and Pollution Prevention

Final Risk Evaluation for n-Methylpyrrolidone

Systematic Review Supplemental File:

Data Quality Evaluation of Environmental Release and Occupational Exposure Data

CASRN: 872-50-4



December 2020

This document is a compilation of tables for the data extraction and evaluation for N-Methylpyrrolidone (NMP). Each table shows the data point or set or information element that was extracted and evaluated from a data source in accordance with Appendix D of the *Application of Systematic Review in TSCA Risk Evaluations*. If the source contains more than one data set or information element, the review provides an overall confidence score for each data set or information element that is found in the source. Therefore, it is possible that a source may have more than one overall quality/confidence score.

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Explanatory Notes

These explanatory notes provide context to understand the short comments in the data evaluation tables.

Domain	Metric	Description of Comments Field				
Reliability	Methodology	Indicates the sampling/analytical methodology, estimation method, or type of publication				
Representativeness	Geographic Scope	Indicates the country of the study, publication, or underlying data				
	Applicability	Indicates whether the data are for a condition of use within scope of th Risk Evaluation				
	Temporal Representativeness	Provides the year of study, publication, or underlying data				
	Sample Size	Describes the distribution of the sample or underlying data				
Accessibility / Clarity	Metadata Completeness	Describes the completeness of the metadata				
Variability and Uncertainty	Metadata Completeness	Indicates if study or publication addresses variability and uncertainty of the data or information				

Releases to the Environment

Source Citation:	Solomon, G. M., Morse, E. P., Garbo, M. J., Milton, D. K 1996. Stillbirth after occupational exposure to N- methyl-2-pyrrolidone: A case report and review of the literature. Journal of Occupational and Environmental Medicine.								
Type of Data Source Hero ID	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3043623								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:	. (0.1		Use						
Life Cycle Descripti	ion (Subca	ategory of Use):	laborator	y ,					
Release Source:			Laborator	y waste					
Disposal / Treatmen	nt Method:	:	hazardous	s waste					
Environmental Mec	11a: . Footom		nazardous	s waste	a d				
Deily Polosco Over	i ractor:		100 perce	nt release	ea				
Number of Sites:	nny (kg/u	lay).	1 L/day						
rumber of Sites.			1.0						
EVALUATION									
EVALUATION			D	NOVD+	a				
Domain		Metric	Rating	MWF'^	Score	Comments			
Damain 1. Daliabili									
Domain 1: Reliabili	ity Motrio 1.	Mathadalam	Madium	V 1	0				
	Metric 1.	Methodology	Medium	× 1	2	From an industry contact			
Domain 2. Represe	ntative								
Domain 2. Represe	Metric 2:	Geographic Scope	High	× 1	1	US			
]	Metric 3:	Applicability	High	$\times 2$	2	Use is in scope			
]	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1996 - more than 20 years old			
]	Metric 5:	Sample Size	Medium	$\times 1$	2	Information is from one source			
Domain 3: Accessib	oility/Clari	ity							
]	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
D	., 1								
Domain 4: Variabil	ity and Ur	ncertainty	TT: 1	-					
	Metric 7:	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results			
		+	N 7 11						
Overall Quality Def	terminatio	n'	Medium		1.7				

Source Citation:	Kim, B. R., Kalis, E. M., Dewulf, T., Andrews, K. M 2000. Henry's law constants for paint solvents and their implications on velatile organic compound emissions from automotive painting. Water Environment Research								
Type of Data Source Hero ID	Releases to the Environment; Environmental Release Data; 3578170								
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Disposal /Treatment Method: Release or Emission Factor: Release Estimation Method: Annual Release Quantity (kg/yr): Number of Sites:			Use Painting During painting, overspray paint materials are captured in continuously recirculating scrubber water and stored in a sludge pit. Periodically or continually (depending on operating conditions of an assembly plant), captured paint material (paint sludge) is separated from scrubber water and sent to a landfill. Spent scrubber water that contains VOCs is peri- odically discharged to a municipal wastewater treatment plant. At some assembly plants, a portion of VOCs in the exhaust air is captured and destroyed using vapor-phase adsorption followed by thermal oxidation before the air is emitted to the atmosphere. Wastewater, incineration 80 percent of the PV (9700 kg/yr) is released in scrubber wastewater Measured 7700 kg/yr in scrubber wastewater 1.0						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Does not cover all releases at the site			
Domain 2. Bepres	sentative								
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Use is in scope			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1996			
	Metric 5:	Sample Size	High × 1 1 Statistical distribution of samples is fully characterized. Sample size is sufficiently representative (11 samples)						
		Cor	tinued on 1	next page	<u>,</u>				

- continued from previous page								
Source Citation: Kim, B. R., Kalis, E. M., Dewulf, T., Andrews, K. M. 2000. Henry's law constants for paint solvents and their implications on volatile organic compound emissions from automotive painting. Water Environment Research.								
Type of Data Source Hero ID	Releases to 3578170	Releases to the Environment; Environmental Release Data; 3578170						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 Lacks release frequency						Lacks release frequency		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	limited discussion		
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	Medium		1.8			

.+ir und fr

Source Citation: Type of Data Source Hero ID	Nicnas, 2001. Full public report: Polymer in primal binder u-51. Releases to the Environment; Environmental Release Data; 3978357								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source:		Processing Formulation of adhesive Wash water from formulation equipment will be re-used in subsequent batches where possible. Otherwise, it will be treated on site and sludge disposed of to landfill. 50 percent of the wash water will be re-used in subsequent batches and the remainder released into the sewer. An							
Disposal /Treatm Environmental M Release Estimatic Annual Release G	eent Method edia: on Method: Quantity (kg	: /yr):	estimated in the em WWT Landfill, ' Estimated For polyn) = 45 kg kg/yr (lan	100 kg o pty impo Water d by form ner in for g/yr (lan adfill fron	f the no ort drum nulation rmulatic dfill fro m empty	tified polymer will be lost to landfill as residues as each year. and use company on (polymer is 35 percent ; NMP is 5 percent om WWT); 5 kg/yr (water from WWT); 100 y drums)			
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	Likely to cover all releases			
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Australia			
	Metric 3:	Applicability	High	$\times 2$	2	Use is in scope			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001			
	Metric 5:	Sample Size	Low	$\times 1$	3	Not characterized			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	data include all associated metadata			
Domain 4: Varial	Domain 4: Variability and Uncertainty								
Continued on next page									

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Source Citation: Type of Data Source Hero ID	Nicnas, 20 Releases to 3978357	Nicnas,. 2001. Full public report: Polymer in primal binder u-51. Releases to the Environment; Environmental Release Data; 3978357							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score		Comments		
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion			
Overall Quality D	Determination	'nţ	Medium		1.8				

Source Citation:Nicnas,. 2Type of Data SourceReleases toHero ID3978357	001. Full public report: Polymer o the Environment; Environmen	r in primal tal Release	binder u Data;	-51.			
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Disposal /Treatment Method:		Use Spray application of adhesive The notifier estimates that approximately one third of the formulation will be lost as overspray. Of this, 50 percent will be trapped in the spray both water reservoir and 50 percent will be removed by the scrub- ber unit. All other dry wastes generated during the application of the basecoat, including the waste obtained from the periodic cleaning of scrubber baffles and filters will also be disposed of in landfill.					
Environmental Media: Release Estimation Method: Annual Release Quantity (kg	Landfill, Estimated For polyn = 6.6 ton	Water 1 by form ner in for nes/yr (nulation rmulatio WWT)	and use company n (polymer is 35 percent ; NMP is 5 percent)			
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Likley to cover all releases		
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High Medium Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 4 3	Australia Use is in scope 2001 Not characterized		
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	data include all associated metadata		
Domain 4: Variability and Ur Metric 7:	Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Low × 1 3 No discussion						
Continued on next page							

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Source Citation: Type of Data Source Hero ID	Nicnas,. 2001. Full public report: Polymer in primal binder u-51. Releases to the Environment; Environmental Release Data; 3978357							
EVALUATION Domain	Metric	Rating MWI	* Score	Comments				
Overall Quality D	$\operatorname{Petermination}^{\dagger}$	Medium	1.8					

Source Citation: Type of Data Source Hero ID	Basf, 1993. Modification of a vapor degreasing machine for immersion cleaning use N-methylpyrrolidone. Releases to the Environment; Environmental Release Data; 3982074								
EXTRACTION Parameter	0302011		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Disposal /Treatment Method: Release or Emission Factor: Daily Release Quantity (kg/day): Number of Sites:			Use immersion degreasing solvent dragout dragout 1.94 grams/lb of parts cleaned 912 g/day (114 g/hr for 8 hrs) 1.0						
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	may not cover all release sources at the site			
Domain 2: Repres	entative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 6\\ 3\end{array}$	US Cleaning is included in scope 1993 characterized by no statistics.			
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Medium	$\times 1$	2	Lacks release frequency			
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	The report does not address variability or uncertainty.			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Medium		2.1				

Source Citation: Type of Data Source Hero ID	Basf, 1993 Releases to 3982074	3. Modification of a vapor degre to the Environment; Environment	asing machi tal Release	ine for in Data;	nmersio	n cleaning use N-methylpyrrolidone.
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Environmental Media: Annual Release Quantity (kg/yr): Number of Sites:				n degreas ive losses 4 in. ms/hour	ing during	operation. Total bath solvent surface area is
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	may not cover all release sources at the site
Domain 2: Repres	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$ \begin{array}{c} 1 \\ 2 \\ 6 \\ 3 \end{array} $	US Cleaning is included in scope 1993 characterized by no statistics.
Domain 3: Access	ibility/Clari Metric 6:	ity Metadata Completeness	Medium	$\times 1$	2	Lacks release frequency
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	The report does not address variability or uncertainty.
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Medium		2.1	

Source Citation:Oecd, 2Type of Data SourceReleasesHero ID3828838	017. Emission Scenario Document to the Environment; Reports for	t (ESD) on Data or Inf	the use of ormation	of textile Other	e dyes. than Exposure or Release Data;
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Sub Release Source: Environmental Media: Release or Emission Factor:	All all Releases to air from various generic unit operations, valves and other attachments. Residuals in drums and tanks air, uncertain Average emission factors for unit operations are in Table 7.1. Emis- sion factors for fugitive emissions from valves, etc. in Table 7.2. Drum residual LF in Table 7.3.				
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Metric 1	Methodology	High	× 1	1	trusted sources
Domain 2: Representative Metric 2 Metric 3 Metric 4 Metric 5	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Medium High Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 4 2 3	OECD Generic information that can be applied to in-scope uses 2011 characterized by no statistics.
Domain 3: Accessibility/Cl Metric 6	arity Metadata Completeness	Medium	× 1	2	Data sources are generally described but not fully transparent.
Domain 4: Variability and Metric 7	Uncertainty Metadata Completeness	High	$\times 1$	1	well characterized
Overall Quality Determinat	$\operatorname{ion}^{\dagger}$	Medium		1.7	

Source Citation: Type of Data Source Hero ID	2017. Hazardous substances data bank: 1-Methyl-2-pyrrolidinone. Releases to the Environment; Environmental Release Data; 3860493							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Environmental Media: Release or Emission Factor: Release Estimation Method:			Use petrochemical processing aid? wastewater effluent POTW 0, 33.7, 66.3 ug NMP/L wastewater 3 measurements taken at petrochemical plant					
EVALUATION								
Domain		Metric	Rating	MWF^*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	Does not cover all releases at the site		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1996-1997		
	Metric 5:	Sample Size	High	$\times 1$	1	3 samples, all results given		
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	Low	× 1	3	Release data include release media but no other metadata.		
Domain 4: Variability and Uncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion		
Overall Quality Determination [†]		Medium		2.0				

Source Citation:	Atsdr., 2015. Health consultation: Review of air quality data: Intel Corporation "New Mexico facility: Rio Rancho, Sandoval County, New Mexico: EPA facility, ID: NMD000609339, Part 2							
Type of Data Source Hero ID	Releases to the Environment; Environmental Release Data; 3970460							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source:		Use electronics - photoresist remover? unknown - based on company process operations, NMP was likely used as a photoresist remover in the 1990s and the facility switched to a different						
Environmental Me	edia:		Air	the 2000	5			
Release Estimatio	n Method:		TRI 1987	-2013				
Annual Release Q	uantity (kg	/yr):	>9,000 lb	in 1995;	0 poun	nds in 2013		
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Does not cover all releases at the site		
Domain 2. Donnos	ontativo							
Domain 2: Repres	Metric 2.	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1987-2013		
	Metric 5:	Sample Size	Medium	$\times 1$	2	range provided in bar graph		
Domain 3: Access	ibility/Clari	ity						
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Release data include release media but no other metadata.		
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	limited discussion		
			incaran	<u></u>	-			
Overall Quality D	eterminatio	n [†]	Medium		2.0			

Source Citation:Nicnas,. 1Type of Data SourceReleases tHero ID3978356	997. Full public report: Polymer o the Environment; Environmen	r in byk-410 tal Release). Data;				
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Environmental Media: Release or Emission Factor: Release Estimation Method: Annual Release Quantity (kg/yr):			Processing coating /paint formulation release of polymer-NMP coating additive during formulation is estimated to be no more than 2 percent total. Incorporates all sources of release. all 2 percent information from one formulation company 55 kg/yr of polymer_NMP soln based on annual use rate of 2750 kg.yr				
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Likely to cover all releases		
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High Low Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$2 \\ 2 \\ 6 \\ 3$	Australia in scope 1997 characterized by no statistics.		
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Release data include release media but no other metadata.		
Domain 4: Variability and U Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	No discussion		
Overall Quality Determination [†]		Medium		2.2			

Source Citation: Type of Data Source Hero ID	Nicnas,. 1 Releases to 3978358	998. Full public report: Copolyr o the Environment; Environmen	mer in forap tal Release	perle 321. Data;				
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Environmental Media:		Use Coating /additive in Papermaking release to the environment may potentially occur from: leaking storage containers (less than 2 percent); accidental spills (less than 1 percent); during application (less than 10 percent) and disposal of residual material in containers (less than 5 percent). The worst case total of 20 percent released during the application to paper, corresponds to a maximum of 500 kg per annum at the maximum rate of import. all						
Release or Emissic Release Estimatio Annual Release Q	Release or Emission Factor: Release Estimation Method: Annual Release Quantity (kg/yr):			10 percent information from one papermaking company 500 kg/yr of polymer-NMP soln based on annual import rate of 2,500 kg				
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Likely to cover all releases		
Domain 2: Repres	sentative Motric 2:	Coographic Scope	Modium	× 1	9	Australia		
	Metric 3:	Applicability	High	$\stackrel{\wedge}{\times} \stackrel{1}{2}$	$\frac{2}{2}$	Australia This was not identified as a use by EPA, but no uses are ex- cluded from scope. May be applicable to coating OES?		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1998		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	ibility/Clar	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Release data include release media and source, but not fre- quency of release		
		C.~~	tinued or -	out nom				
		Con	nulled on r	iext page	2			

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Source Citation: Type of Data Source Hero ID	Nicnas, 1998. Full public report: Copolymer in foraperle 321. Releases to the Environment; Environmental Release Data; 3978358							
EVALUATION								
Domain		Metric	Rating	$\rm MWF^{\star}$	Score		Comments	
Domain 4: Variab	ility and Un Metric 7:	certainty Metadata Completeness	Low	× 1	3	No discussion		
Overall Quality D	etermination	1 [†]	Medium		2.1			

Source Citation:Nicnas, 1998. Full public report: Copolymer in foraperle 321.Type of Data SourceReleases to the Environment; Environmental Release Data;Hero ID3078358						
EXTRACTION Parameter	3910300		Data			
			Dutu			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source:		Use architectural (concrete) coating Release to the environment resulting from the use of the polymer as a concrete coating may occur to the sewer (washing of tools used to apply formulations containing the notified chemical), or to landfill (disposal of				
Environmental Media:			spray or remain wi Sewer; lar	splatter : here they ndfill	from rc fall, m	ollers or brushes (These releases are likely to nainly on the ground.)
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	Likely to cover all releases
Domain 2: Repres	sentative Matria 2	Coorrentie Coorre	Madium	V 1	0	
	Metric 2: Metric 3:	Applicability	High	$\times 1$ $\times 2$	2	Australia
	Metric 4:	Temporal Representativeness	Low	$\times 2$ $\times 2$	6	1998
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data element
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Release data include release media and source, but not fre- quency of release
						A V
Domain 4: Variat	oility and U	ncertainty	_		_	
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion
Overall Quality Determination ^{\dagger}		Medium		2.0		
Continued on next page						

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Source Citation: Type of Data Source Hero ID	Nicnas, 1998. Full public report: Copolym Releases to the Environment; Environment 3978358	er in forap al Release	perle 321. Data;					
EVALUATION		_		_				
Domain	Metric	Rating	MWF*	Score	Comments			

Source Citation:	Erg, 2000. Preferred and alternative methods for estimating air emissions from paint and ink manufacturing facilities.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982076

EXTRACTION	
Parameter	Data
Life Cycle Stage:	Processing
Life Cycle Description (Subcategory of Use):	Paint and ink formulation
Release Source:	material loading, heat-up losses, equipment leaks, spills, surface evapo-
Emineratel Media	Function, inquid material storage, w w 1
Environmental Media:	Fugitive air emissions from the instead release sources
Release or Emission Factor:	Provides examples of calculating emissions based on emission factors
	from AP-42, source-specific models, and mass balances.
Release Estimation Method:	AP-42 and models (not NMP-specific)
P2 Control & percent Efficiency:	Removal equipment available for treating VOC-containing air streams
	includes recovery devices (i.e., carbon adsorption, absorption, and con-
	densation) and combustion devices (i.e., thermal incinerators, catalytic
	incinerators, and industrial boilers and process heaters). Control effi-
	ciencies for this equipment can range from 50 to 99 percent, but are
	most typically greater than 95 percent (EIIP, 2000). Carbon adsorbers,
	absorbers (scrubbers), condensers, and catalytic incinerators are gener-
	ally not appropriate for paint and ink manufacturing facilities. Industrial
	and process heaters are capable of effectively treating the types and lev-
	els of VOCs generated by the paint and ink industry but are found in
	few, if any, paint and ink manufacturing facilities (EPA, 1992a).

EVALUATION								
Domain	Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	$\times 1$	1	From trusted sources			
Domain 2: Representative Motria 2:	Coographic Scope	High	v 1	1				
Metric 3:	Applicability	High	$\times 1 \times 2$	2	in scope			
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000			
Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data element			
Continued on next page								

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Source Citation: Type of Data Source Hero ID	Erg, 2000. Preferred and alternative methods for estimating air emissions from paint and ink manufacturing facilities. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982076							
EVALUATION								
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments		
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	well characterized		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.3			

Source Citation: Type of Data Source	Mo, D. N. R 2001. State of Missouri toxics release inventory: Summary report: 1999 data. Releases to the Environment; Environmental Release Data; 3082077							
	3982077							
EXTRACTION Parameter			Data					
			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	tion (Subca	tegory of Use):	paints and	d adhesiv	res used	in the transportation equipment MFG sector		
Release Source:			air emissi	ons				
Environmental Me	edia:		Air					
Release Estimation	n Method:		1999 TRI	data for	the sta	te of Missouri		
Annual Release Q	uantity (kg	/yr):	83,500 kg	/yr (in 1	999 in I	Missouri)		
EVALUATION					_	_		
Domain		Metric	Rating	MWF*	Score	Comments		
Damain 1. Daliahi	1:4							
Domain 1: Reliabl	Ilty Motrie 1.	Mathadalagy	Uich	× 1	1			
	Metric 1.	Methodology	IIIgii	× 1	1	Expected to cover all releases		
Domain 2: Repres	entative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1999		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	ibility/Clari	ity	т	1	9			
	Metric 6:	Metadata Completeness	Low	× 1	3	Release data include release media but no other metadata.		
Domain 4: Variab	ility and Ur	ocertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion		
				·· -	· ·			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Medium		19			
Crotain Quality D			mount		1.0			

Source Citation: Type of Data Source Hero ID	Mo, D. N. Releases to 3982077	R 2001. State of Missouri toxi o the Environment; Environment	ics release in tal Release	nventory: Data;	Summ	ary report: 1999 data.	
EXTRACTION Parameter			Data				
Life Cycle Description (Subcategory of Use): Release Source: Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr):			Unknown - emission data provide per company name (based on names, may include: wire coating, car painting, lab, solvent mfg, cement coat- ing) unknown - TRI data Air, POTW, WWT, landfill, energy recovery 1999 TRI data for the state of Missouri see App C and G for site specific TRI emissions				
EVALUATION Domain		Metric	Rating	MWF^*	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Expected to cover all releases	
Domain 2: Repres	sentative		0			· · ·	
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	Medium	$\times 2$	4	Data may include info on in-scope uses, but cannot be deter- mined without searching company names	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1999	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	Release data include release media but no other metadata.	
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Low	× 1	3	No discussion		
Overall Quality Determination [†]		Medium		2.1			

Source Citation: Type of Data Source Hero ID	Technikon Releases te 3982183	, L. L. C 2001. Core box cleaners the Environment; Reports for the Envit	er study: E Data or Inf	vaporativ	ve emiss Other	sion study of specialty systems' solvent FC-47-G1. than Exposure or Release Data;	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Environmental Media: Release or Emission Factor:			Use cleaning of casts /molds and hoppers in foundry applications Study on the rate of evaporation of cleaning solution containing NMP at unknown concentration Fugitive air 0.00004 g of solvent soln/sec (see Fig 12 - 16)				
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	High quality techniques	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001	
	Metric 5:	Sample Size	High	× 1	1	Fully characterized with multiple figures and charts	
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.	
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness			High	× 1	1	well characterized	
Overall Quality Determination [†]			High		1.2		

Source Citation:Chemistry Industry Association of, Canada. 2017. All substances emissions for 2012 and projections for 2015.Type of Data SourceReleases to the Environment; Environmental Release Data;Hero ID3982361							
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source:		Use Assumed = Paint formulation; Chemical Formulation Source lists NMP emissions from sites in Canada. Source does not list the operations that occur at the sites. Assumed life cycle descriptions based on the names of the facilities.					
Environmental Media: Annual Release Quantity (kg/yr):			s/yr (201	2)			
EVALUATION	Matria	Dating	MXX/D+	G	C		
Domain	Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	Low	$\times 1$	3	Methodology is not specified		
Domain 2: Representative	~						
Metric 2:	Geographic Scope	Medium	× 1	2	Canada		
Metric 3:	Applicability	Medium	$\times 2$	4	The operations at these sites are not characterized. Assumed to likely be in scope, but unknown,		
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012		
Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 2: Accessibility/Clar	:+						
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Release data include release media but no other metadata.		
Domain 4: Variability and Uncertainty							
Metric 7:	Metadata Completeness	Low	$\times 1$	3	The release data study does not address variability or uncer- tainty.		
Overall Quality Determinatio	Medium		2.2				

Source Citation:Chemistry Industry Association of, Canada. 2017. All substances emissions for 2011 and projections for 2014.Type of Data SourceReleases to the Environment; Environmental Release Data;Hero ID3982362							
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source:		Use Assumed = Paint formulation; Chemical Formulation Source lists NMP emissions from sites in Canada. Source does not list the operations that occur at the sites. Assumed life cycle descriptions based on the names of the facilities.					
Environmental Media: Annual Release Quantity (kg/yr):		Air 0.05 tonne	Air 0.05 tonnes/yr (2011)				
EVALUATION	Metric	Bating	MWF*	Score	Comments		
	Wieune	Itating	101 00 1	Deore	Connicitos		
Domain 1: Reliability Metric 1:	Methodology	Low	$\times 1$	3	Methodology is not specified		
Domain 2: Representative	Commendie Comme	M	1	0			
Metric 2: Motric 3:	Applicability	Medium	$\times 1$	2	Canada The exercises of these sites are not characterized. Assumed		
Metric 5.	Applicability	meanum	× 2	4	to likely be in scope, but unknown,		
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2011		
Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Accessibility/Clar	ity	Ŧ					
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Release data include release media but no other metadata.		
Domain 4: Variability and U	ncortainty						
Metric 7:	Metadata Completeness	Low	$\times 1$	3	The release data study does not address variability or uncer- tainty.		
Overall Quality Determinatio	Medium		2.2				

Source Citation: Type of Data Source Hero ID	Turner, S. L., McCrillis, R. C 2017. Evaluation of alternative chemical strippers on wood furniture coatings. Releases to the Environment; Environmental Release Data; 3986887							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Environmental Media: Release or Emission Factor: Release Estimation Method:				Use Paint stripper VOC emissions during stripping fugitive air 158.94 to 263.74 g VOC /m2 substrate surface VOC from stripping solutions containing NMP (solutions 2, 3, 4 in the study)				
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	The release data methodology is known or expected to be accu- rate (e.g., trusted source) but may not cover all release sources at the site		
Domain 2: Repres	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$egin{array}{c} 1 \\ 2 \\ 6 \\ 3 \end{array}$	US in scope no date characterized by no statistics.		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Release data include release media but no other metadata.		
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	The release data study does not address variability or uncer- tainty.		
Overall Quality Determination [†]			Medium		2.2			

Source Citation:	Campbell, H. L., Striebig, B. A. 1999. Evaluation of N-methylpyrrolidone and its oxidative products toxicity utilizing the microtox assay. Environmental Science and Technology.							
Type of Data Source Hero ID	Releases to 3566019	b the Environment; Reports for 1	Data or Infe	ormation	Other	than Exposure or Release Data;		
EXTRACTION								
Parameter		Data						
Life Cycle Stage:			All					
Life Cycle Descrit	otion (Subca	ategory of Use):	all					
Release Source:			Study on	the tox	icity of	byproducts from the oxidation of NMP in		
			wastewate	er.	-			
P2 Control & per	cent Efficier	ncy:	Countercu	urrent we	et scrub	ber was utilized to transfer the NMP vapor to		
			the aqueo	us phase	. The s	crubber utilized water as the scrubbing liquor		
			and remo	ved great	ter than	97 percent of the NMP from the exhaust air		
			stream at	the fach	10 y			
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Medium	$\times 1$	2	The assessment or report uses high quality data and/or tech-		
						information does not indicate flaws or quality issues.		
Domain 2: Repres	sentative	Coordinate Coordinate	TT:l.	· 1	1	NG.		
	Metric 2: Motric 3:	Applicability	Hign Modium	$\times 1$	1	US Applicable to in score uses but information is an tonicity		
	Metric 5.	Applicability	Medium	X 2	4	Applicable to in-scope uses; but, information is on toxicity which is not used by engineering assessors (is used by exposure assessors)		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1999		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 2. Accord	sibility /Clar	:+						
Domain 5. Access	Metric 6	Metadata Completeness	Medium	× 1	2	Assessment or report clearly documents its data sources as		
	Metric 0.	Metadata Completeness	Medium	~ 1	2	sessment methods, results, and assumptions		
Domain 4. Variah	vility and U	acertainty						
Domain 4. Vallar	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	limited discussion		
			tinued on	ort nort				
Continued on next page								

- continued from previous page									
Source Citation:	Campbell, H. L., Striebig, B. A 1999. Evaluation of N-methylpyrrolidone and its oxidative products toxicity utilizing the microtox assay. Environmental Science and Technology.								
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;								
Hero ID	3566019	3566019							
EVALUATION									
Domain	Metric	Rating	MWF^{\star}	Score	Comments				
Overall Quality Determination [†] Medium 2.0									

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Descrip Release Estimatic Annual Release Q Number of Sites:	Processing paint and coating formulation releases from Envirofacts search see release rates in report 1.0						
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.	
						UV A	
Domain 2: Repres	sentative	~					
	Metric 2:	Geographic Scope	High	× 1	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present	
	Metric 5:	Sample Size	Low	× 1	3	characterized by no statistics.	
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information	
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion	
Overall Quality Determination [†]		Unacceptable		4	Metric Mean Score: 2.0.		

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION			Data					
Farameter			Data					
Life Cycle Stage:			Processing					
Life Cycle Descrip	otion (Subca	ategory of Use):	Photographic I	Film, Pap	per, Pla	te, and Chemical Manufacturing		
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	ort			
Number of Sites:			1.0					
EVALUATION								
Domain		Metric	Rating	MWF^*	Score	Comments		
Domain 1. Daliah	:1:4							
Domain 1: Kenab	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
D : 0 D								
Domain 2: Repres	Sentative	Communitie Commu	TT:l.	v 1	1			
	Metric 2: Motrie 2:	Appliesbility	High	× 1 × 2	1			
	Metric 5: Motrie 4:	Tomporal Representativeness	High	$\times 2$	2	in scope		
	Metric 5:	Sample Size	Low	$\times 1$	2	characterized by no statistics		
	Metric 9.	Sample Size	LOW	~ 1	0	characterized by no statistics.		
Domain 3: Access	sibility/Clar	ity						
20111111 01 110000	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information		
D								
Domain 4: Variat	ility and U_1	ncertainty	T	1	0			
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion		
Overall Quality Determination [†]		Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION			Data					
Farameter			Data					
Life Cycle Stage:			Processing		~ .			
Life Cycle Descrip	otion (Subca	ategory of Use):	All Other Misc	cellaneous	sC hemi	cal Product and Preparation Manufacturing		
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	ort			
Number of Sites:			1.0					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Damain 9. Damai								
Domain 2: Repres	Motria 2	Coographic Scope	High	\vee 1	1	IIC		
	Metric 3:	Applicability	High	$\times 1$ $\times 2$	1	US		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	× 1	3	characterized by no statistics.		
		r r r			-			
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information		
Domain 4: Variat	ility and U	ncertainty	T	1	0			
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion		
Overall Quality Determination [†]		Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Descrip Annual Release G Number of Sites:	Processing Plastic Material and Resin Manufacturing see release rates in report 1.0							
EVALUATION					q			
Domain		Metric	Rating	MWF'*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information		
Domain 4: Variab	oility and U Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion		
Overall Quality Determination [†]		Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Processing					
Life Cycle Descrip	otion (Subca	ategory of Use):	All Other Misc	cellaneous	s Manuf	acturing		
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	ort			
Number of Sites:			1.0					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 2. Accord	sibility /Clan	:+						
Domain 5. Access	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information		
Domain 4. Variat	ilitar and TI							
Domain 4: Variat	Low	\vee 1	2	No discussion				
	metric 7:	metadata Completeness	LUW	× 1	ა	INO discussion		
Overall Quality Determination ^{\dagger}		Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Processing			
Life Cycle Description (Subcategory of Use):			Cement Manufacturing see release			
Annual Release Quantity (kg/yr):			rates in report			
Number of Sites:			1.0			
EVALUATION						
Domain		Matria	Dating	MMT	Coore	Commente
Domain		Metric	Rating	IVI VV F ^	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.
Domain 2: Representative						
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	$\times 2$	2	in scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.
Domain 3: Access	TT . 11					
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	has no release media or other information
Domain 4. Variability and Uncertainty						
Domain 4. Variat	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion
					· ·	
Overall Quality Determination †			Unacceptable		4	Metric Mean Score: 2.0.
Metric 7: Metadata Completeness Overall Quality Determination [†]			Low Unacceptable	× 1	3	No discussion Metric Mean Score: 2.0.

* MWF = Metric Weighting Factor
| Source Citation:
Type of Data Source
Hero ID | 2017. Pollution prevention search results, envirofacts database.
Releases to the Environment; Environmental Release Data;
3860453 | | | | | | | |
|---|---|-----------------------------|------------------|------------|-------------------------|--|--|--|
| EXTRACTION | | | | | | | | |
| Parameter | | Data | | | | | | |
| Life Cycle Stage: | | | Disposal | | | | | |
| Life Cycle Descrip | otion (Subca | ategory of Use): | Hazardous Wa | ste Treat | ment a | nd Disposal | | |
| Annual Release Q | uantity (kg | /yr): | see release rate | es in repo | ort | | | |
| Number of Sites: | | | 1.0 | | | | | |
| | | | | | | | | |
| EVALUATION | | | D. I | | a | | | |
| Domain | | Metric | Rating | MWF'* | Score | Comments | | |
| Domain 1: Reliab | ility | | | | | | | |
| | Metric 1: | Methodology | Low | $\times 1$ | 3 | The release data methodology is not specified. | | |
| Domain 2: Bonro | contativo | | | | | | | |
| Domain 2. Repres | Metric 2 | Geographic Scope | High | × 1 | 1 | US | | |
| | Metric 3: | Applicability | High | $\times 2$ | 2 | in scope | | |
| | Metric 4: | Temporal Representativeness | High | $\times 2$ | 2 | 2008-present | | |
| | Metric 5: | Sample Size | Low | $\times 1$ | 3 | characterized by no statistics. | | |
| | | * | | | | v | | |
| Domain 3: Access | sibility/Clar | ity | | | | | | |
| | Metric 6: | Metadata Completeness | Unacceptable | $\times 1$ | 4 | has no release media or other information | | |
| | | | | | | | | |
| Domain 4: Variability and Uncertainty | | т | 1 | 9 | | | | |
| | Metric <i>i</i> : | Metadata Completeness | Low | × 1 | 3 | No discussion | | |
| Overall Quality Determination ^{\dagger} | | Unacceptable | | 4 | Metric Mean Score: 2.0. | | | |

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453										
EXTRACTION											
Parameter			Data								
Life Cycle Stage:			Use	Use							
Life Cycle Descrip	otion (Subca	ategory of Use):	Battery Manuf	acturing							
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	rt						
Number of Sites:			1.0								
EVALUATION											
Domain		Metric	Rating	MWF*	Score	Comments					
Domain 1: Beliah	ility										
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.					
D O D	, , .										
Domain 2: Repres	Matria 2.	Coorrentie Seene	Himb	× 1	1	110					
	Metric 2:	Applicability	High	× 1 × 2	1						
	Metric A :	Temporal Representativeness	High	$^{\land 2}$ $^{\lor 2}$	2	2008 present					
	Metric 5:	Sample Size	Low	× 1	2	characterized by no statistics					
	Meene 9.	Sumple Size	LOW	~ 1	0	characterized by no statistics.					
Domain 3: Access	sibility/Clar	ity									
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information					
D · (W · 1											
Domain 4: Variability and Uncertainty		т	1	9							
	Metric 7:	Metadata Completeness	LOW	× 1	ა	No discussion					
Overall Quality Determination [†]		Unacceptable		4	Metric Mean Score: 2.0.						

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION			Data					
Farameter		Data						
Life Cycle Stage:			Processing					
Life Cycle Descrip	ption (Subca	ategory of Use):	All Other Basi	c Organie	c Chemi	cal Manufacturing		
Annual Release G	uantity (kg	/yr):	see release rate	es in repo	ort			
Number of Sites:			1.0					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Beliah	ility							
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Domain 2: Repre	sentative							
Domain 2. Ropio	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
D : 9 4	1.11. (CI	•,						
Domain 3: Access	Metric 6:	Ity Metadata Completeness	Unaccentable	× 1	4	has no release modia or other information		
	WICUIC 0.	Metadata Completeness	Chacceptable	~ 1		has no release media of other mormation		
Domain 4: Variat	oility and U	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.0.		
			-					

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION								
Parameter		Data						
Life Cycle Stage:			Distribution					
Life Cycle Descrip	otion (Subca	ategory of Use):	Other Chemica	al and Al	lied Pro	oducts Merchant Wholesalers		
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	ort			
Number of Sites:			1.0					
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Domain 2: Bonro	contativo							
Domain 2. Repres	Metric 2	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information		
Domain 4. Variah	ility and U	acortainty						
Domain 4: Variat	Motric 7	Motadata Completeness	Low	~ 1	3	No disquesion		
	MEDIIC /.	metadata Completeness	LOW	^ 1	0	10 (150,05510)1		
Overall Quality Determination ^{\dagger}		Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Poll ¹ Releases to 3860453	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Annual Release Quantity (kg/yr): Number of Sites:			Use Semiconductor and Related Device Manufacturing see release rates in report 1.0						
EVALUATION		N	D		a				
Domain		Metric	Rating	MWF'*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	in scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present			
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information			
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion			
Overall Quality D	Determinatio	n [†]	Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Annual Release Quantity (kg/yr): Number of Sites:			Processing Pesticide and Other Agricultural Chemical Manufacturing see release rates in report 1.0					
EVALUATION					q			
Domain		Metric	Rating	MWF'*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information		
Domain 4: Variab	oility and U Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion		
Overall Quality Determination [†]		Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Annual Release Quantity (kg/yr): Number of Sites:			Processing Adhesive Manusee release rate 1.0	ufacturing es in repo	g ort			
EVALUATION					~	~		
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	× 1	3	The release data methodology is not specified.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information		
Domain 4: Variab	oility and U Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion		
Overall Quality Determination [†]		Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION Parameter			Data					
Life Cycle Stage:			Processing					
Life Cycle Descrip	otion (Subca	ategory of Use):	Other Miscellar	neous Ge	neral Pı	rpose Machinery Manufacturing		
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	ort			
Number of Sites:			1.0					
EVALUATION								
Domain		Matria	Dating	MWD*	Coore	Commente		
Domain		Metric	natilig	IVI VV F	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Domain 2. Ponno	antativa							
Domain 2. Repres	Metric 2.	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information		
Domain 4. Variah	ility and U	acortainty						
Domain 4: Variat	Metric 7.	Metadata Completeness	Low	× 1	3	No discussion		
	TALEUTIC 1.	metadata Completeness	LOW	^ 1	5	10 (150 (155))		
Overall Quality Determination ^{\dagger}		Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION								
Parameter		Data						
Life Cycle Stage:			Disposal					
Life Cycle Descrip	otion (Subca	ategory of Use):	All Other Misc	ellaneous	Waste	Management Services		
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	ort			
Number of Sites:			1.0					
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
			0					
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Domain 9. Donno								
Domain 2: Repres	Motria 2	Coographic Scope	High	\vee 1	1	IIC		
	Metric 3:	Applicability	High	$\times 1$ $\times 2$	1	US		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information		
Domain 4: Variab	ility and U	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion		
Overall Quality Determination ^{\dagger}		Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Annual Release Quantity (kg/yr): Number of Sites:			Use Motor Vehicle Seating and Interior Trim Manufacturing see release rates in report 1.0					
EVALUATION		N	D		a			
Domain		Metric	Rating	MWF'*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Domain 2: Repre	sentative							
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	× 1	4	has no release media or other information		
Domain 4: Variab	oility and Un Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion		
Overall Quality Determination [†]		Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descrip	otion (Subca	ategory of Use):	Fabric Coating	; Mills						
Annual Release G	uantity (kg	/yr):	see release rate	s in repo	ort					
Number of Sites:			1.0							
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Demein 1. Delieb	:1:									
Domain 1: Kenad	Metric 1:	Methodology	Low	× 1	3	The release data methodology is not specified.				
						0,				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	in scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present				
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.				
	1.11. (0)	•.								
Domain 3: Access	Sibility/Clar	Ity Mata lata Gammlatan an	TT	v 1	4					
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	has no release media or other information				
Domain 4. Variat	ulity and U	ocertainty								
Domain 4. Variat	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion				
	1.100110 1.		2011	// 1	5					
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.0.				

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION			Data					
Parameter			Data					
Life Cycle Stage:			Processing					
Life Cycle Descrip	otion (Subca	ategory of Use):	Unlaminated F	Plastics F	ilm and	Sheet (except Packaging) Manufacturing		
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	ort			
Number of Sites:			1.0					
Demain		Matria	Dating	MWD*	Coore	Commente		
Domain		Metric	nating	IVI VV F	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Domain 2: Repres	sentative		TT: 1					
	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Damain 9. Aaraa	:1::1::/Cl							
Domain 3: Access	Motric 6:	Motadata Completeness	Unaccontable	~ 1	4	has no release media or other information		
	Wietric 0.	Metadata Completeness	Unacceptable	~ 1	4	has no release media or other miormation		
Domain 4. Variah	vility and U	acertainty						
	Metric 7.	Metadata Completeness	Low	× 1	3	No discussion		
			2011	// 1	0			
Overall Quality Determination ^{\dagger}		Unacceptable		4	Metric Mean Score: 2.0.			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION			Data				
Farameter			Data				
Life Cycle Stage:			Processing				
Life Cycle Descrip	ption (Subca	ategory of Use):	Other Commu	nication	and Ene	ergy Wire Manufacturing	
Annual Release G	uantity (kg	/yr):	see release rate	es in repo	ort		
Number of Sites:			1.0				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Beliah	ility						
Domain 1. Itenae	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.	
Domain 2: Repre	sentative						
Domain 2. Ropio	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Demain 2. Access	:1::1::+ / <i>C</i> 1	•					
Domain 3: Access	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information	
		I					
Domain 4: Varial	oility and U	ncertainty					
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion	
Overall Quality I	Determinatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.0.	

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION			Data				
1 al allietel			Data				
Life Cycle Stage:			Use				
Life Cycle Descrip	ption (Subca	ategory of Use):	Other Electron	ic Compo	onent M	anufacturing	
Annual Release G	uantity (kg	/yr):	see release rate	es in repo	ort		
Number of Sites:			1.0				
EVALUATION							
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.	
Domain 2: Bopro	contativo						
Domain 2. Repres	Metric 2.	Geographic Scope	High	× 1	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information	
Domain 4. Variat	ility and U	agentainty					
Domain 4. variat	Motric 7	Motadata Completeness	Low	~ 1	3	No disquesion	
	metric 7:	metadata Completeness	LOW	~ 1	บ	INO UISCUSSIOII	
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.0.	

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION			_				
Parameter			Data				
Life Cycle Stage:			Processing				
Life Cycle Descrip	ption (Subca	ategory of Use):	Medicinal and	Botanica	l Manuf	acturing	
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	ort		
Number of Sites:			1.0				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 2: Agaag	sibility /Clan	:+					
Domain 5. Access	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information	
Domain 4: Variah	ility and U	acortainty					
Domain 4. Variat	Metric 7.	Metadata Completeness	Low	× 1	3	No discussion	
		Metadata Completeness	LOW	~ 1	0	10 (15:05:00)	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.0.	

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Poll ¹ Releases to 3860453	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Annual Release Quantity (kg/yr): Number of Sites:			Use Printing Ink Manufacturing see release rates in report 1.0					
EVALUATION		Matria	Dating	MMT	Coore	Commente		
Domain		Metric	Rating	IVI VV F ~	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion		
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.0.		

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Poll Releases to 3860453	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descri	otion (Subca	ategory of Use):	Ophthalmic Go	oods Man	ufactur	ing		
Annual Release G	uantity (kg	/yr):	see release rate	es in repo	ort			
Number of Sites:			1.0					
EVALUATION					~	~		
Domain		Metric	Rating	MWF'*	Score	Comments		
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.		
Domain 2: Benre	sentative							
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
		•.						
Domain 3: Access	sibility/Clar	ity Mata lata Gammalatan an	TT	v 1	4			
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	has no release media or other information		
Domain 4: Variat	oility and U	acertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion		
		L C						
Overall Quality D	Determinatio	n^\dagger	Unacceptable		4	Metric Mean Score: 2.0.		
- 0			*					

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION			Data				
Parameter			Data				
Life Cycle Stage:			Processing				
Life Cycle Descrip	otion (Subca	ategory of Use):	Polish and Oth	ner Sanita	ation Go	ood Manufacturing	
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	ort		
Number of Sites:			1.0				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.	
Domain 2: Bopros	contativo						
Domain 2. Repres	Metric 2.	Geographic Scope	High	× 1	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information	
Damain 4. V. 11	:1:41 TT						
Domain 4: Variat	Matria 7	Metadata Completeness	Low	× 1	9	NT 14 4	
	Metric 7:	Metadata Completeness	LOW	X 1	3	No discussion	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.0.	

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Processing				
Life Cycle Descrip	otion (Subca	ategory of Use):	Pharmaceutica	l Prepara	ation M	anufacturing	
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	ort		
Number of Sites:			1.0				
EVALUATION							
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.	
Domain 9. Ponno	antativa						
Domain 2. Repres	Metric 2	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
		Å				u u u u u u u u u u u u u u u u u u u	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information	
Domain 4: Variat	Metal 7	Metaleta Completences	Τ	1	9		
	Metric 7:	Metadata Completeness	LOW	× 1	3	No discussion	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.0.	

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Annual Release Quantity (kg/yr): Number of Sites:			Use Leather and Hide Tanning and Finishing see release rates in report 1.0				
EVALUATION		N			a		
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.	
Domain 2: Repres	sentative						
_	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information	
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.0.	

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION			Data				
			Data				
Life Cycle Stage:			Processing				
Life Cycle Descrip	otion (Subca	ategory of Use):	Urethane and	Other Fo	am Pro	duct (except Polystyrene) Manufacturing	
Annual Release Q	uantity (kg	/yr):	see release rate	es in repo	ort		
Number of Sites:			1.0				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1. Roliah	ilitar						
Domain 1. Renau	Metric 1:	Methodology	Low	$\times 1$	3	The release data methodology is not specified.	
Domain 2. Donno							
Domain 2. Repres	Motric 2	Coographic Scope	High	~ 1	1	IIQ	
	Metric 3:	Applicability	High	$\times 2$	2	us in scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008-present	
	Metric 5:	Sample Size	Low	× 1	3	characterized by no statistics.	
		Å				v v	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	has no release media or other information	
Domain 4: Variat	Metal 7	Metaleta Completences	Τ	v 1	9		
	Metric 7:	Metadata Completeness	LOW	× 1	3	No discussion	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.0.	

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Basf, 1998. N-methylpyrrolidone(NMP): Biodegradability. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982075						
EXTRACTION			_				
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source:		All All Information on the biodegradability of NMP and use of WWT to treat/					
Waste Treatment	Method:		WWTP		wastev		
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi-	
						dent.	
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	Medium	$\times 2$	4	Information is not related to a life cycle stage, but is broadly applicable	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1998	
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type	
Domain 2. Accord	ihiliter /Clam						
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	clearly documents its data sources, assessment methods, results, and assumptions	
Domain 4: Varial	vility and U	ncertainty					
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	limited discussion	
Overall Quality D	Determinatio	n^\dagger	Medium		2.0		

Source Citation:	Us, E. I Methyli	P. A 1989. SUMMAR PYBROLIDONE WITH COVE	Y ENGIN B LETTER	EERING	REP	ORT TEST RULES EXPOSURE ANALYSIS N- 9			
Type of Data Source Hero ID	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 4214135								
EXTRACTION									
Parameter			Data						
			р .						
Life Cycle Stage:			Processin Daint and	lg d acatime					
Dile Cycle Descrip	brion (Subce	ategory of Use):	Paint and Doint str	innora	remove	218			
Disposal /Treatm	ont Mothod		Sont to V	Ippers Vastewati	or troat	mont			
Belease or Emissi	on Factor		0.07 kg/s	ite-dav	ci ticati	ment			
Annual Belease O	mantity (kg	/vr)·	2500 - 37	70					
Release Days per	Year:	(91).	250.0	10					
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1. Daliah	:1:4								
Domain 1. Kenab	Metric 1:	Methodology	High	× 1	1	EPA			
		incenedaries,	8		-				
Domain 2: Repres	sentative								
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Manufacturing in scope			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989			
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 2. Access	ibility /Class	:+							
Domain 5: Access	Metric 6	Metadata Completeness	High	× 1	1	Data sources included			
	metric 0.	Metadata Completeness	Ingn	~ 1	1	Data sources included			
Domain 4: Variab	ility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Medium		1.8				

Source Citation:	LICM. 2020. Comment on docket no. EPA-HQ-OPPT-2019-0236, Toxic Substances Control Act (TSCA) draft risk evaluation for n-methylpyrrolidone (NMP).									
Type of Data Source Hero ID	Releases to 6592033	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 6592033								
EXTRACTION Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Description (Subcategory of Use):			Electronic	cs manufa	acturing	g - Lithium Ion Battery				
Release Source:			Electrode	drying p	process	and NMP recovery system.				
Disposal /Treatment Method: P2 Control & percent Efficiency:		NMP is recycled for reuse or taken by licensed haulers for off-site recycling. Exhaust from recovery systems may be collected and discharged to the municipal sewer in compliance with wastewater permit conditions (and may contain approximately 0.9 percent NMP). Some amount released to air. Manufacturers capture vapor driven off by the electrode drying process, condense the vapor, and either recover or dispose of the liquid. During the drying process, the NMP solvent is volatilized and the "oven air" can be captured and conveyed to an NMP recovery system, with up to approximately 12 percent immediately returned to the coating/drying								
			off site. Description of recovery system provided on pg. 17.							
EVALUATION										
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a trade association of manufacturers. No bias /errors evident				
Domain 2. Benres	sontativo									
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	in scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020				
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.				
Domain 3: Access	sibility/Clari	ty								
Continued on next page										

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Source Citation:	LICM. 202 for n-meth	LICM. 2020. Comment on docket no. EPA-HQ-OPPT-2019-0236, Toxic Substances Control Act (TSCA) draft risk evaluation for n-methylpyrrolidone (NMP).					
Type of Data Source	Releases to	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;					
Hero ID	6592033	3592033					
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP	
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion on uncertainty and variability	
Overall Quality Determination †		High		1.6			

Source Citation:	FUJIFILM CASRN 8'	a. 2020. FUJIFILM comments for docket ID $\#$ EPA-HQ-OPPT-2019-0236 for MP)					
Type of Data Source Hero ID	Releases to 6592030	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 6592030					
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Processin	o			
Life Cycle Descrit	otion (Subca	ategory of Use):	Formulati	s ion into s	olution	s for electronics industry	
Release Source:	(all				
Disposal /Treatm	ent Method	:	off-site re	cycling (s	solvent	recovery or fuel blending)	
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1. Deliah	:1:4						
Domain 1. Renad	Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	In scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020	
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type	
Domain 3. Access	ubility/Clar	ity					
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP	
Domain 4. Variah	vility and U	ncertainty					
Domain 4. Vallat	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty	
		The second se			-		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.4		
• 0			U				

* MWF = Metric Weighting Factor

Source Citation:IsaType of Data SourceReiHero ID398	acs, D. leases to 86801	2017. Comment submitted by D b the Environment; Reports for 1	avid Isaacs Data or Info	, Semicon ormation	nductor Other	Industry Association (SIA). than Exposure or Release Data;
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Disposal /Treatment Method: Release or Emission Factor: Release Estimation Method:			Use Electronics manufacturing - semiconductors spin coating off-site incineration In the spin coat process, between 1-7 percent of the deposited liquid remains on the wafer; the remainder is spun off the wafer with 1 percent remaining in the tool and removed during tool cleaning and the balance collected via solvent waste drain for off-site disposal OECD ESD			
EVALUATION Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability Me	etric 1:	Methodology	High	× 1	1	Information is from OECD, which is a trusted source
Domain 2: Representa Me Me Me	ative etric 2: etric 3: etric 4: etric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 2 2	OECD In scope 2020 Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative
Domain 3: Accessibili Me	ty/Clar etric 6:	ity Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP
Domain 4: Variability Me	and Ur etric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Some discussion on variability
Overall Quality Determination ^{\dagger}			High		1.3	
		Con	tinued on r	ext page		

		asa nom	provioa	Page	
Source Citation: Type of Data Source Hero ID	Isaacs, D. 2017. Comment submitted by David Isaacs, Semiconductor Industry Association (SIA). Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3986801				
EVALUATION					
Domain	Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments

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* MWF = Metric Weighting Factor

Source Citation:	Intel Corporation. 2020. Comments of Int Substances Control Act (TSCA) risk evaluat			e United -methylp	States yrrolide	Environmental Protection Agency on the draft Toxic one. EPA-HQ-OPPT-2019-0236-0064.
Type of Data Source Hero ID	Releases to 6592034	o the Environment; Environment	tal Release	Data;		
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Uso			
Life Cycle Descrir	tion (Subca	ategory of Use):	Electronic	cs manuf	acturing	⁹ - semiconductors
Release Source:	(Suber		All releas	es from 2	2 semico	onductor manufacturing sites
Disposal /Treatme	ent Method	:	On-site w	astewate	er treatn	nent then discharge to POTW
Environmental Me	edia:		water			
Release or Emission	on Factor:		the estim	ated con	centrati	ion of NMP from the combined Hillsboro and
Annual Release Quantity (kg/yr): P2 Control & percent Efficiency:		Aloha facilities to the receiving body of water would be reduced from 1,995 ug/l to 619 ug/l. Hillsboro facility (2015): 510,000 lbs/yr NMP released to POTW; Aloha facility (2015): 170,000 lbs/yr NMP released to POTW 92 percent of the NMP from the Hillsboro facility will be removed during onsite wastewater treatment system, and the remaining NMP from the Hillsboro facility will be reduced by another 92 percent at the POTW.				
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Release data is provided by the company; company expected to have accurate accounting of their releases. Reported releases include all water releases.
Domain 2: Repres	Matuic D	Communitie Soome	TT:l.		1	
	Metric 2:	Appliesbility	High Uigh	$\times 1$	1	
	Metric 3.	Tomporal Boprosontativonoss	High	$\times 2$ $\times 2$	2	In scope
	Metric 5:	Sample Size	Medium	$\times 2 \times 1$	$\frac{2}{2}$	Single data point or range provided. It is unclear if analysis on wastewater treatment efficiency is representative.
Domain 3: Access	ibility/Clar	ity				
Domain 5. Access	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Release data include release media but no other metadata.
		Con	tinued on r	next page	9	

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Source Citation:	Intel Corporation Substances Con	Intel Corporation. 2020. Comments of Intel to the United States Environmental Protection Agency on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone. EPA-HQ-OPPT-2019-0236-0064.					
Type of Data Source Hero ID	Releases to the 6592034	Releases to the Environment; Environmental Release Data;					
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 4: Varial	bility and Uncerta Metric 7: Met	ainty tadata Completeness	Low	× 1	3	The release data study does not address variability or uncer- tainty.	
Overall Quality I	$\operatorname{Determination}^\dagger$		High		1.6		

* MWF = Metric Weighting Factor

Source Citation:	National Electrical Manufacturers Association. 2020. NMP use in magnet wire. EPA-HQ-OPPT-2019-0236-0047.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	6592028

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Electronics - magnet wires
Release Source:	Emissions consist of evaporation from the NMP bath and from the
	cleaned parts removed from the bath. Some NMP vapors may be emit-
	ted, for example, during equipment cleaning.
Disposal /Treatment Method:	Any vapor emitted during application moves directly into the curing oven wherein at least 90 percent of the NMP combusts3. Depending on the type of oven, operating temperatures range from 800 1400F degrees.
Environmental Media:	Almost all operating lines now have an incinerator. Any liquid waste NMP and/or solid waste wet with NMP (paper, plastic, rags, etc.) are handled in compliance with the Resource Conservation and Recovery Act (RCRA).

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Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident
Domain 2: Representative					
Metric 2:	Geographic Scope	High	$\times 1$	1	US
Metric 3:	Applicability	High	$\times 2$	2	In scope
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020
Metric 5:	Sample Size	Medium	$\times 1$	2	Incineration efficiency is provided as a single value with uncer- tain statistics. It is unclear if analysis is representative
Domain 3: Accessibility/Cla	ity				
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Data source for the estimate of NMP destruction is not fully transparent.
Domain 4: Variability and U	ncertainty				
	Cor	tinued on r	ext nage	<u>،</u>	

					1 0			
Source Citation: Type of Data Source Hero ID	National E Releases to 6592028	National Electrical Manufacturers Association. 2020. NMP use in magnet wire. EPA-HQ-OPPT-2019-0236-0047. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 6592028						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The release data study does not address variability or uncer- tainty.		
Overall Quality Determination ^{\dagger}		High		1.6				

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Occupational Exposure

Source Citation:	Nishimura, S., Yasui, H., Miyauchi, H., Kikuchi, Y., Kondo, N., Takebayashi, T., Tanaka, S., Mikoshiba, Y., Omae, K., Nomiyama,
	T 2009. A cross-sectional observation of effect of exposure to N-methyl-2-pyrrolidone (NMP) on workers' health. Industrial Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	735269

EXTRACTION								
Parameter		Data						
Life Cycle Stage:		Uso						
Life Cycle Description (Subcategory of Use).		cleaning of instruments						
Physical Form:		vapor						
Physical Form. Bouto of Exposure:		Inhalation						
Exposure Concentration (Unit):		0.14-0.26 ppm (mean): 0.8 ppm (max)						
Number of Samples:		70 0						
Number of Sites:		1.0						
Type of Measurement or Met	hod:	full-shift						
Worker Activity:		all activities during a day						
Number of Workers:		14						
Type of Sampling:		personal						
Exposure Duration:	Exposure Duration:		$\overline{8}$ hrs					
Exposure Frequency:		5 days/wk						
PPE:	PPE:		None of the NMP-exposed workers wore any protective respiratory					
		devices of	r clothin	g. All	wore disposable, thin protective gloves			
		made of polyethylene						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1. Beliability								
Metric 1:	Methodology	High	$\times 1$	1	Methodology is explained and seems legitimate			
		8						
Domain 2: Representative								
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan			
Metric 3:	Applicability	High	$\times 2$	2	Cleaning is included in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2009			
Metric 5:	Sample Size	High	$\times 1$	1	Statistical distribution of samples is fully characterized.			

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Source Citation: Type of Data Source Hero ID	Nishimura, S., Yasui, H., Miyauchi, H., Kikuchi, Y., Kondo, N., Takebayashi, T., Tanaka, S., Mikoshiba, Y., Omae, K., Nomiyama, T 2009. A cross-sectional observation of effect of exposure to N-methyl-2-pyrrolidone (NMP) on workers' health. Industrial Health. Occupational Exposure; Monitoring Data; 735260					
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Lacks worker actitities and whether its TWA
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	High		1.2	

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* MWF = Metric Weighting Factor

Source Citation:	Haufroid, V., Jaeger, V. K., Jeggli, S., Eisenegger, R., Bernard, A., Friedli, D., Lison, D., Hotz, P 2014. Biological monitoring and health effects of low-level exposure to N-methyl-2-pyrrolidone: a cross-sectional study. International Archives of Occupational and Environmental Health.									
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 2654929									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Description (Subcategory of Use):		graffiti removal or through other uses of NMP								
Physical Form:		vapor								
Route of Exposure:		Inhalation								
Exposure Concent	tration (Uni	t):	0.18 (mean), 0.89 (75th), 2.77 (90th), and 25.83 (Max) mg/m3							
Number of Sampl	es:		91.0							
Number of Sites:			21.0							
Type of Measuren	nent or Met	hod:	full-shift							
Worker Activity:			graffiti removal or other activities associated with the life cycle							
Number of Workers:		91								
Type of Sampling	:		personal							
Exposure Duratio	Exposure Duration:		310525 min							
Exposure Frequen	requency:		varies							
PPE:			Suitable masks, butyl or latex gloves							
EVALUATION										
Domain		Metric	Rating	MWF^*	Score	Comments				
Domain 1: Boliah	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Airborne NMP was determined according to the NIOSH method.				
Domain 2: Benres	sentative									
Domain 2. Ropro.	Metric 2:	Geographic Scope	Low	× 1	3	Multiple European Countries				
	Metric 3:	Applicability	High	$\times 2$	2	All described conditions of use are in scope				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006-2011				
	Metric 5:	Sample Size	High	$\times 1$	1	Statistical distribution of samples is fully characterized.				
Domain 3: Accessibility/Clarity										
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Source Citation:	Haufroid, health effe and Enviro	Haufroid, V.,Jaeger, V. K.,Jeggli, S.,Eisenegger, R.,Bernard, A.,Friedli, D.,Lison, D.,Hotz, P. 2014. Biological monitoring and health effects of low-level exposure to N-methyl-2-pyrrolidone: a cross-sectional study. International Archives of Occupational and Environmental Health.								
Type of Data Source	Occupation	Occupational Exposure; Monitoring Data;								
Hero ID	2654929									
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks worker activities and whether its TWA				
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results				
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	High		1.6					

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Source Citation: Type of Data Source	Solomon, G. M., Morse, E. P., Garbo, M. J., Milton, D. K 1996. Stillbirth after occupational exposure to N- methyl-2-pyrrolidone: A case report and review of the literature. Journal of Occupational and Environmental Medicine. Occupational Exposure; Monitoring Data;									
Hero ID	3043623									
EXTRACTION Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descrip	otion (Subca	tegory of Use):	Laborator	ry						
Physical Form:			vapor							
Route of Exposure	e:		Inhalation	n						
Exposure Concent	tration (Uni	t):	0.2 mg/m	13						
Type of Measuren	nent or Met	hod:	2-hour sh	ort term						
Number of Worke	rs:		15	,						
Type of Sampling	:		personal a	and area	,	1				
Exposure Duratio	n:		Average of 42 hours each week							
Exposure Frequen	Exposure Frequency:			J-4 uays/wk LEV over the spectrophotometers, but there was no LEV over the coup						
Engineering Conti	roi & percer	it Exposure Reduction:	LEV Over	the spec	tropnot	one ters, but there was no LEV over the coun-				
DDF.			half face	i which t	ing room	pirator, cost, sofety goggles, and latey gloves				
1112.			nan-iace a	an-purny	ing resp	pliator, coat, salety goggies, and latex gloves				
EVALUATION										
EVALUATION				MINT:+	G	C				
Domain		Metric	Rating	MWF'^	Score	Comments				
Damain 1. Dallah	:1:									
Domain 1: Kenab	Motrie 1.	Mathadalagy	Low	\vee 1	2	Compliant on analytical methodology is not an asifad				
	Methe 1.	Methodology	LOW	~ 1	5	Sampling or analytical methodology is not specified				
Domain 2. Bepres	sentative									
Domain 2. Ropro.	Metric 2:	Geographic Scope	High	× 1	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	This use is in scope				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1996 - more than 20 years old				
	Metric 5:	Sample Size	Low	$\times 1$	3	Distribution not characterized				
		*								
Domain 3: Access	ibility/Clar	ity								
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks worker activities and whether its TWA				
Domain 4: Variab	ility and Ur	ncertainty								
	Continued on next page									

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Source Citation: Type of Data Source	Solomon, pyrrolidon Occupation	Solomon, G. M.,Morse, E. P.,Garbo, M. J.,Milton, D. K. 1996. Stillbirth after occupational exposure to N-methyl-2- pyrrolidone: A case report and review of the literature. Journal of Occupational and Environmental Medicine. Occupational Exposure; Monitoring Data;								
Hero ID	3043623	3043623								
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
	Metric 7:	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results				
	1	0								

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Source Citation:	Belanger, P. L., Coye, M. J., 1983. Health Hazard Evaluation Report No. HETA-79-129-1350, San Francisco Newspaper Agency, San Francisco, California.									
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 3101190									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descrip	Life Cycle Description (Subcategory of Use):									
Physical Form:			particulat	e						
Route of Exposur	e:		Inhalation	1						
Exposure Concen	tration (Uni	t):	0.12 - 3.2	9 mg/m						
Number of Sampl	les:		43.0							
Number of Sites:			1.0							
Type of Measurer	ment or Met	hod:	full-shift	ГWA						
Type of Sampling	r:		personal	_						
Exposure Duratio	Exposure Duration:				5.17 - 7.92 hours					
EVALUATION										
Domain		Metric	Rating	MWF^*	Score	Comments				
Domain 1: Reliat	oility									
	Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method				
Domain 2: Repre	sentative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
			N 1.	~ 2	4	in scope, but data is not NMP-specific (i.e., surrogate data)				
	Metric 3:	Applicability	Medium	X 4	1	in beope, but data is not thin specific (i.e., bullogate data)				
	Metric 3: Metric 4:	Applicability Temporal Representativeness	Low	$\times 2 \times 2$	6	1983				
	Metric 3: Metric 4: Metric 5:	Applicability Temporal Representativeness Sample Size	Medium Low High	$\begin{array}{c} \times 2 \\ \times 2 \\ \times 1 \end{array}$	6 1	1983 Fully characterized				
Domain 3: Access	Metric 3: Metric 4: Metric 5:	Applicability Temporal Representativeness Sample Size	Medium Low High	$\begin{array}{c} \times 2 \\ \times 2 \\ \times 1 \end{array}$	6 1	1983 Fully characterized				
Domain 3: Access	Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6:	Applicability Temporal Representativeness Sample Size ity Metadata Completeness	Medium Low High High	$\begin{array}{c} \times 2 \\ \times 2 \\ \times 1 \end{array}$	6 1 1	Fully characterized				
Domain 3: Access Domain 4: Variat	Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6: bility and U	Applicability Temporal Representativeness Sample Size ity Metadata Completeness neertainty	Medium Low High High	× 2 × 2 × 1 × 1	6 1 1	Fully characterized				
Domain 3: Access Domain 4: Varial	Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6: pility and Un Metric 7:	Applicability Temporal Representativeness Sample Size ity Metadata Completeness neertainty Metadata Completeness	Medium Low High High	$\begin{array}{c} \times 2 \\ \times 2 \\ \times 1 \end{array}$ $\times 1$ $\times 1$	6 1 1 2	In scepe, but data is not thin specific (ne., burlogate data) 1983 Fully characterized Some discussion				
Domain 3: Access Domain 4: Varial	Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6: bility and Un Metric 7:	Applicability Temporal Representativeness Sample Size ity Metadata Completeness neertainty Metadata Completeness	Medium Low High High Medium	$\begin{array}{c} \times 2 \\ \times 2 \\ \times 1 \end{array}$ $\times 1$ $\times 1$	6 1 1 2	In scepe, but data is not thin specific (ne., surrogate data) 1983 Fully characterized Some discussion				

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Source Citation:	Belanger, P. L.,Coye, M. J., 1983. He Agency, San Francisco, California.	ealth Hazard I	Evaluatio	n Report No.	HETA-79-129-1350, San Francisco Newspaper			
Type of Data Source	Occupational Exposure; Monitoring Dat	ta;						
Hero ID	3101190							
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Overall Quality D	$\operatorname{etermination}^\dagger$	Medium		1.8				

Source Citation:	Belanger,	P. L.,Coye, M. J., 1983. Healt	th Hazard	Evaluatio	n Repo	rt No. HETA-79-129-1350, San Francisco Newspaper				
Type of Data Source Hero ID	Occupation 3101190	nal Exposure; Monitoring Data;								
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descrip	otion (Subca	ategory of Use):	Printing							
Physical Form:			particulat	e						
Route of Exposur	e:		Inhalation	1						
Exposure Concen	tration (Uni	t):	0.27 - 0.6	8 mg/m						
Number of Sampl	es:		5.0							
Number of Sites:			1.0							
Type of Measurer	ment or Met	hod:	partial sh	ift						
Type of Sampling			personal							
Exposure Duration	Exposure Duration:				3.33 - 3.58 hours					
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1. Reliab	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method				
Domain 2: Repre	sentative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 2: Metric 3:	Geographic Scope Applicability	High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \end{array}$	$\frac{1}{4}$	US in scope, but data is not NMP-specific (i.e., surrogate data)				
	Metric 2: Metric 3: Metric 4:	Geographic Scope Applicability Temporal Representativeness	High Medium Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$egin{array}{c} 1 \\ 4 \\ 6 \end{array}$	US in scope, but data is not NMP-specific (i.e., surrogate data) 1983				
	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High Medium Low High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c}1\\4\\6\\1\end{array}$	US in scope, but data is not NMP-specific (i.e., surrogate data) 1983 Fully characterized				
 Domain 3: Access	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High Medium Low High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c}1\\4\\6\\1\end{array}$	US in scope, but data is not NMP-specific (i.e., surrogate data) 1983 Fully characterized				
Domain 3: Access	Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6:	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High Medium Low High High	$\begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$	$ \begin{array}{c} 1 \\ 4 \\ 6 \\ 1 \\ 1 \end{array} $	US in scope, but data is not NMP-specific (i.e., surrogate data) 1983 Fully characterized Fully characterized				
Domain 3: Access Domain 4: Variat	Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6: pility and U	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High Medium Low High High	$\begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$ $\times 1$	$ \begin{array}{c} 1 \\ 4 \\ 6 \\ 1 \\ 1 \end{array} $	US in scope, but data is not NMP-specific (i.e., surrogate data) 1983 Fully characterized Fully characterized				
Domain 3: Access Domain 4: Variab	Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6: pility and Un Metric 7:	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness neertainty Metadata Completeness	High Medium Low High High	$ \begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $ $ \times 1 $	$ \begin{array}{c} 1 \\ 4 \\ 6 \\ 1 \\ 1 \\ 2 \end{array} $	US in scope, but data is not NMP-specific (i.e., surrogate data) 1983 Fully characterized Fully characterized				
Domain 3: Access Domain 4: Variab	Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6: pility and Un Metric 7:	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness neertainty Metadata Completeness	High Medium Low High High Medium	$ \begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} \\ \times 1 \\ \times 1 \end{array} $	$ \begin{array}{c} 1 \\ 4 \\ 6 \\ 1 \\ 1 \\ 2 \end{array} $	US in scope, but data is not NMP-specific (i.e., surrogate data) 1983 Fully characterized Fully characterized Some discussion				
Domain 3: Access Domain 4: Variab	Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6: bility and Un Metric 7:	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness neertainty Metadata Completeness	High Medium Low High High Medium	$ \begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} \\ \times 1 \\ \end{array} $	1 4 6 1 1 2	US in scope, but data is not NMP-specific (i.e., surrogate data) 1983 Fully characterized Fully characterized Some discussion				

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Source Citation:	Belanger, P. L.,Coye, M. J., 1983. He Agency, San Francisco, California.	ealth Hazard I	Evaluatio	n Report No.	HETA-79-129-1350, San Francisco Newspaper			
Type of Data Source	Occupational Exposure; Monitoring Dat	ta;						
Hero ID	3101190							
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Overall Quality D	$\operatorname{etermination}^\dagger$	Medium		1.8				

Source Citation:	Bader, M., Rosenberger, W., Rebe, T., Keener, S. A., Brock, T. H., Hemmerling, H. J., Wrbitzky, R 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health.								
Type of Data Source Hero ID	Occupation 3539720	nal Exposure; Monitoring Data;							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrir	tion (Subca	ategory of Use):	cleaning of	of optical	and me	etal parts			
Physical Form:		logory of ese,	vapor	or opered.	and m	Part of			
Route of Exposure	e:		Inhalatio	n					
Exposure Concent	ration (Uni	t):	average =	= 2 mg/n	n3; max	= 2.8 mg/m3			
Number of Sites:	×	,	2.0	0,		2,			
Type of Measuren	nent or Met	hod:	12-hr TW	VΑ					
Worker Activity:			cleaning o	of optical	and me	etal parts			
Number of Worke	12	12							
Type of Sampling	:		personal						
Exposure Duration	n:		12 hr						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Damain 1. Daliah	:1:4								
Domain 1: Reliad	Metric 1:	Methodology	High	× 1	1	Well described methods			
			0						
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan			
	Metric 3:	Applicability	High	$\times 2$	2	This use is in scope			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000			
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3. Access	ibility/Clar	itv							
Domain 5. Access	Metric 6	Metadata Completeness	Medium	× 1	2	Lacks certain metadata			
			mount	<u> </u>	-				
Domain 4: Variab	ility and U	ncertainty							
		Con	tinued on r	next page) 				

- continued from previous page									
Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health.								
Type of Data Source Hero ID	Occupation 3539720	Occupational Exposure; Monitoring Data; 3539720							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty.			
Overall Quality Determination [†] Medium 1.8									

Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of								
Turna of Data Courses	Occupation	nal and Environmental Health.							
Hero ID	3539720	nai Exposure; Monitoring Data;							
	0000120								
EXTRACTION			Data						
1 al allietei			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	otion (Subca	ategory of Use):	graffiti re	moval					
Physical Form:	,	/	vapor						
Route of Exposure	e:		Inhalation	n					
Exposure Concent	tration (Uni	t):	ranged be	etween 0.0	03 and 4	4.52 mg/m3; mean - 1.01 (+ or - 0.89) mg/m3;			
			peak = 2	4.6 mg/m	n3				
Type of Measurement or Method:			8-hr TWA	A; short-t	term pea	ak			
Type of Sampling:			personal						
Exposure Duratio	osure Duration: 8 h								
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	Well described methods			
Domain 2. Donne	ontotivo								
Domain 2. Repres	Metric 2.	Geographic Scope	Medium	× 1	2	Sweden			
	Metric 3:	Applicability	Medium	$\times 2$	4	Similar to an occupational scenario within the scope of the risk			
		rippilouoliity	mourum	~ -	1	evaluation			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1993-2001			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3. Access	ibility/Clar	ity							
Domain 9. Meeess	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks certain metadata			
		I I I I I I I I I I I I I I I I I I I							
Domain 4: Variab	ility and U	ncertainty							
		Cor	tinued on 1	next page	e				

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Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health.								
Type of Data Source Hero ID	Occupation 3539720	Occupational Exposure; Monitoring Data; 3539720							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty.			
Overall Quality Determination [†] Medium 2.2									

Source Citation: Type of Data Source	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health. Occupational Exposure; Monitoring Data; 3539720								
nero ID	5559720								
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Sites: Worker Activity: Number of Workers: Type of Sampling: PPE:			Processing adhesive formulation vapor Inhalation average = 3.0 mg/m3 1.0 production area 7 area cotton working clothes, butyl rubber gloves during the cleaning process and safety eyeglasses						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	Well described methods			
Domain 2: Repres	Motria 2.	Coographic Scope	Modium	~ 1	9	Commons			
	Metric 2.	Applicability	High	$\times 1$ $\times 2$	2	Germany This use is in scope			
	Metric 4:	Temporal Representativeness	Medium	$\times 2 \times 2$	4	2006			
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
		•,							
Domain 3: Access	1011ity/Clar	Notadata Completeness	Modium	~ 1	9	Ladra contain matadata			
	METIC 0:	metadata Completelless	meanni	~ 1	2	Lacks certain metadata			
Domain 4: Variab	ility and U	ncertainty							
		Con	tinued on r	next page	9				

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Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R. 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health.						
Type of Data Source Hero ID	Occupation 3539720	nal Exposure; Monitoring Data	;				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
	Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results	
Overall Quality I	Determination	n†	High		1.6		

Source Citation: Type of Data Source Hero ID	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health. Occupational Exposure; Monitoring Data; 3539720						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Type of Sampling:			Processing adhesive formulation vapor Inhalation average = 10.7 to 18.0 mg/m3 8hr TWA manual vessel and fittings cleaning personal				
EVALUATION		N	5.1		a		
Domain		Metric	Rating	MWF'*	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	Well described methods	
Domain 2: Repres	entative			1	0		
	Metric 2:	Geographic Scope	Medium	× 1	2	Germany	
	Metric 3:	Transport Description	High Madiana	× Z	2	This use is in scope	
	Metric 4: Motrie 5:	Somple Size	Medium	$\times 2$ $\times 1$	4	2006 Distribution of complexity descent of a labor second state of the second state of	
	metric 5.	Sample Size	meann	× 1	2	Listribution of samples is characterized by a range with uncer- tain statistics.	
Domain 3: Access	ibility/Clar	ity		1	0		
	Metric 6:	Metadata Completeness	Medium	× 1	2	Lacks certain metadata	
Domain 4. Variab	ility and U	ncertainty					
Domain 4. Variab	Metric 7:	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results	
			8	/、 1	+		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.6		
Continued on next page							

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Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health.
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 3539720
EVALUATION	
Domain	Metric Rating MWF^{\star} Score Comments

Source Citation:	Bader, M., Rosenberger, W., Rebe, T., Keener, S. A., Brock, T. H., Hemmerling, H. J., Wrbitzky, R. 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of								
	Occupational and Environmental Health.								
Type of Data Source	Occupational Exposure; Monitoring Data;								
Hero ID	3539720								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Processin	g					
Life Cycle Descript	ion (Subca	tegory of Use):	adhesive	o formulati	on				
Physical Form:	,	,	vapor						
Route of Exposure:			Inhalation	n					
Exposure Concentry	ation (Uni	t):	0.2 mg/m	13					
Number of Samples	3:		1.0						
Type of Measureme	ent or Met	hod:	8hr TWA						
Worker Activity:			bottling a	and shipp	oing dep	artment			
Type of Sampling:			area						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1. Boliabili	ity								
	Metric 1:	Methodology	High	$\times 1$	1	Well described methods			
Domain 2: Represe	ntative								
Domani 1 , 100prose	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany			
	Metric 3:	Applicability	High	$\times 2$	2	This use is in scope			
]	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006			
1	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessit	vility/Clari								
Domain J. Accessic	Metric 6	Metadata Completeness	Medium	× 1	2	Lacks certain metadata			
			mouraili	/\ ±	-				
Domain 4: Variabil	ity and Ur	ncertainty							
1	Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results			
		-	-						
		Con	tinued on a	lext nam	<u>`</u>				

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Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Keer toring and biomonitoring of workers expo Occupational and Environmental Health.	ner, S. A.,E sed to N-m	Brock, T ethyl-2-p	. H.,Hen oyrrolido	nmerling, H. J., Wrbitzky, R 2006. Ambient moni- ne in an industrial facility. International Archives of
Type of Data Source	Occupational Exposure; Monitoring Data;				
Hero ID	3539720				
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Overall Quality I	$\operatorname{Petermination}^\dagger$	High		1.6	

Source Citation: I	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R. 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of								
(Type of Data Source	Occupational and Environmental Health. Occupational Exposure; Monitoring Data;								
Hero ID 3	3539720								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Processin	g					
Life Cycle Descripti	ion (Subca	tegory of Use):	adhesive	o formulati	on				
Physical Form:	,	,	vapor						
Route of Exposure:			Inhalation	n					
Exposure Concentra	ation (Uni	t):	0.9 to 2.8	mg/m3					
Number of Samples	:		3.0						
Type of Measureme	ent or Met	hod:	8hr TWA						
Worker Activity:			Bottling/	shipping	worker				
Type of Sampling:			personal						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Boliabili	+x7								
	Metric 1:	Methodology	High	$\times 1$	1	Well described methods			
Domain 2: Represe	ntative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany			
1	Metric 3:	Applicability	High	$\times 2$	2	This use is in scope			
1	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006			
1	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessib	oility/Clari	ty							
l	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks certain metadata			
Domain 4. Verishili	ity and Ur	cortainty							
Domain 4. vanabin	Metric 7.	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results			
		include completeness		/\ 1	1	Discussion on variability and uncertainty of results			
		Con	tinued on r	lext nage	<u>,</u>				

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Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Keer toring and biomonitoring of workers expo Occupational and Environmental Health.	ner, S. A.,E sed to N-m	Brock, T ethyl-2-p	. H.,Hen oyrrolido	nmerling, H. J., Wrbitzky, R 2006. Ambient moni- ne in an industrial facility. International Archives of
Type of Data Source	Occupational Exposure; Monitoring Data;				
Hero ID	3539720				
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Overall Quality I	$\operatorname{Petermination}^\dagger$	High		1.6	

Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of								
Type of Data Source Hero ID	Occupational and Environmental Health. Occupational Exposure; Monitoring Data; 3539720								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Processin	g					
Life Cycle Descrip	tion (Subca	ategory of Use):	adhesive	formulati	ion				
Physical Form:			vapor						
Route of Exposure	:		Inhalation	n					
Exposure Concent	ration (Uni	t):	2.3 mg/m	13					
Number of Sample	es:		1.0						
Type of Measurem	ent or Met	hod:	8hr TWA	L					
Worker Activity:			Bottling/	shipping	- Maint	senance and cleaning			
Type of Sampling:			personal						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Baliabi	lity								
	Metric 1:	Methodology	High	$\times 1$	1	Well described methods			
Domain 2: Repres	entative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany			
	Metric 3:	Applicability	High	$\times 2$	2	This use is in scope			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessi	hility/Clar	ity							
Domain 5. Accessi	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks certain metadata			
	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1								
Domain 4: Variabi	Inty and Ur	Matadata Completences	II: ml-	V 1	1				
	Metric <i>i</i> :	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results			
		Cor	tinued on 1	next page	е				

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Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Ke toring and biomonitoring of workers exp Occupational and Environmental Health	eener, S. A., posed to N-n	Brock, T nethyl-2-p	. H.,Hen oyrrolido	nmerling, H. J., Wrbitzky, R 2006. Ambient moni- ne in an industrial facility. International Archives of
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data 3539720	a;			
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	High		1.6	

Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R. 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health.						
Type of Data Source Hero ID	Occupation 3539720	nal Exposure; Monitoring Data;					
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Processin	Q			
Life Cycle Descrip	tion (Subca	ategory of Use):	adhesive	formulati	ion		
Physical Form:			vapor				
Route of Exposure):		Inhalation	n			
Exposure Concent	ration (Uni	t):	5.9 mg/m	13			
Number of Sample	es:		1.0				
Type of Measurem	ent or Met	hod:	short-terr	n peak			
Worker Activity:			Bottling/	shipping	- Maint	cenance and cleaning	
Type of Sampling:	· ·		personal				
Exposure Duration	1:		42 mms				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliabi	lity						
	Metric 1:	Methodology	High	$\times 1$	1	Well described methods	
Domain 2. Panna	ontativo						
Domain 2. Repres	Motric 2	Geographic Scope	Modium	~ 1	2	Cormony	
	Metric 3.	Applicability	High	$^{\wedge 1}$ $\times 2$	2	This use is in scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006	
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.	
Domain 3: Accord	bility/Clar	i+.,					
Domain 5. Accessi	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks certain metadata	
		T T T T T T T T T T T T T T T T T T T					
Domain 4: Variabi	ility and U	ncertainty					
	Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results	
Continued on next page							

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Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,K toring and biomonitoring of workers ex Occupational and Environmental Health	Keener, S. A., cposed to N-n h.	Brock, T nethyl-2-p	. H.,Hen oyrrolido	nmerling, H. J., Wrbitzky, R 2006. Ambient moni- ne in an industrial facility. International Archives of
Type of Data Source	Occupational Exposure; Monitoring Da	ta;			
Hero ID	3539720	,			
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Overall Quality I	$\operatorname{Determination}^\dagger$	High		1.6	

ntinued from provid

Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R. 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of							
Type of Data Source Hero ID	Occupational and Environmental Health. Occupational Exposure; Monitoring Data; 3539720							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Processin	g				
Life Cycle Descript	ion (Subca	ategory of Use):	adhesive	formulati	on			
Physical Form:		,	vapor					
Route of Exposure:			Inhalation	n				
Exposure Concentr	ation (Uni	t):	3.4 to 6.6	mg/m3				
Number of Samples	5:		2.0					
Type of Measureme	ent or Met	hod:	8hr TWA					
Worker Activity:			productio	n - stirre	r cleani	ng		
Type of Sampling:			personal					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Boliabil	ity							
Domain 1. Renabir	Metric 1:	Methodology	High	$\times 1$	1	Well described methods		
Domain 2: Represe	ntative							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany		
	Metric 3:	Applicability	High	$\times 2$	2	This use is in scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 3. Accessit	oility/Clari	ty						
Domain 0. Necessi	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks certain metadata		
Domain 4. Variabil	ity and Ur	acortainty						
Domain 4. variabil	Metric 7.	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results		
		mondata completeness	111911	~ 1	T	Discussion on variability and uncertainty of results		
		Con	tinued on a	next nage				

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Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Keer toring and biomonitoring of workers expo Occupational and Environmental Health.	ner, S. A.,E sed to N-m	Brock, T ethyl-2-p	. H.,Hen oyrrolido	nmerling, H. J., Wrbitzky, R 2006. Ambient moni- ne in an industrial facility. International Archives of
Type of Data Source	Occupational Exposure; Monitoring Data;				
Hero ID	3539720				
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Overall Quality I	$\operatorname{Petermination}^\dagger$	High		1.6	

Source Citation: Type of Data Source	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health. Occupational Exposure; Monitoring Data;						
Hero ID	3539720						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Descrip Physical Form: Route of Exposure Exposure Concent Number of Sample Type of Measuren Worker Activity: Type of Sampling Exposure Duration	otion (Subca e: cration (Uni es: nent or Met : n:	ategory of Use): it): hod:	Processin adhesive vapor Inhalation 18.7 mg/r 1.0 short-tern production personal 19	g formulati m3 n peak n - stirre	ion er cleani	ng	
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	Well described methods	
Domain 2. Poppor	ontotivo						
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	× 1	2	Germany	
	Metric 3:	Applicability	High	$\times 2$	2	This use is in scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006	
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.	
Domain 3. Access	ibility/Clar	ity					
Domain 9. Recess	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks certain metadata	
Demain 4. V. 1	:1:41 TT						
Domain 4: Variab	Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results	
		Con	tinued on a	next nage	2	v	
		Con		icht page			

	- contin	nued from	previous	page	
Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Ke toring and biomonitoring of workers exp Occupational and Environmental Health.	eener, S. A., posed to N-n	Brock, T nethyl-2-p	H.,Hen yrrolido	nmerling, H. J., Wrbitzky, R 2006. Ambient moni- ne in an industrial facility. International Archives of
Type of Data Source	Occupational Exposure; Monitoring Data	a;			
Hero ID	3539720				
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	High		1.6	

