United States
Environmental Protection Agency

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Office of Chemical Safety and
Pollution Prevention

Use Report for Octamethylcyclotetra- siloxane (Cyclotetrasiloxane, 2,2,4,4,6,6,8,8-octamethyl-) (D4)

CASRN 556-67-2

August 2021

Contains no TSCA CBI

Economic and Policy Analysis Branch
Existing Chemicals Risk Management Division

Acknowledgment and Disclaimer

EPA acknowledges the analytical and draft preparation support of Abt Associates Inc. of Cambridge, Massachusetts, provided under Contract No. EP-W-16-009 in the preparation of this report.

This document provides publicly available information as of the date of this document on the manufacturing (including importing), processing, distribution in commerce, use, and disposal of D4, and is used to inform decisions regarding conditions of use. The document does not reflect information received directly from other sources such as manufacturers, processors, etc., which has further informed the conditions of use in the draft Scope Document. As such, the uses described in this document may differ from the conditions of use in the draft Scope Document.

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1. Introduction

On March 19, 2020, EPA received a complete manufacturer request for risk evaluation for octamethylcyclotetra- siloxane, also known as D4, (CASRN 556-67-2) (EPA-HQ-OPPT-2018-0443-0004). D4 is an important commercial chemical that is used to make other silicone chemicals, and as an ingredient in cosmetics, hair care products, and deodorants (Kim et al. 2016). In performing risk evaluations for existing chemicals, EPA is directed to "determine whether a chemical substance presents an unreasonable risk of injury to health or the environment, without consideration of costs or other non-risk factors, including an unreasonable risk to a potentially exposed or susceptible subpopulation identified as relevant to the risk evaluation by the Administrator under the conditions of use." Condition of use is legally defined under TSCA section 3(4) as "*the circumstances, as determined by the Administrator, under which a chemical substance is intended, known, or reasonably foreseen to be manufactured, processed, distributed in commerce, used, or disposed of.*" This document provides publicly available information as of the date of this document on the manufacturing (including importing), processing, distribution in commerce, use, and disposal of D4 and is used to inform decisions regarding conditions of use. The document does not reflect information received directly from other sources such as manufacturers, processors, etc., which has further informed the conditions of use in the draft Scope Document. As such, the uses described in this document may differ from the conditions of use in the draft Scope Document.

EPA consulted a variety of sources to identify uses of D4. This included EPA's review of published literature and online databases including the most recent data available from EPA's Chemical Data Reporting program (CDR) and Functional Use Database, in addition to other publications, including the Government of Canada's Screening Assessments and National Institute of Health (NIH)'s PubChem. To identify formulated products containing D4, EPA searched for (material) safety data sheets (M)SDS using internet searches, EPA Chemical and Product Categories (CPCat) data, and other resources in which (M)SDS could be found. Each (M)SDS was then cross-checked with company websites to make sure that each product (M)SDS was current. EPA also makes use of communications with companies, industry groups, environmental organizations, and public comments to supplement the information when possible. A full list of sources can be found in Table_Apx A-1. Table 1-1 includes basic information about D4.

Table 1-1. Chemical Name, Synonyms, and CASRN for D4

Chemical Name	D4: Cyclotetrasiloxane, 2,2,4,4,6,6,8,8-octamethyl-
CASRN	556-67-2
Synonyms	Cyclotetrasiloxane; octamethylcyclotetrasiloxane; OMCTS; Octamethylcydotetrasiloxane; Octamethylcyklotetrasiloxan; Cyclic dimethylsiloxane tetramer; dimethylsiloxane tetramer[3]; Siloxane D4[4]
Trade Name(s)	Silicone SF 1173; NUC Silicone VS 7207; KF 944; Union Carbide 7207; Volasil™ 244; Cyclomethicone 4
Sources: Kim et al. 2016; DeLima Associates 2018; GoodGuide 2011; Government of Canada 2018	

2. Uses and Production Volume

The data source primarily utilized to assess use and production in this report is EPA's Chemical Reporting Database (CDR). Note that Table_Apx A-1 presents a complete list of the sources searched and utilized for the composition of this report.

2.1. Domestic Manufacture (CDR Data)

The CDR rule under TSCA requires manufacturers (including importers) to provide information to EPA every four years on the chemicals they manufacture or import into the United States. Table 2-1 presents the various conditions under which a facility subject to TSCA must report to CDR. D4 is subject to TSCA section 4 rules and Enforceable Consent Agreements.

Table 2-1. Conditions under Which a Company Must Report to CDR[a]

TSCA Action	Obligation to Report to CDR Information[b] When Subject to TSCA Action as Indicated in Left Column			
	Subject to 25,000 lb reporting threshold	Subject to 2,500 lb reporting threshold	Not eligible for certain full or partial exemptions from reporting	Not eligible for small manufacturer exemption
Not subject to TSCA action	✓			
TSCA section 4 rules (proposed or promulgated)	✓		✓	✓
Enforceable Consent Agreements (ECAs)	✓		✓	
TSCA section 5(a)(2) SNURs (proposed or promulgated)		✓	✓	
TSCA section 5(b)(4) rules (proposed or promulgated)		✓	✓	✓
TSCA section 5(e) orders		✓	✓	✓
TSCA section 5(f) orders		✓	✓	
TSCA section 5 civil actions		✓	✓	✓
TSCA section 6 rules (proposed or promulgated)		✓	✓	✓
TSCA section 7 civil actions		✓	✓	✓

[a] Shaded area applies to D4.

[b] Over time, the requirements for reporting frequency, production volume thresholds, and chemicals under the Chemical Data Reporting (CDR) rule have changed. CDR was formerly known as the Inventory Update Rule (IUR). The first IUR collection occurred in 1986 and continued every 4 years through 2006. As part of two rulemakings in 2003 and 2005, EPA made a variety of changes to the IUR, including to change the reporting frequency to every 5 years to address burden associated with new reporting requirements. Additional changes to reporting requirements were made in 2011, including to suspend and replace the 2011 submission period with a 2012 submission period, return to reporting every 4 years, and require the reporting of all years beginning with 2011 production volumes. The reporting of production volumes for all years was added because of

the mounting evidence that many chemical substances, even larger production volume chemical substances, often experience wide fluctuations in production volume from year to year. In addition, also as part of the 2011 IUR Modifications final rule (76 FR 50816, Aug 16, 2011), EPA changed the name of the regulation from IUR to CDR to better reflect the distinction between this data collection (which includes exposure-related data) and the TSCA Inventory itself (which only involves chemical identification information).

2.1.1 National Production Volume

Table 2-2 presents the historic production volumes of D4 from the CDR (previously known as the Inventory Update Rule, or IUR) from 1986–2015. For most reporting cycles the production volumes of D4 are presented in ranges to protect confidential business information (CBI). Although most of the data is limited to ranges, the production volume for D4 appears to be generally increasing in the time period analyzed. In reporting years 1986, 1990, 1994, 1998, 2002, and 2006, aggregate production volume for D4 was between 100 million and 500 million lb. The exact amount is available for one year, 2011, in which 306,034,503 lb of D4 was produced or imported. Over the most recent reporting period, aggregate production volume was between 500 and 750 million lb in 2012 and between 750 million and 1 billion lb in 2013, 2014, and 2015.

Table 2-2. 1986–2015 National Production Volume Data for D4 (CAS RN 556-67-2) (Non-confidential Production Volume in Pounds)

Year	Production Volume (lb)
1986	>100–500M
1990	>100–500M
1994	>100–500M
1998	>100–500M
2002	>100–500M
2006	100 to <500M
2011	306,034,503
2012	500–750 M
2013	750M–1B
2014	750M–1B
2015	750M–1B

M = million; B = billion
Sources: U.S. EPA 2002, U.S. EPA 2006, U.S. EPA 2017b, U.S. EPA 2020

2.1.2 Manufacturers

According to the 2016 CDR database, eight parent companies manufactured or imported D4 (556-67-2) at nine sites for reporting year 2015. Table 2-3 presents the company information and manufacture and import information where available; it does not represent all the facilities potentially manufacturing or using D4. CDR requires manufacturers (including importers) to report information on the chemicals they produce domestically or import into the United States generally above 25,000 lb per site per year.

Table 2-3. 2016 CDR U.S. Manufacturers and Importers of D4

U.S. Parent Company	Site	Site Address	Manufacture or Import	Manufactured Volume (lb/year)	Imported Volume (lb/year)	Past Production Volume (2014) (lb/year)
AB Specialty Silicones LLC	AB Specialty Silicones LLC	3790 Sunset Ave, Waukegan, IL 60087	Imported	0	120,400	1,030,360
Bluestar Silicones USA Corp.	Bluestar Silicones USA Corp.	Two Tower Center Boulevard, East Brunswick, NJ 08816	CBI	CBI	CBI	CBI
CBI	CBI	CBI	Imported	0	39	6,417
Dow Corning Corporation	Dow Corning Corp. Midland Plant	3901 South Saginaw Road, Midland, MI 48640	Imported	CBI	CBI	CBI
	Dow Corning Corp.	4770 Highway 42 East, Carroll, KY 41008	Domestically Manufactured/ Imported	CBI	CBI	CBI
Momentive Performance Materials Inc.	Momentive Performance Materials Inc.	260 Hudson River Road, Waterford, NY 12188	Domestically Manufactured/ Imported	560,309,205	4,804,021	607,513,163
Rudolf-Venture Chemical Inc.	Rudolf-Venture Chemical Inc.	2304 Ebenezer Rd, Rock Hill, SC 29732	CBI	CBI	CBI	CBI
CBI	Shin-Etsu Silicones of America	1150 Damar Dr, Akron, OH 44305	CBI	CBI	CBI	CBI
Wacker Chemical Corporation	Wacker Chemical Corporation	3301 Sutton Road, Adrian, MI 49221	CBI	CBI	CBI	CBI

Source: U.S. EPA (2017b)

AB Specialty Silicones LLC is a manufacturer and worldwide distributor of specialty silicone chemicals.

Bluestar Silicones USA Corp. changed its name to Elkem Silicones in November 2017. Elkem Silicones, a division of Elkem, is one of the world's leading fully integrated silicone suppliers. D4 is listed as a product on their website (Elkem 2017).

Dow Corning Corporation, a wholly owned subsidiary of The Dow Chemical Company, changed its name to Dow Silicones Corporation in 2018. Dow Silicones Corporation manufactures diverse silicon-based products. D4 is listed as a product as well as an intermediate on their website (Dow Chemical 2016).

Momentive Performance Materials Inc., an indirect wholly owned subsidiary of MPM Holdings Inc., is a producer of silicones and silicone derivatives and products derived from quartz and specialty ceramics. D4 is listed as a product on their website (Momentive 2020).

Rudolf-Venture Chemical Inc. is a subsidiary of the German company Rudolf Group, a supplier to the textile, construction, and coating industries.

Shin-Etsu Silicones Inc. is a major supplier of silicone materials. D4 is listed as a diluent on their website (Shin-Etsu 2020).

Wacker Chemical Corporation is a chemical manufacturer that claims to be the world's second largest silicone manufacturer. D4 is listed as a product on their website (Wacker 2020).

2.1.3 Industrial and Consumer/Commercial Use Data

Table 2-4 presents the information provided by each company to CDR regarding the industrial and consumer/commercial use of the chemical. As shown below, there were 12 sectors of industrial use reported by nine manufacturing sites. The most reported industrial use sectors were "All other chemical product and preparation manufacturing" and "All other basic inorganic chemical manufacturing," with three manufacturing sites reporting use in these two sectors.

Table 2-4. Industrial and Consumer Use Data for D4 from the CDR

Site	Type of Processing	Industrial Use Data			Consumer Use Data		
		Sector	Industrial Use	Percent of Production Volume	Consumer Use Product Category	Commercial or Consumer Use	Percent of Production Volume
AB Specialty Silicones LLC	Processing as a reactant	All other basic inorganic chemical manufacturing	Intermediates	100	ND	ND	ND
Bluestar Silicones USA Corp.	Processing as a reactant	All other chemical product and preparation manufacturing	Intermediates	100	Plastic and rubber products not covered elsewhere	Both	95
					Paints and coatings	Both	5
Shin-Etsu Silicones of America	Processing—incorporation into formulation, mixture, or reaction product	Rubber product manufacturing	Paint additives and coating additives not described by other categories	100	ND	ND	ND
CBI	CBI	Plastic material and resin manufacturing	Process regulators	100	ND	ND	ND
Dow Corning Corp. Midland Plant	Processing—incorporation into formulation, mixture, or reaction product	All other chemical product and preparation manufacturing	Solvents (which become part of product formulation or mixture)	20	ND	ND	ND

Site	Type of Processing	Industrial Use Data			Consumer Use Data		
		Sector	Industrial Use	Percent of Production Volume	Consumer Use Product Category	Commercial or Consumer Use	Percent of Production Volume
Dow Corning Corp. Midland Plant	Processing—repackaging	All other chemical product and preparation manufacturing	Solvents (which become part of product formulation or mixture)	120	ND	ND	ND
	Processing as a reactant	All other basic inorganic chemical manufacturing	Intermediates	80	ND	ND	ND
Dow Corning Corp.	Processing as a reactant	All other basic inorganic chemical manufacturing	Intermediates	80	ND	ND	ND
	Processing—incorporation into formulation, mixture, or reaction product	Personal care product manufacturing	Solvents (which become part of product formulation or mixture)	20	ND	ND	ND
	Processing—repackaging	All other basic inorganic chemical manufacturing	Intermediates	3	ND	ND	ND
	Processing—repackaging	Personal care product manufacturing	Solvents (which become part of product formulation or mixture)	20	ND	ND	ND

Site	Type of Processing	Industrial Use Data			Consumer Use Data		
		Sector	Industrial Use	Percent of Production Volume	Consumer Use Product Category	Commercial or Consumer Use	Percent of Production Volume
Dow Corning Corp.	Processing—incorporation into formulation, mixture, or reaction product	All other basic inorganic chemical manufacturing	Intermediates	60	ND	ND	ND
Momentive Performance Materials Inc.	Processing—incorporation into formulation, mixture, or reaction product	Synthetic rubber manufacturing	Intermediates	10	Plastic and rubber products not covered elsewhere	Commercial	20
	Processing—incorporation into formulation, mixture, or reaction product	Cyclic crude and intermediate manufacturing	Intermediates	15	Personal care products	Commercial	20
	Processing as a reactant	Adhesive manufacturing	Adhesives and sealant chemicals	15	Adhesives and sealants	Commercial	20
	Processing—incorporation into formulation, mixture, or reaction product	Computer and electronic product manufacturing	Adhesives and sealant chemicals	10			
	Processing—incorporation into formulation, mixture, or reaction product	Electrical equipment, appliance, and component manufacturing	Adhesives and sealant chemicals	30			

Site	Type of Processing	Industrial Use Data			Consumer Use Data		
		Sector	Industrial Use	Percent of Production Volume	Consumer Use Product Category	Commercial or Consumer Use	Percent of Production Volume
Momentive Performance Materials Inc.	Processing as a reactant	All other basic organic chemical manufacturing	Intermediates	10	Cleaning and furnishing care products	Commercial	20
	Processing—incorporation into formulation, mixture, or reaction product	Asphalt paving, roofing, and coating materials manufacturing	Lubricants and lubricant additives	10	Automotive care products	Commercial	20
Rudolf Venture Chemical Inc.	ND	Textiles, apparel, and leather manufacturing	Finishing agents	100	CBI	Commercial	100
Wacker Chemical Corporation	Processing as a reactant	All other chemical product and preparation manufacturing	Intermediates	CBI	ND	ND	ND
	CBI	CBI	CBI	CBI	ND	ND	ND