Source Citation:	Bader, M. toring and	Rosenberger, W.,Rebe, T.,Kee biomonitoring of workers expo	ner, S. A., sed to N-m	Brock, T nethyl-2-p	. H.,He oyrrolide	mmerling, H. J., Wrbitzky, R 2006. Ambient moni- one in an industrial facility. International Archives of		
Type of Data Source Hero ID	Occupational and Environmental Health. Occupational Exposure; Monitoring Data; 3539720							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Processin	g				
Life Cycle Descript	ion (Subca	tegory of Use):	adhesive	formulati	on			
Physical Form:	,	/	vapor					
Route of Exposure:			Inhalation	n				
Exposure Concentry	ation (Uni	t):	15.5 mg/s	m3				
Number of Samples	:		1.0					
Type of Measureme	ent or Met	hod:	8hr TWA					
Worker Activity:			productio	on - vesse	l cleanii	ng		
Type of Sampling:	Type of Sampling:							
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1. Beliabili	ity							
	Metric 1:	Methodology	High	$\times 1$	1	Well described methods		
Domain 2: Represe	ntative							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany		
]	Metric 3:	Applicability	High	$\times 2$	2	This use is in scope		
]	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006		
1	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 3: Accessit	oility/Clari	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks certain metadata		
Domain 4 Variabil	ity and Ur	ncertainty						
	Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results		
		Com	tinued on .	lovt page				

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Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Ke toring and biomonitoring of workers exp Occupational and Environmental Health	eener, S. A., posed to N-n	Brock, T nethyl-2-p	. H.,Hen oyrrolido	nmerling, H. J., Wrbitzky, R 2006. Ambient moni- ne in an industrial facility. International Archives of
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data 3539720	a;			
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	High		1.6	

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Source Citation: Type of Data Source	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health. Occupational Exposure; Monitoring Data;							
Hero ID	3539720							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Descrip Physical Form: Route of Exposure Exposure Concent: Number of Sample Type of Measurem Worker Activity: Type of Sampling: Exposure Duration	tion (Subca :: ration (Uni es: lent or Met 1:	ategory of Use): t): hod:	Processin adhesive vapor Inhalation 85 mg/m 1.0 short-tern productic personal 5 min	g formulati 3 n peak n - vesse	ion I cleanin	ng		
EVALUATION								
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments		
Domain 1: Reliabi	lity Metric 1:	Methodology	High	$\times 1$	1	Well described methods		
			0					
Domain 2: Represe	Metric 2.	Geographic Scope	Medium	× 1	2	Cormony		
	Metric 3:	Applicability	High	$\times 2$	2	This use is in scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 3: Accessi	hility/Clar	ity						
Domain 0. Meeessi	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks certain metadata		
Domoir 4 Vo. 1	liter or d TT	a containte						
Domain 4: Variabi	Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results		
		Con	tinued on 1	next page	e			

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Source Citation:	Bader, M.,Rosenberger, W.,Rebe, T.,Ke toring and biomonitoring of workers exp Occupational and Environmental Health.	eener, S. A., posed to N-n	Brock, T nethyl-2-p	. H.,Hen oyrrolidor	merling, H. J., Wrbitzky, R 2006. Ambient moni- ne in an industrial facility. International Archives of
Type of Data Source	Occupational Exposure; Monitoring Data	a;			
Hero ID	3539720				
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Overall Quality I	$\operatorname{Determination}^\dagger$	High		1.6	

Source Citation: Type of Data Source	Meier, S., Schindler, B. K., Koslitz, S., to N-methyl-2-pyrrolidone in workers Occupational Exposure; Reports for D	Koch, H. M., Weiss, T., Käfferlein, H. U., Brüning, T 2013. Biomonitoring of expo of the automobile industry. Annals of Occupational Hygiene. Data or Information Other than Exposure or Release Data;	osure
Hero ID	3539921		
EXTRACTION			
Parameter		Data	
Life Cycle Stage:		Use	
Life Cycle Descrit	tion (Subcategory of Use):	Spray application of paint in the automotive industry	
Physical Form:	(Subcategory of esc).	liquid, vapor	
Route of Exposur	e:	dermal, inhalation	
Worker Activity:		Preparing the lacquers; Loading the spraying system; After drying the	
U		panels in an enclosed area within the spraying chamber, the panels were	
		finally released back into the open workspace. There, the panels were	
		wiped off, detached, and packed into boxes. Irregular activities included	
		disassembling and manually cleaning the nozzles, screws, nuts, and bolts	
		of the sprayers because the sprayers can get clogged. The cleaning pro-	
		cess included the use of pure solvent mixtures containing up to 100 per-cent NMP.	
Number of Worke	rs:	14 (10 of 14 workers were wipers/packers of dried parts and were not	
		regularly exposed to NMP; 2 of 14 were cleaners of spraying parts and	
		had the highest concentration)	
PPE:		Workers were required to wear thin solvent-resistant gloves made out of	
		laminate. The gloves were used either alone or inside a second pair of	
		gloves made out of polychloroprene or nitrile, which helped improve the	
		grip. All gloves were discarded after a single use. Workers were also able	
		to voluntarily use filter masks or as needed.	
EVALUATION			
Domain	Metric	Rating MWF* Score Comments	
Domain 1: Reliab	ility		

Domain 1: Reliability					
Metric 1:	Methodology	High	$\times 1$	1	trusted sources
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	× 1	2	Cormany
		mount	× 1	_	Germany

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Source Citation:	on: Meier, S., Schindler, B. K., Koslitz, S., Koch, H. M., Weiss, T., Käfferlein, H. U., Brüning, T 2013. Biomonitoring of exposure to N-methyl-2-pyrrolidone in workers of the automobile industry. Annals of Occupational Hygiene.									
Type of Data Source	Occupation	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;								
Hero ID	3539921	3539921								
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
	Metric 4:	Temporal Representativeness	High	× 2	2	2012				
	Metric 5:	Sample Size	N/A	~ =	N/A	This metric is not applicable to this data type				
Domain 3: Access	vibility/Clar									
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	clearly documents its data sources				
Domain 4: Variab	oility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	High	$\times 1$	1	well characterized				
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.1					

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* MWF = Metric Weighting Factor

Source Citation: X u J	Xiaofei, E. sefulness ournal of	, Wada, Y., Nozaki, J., Miyauch of N-methyl-2-pyrrolidone (NM Occupational Health.	i, H.,Tanak P) in plasm	a, S., Sel 1a or urii	ki, Y., K ne as a∣	Koizumi, A 2000. A linear pharmacokinetic model predicts biomarker for biological monitoring for NMP exposure.			
Type of Data SourceCHero ID3	Occupation 562767	al Exposure; Monitoring Data;							
EXTRACTION									
Parameter			Data						
Life Cycle Stage			Use						
Life Cycle Descriptio	on (Subca	tegory of Use):	degreasing	g optical	lenses				
Physical Form:	on (Sasta	logory of ese).	vapor	5 optiour	1011000				
Route of Exposure:			Inhalation	ı					
Exposure Concentra	tion (Unit	t):	Range =	0.09 to 0	.69 ppn	n			
Number of Samples:			20.0		•••				
Number of Sites:			1.0						
Type of Measuremen	Type of Measurement or Method:			12-hr TV	VA				
Worker Activity:	Worker Activity:		all activit	ies durin	g a day				
Number of Workers:	Number of Workers:		4						
Type of Sampling:			personal						
Exposure Duration:			12 hr/dy						
Exposure Frequency	:		5 dy/wk						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliabilit	V								
N	Ietric 1:	Methodology	High	$\times 1$	1	Well described methods			
Domain 9. Panyagan	tativa								
Domain 2. Represen	Aptric 2.	Geographic Scope	Medium	× 1	2	Japan			
IV N	Aetric 2.	Applicability	High	$^{\wedge 1}$	2	Degreesing is in scope			
N	Aetric 4.	Temporal Representativeness	Medium	$\times 2$	4	2000			
N	Aetric 5:	Sample Size	High	$\times 1$	1	Statistical distribution of samples is fully characterized.			
Domain 2. Accessibi	iliter / Clari	+							
Domain 5: Accessibi	Inty/Clari Actric 6:	Motadata Completeness	Modium	~ 1	9	Looks description of all worker activities			
	160110 0:	metadata Completeness	meurum	~ 1	4	Lacks description of all worker activities			
		Cor	tinued on r	next page	2				

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Source Citation:	Xiaofei, E. usefulness Journal of	Xiaofei, E., Wada, Y., Nozaki, J., Miyauchi, H., Tanaka, S., Seki, Y., Koizumi, A. 2000. A linear pharmacokinetic model predicts usefulness of N-methyl-2-pyrrolidone (NMP) in plasma or urine as a biomarker for biological monitoring for NMP exposure. Journal of Occupational Health.						
Type of Data Source Hero ID	Occupation 3562767	Occupational Exposure; Monitoring Data; 3562767						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 4: Varial	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty.		
Overall Quality I	Determinatio	n†	Medium		1.7			

* MWF = Metric Weighting Factor

Source Citation:	Xiaofei, E., Wada, Y., Nozaki, J., Miyauchi, H., Tanaka, S., Seki, Y., Koizumi, A. 2000. A linear pharmacokinetic model predicts usefulness of N-methyl-2-pyrrolidone (NMP) in plasma or urine as a biomarker for biological monitoring for NMP exposure. Journal of Occupational Health.								
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 3562767								
EXTRACTION									
Parameter			Data						
Life Cycle Stage			Uso						
Life Cycle Description (Subcategory of Use):			degreasing metal parts						
Physical Form:			vapor						
Route of Exposure:			Inhalation						
Exposure Concentration (Unit):			Range = 0.04 to 0.59 ppm						
Number of Samples:			8.0						
Number of Sites:			1.0						
Type of Measurement or Method:			full shift 12-hr TWA						
Worker Activity:			all activities during a day						
Number of Workers:			8						
Type of Sampling:			personal						
Exposure Duration:			12 hr/dy						
Exposure Frequency:			5 dy/wk						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	Well described methods			
Domain 2. Ponno	ontativo								
Domain 2. Repres	Metric 2	Geographic Scope	Medium	$\times 1$	2	Japan			
	Metric 3:	Applicability	High	$\times 2$	2	Degreesing is in scope			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000			
	Metric 5:	Sample Size	High	× 1	1	Statistical distribution of samples is fully characterized.			
Domain 3: Access	ity			_					
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks description of all worker activities			
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Source Citation:	Xiaofei, E. usefulness Journal of	Xiaofei, E.,Wada, Y.,Nozaki, J.,Miyauchi, H.,Tanaka, S.,Seki, Y.,Koizumi, A. 2000. A linear pharmacokinetic model predicts usefulness of N-methyl-2-pyrrolidone (NMP) in plasma or urine as a biomarker for biological monitoring for NMP exposure. Journal of Occupational Health.							
Type of Data Source Hero ID	Occupation 3562767	Occupational Exposure; Monitoring Data; 3562767							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 4: Varial	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty.			
Overall Quality Determination [†] Medium 1.7									

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	 Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction. Occupational Exposure; Completed Exposure or Risk Assessments; 3809440 							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity: PPE:		Manufacturing Manufacturing Exposure may arise from sampling, technical maintenance and cleaning LEV and gloves (APF 5, 80 percent)						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Information from trusted sources		
Domain 2: Repres	sentative	~	_		_			
	Metric 2:	Geographic Scope	Low	× 1	3	Europe		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4: Motric 5:	Sample Size	High N/A	$\times 2$	2 N/A	2013 This metric is not applicable to this data time		
	Metric 5.	Sample Size	N/A		\mathbf{N}/\mathbf{A}	This metric is not applicable to this data type		
Domain 3: Access	sibility/Clari	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results		
Overall Quality D	eterminatio	n [†]	High		1.3			

Data Data Life Cycle Stage: Life Cycle Description (Subcategory of Use): Processing formulation Tasks include liquid transfer operations to and from bulk storage/ IBCs (intermediate bulk containers)/drums/smaller containers, mixing in batch or continuous operations, sampling and analysis, storage and cleaning and maintenance operations Number of Workers: PPE: Vertee Name Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 2: Geographic Scope Metric 3: Low × 1 1 Information from trusted sources Domain 2: Representative Metric 3: Geographic Scope Metric 3: Low × 1 3 Europe High × 2 2 Domain 3: Accessibility/Clarity Metric 6: Sample Size N/A N/A This metric is not applicable to this data type Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High × 1 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High × 1 1 Data sources are transparent	Source Citation: Type of Data Source Hero ID	Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction. Occupational Exposure; Completed Exposure or Risk Assessments; 3809440							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity: Processing formulation Tasks include liquid transfer operations to and from bulk storage/ BBCs (intermediate bulk containers)/drums/smaller containers, mixing in batch or continuous operations 160,000 (coating), 98,000 (cleaning) Debt and Maintenance Operations 160,000 (coating), 98,000 (cleaning) Debt and Respiratory Protective Equipment (RPE) are employed and protective drum in the second Domain 1: Reliability Metric 1: Metric Rating MWF* Score Comments Domain 1: Reliability Metric 2: Geographic Scope Metric 3: Link Kingh × 1 3 Europe Metric 3: Europe Metric 4: Temporal Representative Metric 4: Low × 1 3 Europe Metric 3: Score Domain 1: Reliability Metric 4: Temporal Representative Metric 5: Sample Size Not Not Not Not Domain 2: Representative Metric 4: Temporal Representative Metric 5: Kapplicability Metric 6: Not Not <td< td=""><td>EXTRACTION Parameter</td><td></td><td></td><td>Data</td><td></td><td></td><td></td></td<>	EXTRACTION Parameter			Data					
FFE.Intervalue Respiratory Protective Equipment (RFE) are employed and employed and the protective Equipment (RFE) are employed and employed and the protective Equipment (RFE) are employed and employed and the protective Equipment (RFE) are employed and employed and the protective Equipment (RFE) are employed and employed and employed and the protective Equipment (RFE) are employed and the protective Equipment (RFE) are employed and employed empl	Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity: Number of Workers: PPE:		Processing formulation Tasks include liquid transfer operations to and from bulk storage/ IBCs (intermediate bulk containers)/drums/smaller containers, mixing in batch or continuous operations, sampling and analysis, storage and cleaning and maintenance operations 160,000 (coating), 98,000 (cleaning) LEV and Respiratory Protective Equipment (RPE) are employed and						
EVALUATIONDomainMetricRatingNUF*SoreCommentsDomain 1: Reliability Metric 1:MethodogyHigh $\times 1$ 1Information from trusted sourcesDomain 2: Representative Metric 2:Geographic ScopeKX3EuropeMetric 2:Geographic ScopeHigh $\times 2$ 2in scopeMetric 3:ApplicabilityHigh $\times 2$ 22013Metric 4:Temporal Representativees Metric 5:High $\times 2$ 22013Ormain 3: Accessibility/ClarHigh $\times 1$ 1Tis metric is not applicable to this data typeDomain 4: Variability metric 5:Metric 6:High $\times 1$ 1Diacasources are transparentDomain 4: Variability metric 5:Metric 6:High $\times 1$ 1Diacasources are transparentCoverall Quality DeterminationHigh $\times 1$ 11Scoupe are transparent	PPE:			LEV and Respiratory Protective Equipment (RPE) are employed and protective clothing is used					
DomainMetricRatingMWF*ScoreCommentsDomain 1: Reliability Metric 1:MethodologyHigh× 11Information from trusted sourcesDomain 2: Representative Metric 2:Geographic ScopeLow× 13EuropeMetric 3:ApplicabilityHigh× 22in scopeMetric 4:Temporal RepresentativenessHigh× 222013Metric 5:Sample SizeN/AN/AThis metric is not applicable to this data typeDomain 3: Accessibility/Clarity Metric 6:High× 11Data sources are transparentDomain 4: Variability and Uncertainty Metric 7:Metadata CompletenessHigh× 11Discussion on variability and uncertainty of resultsOverall Quality Determination [†] High1.31111	EVALUATION								
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Domain		Metric	Rating	MWF^{\star}	Score	Comments		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Information from trusted sources		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Domain 2: Repres	entative							
Metric 3:ApplicabilityHigh $\times 2$ 2in scopeMetric 4:Temporal RepresentativenessHigh $\times 2$ 22013Metric 5:Sample SizeN/AN/AThis metric is not applicable to this data typeDomain 3:Accessibility/Clarity Metric 6:Metadata CompletenessHigh $\times 1$ 1Domain 4:Variability and Uncertainty Metric 7:Metadata CompletenessHigh $\times 1$ 1Dowain 4:Variability and Uncertainty Metric 7:Metadata CompletenessHigh $\times 1$ 1Dowain 4:Variability and Uncertainty Metric 7:High $\times 1$ 1Discussion on variability and uncertainty of resultsOverall Quality Determination [†] High1.31.31.3		Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe		
Metric 4: Metric 5:Temporal Representativeness Sample SizeHigh N/A $\times 2$ N/A 2 N/A 2 2013 This metric is not applicable to this data typeDomain 3:Accessibility/Clarity Metric 6:Metadata CompletenessHigh $\times 1$ 1Data sources are transparentDomain 4:Variability and Uncertainty Metric 7:Metadata CompletenessHigh $\times 1$ 1Discussion on variability and uncertainty of resultsOverall Quality Determination † High1.31.3		Metric 3:	Applicability	High	$\times 2$	2	in scope		
Metric 5: Sample Size N/A N/A This metric is not applicable to this data type Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High $\times 1$ 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High $\times 1$ 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.3 1.3		Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013		
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High $\times 1$ 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High $\times 1$ 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.3 1.3		Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Metric 6: Metadata Completeness High $\times 1$ 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High $\times 1$ 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.3	Domain 3: Access	ibility/Clari	tv						
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High × 1 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.3		Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent		
Overall Quality Determination [†] High 1.3	Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results		
	Overall Quality D	eterminatio	n [†]	High		1.3			

Source Citation: Type of Data Source Hero ID	Rivm, 2013. Annex XV Restriction Report: Proposal for a Restriction. Occupational Exposure; Completed Exposure or Risk Assessments; 3809440							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity: PPE:		Process chemica Exposu LEV an	Processing chemical production aid Exposure may arise from sampling, technical maintenance and cleaning LEV and gloves (APF 5, 80 percent)					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Information from trusted sources		
Domain 2: Repres	sentative		т	1	0			
	Metric 2:	Geographic Scope	Low	× 1	3	Europe		
	Metric 3:	Applicability	Hign High	× 2	2	in scope		
	Metric 4: Metric 5:	Sample Size	N/A	× 2	N/A	This metric is not applicable to this data type		
Domain 3: Access	ibility/Clari Metric 6:	ity Metadata Completeness	High	× 1	1	Data sources are transparent		
Domain 4: Variab	oility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results		
Overall Quality D	eterminatio	n [†]	High		1.3			

Source Citation:Rivm,. 20Type of Data SourceOccupationHero ID3809440	13. Annex XV Restriction Repo nal Exposure; Completed Expos	rt: Propo ure or Ris	sal for a sk Assess	Restrict ments;	tion.			
EXTRACTION Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity: PPE:			Use Coating application Tasks include liquid transfer operations to and from bulk storage/IBCs/ drums/smaller containers, mixing in batch or continuous operations, preparation for application, application by spraying, brushing, roller, and dipping/immersion, film formation or within a fluidized bed system, sampling and analysis, storage and cleaning and maintenance operations. Protective clothing, gloves and RPE					
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Low High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	3 2 2 N/A	Europe in scope 2013 This metric is not applicable to this data type			
Domain 3: Accessibility/Clan Metric 6:	ity Metadata Completeness	High	× 1	1	Data sources are transparent			
Domain 4: Variability and U Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results			
Overall Quality Determination	on^{\dagger}	High		1.3				

Source Citation: Type of Data Source Hero ID	Rivm, 201 Occupation 3809440	13. Annex XV Restriction Report nal Exposure; Completed Expos	rt: Propos ure or Ris	sal for a sk Assess	Restrict ments;	tion.	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity:		Use Cleaning Activities arising from the use of cleaning products containing NMP that could give rise to exposure include transfer from storage, pouring/ unloading from drums or containers, mixing/diluting prior to use, clean- ing activities (spraying, brushing, dipping,) and associated cleaning and maintenance of equipment.					
Number of Worker PPE:	rs:		maintenance of equipment. 3,400,000 (prof cleaning), 43,000 (optical cleaning), 1,080,000 (furniture cleaning), 662,000 (paint and glaze removal?) LEV and gloves (with training; APF20 95 percent)				
EVALUATION							
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliabi	lity Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources	
Domain 2 [.] Bepres	entative						
Domain 2. Repres	Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013	
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type	
Domain 3: Accessi	ibility/Clari	ity					
Domain 9. 1100035	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent	
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results	
		novadata Completeness	111911	~ 1	1	Discussion on variability and uncertainty of results	
Overall Quality D	eterminatio	n†	High		1.3		
Continued on next page							

	- contin	nued from	n previous page				
Source Citation: Type of Data Source Hero ID	Rivm,. 2013. Annex XV Restriction Rep Occupational Exposure; Completed Expo 3809440	oort: Propo osure or Ris	osal for a Restriction. sk Assessments;				
EVALUATION							
Domain	Domain Metric Rating MWF* Score Comments						

Source Citation:HType of Data SourceOHero ID3	Rivm,. 201 Occupatior 8809440	3. Annex XV Restriction Report al Exposure; Completed Expos	rt: Propo ure or Ris	sal for a sk Assess	Restrict	tion.
EXTRACTION			D /			
Parameter			Data			
Life Cycle Stage:			All			
Life Cycle Descripti	on (Subca	tegory of Use):	any stag	ge with c	losed-sy	vstem transfers
Route of Exposure:			Inhalati	on		
Exposure Concentra	ation (Unit	t):	0.04 to	12.39 mg	g/m3	
Type of Measureme	nt or Metl	hod:	Modelle	ed using l	EasyTR	A
Worker Activity:			closed-s	ystem tr	ansfers.	Table B65
Exposure Duration:			8 hr			
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Roliabili	t.v.					
Domain 1. Teenaoin N	Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources
D i o D						
Domain 2: Represer	itative		т	1	0	
1 N	Vletric 2:	Geographic Scope	Low	× 1	3	Europe
ľ	Vietric 3:	Applicability	High	× 2	2	in scope
ľ	Metric 4:	Comple Cine	High	× 2	2	
I	Metric 5:	Sample Size	High	× 1	1	Multiple data points provided with necessary metadata
Domain 3. Accessib	ility/Clari	tv				
Domain 0. Heeebin	Metric 6:	Metadata Completeness	High	× 1	1	Data sources are transparent
			8			
Domain 4: Variabili	ty and Un	certainty				
Ν	Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results
		-				
Overall Quality Det	erminatio	\mathbf{n}^{\dagger}	High		1.2	
• 5			0			

Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments; 3809440								
EXTRACTION Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Exposure Duration:			Manufacturing any stage with closed-system transfers liquid, 100 percent dermal 0.03 to 1.37 mg/kg bw/day Modelled using EasyTRA closed-system transfers. Table B65 8 hr					
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Information from trusted sources			
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Low High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	3 2 2 1	Europe in scope 2013 Multiple data points provided with necessary metadata			
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Data sources are transparent			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		High	× 1	1	Discussion on variability and uncertainty of results			
Overall Quality Determination	n^{\dagger}	High		1.2				

Source Citation:Rivm,. 20Type of Data SourceOccupatioHero ID3809440	13. Annex XV Restriction Report nal Exposure; Completed Expos	rt: Propo ure or Ris	sal for a sk Assess	Restrict	tion.		
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Exposure Duration:			All any stage with manual transfers Inhalation 3.10 to 17.35 mg/m3 Modelled using EasyTRA Charging and discharging, including scenarios with elevated tempera- ture. Table B66 1 to 8 hrs				
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Information from trusted sources		
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Low High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	3 2 2 1	Europe in scope 2013 Multiple data points provided with necessary metadata		
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Data sources are transparent		
Domain 4: Variability and Us Metric 7:	ncertainty Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results		
Overall Quality Determination	n^\dagger	High		1.2			

Source Citation: Type of Data Source Hero ID	rce Citation: Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction. e of Data Source Occupational Exposure; Completed Exposure or Risk Assessments; o ID 3809440							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Exposure Duration:			All any stage with manual transfers liquid, 100 percent dermal 0.34 to 2.74 mg/kg bw/day Modelled using EasyTRA Charging and discharging, including scenarios with elevated tempera- ture. Table B66 1 to 8 hrs					
EVALUATION		Motric	Bating	MWF*	Score	Commonts		
Domain 1: Reliabil	lity Metric 1:	Methodology	High	× 1	1	Information from trusted sources		
Domain 2: Represe	entative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Low High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	3 2 2 1	Europe in scope 2013 Multiple data points provided with necessary metadata		
Domain 3: Accessi	bility/Clari Metric 6:	ity Metadata Completeness	High	× 1	1	Data sources are transparent		
Domain 4: Variabi	lity and Ur Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results		
Overall Quality De	eterminatio	\mathbf{n}^{\dagger}	High		1.2			

Source Citation:Rivm, 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments; 3809440								
EXTRACTION								
Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Exposure Duration:			Processing formulation Inhalation 0.04 to 20.65 mg/m3 Modelled using EasyTRA mixing and blending 8 hr					
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Information from trusted sources			
Domain 2: Representative								
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013			
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata			
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		High	$\times 1$	1	Discussion on variability and uncertainty of results			
Overall Quality Determinatio	\mathbf{n}^{\dagger}	High		1.2				

Source Citation:Rivm,.Type of Data SourceOccupaHero ID380944	Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments; 3809440							
EXTRACTION								
Parameter		Data						
Life Cycle Stage: Life Cycle Description (Su Physical Form: Route of Exposure: Exposure Concentration (Type of Measurement or Worker Activity: Exposure Duration:	bcategory of Use): Unit): Aethod:	Processing formulation liquid, 100 percent dermal 0.69 to 2.74 mg/kg b Modelled using Easy mixing and blending 8 hr			day A			
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability Metric	1: Methodology	High	× 1	1	Information from trusted sources			
Domain 2: Representative Metric Metric Metric Metric	 Geographic Scope Applicability Temporal Representativeness Sample Size 	Low High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	3 2 2 1	Europe in scope 2013 Multiple data points provided with necessary metadata			
Domain 3: Accessibility/0	larity 6: Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		High	× 1	1	Discussion on variability and uncertainty of results			
Overall Quality Determination ^{\dagger}		High		1.2				

Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments;Hero ID3809440								
EXTRACTION		.						
Parameter		Data						
Life Cycle Stage:		Processin	g					
Life Cycle Description (Subo	category of Use):	adhesive i	formulati	on				
Route of Exposure:		Inhalation	1					
Exposure Concentration (Ur	nit):	same data	a as sour	ce 3539'	720			
Type of Measurement or Me	thod:	Measured						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2. Poprogentative								
Metric 2:	Geographic Scope	Medium	× 1	2	Cermany			
Metric 3:	Applicability	High	$\times 2$	2	This use is in scope			
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006			
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessibility/Cla	rity							
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Lacks certain metadata			
Domain 4: Variability and U	Incertainty							
Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results			
Overall Quality Determinati	on^\dagger	High		1.6				

Source Citation:Rivm, 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments; 3809440								
EXTRACTION		_						
Parameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Subc	ategory of Use):	spray a	pplicatio	n of sub	strate (coating, cleaner, etc.)			
Route of Exposure:		Inhalati	on					
Exposure Concentration (Uni	it):	7.96 to	18.70 mg	g/m3				
Type of Measurement or Met	hod:	Modelle	ed using \$	Stoffenn	nanager and RISKOFDERM			
Exposure Duration:		4 hr						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2: Representative								
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013			
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
Domain 4: Variability and U	ncertainty							
Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results			
Overall Quality Determination [†]		High		1.2				

Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments; 3809440								
EXTRACTION								
Parameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Subc	ategory of Use):	spray a	pplicatio	n of sub	strate (coating, cleaner, etc.)			
Route of Exposure:		dermal						
Exposure Concentration (Uni	it):	1.73 to	3.46 mg/	'kg bw/	day			
Type of Measurement or Met	hod:	Modelle	ed using \$	Stoffenn	nanager and RISKOFDERM			
Exposure Duration:		4 hr						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2: Representative								
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013			
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
Domain 4: Variability and U	ncertainty							
Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results			
Overall Quality Determination [†]				1.2				

Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments; 3809440								
EXTRACTION		_						
Parameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Subc	ategory of Use):	roll /br	ush appli	cation of	of substrate (coating, cleaner, etc.)			
Route of Exposure:		Inhalati	on					
Exposure Concentration (Uni	it):	4.13 mg	$_{\rm g/m3}$					
Type of Measurement or Met	hod:	Modelle	ed using l	EasyTR	A			
Exposure Duration:		8 hr						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2: Representative								
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013			
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
Domain 4: Variability and U	ncertainty							
Metric 7:	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results			
Overall Quality Determination	\mathbf{n}^{\dagger}	High		1.2				

Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments; 3809440								
EXTRACTION								
Parameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Subc	ategory of Use):	roll /br	ush appli	ication o	of substrate (coating, cleaner, etc.)			
Route of Exposure:		dermal						
Exposure Concentration (Uni	it):	$5.49~\mathrm{mg}$	g/kg bw/	day				
Type of Measurement or Met	hod:	Modelle	ed using l	EasyTR	A			
Exposure Duration:		8 hr						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2: Representative								
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013			
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
Domain 4: Variability and U	ncertainty							
Metric 7:	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results			
Overall Quality Determination	\mathbf{n}^{\dagger}	High		1.2				

Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments;Hero ID3809440								
EXTRACTION								
Parameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Subc	ategory of Use):	dip app	lication of	of subst	rate (coating, cleaner, etc.)			
Route of Exposure:	,	Inhalati	ion					
Exposure Concentration (Un	it):	4.13 to	12.40 mg	g/m3				
Type of Measurement or Met	hod:	Modelle	ed using l	EasyTR	A			
Exposure Duration:		4 to 8 h	nr/day					
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2: Representative								
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013			
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
Domain 4: Variability and U	ncertainty							
Metric 7:	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results			
Overall Quality Determination [†]				1.2				

Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments; 3809440								
EXTRACTION								
Parameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Subc	ategory of Use):	dip app	lication of	of subst	rate (coating, cleaner, etc.)			
Route of Exposure:		dermal						
Exposure Concentration (Un	it):	1.64 to	2.74 mg/	'kg bw/	day			
Type of Measurement or Met	hod:	Modelle	ed using l	EasyTR	A			
Exposure Duration:		4 to 8 h	nr/day					
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2: Representative								
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013			
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
Domain 4: Variability and U	ncertainty							
Metric 7:	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results			
Overall Quality Determination [†]				1.2				

Source Citation: Rivm, 20 Type of Data Source Occupatio	Citation: Rivm, 2013. Annex XV Restriction Report: Proposal for a Restriction.							
Hero ID 3809440	3809440							
EXTRACTION								
Parameter		Data						
		TT						
Life Cycle Stage:	atomomy of Ugo).	Use	nlont					
Boute of Exposure:	ategory of Use):	Inhalation	plant					
Exposure Concentration (Un	it):	71 to 22.2 mg	/m"					
Number of Samples:		unknown	111					
Number of Sites:		1.0						
Type of Measurement or Me	thod:	unknown						
Worker Activity:		unknown						
Type of Sampling:		unknown						
Exposure Duration:		unknown						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability		TT: 1	1	1				
Metric 1:	Methodology	High	× 1	1	Information from trusted sources			
Domain 2: Representative								
Metric 2:	Geographic Scope	Low	$\times 1$	3	unknown			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	Unacceptable	$\times 2$	8	1988 - so different as to make outdated information unacceptable			
Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics			
Domain 3: Accessibility/Clar	Nete lete Generaleter ere	TT:l.	1	1				
Metric 0:	Metadata Completeness	підіі	× 1	1	Data sources are transparent			
Domain 4: Variability and U	ncertainty							
Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results			
	-							
Overall Quality Determination	on [†]	Unacceptable		4	Metric Mean Score: 2.1.			
Continued on next page								

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Source Citation: Type of Data Source Hero ID	Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction. Occupational Exposure; Completed Exposure or Risk Assessments; 3809440						
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		

** Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments;							
Hero ID 3809440							
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Route of Exposure: Exposure Concentration (Unit): Number of Samples: Type of Measurement or Method: Worker Activity: Type of Sampling: Exposure Duration: Analytic Method:			Use paint stripping Inhalation up to 64 mg/m3 unknown 8-hr TWA unknown personal? 8 hr note: in paint stripper RA				
EVALUATION							
Domain	Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Metric 2	: Methodology	High	$\times 1$	1	Information from trusted sources		
Domain 2: Representative Metric 2 Metric 3	2: Geographic Scope 3: Applicability	Low High	$ \times 1 \ \times 2 $	$\frac{3}{2}$	unknown in scope		
Metric 4	4: Temporal Representativeness	Medium	$\times 2$	4	2000		
Metric 4	5: Sample Size	Medium	$\times 1$	2	some statistics unknown		
Domain 3: Accessibility/C Metric (arity 5: Metadata Completeness	High	× 1	1	Data sources are transparent		
Domain 4: Variability and Metric	Uncertainty 7: Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results		
Overall Quality Determination [†] High 1.6							
	Cor	ntinued on r	next page				

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Source Citation: Type of Data Source Hero ID	Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction. Occupational Exposure; Completed Exposure or Risk Assessments; 3809440					
EVALUATION						
Domain	Metric	Rating MWF* Score	Comments			

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Source Citation:Rivm,. 201Type of Data SourceOccupationHero ID3809440	13. Annex XV Restriction Repo nal Exposure; Completed Expos	rt: Proposa ure or Risk	l for a R Assessm	estrictic ents;	n.
EXTRACTION					
Parameter		Data			
		TT			
Life Cycle Stage:	togory of Use).	Use	pping		
Boute of Exposure.	tegory of Ose).	Inhalation	pping		
Exposure Concentration (Uni	t):	280 mg/m	13		
Number of Samples:	-/	unknown	-		
Type of Measurement or Met	hod:	1-hr peak			
Worker Activity:		unknown			
Type of Sampling:		personal?			
Exposure Duration:		1 hr			
Analytic Method:		note: in p	aint strij	oper RA	λ
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources
Domain 2: Representative					
Metric 2:	Geographic Scope	Low	$\times 1$	3	unknown
Metric 3:	Applicability	High	$\times 2$	2	in scope
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000
Metric 5:	Sample Size	Medium	$\times 1$	2	some statistics unknown
Domain 3: Accessibility/Clar	ity				
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent
Domain 4: Variability and U	acortainty				
Metric 7	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results
		8		-	
Overall Quality Determinatio	n [†]	High		1.6	
	Cor	tinued on r	next page		

	- cor	ntinued from previous page	
Source Citation: Type of Data Source Hero ID	Rivm,. 2013. Annex XV Restriction F Occupational Exposure; Completed E 3809440	Report: Proposal for a Restriction. Axposure or Risk Assessments;	
EVALUATION			
Domain	Metric	Rating MWF* Score Comments	

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Source Citation: Rivm, 2013. Annex XV Restriction Report: Proposal for a Restriction.							
Type of Data Source Occupational Exposure; Completed Exposure or Risk Assessments;							
Hero ID 3809440							
EXTRACTION							
Parameter		Data					
Life Cycle Stage:		Use					
Life Cycle Description (Sub	category of Use):	graffiti re	moval				
Route of Exposure:		Inhalation	1				
Exposure Concentration (Un	nit):	10 mg/m^3	3				
Number of Samples:		unknown					
Type of Measurement or Me	thod:	8-hr TWA	A				
Worker Activity:		unknown					
Type of Sampling:		personal					
Exposure Duration:		8 hr		-			
Analytic Method:		note: in p	paint strij	pper RA	Ι		
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Polisbility							
Metric 1:	Methodology	High	× 1	1	Information from tructed sources		
	Methodology	IIIgii	~ 1	1	Information from trusted sources		
Domain 2: Representative							
Metric 2:	Geographic Scope	Low	$\times 1$	3	unknown		
Metric 3:	Applicability	High	$\times 2$	2	in scope with paint stripping?		
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000		
Metric 5:	Sample Size	Medium	$\times 1$	2	some statistics unknown		
Domain 3: Accessibility/Cla	rity						
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent		
Domain 4: Variability and U	Incertainty						
Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results		
Overall Quality Determinati	on [†]	High		1.6			
	Cor	ntinued on r	next page				
			. 0				

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Source Citation: Type of Data Source Hero ID	Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction. Occupational Exposure; Completed Exposure or Risk Assessments; 3809440					
EVALUATION						
Domain	Metric	Rating MWF* Score	Comments			

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Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments;Hero ID3809440							
EXTRACTION							
Parameter		Data					
Life Cycle Stage:		Use					
Life Cycle Description (Subca	tegory of Use):	paint strip	pping				
Route of Exposure:		Inhalation	1				
Exposure Concentration (Uni	t):	0.82 to 4 .	1 mg/m				
Number of Samples:		unknown					
Type of Measurement or Met	hod:	unknown					
Worker Activity:		unknown					
Type of Sampling:		unknown					
Exposure Duration:		unknown		-			
Analytic Method:		note: in p	aint strij	pper RA	Δ		
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliability							
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources		
Domain 2: Representative							
Metric 2:	Geographic Scope	Low	$\times 1$	3	unknown		
Metric 3:	Applicability	High	$\times 2$	2	in scope		
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2004		
Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics		
Domain 3: Accessibility/Clari	ity						
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent		
Domain 4: Variability and Ur	ncertainty						
	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results		
Overall Quality Determinatio	\mathbf{n}^{\dagger}	Medium		1.7			
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Source Citation: Type of Data Source Hero ID	Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction. Occupational Exposure; Completed Exposure or Risk Assessments; 3809440					
EVALUATION						
Domain	Metric	Rating MWF* Score	Comments			

atinued from previous

Source Citation:Rivm,.Type of Data SourceOccupatHero ID3809440	2013. Annex XV Restriction Repo ional Exposure; Completed Expos	rt: Propo ure or Ris	sal for a sk Assess	Restrict	tion.		
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Route of Exposure: Exposure Concentration (Unit): Number of Samples: Type of Measurement or Method: Worker Activity: Type of Sampling: Exposure Duration:			all tank cleaning Inhalation 4.1 to 12.4 mg/m3 unknown unknown unknown unknown unknown				
EVALUATION	Metric	Bating	MWF*	Score	Comments		
Domain 1: Reliability Metric 1	: Methodology	High	× 1	1	Information from trusted sources		
Domain 2: Representative Metric 2 Metric 3 Metric 3	 Geographic Scope Applicability Temporal Representativeness Sample Size 	Low High High Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	3 2 2 3	unknown in scope 2011 characterized by no statistics		
Domain 3: Accessibility/C Metric 6	arity : Metadata Completeness	High	× 1	1	Data sources are transparent		
Domain 4: Variability and Metric 7	Uncertainty ': Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results		
Overall Quality Determina	tion [†]	High		1.4			

Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments; 3809440							
EXTRACTION							
Parameter			Data				
Life Cruele Sterrey			Uae				
Life Cycle Description (Sube	ategory of Use).	cloaning c	of instrum	nonte		
Boute of Exposure.	Subc	ategory of Use).	Inhalation	n maarum n	lients		
Exposure Concentration	(Un	it):	same data	1 a. as 7352	69		
Type of Measurement of	r Me	thod:	Measured	1002	00		
1, po or modearement o			mousaroa				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1. Roliability							
Metr	ic 1:	Methodology	High	$\times 1$	1	Information from trusted sources	
Domain 9. Donnagentati							
Motr	ve	Coographia Scope	Modium	~ 1	2	Inner	
Metr	$\frac{10}{2}$	Applicability	High	$^{\land 1}$ $^{\lor 2}$	2	japan	
Metr	ic 4 ·	Temporal Representativeness	High	$\times 2$	2	2009	
Metr	ic 5 :	Sample Size	Medium	$\times 1$	2	some statistics unknown	
		Sample Sille	intodiani		_		
Domain 3: Accessibility	/Clai	rity					
Metr	ic 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent	
Domain 4: Variability a	nd U	ncertainty					
Metr	ic 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results	
Overall Quality Determ	inatio	on^\dagger	High		1.2		

Source Citation:Rivm, 2Type of Data SourceOccupatHero ID3809440	013. Annex XV Restriction Repo onal Exposure; Completed Expos	rt: Proposa sure or Risk	l for a Re Assessm	estrictic ents;	n.
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Sub Route of Exposure: Exposure Concentration (U Number of Samples: Type of Measurement or M Worker Activity: Type of Sampling: Exposure Duration:	Processing polymer Inhalation air concentrations exceeding the DNEL of 5 mg/m3 by approximately 5-fold unknown Measured during preparation and initiating of the production pr both unknown				
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Metric 1	Methodology	High	× 1	1	Information from trusted sources
Domain 2: Representative Metric 2 Metric 3 Metric 4 Metric 5	Geographic Scope Applicability Temporal Representativeness Sample Size	Low High Medium Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	3 2 4 3	unknown in scope 2005 characterized by no statistics
Domain 3: Accessibility/Cla Metric 6	arity Metadata Completeness	High	× 1	1	Data sources are transparent
Domain 4: Variability and Metric 7	Uncertainty Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results
Overall Quality Determinat	Medium ntinued on r	next page	1.7		

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Source Citation: Type of Data Source Hero ID	Rivm,. 2013. Annex XV Restriction F Occupational Exposure; Completed E 3809440	Report: Proposal for a Restriction. Axposure or Risk Assessments;	
EVALUATION			
Domain	Metric	Rating MWF* Score Comments	

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* MWF = Metric Weighting Factor

Source Citation:Rivm, 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments; 3809440							
EXTRACTION							
Parameter		Data					
Life Cycle Stage:		Use					
Life Cycle Description (Subca	ategory of Use):	lab					
Route of Exposure:		Inhalati	on				
Exposure Concentration (Uni	it):	2.07 - 4	.13 mg/n	n3			
Type of Measurement or Met	hod:	Modelle	d using l	EasyTR	А		
Exposure Duration:		8 hr					
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliability							
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources		
Domain 2: Representative							
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe		
Metric 3:	Applicability	High	$\times 2$	2	in scope		
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013		
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata		
Domain 3: Accessibility/Clar	ity						
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent		
Domain 4: Variability and U	ncertainty						
Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results		
Overall Quality Determination	\mathbf{n}^{\dagger}	High		1.2			

Source Citation: Type of Data Source Hero ID	Rivm, 201 Occupation 3809440	3. Annex XV Restriction Report nal Exposure; Completed Expos	rt: Propo ure or Ris	sal for a sk Assess	Restrict ments;	tion.		
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrir	otion (Subca	tegory of Use):	lab					
Route of Exposure	e:		dermal					
Exposure Concent	ration (Uni	t):	0.34 mg	/kg bw/	day			
Type of Measuren	nent or Met	hod:	Modelle	d using 1	EasyTR	А		
Exposure Duratio	n:		8 hr	_	-			
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources		
Domain 2: Repres	entative							
	Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013		
	Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata		
Domain 3: Access	ibilitv/Clari	tv						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent		
Domain 4. Variab	ility and Ur	ocertainty						
	Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results		
Overall Quality D	eterminatio	n†	High		1.2			
Source Citation:Rivm,. 20Type of Data SourceOccupatioHero ID3809440	13. Annex XV Restriction Report nal Exposure; Completed Expos	rt: Propo ure or Ris	sal for a sk Assess	Restrict	tion.			
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EXTRACTION								
Parameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Subc	ategory of Use):	lubricat	ion and	grease a	pplication			
Route of Exposure:	,	Inhalati	on	-				
Exposure Concentration (Un	it):	8.26 - 1	5.49 mg/	'm3				
Type of Measurement or Met	hod:	Modelle	ed using l	EasyTR	A			
Exposure Duration:		8 hr						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2: Representative								
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013			
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
Domain 4: Variability and U	ncertainty							
Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results			
Overall Quality Determination	\mathbf{n}^{\dagger}	High		1.2				

Source Citation:Rivm,. 20Type of Data SourceOccupatioHero ID3809440	13. Annex XV Restriction Repo nal Exposure; Completed Expos	rt: Propo ure or Ris	sal for a sk Assess	Restrict	tion.				
EXTRACTION									
Parameter		Data							
Life Cycle Stage:		Use	Use						
Life Cycle Description (Subc	ategory of Use):	lubricat	ion and	grease a	pplication				
Route of Exposure:		dermal		0	* *				
Exposure Concentration (Uni	it):	2.74 to	5.49 mg/	kg bw/	day				
Type of Measurement or Met	hod:	Modelle	ed using l	EasyTR	A				
Exposure Duration:		8 hr							
EVALUATION									
Domain	Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources				
Domain 2: Representative									
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe				
Metric 3:	Applicability	High	$\times 2$	2	in scope				
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013				
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata				
Domain 3: Accessibility/Clar	itv								
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent				
Domain 4: Variability and U	ncertainty								
Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results				
Overall Quality Determination	\mathbf{n}^{\dagger}	High		1.2					

Source Citation:Rivm,. 20Type of Data SourceOccupatioHero ID3809440	13. Annex XV Restriction Repo nal Exposure; Completed Expos	rt: Propo ure or Ris	sal for a sk Assess	Restrict ments;	tion.
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Subc	ategory of Use):	Spray a	pplicatio	n of agr	richemicals
Route of Exposure:		Inhalati	on	0	
Exposure Concentration (Uni	t):	2.97 to	5.27 mg/	′m3	
Type of Measurement or Met	hod:	Modelle	ed using l	EasyTR	A
Exposure Duration:		8 hr			
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources
Domain 2: Representative					
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe
Metric 3:	Applicability	High	$\times 2$	2	in scope
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata
Domain 3: Accessibility/Clar	itv				
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent
Domain 4: Variability and U	ncertainty				
Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results
Overall Quality Determination	\mathbf{n}^{\dagger}	High		1.2	

Source Citation:Rivm,. 20Type of Data SourceOccupatioHero ID3809440	13. Annex XV Restriction Report nal Exposure; Completed Expos	rt: Propo ure or Ris	sal for a sk Assess	Restrict	tion.				
EXTRACTION									
Parameter		Data							
Life Cycle Stage:		Use							
Life Cycle Description (Subc	ategory of Use):	Spray a	pplicatio	n of agr	richemicals				
Route of Exposure:	,	dermal		-					
Exposure Concentration (Uni	it):	2.21 to	5.38 mg/	'kg bw/	day				
Type of Measurement or Met	bhod:	Modelle	ed using l	EasyTR	A				
Exposure Duration:		8 hr							
EVALUATION									
Domain	Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliability									
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources				
Domain 2: Representative									
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe				
Metric 3:	Applicability	High	$\times 2$	2	in scope				
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013				
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata				
Domain 3: Accessibility/Clar	ity								
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent				
Domain 4: Variability and U	ncertainty								
Metric 7:	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results				
Overall Quality Determination	n^\dagger	High		1.2					

Source Citation:Rivm,. 20Type of Data SourceOccupationHero ID3809440	13. Annex XV Restriction Repo nal Exposure; Completed Expos	rt: Propo ure or Ris	sal for a sk Assess	Restrict	tion.
EXTRACTION		D /			
Parameter		Data			
Life Cycle Stage:		All			
Life Cycle Description (Subca	ategory of Use):	All			
Route of Exposure:		dermal			
Exposure Concentration (Uni	t):	Input p	arameter	s are de	efaults as given in ECHA guidance (chapter R14
Type of Measurement or Method:		Occupa Modelle	tional ex ed using l	posure (EasyTR	estimation). A
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Information from trusted sources
Domain 2: Representative					
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe
Metric 3:	Applicability	High	$\times 2$	2	in scope
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013
Metric 5:	Sample Size	High	$\times 1$	1	Multiple data points provided with necessary metadata
Domain 3. Accessibility/Clar	ity				
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent
Domain 4: Variability and U	acortainty				
Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results
Overall Quality Determinatio	n^\dagger	High		1.2	

Source Citation: Type of Data Source Hero ID	Who,. 200 Occupation 3809476	1. Concise International Chemic nal Exposure; Monitoring Data;	cal Assessm	ent Docu	iment 3	5: N-Methyl-2-Pyrrolidone.	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Type of Sampling: Analytic Method:			Use graffiti removal vapor Inhalation up to 10 mg/m3 8-hr TWA personal note: in paint stripper RA				
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Low	× 1	3	Sampling or analytical methodology is not specified.	
Domain 2: Repres	entative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Low High Low Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	3 2 6 3	unknown in scope with paint stripping? 1993-2000 characterized by no statistics.	
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but no other metadata.	
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	limited discussion	
Overall Quality D	eterminatio	n†	Low		2.4		

 * MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Who,. 200 Occupation 3809476	1. Concise International Chemic nal Exposure; Monitoring Data;	cal Assessme	ent Docu	ment 3	5: N-Methyl-2-Pyrrolidone.	
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Type of Sampling:			Use microelectronic industry vapor Inhalation up to 6 mg/m3 8-hr TWA personal				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.	
Domain 2: Repres	sentative						
Domain 2. Repres	Metric 2:	Geographic Scope	Low	× 1	3	unknown	
	Metric 3:	Applicability	Medium	$\times 2$	4	Not fully specified: could be cleaning in electronics industry	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1991	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Lacks worker activities	
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	no discussion	
Overall Quality D	eterminatio	n [†]	Low		2.7		

Source Citation: Type of Data Source Hero ID	Who,. 200 Occupation 3809476	1. Concise International Chemic nal Exposure; Monitoring Data;	cal Assessm	ent Docu	iment 3	5: N-Methyl-2-Pyrrolidone.	
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Type of Sampling:			Use microelectronic industry vapor Inhalation up to 280 mg/m3 (temperature of 80"C) full-shift area				
EVALUATION				MUUD+			
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.	
Domain 2: Benre	contativo						
Domain 2. Repres	Metric 2:	Geographic Scope	Low	× 1	3	unknown	
	Metric 3:	Applicability	Medium	$\times 2$	4	Not fully specified; could be cleaning in electronics industry	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1991	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Lacks worker activities	
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	no discussion	
Overall Quality D	eterminatio	n [†]	Low		2.7		

 \star MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	urce Citation: Who,. 2001. Concise International Chemical Assessment Document 35: N-Methyl-2-Pyrrolidone. Occupational Exposure; Monitoring Data; 3809476							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Type of Sampling:			Use paint strip vapor Inhalation up to 64 n 8-hr TWA personal	Use paint stripping vapor Inhalation up to 64 mg/m3 8-hr TWA personal				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.		
Domain 2: Repres	sentative							
Domain 2. Repres	Metric 2.	Geographic Scope	Low	× 1	3	unknown		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	ibility/Clari Metric 6:	ty Metadata Completeness	Medium	× 1	2	Lacks worker activities		
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	no discussion		
	menne /.	Metadata Completeness	LOW	~ 1	J	10 (15(155)0)		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Medium		2.2			

Source Citation: Type of Data Source Hero ID	Who,. 200 Occupation 3809476	Who,. 2001. Concise International Chemical Assessment Document 35: N-Methyl-2-Pyrrolidone. Occupational Exposure; Monitoring Data; 3809476						
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method:			Use paint strip vapor Inhalatior 280 mg/m 1-hr peak	Use paint stripping vapor Inhalation 280 mg/m3 1-hr peak				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	× 1	3	Sampling or analytical methodology is not specified.		
Domain 2: Repres	Metric 2: Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Low High Medium Low	$\begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$	3 2 4 3 2	unknown in scope 2000 characterized by no statistics.		
	Metric 0.	Metadata Completeness	Medium	× 1	2	Lacks worker activities		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	no discussion		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Medium		2.2			

Source Citation:U.S, E. P.Type of Data SourceOccupatioHero ID3827493	A., 1998. Environmental profile nal Exposure; Monitoring Data;	e for N-meth	hylpyrroli	done.			
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Worker Activity: Type of Sampling:			Use photoresist remover vapor Inhalation typical: 0.02 to 1.5 ppm Industrial hygiene evaluations were performed in the die-coat application areas, in the NMP cleaning rooms, and in rooftop stack exhausts. area				
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified		
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Low High Low Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	3 2 6 3	unknown in scope 1991 characterized by no statistics.		
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Lacks sample duration, exposure duration, frequency, and worker activities		
Domain 4: Variability and Un Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	does not address variability or uncertainty.		
Overall Quality Determination	\mathbf{n}^{\dagger}	Low		2.4			

^{*} MWF = Metric Weighting Factor
[†] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:U.SType of Data SourceOccHero ID382'	, E. P. A.: 2015. TSCA work plan che cupational Exposure; Completed Expo 7504	mical risk sure or Ri	assessme sk Assess	nt. N-N sments;	Iethylpyrrolidone: Paint stripper use (CASRN: 872-50-4).	
EXTRACTION Parameter		Data				
Life Cycle Stage: Life Cycle Description Physical Form: Route of Exposure: Type of Measurement Worker Activity: Number of Workers: Exposure Duration: Exposure Frequency: PPE:	(Subcategory of Use): or Method:	Use paint st liquid dermal PBPK = skin sur cm2; bo Total < Assume Acute s sumed 3 EPA co respirat nor glow	e nt stripping uid mal BPK modelling n surface contact = 445 (low-end), 668 (mid), and 890 (high-end) 2; body weight = 74 kg tal <230,000 workers. There were no risks to nearby worker non-users. sumed durations of 1-hr, 4-hrs, and 8-hrs ute scenarios assumed 1 day of exposure and chronic scenarios as- ned 5 days of exposure per week PA considered the impact of different combinations of PPE including: pirator and gloves, respirator only, gloves only, and neither respirator r gloves.			
EVALUATION Domain	Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliability Met	tric 1: Methodology	High	$\times 1$	1	Data and techniques are high quality; Information from trusted sources.	
Domain 2: Representat Met Met Met	tive cric 2: Geographic Scope cric 3: Applicability cric 4: Temporal Representativeness cric 5: Sample Size	$\begin{array}{ccccccc} \mathrm{High} & \times 1 & 1 & \mathrm{US} \\ \mathrm{High} & \times 2 & 2 & \mathrm{in\ scope} \\ \mathrm{S} & \mathrm{High} & \times 2 & 2 & 2015 \\ \mathrm{High} & \times 1 & 1 & \mathrm{Statistical\ distribution\ of\ samples\ is\ fully\ characterized.\ Samples\ is\ sufficiently\ representative.} \end{array}$				
Domain 3: Accessibilit Met	y/Clarity tric 6: Metadata Completeness	High	× 1	1	clearly documents its data sources	

- continued from previous page							
Source Citation: Type of Data Source Hero ID	U.S, E. P. A 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). Occupational Exposure; Completed Exposure or Risk Assessments; 3827504						
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 4: Variab	ility and Ur Metric 7:	certainty Metadata Completeness	High	$\times 1$	1	well characterized	
Overall Quality Determination ^{\dagger}		High		1.0			

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

EXTRACTION ParameterDataLife Cycle Stage:UseLife Cycle Description (Subcategory of Use):paint strippingPhysical Form:liquidRoute of Exposure:InhalationExposure Concentration (Unit):1.0 (low-end), 32.5 (mid), 64 (high-end) mg/m3Type of Measurement or Method:8-hr TWAWorker Activity:Miscellaneous stripping (assumed mostly indoor)Number of Workers:Total <230,000 workers. Professional contractors (likely to include bath- tub refinishing): 5 workers/facility: Automotive refinishing: 6 workers/	Source Citation:UType of Data SourceOHero ID38	ce Citation: e of Data Source ID U.S, E. P. A., 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). Occupational Exposure; Completed Exposure or Risk Assessments; 3827504					
ParameterDataLife Cycle Stage:UseLife Cycle Description (Subcategory of Use):paint strippingPhysical Form:liquidRoute of Exposure:InhalationExposure Concentration (Unit):1.0 (low-end), 32.5 (mid), 64 (high-end) mg/m3Type of Measurement or Method:8-hr TWAWorker Activity:Miscellaneous stripping (assumed mostly indoor)Number of Workers:Total <230,000 workers. Professional contractors (likely to include bath- tub refinishing): 5 workers/facility: Automotive refinishing: 6 workers/	EXTRACTION						
Life Cycle Stage:UseLife Cycle Description (Subcategory of Use):paint strippingPhysical Form:liquidRoute of Exposure:InhalationExposure Concentration (Unit):1.0 (low-end), 32.5 (mid), 64 (high-end) mg/m3Type of Measurement or Method:8-hr TWAWorker Activity:Miscellaneous stripping (assumed mostly indoor)Number of Workers:Total <230,000 workers. Professional contractors (likely to include bath- tub refinishing): 5 workers/facility: Automotive refinishing: 6 workers/	Parameter			Data			
Life Cycle Istage.OseLife Cycle Description (Subcategory of Use):paint strippingPhysical Form:liquidRoute of Exposure:InhalationExposure Concentration (Unit):1.0 (low-end), 32.5 (mid), 64 (high-end) mg/m3Type of Measurement or Method:8-hr TWAWorker Activity:Miscellaneous stripping (assumed mostly indoor)Number of Workers:Total <230,000 workers. Professional contractors (likely to include bath- tub refinishing): 5 workers/facility: Automotive refinishing: 6 workers/	Life Cuelo Staro			Uco			
Interest of the Description (Subcutegory of Cose).paint strippingPhysical Form:liquidRoute of Exposure:InhalationExposure Concentration (Unit):1.0 (low-end), 32.5 (mid), 64 (high-end) mg/m3Type of Measurement or Method:8-hr TWAWorker Activity:Miscellaneous stripping (assumed mostly indoor)Number of Workers:Total <230,000 workers. Professional contractors (likely to include bath- tub refinishing): 5 workers/facility: Automotive refinishing: 6 workers/	Life Cycle Descriptio	on (Subca	tegory of Use).	naint st	rinning		
Route of Exposure: Inhalation Exposure Concentration (Unit): 1.0 (low-end), 32.5 (mid), 64 (high-end) mg/m3 Type of Measurement or Method: 8-hr TWA Worker Activity: Miscellaneous stripping (assumed mostly indoor) Number of Workers: Total <230,000 workers. Professional contractors (likely to include bath-tub refinishing): 5 workers/facility: Automotive refinishing: 6 workers/	Physical Form:	in (Dubea	legory of elec).	liquid	ripping		
Exposure Concentration (Unit):1.0 (low-end), 32.5 (mid), 64 (high-end) mg/m3Type of Measurement or Method:8-hr TWAWorker Activity:Miscellaneous stripping (assumed mostly indoor)Number of Workers:Total <230,000 workers. Professional contractors (likely to include bath- tub refinishing): 5 workers/facility: Automotive refinishing: 6 workers/	Route of Exposure:			Inhalati	on		
Type of Measurement or Method: 8-hr TWA Worker Activity: Miscellaneous stripping (assumed mostly indoor) Number of Workers: Total <230,000 workers. Professional contractors (likely to include bath-tub refinishing): 5 workers/facility: Automotive refinishing: 6 workers/	Exposure Concentrat	tion (Unit	t):	1.0 (low	-end), 32	2.5 (mid)), 64 (high-end) $mg/m3$
Worker Activity: Miscellaneous stripping (assumed mostly indoor) Number of Workers: Total <230,000 workers. Professional contractors (likely to include bath- tub refinishing): 5 workers/facility: Automotive refinishing: 6 workers/	Type of Measuremen	nt or Metl	hod:	8-hr TV	VA	- (
Number of Workers: Total <230,000 workers. Professional contractors (likely to include bath- tub refinishing): 5 workers/facility: Automotive refinishing: 6 workers/	Worker Activity:			Miscella	neous st	ripping	(assumed mostly indoor)
Exposure Duration:Acute scenarios assumed 1 day of exposure and chronic scenarios assumed 5 days of exposure per weekPPE:PPE:PPE:PPE including:PPE:PPE including:PPE: </td <td colspan="2">Worker Activity: Number of Workers: Exposure Duration: Exposure Frequency: PPE:</td> <td colspan="5">Miscellaneous stripping (assumed mostly indoor) Total <230,000 workers. Professional contractors (likely to include bath- tub refinishing): 5 workers/facility; Automotive refinishing: 6 workers/ facility; Furniture refinishing: 3 workers/facility; Art restoration and conservation (not estimated); Aircraft paint stripping: 320 workers/ facility (for aircraft manufacturing only); Ship paint stripping: 100 work- ers/facility. There were no risks to nearby worker non-users. Assumed durations of 1-hr, 4-hrs, and 8-hrs Acute scenarios assumed 1 day of exposure and chronic scenarios as- sumed 5 days of exposure per week EPA considered the impact of different combinations of PPE including: respirator and gloves, respirator only, gloves only, and neither respirator nor gloves.</td>	Worker Activity: Number of Workers: Exposure Duration: Exposure Frequency: PPE:		Miscellaneous stripping (assumed mostly indoor) Total <230,000 workers. Professional contractors (likely to include bath- tub refinishing): 5 workers/facility; Automotive refinishing: 6 workers/ facility; Furniture refinishing: 3 workers/facility; Art restoration and conservation (not estimated); Aircraft paint stripping: 320 workers/ facility (for aircraft manufacturing only); Ship paint stripping: 100 work- ers/facility. There were no risks to nearby worker non-users. Assumed durations of 1-hr, 4-hrs, and 8-hrs Acute scenarios assumed 1 day of exposure and chronic scenarios as- sumed 5 days of exposure per week EPA considered the impact of different combinations of PPE including: respirator and gloves, respirator only, gloves only, and neither respirator nor gloves.				
EVALUATION	EVALUATION						
Domain Metric Rating MWF* Score Comments	Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability	Domain 1: Reliabilit	V					
Metric 1: Methodology High × 1 1 Data and techniques are high quality; Information from trusted sources.	M	fetric 1:	Methodology	High	$\times 1$	1	Data and techniques are high quality; Information from trusted sources.
Demain 9. Depresentative	Domoir 9: Down	tative					
Domain 2: Representative	Domain 2: Represent	tative	Coorrentie Soore	II: mb	× 1	1	
Metric 2. Geographic scope fight $\times 1$ 1 US Metric 3: Applicability High $\times 2$ 2 in scope	1VI N/1	fetric 2:	Applicability	High	× 1 × 9	1 9	US
Metric 4: Temporal Representativeness High $\times 2$ 2 2015	M	fetric 4	Temporal Representativeness	High	$\stackrel{\wedge}{\times} 2$	$\frac{2}{2}$	2015
Continued on part page			Con	tinued on	novt po	-	

				<u> </u>			
Source Citation: Type of Data Source Hero ID	U.S, E. P. A 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). Occupational Exposure; Completed Exposure or Risk Assessments; 3827504						
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
	Metric 5:	Sample Size	High	$\times 1$	1	Statistical distribution of samples is fully characterized. Sam- ple size is sufficiently representative.	
Domain 3: Accessibility/Clarity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	clearly documents its data sources	
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	well characterized	
Overall Quality Determination ^{\dagger}		High		1.0			

* MWF = Metric Weighting Factor

Source Citation: U.S, E. P. A. 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4) Occupational Exposure; Completed Exposure or Risk Assessments;								
Hero ID 382750	4							
EXTRACTION		Data						
Parameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (S	bcategory of Use):	graffiti	removal					
Physical Form:		liquid						
Route of Exposure:		Inhalat	ion					
Exposure Concentration	Unit):	0.03 (lo	w-end),	1.01 (mi	id), 4.52 (high-end) mg/m3			
Type of Measurement or	Method:	8-hr T∖	NA	,				
Worker Activity:		Graffiti	removal	(assume	ed mostly outdoor but may include semi-confined			
		spaces)						
Number of Workers:		Total <	< 230,000	worker	s. 8 workers/facility. There were no risks to			
		nearby	worker n	on-user	S.			
Exposure Duration:		Assume	ed durati	ons of 1	-hr, 4-hrs, and 8-hrs			
Exposure Frequency:		Acute s	Acute scenarios assumed 1 day of exposure and chronic scenarios as-					
		sumed	sumed 5 days of exposure per week					
PPE:		EPA considered the impact of different combinations of PPE including:						
		respirat	respirator and gloves, respirator only, gloves only, and neither respirator					
		nor gloves.						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metric	1: Methodology	High	$\times 1$	1	Data and techniques are high quality; Information from trusted			
					sources.			
Domain 2: Representativ								
Metric	2: Geographic Scope	High	× 1	1	US			
Metric	3: Applicability	High	$\times 2$	2	in scope with paint stripping?			
Metric	4: Temporal Representativeness	High	$\times 2$	2	2015			
Metric	5: Sample Size	High	$\times 1$	1	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative.			
	Cor	ntinued or	n next pa	lge				
Continued on next page								

Source Citation: Type of Data Source Hero ID	U.S, E. P. A 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). Occupational Exposure; Completed Exposure or Risk Assessments; 3827504					
EVALUATION						
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	clearly documents its data sources
Domain 4: Variat	oility and Ur Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	well characterized
Overall Quality D	Determinatio	n^\dagger	High		1.0	

 \star MWF = Metric Weighting Factor

Source Citation: U.S, E. P. A.: 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). Occupational Exposure; Completed Exposure or Risk Assessments;							
Hero ID 3827504							
EXTRACTION							
Parameter		Data					
		T T					
Life Cycle Stage:	octomore of Lag).	Use					
Dhusical Form:	category of Use):	liquid	ripping				
Boute of Exposure		Inhalat	ion				
Exposure Concentration (U)	nit):	0.01 to	280 mg/	m3			
Type of Measurement or Me	ethod:	measur	ed - see 7	Table A	px D-9		
Worker Activity:		during	stripping	- see T	able Apx D-9		
Type of Sampling:		persona	ıl				
Exposure Duration:		43 to 10	$67 \mathrm{~mins}$				
EVALUATION							
Domain	Metric	Rating	MWF^*	Score	Comments		
Metric 1:	Methodology	High	$\times 1$	1	Data and techniques are high quality; Information from trusted		
		0			sources.		
Domain 2. Domagontativo							
Motric 2: Metric 2:	Geographic Scope	High	~ 1	1	IIC		
Metric 3:	Applicability	High	$\times 2$	2	in scope		
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015		
Metric 5:	Sample Size	High	× 1	1	Statistical distribution of samples is fully characterized. Sam-		
		0			ple size is sufficiently representative.		
	.,						
Domain 3: Accessibility/Cla	rity Mata data Gammalatan ara	TT:1.	1	1			
Metric 6:	Metadata Completeness	High	× 1	1	clearly documents its data sources		
Domain 4: Variability and I	Incertainty						
Metric 7: Metadata Completeness		High	$\times 1$	1	well characterized		
	T T T T T T T T T T T T T T T T T T T	0					
Overall Quality Determination	on^\dagger	High		1.0			
	Cor	tinued or	n next pa	ıge			
			-				

Source Citation: Type of Data Source Hero ID	U.S, E. P. A 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). Occupational Exposure; Completed Exposure or Risk Assessments; 3827504
EVALUATION	
Domain	Metric Rating MWF* Score Comments

* MWF = Metric Weighting Factor

Source Citation: U.S, E. P. A 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). Occupational Exposure; Completed Exposure or Risk Assessments; Hero ID 3827504							
EXTRACTION Parameter		Data					
1 ai ainetei		Data					
Life Cycle Stage:		Use					
Life Cycle Description (Sub	category of Use):	paint st	ripping				
Physical Form:		liquid					
Route of Exposure:		Inhalati	on				
Exposure Concentration (U	nit):	64 mg/s	m3				
Type of Measurement or M	ethod:	8-hr TV	VA				
Worker Activity:		during s	stripping	- see T	able Apx D-9		
Type of Sampling:		persona	.1				
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliability							
Metric 1	Methodology	High	$\times 1$	1	Data and techniques are high quality; Information from trusted sources.		
Domain 2: Representative							
Metric 2	Geographic Scope	High	× 1	1	US		
Metric 3	Applicability	High	$\times 2$	2	in scope		
Metric 4	Temporal Representativeness	High	$\times 2$	2	2015		
Metric 5	Sample Size	High	$\times 1$	1	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative.		
	.,						
Domain 3: Accessibility/Cla Metric 6	irity Metadata Completeness	High	× 1	1	clearly documents its data sources		
	metadata Completeness	111511	~ 1	T	clearly documents its data sources		
Domain 4: Variability and	Uncertainty						
Metric 7	Metadata Completeness	High	$\times 1$	1	well characterized		
Overall Quality Determinat	$\operatorname{ion}^{\dagger}$	High		1.0			
	Cor	tinued or	next pa	ge			

Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). Occupational Exposure; Completed Exposure or Risk Assessments; 3827504						
EVALUATION							
Domain	Metric Rating MWF* Score Comments						

Source Citation:U.S, E. P. A 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4).Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments; 3827504Hero ID3827504								
EXTRACTION		D (
Parameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Su	bcategory of Use):	graffiti	removal					
Physical Form:		liquid						
Route of Exposure:		Inhalat	ion					
Exposure Concentration (Unit):	0.56 to	1.78 mg/	/m3				
Type of Measurement or 1	Method:	8-hr TV	VA	_				
Worker Activity:		during	graffiti re	emoval -	see Table Apx D-9			
Type of Sampling:		persona	ıl					
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metric	1: Methodology	High	$\times 1$	1	Data and techniques are high quality; Information from trusted sources.			
Domain 2: Representative	1							
Metric	2: Geographic Scope	High	$\times 1$	1	US			
Metric	3: Applicability	High	$\times 2$	2	in scope with paint stripping?			
Metric	4: Temporal Representativeness	High	$\times 2$	2	2015			
Metric	5: Sample Size	High	$\times 1$	1	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative.			
Domain 2. Accessibility/	llovity							
Metric	6: Metadata Completeness	High	$\times 1$	1	clearly documents its data sources			
Demein 4. Veniebiliter en								
Domain 4: variability and	7. Motodata Completeness	High	v 1	1	well shows staring d			
metric	7: Metadata Completeness	підп	X 1	1	well characterized			
Overall Quality Determination ^{\dagger}		High		1.0				
	Continued on next page							
			-					

Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). Occupational Exposure; Completed Exposure or Risk Assessments; 3827504						
EVALUATION							
Domain	Metric Rating MWF* Score Comments						

Source Citation:U.S.Type of Data SourceOccuHero ID3827	E. P. A., 2015. TSCA work plan cher pational Exposure; Completed Expos 504	nical risk sure or Ri	assessme sk Assess	nt. N-N sments;	Iethylpyrrolidone: Paint stripper use (CASRN: 872-50-4).		
EXTRACTION Parameter		Data					
Parameter Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Type of Sampling:			Data Use graffiti removal vapor Inhalation Range: 0.01 to 24.61Geometric mean: 1.97Mean: 4.71Standard devia- tion: 6.17 15-min short term sample during graffiti removal - see Table Apx D-9 personal				
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Metr	ic 1: Methodology	High	× 1	1	Data and techniques are high quality; Information from trusted sources.		
Domain 2: Representati Metr Metr Metr Metr	ve ic 2: Geographic Scope ic 3: Applicability ic 4: Temporal Representativeness ic 5: Sample Size	High High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 2 1	US in scope with paint stripping? 2015 Statistical distribution of samples is fully characterized. Sam- ple size is sufficiently representative.		
Domain 3: Accessibility Metr	/Clarity ic 6: Metadata Completeness	High	$\times 1$	1	clearly documents its data sources		
Domain 4: Variability a Metr	nd Uncertainty ic 7: Metadata Completeness	High	$\times 1$	1	well characterized		
Overall Quality Determination ^{\dagger}		High		1.0			
Continued on next page							

Source Citation: Type of Data Source Hero ID	U.S, E. P. A 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). Occupational Exposure; Completed Exposure or Risk Assessments; 3827504
EVALUATION	
Domain	Metric Rating MWF* Score Comments

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. PubChem: 1-Methyl-2-pyrrolidinone. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3860487						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Number of Workers:		All All 85169 wo where NM	All All 85169 workers estimated to be exposed to NMP in US at workplaces where NMP is produced or used				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	From NIOSH	
Domain 2: Repres	sentative	Coorden alia Coorda	TT:].	v 1	1		
	Metric 2:	Geographic Scope	Hign Madiuma	$\times 1$	1		
	Metric 3:	Tomporal Representativeness	Low	$\times 2$ $\times 2$	4	Not fully specified; could include out of scope stages	
	Metric 5:	Sample Size	N/A	A 4	N/A	This metric is not applicable to this data type	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	No metadata, but still can be applied	
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Medium	$\times 1$	2	limited discussion	
Overall Quality D	Determinatio	n†	Medium		2.1		

Source Citation: 2017. Haz Type of Data Source Occupatio Here ID 3860403	ardous substances data bank: 1- nal Exposure; Reports for Data	Methyl-2-p or Informat	yrrolidine tion Othe	one. er than	Exposure or Release Data;
FYTRACTION					
Parameter		Data			
		4.11			
Life Cycle Stage: Life Cycle Description (Suba	atoromy of Llao).	All			
Worker Activity:	ategory of Use).	All all worko	e notont	ially ovi	posed
Number of Workers:		85 169 wc	rkers	iany exp	Joseu
itumber of workers.		00,100	, include the second se		
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domoin 1. Doliobility					
Domain 1: Reliability Motric 1:	Methodology	High	\vee 1	1	Erom MOSH
	Methodology	IIIgii	~ 1	1	From NIOSH
Domain 2: Representative					
Metric 2:	Geographic Scope	High	$\times 1$	1	US
Metric 3:	Applicability	Medium	$\times 2$	4	Not fully specified; could include out of scope stages
Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1983
Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Domain 2. Accessibility/Clay	:+				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	No metadata, but still can be applied
	*				
Domain 4: Variability and U	ncertainty				
Metric 7:	Metadata Completeness	Medium	$\times 1$	2	limited discussion
Overall Quality Determination	n^{\dagger}	Medium		2.1	

Source Citation:	2017. Haza	ardous substances data bank: 1-	Methyl-2-	pyrrolidi	inone.	
Type of Data Source Hero ID	Occupation 3860493	nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Uso			
Life Cycle Descript	tion (Subca	tegory of Use):	Wood r	reservati	ve	
Exposure Concent	ration (Uni	t):	142 ug/	m3		
Type of Sampling:	(•	-)-	area			
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
	_					
Domain 1: Reliabi	lity		_		_	
	Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.
Domain 2. Represe	entative					
Domain 2. Repress	Metric 2:	Geographic Scope	Low	$\times 1$	3	unknown
	Metric 3:	Applicability	High	$\times 2$	2	in scope
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1997
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.
Domain 3: Accessi	bility/Clari	ity	Ŧ			
	Metric 6:	Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but no other metadata.
	1. 1					
Domain 4: Variabi	lity and Ur	ncertainty	т	1	9	
	Metric 7:	Metadata Completeness	Low	× 1	3	no discussion
	, . ,.	+	Ŧ		2.4	
Overall Quality De	eterminatio	n'	Low		2.6	

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation: Type of Data Source Hero ID	 Australian Government Department of, Health. 2016. Human health tier III assessment for 1-methyl-2-pyrrolidinone. Occupational Exposure; Published Models for Exposures or Releases; 3969286 						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Type of Measurement or Method:			Consumer Use Coatings liquid dermal Floor lacquer $A = 108$ cm2Writing $A = 1$ cm2				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	the model makes assumptions or uses parameter values that lead to significant uncertainties	
Domain 2: Repres	sentative			-	0		
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia	
	Metric 3:	Applicability	Low	$\times 2$	6	non-occupational scenario that is similar to an occupational scenario	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Medium	$\times 1$	2	Model approach, equations, and choice of parameter values are	
						transparent. However, rationale not fully described.	
Domain 4: Variab	ility and U	ncertainty					
	Metric 7:	Metadata Completeness	High	$\times 1$	1	well characterized	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Medium		2.0		

Source Citation: Type of Data Source Hero ID	 n: Australian Government Department of, Health. 2016. Human health tier III assessment for 1-methyl-2-pyrrolidinone. Source Occupational Exposure; Published Models for Exposures or Releases; 3969286 							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Type of Measurement or Method:			Consumer Use Cleaning liquid dermal Spot removal = 230 cm2Paint remover = 430 cm2Sealant /foam remover A = 5 cm2					
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliabili	ity Metric 1:	Methodology	Low	× 1	3	the model makes assumptions or uses parameter values that lead to significant uncertainties		
Domain 2: Represe	ntative Metric 2:	Geographic Scope	Medium	$\times 1$	2	Australia		
]	Metric 3: Metric 4:	Applicability Temporal Representativeness	Low High	$\times 2$ $\times 2$	6 2 N / A	non-occupational scenario that is similar to an occupational scenario 2016		
Domain 3: Accessib	oility/Clari Metric 6:	ty Metadata Completeness	Medium	× 1	2	Model approach, equations, and choice of parameter values are		
Domain 4: Variabil	ity and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	well characterized		
Overall Quality Det	terminatio	n [†]	Medium		2.0			

Source Citation: Type of Data Source Hero ID	Australian Government Department of, Health. 2016. Human health tier III assessment for 1-methyl-2-pyrrolidinone. Occupational Exposure; Published Models for Exposures or Releases; 3969286						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit):			Consumer Use Ink vapor Inhalation Assumed negligible due to small volume of use				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	the model makes assumptions or uses parameter values that lead to significant uncertainties	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Australia	
	Metric 3:	Applicability	Low	$\times 2$	6	non-occupational scenario that is similar to an occupational scenario	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Medium	$\times 1$	2	Model approach, equations, and choice of parameter values are transparent. However, rationale not fully described.	
Domain 4: Variab	ility and Uı Metric 7:	ncertainty Metadata Completeness	High	× 1	1	well characterized	
Overall Quality D	eterminatio	n [†]	Medium		2.0		

Source Citation: Type of Data Source Hero ID	Australian Government Department of, Health. 2016. Human health tier III assessment for 1-methyl-2-pyrrolidinone. Occupational Exposure; Published Models for Exposures or Releases; 3969286						
EXTRACTION Parameter	EXTRACTION Parameter Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method:			Consumer Use Coating and cleaning vapor Inhalation mean concentration ranged 54.3 to 217 mg/m3 for products containing 50 and 25 percent of NMP; 10.4 to 113 mg/m3 for 5 percent NMP; and 0.623 to 12.9 for mg/m3 for 0.3 percent NMP Modeled based on saturation and parameters in Table 5 (ventilation, time)				
EVALUATION Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliabi	ility Metric 1:	Methodology	Low	$\times 1$	3	the model makes assumptions or uses parameter values that lead to significant uncertainties	
Domain 2: Repres	entative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Low High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	2 6 2 N/A	Australia non-occupational scenario that is similar to an occupational scenario 2016 No Comment.	
Domain 3: Accessi	Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 Model approach, equations, and choice of parameter values transparent. However, rationale not fully described						
Domain 4: Variabi	ility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	well characterized	
Continued on next page							

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Source Citation: Type of Data Source Hero ID	Australian Government Department of, Health. 2016. Human health tier III assessment for 1-methyl-2-pyrrolidinone. Occupational Exposure; Published Models for Exposures or Releases; 3969286							
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments			
Overall Quality I	$\operatorname{Determination}^{\dagger}$	Medium		2.0				

* MWF = Metric Weighting Factor

Source Citation:	Niosh, 2014. Health hazard evaluation report no. HHE-2011-0099-3211, evaluation of employee exposures during sea lamprey pesticide application.									
Type of Data Source Hero ID	Occupation 3974909	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3974909								
EXTRACTION Parameter	Data									
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity: Number of Workers: Exposure Frequency: PPE:				Use Agricultural products Mixing pesticides with water prior to application; application; lab anal- yses to measure concentration upon application 38 employees 10-day periods throughout the season (April to October) Eye protection (safety glasses, goggles, or face shield) and chemical resis- tant gloves when mixing and applying pesticide. NIOSH-approved full facepiece dual cartridge (particulate and organic vapor) respirator when using the Bayluscide wettable powder and Bayluscide granular.						
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Boliah	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Information is from trusted sources (NIOSH HHE)				
Domain 2: Repre	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 2 1	US Agricultural use is in scope 2014 Sample size is sufficiently representative. Results are from in- terviewing of 20 employees				
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness				× 1	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.				
Domain 4: Variab	bility and Un Metric 7:	ncertainty Metadata Completeness	High	× 1	1	The report addresses variability and uncertainty in the results.				
Continued on next page										

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Source Citation:	Niosh, 2014. Health hazard evaluation report no. HHE-2011-0099-3211, evaluation of employee exposures during sea lamprey pesticide application.							
Type of Data Source Hero ID	Occupational Exposure; Reports for Data 3974909	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3974909						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Overall Quality Determination [†] High 1.0								

* MWF = Metric Weighting Factor
[†] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Osha, 201 reduction	Osha,. 2010. Input received through web forum for identifying hazardous chemicals for which OSHA should develop exposure reduction strategies.							
Type of Data Source Hero ID	Occupation 3978176	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978176							
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Descrip	All Source was listed for exposure data, but only contained exposure limits. No data extracted								
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	OSHA			
Domain 2: Repres	sentative		TT: 1	-	-				
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	× 2	8	No information relevant to assessed conditions of use			
	Metric 4: Metric 5:	Sample Size	Hign N/Δ	× Z	$\frac{2}{N/\Delta}$	2010 This metric is not applicable to this data type			
	Metric 5.	Sample Size	N/A		n/n	This metric is not applicable to this data type			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Data sources are generally described but not fully transparent.			
Domain 4: Variab	ility and U	ncertainty	27.14						
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.0.			