Source: U.S. EPA 2017b
CBI = Data withheld as Confidential Business Information; ND = no data provided

2.2. Additional Import Data

For this analysis, Datamyne data over the years 2013 to 2019 were analyzed. Descartes Datamyne is a commercial searchable trade database that covers the import-export data and global commerce of more than 50 countries across five continents (approximately 76% of the world's import trade by value) and includes the cross-border commerce of the United States with over 230 trading partners. The trade data is gathered from U.S. Customs Automated Manifest System. For this analysis, EPA queried the database for bills of lading related to D4. Due to the nature of Datamyne data, some shipments containing the chemical of concern may be excluded due to being categorized under other names that were not included in the search terms. There also may be typos in the data that prevent shipment records containing the chemical from being located. Datamyne does not include articles/products containing the chemical unless the chemical name is included in the description of the article/product.

Datamyne revealed data on shipments of the chemical D4. Based on the descriptions provided on the bills of lading, Table 2-5 provides an estimate of the volume of D4 imported as the chemical (not in an identified product) for the time period 2013 to 2019. Table 2-6 lists the importers of D4 as identified in Datamyne, from 2013 to 2019. As shown below imports of D4 have been generally trending upwards over the past several years.

Table 2-5. U.S. Volume of Imports of D4 (Chemical), (2013 to 2019)

Year	Total Import Volume (kg)	Number of Shipments
2013	624,010	21
2014	3,000,279	140
2015	1,740,128	76
2016	1,399,680	56
2017	3,722,380	93
2018	1,826,855	103
2019	4,137,699	160

Source: Descartes Datamyne 2019

Due to the nature of Datamyne data, some shipments containing the chemical of concern may be excluded due to being categorized under other names that were not included in the search terms. There also may be typos in the data that prevent shipment records containing the chemical from being located. Datamyne does not include articles/products containing the chemical unless the chemical name is included in the description of the article/product.

Table 2-6. U.S. Importers of D4 (Chemical) from Descartes Datamyne (2013 to 2019)

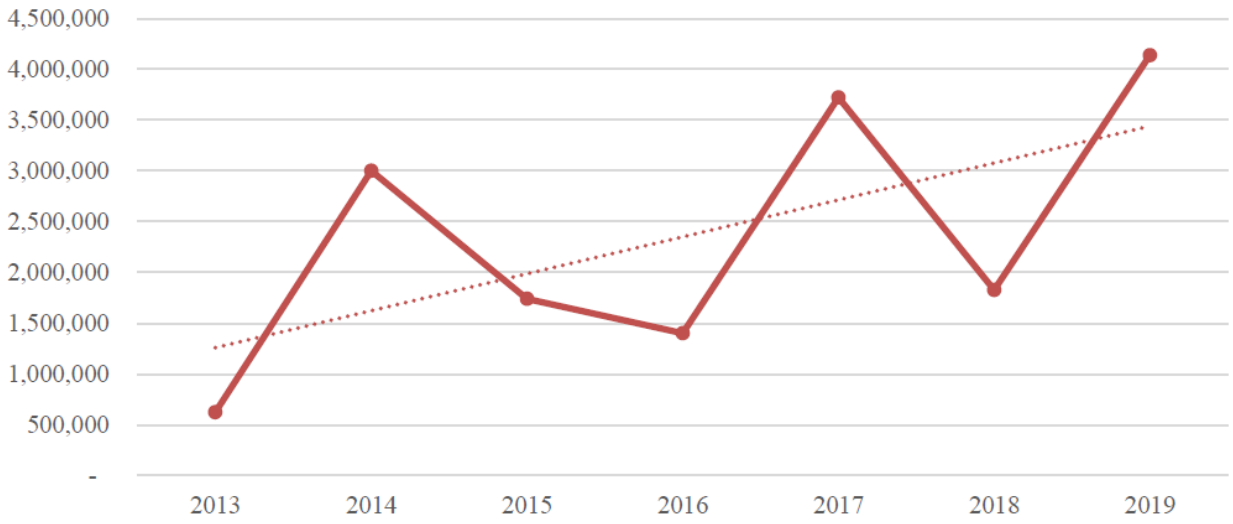
Consignee Declared (Importer)	Import Volume by Year (kg)							
	2013	2014	2015	2016	2017	2018	2019	Total
AB Specialty Silicon Plant		86,508						86,508
Advanced Tech Materials			7					7
AL2Chem LLC				14,834				14,834
ATMI Inc.	34,484	63,756	62,363					160,603
Bluestar Silicones USA Corp.			698,860	380,520	260,140			1,339,520
BRB North America Inc.						32,960	38,490	71,450
Dow Corp.			298,948		7,259	97,480	104,739	508,426
Elkem Silicones USA Corp.					40,100	563,980	613,490	1,217,570
Entegris Inc.			8,638	82,184	75,739	85,126	72,857	324,544
Evonik Goldschmidt Corp.	39,724							39,724
FujiFilm Electronic Materials USA Inc.	24,082	11,405	1,922	4,985		13,711	30,792	86,897
Helicity Technologies Inc.				210				210
Momentive Performance Materials Inc.		1,839,470		69,890	1,242,810	982,380	3,057,710	7,192,260
OMG Americas Inc.	4,667							4,667
Orion Engineered Carbons LLC							166,252	166,252

Consignee Declared (Importer)	Import Volume by Year (kg)							
	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**
Ruichem USA Inc.							18,162	18,162
Sarchem Laboratories Inc.			212					212
SiVance					212			212
Stolt-Nielsen	521,050	999,140	280,520					1,800,710
Suttons International	3							3
Not Declared			388,658	847,057	2,096,120	51,218	35,207	3,418,260
Grand Total	**624,010**	**3,000,279**	**1,740,128**	**1,399,680**	**3,722,380**	**1,826,855**	**4,137,699**	**16,451,030**

Source: Descartes Datamyne 2019

Due to the nature of Datamyne data, some shipments containing the chemical of concern may be excluded due to being categorized under other names that were not included in the search terms. There may be typos in the data that prevent shipment records containing the chemical from being located. Datamyne does not include articles/products containing the chemical unless the chemical name is included in the description of the article/product.

Figure 1. Import Volume of D4 (chemical), 2013-2019 (kg)



Source: Descartes Datamyne 2019

Due to the nature of Datamyne data, some shipments containing the chemical of concern may be excluded due to being categorized under other names that were not included in the search terms. There also may be typos in the data that prevent shipment records containing the chemical from being located. Datamyne does not include articles/products containing the chemical unless the chemical name is included in the description of the article/product.

Figure 2-1. Import Volume of D4 (Chemical), 2013–2019 (kg)

As shown in Table 2-6, the following companies were the major importers of D4 between 2013 and 2019, based on volume. Contact with the companies is necessary to determine if they are currently importing or using D4.

- **AB Specialty Silicon Plant** – see description in 2.1.2.
- **Advanced Tech Materials**, now known as **L3Harris Narda-ATM**, manufactures coaxial and waveguide components.
- **AL2Chem LLC** is a supplier of specialty chemicals, innovative silica and organosilane products.
- **ATMI Inc.**, acquired by **Entegris Inc.** in 2014, is a supplier of products and materials for semiconductor and other advanced manufacturing.
- **Bluestar Silicones USA Corp.** – see description in Section 2.1.2.
- **BRB North America Inc.**, which is part of BRB International BV, is an international supplier of silicones, lube oil additives, and chemicals.
- **Dow Corp.** – see description in Section 2.1.2.
- **Elkem Silicones USA Corp.** is a supplier of silicon-based advanced materials with operations throughout the value chain from quartz to specialty silicones.
- **Entegris Inc.** is a provider of yield-enhancing materials and components for advanced manufacturing processes in the semiconductor and other high-technology industries.

- **Evonik Goldschmidt Corp.**, a provider of specialty surfactants to a variety of industries but with a major focus on the consumer goods market, merged into parent company, Evonik Corporation, in 2014.
- **FUJIFILM Electronic Materials USA Inc.** supplies a broad array of products and services used throughout the semiconductor manufacturing processes.
- **Helicity Technologies Inc.** is a supplier of specialty coatings that protect surfaces in challenging environmental conditions and impart resistance to extreme temperatures, UV, weathering, and corrosion.
- **Momentive Performance Materials Inc.** – see description in Section 2.1.2.
- **OMG Americas Inc.**, now known as **Borchers Americas Inc.**, supplies coatings additives, driers, catalysts, emulsifiers and more for a wide range of coatings applications.
- **Orion Engineered Carbons LLC** is a supplier of specialty and rubber carbon blacks for coatings, printing, inks, polymers, rubber and more.
- **Ruichem USA Inc.**, the U.S. division of the Ruijiang Group, is a provider and exporter of titanium dioxide and pigment.
- **Sarchem Laboratories Inc.** is a leading custom synthesis laboratory and supplier of fine and specialty chemicals around the world.
- **SiVance**, acquired by **Milliken & Co.** in 2011, is a supplier of specialty silane, silicone, and siloxane intermediates.
- **Stolt-Nielsen** is a provider of transportation and storage for specialty chemicals and other bulk liquids.
- **Suttons International** is an international supply chain provider specializing in the safe movement of chemicals, gases, foods, waste and fuels.

2.3. Toxic Release Inventory Data

D4 is not reported under TRI.

2.4. Use Information

2.4.1 Summary of Uses

Based on the sources described throughout this chapter and in Table_Apx A-1, the types of end-use products that are produced using D4 are summarized below. These include both ongoing uses and uses that may have been discontinued.

Adhesives and Sealants

One company reporting to CDR (U.S. EPA 2017b), Momentive Performance Materials, indicated that the chemical is used as an adhesive and sealant chemical in adhesive manufacturing, computer and electronic products manufacturing, and electrical equipment, appliance, and component manufacturing.

Animal Grooming Products

D4 is used in animal grooming products. At least six animal grooming products containing D4 have been identified (see Table 2-8). Products include serums, finishing sprays, and conditioners for various animals such as horses, dogs, and cats.

Automotive Care Products
One company reporting to CDR (U.S. EPA 2017b), Momentive Performance Materials, indicated the use of the chemical in automotive care products. Substances in Preparations in Nordic Countries (SPIN) identifies use of the chemical as a polishing agent for lacquers (car wax) and car care products in Nordic countries (Danish EPA 2019).

Chemical Manufacturing
Of the companies reporting to the CDR (U.S. EPA 2017b), one site indicated that D4 is used in the all other basic organic chemical manufacturing sector, three sites indicated the chemical is used in the all other basic inorganic chemical manufacturing sector, and three sites indicated the chemical is used in the all other chemical product and preparation manufacturing sector.

Cleaning and Furnishing Care Products
One company reporting to CDR (U.S. EPA 2017b), Momentive Performance Materials, indicated the use of the chemical in cleaning and furnishing care products. The European Chemicals Agency (ECHA) cites consumer use in washing and cleaning products and polishes and waxes in European countries (ECHA 2019). The American Cleaning Institute, whose members include manufacturers and formulators of soaps, detergents, and general cleaning products, companies that supply ingredients and finished packaging for these products, and chemical distributors, informed EPA that silicone polymers are used in the products their members produce (EPA-HQ-OPPT-2018-0443-0008).

Inks, Toners, and Colorant Products
D4 is used in printing ink and colorant products. At least three printing ink products containing D4 have been identified (see Table 2-8). Substances in Preparations in Nordic Countries identifies use of the chemical in printing inks in Nordic countries (Danish EPA 2019). The European Chemicals Agency reports use of this chemical in ink and toners in European countries (ECHA 2020).

Laboratory Use
D4 is used as laboratory chemicals. At least three laboratory chemicals containing D4 have been identified (see Table 2-8). Dow Silicones Corporation *et al.* report use of this chemical as a laboratory chemical (EPA-HQ-OPPT-2018-0443-0004). The European Chemicals Agency reports use of this chemical as laboratory chemicals in European countries (ECHA 2020).

Laundry and Dishwashing Detergents
D4 is used in detergents. At least five laundry products containing D4 have been identified (see Table 2-8). Dow Silicones Corporation *et al.* report use of this chemical in soaps and detergents (EPA-HQ-OPPT-2018-0443-0004). The American Cleaning Institute, whose members include manufacturers and formulators of soaps, detergents, and general cleaning products, companies that supply ingredients and finished packaging for these products, and chemical distributors, informed EPA that silicone polymers are used in the products their members produce (EPA-HQ-OPPT-2018-0443-0008).

Lubricants and Greases
One company reporting to CDR (U.S. EPA 2017b), Momentive Performance Materials, indicated that the chemical is used as a lubricant and lubricant additive in asphalt paving, roofing, and coating materials manufacturing.

Paints and Coatings
One company reporting to CDR (U.S. EPA 2017b), Shin-Etsu Silicones of America, indicated that the chemical is used as a paint additive and coating additive not described by other categories in rubber

product manufacturing. Another company reporting to CDR (U.S. EPA 2017b), Bluestar Silicones USA Corp., indicated the use of the chemical in paints and coatings.

Personal Care Products

One company reporting to CDR (U.S. EPA 2017b), Momentive Performance Materials, indicated the use of the chemical in personal care products. Dow Silicones Corporation et al. report use of this chemical in personal care products and cosmetics (EPA-HQ-OPPT-2018-0443-0004). The Personal Care Products Council informed EPA that D4 is a critical building block of silicone polymers, which are used as ingredients for cosmetics and personal products (EPA-HQ-OPPT-2018-0443-0012).

Plastics and Resins

Two companies reporting to CDR (U.S. EPA 2017b), Momentive Performance Materials and Bluestar Silicones USA Corporation, indicated the use of D4 in plastic and rubber products not covered elsewhere. Substances in Preparations in Nordic Countries identifies use of D4 as a raw material for the production of plastics in Nordic countries (Danish EPA 2019). Dow Silicones Corporation et al. report use of this chemical in plastics and rubber products not covered elsewhere and resin and synthetic rubber manufacturing (EPA-HQ-OPPT-2018-0443-0004).

Synthetic Rubber and Rubber

One company reporting to CDR (U.S. EPA 2017b), Momentive Performance Materials, indicated that the chemical is used as an intermediate in synthetic rubber manufacturing. Substances in Preparations in Nordic Countries identifies use of D4 as a raw material used for production of rubber products in Nordic Countries (Danish EPA 2019).

2.4.2 Tier 1 Uses of D4

Uses are divided into Tier 1 and Tier 2 uses. Those in Tier 1 generally have more information to support the accuracy of the use. For instance, these uses may be identified from sources where manufacturers and producers self- report the information or have been confirmed by identification of the chemical on a product SDS. Tier 2 uses are other uses that may be historic, non-TSCA use, or more anecdotal, and are found in Table_Apx B-1.