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor
| Source Citation:
Type of Data Source
Hero ID | Osha, 2017. Sampling and analytical methods: N-methyl-2-pyrrolidinone.
Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
3978312 | | | | | | | |
|---|--|---|----------------|--------------------------|-------|---|--|--|
| EXTRACTION | | | Data | | | | | |
| Parameter | | | Data | | | | | |
| Life Cycle Stage:
Life Cycle Description (Subcategory of Use): | | All
Source was listed for exposure data, but only contained exposure limits. | | | | | | |
| | | | No data extrac | ted | | | | |
| | | | | | | | | |
| EVALUATION | | Matria | Dating | MATE | Coore | Commente | | |
| Domain | | Metric | Rating | IVI VV F ^ | Score | Comments | | |
| Domain 1. Beliab | ility | | | | | | | |
| | Metric 1: | Methodology | High | $\times 1$ | 1 | OSHA | | |
| Domain 9. Ponro | ontativo | | | | | | | |
| Domain 2: Repres | Motrie 2 | Coographic Scope | High | ~ 1 | 1 | IIC | | |
| | Metric 2. | Applicability | Unaccontable | $^{\land 1}$ $^{\lor 2}$ | 8 | US | | |
| | Metric 4: | Temporal Representativeness | High | $^{\sim 2}$ $\times 2$ | 2 | 2017 | | |
| | Metric 5: | Sample Size | N/A | ~ 2 | N/A | This metric is not applicable to this data type | | |
| | | | | | | | | |
| Domain 3: Access | ibility/Clari | ity | | | | | | |
| | Metric 6: | Metadata Completeness | High | $\times 1$ | 1 | clearly documents its data sources | | |
| Domain 4. Variah | ility and Ur | acortainty | | | | | | |
| Domain 4. Variau | Metric 7: | Metadata Completeness | N/A | | N/A | This metric is not applicable to this data type | | |
| | | L | | | / | | | |
| Overall Quality D | eterminatio | \mathbf{n}^{\dagger} | Unacceptable | | 4 | Metric Mean Score: 1.9. | | |
| | | | | | | | | |

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

Source Citation:Nicnas,. 2Type of Data SourceOccupationHero ID3978357	001. Full public report: Polymer nal Exposure; Reports for Data	r in primal or Informat	binder u- tion Othe	51. er than	Exposure or Release Data;
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subc Physical Form: Boute of Exposure:	ategory of Use):	Formulati polymeric liquid, 5 j dermal	ion c adhesive percent	e for lea	ther coating application
Worker Activity:			ing and a g vessel.	dding p	orimal Binder U-51 and other components into
Number of Workers: Exposure Duration: Exposure Frequency: Engineering Control & perce PPE:	the mixing vessel. 2-3 /site 4-6 hours/day 100 days/year Exhaust ventilation systems are installed in the mixing room. Safety glasses, impervious gloves. Overalls and safety boots				
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Information is from trusted sources
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Australia
Metric 3:	Applicability	High	$\times 2$	2	Adhesive formulation is in scope
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001
Metric 5:	Sample Size	Low	$\times 1$	3	Distribution of samples is qualitative
Domain 3: Accessibility/Clar	ity				
Metric 6:	Metadata Completeness	High	× 1	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions
Domain 4: Variability and U	ncertainty				
Metric 7:	Metadata Completeness	Medium	$\times 1$	2	limited discussion
	Cor	ntinued on r	next page)	

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Source Citation: Type of Data Source Hero ID	Vicnas, 2001. Full public report: Polymer in primal binder u-51. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978357						
EVALUATION							
Domain	Metric	Rating N	IWF* Score	Comments			
Overall Quality E	$\operatorname{Determination}^\dagger$	Medium	1.7				

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* MWF = Metric Weighting Factor

Source Citation:Nicnas, 2Type of Data SourceOccupationHero ID3978357	2001. Full public report: Polymer onal Exposure; Reports for Data	r in primal or Informa	binder u- tion Othe	-51. er than I	Exposure or Release Data;		
EXTRACTION Parameter		Data					
		Data					
Life Cycle Stage:		Use					
Life Cycle Description (Subo	category of Use):	spray app	olication	of polyn	neric adhesive for leather coating application		
Physical Form:		liquid, 5 j	percent				
Route of Exposure:		dermal, ii	nhalation	1 			
Worker Activity:		Transferr on convey	ing basec yor line.	oat and	operating spray machines. Placing substrates		
Number of Workers:		2-3 /site					
Exposure Duration:		6-8 hours	/day				
Exposure Frequency:		100 days/	/year				
Engineering Control & percent Exposure Reduction: PPE:			Enclosed rotary spray unit. An exhaust ventilation system is present above the spray machines and any overspray is filtered and caught in a water curtain filtering system. Safety glasses, impervious gloves. Overalls and safety boots				
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Information is from trusted sources		
Domain 2: Representative Motrie 2:	Coographic Scope	Modium	~ 1	9	Australia		
Metric 2.	Applicability	High	$\times 1$ $\times 2$	2	Adhesiye use is in scope		
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001		
Metric 5:	Sample Size	Low	$\times 1$	3	Distribution of samples is qualitative		
Domain 3: Accessibility/Cla	rity		_	_			
Metric 6:	Metadata Completeness	High	× 1	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions		
Domain 4: Variability and U	Incertainty						
	Cor	ntinued on 1	next page	9			

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Source Citation: Type of Data Source Hero ID	Nicnas,. 20 Occupation 3978357	Vicnas, 2001. Full public report: Polymer in primal binder u-51. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978357							
EVALUATION									
Domain		Metric	Rating	$\rm MWF^{\star}$	Score		Comments		
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	limited discussion			
Overall Quality I	Determination	a [†]	Medium		1.7				

Source Citation: Type of Data Source Hero ID	Nicnas, 2001. Full public report: Polymer in primal binder u-51. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978357							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Worker Activity: Number of Workers:			Processing Distribution polymeric adhesive for leather coating application liquid, 5 percent dermal Load/unload drums from trucks. No exposure anticipated except in the event of an accident. 5 Waterside, workers, 5-10 transport and warehouse workers					
EVALUATION								
Domain		Metric	Rating	MWF^*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	Information is from trusted sources		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Australia		
	Metric 3:	Applicability	High	$\times 2$	2	Distribution is in scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001		
	Metric 5:	Sample Size	Low	$\times 1$	3	Distribution of samples is qualitative		
	11114 / C 1	•,						
Domain 3: Access	Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions		
Domain 4: Variab	ility and U	ncertainty		1	0			
	Metric 7:	Metadata Completeness	Medium	× 1	2	limited discussion		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Medium		1.7			

Source Citation: Type of Data Source Hero ID	Basf, 1990. Technical information: N-methylpyrrolidone handling and storage. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3982070							
EXTRACTION Parameter	Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): PPE:			All recommended PPE Chemical splash goggles should be worn. Gloves of butyl rubber and FEP Teflon provide the best resistance to NMP. Gloves should be rinsed following use and discarded. Butyl rubber aprons may be used for splash protection, however, the PVC coatings' found on much protective cloth- ing rapidly dissolve in NMP.					
EVALUATION					~	~		
Domain		Metric	Rating	MWF'*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.		
Domain 9. Ponno	ontativo							
Domain 2. Repres	Metric 2.	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	Medium	$\times 2$	4	Information is not related to a life cycle stage, but is broadly applicable		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1990		
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Access	ibility/Clar	ity	-	_				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	underlying data source are not fully transparent.		
Domain 4. Variah	vility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Low		2.3			

Source Citation:Basf., 1Type of Data SourceOccupaHero ID3982074	993. Modification of a vapor degre tional Exposure; Monitoring Data; 4	easing mad	chine for	immers	ion cleaning use N-methylpyrrolidone.
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Su Physical Form: Route of Exposure: Exposure Concentration (Worker Activity: Type of Sampling:	Use immersion degreasing vapor Inhalation average = 0.31 ppm collection tube was located 5.0 feet away from the front lip of the de- greaser top (exhaust hood was located at back lip of degreaser top) and 3.0 feet off of the floor area				
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability Metric	1: Methodology	Low	$\times 1$	3	The data, data sources, and/or techniques used in the assessment or report are not specified.
Domain 2: Representative Metric Metric Metric Metric Metric	 Geographic Scope Applicability Temporal Representativeness Sample Size 	High High Low Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 6\\ 3\end{array}$	US Cleaning is included in scope 1993 characterized by no statistics.
Domain 3: Accessibility/C Metric	larity 6: Metadata Completeness	Low	× 1	3	provides results, but the underlying methods, data sources, and assumptions are not fully transparent
Domain 4: Variability and Metric	Uncertainty 7: Metadata Completeness	Low	× 1	3	The report does not address variability or uncertainty.
Overall Quality Determina	$tion^{\dagger}$	Low		2.3	
	Сог	ntinued or	n next pa	ge	

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Source Citation: Type of Data Source Hero ID	Basf, 1993. Modification of a vapor de Occupational Exposure; Monitoring Da 3982074	egreasing mac ata;	chine for immersion clean	ing use N-methylpyrrolidone.	
EVALUATION					
Domain	Metric	Rating	MWF* Score	Comments	

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* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Basf, 1993 Occupation 3982074	3. Modification of a vapor degre nal Exposure; Monitoring Data;	asing mac	chine for	immers	ion cleaning use N-methylpyrrolidone.	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Worker Activity: Type of Sampling:			Use immersion degreasing vapor Inhalation average = 1.84 ppm Collection tube was taped into place on the workers shirt personal				
EVALUATION		Metric	Bating	MWF*	Score	Comments	
			itating		50010		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	× 1	3	The data, data sources, and/or techniques used in the assess- ment or report are not specified.	
Domain 9. Ponro	ontativo						
Domain 2: Repres	Metric 2.	Geographic Scope	High	× 1	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	Cleaning is included in scope	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1993	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 3: Access	bility/Clari	ity					
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	provides results, but the underlying methods, data sources, and assumptions are not fully transparent	
Domain 4. V	ilitar and TT-	tointe					
Domain 4: Variat	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The report does not address variability or uncertainty.	
Overall Quality D	eterminatio	n [†]	Low		2.3		

Source Citation:	Oehha, 2007. Occupational health hazard risk assessment project for California: Identification of chemicals of concern, possible risk assessment methods, and examples of health protective occupational air concentrations.							
Type of Data Source Hero ID	Occupational Exposure; Published Models for Exposures or Releases; 3982225							
EXTRACTION								
Parameter			Data					
Life Charle Charm			A 11					
Life Cycle Stage:	tion (Subo	tomore of Liza).						
Physical Form:	tion (Subca	tegory of Use).	All					
Route of Exposure	· ·		Inhalation	n				
Exposure Concent	ration (Uni	t).	0.4 to 5 r	nm				
Type of Measurem	ent or Met	hod:	modelled	using int	terspecie	es uncertainty factors		
Worker Activity:	10110 01 10100		Workers v	vere assu	med to	breathe 10 m3 out of a daily breathing rate of		
			20 m3/da	y, and b	e expose	ed at the PEL for 5 days per week.		
Exposure Duration	n:		8 hrs			U A		
Exposure Frequen	cy:		5 days/w	k				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1. Roliabi	litar							
	Metric 1:	Methodology	Medium	$\times 1$	2	Seems sound, but utilizes animal studies to derive human values		
Domain 2: Bepres	ontativo							
Domain 2. Repres	Metric 2.	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	can be appropriately applied		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Accessi	ibility/Clar	ity						
	Metric 6:	Metadata Completeness	High	× 1	1	Model approach, equations, and choice of parameter values are transparent and clear and can be evaluated. Rationale for se- lection of approach, equations, and parameter values is pro- vided.		
Domain 4: Variabi	ility and Ur	ncertainty						
		Con	tinued on r	next page	è			

		contin	lucu nom j	JICVIOUS	page				
Source Citation: Type of Data Source Hero ID	Oehha,. 2 possible ris Occupation 3982225	Oehha, 2007. Occupational health hazard risk assessment project for California: Identification of chemicals of concern, possible risk assessment methods, and examples of health protective occupational air concentrations. Occupational Exposure; Published Models for Exposures or Releases; 3982225							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	Metric 7:	Metadata Completeness	High	$\times 1$	1	The model characterizes variability and uncertainty in the re- sults.			
Overall Quality D	Determination	n^\dagger	High		1.4				

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* MWF = Metric Weighting Factor

Source Citation:Hesis,. 20Type of Data SourceOccupationHero ID3982238	Hesis, 2014. N-methylpyrrolidone (nmp): Health hazard advisory: Fact sheet. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3982238						
EXTRACTION Parameter	ACTION rameter						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Type of Measurement or Method: PPE:			Use all This document lists health effects and suggested PPE. Half-face respirator with organic vapor cartridges. In spraying opera- tions, this should be combined with a mist pre-filter. Wear chemical protective utility gloves such as butyl rubber or Silvershield" (laminated polyethylene/EVOH). NMP will go right through less durable gloves such as those made of natural rubber, nitrile, or polyethylene. Replace gloves often. Use chemical protective clothing such as aprons, sleeves, boots, and head and face protection if NMP can contact your skin at areas other than your hands.				
EVALUATION	Motrie	Bating	MWE*	Score	Comments		
	MEtHC	Itatilig	IVI VV I	Score	Comments		
Domain 1: Reliability		· · · ·	-	_			
Metric 1:	Methodology	High	× 1	1	CalOSHA		
Domain 2: Representative							
Metric 2:	Geographic Scope	High	$\times 1$	1	US		
Metric 3:	Applicability	High	$\times 2$	2	PPE suggestions applicable to in-scope uses		
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014		
Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Accessibility/Clar	rity						
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Data sources are generally described but not fully transparent.		
Domain 4: Variability and U	ncertainty						
Metric 7:	Metadata Completeness	Medium	$\times 1$	2	limited discussion		
	*						
	Con	tinued on r	next page	<u>)</u>			

	55	minuca nom previot	is page	
Source Citation: Type of Data Source Hero ID	Hesis,. 2014. N-methylpyrrolidone (r Occupational Exposure; Reports for 3982238	nmp): Health haazard ac Data or Information Otl	lvisory: Fact s ner than Expo	heet. sure or Release Data;
EVALUATION Domain	Metric	Rating MWF	* Score	Comments
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	High	1.3	

– continued from previous page

* MWF = Metric Weighting Factor

Source Citation:Ec., 2007.Type of Data SourceOccupationHero ID3982353	Recommendation from the scien anal Exposure; Monitoring Data;	ntific comm	ittee on o	occupat	ional exposure limits for n-methyl-2-pyrrolidone.	
EXTRACTION Parameter		Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Sampling: Analytic Method:			Use graffiti removal vapor Inhalation up to 10 mg/m3 personal note: in paint stripper RA			
EVALUATION Domain	Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliability Metric 1:	Methodology	Low	× 1	3	Sampling or analytical methodology is not specified.	
Domain 2: Representative						
Metric 2:	Geographic Scope	Low	$\times 1$	3	unknown	
Metric 3:	Applicability	High	$\times 2$	2	in scope with paint stripping?	
Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1993-2000	
Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but no other metadata.	
Domain 4: Variability and U Metric 7:	ncertainty Metadata Completeness	Medium	$\times 1$	2	limited discussion	
Overall Quality Determination	on [†]	Low		2.4		

Source Citation: Type of Data Source Hero ID	Ec,. 2007. Occupation 3982353	Recommendation from the scien nal Exposure; Monitoring Data;	ntific comm	ittee on o	occupat	ional exposure limits for n-methyl-2-pyrrolidone.
EXTRACTION						
Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Sampling:			Use microelectronic industry vapor Inhalation up to 6 mg/m3 (reg temp); up to 280 mg/m3 (temperature of 80"C) personal			
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.
Domain 2: Repres	Motrie 2	Coographia Soopa	Low	× 1	9	
	Metric 2.	Applicability	Modium	∧ 1 ∨ 9	3	unknown Nat fully graaifad, gould be cleaning in cleatronics in dustry
	Metric 4:	Tomporal Representativeness	Low	$^{\land 2}$ $^{\lor 2}$	4	1001
	Metric 5:	Sample Size	Low	$\times 1^{2}$	3	characterized by no statistics.
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but no other metadata.
Domain 4: Variab	U_1 and U_1	ncertainty	N.C. 11	1	0	
	Metric 7:	Metadata Completeness	Medium	× 1	2	limited discussion
Overall Quality D	eterminatio	n^\dagger	Low		2.7	

Source Citation:Ec,. 2007.Type of Data SourceOccupatioHero ID3982353	Recommendation from the scien nal Exposure; Monitoring Data;	ntific comm	ittee on o	occupat	ional exposure limits for n-methyl-2-pyrrolidone.	
EXTRACTION Parameter		Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Sampling: Analytic Method:			Use paint stripping vapor Inhalation up to 64 mg/m3; peak 280 mg/m3 personal note: in paint stripper RA			
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliability Metric 1:	Methodology	Low	× 1	3	Sampling or analytical methodology is not specified.	
Domain 2: Representative						
Metric 2:	Geographic Scope	Low	$\times 1$	3	unknown	
Metric 3:	Applicability	High	$\times 2$	2	in scope	
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000	
Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but no other metadata.	
Domain 4: Variability and U: Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	limited discussion	
Overall Quality Determination	n^\dagger	Medium		2.2		

Source Citation: Type of Data Source Hero ID	Ec, 2007. Recommendation from the scientific committee on occupational exposure limits for n-methyl-2-pyrrolidone. Occupational Exposure; Monitoring Data; 3982353						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method:		All All vapor dermal 30 percent of the total inhalation dose experimental study in human volunteers					
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	oility Metric 1:	Methodology	Low	× 1	3	Sampling or analytical methodology is not specified.	
Domain 2: Repres	sentative	0					
	Metric 2:	Geographic Scope	Low	$\times 1$	3	unknown	
	Metric 3:	Applicability	Medium	$\times 2$	4	Not fully specified; could be applied to in scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	No metadata, but still can be applied	
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	limited discussion	
Overall Quality	Determinatio	\mathbf{n}^{\dagger}	Low		2.4		

Source Citation: Type of Data Source Hero ID	Ec,. 2007. Recommendation from the scientific committee on occupational exposure limits for n-methyl-2-pyrrolidone. Occupational Exposure; Monitoring Data; 3982353						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Route of Exposure: Exposure Concentration (Unit):				All All dermal 15 minutes exposure to 15 percent aqueous NMP is equivalent to inhalation of 10 mg/m3 NMP with respect to absorption			
			D (MMT+	q		
Domain		Metric	Rating	MWF'^	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.	
Domain 2: Bepre	sentative						
Domain = Teopro	Metric 2:	Geographic Scope	Low	$\times 1$	3	unknown	
	Metric 3:	Applicability	Medium	$\times 2$	4	Not fully specified; could be applied to in scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002	
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	No metadata, but still can be applied	
		*					
Domain 4: Varial	oility and Ur	ncertainty					
	Metric 7:	Metadata Completeness	Medium	× 1	2	limited discussion	
Overall Quality I	eterminatio	\mathbf{n}^{\dagger}	Low		2.4		

Source Citation: Type of Data Source Hero ID	Ec,. 2007. Recommendation from the scientific committee on occupational exposure limits for n-methyl-2-pyrrolidone. Occupational Exposure; Monitoring Data; 3982353							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Route of Exposure: Exposure Concentration (Unit):				All All dermal permeability rate through human skin of $171 + 59$ g/m3 has been derived for NMP				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.		
Domain 2: Panna	antativa							
Domain 2: Repres	Metric 2.	Geographic Scope	Low	$\times 1$	3	unknown		
	Metric 3:	Applicability	Medium	$\times 2$	4	Not fully specified: could be applied to in scope		
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995		
	Metric 5:	Sample Size	Low	$\times 1$	3	characterized by no statistics.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	No metadata, but still can be applied		
Domain 4: Variab	ility and Ur	ncertainty		_	-			
	Metric 7:	Metadata Completeness	Medium	× 1	2	limited discussion		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Low		2.7			

Source Citation:	U.S, E. P. A 2013. OPPT N-Methylpyrrolidone (NMP) draft risk assessment final comments of nine member peer review panel December 31, 2013							
Type of Data Source Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3986611							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Type of Measurement or Method:				Use paint stripping This source is a review of EPA's Draft Paint Stripping RA. It lists mod- elling considerations.				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	The assessment or report uses high quality data and/or tech- niques that are not from trusted sources; however, Associated information does not indicate flaws or quality issues.		
Domain 2: Repres	sentative							
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013		
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Data sources are generally described but not fully transparent.		
Domain 4: Variab	ility and U	ncertainty			_			
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	limited discussion of the variability and uncertainty in the results		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.4			

Source Citation:Thomas,Type of Data SourceOccupationHero ID3986789	Thomas, T. 2017. Comment submitted by Todd Thomas, ELANTAS PDG, Inc. (EPDG). Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3986789							
EXTRACTION Parameter	Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Number of Workers: Engineering Control & percent Exposure Reduction:			Processing /Use Polymers and Electronics (wires) 5 to 10 NMP is used in the following process conditions: Enclosed process vessels with emissions sent to an RTO; includes manufacturing and cleaning op- erations; Small enclosed process vessel (<30 gallons); emissions are fugi- tive; Filling operations into drums, IBC"s and tank wagons; emissions are fugitive; Bulk and container storage operations; Regulated metal parts washers; emissions are fugitive					
EVALUATION								
Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evi- dent.			
Domain 2: Representative								
Metric 2:	Geographic Scope	High	$\times 1$	1	US			
Metric 3:	Applicability	High	$\times 2$	2	In scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accessibility/Cla	rity							
Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source			
	· · · ·							
Domain 4: Variability and U	Metadata Completeness	NI / A		NI / A	N. Comment			
	Metadata Completeness	1N/A		1 N / A	no Comment.			
Overall Quality Determination	Overall Quality Determination ^{\dagger}							
	Cor	ntinued on r	next page	!				

			2	F0-	
Source Citation: Type of Data Source Hero ID	Thomas, T. 2017. Comment submitted by 7 Occupational Exposure; Reports for Data of 3986789	Todd Thom or Informat	mas, ELA tion Othe	NTAS PD r than Exj	G, Inc. (EPDG). posure or Release Data;
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
-					

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* MWF = Metric Weighting Factor

Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group, Inc.							
Type of Data Source Hero ID	Occupation 3986796	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3986796						
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Engineering Control & percent Exposure Reduction:				Use electronics - Photoresist Stripping Closed conveyorized equipment or tank with exhaust ventilation; Venti- lation within the process enclosures are used to maintain proper work- place exposure levels.				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evi- dent.		
Domain 2: Repres	sentative							
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	ibility/Clar	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source		
Domain 4: Variab	ility and Ui Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	eterminatio	n^\dagger	High		1.1			

Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group. Inc.						
Type of Data Source Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3986796						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Engineering Control & percent Exposure Beduction:		Use electronic open topp	Use electronics - Soldermask Stripping open topped tankoguipped with vontilation				
PPE:	×		Worker ex	xposure is	s contro	lled via ventilation and use of appropriate PPE.	
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evident.	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	In scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source	
Domain 4: Variab	oility and Ui	ncertainty					
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.1		

Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group, Inc.						
Type of Data Source Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3986796						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Descrip Engineering Cont PPE:	otion (Subca rol & percer	ategory of Use): at Exposure Reduction:	Processing Chemical processing, excluding formulation (polymer manufacturing) closed reaction system; local ventilation personnel are equipped with PPE				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.	
Domain 2: Repres	sentative						
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	In scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	sibility/Clar	ity Matadata Completeners	II: ab	v 1	1		
	Metric 6:	Metadata Completeness	High	× 1	1	Information is from the source	
Domain 4: Variab	ility and U	ncertainty					
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.	
Overall Quality D	eterminatio	n^\dagger	High		1.1		

Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group, Inc.						
Type of Data Source Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3986796						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Life Cycle Descrip	otion (Subca	ategory of Use):	Fertilizer	applicati	on		
Engineering Cont	rol & percei	t Exposure Reduction:	closed sys	stem tanl	k mixer	in a continuous process	
PPE:			PPE, resp	pirators			
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evident.	
Domain 2: Repres	sentative						
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	In scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source	
Domain 4: Variah	oility and U	ncertainty					
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.1		

Source Citation: Type of Data Source Hero ID	Isaacs, D. Occupation 3986801	2017. Comment submitted by E nal Exposure; Reports for Data	avid Isaacs or Informat	, Semicor tion Othe	nductor er than	Industry Association (SIA). Exposure or Release Data;	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Engineering Control & percent Exposure Reduction: PPE:			Use Electronics - semiconductor manufacturing The wafer fabrication activities listed in this table would normally be conducted within robotically operated enclosed tools, where engineering controls (chamber containment) provide exposure control during normal operations. List of specific controls on page 10. Unspecified PPE				
EVALUATION					~		
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	Trade association poll of manufacturers. No bias /errors evi- dent.	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	In scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information is from the source	
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.	
Overall Quality D	eterminatio	n [†]	High		1.1		

Source Citation:	National E (NEMA).	National Electrical Manufacturers Association. 2017. Comment submitted by National Electrical Manufacturers Association (NEMA).						
Type of Data Source Hero ID	Occupation 3986803	nal Exposure; Reports for Data	or Informat	tion Othe	er than	Exposure or Release Data;		
EXTRACTION			_					
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	otion (Subca	ategory of Use):	Electronic	cs - magn	net wire	S		
Engineering Cont.	roi & percei	it Exposure Reduction:	is comple	telv enclo	sed and	d curing oven are completely enclosed; process		
PPE:			gloves, ap	rons and	goggle	s as well as engineering controls		
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	•1•,							
Domain 1: Reliab	Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evident.		
Domain 2: Repres	sentative							
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clar	itv						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source		
Domain 4: Variat	ility and Ui	ncertainty	NT / A		NT / A			
	Metric 7:	Metadata Completeness	IN/A		N/A	No Comment.		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.1			

Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT-TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH								
Type of Data Source	Occupatio	MENI. nal Exposuro: Monitoring Data:							
Hero ID	4214100	nai Exposure, Mointoring Data,							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Processin	g					
Life Cycle Descrip	tion (Subca	ategory of Use):	Processin	Processing Non-Incorporative (polymer manufacturing)					
Physical Form:			Vapor	Vapor					
Route of Exposure	9 :		Inhalation	n					
Exposure Concent	ration (Uni	it):	0.005 ppr	n (mean)	0.2 ppn	n (max)			
Number of Sample	es:		21.0						
Number of Sites:			1.0						
Worker Activity:			Organic p	olymer j	prep and	d solvent recovery			
Type of Sampling	:		personal						
EVALUATION									
Domain		Metric	Bating	MWF*	Score	Comments			
Domain		Weblie	Itating	IVI VV I	beore	Comments			
Domain 1. Reliab	ility								
Domain 1. Renab	Metric 1:	Methodology	Low	× 1	3	Sampling or analytical methodology is not specified.			
						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
Domain 2: Repres	entative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Processing in scope			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Characterized by a range			
Domain 3: Access	ibility/Clar	ity		_					
	Metric 6:	Metadata Completeness	Medium	× 1	2	Monitoring data lacks sample durations and/or measurement method			
Domain 4: Variab	ility and U	ncertainty	-	_	-				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability			
Continued on next page									

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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.							
Type of Data Source	Occupational Exposure; Monitoring Data	ι;						
Hero ID	4214100							
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium		2.1				

Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH-							
Type of Data Source	MENT.	nal Euroquina Manitaring Data						
Hero ID	4214100	nai Exposure, Monitoring Data,						
EXTRACTION								
Parameter			Data					
Life Cycle Stage			Processin	σ				
Life Cycle Descrip	tion (Subca	ategory of Use):	Processin	s g Non-Ir	lcorpora	tive (polymer manufacturing)		
Physical Form:	cion (Suboc		Vapor	8 11011 11	loorpord	(polymer manufaceums)		
Route of Exposure	:		Inhalatio	n				
Exposure Concent	ration (Uni	t):	0.2 ppm,	1 ppm				
Number of Sample	ès:	,	2.0					
Number of Sites:			1.0					
Worker Activity:			Manufact	ure of co	mposite	e prepreg		
Type of Sampling:			personal					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Boliabi	litz							
Domain 1. Itenabi	Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.		
Domain 2: Repres	entative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Processing in scope		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989		
	Metric 5:	Sample Size	High	× 1	1	Discrete data point provided		
Domain 3. Accessi	bility/Clar	ity						
Domain 9. Treeess	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Monitoring data lacks sample durations and/or measurement		
						metnoq		
Domain 4: Variabi	ility and U	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability		
		Cor	tinued on 1	lext page	9			

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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.							
Type of Data Source	Occupational Exposure; Monitoring Data	a;						
Hero ID	4214100							
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium		2.0				

Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT						
Type of Data Source	Occupatio	nal Exposure; Monitoring Data;					
Hero ID	4214100						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Processin	a.			
Life Cycle Descrip	otion (Subc	ategory of Use).	Processin	g g Non-In	cornora	tive (polymer manufacturing)	
Physical Form	bilon (Suber	tegory of eller.	Vapor				
Route of Exposur	e:		Inhalatio	n			
Exposure Concen	tration (Uni	it):	6 ppm, 1	ppm			
Number of Sampl	es:	,	2.0				
Number of Sites:			1.0				
Worker Activity:			Resin hea	ting mill	l hood		
Type of Sampling	:		area				
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1. Beliah	ility						
Domain 1. Henab	Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.	
	:						
Domain 2: Repres	Motrie 2	Coorrephie Seene	Uich	× 1	1	IIC	
	Metric 2:	Applicability	High	$\times 1$	1	US Braccosin n in commo	
	Metric 4:	Temporal Representativeness	Low	$\times 2$ $\times 2$	6	1080	
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data point provided	
	10100110-01	Sample Size	111.511	× 1	-		
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Monitoring data lacks sample durations and/or measurement method	
Domain 4: Variat	Matrie 7	Metadata Completence	Low	V 1	n		
	Metric (:	Metadata Completeness	LOW	× 1	ა	No discussion on uncertainty and variability	
Continued on next page							

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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.							
Type of Data Source	Occupational Exposure; Monitoring Data	a;						
Hero ID	4214100							
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium		2.0				

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Type of Data Source Hero ID	Occupatio 4214100	nal Exposure; Monitoring Data;						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	otion (Subca	ategory of Use):	Paints and Coatings application					
Physical Form:			Vapor					
Route of Exposur	e:		Inhalatio	n				
Exposure Concent	tration (Uni	it):	0.13 ppm	(mean)0	$0.2 \pmod{2}$	x)		
Number of Sampl	es:		3.0					
Number of Sites:			1.0					
Worker Activity:			Equipmen	nt clean i	up in pa	unt shop		
Type of Sampling	:		personal					
Sampling Location	11:		paint sno	þ				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Boliah	ility							
Domain 1. Renad	Metric 1	Methodology	Low	× 1	3	Sampling or analytical methodology is not specified		
		memodology	How	× 1	0	Sumpring of analysical methodology is not specified.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Use in scope		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Characterized by a range		
Domain 2. Access	ihiliter /Clam	:+						
Domain 3: Access	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Monitoring data lacks sample durations and/or measurement method		
	.1., 1.7.	, • ,						
Domain 4: Variab	Motrie 7:	Motodoto Completeness	Low	v 1	9	No discussion on uncertainty on housishilit		
	Metric 7:	metadata Completeness	LOW	× 1	ა	to discussion on uncertainty and variability		
Continued on next page								
- continued from previous page								
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Source Citation:	E. I. Dupont De Nemours,Co,. 1990. I TING COMMENTS CONCERNING MENT.	LETTER FROM THE PROPOS	I E I DU ED TEST	ΡΟΝΤ Ι Γ RULE	E NEMOURS & COMPANY TO USEPA SUBMIT- ON N-METHYLPYRROLIDONE WITH ATTACH-			
Type of Data Source Hero ID	Occupational Exposure; Monitoring Da 4214100	ata;						
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Overall Quality I	$\operatorname{Petermination}^\dagger$	Medium		2.1				

Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.						
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 4214100						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Life Cycle Descrip	otion (Subca	ategory of Use):	Paints an	d Coatin	gs appli	ication	
Physical Form:			Vapor				
Route of Exposur	e:	4)	Inhalatio	n (	0	()	
Exposure Concent	tration (Uni	t):	2.0 ppm (	(mean)5.	0 ppm (	max)	
Number of Sites:	es.		2.0				
Worker Activity:			Solvent fo	or sprav	applicat	ion of roll coating	
Type of Sampling			personal	n spray	appneae	ion of four coating	
Exposure Frequen	cv:		25  min				
PPE:	- 5		Respiratory and skin protection worn				
					-		
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliab	ility		т	1	0		
	Metric 1:	Methodology	Low	× 1	3	Sampling or analytical methodology is not specified.	
Domain 2: Repres	sentative						
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	Use in scope	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989	
	Metric 5:	Sample Size	Medium	$\times 1$	2	Characterized by a range	
	·1 ·1· / C1	•,					
Domain 3: Access	Motrie 6	Ity Matadata Completeness	Modium	× 1	0		
	Methe 0.	Metadata Completeness	meanni	~ 1	2	monitoring data facks sample durations and/or measurement method	
Domain 4: Variab	ility and Ur	ncertainty					
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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.							
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 4214100							
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability		
Overall Quality Determination [†] Mediu					2.1			

Source Citation: E	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH-							
Type of Data Source (	MENT. Occupation	nal Exposure: Monitoring Data:						
Hero ID 4	1214100	iai Enposaro, nomoring Eala,						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Processin	o				
Life Cycle Description	on (Subca	tegory of Use):	Processin	e g Non-In	corpora	tive (polymer manufacturing)		
Physical Form:	· · · · · · · · · · · · · · · · · · ·		Vapor	0				
Route of Exposure:			Inhalation	1				
Exposure Concentra	ation (Uni	t):	<0.1  ppn	1				
Number of Samples:	:		1.0					
Worker Activity:			Curing co	omposite	article a	at 800 F		
Type of Sampling:			personal	1	. ,			
PPE:			Respirato	ry and s	kin prot	ection worn		
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Beliabili	tv							
N	Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.		
Domain 2: Bepreser	ntativo							
Domain 2. Represer	Metric 2:	Geographic Scope	High	× 1	1	US		
N	Metric 3:	Applicability	High	$\times 2$	2	Processing in scope		
Ν	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989		
Ν	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data point provided		
	·1·· /Cl ·							
Domain 3: Accessib	ulity/Clari	Motadata Completeness	Modium	× 1	0			
	Metric 0:	Metadata Completeness	meanum	X I	Z	Monitoring data lacks sample durations and/or measurement method		
Domain 4: Variabili	ty and Ur	ocertainty						
N	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability		
		L				v v		
		Continued on next page						

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Type of Data Source	Occupational Exposure; Monitoring Data	a;				
Hero ID	4214100					
EVALUATION						
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium		2.0		

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Type of Data Source	Occupational Exposure: Monitoring Data:						
Hero ID	4214100	r,					
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Processin	g			
Life Cycle Descript	ion (Subca	ategory of Use):	Processin	g Non-In	icorpora	tive (polymer manufacturing)	
Physical Form:	,		Vapor		•		
Route of Exposure:			Inhalation	1			
Exposure Concentry	ation (Uni	t):	<0.1  ppm	1			
Number of Samples	3:		1.0				
Worker Activity:			Curing co	omposite	article a	at 800 F	
Type of Sampling:			area		1		
FFE:			respirato	ry and s	kin prot	ection worn	
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1 [.] Beliabili	ity						
	Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.	
Domain 2: Beprese	ntative						
Domain 2. Represe	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
]	Metric 3:	Applicability	High	$\times 2$	2	Processing in scope	
]	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989	
1	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data point provided	
	···· / (0)						
Domain 3: Accessit	Motrie 6:	Ity Matadata Completeness	Modium	× 1	9	Monitoring data ladio comple durations and for more	
	Metric 0:	Metadata Completeness	meann	× 1	2	monitoring data lacks sample durations and/or measurement method	
Domain 4. Variabil	ity and Ur	ocertainty					
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability	
		*				v v	
	Continued on next page						

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Type of Data Source	Occupational Exposure; Monitoring Data	a;				
Hero ID	4214100					
EVALUATION						
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium		2.0		

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Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 4214100							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Descrip Physical Form: Route of Exposur Exposure Concent Number of Sampl Worker Activity: Type of Sampling	otion (Subca e: cration (Uni es: :	ategory of Use): t):	Processin Processin Vapor Inhalation <0.1 ppm 1.0 Devolatili personal	g g Non-In n izing com	corpora aposite a	ative (polymer manufacturing) article in laboratory hood		
EVALUATION		Mataia	Dating	MXX/17*	C	Commente		
Domain		Metric	Rating	M W F**	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.		
Domain 2: Repres	Motria 2:	Coographic Scope	High	$\times 1$	1	IIC		
	Metric 2.	Applicability	High	$^{\wedge 1}$	2	US Processing in scope		
	Metric 4:	Tomporal Boprosontativonoss	Low	$\sim 2$ $\sim 2$	6			
	Metric 5	Sample Size	High	× 1	1	Discrete data point provided		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Monitoring data lacks sample durations and/or measurement method		
Domain 4: Variab	ility and U	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		2.0			
Continued on next page								

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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.							
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 4214100							
EVALUATION								
Domain	Metric Rating MWF* Score Comments							

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Type of Data Source Hero ID	Occupation 4214100	nal Exposure; Monitoring Data;						
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit):			Processin Processin Vapor Inhalation <0.1 ppm	Processing Processing Non-Incorporative (polymer manufacturing) Vapor Inhalation <0.1 ppm				
Number of Sample	s:		1.0		•,			
Type of Sampling:			Devolatili	zing con	iposite a	article in ventilated press		
PPE:			Respirato	ry and s	kin prot	section worn		
					-			
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1. Daliahii	1:4							
Domain 1. Renabi	Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.		
Domain 2: Represe	entative Matria 2.	Caamankia Saana	II:h	× 1	1	TIG .		
	Metric 2: Motric 3:	Applicability	пigii High	$\times 1$ $\times 2$	1	US Braccosing in coope		
	Metric 4.	Temporal Representativeness	Low	$\times 2$ $\times 2$	2 6	rocessing in scope		
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data point provided		
		*				<u> </u>		
Domain 3: Accessi	bility/Clar	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Monitoring data lacks sample durations and/or measurement method		
Domain 4. Variabi	lity and U	acertainty						
Domani 4. Variabi	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability		
				-		······································		
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Type of Data Source	Occupational Exposure; Monitoring Data	a;				
Hero ID	4214100					
EVALUATION						
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium		2.0		

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Type of Data Source Hero ID	Occupation 4214100	nal Exposure; Monitoring Data;					
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit):			Processin Processin Vapor Inhalation <0.1 ppm	Processing Processing Non-Incorporative (polymer manufacturing) Vapor Inhalation			
Number of Sample	es:	,	1.0				
Worker Activity:			Devolatili	zing con	nposite a	article in ventilated press	
Type of Sampling	:		area	1	<b>.</b> . ,		
PPE:			Respirato	ry and s	kın prot	ection worn	
EVALUATION							
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments	
Domain 1: Reliabi	ilitar						
Domain 1. Reliab	Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.	
	, . <b>.</b>						
Domain 2: Repres	Metric 2.	Geographic Scope	High	× 1	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	Processing in scope	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989	
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data point provided	
Domain 3: Access	ibility/Clar	ity Mata data Gammalatan ara	M	. T	0		
	Metric o:	Metadata Completeness	Medium	× 1	2	Monitoring data lacks sample durations and/or measurement method	
Damain 4. V. 1	:1:41 TT						
Domain 4: Variab	Motrie 7:	Motadata Completeness	Low	× 1	3	No discussion on uncertainty and variability	
	WIE011C /.	metadata Completeness	LOW	^ I	5	to discussion on uncertainty and variability	
Continued on next page							

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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LE TING COMMENTS CONCERNING TH MENT.	TTER FROM HE PROPOS	M E I DU ED TES	PONT I T RULE	DE NEMOURS & COMPANY TO USEPA SUBMIT- ON N-METHYLPYRROLIDONE WITH ATTACH-				
Type of Data Source	Occupational Exposure; Monitoring Data	a;							
Hero ID	4214100								
EVALUATION									
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium		2.0					

Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.							
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 4214100							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Worker Activity: Type of Sampling:				Processing Processing Non-Incorporative (polymer manufacturing) Vapor Inhalation <0.1 ppm 1.0 Impregnating fibers with resin in laboratory hood personal				
EVALUATION		Metric	Bating	MWF*	Score	Comments		
		Methe	Itating	IVI VV I	Deore	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.		
Domain 2. Donno	ontotivo							
Domain 2. Repres	Metric 2.	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Processing in scope		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989		
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data point provided		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Medium	$\times 1$	2	Monitoring data lacks sample durations and/or measurement method		
Domain 4. Variah	ility and U	ncortainty						
Domain 4. Vallau	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability		
Overall Quality Determination [†]				lovt page	2.0			
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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.								
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 4214100								
EVALUATION									
Domain	Metric Rating MWF* Score Comments								

Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH-						
Type of Data SourceIHero ID4	Occupation 4214100	nal Exposure; Monitoring Data;					
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit):			Processing Processing Non-Incorporative (polymer manufacturing) Vapor Inhalation <0.1 ppm				
Number of Samples	:		2.0	c			
Worker Activity: Type of Sampling:			Cut patte	erns from	prepre	g and devolatilized for 2 hours	
PPE.			Respirato	rv and s	kin prot	ection worn	
112.			respirate	i y ana s	nin prot		
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1, Poliabili							
Domain 1. Renabin	Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.	
Domain 2: Represe	ntative		TT: 1	1	1		
ו ר	Metric 2:	Geographic Scope	High Uimh	× 1	1		
ן ק	Metric 5:	Tomporal Boprosontativonoss	Low	$\times 2$ $\times 2$	6	Processing in scope	
י	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data point provided	
			111.911	<u> </u>	1		
Domain 3: Accessib	oility/Clari	ity					
I	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Monitoring data lacks sample durations and/or measurement method	
Domain 4. Variabili	ity and Ur	cortainty					
Domain 4. variabin	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability	
		······································		-	-	······································	
		Cor	tinued on r	next page	9		

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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LE TING COMMENTS CONCERNING TH MENT.	TTER FROM HE PROPOS	M E I DU ED TES	PONT I T RULE	DE NEMOURS & COMPANY TO USEPA SUBMIT- ON N-METHYLPYRROLIDONE WITH ATTACH-				
Type of Data Source	Occupational Exposure; Monitoring Data	a;							
Hero ID	4214100								
EVALUATION									
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium		2.0					

Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH-							
Type of Data Source	MENT. Occupational Exposure: Monitoring Data:							
Hero ID	4214100	nai Exposure, Monitoring Data,						
EXTRACTION								
Parameter			Data					
Life Cycle Stars			Drogogin	c.				
Life Cycle Descrir	tion (Subc	aterory of Use).	Processin	g g Non-Ir	cornora	tive (polymer manufacturing)		
Physical Form	Super (Super	inegory of ese).	Vapor	ig non-n	leorpora	(polymer manufacturing)		
Route of Exposur	e:		Inhalatio	n				
Exposure Concent	tration (Uni	it):	<0.1 ppm	1				
Number of Sampl	es:		1.0					
Worker Activity:			Cut patte	erns from	prepres	g and devolatilized for 2 hours		
Type of Sampling	:		area			-		
PPE:			Respirato	ry and s	kin prot	ection worn		
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Boliah	ility							
Domain 1. Renab	Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Processing in scope		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989		
	Metric 5:	Sample Size	High	× 1	1	Discrete data point provided		
Domain 3: Accoss	ibility/Clar	it						
Domain 5. Access	Metric 6	Metadata Completeness	Medium	× 1	2	Monitoring data lacks sample durations and/or measurement		
	Meetile 0.	Metadata Completeness	Medium	~ 1	2	method		
Domain 4: Variab	ility and Ui	ncertainty			_			
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion on uncertainty and variability		
Continued on next page								

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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LE TING COMMENTS CONCERNING TH MENT.	TTER FROM HE PROPOS	M E I DU ED TES	PONT I T RULE	DE NEMOURS & COMPANY TO USEPA SUBMIT- ON N-METHYLPYRROLIDONE WITH ATTACH-				
Type of Data Source	Occupational Exposure; Monitoring Data	a;							
Hero ID	4214100								
EVALUATION									
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium		2.0					

Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH-								
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 4214100								
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Worker Activity: Type of Sampling: PPE:				Processing Processing Non-Incorporative (polymer manufacturing) Vapor Inhalation <0.1 ppm 1.0 Operator cut patterns from prepreg personal skin protection worn					
EVALUATION		Matria	Dating	MATE	Coone	Comments			
Domain		Metric	nating	IVI VV F	Score	Comments			
Domain 1. Beliab	ility								
Domain IV Homas	Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.			
Domain 2: Repres	entative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low High	$ \begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	$     \begin{array}{c}       1 \\       2 \\       6 \\       1     \end{array} $	US Processing in scope 1989 Discrete data point provided			
	Methe 5.	Sample Size	Iligii	~ 1	1	Discrete data point provided			
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Monitoring data lacks sample durations and/or measurement method			
Domain 4: Variab	ility and U Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability			
Continued on next page									

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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LE TING COMMENTS CONCERNING TH MENT.	TTER FROM HE PROPOS	M E I DU ED TES	PONT I T RULE	DE NEMOURS & COMPANY TO USEPA SUBMIT- ON N-METHYLPYRROLIDONE WITH ATTACH-				
Type of Data Source	Occupational Exposure; Monitoring Data	a;							
Hero ID	4214100								
EVALUATION									
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium		2.0					

Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT								
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 4214100								
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Worker Activity: Type of Sampling: Exposure Frequency: PPE:				Processing Processing Non-Incorporative (polymer manufacturing) Vapor Inhalation 5.2 ppm 1.0 Clean up of 310 F heater plates personal 9 min Respiratory and skin protection worn					
<b>EVALUATION</b>									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.			
	, , <b>.</b>								
Domain 2: Repres	Metric 2.	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Processing in scope			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989			
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data point provided			
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Monitoring data lacks sample durations and/or measurement method			
Domain 4: Variab	ility and U	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability			
Continued on next page									

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Source Citation:	E. I. Dupont De Nemours,Co,. 1990. I TING COMMENTS CONCERNING MENT.	LETTER FROM THE PROPOSE	E I DUPC D TEST F	ONT DE NE RULE ON N	MOURS & COMPANY TO USEPA SUBMIT- -METHYLPYRROLIDONE WITH ATTACH-				
Type of Data Source Hero ID	Occupational Exposure; Monitoring D 4214100	Pata;							
EVALUATION									
Domain	Metric	Rating	MWF* Sc	core	Comments				
Overall Quality D	$\operatorname{Petermination}^\dagger$	Medium	2	2.0					

Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT								
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 4214100								
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Worker Activity: Type of Sampling: Exposure Frequency: PPE:				Processing Processing Non-Incorporative (polymer manufacturing) Vapor Inhalation 3.7 ppm, 10 ppm 2.0 Clean up of 310 F heater plates personal 13 min Respiratory and skin protection worn					
EVALUATION			<b>D</b>		a	<i>a</i>			
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.			
Domain 2: Repres	sentative	~	**. 1	_	_				
	Metric 2:	Geographic Scope	High II:h	$\times 1$	1	US			
	Metric 3: Motrie 4	Applicability Tomporal Poppogentativeness	High	$\times 2$	2	Processing in scope			
	Metric 4: Metric 5:	Sample Size	LOW High	× 2 × 1	1	1989 Discrete data point provided			
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Monitoring data lacks sample durations and/or measurement method			
Domain 4: Variab	ility and Ui Metric 7:	Accertainty Metadata Completeness	Low	× 1	9				
	Metric 7:	Metadata Completeness	LOW	× 1	3	No discussion on uncertainty and variability			
Continued on next page									

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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.							
Type of Data Source Hero ID	Occupational Exposure; Monitoring D 4214100	Pata;						
EVALUATION								
Domain	Metric	Rating	MWF* Sc	core	Comments			
Overall Quality D	$\operatorname{Petermination}^\dagger$	Medium	2	2.0				

* MWF = Metric Weighting Factor

Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.							
Type of Data Source Hero ID	Occupatio 4214100	nal Exposure; Monitoring Data;						
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Worker Activity: Type of Sampling: Exposure Frequency: PPE:				Processing Processing Non-Incorporative (polymer manufacturing) Vapor Inhalation 12 ppm 1.0 Clean up of 310 F heater plates personal 17 min Respiratory and skin protection worn				
EVALUATION Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	× 1	3	Sampling or analytical methodology is not specified.		
Domain 2: Repres	Motrie 2	Coographia Soopo	Uigh	× 1	1	TIG .		
	Metric 2: Metric 3:	Applicability	піgn High	$\times 1$ $\times 2$	1	US Processing in scope		
	Metric 4:	Temporal Representativeness	Low	$\times 2 \times 2$	6	1989		
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data point provided		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Monitoring data lacks sample durations and/or measurement method		
Domain 4: Variab	ility and U	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability		
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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.							
Type of Data Source Hero ID	Occupational Exposure; Monitoring D 4214100	Pata;						
EVALUATION								
Domain	Metric	Rating	MWF* Sc	core	Comments			
Overall Quality D	$\operatorname{Petermination}^\dagger$	Medium	2	2.0				

Source Citation:	Us, E. I METHYL	P. A 1989. SUMMAR PYRROLIDONE WITH COVE	Y ENGIN B LETTEI	EERINO	REP(	ORT TEST RULES EXPOSURE ANALYSIS N-			
Type of Data Source Hero ID	Occupation 4214135	nal Exposure; Reports for Data	or Informa	tion Oth	er than	Exposure or Release Data;			
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufacturing						
Life Cycle Description (Subcategory of Use):			Manufact	turing					
Physical Form:			Vapor						
Route of Exposur	e:		Inhalatio	n ,					
Exposure Concent	tration (Uni	t):	5  mg/day	, avg bre	eathing	rate of 1.25 m3/hr			
Turne of Measurer	mont or Mot	had	3.0 CFB dru	mmina n	odol				
Worker Activity:	nent of met	nou.	sampling	and pac	kaging				
Number of Worke	ers.		6  to  10  p	er site	Kaging				
PPE:			Bespiratory and skin protection worn						
			F		F				
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
ויות ו	•1• /								
Domain 1: Reliad	onity			· 1	1				
	Motrie 1.	Mathadalagy	Lich	· · ·		E P A			
	Metric 1:	Methodology	High	× 1	-				
Domain 2: Repres	Metric 1:	Methodology	High	× 1	-				
Domain 2: Repres	Metric 1: sentative Metric 2:	Methodology Geographic Scope	High	× 1 × 1	1	US			
Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3:	Methodology Geographic Scope Applicability	High High High	$\times 1$ $\times 1$ $\times 2$	1 2	US In scope			
Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3: Metric 4:	Methodology Geographic Scope Applicability Temporal Representativeness	High High High Low	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \end{array} $	1 2 6	US In scope 1989			
Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low N/A	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \end{array} $	1 2 6 N/A	US In scope 1989 No Comment.			
Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low N/A	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 2 \end{array}$	1 2 6 N/A	US In scope 1989 No Comment.			
Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low N/A	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \end{array}$	1 2 6 N/A	US In scope 1989 No Comment.			
Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar: Metric 6:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High High Low N/A High	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \end{array} \\ \times 1 $	1 2 6 N/A 1	US In scope 1989 No Comment. Data sources included			
Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar: Metric 6: pility and U	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High High Low N/A High	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \end{array}$ $\times 1$	1 2 6 N/A 1	US In scope 1989 No Comment. Data sources included			
Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar: Metric 6: bility and Ur Metric 7:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness neertainty Metadata Completeness	High High Low N/A High	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \end{array} \\ \times 1 \\ \end{array} $	1 2 6 N/A 1	US In scope 1989 No Comment. Data sources included			
Domain 2: Repres Domain 3: Access Domain 4: Variab	Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar: Metric 6: pility and Ur Metric 7:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness neertainty Metadata Completeness	High High Low N/A High Low	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \end{array} \\ \times 1 \\ \end{array} $	1 2 6 N/A 1 3	US In scope 1989 No Comment. Data sources included No discussion on uncertainty and variability			
Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar: Metric 6: bility and Un Metric 7:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness neertainty Metadata Completeness	High High Low N/A High Low	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \end{array} \\ \times 1 \\ \hline \end{array} $	1 2 6 N/A 1 3	US In scope 1989 No Comment. Data sources included No discussion on uncertainty and variability			

		– continued from pr	revious page		
Source Citation:	Us, E. P. A 1989. S METHYLPYRROLIDONE WI	SUMMARY ENGINE	ERING REPORT DATED 110189.	TEST RULES EXPOSURE	ANALYSIS N-
Type of Data Source	Occupational Exposure; Reports	s for Data or Informatio	on Other than Expos	sure or Release Data;	
Hero ID	4214135				
EVALUATION					
Domain	Metric	Rating	$MWF^*$ Score	Comments	
Overall Quality I	$\operatorname{Petermination}^\dagger$	Medium	1.8		

Type of Data Source Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; Hero ID 4214135 EXTRACTION Parameter Data Life Cycle Stage: Manufacturing Life Cycle Stage: Manufacturing Life Cycle Description (Subcategory of Use): Manufacturing Physical Form: Dermal contact Exposure Concentration (Unit): 1300 - 3900 mg/day Number of Sites: 3.0 Type of Measurement or Method: CEE two hand immersion model Worker Activity: Samphing and packaging Number of Workers: 6 to 10 per site PPE: Respiratory and skin protection worn EVALUATION Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology High × 1 1 EPA Domain 2: Representative Metric 3: Applicability High × 2 2 In scope Metric 4: Temporal Representativeness Metric 6: Sample Size N/A N/A N/A No Comment. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High × 1 1 Data sources included Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Low × 1 3 No discussion on uncertainty and variability Metric 7: Metadata Completeness Low × 1 3 No discussion on uncertainty and variability	Source Citation:	Us, E. I METHYL	P. A 1989. SUMMAR PYBROLIDONE WITH COVE	Y ENGIN B LETTEI	EERING	REP	ORT TEST	RULES EXPOSURE	ANALYSIS	N-	
EXTRACTION Parameter     Data       Life Cycle Stage: Life Cycle Description (Subcategory of Use): Higuid     Manufacturing Haviacal Form: Higuid       Route of Exposure: Exposure: Concentration (Unit): Number of Sites: 3.0     Dermal contact Dermal contact       Type of Measurement or Method: Worker Activity: Number of Sites: 70 per of Measurement or Method: Worker Activity: Number of Workers: PPE: PPE:     CEB two hand immersion model ackaging 6 to 10 per site Respiratory and skin protection worn       EVALUATION Domain 1: Reliability Metric 1: Methodology     High × 1 1 High × 1 1 High × 2 2 High × 2 2 Metric 2: Geographic Scope Metric 4: Temporal Representativeness Metric 4: Temporal Representativeness Metric 5: Sample Size       Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness     High × 1 1 High × 1 1 High × 1 1 Data sources included       Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness     Low × 1 Low × 1 3 No discussion on uncertainty and variability	Type of Data Source Hero ID	Occupation 4214135	nal Exposure; Reports for Data	or Informa	tion Othe	er than	Exposure or F	Release Data;			
Parameter     Data       Life Cycle Stage:     Manufacturing       Life Cycle Description (Subcategory of Use):     Manufacturing       Physical Form:     liquid       Route of Exposure:     Dermal contact       Exposure Concentration (Unit):     1300 - 3900 mg/day       Number of Sites:     3.0       Type of Measurement or Method:     CEB two hand immersion model       Worker Activity:     sampling and packaging       Number of Workers:     6 to 10 per site       PPE:     Respiratory and skin protection worn         EVALUATION       Domain     Metric       Rating     MWF*       Score     Comments       Domain 1: Reliability     Metric 2: Geographic Scope       Metric 2: Geographic Scope     High     × 1     1       Metric 3: Applicability     High     × 2     1       Metric 4: Temporal Representativeness     Low     × 2     1       Metric 5: Sample Size     N/A     N/A     N/A       Domain 3: Accessibility/Clarity     Migh     × 1     1     Data sources included       Domain 4: Variability and Uncertainty     Metric 7: Metadata Completeness     Low     × 1     3     No discussion on uncertainty and variability	EXTRACTION										
	Parameter			Data							
Life Cycle Stage: Manufacturing Life Cycle Description (Subcategory of Use): Manufacturing Iquid Route of Exposure: Dermal contact Exposure Concentration (Unit): 1300 - 3900 mg/day Number of Sites: 3.0 Type of Measurement or Method: CEB two hand immersion model Worker Activity: sampling and packaging Number of Workers: 6 to 10 per site PPE: Respiratory and skin protection worn  EVALUATION Domain 1: Reliability Metric 1: Methodology High × 1 1 EPA  Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Low × 1 3 No discussion on uncertainty and variability  Domain 3: Accessibility/Clarity Metric 7: Metadata Completeness Low × 1 3 No discussion on uncertainty and variability											
Life Cycle Description (Subcategory of Use): Manufacturing Physical Form: liquid Route of Exposure: Dermal contact Exposure Concentration (Unit): 1300 - 3900 mg/day Number of Sites: 3.0 Type of Measurement or Method: CEB two hand immersion model Worker Activity: Sampling and packaging Number of Workers: 6 to 10 per site PPE: 7 to 2000 mg/day Presentative Presentativ	Life Cycle Stage:			Manufacturing							
Physical Form:       liquid         Route of Exposure:       Dermal contact         Exposure Concentration (Unit):       1300 - 3900 mg/day         Number of Sites:       3.0         Type of Measurement or Method:       CEB two hand immersion model         Worker Activity:       sampling and packaging         Number of Workers:       6 to 10 per site         PPE:       Respiratory and skin protection worn         EVALUATION	Life Cycle Description (Subcategory of Use):			Manufact	uring						
Route of Exposure:       Dermal contact         Exposure Concentration (Unit):       1300 - 3900 mg/day         Number of Sites:       3.0         Type of Measurement or Method:       CEB two hand immersion model         worker Activity:       sampling and packaging         Number of Workers:       6 to 10 per site         PPE:       Respiratory and skin protection worn         EVALUATION       Comments         Domain       Metric       Rating       MWF*       Score       Comments         Domain       It Reliability       Metric 1:       Methodology       High       × 1       1       EPA         Domain 1: Reliability       Metric 2:       Geographic Scope       High       × 1       1       US         Metric 2:       Geographic Scope       High       × 1       1       US         Metric 3:       Applicability       High       × 2       6       1980         Metric 5:       Sample Size       N/A       N/A       N/A       N/A         Domain 3: Accessibility/Clarity       High       × 1       1       Data sources included         Domain 4: Variability and Uncertainty       Metric 7:       Metridata Completeness       Low       × 1       3       No discu	Physical Form:			liquid							
Exposure Concentration (Unit):       1300 - 3900 mg/day         Number of Sites:       3.0         Type of Measurement or Method:       CEB two hand immersion model         Worker Activity:       sampling and packaging         Number of Workers:       6 to 10 per site         PPE:       Respiratory and skin protection worn         EVALUATION       Netric 1:         Metric 1:       Methodogy         High       × 1       1         Domain 1:       Reliability         Metric 2:       Geographic Scope         Metric 2:       Geographic Scope         Metric 3:       Applicability         Metric 4:       Temporal Representative         Metric 5:       Sample Size         N/A       N/A       N/A         Domain 3:       Accessibility/Clarity         Metric 6:       Metadata Completeness         High       × 1       1         Domain 4:       Variability and Uncertainty         Metric 7:       Metadata Completeness         Low       × 1       3         No       Metric 7:	Route of Exposure:			Dermal c	ontact						
Number of Sites:       3.0         Type of Measurement or Method:       CEB two hand immersion model         Worker Activity:       sampling and packaging         Number of Workers:       6 to 10 per site         PPE:       Respiratory and skin protection worn         EVALUATION       Number of Netric 1:         Metric 1:       Metric         Metric 1:       Methodology         High       × 1       1         EVALUATION       Number of Score         Domain 1:       Reliability         Metric 1:       Methodology         High       × 1       1         EVALUATION       EPA         Domain 1:       Reliability         Metric 1:       Methodology         High       × 1       1         EVALUATION       EPA         Domain 2:       Representative         Metric 3:       Applicability         High       × 2       2         Metric 4:       Temporal Representativeness         Low       × 2       6       1989         Metric 5:       Sample Size       N/A       N/A         Domain 3:       Accessibility/Clarity       Netric 6:       Metadata Completeness      <	Exposure Concent	tration (Uni	t):	1300 - 39	00  mg/da	ау					
Type of Measurement of Method:       C.EB two hand timmersion model         Worker Activity:       sampling and packaging         Number of Workers:       6 to 10 per site         PPE:       Respiratory and skin protection worn         EVALUATION       Netric         Domain       Metric         Rating       MWF*         Score       Comments         Domain 1: Reliability       High       × 1       1         Metric 2:       Geographic Scope       High       × 1       1         Metric 3:       Applicability       High       × 2       2       In scope         Metric 4:       Temporal Representative       N/A       N/A       N/A       No Comment.         Domain 3:       Accessibility/Clarity       High       × 1       1       Data sources included         Domain 4:       Variability and Uncertainty       Metric 7:       Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability         Metric 7:       Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability	Number of Sites:		1 1	3.0 CED (	1 1 .		1.1				
Number of Workers:       Samping and packaging         Number of Workers:       6 to 10 per site         PPE:       Respiratory and skin protection worn         EVALUATION          Domain       Metric         Reliability       Metric         Metric 1:       Methodology         High       × 1       1         EVALUATION       EPA         Domain 1: Reliability       High       × 1       1         Metric 2:       Geographic Scope       High       × 1       1         Metric 3:       Applicability       High       × 2       2       In scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1989         Metric 5:       Sample Size       N/A       N/A       No Comment.         Domain 3: Accessibility/Clarity       High       × 1       1       Data sources included         Domain 4: Variability and Uncertainty       Metric 7:       Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability         Metric 7:       Metric 6:       Low       × 1       3       No discussion on uncertainty and variability	Worker Activity	nent or Met	nod:	CEB two	and nad	mersion	model				
Number of Workers.       O to 10 per site         PPE:       Respiratory and skin protection worn         EVALUATION       Number of Workers.       Comments         Domain       Metric       Rating       MWF*       Score       Comments         Domain 1: Reliability       Metric 1:       Methodology       High       × 1       1       EPA         Domain 2: Representative       Metric 2:       Geographic Scope       High       × 1       1       US         Metric 3:       Applicability       High       × 2       2       In scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1989         Domain 3: Accessibility/Clarity       Metric 6:       Metadata Completeness       High       × 1       1       Data sources included         Domain 4: Variability and Uncertainty       Low       × 1       3       No discussion on uncertainty and variability	Number of Worke	<b>r</b> a•		6 to 10 p	and paci	aging					
EVALUATION       Domain       Metric       Rating       MWF*       Score       Comments         Domain 1: Reliability       Metric 1:       Methodology       High       × 1       1       EPA         Domain 2: Representative       Metric 2:       Geographic Scope       High       × 1       1       US         Metric 3:       Applicability       High       × 2       2       In scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1989         Metric 5:       Sample Size       N/A       N/A       No Comment.         Domain 3: Accessibility/Clarity       Metric 6:       Metadata Completeness       High       × 1       1       Data sources included         Domain 4: Variability and Uncertainty       Metric 7:       Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability	PPE.	15.		Besnirate	er site	kin prot	ection worn				
EVALUATION       Domain       Metric       Rating       MWF*       Score       Comments         Domain 1: Reliability       Metric 1:       Methodology       High       × 1       1       EPA         Domain 2: Representative       Metric 2:       Geographic Scope       High       × 1       1       US         Metric 3:       Applicability       High       × 2       2       In scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1989         Metric 5:       Sample Size       N/A       N/A       No Comment.         Domain 3: Accessibility/Clarity       High       × 1       1       Data sources included         Domain 4: Variability and Uncertainty       Metric 7:       Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability         Metric 7:       Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability	112.										
Domain       Metric       Rating       MWF*       Score       Comments         Domain 1: Reliability Metric 1:       Methodology       High       × 1       1       EPA         Domain 2: Representative Metric 2:       Geographic Scope       High       × 1       1       US         Metric 3:       Applicability       High       × 2       2       In scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1989         Metric 5:       Sample Size       N/A       N/A       No Comment.         Domain 3: Accessibility/Clarity Metric 6:       Metadata Completeness       High       × 1       1       Data sources included         Domain 4: Variability and Uncertainty Metric 7:       Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability         Metric 7:       Metric 7:       Metric accompleteness       Low       × 1       3       No discussion on uncertainty and variability	EVALUATION										
Domain 1: Reliability       Metric 1:       Methodology       High × 1       1       EPA         Domain 2: Representative       Metric 2:       Geographic Scope       High × 1       1       US         Metric 3:       Applicability       High × 2       2       In scope         Metric 4:       Temporal Representativeness       Low × 2       6       1989         Metric 5:       Sample Size       N/A       N/A       No Comment.         Domain 3: Accessibility/Clarity       High × 1       1       Data sources included         Domain 4: Variability and Uncertainty       Metric 7:       Metadata Completeness       Low × 1       3       No discussion on uncertainty and variability	Domain		Metric	Rating	$MWF^{\star}$	Score		Comments			
Domain 1: Renability       Metric 1:       Methodology       High       × 1       1       EPA         Domain 2: Representative       Metric 2:       Geographic Scope       High       × 1       1       US         Metric 3:       Applicability       High       × 2       2       In scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1989         Metric 5:       Sample Size       N/A       N/A       No Comment.         Domain 3: Accessibility/Clarity       Metric 6:       Metadata Completeness       High       × 1       1       Data sources included         Domain 4: Variability and Uncertainty       Metric 7:       Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability	Danain 1. Daliah	:1:4									
Metric 1.       Metridology       High       × 1       1       EFA         Domain 2:       Representative         Metric 2:       Geographic Scope       High       × 1       1       US         Metric 3:       Applicability       High       × 2       2       In scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1989         Metric 5:       Sample Size       N/A       N/A       No Comment.         Domain 3:       Accessibility/Clarity       Metric 6:       Metadata Completeness       High       × 1       1       Data sources included         Domain 4:       Variability and Uncertainty       Metric 7:       Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability	Domain 1: Reliad	Motria 1.	Mathadalagy	High	$\sim 1$	1	EDA				
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		Metric 1.	Methodology	Ingn	× 1	1	EPA				
Metric 2:       Geographic Scope       High       × 1       1       US         Metric 3:       Applicability       High       × 2       2       In scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1989         Metric 5:       Sample Size       N/A       N/A       No Comment.         Domain 3:       Accessibility/Clarity       Ketric 6:       Metadata Completeness       High       × 1       1       Data sources included         Domain 4:       Variability and Uncertainty       Metric 7:       Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability	Domain 2: Repres	sentative									
Metric 3:       Applicability       High       × 2       2       In scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1989         Metric 5:       Sample Size       N/A       N/A       No Comment.         Domain 3:       Accessibility/Clarity         Metric 6:       Metadata Completeness       High       × 1       1       Data sources included         Domain 4:       Variability and Uncertainty       Low       × 1       3       No discussion on uncertainty and variability		Metric 2:	Geographic Scope	High	$\times 1$	1	US				
Metric 4:       Temporal Representativeness       Low       × 2       6       1989         Metric 5:       Sample Size       N/A       N/A       N/A       No Comment.         Domain 3:       Accessibility/Clarity       Metric 6:       Metadata Completeness       High       × 1       1       Data sources included         Domain 4:       Variability and Uncertainty       Metric 7:       Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability		Metric 3:	Applicability	High	$\times 2$	2	In scope				
Metric 5:     Sample Size     N/A     N/A     No Comment.       Domain 3:     Accessibility/Clarity		Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989				
Domain 3: Accessibility/Clarity       Metric 6: Metadata Completeness       High       × 1       1       Data sources included         Domain 4: Variability and Uncertainty       Metric 7: Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability		Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Accessionity/Clarity         Metric 6: Metadata Completeness       High       × 1       1       Data sources included         Domain 4: Variability and Uncertainty       Metric 7: Metadata Completeness       Low       × 1       3       No discussion on uncertainty and variability	Domain 3: Accoss	ibility/Clar	i+.,								
Domain 4: Variability and Uncertainty         Metric 7:       Metadata Completeness         Low       × 1       3         No discussion on uncertainty and variability	Domain 5: Access	Metric 6	Metadata Completeness	High	× 1	1	Data sources	included			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Low × 1 3 No discussion on uncertainty and variability			Metadata Completeness	111611	~ 1	Ŧ	Data sources	menueu			
Metric 7: Metadata Completeness Low × 1 3 No discussion on uncertainty and variability Continued on next page	Domain 4: Variab	ility and Ur	ncertainty								
Continued on port page	Metric 7: Metadata Completeness				$\times 1$	3	No discussion	on uncertainty and variabilit	У		
Continued on next page											
	Continued on next page										

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Source Citation:	Us, E. P. A 1989. S METHYLPYRROLIDONE WIT	SUMMARY ENGINEI TH COVER LETTER I	ERING REPORT DATED 110189.	TEST RULES EXPOSURE	ANALYSIS N-			
Type of Data Source Hero ID	Occupational Exposure; Reports 4214135	for Data or Informatio	on Other than Expose	ure or Release Data;				
EVALUATION								
Domain	Metric	Rating	$MWF^*$ Score	Comments				
Overall Quality D	$\mathrm{retermination}^\dagger$	Medium	1.8					

Source Citation:	Us, E. I METHYL	P. A 1989. SUMMAR PYBROLIDONE WITH COVE	Y ENGIN B LETTER	EERING	REP	ORT TEST RULES EXPOSURE ANALYSIS N- 9
Type of Data Source Hero ID	Occupation 4214135	nal Exposure; Reports for Data	or Informat	tion Othe	er than	Exposure or Release Data;
EXTRACTION						
Parameter			Data			
Life Create Sterror			D			
Life Cycle Description (Subcategory of Use):			Processin	g g Non In	000000000	tive (lube oil autrection)
Physical Form.	Juon (Subca	tegory of Use).	vapor	ig Non-m	corpora	the (lube of extraction)
Route of Exposur	·•·		Inhalation	n		
Exposure Concen	c. tration (Uni	it):	>0.1  mg/	/dav		
Type of Measurer	nent or Met	hod:	CEB sam	pling mo	del	
Worker Activity:			Lube oil e	extraction	n	
Number of Worke	ers:		5999 - 17	000		
PPE:			Respirato	ory and sl	kin prot	section worn
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1. Daliah	:1:4					
Domain 1: Kenad	Metric 1.	Methodology	High	× 1	1	FDΛ
	WICUIC 1.	Wethodology	IIIgii	~ 1	1	
Domain 2: Repres	sentative					
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	In scope
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Danain 2. Aaaan	:1::::/ <i>C</i> 1					
Domain 5: Access	Motrie 6	Motodoto Completeness	Uich	× 1	1	
	Metric 0.	Metadata Completeness	IIIgII	× 1	1	Data sources included
Domain 4: Varial	oility and U	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability
		Å				• v
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		1.8	
<b>•</b> 0		Con	tinued on a	nevt neg	<u>,</u>	
		Con	unueu oli i	next page	>	

		– continued from	previous	page					
Source Citation:	Us, E. P. A 1989. METHYLPYRROLIDONE W	SUMMARY ENGI TTH COVER LETTE	NEERING CR DATED	REPORT 110189.	TEST	RULES	EXPOSURE	ANALYSIS	N-
Type of Data Source Hero ID	Occupational Exposure; Repor 4214135	rts for Data or Inform	ation Othe	r than Expo	sure or R	telease Da	ata;		
EVALUATION									
Domain	Metric	Rating	$MWF^{\star}$	Score			Comments		

Source Citation: Us, E. P. A 1989. SUMMARY ENGINEERING REPORT TEST RULES EXPOSURE ANALYSIS N- METHYLPYRROLIDONE WITH COVER LETTER DATED 110189.							
Type of Data SourceOccupational Exposure; RepHero ID4214135	ports for Data or Inf	Formation Of	ther than	Exposure or Release Data;			
EXTRACTION							
Parameter	Dat	ta					
Life Could Sterry	Due	· · · · ·					
Life Cycle Stage: Life Cycle Description (Subcategory of Use):	Pro	cessing Non	Incorpora	ative (lube oil extraction)			
Physical Form.	liqu	id	filcorpora	ative (lube on extraction)			
Boute of Exposure:	Der	mal contact					
Exposure Concentration (Unit):	130	0 - 3900  mg	'dav				
Type of Measurement or Method:	CEI	B two hand	mmersion	n model			
Worker Activity:	Lub	e oil extract	ion				
Number of Workers:	600	0 - 17000					
PPE:	Res	piratory and	skin prot	tection worn			
EVALUATION							
Domain Metr	ric Ra	ting MWI	Score	Comments			
Domain 1. Poliability							
Metric 1: Methodology	Hig	$h \times 1$	1	EPA			
	0						
Domain 2: Representative							
Metric 2: Geographic Sco	pe Hig	h $\times 1$	1	US			
Metric 3: Applicability	Hig	h $\times 2$	2	In scope			
Metric 4: Temporal Repre	esentativeness Low	$\times 2$	6	1989			
Metric 5: Sample Size	N/A	A	N/A	No Comment.			
Domain 3: Accessibility/Clarity							
Metric 6: Metadata Comr	oleteness Hig	$h \times 1$	1	Data sources included			
	1118.		-				
Domain 4: Variability and Uncertainty							
Metric 7: Metadata Comp	oleteness Low	$\times 1$	3	No discussion on uncertainty and variability			
Overall Quality Determination [†]	Mee	lium	1.8				
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		– continued from	previous	page					
Source Citation:	Us, E. P. A 1989. METHYLPYRROLIDONE W	SUMMARY ENGI TTH COVER LETTE	NEERING CR DATED	REPORT 110189.	TEST	RULES	EXPOSURE	ANALYSIS	N-
Type of Data Source Hero ID	Occupational Exposure; Repor 4214135	rts for Data or Inform	ation Othe	r than Expo	sure or R	telease Da	ata;		
EVALUATION									
Domain	Metric	Rating	$MWF^{\star}$	Score			Comments		

Source Citation: U	Js, E. F Methvli	P. A 1989. SUMMAR PVBROLIDONE WITH COVE	Y ENGIN B LETTEI	EERING	REP	ORT TEST RULES EXPOSURE ANALYSIS N-			
Type of Data SourceOHero ID4	Occupation 214135	al Exposure; Reports for Data	or Informa	tion Othe	er than	Exposure or Release Data;			
EXTRACTION									
Parameter			Data						
Life Cycle Stage			Uso						
Life Cycle Description	on (Subca	tegory of Use):	Use Paint and coating removers						
Physical Form:			Vapor		10111010				
Route of Exposure:	Route of Exposure:			n					
Exposure Concentra	ation (Unit	t):	up to 16	mg/day					
Type of Measureme	nt or Metl	nod:	Manipula	ting curr	ent met	hylene chloride data by vapor pressures			
Worker Activity:			Stripper	applied t	o surfac	ce by spraying or brushing or dipping. Time			
			given to p	penetrate	e. Stripp	per removed, wiped or scraped.			
Number of Workers:	:		2,500-10,	700					
PPE:			Respiratory and skin protection worn						
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Boliabili	taz								
Domain 1. Renabilit	Metric 1:	Methodology	High	$\times 1$	1	EPA			
Damain 9. Damaan									
Domain 2: Represen	Motric 2:	Coographic Scope	High	~ 1	1	110			
N	Metric 3.	Applicability	High	$^{\wedge 1}$ $\times 2$	2	US In scope			
N	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989			
N	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3. Accessib	ility /Clari	t							
Domain 5: Accessio	Metric 6:	Metadata Completeness	High	× 1	1	Data sources included			
1		metadata Completeness	111611	~ 1	T				
Domain 4: Variabili	ty and Un	certainty							
Ν	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion on uncertainty and variability			
		Con	tinued on	next page	ć				
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Source Citation:	Us, E. P. A 1989. S METHYLPYRROLIDONE WIT	SUMMARY ENGINEI TH COVER LETTER I	ERING REPORT DATED 110189.	TEST RULES EXPOSURE	ANALYSIS N-				
Type of Data Source Hero ID	Occupational Exposure; Reports 4214135	for Data or Informatio	on Other than Expose	ure or Release Data;					
EVALUATION									
Domain	Metric	Rating	$MWF^*$ Score	Comments					
Overall Quality D	$\mathrm{retermination}^\dagger$	Medium	1.8						

Source Citation:	Us, E. I METHVL	P. A 1989. SUMMAR PYRROLIDONE WITH COVE	Y ENGIN B LETTEI	EERING	REP	ORT TEST RULES EXPOSURE ANALYSIS N- 9
Type of Data Source Hero ID	Occupation 4214135	nal Exposure; Reports for Data	or Informa	tion Othe	er than	Exposure or Release Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Uso			
Life Cycle Descrit	otion (Subca	ategory of Use):	Paint and	1 coating	remove	rs
Physical Form:	Physical Form:				10111010	
Route of Exposure:			Dermal c	ontact		
Exposure Concentration (Unit):			400-975 r	ng/day		
Type of Measurement or Method:			CEB two	hand im	mersion	n model
Worker Activity:			Stripper	applied t	o surfac	ce by spraying or brushing or dipping. Time
		given to g	penetrate	e. Stripp	per removed, wiped or scraped.	
Number of Worke	ers:		2,500-10,	701		
PPE:			Respirato	ory and s	kin prot	section worn
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1. Beliah	ility					
Domain 1: Reliab	oility Metric 1:	Methodology	High	$\times 1$	1	EPA
Domain 1: Reliab	Metric 1:	Methodology	High	× 1	1	EPA
Domain 1: Reliab  Domain 2: Repres	Metric 1: sentative Metric 2:	Methodology Geographic Scope	High High	× 1	1	EPA
Domain 1: Reliab  Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3:	Methodology Geographic Scope Applicability	High High High	$\times 1$ $\times 1$ $\times 2$	1 1 2	EPA US In scope
Domain 1: Reliab  Domain 2: Repres	Metric 1: Metric 1: Sentative Metric 2: Metric 3: Metric 4:	Methodology Geographic Scope Applicability Temporal Representativeness	High High High Low	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \end{array}$	1 1 2 6	EPA US In scope 1989
Domain 1: Reliab  Domain 2: Repres	Metric 1: Metric 1: Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low N/A	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \end{array}$	1 1 2 6 N/A	EPA US In scope 1989 No Comment.
Domain 1: Reliab Domain 2: Repres	Metric 1: Metric 1: Metric 2: Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low N/A	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \end{array}$	1 1 2 6 N/A	EPA US In scope 1989 No Comment.
Domain 1: Reliab Domain 2: Repres Domain 3: Access	ility Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High High Low N/A High	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \end{array}$ $\times 1$	1 1 2 6 N/A	EPA US In scope 1989 No Comment.
Domain 1: Reliab Domain 2: Repres Domain 3: Access	ility Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High High Low N/A High	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \end{array}$ $\times 1$	1 1 2 6 N/A 1	EPA US In scope 1989 No Comment. Data sources included
Domain 1: Reliab Domain 2: Repres Domain 3: Access Domain 4: Variab	sility Metric 1: Metric 2: Metric 2: Metric 3: Metric 4: Metric 5: Sibility/Clar Metric 6: Dility and Un	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High High Low N/A High	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \end{array}$	1 1 2 6 N/A 1	EPA US In scope 1989 No Comment. Data sources included
Domain 1: Reliab Domain 2: Repres Domain 3: Access Domain 4: Variab	ility Metric 1: Metric 2: Metric 2: Metric 3: Metric 4: Metric 5: Sibility/Clar Metric 6: Dility and Un Metric 7:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness neertainty Metadata Completeness	High High Low N/A High Low	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \end{array}$ $\times 1 \\ \times 1 \\ \end{array}$	1 1 2 6 N/A 1 3	EPA US In scope 1989 No Comment. Data sources included No discussion on uncertainty and variability
Domain 1: Reliab Domain 2: Repres Domain 3: Access Domain 4: Variab	ility Metric 1: Sentative Metric 2: Metric 3: Metric 4: Metric 5: Sibility/Clar Metric 6: Dility and Un Metric 7:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness neertainty Metadata Completeness	High High Low N/A High Low	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \end{array}$ $\times 1 \\ \end{array}$	1 2 6 N/A 1 3	EPA US In scope 1989 No Comment. Data sources included No discussion on uncertainty and variability

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Source Citation:	Us, E. P. A 1989. S METHYLPYRROLIDONE WIT	SUMMARY ENGINEI TH COVER LETTER I	ERING REPORT DATED 110189.	TEST RULES EXPOSURE	ANALYSIS N-
Type of Data Source Hero ID	Occupational Exposure; Reports 4214135	for Data or Informatio	on Other than Expose	ure or Release Data;	
EVALUATION					
Domain	Metric	Rating	$MWF^*$ Score	Comments	
Overall Quality D	$\mathrm{retermination}^\dagger$	Medium	1.8		

Source Citation:IFA. 2010.Type of Data SourceOccupatioHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subc	ategory of Use):	Manufact Chemical lutions	uring /P industry	rocessin and m	ng ineral oil processing - likely formulation of so-
Physical Form:		vapor			
Route of Exposure:		Inhalatio	n		
Exposure Concentration (Uni	t):	0.175(50)	th; below	LOQ),	13.41 (90th), 16.93 (95th) mg/m3
Number of Samples:		11.0			
Number of Sites:	had	0.U TWA 2			
Type of Sampling:	nou.	1 WA:			
Exposure Duration:		sample ti	mo > -1	r. evno	sure duration $>-$ 6hr
Exposure Duration.		sample ti	IIIC >=11	п, слро	
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1. Poliobility					
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Roprosontativo					
Metric 2:	Geographic Scope	Medium	× 1	2	Cermany
Metric 3:	Applicability	Medium	$\times 2$	4	Potentially contains some scenarios that are out of scope. Con-
			–	-	tains some that are in scope
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibility/Clar	ity				
Metric 6:	Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 4: Variability and U	ncertainty				
	Con	tinued on 1	next page	)	

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	eterminatio	n [†]	Medium		1.9	

XTRACTION						
Parameter		Data				
Life Cycle Stage:		Processin	g 11./·	C	· / C	
Life Cycle Description (Sub	category of Use):	Plastics a	nd plasti	c toam	processing/mfg	
Physical Form:		vapor				
Fundame Concentration (II		$0.2 (50 \pm h)$	l bolow I	00) 2	(00th) 2.5 $(05th)$ mg/m2	
Number of Samples:		40.0	Delow L	$(\mathbf{Q}), \mathbf{S}$	(90th), 5.5 (95th) mg/m5	
Number of Sites:						
Type of Measurement or M	ethod:	TWA?				
Type of Sampling:		area				
Exposure Duration:		sample time $>=1hr$ ; exposure duration $>=6hr$				
-				, <u>-</u>		
VALUATION						
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain I: Reliability	Mathadalam	II: mh	× 1	1		
Metric 1	Methodology	піgn	X I	1	Sampling or analytical methodology is an approved OSHA o NIOSH method	
Domain 2: Representative						
Metric 2	Geographic Scope	Medium	$\times 1$	2	Germany	
Metric 3	Applicability	Medium	$\times 2$	4	Polymer processing is in scope, but due to unknown opera- tions considered in this industry, this may include out of scop- scenarios	
Metric 4	Temporal Representativeness	High	$\times 2$	2	2010	
Metric 5	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer tain statistics.	
Domain 3: Accessibility/Cla	rity					
Motrie 6	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing	

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^*$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

Source Citation:IFA. 2010.Type of Data SourceOccupatioHero ID4271620	. MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of REA	CH expos	sure sce	narios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subc Physical Form: Route of Exposure: Exposure Concentration (Un Number of Samples: Number of Sites: Type of Measurement or Met Type of Sampling: Exposure Duration:	ategory of Use): it): chod:	Processing stones, earth, o vapor Inhalation 0.2 (50th; belo 12.0 8.0 TWA? area sample time >	ceramics, w LOQ), =1hr; ex	glass ir 0.68 (9 posure e	dustry 0th), 0.74 (95th) mg/m3 duration $\geq = 6$ hr
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Unacceptable High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 8 2 2	Germany Not in scope, doesn't seem applicable to those scenarios in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 4: Variability and U	ncertainty	Continued on nex	t page		

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of REA	CH expos	sure sce	narios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.3.

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

Source Citation:IFA. 2010.Type of Data SourceOccupatioHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subca Physical Form: Route of Exposure: Exposure Concentration (Uni Number of Samples: Number of Sites: Type of Measurement or Met Type of Sampling: Exposure Duration:	ategory of Use): it): shod:	Processin Mfg and p vapor Inhalation 0.2 (50th; 43.0 27.0 TWA? area sample tim	g processin below L me >=1h	g of me OQ), 1: ur; expo	tals - processing of liquid coating materials 3.41 (90th), 24.65 (95th) mg/m3 osure duration $\geq = 6$ hr
EVALUATION Domain	Metric	Bating	MWF*	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 2 2	Germany Formulation of coating materials for metals 2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 4: Variability and Un Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	The monitoring study does not address variability or uncer- tainty
	Con	tinued on r	next page	9	

	– conti	nued from p	revious	page	
Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the pr Occupational Exposure; Monitoring Date 4271620	reparation of I a;	REACH	exposure s	cenarios for N-methyl-2-pyrrolidone (vapour).
<b>EVALUATION</b> Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality D	Determination ^{$\dagger$}	Medium		1.7	

Parameter					
Life Cycle Stage:		Processin	g		
Life Cycle Description (Su	ocategory of Use):	Steel cons	struction,	mfg of	machinery and vehicles
Physical Form:		vapor			
Route of Exposure:	<b>•</b> • • • •	Inhalation	$(\mathbf{r}_{0},\mathbf{l})$	<b>F</b> 00 (	
Exposure Concentration (	Jnit):	below LO	D (50th)	, 5.02 (	90th), 7.36 (95th) mg/m3
Number of Samples:		16.0			
Number of Sites:					
Type of Measurement of M	lethod:				
Type of Sampling:		area	$m_0 > -1h$		$a_{\rm current} = 6 h n$
Exposure Duration:		sample ti	me >=11	n; expo	sure duration $\geq -$ on
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability		TT:l.	v 1	1	
Metric	: Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA o NIOSH method
Domain 2: Representative					
Metric	2: Geographic Scope	Medium	$\times 1$	2	Germany
Metric	B: Applicability	Medium	$\times 2$	4	Likely related to degreasing, which is in scope. but due to un known operations considered in this industry, this may include out of scope scenarios
Metric	1: Temporal Representativeness	High	$\times 2$	2	2010
Metric	5: Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer tain statistics.
Domain 3: Accessibility/C	arity				
Metric	6: Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^*$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

EXTRACTION					
Parameter					
		-			
Life Cycle Stage:		Processin	g		
Life Cycle Description (Sub	category of Use):	Electrical	, fine me	chanics,	, optics
Physical Form:					
Route of Exposure:		Innalation	1 1 - 1 T	(0,0)	$[4, (00+1), (2, 2, (0, 5+1)), \dots, (2, 2)]$
Exposure Concentration (U	nit):	0.3 (50tn;	Delow L	OQ), 3.	.54 (90th), 6.2 (95th) mg/m3
Number of Sites:		44.0 33.0			
Type of Measurement or M	ethod	$_{\rm TWA?}$			
Type of Measurement of M Type of Sampling		area			
Exposure Duration:			me >=1ł	r. expo	sure duration $>= 6hr$
		sampio in		ii, onpo	
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain I: Reliability	Mathadalam	II: mb	× 1	1	
Metric 1	Methodology	підп	× 1	1	Sampling or analytical methodology is an approved OSHA o NIOSH method
Domain 2: Representative					
Metric 2	: Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3	: Applicability	Medium	$\times 2$	4	Likely related to degreasing, which is in scope. but due to un known operations considered in this industry, this may include out of scope scenarios
Metric 4	: Temporal Representativeness	High	$\times 2$	2	2010
Metric 5	: Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer tain statistics.
Domain 3: Accessibility/Cl	arity				
	: Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pre- nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

EXTRACTION								
Parameter		Data						
Life Cycle Stage:		Processin	o					
Life Cycle Description (Subc	ategory of Use):	woodworł	o king, pap	er. prin	ting			
Physical Form:		vapor	8) FF		0			
Route of Exposure:		Inhalation	1					
Exposure Concentration (Uni	it):	below LO	D (50th)	, 1 (90t	h), 1.7 (95th) mg/m3			
Number of Samples:		40.0						
Number of Sites:		23.0						
Type of Measurement or Met	hod:	TWA?						
Type of Sampling:		area						
Exposure Duration:			sample time $>=1hr$ ; exposure duration $>=6hr$					
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			
Domain 2: Representative								
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany			
Metric 3:	Applicability	Medium	$\times 2$	4	Printing is in scope. Woodworking and paper may be out o scope.			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.			
Domain 4: Variability and U	ncertainty							
Domain it (arrabilit) and 0.								