Table 2-7. First Tier Uses of D4

Activity or Chemical Function	Sector or Product Type	Expected Users	Comments and References
Manufacturing			
Manufacture		Industrial	U.S. EPA 2017b; EPA-HQ-OPPT-2018-0443-0004 2016 CDR reports manufacture of D4. Dow Silicones Corporation et al. report use of this chemical in domestic manufacture.
Import		Industrial	U.S. EPA 2017b 2016 CDR reports import of D4.
Processing			
Processing as a reactant	Adhesives and sealant chemicals	Industrial	U.S. EPA 2017b; EPA-HQ-OPPT-2018-0443-0004 2016 CDR reports D4 use as an adhesive and sealant chemical in adhesive manufacturing. Dow Silicones Corporation et al. similarly report the use of the chemical for processing (as a reactant) in adhesive manufacturing.
Processing as a reactant	All other basic inorganic chemical manufacturing	Industrial	U.S. EPA 2014b; U.S. EPA 2017b; Danish EPA 2019; EPA-HQ-OPPT-2018-0443-0004 2012 and 2016 CDR report use of this chemical as an intermediate in the manufacture of other basic inorganic chemicals. SPIN reports its use in the manufacture of chemicals and chemical products in Nordic countries. Dow Silicones Corporation et al. report use of this chemical for processing (as a reactant) in all other basic inorganic chemical manufacturing.
Incorporation into formulation, mixture, or reaction product			U.S. EPA 2014b; U.S. EPA 2017b; EPA-HQ-OPPT-2018-0443-0004 2016 CDR cites the use of this chemical as an intermediate in formulation, mixture, or reaction products, while 2012 CDR reports its use as a solvent (which becomes part of product formulation or mixture) and as an adhesive and sealant chemical in processing (incorporation into formulation, mixture, or reaction product) in other basic inorganic chemical manufacturing. Dow Silicones Corporation et al. report use of this chemical for processing

Activity or Chemical Function	Sector or Product Type	Expected Users	Comments and References
			(incorporation into formulation, mixture, or reaction product) in all other basic inorganic chemical manufacturing.
Processing – repackaging			U.S. EPA 2014b; U.S. EPA 2017b 2012 and 2016 CDR include D4 as an intermediate in repackaging in all other basic inorganic chemical manufacturing.
Processing as a reactant	All other basic organic chemical manufacturing	Industrial	U.S. EPA 2014b; U.S. EPA 2017b; EPA-HQ-OPPT-2018-0443-0004 2012 and 2016 CDR report use of this chemical as an intermediate for processing (as a reactant) in all other basic organic chemical manufacturing. Dow Silicones Corporation et al. report use of this chemical for processing (as a reactant) in all other basic organic chemical manufacturing.
Processing as a reactant	All other chemical product and preparation manufacturing	Industrial	U.S. EPA 2014b; U.S. EPA 2017b; Environment Canada 2008; Government of Canada 2018; ECHA 2015; EPA-HQ-OPPT-2018-0443-0004 2012 and 2016 CDR report the use of D4 as an intermediate for processing (as a reactant) in all other chemical product and preparation manufacturing. According to Environment Canada, the chemical is reacted to form silicone polymers, from blending, formulation and packaging operations. D4 is used to manufacture silicone polymers and copolymers (Government of Canada 2018). ECHA 2015 indicates use as laboratory agent as an intermediate in the synthesis of silicone-based chemicals in European countries. Dow Silicones Corporation et al. report use of this chemical for processing (as a reactant) in all other chemical product and preparation manufacturing.
Incorporation into formulation, mixture, or reaction product			U.S. EPA 2014b; EPA-HQ-OPPT-2018-0443-0004 2012 CDR reports the use of D4 as a solvent which becomes part of a product formulation or mixture. Dow Silicones Corporation et al. similarly report use of this chemical for processing (incorporation into formulation, mixture, or reaction product) in all other chemical product and preparation manufacturing.

Activity or Chemical Function	Sector or Product Type	Expected Users	Comments and References
Processing – repackaging			U.S. EPA 2017b 2016 CDR include D4 as a solvent (which become part of product formulation or mixture) in repackaging in all other chemical product and preparation manufacturing.
Incorporation into formulation, mixture, or reaction product	Asphalt paving, roofing, and coating materials manufacturing	Industrial	U.S. EPA 2017b 2016 CDR reports that D4 functions as a lubricant and lubricant additive for processing (incorporation into formulation, mixture, or reaction product) in asphalt paving, roofing, and coating materials manufacturing.
Incorporation into formulation, mixture, or reaction product	Computer and electronic product manufacturing	Industrial	U.S. EPA 2017b; Danish EPA 2019; EPA-HQ-OPPT-2018-0443-0009 2016 CDR indicates D4 functions as an adhesive and sealant chemical for processing (incorporation into formulation, mixture, or reaction product) to manufacture computer and electronic products. SPIN indicates the use of D4 as electric current insulation material in Nordic countries. The Semiconductor Industry Association informed EPA that D4 is used as a precursor for a dielectric layer disposition in advanced semiconductor technology manufacturing.
Incorporation into formulation, mixture, or reaction product	Cyclic crude and intermediate manufacturing	Industrial	U.S. EPA 2017b 2016 CDR reports D4 as an intermediate for processing (incorporation into formulation, mixture, or reaction product) in cyclic crude and intermediate manufacturing.
Incorporation into formulation, mixture, or reaction product	Electrical equipment, appliance, and component manufacturing	Industrial	U.S. EPA 2017b; Danish EPA 2019; EPA-HQ-OPPT-2018-0443-0009 2016 CDR reports the use of D4 as an adhesive and sealant chemical for processing (incorporation into formulation, mixture, or reaction product) in electrical equipment, appliance, and component manufacturing. SPIN indicates the use of D4 as electric current insulation material in Nordic countries. The Semiconductor Industry Association informed EPA that D4 is used as a precursor for a dielectric layer disposition in advanced semiconductor technology manufacturing.

Activity or Chemical Function	Sector or Product Type	Expected Users	Comments and References
Incorporation into formulation, mixture, or reaction product	Miscellaneous manufacturing	Industrial	U.S. EPA 2014b; EPA-HQ-OPPT-2018-0443-0004 2012 CDR reports the use of D4 as a finishing agent for processing (incorporation into formulation, mixture, or reaction product) in miscellaneous manufacturing. Dow Silicones Corporation et al. similarly report the use of this chemical for processing (incorporation into formulation, mixture, or reaction product) in miscellaneous manufacturing.
Processing – repackaging			U.S. EPA 2014b 2012 CDR reports the use of D4 as a finishing agent for processing (repackaging) in miscellaneous manufacturing.
Incorporation into formulation, mixture, or reaction product	Paints and coatings	Industrial	U.S. EPA 2014b; U.S. EPA 2017b; Danish EPA 2019; EPA-HQ-OPPT-2018-0443-0004 2016 CDR reports the use of this chemical as a paint additive and coating additive not described by other categories, while 2012 CDR reports its use as a solvent (which became part of product formulation or mixture) in paint and coating manufacturing. SPIN indicates use as an additive for paint and varnishes in Nordic countries. Dow Silicones Corporation et al. report the use of this chemical in the processing (incorporation into formulation, mixture, or reaction product) in paint and coating manufacturing.
Incorporation into formulation, mixture, or reaction product	Personal care product manufacturing	Industrial/ Commercial	U.S. EPA 2017b 2016 CDR reports the use of D4 as a solvent for processing (incorporation into formulation, mixture, or reaction product) in personal care product manufacturing.
Processing – repackaging			U.S. EPA 2017b 2016 CDR reports the use of D4 as a solvent for processing (repackaging) in personal care product manufacturing.

Activity or Chemical Function	Sector or Product Type	Expected Users	Comments and References
Processing as a reactant	Plastic material and resin manufacturing	Industrial	Danish EPA 2019; EPA-HQ-OPPT-2018-0443-0004 SPIN reports use of D4 as a raw material for the production of plastics. Dow Silicones Corporation et al. includes use of D4 for processing (as a reactant) in resin and synthetic rubber manufacturing.
Incorporation into formulation, mixture, or reaction product	Rubber product manufacturing	Industrial	U.S. EPA 2017b; Danish EPA 2019 2016 CDR reports D4 is used as a paint additive and coating additive for processing (incorporation into formulation, mixture, or reaction product) in rubber product manufacturing. SPIN indicates the use of this chemical as a raw material used for production of rubber products in Nordic countries.
Processing as a reactant	Synthetic rubber manufacturing	Industrial	EPA-HQ-OPPT-2018-0443-0004; Danish EPA 2019 Dow Silicones Corporation et al. report use of this chemical for processing (as a reactant) in synthetic rubber manufacturing. SPIN reports use of D4 in the manufacture of rubber and plastics products in Nordic countries.
Incorporation into formulation, mixture, or reaction product			U.S. EPA 2014b; U.S. EPA 2017b 2012 and 2016 CDR report D4 as an intermediate for processing (incorporation into formulation, mixture, or reaction product) in synthetic rubber manufacturing.
Unknown	Textiles, apparel, and leather manufacturing	Industrial	U.S. EPA 2017b 2016 CDR reports D4 is used as a finishing agent in textiles, apparel, and leather manufacturing.
Consumer and commercial use			
Unknown	Adhesives and sealants	Commercial	U.S. EPA 2017b; EPA-HQ-OPPT-2018-0443-0004 2016 CDR cites the use of D4 in adhesives and sealants in commercial uses. Dow Silicones Corporation et al. similarly report use of this chemical in adhesives and sealants.

Activity or Chemical Function	Sector or Product Type	Expected Users	Comments and References
Unknown	Animal grooming products	Commercial/ Consumer	Various product websites (see Table 2-8) D4 has been identified in several animal grooming products (see Table 2-8).
Polishing agent	Automotive care products	Commercial	U.S. EPA 2017b; Danish EPA 2019; EPA-HQ-OPPT-2018-0443-0004 2016 CDR indicates the use of the chemical in automotive care products. SPIN reports use of the chemical as a polishing agent for lacquers (car wax) and car care products in Nordic countries. Dow Silicones Corporation et al. report use of this chemical in automotive care products.
Unknown	Cleaning and furnishing care products	Commercial/ Consumer	U.S. EPA 2017b; ECHA 2020; EPA-HQ-OPPT-2018-0443-0004 2016 CDR includes the use of the chemical in cleaning and furnishing care products. ECHA cites consumer use in washing and cleaning products and polishes and waxes in European countries. Dow Silicones Corporation et al. report use of this chemical in cleaning and furnishing care products.
Unknown	Ink, toner, and colorant products	Commercial	Danish EPA 2019; ECHA 2020; Various SDSs (see Table 2-8) SPIN reports use of the chemical in printing inks. ECHA cites use in ink and toners in European countries. D4 has been identified in several ink, toner, and colorant products (see Table 2-8).
Laboratory chemical	Laboratory use	Commercial	ECHA 2015; EPA-HQ-OPPT-2018-0443-0004 ECHA 2015 reports D4 exposure scenario and includes its use as a laboratory agent in European countries. Dow Silicones Corporation et al. states its use as a reagent in academic and industrial laboratories.
Unknown	Laundry and dishwashing products	Consumer	EPA-HQ-OPPT-2018-0443-0004; Various SDSs (see Table 2-8) Dow Silicones Corporation et al. report use of this chemical in soaps and detergents. D4 has been identified in several detergents (see Table 2-8).
Unknown	Paints and coatings	Commercial/ Consumer	U.S. EPA 2014b; U.S. EPA 2017b; Danish EPA 2019

Activity or Chemical Function	Sector or Product Type	Expected Users	Comments and References
			2012 and 2016 CDR report the use of D4 in paints and coatings available for consumer and/or commercial use. SPIN indicates its use in additives for paint and varnishes.
Unknown	Personal care products	Commercial	U.S. EPA 2017b; EPA-HQ-OPPT-2018-0443-0004 2016 CDR cites D4 as a commercial use in personal care products. Dow Silicones Corporation et al. report use of this chemical in personal care products and cosmetics.
Unknown	Plastic and rubber products not covered elsewhere	Commercial/ Consumer	U.S. EPA 2014b; U.S. EPA 2017b; EPA-HQ-OPPT-2018-0443-0004 2012 and 2016 CDR cite D4 as used in plastic and rubber products not covered elsewhere. Dow Silicones Corporation et al. report use of this chemical in plastics and rubber products.
Viscosity controlling agent	Unknown	Consumer	U.S. EPA 2017a; Danish EPA 2019; Environment Canada 2008; CPCat 2015 Functional Use Database reports viscosity controlling agent as a functional use of D4. SPIN and Environment Canada report use as anti-foaming agent, foam-reducing agent, and defoamer in Nordic countries. CPCat[1] includes "viscosity adjustor" under consumer use.
D4 as contaminant			
Contaminant	Textiles and apparel	Consumer	Washington State Dept. of Ecology 2019; Danish EPA 2019; ECHA 2015 The Children Safe Product Act Reported Data lists the presence of D4 as a contaminant (equal to or greater than 100 ppm but less than 500 ppm) in athletic footwear and general purpose shoes. SPIN reports use of the chemical as a textile impregnation agent in Nordic countries and ECHA 2015 reports use as softening, waterproofing and wetting agents in textile manufacturing in European countries.

[1] CPCat was utilized to verify this specific classification and was not otherwise utilized in this report.

Activity or Chemical Function	Sector or Product Type	Expected Users	Comments and References
Contaminant	Toys, playground, and sporting equipment	Consumer	Washington State Dept. of Ecology 2019; Washington State Dept. of Ecology 2017; Gentry et al. 2017 The Children Safe Product Act Reported Data lists the presence of D4 as a contaminant (equal to or greater than 100 ppm but less than 500 ppm) in dolls/puppets/soft toys, bath/pool water toys, pacifiers/teething rings, and baby/infant stimulation toys. The current use or availability of these products is unknown. To support the Washington State Children's Safe Products Act (CSPA), the Washington State Department of Ecology conducted a study of 137 children's products and detected the presence of D4 in a teething necklace (104 ppm) and a pacifier (0.125 ppm). Gentry et al. reports child exposure through residual antifoam in some baby bottle nipples and pacifiers and sipper tubes.

2.5. Products Containing D4

This section includes a sample of products containing D4, based on the most recent SDS for each product that was found. This is not a comprehensive list of products containing D4. In addition, some manufacturers may appear over-represented in this table. This may mean that they are more likely to disclose product ingredients online than other manufacturers, but it does not imply anything about use of the chemical compared to other manufacturers in this sector.

Additionally, the existence of an SDS for a product does not necessarily mean that the product currently contains D4 or that the product is still on the market. EPA attempted to locate the most recent SDS for each product (and does not include in the table any products for which the previous, but not the current, SDS lists D4). Products considered to be "currently on the market" as indicated in the sixth column in Table 2-8 are those that were identified as currently for sale (*e.g.*, through an online vendor or by requesting a quote from the manufacturer), as of April 2020.