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^*$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of I	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).			
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Type of Sampling: Exposure Duration:				Use Painting cars vapor Inhalation 0.2 (50th; below LOQ), 0.5 (90th), 2.5 (95th) mg/m3 TWA? area sample time >=1hr; exposure duration >= 6hr					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliabi	lity Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			
Domain 2: Repres	entative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 2 2	Germany Painting is in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessi	bility/Clari Metric 6:	ty Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.			
Domain 4: Variabi	lity and Un Metric 7:	certainty Metadata Completeness	Low	× 1	3	The monitoring study does not address variability or uncer- tainty			
Overall Quality De	etermination	n [†]	Medium		1.7				
		Con	tinued on r	ext page	)				

			P	F0-	
Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the prep Occupational Exposure; Monitoring Data; 4271620	paration of	REACH	exposure sce	enarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION					
Domain	Metric	Rating	$\mathbf{MWF}^{\star}$	Score	Comments

– continued from previous page

* MWF = Metric Weighting Factor

Source Citation:IFA. 2010Type of Data SourceOccupatiHero ID4271620	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620							
EXTRACTION Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use):		Manufacturing /Processing Chemical industry and mineral oil processing - likely formulation of so- lutions						
Physical Form:		vapor						
Route of Exposure:		Inhalation	n					
Exposure Concentration (Un	nit):	0.45 (50t)	n; below	LOQ), (	6 (90th), 9.5 (95th) mg/m3			
Number of Samples:		30.0 11.0						
Type of Measurement or Me	ethod:	TWA?						
Type of Sampling:	stilou.	personal						
Exposure Duration:		sample ti	me >=1l	ır; expo	sure duration $>= 6hr$			
-		-		, <u> </u>				
EVALUATION								
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Baliability								
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			
Domain 2: Representative								
Metric 2:	Geographic Scope	Medium	× 1	2	Germany			
Metric 3:	Applicability	Medium	$\times 2$	4	Potentially contains some scenarios that are out of scope. Con- tains some that are in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3. Accessibility /Cla	rity							
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.			
Domain 4: Variability and U	Incertainty							
	Cor	ntinued on 1	next page	)				

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^*$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

gory of Use):	Data Processing Plastics a vapor	g nd plasti		
gory of Use):	Processing Plastics a vapor	g nd plasti	<i>a</i>	
gory of Use):	Processing Plastics a vapor	g nd plasti	0	
gory of Use):	Plastics a vapor	nd plasti		
	vapor	-	c foam	processinc/mfg
	T 1 1 4 *			
	Innalation	1		$2,02,(00+1), 4,025,(05+1), \dots, n/m, 2$
	0.35 (50t)	i; below I	LOQ), 2	2.93 (90tn), 4.985 (95tn) mg/m3
	01.0 35.0			
4.	TWA?			
	personal			
	sample ti	me >=1h	r. expo	sure duration $>= 6hr$
	sampio m		ii, onpo	
Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
lethodology	High	$\sim 1$	1	Sempling on exclusion methodology is an expressed OSIIA of
lethodology	IIIgii	~ 1	T	NIOSH method
eographic Scope	Medium	$\times 1$	2	Germany
pplicability	Medium	$\times 2$	4	Polymer processing is in scope, but due to unknown opera tions considered in this industry, this may include out of scope scenarios
emporal Representativeness	High	$\times 2$	2	2010
ample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
letadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing
	l: Metric Iethodology Geographic Scope pplicability Gemporal Representativeness ample Size Ietadata Completeness	l: TWA? personal sample tin Metric Rating Iethodology High Peographic Scope Medium pplicability Medium emporal Representativeness High ample Size High Medium	h:       TWA? personal sample time >=1h         Metric       Rating         Metric       Medium         Yeographic Scope       Medium         pplicability       Medium       × 1         Memporal Representativeness       High       × 2         Ample Size       Medium       × 1         Ietadata Completeness       Low       × 1	I:       TWA? personal sample time >=1hr; expo         Metric       Rating       MWF* Score         Iethodology       High       × 1       1         Peographic Scope       Medium       × 1       2         pplicability       Medium       × 2       4         Peopral Representativeness       High       × 2       2         Ietadata Completeness       Low       × 1       3

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pro- nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

Source Citation:IFA. 2010.Type of Data SourceOccupationHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Processin	g		
Life Cycle Description (Subca	tegory of Use):	Mfg and j	processin	g of me	etals - processing of liquid coating materials
Physical Form:		vapor			
Route of Exposure:		Inhalation	1		
Exposure Concentration (Uni	t):	0.5 (50 th)	, 2.72 (9)	0th $), 3$	(95th)  mg/m3
Number of Samples:		44.0			
Number of Sites:		20.0			
Type of Measurement or Met	hod:	TWA?			
Type of Sampling:		personal			
Exposure Duration:		sample th	me >=1t	ır; expo	sure duration $\geq = 6hr$
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	× 1	2	Germany
Metric 3:	Applicability	High	$\times 2$	2	Formulation of coating materials for metals
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 2: Accessibility/Clavi	:+				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domoiro 4. Voniobilitza er d Ur					
Metric 7:	Metadata Completeness	Low	× 1	3	The monitoring study does not address variability or uncer- tainty
	Con	tinued on r	next page	)	

	- co	ontinued from pre	evious	page	
Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for th Occupational Exposure; Monitoring 4271620	ne preparation of RH Data;	EACH e	exposure	scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION					
Domain	Metric	Rating M	MWF*	Score	Comments
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium		1.7	

Parameter		Data			
Life Cruck Steme		Duccostin	~		
Life Cycle Stage:	tomore of Hap).	Processing Steel come	g turration	mafer of	mashingmy and mahiolog
Physical Form:	ttegory of Use).	Steel cons	struction,	ing or	machinery and venicles
Boute of Exposure:		Inhalation	h		
Exposure Concentration (Uni	t).	0.3 (50 th)	below L	(00) 1	75 (90th) 2 725 (95th) mg/m3
Number of Samples:		15.0	Delow L	00, 1	(3000); 2.120 (3000) mg/mb
Number of Sites:		12.0			
Type of Measurement or Met	hod:	TWA?			
Type of Sampling:		personal			
Exposure Duration:		sample ti	me >=1h	ır; expo	sure duration $>= 6$ hr
EVALUATION				~	~
Domain	Metric	Rating	MWF'*	Score	Comments
Domain 1. Daliabilitar					
Motric 1:	Mathadalagy	High	$\sim 1$	1	Sampling or applytical methodology is an approved OSHA
Methe 1.	Methodology	Ingn	~ 1	1	NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3:	Applicability	Medium	$\times 2$	4	Likely related to degreasing, which is in scope. but due to un known operations considered in this industry, this may includ out of scope scenarios
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer tain statistics.
Domain 3: Accessibility/Clar	ity				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathin zone) but lack other metadata.

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	eterminatio	n [†]	Medium		1.9	

EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Processin	g		
Life Cycle Description (Subca	ategory of Use):	Electrical	, fine me	chanics,	, optics
Physical Form:		vapor			
Route of Exposure:		Inhalation	1		
Exposure Concentration (Uni	it):	below LO	D (50th)	, 9.6 (9)	0th), 11.9 (95th) mg/m3
Number of Samples:		21.0			
Number of Sites:		15.0			
Type of Measurement or Met	hod:	TWA?			
Type of Sampling:		personal			
Exposure Duration:		sample ti	me >=1h	ır; expo	sure duration $>= 6hr$
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain I: Reliability	Matha dala ma	TT:l.	<b>1</b>	1	
Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA of NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3:	Applicability	Medium	$\times 2$	4	Likely related to degreasing, which is in scope. but due to un known operations considered in this industry, this may include out of scope scenarios
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer tain statistics.
Domain 3: Accessibility/Clar	ity				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 4: Variability and U	ncertainty				
	0				

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^*$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Processin	o		
Life Cycle Description (Subc	ategory of Use):	woodworl	e sing, pap	er, prin	ting
Physical Form:		vapor	8, rr	, <b>F</b>	0
Route of Exposure:		Inhalatio	n		
Exposure Concentration (Uni	it):	0.2 (50th;	below L	OQ), 3.	2 (90th), 12.8 (95th) mg/m3
Number of Samples:	,	39.0		•,,,	
Number of Sites:		19.0			
Type of Measurement or Met	hod:	TWA?			
Type of Sampling:		personal			
Exposure Duration:		sample ti	me >=1h	ır; expo	sure duration $\geq = 6$ hr
τνατιατίον					
Domain	Metric	Bating	MWF*	Score	Comments
Domani	mourie	Itating	101 00 1	Beore	Commones
Domain 1: Beliability					
Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or
		8			NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	× 1	2	Germany
Metric 3:	Applicability	Medium	$\times 2$	4	Printing is in scope. Woodworking and paper may be out of scope.
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 2. Accorribility / Clar	:+				
Motrie 6	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g. personal breathing
	metadata completeness	TOM	~ 1	0	zone) but lack other metadata.
Domain 4: Variability and U	ncertainty				

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	eterminatio	n [†]	Medium		1.9	

Source Citation:IFA. 2010.Type of Data SourceOccupatioHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Subca	ategory of Use):	Building	industry		
Physical Form:		vapor			
Route of Exposure:		Inhalation	1		
Exposure Concentration (Uni	it):	1.5 (50 th)	), 6.6 (90	th), 7.9	(95th) mg/m3
Number of Samples:		11.0			
Tunne of Measurement or Met	had	7.0 TWA 2			
Type of Sampling:	illou.	1 WA:			
Exposure Duration:		completi	mo > -1b	r: orno	sure duration $> - 6hr$
Exposure Duration.		sample u	ine >=11	п, ехро	sure duration >= oni
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or
				-	NIOSH method
Domain 2: Roprosontativo					
$\frac{1}{2} = \frac{1}{2} $	Geographic Scope	Medium	× 1	2	Germany
Metric 3:	Applicability	Medium	$\times 2$	4	due to unknown operations considered in this industry, this
Wicolle 0.	ripplicability	meanin	× 2	1	may include out of scope scenarios
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 5: Accessionity/Ciar Motria 6:	Motodata Completeness	Low	$\vee$ 1	2	Manitoning data include completions (a.g. parcenal breathing
metric 0.	Metadata Completeness	LOW	~ 1	5	zone) but lack other metadata.
Domain 4: Variability and U	ncertainty				
	Cor	tinued on r	next page	<u>,</u>	
			. 10.		

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^*$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the preparation of the prepara	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Descrij	ption (Subca	ategory of Use):	Manufact Chemical lutions	uring /P industry	rocessin v and m	ng ineral oil processing - likely formulation of so-
Physical Form:			vapor			
Route of Exposur	e:		Inhalatio	n		
Exposure Concent	tration (Uni	it):	0.45 (50t)	h; below	LOQ),	12.5 (90 th), 16.8 (95 th)  mg/m3
Number of Sampl	es:		30.0			
Number of Sites:			11.0			
Type of Measurer	nent or Met	hod:	TWA?			
Type of Sampling			unknown			
Exposure Duration	on:		sample ti	me >=1	hr; expo	sure duration $\geq = 6$ hr
Engineering Cont	rol & percei	nt Exposure Reduction:	samples t	aken in t	the pres	ence of LEV
EVALUATION						
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments
Domain 1: Reliab	oility					
	Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Repres	sentative					
•	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
	Metric 3:	Applicability	Medium	$\times 2$	4	Potentially contains some scenarios that are out of scope. Con- tains some that are in scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
		Cor	ntinued on 1	next page	e	

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 4: Variab	ility and Un Metric 7:	certainty Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	a [†]	Medium		1.9	

* MWF = Metric Weighting Factor

Parameter		Data			
Life Cycle Stage:		Processin	g		
Life Cycle Description (Subc	ategory of Use):	Plastics a	nd plasti	ic foam	processinc/mfg
Physical Form:		vapor			
Route of Exposure:		Inhalation	1		
Exposure Concentration (Un	it):	0.5 (50 th)	, 3.45 (9)	0th), 4.7	775 (95 th)  mg/m3
Number of Samples:		65.0			
Number of Sites:		31.0			
Type of Measurement or Me	thod:	TWA?			
Type of Sampling:		unknown			
Exposure Duration:		sample tii	me >=1l	nr; expo	sure duration $\geq = 6hr$
Engineering Control & perce	nt Exposure Reduction:	samples t	aken in t	he prese	ence of LEV
ALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability					
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA NIOSH method
Domain 1: Reliability Metric 1: Domain 2: Representative	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA NIOSH method
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2:	Methodology Geographic Scope	High Medium	× 1 × 1	1	Sampling or analytical methodology is an approved OSHA NIOSH method Germany
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3:	Methodology Geographic Scope Applicability	High Medium Medium	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \end{array}$	1 2 4	Sampling or analytical methodology is an approved OSHA NIOSH method Germany Polymer processing is in scope, but due to unknown oper tions considered in this industry, this may include out of sco scenarios
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4:	Methodology Geographic Scope Applicability Temporal Representativeness	High Medium Medium High	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \end{array}$	1 2 4 2	Sampling or analytical methodology is an approved OSHA NIOSH method Germany Polymer processing is in scope, but due to unknown oper tions considered in this industry, this may include out of scop scenarios 2010
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High Medium Medium High Medium	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$	1 2 4 2 2	Sampling or analytical methodology is an approved OSHA NIOSH method Germany Polymer processing is in scope, but due to unknown open tions considered in this industry, this may include out of sco scenarios 2010 Distribution of samples is characterized by a range with unce tain statistics.
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High Medium Medium High Medium	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	1 2 4 2 2	Sampling or analytical methodology is an approved OSHA NIOSH method Germany Polymer processing is in scope, but due to unknown oper tions considered in this industry, this may include out of sco scenarios 2010 Distribution of samples is characterized by a range with unce tain statistics.
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clan	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High Medium Medium High Medium	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	1 2 4 2 2	Sampling or analytical methodology is an approved OSHA NIOSH method Germany Polymer processing is in scope, but due to unknown open tions considered in this industry, this may include out of sco scenarios 2010 Distribution of samples is characterized by a range with unce tain statistics.
IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
-------------------------------------	--------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
	Metric	Rating	$\rm MWF^{\star}$	Score	Comments
ility and Un Metric 7:	certainty Metadata Completeness	Low	× 1	3	The monitoring study does not address variability or uncer- tainty
etermination	a [†]	Medium		1.9	
	Occupation 4271620 ility and Un Metric 7: etermination	Occupational Exposure; Monitoring Data 4271620 Metric ility and Uncertainty Metric 7: Metadata Completeness etermination [†]	Occupational Exposure; Monitoring Data;         4271620         Metric       Rating         ility and Uncertainty         Metric 7:       Metadata Completeness         Low         etermination [†] Medium	Occupational Exposure; Monitoring Data;         4271620         Metric       Rating         Metric 7:       Metadata Completeness         Low       × 1         etermination [†] Medium	Occupational Exposure; Monitoring Data;         4271620         Metric       Rating         Metric       Rating         Metric 7:       Metadata Completeness         Low       × 1       3         etermination [†] Medium       1.9

* MWF = Metric Weighting Factor

Source Citation: IFA. 20 Type of Data Source Occupa Horo ID 427162	10. MEGA evaluations for the pre- cional Exposure; Monitoring Data;	paration of REA	CH expo	sure sce	narios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION		Data			
Parameter		Data			
Life Cycle Stage:		Processing			
Life Cycle Description (Su	ocategory of Use):	stones, earth,	ceramics.	glass in	ndustry
Physical Form:		vapor	,	0	,
Route of Exposure:		Inhalation			
Exposure Concentration (	Jnit):	0.3 (50th; belo	w LOQ),	0.78 (9	0th), 0.92 (95th) mg/m3
Number of Samples:		12.0			
Number of Sites:		9.0			
Type of Measurement or M	lethod:	TWA?			
Type of Sampling:		unknown			
Exposure Duration:		sample time $>$	=1hr; ex	posure	duration $>= 6hr$
Engineering Control & per	cent Exposure Reduction:	samples taken	in the pr	resence of	of LEV
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability Motrie	Methodology	Uich	× 1	1	
Metric	1: Methodology	підії	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative					
Metric	2: Geographic Scope	Medium	× 1	2	Germany
Metric	B: Applicability	Unacceptable	$\times 2$	8	Not in scope, doesn't seem applicable to those scenarios in
	I I I I I I	I IIIII		-	scope
Metric	4: Temporal Representativeness	High	$\times 2$	2	2010
Metric	5: Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 2. Accordibility/	a				
Domain 3: Accessibility/C	arity Matadata Camplatanaga	Low	V 1	9	
Metric	5. Metadata Completeness	LOW	× 1	0	zone) but lack other metadata.
Domain 4: Variability and	Uncertainty				
	(	Continued on nex	t page		

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620							
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty		
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.3.		

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

Source Citation:IFA. 2010.Type of Data SourceOccupationHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).			
EXTRACTION Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Type of Measurement or Method: Type of Sampling: Exposure Duration: Engineering Control & percent Exposure Reduction:			Data Processing Mfg and processing of metals - processing of liquid coating materials vapor Inhalation 0.55 (50th; below LOQ), 4 (90th), 6.5 (95th) mg/m3 55.0 26.0 TWA? unknown sample time >=1hr; exposure duration >= 6hr samples taken in the presence of LEV					
<b>EVALUATION</b> Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 2 2	Germany Formulation of coating materials for metals 2010 Distribution of samples is characterized by a range with uncer- tain statistics			
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.			
Domain 4: Variability and U	ncertainty Cor	ntinued on 1	next page	9				

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	Determination	$\mathbf{n}^{\dagger}$	Medium		1.7		

Source Citation:IFA. 2010. MEGA evaluations for the preType of Data SourceOccupational Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
Hero ID 4271620				
EXTRACTION				
Parameter	Data			
Life Cycle Stage:	Processin	g		
Life Cycle Description (Subcategory of Use):	Steel cons	struction	i, mfg of	machinery and vehicles
Physical Form:	vapor			
Route of Exposure:	Inhalation	1		
Exposure Concentration (Unit):	0.55 (50t)	n; below	$LOQ), \xi$	5.8 (90th), 7.45 (95th) mg/m3
Number of Samples:	15.0			
Number of Sites:	10.0			
Type of Measurement or Method:	TWA?			
Type of Sampling:	unknown			
Exposure Duration:	sample ti	me >=1	hr; expo	sure duration $\geq = 6hr$
Engineering Control & percent Exposure Reduction:	samples t	aken in 1	the prese	ence of LEV
EVALUATION				
Domain Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability	TT: 1	-	-	
Metric 1: Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative				
Metric 2: Geographic Scope	Medium	× 1	2	Germany
Metric 3: Applicability	Medium	$\times 2$	4	Likely related to degreasing which is in scope, but due to un-
Neure 6. Appreability	Wiedfulli	× 2	1	known operations considered in this industry, this may include out of scope scenarios
Metric 4: Temporal Representativeness	High	$\times 2$	2	2010
Metric 5: Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibility/Clarity	Low	~ 1	9	
Metric 0: Metadata Completeness	LOW	×Ι	9	Monitoring data include sample type (e.g., personal breathing
				zone) but lack other metadata.
				zone) but lack other metadata.

IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
	Metric	Rating	$\rm MWF^{\star}$	Score	Comments
ility and Un Metric 7:	certainty Metadata Completeness	Low	× 1	3	The monitoring study does not address variability or uncer- tainty
etermination	a [†]	Medium		1.9	
	Occupation 4271620 ility and Un Metric 7: etermination	Occupational Exposure; Monitoring Data 4271620 Metric ility and Uncertainty Metric 7: Metadata Completeness etermination [†]	Occupational Exposure; Monitoring Data;         4271620         Metric       Rating         ility and Uncertainty         Metric 7:       Metadata Completeness         Low         etermination [†] Medium	Occupational Exposure; Monitoring Data;         4271620         Metric       Rating         Metric 7:       Metadata Completeness         Low       × 1         etermination [†] Medium	Occupational Exposure; Monitoring Data;         4271620         Metric       Rating         Metric       Rating         Metric 7:       Metadata Completeness         Low       × 1       3         etermination [†] Medium       1.9

* MWF = Metric Weighting Factor

Source Citation:IFA. 2010.Type of Data SourceOccupatio	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
Hero ID 4271620					
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Processin	g		
Life Cycle Description (Subca	ategory of Use):	Electrical	, fine me	chanics,	optics
Physical Form:		vapor			
Route of Exposure:		Inhalation	1		
Exposure Concentration (Uni	t):	0.2 (50th;	below I	LOQ, 3	(90th), 3.9 (95th) mg/m3
Number of Samples:		40.0			
Number of Sites:		25.0			
Type of Measurement or Met	hod:	TWA?			
Type of Sampling:		unknown			
Exposure Duration:		sample ti	me >=1	hr; expo	sure duration $\geq = 6hr$
Engineering Control & percer	nt Exposure Reduction:	samples t	aken in t	the prese	ence of LEV
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain I: Reliability		TT· 1		1	
Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	× 1	2	Germany
Metric 2: Metric 3:	Geographic Scope Applicability	Medium Medium	$\times 1 \times 2$	$\frac{2}{4}$	Germany Likely related to degreasing, which is in scope. but due to un- known operations considered in this industry, this may include
Metric 2: Metric 3:	Geographic Scope Applicability	Medium Medium	$\begin{array}{c} \times 1 \\ \times 2 \end{array}$	2 4	Germany Likely related to degreasing, which is in scope. but due to un- known operations considered in this industry, this may include out of scope scenarios
Metric 2: Metric 3: Metric 4:	Geographic Scope Applicability Temporal Representativeness	Medium Medium High	$\begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \end{array}$	2 4 2	Germany Likely related to degreasing, which is in scope. but due to un- known operations considered in this industry, this may include out of scope scenarios 2010
Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Medium High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \end{array}$ $\begin{array}{c} \times \ 2 \\ \times \ 1 \end{array}$	2 4 2 2	Germany Likely related to degreasing, which is in scope. but due to un- known operations considered in this industry, this may include out of scope scenarios 2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Medium High Medium	$\begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$	2 4 2 2	Germany Likely related to degreasing, which is in scope. but due to un- known operations considered in this industry, this may include out of scope scenarios 2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Medium High Medium	$\begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$	2 4 2 2 3	Germany Likely related to degreasing, which is in scope. but due to un- known operations considered in this industry, this may include out of scope scenarios 2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6:	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	Medium Medium High Medium Low	$\begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$ $\times 1$	2 4 2 2 3	Germany Likely related to degreasing, which is in scope. but due to un- known operations considered in this industry, this may include out of scope scenarios 2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6:	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	Medium Medium High Medium Low	$\begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$ $\times 1$	2 4 2 2 3	Germany Likely related to degreasing, which is in scope. but due to un- known operations considered in this industry, this may include out of scope scenarios 2010 Distribution of samples is characterized by a range with uncer- tain statistics. Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 4: Variab	ility and Un Metric 7:	certainty Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	a [†]	Medium		1.9	

* MWF = Metric Weighting Factor

Source Citation:IFA. 2010. MEGA evType of Data SourceOccupational ExposuHero ID4271620	aluations for the prep re; Monitoring Data;	paration of	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Processin	g		
Life Cycle Description (Subcategory of U	Jse):	woodwork	king, pap	er, prin	ting
Physical Form:		vapor			
Route of Exposure:		Inhalation	1	,	
Exposure Concentration (Unit):		below LO	D (50th)	), 1 (90t	h), $3.855 (95th) mg/m3$
Number of Samples:		33.0			
Number of Sites:		23.0			
Type of Measurement or Method:		TWA?			
Type of Sampling:		unknown	、 11		
Exposure Duration:	Delevetien	sample th	me >=11	ır; expo	sure duration $\geq = 6$ nr
Engineering Control & percent Exposure	e Reduction:	samples t	aken in t	ne prese	ence of LEV
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1. Poliability					
Metric 1: Methodol	ogy	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative				_	
Metric 2: Geograph	ic Scope	Medium	× 1	2	Germany
Metric 3: Applicabi	lity	Medium	$\times 2$	4	Printing is in scope. Woodworking and paper may be out of scope.
Metric 4: Temporal	Representativeness	High	$\times 2$	2	2010
Metric 5: Sample S	ize	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibility/Clarity					
Metric 6: Metadata	Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 4: Variability and Uncertainty					
	Cor	ntinued on r	next page	e	

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^*$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	n†	Medium		1.9		

Source Citation:IFA. 2010.Type of Data SourceOccupatioHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION Parameter		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Subca	ategory of Use):	woodworl	king, pap	per, prin	ting
Physical Form:		vapor			
Route of Exposure:		Inhalation	n 1	(0,0)	25(00th) - 2(05th) 2
Number of Semples:	.t.):	0.2 (50th;	; below I	LOQ), 2.	35 (90th), 3 (95th) mg/m3
Number of Sites:		40.0 22.0			
Type of Measurement or Met	hod:	TWA?			
Type of Sampling:	nou	unknown			
Exposure Duration:		sample ti	me >=11	hr; expo	sure duration $>= 6hr$
Engineering Control & percer	nt Exposure Reduction:	samples t	aken in t	the pres	ence of LEV
	-	-		_	
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain I: Reliability	Matha dala ma	TT:l.	1	1	
	methodology	nigii	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3:	Applicability	Medium	$\times 2$	4	Printing is in scope. Woodworking and paper may be out of
					scope.
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 2: Accessibility/Clan	:+				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing
	<b>L</b>				zone) but lack other metadata.
Domain 4. Variability and U	ocertainty				
			4		
	Cor	ntinued on i	next page	е	

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pro- nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

Source Citation:IFA. 2010.Type of Data SourceOccupatioHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION		Data			
Farameter		Data			
Life Cycle Stage:		Processin	g		
Life Cycle Description (Subc	ategory of Use):	Plastics a	o nd plast	ic foam	processinc/mfg
Physical Form:	0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,	vapor	1		. , 0
Route of Exposure:		Inhalation	1		
Exposure Concentration (Uni	it):	0.2 (50th;	below I	LOQ), 1.	92 (90th), 2.9 (95th) mg/m3
Number of Samples:		22.0			
Number of Sites:		14.0			
Type of Measurement or Met	hod:	TWA?			
Type of Sampling:		unknown			
Exposure Duration:		sample ti	me >=1	hr; expo	sure duration $\geq = 6hr$
Engineering Control & percer	Engineering Control & percent Exposure Reduction:		aken WI	ТНОИЛ	T LEV
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1. Roliability					
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3:	Applicability	Medium	$\times 2$	4	Polymer processing is in scope, but due to unknown opera-
					scenarios
Metric 4:	Temporal Representativeness	High	$\times 2$	2	scenarios 2010
Metric 4: Metric 5:	Temporal Representativeness Sample Size	High Medium	$\times 2 \times 1$	$2 \\ 2$	<ul><li>2010</li><li>Distribution of samples is characterized by a range with uncertain statistics.</li></ul>
Metric 4: Metric 5:	Temporal Representativeness Sample Size	High Medium	$\times 2 \times 1$	2 2	2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6:	Temporal Representativeness Sample Size	High Medium	× 2 × 1	2 2	2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6:	Temporal Representativeness Sample Size	High Medium Low	$\begin{array}{c} \times \ 2 \\ \times \ 1 \end{array}$ $\times \ 1$	2 2 3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6:	Temporal Representativeness Sample Size ity Metadata Completeness	High Medium Low	$\times 2 \times 1 \times 1 \times 1$	2 2 3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 4: Variab	ility and Un Metric 7:	certainty Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	a [†]	Medium		1.9	

* MWF = Metric Weighting Factor

Source Citation: IFA. 2010.	MEGA evaluations for the prep	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).		
Type of Data Source Occupatio	nal Exposure; Monitoring Data;						
Hero ID 4271620							
EXTRACTION							
Parameter		Data					
Life Cycle Stage:		Processin	g				
Life Cycle Description (Subc	ategory of Use):	Mfg and	processin	g of me	tals - processing of liquid coating materials		
Physical Form:		vapor					
Route of Exposure:		Inhalation	n				
Exposure Concentration (Uni	it):	0.2 (50 th)	; below L	OQ), 13	3.45 (90 th), 86.9 (95 th)  mg/m3		
Number of Samples:		19.0					
Number of Sites:		12.0					
Type of Measurement or Met	hod:	TWA?					
Type of Sampling:		unknown	. 11				
Exposure Duration:		sample ti	me >=11	ır; expo	sure duration $\geq = 6$ hr		
Engineering Control & percer	nt Exposure Reduction:	samples taken WITHOUT LEV					
EVALUATION							
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliability	Mothodology	II: mh	~ 1	1			
metric 1:	Methodology	nigii	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method		
Domain 2: Representative							
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany		
Metric 3:	Applicability	High	$\times 2$	2	Formulation of coating materials for metals		
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010		
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 3: Accessibility/Clar	ity						
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.		
Domain 4: Variability and U	ncertainty						
	Cor	tinued on 1	next page	<u>)</u>			

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pre- nal Exposure; Monitoring Data	eparation of a;	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	$\mathbf{n}^{\dagger}$	Medium		1.7	

Source Citation:IFA. 2010.Type of Data SourceOccupationHero ID4271620	. MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION		_			
Parameter		Data			
Life Cycle Stage:		Processin	ď		
Life Cycle Description (Subc	ategory of Use).	Steel cons	8 struction	mfg of	machinery and vehicles
Physical Form:	atogory of obo).	vapor	our detroit	, iiig oi	indomiory and volicios
Route of Exposure:		Inhalatio	n		
Exposure Concentration (Un	it):	below LO	D		
Number of Samples:	,	15.0			
Number of Sites:		10.0			
Type of Measurement or Met	thod:	TWA?			
Type of Sampling:		unknown			
Exposure Duration:		sample ti	me >=1	hr; expo	sure duration $\geq = 6$ hr
Engineering Control & percent Exposure Reduction:		samples t	aken Wl	ТНОИЛ	I LEV
EVALUATION					
Domain	Metric	Rating	MWF*	Score	Comments
Domain 1. Poliability					
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3:	Applicability	Medium	$\times 2$	4	Likely related to degreasing, which is in scope. but due to un- known operations considered in this industry, this may include out of scope scenarios
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibility/Clar	sitar				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing
					zone) but lack other metadata.
	Con	ntinued on r	next pag	e	

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 4: Variab	ility and Un Metric 7:	certainty Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	a [†]	Medium		1.9	

* MWF = Metric Weighting Factor

Parameter		Data			
Life Cycle Stage:		Processin	g		
Life Cycle Description (Subc	ategory of Use):	woodworl	king, pap	er, prin	ting
Physical Form:		vapor			
Route of Exposure:		Inhalatio	n		
Exposure Concentration (Un	it):	below LO	D (50 th)	), 1.7 (90)	0th), $1.74 (95th) \text{ mg/m3}$
Number of Samples:		33.0			
Number of Sites:		23.0			
Type of Measurement or Met	:hod:	TWA?			
Type of Sampling:		unknown			
Exposure Duration:		sample ti	me >=1l	hr; expo	sure duration $\geq = 6hr$
Engineering Control & percent Exposure Reduction:		samples t	aken WI	THOUT	I LEV
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Polisbility					
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or
					NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3:	Applicability	Medium	$\times 2$	4	Printing is in scope. Woodworking and paper may be out of scope.
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Matula F	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Metric 5:					
Metric 5:					
Domain 3: Accessibility/Clar	ity	_		_	
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 3: Accessibility/Clar Metric 6: Domain 4: Variability and U	ity Metadata Completeness ncertainty	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 3: Accessibility/Clar Metric 6: Domain 4: Variability and U	ity Metadata Completeness ncertainty	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pro- nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

Source Citation:IFA. 2010. MEGA evaluations for the prepType of Data SourceOccupational Exposure; Monitoring Data;Hero ID4271620	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION	Data			
	Data			
Life Cycle Stage:	Use			
Life Cycle Description (Subcategory of Use):	woodworl	king, pap	er, prin	ting
Physical Form:	vapor			
Route of Exposure:	Inhalation	n		
Exposure Concentration (Unit):	0.045~(50)	th; below	vLOQ),	28 (90th), 34 (95th) mg/m3
Number of Samples:	45.0			
Number of Sites:	22.0			
Type of Measurement or Method:	TWA?			
Type of Sampling:	unknown			
Exposure Duration:	sample ti	me >=1	hr; expo	sure duration $>= 6hr$
Engineering Control & percent Exposure Reduction:		aken WI	THOUT	I LEV
EVALUATION				
Domain Metric	Rating	$\rm MWF^{\star}$	Score	Comments
Domain 1. Beliability				
Metric 1: Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative				
Metric 2: Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3: Applicability	Medium	$\times 2$	4	Printing is in scope. Woodworking and paper may be out of scope.
Metric 4: Temporal Representativeness	High	$\times 2$	2	2010
Metric 5: Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3. Accessibility/Clarity				
Metric 6: Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 4: Variability and Uncertainty				
Cor	ntinued on r	next page	e	

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^*$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

Source Citation:IFA. 2010.Type of Data SourceOccupationHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		All			
Life Cycle Description (Subca	ategory of Use):	All			
Physical Form:		vapor			
Route of Exposure:		Inhalation	n 		
Exposure Concentration (Uni	t):	below LO	D (50 th)	), 0.64 (	90th), $1.155 (95th) \text{ mg/m3}$
Number of Samples:		13.0			
Number of Sites:		7.0			
Type of Measurement or Met	hod:	TWA?			
Worker Activity:		storing, c	onveying		
Type of Sampling:		area			
Exposure Duration:		sample ti	me >=11	hr; expo	sure duration $\geq = 6hr$
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability			_		
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	× 1	2	Germany
Metric 3:	Applicability	Medium	$\times 2$	4	due to unknown industries for this activity, this may include
	TT				out of scope scenarios
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibility/Clari	ity	-	_		
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing
					zone) but fack Other metadata.
Domain 4: Variability and Ur	ncertainty				
	Cor	ntinued on r	next page	е	

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	n†	Medium		1.9		

Source Citation:IFA. 20Type of Data SourceOccupatHero ID4271620	10. MEGA evaluations for the pre- tional Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION		Data			
		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Sul	ocategory of Use):	Processin	g and tr	eatment	of wood
Physical Form:		vapor	0		
Route of Exposure:		Inhalation	n		
Exposure Concentration (U	Jnit):	below LC	D (50th	), 49.8 (	90th), 149.8 (95th) mg/m3
Number of Samples:		24.0			
Number of Sites:		9.0			
Type of Measurement or M	lethod:	TWA?			
Worker Activity:		processin	g, sandin	ng, remo	val
Type of Sampling:		area			
Exposure Duration:		sample ti	me >=1	hr; expo	sure duration $>= 6hr$
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability		TT: 1			
Metric	: Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative					
Metric 2	2: Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3	B: Applicability	Medium	$\times 2$	4	Application of finishing to wood is in scope, but sanding and
					removal may not be
Metric 4	l: Temporal Representativeness	$\operatorname{High}$	$\times 2$	2	2010
Metric 5	5: Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibility/C	arity	T	1	0	
Metric 6	b: Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata
Domain 4: Variability and	Uncertainty				
	Cor	ntinued on 1	next page	e	
			. 0		

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^*$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	n†	Medium		1.9		

EXTRACTION Parameter Da	ata se rocessing por halation 2 (50th;	g of plast	tic and I	
Life Cycle Stage:	se rocessing por halation 2 (50th;	g of plast	tic and p	
Life Cycle Stage:	se rocessing por halation 2 (50th;	g of plast	tic and _I	alastic foom
THE OVER MARE. US	rocessing por halation 2 (50th;	g of plast	tic and p	alastia faama
Life Cycle Description (Subcategory of Use):	por halation 2 (50th;	<b>.</b>	I	DIASUC IOAIII
Physical Form: va	halation 2 (50th;			
Route of Exposure: Inl	2 (50 th;			
Exposure Concentration (Unit): 0.2	· · · ·	below L	OQ), 3	(90th), 5.35 (95th) mg/m3
Number of Samples: 82	2.0		-,,,	
Number of Sites: 55	5.0			
Type of Measurement or Method: TV	WA?			
Worker Activity: su	urface coa	ating an	d painti	ng
Type of Sampling: are	ea			
Exposure Duration: san	mple tin	ne >=1h	nr; expos	sure duration $>= 6hr$
FVALUATION				
Domain Metric R	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability				
Metric 1: Methodology Hi	igh	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative				
Metric 2: Geographic Scope Me	edium	$\times 1$	2	Germany
Metric 3: Applicability Hi	igh	$\times 2$	2	in scope
Metric 4: Temporal Representativeness Hi	igh	$\times 2$	2	2010
Metric 5: Sample Size Me	edium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 2. Accessibility (Clarity				
Domain 5: Accessionity/Clarity Metric 6: Metadata Completeness I.o.		$\sim 1$	2	Manitanian data include completence (a.e. normal breathing
Metadata Completeness	Jw	~ 1	0	zone) but lack other metadata.
Domain 4: Variability and Uncertainty				
Continu	ied on n	ext page	è	

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	$\mathbf{n}^{\dagger}$	Medium		1.7		

Source Citation:IFA. 2010. MEGA evaluations for the preType of Data SourceOccupational Exposure; Monitoring DataHero ID4271620	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).				
EXTRACTION								
Parameter	Data							
Life Crede Stage	Ugo							
Life Cycle Description (Subcategory of Use):	Motale fi	no moch	anice or	atics				
Physical Form:	vapor	ne meen	ames, of	50105				
Route of Exposure:	Inhalatio	n						
Exposure Concentration (Unit):	0.7 (50 th)	). 15 (90	th), 90 (	(95th) mg/m3				
Number of Samples:	30.0	), _0 (00	,,					
Number of Sites:	15.0							
Type of Measurement or Method:	TWA?							
Worker Activity:	cleaning							
Type of Sampling:	area							
Exposure Duration:	sample ti	sample time $>=1hr$ ; exposure duration $>=6hr$						
EVALUATION								
Domain Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliability								
Metric 1: Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method				
Domain 2: Representative								
Metric 2: Geographic Scope	Medium	$\times 1$	2	Germany				
Metric 3: Applicability	High	$\times 2$	2	in scope				
Metric 4: Temporal Representativeness	High	$\times 2$	2	2010				
Metric 5: Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.				
Domain 3: Accessibility/Clarity	т		0					
Metric 6: Metadata Completeness	LOW	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.				
				,				
Domain 4: Variability and Uncertainty								
Co	ntinued on 1	next pag	e					

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	$\mathbf{n}^{\dagger}$	Medium		1.7		

Source Citation:IFA. 2010.Type of Data SourceOccupatioHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Subca	ategory of Use):	Mfg of sh	loes; Pro	cessing o	of plastic and plastic foam
Physical Form:		vapor			
Route of Exposure:		Inhalatio	n		
Exposure Concentration (Uni	it):	0.2 (50th;	; below I	LOQ), 3.	76 (90th), $5.52$ (95th) mg/m3
Number of Samples:		18.0			
Number of Sites:		10.0			
Type of Measurement or Met	shod:	TWA?			
Worker Activity:		gluing			
Type of Sampling:		area			
Exposure Duration:		sample ti	me >=1	hr; expo	sure duration $\geq = 6hr$
EVALUATION					
Domain	Metric	Rating	MWF*	Score	Comments
Demois 1. Deliebilitar					
Domain 1: Reliability	Mathadalam	II: mh	V 1	1	
Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative	~				
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3:	Applicability	Medium	$\times 2$	4	Adhesive use is in scope, but this may also include out of scope scenarios
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibility/Clar	ity				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 4: Variability and U	ncertainty				
	Cor	ntinued on r	next page	2	
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Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^*$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	n†	Medium		1.9		

Source Citation:IFA. 2010.Type of Data SourceOccupationHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of REA	CH expo	sure sce	narios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Subca	tegory of Use):	Foundries			
Physical Form:		vapor			
Route of Exposure:		Inhalation	- )		
Exposure Concentration (Uni	t):	below LOD (50	0th), 15.8	$3 (90 \mathrm{th})$	, 21.1 (95th) mg/m3
Number of Samples:		11.0			
Number of Sites:		5.0			
Type of Measurement or Met	hod:	TWA?			
Type of Sampling:		area			
Exposure Duration:		sample time $>$	=1hr; ex	posure	duration $\geq = 6hr$
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or
	wiethodology	Ingn	~ 1	1	NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3:	Applicability	Unacceptable	$\times 2$	8	the function in this industry is unknown
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accordibility /Claw					
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 4: Variability and Ur	Metadata Completence	Low	V 1	0	
Metric 7:	Metadata Completeness	Low	× 1	3	The monitoring study does not address variability or uncer- tainty
	(	Continued on nex	t page		

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620							
EVALUATION								
Domain	Metric	Rating	MWF*	Score	Comments			
Overall Quality D	$\operatorname{Petermination}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.3.			

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

Source Citation:IFA. 2010Type of Data SourceOccupaticHero ID4271620	. MEGA evaluations for the prepond Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).		
EXTRACTION							
Parameter		Data					
Life Cycle Stage:		Processin	g				
Life Cycle Description (Subc	ategory of Use):	Mfg of co	atings, a	dhesives	3		
Physical Form:		vapor					
Route of Exposure:		Inhalatio	n				
Exposure Concentration (Un	it):	0.35 (50t)	n; below	LOQ), 3	3.45 (90 th), 5.875 (95 th)  mg/m3		
Number of Samples:		21.0					
Number of Sites:		11.0					
Type of Measurement or Met	thod:	TWA?					
Worker Activity:		mixing, p	ressing (	compact	ting)		
Type of Sampling:		Personal		1			
Exposure Duration:		sample tr	me >=1	hr; expo	sure duration $\geq = 6hr$		
EVALUATION							
Domain	Metric	Rating	MWF*	Score	Comments		
Domain 1. Poliability							
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method		
Domain 2: Representative							
Metric 2:	Geographic Scope	Medium	× 1	2	Germany		
Metric 3:	Applicability	High	$\times 2$	2	in scope		
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010		
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 3: Accessibility/Clay	it.						
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.		
Domain 4: Variability and U	ncertainty						
	Cor	ntinued on r	next pag	e			
Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
----------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------	--------	---------------	-------	-----------------------------------------------------------------------	--
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	$\mathbf{n}^{\dagger}$	Medium		1.7		

Source Citation:IFA. 2010Type of Data SourceOccupationHero ID4271620	. MEGA evaluations for the prepond Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION					
Parameter		Data			
Life Cycle Stage:					
Life Cycle Description (Subcategory of Use):			g plastics	s and pl	astic
Physical Form:		vapor			
Route of Exposure:		Inhalation	n		
Exposure Concentration (Un	it):	below LO	D (50th)	), 0.38 (	90th; below LOQ), $0.49 (95th) \text{ mg/m3}$
Number of Samples:	Number of Samples:				
Number of Sites:	Number of Sites:				
Type of Measurement or Me	thod:	TWA?			
Worker Activity:		foaming			
Type of Sampling:		Personal			
Exposure Duration:		sample ti	me >=1l	hr; expo	sure duration $\geq = 6$ hr
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability		1	_		
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3:	Applicability	High	$\times 2$	2	Potentially in scope; function of NMP for plastics not well
		0			known
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibility/Cla	rity	Ŧ	-	0	
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata
					Lone, Sau lier outer metadatu.
Domain 4: Variability and U	ncertainty				
	Cor	ntinued on r	next page	9	

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	$\mathbf{n}^{\dagger}$	Medium		1.7		

Source Citation:IFA. 2010Type of Data SourceOccupationHero ID4271620	. MEGA evaluations for the prepond Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).				
EXTRACTION									
Parameter		Data							
Life Cycle Stage:			Use						
Life Cycle Description (Subc	ategory of Use):	Processin	g and tre	eatment	of wood				
Physical Form:		vapor							
Route of Exposure:	- >	Inhalation	1						
Exposure Concentration (Un	it):	0.5 (50 th)	, 8.4 (90)	0th), 13.	9 (95 th)  mg/m3				
Number of Samples:		13.0							
Number of Sites:		8.0							
Type of Measurement or Me	thod:	TWA?							
Worker Activity:		sanding							
Type of Sampling:		Personal	. 11						
Exposure Duration:		sample th	me >=1	nr; expo	sure duration $\geq = 6$ nr				
EVALUATION									
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1. Poliability									
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or				
		0			NIOSH method				
Domain 2: Representative									
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany				
Metric 3:	Applicability	Medium	$\times 2$	4	Application of finishing to wood is in scope, but sanding and removal may not be				
Metric 4	Temporal Representativeness	High	$\times 2$	2	2010				
Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer-				
		mourum	~ 1	-	tain statistics.				
Domain 3: Accessibility/Clar	ritv								
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.				
Domain 4: Variability and U	ncertainty								
	Cor	tinued on r	next page	e					
			1.0						

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	n†	Medium		1.9		

Source Citation:IFA. 2010.Type of Data SourceOccupationHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposur	e scenarios for N-methyl-2-pyrrolidone (vapour).		
EXTRACTION							
Parameter		Data					
Life Cycle Stage:							
Life Cycle Description (Subca	tegory of Use):	Processin	g of plas	stic and j	plastic foam		
Physical Form:		vapor					
Route of Exposure:		Inhalation	1	1) 100			
Exposure Concentration (Unit	t):	0.65 (501)	1), 3 (90	tn), 4.86	5 (95th) mg/m3		
Number of Samples:		09.0					
Tupe of Measurement or Meth	and:	39.0 TWA ?					
Worker Activity:	lou.	I WA:	oting or	nd nainti	ng		
Type of Sampling:		Personal	ating an	ia painti	ing .		
Exposure Duration:		sample ti	me > -1	hr· evno	sure duration >= 6hr		
		sample time >=1m, exposure duration >= 0m					
EVALUATION							
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain I: Reliability		TT: 1	1	1			
Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method		
Domain 2: Representative	Communitie Soome	M - J	1	0	<u> </u>		
Metric 2:	Geographic Scope	Medium	× 1 × 2	2	Germany		
Metric 5:	Tomporal Roprosontativonoss	ПIgli High	$\times 2$	2	in scope		
Metric 4.	Sample Size	Modium	$\times 2$ $\times 1$	2	2010 Distribution of complex is show staring hus some with up con-		
	Sample Size	meann	~ 1	2	tain statistics.		
Domain 3: Accessibility/Clari	t						
Motric 6:	Motadata Completeness	Low	$\vee 1$	3	Monitoring data include completures (e.g., personal breathing		
Metric 0.	Metadata Completeness	LOW	~ 1	0	zone) but lack other metadata.		
Domain 4: Variability and Un	certainty						
	Cor	tinued on 1	next pag	e			

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	$\mathbf{n}^{\dagger}$	Medium		1.7		

Type of Data Source Hero ID	Occupatio 4271620	nal Exposure; Monitoring Data;	paration of	ILEAOII	exposu	e scenarios for iv-methyi-2-pyrrondone (vapour).
EXTRACTION						
Parameter			Data			
Life Cycle Stage:	/C 1		Use	1		
Life Cycle Descri	ption (Subc	ategory of Use):	Metals, n	ne mecn	anics, op	DUICS
Physical Form:			vapor			
Free agrees Conson	re: tration (IIni		$2 (50 \pm h)$	1 19.95 (0	04h) 10	975 (05th) mm/m2
Exposure Concer.	ltration (Un.	it <i>)</i> :	2(5000),	12.55 (9	0(11), 18.	873 (95th) mg/m5
Number of Sites:	ies.		23.0 17.0			
Type of Mossure	mont or Mot	hod	TWA?			
Worker Activity	ment of met	liou.	cleaning			
Type of Sampling	<b>D.</b> •		Personal			
Exposure Duration	on.		sample ti	me >=1	hr. expo	sure duration $\geq = 6$ hr
Enposaro E aradi			builipie en		in, onpo	
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
	•1• /					
Domain I: Reliat	ollity		TT' 1	1	1	
	Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
	, , <b>.</b>					
Domain 2: Repre	Matuia D	Communitée Commu	Mallin	1	0	<u> </u>
	Metric 2:	Geographic Scope	Medium	× 1	2	Germany
	Metric 5:	Applicability	ПI <u>g</u> II Цітр	× 2 × 9	2	in scope
	Metric 4:	Semple Size	Madium	× 2 × 1	2	2010 Distribution of complexity is also activity of the company of the complexity of the complexity of the company of the comp
	Metric 5:	Sample Size	Medium	× 1	2	Listribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Acces	eibility/Clar	itz				
Domain 5. Acces	Metric 6	Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing
	Metric 0.	Metadata Completeness	LOW	~ 1	0	zone) but lack other metadata.
Domain 4: Varial	bility and U	ncertainty				
	•	Cor	ntinued on r	next pag	e	
		0.00		. 10		

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	$\mathbf{n}^{\dagger}$	Medium		1.7		

Source Citation:IFA. 2010.Type of Data SourceOccupatioHero ID4271620	. MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION					
Parameter		Data			
Life Cycle Stage:			D		
Life Cycle Description (Subca	ategory of Use):	Mfg of sh	oes; Pro	cessing o	of plastic and plastic foam
Physical Form:		vapor			
Route of Exposure:		Innalation		(0,0) 1	
Exposure Concentration (Uni	it):	0.3 (50tn;	below L	.0Q), 1.	94 (90th), 2.095 (95th) mg/m3
Number of Samples:					
Tunne of Measurement or Met	had	14 TWA?			
Worker Activity:	silou.	gluing			
Type of Sampling		Personal			
Exposure Duration:		sample ti	me >—11	hr. evno	sure duration >= 6br
		sample th		in, enpo	
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Demoir 1. Deliebilitar					
Domain 1: Reliability	Mathadalam	Uich	× 1	1	Constitution and the later is an entry of OCHA
	Methodology	Ingn	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2. Pannagantativa					
Motria 2: Motria 2:	Coographic Scope	Modium	$\vee$ 1	9	Commonwe
Metric 2.	Applicability	Medium	$^{\wedge 1}$ $^{\vee 2}$	2 1	Adhesiya usa is in scope, but this may also include out of scope
metric 5.	Applicability	Wiedrum	× 2	т	scenarios
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
	.,				
Domain 3: Accessibility/Clar	Ity Mata lata Gama latan ara	τ		9	
Metric 6:	Metadata Completeness	LOW	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
					,
Domain 4: Variability and U	ncertainty				
	Cor	tinued on r	next page	э	

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	etermination	n†	Medium		1.9		

Source Citation: Type of Data Source Hero ID	IFA. 2010 Occupatio 4271620	. MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).			
EXTRACTION									
Parameter			Data						
Life Cycle Stage			Uco						
Life Cycle Stage:	tion (Subc	ategory of Use).	Processin	g and tre	eatmont	of wood			
Physical Form	Could build	ategory of eser.	vapor	g and th	aument				
Route of Exposure	?:		Inhalatio	n					
Exposure Concent	ration (Un	it):	below LC	) D (50th)	). 5.72 (	90th), 7.8 (95th) mg/m3			
Number of Sample	es:	).	12	_ (0000-)	,, (				
Number of Sites:			5						
Type of Measurem	nent or Met	thod:	TWA?						
Worker Activity:			sanding						
Type of Sampling:	:		unknown						
Exposure Duration	n:		sample ti	me >=1l	hr; expo	sure duration $>= 6hr$			
Engineering Contr	Engineering Control & percent Exposure Reduction:		samples t	samples taken WITHOUT LEV					
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliabi	ility								
	Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			
Domain 2. Bonros	ontativo								
Domain 2. Repres	Metric 2.	Geographic Scope	Medium	× 1	2	Cermany			
	Metric 3:	Applicability	Medium	$\times 2$	4	Application of finishing to wood is in scope, but sanding and removal may not be			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 2. Access	:h:l:+/Cl	:							
Domain 5: Accessi	Motrie 6	Motodoto Completeness	Low	$\vee$ 1	2	Manitaning data include completing (a.g. general breathing			
	metric 0:	metadata Completeness	LOW	~ 1	J	zone) but lack other metadata.			
		Cor	ntinued on 1	next page	э				

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 4: Variab	ility and Un Metric 7:	certainty Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	a [†]	Medium		1.9	

* MWF = Metric Weighting Factor

Source Citation:IFA. 2010Type of Data SourceOccupationHero ID4271620	. MEGA evaluations for the prep anal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).				
EXTRACTION		D /							
Parameter		Data							
Life Cycle Stage:		Use							
Life Cycle Description (Subc	ategory of Use):	Processing of plastic and plastic foam							
Physical Form:	Physical Form: Route of Exposure:				F				
Route of Exposure:									
Exposure Concentration (Un	it):	below LC	D (50th)	). 3.24 (	90th), 4.055 (95th) mg/m3				
Number of Samples:	,	17		<i>,,</i> (	// ( ) 6/				
Number of Sites:		11							
Type of Measurement or Me	Type of Measurement or Method:								
Worker Activity:	Worker Activity: Type of Sampling:			d painti	ing				
Type of Sampling:									
Exposure Duration:	Exposure Duration:			hr; expo	sure duration $>= 6hr$				
Engineering Control & perce	Engineering Control & percent Exposure Reduction:			samples taken WITHOUT LEV					
EVALUATION									
Domain	Metric	Rating	MWF*	Score	Comments				
Domain 1: Boliability									
Metric 1	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or				
	methodology	111.9.11	<u> </u>	1	NIOSH method				
Domain 2: Representative									
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany				
Metric 3:	Applicability	High	$\times 2$	2	in scope				
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010				
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.				
Domain 2. Accessibility/Clas	.:								
Metric 6:	Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing				
	metadata Completeness	LOW	~ 1	5	zone) but lack other metadata.				
Domain 4: Variability and U	ncertainty								
	Cor	ntinued on 1	next page	e					
			. 10.						

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	Determination	$\mathbf{n}^{\dagger}$	Medium		1.7		

Source Citation:IFA. 2010.Type of Data SourceOccupationHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).				
EXTRACTION									
Parameter		Data							
Life Cycle Stage:		Use							
Life Cycle Description (Subca	Life Cycle Description (Subcategory of Use):			anics, op	otics				
Physical Form:	Physical Form:								
Route of Exposure:		Inhalation	n						
Exposure Concentration (Uni	t):	0.4 (50 th)	; below L	LOQ), 79	9.6 (90 th), 102.1 (95 th)  mg/m3				
Number of Samples:		11							
Number of Sites:		6							
Type of Measurement or Met	Type of Measurement or Method:								
Worker Activity:	Worker Activity:								
Type of Sampling:	Type of Sampling:								
Exposure Duration:	Exposure Duration:			hr; expo	sure duration $\geq = 6hr$				
Engineering Control & percer	Engineering Control & percent Exposure Reduction:			samples taken WITHOUT LEV					
EVALUATION									
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1, Paliability									
Motrie 1:	Mothodology	High	$\vee$ 1	1	Compliant on analytical methodology is an approved OCIIA on				
	Methodology	IIIgii	~ 1	1	NIOSH method				
Domain 2: Representative									
Metric 2:	Geographic Scope	Medium	× 1	2	Germany				
Metric 3:	Applicability	High	$\times 2$	2	in scope				
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010				
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.				
Domain 2: Accordibility/Clar	:+								
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.				
Domain 4: Variability and U	ncertainty								
	Cor	ntinued on 1	next page	e					

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	Determination	$\mathbf{n}^{\dagger}$	Medium		1.7		

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).		
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples:			Use Mfg of shoes; Processing of plastic and plastic foam vapor Inhalation below LOD (50th), 0.2 (90th; below LOQ), 0.245 (95th; below LOQ) mg/m3					
Number of Samples. Number of Sites: Type of Measurement or Method: Worker Activity: Type of Sampling: Exposure Duration: Engineering Control & percent Exposure Reduction:			7 TWA? gluing unknown sample time >=1hr; exposure duration >= 6hr samples taken WITHOUT LEV					
<b>EVALUATION</b> Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method		
Domain 2: Repres	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Medium High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 4 2 2	Germany Adhesive use is in scope, but this may also include out of scope scenarios 2010 Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.		
		Con	itinued on 1	iext page	9			

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the p nal Exposure; Monitoring Da	preparation of ta;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 4: Variab	ility and Ur Metric 7:	acertainty Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	Determination	$\mathbf{n}^{\dagger}$	Medium		1.9	

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupatio 4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity: Type of Sampling: Exposure Duration: Engineering Control & percent Exposure Reduction:		All All vapor Inhalation 0.2 (50th; below LOQ), 0.7 (90th), 1.35 (95th) mg/m3 10 4 TWA? storing, conveying unknown sample time >=1hr; exposure duration >= 6hr samples taken in the presence of LEV					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method	
Domain 2: Repre	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Medium High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 4 2 2	Germany due to unknown industries for this activity, this may include out of scope scenarios 2010 Distribution of samples is characterized by a range with uncer- tain statistics.	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.	
	Continued on next page						

IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
	Metric	Rating	$\rm MWF^{\star}$	Score	Comments
ility and Un Metric 7:	certainty Metadata Completeness	Low	× 1	3	The monitoring study does not address variability or uncer- tainty
etermination	a [†]	Medium		1.9	
	Occupation 4271620 ility and Un Metric 7: etermination	Occupational Exposure; Monitoring Data 4271620 Metric ility and Uncertainty Metric 7: Metadata Completeness etermination [†]	Occupational Exposure; Monitoring Data;   4271620   Metric   Rating   ility and Uncertainty   Metric 7: Metadata Completeness   Low   etermination [†] Medium	Occupational Exposure; Monitoring Data;     4271620     Metric   Rating     Metric 7:   Metadata Completeness     Low   × 1     etermination [†] Medium	Occupational Exposure; Monitoring Data;     4271620     Metric   Rating     Metric   Rating     Metric 7:   Metadata Completeness     Low   × 1   3     etermination [†] Medium   1.9

* MWF = Metric Weighting Factor

Parameter		Data						
Life Cycle Stage:		Processing						
Life Cycle Description (Subca	ategory of Use):	Mfg of co	atings, a	dhesives	3			
Physical Form:	vapor							
Route of Exposure:	Inhalation	n						
Exposure Concentration (Uni	it):	below LO	D (50th)	, 3.45 (	90th), $5.875 (95th) \text{ mg/m3}$			
Number of Samples:		21						
Number of Sites:	9							
Type of Measurement or Met	TWA?							
Worker Activity:	mixing, p	ressing (	compact	ting)				
Type of Sampling:	unknown							
Exposure Duration:	sample ti	me >=1h	nr; expo	sure duration $\geq = 6hr$				
Engineering Control & percent Exposure Reduction:		samples taken in the presence of LEV						
EVALUATION								
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Beliability								
Metric 1	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or			
	Methodology	mgn	~ 1	1	NIOSH method			
Domain 2: Representative								
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.			
Domain 4: Variability and U	ncertainty							
			+	-				

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620						
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty	
Overall Quality D	Determination	$\mathbf{n}^{\dagger}$	Medium		1.7		

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity: Type of Sampling: Exposure Duration: Engineering Control & percent Exposure Reduction:			Use processing plastics and plastic vapor Inhalation below LOD (50th), 0.88 (90th), 1.84 (95th) mg/m3 13 7 TWA? foaming unknown sample time >=1hr; exposure duration >= 6hr samples taken in the presence of LEV					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method		
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 2 2	Germany Potentially in scope; function of NMP for plastics not well known 2010 Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.		
Continued on next page								

IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Dat	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
	Metric	Rating	$\rm MWF^{\star}$	Score	Comments
bility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	The monitoring study does not address variability or uncer- tainty
Determinatio	$\mathbf{n}^{\dagger}$	Medium		1.7	
	IFA. 2010. Occupation 4271620 bility and Ur Metric 7: Determination	IFA. 2010. MEGA evaluations for the pr Occupational Exposure; Monitoring Dat 4271620 Metric bility and Uncertainty Metric 7: Metadata Completeness Determination [†]	IFA. 2010. MEGA evaluations for the preparation of Cocupational Exposure; Monitoring Data; 4271620       Metric     Rating       bility and Uncertainty     Low       Determination [†] Medium	IFA. 2010. MEGA evaluations for the preparation of REACH Occupational Exposure; Monitoring Data; 4271620 Metric Rating MWF* bility and Uncertainty Metric 7: Metadata Completeness Low × 1 Determination [†] Medium	IFA. 2010. MEGA evaluations for the preparation of REACH exposure Occupational Exposure; Monitoring Data; 4271620 Metric Rating MWF* Score bility and Uncertainty Metric 7: Metadata Completeness Low × 1 3 Determination [†] Medium 1.7

* MWF = Metric Weighting Factor

Source Citation:IIType of Data SourceCHero ID4	FA. 2010. Occupation 271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Description Physical Form: Route of Exposure: Exposure Concentra Number of Samples: Number of Sites: Type of Measuremen Worker Activity: Type of Sampling: Exposure Duration: Engineering Control	on (Subca tion (Uni nt or Met & percer	ategory of Use): t): hod: nt Exposure Reduction:	Use Processin vapor Inhalation below LC 14 7 TWA? sanding unknown sample ti samples t	g and trend n DD (50th) me >=11 aken in t	eatment ), 1 (90t hr; expo	of wood h), 1 (95th) mg/m3 sure duration $>= 6hr$ ence of LEV
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliabilit N	y Ietric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Represen M M M M	tative Ietric 2: Ietric 3: Ietric 4: Ietric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Medium High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 4 2 2	Germany Application of finishing to wood is in scope, but sanding and removal may not be 2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibi M	ility/Clar Ietric 6:	ity Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
		Cor	tinued on 1	next page	9	

IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
	Metric	Rating	$\rm MWF^{\star}$	Score	Comments
ility and Un Metric 7:	certainty Metadata Completeness	Low	× 1	3	The monitoring study does not address variability or uncer- tainty
etermination	a [†]	Medium		1.9	
	Occupation 4271620 ility and Un Metric 7: etermination	Occupational Exposure; Monitoring Data 4271620 Metric ility and Uncertainty Metric 7: Metadata Completeness etermination [†]	Occupational Exposure; Monitoring Data;   4271620   Metric   Rating   ility and Uncertainty   Metric 7: Metadata Completeness   Low   etermination [†] Medium	Occupational Exposure; Monitoring Data;     4271620     Metric   Rating     Metric 7:   Metadata Completeness     Low   × 1     etermination [†] Medium	Occupational Exposure; Monitoring Data;     4271620     Metric   Rating     Metric   Rating     Metric 7:   Metadata Completeness     Low   × 1   3     etermination [†] Medium   1.9

* MWF = Metric Weighting Factor

XTRACTION Parameter Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure:	Data Use Processin vapor Inhalation	g of plas	tia and i				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure:	Use Processin vapor Inhalation	g of plas	tia and				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure:	Use Processin vapor Inhalation	g of plas	tic and				
Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure:	Processin vapor Inhalation	g of plas	tio and				
Physical Form: Route of Exposure:	vapor Inhalation	· ·	uc and	plastic foam			
Route of Exposure:	Inhalation			-			
- · · · · · · · · · · · · · · · · · · ·		n					
Exposure Concentration (Unit):	0.3 (50 th)	; below L	OQ), 3.	76 (90th), 5.46 (95th) mg/m3			
Number of Samples:	108						
Number of Sites:	68						
Type of Measurement or Method:	TWA?						
Worker Activity:	surface co	pating an	d painti	ng			
Type of Sampling:		unknown					
Exposure Duration:	sample ti	sample time $>=1hr$ ; exposure duration $>=6hr$					
Engineering Control & percent Exposure Reduction:	samples t	samples taken in the presence of LEV					
VALUATION							
Domain Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1. Reliability							
Metric 1: Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			
Domain 2. Popuscontativo							
Matric 2: Coographic Scope	Modium	$\vee$ 1	9	Commonwe			
Metric 2: Appliesbility	High	$^{\wedge 1}$	2	Germany			
Metric 4: Tomporal Bopresentativene	High	$\sim 2$ $\times 2$	2	2010			
Metric 5: Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer-			
Meene of Sample bize	Weddulli	~ 1	2	tain statistics.			
Domain 3: Accessibility/Clarity							
Metric 6: Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.			
Domain 4: Variability and Uncertainty							
	Continued on 1	next page	<u>)</u>				

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pre- nal Exposure; Monitoring Data	eparation of a;	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	$\mathbf{n}^{\dagger}$	Medium		1.7	

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupatio 4271620	. MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).				
EXTRACTION										
Parameter			Data							
Life Cycle Stage:	/: /C 1		Use	1						
Dire Cycle Descrip	otion (Subc	ategory of Use):	Metals, n	ne mecna	anics, op	ptics				
Physical Form: Route of Exposur	0.		vapor Inholotio	vapor La balation						
Exposure Concort	e. tration (Un	it).	$0.9 (50 \text{ th}) = 10.85 (00 \text{ th}) = 13.125 (05 \text{ th}) \text{ mg/m}^3$							
Number of Sampl	es.		35	, 10.00 (	<i>30</i> 000 <i>)</i> , 1	(3011) mg/m3				
Number of Sites:			19							
Type of Measuren	nent or Met	thod:	TWA?							
Worker Activity:			cleaning							
Type of Sampling	:		unknown							
Exposure Duratio	n:		sample ti	me >=1	hr; expo	sure duration $>= 6hr$				
Engineering Contr	rol & perce	nt Exposure Reduction:	samples taken in the presence of LEV							
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1. Daliah	:1:4									
Domain 1: Kenad	Motric 1.	Methodology	High	$\sim 1$	1	Sampling or applytical methodology is an approved OSUA or				
	MEGIIC 1.	wethouology	Ingn	~ 1	T	NIOSH method				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany				
	Metric 3:	Applicability	High	$\times 2$	2	in scope				
	Metric 4:	Temporal Representativeness	High	× 2	2	2010				
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics.				
Domain 3: Access	vibility /Clar	ity								
Domain 5. Access	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.				
Domain 4: Variab	ility and U	ncertainty								
		Cor	tinued on 1	next page	Э					
				. 0						

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pre- nal Exposure; Monitoring Data	eparation of a;	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	$\mathbf{n}^{\dagger}$	Medium		1.7	

Source Citation:IFA.Type of Data SourceOccuHero ID42716	010. MEC ational Ex 20	A evaluations for the prep coosure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).			
EXTRACTION Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Description (	ubcategory	y of Use):	Mfg of sh	loes; Pro	cessing of	of plastic and plastic foam			
Physical Form:			vapor						
Route of Exposure:			Inhalation	n					
Exposure Concentration	(Unit):		0.45 (50t)	h; below	LOQ),	4.28 (90 th), 6.96 (95 th)  mg/m3			
Number of Samples:			24						
Number of Sites:			13						
Type of Measurement or	Method:		TWA?						
Worker Activity:			gluing						
Type of Sampling:			unknown						
Exposure Duration:	_		sample time $>=1hr$ ; exposure duration $>=6hr$						
Engineering Control & p	ercent Exp	oosure Reduction:	samples t	aken in t	the pres	ence of LEV			
EVALUATION									
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments			
Domain 1: Reliability									
Metr	e 1: Met	hodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			
Domain 2: Representati	e								
Metri	e 2: Geog	graphic Scope	Medium	$\times 1$	2	Germany			
Metr	e 3: App	licability	Medium	$\times 2$	4	Adhesive use is in scope, but this may also include out of scope scenarios			
Metri	e 4: Tem	poral Representativeness	High	$\times 2$	2	2010			
Metr	e 5: Sam	ple Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessibility	Clarity								
Metri	e 6: Met	adata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.			
		Cor	ntinued on 1	next page	e				

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 4: Variab	ility and Un Metric 7:	certainty Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	a [†]	Medium		1.9	

* MWF = Metric Weighting Factor

Source Citation:IFA. 2010.Type of Data SourceOccupationHero ID4271620	MEGA evaluations for the prej nal Exposure; Monitoring Data;	paration of REA	CH expos	sure sce	marios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Subca	ategory of Use):	Foundries			
Physical Form:		vapor			
Route of Exposure:		Inhalation		(00.1)	
Exposure Concentration (Uni	it):	below LOD (50	0th), $0.6$	(90th),	0.75 (95th)  mg/m3
Type of Measurement or Met	hod:	TWA?			
Type of Sampling:		unknown	11		lowether S. Cha
Exposure Duration:	t Euroquino Poduction	sample time >	=1nr; ex	posure	$duration \ge 0$ nr
Engineering Control & percer	it Exposure Reduction.	samples taken	m the pr	esence	DI LE V
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Beliability					
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3:	Applicability	Unacceptable	$\times 2$	8	Not in scope, doesn't seem applicable to those scenarios in scope
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 2: Accordibility/Clar	:+				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 4: Variability and Un	Metadata Completence	Low	v 1	9	
Metric 7:	Metadata Completeness	LOW	× 1	3	The monitoring study does not address variability or uncer- tainty
	(	Continued on nex	t page		

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the prep Occupational Exposure; Monitoring Data; 4271620	paration of REA	CH expos	sure sce	narios for N-methyl-2-pyrrolidone (vapour).
EVALUATION					
Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality D	$\operatorname{Petermination}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.3.

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

Parameter								
Life Cycle Stage:	Parameter		Data					
Life Cycle Stage								
Life Oyele Blage.		Use						
Life Cycle Description (Subo	category of Use):	Painting	- manufa	acture a	nd processing of metals			
Physical Form:		vapor						
Route of Exposure:		Inhalation	n					
Exposure Concentration (Ur	nit):	0.7 (50 th)	), 3.86 (9)	0th $), 5.4$	415 (95 th)  mg/m3			
Number of Samples:		37						
Number of Sites:		19						
Type of Measurement or Me	thod:	TWA						
Worker Activity:		Industry	listed as	"manuf	acture and processing of metals." Work group			
		area liste	d as "si	urface co	pating, painting." Unknown application type.			
		Unknown	area of	samplin	g. No additional details are provided.			
Type of Sampling:		unknown						
VALUATION								
Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability			-					
Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.			
Domain 2: Representative								
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessibility/Cla	rity							
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.			
Domain 4: Variability and I	Incertainty							
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pre- nal Exposure; Monitoring Data	eparation of a;	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).		
--	-------------------------------------	--	-----------------	---------------	--------	---		
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty		
Overall Quality D	Determination	\mathbf{n}^{\dagger}	Medium		1.7			

Source Citation:IFA. 2010.Type of Data SourceOccupatioHero ID4271620	. MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).			
EXTRACTION		Data						
Farameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Subc	ategory of Use):	Cleaning - manufacture and processing of metals						
Physical Form:	Physical Form:							
Route of Exposure: Exposure Concentration (Unit):			n					
),57 (90t	h), 96.4	(95th) mg/m3			
Number of Samples:	14							
Number of Sites:	7							
Type of Measurement or Met	Type of Measurement or Method:							
Worker Activity: Type of Sampling:		Industry listed as "manufacture and processing of metals." Work group area listed as "cleaning." Unknown application type. Unknown area of sampling. No additional details are provided. unknown						
EVALUATION								
Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.			
Domain 2. Ponyagantativa								
Motria 2: Representative	Coographic Scope	Modium	~ 1	ი	Commonwe			
Metric 2. Metric 3:	Applicability	High	$^{\wedge 1}$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 2. Accordinities (Clar	:+							
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.			
Domain 4: Variability and U	ncertainty							
	Cor	ntinued on a	next pag	е				

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pre- nal Exposure; Monitoring Data	eparation of a;	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	Determination	\mathbf{n}^{\dagger}	Medium		1.7	

EXTRACTION		Data			
Farameter		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Subcategory of Use):			king, pap	er, prin	ting
Physical Form:		vapor			
Route of Exposure:		Inhalation	1		
Exposure Concentration (Uni	it):	below LO	D (50th)	, 0.46 (90th), $0.95 (95$ th) mg/m 3
Number of Samples:		22			
Number of Sites:					
Type of Measurement or Method:					
Worker Activity:	Worker Activity:			orking, j	paper, printing".
Type of Sampling:		unknown			
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	× 1	2	Germany
Metric 3:	Applicability	Medium	$\times 2$	4	Printing is in scope. Woodworking and paper may be out of scope.
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3. Accessibility/Clar	ity				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 4: Variability and U	ncertainty				

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pro- nal Exposure; Monitoring Data	eparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	n†	Medium		1.9	

Source Citation: IFA. 2 Type of Data Source Occup Hero ID 42716	10. MEGA evaluations for the p ational Exposure; Monitoring Da	reparation of ta;	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION					
Parameter		Data			
		TT			
Life Cycle Description (Subcategory of Use):			struction	monuf	enture of machinery and vehicles
Direction (Subcategory of Use):			struction	, manui	acture of machinery and venicles
Physical Form: Boute of Eurocume			n		
Exposure Concentration	Unit).	0.7(50th	556(9)	0th) 7	36 (95th) mg/m3
Number of Samples:	eme).	16), 0.00 (0	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Number of Sites:	Number of Sites:				
Type of Measurement or	Method:	TWA			
Worker Activity:	Worker Activity			onstruct	tion, manufacture of machinery and vehicles."
		Workgrou	p listed	as :surfa	ace coating, painting."
Type of Sampling:		unknown			
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability					
Metric	1: Methodology	High	× 1	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.
Domain 2: Representativ	<u>ن</u>				
Metric					
	2: Geographic Scope	Medium	$\times 1$	2	Germany
Metric	2: Geographic Scope 3: Applicability	Medium High	$\begin{array}{c} \times 1 \\ \times 2 \end{array}$	$\frac{2}{2}$	Germany in scope
Metric Metric	 Geographic Scope Applicability Temporal Representativenes 	Medium High s High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$2 \\ 2 \\ 2$	Germany in scope 2010
Metric Metric	 Geographic Scope Applicability Temporal Representativenes Sample Size 	Medium High ss High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 2 2	Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Metric Metric ————————————————————————————————————	 Geographic Scope Applicability Temporal Representativenes Sample Size 	Medium High ss High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 2 2	Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Metric Metric Domain 3: Accessibility/	 Geographic Scope Applicability Temporal Representativenes Sample Size 	Medium High ss High Medium	$ \begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	2 2 2 2	Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics.
Metric Metric Metric Domain 3: Accessibility/ Metric	 Geographic Scope Applicability Temporal Representativenes Sample Size Clarity Metadata Completeness 	Medium High ss High Medium Low	$ \begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	2 2 2 2 3	Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics. Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Metric Metric Metric Domain 3: Accessibility/ Metric	 Geographic Scope Applicability Temporal Representativenes Sample Size Clarity Metadata Completeness 	Medium High ss High Medium Low	$ \begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	2 2 2 2 3	Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics. Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Metric Metric Metric Domain 3: Accessibility/ Metric Domain 4: Variability an	 2: Geographic Scope 3: Applicability 4: Temporal Representativene: 5: Sample Size Clarity 6: Metadata Completeness l Uncertainty 	Medium High ss High Medium Low	$ \begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	2 2 2 2 3	Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics. Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Metric Metric Domain 3: Accessibility/ Metric Domain 4: Variability an	2: Geographic Scope 3: Applicability 4: Temporal Representativenes 5: Sample Size Clarity 6: Metadata Completeness l Uncertainty	Medium High ss High Medium Low		2 2 2 2 3	Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics. Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pre- nal Exposure; Monitoring Data	eparation of a;	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	Determination	\mathbf{n}^{\dagger}	Medium		1.7	

Parameter Life Cycle Stage: Life Cycle Description (Subca Physical Form: Route of Exposure:		Data						
Life Cycle Stage: Life Cycle Description (Subca Physical Form: Route of Exposure:								
Life Cycle Stage: Life Cycle Description (Subca Physical Form: Route of Exposure:								
Life Cycle Description (Subca Physical Form: Route of Exposure:		Use						
Physical Form: Route of Exposure:	tegory of Use):	Electrical engineering, fine mechanics, optics						
Route of Exposure:		vapor						
Route of Exposure:			1					
Exposure Concentration (Unit):		below LC	D (50th)	, 1.22 (90th), 1.965 (95th) mg/m3			
Number of Samples: Number of Sites: Type of Measurement or Method:								
Worker Activity:		Listed as "surface coating, painting" within electrical engineering, fine						
		mechanic	s, and op	otics ma	anufacturing. Additional details are not pro-			
		vided.						
Type of Sampling:								
ALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1. Paliability								
Motrie 1:	Mathadalagy	High	~ 1	1	Compliant on exploring methodology not enceifed on NIOCII o			
	Methodology	Ingn	~ 1	1	OSHA, but seems acceptable.			
Domain 2: Representative								
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessibility/Clari	tv							
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathin zone) but lack other metadata.			

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pre- nal Exposure; Monitoring Data	eparation of a;	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	Determination	\mathbf{n}^{\dagger}	Medium		1.7	

Hero ID 427162	utional Exposure; Monitoring Data 0	;		F	te scenarios for iv-metnyi-2-pyriondone (vapour).						
EXTRACTION		_									
Parameter	Parameter			Data							
		TT									
Life Cycle Stage:			lonminoo	ning fo	a machanica antica						
Dire Cycle Description (St	Life Cycle Description (Subcategory of Use):			ring, iin	e mechanics, optics						
Physical Form. Boute of Exposure:		Inhalatio	n								
Exposure Concentration ([Init].	0.95(50t)	n h) 110/	(00+b) = 1	$12 (05 \text{th}) \text{mg/m}^3$						
Number of Samples:	emt).	0.55 (50t) 91	11), 11.5 ((50011), 1	(3501) Ing/In5						
Number of Sites:		8									
Type of Measurement or	Method:	TWA									
Worker Activity:	Worker Activity			ng" with	in electrical engineering, fine mechanics, and						
Worker Houviey.		optics ma	anufactur	ring. Ad	ditional details are not provided.						
Type of Sampling:		unknown		0	r						
EVALUATION											
Domain	Metric	Rating	MWF^{\star}	Score	Comments						
Domain 1: Reliability Motria	1. Mathadalagy	Uich	× 1	1	Constitution and the labor and an effective MICCH						
Metric	1: Methodology	піgn	× 1	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.						
Domain 2: Representative											
Metric	2: Geographic Scope	Medium	$\times 1$	2	Germany						
Metric	3: Applicability	High	$\times 2$	2	in scope						
Metric	4: Temporal Representativeness	High	$\times 2$	2	2010						
Metric	5: Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.						
Domain 2. Accessibility/	lonity										
Domain 3: Accessibility/0	larity 6: Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g. personal breathing						
Domain 3: Accessibility/O Metric	Clarity 6: Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.						
Domain 3: Accessibility/0 Metric	larity 6: Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.						
Domain 3: Accessibility/O Metric Domain 4: Variability and	21arity 6: Metadata Completeness Uncertainty	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.						
Domain 3: Accessibility/O Metric Domain 4: Variability and	l'arity 6: Metadata Completeness Uncertainty Co	Low ntinued on a	× 1	3 e	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.						

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pre- nal Exposure; Monitoring Data	eparation of a;	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	etermination	\mathbf{n}^{\dagger}	Medium		1.7	

Source Citation:IFA. 2010.Type of Data SourceOccupationHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).			
EXTRACTION								
Parameter		Data						
		р ·						
Life Cycle Stage:		Processing Formulation - manufacture /processing of coatings, glue, adhesives						
Life Cycle Description (Subca	ategory of Use):							
Physical Form:	Boute of Exposure:							
Function Concentration (Uni	0.4 h alarr		0+b) / 1	$(00th) 6.2 (05th) mm/m^2$				
Number of Samples:		0.4 Delow	LOD (3	000), 4.3	5 (90 th), 0.2 (95 th) mg/ms			
Number of Sites:	14 0							
Type of Measurement or Met	TWA							
Worker Activity:	Worker Activity:			al indus	stry and minoral processing," including many			
Worker Activity.	worker Activity:			a indus	stings glue adhesives. Work area group listed			
		as "mivin	or processii	g or coa ng " Th	ese data are likely a subset of the above data			
Type of Sampling:		unknown						
Type of Samping.		unniown						
EVALUATION								
Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology not specified as NIOSH or			
		0			OSHA, but seems acceptable.			
Domain 2: Representative		N C II	1	0	~			
Metric 2:	Geographic Scope	Medium	× 1	2	Germany			
Metric 3:	Applicability	High Hisub	× 2	2	in scope			
Metric 4:	Temporal Representativeness	High	× 2	2	2010			
Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessibility/Clar	ity							
Metric 6	Metadata Completeness	Low	× 1	3	Monitoring data include sample type (e.g., personal breathing			
		1011	· · ·	0	zone) but lack other metadata.			
Domain 4: Variability and Ur	ncertainty							
	Cor	tinued on i	next page	9				

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620							
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty		
Overall Quality D	etermination	\mathbf{n}^{\dagger}	Medium		1.7			

Source Citation:IFA.Type of Data SourceOccuHero ID4271	2010. MEGA evaluations for the proparational Exposure; Monitoring Data 620	eparation of a;	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).			
EXTRACTION Parameter		Data						
Parameter Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity:			Data Processing Manufacture /processing of plastic and plastic foam vapor Inhalation 0.2 below LOD (50th), 0.84 (90th), 1.72 (95th) mg/m3 14 8 TWA Listed as "plastics and plastic foam, processing and manufacture; man- ufacture and processing of rubber products." Work area group listed as "Foaming." These data are likely a subset of the above data. unknown					
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability Metr	ic 1: Methodology	High	× 1	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.			
Domain 2: Representat Metr Metr Metr Metr	ve ic 2: Geographic Scope ic 3: Applicability ic 4: Temporal Representativeness ic 5: Sample Size	Medium High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 2 2	Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics.			
Domain 3: Accessibility Metr	/Clarity ic 6: Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.			
Domain 4: Variability a	nd Uncertainty C	ontinued on a	next page	e				

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620							
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty		
Overall Quality D	etermination	\mathbf{n}^{\dagger}	Medium		1.7			

Source Citation:IFAType of Data SourceOcHero ID427	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620							
EXTRACTION Parameter			Data					
Life Cycle Stage:			Processin	g				
Life Cycle Description	Life Cycle Description (Subcategory of Use):			ure /pro	cessing	of plastic and plastic foam		
Physical Form:			vapor					
Route of Exposure:	/	<u>`</u>	Inhalation	n Torría				
Exposure Concentration	on (Uni	t):	0.3 below	LOD (5	0th), 2 ((90th), 2.6 (95th) mg/m3		
Number of Samples:			28 19					
Number of Sites:	on Mot	had	15 TWA					
Worker Activity:	or met	nod.	Listed as	"nlastics	and pla	astic foam processing and manufacture: man-		
Worker Activity: Type of Sampling:			Listed as "plastics and plastic foam, processing and manufacture; man- ufacture and processing of rubber products." Work area group listed as "Surface coating, painting, coating." These data are likely a subset of the above data. unknown					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliability Me	etric 1:	Methodology	High	× 1	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.		
Domain 2: Representa	ative							
Me	etric 2:	Geographic Scope	Medium	$\times 1$	2	Germany		
Me	etric 3:	Applicability	High	$\times 2$	2	in scope		
Me	etric 4:	Temporal Representativeness	High	$\times 2$	2	2010		
Me	etric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 3: Accessibilit	tv/Clar	ity						
Me	etric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.		
		Con	tinued on 1	next page	è			

Source Citation: Type of Data Source Hero ID	IFA. 2010. Occupation 4271620	MEGA evaluations for the pr nal Exposure; Monitoring Data	reparation of a;	REACH	exposur	re scenarios for N-methyl-2-pyrrolidone (vapour).
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 4: Variab	ility and Un Metric 7:	certainty Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty
Overall Quality D	Determination	a [†]	Medium		1.7	

* MWF = Metric Weighting Factor

Source Citation:IFA. 2010.Type of Data SourceOccupationHero ID4271620	MEGA evaluations for the prep nal Exposure; Monitoring Data;	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Subcategory of Use):					
Physical Form:					
Route of Exposure:		Inhalation	1		
Exposure Concentration (Uni	t):	0.85 (50t)	n), 6.15 (90th), 8	8.625 (95th) mg/m3
Number of Samples:		15			
Number of Sites:		8			
Type of Measurement or Met	hod:	TWA			
Worker Activity:		Work grou	ip area is	listed a	as "Gluing." No additional details are provided.
Type of Sampling:		unknown			
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.
					, k
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany
Metric 3:	Applicability	Low	$\times 2$	6	unknown if in scope
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics.
Domain 3: Accessibility/Clar	ity				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.
Domain 4: Variability and Un	ncertainty	т	1		
Metric 7:	Metadata Completeness	Low	× 1	3	The monitoring study does not address variability or uncer- tainty
	Cor	tinued on r	ext page	9	

– continued from previous page									
Source Citation: Type of Data Source Hero ID	IFA. 2010. MEG Occupational Exp 4271620	A evaluations for the posure; Monitoring Da	preparation of F ata;	REACH	exposure	scenarios for N-methyl-2-pyrrolidone (vapour).			
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments			
Overall Quality D	$\operatorname{Petermination}^\dagger$		Medium		2.1				

Type of Data Source Oc	a. 2010.	MEGA evaluations for the prep nal Exposure: Monitoring Data:	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).		
Hero ID 427	71620	nai Exposure, Monitoring Data,						
EXTRACTION								
Parameter			Data					
			TT					
Life Cycle Stage:			Use	ing non	on prin	ting		
Physical Form:	i (Subca	tegory of Ose).	vapor	ung, pap	er, prin	ung		
Route of Exposure:			Inhalatio	า				
Exposure Concentrati	on (Uni	t):	50th perc	entile: b	elow ar	nalytical quantification limit of 0.4290th per-		
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(• • •	-)-	centile: 6	.7695th p	ercenti	le: 26		
Number of Samples:			28	1				
Number of Sites:			17					
Type of Measurement or Method:			TWA					
Worker Activity:			Listed as	"woodwo	orking, j	paper, printing"		
Type of Sampling:			area	area				
EVALUATION			D		a			
Domain		Metric	Rating	M W F^	Score	Comments		
Domain 1. Reliability								
Domain 1. Homability								
Me	etric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.		
Domain 2: Representa	ative	Methodology	High	× 1	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.		
Domain 2: Representa	etric 1: ative etric 2:	Methodology Geographic Scope	High	× 1 × 1	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.		
Domain 2: Representa Me Me	ative etric 2: etric 3:	Methodology Geographic Scope Applicability	High Medium High	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \end{array} $	1 2 2	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope		
Domain 2: Representa Me Me Me	etric 1: ative etric 2: etric 3: etric 4:	Methodology Geographic Scope Applicability Temporal Representativeness	High Medium High High	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \end{array} $	1 2 2 2	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010		
Domain 2: Representa Me Me Me Me	ative etric 2: etric 3: etric 4: etric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High Medium High High Medium	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	1 2 2 2 2 2	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 2: Representa Me Me Me Domain 3: Accessibili	etric 1: ative etric 2: etric 3: etric 4: etric 5: ty/Clar	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High Medium High High Medium	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$	1 2 2 2 2	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 2: Representa Me Me Me Me Domain 3: Accessibili Me	etric 1: ative etric 2: etric 3: etric 4: etric 5: ty/Clar etric 6:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High Medium High Medium Low	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \\ \end{array} $	1 2 2 2 2 3	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics. Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.		
Domain 2: Representa Me Me Me Domain 3: Accessibili Me Domain 4: Variability	etric 1: ative etric 2: etric 3: etric 4: etric 5: ty/Clar etric 6: r and Un	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High Medium High Medium Low	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \\ \end{array}$	1 2 2 2 2 3	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics. Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.		

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620							
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty		
Overall Quality D	etermination	\mathbf{n}^{\dagger}	Medium		1.7			

Type of Data Source Occupatio	. MEGA evaluations for the prep nal Exposure: Monitoring Data:	paration of	REACH	exposu	re scenarios for N-methyl-2-pyrrolidone (vapour).		
Hero ID 4271620	nai Exposure, Montoring Data,						
EXTRACTION							
Parameter		Data					
Life Cycle Stage:					· ·		
Dhusical Former	ategory of Use):	woodworl	ang, pap	er, prin	ting		
Physical Form. Boute of Exposure:		Inhalation					
Exposure Concentration (Un	it).	50th perc	n ontilo: h	olow ar	alytical quantification limit of 0.4290th per-		
Exposure concentration (en		centile: 1	2.5695th	percent	ile: 120.6		
Number of Samples:		14		1			
Number of Sites:		9					
Type of Measurement or Met	chod:	TWA					
Worker Activity:		Listed as	"woodwo	orking, j	paper, printing"		
Type of Sampling:		personal					
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
		0					
Domain 1. Doliability							
Domain 1: Reliability	Mathadalagy	High	× 1	1	Sampling on analytical mathedalague not an asifad as NIOCII an		
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.		
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.		
Domain 1: Reliability Metric 1: Domain 2: Representative	Methodology	High	× 1	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable.		
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2:	Methodology Geographic Scope	High	× 1	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany		
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Netric 3:	Methodology Geographic Scope Applicability	High Medium High	× 1 × 1 × 2	1	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope		
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 4:	Methodology Geographic Scope Applicability Temporal Representativeness Sampla Size	High Medium High High Madium	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	1 2 2 2 2	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010		
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High Medium High High Medium	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$	1 2 2 2 2 2	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High Medium High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 2 2 2 2	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High Medium High High Medium	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	1 2 2 2 2 2 3	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics.		
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High Medium High High Medium	$ \begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \\ \times 1 \end{array} $	1 2 2 2 2 2 3	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics. Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.		
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High Medium High Medium Low	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \\ \times 1 \end{array}$	1 2 2 2 2 2 3	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics. Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.		
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6: Domain 4: Variability and U	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness ncertainty	High Medium High High Medium Low	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \\ \end{array}$	1 2 2 2 2 2 3	Sampling or analytical methodology not specified as NIOSH or OSHA, but seems acceptable. Germany in scope 2010 Distribution of samples is characterized by a range with uncer- tain statistics. Monitoring data include sample type (e.g., personal breathing zone) but lack other metadata.		

Source Citation: Type of Data Source Hero ID	IFA. 2010. MEGA evaluations for the preparation of REACH exposure scenarios for N-methyl-2-pyrrolidone (vapour). Occupational Exposure; Monitoring Data; 4271620							
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The monitoring study does not address variability or uncer- tainty		
Overall Quality D	etermination	\mathbf{n}^{\dagger}	Medium		1.7			

Source Citation: NIOS Type of Data Source Occu Uana ID 4287	SH. 19 patio	998. Health Hazard Evaluation F nal Exposure; Completed Expos	Report No. ure or Risk	HETA 96 Assessm	6026627 ents;	02, Cooper Engineered Products, Bowling Green, Ohio.
EXTRACTION Boxemeter	129		Data			
Farameter			Data			
Life Cycle Stage:			Use			
Life Cycle Description (Subcategory of Use):			spray app	lication of	of coati	ng
Route of Exposure:			Inhalation	n		
Exposure Concentration	(Un	it):	0.04-5.2 n	ng/m3		
Number of Samples:			unknown			
Number of Sites:			1			
Type of Measurement of	: Met	hod:	unknown			
Worker Activity:			workers in	nside spra	ay boot	h
Type of Sampling:			personal			
Exposure Duration:			unknown			
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1. Deliability						
Metr	ic 1:	Methodology	High	$\times 1$	1	Information from trusted sources
Domain 9. Donnagontati						
Domain 2: Representati	ve	Coorrenhie Seene	Uich	× 1	1	IIC
Metr	10 2.	Applicability	High	$^{\land 1}$ $^{\lor 2}$	1	US
Metr	10.0	Temporal Representativeness	Low	$^{\sim 2}$ $\times 2$	6	1006
Metr	10 + 1	Sample Size	Medium	$\times 1$	$\frac{0}{2}$	characterized by a range with uncertain statistics
			mount		_	
Domain 3: Accessibility	/Clar	ity				
Metr	ic 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent
Domain 4. Variability a	nd U	ncertainty				
Metr	ic 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results
Overall Quality Determ	natic	on^{\dagger}	High		1.6	
		Con	tinued on r	next page		

			P	F0-	
Source Citation: Type of Data Source Hero ID	NIOSH. 1998. Health Hazard Evaluation I Occupational Exposure; Completed Expos 4287129	Report No. sure or Risk	HETA 96 Assessm	02662702 ents;	, Cooper Engineered Products, Bowling Green, Ohio.
EVALUATION	Matric	Dating	MANDA	Coore	Commente
Domain	Metric	Kating	IVI VV F ^	Score	Comments

The origon of the second se	Source Citation: I Type of Data Source (Hero ID	Citation: NIOSH. 1998. Health Hazard Evaluation Report No. HETA 9602662702, Cooper Engineered Products, Bowling Green, Ohio f Data Source Occupational Exposure; Completed Exposure or Risk Assessments; 20 4287129						
Data Parameter Data Life Cycle Stage: Use Life Cycle Description (Subcategory of Use): spray application of coating Route of Exposure: Inhalation Exposure Concentration (Unit): 0.04-0.62 mg/m3 Number of Samples: 1 Type of Measurement or Method: unknown Worker Activity: personal Exposure Duration: unknown Worker Activity: workers outside spray booth Type of Sampling: personal Exposure Duration: unknown Bomain Metric Rating MWF* Score Comments Domain 1: Reliability High × 1 1 Metric 2: Geographic Scope High × 1 1 Metric 3: Applicability High × 1 1 Metric 4: Temporal Representativeness Low × 2 6 1996 Metric 5: Sample Size Medium 1 2 characterized by a range with uncertain statistics Domain 3: Accessibility/Clarity High × 1 1 Data sources are transparent Domain 4: Variability and Uncertainty High × 1 1 Discustion on variability and u		1201120						
Life Cycle Stage: Use Life Cycle Description (Subcategory of Use): spray application of coating Route of Exposure: Inhalation Exposure Concentration (Unit): $0.04 - 0.2 \operatorname{rmg/m3}$ Number of Stamples: unknown Number of Stamples: 1 Type of Measurement or Method: unknown Worker Activity: workers outside spray booth Type of Sampling: personal EVALUATION metric 1: Domain 1: Reliability Metric 1: Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representative Metric 5: Geographic Scope Metric 4: Temporal Representative Metric 5: Geographic Scope Metric 6: Metric 6: Metric 6: Metric 6: Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High 1 Data sour	Parameter			Data				
Life Cycle Stage: Use Life Cycle Description (Subcategory of Use): spray application of coating Route of Exposure: Inhalation Exposure Concentration (Unit): $0.44-0.62 \text{ mg/m3}$ Number of Samples: unknown Number of Samples: unknown Number of Samples: unknown Number of Samples: unknown Worker Activity: workers outside spray booth Type of Sampling: personal EXposure Duration: unknown Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology High $\times 1$ 1 Information from trusted sources Domain 2: Representative Metric 3: Applicability High $\times 1$ 1 US Metric 4: Temporal Representativeness Low $\times 2$ 6 1996 Metric 6: Metadata Completeness High $\times 1$ 1 Data sources are transparent Domain 3: Accessibility/Clarity Metric 7: Metadata Completeness High $\times 1$ 1 Data sources are transparent Domain 4: Variability and Uncertainty								
Life Cycle Description (Subcategory of Use): spray application of coating Route of Exposure Concentration (Unit): 0.04-0.62 mg/m3 Number of Samples: unknown Number of Sites: 1 Type of Measurement or Method: unknown Worker Activity: workers outside spray booth Type of Sampling: personal Evaluation: unknown More of Sampling: personal Evaluation: unknown Bomain 1: Reliability Metric Metric 1: Methodology Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representative Metric 5: Sample X2 Metric 5: Sample Size Metric 6: Metric 8: Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High x 1 1 Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High x 1 1 Domain 3: Accessibility and Uncertainty Metric 7: </td <td>Life Cycle Stage:</td> <td></td> <td></td> <td>Use</td> <td></td> <td></td> <td></td>	Life Cycle Stage:			Use				
Route of Exposure: Inhalation Exposure Concentration (Unit): 0.04-0.62 mg/m3 Number of Samples: unknown Number of Stes: 1 Type of Measurement or Method: unknown Worker Activity: workers outside spray booth Type of Sampling: personal EXposure Duration: unknown Metric 1: Metric Rating MWF* Score Comments Domain Metric Representative Metric 1: Metric 2: Geographic Scope High × 1 1 Information from trusted sources Metric 3: Applicability High × 2 2 Metric 3: Applicability High × 2 2 Metric 4: Temporal Representativeness Low × 2 6 1996 Metric 5: Sample Size Medium × 1 2 characterized by a range with uncertain statistics Domain 3: Accessibility/Clarity Metric 6: Metric 7: Metric 7: Data sources are transparent D	Life Cycle Descripti	ion (Subca	tegory of Use):	spray app	lication o	of coatin	ng	
Exposure Concentration (Unit): 0.04-0.62 mg/m3 Number of Samples: unknown Number of Sites: 1 Type of Measurement or Method: unknown Worker Activity: workers outside spray booth Type of Sampling: personal Exposure Duration: unknown EVALUATION netric Remain 1: Reliability Metric Metric 1: Methodology High × 1 1 Information from trusted sources Domain 2: Representative High × 1 1 Metric 2: Geographic Scope High × 1 1 Metric 3: Applicability Low × 2 6 1996 Metric 5: Sample Size Medium × 1 2 characterized by a range with uncertain statistics Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High × 1 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High × 1 1 Discussion on variability and uncertainty of results Overall Quality Determination [#] <td>Route of Exposure:</td> <td></td> <td></td> <td>Inhalation</td> <td>1</td> <td></td> <td></td>	Route of Exposure:			Inhalation	1			
Number of Samples: unknown Number of Sites: 1 Type of Measurement or Method: unknown Worker Activity: workers outside spray booth Type of Sampling: personal Exposure Duration: unknown Bomain Metric Rating MWF* Score Comments Comments Domain 1: Reliability Metric 1: Metric 1: Methodology High × 1 1 Information from trusted sources Domain 2: Representative High × 1 1 Metric 2: Geographic Scope High × 2 6 Metric 3: Applicability High × 2 6 1996 Metric 5: Sample Size Medium × 1 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High × 1 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.6 Continued on next page	Exposure Concentra	ation (Uni	t):	0.04-0.62	mg/m3			
Number of Sites: 1 Type of Measurement or Method: unknown Worker Activity: workers outside spray booth Type of Sampling: personal Exposure Duration: unknown Bomain 1: Reliability metric Metric 1: Methodology High × 1 1 Information from trusted sources Domain 2: Representative Metric 3: Applicability High × 1 1 Use: Metric 4: Temporal Representative Low Metric 5: Sample Size Metric 5: Sample Size Metric 6: Metadata Completeness High × 1 1 Domain 4: Variability and Uncertainty Metric 7: Metric 6: High × 1 1 Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High × 1 1 Domain 4: Variability and uncertainty of results Overall Quality Determination [†] High × 1 1	Number of Samples	5:		unknown				
Type of Activity: unknown Worker Activity: workers outside spray booth Type of Sampling: personal Exposure Duration: unknown EVALUATION	Number of Sites:	nt on Mot	had	1 unlmown				
WORE ACHTY, WORE ACHTY, Type of Sampling: personal Exposure Duration: unknown EVALUATION Metric Rating MWF* Score Comments Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology High × 1 1 Information from trusted sources Domain 2: Representative Metric 3: Applicability High × 2 2 in scope Metric 4: Temporal Representativeness Low × 2 6 1996 Metric 5: Sample Size Medium<× 1	Worker Activity:	ent or met	nod.	workers o	uteido en	ray boo	t h	
Exposure Duration: protonal unknown EVALUATION Metric Rating MWF* Score Comments Domain Metric Rating MWF* Score Comments Domain Itelevision Metric Information from trusted sources Domain Representative Information from trusted sources Metric Geographic Scope High × 1 1 US Metric Applicability High × 2 2 in scope Metric Temporal Representativeness Low × 2 6 1996 Metric Sample Size Medium × 1 2 characterized by a range with uncertain statistics Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High × 1 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High × 1 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.6 Continued on next page Continued on next page	Type of Sampling			personal	utside sp.	ray boo	/011	
EVALUATION Metric Rating MWF* Score Comments Domain Metric Rating MWF* Score Comments Domain Metric Methodology High $\times 1$ 1 Information from trusted sources Domain Metric 2: Geographic Scope High $\times 1$ 1 US Metric 2: Geographic Scope High $\times 2$ 2 in scope Metric 4: Temporal Representativeness Low $\times 2$ 6 1996 Metric 5: Sample Size Medium $\times 1$ 2 characterized by a range with uncertain statistics Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High $\times 1$ 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High $\times 1$ 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.6 Continued on next page Continued on next page	Exposure Duration:	:		unknown				
EVALUATION Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology High $\times 1$ 1 Information from trusted sources Domain 2: Representative Metric 2: Geographic Scope High $\times 1$ 1 US Metric 3: Applicability High $\times 2$ 2 in scope Metric 4: Temporal Representativeness Low $\times 2$ 6 1996 Metric 5: Sample Size Medium $\times 1$ 2 characterized by a range with uncertain statistics Domain 3: Accessibility/Clarity Metric 6: Hedadata Completeness High $\times 1$ 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metradata Completeness High $\times 1$ 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.6 Continued on next page	I the second second							
Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology High × 1 1 Information from trusted sources Domain 2: Representative Metric 2: Geographic Scope High × 1 1 US Metric 3: Applicability High × 2 2 in scope Metric 4: Temporal Representativeness Low × 2 6 1996 Metric 5: Sample Size Medium × 1 2 characterized by a range with uncertain statistics Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High × 1 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High × 1 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.6 Continued on next page	EVALUATION							
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1. Reliability Metric 1: Methodology High \times 1 1 Information from trusted sources Domain 2: Representative Metric 2: Geographic Scope High \times 1 1 US Metric 3: Applicability High \times 2 2 in scope Metric 4: Temporal Representativeness Low \times 2 6 1996 Metric 5: Sample Size Medium \times 1 2 characterized by a range with uncertain statistics Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High \times 1 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High \times 1 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.6 Continued on next page	Domain 1, Poliabili							
Indiration Internation High $\times 1$ I Information hold dated sources Domain 2: Representative Metric 2: Geographic Scope High $\times 1$ 1 US Metric 3: Applicability High $\times 2$ 2 in scope Metric 4: Temporal Representativeness Low $\times 2$ 6 1996 Metric 5: Sample Size Medium $\times 1$ 2 characterized by a range with uncertain statistics Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High $\times 1$ 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High $\times 1$ 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.6 Continued on next page	Domain 1: Kenabin	lty Metric 1	Methodology	High	$\times 1$	1	Information from trusted sources	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			Wiethodology	IIIgii	~ 1	1	mormation from trusted sources	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Domain 2: Represent	ntative						
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Ĩ	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
Metric 4: Temporal Representativeness Low $\times 2$ 6 1996 Metric 5: Sample Size Medium $\times 1$ 2 characterized by a range with uncertain statistics Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High $\times 1$ 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High $\times 1$ 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.6 Continued on next page	I	Metric 3:	Applicability	High	$\times 2$	2	in scope	
Metric 5: Sample Size Medium $\times 1$ 2 characterized by a range with uncertain statistics Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High $\times 1$ 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High $\times 1$ 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.6 Continued on next page	I	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1996	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $]	Metric 5:	Sample Size	Medium	$\times 1$	2	characterized by a range with uncertain statistics	
Domain 3. Accessionity/Clarity Metric 6: Metadata Completeness High × 1 1 Data sources are transparent Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High × 1 1 Discussion on variability and uncertainty of results Overall Quality Determination [†] High 1.6 Continued on next page	Domain 2. Accessib	ility/Class	i+.,					
Image: Initial conduction of the conductive completeness of the fight is concerned at a completeness of the completeness of the fight is concerned at a completeness of the completeness of the fight is concerned at a completeness of the completenes of the	Domain 5. Accessio	Motric 6:	Motadata Completeness	High	$\vee 1$	1	Data sources are transport	
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$			Metadata Completeness	111511	~ 1	T	Data sources are transparent	
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Domain 4: Variabili	ity and Ur	ncertainty					
Overall Quality Determination [†] High 1.6 Continued on next page	I	Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results	
Overall Quality Determination [†] High 1.6 Continued on next page								
Continued on next page	Overall Quality Det	terminatio	n^{\dagger}	High		1.6		
			Con	tinued on r	next page			

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Source Citation: Type of Data Source Hero ID	NIOSH. 1998. Health Hazard Evaluation I Occupational Exposure; Completed Expos 4287129	Report No. sure or Risk	HETA 96 Assessm	02662702 ents;	, Cooper Engineered Products, Bowling Green, Ohio.
EVALUATION	Matric	Dating	MANDA	Coore	Commente
Domain	Metric	Kating	IVI VV F ^	Score	Comments

Source Citation: Type of Data Source	NIOSH. 19 Occupation	998. Health Hazard Evaluation I nal Exposure; Completed Expos	Report No. ure or Risk	HETA 96 Assessm	6026627 ents;	02, Cooper Engineered Products, Bowling Green, Ohio.
Hero ID	4287129					
EXTRACTION Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descript	tion (Subca	ategory of Use):	spray app	olication of	of coati	ng
Route of Exposure	: notion (IIm;		Inhalation	n 		
Number of Sample			10.0 101 J	mg/mo		
Number of Sites:	ъ.		1			
Type of Measurem	ent or Met	hod:	unknown			
Worker Activity:	0110 01 10100		inside spr	av booth		
Type of Sampling:			area	0		
Exposure Duration	1:		unknown			
EVALUATION						
Durain) (. t	Deting	MANDA	C	Community
Domain		Metric	Rating	M W F**	Score	Comments
Domain 1. Raliabi	1;+					
Domain 1: Kenabi	Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources
			0			
Domain 2: Represe	entative					
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	in scope
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1996
	Metric 5:	Sample Size	Medium	$\times 1$	2	characterized by a range with uncertain statistics
Domain 3: Accossi	hility/Clar	ity				
Domain 5. Accessi	Metric 6	Metadata Completeness	High	× 1	1	Data sources are transparent
	Meerre 0.	Metadata Completeness	111511	~ 1	1	Data sources are transparent
Domain 4: Variabi	lity and Ui	ncertainty				
	Metric 7:	Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results
		+	·			
Overall Quality De	eterminatio	n'	High		1.6	
		Cor	ntinued on r	next page		

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Source Citation: Type of Data Source Hero ID	NIOSH. 1998. Health Hazard Evaluation I Occupational Exposure; Completed Expos 4287129	Report No. sure or Risk	HETA 96 Assessm	02662702 ents;	, Cooper Engineered Products, Bowling Green, Ohio.
EVALUATION	Matric	Dating	MANDA	Coore	Commente
Domain	Metric	Kating	IVI VV F ^	Score	Comments

Source Citation: NIOSH Type of Data Source Occupa	NIOSH. 1998. Health Hazard Evaluation Report No. HETA 9602662702, Cooper Engineered Products, Bowling Green, Ohio. Occupational Exposure; Completed Exposure or Risk Assessments;							
Hero ID 428712)							
Parameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Si	bcategory of Use):	spray apr	lication of	of coati	ng			
Route of Exposure:		Inhalation	n		0			
Exposure Concentration (Unit):	0.04-0.81	mg/m3					
Number of Samples:		unknown	-,					
Number of Sites:		1						
Type of Measurement or I	Method:	unknown						
Worker Activity:		outside sp	oray boot	h				
Type of Sampling:		area						
Exposure Duration:		unknown						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Beliability								
Metric	1: Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2: Representative								
Metric	2: Geographic Scope	High	$\times 1$	1	US			
Metric	3: Applicability	High	$\times 2$	2	in scope			
Metric	4: Temporal Representativeness	Low	$\times 2$	6	1996			
Metric	5: Sample Size	Medium	$\times 1$	2	characterized by a range with uncertain statistics			
Domain 3: Accessibility/O	larity							
Metric	6: Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
Domain 4: Variability and	Uncertainty							
Metric	7: Metadata Completeness	High	$\times 1$	1	Discussion on variability and uncertainty of results			
		0						
Overall Quality Determination	$tion^{\dagger}$	High		1.6				
	Co	ntinued on 1	next page	9				

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Source Citation: Type of Data Source Hero ID	NIOSH. 1998. Health Hazard Evaluation I Occupational Exposure; Completed Expos 4287129	Report No. sure or Risk	HETA 96 Assessm	02662702 ents;	, Cooper Engineered Products, Bowling Green, Ohio.
EVALUATION	Matric	Dating	MANDA	Coore	Commente
Domain	Metric	Kating	IVI VV F ^	Score	Comments

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	ctor Industry Association (S nal Exposure; Monitoring Da	IA). 2019. N ata;	MP Sup	plement	tal Data: Container Handling.			
EXTRACTION Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descri	ption (Subca	tegory of Use):	Electron	nics semi	conduct	tors			
Physical Form:			Vapor						
Route of Exposur	re:		Inhalati	on					
Exposure Concen	tration (Uni	t):	Measur <0.006	ed Expo ppm	sure Ra	ange: <0.0057- <0.083 ppm TWA: <0.0057 -			
Number of Samp	les:		5						
Number of Sites:			14 total	sites sai	mpled in	n study			
Type of Measure	ment or Met	hod:	Full shi	ft TWA	(8 or 12)	2 hours)			
Worker Activity:			Contair	er chang	e out: v	various sizes			
Type of Sampling	g:		Persona	.1					
Exposure Duration	on:		2-20 minutes						
Exposure Frequen	ncy:		55- gallon drum change outs can occur once every other week to 16 times in a 12-hour shift						
Engineering Cont	rol & percer	t Exposure Reduction:	Typical chemical delivery systems are enclosed units equipped with local exhaust ventilation, leak detection, and exhaust monitoring with alarm to a central control room or personnel						
PPE:			Semicon boots a skin co tant ap	nductor f s well a verage. rons and	Tab worl s gloves Persona gloves,	kers wear long sleeved coveralls with hoods and s and safety glasses that provide ?98 percent al protective equipment such as chemical resis- face shields, and respiratory protection are used			
Analytic Method	:		NIOSH	1302; O	SHA PV	V2043, SOP-5, GC-FID; mod. NIOSH 1302			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1. Beliat	oility								
	Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			
			Continued or	ı next pa	ige				

				<u> </u>		
Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	ctor Industry Association (SIA) nal Exposure; Monitoring Data;	. 2019. N	MP Sup	plement	al Data: Container Handling.
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	In scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2018
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data points provided
Domain 3: Access	sibility/Clari	ity				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	well characterized
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.0	

Source Citation: Type of Data Source Hero ID	Semiconductor Industry Association Occupational Exposure; Monitoring 5161295	on (SIA). 2019. NMP Supplemental Data: Container Handling. g Data;							
EXTRACTION Parameter		Data							
Life Cycle Stage:		Use							
Life Cycle Descrip	otion (Subcategory of Use):	Electronics semiconductors							
Physical Form:		Vapor							
Route of Exposur	e:	Inhalation							
Exposure Concen	tration (Unit):	Measured Exposure Range: <0.0023 - <3 ppm TWA: <0.08 - <0.762 ppm							
Number of Sampl	es:	15							
Number of Sites:		14 total sites sampled in study							
Type of Measurer	nent or Method:	Full shift TWA (8 or 12 hours)							
Worker Activity:		Container change out: various sizes							
Type of Sampling	:	Personal							
Exposure Duratic	n:	2-20 minutes							
Exposure Frequer	icy:	55- gallon drum change outs can occur once every other week to 16 times in a 12-hour shift							
Engineering Cont	rol & percent Exposure Reduction:	Typical chemical delivery systems are enclosed units equipped with local exhaust ventilation, leak detection, and exhaust monitoring with alarm to a central control room or personnel.							
PPE:		Semiconductor fab workers wear long sleeved coveralls with hoods and boots as well as gloves and safety glasses that provide ?98 percent skin coverage. Personal protective equipment such as chemical resis- tant aprons and gloves, face shields, and respiratory protection are used when necessary to further reduce worker exposure							
Analytic Method:		NIOSH 1302; OSHA PV2043, SOP-5, GC-FID; mod. NIOSH 1302							
EVALUATION									
Domain	Metric	Rating MWF* Score Comments							
Domain 1: Reliab	ility								
	Metric 1: Methodology	$\begin{array}{ccc} {\rm High} & \times \ 1 & 1 & {\rm Sampling \ or \ analytical \ methodology \ is \ an \ approved \ OSHA \ or \\ {\rm NIOSH \ method} \end{array}$							
		Continued on next page							

				<u> </u>		
Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	ctor Industry Association (SIA) nal Exposure; Monitoring Data;	. 2019. N	MP Sup	plement	al Data: Container Handling.
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	In scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2018
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data points provided
Domain 3: Access	sibility/Clari	ity				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	well characterized
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.0	

* MWF = Metric Weighting Factor

Source Citation:SemicType of Data SourceOccupHero ID516129	onductor Industry Association (S ational Exposure; Monitoring D 95	SIA). 2019. NM ata;	MP Sup	plement	tal Data: Container Handling.				
EXTRACTION Parameter		Data							
Life Cycle Stage:		Use							
Life Cycle Description (S	ubcategory of Use):	Electron	ics semi	conduct	tors				
Physical Form:		Vapor							
Route of Exposure:		Inhalatic	on						
Exposure Concentration	(Unit):	Measure <0.19 pp	d Expos om	sure Ra	ange: <0.2 - <0.39 ppm TWA: <0.011 -				
Number of Samples:		12							
Number of Sites:		14 total	sites sar	npled in	n study				
Type of Measurement or	Method:	Full shift	t TWA	(8 or 12)	2 hours)				
Worker Activity:		Containe	Container change out: various sizes						
Type of Sampling:		Personal							
Exposure Duration:		$2-20 \min$	2-20 minutes						
Exposure Frequency:		55- gallo in a 12-h	55- gallon drum change outs can occur once every other week to 16 times in a 12-hour shift						
Engineering Control & po	ercent Exposure Reduction:	Typical of exhaust to a cent	chemica ventilat tral cont	l deliver ion, lea rol roor	ry systems are enclosed units equipped with local k detection, and exhaust monitoring with alarm m or personnel.				
PPE:		Semicon- boots as skin cov- tant apro- when ne-	ductor f s well a erage. ons and cessary	ab worl s glove Persona gloves, to furth	kers wear long sleeved coveralls with hoods and s and safety glasses that provide ?98 percent al protective equipment such as chemical resis- face shields, and respiratory protection are used her reduce worker exposure				
Analytic Method:		NIOSH	1302; OS	SHA PV	V2043, SOP-5, GC-FID; mod. NIOSH 1302				
EVALUATION									
Domain	Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliability									
Metric	High	$\begin{array}{ccc} {\rm High} & \times \ 1 & 1 & {\rm Sampling \ or \ analytical \ methodology \ is \ an \ approved \ OSHA \ or \\ {\rm NIOSH \ method} \end{array}$							
		Continued on	next pa	ge					
				<u> </u>					
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Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling. Occupational Exposure; Monitoring Data; 5161295							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 2: Representative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2018			
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data points provided			
Domain 3: Access	sibility/Clari	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness				$\times 1$	1	well characterized			
Overall Quality Determination ^{\dagger}			High		1.0				

Source Citation: Type of Data Source Hero ID	Semiconductor Industry Associ Occupational Exposure; Monito 5161295	ation (SIA). 2019. NMP Supplemental Data: Container Handling. bring Data;
EXTRACTION Parameter		Data
Life Cycle Stage:		Use
Life Cycle Descri	ption (Subcategory of Use):	Electronics semiconductors
Physical Form:		Vapor
Route of Exposur	e:	Inhalation
Exposure Concen	tration (Unit):	Measured Exposure Range: <0.9 ppmTWA: <0.1 ppm
Number of Samp	es:	1
Number of Sites:		14 total sites sampled in study
Type of Measure	nent or Method:	Full shift TWA (8 or 12 hours)
Worker Activity:		Container changeout and waste handling: NOWPAK bladder removal
T		prior to disposal.
Type of Sampling	:	Personal
Exposure Duratio	on:	2-20 minutes
Exposure Frequei	icy:	55- gallon drum changeouts can occur once every other week to 16 times
Engineering Cont	rol & percent Exposure Reductio	n: Typical chemical delivery systems are enclosed units equipped with local exhaust ventilation, leak detection, and exhaust monitoring with alarm to a central control room or personnel.
PPE:		Semiconductor fab workers wear long sleeved coveralls with hoods and boots as well as gloves and safety glasses that provide ?98 percent skin coverage. Personal protective equipment such as chemical resis- tant aprons and gloves, face shields, and respiratory protection are used when necessary to further reduce worker exposure
Analytic Method		NIOSH 1302; OSHA PV2043, SOP-5, GC-FID; mod. NIOSH 1302
EVALUATION		
Domain	Metric	Rating MWF* Score Comments
Domain 1: Reliab	oility	
	Metric 1: Methodology	$\begin{array}{ccc} {\rm High} & \times \ 1 & 1 & {\rm Sampling \ or \ analytical \ methodology \ is \ an \ approved \ OSHA \ or \\ {\rm NIOSH \ method} \end{array}$
		Continued on next page

				<u> </u>				
Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling. Occupational Exposure; Monitoring Data; 5161295						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 2: Representative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2018		
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data points provided		
Domain 3: Access	sibility/Clari	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness				$\times 1$	1	well characterized		
Overall Quality Determination ^{\dagger}			High		1.0			

Source Citation: Type of Data Source	Semiconductor Industry Asso Occupational Exposure; Moni	ciation (SIA). 2019. NMP Supplemental Data: Container Handling. toring Data;
Hero ID	5161295	
EXTRACTION Parameter		Data
Life Cycle Stage:		Uso
Life Cycle Descrit	otion (Subcategory of Use).	Electronics semiconductors
Physical Form	(Subcategory of ese).	Vapor
Route of Exposur	e:	Inhalation
Exposure Concen	tration (Unit):	Measured Exposure Range: <0.49 ppm TWA: <0.013 ppm
Number of Sampl	es:	1
Number of Sites:		14 total sites sampled in study
Type of Measurer	nent or Method:	Full shift TWA (8 or 12 hours)
Worker Activity:		Container change out and waste handling: Waste drum Disconnect, Re- moval, Handling (55 gal)
Type of Sampling	:	Personal
Exposure Duratio	n:	2-20 minutes
Exposure Frequer	cy:	55- gallon drum change outs can occur once every other week to 16 times
	-	in a 12-hour shift
Engineering Control & percent Exposure Reduction:		ion: Typical chemical delivery systems are enclosed units equipped with local exhaust ventilation, leak detection, and exhaust monitoring with alarm to a central control room or personnel.
PPE:		Semiconductor fab workers wear long sleeved coveralls with hoods and boots as well as gloves and safety glasses that provide ?98 percent skin coverage. Personal protective equipment such as chemical resis- tant aprons and gloves, face shields, and respiratory protection are used when necessary to further reduce worker exposure
Analytic Method:		NIOSH 1302; OSHA PV2043, SOP-5, GC-FID; mod. NIOSH 1302
EVALUATION		
Domain	Metric	Rating MWF* Score Comments
Domain 1: Beliah	ility	
	Metric 1: Methodology	$\begin{array}{ccc} {\rm High} & \times \ 1 & 1 & {\rm Sampling \ or \ analytical \ methodology \ is \ an \ approved \ OSHA \ or \\ {\rm NIOSH \ method} \end{array}$
		Continued on next page

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				<u> </u>				
Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling. Occupational Exposure; Monitoring Data; 5161295						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 2: Representative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2018		
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data points provided		
Domain 3: Access	sibility/Clari	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness				$\times 1$	1	well characterized		
Overall Quality Determination ^{\dagger}			High		1.0			

* MWF = Metric Weighting Factor

[†] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID	Semiconductor Industry Association Occupational Exposure; Monitoring 5161295	ı (SIA). 2019. NMP Supplemental Data: Container Handling. ; Data;					
EXTRACTION							
Parameter		Data					
Life Cycle Stage:		Use					
Life Cycle Descri	ption (Subcategory of Use):	Electronics semiconductors					
Physical Form:	F (200000800) 01 000).	Vapor					
Route of Exposu	re:	Inhalation					
Exposure Concer	tration (Unit):	Measured Exposure Range: <0.006 - <0.20 ppm TWA: <0.0057-					
Enposare concer		<0.20 ppm					
Number of Samp	les:	18					
Number of Sites:		14 total sites sampled in study					
Type of Measure	ment or Method:	Full shift TWA (8 or 12 hours)					
Worker Activity:		Maintenance activities: Plate cleans, filter changes, tool PMs, tool clean-					
		ing, o-ring change out					
Type of Sampling	z:	Personal					
Exposure Duration	on:	The task takes from less than 12 minutes to less than or equal to 2 hours					
Exposure Freque	ncv:	Performed fewer than 1 time per month per tool					
PPE:	·	Semiconductor fab workers wear long sleeved coveralls with hoods and boots as well as gloves and safety glasses that provide ?98 percent skin coverage. Personal protective equipment such as chemical resis- tant aprons and gloves, face shields, and respiratory protection are used when peacecame to further reduce worker exposure					
Analytic Method:		NIOSH 1302; mod. NIOSH 1302 - GC/FID; PV2043; OSHA PV2043 - SOP-5, GC-FID					
EVALUATION							
Domain	Metric	Rating MWF* Score Comments					
Domain 1: Relial	bility Metric 1: Methodology	$\begin{array}{ccc} {\rm High} & \times \ 1 & 1 & {\rm Sampling \ or \ analytical \ methodology \ is \ an \ approved \ OSHA \ or \\ {\rm NIOSH \ method} \end{array}$					
Domain 2: Repre	sentative						

Continued on next page

High

 $\times 1$

1

US

Geographic Scope

Metric 2:

				-				
Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling. Occupational Exposure; Monitoring Data; 5161295						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	Metric 3: Metric 4: Metric 5:	Applicability Temporal Representativeness Sample Size	High High High	$\begin{array}{c} \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 1	In scope Data from 2018 Discrete data points provided		
Domain 3: Accessibility/Clarity Metric 6: Metric ata Completeness High X 1 1 Bay data provided and is well described by metadata						Raw data provided and is well-described by metadata		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	well characterized		
Overall Quality Determination [†]			High		1.0			

* MWF = Metric Weighting Factor

[†] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	actor Industry Association (SIA) nal Exposure; Monitoring Data;	. 2019. N	MP Sup	plement	al Data: Container Handling.			
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Descri	Life Cycle Stage: Life Cycle Description (Subcategory of Use):			Use Electronics semiconductors					
Physical Form:			Vapor						
Route of Exposur	re:		Inhalat	ion					
Exposure Concer	tration (Uni	t):	Measur	ed Expos	sure Ran	nge: $<0.024 - 0.29$ ppm TWA: $<0.001 - <0.13$ ppm			
Number of Samp	les:		12						
Number of Sites:			14 tota	l sites sai	mpled in	n study			
Type of Measure	ment or Met	hod:	Full shi	ft TWA	(8 or 12)	2 hours)			
Worker Activity:			Mainter	nance act	tivities				
Type of Sampling	g:		Persona	ıl					
Exposure Duration	on:		The task takes from less than 12 minutes to less than or equal to 2 hours						
Exposure Freque	ncy:		Perform	ned fewer	than 1	time per month per tool			
Analytic Method	PPE: Analytic Method:		boots as well as gloves and safety glasses that provide ?98 percent skin coverage. Personal protective equipment such as chemical resis- tant aprons and gloves, face shields, and respiratory protection are used when necessary to further reduce worker exposure. NIOSH 1302; mod. NIOSH 1302 - GC/FID; PV2043; OSHA PV2043 - SOP-5, GC-FID						
EVALUATION									
Domain		Metric	Rating	MWF^*	Score	Comments			
Domain 1: Relial	oility Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			
Domain 2: Repre	sentative		TT· 1		1				
	Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2018			

Continued on next page

				<u> </u>			
Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling. Occupational Exposure; Monitoring Data; 5161295					
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data points provided	
Domain 3: Access	sibility/Clari	ity					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata	
Domain 4: Variab	oility and Ur	ncertainty					
	Metric 7:	Metadata Completeness	High	$\times 1$	1	well characterized	
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	High		1.0		

* MWF = Metric Weighting Factor

[†] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data SourceOccupationHero ID5161295	al Exposure; Monitoring	Data;						
EXTRACTION								
Parameter		Data						
Life Cycle Stage		Use						
Life Cycle Description (Subcat	tegory of Use):	Electro	nics semi	conduct	ors			
Physical Form:		Vapor						
Route of Exposure:		Inhalati	ion					
Exposure Concentration (Unit):	Measur	ed Expos	sure Rai	nge: <0.18 - <1 ppm TWA: <0.003 - <0.18			
Number of Samples:	,	ppm 9						
Number of Sites:		14 total	sites sa	mpled in	a study			
Type of Measurement or Meth	iod:	Full shi	ft TWA	(8 or 12)	hours)			
Worker Activity:		Mainter	nance act	tivities:	Tool PMs and dip tube change out on chem de-			
		livery s	ystem					
Type of Sampling:		Persona	ıl					
Exposure Duration:		The task takes from less than 12 minutes to less than or equal to 2 hours						
Exposure Frequency:		Performed fewer than 1 time per month per tool						
PPE: Analytic Method:		Semiconductor fab workers wear long sleeved coveralls with hoods and boots as well as gloves and safety glasses that provide ?98 percent skin coverage. Personal protective equipment such as chemical resis- tant aprons and gloves, face shields, and respiratory protection are used when necessary to further reduce worker exposure. NIOSH 1302; mod. NIOSH 1302 - GC/FID; PV2043; OSHA PV2043 - SOP-5, GC-FID						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			
Domain 2: Representative								
Metric 2:	Geographic Scope	High	$\times 1$	1	US			
Metric 3:	Applicability	High	$\times 2$	2	In scope			

Continued on next page

				-				
Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling. Occupational Exposure; Monitoring Data; 5161295						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	High High	$\times 2 \times 1$	21	Data from 2018 Discrete data points provided		
Domain 3: Accessibility/Clarity								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata		
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	well characterized		
Overall Quality D	eterminatio	n^\dagger	High		1.0			

Type of Data SourceOccupational Exposure; MonitorinHero ID5161295	ing Data;				
EXTRACTION					
Parameter	Data				
Life Cycle Stage:	Use				
Life Cycle Description (Subcategory of Use):	Electronics semiconductors				
Physical Form:	Vapor				
Route of Exposure:	Inhalation				
Exposure Concentration (Unit):	Measured Exposure Range: <0.2 - <1 ppm TWA: <0.0095 - <0.37				
Number of Samples:	6				
Number of Sites:	14 total sites sampled in study				
Type of Measurement or Method:	Full shift TWA (8 or 12 hours)				
Worker Activity:	Maintenance activities: wet station clean and parts clean using 100 percent NMP				
Type of Sampling:	Personal				
Exposure Duration:	The task takes from less than 12 minutes to less than or equal to 2 hours				
Exposure Frequency:	Performed fewert han 1 time per month per tool; 1-4 times/month				
PPE:	Semiconductor fab workers wear long sleeved coveralls with hoods and boots as well as gloves and safety glasses that provide ?98 percent skin coverage. Personal protective equipment such as chemical resis- tant aprons and gloves, face shields, and respiratory protection are used when necessary to further reduce worker exposure.				
Analytic Method:	NIOSH 1302; mod. NIOSH 1302 - GC/FID; PV2043; OSHA PV2043 - SOP-5, GC-FID				
EVALUATION					
Domain Metric	Rating MWF* Score Comments				
Domain 1: Reliability Metric 1: Methodology	High $\times 1$ 1 Sampling or analytical methodology is an approved OSHA or NIOSH method				
Domain 2: Representative Metric 2: Geographic Scope	m High imes 1 1 Us				

Source Citation: Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling.

Continued on next page

High

Metric 3: Applicability

 $\times 2$

 $\mathbf{2}$

In scope

Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	ctor Industry Association (SIA) nal Exposure; Monitoring Data;	. 2019. N	MP Sup	plement	cal Data: Container Handling.			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	High High	$\times 2 \times 1$	21	Data from 2018 Discrete data points provided			
Domain 3: Accessibility/Clarity									
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata			
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	well characterized			
Overall Quality D	eterminatio	n^\dagger	High		1.0				

Type of Data Source Occupational E Hero ID 5161295	Exposure; Monitoring Da	ata;			
FYTPACTION					
Parameter		Data			
T di difficitor		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Subcatego	ory of Use):	Electronics	semiconductors		
Physical Form:	· ,	Vapor			
Route of Exposure:		Inhalation			
Exposure Concentration (Unit):		Measured E	xposure Range: <0	0.0038 - <0.20 ppm TWA: <0.0036 - <0.20	
Number of Samples:		28			
Number of Sites:		14 total site	s sampled in study	7	
Type of Measurement or Method:		Full shift T	WA (8 or 12 hours)	
Worker Activity:		Fab Worker	: Production opera	tors of tools using NMP and maintenance	
		technicians			
Type of Sampling:		Personal an	d area		
Exposure Duration:		Fab operato	ors and technicians	typically work in the fab 10.5 hours of a	
		12-hour shift	it.		
Exposure Frequency:		Daily			
PPE:		Semiconduc	tor fab workers we	ear long sleeved coveralls with hoods and	
		boots as w	ell as gloves and	safety glasses that provide ?98 percent	
		skin covera	ge. Personal prote	ective equipment such as chemical resis-	
		tant aprons	and gloves, face sh	ields, and respiratory protection are used	
		when necess	sary to further red	uce worker exposure.	
Analytic Method:		NIOSH 130	2; mod. NIOSH 13	302 - GC/F1D; PV2043; OSHA PV2043 -	
		SOP-5, GC-	·FID; OSHA 7		
EVALUATION					
Domain	Metric	Rating M	WF* Score	Comments	
Domain 1: Reliability					

Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling.

Type of Sampling:	Personal and area
Exposure Duration:	Fab operators and technicians typically work in the fab 10.5 hours of a
	12-hour shift.
Exposure Frequency:	Daily
PPE:	Semiconductor fab workers wear long sleeved coveralls with hoods and
	boots as well as gloves and safety glasses that provide ?98 percent
	skin coverage. Personal protective equipment such as chemical resis-
	tant aprons and gloves, face shields, and respiratory protection are used
	when necessary to further reduce worker experime

High

High

Metric 1: Methodology

Metric 2:

Geographic Scope

Domain 2: Representative

Source Citation:

 $\times 1$

 $\times 1$

1

1

US

Sampling or analytical methodology is an approved OSHA or NIOSH method

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Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	actor Industry Association (SIA) nal Exposure; Monitoring Data;	. 2019. N	MP Sup	plement	al Data: Container Handling.
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
	Metric 3:	Applicability	High	$\times 2$	2	In scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2018
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data points provided
Domain 3: Access	sibility/Clar	ity Matadata Completeness	Uich	× 1	1	
	Metric 0:	Metadata Completeness	підп	× 1	1	Raw data provided and is well-described by metadata
Domain 4: Variab	oility and Ur	ncertainty	TT' 1	1	1	
	Metric <i>i</i> :	Metadata Completeness	High	× 1	1	well characterized
Overall Quality Determination ^{\dagger}		High		1.0		

* MWF = Metric Weighting Factor

[†] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID	Semiconductor Industry Associatio Occupational Exposure; Monitoring 5161295	n (SIA). 2019. NMP Supplemental Data: Container Handling. g Data;
EXTRACTION		
Parameter		Data
Life Cycle Stage:		Use
Life Cycle Descri	ption (Subcategory of Use):	Electronics semiconductors
Physical Form:		Vapor
Route of Exposur	re:	Inhalation
Exposure Concen	tration (Unit):	Measured Exposure Range: $<0.013 - <0.14$ ppm TWA: N/A
Number of Samp	les:	9
Number of Sites:		14 total sites sampled in study
Type of Measure	ment or Method:	Full shift TWA (8 or 12 hours)
Worker Activity:		Fab Area Monitoring (near tools that use NMP in process)
Type of Sampling	r.	Personal and area
Exposure Duration	on:	Fab operators and technicians typically work in the fab 10.5 hours of a 12-hour shift.
Exposure Freque	ncy:	Daily
PPE:		Semiconductor fab workers wear long sleeved coveralls with hoods and
		boots as well as gloves and safety glasses that provide ?98 percent skin coverage. Personal protective equipment such as chemical resis- tant aprons and gloves, face shields, and respiratory protection are used when necessary to further reduce worker exposure.
Analytic Method	:	NIOSH 1302; mod. NIOSH 1302 - GC/FID; PV2043; OSHA PV2043 - SOP-5, GC-FID; OSHA 7

EVALUATION

Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method		
Domain 2: Representative							
Metric 2:	Geographic Scope	High	$\times 1$	1	US		
Metric 3:	Applicability	High	$\times 2$	2	In scope		
Continued on next page							

Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	ctor Industry Association (SIA) nal Exposure; Monitoring Data;	. 2019. N	MP Sup	plement	cal Data: Container Handling.			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	High High	$\times 2 \times 1$	21	Data from 2018 Discrete data points provided			
Domain 3: Accessibility/Clarity									
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata			
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	well characterized			
Overall Quality D	eterminatio	n^\dagger	High		1.0				

Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	niconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling. rupational Exposure; Monitoring Data; 1295								
EXTRACTION Parameter	TION neter Data									
Life Cycle Stage:			Use		_					
Life Cycle Descrip	tion (Subca	tegory of Use):	Electro	nics semi	conduct	tors				
Physical Form:			Vapor							
Route of Exposure	e:		Inhalati	ion	T					
Exposure Concent	ration (Uni	t):	Measur	ed: < 0.4	ppm T	WA: <0.35 ppm				
Number of Sample	es:		1	•.						
Number of Sites:			14 total	sites sai	npled 11	n study				
Worker Activity	ient or Met	nod:	Full Shi	IT I WA	(8 or 12	nours)				
worker Activity:			waste i	$r_{\rm om} = 10$	nng: 1 000 col	lon tank to a tankor truck				
Type of Sampling			Persona		000 gai	ion tank to a tanker truck.				
Exposure Duration	n.		2 to 4 h	ours						
PPE:			Tasks a	re perfori	ned by a	one employee and the truck driver. The employee				
			wears s	afetv glas	ses and	face shield, PVC apron with sleeves, long pants				
			and wor	rk boots,	and Tr	ionic gloves.				
Analytic Method:			mod. NIOSH 1302 - GC/FID BADGE							
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliabi	ility									
	Metric 1:	Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method				
Domain 2: Repres	entative									
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	In scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2018				
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data points provided				
Domain 3: Access	ibility/Clari	ty								
		Con	tinued or	n next pa	ge					

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Source Citation: Type of Data Source Hero ID	Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling. Occupational Exposure; Monitoring Data; 5161295									
EVALUATION										
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata				
Domain 4: Variab	ility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	High	$\times 1$	1	well characterized				
Overall Quality Determination ^{\dagger}					1.0					

* MWF = Metric Weighting Factor

[†] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source Hero ID	of Data Source Occupational Exposure; Monitoring Data; D 5161295									
	0101200									
EXTRACTION			Data							
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descrip	tion (Subca	tegory of Use):	Electron	nics semi	conduct	ors				
Physical Form:	,		Vapor							
Route of Exposure	:		Inhalati	on						
Exposure Concent	ration (Uni	t):	Measure	ed: 1.2 p	pmTWA	A: 1.18 ppm				
Number of Sample	es:		1	_	-					
Number of Sites:			14 total	sites sar	npled in	n study				
Type of Measurem	nent or Met	hod:	Full shi	ft TWA	(8 or 12)	hours)				
Worker Activity:			Virgin I	NMP tru	ck off-lo	ading: Pull 6 samples for purity analysis; trans-				
			fer of v	irgin NM	P from	a 10,000 gallon tanker truck to a 10,000 gallon				
			tank in	the tank	farm. 7	Furn on pump; stay in enclosure upstairs during				
			2 hour 1	transfer.						
Type of Sampling:			Personal							
Exposure Duration	1:		2 to 4 hours							
PPE:			Tasks are performed by one employee and the truck driver. The employee							
			wears safety glasses and face shield, PVC apron with sleeves, long pants							
			and work boots, and Trionic gloves.							
Analytic Method:			mod. NIOSH 1302 - GC/FID BADGE							
EVALUATION										
EVALUATION			D		a					
Domain		Metric	Rating	MWF'*	Score	Comments				
	1.									
Domain 1: Kelladi	Ilty Motrie 1.	Mathadalagy	Ujeh	× 1	1	Compliant on and dischardly below is an annual OCHA or				
	Methe 1.	Methodology	mgn	× 1	1	NIOSH method				
Domain 2: Repres	entative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	In scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2018				
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data points provided				
		Con	tinued or	next pa	øe					
	Continued on next page									

Source Citation: Type of Data Source Hero ID	Semicondu Occupation 5161295	actor Industry Association (SI nal Exposure; Monitoring Dat	(A). 2019. N ta;	MP Sup	plement	al Data: Container Handling.			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 3: Access	sibility/Clari	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata			
Domain 4: Variab	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	High	$\times 1$	1	well characterized			
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	High		1.0				

Source Citation: Type of Data Source Hero ID	Kemira. 2018. RE: N-Methylpyrrolidone (NMP) (CASRN 872-50-4). EPA-HQ-OPPT-2016-0743-0085. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5176404									
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): PPE:			Processing Chemical processing, excluding formulation (polymer manufacturing) chemical resistant jacket, gloves, goggles and a face shield							
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliab	oility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.				
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US In scope 2017 No Comment.				
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information is from the source				
Domain 4: Variab	oility and U Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality D	Determinatio	n^\dagger	High		1.1					

Source Citation:	FUJIFILM Electronics Materials USA Inc 2017. NMP Use/Application Survey FFEM/FEUP. EPA-HQ-OPPT-2016-0743-0024.								
Type of Data Source Hero ID	Occupation 5176406	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5176406							
EXTRACTION Parameter	Data								
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Engineering Control & percent Exposure Reduction: PPE:			Use Electronics - semiconductor manufacturing Enclosed process; In many cases, operations are conducted in class 100 or class 10 clean rooms. Safety Glasses, impervious gloves, protective clothing with respirators if required						
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.			
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US In scope 2017 No Comment.			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information is from the source			
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	Determinatio	n†	High		1.1				

Source Citation:	Saft American Inc 2017. Memorandum to EPA: N-methylpyrrolidone, docket ID number EPA-HQ-OPPT-2016-0743. EPA-HQ-OPPT-2016-0743-0005.							
Type of Data Source Hero ID	Occupatio 5176407	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5176407						
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity: Engineering Control & percent Exposure Reduction: PPE:			Use Electronics - batteries Workers may also be potentially exposed during dilution, mixing, or sampling of solutions containing NMP, totally or partially enclosed and equipped with ventilation face shields, gloves, and chemical resistant clothing					
EVALUATION Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.		
Domain 2: Repre	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US In scope 2017 No Comment.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information is from the source		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		N/A		N/A	No Comment.			
Overall Quality Determination [†]		High		1.1				

Source Citation:	North America's Building Trades Unions (NABTU). 2017. Re: TSCA scoping and review: Ten priority chemicals. EPA-HQ-OPPT-2016-07/13-0023						
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data;						
	0110100						
EXTRACTION			Data				
			Data				
Life Cycle Stage:			Use				
Life Cycle Descript	tion (Subca	ategory of Use):	Electronic	cs			
Physical Form:	`		vapor				
Route of Exposure	:		Inhalation	ı			
Exposure Concentr	ation (Uni	t):	Range: le	ss than t	he dete	ction limit to 0.202 mg/m3	
Number of Samples	s:		unknown				
Number of Sites:			unknown				
Type of Measurem	ent or Met	hod:	full-shift '	ГWA			
Worker Activity:			Wafer str	ipping ("	cleanin	g") removing photoresist. Wafer cleaning for	
			organics 1	removal.	Operati	ons are in a closed processing system.	
Type of Sampling:			personal				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Beliabil	ity						
Domain 1. Henabi	Metric 1	Methodology	Medium	× 1	2	Methodology is stated and seems legitimate	
		methodology	mourum	~ 1	-	Methodology is stated and seems regionnate	
Domain 2: Represe	entative						
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2003 - 2011	
	Metric 5:	Sample Size	Medium	$\times 1$	2	range with uncertain statistics	
Domain 3: Accessi	bility/Clar	ity					
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	lacks exposure duration and frequency	
Domain 4: Variabi	lity and Ur	ncertainty		1	0		
	Metric 7:	Metadata Completeness	Medium	× 1	2	limited discussion	
		Con	tinued on r	next page	è		

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Source Citation:	North America's Building Trades Unions OPPT-2016-0743-0023.	s (NABTU). 2	2017. Re:	TSCA se	coping and review: Ten priority chemicals. EPA-HQ-		
Type of Data Source	Occupational Exposure; Monitoring Dat	a;					
Hero ID	5176408	,					
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Overall Quality I	$\operatorname{Petermination}^\dagger$	Medium		1.8			

Source Citation:	North America's Building Trades Unions (NABTU). 2017. Re: TSCA scoping and review: Ten priority chemicals. EPA-HQ-OPPT-2016-0743-0023.						
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 5176408						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Life Cycle Descrij	ption (Subca	ategory of Use):	Electronic	cs			
Physical Form: Doute of Function			vapor				
Function Concorr	e: tration (Uni	<u>.</u>	Panga 0	0947 to 1	0.857 m	~ /m ²	
Number of Sampl			unknown	0247 10	0.007 11	g/1113	
Number of Sites:			unknown				
Type of Measurer	nent or Met	hod:	full-shift.	TWA			
Worker Activity	none or mot	ilou.	Photolith	ography	laver sr	on-on Polyimide deposition Operations are	
,,oiner 11001/10j1			in a close	d process	sing syst	tem.	
Type of Sampling	;:		personal				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	oility						
Domain 1. Ronad	Metric 1:	Methodology	Medium	$\times 1$	2	Methodology is stated and seems legitimate	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2003 - 2011	
	Metric 5:	Sample Size	Medium	$\times 1$	2	range with uncertain statistics	
Domain 3: Access	sibility/Clar	ity			-		
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	lacks exposure duration and frequency	
Domain 4: Variat	Matrie 7	Metadata Completence	Mad	V 1	0		
	metric <i>(</i> :	Metadata Completeness	Medium	× 1	2	limited discussion	
	Continued on next page						

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Source Citation:	North America's Building Trades Unions OPPT-2016-0743-0023.	s (NABTU). 2	2017. Re:	TSCA se	coping and review: Ten priority chemicals. EPA-HQ-		
Type of Data Source	Occupational Exposure; Monitoring Dat	a;					
Hero ID	5176408	,					
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Overall Quality I	$\operatorname{Petermination}^\dagger$	Medium		1.8			

Source Citation:	North America's Building Trades Unions (NABTU). 2017. Re: TSCA scoping and review: Ten priority chemicals. EPA-HQ-OPPT-2016-0743-0023.						
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 5176408						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Life Cycle Descrij	ption (Subca	ategory of Use):	Electronic	CS			
Physical Form: Doute of Function			Vapor				
Fypogure Concor	e: tration (Uni	(+)-	Range: lo	1 ca than t	ho doto	ation limit to 0.770 mg/m^3	
Number of Sampl			unknown	ss than t	the deter	ction mint to 0.770 mg/mb	
Number of Sites:	съ.		unknown				
Type of Measurer	ment or Met	hod:	full-shift.	TWA			
Worker Activity	none or mot	ilou.	Preventiv	e mainte	enance a	t process equipment tools in the cleanroom	
,,oiner 11001/10j1			Invasive r	naintena	nce.	a process equipment cools in the creameent	
Type of Sampling	;:		personal				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility						
Domain II Toonaa	Metric 1:	Methodology	Medium	$\times 1$	2	Methodology is stated and seems legitimate	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2003 - 2011	
	Metric 5:	Sample Size	Medium	$\times 1$	2	range with uncertain statistics	
Domain 3: Access	sibility/Clar	ity			_		
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	lacks exposure duration and frequency	
Domain 4: Variat	Matuin 7	Meta data Gammalatana	M. J	v 1	0		
	Metric (:	Metadata Completeness	Medium	× 1	2	limited discussion	
	Continued on next page						

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Source Citation:	North America's Building Trades Unions OPPT-2016-0743-0023.	s (NABTU). 2	2017. Re:	TSCA se	coping and review: Ten priority chemicals. EPA-HQ-		
Type of Data Source	Occupational Exposure; Monitoring Dat	a;					
Hero ID	5176408	,					
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Overall Quality I	$\operatorname{Petermination}^\dagger$	Medium		1.8			

Source Citation:	North America's Building Trades Unions (NABTU). 2017. Re: TSCA scoping and review: Ten priority chemicals. EPA-HQ-OPPT-2016-0743-0023.						
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 5176408						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Life Cycle Descri	ption (Subca	ategory of Use):	Electronic	cs			
Physical Form:	r (vapor				
Route of Exposur	e:		Inhalation	n			
Exposure Concen	tration (Uni	it):	Range: le	ss than t	the dete	ction limit to 4.054 mg/m3	
Number of Samp	les:		unknown				
Number of Sites:			unknown				
Type of Measurer	ment or Met	hod:	full-shift	TWA			
Worker Activity:			Chemical	s storage	e and de	elivery areas open to ambient air. Canister,	
			bottle an	d contai	ner chai	nge at tools and chemfill stations not in the	
			cleanroon	n.			
Type of Sampling	r:		personal				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Boliat	vility						
Domain 1. Renau	Metric 1:	Methodology	Medium	× 1	2	Methodology is stated and seems legitimate	
			mourain		_	inconociones, le source and scome regionnatio	
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2003 - 2011	
	Metric 5:	Sample Size	Medium	$\times 1$	2	range with uncertain statistics	
	1.11. (01						
Domain 3: Access	sibility/Clar	ity	N 11		0		
	Metric 6:	Metadata Completeness	Medium	× 1	2	lacks exposure duration and frequency	
Domain 4. Verial	ality and U	ncortainty					
Domain 4. Variai	Metric 7.	Metadata Completeness	Medium	× 1	2	limited discussion	
		Metadata Compreteness	incurum	~ 1	4		
	Continued on next page						

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Source Citation:	North America's Building Trades Unions OPPT-2016-0743-0023.	s (NABTU). 2	017. Re:	TSCA so	oping and review: Ten priority chemicals. EPA-HQ-		
Type of Data Source	Occupational Exposure; Monitoring Dat	a;					
Hero ID	5176408						
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Overall Quality D	$\operatorname{Petermination}^{\dagger}$	Medium		1.8			

Source Citation:	Celanese Engineered Materials. 2017. N-methylpyrrolidone (NMP) CASRN: 872-50-4, use, disposal and exposure scenarios.						
Type of Data Source Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5176410						
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity:		Processin Chemical Exposure toms was are being	Processing Chemical processing, excluding formulation (polymer manufacturing) Exposure scenarios include: 1. Exposure to vapors when the NMP bot- toms waste stream is dumped into a hopper to cool or when the hoppers are being dumped into roll off hoxes : 2. Line breaking activities for				
Engineering Control & percent Exposure Reduction:			maintena exposure NMP is u vent syste the therm	nce pers during s used in a ems and nal oxidiz	onnel. ampling contain burned i zer is >9	PPE is defined.; 3. Other fugitive emission c, lab analysis or in the event of a leak. ed system in which all vapors are collected in in a thermal oxidizer. Destruction efficiency of 09.9 percent.	
EVALUATION					~		
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evident.	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	In scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	ibility/Clar	itv					
Domain 9. Meeess	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source	
			-				
Domain 4: Variab	ility and Ur	ncertainty					
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.	
Continued on next page							

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Source Citation:	Celanese Engineered Materials. 2017. N-methylpyrrolidone (NMP) CASRN: 872-50-4, use, disposal and exposure scenarios. EPA-HQ-OPPT-2016-0743-0015.							
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;							
Hero ID	5176410							
EVALUATION								
Domain	Metric	Rating M	IWF [*] Score	Comments				
Overall Quality D	$\operatorname{Petermination}^\dagger$	High	1.1					

Source Citation:	Akin Gump Strauss Hauer & Feld LLP. 2018. Re: EPA docket EPA-HQ-OPPT-2016-0743: N-Methyl-2-pyrrolidone ("NMP"), CAS# 872-50-4 comments regarding the NMP problem formulation document. EPA-HQ-OPPT-2016 0743 0102								
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 5176411								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Description (Subcategory of Use):			dip cleaning of plastic films						
Physical Form:			Vapor						
Route of Exposure:			Inhalation						
Exposure Concentration (Unit):			Occupational exposure levels to NMP through inhalation range from neg-						
			ligible to approximately 4 ppm						
Type of Measurement or Method:			8-nour 1 WA						
PPE.	ioi & percer	it Exposure neutron.	Neoprono gloves long slove cotton uniforms with pants and /or coveralls						
112.	1112.			safety shoes, and safety glasses. Face shields and safety googles along					
			with chemical resistant aprons are utilized for tasks with liquid splash						
			potential						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Damain 1. Daliah	:1:4								
Domain 1: Reliac	Motric 1	Mathadalagy	Low	~ 1	3	Compling on analytical methodology is not specified			
	metric 1.	Methodology	LOW	~ 1	5	Sampling of analytical methodology is not specified.			
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2018			
	Metric 5:	Sample Size	Low	$\times 1$	3	qualitative or characterized by no statistics			
Damain 9. A	-:1-:1:+ / <i>C</i> 1								
Domain 3: Accessibility/Clarity			Unaccontable	× 1	4	Martine late la set induit an and la second			
	Metric 0:	Metadata Completeness	Unacceptable	× 1	4	Monitoring data do not include any needed metadata to un- derstand what the data represent - i.e., PBZ or Area, Num. of samples, worker activities			
Continued on next page									

Source Citation:	Akin Gump Strauss Hauer & Feld LLP. 2018. Re: EPA docket EPA-HQ-OPPT-2016-0743: N-Methyl-2-pyrrolidone ("NMP"), CAS# 872-50-4 comments regarding the NMP problem formulation document. EPA-HQ-OPPT-2016-0743-0102.								
Type of Data Source	Occupational Exposure; Monitoring Data;								
Hero ID	5176411	· / ·	,						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Low × 1 3 does not address variability or uncertainty									
Overall Quality Determination ^{\dagger}			Unacceptable		4	Metric Mean Score: 2.0.			

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

[†] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

– continued from previous page
Source Citation:	American Chemistry Council. 2017. American Chemistry Council comments on the U.S. Environmental Protection Agency's initial 10 chemicals identified for risk evaluation. EPA-HQ-OPPT-2016-0743-0011.								
Type of Data Source Hero ID	Occupation 5176412	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5176412							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Engineering Control & percent Exposure Reduction: PPE:			Use Paints, coatings, adhesives The products are batch manufactured in an enclosed process. The pro- cess vents to a carbon absorber. During the compounding process, the blend vessel is closed. Full face respirators						
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	ACC poll of trade association members. No bias /errors evi- dent.			
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US In scope 2017 No Comment.			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Information is from the source			
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	eterminatio	n [†]	High		1.1				

Source Citation: Type of Data Source Hero ID	OSHA. 202 Occupation 3827305	OSHA to EPA.						
EXTRACTION Parameter			Data					
Life Cycle Stage: Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity:		Use vapor Inhalation ND - 7.745 ppm 174 16 short-term measurements and full-shift All Other Converted Paper Product Mfg.; All Other Misc. Wood Prod- uct Mfg.; All Other Plastics Product Mfg.; All Other Rubber Prod- uct Mfg.; Fabric Coating Mills; Iron Foundries; Landscaping Services; Metal Coating, Engraving (Except Jewelry and Silverware), and Allied Services to Manufacturers; Metal Kitchen Cookware, Utensil, Cutlery, and Flatware (Except Precious) Mfg.; Photographic and Photocopying Equipment Mfg.						
Type of Sampling	:		personal and area					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	OSHA and state inspectors are expected to use OSHA or NIOSH sampling methods. Samples sent to the OSHA SLTC are expected to be analyzed using OSHA or NIOSH analytical methods.		
Domain 2: Benres	entative							
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	Data collected in the United States		
	Metric 3:	Applicability	Medium	$\times 2$	4	These conditions of use are unknown but likely fall within the scope		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Samples collected in 1984 to 1999. Data are more than 20 years old.		
Continued on next page								

Source Citation: Type of Data Source Hero ID	OSHA. 201 Occupation 3827305	OSHA. 2017. Chemical Exposure Health Data (CEHD) provided by OSHA to EPA. Occupational Exposure; Monitoring Data; 3827305						
EVALUATION								
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments		
	Metric 5:	Sample Size	High	$\times 1$	1	Individual measurements are provided so the sample sets can be fully statistically characterized.		
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	Medium	$\times 1$	2	OSHA data include sample type and exposure type. Sample times also provided.		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	OSHA data do not address variability or uncertainty		
Overall Quality D	Peterminatio	\mathbf{n}^{\dagger}	Medium		2.0			

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	OSHA. 20 Occupation 3827305	17. Chemical Exposure Health I nal Exposure; Monitoring Data;	Data (CEH)	D) provid	ded by (OSHA to EPA.		
EXTRACTION Parameter			Data					
Life Cycle Stage: Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity: Type of Sampling:			Use vapor Inhalation ND - 1.54 ppm 53 10 short-term measurements and full-shift Administration of Education Programs; Institutional Furniture Manu- facturing; Nonferrous Metal (Except Copper and Aluminum) Rolling, Drawing, and Extruding; Other Industrial Machinery Mfg.; Printing Machinery and Equipment Mfg. personal and area					
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	OSHA and state inspectors are expected to use OSHA or NIOSH sampling methods. Samples sent to the OSHA SLTC are expected to be analyzed using OSHA or NIOSH analytical methods.		
Domain 2: Repres	sentative Matria 2:	Caarranhia Saana	Himb	× 1	1			
	Metric 2: Metric 3:	Applicability	Medium	$\times 1 \times 2$	4	Data collected in the United States These conditions of use are unknown but likely fall within the		
					-	scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Samples collected in 2000 to 2001. Data are more than 10 years old but not more than 20 years old.		
Metric 5: Sample Size				$\times 1$	1	Individual measurements are provided so the sample sets can be fully statistically characterized.		
Domain 3: Access	Domain 3: Accessibility/Clarity							
		Cor	tinued on 1	next page	9			

Source Citation: Type of Data Source Hero ID	OSHA. 2017. Chemical Exposure Health Data (CEHD) provided by OSHA to EPA. Occupational Exposure; Monitoring Data; 3827305						
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	OSHA data include sample type and exposure type. Sample times also provided.	
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	OSHA data do not address variability or uncertainty	
Overall Quality Determination ^{\dagger}			Medium		1.8		

* MWF = Metric Weighting Factor

Source Citation:OType of Data SourceOHero ID38	SHA. 201 ccupation 327305	17. Chemical Exposure Health I nal Exposure; Monitoring Data;	Data (CEH)	D) provid	led by (OSHA to EPA.			
EXTRACTION Parameter	EXTRACTION Parameter			Data					
Life Cycle Stage: Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity: Type of Sampling:			Use vapor Inhalation ND - 2.52 ppm 19 6 short-term measurements and full-shift All Other Miscellaneous Fabricated Metal Product Manufacturing; Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers; Regulation, Licensing, and Inspection of Mis- cellaneous Commercial Sectors; Reupholstery and Furniture Repair; Sign Manufacturing personal and area						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability M	y letric 1:	Methodology	High	× 1	1	OSHA and state inspectors are expected to use OSHA or NIOSH sampling methods. Samples sent to the OSHA SLTC are expected to be analyzed using OSHA or NIOSH analytical methods.			
Domain 2: Represent	tative								
M	letric 2:	Geographic Scope	High	$\times 1$	1	Data collected in the United States			
М	letric 3:	Applicability	Medium	$\times 2$	4	These conditions of use are unknown but likely fall within the scope			
Μ	letric 4:	Temporal Representativeness	High	$\times 2$	2	Samples collected in 2011 to 2019. Data are less than 10 years old.			
M	letric 5:	Sample Size	High	× 1	1	Individual measurements are provided so the sample sets can be fully statistically characterized.			
		Con	tinued on 1	next page	9				

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Source Citation: Type of Data Source Hero ID	OSHA. 2017. Chemical Exposure Health Data (CEHD) provided by OSHA to EPA. Occupational Exposure; Monitoring Data; 3827305						
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	OSHA data include sample type and exposure type. Sample times also provided.	
Domain 4: Variability and Uncertainty							
	Meerie 7.	Metadata Completeness	LOW	~ 1	0	OSHA data do not address variability of uncertainty	
Overall Quality D	High		1.6				

Source Citation:OSHA. 20Type of Data SourceOccupatioHero ID3827305	17. Chemical Exposure Health I nal Exposure; Monitoring Data;	Data (CEH)	D) provid	led by (OSHA to EPA.	
EXTRACTION						
Parameter		Data				
Life Cycle Stage:		Use				
Life Cycle Description (Subca	ategory of Use):	Printing				
Physical Form:		vapor				
Route of Exposure:		Inhalation	n			
Exposure Concentration (Uni	it):	ND (5 same)	mples); 0	.2637 pj	pm	
Number of Samples:		6				
Number of Sites:		2				
Type of Measurement or Met	hod:	short-terr	n	(5		
Worker Activity:		Commerc	ial Printi	ing (Exe	cept Screen and Books)	
Type of Sampling:		personal				
EVALUATION						
Domain	Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Beliability						
Metric 1	Methodology	High	× 1	1	OSHA and state inspectors are expected to use OSHA or	
			~ ±	-	NIOSH sampling methods. Samples sent to the OSHA SLTC	
					are expected to be analyzed using OSHA or NIOSH analytical	
					methods.	
Domain 2: Representative						
Metric 2:	Geographic Scope	High	$\times 1$	1	Data collected in the United States	
Metric 3:	Applicability	High	$\times 2$	2	This occupational condition of use is in scope	
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Samples collected in 2000 to 2001. Data are more than 10 years	
					old but not more than 20 years old.	
Metric 5:	Sample Size	High	$\times 1$	1	Individual measurements are provided so the sample sets can be fully statistically characterized.	
Domain 3: Accessibility/Clar	ity					
Domain J. Autosolomity/Olarity Matric 6: Matadata Completaness Modium v 1 2 OSUA has been been					OSHA data include sample type and exposure type. Sample	
	Metadata Completeness	Mculum	~ 1	2	times also provided.	
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Source Citation: Type of Data Source Hero ID	OSHA. 2017. Chemical Exposure Health Data (CEHD) provided by OSHA to EPA. Occupational Exposure; Monitoring Data; 3827305						
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 4: Variab	Low	× 1	3	OSHA data do not address variability or uncertainty			
Overall Quality Determination ^{\dagger}			High		1.6		

Source Citation:OSHA. 20Type of Data SourceOccupatioHero ID3827305	17. Chemical Exposure Health I nal Exposure; Monitoring Data;	Data (CEH)	D) prović	led by (OSHA to EPA.			
EXTRACTION		Data						
Farameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Subc	ategory of Use):	Electronic	cs					
Physical Form:		vapor						
Route of Exposure:		Inhalation						
Exposure Concentration (Uni	it):	0.37 - 13.	84 ppm					
Number of Samples:	,	4						
Number of Sites:		1						
Type of Measurement or Met	thod:	Full-shift						
Worker Activity:		Capacitor	r, Resisto	r, Coil,	Transformer, and Other Inductor Mfg.			
Type of Sampling:		personal						
EVALUATION								
Domain	Metric	Rating	MWF^*	Score	Comments			
Domain I: Reliability	Matha dala mu	TT:l.	1	1				
Metric 1:	Methodology	Hign	X I	1	OSHA and state inspectors are expected to use OSHA or NIOSH sampling methods. Samples sent to the OSHA SLTC are expected to be analyzed using OSHA or NIOSH analytical methods.			
Domain 2. Representative								
Metric 2:	Geographic Scope	High	× 1	1	Data collected in the United States			
Metric 3:	Applicability	High	$\times 2$	2	This occupational condition of use is in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	Samples collected in 2007. Data are not more than 10 years old (measured from start of project, 2016).			
Metric 5:	Sample Size	High	$\times 1$	1	Individual measurements are provided so the sample sets can be fully statistically characterized.			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	OSHA data include sample type and exposure type. Sample times also provided.			
Continued on next page								

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Source Citation: Type of Data Source Hero ID	OSHA. 2017. Chemical Exposure Health Data (CEHD) provided by OSHA to EPA. Occupational Exposure; Monitoring Data; 3827305						
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 4: Variab	Low	$\times 1$	3	OSHA data do not address variability or uncertainty			
Overall Quality Determination ^{\dagger}			High		1.3		

Source Citation:OSHA. 20Type of Data SourceOccupatioHero ID3827305	17. Chemical Exposure Health I nal Exposure; Monitoring Data;	Data (CEH)	D) provic	led by (JSHA to EPA.					
EXTRACTION										
Parameter		Data								
Life Cycle Stage:	Life Cycle Stage:			Use						
Life Cycle Description (Subca	ategory of Use):	Electroni	cs							
Physical Form:		vapor								
Route of Exposure:		Inhalation	n							
Exposure Concentration (Uni	it):	ND								
Number of Samples:		1								
Number of Sites:	, ,	1								
Worker Activity	thod:	Short-terr	n measur	ements	nd Mfr					
Turne of Sempling		Dare Fill		unt Doar	iu mig					
Type of Sampling.		personal								
EVALUATION										
Domain	Metric	Rating	MWF^{\star}	Score	Comments					
Domain 1: Reliability										
Motrie 1:	Mathadalogy	High	× 1	1	OSHA and state inspectors are expected to use OSHA or					
methe 1.	wethodology	mgn	~ 1	T	NIOSH sampling methods. Samples sent to the OSHA SLTC					
					are expected to be analyzed using OSHA or NIOSH analytical					
					methods.					
Domain 2: Representative										
Metric 2:	Geographic Scope	High	$\times 1$	1	Data collected in the United States					
Metric 3:	Applicability	High	$\times 2$	2	This occupational condition of use is in scope					
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Samples collected in 2000. Data are more than 10 years old but not more than 20 years old.					
Metric 5:	Sample Size	High	$\times 1$	1	Individual measurements are provided so the sample sets can be fully statistically characterized.					
Domain 3: Accessibility/Clar	ity									
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	OSHA data include sample type and exposure type. Sample times also provided.					
	Cor	ntinued on 1	next page	<u> </u>						

					10	
Source Citation: Type of Data Source Hero ID	OSHA. 201 Occupation 3827305	17. Chemical Exposure Health nal Exposure; Monitoring Data	Data (CEH)	D) provid	led by (DSHA to EPA.
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 4: Variab	oility and Ur Metric 7:	acertainty Metadata Completeness	Low	× 1	3	OSHA data do not address variability or uncertainty
Overall Quality Determination ^{\dagger}		High		1.6		

EXTRACTION					
Parameter		Data			
		TT			
Life Cycle Stage:	for the second of the second sec	Use Electronic			
Dire Cycle Description (Subca	itegory of Use):	Electronic	:s		
Physical Form:		Vapor			
Function Concentration (Uni	+).	ND	1		
Exposure Concentration (On	t):				
Number of Sites:		อ 1			
Tump of Mosquement or Met	had	I showt town	n moogur	omonto	and full shift
Worker Activity:	noa.	Somicond	n measur	d Rolate	and Tun-shift
Tupo of Sampling:		personal	uctor and	1 melate	ed Device mig.
Type of Sampling.		personar			
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Baliability					
Metric 1	Methodology	High	× 1	1	OSHA and state inspectors are expected to use OSHA of
	income deregy		·· -	-	NIOSH sampling methods. Samples sent to the OSHA SLT
					are expected to be analyzed using OSHA or NIOSH analytica methods.
Domain 2: Representative	Geometric Second	II:l.	1	1	
Metric 2: Matria 2:	Applicability	High High	× 1 × 2	1	Data collected in the United States
Metric 5:	Town and Depresentativeness	Madium	× Z	2	This occupational condition of use is in scope
Metric 4:	Temporal Representativeness	Medium	× 2	4	not more than 20 years old (measured from start of project 2016).
Metric 5:	Sample Size	High	$\times 1$	1	Individual measurements are provided so the sample sets ca be fully statistically characterized.
Domain 3: Accossibility/Clar	ity				
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	OSHA data include sample type and exposure type. Sample
	I I I I I I I I I I I I I I I I I I I				times also provided

					1.9.	
Source Citation: Type of Data Source Hero ID	OSHA. 201 Occupation 3827305	17. Chemical Exposure Health nal Exposure; Monitoring Data	Data (CEH)	D) provid	led by C	DSHA to EPA.
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 4: Variab	ility and Ur Metric 7:	certainty Metadata Completeness	Low	× 1	3	OSHA data do not address variability or uncertainty
Overall Quality Determination ^{\dagger}		High		1.6		

Parameter Data Life Cycle Stage: Life Cycle Description (Subcategory of Use): Cleaning Physical Form: Route of Exposure: Inhalation Cleaning Physical Form: Exposure Concentration (Unit): 0.153, 0.203, 0.59 ppm Number of Samples: 3 Number of Samples: 3 Number of Samples: 1 Type of Measurement or Method: short-term measurements Worker Activity: Janitorial Services Type of Sampling: personal EVALUATION Metric Domain Metric Rating MWF* Score Comments NIOSH sampling methods. Samples sent to the OSHA SI are conjected to be analyzed using OSHA or NIOSH analytic methods. Domain 1: Reliability Metric 1: Methodology Metric 2: Geographic Scope High × 1 1 Metric 2: Geographic Scope High × 2 6 Metric 5: Sample Size Low 2 This occupational condition of use is in scope Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity	EXTRACTION					
Life Cycle Stage: Use Life Cycle Description (Subcategory of Use): Cleaning Physical Form: vapor Route of Exposure: Inhalation Exposure Concentration (Unit): 0.153, 0.203, 0.59 ppm Number of Samples: 3 Number of Samples: 3 Number of Sites: 1 Type of Measurement or Method: short-term measurements Worker Activity: Janitorial Services Type of Sampling: personal Pomain Metric Rating MWF* Score Comments Metric 1: Methodology High × 1 1 OshiA and state inspectors are expected to use OSHA NIOSH sampling methods. Samples sent to the OSHA SI are expected to be analyzed using OSHA or NIOSH analyt methods. Domain 1: Reliability Metric 2: Geographic Scope High × 1 1 Data collected in the United States Metric 3: Applicability High × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 4: Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of High <t< th=""><th>Parameter</th><th></th><th>Data</th><th></th><th></th><th></th></t<>	Parameter		Data			
Life Cycle Description (Subcategory of Use): Cleaning Physical Form: vapor Route of Exposure: Inhalation Exposure Concentration (Unit): 0.153, 0.203, 0.59 ppm Number of Samples: 3 Number of Sites: 1 Type of Measurement or Method: short-term measurements Worker Activity: Janitorial Services Type of Sampling: personal EVALUATION Domain 1: Reliability Metric 1: Methodology High × 1 1 Metric 2: Geographic Scope Metric 2: Geographic Scope Metric 4: Temporal Representativeness Metric 5: Sample Size Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Sam			TT			
Decycle Description (Subcategory of Use): Cleaning Physical Form: vapor Route of Exposure: Inhalation Exposure Concentration (Unit): 0.153, 0.203, 0.59 ppm Number of Samples: 3 Number of Samples: 1 Type of Measurement or Method: short-term measurements Worker Activity: Janitorial Services Type of Sampling: personal EVALUATION Domain 1: Reliability Metric 1: Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology High × 1 1 Domain 2: Representative Metric 3: Applicability High × 1 1 Data collected in the United States Metric 3: Applicability High × 1 1 Data collected in 1992. Data are more than 20 years of Metric 5: Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized.	Life Cycle Stage:		Use			
Paysical rollin: vapor Route of Exposure: Inhalation Exposure Concentration (Unit): 0.153, 0.203, 0.59 ppm Number of Samples: 3 Number of Sites: 1 Type of Measurement or Method: short-term measurements Worker Activity: Janitorial Services Type of Sampling: personal EVALUATION Domain Domain 1: Reliability Metric 1: Metric 1: Methodology High × 1 1 OSHA and state inspectors are expected to use OSHA SI are expected to analyzed using OSHA or NIOSH analyt methods. Domain 2: Representative High × 1 1 Metric 2: Geographic Scope High × 1 1 Metric 3: Applicability High × 2 2 Metric 4: Temporal Representativeness Low × 2 6 Samples Collected in 1992. Data are more than 20 years of high Metric 5: Sample Size High × 1 1 Individual measurementensare provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata	Dire Cycle Description (Subca	itegory of Use):	Cleaning			
Initiation Initiation Exposure Concentration (Unit): 0.153, 0.203, 0.59 ppm Number of Samples: 3 Number of Sites: 1 Type of Measurement or Method: short-term measurements Worker Activity: Janitorial Services Type of Sampling: personal EVALUATION Personal Domain 1: Reliability Metric 1: Metric 1: Methodology High × 1 1 OSHA and state inspectors are expected to use OSHA MIOSH sampling methods. Samples sent to the OSHA SI are expected to be analyzed using OSHA or NIOSH analyt methods. Domain 2: Representative Metric 2: Geographic Scope Metric 4: Temporal Representativeness Metric 4: Temporal Representativeness Metric 5: Sample Size High × 1 1 Domain 3: Accessibility/Clarity Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Medium × 1 2 OSHA data include sample type and exposure type. Samples	Physical Form. Route of Exposure:		Inhalation	2		
Number of Samples: 3 Number of Samples: 3 Number of Samples: 1 Type of Measurement or Method: short-term measurements Worker Activity: Janitorial Services Type of Sampling: personal EVALUATION personal Domain Metric Retric 1: Methodology High × 1 1 OSHA and state inspectors are expected to use OSHA NIOSH sampling methods. Samples sent to the OSHA SI are expected to be analyzed using OSHA or NIOSH analyte methods. Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size High × 1 1 Domain 3: Accessibility/Clarity Metric 6: Metric 6: Metric 6: Medium × 1 2 OSHA data include sample type and exposure type. Samples Sample sende type. Sample type.	Exposure Concentration (Uni	+).	0.153.0.2	1 03 0 50 1	nnm	
Number of Sites: 1 Type of Measurement or Method: short-term measurements Worker Activity: Janitorial Services Type of Sampling: personal EVALUATION Domain Domain 1: Reliability Metric Metric 1: Methodology High × 1 1 OSHA and state inspectors are expected to use OSHA NIOSH sampling methods. Domain 2: Representative High × 1 1 Metric 2: Geographic Scope High × 2 2 Metric 3: Applicability High × 2 2 Metric 4: Temporal Representativeness Low × 2 6 Samples collected in the United States Metric 5: Sample Size High × 1 1 Domain 3: Accessibility/Clarity Metric 6: Medium × 1 2 OSHA data include sample type and exposure type. Sample sciection for the sample sets be fully statistically characterized.	Number of Samples:		3	05, 0.55	ppm	
Type of Measurement or Method: short-term measurements Worker Activity: Janitorial Services Type of Sampling: personal EVALUATION Domain Metric 1: Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology High × 1 1 OSHA and state inspectors are expected to use OSHA NIOSH sampling methods. Samples sent to the OSHA SI are expected to be analyzed using OSHA or NIOSH analyt methods. Domain 2: Representative Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size High × 1 1 Domain 3: Accessibility/Clarity Metric 6: Metric 6: Metric 6: Medium × 1 2 OSHA data include sample type and exposure type. Samples Sample sample type and exposure type. Sample sample type and exposure type. Samples	Number of Sites:		1			
Worker Activity: Type of Sampling: Janitorial Services personal EVALUATION Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Metric 1: Methodology High × 1 1 OSHA and state inspectors are expected to use OSHA NIOSH sampling methods. Samples sent to the OSHA SI are expected to be analyzed using OSHA or NIOSH analyt methods. Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability High × 1 1 Data collected in the United States Metric 5: Sample Size Metric 5: Sample Size Low × 2 Metric 5: Sample Size High × 1 1 Domain 3: Accessibility/Clarity Metric 6: Medium × 1 2 OSHA data include sample type and exposure type. Sample scolected in the sample type and exposure type. Sample scolected in the sample type and exposure type. Sample scolected in the sample type and exposure type. Sample scolected in the sample type and exposure type. Sample scolected in the sample type and exposure type. Sample scolected in the sample type and exposure type. Sample scolected in the sample type and exposure type. Sample scolected in the sample type and exposure type. Sample scolecte	Type of Measurement or Met	hod:	short-tern	n measur	ements	
Type of Sampling: personal EVALUATION Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology High × 1 1 OSHA and state inspectors are expected to use OSHA NIOSH sampling methods. Samples sent to the OSHA SI are expected to be analyzed using OSHA or NIOSH analyt methods. Domain 2: Representative Metric 2: Geographic Scope High × 1 1 Data collected in the United States Metric 3: Applicability High × 2 2 This occupational condition of use is in scope Metric 5: Sample Size Low × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 5: Domain 3: Accessibility/Clarity High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Medium × 1 2 OSHA data include sample type and exposure type. Sam	Worker Activity:		Janitorial	Services		
EVALUATION Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: OSHA and state inspectors are expected to use OSHA NIOSH sampling methods. Samples sent to the OSHA SI are expected to be analyzed using OSHA or NIOSH analytemethods. Domain 2: Representative Metric 2: Geographic Scope High × 1 1 Data collected in the United States Metric 3: Applicability High × 2 2 This occupational condition of use is in scope Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Samples	Type of Sampling:		personal			
EVALUATION Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology High × 1 1 OSHA and state inspectors are expected to use OSHA NIOSH sampling methods. Samples sent to the OSHA and state inspectors are expected to use OSHA NIOSH sampling methods. Samples sent to the OSHA and yr methods. Domain 2: Representative Metric 2: Geographic Scope High × 1 1 Data collected in the United States Metric 3: Applicability High × 2 2 This occupational condition of use is in scope Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Sam						
Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology High × 1 1 OSHA and state inspectors are expected to use OSHA NIOSH sampling methods. Samples sent to the OSHA SI are expected to be analyzed using OSHA or NIOSH analyt methods. Domain 2: Representative Metric 2: Geographic Scope High × 1 1 Data collected in the United States Metric 3: Applicability High × 2 2 This occupational condition of use is in scope Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of thigh Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Medium × 1 2 OSHA data include sample type and exposure type. Sam	EVALUATION					
Domain 1: Reliability Metric 1: Methodology High × 1 1 OSHA and state inspectors are expected to use OSHA NIOSH sampling methods. Samples sent to the OSHA SI are expected to be analyzed using OSHA or NIOSH analyt methods. Domain 2: Representative Metric 2: Geographic Scope High × 1 1 Data collected in the United States Metric 3: Applicability High × 2 2 This occupational condition of use is in scope Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Sam	Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Rehability Metric 1: Methodology High × 1 1 OSHA and state inspectors are expected to use OSHA NIOSH sampling methods. Samples sent to the OSHA SI are expected to be analyzed using OSHA or NIOSH analyt methods. Domain 2: Representative Metric 2: Geographic Scope High × 1 1 Data collected in the United States Metric 3: Applicability High × 2 2 This occupational condition of use is in scope Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Samples sample type	Demoir 1. Delishiliter					
Image: A final state in st	Motric 1:	Mathadalagy	High	~ 1	1	OSUA and state inspectors are supported to use OSUA as
are expected to be analyzed using OSHA or NIOSH analyt methods. Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability High × 1 1 Data collected in the United States Metric 3: Applicability High × 2 2 Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Sam	Weblie 1.	Wiethodology	mgn	~ 1	1	NIOSH sampling methods. Samples sent to the OSHA SLTC
Domain 2: Representative Metric 2: Geographic Scope High × 1 1 Data collected in the United States Metric 3: Applicability High × 2 2 This occupational condition of use is in scope Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Sam						are expected to be analyzed using OSHA or NIOSH analytical methods.
Domain 2: Representative Metric 2: Geographic Scope High × 1 1 Data collected in the United States Metric 3: Applicability High × 2 2 This occupational condition of use is in scope Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Sam						incenous.
Metric 2: Geographic Scope High × 1 1 Data collected in the United States Metric 3: Applicability High × 2 2 This occupational condition of use is in scope Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Sample	Domain 2: Representative					
Metric 3: Applicability High × 2 2 This occupational condition of use is in scope Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Sam	Metric 2:	Geographic Scope	High	$\times 1$	1	Data collected in the United States
Metric 4: Temporal Representativeness Low × 2 6 Samples collected in 1992. Data are more than 20 years of Metric 5: Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Sample	Metric 3:	Applicability	High	$\times 2$	2	This occupational condition of use is in scope
Metric 5: Sample Size High × 1 1 Individual measurements are provided so the sample sets be fully statistically characterized. Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium × 1 2 OSHA data include sample type and exposure type. Sam	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Samples collected in 1992. Data are more than 20 years old.
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Medium $\times 1$ 2 OSHA data include sample type and exposure type. Sam	Metric 5:	Sample Size	High	× 1	1	Individual measurements are provided so the sample sets can be fully statistically characterized.
Metric 6: Metadata Completeness Medium $ imes 1$ 2 OSHA data include sample type and exposure type. Sam	Domain 3: Accessibility/Clari	ity				
times also provided.	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	OSHA data include sample type and exposure type. Sample times also provided.
	-	-				

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* MWF = Metric Weighting Factor

Source Citation:OSHA. 20Type of Data SourceOccupatioHero ID3827305	17. Chemical Exposure Health I nal Exposure; Monitoring Data;	Data (CEHD) pr	ovided by	y OSHA	to EPA.
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Uso			
Life Cycle Description (Subc	aterory of Use).	Pesticides			
Physical Form:	itegory of ese).	vapor			
Boute of Exposure:		Inhalation			
Exposure Concentration (Uni	t):	ND			
Number of Samples:		2			
Number of Sites:		1			
Type of Measurement or Met	hod:	short-term mea	asuremen	its	
Worker Activity:		Exterminating	and Pest	t Contro	ol Services
Type of Sampling:		personal			
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	OSHA and state inspectors are expected to use OSHA or NIOSH sampling methods. Samples sent to the OSHA SLTC are expected to be analyzed using OSHA or NIOSH analytical methods.
Domain 2: Representative	Coorrentie Seene	Himb	~ 1	1	
Metric 2: Motria 3:	Applicability	Ilgii Unaccontable	$\times 1$	1	Data collected in the United States
Metric 3.	Tomporal Representativeness	Low	$^{\wedge 2}$	6	Samples collected in 1988. Data are more than 20 years old
Metric 4. Metric 5:	Sample Size	High	$\times 1^{\times 2}$	1	Individual measurements are provided so the sample sets can
	T	0			be fully statistically characterized.
Domain 2: Accessibility/Clar	:+				
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	OSHA data include sample type and exposure type. Sample times also provided.
Domain 4: Variability and U	ncertainty				
	(Continued on nex	t page		

			-			
Source Citation: Type of Data Source Hero ID	OSHA. 201 Occupation 3827305	7. Chemical Exposure Health and Exposure; Monitoring Data;	Data (CEHD) pr	ovided by	y OSHA	to EPA.
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	OSHA data do not address variability or uncertainty
Overall Quality D	Determination	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.4.