Table 2-8. Sample Products that Contain D4

Use	Expected Users	Product	Manufacturer	Percent in Product	Currently on Market?	Source
Adhesives and sealants						
Adhesive (electrical industry)	Commercial	DOWSIL 3140 RTV Coating	The Dow Chemical Company	≥0.05 to ≤0.21%	Yes	Dow Chemical Company (2020)
Silicone sealant	Commercial	PG-700 Pro-Grip Yellow Walkway Coating	Progressive Materials, LLC	1 to 10%	Yes	Materials (2017)
Silicone sealant and adhesive	Commercial / Consumer	Nuflex 302	Nuco Inc.	0.05 to 0.015%	Yes	Nuco Inc. (2017)
Masonry sealer	Commercial	SB2445 Oil Repellent Penetrating Sealer	Shore Corporation	5 to 10%	Yes	Shore Corporation 2015
Moisture barrier and electrical lubricant	Commercial	United 101 Moisture Barrier and Electrical Lubricant	United Laboratories	1 to 5%	Yes	United Laboratories Inc. (2018)
Protection of construction materials	Commercial	SILSHIELD 3100 NEUTRAL BASE 5GP	Momentive Performance Materials LLC	0.1 to <1%	Yes	Momentive Performance Materials LLC. (2018)
Cleaning products						
Cleaning agent	Consumer	Shine Plus	Spartan Chemical Company, Inc.	0.1 to 1%	Yes	Spartan Chemical Company Inc. (2019)
Degreaser	Commercial	NAVSOLVE	Ecolink	25 to 50%	No evidence found	Ecolink (2015)
Cleaning and degreasing metal parts	Commercial	QSOL 220 Cleaning Solvent	Safety-Kleen Systems, Inc.	3 to 7%	No evidence found	Safety-Kleen Systems (2016)

Use	Expected Users	Product	Manufacturer	Percent in Product	Currently on Market?	Source
Cleaner	Consumer	Plastic Cleaner	Claire Manufacturing Company	0.01 to <1%	Yes	Claire Manufacturing Company (2019)
Laundry products						
Laundry softener	Commercial	FaciliPro Fabric Softener	Ecolab Inc.	0.1 to 1%	No	Ecolab Inc. (2017)
Laundry softener	Commercial	Low Temp Laundry Clearly Soft	Ecolab Inc.	0.1 to 1%	No	Ecolab Inc. (2019)
Fabric finish	Consumer	Niagara Fabric Finish Spray Sizing	Faultless Brands	<0.1%	No	Faultless Brands (2019)
Laundry detergent	Commercial	Alpine Green Choice Laundry Detergent	Alpine Specialty Chemicals Ltd. [Canada]	0.2 to 0.5%	Yes	Alpine Specialty Chemicals LTD (2016a)
Laundry detergent	Commercial	Elite Laundry Detergent	Alpine Specialty Chemicals Ltd. [Canada]	0.2 to 0.5%	Yes	Alpine Specialty Chemicals LTD (2016b)
Laboratory chemicals						
Laboratory chemical	Commercial	Octamethylcyclotetrasiloxane	Sigma-Aldrich Inc.	≤100%	Yes	Sigma-Aldrich Inc. (2020)
Laboratory chemical	Commercial	D4 Cyclomethicone	Sigma-Aldrich Inc.	90 to 100%	Yes	Sigma-Aldrich Inc. (2018)
Laboratory research purposes	Commercial	Octamethylcyclotetrasiloxane	TCI America	>98%	Yes	TCI America (2019)
Lubricants and greases						
Lubricant	Commercial	Tap Magic Corrosion Inhibitor	The Steco Corporation	<10%	Yes	Steco Corporation (2017)

Use	Expected Users	Product	Manufacturer	Percent in Product	Currently on Market?	Source
Lubricant	Commercial	Terand Penetrant Lubricant Demoisturant Protectant	CPC Specialty Chemical Experts	2.5 to 10%	Yes	CPC Specialty Chemical Experts (2018)
Lubricants and lubricant additives	Commercial	Dowsil 3179 Dilatant Compound	Dow Corning Corporation	≥0.82 to ≤1.1%	Yes	Dow Corning Corporation (2017)
Paints and coatings						
Paint or paint related material	Commercial	White Lightning Silicone Rubber Window & Door Sealant Clear	White Lightning Products	<1%	Yes	White Lightning Products (2020)
Silicone coating	Commercial	AP-5400 High Solids Silicone Roof Coating	United Asphalt Company	0.1 to 1%	Yes	United Asphalt Company (2019)
Topcoat/alkyd	Commercial / Consumer	PRO 1-GL 2PK Gloss Leather Brown 100VOC	Rust-Oleum Corporation	10 to 25%	Yes	Rust-Oleum Corporation (2018)
Oil modified wood floor finish	Commercial	Buckeye Coliseum 350	Buckeye International Inc.	5.50%	Yes	Buckeye International Inc. (2018)
Floor finish	Commercial	Classic 50 Ultra Wood Floor Finish	Ecolab Inc.	10 to 30%	Yes	Ecolab Inc. (2015)
Semiconductor coating	Commercial	DOW CORNING WL-5351 Photopatternable Spin-On Silicone	Dow Corning Canada Inc. [Canada]	0.5 to 1.5%	No	Dow Corning Corporation (2007)
Vehicle coating	Commercial	Jade Ceramic Coating - Ice	B&B Blending, LLC	40 to <55%	Yes	B&B Blending LLC (2018)
Finishing agents for fabric, textile, and leather products						
Textile coating/protection	Industrial	Bluesil ECOSOFT	Elkem Siliconas España, S.A. [Spain]	0.1 to 1%	Yes	Elkem Silicones USA Corp (2019)

Use	Expected Users	Product	Manufacturer	Percent in Product	Currently on Market?	Source
Dying and finishing of textiles, leather, or paper	Industrial	Silamine PD	Siltech Corp	<0.5%	Yes	Siltech Corporation (2018)
Rubber and synthetic rubber products						
Silicone rubber base	Industrial/ Commercial	DOW CORNING HS II RTV High Strength Moldmaking Silicone Rubber Base	Dow Corning Corporation	0.1 to 1.0%	No	Dow Corning Corporation (2018)
Silicone rubber for use as vacuum blankets	Industrial/ Commercial	Mosites #14272	Mosites Rubber Company	<1%	No evidence found	Mosites Rubber Company (2018)
Jewelry molding rubber material	Commercial	Castaldo QuickSil Silicone RTV Jewelry Molding Rubber Part A	Goodwin Refractory Services Ltd [UK]	0.1 to 1%	Yes	Goodwin Refractory Services Ltd. (2020)
Personal care products						
Hair treatment	Consumer	OGX Biotin & Collagen Weightless Healing Oil	Vogue International	Unknown	Yes	OGX (2021b)
Hair treatment	Consumer	OGX Argan Oil of Morocco Penetrating Oil	Vogue International	Unknown	Yes	OGX (2021a)
Animal grooming products						
Equine hair serum	Consumer	Gleam® Moisturizing + Shine Serum	equiFUSE	Unknown	Yes	EquiFUSE (2021a)
Equine finishing spray	Consumer	SHINE™ Perfect + Shine Spray!	equiFUSE	Unknown	Yes	EquiFUSE (2021b)
Canine finishing spray	Consumer	K9 Silk & Shine	Warren London	Unknown	Yes	Warren London (2021)