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

Source Citation:	FUJIFILM Holdings America Corporation. 2020. FUJIFILM comments for docket ID # EPA-HQ-OPPT-2019-0236 for CASRN 872-50-4, n-methylpyrrolidone (NMP).										
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 6592030										
EXTRACTION											
Parameter			Data								
Life Cycle Stage:			Processir	o							
Life Cycle Descrir	otion (Subca	tegory of Use):	Formulat	ion into s	solutions	s for electronics industry					
Physical Form:	(24500		vapor	1011 11100 1	oracion	for electronice maasery					
Route of Exposure	e:		Inhalatio	n							
Exposure Concent	tration (Uni	t):	ND (14 s	amples).	0.23 ppi	m, 0.86 ppm					
Number of Sample	es:	,	16	1 //		, . .					
Number of Sites:			1								
Type of Measuren	ment or Met	hod:	full-shift	measurer	nents						
Worker Activity:			Lab tech	nician (ar	nalytical	l work) and tote filling					
Type of Sampling	:		personal	personal							
Engineering Contr	rol & percer	at Exposure Reduction:	Enclosed	Enclosed processes. Hood. LEV.							
PPE:			PPE required - the gloves in use are Showa brand $#3416$: neoprene-								
			coated, 1	5-mil thi	ckness,	and 14-inch gauntlet cuff with interlock knit					
		lining. Safety glasses. Chemical hygiene training on a scheduled basis									
			and use of PPE are a requisite condition of employment and prior to								
			first use o	of NMP a	and all o	other chemicals in the facility.					
EVALUATION											
Domain		Metric	Rating	MWF*	Score	Comments					
Domain 1. Roliah	ilitar										
Domain 1. Renad	Metric 1.	Methodology	Low	× 1	3	Sampling or analytical methodology is not specified					
	Meetic 1.	Methodology	LOW	× 1	0	Sampling of analytical methodology is not specified.					
Domain 2: Repres	sentative										
	Metric 2:	Geographic Scope	High	$\times 1$	1	Data collected in the United States					
	Metric 3:	Applicability	High	$\times 2$	2	This occupational condition of use is in scope					
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Samples collected in 2019. Data are less than 10 years old.					
	Metric 5:	Sample Size	High	$\times 1$	1	Individual measurements are provided so the sample sets can be fully statistically characterized.					
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Source Citation:	FUJIFILM CASRN 87	I Holdings America Corporat 72-50-4, n-methylpyrrolidone (ion. 2020. 1 NMP).	FUJIFIL	M com	ments for docket ID $\#$ EPA-HQ-OPPT-2019-0236 for
Type of Data Source	Occupation	nal Exposure; Monitoring Dat	a;			
Hero ID	6592030	1 / U	,			
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Medium	$\times 1$	2	These data include sample type and exposure type. Sample times also provided.
Domain 4: Varial	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	These data do not address variability or uncertainty
Overall Quality I	Determinatio	\mathbf{n}^{\dagger}	High		1.6	

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	LICM. 2020. Comment on docket no. I for n-methylpyrrolidone (NMP). Occupational Exposure; Monitoring D 6592033	EPA-HQ-OPPT-2019-0236, Toxic Substances Control Act (TSCA) draft risk evaluatio ata;
EXTRACTION	0002000	
Parameter		Data
Life Cycle Stage:		Use
Life Cycle Descri	ption (Subcategory of Use):	Electronics manufacturing - Lithium Ion Battery
Physical Form:		vapor
Route of Exposu	re:	Inhalation
Exposure Concer	ntration (Unit):	ND - 9.8 ppm
Number of Samp	les:	22
Number of Sites:		2
Type of Measure	ment or Method:	full-shift measurements (8-hour TWA)
Worker Activity:		cathode coating; cathode mixing; cleaning; fill room; maintenance; mix room; research and development
Type of Sampling	g.	personal
Exposure Durati	on:	Total exposure would be on the order of minutes rather than hours
Engineering Com	for a percent Exposure Reduction.	environment and closed pipe systems are used for NMP transfer. Dry room design to prevent absorption of water. All NMP tanks with the exception of the slurry tanks, are equipped with a nitrogen blanketing system as a measure to protect the quality of the NMP.
PPE:		Full coverage PPE. NMP-resistant butyl rubber gloves. Personnel work- ing in mixing and coating areas receive extensive training regarding the processes and proper PPE. Additional PPE is provided for work that will involve contact or potential contact with NMP and includes chemical re- sistant suits, respirators, and chemical resistant gloves, depending on the task performed. These workers are required to wear full body chemical resistant suit with booties/shoe covers. The equipment includes a PAPR and hood with organic/acid gas + HEPA cartridge coverage. Gloves are required, typically double latex for limited contact with NMP. Butyl gloves are required when contact with NMP is expected. (pg. 15-16)
EVALUATION	Motuie	Poting MWEt Score Commerts
Domain	Metric	nating www.r. Score Comments
		Continued on next page

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Source Citation:	tion: LICM. 2020. Comment on docket no. EPA-HQ-OPPT-2019-0236, Toxic Substances Control Act (TSCA) draft risk evaluation for n-methylpyrrolidone (NMP).								
Type of Data Source	Occupation	nal Exposure; Monitoring Data;							
Hero ID	6592033	1 / 0 /							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	Low	$\times 1$	3	Sampling or analytical methodology is not specified.			
Damain 9. Damas									
Domain 2: Repres	sentative		*** 1						
	Metric 2:	Geographic Scope	High	$\times 1$	1	Data collected in the United States			
	Metric 3:	Applicability	High	$\times 2$	2	This occupational condition of use is in scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Samples collected in 2011 to 2019. Data are less than 10 years old.			
	Metric 5:	Sample Size	High	$\times 1$	1	Individual measurements are provided so the sample sets can be fully statistically characterized.			
Domain 3: Access	ibility/Clar	ity							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	These data include sample type and exposure type. Sample times also provided.			
Domain 4: Variab	ility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	These data do not address variability or uncertainty			
			TT:l.		1.0				
Overall Quality D	eterminatio	11 '	nign		1.0				

Source Citation:	EaglePicher Technologies, LLC. 2020. Comments of EaglePicher Technologies, LLC on the draft TSCA risk evaluation of n-methylpyrrolidone (NMP): EPA"HQ"OPPT-2019-0236.									
Type of Data Source Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 6592029									
EXTRACTION Parameter	Data									
Life Cycle Stage:										
Life Cycle Descrip Worker Activity:	Life Cycle Description (Subcategory of Use): Worker Activity:		Electronic At no tim tact with	cs manuf ie do any NMP. E	acturing [·] EagleF mployee	g - Lithium Ion Battery Picher employees come into direct dermal con- es infrequently work with NMP, as our batch				
Exposure Duration: Engineering Control & percent Exposure Reduction:			manufact include m total time Blending system. A	uring pro iixing, tra e for all a and appl After coat	ansfer the activities ication of the constant	ly occurs periodically. Activities with NMP he blended binder mix and clean a small tank. s combined is less than 2.5 hours of coating (containing NMP) occurs in a closed e parts are dried in an oven (NMP evaporates)				
PPE:			with a ca Protective exposure, an assigned dermal co	pture sys e clothing respirato ed protec ntact.	tem tha g, gloves ors, and tion fact	at vents all the emissions outside. specifically designed to protect against NMP goggles/face-shields. employees wear PPE with tor (APF) of 1,000 that precludes in-halation or				
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Information from manufacturer of lithium ion batteries. No bias /errors evident.				
Domain 9. Doma	antatina									
Domain 2: Repres	Motric 2	Geographic Scope	High	$\times 1$	1	IIG				
	Metric 3:	Applicability	High	$\times 1$ $\times 2$	2	This occupational condition of use is in scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2					
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type				
Domain 3: Access	ibility/Clari	ity								
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Source Citation:	EaglePicher Technologies, LLC. 2020. Comments of EaglePicher Technologies, LLC on the draft TSCA risk evaluation of n-methylpyrrolidone (NMP): EPA"HQ"OPPT-2019-0236.							
Type of Data Source Hero ID	Occupation 6592029	Cupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 592029						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty		
Overall Quality I	Determinatio	n^\dagger	High		1.4			

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Source Citation:	EaglePicher Technologies, LLC. 2020. Conference call with EaglePicher Technologies on n-methylpyrrolidone. EPA-HQ- OPPT-2016-0743-0113										
Type of Data Source Hero ID	Occupatio 6592024	nal Exposure; Reports for D	ata or Informa	tion Othe	r than	Exposure or Release Data;					
EXTRACTION Parameter			Data								
Life Cycle Stage: Life Cycle Descrip Exposure Concent Worker Activity: Exposure Duration Exposure Frequence Engineering Contr PPE:	Parameter Life Cycle Stage: Life Cycle Description (Subcategory of Use): Exposure Concentration (Unit): Worker Activity: Exposure Duration: Exposure Frequency: Engineering Control & percent Exposure Reduction: PPE:			Use Electronics manufacturing - Lithium Ion Battery Direct hand/skin contact does not occur. Cathode slurry mixing. Maintenance - equipment cleaning and repair. Small container unloading: 1-gallon containers (only applicable to small sites). NMP unloading at large sites is done by the vendor. Drum han- dling - for some small scale operations, waste disposal includes pouring small quantities of residual into closed 50-gallon drum 30 mins (mixing); 4 hours (Maintenance); 30 mins (small container un- loading); 1 hour (drum handling) 250 day/yr (mixing); infrequent - few times/year (maintenance); infre- quent - couple weeks per year (drum handling) Small sites: NMP containers are opened and mixed under an engineering hood. Large sites: enclosed process. Fume hoods, fume extractors, jigs. Mixing: Light Tyvek, Safety glasses, Nitrile gloves, Safety shoes, Surgical mask, Hairnet and bump cap. Donning procedures and rooms with training. //Maintenance: Heavy Tyvek /or aprons, PAPR or respirator /goggles, Heavy butyl gloves over lighter gloves, Safety shoes. Donning procedures and rooms with training. //Small container: Goggles /face shield, Butyl gloves over nitrile, Aprons. Donning procedures and rooms							
EVALUATION						_					
Domain		Metric	Rating	MWF*	Score	Comments					
Domain 1: Reliabi	lity Metric 1:	Methodology	Medium	× 1	2	Information is from a manufacturer. No bias /errors evident					
Domain 2: Repres	entative Metric 2:	Geographic Scope	High	$\times 1$	1	US					
			Continued on 1	next page							

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Source Citation:	EaglePiche OPPT-201	EaglePicher Technologies, LLC. 2020. Conference call with EaglePicher Technologies on n-methylpyrrolidone. EPA-HQ-OPPT-2016-0743-0113.							
Type of Data Source Here ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 6502024								
	0092024								
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	Metric 3:	Applicability	High	$\times 2$	2	This occupational condition of use is in scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Exposure duration provided as single value. Uncertain statis- tics and uncertain if representative.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP			
Domain 4: Variab	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty			
Overall Quality Determination [†]		High		1.4					

* MWF = Metric Weighting Factor

Source Citation: EaglePicher Technologies, LLC. 2020. OPPT-2016-0743-0113.	EaglePicher Technologies, LLC. 2020. Conference call with EaglePicher Technologies on n-methylpyrrolidone. EPA-HQ- OPPT-2016-0743-0113.							
Type of Data SourceOccupational Exposure; Reports for DataHero ID6592024	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 6592024							
EXTRACTION Parameter	Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Exposure Concentration (Unit): Worker Activity: Exposure Frequency: PPE:	Use Electroni No poten Small sea intermitt For slurry glasses, H PAPR (F of hair ne	cs manuf tial for d led conta ent 7 materia Hair net, Powered 2 et, beard	acturing ermal c iners. I ls: Tyve beard n Air Puri net and	g - Lithium Ion Battery ontact due to PPE usage. Drums. ek Suit, Protective Gloves, Shoe Covers, Safety net and face mask. When powders involved: ifying Respirator) with a HEPA filter instead I face mask. Are trained on proper glove use.				
EVALUATION Domain Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliability Metric 1: Methodology	Medium	× 1	2	Information is from a manufacturer. No bias /errors evident				
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness	High High N/A High Low	$ \begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \end{array} \\ \times 1 \\ \times 1 \end{array} $	1 2 N/A 1	US This occupational condition of use is in scope 2020 This metric is not applicable to this data type Information provided is firsthand information from industrial user(s) of NMP Does not address variability or uncertainty				
				been not address variability of anericality				
Overall Quality Determination'	High ontinued on a	next page	1.4					

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Source Citation:	EaglePicher Technologies, LLC. 2020. OPPT-2016-0743-0113.	Conference ca	all with	EaglePicher	Technologies on n-methylpyrrolidone.	EPA-HQ-
Type of Data Source Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 6592024					
EVALUATION						
Domain	Metric	Rating	MWF^{\star}	Score	Comments	

Source Citation:	LICM. 2020. Supplemental NMP infor Manufacturers. EPA-HQ-OPPT-2016-	rmation to document PPE protection for submission to docket from Lithium Ion Cell 0743-0116.
Type of Data Source Hero ID	Occupational Exposure; Reports for D 6592044	ata or Information Other than Exposure or Release Data;
EXTRACTION Parameter		Data
Life Cycle Stage:		Use
Life Cycle Descri	ption (Subcategory of Use):	Electronics manufacturing - Lithium Ion Battery
Exposure Concer	ntration (Unit):	There is no actual exposure to NMP during any of these tasks due to engineering controls and PPE.
Worker Activity:		Container Handling, Small Containers - including manual transfers and mixing preparation //Container Handling, Drums - loading waste material into drums //Batch mixing; Batch coating and drying // Maintenance activities //occupational non-user exposures - NMP used in secured area. Process and safety checks and walk-throughs occur.
Exposure Durati	on:	30 - 60 mins/day (small containers) //30 - 60 mins/month (drums) //2- 6 hours/day (small operations); 12-hr shifts (large operations) (mixing) //60 mins/month (maintenance; ONUs)
Exposure Freque Engineering Con	ncy: trol & percent Exposure Reduction:	daily (small containers, mixing); monthly (drums, maintenance, ONUs) Small operations: Closed systems, some process piping, ventilation con- trols. //Large operations: Fully automated systems - closed reactors, process piping, ventilation controls, manufacturing one or few types of cells. Semi-automated systems - same as above but greater operational flexibility needed, manufacturing different cell types. //Additional con- trols provided for each activity.
PPE:		Small operations: Latex (no expected exposure; PPE to prevent product contamination). Safety glasses, lab coat, and surgical mask. //Large operations: Fully automated systems - nitrile (no expected exposure; PPE to prevent product contamination). Light Tyvek, safety glasses, safety shoes, surgical mask, hairnet, and bump cap. Semi-automated systems - butyl over latex or nitrile (no expected exposure; PPE to prevent product contamination). PAPR with hood and organic vapor/ acid gas/HEPA combination cartridge. //Additional PPE provided for each activity.
EVALUATION		
		Continued on next page

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Source Citation: LICM. 2020. Supplemental NMP information to document PPE protection for submission to docket from Lithium Ion Cell Manufacturers. EPA-HQ-OPPT-2016-0743-0116.									
Type of Data Source Hero ID	Occupation 6592044	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 6592044							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident			
Domain 2: Representative									
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	This occupational condition of use is in scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Exposure duration provided as single value or range. Uncertain statistics and uncertain if representative.			
Domain 3: Access	sibility/Clari	ity							
2 011111 01 110000	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP			
Domain 4: Variah	vility and Ur	ocertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.4				

 * MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Isaacs, D. 2017. Comment submitted b Occupational Exposure; Monitoring Da 3986801	oy David Isaac ata;	s, Semic	conducto	or Industry Association (SIA).			
EXTRACTION Parameter		Data						
Life Cycle Stage: Life Cycle Descrip Physical Form: Route of Exposure Exposure Concent Number of Sample Number of Sites: Type of Measurem Worker Activity: Type of Sampling	Use Electronics semiconductors Vapor Inhalation Same monitoring data as 5161295 118.0 14.0 Full shift TWA (8 or 12 hours) Same activities as 5161295 (described further on page 6). Personal							
Exposure Duratio Exposure Frequen Engineering Contr PPE:	n: cy: rol & percent Exposure Reduction:	 Personal Same as 5161295; Fab operators and technicians typically work in the fab 10.5 hours of a 12-hour shift. Same as 5161295; Waste truck loading (follow-up on 5161295): 1/yr The fabrication of semiconductors is conducted in specialized buildings known as "fabs" that involve the use of cleanrooms, and a hierarchy of design features that isolate workers and the product wafers from chemicals and contaminants. Exhaust ventilation. Modern highvolume manufacturing fabs use enclosed, interlocked, ventilated, and automated manufacturing equipment (tools) which separate employees from the product wafer and process chemicals. Fab workers wear cleanroom garments (cleanroom suit with hood and boots), gloves, and safety glasses (see Figure 2) which provide ?98 percent skin coverage. Activity-specific PPE same as 5161295. Workers have appropriate training, including on donning and doffing gloves. 						
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1: Methodology	High	× 1	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			

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Source Citation: Type of Data Source Hero ID	Isaacs, D. 2017. Comment submitted by David Isaacs, Semiconductor Industry Association (SIA). Occupational Exposure; Monitoring Data; 3986801							
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2018		
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data points provided		
Domain 3: Access	bility/Clari	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Raw data provided and is well-described by metadata		
Domain 4: Variability and Uncertainty								
	Metric 7:	Metadata Completeness	High	$\times 1$	1	well characterized		
Overall Quality Determination [†]		High		1.0				

Source Citation:	Intel Corporation. 2019. Intel comments to: Science Advisory Committee on Chemicals (SACC) on the draft Toxic Substances Control Act (TSCA) risk evaluation for N-Methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0037.							
Type of Data Source Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 6592026							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Worker Activity: PPE:			Use Electronic vapor, liq Inhalation container Chemical is potenti Chemical scribes P quired, w	cs semico juid n, derma change o resistan al for sk Resistan PE train hat PPE	onductor l out, main t PPE : in conta nt Gowr ing rece c is requi	rs is always required for any tasks where there act. PPE includes Chemical Resistant Gloves, a, Chemical Goggles, Face Shield. Source de- ived by employees, including when PPE is re- ired, and proper donning and doffing.		
EVALUATION Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	Information is from a manufacturer. No bias /errors evident		
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size		High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US This occupational condition of use is in scope 2019 This metric is not applicable to this data type			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP		
Domain 4: Variab	Dility and Un Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty		
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Source Citation:	Intel Corporation. 2019. Intel comments to: Science Advisory Committee on Chemicals (SACC) on the draft Toxic Substances Control Act (TSCA) risk evaluation for N-Methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0037.							
Type of Data Source Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 6592026							
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Overall Quality D	$\operatorname{Petermination}^\dagger$	High		1.4				

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Source Citation:	Intel Corporation. 2020. Comments of Intel to the United States Environmental Protection Agency on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone. EPA-HQ-OPPT-2019-0236-0064.								
Hero ID	Occupational Exposure; Monitoring Data; 6592034								
EXTRACTION Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Description (Subcategory of Use):			Electronics semiconductors						
Physical Form:			Vapor						
Route of Exposure:			Inhalation						
Exposure Concentration (Unit):			Same monitoring data as 5161295						
Engineering Control & percent Exposure Reduction: PPE:			Engineering controls include the use of bulk chemical delivery to reduce manual handling of chemical containers, lockout/tagout to turn off bulk chemical supplies prior to equipment maintenance, flushing of filters and housing prior to work, integrated local ventilation exhaust on manufac- turing equipment, liquid leak detection systems, use of ventilated parts clean sinks or hoods for parts cleaning, and emergency machine off sys- tems. The current PPE required is: MAPA8 Trionic 514+ (or equivalent) chemical resistant gloves3, chemical resistant gowns, and eye and face						
Analytic Method:			NIOSH 1302; OSHA PV2043						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	Sampling or analytical methodology is an approved OSHA or NIOSH method			
Domain 2. Representative									
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2018			
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data points provided			
Continued on next page									
– continued from previous page									
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Source Citation:	Intel Corp Substances	Intel Corporation. 2020. Comments of Intel to the United States Environmental Protection Agency on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone. EPA-HQ-OPPT-2019-0236-0064.							
Type of Data Source Hero ID	Occupation 6592034	Occupational Exposure; Monitoring Data; 6592034							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness			High	$\times 1$	1	Raw data provided and is well-described by metadata			
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty			
Overall Quality Determination ^{\dagger}			High		1.2				

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Source Citation:	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052.								
Type of Data Source Hero ID	Occupation 6592032	nal Exposure; Completed Expos	ure or Risk	Assessm	ients;				
EXTRACTION			_						
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	otion (Subca	ategory of Use):	Electroni	cs semico	nductor	rs			
Physical Form:			vapor, liq	uid					
Route of Exposur	e:		Inhalation	n, derma	1				
Exposure Concent	tration (Uni	t):	Air conce	ntration:	0.511 n	ng/m3 (central tendency); 0.613 mg/m3 (High-			
			end) Derr	nal surfa	ce area:	24.08 cm2 (male) and 20.03 cm2 (female) (cen-			
			dormal lo	ency); 80. ading: 0	25 cm^2 7 mg/c	(male) and bb. (5 cm2 (female) (high-end) Daily			
			end)	aung. 0	7 mg/c	mz (central tendency) and 2.1 mg/cmz (mgn-			
Type of Measurement or Method:			PBPK model inputs						
Worker Activity:			container handling, small containers						
Exposure Duratio	on:		Dermal exposure duration: 0.33 hrs (central tendency); 1 hour (high-						
			end) Task durations as low as 5 to 10 minutes						
Exposure Frequer	ncy:		3 days/week over 50 weeks/yr (central tendency); 4 days/week over 50						
DDF.			weeks/yr (high-end) Clause with Protection Factor of 20 Additional information on time of						
PPE:			Gloves with Protection Factor of 20. Additional information on type of PPF used and employee training						
				and cm	pioyee t	rannig.			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Roliab	ilitar								
Domain 1. Renad	Metric 1:	Methodology	Medium	× 1	2	Assessment uses data from member companies of trade associ-			
		Mittingeology	mearann	~ 1	-	ation. Information does not indicate flaws or quality issues.			
Danain 9. Dana									
Domain 2: Repres	Motric 2	Geographic Scope	High	~ 1	1	IIG			
	Metric 3.	Applicability	High	$ \times 2 $	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	$\frac{2}{2}$	2020			
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Source Citation:	Semicondu Toxic Subs	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Foxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052.								
Hero ID	6592032	3592032								
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
	Metric 5:	Sample Size	Medium	$\times 1$	2	Inputs characterized as central tendency and high-end. Un- clear if these inputs are representative of all semiconductor manufacturing sites.				
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.				
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.				
Overall Quality E	Determinatio	\mathbf{n}^{\dagger}	High		1.2					

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Source Citation:	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052.							
Type of Data Source Hero ID	Occupation 6592032	nal Exposure; Completed Expos	ure or Risk	Assessm	ents;			
EXTRACTION								
Parameter			Data					
Life Cruele Sterrer			Use					
Life Cycle Stage:	tion (Subce	togory of Uso).	Use Electronic	e somico	nductor			
Physical Form	Subca	tegory of ese).	vapor lig	uid	nuuctoi	.5		
Boute of Exposure	e.		Inhalation	ulu dermal				
Exposure Concent	tration (Uni	t):	Air concer	tration:	0.013 n	ng/m3 (central tendency): 1.557 mg/m3 (High-		
p		-)-	end)Derm	al surfac	e area:	24.08 cm2 (male) and 20.03 cm2 (female) (cen-		
			traltende	ncy); 80.	$25\mathrm{cm}2$	(male) and 66.75 cm2 (female) (high-end)Daily		
			dermal los	ading: 0.	7 mg/cm	m2 (central tendency) and 2.1 mg/cm2 (high-		
			end)					
Type of Measurement or Method:			PBPK me	odel inpu	ts			
Worker Activity:			container	handling	, drums	5		
Exposure Duratio	n:		dermal exposure duration: 0.33 hrs (central tendency); 1 hour (high-end)					
Exposure Frequen	icy:		3 days/week over 50 weeks/yr (central tendency); 4 days/week over 50					
DDE			weeks/yr (nign-end)					
PPE:			Gloves with Protection Factor of 20. Additional information on type of					
			PPE used and employee training.					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	_							
Domain 1: Reliab	ility				0			
	Metric 1:	Methodology	Medium	$\times 1$	2	Assessment uses data from member companies of trade associ- ation. Information does not indicate flaws or quality issues		
						ation. mormation does not indicate naws of quarty issues.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020		
	Metric 5:	Sample Size	$ \begin{array}{ccc} \widetilde{\text{Medium}} \times 1 & 2 & \text{Inputs characterized as central tendency and high-end. Unclear if these inputs are representative of all semiconductor manufacturing sites.} \end{array} $					
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Source Citation:	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052.								
Type of Data Source Hero ID	Occupation 6592032	Occupational Exposure; Completed Exposure or Risk Assessments; 6592032							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 3: Accessibility/Clarity									
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.			
Domain 4. Varial	ility and U	acontainte							
Domani 4. Variat	Metric 7:	Metadata Completeness	High	$\times 1$	1	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.			
Overall Quality I	Determinatio	\mathbf{n}^{\dagger}	High		1.2				

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* MWF = Metric Weighting Factor

Source Citation:	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052. Occupational Exposure: Completed Exposure or Bisk Assessments:									
Hero ID	6592032	iai Exposure, completed Expos	ure of fusk	10505511						
EXTRACTION Parameter			Data							
Life Charle Sterrey			T.							
Life Cycle Stage: Life Cycle Description (Subsetences of Use).			Use Electronic	e somico	nductor					
Physical Form		tegory of Use).	vapor lia	uid	nauctor	.5				
Route of Exposure	e:		Inhalatio	n. derma						
Exposure Concent	ration (Uni	t):	Air conce	ntration:	0.139 n	ng/m3 (central tendency); 0.409 mg/m3 (High-				
Ĩ	× ×	,	end)Dern	al surfac	e area:	0 cm^2 (male and femal, central tendency and				
			high-end)			• • • •				
Type of Measurement or Method:			PBPK m	odel inpu	its					
Worker Activity:			typical fa	b worker						
Exposure Duration	n:		0 hrs of dermal exposure							
Exposure Frequen	cy:		3 days/week over 50 weeks/yr (central tendency); 4 days/week over 50							
PPE:			Gloves with Protection Factor of 20. Additional information on type of PPE used and employee training.							
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliab	ility									
	Metric 1:	Methodology	Medium	$\times 1$	2	Assessment uses data from member companies of trade associ- ation. Information does not indicate flaws or quality issues.				
Domain 2: Repres	sentative									
2 sintani =. 10prot	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	In scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020				
	Metric 5:	Sample Size	Medium	× 1	2	Inputs characterized as central tendency and high-end. Un- clear if these inputs are representative of all semiconductor manufacturing sites.				
Domain 3: Access	ibility/Clari	ty								

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Source Citation: Type of Data Source	Semicondu Toxic Sub Occupatio	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052. Occupational Exposure; Completed Exposure or Risk Assessments;							
Hero ID	6592032								
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.			
Domain 4: Varial	bility and Un Metric 7:	ncertainty Metadata Completeness	High	× 1	1	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.			
Overall Quality Determination ^{\dagger}			High		1.2				

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Source Citation:	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052.								
Hero ID	6592032	nai Exposure; Completed Expos	ure or filsk	Assessin	ents;				
EXTRACTION									
Parameter			Data						
Life Cycle Stare:			Uso						
Life Cycle Descrir	otion (Subca	tegory of Use):	Electronic	rs semico	nductor	'S			
Physical Form:	Stion (Subee	legely of ese).	vapor, lig	uid	inductor				
Route of Exposure	e:		Inhalatior	n. dermal					
Exposure Concent	tration (Uni	t):	Air concer	tration:	0.139 n	ng/m3 (central tendency): 0.409 mg/m3 (High-			
I			end)Derm	al surfac	e area:	24.08 cm2 (male) and 20.03 cm2 (female) (cen-			
			tral tende	ncy); 80.	$25\mathrm{cm}2$	(male) and 66.75 cm2 (female) (high-end)Daily			
			dermal lo	ading: 0.	7 mg/cm	m2 (central tendency) and 2.1 mg/cm2 (high-			
			end)						
Type of Measurement or Method:			PBPK model inputs						
Worker Activity:			fab worke	tab worker with NMP container changeout					
Exposure Duratio	on:		dermal exposure duration: 0.33 hrs (central tendency); 1 hour (high-end)						
Exposure Frequen	ncy:		o days/week over 50 weeks/yr (central tendency); 4 days/week over 50						
DDE			weeks/yr (nign-end) Clause with Distortion Factor of 20 Additional information of the state						
PPE:			Gloves with Protection Factor of 20. Additional information on type of						
			PPE used and employee training.						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility				0				
	Metric 1:	Methodology	Medium	$\times 1$	2	Assessment uses data from member companies of trade associ- ation. Information does not indicate flaws or quality issues.			
Domain 2: Repres	sentative								
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020			
	Metric 5:	Sample Size							
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Source Citation:	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052.								
Type of Data Source Hero ID	Occupation 6592032	Occupational Exposure; Completed Exposure or Risk Assessments; 6592032							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 3: Accessibility/Clarity									
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.			
Domain 4. Varial	ility and U	acontainte							
Domani 4. Variat	Metric 7:	Metadata Completeness	High	$\times 1$	1	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.			
Overall Quality I	Determinatio	\mathbf{n}^{\dagger}	High		1.2				

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* MWF = Metric Weighting Factor

Source Citation: Type of Data Source	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052. Occupational Exposure; Completed Exposure or Risk Assessments; 6592032							
	0592052							
Parameter			Data					
Life Cycle Stage:	(0.1		Use					
Life Cycle Descrip	ption (Subca	tegory of Use):	Electronic	s semico	onductor	'S		
Physical Form:			vapor, nq Inhalation	uia domeso	1			
Exposure Concorr	e: tration (Uni	+).	Air concor	i, derma	ו 1 ח חיז חיי	ag/m2 (control tondonow): 0.606 mg/m2 (High		
Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Exposure Duration: Exposure Frequency: PPE:			Air concentration: 0.020 mg/m3 (central tendency); 0.696 mg/m3 (High- end)Dermal surface area: 267.50 cm2 (male) and 222.50 cm2 (female) (central tendency); 374.50 cm2 (male) and 311.50 cm2 (female) (high- end)Daily dermal loading: 0.7 mg/cm2 (central tendency) and 2.1 mg/ cm2 (high-end) PBPK model inputs maintenance dermal exposure duration: 0.33 hrs (central tendency); 1 hour (high-end) 3 days/week over 50 weeks/yr (central tendency); 4 days/week over 50 weeks/yr (high-end) Gloves with Protection Factor of 20. Additional information on type of PPE used and employee training.					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	Assessment uses data from member companies of trade associ- ation. Information does not indicate flaws or quality issues.		
						1		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020		
	Metric 5:	Sample Size	Medium	× 1	2	Inputs characterized as central tendency and high-end. Un- clear if these inputs are representative of all semiconductor manufacturing sites.		
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Source Citation:	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052.								
Type of Data Source Hero ID	Occupation 6592032	Occupational Exposure; Completed Exposure or Risk Assessments; 6592032							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 3: Accessibility/Clarity									
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.			
Domain 4. Varial	ility and U	acontainte							
Domani 4. Variat	Metric 7:	Metadata Completeness	High	$\times 1$	1	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.			
Overall Quality I	Determinatio	\mathbf{n}^{\dagger}	High		1.2				

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* MWF = Metric Weighting Factor

Source Citation: Type of Data Source	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052. Occupational Exposure; Completed Exposure or Risk Assessments;									
Hero ID	6592032									
EXTRACTION Parameter			Data							
Life Cruele Starrey			Use							
Life Cycle Stage.			Electronic	e somico	nductor	ro				
Physical Form:			vapor lia	uid	nuucto	15				
Route of Exposure	· ·		Inhalation	ulu derma						
Koute of Exposure: Exposure Concentration (Unit):		Air concentration: 4.822 mg/m3 (central tendency); 4.822 mg/m3 (High- end)Dermal surface area: 80.25 cm2 (male) and 66.75 cm2 (female) (central tendency); 267.50 cm2 (male) and 22.50 cm2 (female) (high- end)Daily dermal loading: 0.7 mg/cm2 (central tendency) and 2.1 mg/ cm2 (high-end)								
Type of Measurement or Method:			PBPK model inputs							
Worker Activity:			virgin NN	IP truck	unload	ing				
Exposure Duration	1:		dermal exposure duration: 0.55 nrs (central tendency); 1 nour (nign-end)							
Exposure Frequence	cy:		I day/we	ek over 1	week/y	yr (central tendency and high-end)				
PPE:			PPE used and employee training							
			1 2 aboa and omprojoo vammg.							
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Beliabi	lity									
	Metric 1:	Methodology	Medium	$\times 1$	2	Assessment uses data from member companies of trade associ- ation. Information does not indicate flaws or quality issues.				
Domain 9. Domag	ontotino									
Domain 2: Represe	Motric 2.	Geographic Scope	High	$\vee 1$	1	IIC				
	Metric 2.	Applicability	High	~ 1 ~ 2	2					
	Metric 4 ·	Temporal Representativeness	High	$\times 2^{-2}$	2	2020				
	Metric 5:	Sample Size	Medium	$\times 1$	2	Inputs characterized as central tendency and high-end. Un- clear if these inputs are representative of all semiconductor manufacturing sites.				
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Source Citation:	Semicondu Toxic Subs	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052.							
Type of Data Source	Occupation	nal Exposure; Completed Expo	osure or Risk	Assessm	ents;				
Hero ID	6592032								
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.			
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.			
Overall Quality I	Determinatio	\mathbf{n}^{\dagger}	High		1.2				

ntinued fro

Source Citation: Type of Data Source	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052. Occupational Exposure; Completed Exposure or Risk Assessments;									
Hero ID	6592032	ö592032								
EXTRACTION Parameter			Data							
Life Cruele Sterrey			Ugo							
Life Cycle Stage:	tion (Subco	togony of Uso).	Use	s somico	nductor	20				
Physical Form:	Subca	tregory of Use).	vapor lig	id senned	nuuctor	5				
Route of Exposure	• •		Inhalation	ulu dermal						
Exposure Concent	ration (Uni	t).	Air concer	ntration.	0 715 m	ng/m3 (central tendency): 0 715 mg/m3 (High-				
Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Exposure Duration: Exposure Frequency: PPE:			Air concentration: 0.715 mg/m3 (central tendency); 0.715 mg/m3 (High- end)Dermal surface area: 80.25 cm2 (male) and 66.75 cm2 (female) (central tendency); 267.50 cm2 (male) and 22.50 cm2 (female) (high- end)Daily dermal loading: 0.7 mg/cm2 (central tendency) and 2.1 mg/ cm2 (high-end) PBPK model inputs waste truck loading dermal exposure duration: 0.33 hrs (central tendency); 1 hour (high-end) 1 day/week over 12 weeks/yr (central tendency); 1 day/week over 17.3 weeks/yr (high-end) Gloves with Protection Factor of 20. Additional information on type of PPE used and employee training.							
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Assessment uses data from member companies of trade associ- ation. Information does not indicate flaws or quality issues.				
						X U				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	In scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020				
	Metric 5:	Sample Size	Medium	× 1	2	Inputs characterized as central tendency and high-end. Un- clear if these inputs are representative of all semiconductor manufacturing sites.				
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- continued from previous page									
Source Citation:	ccc Citation: Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052.								
Type of Data Source Hero ID	Occupation 6592032	Occupational Exposure; Completed Exposure or Risk Assessments; 3592032							
EVALUATION	EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 3: Access	sibility/Clar	itv							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.			
Domain 4. Varial	ility and U	acontainte							
Domani 4. Variat	Metric 7:	Metadata Completeness	High	$\times 1$	1	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.			
Overall Quality Determination [†] High 1.2									

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* MWF = Metric Weighting Factor

Source Citation: Hach Company n-methylpyrrol	Hach Company. 2020. Hach's comments regarding the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP), EPA docket EPA-HQ-OPPT-2019-0236.								
Type of Data SourceOccupational FHero ID6592027	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 6592027								
EXTRACTION Parameter		Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity:		Processing Formulation In small-scale incorporation of NMP into a mixture, NMP is transferred from hand-held containers, such as a 1-gallon container, to the mixing vessel. Fewer than 10 gallons per day of NMP are handled.							
PPE:		Workers are required to wear the following personal protective equip- ment: gloves (laminate film, latex at least 20 mil thickness, or butyl at least 20 mil thickness); safety glasses for operations in fume hood, or splash goggles; fume hood or half-face or full-face respirator.							
EVALUATION									
Domain	Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliability Metric 1: Me	ethodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident				
Domain 2: Representative Metric 2: Ge	pographic Scope	High	$\times 1$	1	IIS				
Metric 3: Ap	oplicability	High	$\times 2$	2	This occupational condition of use is in scope				
Metric 4: Ter	emporal Representativeness	High	$\times 2$	2	2020				
Metric 5: Sat	mple Size	N/A		N/A	This metric is not applicable to this data type				
Domain 3: Accessibility/Clarity									
Metric 6: Me	etadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial $user(s)$ of NMP				
Domain 4: Variability and Uncert	tainty								
Metric 7: Me	etadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty				
Overall Quality Determination ^{\dagger}		High		1.4					
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Source Citation:	Hach Company. 2020. Hach's comments regarding the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP), EPA docket EPA-HQ-OPPT-2019-0236.							
Type of Data Source Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 6592027							
EVALUATION								
Domain	Metric Rating MWF [*] Score Comments							

Electrical Manufacturers Associa nal Exposure; Reports for Data	tion. 2020. or Informat	NMP us tion Othe	e in ma er than	ignet wire. EPA-HQ-OPPT-2019-0236-0047. Exposure or Release Data;		
	Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity: Engineering Control & percent Exposure Reduction:		Use Electronics - magnet wires Magnet wire coating. Equipment cleaning. The polymer applicator and curing oven are completely enclosed and there is no human exposure to NMP during this process. This process is also completely enclosed while equipment is cleaned.				
	Human extension equilation equilatication equilation equilation equilation equilation eq	xposure t uipment	o NMP such as	' is controlled through the use of personal pro- s gloves, aprons and goggles.		
Metric	Rating	MWF^{\star}	Score	Comments		
Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident		
Geographic Scope	High	$\times 1$	1	US		
Applicability	High	$\times 2$	2	This occupational condition of use is in scope		
Temporal Representativeness	High	$\times 2$	2	2020		
Sample Size	N/A		N/A	This metric is not applicable to this data type		
ita						
Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial $user(s)$ of NMP		
ncontaint						
Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty		
n^\dagger	High		1.4			
	Electrical Manufacturers Associa nal Exposure; Reports for Data ategory of Use): nt Exposure Reduction: Metric Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness ncertainty Metadata Completeness n [†]	Electrical Manufacturers Association. 2020. nal Exposure; Reports for Data or Informat Data ategory of Use): Use Electronic Magnet w nt Exposure Reduction: The polynthere is n is also con Metric Rating Methodology Medium Geographic Scope High Applicability High Sample Size N/A ity Metadata Completeness High necertainty Metadata Completeness Low n [†] High High	Electrical Manufacturers Association. 2020. NMP us nal Exposure; Reports for Data or Information Othe ategory of Use): Use Electronics - magn Magnet wire coati The polymer appl there is no human is also completely Human exposure t tection equipment Metric Rating Methodology Medium × 1 Geographic Scope High × 1 Applicability High × 2 Temporal Representativeness High × 2 Sample Size N/A ity Metadata Completeness High × 1 necertainty Low × 1 m [†] High × 1	Electrical Manufacturers Association. 2020. NMP use in manal Exposure; Reports for Data or Information Other than $\begin{array}{cccccccccccccccccccccccccccccccccccc$		

Source Citation: Type of Data Source Hero ID	ACA. 2020. American Coatings Association submittal to NMP docket: EPA-HQ-2016-0743. Occupational Exposure; Monitoring Data; 6592043								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity: Number of Workers: Type of Sampling: Exposure Duration: Engineering Control & percent Exposure Reduction: PPE: Analytic Method:		Processing Formulation of paint vapor inhalation <0.091 ppm 1.0 1.0 TWA Paint formulation - Employee working in WB small batch loading to 504. Worked at solvent bath SR1 for < 10 min washing a wand. 1.0 personal sample time: 375 mins (6.25 hours) Local Exhaust and General Exhaust Nitrile and Hyflex Gloves, Safety Glasses, Goggles, Nomex protective clothing Sample method: SO-3, GC-FID NIOSH 1550							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	Sampling methodology is an approved NIOSH method			
Domain 2: Repres	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 2\\ 3\end{array}$	US This occupational condition of use is in scope 2018 One sample result provided. Distribution of samples is un- known.			
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Source Citation: Type of Data Source Hero ID	ACA. 2020. American Coatings Association submittal to NMP docket: EPA-HQ-2016-0743. Occupational Exposure; Monitoring Data; 6592043						
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	Medium	× 1	2	Monitoring data include same type, exposure type, and du- ration. Data do not include exposure duration, exposure frequency, or detailed worker activities.	
Domain 4: Variab	oility and Ur	ncertainty					
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty	
Overall Quality Determination ^{\dagger}		High		1.6			

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* MWF = Metric Weighting Factor

Source Citation:	LICM. 2020. Supplemental NMP info Manufacturers. EPA-HQ-OPPT-2016-	ormation to document PPE protection for submission to docket from Lithium Ion Cel 0743-0116.						
Hero ID	Occupational Exposure; Reports for D 6592044	Jata or Information Other than Exposure or Release Data;						
EXTRACTION		Deta						
1 di dilletei		Data						
Life Cycle Stage:		Use						
Life Cycle Descri	ption (Subcategory of Use):	Electronics - lithium ion battery						
Worker Activity:		For small operations, NMP is received in one-gallon containers that are securely stored until they are carefully transferred to the mixing room. In some circumstances, small operators perform a controlled transfer from a small bottle of waste containing NMP into a 55-gallon drum, using an industrial-grade funnel with a sealable lid and spill containment. In other circumstances, small operators place sealed small bottles into a 55-gallon drum. The drums are then torqued to seal them and taken on a drum dolly to a secure storage location until a third-party vendor loads the drums onto a truck for disposal.						
Engineering Cont	rol & percent Exposure Reduction:	Extensive engineering controls exist within large operations to prevent worker contact with NMP and NMP-containing slurry.						
PPE:		The selection of protective glove materials is based on the recommenda- tions of leading glove manufacturers. Workers are trained in PPE usage. Instruction in PPE is augmented by signage in the workplace, dedicated stations to don PPE, and the use of mixing air showers before entry into secured production areas. Information on NMP breakthrough times for various gloves and PPE training materials are provided.						
EVALUATION								
Domain	Metric	Rating MWF* Score Comments						
Domain 1. Paliak	sility.							
Domain 1. Reliat	Metric 1: Methodology	Medium $\times 1$ 2 Information is from a manufacturer. No bias /errors evident						

Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident			
Domain 2: Representative Metric 2: Metric 3: Metric 4:	Geographic Scope Applicability Temporal Representativeness	High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$\begin{array}{c} 1 \\ 2 \\ 2 \end{array}$	US This occupational condition of use is in scope 2020			
Continued on next page								

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LICM. 2020. Supplemental NMP information to document PPE protection for submission to docket from Lithium Ion Cell Manufacturers. EPA-HQ-OPPT-2016-0743-0116.									
Occupation 6592044	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 6592044								
	Metric	Rating	MWF^{\star}	Score	Comments				
Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type				
sibility/Clar	ity								
Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP $$				
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Low X				3	Does not address variability or uncertainty				
	1				v v				
Determinatio	\mathbf{n}^{\dagger}	High		1.4					
	LICM. 202 Manufactu Occupation 6592044 Metric 5: sibility/Clar: Metric 6: bility and Un Metric 7: Determinatio	LICM. 2020. Supplemental NMP infor Manufacturers. EPA-HQ-OPPT-2016-C Occupational Exposure; Reports for Da 6592044 Metric Metric 5: Sample Size sibility/Clarity Metric 6: Metadata Completeness bility and Uncertainty Metric 7: Metadata Completeness	LICM. 2020. Supplemental NMP information to doc Manufacturers. EPA-HQ-OPPT-2016-0743-0116. Occupational Exposure; Reports for Data or Informa 6592044 Metric Rating Metric 5: Sample Size N/A sibility/Clarity Metric 6: Metadata Completeness High bility and Uncertainty Metric 7: Metadata Completeness Low Determination [†] High	LICM. 2020. Supplemental NMP information to document Pl Manufacturers. EPA-HQ-OPPT-2016-0743-0116. Occupational Exposure; Reports for Data or Information Othe 6592044 Metric Rating Metric 5: Sample Size N/A sibility/Clarity Metric 6: Metadata Completeness High × 1 Determination [†] High	Continued from provide page LICM. 2020. Supplemental NMP information to document PPE prof Manufacturers. EPA-HQ-OPPT-2016-0743-0116. Occupational Exposure; Reports for Data or Information Other than 6592044 Metric Rating Metric 5: Sample Size N/A N/A sibility/Clarity Metric 6: Metric 7: Metadata Completeness High 1.4				

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 \star MWF = Metric Weighting Factor

Facility

Source Citation:CoType of Data SourceFaHero ID28'	 Cory, N. J 2002. An update on environmental constraints. American Leather Chemists Association. Journal. Facility; Reports for Data or Information Other than Exposure or Release Data; 2874538 								
EXTRACTION Parameter	XTRACTION Parameter								
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Polymer solvent; leather finishing NMP is used as a solvent for urethane polymerization. It is found in residual concentrations in polyurethane coatings used for leather finishing. NMP has been found in auto leather at concentrations up to averaging 3,000 mg/kg. Studies on boot leather have demonstrated significantly-lower NMP concentrations ranging from 200 to 600 mg/kg.						
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability Me	, etric 1:	Methodology	Low	$\times 1$	3	The data, data sources, and/or techniques used in the assess- ment or report are not specified.			
Domain 2: Representa Me Me Me Me	ative etric 2: etric 3: etric 4: etric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 4\\ 3\end{array}$	US In scope 2002 Characterized by no statistics			
Domain 3: Accessibili Me	ity/Clari etric 6:	ty Metadata Completeness	Unacceptable	$\times 1$	4	Assessment or report does not document its data sources, as- sessment methods, and assumptions.			
Domain 4: Variability Me	v and Un etric 7:	certainty Metadata Completeness	Low	× 1	3	The report does not address variability or uncertainty.			
Overall Quality Deter	rmination	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.2.			
		C	Continued on nex	t page					

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Source Citation: Type of Data Source Hero ID	Cory, N. J 2002. An update on environmentation Facility; Reports for Data or Information 2874538	mental constraints Other than Expo	. Americ sure or R	an Leath telease D	er Chemists Association. Journal. ata;			
EVALUATION								
Domain	Metric Rating MWF^{\star} Score Comments							

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

Source Citation:	Solomon, G. M., Morse, E. P., Garbo, M. J., Milton, D. K. 1996. Stillbirth after occupational exposure to N-methyl-2- pyrrolidone: A case report and review of the literature. Journal of Occupational and Environmental Medicine.								
Hero ID	3043623	3043623							
EXTRACTION Parameter	Data								
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Batch Size:				Use Laboratory NMP used to dissolve solid samples (negative photoresist), which is an- alyzed in atomic absorption spectrophotometers, and discarded as Haz waste. NMP first poured from 5 gallon containers through an ion ex- change column for filtering before use. Custom chemical manufacturer. 1 L/day					
EVALUATION Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	Medium	$\times 1$	2	From an industry contact			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Use is in scope			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1996 - more than 20 years old			
	Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics			
Domain 3: Access	ibility/Clar	itv							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
	.1., 1.1.1								
Domain 4: Variat	\mathcal{O} and \mathcal{O}	ncertainty	TT: 1	1	1				
	Metric 7:	Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty of results			
Overall Quality D	eterminatio	n [†]	Medium		1.8				

Source Citation:Bader, M toring an OccupatiType of Data SourceFacility;Hero ID3539720	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health. Facility; Reports for Data or Information Other than Exposure or Release Data; 3539720							
EXTRACTION								
Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Adhesive formulation facility NMP was applied for the manual cleaning of mixing and stirring vessels (500 l volume) and of smaller parts such as drain valves and tools. After the mixing of the basic compounds (2 h), the vessels are emptied and the stirrers and upper parts of the mixers are cleaned manually with brushes and wiping cloths. The vessels are then disassembled and cleaned for about 30 min with brushes and cloths together with inlets, drain valves and other fittings.					
Possible Physical Form:		liquid						
Chemical Concentration:		65 percent						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	Medium	$\times 1$	2	From an industry contact			
Domain 2: Bepresentative								
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany			
Metric 3:	Applicability	High	$\times 2$	2	Use is in scope			
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006			
Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Accessibility/Cla Metric 6:	rity Metadata Completeness	High	× 1	1	Data sources are transporent			
	Metadata Completeness	111611	~ 1	Ŧ	Data sources are transparent			
Domain 4: Variability and U	Incertainty							
Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty.			
	Cor	tinued on 1	next page	9				

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Source Citation:	Bader, M.,Rosenbe toring and biomon Occupational and	Bader, M.,Rosenberger, W.,Rebe, T.,Keener, S. A.,Brock, T. H.,Hemmerling, H. J.,Wrbitzky, R. 2006. Ambient moni- toring and biomonitoring of workers exposed to N-methyl-2-pyrrolidone in an industrial facility. International Archives of Occupational and Environmental Health.							
Type of Data Source	Facility; Reports for	Facility; Reports for Data or Information Other than Exposure or Release Data;							
	3339720								
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Overall Quality I	$\operatorname{Petermination}^\dagger$		Medium		1.8				

Source Citation: Type of Data Source Hero ID	Xiaofei, E.,Wada, Y.,Nozaki, J.,Miyauchi, H.,Tanaka, S.,Seki, Y.,Koizumi, A. 2000. A linear pharmacokinetic model predicts usefulness of N-methyl-2-pyrrolidone (NMP) in plasma or urine as a biomarker for biological monitoring for NMP exposure. Journal of Occupational Health. Facility; Reports for Data or Information Other than Exposure or Release Data; 3562767							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Descript Process Description	tion (Subca n:	tegory of Use):	Use Degreasing optical lenses The lenses were washed in a room with a large washing chamber $(1 \text{ m x I} \text{ m x } 2.5 \text{ m})$. Four workers were engaged in the washing process. Fifty lenses were put in a special container basket. Workers opened a door of the chamber to dip the basket into a pool containing NMP inside the chamber. After closing the door, sonication was started to wash the lens surfaces. This washing process lasted for 5 min. After washing, the baskets were lifted from the pool and then dried outside the chamber for a couple of minutes.					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliabil	ity Metric 1:	Methodology	Medium	× 1	2	From an industry contact		
Domain 2: Represe	entative							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan		
	Metric 3:	Applicability	High	$\times 2$	2	Degreasing is in scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000		
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Accessil	bility/Clari	ty						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent		
Domain 4: Variabil	lity and Ur	cortainty						
Domanii 4. Variabii	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty.		
Continued on next page								

	- con	tinued from pre-	vious page						
Source Citation:	Xiaofei, E., Wada, Y., Nozaki, J., Miyauchi, H., Tanaka, S., Seki, Y., Koizumi, A.: 2000. A linear pharmacokinetic model predicts usefulness of N-methyl-2-pyrrolidone (NMP) in plasma or urine as a biomarker for biological monitoring for NMP exposure. Journal of Occupational Health.								
Type of Data Source	Facility; Reports for Data or Informat	ion Other than Exp	posure or Release Da	ıta;					
Hero ID	3562767	-	-	·					
EVALUATION									
Domain	Metric	Rating M	IWF [*] Score	Comments					
Overall Quality I	$\operatorname{Determination}^\dagger$	Medium	1.8						

Source Citation: Type of Data Source Hero ID	Xiaofei, E.,Wada, Y.,Nozaki, J.,Miyauchi, H.,Tanaka, S.,Seki, Y.,Koizumi, A 2000. A linear pharmacokinetic model predicts usefulness of N-methyl-2-pyrrolidone (NMP) in plasma or urine as a biomarker for biological monitoring for NMP exposure. Journal of Occupational Health. Facility; Reports for Data or Information Other than Exposure or Release Data; 3562767							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Descrip Process Descriptio	otion (Subca on:	(Subcategory of Use): Use Degreasing metal parts They put more than 100 parts in a basket, opened the cover of a tank containing NMP and dumped the basket into the tank. The lid of the container was then closed. After 30 min of soaking in NMP, the basket was lifted out and immediately transferred to a tank containing water. Some drops adhering to the parts and baskets were scattered over the floor. Other drops were carried into the water tank. NMP evaporated into the washing room air from the contaminated floor and water tank. Eight workers were engaged in this process.						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	From an industry contact		
Domain 2. Bonros	contativo							
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	× 1	2	Japan		
	Metric 3:	Applicability	High	$\times 2$	2	Degreasing is in scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000		
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	High	× 1	1	Data sources are transparent		
Domain 4: Variab	ility and Ur	ncertainty	-		-			
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty.		
Continued on next page								

	- con	tinued from pre-	vious page						
Source Citation:	Xiaofei, E., Wada, Y., Nozaki, J., Miyauchi, H., Tanaka, S., Seki, Y., Koizumi, A.: 2000. A linear pharmacokinetic model predicts usefulness of N-methyl-2-pyrrolidone (NMP) in plasma or urine as a biomarker for biological monitoring for NMP exposure. Journal of Occupational Health.								
Type of Data Source	Facility; Reports for Data or Informat	ion Other than Exp	posure or Release Da	ıta;					
Hero ID	3562767	-	-	·					
EVALUATION									
Domain	Metric	Rating M	IWF [*] Score	Comments					
Overall Quality I	$\operatorname{Determination}^\dagger$	Medium	1.8						

Source Citation:	Muenter, J., Blach, R 2010. ECOLOGICAL TECHNOLOGY: NMP-FREE LEATHER FINISHING. American Leather Chemists Association Journal								
Type of Data Source Hero ID	Facility; R 3577026	Facility; Reports for Data or Information Other than Exposure or Release Data; 3577026							
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use):		Use Coating -	polymer	ic for le	eather finishing				
Process Description	on:		NMP ease NMP infl	ed the p uences t	roduction he visco	on of binders and the application on lemher. osity and even the rheology. When NMP is			
			used in le	ather fin	ishing ε	almost 90 percent remains in the leather after			
Chemical Concentration:			0-7.1 perc	ent	iually it	eleased over a long period of time.			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1. Beliah	ility								
	Metric 1:	Methodology	Medium	$\times 1$	2	The assessment or report uses high quality data and/or tech- niques that are not from trusted sources; however, Associated information does not indicate flaws or quality issues.			
Domain 2: Ropros	contativo								
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	× 1	2	Germany			
	Metric 3:	Applicability	High	$\times 2$	2	in scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range with uncertain statistics			
Domain 3: Access	Motrie 6	Ity Matadata Completeness	Modium	× 1	0				
	Metric 0:	Metadata Completeness	Medium	× 1	2	Assessment or report clearly documents results, methods, and assumptions. Data sources are generally described but not fully transparent.			
Domain 4. Variah	ility and Ur	ocertainty							
	$ \begin{array}{ccc} \text{Metric 7:} & \text{Metadata Completeness} & \text{High} & \times 1 & 1 & \text{The report addresses variability and uncertainty in the results.} \\ & \text{Uncertainty is well characterized} \end{array} $								
Continued on next page									

	—	continued from prev	vious page	
Source Citation:	Muenter, J.,Blach, R 2010. EC Chemists Association. Journal.	COLOGICAL TECHNO	DLOGY: NMP-FI	REE LEATHER FINISHING. American Leather
Type of Data Source	Facility; Reports for Data or Infor	mation Other than Exp	osure or Release l	Data;
Hero ID	3577026			
EVALUATION				
Domain	Metric	Rating MV	WF^* Score	Comments
Overall Quality D	$\mathrm{retermination}^\dagger$	High	1.4	

Source Citation:	Lammens, T. M., Potting, J., Sanders, J. P. M., De Boer, I. J. M 2012. Environmental comparison of biobased chemicals from glutamic acid with their petrochemical equivalents. International Sugar Journal								
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3578330								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufa	cture					
Life Cycle Descrip	otion (Subca	tegory of Use):	Manufa	cturing					
Total Annual U.S	. Volume (a	nd percent of PV):	100-150	kton					
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Motrie 1.	Mathadalam	II: mh	× 1	1				
	Metric 1:	Methodology	підп	× 1	1	Information from journal articles			
Domain 2: Repres	sentative								
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Manufacturing is in scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
	Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics			
Domain 3: Access	ibility/Clar	i+							
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent			
		L.	0			*			
Domain 4: Variab	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty for this data ele- ment			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.4				

Source Citation:	Eu, 2007. Impact assessment of potential restrictions on the marketing and use of dichloromethane in paint strippers. Revised final report-Annexes						
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3808951						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Descrit	otion (Subca	ategory of Use):	Use Paint stri	pper			
Process Descriptio	on:		Paint stri blistered	ippers ar or cracke	e used ed coats	to remove various coats of paints especially s on wood both indoors and outdoors. NMP	
Chemical Concentration:			cannot be 2.5-63 per	e used for rcent	[·] polyes	ter or baked on coatings.	
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1. Deliah	:1:4						
Domain 1. Renad	Metric 1:	Methodology	High	$\times 1$	1	Trusted sources	
Domain 2: Ropros	ontativo						
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	× 1	2	OECD member states	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007	
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range with uncertain statistics	
Domain 3: Access	ibility/Clar	i+.,					
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.	
Demain 4. Mariah	:1:41 TT-						
Domain 4: Variab	Metric 7:	Metadata Completeness	High	$\times 1$	1	The report addresses variability and uncertainty in the results. Uncertainty is well characterized	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.4		

 * MWF = Metric Weighting Factor
| Source Citation: | ECHA. 20
Substance | 11. Annex XV dossier. Propo | sal for Ider | ntification | n of a S | Substance as a CMR Cat 1A or 1B, PBT, vPvB or a | | |
|--|------------------------|--|--------------------------------|-------------|-----------|--|--|--|
| Type of Data Source
Hero ID | Facility; R
3809417 | eports for Data or Information (| Other than | Exposur | e or Rel | lease Data; | | |
| EXTRACTION
Parameter | | | Data | | | | | |
| Life Cycle Stage:
Life Cycle Description (Subcategory of Use):
Process Description:
Total Annual U.S. Volume (and percent of PV): | | Processing
Chemical processing, excluding formulation (petrochemical extraction)
NMP is used in the large-scale recovery of hydrocarbons by extractive
distillation. Hydrocarbons are highly soluble in NMP and differences in
volatility are sometimes considerably increased in the presence of NMP
(BASF, 2010). NMP is used particularly because, unlike other commer-
cial solvents and extraction media, its use does not lead to the formation
of azeotropes10 and because NMP has high resistance to heat and chem-
icals. | | | | | | |
| Total Hinda Cib. | | | estimated
in the EU
t/y. | as 10 pe | al use in | f global use. If the same is true for current use
a this application could be around 1,000 -5,000 | | |
| EVALUATION | | | | | a | | | |
| Domain | | Metric | Rating | MWF'* | Score | Comments | | |
| Domain 1: Reliabi | ility
Metric 1: | Methodology | High | × 1 | 1 | ECHA | | |
| Domain 2: Repres | entative | | | | | | | |
| | Metric 2: | Geographic Scope | Medium | $\times 1$ | 2 | Europe | | |
| | Metric 3: | Applicability | High | $\times 2$ | 2 | In scope | | |
| | Metric 4: | Temporal Representativeness | High | $\times 2$ | 2 | 2011 | | |
| | Metric 5: | Sample Size | N/A | | N/A | This metric is not applicable to this data type | | |
| Domain 3: Access | ibility/Clari | ity | | | | | | |
| | Metric 6: | Metadata Completeness | High | $\times 1$ | 1 | Data sources included | | |
| Domain 4: Variab | ility and Ur | ncertainty | | | | | | |
| | | Con | tinued on r | next page | <u>)</u> | | | |

		Cont	mucu nom p	revious	page	
Source Citation:	ECHA. 20 Substance	11. Annex XV dossier. Pro of an Equivalent Level of Co	oposal for Iden oncern.	tification	of a S	ubstance as a CMR Cat 1A or 1B, PBT, vPvB or a
Type of Data Source Hero ID	Facility; R 3809417	eports for Data or Informatio	on Other than	Exposure	e or Rel	ease Data;
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type
Overall Quality I	Determinatio	n^\dagger	High		1.1	

continued from previous page

Source Citation:	ECHA. 20	11. Annex XV dossier. Propo	sal for Ider	ntification	n of a	Substance as a CMR Cat 1A or 1B, PBT, vPvB or a
Type of Data Source Hero ID	Facility; R 3809417	eports for Data or Information (ern. Other than	Exposure	e or Re	elease Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage	:		Processin	g		
Life Cycle Descr	iption (Subc	ategory of Use):	Chemical medium)	processi	ng, exc	luding formulation (pharmaceutical extraction
Process Description:		According	g to the	OECD	(2009) SIDS dossier, NMP is used as a pen-	
			etration e	enhancer	for a r	nore rapid transfer of substances through the
			skin. Us	e as a so	olvent a	and extraction medium is reported by indus-
			try (Tam	1nco, 201	0). Th	t during the propagation of pharmacouticals as
			well as be	useu as a	ont in s	some pharmaceutical products (Jouvban et al
			2010). Th	nese auth	ors stat	te that NMP is one of the main pharmaceutical
			co-solvent	ts and th	at it is	an important solvent used in the extraction,
			purification	on and cr	rystallis	sation of drugs. It is not known whether NMP
	a (is used in	this way	withir	the EU.
Total Annual U.	S. Volume (a	nd percent of PV):	No comp	rehensive	inforn	nation is available on quantities of NMP cur-
			level perc	entage si	EU in p plit of	bharmaceuticals. However, based on the global-
			the assur	ned quan	tity us	and 1000 several years ago (15 percent) and 100 and 100 methods ago (15 percent) and 100 methods ago (15 percent) and 100 met
			estimated	that per	rhaps 1	,500 to 7,500 tonnes of NMP are used in this
			applicatio	on each y	ear.	
EVALUATION						
Domain		Metric	Rating	MWF^*	Score	Comments
Domain 1. Rolia	hilita					
Domain 1. Rena	Metric 1:	Methodology	High	$\times 1$	1	ECHA
Domoin 9. Down	agamtatiwa					
Domain 2: Kepre	Motrie 2.	Geographic Scope	Medium	× 1	0	Furene
	Metric 2.	Applicability	High	$\stackrel{\wedge}{\times} \stackrel{1}{2}$	2	In scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2011

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			omennaea nem p		Page	
Source Citation:	ECHA. 20 Substance	11. Annex XV dossier. of an Equivalent Level of	Proposal for Iden Concern.	tification	of a S	Substance as a CMR Cat 1A or 1B, PBT, vPvB or a
Hero ID	3809417	eports for Data of Inform	ation Other than	Exposure	e or nei	lease Data;
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources included
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type
Overall Quality D	Peterminatio	\mathbf{n}^{\dagger}	High		1.1	

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XTRACTION Parameter		Data			Data					
Life Cycle Stage:		Manufacture								
Life Cycle Description (Subc	ategory of Use):	Manufacture								
Possible Physical Form: Chemical Concentration:		Large-scale production of NMP is predominantly carried out by reacting ?-butyrolactone with an excess of pure or aqueous methylamine in a high- pressure tube reactor (612 MPa). The reaction is exothermic and often run under adiabatic conditions with reactor temperatures in the range of 250400 "C. The resulting product mixture is decompressed and distilled. The NMP yield is normally more than 97 percent [27]. Other processes, e.g., analogous to those used for pyrrolidone synthesis can also be used, in particular hydrogenation of N-methylsuccinimide or mixtures of maleic or succinic anhydride and methylamine [28]. NMP can also be produced by hydrogenation of N-hydroxymethyl- 2-pyrrolidone (see Chap. 2) [29] or by reaction of acrylonitrile with methylamine in the presence of a peroxide radical initiator [30]. liquid NMP content, min.99.5 wt percent ; methylamine, max. 0.02 wt percent ; water, max. 0.1 wt percent								
Possible Physical Form: Chemical Concentration:		or succini by hydrog or by rea peroxide r liquid NMP com percent ; y	c anhydr genation ction of cadical in tent, min water, m	de and of N-hyd acrylon itiator .99.5 wt ax. 0.1	methylamine [28]. NMP can also be produced droxymethyl- 2-pyrrolidone (see Chap. 2) [29] itrile with methylamine in the presence of a [30]. t percent ; methylamine, max. 0.02 wt wt percent					
Possible Physical Form: Chemical Concentration: VALUATION		or succini by hydrog or by rea peroxide r liquid NMP com percent ;	c anhydr cenation ction of cadical in tent, min water, m	de and of N-hyd acrylon itiator .99.5 wt ax. 0.1	methylamine [28]. NMP can also be produced droxymethyl- 2-pyrrolidone (see Chap. 2) [29] itrile with methylamine in the presence of a [30]. t percent ; methylamine, max. 0.02 wt wt percent					
Possible Physical Form: Chemical Concentration: VALUATION Domain	Metric	or succini by hydrog or by rea peroxide r liquid NMP com percent ; • Rating	c anhydr genation ction of cadical in tent, min water, m MWF*	de and of N-hyd acrylon itiator .99.5 w ax. 0.1 Score	methylamine [28]. NMP can also be produced droxymethyl- 2-pyrrolidone (see Chap. 2) [29] itrile with methylamine in the presence of a [30]. t percent ; methylamine, max. 0.02 wt wt percent Comments					
Possible Physical Form: Chemical Concentration: VALUATION Domain Domain 1: Reliability	Metric	or succini by hydrog or by rea peroxide r liquid NMP com percent ; Rating	c anhydr genation of cadical in tent, min water, m MWF*	de and of N-hya acrylon itiator .99.5 wi ax. 0.1 Score	methylamine [28]. NMP can also be produced droxymethyl- 2-pyrrolidone (see Chap. 2) [29] itrile with methylamine in the presence of a [30]. t percent ; methylamine, max. 0.02 wt wt percent Comments					
Possible Physical Form: Chemical Concentration: VALUATION Domain Domain 1: Reliability Metric 1:	Metric	or succini by hydrog or by rea peroxide r liquid NMP com percent ; • Rating High	c anhydr genation of cadical in tent, min water, m MWF* × 1	de and of N-hya acrylon itiator .99.5 wr ax. 0.1 Score	methylamine [28]. NMP can also be produced droxymethyl- 2-pyrrolidone (see Chap. 2) [29] itrile with methylamine in the presence of a [30]. t percent ; methylamine, max. 0.02 wt wt percent Comments Ullmann's Encyclopedia of Industrial Chemistry					
Possible Physical Form: Chemical Concentration: VALUATION Domain Domain 1: Reliability Metric 1:	Metric	or succini by hydrog or by rea peroxide r liquid NMP com percent ; v Rating High	x anhydr genation of cadical in tent, min water, m MWF* × 1	de and of N-hyd acrylon itiator .99.5 wi ax. 0.1 Score	methylamine [28]. NMP can also be produced droxymethyl- 2-pyrrolidone (see Chap. 2) [29] itrile with methylamine in the presence of a [30]. t percent ; methylamine, max. 0.02 wt wt percent Comments Ullmann's Encyclopedia of Industrial Chemistry					
Possible Physical Form: Chemical Concentration: VALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative	Metric Methodology	or succini by hydrog or by rea peroxide r liquid NMP com percent ; • Rating High	$\frac{1}{2} \frac{1}{2} \frac{1}$	de and of N-hyd acrylon itiator .99.5 wi ax. 0.1 Score	methylamine [28]. NMP can also be produced droxymethyl- 2-pyrrolidone (see Chap. 2) [29] itrile with methylamine in the presence of a [30]. t percent ; methylamine, max. 0.02 wt wt percent Comments Ullmann's Encyclopedia of Industrial Chemistry					
Possible Physical Form: Chemical Concentration: VALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Matric 3:	Metric Methodology Geographic Scope Applicability	or succini by hydrog or by rea peroxide r liquid NMP com percent ; • Rating High Medium Higb	$ \frac{1}{2} 1$	de and of N-hyd acrylon itiator .99.5 wr ax. 0.1 Score	Methylamine [28]. NMP can also be produced droxymethyl- 2-pyrrolidone (see Chap. 2) [29] itrile with methylamine in the presence of a [30]. t percent ; methylamine, max. 0.02 wt wt percent Comments Ullmann's Encyclopedia of Industrial Chemistry					
Possible Physical Form: Chemical Concentration: VALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 3:	Metric Methodology Geographic Scope Applicability Temporal Representativeness	or succini by hydrog or by rea peroxide r liquid NMP com percent ; • Rating High High High	$\frac{1}{2} \frac{1}{2} \frac{1}$	de and of N-hydacrylon itiator .99.5 wr ax. 0.1 Score	Methylamine [28]. NMP can also be produced droxymethyl- 2-pyrrolidone (see Chap. 2) [29] itrile with methylamine in the presence of a [30]. t percent ; methylamine, max. 0.02 wt wt percent Comments Ullmann's Encyclopedia of Industrial Chemistry Germany In scope 2011					

			I		1.9	
Source Citation: Type of Data Source Hero ID	A. L. Harr Facility; R 3809424	eus, R. Backes, J. O. Eichloer eports for Data or Informatio	r, R. Feuerhak n Other than	e, C. Jak Exposure	el, U. M e or Rel	Jahn, R. Pinkos, R. Vogelsang. 2011. 2-Pyrrolidone. ease Data;
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources included
Domain 4: Variab	oility and Uı Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited information on concentration variability
		inecadata completeness	mourum	·· -	-	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.3	

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* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Nicnas,. 2 Facility; R 3809432	013. Human health Tier II assess reports for Data or Information (sment for 2 Other than	2-pyrrolid Exposure	inone, 1 e or Rel	-methyl, CAS Number 872-50-4. ease Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descrip	ption (Subca	ategory of Use):	Domestic	paint an	d varnis	sh remover
Chemical Concen	tration:		up to 100	percent		
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	oility					
	Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources
Domain 2: Repres	sentative					
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Low	$\times 2$	6	a non-occupational scenario that is similar to an occupational scenario
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2011-2017
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent
Domain 4. Variah	ility and U	ncortainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty for this data element
Overall Quality I	Determinatio	\mathbf{n}^{\dagger}	Medium		1.8	

Source Citation: Type of Data Source Hero ID	Nicnas,. 2 Facility; R 3809432	013. Human health Tier II asses eports for Data or Information (sment for 2 Other than	2-pyrrolid Exposure	inone, 1 e or Rel	-methyl, CAS Number 872-50-4. ease Data;
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Descrij Chemical Concen	ption (Subca tration:	ategory of Use):	Use Domestic 5 percent	cleaning	produc	ts
EVALUATION		Matric	Dating		C	Comments.
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	Information from trusted sources
Domain 2: Bapro	contativo					
Domani 2. Repre	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Low	$\times 2$	6	a non-occupational scenario that is similar to an occupational scenario
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2011-2017
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent
Domain 4: Varial	bility and Un Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty for this data ele- ment
Overall Quality	Determinatio	n†	Medium		1.8	

Type of Data Source Facility; C Hero ID 3809440	13. Annex XV Restriction Repo Completed Exposure or Risk Asso	rt: Propo essments;	sal for a	Restric	tion.
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subc Process Description:	ategory of Use):	Manufa Manufa The pro- containe closed sy (chargin mainter	cture cturing oduction ed withir ystems (1 ng and dia nance and	of NM 1 closed PROC1 schargir 1 cleanin /	P and associated bulk transfers and storage is systems. Processes involved are the use in -2-3), the transfer of NMP after production ng, see below under generic use), sampling and ng.
Total Annual U.S. Volume (a Number of Sites:	nd percent of PV):	60,000 8 3 US Si	30,000 to tes (2007	onnes/yr 7)	
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Information from trusted sources
Domain 2: Roprosontativo					
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe
Metric 3:	Applicability	High	$\times 2$	2	in scope
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013
Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics
Domain 3: Accessibility/Clar	ity				
Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are transparent
Domain 4: Variability and U: Metric 7:	ncertainty Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty
Overall Quality Determination	$\mathbf{p}\mathbf{n}^{\dagger}$	High		1.4	

Source Citation:Rivm,. 20Type of Data SourceFacility; CHero ID3809440	13. Annex XV Restriction Repo completed Exposure or Risk Asso	rt: Propo essments;	sal for a	Restrict	tion.
EXTRACTION					
Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subc Process Description:	ategory of Use):	Process Formula mixing such as closed s used.	ing ation in batch transfers systems.	or con s, storas In the	tinuous processes and further processing steps ge and packing. Such processes might occur in industrial setting elevated temperatures can be
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources
Domain 2: Representative					
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe
Metric 3:	Applicability	High	$\times 2$	2	in scope
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013
Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Data sources are transparent
Domain 4: Variability and U:	ncertainty Metadata Completeness	High	× 1	1	Discussion on unichility and uncertainty
	metadata Completeness	TIIBII	× 1	1	Discussion on variability and uncertainty
Overall Quality Determination	\mathbf{n}^{\dagger}	High		1.3	

Source Citation:Rivm,. 20Type of Data SourceFacility; CHero ID3809440	13. Annex XV Restriction Repo completed Exposure or Risk Asso	rt: Propo essments;	sal for a	Restric	tion.
EXTRACTION					
Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subc Process Description:	ategory of Use):	Use Petroch NMP is distillat the desu from ga	emical s used in ion. Hyd ulfurizati s streams	the larger lrocarbo on of oi s and in	ge-scale recovery of hydrocarbons by extractive ons are highly soluble in NMP. NMP is used in il products, the removal of CO2, COS and H2S n butadiene production.
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources
Domain 2: Representative					
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe
Metric 3:	Applicability	High	$\times 2$	2	in scope
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013
Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Data sources are transparent
Domain 4: Variability and U Metric 7:	ncertainty Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty
Overall Quality Determination	n^{\dagger}	High		1.3	v v