Use	Expected Users	Product	Manufacturer	Percent in Product	Currently on Market?	Source
Canine coat serum	Commercial	Rockin' Mat Stopper Serum	Monte Boy, Inc.	Unknown	Yes	Monte Boy (2021)
Canine conditioner	Consumer	High Maintenance Strawberry Yogurt Leave-In Conditioner	Pet Head Inc.	Unknown	Yes	Pet Head (2021)
Canine and feline coat oil	Consumer	Pet Silk Brazilian Keratin Dog & Cat Oil	Pet Silk Inc.	Unknown	Yes	Pet Silk (2021)
Automotive care products						
Vehicle polish	Consumer	Adam's Buttery Wax	Adam's Polishes	1 to <5%	Yes	Adam's Polishes (2017)
Leather/vinyl protectant (automotive)	Commercial	Scotchgard Leather and Vinyl Protector, 38601	3M Company	<0.5%	Yes	3M Company (2019b)
Chemical feedstock						
Chemical intermediate	Industrial	Octamethylcyclotetrasiloxane, 98%	Gelest Inc.	98 to 100%	Yes	Gelest Inc. (2017)
Chemical intermediate	Industrial	[4-6% (Methacryloxypropyl)methylsiloxane]-dimethylsiloxane copolymer	Gelest Inc.	0 to 2%	Yes	Gelest Inc. (2019)
Ink, toner, and colorant products						
Flow additive for screen printing inks	Commercial	3M Flow Additive 892	3M Company	0 to 2%	Yes	3M Company (2018)
Screen printing ink	Commercial	3M Screen Printing UV Ink 9864 Transparent Green (BS)	3M Company	0.1 to 1%	Yes	3M Company (2019a)
UV digital printing ink	Commercial	ORALITE® 5019i yellow (020)	Orafol Europe GmbH [Germany]	<0.1%	Yes	Orafol Europe GmbH (2019)

Use	Expected Users	Product	Manufacturer	Percent in Product	Currently on Market?	Source
Plastic and resins						
Hydrophobic treatment	Industrial	APS-232HCA	Advanced Polymer Inc.	50%	No evidence found	Advanced Polymer Inc. (2016)
Hydrophobing agent	Industrial	TEGO Phobe 1650	Evonik Corporation	0.1 to <1%	Yes	Evonik Corporation (2019)

3. Waste, Disposal, and Recycling

3.1. National Emissions Inventory Data

D4 is not reported to the National Emissions Inventory.

3.2. RCRA Data

D4 is not reported through the Resource Conservation and Recovery Act (RCRA).

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Appendix A Sources Searched for Uses of D4

To compile the uses presented in Section 2, EPA searched publicly available databases listed in Table_Apx A-1 and conducted additional Google searches to clarify uses or find current products in commerce.

Table_Apx A-1. Sources Searched for Uses of D4

Title	Author and Year	Search Term(s)	Found Use Information? [a]
Non-Confidential 2016 Chemical Data Reporting (CDR)	U.S. Environmental Protection Agency (2017b)	556-67-2	Yes
Non-Confidential 2012 Chemical Data Reporting (CDR)	U.S. Environmental Protection Agency (2014b)	556-67-2	Yes
ChemView [b]	U.S. Environmental Protection Agency (2020)	556-67-2	Yes
TSCA Inventory Update Reporting 1986–2002 IUR (1986-2002 IUR)	U.S. Environmental Protection Agency (2002)	556-67-2	Yes
TSCA Inventory Update Reporting 2006 (2006 IUR)	U.S. Environmental Protection Agency (2006)	556-67-2	Yes
Toxics Release Inventory (TRI)	U.S. Environmental Protection Agency (2019)	556-67-2	No
National Emissions Inventory (NEI)	U.S. Environmental Protection Agency (2014a)	556672	No
Resource Conservation and Recovery Act (RCRA)	U.S. Environmental Protection Agency (2018a)	Octamethylcyclotetrasiloxane, Cyclotetrasiloxane, D4	No
Chemical and Product Categories (CPCat) [c]	CPCat (2015)	556-67-2	Yes
Children's Safe Product Act Reported Data	Washington State Dept. of Ecology (2019)	556-67-2	Yes
Datamyne	Descartes Datamyne (2018)	Octamethylcyclotetrasiloxane; Cyclotetrasiloxane; OMCTS	Yes
European Chemicals Agency (ECHA) Registration Dossier	European Chemicals Agency (2020)	556-67-2	Yes
Functional Use Database (FUse)	U.S. Environmental Protection Agency (2017a)	556-67-2	Yes
Safer Chemical Ingredients List (SCIL)	U.S. Environmental Protection Agency (2018b)	556-67-2, 000556-67-2, Octamethylcyclotetrasiloxane, Cyclotetrasiloxane, D4	No
Scorecard: The Pollution Information Site	GoodGuide (2011)	556-67-2	Yes
eChemPortal [b]	Organisation for Economic Cooperation and Development (2018)	556-67-2	Yes

Title	Author and Year	Search Term(s)	Found Use Information? [a]
Canada Chemicals Management Plan information sheets	Government of Canada (2018)	Siloxane D4	Yes
Environment Canada, Health Canada, Screening Assessment Challenges	Environment Canada (2008)	N/A	Yes
Substances in Preparations in the Nordic countries (SPIN) Database	SPIN (2020)	556-67-2	Yes
PubChem Compound	Kim et al. (2016)	556-67-2	Yes
A global human health risk assessment for octamethylcyclotetrasiloxane (D_4)	Gentry et al. (2017)	Incidentally identified while researching into details of this chemical's uses and products	Yes
Request for Risk Evaluation under the Toxic Substances Control Act; *Octamethylcyclotetrasiloxane (D4; CASRN: 556-67-2)*	Dow Silicones Corporation et al. (2020)	Incidentally identified while researching into details of this chemical's uses and products	Yes
Annex XV Restriction Report Proposal for a Restriction Octamethylcyclotetrasiloxane 2,2,4,4,6,6,8,8-	European Chemicals Agency (2015)	Incidentally identified while researching into details of this chemical's uses and products	Yes

Notes:

[a] If use information was found in the resource, it will appear in Table 2-4.

[b] This source is a group of databases; thus, the exact resource(s) it led to will be cited instead of the database as whole.

[c] CPCat was utilized to corroborate use as a viscosity controlling agent in Table 2-4 and was not otherwise utilized as a source in this report.

Appendix B Tier 2 Uses of D4

This appendix contains uses classified as Tier 2. As noted in Table_Apx B-1, these may be historic, non-TSCA use, or more anecdotal.

Table_Apx B-1. Tier 2 Uses of D4

Activity or Chemical Function	Expected Users	Description of Use or Process and References
Non-TSCA uses		
Contaminant in homogenous mixtures (gels, creams, powders, liquids, adhesives, synthetic fragrances)	Consumer	Washington State Dept. of Ecology 2019 The Children Safe Product Act Reported Data lists the presence of D4 as a contaminant (≥100 ppm but <500 ppm) in hair conditioner/treatment. The current use or availability of these products is unknown.
Use in food contact materials	Consumer	Gentry et al. 2017; EPA-HQ-OPPT-2018-0443-0004 Gentry et al. reports adult exposure to D4 through ingestion of residual antifoam in some processed foods, fish, leafy vegetables (greens), meat, cow's milk, root vegetables, and drinking (potable) water. Dow Silicones *et al.* report conditions of use that include food contact materials (such as nipples for baby bottles containing infant formula) in their request.
Biomedical use	Commercial	Government of Canada 2018; EPA-HQ-OPPT-2018-0443-0004 Silicone polymers that may contain residual amounts of D4 from the manufacturing process are used in biomedical applications, including over-the-counter (OTC) anti-gas and vapor rub medications.
Humectant in personal care products	Commercial	U.S. EPA 2017b; ECHA 2020; Government of Canada 2018; U.S. EPA 2017a; Environment Canada 2008 Functional Use Database reports the functional use of D4 as a skin conditioner, humectant, emollient, and hair conditioner. Environment Canada 2008 reports that D4 is released from the use and disposal of personal care products. ECHA and the Government of Canada indicate that D4 is found in cosmetics and personal care products such as hair/skin care products and antiperspirants and deodorants. 2016 CDR reports its use in personal care products.
Uses with minimal substantiation		
Fragrance	Unknown: not categorized in Functional Use Database	U.S. EPA 2017a Functional Use Database reports that D4 is used as a fragrance.

Activity or Chemical Function	Expected Users	Description of Use or Process and References
Antistatic agent	Unknown: not categorized in Functional Use Database	U.S. EPA 2017a Functional Use Database reports the functional use of D4 as an antistatic agent.