XTRACTION Parameter		Data					
Life Cycle Stage:		Use					
Life Cycle Description (Subc	ategory of Use):	Coatings, Paints, adhesive, varnish, etc.					
Process Description:		NMP is used as a solvent in a wide range of different coating products. NMP is often used in polymer based coatings, such as wire coatings. The characteristics are favorable for baked coatings that are cured at relatively high temperatures (BASF, 2010). The use in coatings may be under elevated temperatures up to 120 °C. The processes involved in the use of non-wire coatings are in general open processes involving dipping, rolling, spraying and curing/drving of the coatings					
Total Annual U.S. Volume (a	and percent of PV):	2,220-4,	280 tonn	es/yr (I	Europe)		
Chemical Concentration:	1 /	0.06 13 (paint); 13 68 (paint remover); 0.06 2 (polish); 1-10 (adhesive)					
VALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliability							
Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources		
Domain 2: Representative							
	Geographic Scope	Low	$\times 1$	3	Europe		
Metric 2:			-	0			
Metric 2: Metric 3:	Applicability	High	$\times 2$	2	in scope		
Metric 2: Metric 3: Metric 4:	Applicability Temporal Representativeness	High High	$\times 2 \times 2$	2	in scope 2013		
Metric 2: Metric 3: Metric 4: Metric 5:	Applicability Temporal Representativeness Sample Size	High High Low	$\begin{array}{c} \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\frac{2}{2}$	in scope 2013 Characterized by no statistics		
Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar	Applicability Temporal Representativeness Sample Size	High High Low	$\begin{array}{c} \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 3	in scope 2013 Characterized by no statistics		
Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6:	Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High High Low High	$\begin{array}{c} \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$ $\times \ 1$	2 2 3	in scope 2013 Characterized by no statistics Data sources are transparent		
Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6: Domain 4: Variability and U	Applicability Temporal Representativeness Sample Size 'ity Metadata Completeness ncertainty	High High Low High	$\begin{array}{c} \times 2 \\ \times 2 \\ \times 1 \end{array}$	2 2 3 1	in scope 2013 Characterized by no statistics Data sources are transparent		

	– continu	led from	previo	us page		
Source Citation: Type of Data Source Hero ID	Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction. Facility; Completed Exposure or Risk Assessments; 3809440					
EVALUATION						
Domain	Metric	Rating	MWF^{\star}	Score	Comments	
Overall Quality D	$etermination^{\dagger}$	High		1.4		

– continued from previous page

 \star MWF = Metric Weighting Factor

Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceFacility; Completed Exposure or Risk Assessments;Hero ID3809440								
EXTRACTION								
Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Cleaning NMP is used as an ingredient in paint removers, cleaners and as or in degreasers. It can be used in pure form or in mixtures. Industrially, it can be used under elevated temperatures.					
Total Annual U.S. Volume (and percent of PV): Chemical Concentration:		60-95 to 30-60 p	onnes/yr ercent					
		I I I I						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability Metric 1	: Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2: Representative								
Metric 2	: Geographic Scope	Low	$\times 1$	3	Europe			
Metric 3	: Applicability	High	$\times 2$	2	in scope			
Metric 4	: Temporal Representativeness	High	$\times 2$	2	2013			
Metric 5	: Sample Size	Low	$\times 1$	3	Characterized by no statistics			
Domain 3: Accessibility/Cl	arity	· · · · ·						
Metric 6	: Metadata Completeness	High	× 1	1	Data sources are transparent			
Domain 4: Variability and Uncertainty		TT: 1	-	-				
Metric 7	: Metadata Completeness	Hıgh	× 1	1	Discussion on variability and uncertainty			
Overall Quality Determinat	$\operatorname{ion}^{\dagger}$	High		1.4				

Source Citation:Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceFacility; Completed Exposure or Risk Assessments;Hero ID3809440								
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):			Use Cleaning and coating in the Electronics industry Wafer cleaning and stripping to remove organic contamination and organic layers. And, as a solvent in dedicated formulations (i.e., precursor solutions for wafer coatings such as polyimides and anti-reflective coatings). <5 tonnes/yr					
	,	1 /						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	Information from trusted sources		
Domain 2: Repre	sentative							
	Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013		
	Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics		
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness		High	$\times 1$	1	Data sources are transparent			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		High	$\times 1$	1	Discussion on variability and uncertainty			
Overall Quality Determination [†]		High		1.4				

Source Citation: Type of Data Source Hero ID	ation: Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction. ata Source Facility; Completed Exposure or Risk Assessments; 3809440							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):			Use Electronics A photoresist carrier solvent. A photoresist stripper. 10-100 tonnes/yr per site					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Information from trusted sources		
Domain 2: Repres	sentative	~			2			
	Metric 2:	Geographic Scope	Low	× 1	3	Europe		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4: Metric 5:	Sample Size	High Low	$\times 2$ $\times 1$	2	2013 Characterized by no statistics		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Data sources are transparent		
Domain 4: Variab	Motrie 7:	Motadata Completeness	High	\vee 1	1	Discussion on avaiability and an avaitable		
	metho 1.	Metadata Completeness	TIBII	~ 1	1	Discussion on variability and uncertainty		
Overall Quality Determination ^{\dagger}			High		1.4			

Source Citation:Rivm, 2013. Annex XV Restriction Report: Proposal for a Restriction.Type of Data SourceFacility; Completed Exposure or Risk Assessments;Hero ID3809440								
EXTRACTION								
Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Battery In lithium battery production it is applied as a solvent for the binder resins for both the carbon anode and the lithium cobalt oxide cathode, it may be used in gel-polymer lithium ion battery separators/electrolytes, and it may be used in coatings on the outside of the batteries.					
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Information from trusted sources			
Domain 2: Representative								
Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe			
Metric 3:	Applicability	High	$\times 2$	2	in scope			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013			
Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Data sources are transparent			
Domain 4: Variability and U Metric 7:	ncertainty Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty			
Overall Quality Determination	on [†]	High		1.3				

EXTRACTION Data Parameter Data Life Cycle Stage: Processing Life Cycle Description (Subcategory of Use): Polymers Process Description: NMP is used as a processing aid in the production of polymers. Immer- vice provisitation in a solument. Up to and including polymersizent this	Rivm,. 2013. Annex XV Restriction Report: Proposal for a Restriction. Facility; Completed Exposure or Risk Assessments; 3809440							
Life Cycle Stage:ProcessingLife Cycle Description (Subcategory of Use):PolymersProcess Description:NMP is used as a processing aid in the production of polymers. Immer-cinc process in a columnt.Un to and including polymers in this	Data							
sion precipitation in a solvent. Op to and including polymerization, this use can be considered as a controlled process, though not fully closed, but after polymerization, the resultant polymer still contains traces of NMP that may evaporate during the production process and may cause worker exposure. The high performance polymer end product is assumed not to contain any remaining NMP.	Processing Polymers NMP is used as a processing aid in the production of polymers. Immer- sion precipitation in a solvent. Up to and including polymerization, this use can be considered as a controlled process, though not fully closed, but after polymerization, the resultant polymer still contains traces of NMP that may evaporate during the production process and may cause worker exposure. The high performance polymer end product is assumed not to contain any remaining NMP.							
EVALUATION								
Domain Metric Rating MWF* Score Comments	MWF* Score Comments							
Domain 1: Reliability Metric 1: Methodology High $\times 1$ 1 Information from trusted sources	$\times 1$ 1 Information from trusted sources							
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{cccc} \times 1 & 3 & \mbox{Europe} \\ \times 2 & 2 & \mbox{in scope} \\ \times 2 & 2 & 2013 \\ & & \mbox{N/A} & \mbox{This metric is not applicable to this data type} \end{array}$							
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High $\times 1$ 1 Data sources are transparent	$\times 1$ 1 Data sources are transparent							
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High × 1 1 Discussion on variability and uncertainty	$\times 1$ 1 Discussion on variability and uncertainty							
Overall Quality Determination [†] High 1.3	1.3							

Source Citation:RiverType of Data SourceFacilHero ID38094	,. 2013. Annex XV Restriction Rep- ty; Completed Exposure or Risk Ass 440	ort: Proposa sessments;	l for a R	estrictio	on.		
EXTRACTION Parameter	Data	Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:			Processing Agricultural products NMP is both used in the synthesis of active ingredients and as a co- solvent in the formulation of various agrochemicals. In case NMP is used in the synthesis of active ingredients, the use is fully industrial and NMP is assumed not end up in the final product. If NMP is used as a co-solvent, NMP will obviously be contained in the final products. The concentration of NMP in herbicides, fungicides and pesticides is < 7 percent . 1-15 (pesticide)				
EVALUATION	Mart						
Domain	Metric	Rating	M W F**	Score	Comments		
Domain 1: Reliability Metr	c 1: Methodology	High	× 1	1	Information from trusted sources		
Domain 2: Representati	ve						
Metr	c 2: Geographic Scope	Low	$\times 1$	3	Europe		
Metr	c 3: Applicability	High	$\times 2$	2	in scope		
Metr	c 4: Temporal Representativeness	High	$\times 2$	2	2013		
Metr	c 5: Sample Size	Medium	$\times 1$	2	Range with uncertain statistics		
Domain 3: Accessibility	/Clarity						
Metr	c 6: Metadata Completeness	High	$\times 1$	1	Data sources are transparent		
Domain 4: Variability a Metr	nd Uncertainty c 7: Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty		
Overall Quality Determ	nation [†]	High		1.3			
Continued on next page							

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Source Citation: Type of Data Source Hero ID	Rivm,. 2013. Annex XV Restriction F Facility; Completed Exposure or Risk 3809440	Report: Proposa Assessments;	l for a Restriction.	
EVALUATION				
Domain	Metric	Rating	MWF* Score	Comments

continued from previous page

Source Citation:IType of Data SourceIHero IDI	Rivm,. 201 Facility; Co 3809440	3. Annex XV Restriction Report ompleted Exposure or Risk Asse	rt: Propos essments;	sal for a	Restrict	tion.		
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:				Processing Pharmaceutical In the production of pharmaceuticals, NMP is an important solvent used in the extraction, purification, and crystallization of pharmaceuticals (Jouyban et al 2010). BASF (2011a) further reports that it produces high grade NMP. A number of topical formulations that may contain NMP as a transdermal enhancer. Also the use as a solvent and as ex- traction medium				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliabili	ity Metric 1:	Methodology	High	× 1	1	Information from trusted sources		
Domain 2: Represe	ntative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Low High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	3 2 2 N/A	Europe in scope 2013 This metric is not applicable to this data type		
Domain 3: Accessib	oility/Clari Metric 6:	ty Metadata Completeness	High	× 1	1	Data sources are transparent		
Domain 4: Variabil	ity and Un Metric 7:	certainty Metadata Completeness	High	× 1	1	Discussion on variability and uncertainty		
Overall Quality Determination ^{\dagger}		High		1.3				

Source Citation: Type of Data Source Hero ID	Ec/Hc,. 2017. Chemicals at a glance: NMP and NEP. Facility; Reports for Data or Information Other than Exposure or Release Data; 3827463									
EXTRACTION Parameter	EXTRACTION Parameter				Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			All All NMP is used in industrial applications, as well as in products available to consumers, including paint strippers, cosmetics, and certain food packag- ing materials. Canadians may be exposed to these substances primarily through products used by consumers, such as paint strippers, nail polish remover and body lotion.							
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	The data, data sources, and/or techniques used in the assess- ment or report are not specified.				
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Unacceptable High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	2 8 2 N/A	Canada Not enough information to assess applicability 2017 This metric is not applicable to this data type				
Domain 3: Access	bility/Clari Metric 6:	ity Metadata Completeness	Low	× 1	3	data sources are not fully transparent.				
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	no discussion				
Overall Quality Determination [†]		Unacceptable		4	Metric Mean Score: 2.6.					
Continued on next page										

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Source Citation: Type of Data Source Hero ID	Ec/Hc,. 2017. Chemicals at a glance: NI Facility; Reports for Data or Information 3827463	MP and NEP. a Other than Expo	osure or Release Data;					
EVALUATION Domain	Metric	Rating	MWF* Score	Comments				
		0						

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

Source Citation:U.S, E. P. A 1998. Environmental profile for N-methylpyrrolidone.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3827493							
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Manufacture Manufacture See Section 2.1. N-methylpyrrolidone is manufactured by combining y- butyrolactone with methylamine. NMP production is accomplished by condensing y-butyrolactone with methylamine at 200 to 350"C and 10 MPa.					
Number of Sites:			3				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	The assessment or report uses data or techniques that are high quality (from trusted sources (e.g., journal articles)	
Domain 2: Repres	Motrie 2:	Coographic Scope	High	× 1	1	TIC .	
	Metric 2 :	Applicability	High	$\times 1$ $\times 2$	1	US	
	Metric 4.	Temporal Bepresentativeness	Medium	$\times 2$	2 4	1998	
	Metric 5:	Sample Size	N/A	~ 2	N/A	This metric is not applicable to this data type	
Domain 3: Access	ibility/Clari Metric 6:	ity Metadata Completeness	High	× 1	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.	
						, , , ,	
Domain 4: Variab	ility and Ur	ncertainty					
	Metric 7:	Metadata Completeness	Medium	× 1	2	The report provides only limited discussion of the variability and uncertainty in the results.	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.4		

Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 1998. Environmental profile for N-methylpyrrolidone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3827493							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Chemical Concentration:		Use Paint stripper 12-80 percent						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	The assessment or report uses data or techniques that are high quality (from trusted sources (e.g., journal articles)		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3: Motrie 4:	Applicability	Hign Modium	$\times 2$	2	in scope		
	Metric 4:	Sample Size	Medium	$ \times 2 \times 1 $	2	Range with uncertain statistics		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Medium	$\times 1$	2	The report provides only limited discussion of the variability and uncertainty in the results.			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.4			

Source Citation: Type of Data Source Hero ID	U.S, E. P. A 1998. Environmental profile for N-methylpyrrolidone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3827493							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use photoresist remover N-methylpyrrolidone is used in the microelectronics industry to strip phenolic residue from packages and photoresist resins on wafer surfaces and as a vehicle for "die-coat" application.						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	The assessment or report uses data or techniques that are high quality (from trusted sources (e.g., journal articles)		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998		
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Medium	× 1	2	The report provides only limited discussion of the variability and uncertainty in the results.			
Overall Quality D	eterminatio	n†	High		1.4			

Source Citation: Type of Data Source Hero ID	U.S, E. P. Facility; C 3827504	A. 2015. TSCA work plan chen completed Exposure or Risk Asse	nical risk essments;	assessme:	nt. N-M	lethylpyrrolidone: Paint stripper use (CASRN: 872-50-4).
EXTRACTION						
Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Total Annual U.S. Volume (and percent of PV):		Manufacture Manufacture or import 184.7 million pounds				
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Data and techniques are high quality; Information from trusted sources.
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	in scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012-2015
	Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	clearly documents its data sources
Domain 4: Variab	ility and Un Metric 7:	ncertainty Metadata Completeness	High	× 1	1	well characterized
Overall Quality D	eterminatio	n^\dagger	High		1.2	

Source Citation: Type of Data Source Hero ID	tree Citation:U.S, E. P. A 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4).e of Data SourceFacility; Completed Exposure or Risk Assessments;o ID3827504									
EXTRACTION Parameter			Data							
Life Cycle Stage:	Life Cycle Stage:									
Life Cycle Descrip	otion (Subca	ategory of Use):	Paint st	ripper						
Process Description	Process Description:		Larger f to 55-ga	acilities f illon dru	typically ms. Sma	y purchase in quantities ranging in size from five- aller facilities purchase small quantities of strip-				
			per from	n narawa v include	re or pa • manua	and supply stores. Techniques for paint stripping				
			Pouring	, wiping	and roll	ling are also possible application techniques and				
			applicat	ion can	be man	ual or automated. After application, the strip-				
			per is a	llowed to	o set and	d soften the old coating. Once the stripper has				
			finished	setting,	the old After th	coating is removed from the surface by scraping				
			clean be	clean before moving to the next stages of the job.						
Total Annual U.S	. Volume (a	nd percent of PV):	9 percent							
Number of Sites:			In Calif	In California, approximately 80 facilities that have stripping equipment.						
			500 additional facilities in the state, which would include small facilities							
Possible Physical	Form:		liquid							
Chemical Concent	tration:		0.25 (low-end), 0.625 (mid), 1 (high-end)							
					-					
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Beliab	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Data and techniques are high quality; Information from trusted sources.				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	in scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012-2015				
	Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics				
Continued on next page										

Source Citation: Type of Data Source Hero ID	U.S, E. P. A 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). Facility; Completed Exposure or Risk Assessments; 3827504						
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 3: Access	sibility/Clari	ity					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	clearly documents its data sources	
Domain 4: Variability and Uncertainty						well characterized	
	Metho 7.	Metadata Completeness	IIIgii	~ 1	1	wen characterized	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.2		

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Source Citation:U.S.Type of Data SourceFacilHero ID3827	ation: U.S, E. P. A 2015. TSCA work plan chemical risk assessment. N-Methylpyrrolidone: Paint stripper use (CASRN: 872-50-4). ta Source Facility; Completed Exposure or Risk Assessments; 3827504							
EXTRACTION Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use graffiti removal Solvents are either spray or brush applied. Sprayed solvents can be swabbed or wiped with a cloth or tissue. After spraying and wiping or brushing the solvent on the surface, the surface is then washed with heated (70oC) wash water using a high-pressure spray.					
EVALUATION Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability Metr	c 1: Methodology	High	× 1	1	Data and techniques are high quality; Information from trusted sources.			
Domain 2: Representati Metr Metr Metr Metr Domain 3: Accessibility	ve c 2: Geographic Scope c 3: Applicability c 4: Temporal Representativeness c 5: Sample Size /Clarity	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US in scope with paint stripping 2012-2015 This metric is not applicable to this data type			
Metr	c 6: Metadata Completeness	High	$\times 1$	1	clearly documents its data sources			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		High	× 1	1	well characterized			
Overall Quality Determ	nation^\dagger	High		1.0				

Source Citation: Type of Data Source Hero ID	Oecd,. 2017. Emission Scenario Document (ESD) on the use of textile dyes. Facility; Reports for Data or Information Other than Exposure or Release Data; 3828838							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Processing Manufacture of dyes and pigment see pages 73-79 for basic, not NMP-specific process description						
EVALUATION								
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	trusted sources		
Domain 2: Repres	sentative	G 1: 6		4	0			
	Metric 2:	Geographic Scope	Medium	× 1	2	OECD .		
	Metric 3: Motrie 4:	Applicability Temporal Representativeness	High High	$\times 2$ $\times 2$	2	in scope		
	Metric 4:	Sample Size	N/A	~ 2	N/A	This metric is not applicable to this data type		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	clearly documents its data sources		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	well characterized		
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	High		1.1			

Source Citation: Type of Data Source Hero ID	Oecd,. 2017. Emission Scenario Document (ESD) on the use of textile dyes. Facility; Reports for Data or Information Other than Exposure or Release Data; 3828838							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Processing pesticides, fertilizers and nitrogen compounds see pages 73-79 for basic, not NMP-specific process description						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	trusted sources		
Domain 2: Repres	sentative	Communitie Commu	Madian	v 1	0			
	Metric 2: Motrie 2:	Geographic Scope	Medium	$\times 1$	2	OECD		
	Metric J.	Temporal Representativeness	High	$\times 2$ $\times 2$	2	in scope		
	Metric 5:	Sample Size	N/A	~ 2	N/A	This metric is not applicable to this data type		
Domain 3: Accessibility/Clarity				× 1	1	clearly documents its data sources		
	1.100110 0.		8		-			
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	well characterized		
Overall Quality D	Peterminatio	n^\dagger	High		1.1			

Source Citation: Type of Data Source Hero ID	Oecd,. 2017. Emission Scenario Document (ESD) on the use of textile dyes. Facility; Reports for Data or Information Other than Exposure or Release Data; 3828838							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Processing Manufacture of paints, varnishes and similar coatings, printing ink see pages 73-79 for basic, not NMP-specific process description						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	trusted sources		
Domain 2: Repres	sentative	Q 1: 0		1	0			
	Metric 2:	Geographic Scope	Medium	× 1	2	OECD .		
	Metric 3: Motric 4:	Applicability Temporal Representativeness	High High	$\times 2$ $\times 2$	2	in scope		
	Metric 5:	Sample Size	N/A	~ 2	N/A	This metric is not applicable to this data type		
Domain 3: Access	bility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	clearly documents its data sources		
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	well characterized		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.1			

Source Citation:Oecd., 201Type of Data SourceFacility; RHero ID3828838	7. Emission Scenario Document eports for Data or Information ((ESD) on Other than	the use of Exposure	of textile e or Rel	e dyes. Jease Data;
EXTRACTION					
Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Processing Manufacture of pharmaceuticals, medicinal chemicals and botanical product see pages 73-79 for basic, not NMP-specific process description			
EVALUATION	Motric	Bating	MWF*	Score	Commonts
Domain	Metric	Rating	IVI VV F	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	trusted sources
Domain 2: Representative		N.C. II	1	0	0.7.07
Metric 2: Matria 2:	Geographic Scope	Medium	× 1 × 2	2	OECD .
Metric 5:	Tomporal Representativeness	ПIgli High	$\times 2$	2	in scope
Metric 4. Metric 5:	Sample Size	N/A	~ 2	N/A	This metric is not applicable to this data type
Demoir 2. Accessibility (Clar	- -			,	
Metric 6:	Metadata Completeness	High	$\times 1$	1	clearly documents its data sources
Domain 4: Variability and Un	ncertainty	TT: 1	-		
Metric 7:	Metadata Completeness	High	× 1	1	well characterized
Overall Quality Determinatio	High		1.1		

Source Citation:OecdType of Data SourceFaciliHero ID38288	purce Citation:Oecd,. 2017. Emission Scenario Document (ESD) on the use of textile dyes.ype of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;ero ID3828838							
EXTRACTION								
Parameter		Data						
Life Cycle Stage:		Processin	g					
Life Cycle Description (Subcategory of Use):	Manufact	sure of so	pap and	detergents, cleaning and polishing prepara-			
Process Description:		tions, per see pages	tions, perfumes and toilet preparations (cosmetics) see pages 73-79 for basic, not NMP-specific process description					
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability								
Metr	c 1: Methodology	High	$\times 1$	1	trusted sources			
Domain 2: Representati	<i>v</i> e							
Metr	c 2: Geographic Scope	Medium	$\times 1$	2	OECD			
Metr	c 3: Applicability	High	$\times 2$	2	in scope			
Metr	c 4: Temporal Representativeness	High	$\times 2$	2	2011			
Metr	c 5: Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Accessibility	/Clarity							
Metr	c 6: Metadata Completeness	High	$\times 1$	1	clearly documents its data sources			
Domain 4. Variability a	d Uncortainty							
Metr	c 7: Metadata Completeness	High	$\times 1$	1	well characterized			
Overall Quality Determination [†]				1.1				

Source Citation:WIType of Data SourceFacHero ID385	hite, D. 1 cility; R 59417	L., Bardole, J. A., 2004. Paint and eports for Data or Information (d finish rem Other than	overs. Exposure	e or Rel	ease Data;	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Possible Physical Form: Chemical Concentration:		Use Paint stripper >104 industries use finish removers. Finish removers are applied by brushing, spraying, troweling, flowing, or soaking. Cleaning the sub- strate may be by water rinse, wipe and let dry, or solvent rinse. Re-movers may be neutral, basic, or acidic. The viscosity may be water thin, thick enough to spray-on and cling, or a paste to be troweled on. liquid; semipaste, water rinse finish remover optimal = 40 to 50 mole percent ; Typical solution = 15 to 27.5wt percent					
EVALUATION							
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliability Me	etric 1:	Methodology	High	$\times 1$	1	From trusted sources	
Domain 2: Representa Me	ative etric 2:	Geographic Scope	High	× 1	1	US	
Me	etric 3:	Applicability	High	$\times 2$	2	in scope	
Me	etric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006	
Me	etric 5:	Sample Size	Medium	$\times 1$	2	Range with uncertain statistics	
Domain 3: Accessibili Me	ty/Clari etric 6:	ity Metadata Completeness	High	$\times 1$	1	clearly documents its data sources	
Domain 4: Variability Me	and Ur etric 7:	ncertainty Metadata Completeness	High	× 1	1	addresses variability and uncertainty	
Overall Quality Deter	minatio	\mathbf{n}^{\dagger}	High		1.3		
	Continued on next page						
	– continue	ed from p	orevious	page			
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White, D. L.,Bardole, J Facility; Reports for Da 3859417	. A 2004. Paint and ta or Information Ot	d finish re ther than	movers. Exposure	e or Release Data;			
	Metric	Rating	MWF^{\star}	Score	Comments		
	White, D. L.,Bardole, J Facility; Reports for Da 3859417	– continue White, D. L.,Bardole, J. A 2004. Paint and Facility; Reports for Data or Information Of 3859417 Metric	- continued from p White, D. L.,Bardole, J. A 2004. Paint and finish re Facility; Reports for Data or Information Other than 3859417 Metric Rating	- continued from previous White, D. L.,Bardole, J. A 2004. Paint and finish removers. Facility; Reports for Data or Information Other than Exposure 3859417 Metric Rating MWF*	- continued from previous page White, D. L., Bardole, J. A 2004. Paint and finish removers. Facility; Reports for Data or Information Other than Exposure or Release Data; 3859417 Metric Rating MWF* Score		

Source Citation: White, I Type of Data Source Facility;	ce Citation:White, D. L.,Bardole, J. A 2004. Paint and finish removers.e of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;AD3859417								
EXTRACTION									
Parameter		Data							
Life Cycle Stage:		Processin	ď						
Life Cycle Description (Sub	category of Use):	formulati	s on of pai	nt strip	pers				
Life Cycle Description (Subcategory of Use): Process Description: Number of Sites:		Finish rer kettles ar personnel stacks. M removers; acidic rer waxes an are used	Finish removers may be manufactured in open or closed kettles. Closed kettles are preferred because they prevent solvent loss and exposure to personnel. To reduce emissions, condenser are often employed on vent stacks. Mild steel or black iron kettles are used for neutral or basic removers; stainless steel or reinforced polyethylene kettles are used for acidic removers. The kettles are heated to aid dispersion of paraffin waxes and mixing of other ingredients. Steel and polypropylene drums are used for industrial removers.						
Number of Sites:		There are	There are about 51 paint remover manufacturers in the United States.						
EVALUATION									
Domain	Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1. Paliability									
Metric 1	: Methodology	High	$\times 1$	1	From trusted sources				
Domain 2: Representative									
Metric 2	: Geographic Scope	High	$\times 1$	1	US				
Metric 3	: Applicability	High	$\times 2$	2	in scope				
Metric 4	: Temporal Representativeness	Medium	$\times 2$	4	2006				
Metric 5	: Sample Size	N/A		N/A	This metric is not applicable to this data type				
Domain 3: Accessibility/Cla	arity Mata lata Camalatanaa	TT:l.	v 1	1					
Metric b	: Metadata Completeness	High	× 1	1	clearly documents its data sources				
Domain 4: Variability and	Uncertainty								
Metric 7		TT:1.	× 1	1	addresses registed lites and reports inter				
	: Metadata Completeness	High	× 1	1	addresses variability and uncertainty				
	: Metadata Completeness	High	× 1	1	addresses variability and uncertainty				

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Source Citation: Type of Data Source Hero ID	White, D. L.,Bardole, J. A 2004. Paint and finish removers. 'acility; Reports for Data or Information Other than Exposure or Release Data; 859417						
EVALUATION							
Domain	Metric	Rating MWI	* Score	Comments			
Overall Quality D	$\operatorname{Determination}^{\dagger}$	High	1.3				

Source Citation: Type of Data Source Hero ID	Ashford, R Facility; R 3860437	Ashford, R. D 2001. Ashford's Dictionary of Industrial Chemicals N-methylpyrrolidone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3860437							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Descrip Process Descriptio	ption (Subca on:	ategory of Use):	Manufacture Manufacture N-methylpyrro with methylan extractions (ar zation, paint re	lidone is nine. NM omatics, emovers,	s manu IP is us acetylen and coa	factured by combining ?-butyrolactone ed in chemical synthesis, petrochemical ne, butadiene), lubricating oil dearomati- atings.			
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	oility Metric 1:	Methodology	Low	$\times 1$	3	The data, data sources, and/or techniques used in the assess- ment or report are not specified.			
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High Medium N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	2 2 4 N/A	UK in scope 2001 This metric is not applicable to this data type			
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	Unacceptable	$\times 1$	4	Assessment or report does not document its data sources			
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type			
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.1.			
		(Continued on nex	t page					

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Source Citation: Type of Data Source Hero ID	Ashford, R. D 2001. Ashford's Dictionary Facility; Reports for Data or Information O 3860437	of Industrial C ther than Expo	^c hemicals osure or F	N-methylpyrrolidone. Release Data;	
EVALUATION					
Domain	Metric	Rating	MWF^*	Score	Comments

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Pub Facility; R 3860487	2017. PubChem: 1-Methyl-2-pyrrolidinone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3860487							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Descrip Process Descriptio	otion (Subca on: . Volume (a	ategory of Use): nd percent of PV):	Manufact Manufact Large-sca gamma-bu a high-pre often run range of 2 and distil 100 millio	ure uring le produc utyrolace essure tul under a 250-400 d led. The on to 500	ction of tone wi be react diabatic leg C. T NMP y million	NMP is predominantly carried out by reacting th an excess of pure or aqueous methyamine in or (6-12 Mpa). The reaction is exothermic and c conditions with reactor temperatures in the The resulting product mixture is decompressed yield is normally more than 97 percent . a pounds/yr (2002)			
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	From trusted sources			
Domain 2: Repres	Sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 4\\ 3\end{array}$	US in scope 2002 Characterized by no statistics			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	clearly documents its data sources			
Domain 4: Variab	bility and Un Metric 7:	ncertainty Metadata Completeness	Medium	$\times 1$	2	limited discussion			
Overall Quality D	eterminatio	n [†]	High		1.6				

 * MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2016. Agen Facility; R 3860491	2016. Agent name: N-methyl-2-pyrrolidone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3860491							
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use):		All Used as resin in microelectronics industrial paint stripping; lube oil extraction; pesticides; coatings; adhesives dyes; pigments; polymers;							
Process Description:			Lists th	e life cyc	le stage	es and chemical - physical properties.			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	NIH information			
Domain 2: Repres	sentative								
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	in scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016			
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	underlying methods, data sources, and assumptions are not fully transparent			
Domain 4: Variab	ility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type			
Overall Quality D	eterminatio	n^\dagger	High		1.3				

Source Citation:2017. HazType of Data SourceFacility; RHero ID3860493	Citation:2017. Hazardous substances data bank: 1-Methyl-2-pyrrolidinone.of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;D3860493								
EXTRACTION									
Parameter		Data							
Life Cycle Stage:		Use							
Life Cycle Description (Subca	ategory of Use):	Petrocher	nical						
Process Description:		Acetylene diene, gas	Acetylene recovery from cracked gas, extraction of aromatics and buta- diene, gas purification (removal of CO2 and H2S)						
EVALUATION									
Domain	Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliability									
Metric 1:	Methodology	High	$\times 1$	1	trusted sources				
Domain 2: Representative									
Metric 2:	Geographic Scope	High	$\times 1$	1	US				
Metric 3:	Applicability	High	$\times 2$	2	in scope				
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	oldest source listed from 1999				
Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type				
Domain 3: Accessibility/Clar	ity								
Metric 6:	Metadata Completeness	High	$\times 1$	1	clearly documents its data sources				
Domain 4: Variability and U	ncertainty								
Metric 7:	Metadata Completeness	Low	$\times 1$	3	no discussion				
Overall Quality Determinatio	\mathbf{n}^{\dagger}	High		1.5					

Source Citation: Type of Data Source Hero ID	2017. Hazardous substances data bank: 1-Methyl-2-pyrrolidinone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3860493								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Processin	g					
Life Cycle Descrip	otion (Subca	ategory of Use):	plastics	0					
Process Description:		Reaction as polyet	Reaction medium for the production of high-temperature polymers such as polyethersulfones, polyamideimides, and polyaramids						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	trusted sources			
D : 0 D									
Domain 2: Repres	Motrie 2.	Coographia Second	Uich	× 1	1				
	Metric 2.	Applicability	High	$\times 1$ $\times 2$	1	US			
	Metric 4:	Temporal Representativeness	Medium	$\times 2 \times 2$	4	oldest source listed from 1999			
	Metric 5:	Sample Size	N/A	~ _	N/A	This metric is not applicable to this data type			
Domain 3: Access	ibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	clearly documents its data sources			
Domain 4: Variab	ility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	no discussion			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.5				

Source Citation:2017. HasType of Data SourceFacility;Hero ID3860493	tion: 2017. Hazardous substances data bank: 1-Methyl-2-pyrrolidinone. a Source Facility; Reports for Data or Information Other than Exposure or Release Data; 3860493								
EXTRACTION									
Parameter		Data							
Life Cycle Stage:		Use							
Life Cycle Description (Sub	category of Use):	Electroni	cs						
Process Description:		Cleaning printed c	Cleaning agent for silicon wafers, photoresist stripper, auxiliary in printed circuit board technology						
EVALUATION									
Domain	Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliability Metric 1	: Methodology	High	$\times 1$	1	trusted sources				
Domain 2: Representative Motrie 2	· Coographic Scope	High	\vee 1	1	110				
Metric 3	· Applicability	High	$^{\wedge 1}$ $^{\vee 2}$	2	US				
Metric 4	: Temporal Representativeness	Medium	$\times 2 \times 2$	4	oldest source listed from 1999				
Metric 5	: Sample Size	N/A	~ -	N/A	This metric is not applicable to this data type				
Domain 3: Accessibility/Cl	arity								
Metric 6	: Metadata Completeness	High	$\times 1$	1	clearly documents its data sources				
Domain 4: Variability and	Uncertainty								
Metric 7	: Metadata Completeness	Low	$\times 1$	3	no discussion				
Overall Quality Determinat	ion^\dagger	High		1.5					

Source Citation:2017. HazType of Data SourceFacility; RHero ID3860493	ardous substances data bank: 1- Reports for Data or Information (Other than	yrrollain Exposur	one. e or Rel	ease Data;	
EXTRACTION Parameter		Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Number of Sites:		Manufacture Manufacture Large-scale production of NMP is predominantly carried out by reacting gamma-butyrolacetone with an excess of pure or aqueous methyamine in a high-pressure tube reactor (6-12 Mpa). The reaction is exothermic and often run under adiabatic conditions with reactor temperatures in the range of 250-400 deg C. The resulting product mixture is decompressed and distilled. The NMP yield is normally more than 97 percent . It can also be produced by hydrogenation of N-hydroxymethyl-2-pyrrolidone or reaction of acrylonitrile with methylamine in the presence of a peroxide radical initiator.				
Number of Sites:		12				
EVALUATION						
Domain	Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	trusted sources	
Domain 2: Representative						
Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 4 N/A	US in scope oldest source listed from 1999 This metric is not applicable to this data type	
Domain 3: Accessibility/Clar	rity					
Metric 6:	Metadata Completeness	High	$\times 1$	1	clearly documents its data sources	
Domain 4: Variability and U: Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	no discussion	
	Cor	tinued on r	next page)		

		- continue	ed from p	orevious	page			
Source Citation: Type of Data Source Hero ID	2017. Hazardous substat Facility; Reports for Day 3860493)17. Hazardous substances data bank: 1-Methyl-2-pyrrolidinone. acility; Reports for Data or Information Other than Exposure or Release Data; 360493						
EVALUATION								
Domain]	Metric	Rating	MWF^{\star}	Score	Comments		
Overall Quality I	$\operatorname{Determination}^\dagger$		High		1.5			

Source Citation:Australian Government Department of, Health. 2016. Human health tier III assessment for 1-methyl-2-pyrrolidinone.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data; 3969286								
EXTRACTION Parameter	Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use):		All coating (paints, writing inks); cleaning products (paint strippers, glue and grease removers, sealant removers); cosmetic and personal care prod- ucts						
Process Description: Total Annual U.S. Volume (and percent of PV): Chemical Concentration:		ucts Source is a high-level risk assessment for potential consumer exposure to NMP in consumer products. 100 to 1000 tonnes (Australia) 5 percent (consumer prod limit in Europe); 0.3 percent (proposed new consumer prod limit)						
EVALUATION								
Domain Metric	Rating	MWF^*	Score	Comments				
Domain 1: Reliability Metric 1: Methodology	High	$\times 1$	1	High quality - journal articles, etc				
Domain 2: Representative								
Metric 2: Geographic Scope Metric 3: Applicability	Medium Low	$\begin{array}{c} \times 1 \\ \times 2 \end{array}$	$\frac{2}{6}$	Australia non-occupational scenario that is similar to an occupational				
Metric 4: Temporal Representat Metric 5: Sample Size	iveness High Medium	$\times 2 \times 1$	$\frac{2}{2}$	2016 Range with uncertain statistics				
Domain 3: Accessibility/Clarity								
Metric 6: Metadata Completene	ss Medium	$\times 1$	2	Data sources are generally described but not fully transparent.				
Domain 4: Variability and Uncertainty Metric 7: Metadata Completene	ss High	× 1	1	well characterized				
Overall Quality Determination [†]			1.8					
Continued on next page								

			P	F0-	
Source Citation: Type of Data Source Hero ID	Australian Government Department of, He Facility; Reports for Data or Information (3969286	alth. 2016 Other than	. Human Exposur	health tier e or Release	III assessment for 1-methyl-2-pyrrolidinone. a Data;
EVALUATION					
Domain	Metric	Rating	MWF^*	Score	Comments

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* MWF = Metric Weighting Factor

Source Citation: U.S. H Type of Data Source Facilit Hero ID 39700	rec Citation:U.S, E. P. A 2017. Inert details: N-methyl-2-pyrrolidinone.e of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;a ID3970073							
EXTRACTION	0							
Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use pesticide 40 CFR cosolvent	Use pesticides 40 CFR 180.920 - indicates NMP is used in pesticides as a Solvent, cosolvent					
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability Metric	1: Methodology	High	× 1	1	CFR			
Domain 2: Roprocontativ								
Metric	2: Geographic Scope	High	× 1	1	US			
Metric	3: Applicability	High	$\times 2$	2	in scope			
Metric	4: Temporal Representativeness	Medium	$\times 2$	4	2004			
Metrie	5: Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Accessibility/	Clarity							
Metrie	6: Metadata Completeness	N/A		N/A	This metric is not applicable to this data type			
Domain 4: Variability and Uncertainty								
Metrie	7: Metadata Completeness	N/A		N/A	This metric is not applicable to this data type			
Overall Quality Determin	$\operatorname{ation}^\dagger$	High		1.3				

Source Citation: Type of Data Source Hero ID	Source Citation:Echa, 2017. Substance information: 1-Methyl-2-pyrrolidone.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3970774							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):		All pH regulators and water treatment products and laboratory chemicals. Substance information, including physical-chemical properties This substance is manufactured and/or imported in the European Eco- nomic Area in 10,000 to 100, 000 tonnes per year.						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	ECHA substance database		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Europe		
	Metric 3:	Applicability	Medium	$\times 2$	4	some of these uses were not identified by EPA		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	underlying data source are not fully transparent.		
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Medium		1.7			

Source Citation: Type of Data Source Hero ID	Echa, 2017. Uses as industrial sites: 1-Methyl-2-pyrrolidone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3970775							
EXTRACTION			_					
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use):		All Processing as intermediate; Formulation; Spray Application; Roll ap- plication; Brush application; Dip /pour; Lab; tableting, compression, extrusion, pelletization; Functional fluid; Lubrication at high energy con-						
Process Description:			List of life or sprayir	ditions; cleaning List of life cycle stages and worker activities (high-level, such as transfer or spraying)				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	ECHA substance database		
Domain 2: Repres	sentative							
Domain - , roopro	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Europe		
	Metric 3:	Applicability	High	$\times 2$	2	all in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Access	sibility/Clar	ity	-		2			
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	underlying data source are not fully transparent.		
Domain 4: Variab	ility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type		
Overall Quality D	eterminatio	n†	High		1.4			

Source Citation: Type of Data Source Hero ID	Echa, 2017. Uses by professional workers: 1-Methyl-2-pyrrolidone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3970776							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		All All (see above row) Same information as 3970775						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	ECHA substance database		
Domain 2: Repre	sentative	Coordination Coordination	Madian	v 1	0	-		
	Metric 2: Motrie 2:	Geographic Scope	Medium	$\times 1$	2			
	Metric 4:	Temporal Representativeness	High	$\times 2$ $\times 2$	2	an m scope		
	Metric 5:	Sample Size	N/A	~ 2	N/A	This metric is not applicable to this data type		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	underlying data source are not fully transparent.		
Domain 4: Variab	bility and U Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type		
Overall Quality I	Determinatio	\mathbf{n}^{\dagger}	High		1.4			

Source Citation: Type of Data Source Hero ID	Echa,. 201 Facility; R 3970777	Echa, 2017. Consumer uses: 1-Methyl-2-pyrrolidone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3970777						
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Consumer Use Printing Indicates NMP is used in inks and toners by consumers						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	ECHA substance database		
Domain 2: Repre	sentative Metric 2:	Geographic Scope	Medium	× 1	2	Ешторе		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	underlying data source are not fully transparent.		
Domain 4: Varial	bility and Un Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type		
Overall Quality Determination [†]		High		1.4				

Source Citation: Nio	Niosh, 2014. Health hazard evaluation report no. HHE-2011-0099-3211, evaluation of employee exposures during sea lamprey pesticide application								
Type of Data SourceFacHero ID397	Facility; Reports for Data or Information Other than Exposure or Release Data; 3974909								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Operating Days per Year and Batches per Day: Possible Physical Form: Chemical Concentration:			Use Agricultural products Employees manually applied pesticides into rivers to control sea lamprey larvae. Bayluscide wettable powder and emulsifiable concentrate are used. Technicians prepare equipment, then transport, mix, and apply pesticides into the river. Technicians also analyze river water samples in portable laboratories to measure pesticide concentrations throughout a treatment period. Mix Bayluscide wettable powder into water before pumping it into a maintenance application site 38 employees wettable powder and emulsifiable concentrate The liquid Bayluscide concentrate contains N-methyl-2-pyrrolidone						
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1. Reliability									
Me	etric 1:	Methodology	High	$\times 1$	1	Information is from trusted sources (NIOSH HHE)			
Domain 2: Representa	ative								
Me	etric 2:	Geographic Scope	High	$\times 1$	1	US			
Me	etric 3:	Applicability	High	$\times 2$	2	Agriculutral use is in scope			
Me	etric 4:	Temporal Representativeness	High	$\times 2$	2	2014			
Me	etric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Accessibilit	ty/Clari	tx							
Me	etric 6:	Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.			
Domain 4: Variability	and Un	certainty							
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	commuted from previous page							
Source Citation: Niosh, 2014. Health hazard evaluation report no. HHE-2011-0099-3211, evaluation of employee exposures during sea lamprey pesticide application.								
Type of Data Source Hero ID	Facility; R 3974909	acility; Reports for Data or Information Other than Exposure or Release Data; 974909						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
	Metric 7:	Metadata Completeness	High	$\times 1$	1	The report addresses variability and uncertainty in the results.		
Overall Quality Determination ^{\dagger}			High		1.0			

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Source Citation: Type of Data Source Hero ID	Argonne National, Laboratory. 2015. Lithium-ion battery production and recycling materials issues. Facility; Reports for Data or Information Other than Exposure or Release Data; 3974981							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Batteries NMP is used as a binder solvent in the assembly of lithium-ion batter- ies. (I think binders are used to adhere the electrolytic cells to the battery).					
EVALUATION								
Domain		Metric	Rating	MWF^*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	not from trusted sources, but do not seem flawed		
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US in scope 2015 This metric is not applicable to this data type		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully trans- parent.		
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	no discussion		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.6			

Source Citation:NiType of Data SourceFaHero ID39	icnas,. 19 acility; Re 978356	997. Full public report: Polymer eports for Data or Information (in byk-410 Other than	Exposure	e or Rel	lease Data;
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):		Processing polymer NMP is the solvent in which the polymer is dispersed. The NMP- polymer solution is added to coatings and serves to affect the rheological properties of the coating 2 750 kg of NMP-polymer soln imported to Australia for use				
Chemical Concentration:		45 percen	t NMP; §	55 perce	ent polymer	
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability M	y letric 1:	Methodology	Medium	$\times 1$	2	Information from industry contact. Not standard trusted source but no flaws identified.
Domain 2: Represent	ative					
М	etric 2:	Geographic Scope	Medium	$\times 1$	2	Australia
М	etric 3:	Applicability	High	$\times 2$	2	in scope
M	etric 4:	Temporal Representativeness	Low	$\times 2$	6	1997
M	etric 5:	Sample Size	LOW	× 1	3	Characterized by no statistics
Domain 3: Accessibil	lity/Clari	tx				
M	letric 6:	Metadata Completeness	Medium	$\times 1$	2	sources are not fully transparent, due to confidentiality of in- dustry contact
Domain 4: Variability M	y and Un etric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion
Metric 7: Metadata Completeness Overall Quality Determination [†]		Medium		2.2		

Source Citation:Nicnas,. 19Type of Data SourceFacility; RHero ID3978356	997. Full public report: Polymer eports for Data or Information (r in byk-410 Other than). Exposur	e or Rel	ease Data;	
EXTRACTION Parameter		Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Processing coating /paint formulation The mentioned NMP-polymer soln is added to coatings such that it (NMP is 45 percent in NMP-polymer disp) is added to coatings at a concentration of 0.1-3wt percent (corresponds to 0.45 to 1.35 percent NMP)				
Total Annual U.S. Volume (and percent of PV): Chemical Concentration:			of NMP-j 35 percer	polymer nt NMP	soln imported to Australia for use in coating/paint	
EVALUATION						
Domain	Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliability Metric 1:	Methodology	Medium	$\times 1$	2	Information from industry contact. Not standard trusted source but no flaws identified.	
Domain 2: Representative	a 1. a		1	0		
Metric 2: Metric 3:	Geographic Scope	Medium	$\times 1$	2	Australia	
Metric 3. Metric 4:	Temporal Representativeness	Low	$\times 2$ $\times 2$	6	1007	
Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics	
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	sources are not fully transparent, due to confidentiality of in- dustry contact	
Domain 4: Variability and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion	
Overall Quality Determinatio	\mathbf{n}^{\dagger}	Medium		2.2		
	Con	ntinued on r	next page	e		

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Source Citation: Type of Data Source Hero ID	Nicnas, 1997. Full public report: Po Facility; Reports for Data or Informa 3978356	olymer in byk-410. ation Other than Exposure or Release Dat	ta;					
EVALUATION								
Domain	Metric	Rating MWF* Score	Comments					

er in primal Other than	binder u- Exposure	51. e or Re	lease Data;			
Data						
Formulation polymeric adhesive for leather coating application Adhesive will be decanted or pumped into a stainless steel mixing vessel, mixed with other components such as pigment, defoamer, thickener and water. Formulation is gravity fed or pumped into 200 litre drums or 20 litre pails and transported to the spray line (or customers).						
Up to 40 NMP is 5 5 percent	Up to 40 tonnes/yr of polymer in formulation (polymer is 35 percent; NMP is 5 percent) 5 percent					
Rating	MWF^{\star}	Score	Comments			
High	$\times 1$	1	Information is from trusted sources			
Medium	$\times 1$	2	Australia			
High	$\times 2$	2	Adhesive formulation is in scope			
Medium	$\times 2$	4	2001			
Low	$\times 1$	3	Characterized by no statistics			
High	× 1	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions			
Medium	$\times 1$	2	limited discussion			
Medium		1.7				
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	er in primal Other than Data Formulat polymeric Adhesive mixed wi water. Fo litre paik Up to 40 NMP is 5 5 percent Rating High Medium High Medium Low High Medium	er in primal binder u- Other than Exposure Data Formulation polymeric adhesive Adhesive will be de mixed with other of water. Formulation litre pails and trar Up to 40 tonnes/y NMP is 5 percent) 5 percent Rating MWF* High $\times 1$ High $\times 1$ High $\times 2$ Medium $\times 1$ High $\times 2$ Low $\times 1$ High $\times 1$ Medium $\times 1$ Medium $\times 1$ Medium $\times 1$	er in primal binder u-51. Other than Exposure or Re Data Formulation polymeric adhesive for lea Adhesive will be decanted mixed with other compon water. Formulation is gra- litre pails and transported Up to 40 tonnes/yr of po NMP is 5 percent) 5 percent Rating MWF* Score High $\times 1$ 1 Medium $\times 1$ 2 High $\times 2$ 4 Low $\times 1$ 3 High $\times 1$ 1 Medium $\times 1$ 2 Medium $\times 1$ 2 Medium $\times 1$ 2 Medium $\times 1$ 2 Medium $\times 1$ 3			

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Source Citation: Type of Data Source Hero ID	Nicnas,. 2001. Full public report: Poly Facility; Reports for Data or Informati 3978357	mer in primal binder u-51. on Other than Exposure or Release Data;				
EVALUATION						
Domain	Metric	Rating MWF* Score Comments				

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Source Citation: Type of Data Source Hero ID	Nicnas,. 20 Facility; R 3978357	001. Full public report: Polymer eports for Data or Information (in primal Other than	binder u- Exposure	51. e or Rel	lease Data;		
EXTRACTION Parameter	Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):		Use polymeric adhesive for leather coating application Formulation is pumped directly from drums or pails to spray unit. The formulation will be applied by rotary spray application to untreated leather on a conveyor line, and the treated leather will then be dried in ovens through a drying tunnel prior to further treatment. Any overspray is filtered and caught in a water curtain filtering system during the spray application. Up to 40 tonnes/yr of polymer in formulation (polymer is 35 percent ; NMP os 5 percent)						
EVALUATION								
Domain		Metric	Rating	MWF^*	Score	Comments		
Domain 1: Reliabi	lity Metric 1:	Methodology	High	× 1	1	Information is from trusted sources		
Domain 2: Repres	entative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High Medium Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 4 3	Australia Adhesive use is in scope 2001 Characterized by no statistics		
Domain 3: Accessi	bility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions		
Domain 4: Variabi	ility and Un Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	limited discussion		
Overall Quality De	eterminatio	n [†]	Medium	levt name	1.7			
		Con		icat page				

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Source Citation: Type of Data Source Hero ID	Nicnas, 2001. Full public report: Polym Facility; Reports for Data or Information 3978357	er in primal l ı Other than	binder u-51 Exposure c	or Release Data;				
EVALUATION								
Domain	Metric	Rating	MWF* S	Score	Comments			

Source Citation:Nicnas, 1998. Full public report: Copolymer in foraperle 321.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3978358											
EXTRACTION Parameter			Data								
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Coating / Polymer i for use in surface of product of which ma be diluted spray equ the product pulp follo cutting of	Use Coating /additive in Papermaking Polymer in NMP is imported to Australia in 50 kg to 1 tonne containers for use in the paper and building industries. Polymer may be used as a surface or internal treatment for paper and paper type products. The product containing the notified polymer is transferred to a mixing tank, which may have a holding capacity of up to 1,000 L. Product will then be diluted significantly with water and applied to paper using rollers and spray equipment. As internal paper treatment, the notifier states that the product containing the notified polymer will be added to the paper pulp following the washing and bleaching process, but before rolling and cutting of the final paper product.							
Total Annual U.S. Volume (and percent of PV): Number of Sites: Operating Days per Year and Batches per Day: Chemical Concentration:			2500 kg p kg/yr for 1 (assume 300 days/ 30 percen prior to u	olymer-N paper ed) /yr (assun at polyme ase at pap	MP soli med) er & 10 per mill	n imported to Australia for use; assumed 2,000 to < 30 percent NMP in soln that is diluted					
EVALUATION											
Domain		Metric	Rating	MWF^{\star}	Score	Comments					
Domain 1: Reliabilit M	y Ietric 1:	Methodology	Medium	× 1	2	Information from industry contact. Not standard trusted source but no flaws identified.					
Domain 2: Represen M M	tative Ietric 2: Ietric 3:	Geographic Scope Applicability	Medium High	$\times 1$ $\times 2$	$\frac{2}{2}$	Australia This was not identified as a use by EPA, but no uses are ex-					
N	fetric 4:	Temporal Representativeness	Low	× 2	6	cluded from scope. May be applicable to coating OES?					
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Source Citation: Type of Data Source Hero ID	Nicnas,. 19 Facility; R 3978358	Nicnas, 1998. Full public report: Copolymer in foraperle 321. Facility; Reports for Data or Information Other than Exposure or Release Data; 3978358								
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
	Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics				
Domain 3: Access										
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	sources are not fully transparent, due to confidentiality of industry contact				
Domain 4: Variab	oility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion				
Overall Quality Determination [†]		Medium		2.2						

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* MWF = Metric Weighting Factor

Source Citation:NicType of Data SourceFacHero ID397	nas,. 1 ility; R 8358	998. Full public report: Copolyr Reports for Data or Information (ner in forap Other than	erle 321. Exposur	e or Rel	lease Data;	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use architectural (concrete) coating product containing the notified polymer usually will be applied by brush hence dermal and accidental ocular exposure may occur. The polymer is used at 2.5 g m-2					
Total Annual U.S. Volume (and percent of PV): Chemical Concentration:			is used at 2.5 g.m-2. 2500 kg polymer-NMP soln imported to Australia for use; Assumed 500 kg/yr for coating 5 to 10 percent solution containing polymer & NMP in coating				
EVALUATION		Metric	Bating	MWF*	Score	Comments	
			Itating		50010	Comments	
Domain 1: Reliability Me	tric 1:	Methodology	Medium	$\times 1$	2	Information from industry contact. Not standard trusted source but no flaws identified.	
Domain 2: Representa	tive			1	0		
Mei	tric 2 :	Geographic Scope	Medium	× 1	2	Australia	
Mei	tric 3:		High	× 2	2	in scope	
Me	tric 4:	Sample Size	Low	$\times 2$ $\times 1$	3	1998 Characterized by no statistics	
Domain 3: Accessibilit Mer	y/Clar tric 6:	ity Metadata Completeness	Medium	× 1	2	sources are not fully transparent, due to confidentiality of in- dustry contact	
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Low	× 1	3	No discussion		
Overall Quality Determination [†]		Medium		2.2			
		Con	tinued on r	next page	;		
				. 0			

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Source Citation: Type of Data Source Hero ID	Nicnas, 1998. Full public report: Copolymer in foraperle 321. Facility; Reports for Data or Information Other than Exposure or Release Data; 3978358							
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			

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Source Citation: Type of Data Source Hero ID	Osha, 2006. OSHA permissible exposure limit and general information: n-methyl-2-pyrrolidinone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3981001								
EXTRACTION			D /						
Parameter			Data						
Life Cycle Stage:			All						
Life Cycle Descrip	otion (Subca	ategory of Use):	All						
Process Descriptio	on:		Physical of	chemical	propert	ies; health effects; lab sampling method			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	OSHA			
			8		-	00111			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Medium	$\times 2$	4	Information is not related to a life cycle stage, but is broadly applicable			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Data sources are generally described but not fully transparent.			
Domain 4: Variah	vility and U	acertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type			
Overall Quality D	eterminatio	n^\dagger	High		1.4				

Source Citation:	N-Methylpyrrolidone Procedures Group, Inc. 2006. N-methyl 2-pyrrolidone (NMP) considerations against use in cosmetics, toiletries, and personal care products.								
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3981020								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use Pharmaceutical NMP was used in cosmetics, toiletries, and personal care products. The EU banned this use and prohibited the general public from using non- cosmetic products containing >=5 percent NMP.							
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	oility Metric 1:	Methodology	Low	× 1	3	The data, data sources, and/or techniques used in the assess- ment or report are not specified.			
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clar Metric 6:	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High Unacceptable Medium N/A Low	$\begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \end{array}$ $\times 1$	1 8 4 N/A 3	US Pharmaceutical use is a non-TSCA use. Reported use is cos- metics; therefore, out of scope. 2006 This metric is not applicable to this data type data sources, and assumptions are not fully transparent.			
Domain 4: Varian	Metric 7:	Metadata Completeness	Low	$\times 1$	3	no discussion			
Overall Quality I	Determinatio	n^{\dagger}	Unacceptable		4	Metric Mean Score: 2.8.			
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Source Citation:	N-Methylpyrrolidone Procedures Group, Inc toiletries, and personal care products.	e. 2006. N-m	ethyl 2-py	rrolidone	e (NMP) considerations against use in cosmetics,			
Type of Data Source Hero ID	Facility; Reports for Data or Information Of 3981020	ther than Exp	osure or F	Release I	Data;			
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor
| Source Citation:
Type of Data Source
Hero ID | Mitsubishi
Facility; R
3981028 | Mitsubishi, Chemical. 2017. NMP/N-methyl-2-pyrrolidone.
Facility; Reports for Data or Information Other than Exposure or Release Data;
3981028 | | | | | | |
|---|--|--|------------------------|---|-------------|--|--|--|
| EXTRACTION | | | | | | | | |
| Parameter | | | Data | | | | | |
| Life Cycle Stage:
Life Cycle Description (Subcategory of Use):
Process Description: | | Manufacture
manufacturing
produces high-purity, high-grade NMP from maleic anhydride in an in-
tegrated production process. | | | | | | |
| EVALUATION | | | | | | | | |
| Domain | | Metric | Rating | MWF^{\star} | Score | Comments | | |
| Domain 1: Reliab | ility
Metric 1: | Methodology | Medium | $\times 1$ | 2 | From chemical manufacturing company. No bias /errors evi-
dent. | | |
| Domain 2: Repres | sentative
Metric 2:
Metric 3:
Metric 4: | Geographic Scope
Applicability
Temporal Representativeness | Medium
High
High | $\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$ | 2
2
2 | NMP MFG site is in Japan
in scope
2017 | | |
| | Metric 5: | Sample Size | N/A | | N/A | This metric is not applicable to this data type | | |
| Domain 3: Access | sibility/Clar
Metric 6: | ity
Metadata Completeness | Low | $\times 1$ | 3 | Data sources not transparent | | |
| Domain 4: Variab | oility and U
Metric 7: | ncertainty
Metadata Completeness | N/A | | N/A | This metric is not applicable to this data type | | |
| Overall Quality D | Determinatio | \mathbf{n}^{\dagger} | High | | 1.6 | | | |

Source Citation: Type of Data Source Hero ID	Mitsubishi Facility; R 3981028	Mitsubishi, Chemical. 2017. NMP/N-methyl-2-pyrrolidone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3981028							
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use Metal finishing; Electronics Electronics: Wax, flux removal. Burr removal. Electronic parts clean- ing. Semiconductor parts cleaning. Solvent for lithium battery manu- facturing. Semiconductor photo-resist thinner. Color filter photo-resist thinner							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	NMP MFG site is in Japan			
	Metric 3:	Applicability	High	$\times 2$	2	in scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	Data sources not transparent			
		1				A			
Domain 4: Variab	oility and U	ncertainty	/ -		/ .				
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.6				

Source Citation: Type of Data Source Hero ID	Mitsubishi Facility; R 3981028	i, Chemical. 2017. NMP/N-meth eports for Data or Information (nyl-2-pyrrol Other than	idone. Exposure	e or Rel	ease Data;
EXTRACTION			Data			
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descrip	otion (Subca	ategory of Use):	Automoti	ve care		
Process Description	on:		Mold clea	ning. Me	etal (par	ets) cleaning.
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evident.
Domain 2: Repres	sentative					
1	Metric 2:	Geographic Scope	Medium	$\times 1$	2	NMP MFG site is in Japan
	Metric 3:	Applicability	High	$\times 2$	2	in scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Data sources not transparent
Domain 4: Variah	vility and U	ncortainty				
Domain 4. Variat	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type
		-				
Overall Quality D	eterminatio	\mathbf{n}^{\intercal}	High		1.6	

Source Citation: Type of Data Source Hero ID	Mitsubishi Facility; R 3981028	, Chemical. 2017. NMP/N-meth eports for Data or Information (nyl-2-pyrrol Other than	idone. Exposure	e or Rel	ease Data;
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Processin Petrocher Extract a	Processing Petrochemical Extract agent (acetylene, BTX, butadiene).			
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.
Domain 2: Repre	sentative					
1	Metric 2:	Geographic Scope	Medium	$\times 1$	2	NMP MFG site is in Japan
	Metric 3:	Applicability	High	$\times 2$	2	in scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	Data sources not transparent
Domain 4: Variab	oility and Un Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type
Overall Quality D	eterminatio	n^\dagger	High		1.6	

Source Citation: Type of Data Source Hero ID	Mitsubishi Facility; R 3981028	i, Chemical. 2017. NMP/N-meth eports for Data or Information (nyl-2-pyrrol Other than	idone. Exposure	e or Rel	ease Data;
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Processin intermedi Reaction	Processing intermediate Reaction solvents (PPS, polyimide, etc.)			
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evi- dent.
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	NMP MFG site is in Japan
	Metric 3:	Applicability	High	$\times 2$	2	in scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Data sources not transparent
Domain 4: Variab	ility and U Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type
Overall Quality D	eterminatio	n^\dagger	High		1.6	

Source Citation: Type of Data Source Hero ID	Mitsubishi Facility; R 3981028	i, Chemical. 2017. NMP/N-meth eports for Data or Information (nyl-2-pyrrol Other than	idone. Exposure	e or Rel	ease Data;
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use cleaning Plastic le	ns manuf	acturing	g equipment cleaning. Equipment washing.
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evi- dent.
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	NMP MFG site is in Japan
	Metric 3:	Applicability	High	$\times 2$	2	in scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	Data sources not transparent
Domain 4: Variab	oility and Un Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type
Overall Quality D	eterminatio	n^\dagger	High		1.6	

Source Citation: Type of Data Source Hero ID	Johnson M Facility; R 3981029	Johnson Matthey Process, Technologies. 2017. N-methyl-2-pyrrolidone (NMP). Facility; Reports for Data or Information Other than Exposure or Release Data; 3981029						
EXTRACTION			Data					
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Manufacture Manufacturing Contains PFD and reaction sequences. Our technology generates high- quality NMP by reacting gamma-butyrolactone (GBL) and monomethy- lamine (MMA), which are products of our butanediol and methylamines processes, respectively. Additional process description available.						
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	Low	$\times 1$	3	Unknown - could be US based or other countries		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Data sources not transparent		
Domain 4: Variab	oility and Un Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type		
Overall Quality D	eterminatio	n [†]	Medium		1.7			

Source Citation:Bpi,. 2017Type of Data SourceFacility; RHero ID3981030	. NMP free water borne polyure eports for Data or Information (ethane dispe Other than	ersions. Exposure	e or Rel	ease Data;	
EXTRACTION Parameter		Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use Coatings N-Methyl-2-Pyrrolidone (NMP) is the most common co-solvent used in the manufacture of waterborne polyurethane dispersions. The unique properties of NMP aid in both the processing of the polyurethane dis- persions as well as the flim formation of the applied polyurethane coating. In addition, the NMP can help with substrate wetting, freeze/thaw sta- bility, and adhesion to some substrates.				
EVALUATION						
Domain	Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliability Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.	
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Low High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	3 2 2 N/A	Unknown - could be US based or other countries in scope 2017 This metric is not applicable to this data type	
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	underlying data source are not fully transparent.	
Domain 4: Variability and Un Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type	
Overall Quality Determinatio	n^\dagger	Medium		1.7		

Source Citation: Type of Data Source Hero ID	Spin,. 201 Facility; R 3981132	7. SPIN substances in preparation of the preparatio	ons in nord Other than	ic countr Exposure	ies1-me e or Rel	thyl-2-pyrrolidon. lease Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			All			
Life Cycle Descript	tion (Subca	ategory of Use):	All			
Process Description	n:		Lists appl	licable No	ordic N	AICS equivalents. List of uses in nordic coun-
			tries, in g	generic te	erms (1.	e., degreasers, paints, laquers and varnishes,
Total Annual U.S.	Volume (a	nd percent of PV):	lists nord	ic PV for	each u	se
	`	1 /				
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1, Poliabi	1:+					
Domain 1: Reliabl	Metric 1	Methodology	High	× 1	1	Nordic substance database
		Mothodology	111.511	<u> </u>	1	
Domain 2: Represe	entative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Norway, Finland, other OECD member countries
	Metric 3:	Applicability	High	$\times 2$	2	in scope
	Metric 4:	Temporal Representativeness	High N/A	$\times 2$	$\frac{2}{N}$	
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Domain 3: Accessi	bility/Clar	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	underlying data source are not fully transparent.
Domain 4: Variabi	lity and Ui	ncertainty	DT / A		NT / A	
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type
Orronall Onality D	torminatio	nt	Uich		1 /	
Overall Quality De	eterninatio	11	111g11		1.4	

Source Citation: Type of Data Source Hero ID	European Facility; R 3981148	European Chemicals, Agency. 2016. 1-methyl-2-pyrrolidone brief profile. Facility; Reports for Data or Information Other than Exposure or Release Data; 3981148						
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Total Annual U.S. Volume (and percent of PV):			Manufact Manufact 10,000-10	Manufacture Manufacture or import 10,000-100,000 tonnes/yr (EU)				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	not from trusted sources, but do not seem flawed		
Domain 2: Repres	sentative							
Domain 2. Repres	Metric 2:	Geographic Scope	Low	$\times 1$	3	Europe		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016		
	Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics		
Domain 3: Access	sibility/Clar	ity Matadata Completeness	Low	× 1	3	Assessment on report provides results but the underlying		
	Metric 0.	Metadata Completeness	LOW	~ 1	5	methods, data sources, and assumptions are not fully transparent.		
Domain 4: Variah	oility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	no discussion		
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	Medium		2.0			

Source Citation:Basf., 1990.Type of Data SourceFacility; RepHero ID3982070	Basf, 1990. Technical information: N-methylpyrrolidone handling and storage. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982070								
EXTRACTION Parameter		Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			All All Physical chemical properties; lab analysis methods; biodegradability and aquatic toxicity; lists proper storage and equipment that should be used for NMP. NMP can be handled in carbon steel, stainless steel or nickel equipment. Aluminum is suitable for NMP service at ambient tempera- tures, only. Storage at ambient temperatures will not affect NMP. Cool storage conditions and light paint on aboveground tanks decrease evap- orative losses.						
EVALUATION				~					
Domain	Metric	Rating	MWF'*	Score	Comments				
Domain 1: Reliability Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evi- dent.				
Domain 2: Representative									
Metric 2:	Geographic Scope	High	$\times 1$	1	US				
Metric 3:	Applicability	Medium	$\times 2$	4	Information is not related to a life cycle stage, but is broadly applicable				
Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1990				
Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type				
Domain 3: Accessibility/Clarity	۲ <i>۲</i>								
Metric 6:	, Metadata Completeness	Low	$\times 1$	3	underlying data source are not fully transparent.				
Domain 4: Variability and Unc Metric 7:	ertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type				
Overall Quality Determination [†]	ł	Low		2.3					
	Con	tinued on n	ext page						

	Continu	red from previous page	
Source Citation: Type of Data Source Hero ID	Basf, 1990. Technical information: N-met Facility; Reports for Data or Information (3982070	hylpyrrolidone handling and storage. Other than Exposure or Release Data;	
EVALUATION			
Domain	Metric	Rating MWF* Score Comments	

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Source Citation: Type of Data Source Hero ID	Turi, 1996. N-methyl pyrrolidone: Chemical profile. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982071						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Manufacture Manufacturing NMP is manufactured mainly by condensing butyrolactone with methylamine. It may also be made by high pressure synthesis from acety-lene and formaldehyde. Separation of the water and NMP is generally achieved by distillation.					
Chemical Concentration:		at least 9	9.8	by dist			
EVALUATION							
Domain		Metric	Rating MWF* Score Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	data or techniques that are high quality	
Domain 2: Repres	sentative						
- • • ••F- ••	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1996	
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type	
Domain 3: Access	ibility/Clar	ity					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	clearly documents its data sources	
Domain 4: Variability and Uncertainty		Madium	× 1	0			
	metric /:	Metadata Completeness	meanum	× 1	2	limited discussion	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.6		

Source Citation: Type of Data Source Hero ID	Turi, 1996. N-methyl pyrrolidone: Chemical profile. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982071						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):		Use Paint stripper paint stripping accounts for only 10-15 percent 10-15 percent			or only 10-15 percent		
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	data or techniques that are high quality	
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1996	
	Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics	
Domain 3: Access	sibility/Clar	ity	TT: 1	1	1		
	Metric 6:	Metadata Completeness	High	× 1	1	clearly documents its data sources	
Domain 4: Varial	oility and Ur	ncertainty		_	-		
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	limited discussion	
Overall Quality Determination [†]			Medium		1.8		

Source Citation:	U.S, E. P. volume est	U.S, E. P. A. 1998. Cleaner technologies substitutes assessment for professional fabricare processes: Appendix F: Chemical volume estimates: Screen printing CTSA					
Type of Data Source Hero ID	Facility; R 3982072	Facility; Reports for Data or Information Other than Exposure or Release Data; 3982072					
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Life Cycle Descrip	otion (Subca	ategory of Use):	screen pri	inting - c	leaning	of screens	
Total Annual U.S	. Volume (a	nd percent of PV):	38,000 ga	l NMP u	sed in s	creen cleaning/yr	
Number of Sites:	× ×	. ,	20,000 sci	reen prin	ting fac	ilities	
Batch Size:			screen siz	ie and a	ditiona	l parameters to determine chemical cleaning	
			throughp	ut in Tal	ole F-1		
Operating Days p	er Year and	Batches per Day:	assumed a	252 days	/yr		
Site Daily Throug	ghput:		57 percen	nt of facil	ities cle	ean one to ten screens, or an average of 5.5 a	
			day.				
Possible Physical	Form:		liquid				
Chemical Concent	tration:		35 percent NMP in solution used to clean screens				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Boliah	ility						
Domain 1. Renad	Metric 1.	Methodology	High	× 1	1	USEDA	
	Meetic 1.	Methodology	111511	~ 1	1	00LI M	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1998	
	Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics	
		• .					
Domain 3: Access	Matuity/Clar	Ity Mata lata Gammalatan an	TT:l.		1		
	Metric 6: Metadata Completeness High $\times 1$ 1 report clearly documents its data sources, assessment met results, and assumptions.					report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4. Variah	ility and U.	agentainte					
Domain 4: variad	Metric 7.	Metadata Completeness	Medium	× 1	2	limited discussion	
	MICUIC /.		moutuill	^ I	4		
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Source Citation:	U.S, E. P. A. 1998. Cleaner technologies substitutes assessment for professional fabricare processes: Appendix F: Chemical volume estimates: Screen printing CTSA.							
Type of Data Source Hero ID	Facility; Reports for Data or Informatic 3982072	Facility; Reports for Data or Information Other than Exposure or Release Data; 3982072						
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Overall Quality D	Overall Quality Determination [†] Medium 1.8							

Source Citation: Type of Data Source Hero ID	University of, Minnesota. 2007. Safter stripping and cleaning chemicals for coatings & polymers. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982073						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use Paint stripper alternative stripping methods include: abrasive blasting, water blasting, scraping, sanding, tumbling, burn off and cold shock					
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	oility Metric 1:	Methodology	Medium	$\times 1$	2	not from trusted sources; however, associated information does not indicate flaws or quality issues	
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	in scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007	
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Data sources are generally described but not fully transparent.	
Domain 4: Varial	bility and Un Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type	
Overall Quality I	Determinatio	n^\dagger	High		1.6		

Source Citation:Basf,Type of Data SourceFaciliHero ID39820	. 1993 ty; Re)74	. Modification of a vapor degree eports for Data or Information (asing mach Other than	ine for in Exposure	nmersio e or Rel	n cleaning use N-methylpyrrolidone. lease Data;		
EXTRACTION Parameter	TION neter Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Batch Size: Possible Physical Form:				Use immersion degreasing Degreasing with NMP entails the immersing of an oil coated metal part into a heated bath of NMP, where the oil is solubilized. Upon removal from the cleaning bath, the part is immersed into a second heated bath, to remove the oil contaminated NMP from the metal surface. The sec- ond, or rinse bath, can be filled with either NMP or water. Drying the rinse liquid from the metal part is required. 10 complete cleaning cycles/hr; 5.0 lbs of parts cleaned per cycle liquid				
EVALUATION								
Domain		Metric	Rating	MWF'*	Score	Comments		
Domain 1: Reliability Metr	ic 1:	Methodology	Medium	$\times 1$	2	not from trusted sources, but do not seem flawed		
Domain 2: Roprocontati	10							
Metr	c^{2}	Geographic Scope	High	× 1	1	US		
Metr	ic 3:	Applicability	High	$\times 2$	2	Cleaning is included in scope		
Metr	ic 4:	Temporal Representativeness	Low	$\times 2$	6	1993		
Metr	ic 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics		
Domain 3: Accessibility Metr	Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Low × 1 3 Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully trans parent.							
Domain 4: Variability a	nd Un	certainty Matadata Completeness	Low	× 1	9	1		
Wetr	ic <i>(</i> :	Metadata Completeness	LOW	× 1	3	no discussion		
Continued on next page								

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Source Citation: Type of Data Source Hero ID	Basf, 1993. Modification of a vapor degreasing machine for immersion cleaning use N-methylpyrrolidone. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982074						
EVALUATION							
Domain	Metric	Rating MW	** Score	Comments			
Overall Quality I	$\operatorname{Determination}^{\dagger}$	Medium	2.2				

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* MWF = Metric Weighting Factor

Source Citation:Erg., 2000. Preferred and alternative methods for estimating air emissions from paint and ink manufacturing facilities.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3982076							
EXTRACTION Parameter Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Processing Paint and ink formulation Paint and ink manufacturing can be classified as a batch process and gen- erally involves the blending/mixing of resins, pigments, solvents, and ad- ditives. Traditional paint and ink manufacturing consists of four major steps: Preassembly and premix; Pigment grinding /milling /dispersing; Product finishing/blending; and Product filling/packaging (Fisher et al., 1993).				
EVALUATION	VALUATION Domain Metric Bating MWF* Score Comments						
		Turning					
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	From trusted sources		
Domain 2: Representative							
Metric 2:	Geographic Scope	High	$\times 1$	1	US		
Metric 3:	Applicability	High	$\times 2$	2	in scope		
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000		
Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.		
Domain 4: Variability and U	ncertainty						
Metric 7:	Metadata Completeness	High	$\times 1$	1	well characterized		
Overall Quality Determination	\mathbf{n}^{\dagger}	High		1.3			

Source Citation: Type of Data Source Hero ID	Larranaga, Facility; R 3982124	M. D., Lewis, R. J., Lewis, R. eports for Data or Information (A 2016. Other tha	Hawley' n Exposi	s Conde ure or F	ensed Chemical DictionaryN-methyl-2-pyrrolidone. Release Data;	
EXTRACTION			Data				
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use):		Use Solvent for resins, acetylene, etc., pigment dispersant, petroleum pro- cessing, spinning agent for polyvinyl chloride, microelectronics industry plactic solvent applications intermediate					
Process Description:			lists phy	ysical che	emical p	properties and uses of NMP	
EVALUATION	EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility		TT: 1	-	1		
	Metric 1:	Methodology	High	× 1	1	Hawley's Condensed Chemical Dictionary	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	all uses are in scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016	
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type	
Domain 3: Access	ibility/Clari	ity	÷	_	2		
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	underlying data source are not fully transparent.	
Domain 4: Variab	ility and Ur	ncertainty					
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.3		

Source Citation:TechnikonType of Data SourceFacility; RHero ID3982183	, L. L. C. 2001. Core box clean deports for Data or Information (er study: E Other than	vaporativ Exposure	ve emiss e or Rel	sion study of specialty systems' solvent FC-47-G1. lease Data;
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use cleaning of casts /molds and hoppers in foundry applications Cleaning to remove sand from casting and molding equipment. Solvent is sprayed onto casts /molds at 80-90 psi, rate of 0.08-0.27 gal/min. Solvent allowed to soak for 20 mins, then removed when the next part is molded and removed. Solvent sprayed on hoppers, soaked for 2-13 hours, chipped off.			
Batch Size: Chemical Concentration:		Molds = 0.5-1.2 gal of solvent /mold /day; Hoppers = 4.0-5.4 gal/ hopper/day NMP at unknown concentration			
EVALUATION					
Domain	Metric	Rating MWF [*] Score Comments			
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	High quality techniques
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$egin{array}{c} 1 \\ 2 \\ 4 \\ 2 \end{array}$	US in scope 2001 Range with uncertain statistics
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.
Domain 4: Variability and U: Metric 7:	ncertainty Metadata Completeness	High	× 1	1	well characterized
Overall Quality Determination	on^\dagger	High		1.3	
Continued on next page					

			F8-			
Source Citation: Type of Data Source Hero ID	Technikon, L. L. C 2001. Core box cleaner study: Evaporative emission study of specialty systems' solvent FC-47-G1. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982183					
EVALUATION						
Domain	Metric R	Rating MWF*	Score	Comments		

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* MWF = Metric Weighting Factor

Source Citation:	Oehha, 2007. Occupational health hazard risk assessment project for California: Identification of chemicals of concern,							
Type of Data Source Hero ID	Facility; R 3982225	Facility; Reports for Data or Information Other than Exposure or Release Data; 3982225						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Manufact	ure				
Life Cycle Descri	ption (Subca	ategory of Use):	Manufact	uring				
Total Annual U.S	5. Volume (a	nd percent of PV):	>100M-50	JOM				
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Relial	oility							
	Metric 1:	Methodology	High	$\times 1$	1	data or techniques that are high quality		
Domain 2: Bepre	sentative							
Domain 2. Repre	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	in scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002		
	Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics		
	1.11. /Cl	•						
Domain 3: Acces	Metric 6	Metadata Completeness	High	× 1	1	clearly documents its data sources		
	Meetile 0.		mgn	~ 1	1	clearly documents its data sources		
Domain 4: Varia	bility and Ui	ncertainty						
	Metric 7:	Metadata Completeness	High	$\times 1$	1	addresses variability and uncertainty		
Overall Quality Determination [†]			High		1.4			

Source Citation:	Ec,. 200	4. Effectiveness of vapour reathane	etardants i	n reduci	ng risk	s to human health from paint strippers containing
Type of Data Source	Facility; R	eports for Data or Information	Other than	Exposur	e or Rel	lease Data;
Hero ID	3982358					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descrit	tion (Subc	ategory of Use).	Paint stri	nner		
Chemical Concent	ration:	ategory of obc).	5-20 perce	ent		
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	ility	NG (1 1 1	TT' 1	1	1	
	Metric 1:	Methodology	High	× 1	1	trusted sources
Domain 2: Repres	sentative					
-	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Belgium
	Metric 3:	Applicability	High	$\times 2$	2	in scope
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2004
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range with uncertain statistics
Damain 9. Aaraa	:1::: / <i>C</i> 1					
Domain 3: Access	Motric 6	Motadata Completeness	Modium	$\vee 1$	9	Data courses are consulty described but not fully transport
	Metric 0.	Metadata Completeness	meanni	~ 1	2	Data sources are generally described but not fully transparent.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	no discussion
	otomoinoti-		Madium		1.0	
Overall Quality D	eterminatio	n'	Medium		1.8	

Source Citation: Type of Data Source Hero ID	Erm,. 201 Facility; R 3982372	7. Life cycle assessment of used eports for Data or Information (oil manage Other than	ment. Exposure	e or Rel	lease Data;
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Batch Size:		Use Petrochemical NMP can be used for re-refining of used oil to produce lube base oil. Some process information on pg 70, but confidentiality claims make it difficult to know the process used.				
			0.00 IIg II		, or proc	
EVALUATION Domain		Metric	Bating	MWF*	Score	Comments
		Metric	Hatting	IVI VV I	SCOLE	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	The assessment or report uses high quality data and/or tech- niques that are not from trusted sources; however, Associated information does not indicate flaws or quality issues.
D O D	, , .					
Domain 2: Repres	Sentative Motric 2:	Coographic Scope	High	~ 1	1	IIC
	Metric 2.	Applicability	High	$^{\land 1}$ $^{\lor 2}$	1	
	Metric 4:	Temporal Representativeness	High	$^{\wedge 2}$ $\times 2$	2	2017
	Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully trans- parent.
Domain 4: Variat	Motrie 7	Motodoto Completeness	Uich	V 1	1	
	Metric 7:	Metadata Completeness	пıgn	× 1	1	well characterized
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	High		1.6	

Source Citation: Type of Data Source Hero ID	U.S, E. P. Facility; R 3986610	A. 2013. Fact sheet: N-Methyl eports for Data or Information (pyrrolidone (NM Other than Expo	IP). osure or I	Release	Data;	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):			Use Paint and Coa Indicates that EVOH are resi 9 percent of 18	Use Paint and Coating Removal Indicates that Gloves made of butyl rubber or laminated polyethylene/ EVOH are resistant to NMP. Does not list customary PPE. 9 percent of 184 million lbs/yr			
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	oility Metric 1:	Methodology	Low	× 1	3	The data, data sources, and/or techniques used in the assess- ment or report are not specified.	
Domain 2: Repre	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low Low	$ \begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	$\begin{array}{c} 1\\ 2\\ 6\\ 3\end{array}$	US In scope No date Characterized by no statistics	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	× 1	4	Assessment or report does not document its data sources, as- sessment methods, and assumptions.	
Domain 4: Variab	bility and Un Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	The report does not address variability or uncertainty.	
Overall Quality I	Determinatio	\mathbf{n}^{\dagger}	Unacceptable		4	Metric Mean Score: 2.4.	
		(Continued on nex	t page			

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Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 2013. Fact sheet: N-Methylpyrrolidone (NMP). Facility; Reports for Data or Information Other than Exposure or Release Data; 3986610						
EVALUATION							
Domain	Metric	Rating	MWF* Score	Comments			

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

Source Citation:	McCormick, L. 2017. Comment submitted by Lindsay McCormick, Chemicals and Health Project Manager on behalf of Environmental Defense Fund (EDE). EDE							
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986675							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	otion (Subca	ategory of Use):	coating					
Chemical Concent	tration:		<5 percer	nt				
EVALUATION								
Domain		Metric	Rating	MWF^*	Score	Comments		
Domain 1: Reliab	Matula 1	Matha dala ma	M. J	1	0			
	Metric 1:	methodology	Medium	× 1	2	From environmental organization. No bias /errors evident with respect to this information.		
D O D	, , .							
Domain 2: Repres	Motria 2.	Coorrenhia Saona	Uich	× 1	1	11G		
	Metric 3:	Applicability	High	$\times 1$ $\times 2$	2	US In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	N/A	~ 2	N/A	This metric is not applicable to this data type		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source		
Domain 4. Variat	vility and Ur	acortainty						
Domain 4. Variat	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited information on concentration variability		
				·· •	-			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.3			
- · · · · · · · · · · · · · · · · · · ·			0					

Source Citation:	McCormick, L. 2017. Comment submitted by Lindsay McCormick, Chemicals and Health Project Manager on behalf of Environmental Defense Fund (EDE), EDE								
Type of Data Source Hero ID	Facility; R 3986675	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986675							
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Descrip Chemical Concern	otion (Subca	ategory of Use):	Use paint stri 25-50 per	pper /rei cent : 10	novers -15 perc	ent			
			F	,	P				
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From environmental organization. No bias /errors evident with respect to this information.			
	_								
Domain 2: Repres	sentative		TT: 1	1	1				
	Metric 2:	Geographic Scope	Hign High	× 1 × 2	1	US			
	Metric 5:	Tomporel Perrogentativeness	підп Цієр	× 2 × 2	2	In scope			
	Metric 5	Sample Size	Medium	× 2 × 1	2	2017 Bango with uncortain statistics			
	Metric 0.	Sample Size	Wiedrum	~ 1	2	trange with uncertain statistics			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source			
Domain 4. Variah	ility and U	acentainty							
Domain 4. Variat	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.3				

Source Citation:	Holmes, L. 2017. Comment submitted by Laurie Holmes, Senior Director, Environmental Policy, Motor & Equipment Manufacturers Association (MEMA). Motor & Equipment Manufacturers Association.									
Type of Data Source Hero ID	Facility; R 3986676	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986676								
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:				Use Adhesive NMP is used during the motor vehicle component manufacturing process as an adhesive (added as a viscosity aid). It may also be used in inks, varnishes, paint thinners, paint primers, paint removers, paste, lacquer, and solvents. When NMP is used as a viscosity aid in an adhesive in automotive applications, the chemical is cured and there is no solvent remaining.						
EVALUATION					~	<i>.</i>				
Domain		Metric	Rating	MWF'*	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evident.				
Domain 2: Benre	contativo									
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	In scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017				
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type				
Domain 3: Access	sibility/Clar	ity								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source				
Domain 4. Variah	iliter and He	- contointr								
Domain 4: variat	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type				
Overall Quality Determination [†] Hig					1.1					
Continued on next page										

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Source Citation:	Holmes, L. 2017. Comment submitted by facturers Association (MEMA). Motor &	Laurie Holi Equipment	mes, Senio Manufacti	r Director urers Asso	, Environmental Policy, Motor & Equipment Manu- ciation.
Type of Data Source Hero ID	Facility; Reports for Data or Information 3986676	Other than	Exposure	or Releas	e Data;
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments

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Source Citation: Type of Data Source Hero ID	Thomas, T Facility; R 3986789	C. 2017. Comment submitted by eports for Data or Information (Todd Tho Other than	mas, ELA Exposur	ANTAS e or Rel	PDG, Inc. (EPDG). lease Data;	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Processing /Use Polymers and Electronics (wires) Functional Uses: Reaction medium for the manufacture of high tem- perature polymers; Solvent and/or diluent for synthesis of wire enamels and related intermediates; Dye solutions for use in wire coatings; Pro- cess vessel cleaning solvent; Limited use as an industrial cleaning solvent strictly in the wire coating industry; Limited use as a cleaning solvent in regulated metal parts washer applications; Limited use as a flexibilizer for				
Total Annual U.S	. Volume (a	nd percent of PV):	B-Stage coatings (i.e., dried but not cured) I percent of PV): EPDG used the following weights (in pounds) by year going back to 2014:- 2014 1,606,040- 2015 1,481,993- 2016 1,253,048				
EVALUATION							
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evi- dent.	
Domain 2: Repres	sentative						
	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US In scope 2017 This metric is not applicable to this data type	
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Information is from the source	
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type	
		Cor	tinued on 1	next page	e		

	Contra	mucu nom j	JICVIOUS	page				
Source Citation: Type of Data Source Hero ID	Thomas, T. 2017. Comment submitted by Todd Thomas, ELANTAS PDG, Inc. (EPDG). Facility; Reports for Data or Information Other than Exposure or Release Data; 3986789							
EVALUATION				q				
Domain	Metric	Rating	MWF'*	Score	Comments			
Overall Quality E	$\operatorname{Petermination}^\dagger$	High		1.1				

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* MWF = Metric Weighting Factor

Source Citation:	Brown, T; of Scientifi	Brown, T; Bennett, S. 2017. Comment submitted by Timothy Brown, Regulatory Counsel and Steven Bennett, Vice President of Scientific Affairs, Consumer Specialty Products Association (CSPA). Consumer Specialty Products Association.							
Type of Data Source Hero ID	Facility; R 3986792	eports for Data or Information (Other than	Exposure	e or Re	lease Data;			
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:				Use metal finishing CSPA notes industrial/commercial use of N-methylpyrrilidone as pene- trant used for determination of metal fatigue for turbines, bridges, and other critical uses, for inspections of metal fatigue, welding cracks, etc.					
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Information is from the source			
	1.100110-0.		8	~ 1	+				
Domain 4: Variab	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type			
Overall Quality D	eterminatio	${f n}^\dagger$	High		1.1				

$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Source Citation:	MacRoy, P. 2017. Comment submitted by Patrick MacRoy on behalf of Environmental Health Strategy Center et al Environmental Health Strategy Center.									
EXTRACTION Parameter Data Life Cycle Stage: Life Cycle Description (Subcatesory of Use): Total Annual U.S. Volume (and percent of PV): Manufacture / import Manufacture Manufacture Manufacture Manufacture Number of Sites: The CDR submissions stat for 2011 through 2015, inclusive, report an average annual U.S. production (domestic manufacture plus imports) of 170 million pounds. During this same time period, imports from China rose sharply to four million pounds. more than 2 percent of total U.S. production. Four companies producing NPI in the United States according to CDR and other data: Ashiand (in Texas City, TX), BASF (Geismar, LA), Eastman (Fieldale, VA), Eyondel (Channelview, TX) EVALUATION Metric 1: Metric Rating MWF* Score Comments Domain 1: Reliability Metric 2: Geographic Scope High × 1 1 US Metric 2: Geographic Scope High × 2 2 From environmental organization. No bias / errors evident (Metric 4: Temporal Representativeender (Metric 5: Sample Size) N/A 1 US Metric 3: Applicability High × 1 1 US Metric 4: Temporal Representativeender (Metric 6: Sample Size) N/A N/A In score Domain 1: Reliability Metric 4: Temporal Representativeender (Metr	Type of Data Source Hero ID	Facility; R 3986795	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986795								
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Total Annual U.S. Volume (and percent of PV): Manufacture/import The CDR submissions data for 2011 through 2015, inclusive, report an average annual U.S. production (domestic manufacture plus imports) of 170 million pounds. During this same time period, imports from China rose sharply to four million pounds. During this same time period, imports from China rose sharply to four million pounds. During this same time period, imports from China rose sharply to four million pounds. During this same time period, imports from China rose sharply to four million pounds. During this same time period, imports from China rose sharply to four million pounds. During this same time period, imports from China rose sharply to four million pounds. During this same time period, imports from China rose sharply to four million pounds. During this same time period, imports from China rose sharply to four million pounds. During this same time period, imports from China rose sharply to four million pounds. During this same time period, imports from China rose sharply to four million pounds. During this same time period, imports from China rose sharply to four million pounds. During this same time period, imports from China rose sharply to four onpanies producing NMP in the United States according to CDR and other data: Ashland (in Texas City, TX), BASF (Geismar, LA), EXALUATION Domain 1: Reliability Metric 1: Methodology Metric Rating MWF* Score Commental organization. No bias /errors evident respect to this information. Domain 2: Representative Metric 3: Applicability Metric 5: Sample Size Geographic Scope High High X 1 1 US Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High	EXTRACTION Parameter			Data							
Number of Sites: of 1/0 million pounds. During this same time period, imports from China rose sharply to four million pounds, more than 2 percent of total U.S. production. four companies producing NMP in the United States according to CDR and other data: Ashland (in Texas City, TX), BASF (Geismar, LA), Eastman (Fieldale, VA), Lyondell (Channelview, TX) EVALUATION Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology Medium × 1 2 From environmental organization. No bias /errors evident respect to this information. Domain 2: Representative Metric 3: Applicability High × 1 1 US Metric 4: Temporal Representativeeness High × 2 2 2017 Metric 5: Sample Size N/A N/A N/A This metric is not applicable to this data type Domain 4: Variability and Uncertainty Metric 7: Metric 7: Metric 7: Metric 7:	Life Cycle Stage: Life Cycle Description (Subcategory of Use): Total Annual U.S. Volume (and percent of PV):		Manufact Manufact The CDF average a	ure ure/impo t submiss annual U	ort sions da J.S. proc	ta for 2011 through 2015, inclusive, report an duction (domestic manufacture plus imports)					
EVALUATION Domain Metric Rating MWF* Score Comments Domain 1: Reliability Metric 1: Methodology Medium × 1 2 From environmental organization. No bias /errors evident respect to this information. Domain 2: Representative Metric 2: Geographic Scope High × 1 1 US Metric 3: Applicability High × 2 2 In scope Metric 4: Temporal Representativeness High × 2 2 2017 Metric 5: Sample Size N/A N/A This metric is not applicable to this data type Domain 3: Accessibility/Clarity Metric 6: Metric Accompleteness High × 1 1 Information is from the source Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness N/A N/A This metric is not applicable to this data type	Number of Sites:			of 170 million pounds per year, with a range from 160 to 187 million pounds. During this same time period, imports from China rose sharply to four million pounds, more than 2 percent of total U.S. production. four companies producing NMP in the United States according to CDR and other data: Ashland (in Texas City, TX), BASF (Geismar, LA), Eastman (Fieldale, VA), Lyondell (Channelview, TX)							
DomainMetricRatingMWF*ScoreCommentsDomain 1: Reliability Metric 1:Metric 0Medium× 12From environmental organization. No bias /errors evident respect to this information.Domain 2: Representative Metric 3:Metric 2:Geographic ScopeHigh× 11USMetric 3:Applicability Metric 4:High× 22In scopeMetric 4:Temporal Representativeness Metric 5:High× 222017Metric 5:Sample SizeN/AN/AThis metric is not applicable to this data typeDomain 4: Variability and Uncertainty Metric 7:Metadata CompletenessHigh× 11Metric 7:Metadata CompletenessN/AN/AThis metric is not applicable to this data type	EVALUATION										
Domain 1: Reliability Metric 1: Methodology Medium $\times 1$ 2 From environmental organization. No bias /errors evident respect to this information. Domain 2: Representative Metric 2: Geographic Scope High $\times 1$ 1 US Metric 3: Applicability High $\times 2$ 2 In scope Metric 4: Temporal Representativeness High $\times 2$ 2 2017 Metric 5: Sample Size N/A N/A This metric is not applicable to this data type Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High $\times 1$ 1 Information is from the source Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness N/A N/A This metric is not applicable to this data type	Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Metric 1: Methodology Medium × 1 2 From environmental organization. No bias /errors evident respect to this information. Domain 2: Representative Image: Sepresentative respect to this information. Domain 2: Representative Image: Sepresentative respect to this information. Metric 2: Geographic Scope High × 1 1 US Metric 3: Applicability High × 2 2 In scope Metric 4: Temporal Representativeness High × 2 2 2017 Metric 5: Sample Size N/A N/A This metric is not applicable to this data type Domain 3: Accessibility/Clarity Implicable to this data type Domain 4: Variability and Uncertainty N/A N/A This metric is not applicable to this data type	Domain 1: Reliab	ility									
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		Metric 1:	Methodology	Medium	$\times 1$	2	From environmental organization. No bias /errors evident with respect to this information.				
Metric 2: Geographic Scope High × 1 1 US Metric 3: Applicability High × 2 2 In scope Metric 4: Temporal Representativeness High × 2 2 2017 Metric 5: Sample Size N/A N/A This metric is not applicable to this data type Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High × 1 1 Information is from the source Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness N/A N/A This metric is not applicable to this data type	Domain 2: Repres	sentative									
Metric 3: Applicability High × 2 2 In scope Metric 4: Temporal Representativeness High × 2 2 2017 Metric 5: Sample Size N/A N/A This metric is not applicable to this data type Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High × 1 1 Information is from the source Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness N/A N/A N/A This metric is not applicable to this data type	1	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
Metric 4: Temporal Representativeness High N/A × 2 2 2017 Metric 5: Sample Size N/A N/A This metric is not applicable to this data type Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High × 1 1 Information is from the source Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness N/A N/A N/A		Metric 3:	Applicability	High	$\times 2$	2	In scope				
Metric 5: Sample Size N/A N/A This metric is not applicable to this data type Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High × 1 1 Information is from the source Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness N/A N/A This metric is not applicable to this data type		Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017				
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High × 1 1 Information is from the source Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness N/A N/A N/A		Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type				
Metric 6: Metadata Completeness High × 1 1 Information is from the source Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness N/A N/A This metric is not applicable to this data type	Domain 3: Access	sibility/Clar	ity								
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness N/A N/A This metric is not applicable to this data type		Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source				
Metric 7: Metadata Completeness N/A N/A This metric is not applicable to this data type	Domain 4: Variah	oility and U	ncertainty								
	Domain 1. Variat	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type				
Continued on most no m				timun I							
– continued from previous page											
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Source Citation:	MacRoy, P. 2017. Comment submitted by Patrick MacRoy on behalf of Environmental Health Strategy Center et al Environmental Health Strategy Center.										
Type of Data Source	Facility; Reports for Data or Information	Facility; Reports for Data or Information Other than Exposure or Release Data;									
Hero ID	3986795										
EVALUATION											
Domain	Metric	Rating	MWF^{\star}	Score	Comments						
Overall Quality Determination [†] High 1.1											

Source Citation:	MacRoy, P. 2017. Comment submitted by Patrick MacRoy on behalf of Environmental Health Strategy Center et al Envi-							
Type of Data Source Hero ID	Facility; R 3986795	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986795						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	otion (Subca	ategory of Use):	paints, co	atings, a	dhesives	5		
Chemical Concent	ration:		5-7 percer	t : 0.25-0).5 perc	ent ; <4 percent ; 8-12 percent ; 1-2.5 percent ;		
			0.3-1 perc	ent; $5-1($) percen	t; 1.6 percent; 2.5-10 percent; 1-2.5 percent;		
			1-2.5 perc	ent; 0.1 -	1 percei	nt; 0.1-1 percent; 0.1-1 percent; 0.1-1 percent nt : 2.5.10 percent : 1.3 percent		
			, 1-5 perc	ent, 1-2.	5 perce	nt, 2.5-10 percent, 1-5 percent		
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1. Roliah	:1;+							
	Metric 1:	Methodology	Medium	$\times 1$	2	From environmental organization. No bias /errors evident with respect to this information.		
Domain 2. Benres	entative							
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range with uncertain statistics		
Domain 2. Agaaga	ibility/Clar	:+						
Domain 5. Access	Metric 6	Metadata Completeness	High	× 1	1	Information is from the source		
			111.911	~ 1	1			
Domain 4: Variab	ility and Ui	ncertainty						
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.3			

Source Citation:	MacRoy, P. 2017. Comment submitted by Patrick MacRoy on behalf of Environmental Health Strategy Center et al Envi- ronmental Health Strategy Center							
Type of Data Source Hero ID	Facility; R 3986795	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986795						
EXTRACTION			_					
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	otion (Subca	ategory of Use):	Pesticides	3				
Process Description	on:		Dog flea a	and tick i	remover			
Chemical Concent	tration:		30-47 per	cent				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1. Reliab	ility							
	Metric 1:	Methodology	Medium	$\times 1$	2	From environmental organization. No bias /errors evident with respect to this information.		
Domain 2. Panna	antativa							
Domain 2. Repres	Metric 2.	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	Medium	$\times 2$	4	Pesticide not in scope of TSCA; however, information is appli-		
	Motrie 4.	Tomporal Roprosontativonoss	High	× 9	9	cable to formulation		
	Metric 5	Sample Size	Medium	$\times 1$	$\frac{2}{2}$	Bange with uncertain statistics		
		Sample Size	mourum	<u> </u>	-			
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source		
	.1., 1.1.1	, · ,						
Domain 4: Variat	Motrie 7:	Motodoto Completeness	Modium	× 1	0			
	Metric 7:	Metadata Completeness	Mealum	× 1	2	Limited information on concentration variability		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.6			

* MWF = Metric Weighting Factor

Source Citation:	MacRoy, P. 2017. Comment submitted by Patrick MacRoy on behalf of Environmental Health Strategy Center et al Envi-							
Type of Data Source Hero ID	Facility; R 3986795	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986795						
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Chemical Concentration:				Use cleaners 100 percent ; 5-10 percent ; <1 percent				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From environmental organization. No bias /errors evident with respect to this information.		
Domain 2: Panno	antativa							
Domain 2. Repres	Metric 2.	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range with uncertain statistics		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information is from the source		
Domain 4: Variab	ility and U	ncertainty						
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.3			

Source Citation:	MacRoy, P. 2017. Comment submitted by Patrick MacRoy on behalf of Environmental Health Strategy Center et al Envi-							
Type of Data Source Hero ID	Facility; R 3986795	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986795						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	otion (Subca	ategory of Use):	paint strip	pper /rer	novers			
Chemical Concent	tration:		50 percen	t; 10-20	percent			
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility		M	1	0			
	Metric 1:	Methodology	Medium	X I	2	From environmental organization. No bias /errors evident with respect to this information.		
Domain 9. Donna								
Domain 2: Repres	Metric 2.	Geographic Scope	High	× 1	1	IIS		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	× 2	2	2017		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range with uncertain statistics		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source		
Domain 4. Variat	vility and U	acertainty						
Domain 4. Vallar	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability		
		*				0		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.3			
• •			0					

Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group, Inc.						
Type of Data Source Hero ID	Facility; R 3986796	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986796					
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:			Use electronics - Photoresist Stripping NMP is used as a solvent in circuit board manufacturing in photoresist stripping. Some facilities report that photoresist stripping occurs in batches; others report continuous processing. The NMP used in the process is up to 100 percent concentration, is in liquid or liquid spray form, and is heated up to 85 "F. Facilities report that storage can be in 55-gallon drums, totes, or one to five gallon bottles. up to 100 percent				
EVALUATION						Commente	
Domain		Metric	nating	IVI VV F	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.	
Domain 2: Bonroe	ontotivo						
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	In scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017	
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type	
Domain 3: Access	ibility/Clar	ity					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source	
Domain 4: Variab	ility and U	ncertainty					
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability	
Overall Quality Determination [†]			High		1.3		
		Con	ntinued on r	next page)		

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Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group, Inc.						
Type of Data Source Hero ID	Facility; Reports for Data or Information Other 3986796	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986796					
EVALUATION							
Domain	Metric Rati	ing MWF*	Score	Comments			

Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group. Inc.						
Type of Data Source Hero ID	Facility; R 3986796	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986796					
EXTRACTION			Data				
Parameter			Data				
Life Cycle Stage:			Use				
Life Cycle Descrip	ption (Subca	ategory of Use):	electronic	s - Solde	rmask S	Stripping	
Process Description	on:		Liquid NI	MP (up t	o 99.9 p	percent concentration) is used to remove solder	
			mask in	circuit b	oards.	Solder mask stripping typically occurs as a	
			NMP use	d is repo	rtedly a	t ambient temperature or heated up to 180"F	
			The NMF	^o used in	the pro	ocess is typically stored in 55-gallon drums or	
			one to fiv	e gallon	contain	ers.	
Chemical Concern	tration:		up to 99.9	9 percent	;		
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1. Daliah	:1:4						
Domain 1: Reliad	Metric 1.	Methodology	Medium	× 1	2	From chemical manufacturing company. No hias /errors evi-	
		inethodology	mourum	~ 1	-	dent.	
Domain 2: Repre	sentative						
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	In scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	$\frac{2}{1}$	2017	
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source	
Domain 4: Variat	oility and U	ncertainty					
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability	
		±					
Overall Quality D	Determinatio	on^{\intercal}	High		1.3		
Continued on next page							

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Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group, Inc.						
Type of Data Source Hero ID	Facility; Reports for Data or Information Other 3986796	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986796					
EVALUATION							
Domain	Metric Rati	ing MWF*	Score	Comments			

Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager,							
Type of Data Source Hero ID	Facility; R 3986796	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986796						
EXTRACTION Parameter	Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:				Processing Chemical processing, excluding formulation (polymer manufacturing) NMP is a carrier solvent used to uniformly apply a polymer to man- ufacture an industrial membrane. The polymer and NMP are mixed as batches in a steel tank with controlled releases and local ventilation, followed by application of the polymer solution and extraction of the NMP in a water bath. The NMP used in the process is greater than 50 percent concentration in liquid form and is heated. NMP can be stored in tanks, bulk containers, totes, or drums. greater than 50 percent				
EVALUATION					Comments			
Domain		Metric	Itatilig	IVI VV I	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evi- dent.		
Domain 2: Bepre	sentative							
	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	$\begin{array}{cccccc} \mathrm{High} & \times 1 & 1 & \mathrm{US} \\ \mathrm{High} & \times 2 & 2 & \mathrm{In \ scope} \\ \mathrm{High} & \times 2 & 2 & 2017 \\ \mathrm{N/A} & & \mathrm{N/A} & \mathrm{This \ metric \ is \ not \ applicable \ to \ this \ data \ type} \end{array}$					
Domain 3: Access	sibility/Clar	ity	TT: 1	1	1			
	Metric 6:	Metadata Completeness	High	× 1	1	Information is from the source		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Medium × 1 2 Limited information on concentration variability					Limited information on concentration variability			
Continued on next page								

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Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group, Inc.							
Type of Data Source	Facility; Reports for Data or Information	Facility; Reports for Data or Information Other than Exposure or Release Data;						
Hero ID	3986796							
EVALUATION								
Domain	Metric	Rating MW	F [*] Score	Comments				
Overall Quality D	$\operatorname{Petermination}^{\dagger}$	High	1.3					

Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group. Inc.						
Type of Data Source Hero ID	Facility; R 3986796	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986796					
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:			Use Fertilizer application NMP is a solvent used in the production of a fertilizer additive that prevents the volatilization of urea (as ammonia). As further detailed below, fertilizer additive products that may contain NMP are controlled and finished fertilizers that have such small amounts of NMP, it would be an unnecessary expenditure of EPA"s time to evaluate them for further regulatory restriction. 15-45 percent in additive; 0.1 percent in final product				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.	
Domain 2: Repre	sentative	Q 1: 0	II: 1	1	1		
	Metric 2: Matric 2:	Geographic Scope	High High	$\times 1$	1	US	
	Metric 5: Metric 4:	Applicability Temporal Representativeness	High	$\times 2$ $\times 2$	2	In scope	
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range with uncertain statistics	
Domain 3: Access	sibility/Clar	ity Matadata Completeness	II: ah	× 1	1		
	metric o:	Metadata Completeness	піgn	X 1	1	Information is from the source	
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability	
Overall Quality Determination [†]					1.3		
Continued on next page							

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Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group, Inc.						
Type of Data Source Hero ID	Facility; Reports for Data or Information Other 3986796	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986796					
EVALUATION							
Domain	Metric Rati	ing MWF*	Score	Comments			

Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group. Inc.									
Type of Data Source Hero ID	Facility; R 3986796	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986796								
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:			Data Processing Formulation and distribution NMP is often handled by distributors that blend and package products containing NMP, such as industrial paint stripper formulations or indus- trial surface cleaning blends. On site, NMP is stored in tanks, totes, drums, or tank trucks. Within the distribution facility, NMP is pro- cessed in mixers and tanks within closed and controlled release systems. Processing is typically batched. The NMP is in the liquid form at am- bient or increased temperature. 5-100 percent							
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliab	oility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.				
Domain 2: Repre	sentative									
Ĩ	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 2 2	US In scope 2017 Range with uncertain statistics				
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information is from the source				
Domain 4: Varial	bility and Un Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited information on concentration variability				

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Source Citation:	Roberts, KM. 2017. Comment submitted by Kathleen M. Roberts, N-Methylpyrrolidone (NMP) Producers Group Manager, NMP Producers Group, Inc.							
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;							
Hero ID	3986796							
EVALUATION								
Domain	Metric	Rating MW	F [*] Score	Comments				
Overall Quality D	$\operatorname{Petermination}^{\dagger}$	High	1.3					

Source Citation: Type of Data Source	Gerber, JM. 2017. Comment submitted by Jonathan M. Gerber, Advanced Regulatory Specialist, 3M Medical Department, Toxicology & Compliance Solutions 3M Center, Part 2. 3M Center. Facility; Reports for Data or Information Other than Exposure or Release Data;									
Hero ID	3986797	3986797								
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Chemical Concentration:			Use Paints, coatings, adhesives 0.5 percent ; 5-15 percent ; <5 percent ; <1.5 percent ; <0.5 percent ; <14 percent ; <1 percent ; 1-5 percent ; <0.5 percent							
EVALUATION					~	~				
Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	In scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017				
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range with uncertain statistics				
Domain 3: Access	sibility/Clar	ity Matadata Completeners	II:mb	× 1	1					
	Metric 6:	Metadata Completeness	High	× 1	1	Information is from the source				
Domain 4: Variah	oility and U	ncertainty								
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability				
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.3					

* MWF = Metric Weighting Factor

Source Citation:	Gerber, JM. 2017. Comment submitted by Jonathan M. Gerber, Advanced Regulatory Specialist, 3M Medical Department, Toxicology & Compliance Solutions 3M Center, Part 2, 3M Center						
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986797						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Descrip Chemical Concent	otion (Subca tration:	ategory of Use):	Use Printing 1 5-10 perce	Inks ent			
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.	
Domain 2: Repres	sentative		TT· 1	1	1		
	Metric 2:	Geographic Scope	Hign High	× 1	1	US	
	Metric 5:	Tomporel Poppogentativopog	підіі Цієрь	$\times 2$	2	In scope	
	Metric 5.	Sample Size	Medium	× 2 × 1	2	2017 Banga with uncortain statistics	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Information is from the source	
		<u>^</u>					
Domain 4: Variab	oility and Ur	ncertainty			_		
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited information on concentration variability	
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.3		

Source Citation:	Riegle, L. 2017. Comment submitted by Leslie Riegle, Director of Environmental Policy Aerospace Industries Association (AIA) Part 3 Aerospace Industries Association							
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986798							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:		Use Paint stripper Specific aerospace industrial uses include but may not be limited to: solvents for both cleaning and removal of coatings (in electronics as well as for use with specific coatings and applications); as a constituent in adhesives, release agents, inks, coatings (including topcoats, primers and specialty coatings) surface pretreatments; as well as a sealant for sensitive military aircraft applications. 15-35 percent						
EVALUATION		Matria	Dating	MM7177*	Coore	Commente		
Domain		Metric	Rating	IVI VV F	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.		
Domain 2: Bapro	contativo							
Domain 2. Repre	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range with uncertain statistics		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Information is from the source		
	WICHIE O.	Metadata Completeness	IIIgii	~ 1	1	information is from the source		
Domain 4: Varial	oility and U	ncertainty						
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability		
Overall Quality I	Determinatio	n^{\dagger}	High		1.3			
		Cor	ntinued on r	next page	9			

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Source Citation:	Riegle, L. 2017. Comment submitted by Leslie Riegle, Director of Environmental Policy Aerospace Industries Association (AIA), Part 3. Aerospace Industries Association.						
Type of Data Source Hero ID	Facility; Reports for Data or Information Otl 3986798	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986798					
EVALUATION							
Domain	Metric	Rating MV	VF^* S	Score	Comments		

Source Citation: Type of Data Source Hero ID	Anonymous. 2017. Anonymous public comment, Part 7. Facility; Reports for Data or Information Other than Exposure or Release Data; 3986799								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):		Processing Chemical processing, excluding formulation (polymer manufacturing) NMP is imported as a dispersant liquid for polymer particles. NMP solution is applied by gravure to form a polymer film. NMP is dried and captured for recycle/reuse. <1 metric ton; max. of <20 metric ton/yr							
Number of Sites:				anies in t	the US t	that use NMP this way			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Low	× 1	3	Anonymous comment - data, data sources, and/or techniques used in the assessment or report are not specified			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source			
Damain 4. Variah	:1:41 TT-								
Domain 4: Variat	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type			
			/						
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.3				

Source Citation:	Davis, R. 2017. Comment submitted by Raleigh Davis, Assistant Director, Environmental Health and Safety, American Coatings Association (ACA), Part 2. American Coatings Association.								
Type of Data Source Hero ID	Facility; R 3986800	eports for Data or Information (Other than	Exposur	e or Re	lease Data;			
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:			Use Paints, cc NMP is a used in wa the disper the viscos dispersion process. 0.5 percen <0.1 percent (0.1-1 percent) ; 1-5 percent <0.5 percent; (0.5 percent) (0.5 percen	patings, a used as a ax disper- sions of p ity of ure as. NMP i ent; <1 p ent; $1-5$ ent; <2 ent; 0.1 - cent; <1 rcent	dhesive a coales sions ter jigment thane c is capab percent percent percent 1 perce 4 perce	s scing aid in antistatic applications. NMP is chnology, allowing coatings systems to im-prove s. NMP is used as a rheology additive to control oatings in the process of making aque-ous le of dissolving polymers that are difficult to ; 5-15 percent ; 1-5 percent ; 0.1-1 percent ; t ; 45-60 percent ; 5-10 percent ; 1-5 percent ; t ; <1.5 percent ; <0.2 percent ; 10-50 percent ent ; 1-5 percent ; <1.5 percent ; <1.5 percent ; nt ; 1-2 percent ; 0.8-2.1 percent ; 2-3 percent			
EVALUATION Domain		Metric	Bating	MWF*	Score	Comments			
			8						
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Trade association poll of manufacturers. No bias /errors evident.			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range with uncertain statistics			
Domain 3: Access	sibility/Clari	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source			

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Source Citation:	Davis, R.	Davis, R. 2017. Comment submitted by Raleigh Davis, Assistant Director, Environmental Health and Safety, American						
Type of Data Source Hero ID	Facility; R 3986800	Coatings Association (ACA), Part 2. American Coatings Association. Facility; Reports for Data or Information Other than Exposure or Release Data; 3986800						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 4: Varial	oility and Ur Metric 7:	certainty Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability		
Overall Quality I	Determination	\mathbf{n}^{\dagger}	High		1.3			

Source Citation: Type of Data Source Hero ID	Isaacs, D. Facility; R 3986801	2017. Comment submitted by D eports for Data or Information (avid Isaacs Other than	, Semico Exposur	nductor e or Rel	Industry Association (SIA). ease Data;
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:			Use Electronics - semiconductor manufacturing The semiconductor industry uses NMP in manufacturing for three main purposes:1. Dedicated solvent in certain photolithography formulations, including photoresists, Bottom Anti-Reflective Coatings (BARC) and polyimides2. Solvent pre-wet of wafers prior to application of spin on polymer3. Component of photoresist stripper formulations. No NMP is present in the final polyimide film.			
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliabi	lity Metric 1:	Methodology	Medium	$\times 1$	2	Trade association poll of manufacturers. No bias /errors evi- dent.
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	In scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type
Denne in 9. Accord	1.:1:+ /Cl:					
Domain 3: Accessi	Motric 6:	Motadata Completeness	High	~ 1	1	Information is from the source
	MEDIIC U.	Metadata Completeness	IIIgii	~ 1	1	mormation is from the source
Domain 4: Variabi	ility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type
Overall Quality De	eterminatio	n [†]	High		1.1	

Source Citation:	Rudnick, M. 2017. Comment submitted by Michelle Rudnick, Senior Manager Regulatory Affairs, CRC Industries, Inc., Part 2, CRC.								
Type of Data Source Hero ID	Facility; R 3986802	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986802							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use paint stripper /removers CRC uses NMP in two gasket remover aerosol products and one graffiti remover aerosol product. To use the product, we recommend that the surface be coated with the graffiti remover product and allowed to sit for 5 minutes. The paint can then be wiped or scraped off							
Batch Size: Chemical Concentration:			3 oz (1/4) <= 20 per	of a can)) for the	e average gasket			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.			
Domain 2: Repres	Sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US In scope 2017 This metric is not applicable to this data type			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Information is from the source			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Medium × 1 2 Limited information on concentration variability						Limited information on concentration variability			
Overall Quality Determination [†] High					1.3				
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Source Citation:	Rudnick, M. 2017. Comment submitted by Michelle Rudnick, Senior Manager Regulatory Affairs, CRC Industries, Inc., Part 2. CRC.								
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;								
Hero ID	3986802								
EVALUATION									
Domain	Metric	Rating	MWF^{\star}	Score	Comments				

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Source Citation:	National E (NEMA).	National Electrical Manufacturers Association. 2017. Comment submitted by National Electrical Manufacturers Association (NEMA).							
Type of Data Source Hero ID	Facility; R 3986803	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986803							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:		Use Electronics - magnet wires The magnet wire industry has long utilized NMP as a solvent/diluent in high-performance magnet wire enamels, thinners, and cleaners. Specifi- cally, magnet wire plays a critical role in three areas of energy transfor- mation through its use today in transformers, motors and generators. In the magnet wire industrial process a copper or aluminum wire is routed through an applicator of solvent-based enamel coating. NMP does not react with the other ingredients in this coating, but is simply mixed in to facilitate the smooth application of the enamel. 80-85 percent							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evi- dent.			
Domain 2: Repres	Metric 2: Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 2 2	US In scope 2017 Range with uncertain statistics			
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Information is from the source			
Domain 4: Variab	ility and U Metric 7:	ncertainty Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability			
	Continued on next page								

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Source Citation:	National Electrical Manufacturers Association. 2017. Comment submitted by National Electrical Manufacturers Association (NEMA).							
Type of Data Source Hero ID	Pacility; Reports for Data or Information Other than Exposure or Release Data; 1986803							
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Overall Quality I	High		1.3					

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Source Citation:	Haas, G. 2 Iowat Cor	Haas, G. 2017. Comment submitted by Gerhard Haas, Vice President, Research & Development, Technical Service, Purchasing, Journal Corporation, Part 2, Journal Corporation								
Type of Data Source Hero ID	Facility; R 3986804	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986804								
EXTRACTION										
Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Chemical Concentration:		Use coating Primer which promotes adhesion. The NMP containing primer is applied with a slot die and then dried in a heat tunnel. imported 85000lbs of the primer last year which contained a total of 4250 lbs of NMP <5 percent								
Chemical Concentration.			<5 percer	10						
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.				
Domain 2: Repres	sentative	Coordinate Coordinate	TT:l.	1	1					
	Metric 2:	Applicability	Hign Uigh	$\times 1$	1	US				
	Metric 3:	Tomporal Boprosontativonoss	High	$\times 2$ $\times 2$	2	In scope				
	Metric 4.	Sample Size	N/A	~ 2	N/A	This metric is not applicable to this data type				
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Information is from the source				
Domain 4: Variab	ility and Uı Metric 7:	ncertainty Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability				
Overall Quality Determination [†]		High		1.3						

Source Citation:Turner, S. IType of Data SourceFacility; RegHero ID3986887	L., McCrillis, R. C., 2017. Eval ports for Data or Information (uation of al Other than	lternative Exposure	e chemie e or Rel	cal strippers on wood furniture coatings. ease Data;		
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Batch Size:		Use Paint stripper Solvent strippers work solely by dissolving the coating film. Their dis- solving mechanism causes them to become rapidly saturated with dis- solved coating.					
Batch Size: Chemical Concentration:		1.74 to $3.23E-04$ m3 of stripper per m2 of substrate surface 50-75 percent					
EVALUATION							
Domain	Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	Medium	$\times 1$	2	The assessment or report uses high quality data and/or tech- niques that are not from trusted sources; however, Associated information does not indicate flaws or quality issues.		
Domain 2: Representative Motric 2:	Coographic Scope	High	~ 1	1	IIS		
Metric 2. Metric 3:	Applicability	High	$\times 1$ $\times 2$	2	In scope		
Metric 4:	Temporal Representativeness	Low	$\times 2$	6	No date		
Metric 5:	Sample Size	Low	$\times 1$	3	Characterized by no statistics		
Domain 3: Accessibility/Clarit Metric 6:	y Metadata Completeness	Low	$\times 1$	3	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully trans- parent.		
Domain 4: Variability and Uno	certainty	т	1	0			
Metric 7:	Metadata Completeness	Low	× 1	3	The report does not address variability or uncertainty.		
Overall Quality Determination	,†	Medium		2.2			
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Source Citation: Type of Data Source Hero ID	Curner, S. L.,McCrillis, R. C 2017. Evaluation of alternative chemical strippers on wood furniture coatings. Cacility; Reports for Data or Information Other than Exposure or Release Data; 1986887						
EVALUATION							
Domain	Metric	Rating MWF* Score Comments					

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* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Us, E. P. A Facility; R 4214097	Us, E. P. A 1988. PRODUCTION EXPOSURE PROFILE N-METHYLPYRROLIDONE. Facility; Reports for Data or Information Other than Exposure or Release Data; 4214097									
EXTRACTION											
Parameter			Data								
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Total Annual U.S. Volume (and percent of PV):		Manufacture Domestic manufacturing BASF production in 1987 estimate of 15-25 million lbs/yr, no known volume for second producer, no imports									
Number of Sites:			2	101 50001	ia proa						
EVALUATION											
Domain		Metric	Rating	MWF^{\star}	Score	Comments					
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	EPA					
Domain 2: Benres	entative										
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	US					
	Metric 3:	Applicability	High	$\times 2$	2	Manufacturing in scope					
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1988					
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type					
Domain 3: Access	ibility/Clar	ity	TT: 1		-						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources are included					
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type					
Overall Quality D	eterminatio	n [†]	High		1.6						

Source Citation:Us, E. P.Type of Data SourceFacility; FHero ID4214097	A 1988. PRODUCTION EXPO Reports for Data or Information	OSURE PR Other than	OFILE N Exposure	I-METH e or Rel	IYLPYRROLIDONE. lease Data;		
EXTRACTION		_					
Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Number of Sites: Chemical Concentration:		Processin Formulati Processin 6 <=49	Processing Formulation Processing NMP into paint stripper formulations. 6 <=49				
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	EPA		
Domain 2: Representative	Gaamaahia Gaama	TT:l.	v 1	1	WG .		
Metric 2:	Geographic Scope	High Uigh	× 1 × 2	1	US Mana fa daning in anna		
Metric 3.	Tomporal Representativeness	Low	~ 2	6	Manufacturing in scope		
Metric 5:	Sample Size	N/A	× 2	N/A	This metric is not applicable to this data type		
Domain 3: Accessibility/Clan Metric 6:	ity Metadata Completeness	High	× 1	1	Data sources are included		
Domain 4: Variability and U Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited information on concentration variability		
Overall Quality Determination	on [†]	High		1.6			

Source Citation:	E. I. Dupo TING CO MENT.	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- FING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT								
Type of Data Source Hero ID	Facility; R 4214100	Facility; Reports for Data or Information Other than Exposure or Release Data; 1214100								
EXTRACTION										
Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites: Site Daily Throughput:			Processing Processing as a reactant Several industrial applications including dissolving organic polymers and monomers for manufacture of synthetic fibers, resins, composite mate- rials and film coatings. 55 million lbs/yr in 1989 1 Daily use unknown. Annual use of 1.6 million lbs/yr in 1989							
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evi- dent.				
Domain 2: Repres	Motria 2	Coographic Scope	High	~ 1	1	110				
	Metric 2.	Applicability	High	$^{\land 1}$ $^{\lor 2}$	1	US Processing in second				
	Metric 4:	Temporal Representativeness	Low	$\times 2$ $\times 2$	6	1080				
	Metric 4: Metric 5:	Sample Size	N/A	~ 2	N/A	This metric is not applicable to this data type				
Domain 3: Access	ibility/Clar	ity	,	_	,					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data is from source				
Domain 4. Variab	ility and U	acertainty								
Domain 1. Variab	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type				
Overall Quality D	eterminatio	n [†]	Medium		1.7					
		Cor	ntinued on r	ext page	<u>)</u>					

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Source Citation:	E. I. Dupont De Nemours, Co,. 1990. LETTER FROM E I DUPONT DE NEMOURS & COMPANY TO USEPA SUBMIT- TING COMMENTS CONCERNING THE PROPOSED TEST RULE ON N-METHYLPYRROLIDONE WITH ATTACH- MENT.						
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 4214100						
EVALUATION							
Domain	Metric	Rating MWF*	Score	Comments			

Source Citation:	Us, E. I METHYL	Us, E. P. A 1989. SUMMARY ENGINEERING REPORT TEST RULES EXPOSURE ANALYSIS N- METHYLPYRROLIDONE WITH COVER LETTER DATED 110189.								
Type of Data Source Hero ID	Facility; R 4214135	Facility; Reports for Data or Information Other than Exposure or Release Data; 4214135								
EXTRACTION			Data							
			Data							
Life Cycle Stage:	Life Cycle Stage:		Manufacture							
Life Cycle Descrip	Life Cycle Description (Subcategory of Use):		Domest	ic manuf	acturing	р Э				
Process Description	on:		Continu	ious react	tion pro	cess forms NMP by the condensation of gamma-				
			butyrola	actone w	ith met	hylamine followed by distillation to remove wa-				
Tetal America U.C. Valence (and menore at DV).		ter.	11 /	c						
Iotal Annual U.S. volume (and percent of PV):		produce	$\frac{105}{91}$	manui manui	actured in 1989 New facility expected to					
		1986 an	d 1987	JII ID/ yi	starting in 1990. 5 minor ibs/ yr imported in					
Number of Sites:		2 in 198	39. 3 in 1	990						
				,						
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliab	oility			_						
	Metric 1:	Methodology	High	× 1	1	EPA				
Domain 2: Repres	sentative									
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Manufacturing in scope				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1989				
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type				
Domain 3: Access	sibility/Clar	ity								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data sources included				
Domain 4: Variab	oility and Ur	ncertainty	/ .							
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type				
0 110 11 5	、, · .	+	TT: 1		1.0					
Overall Quality D	Peterminatio	n'	Hıgh		1.6					
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Source Citation:	Us, E. P. A 1989. METHYLPYRROLIDONE V	SUMMARY EI WITH COVER LE	NGINEERING TTER DATED	REPORT 0 110189.	TEST	RULES	EXPOSURE	ANALYSIS	N-	
Type of Data Source	Facility; Reports for Data or	Information Other	than Exposure	e or Release l	Data;					
Hero ID	4214135									
EVALUATION										
Domain	Metrie	c Rati	ing MWF* S	core		С	omments			
Source Citation:	Us, E. P. A 1989. SUMMARY ENGINEERING REPORT TEST RULES EXPOSURE ANALYSIS N- METHYLPYBROLIDONE WITH COVER LETTER DATED 110189									
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Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 4214135									
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:				Use Paint and coatings use and removers Stripper applied to surface by spraying or brushing or dipping. Time given to penetrate. Stripper removed, wiped or scraped. 5.5 - 8.3 million lbs/yr in 1989 200-500 facilities						
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	EPA				
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size			High High Low N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 6 N/A	US Manufacturing in scope 1989 This metric is not applicable to this data type				
Domain 3: Access	Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness High $\times 1$ 1 Data sources included									
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type				
Overall Quality Determination ^{\dagger}			High		1.6					

* MWF = Metric Weighting Factor

Source Citation:	Midwest Research Institute (MRI). 1998. Emission Factor Documentation for AP-42. Section 9.2.1: Fertilizer Application. Draft Report.								
Type of Data Source Hero ID	Facility; R 5097883	Facility; Reports for Data or Information Other than Exposure or Release Data; 5097883							
EXTRACTION Parameter		Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:				Use Fertilizer application Methods of application are detailed in Section 2.2. Although many types of fertilizers are manufactured, the basic application methods depend on whether the fertilizer is in gaseous, fluid, or solid form. Methods for application of each of these three forms of fertilizer are discussed.					
EVALUATION Domain	Metric Rating MWF* Score Comments								
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	Prepared for EPA			
Domain 2: Repre	sentative Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3: Metric 4: Metric 5:	Temporal Representativeness Sample Size	Medium N/A	$\times 2 \times 2$	2 4 N/A	In scope 1998 This metric is not applicable to this data type			
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness				$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions			
Domain 4: Varial	oility and Un Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	Includes discussion of limitations to these estimates/ information			
Overall Quality Determination [†]					1.3				

 * MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Nondestructive Testing (NDT) Resource Center. 2017. What is NDT?. Facility; Reports for Data or Information Other than Exposure or Release Data; 5097890								
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:				Use Metal finishing A nondestructive evaluation (NDE) method would not only locate a defect, but it would also be used to measure something about that defect such as its size, shape, and orientation. NDE may be used to determine material properties, such as fracture toughness, formability, and other physical characteristics					
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	oility Metric 1:	Methodology	Low	× 1	3	Data sources not specified			
Domain 2: Repres	sentative								
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Access	Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Low $\times 1$ 3 not fully transparent								
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type			
Overall Quality D	Determinatio	n^\dagger	High		1.6				

* MWF = Metric Weighting Factor

Source Citation:Kemira. 2018. RE: N-Methylpyrrolidone (NMP) (CASRN 872-50-4). EPA-HQ-OPPT-2016-0743-0085.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID5176404							
EXTRACTION Parameter	KTRACTION Parameter Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:		Processing Chemical processing, excluding formulation (polymer manufacturing) n- Methylpyrrolidone (NMP) is an industrial solvent that is used in a very narrow application. Specifically, it is the preferred solvent for phe- nothaizine (PTZ), the short-stop chemical for glacial acrylic acid (GAA) and glacial methamlic acid (GMA). In case of an uncontrolled polymer- ization within the storage tank, the PTZ can be injected in an attempt to stop this reaction and prevent a tank rupture. 65 percent					
EVALUATION Domain	Metric	Rating MWF [*] Score Comments					
Domain 1: Reliability Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evi- dent.		
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness		High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US In scope 2017 This metric is not applicable to this data type		
Domain 3: Accessibility/Cla Metric 6:	rity Metadata Completeness	High	× 1	1	Information is from the source		
Domain 4: Variability and Uncertainty Low × 1 3 Variability and uncertainty in concent					Variability and uncertainty in concentration not addressed.		
Overall Quality Determination ^{\dagger}		High		1.4			
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Source Citation: Type of Data Source Hero ID	Kemira. 2018. RE: N-Methylpyrrolidone (NMP) (CASRN 872-50-4). EPA-HQ-OPPT-2016-0743-0085. Facility; Reports for Data or Information Other than Exposure or Release Data; 5176404						
EVALUATION							
Domain	Metric	Rating MWF* Score Comme	nts				

* MWF = Metric Weighting Factor

Source Citation: J Type of Data Source H Hero ID	JSR and JSR Micro Inc 2017. Comments on the preliminary information on manufacturing, processing, use, and disposal: N-Methylpyrrolidone (NMP). EPA-HQ-OPPT-2016-0743-0064. Facility; Reports for Data or Information Other than Exposure or Release Data; 5176405							
	,110100							
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use electronics NMP is essential as a solvent in alignment film coatings because poly- imide is soluble in very few other solvents. Used for LCD screen manu- facturing. Alignment film coating is printed on the glass and baked to remove various solvents. The volatile NMP during pre-bake and post- bake process are removed by air emission abatement devices.					
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliabili N	ty Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.		
Domain 2: Represen	ntative	Gaarman bis Gaara	TT:l.	1	1	10		
ין ת	Metric 2:	Geographic Scope	High	× 1	1	US		
ין ת	Metric 3:	Applicability	High	× 2	2	In scope		
ים ת	Metric 4:	Composal Representativeness	High	× 2				
I	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Accessib	oility/Clari	tv						
N N N	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source		
Domain 4: Variabili	ity and Un Metric 7:	certainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type		
Overall Quality Determination [†]		High		1.1				

Source Citation:	FUJIFILM Electronics Materials USA Inc 2017. NMP Use/Application Survey FFEM/FEUP. EPA-HQ-OPPT-2016-0743-0024.								
Type of Data Source Hero ID	Facility; R 5176406	Facility; Reports for Data or Information Other than Exposure or Release Data; 5176406							
EXTRACTION Parameter	Data								
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use Electronics - semiconductor manufacturing Processing aid that is not intended to become part of the final product; Reactant (i.e., used by itself or with other monomers to synthesize an- other substance); Formulant/additive; Cleaner/degreaser/surface prep agent. Bulk containers, totes, drums, and bottles.							
Number of Sites: Batch Size: Chemical Concen	Number of Sites:2 - Texas and CaliforniaBatch Size:batch processChemical Concentration:10-100 percent								
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.			
Domain 2: Benre	sentative								
Domain 2: Representative Metric 2: Geographic Scope High × 1 1 US Metric 3: Applicability High × 2 2 In scope Metric 4: Temporal Representativeness High × 2 2 2017 Metric 5: Sample Size Medium × 1 2 Range with uncertain statistics					US In scope 2017 Range with uncertain statistics				
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information is from the source			
Domain 4: Variab	oility and U Metric 7:	ncertainty Metadata Completeness	Medium	$\times 1$	2	Limited information on concentration variability			
Overall Quality D	Determinatio	\mathbf{n}^{\dagger}	High		1.3				
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Source Citation:	FUJIFILM Electronics Materials USA Inc 20 0024.	017. NMP Use/A	Application Survey FFEM/FE	CUP. EPA-HQ-OPPT-2016-0743-			
Type of Data Source Hero ID	Facility; Reports for Data or Information Othe 5176406	Facility; Reports for Data or Information Other than Exposure or Release Data; 5176406					
EVALUATION	EVALUATION						
Domain	Metric Rating MWF [*] Score Comments						

Source Citation:	Saft American Inc 2017. Memorandum to EPA: N-methylpyrrolidone, docket ID number EPA-HQ-OPPT-2016-0743. EPA-HQ-OPPT-2016-0743-0005.							
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 5176407							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	ption (Subca	ategory of Use):	Electronic	cs - batte	ries			
Process Description:		NMP is us solvent (N	sed in the NMP), bi	Saft "m nder an	ixing" process whereas raw powder chemicals, d substrates are combined to form a positive			
Total Annual U.S. Volume (and percent of PV):			In 2016 th Jacksonvi	ne Cocke lle plant	ysville p used 29	lant used $46,022.69$ kg. While the $6,651$ kg		
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	From chemical manufacturing company. No bias /errors evi- dent.		
Domain 2: Ropros	contativo							
Domain 2. http://	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3: Access	sibility/Clar	itv						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source		
Domain 4. Variah	vility and U	acertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type		
Overall Quality Determination [†]		High		1.1				

Source Citation:	North America's Building Trades Unions (NABTU). 2017. Re: TSCA scoping and review: Ten priority chemicals. EPA-HQ-OPPT-2016-0743-0023.							
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 5176408							
EXTRACTION								
Parameter	Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use all - list of uses in the construction industry adhesives and sealants; cleaners; coatings; strippers; Soldering flux,						
			which clea	ans oxida		in metals, wood preservatives		
EVALUATION								
Domain		Metric	Rating MWF [*] Score Comments					
Domain 1: Reliab	ility Motria 1:	Mathadalagy	Modium	v 1	0	The decomposition will of monofesturene. No bios /emerge eni		
	Metric 1.	Methodology	meann	× 1	2	dent.		
Domain 2: Repres	sentative							
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type		
Domain 3. Access	vibility/Clar	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source		
Domain 4. Variah	vility and U	ocertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type		
Overall Quality Determination [†]		High		1.1				

* MWF = Metric Weighting Factor

Source Citation:	Celanese Engineered Materials. 2017. N-methylpyrrolidone (NMP) CASRN: 872-50-4, use, disposal and exposure scenarios. EPA-HO-OPPT-2016-0743-0015								
Type of Data Source Hero ID	Facility; R 5176410	Facility; Reports for Data or Information Other than Exposure or Release Data; 5176410							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Chemical Concentration:			Processing Chemical processing, excluding formulation (polymer manufacturing) NMP is a solvent critical to manufacturing high-temperature poly- mer Polyphenylene sulfide (PPS). NMP is a solvent used to dissolve monomers allowing for a polymerization reaction. After use as a re- action solvent, NMP is recovered in multiple distillation columns and recycled back to storage tanks for reuse. 26.2 million lbs of PPS; 2,425,000 lbs of NMP in 2016 Residual NMP measured is below 17 ppm						
EVALUATION	Matrix Dation MUIDt Carry								
		Metric	Itating	IVI VV I	beore	Comments			
Domain 1: Reliab	oility Metric 1:	Methodology	Medium	× 1	2	From chemical manufacturing company. No bias /errors evi- dent.			
Domain 2: Repre	sentative								
2011/01/21/200910	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Acces	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source			
Domain 4: Varial	Matrie 7	Nete data Completeness	Madium	× 1	2	T · · · · · · · · · · · · · · · · · · ·			
	metfic /:	metadata Completeness	meann	× 1	2	Limited information on concentration variability			
Overall Quality I	Determinatio	n^{\dagger}	High		1.3				
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Source Citation:	Celanese Engineered Materials. 2017. N-methy EPA-HQ-OPPT-2016-0743-0015.	ylpyrrolidone (N	MP) CASRN: 872-50-4, use,	disposal and exposure scenarios.	
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;				
Hero ID	5176410				
EVALUATION					
Domain	Metric R	ating MWF*	Score	Comments	

Source Citation: Type of Data Source	Akin Gum CAS# 872 Facility; R	Akin Gump Strauss Hauer & Feld LLP. 2018. Re: EPA docket EPA-HQ-OPPT-2016-0743: N-Methyl-2-pyrrolidone ("NMP"), CAS# 872-50-4 comments regarding the NMP problem formulation document. EPA-HQ-OPPT-2016-0743-0102. Facility; Reports for Data or Information Other than Exposure or Release Data;						
Hero ID	5176411							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use dip cleaning of plastic films NMP is used to remove residual colorants from the surface of plastic films following a coloring process. The plastic film, which is initially colored by moving the material through a solvent" colorant solution, is cleaned of excess colorant by processing the material through a wash basin containing NMP. The NMP wash basins are open to allow film to move to other units for further processing. The NMP in the basin is cooled to minimize evaporation. After the NMP wash basins, the product is further washed with water which is collected and routed to an on-site biological treatment plant.					
EVALUATION		Matria	Deting	MAND+	C	Community.		
Domain		Metric	Rating	IVI VV F ^	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	Low	× 1	3	Anonymous comment - data, data sources, and/or techniques used in the assessment or report are not specified		
Domain 2: Repre	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US In scope 2017 This metric is not applicable to this data type		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information is from the source		
Domain 4: Varial	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type		
		Con	tinued or	n next pa	ıge			

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Source Citation:	Akin Gump Strauss Hauer & Feld LLP. 2018. Re: EPA docket EPA-HQ-OPPT-2016-0743: N-Methyl-2-pyrrolidone ("NMP"),							
Type of Data Source Hero ID	CAS# 872-50-4 comments regarding the NMP problem formulation document. EPA-HQ-OPPT-2016-0743-0102. Facility; Reports for Data or Information Other than Exposure or Release Data; 5176411							
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Overall Quality D	$\operatorname{Petermination}^\dagger$	High		1.3				

Source Citation: Americ initial	American Chemistry Council. 2017. American Chemistry Council comments on the U.S. Environmental Protection Agency's initial 10 chemicals identified for risk evaluation. EPA-HQ-OPPT-2016-0743-0011.							
Type of Data SourceFacilityHero ID517641	Facility; Reports for Data or Information Other than Exposure or Release Data; 5176412							
EXTRACTION		Data						
Farameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Su	bcategory of Use):	Paints, co	atings, a	dhesive	s			
Process Description:		NMP is u	sed as a	coalesci	ing aid in antistatic applications. By allowing			
		particles	to coales	ce into	a more continuous film, NMP enhances an-			
		tistatic p	erforman	ce by a	factor of ten or more compared to solutions			
		without N	MP. NM	P is use	ed to control the viscosity of urethane coatings			
Chemical Concentration:		0.5 percei	$t \cdot 5_{-15}$	nercent	aqueous dispersions. < 1.5 percent < 0.5 percent $<$			
Chemical Concentration.		<14 perce	$10, 0^{-10}$	0 perce	1, < 0 percent, < 1.5 percent, < 0.5 percent, $= 1$			
		(11 poros	,	o porce				
EVALUATION								
Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability Matrice	1. Mathadalam	Madium	v 1	0				
Metric	1: Methodology	medium	X I	Ζ	ACC poll of trade association members. No bias /errors evi- dent.			
Domain 2: Representative		TT' 1	1	1				
Metric	2: Geographic Scope	High	$\times 1$	1				
Metric	 Applicability Temporal Representativeness 	High	$\times 2$ $\times 2$	2	In scope			
Metric	5: Sample Size	Medium	$\times 1^{\times 2}$	$\frac{2}{2}$	Range with uncertain statistics			
					0			
Domain 3: Accessibility/C	larity							
Metric	6: Metadata Completeness	High	$\times 1$	1	Information is from the source			
Domain 4: Variability and	Uncertainty							
Metric	7: Metadata Completeness	Medium	× 1	2	Limited information on concentration variability			
		moaran	·· ±	-				
Overall Quality Determina	ution [†]	High		1.3				
	Co	ntinued on r	ext page	;				

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Source Citation:	American Chemistry Council. 2017. Amer initial 10 chemicals identified for risk evalu	can Chemi ation. EP/	istry Cou A-HQ-OP	ıcil comm PT-2016-'	ents on the U.S. Environmental Protection Agency's 0743-0011.	
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;					
Hero ID	5176412					
EVALUATION						
Domain	Metric	Rating	MWF^{\star}	Score	Comments	

Source Citation:	American Chemistry Council. 2017. American Chemistry Council comments on the U.S. Environmental Protection Agency's initial 10 chemicals identified for risk evaluation. EPA-HQ-OPPT-2016-0743-0011.							
Type of Data Source Hero ID	Facility; R 5176412	Facility; Reports for Data or Information Other than Exposure or Release Data; 5176412						
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:		Processing Chemical processing, excluding formulation (polymer manufacturing) NMP is capable of dissolving difficult polymers. This makes it ideal for applications such as dissolving polyester oligomers at an elevated temperature and then precipitating them to form polyester beads. High concentrations of NMP may be necessary						
Chemical Concentration:				entration	15 01 111	wir may be necessary		
EVALUATION Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	ACC poll of trade association members. No bias /errors evident.		
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US In scope 2017 This metric is not applicable to this data type		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Information is from the source		
Domain 4: Variab	oility and Un Metric 7:	ncertainty Metadata Completeness	N/A		N/A	This metric is not applicable to this data type		
Overall Quality D	Determinatio	n [†]	High		1.1			

Source Citation:	Alliance of Automobile Manufacturers. 2017. Re: Scope of risk evaluations for ten chemicals designated on December 19, 2016. EPA-HO-OPPT-2016-0743-0035.								
Type of Data Source Hero ID	Facility; R 5176413	Facility; Reports for Data or Information Other than Exposure or Release Data; 5176413							
EXTRACTION Parameter			Data						
			Data						
Life Cycle Stage: Life Cycle Descrip	ntion (Subca	ategory of Use).	Use all - list o	f uses in	the aut	o industry			
Process Description	on:	and goily of else).	According	g to a bl	inded a	nalysis involving our members, this chemical			
			is used in	the aut	o manu	facturing process in painting, stripping, and			
			cleaning.	The che bonding	mical is agents	s used in certain polymers, leather, adhesives, inks, and paints in certain components			
			courings,	bonding	agomo,	mile, and painte in cortain components.			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	•1•,								
Domain 1: Reliab	Metric 1:	Methodology	Medium	$\times 1$	2	Trade association poll of manufacturers. No bias /errors evident.			
Domain 2: Repres	sentative								
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	$\frac{2}{1}$	2017			
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information is from the source			
Domain 4. Variah	ility and U	aantaintu							
Domain 4. Variat	Metric 7:	Metadata Completeness	N/A		N/A	This metric is not applicable to this data type			
			/		1	**			
Overall Quality D	eterminatio	n^{\dagger}	High		1.1				

Source Citation:	EaglePicher Technologies, LLC. 2020. Comments of EaglePicher Technologies, LLC on the draft TSCA risk evaluation of n-methylpyrrolidone (NMP): EPA"HQ"OPPT-2019-0236.							
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 6592029							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):		Use Electronics manufacturing - Lithium Ion Battery See process description starting on the bottom of page 1. In summary, NMP is used in cathode and anode coatings as a carrier solvent. The facility only receives sealed containers of virgin NMP and pre-mixed binder-NMP solution. Coating is applied in enclosed system by a slot die or reverse comma coating head. Once applied, NMP evaporates in a negative pressure drying oven (emissions captured). NMP is not used in cleaning.						
Total Annual U.S Number of Sites: Operating Days p	Total Annual U.S. Volume (and percent of PV): Number of Sites: Operating Days per Year and Batches per Day:		One facility: 1,100 kg NMP/yr. Another facility: 800 kg NMP/yr 2 One facility: 1-2 bt/day, 3-4 days per week. Another facility: 1 bt/day, 3 days per week					
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	Information from manufacturer of lithium ion batteries. No bias /errors evident.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High II:l.	$\times 2$	2	In scope		
	Metric 4: Metric 5:	Sample Size	High	$\times 2$ $\times 1$	2	2020 Characterized by no statistics		
		Jumpie Dize	HOW	~ 1	0	Characterized by no statistics		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP		
		Con	tinued on r	next page	9			

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Source Citation:	EaglePiche n-methylpy	EaglePicher Technologies, LLC. 2020. Comments of EaglePicher Technologies, LLC on the draft TSCA risk evaluation of a-methylpyrrolidone (NMP): EPA"HQ"OPPT-2019-0236.						
Type of Data Source Hero ID	Facility; R 6592029	Facility; Reports for Data or Information Other than Exposure or Release Data; 592029						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 4: Varial	oility and Ur Metric 7:	certainty Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty		
Overall Quality I	Determination	\mathbf{n}^{\dagger}	High		1.6			

Source Citation: Type of Data Source	LICM. 2020. Comment on docket no. EPA-HQ-OPPT-2019-0236, Toxic Substances Control Act (TSCA) draft risk evaluation for n-methylpyrrolidone (NMP). Facility; Reports for Data or Information Other than Exposure or Release Data;							
Hero ID	6592033							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Possible Physical Form:			Use Electronics manufacturing - Lithium Ion Battery In the manufacturing of lithium ion cells, NMP is used only as a carrier for the binder resin used to form the cathode (and to a lesser extent, the anode) component of the cell. NMP is mixed with powder chemicals and binders, and then the solution is coated onto thin metal foils with a precise automated roll coating process /pumped to a coating die-head and deposited onto a foil current collector. The wet coated foil is passed through a drying oven to drive off the liquid. NMP is not a final compo- nent in lithium ion cells. (description pg 5-15). The handling of NMP in small containers in cell manufacturing facilities is limited to infrequent use in the laboratory or small-scale operations where they are opened only in ventilated hood areas with personnel equipped with extensive PPE for no more than 30 minutes a shift. NMP is not typically han- dled in drums. NMP is delivered to most lithium ion cell manufacturing facilities by rail car and/or semi-trailer truck. NMP used for lithium ion cell making has substantially lower moisture content					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	Medium	× 1	2	Information is from a trade association of manufacturers. No bias /errors evident		
Domain 2: Repre	sentative Metric 2: Metric 3: Metric 4:	Geographic Scope Applicability Temporal Representativeness	High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$\begin{array}{c} 1 \\ 2 \\ 2 \end{array}$	US In scope 2020		
Continued on next page								

Source Citation:	LICM. 202 for n-meth	LICM. 2020. Comment on docket no. EPA-HQ-OPPT-2019-0236, Toxic Substances Control Act (TSCA) draft risk evaluation for n-methylpyrrolidone (NMP).							
Type of Data Source Hero ID	Facility; R 6592033	Facility; Reports for Data or Information Other than Exposure or Release Data; 3592033							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type			
Domain 3: Access	sibility/Clari	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP			
Domain 4: Variab	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty			
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.4				

 \star MWF = Metric Weighting Factor

Source Citation:	LICM . 20 OPPT-201	LICM . 2020. Conference call with Lithium Ion Cell Manufacturers" Coalition (LICM) on n-methylpyrrolidone. EPA-HQ-OPPT-2016-0743-0114.							
Type of Data Source Hero ID	Facility; R 6592025	Facility; Reports for Data or Information Other than Exposure or Release Data; 6592025							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:			Use Electronics manufacturing - Lithium Ion Battery Large sites: NMP distillation -> cathode slurry mixing -> cathode slurry coating -> cathode drying -> NMP collection and recycle to distillation process so that it can be reused. Small sites: NMP truck delivery of small containers (1-gal). Small volume of NMP waste is produced and packaged into drums and hauled off-site for hazardous waste disposal. 99.8 percent						
EVALUATION					~	~			
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident			
Domain 2: Bapra	contativo								
Domain 2. Repres	Metric 2.	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020			
	Metric 5:	Sample Size	Medium	$\times 1$	2	NMP concentration data provided as single data point. Uncer- tain statistics and unclear if representative.			
Domain 3: Access	aibility /Clar	ity							
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP			
Domain 4: Variat	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty			
		Cor	tinued on 1	next page	;				

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Source Citation:	LICM . 2020. Conference call with Lithium Ion Cell Manufacturers" Coalition (LICM) on n-methylpyrrolidone. EPA-HQ-OPPT-2016-0743-0114.						
Type of Data Source	Facility; Reports for Data or Information	Facility; Reports for Data or Information Other than Exposure or Release Data;					
Hero ID	6592025						
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		
Overall Quality D	$\operatorname{Petermination}^{\dagger}$	High		1.4			

Source Citation:	LICM . 20	20. Conference call with $6-0743-0114$	Lithium Ion Cell	Manufa	cturers"	Coalition (LICM) on n-methylpyrrolidone. EPA-HQ-			
Type of Data SourceHeroHero ID6	Facility; Reports for Data or Information Other than Exposure or Release Data; 6592025								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Descripti Process Description	on (Subca :	tegory of Use):	Use Electronic Virgin NN vendor tra may set u and assist container gallon con prep mixt loading in moved on truck for at small si slurry as a prior to a automate	s manufa MP truck ansfers fr ip safety the driv unloadir ntainers ure comp to drums drum de disposal. ites and f a carrier. pplicatios	acturing om tan perime er at tl g occurs of NMI ponents occurs blly to s //Slur fully au Slurry n n to me	g - Lithium Ion Battery ding occurs only at large sites. Third party ker trucks to large, exterior tanks. Employees eter, ensure safety during unloading process, he beginning and end of the process. //Small rs at small sites. DOT-compliant boxes of 1- P, securely stored. Small containers used to for mixer or any small container use. //Waste only at small sites. Drums torqued to seal and storage location until third-party vendor loads rry mixing occurs in semi-automated process tomated process at large sites. NMP added to mixture containing NMP mixed for consistency etal foil. //Coating and drying occurs as fully h small and large sites. //Maintenance occurs			
Chemical Concentra	ation:		at both s adjustmer >99 perce percent (v	nts and rent (virgi vaste NM	epairs, a in NMF IP load	and other non-routine tasks. P - unloading from various containers), $\leq =60$ ing, slurry mixing, cathode coating)			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliabili N	ty Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident			
Domain 2: Represer N N	ntative Metric 2: Metric 3:	Geographic Scope Applicability	High High	$ \times 1 \ \times 2 $	$\frac{1}{2}$	US In scope			
			Continued on n	ext page	1				

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Source Citation:	LICM . 20 OPPT-201	LICM . 2020. Conference call with Lithium Ion Cell Manufacturers" Coalition (LICM) on n-methylpyrrolidone. EPA-HQ-OPPT-2016-0743-0114.							
Type of Data Source Hero ID	Facility; R 6592025	cacility; Reports for Data or Information Other than Exposure or Release Data; 3592025							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020			
	Metric 5:	Sample Size	Medium	$\times 1$	2	NMP concentration data provided as single data points. Uncertain statistics and unclear if representative.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP			
Domain 4: Variab	bility and Ur Motria 7:	ncertainty Matadata Completeness	Low	v 1	3	Dess not a lines unichility on uncertainty			
	Metric 7.	Metadata Completeness	LOW	× 1	3	Does not address variability or uncertainty			
Overall Quality I	Determinatio	\mathbf{n}^{\dagger}	High		1.4				

* MWF = Metric Weighting Factor

Source Citation:	EaglePicher Technologies, LLC. 2020. Conference call with EaglePicher Technologies on n-methylpyrrolidone. EPA-HQ- OPPT-2016-0743-0113							
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 6592024							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:			Use Electronics manufacturing - Lithium Ion Battery Made in small batches production is not continuous. Cathodes and anodes are made from metal powders that are dissolved in NMP, which serves as a "binder" solution. At the Joplin site, NMP arrives in small premixed metal containers (4 gal) or pure NMP (1 gal); at the Greenwich site, NMP arrives in 55-gal drums, which are connected to a valve -> added to mixer -> blending -> transferred to tank, then coater/dryer -> NMP driven off during coating/drying process Joplin MO site: 1,100 kg/yr Greenwich, RI: 800 kg/ yr 2 that use NMP: Joplin, MO and Greenwich, RI					
EVALUATION Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	Information is from a manufacturer. No bias /errors evident		
Domain 2: Repres	Sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 2 2	US In scope 2020 PV data provided as single data point for each site. Uncertain statistics and unclear if representative.		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP		
Domain 4: Variab	ility and U	ncertainty						
		Con	tinued on r	next page	9			

		= cont	mued from p	revious	page				
Source Citation:	EaglePiche OPPT-201	CaglePicher Technologies, LLC. 2020. Conference call with EaglePicher Technologies on n-methylpyrrolidone. EPA-HQ- DPPT-2016-0743-0113.							
Type of Data Source	Facility; Re	Facility; Reports for Data or Information Other than Exposure or Release Data;							
Hero ID	6592024	592024							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty			
Overall Quality D	Determination	n [†]	High		1.4				

Source Citation:	FUJIFILM Holdings America Corporation. 2020. FUJIFILM comments for docket ID # EPA-HQ-OPPT-2019-0236 for CASRN 872-50-4, n-methylpyrrolidone (NMP).										
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 6592030										
EXTRACTION Parameter			Data								
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:			Processin, Formulati NMP is u of inks, a water bas tion chem gal), totes leave in th eral chem blended u ambient t pensed or gallon con At MO si	Processing Formulation into solutions for electronics industry NMP is used as a formulant /additive in industrial products- variety of inks, adhesives, coating and other products. Water base adhesives, water base laminating clears, screen printing inks, and screen reclama- tion chemicals. NMP is received in rail cars (28,000 gal), tanks (5,000 gal), totes (330 gal), drums (55 gal), and bottles (1 gal). Formulations leave in the same types of containers. //At MO site: A mixture of sev- eral chemicals including NMP are added to an open mixing vessel and blended using a high speed disperser. The blending conditions are at ambient temperature and pressure. The finished product is gravity dis- pensed or with use of a pneumatic pump into 1 gallon, 5 gallon, and 55 gallon containers. At MO site: Annual usage is approximately 21,000 lbs 4. North Kingstourn PL Carrollton TX. Creanwood SC and North							
Batch Size: Possible Physical Chemical Concen	Number of Sites: Batch Size: Possible Physical Form: Chemical Concentration:			Kansas City MO At MO site: Maximum batch size of 300 gallons liquid In all products: 10 to 100 percent In printing ink at MO site: 10 to 25 percent							
EVALUATION		Motnia	Poting		Seere	Commente					
Domain		Wiethic	natillg	IVI VV I'	Score	Comments					
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident					
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability				$\times 1$ $\times 2$	1 2	US In scope					
			Commued on I	iext page							

Source Citation:	FUJIFILM CASRN 87	FUJIFILM Holdings America Corporation. 2020. FUJIFILM comments for docket ID # EPA-HQ-OPPT-2019-0236 for CASRN 872-50-4, n-methylpyrrolidone (NMP).							
Type of Data Source Hero ID	Facility; R 6592030	cacility; Reports for Data or Information Other than Exposure or Release Data; 3592030							
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020			
	Metric 5:	Sample Size	Medium	$\times 1$	2	PV and concentration data provided as single data point or range. Uncertain statistics and unclear if representative.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP			
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty			
Overall Quality Determination [†]					1.4				

* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling. Facility; Reports for Data or Information Other than Exposure or Release Data; 5161295							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Descrip Process Description	ption (Subca on: tration:	tegory of Use):	Use Electronic Drums us (55 gal). NOWPAI includes p Virgin NM fer of virg tank in th 2 hour tra gallons of 20-75 pere 1-100 pere 92 percen	cs manufa sed for v //Smai Ks, 20L co parts clean MP truck gin NMP ne tank fa ansfer. // NMP wa cent (dru cent (mai t (waste	acturing vaste. Il conta ontaine: ning, filt off-load from a urm. Tu Waste t aste fro m hand ntenand truck lo	g - semiconductor manufacturing Waste drum Disconnect, Removal, Handling iners include 1 gal containers, 4L and 10L rs, and 5-gal plastic totes. //Maintenance ter change out, preventative maintenance. // ding: Pull 6 samples for purity analysis; trans- 10,000 gallon tanker truck to a 10,000 gallon rrn on pump; stay in enclosure upstairs during truck loading: Transfer of approximately 5,000 m a 10,000 gallon tank to a tanker truck. ling); 40-75 percent (small container handling); ee); 100 percent (virgin NMP truck unloading); pading)		
EVALUATION		Metric	Bating	MWF*	Score	Comments		
	:1:+	Wiebite	Traviilg	101 0 0 1	50010	Comments		
Domain 1: Reliat	Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident		
Domain 2: Repre	sentative Matria 2:	Coormonkie Soone	Hish	v 1	1			

rce Citation:	Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling.
e of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
a ID	5161905

Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors eviden
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	In scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2018
	Metric 5:	Sample Size	Medium	$\times 1$	2	Data provided as single data point or range. Uncertain stat tics and unclear if representative.
Domain 3: Access	sibility/Clari	ity				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industruser(s) of NMP $% \left({{{\rm{NMP}}} \right)$
		Con	tinued on r	next page	<u>,</u>	

		Contra	mueu nom j	previous	page			
Source Citation: Type of Data Source Hero ID	Semicondu Facility; Re 5161295	Semiconductor Industry Association (SIA). 2019. NMP Supplemental Data: Container Handling. Facility; Reports for Data or Information Other than Exposure or Release Data; 5161295						
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 4: Variab	ility and Un Metric 7:	acertainty Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty		
Overall Quality D	etermination	\mathbf{n}^{\dagger}	High		1.4			

 * MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	3986801". Facility; Reports for Data or Information Other than Exposure or Release Data; 3986801								
EXTRACTION Parameter	TRACTION Parameter								
Life Cycle Stage: Life Cycle Descrip Process Descriptio Number of Sites: Operating Days per Chemical Concent	Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Number of Sites: Operating Days per Year and Batches per Day: Chemical Concentration:			Use Electronics manufacturing - semiconductor manufacturing NMP is used in semiconductor manufacturing for three main purposes: 1. Solvent (<5 wt. percent NMP) in certain semiconductor chemi- cal formulations which are deposited on the wafer via spin processes in photolithography including photoresists, bottom anti-reflective coatings (BARC), and in spin-coated polyimides (?60 wt. percent NMP); 2. Sol- vent pre-wet (>90 wt. percent NMP) of wafers prior to application of spin on coatings in photolithography; 3. Solvent (between 30-60 or >90 wt. percent NMP) in wafer cleaning and stripping formulations in wet area. NMP (? 100 wt. percent) is used in some maintenance activities to clean equipment parts. Small quantities of 100 percent NMP also are used in semiconductor manufacturing facilities were operated in 2017 (NMP is not used in all fabs); in 21 states 24 hrs/day; 365 days/yr; 8-12 hr shifts Same data as 516295; Photolithography formulations contain <5 percent NMP; Wet cleans/stripper solutions contain between 30-60 or >90 wt. percent NMP; 100 percent NMP Pre-wet layer; 30-60 percent NMP in the polyimide coating layer					
EVALUATION		Metric	Bating	MWF*	Score	Comments			
Domain		MIGUITO	1,001118	1VI VV I.	50016	Comments			
Domain 1: Reliabi	lity Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident			
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness				$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$\begin{array}{c} 1 \\ 2 \\ 2 \end{array}$	US In scope 2019			
		Con	tinued on r	ext page					

3986801". Facility; R 3986801	3986801". Facility; Reports for Data or Information Other than Exposure or Release Data; 3986801							
	Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments			
Metric 5:	Sample Size	Medium	$\times 1$	2	Data provided as single data point or range. Uncertain statis- tics and unclear if representative.			
sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP			
oility and Uı Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty			
Determinatio	\mathbf{n}^{\dagger}	High		1.4				
	3986801". Facility; R 3986801 Metric 5: sibility/Clar Metric 6: bility and Un Metric 7: Determinatio	3986801". Facility; Reports for Data or Informati 3986801 Metric Metric 5: Sample Size sibility/Clarity Metric 6: Metadata Completeness bility and Uncertainty Metric 7: Metadata Completeness Determination [†]	3986801". Facility; Reports for Data or Information Other than 3986801 Metric Rating Metric 5: Sample Size Metric 6: Medium sibility/Clarity High bility and Uncertainty Low Determination [†] High	3986801". Facility; Reports for Data or Information Other than Exposure 3986801 Metric Rating Metric Rating Metric 5: Sample Size Metric 6: Metadata Completeness High × 1 bility and Uncertainty Low Metric 7: Metadata Completeness Low × 1	3986801". Facility; Reports for Data or Information Other than Exposure or Rel 3986801 Metric Rating MWF* Score Metric 5: Sample Size Medium $\times 1$ 2 sibility/Clarity Metric 6: Metadata Completeness High $\times 1$ 1 bility and Uncertainty Metric 7: Metadata Completeness Low $\times 1$ 3 Determination [†] High 1.4			

* MWF = Metric Weighting Factor

Source Citation:	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052.								
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 6592032								
EXTRACTION			_						
Parameter			Data						
Life Cycle Stage			Use						
Life Cycle Description (Subcategory of Use):			Electronics manufacturing - semiconductor manufacturing						
Process Description:			Small con	Small container handling involved container change out from chemical					
			delivery systems. Drum handling involves inserting and removing dip						
				tubes from drums. Fab workers include photolithography operators who					
				Maintenance includes tool cleaning filter change outs, and other activi					
				ties. Virgin NMP truck unloading requires sampling and line connection/					
				disconnection. Waste truck loading involves sampling, transfer hose op-					
			eration, a	nd remov	val of re	esidual with pressurized air.			
Chemical Concent	ration:		50 (centra	al tenden	icy) 75	percent (high-end) (drum handling); 60 (CT)			
			75 percen	t (HE) (: :+1-	small co	(T) ontainer handling); 0.025 (CT) 0.05 (HE) (tab			
		(main_ten	ith conta	uner ch 00 perc	ent (CT and HE)(virgin NMP truck				
				unloading): 92 percent (CT and HE) (waste truck loading)					
aniouang, of persons (of and the) (nable stack loading)									
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1, Paliahi	1:+								
Domain 1. Kenabi	Metric 1.	Methodology	Medium	× 1	2	Information is from a manufacturer. No bias /errors evident			
		hiothodology	mourum	<u> </u>					
Domain 2: Represe	entative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020			
	Metric 5:	Sample Size	Medium	× 1	2	Data provided as single data point or range. Uncertain statis- tics and unclear if representative.			
Domain 3: Accessibility/Clarity									
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Source Citation:	Semiconductor Industry Association (SIA). 2020. Comments of the Semiconductor Industry Association (SIA) on the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP). EPA-HQ-OPPT-2019-0236-0052. Eacility: Reports for Data or Information Other than Exposure or Release Data:										
Hero ID	6592032										
EVALUATION											
Domain		Metric	Rating	MWF^{\star}	Score	Comments					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP					
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Low $\times 1$ 3 Does not address variability or uncertainty											
Overall Quality Determination ^{\dagger}			High		1.4						

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Source Citation: E	Hach Company. 2020. Hach's comments regarding the draft Toxic Substances Control Act (TSCA) risk evaluation for n-methylpyrrolidone (NMP), EPA docket EPA-HQ-OPPT-2019-0236.						
Type of Data SourceFHero ID6	Facility; Reports for Data or Information Other than Exposure or Release Data; 6592027						
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Laboratory NMP is an ingredient in the Hach product, Silver 2 Reagent Solution Pillows. This laboratory reagent is sold only in unit-dose packaging containing < 5 mL solution per test. One package is opened and poured into a 50-mL mixing cylinder containing powdered Silver 1 Reagent, and the mixing cylinder swirled to dissolve the powder. Once the powder has dissolved, a 50-mL water sample is poured from a graduated cylinder into the mixing cylinder, which is stoppered and inverted to mix.				
EVALUATION							
Domain		Metric	Rating	MWF^*	Score	Comments	
Domain 1: Reliabilit	ty Aetric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident	
Domain 2: Represen	tative						
N N	Aetric 2:	Geographic Scope	High	$\times 1$	1	US	
Ν	Aetric 3:	Applicability	High	$\times 2$	2	In scope	
Ν	Aetric 4:	Temporal Representativeness	High	$\times 2$	2	2020	
N	Aetric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type	
Domain 3: Accessibi	ility/Clari	tx					
N	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP	
Domain 4: Variabili	ty and Un	certainty					
N	Aetric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty	
Overall Quality Det	erminatio	n†	High		1.4		
		Con	tinued on r	next page			

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Source Citation:	Hach Company. 2020. Hach"s comments regarding the draft Toxic Substances Control Act (TSCA) risk evaluation for a-methylpyrrolidone (NMP), EPA docket EPA-HQ-OPPT-2019-0236.						
Type of Data Source	Facility; Reports for Data or Information C	Facility; Reports for Data or Information Other than Exposure or Release Data;					
Hero ID	6592027						
EVALUATION							
Domain	Metric	Rating	MWF^{\star}	Score	Comments		

* MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID	National Electrical Manufacturers Facility; Reports for Data or Infor 6592028	s Association. 2020. NMP use in magnet wire. EPA-HQ-OPPT-2019-0236-0047. rmation Other than Exposure or Release Data;
EXTRACTION		
Parameter		Data
Life Cycle Stage:		Use
Life Cycle Descri	ption (Subcategory of Use):	Electronics - magnet wires
Process Descripti	on:	NMP is used as a solvent/diluent in high-performance magnet wire enamels, thinners, and cleaners. In the magnet wire industrial process, a copper or aluminum wire is routed through an applicator of solvent- based enamel coating. The size of applicator may vary throughout the industry, but most contain " 1 gallon of coating, which contains at most 80-85 percent concentration of NMP. After the wire exits the curing oven on its final pass, the newly-enameled wire is given a lubricant coating to aid in coil winding by the customer. The finished product contains only trace amounts of NMP due to the curing process previously described. In addition to the application and curing process, another facet to mag- net wire manufacturing is maintenance cleaning. Enameling equipment is bathed in agitated tanks of NMP.
Chemical Concer	tration:	80-85 percent
EVALUATION		
Domain	Metric	Rating MWF* Score Comments

Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident
Domain 2: Representative					
Metric 2:	Geographic Scope	High	$\times 1$	1	US
Metric 3:	Applicability	High	$\times 2$	2	In scope
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020
Metric 5:	Sample Size	Medium	$\times 1$	2	Concentration provided as a range. Uncertain statistics and unclear if representative.
Domain 3: Accessibility/Clar	ity				
	Cor	tinued on r	next page	;	

Source Citation: Type of Data Source Hero ID	National Electrical Manufacturers Association. 2020. NMP use in magnet wire. EPA-HQ-OPPT-2019-0236-0047. Facility; Reports for Data or Information Other than Exposure or Release Data; 6592028					
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
Overall Quality Determination ^{\dagger}		High		1.4		

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* MWF = Metric Weighting Factor

[†] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:ACA. 2020Type of Data SourceFacility; RHero ID6592043). American Coatings Associatic eports for Data or Information (n submitta Other than	l to NMI Exposure	' docket e or Rel	t: EPA-HQ-2016-0743. lease Data;	
EXTRACTION Parameter		Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Processing Formulation of paint Mixing occurred in a closed system with NMP being pumped in, as is common for mixing of paints. Mixed in a closed, "small batch" system, with 6 ports on the lid that remain closed throughout loading, mixing and unloading. These ports consist of four 2" ports, one 3" port, and				
Batch Size: Site Daily Throughput: Chemical Concentration:			one 6° port. 500 gallon batch 163 lbs. (19.1 gallons)/batch 100.00 percent			
EVALUATION						
Domain	Metric	Rating	MWF^*	Score	Comments	
Domain 1: Reliability Metric 1:	Methodology	Medium	$\times 1$	2	Information is from a manufacturer. No bias /errors evident	
Domain 2: Representative						
Metric 2:	Geographic Scope	High	$\times 1$	1	US	
Metric 3:	Applicability	High	$\times 2$	2	In scope	
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2018	
Metric 5:	Sample Size	Medium	× 1	2	Concentration and throughput provided as single values for one batch. Uncertain if this is representative of the site's opera- tions or operations at other sites.	
Domain 3: Accessibility/Clari	tv					
Metric 6: Metadata Completeness		High	$\times 1$	1	Information provided is firsthand information from industrial user(s) of NMP	
Domain 4: Variability and Ur	ocertainty					
Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty	
	Cor	tinued on r	next page			

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Source Citation: Type of Data Source Hero ID	ACA. 2020. American Coatings Association submittal to NMP docket: EPA-HQ-2016-0743. Facility; Reports for Data or Information Other than Exposure or Release Data; 6592043							
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments			
Overall Quality I	$\operatorname{Determination}^{\dagger}$	High		1.4				

* MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:	LICM. 2020. Supplemental NMP information to document PPE protection for submission to docket from Lithium Ion Cell Manufacturers. EPA-HO-OPPT-2016-0743-0116						
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 6592044						
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Use Electronics - lithium ion battery The NMP serves as a carrier for the binder resin in the slurry. The coated foil passes through dryers where the NMP is recovered. NMP does not remain in or on the lithium ion electrode or the final cell after the drying stage of the electrode manufacturing process.					
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	oility Metric 1:	Methodology	Medium	× 1	2	Information is from a manufacturer. No bias /errors evident	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	In scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2020	
	Metric 5:	Sample Size	N/A		N/A	This metric is not applicable to this data type	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Information provided is firsthand information from industrial	
		-				user(s) of NMP	
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Low	$\times 1$	3	Does not address variability or uncertainty		
Overall Quality Determination [†]		High		1.4			

* MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .