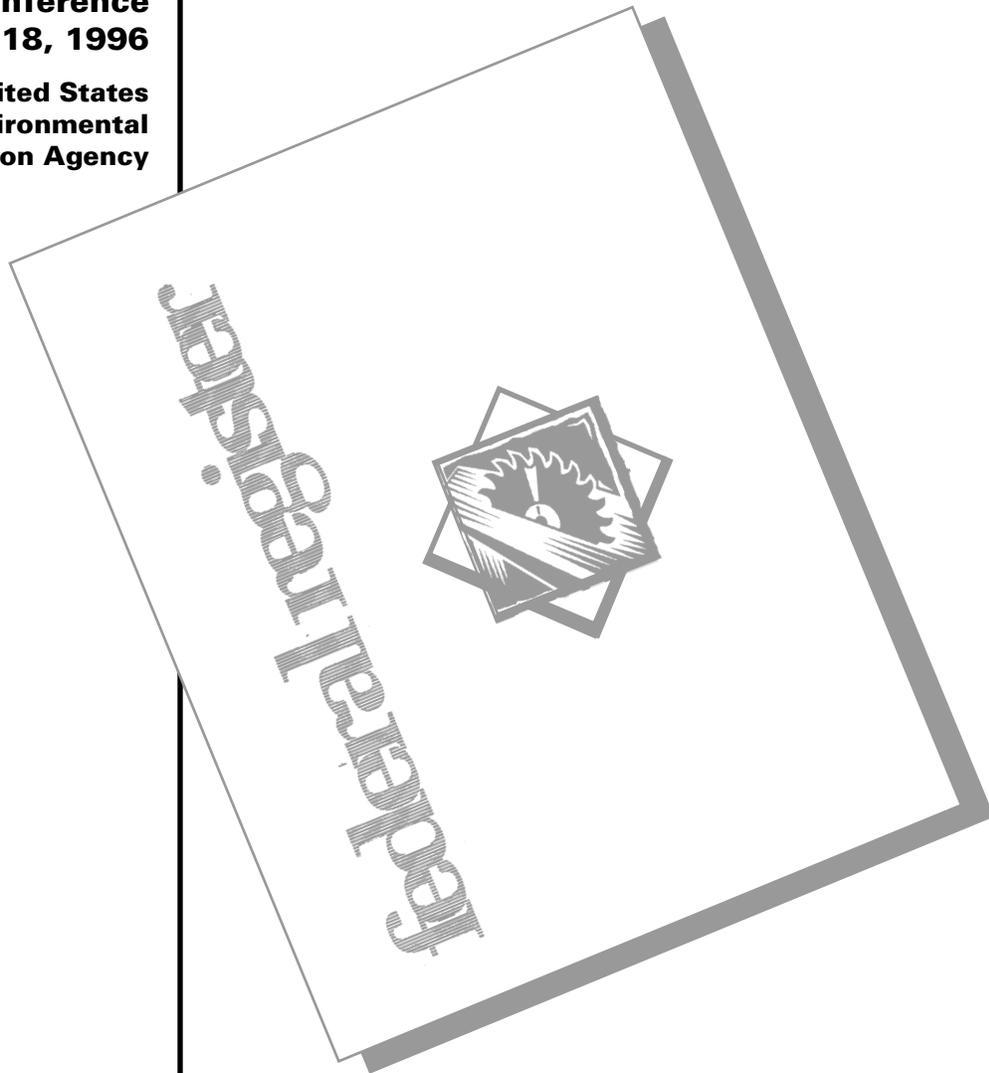


Clean Air Compliance For Wood Furniture Manufacturers

**National
Teleconference
September 18, 1996**

**United States
Environmental
Protection Agency**



TIME LINE For Compliance Reporting Requirements

NESHAP For Wood Furniture Manufacturing Operations

NESHAP first proposed (date published in Federal Register) 12/6/94

NESHAP became effective (date published in Federal Register) 12/7/95

Affected sources regulated as area sources

Material use records begin 12/7/98

New or reconstructed sources (started after 12/6/94)

Construction notice before startup

Compliance date 12/7/95 or upon startup

Compliant materials use records begin 12/1/95 or first day of startup month

Initial compliance demonstration report 60 days later

Written work plan 60 days later

Continuous compliance demonstration report 7 months later*

Existing facilities that emitted 50 tons or more HAPs in 1996

Initial notice 9/3/96

Compliance date 11/21/97

Compliant materials use records begin 11/1/97

Initial compliance demonstration report by 1/20/98

Written work plan by 1/20/98

Continuous compliance demonstration report before 6/30/98*

Existing facilities that emitted less than 50 tons HAPs in 1996

Initial notice 9/3/96

Compliance date 12/7/98

Compliant materials use records begin 12/1/98

Initial compliance demonstration report by 2/5/99

Written work plan by 2/5/99

Continuous compliance demonstration report before 7/30/99*

Existing area source reclassified as a major source

Initial notice due 120 days later

Compliance date one year later

Compliant materials use records begin first day of compliance date month

Initial compliance demonstration report 60 days after compliance date

Written work plan 60 days after compliance date

Continuous compliance demonstration report 7 months after compliance date*

*Submit every six months thereafter

Clean Air Compliance For Wood Furniture Manufacturers

September, 1996

Sponsored by

U.S. Environmental Protection Agency
American Furniture Manufacturers Association
Business and Institutional Furniture Manufacturers Association
Kitchen Cabinet Manufacturing Association
National Paint and Coatings Association
National Institute of Standards and Technology
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and
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Manual prepared by

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DISCLAIMER

This manual is not a legally binding document and is not meant to replace the published regulation titled "National Emission Standards for Hazardous Air Pollutants; Final Standards for Hazardous Air Pollution Emissions from Wood Furniture Manufacturing Operations" (Federal Register, 12/07/95, beginning on page 62929). This manual does not cover all parts of the regulation and is an elaboration of the aforementioned legal document. Final authority rests solely in the legal document.

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ABOUT THIS MANUAL

The University of Tennessee Center for Industrial Services (CIS) prepared this manual to help wood furniture manufacturers comply with Environmental Protection Agency regulations at 40 CFR 63, Subpart JJ. EPA issued this National Emission Standard for Hazardous Air Pollutants (NESHAP) on December 7, 1995. It limits emissions of volatile hazardous air pollutants from operations such as finishing, gluing, cleanup, and washoff.

We confined the manual's coverage to compliance via use of compliant materials. The NESHAP allows affected sources to achieve compliance with specified limits by using a control device to remove the hazardous air pollutants. But, most companies in this industry employ fewer than 50 persons and cannot afford the high costs of installing and operating pollutant control devices.

The manual provides easy-to-understand, step-by-step, guidance in how to satisfy the NESHAP's requirements. We use a “**frequently asked question**” format and show terms with a regulatory definition in *bold italics* when the term is first used. Regulatory definitions and acronyms can be found in Appendix D.

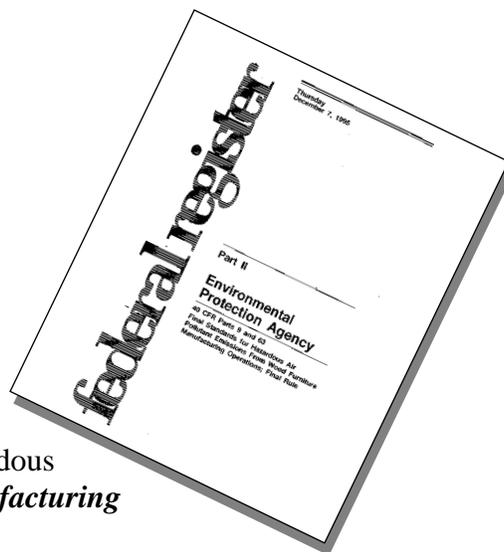
Part I (Compliance) focuses on actions you must take to comply. This part contains five (5) sections guiding the reader through:

- BASICS — Who's affected, what emission standards must be met and when.
- NOTICES — Initial and Construction/Reconstruction Notices.
- WORK PRACTICES — Eleven required plan elements.
- RECORDS — Records required to validate compliance.
- REPORTS — Compliance Demonstration reports.

Part II focuses on pollution prevention (P2). It reviews some less well documented, non-NESHAP mandated, work practices. Among the items discussed are:

- An Overriding P2 Principle
- Waste Data Collection
- Assigning Reasons For Waste Generation
- Using Formal Standards
- Quantifying Rework Costs
- Rework Reduction

THE BASICS



WHAT OPERATIONS DOES THIS NESHAP AFFECT?

This NESHAP covers only *major sources* of volatile hazardous air pollutants (*VHAPs*) who conduct *wood furniture manufacturing operations*.

BUT, implicitly, the NESHAP regards every wood furniture producing facility operating spraying or gluing equipment to be a major source. Most sources desiring to be regulated as *area sources* must keep records affirmatively demonstrating they are not major sources. Facilities uncertain about their classification should contact their permitting authority.

- “Wood” includes wood, wood products such as rattan or wicker, and engineered wood products such as particle board.
- “*Wood furniture*” includes products whose manufacture causes an establishment to be assigned a standard industrial classification code listed below:
 - 2434 Wood Kitchen Cabinets
 - 2511 Wood Household Furniture, Except Upholstered
 - 2512 Wood Household Furniture, Upholstered
 - 2517 Wood Television, Radio, Phonograph, and Sewing Machine Cabinets
 - 2519 Household Furniture, Not Elsewhere Classified
 - 2521 Wood Office Furniture
 - 2531 Public Building and Related Furniture
 - 2541 Wood Office and Store Fixtures, Partitions, Shelving, and Lockers
 - 2599 Furniture and Fixtures, Not Elsewhere Classified
 - 5712 Furniture Stores
- “*Wood furniture manufacturing operations*” include those VHAP emitting operations such as *finishing, gluing, cleaning*, and *washoff* manufacturers may use when making wood furniture or *wood furniture components*.

HOW HAVE VHAP EMISSIONS BEEN REGULATED?

By placing emission limits on the *as applied* VHAP content of all *coating, adhesive*, and *solvent* containing materials used by the industry.

WHAT ARE THOSE LIMITATIONS?

TABLE 1 summarizes the NESHAP’s emission limitations. Appendix A - Part 1 lists the NESHAP regulated VHAPs.

TABLE 1 - SUMMARY OF EMISSION LIMITATIONS	Existing Sources lb VHAP per lb solids	New Sources lb VHAP per lb solids
Finishing materials. Maximum as applied VHAP content <ul style="list-style-type: none"> • Stains • Washcoats, basecoats and enamels • Sealers and topcoats 	1.0 1.0 (a) 1.0	1.0 0.8 (a) 0.8
Contact adhesives. Maximum as applied VHAP content <ul style="list-style-type: none"> • Aerosol adhesives • Contact adhesives applied to non-orous substrates • Foam adhesives used in products that must meet regulated flammability requirements • All other contact adhesive uses 	no limit no limit 1.8 1.0	no limit no limit 0.2 0.2
Control options achieving VHAP limitation equivalence <ul style="list-style-type: none"> • Weighted average VHAP content for all materials used in finishing operations • A control device for finishing operations • A control device/compliant material or control device/weighted average combination • A control device for contact adhesives 	1.0 1.0 1.0 1.0	0.8 0.8 0.8 0.2
OTHER REGULATED MATERIALS		
(a) Thinners used for on -site formulation of washcoats, basecoats and enamels <ul style="list-style-type: none"> • Maximum allowable weight % by HAP 	3.0	3.0
Solvent & thinner mixtures used for other purposes <ul style="list-style-type: none"> • Maximum allowable weight % by HAP 	10.0	10.0
Strippable spray booth materials <ul style="list-style-type: none"> • Maximum VOC content, lb VOC per lb Solids 	0.8	0.8

ARE THERE EXCEPTIONS?

Major sources can be regulated as area sources and will not be subject to NESHAP provisions **IF** they keep appropriate validating records **AND** meet any one of the following criteria for actual use of regulated materials:

- Use no more than 250 gallons per month, or
- Use no more than 3000 gallons per rolling 12-month period, or
- Use materials containing no more than 5 tons of any one HAP or 12.5 tons of any combination of HAPs during a rolling 12-month period.

Major sources limiting their *potential to emit* by other permitting mechanisms to less than 10 tons of any one HAP or 25 tons of any combination of HAPs during a rolling 12-month period also will be classed as area sources not subject to this NESHAP. However, a permitting authority may require a source to meet one or more aspects of the NESHAP as a condition for permit issue.

A major source using no more than 100 gallons per month of regulated materials in wood furniture manufacturing meets the *incidental wood furniture manufacturer* criterion and needs only to maintain records validating continuing compliance with this reduced use rate.

WHAT MUST I DO TO COMPLY?

1. Submit an *Initial Notification* to your permitting authority and to the appropriate Regional Office of the EPA within 270 days of becoming covered by this NESHAP. Existing and new or reconstructed affected sources operating prior to September 3, 1996, must submit this notice on or before September 3, 1996.
2. Prepare and maintain a *work practice implementation plan*.
3. Use either compliant material formulations daily or an emission control device to achieve and demonstrate ongoing compliance with VHAP emission limits. Finishing material users have two (2) more compliance options, essentially variants of the two basic methods. They also can use:
 - A group of compliant and non-compliant materials whose calculated average VHAP content achieves the required limitation on a monthly basis, or
 - A control device/materials usage combination achieving an efficiency equivalent to the VHAP content limitation.
4. Meet monitoring, recordkeeping and reporting requirements which in large part vary in accordance with the procedure you've chosen to achieve compliance.

WHEN MUST MY OPERATION COMPLY WITH ALL NESHAP PROVISIONS?

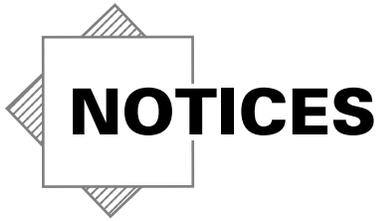
- December 7, 1995, or upon startup, if you are a source whose construction or *reconstruction* commenced after December 6, 1994.
- November 21, 1997, if you are an existing source who actually emitted 50 tons or more of HAPs during 1996.
- December 7, 1998, if you are an existing source who actually emitted less than 50 tons of HAPs during 1996.

Note: Sources whose low actual materials usage qualifies them to be regulated as area sources must begin keeping validating records on this date.

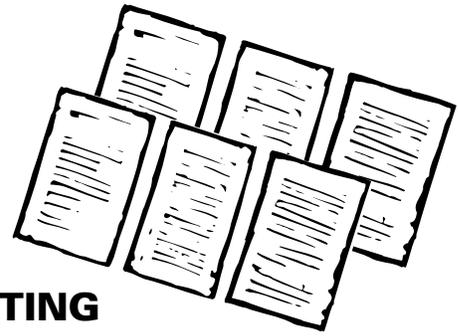
- One year after you become a major source if currently you are classed as an existing area source.

AS AN AREA SOURCE, WHAT MUST I DO?

This NESHAP applies only to major sources. But, you must continue complying with any duties your permitting authority established when they issued your facility permits to operate emission sources.



NOTICES



WHAT NOTICES MUST I GIVE TO PERMITTING AUTHORITIES?

You must submit an *Initial Notice* to your permitting authority and to the Regional Office of EPA. Submittals require the information shown in TABLE 2. Appendix F gives a form suggested for this purpose.

- Existing sources must make this submittal before September 3, 1996.
- Sources that later become subject to the NESHAP must give notice within 120 days of that occurrence.

Before beginning *construction* of a new source or *reconstruction* of an existing source, you must give notice to your permitting authority. The notice must contain the information shown in TABLE 3. Appendix F gives a form suggested for this purpose.

ITEM	TABLE 2 - INITIAL NOTICE INFORMATION
1	Name and address of the facility's owner or operator.
2	Address of your facility's physical location.
3	Name and title of person making the notification.
4	A statement that 40 CFR 63, Subpart JJ is the basis for the notice.
5	A brief description of the nature, size, design, and method of operation of the source.
6	Operating design capacity of the source.
7	Identification associated with each point of HAP emission.
ITEM	TABLE 3 - CONSTRUCTION NOTICE INFORMATION
1	Owner or operator's name, title, and address.
2	A statement that "In compliance with 40 CFR 63 Subpart JJ, the purpose of this notice is to inform EPA [your company] plans to construct a new [or reconstruct an existing] source of VHAPs."
3	Proposed address of the new or reconstructed source, if different from the owner's.
4	Dates the planned effort is expected to begin and to end.
5	Date the new, or reconstructed, facility's initial startup is expected to take place.
6	Type of process operation to be performed.
7	A description of the technique to be used for controlling VHAP emissions following project completion. Where applicable, provide preliminary design drawings and capacity estimates.
8	An estimate of the type and quantity of VHAPs to be emitted expressed in units consistent with the applicable emission limitation. Provide calculation details.

continued

ITEM	ADDITIONAL ITEMS REQUIRED FOR RECONSTRUCTION NOTICES
9	Brief description of the affected source and the components to be replaced.
10	Description of present and proposed emission control methods, including calculations of emission estimates.
11	Estimate of the fixed capital cost of the replacement and of constructing a comparable new source.
12	Estimate of the life of the affected source after the replacements.
13	A discussion of any economic or technical limitations the source may have in complying with relevant standards after the proposed replacement.
NOTE	Items 11, 12 and 13 can be omitted if the owner/operator declares no limitation exists preventing the source from complying with relevant standards after reconstruction.

WORK PRACTICE IMPLEMENTATION PLANNING



WHAT WORK PRACTICE PLANNING MUST I DO?

- You must prepare and maintain a written work practice implementation plan.
- You must complete the plan no more than sixty (60) days after your compliance date and have it available for inspection upon request.
- Your plan must detail how you will incorporate environmentally desirable practices into your operation. The NESHAP divides an acceptable plan into eleven (11) action elements. TABLES 4 through 14 review those actions essential for complying with each of these elements, but you need not limit the plan to those actions.

ITEM	TABLE 4 - OPERATOR TRAINING
WHAT	Train all new and existing employees, including contract employees, involved in VHAP emitting wood furniture manufacturing operations or in the implementation of this NESHAP.
WHEN	Train new hires upon employment, existing employees within six (6) months. Provide refresher training annually.
DETAILS	<p>List the name and job description of all current personnel affected by the training requirement.</p> <p>Prepare an outline of subjects covered in training and retraining for each unique job description.</p> <p>Prepare lesson plans for both initial and refresher courses covering the minimization of material usage and overspray by proper equipment setup and adjustment, application technique, and cleaning and washoff procedures. Include management of cleanup wastes.</p> <p>Describe methods you'll use to demonstrate and document successful completion of each affected employees training or retraining.</p>

ITEM	TABLE 5 - INSPECTION AND MAINTENANCE PLANNING
WHAT	A written leak inspection and maintenance plan for all equipment used to transfer or apply coatings, adhesives, or organic solvents.
DETAILS	<p>Prepare a schedule for visually inspecting affected equipment. The NESHAP specifies the minimum frequency to be once per month.</p> <p>Specify how you will document the date of an inspection, its result, and any repairs.</p> <p>Show how you'll assure leak repair takes place after detection per the following timetable:</p> <ul style="list-style-type: none"> • First attempt to repair within 5 days, • Complete repair within 15 days, unless the repair requires purchase of new equipment. • Complete repair's requiring purchase of new equipment within 3 months.

ITEM	TABLE 6 - CLEANING & WASHOFF SOLVENT ACCOUNTING
WHAT	A form recording details of organic solvent use.
DETAILS	<p>Establish procedures for collecting and recording the following information:</p> <ul style="list-style-type: none"> • The quantity and type of organic solvents used during the month for cleaning and washoff. • The number of pieces washed off and the reason for the washoff. • The quantity of spent solvent generated from each cleaning or washoff operation each month. • Disposition of the spent solvent, recycled on-site or disposed off-site.

ITEM	TABLE 7 - CLEANING & WASHOFF SOLVENT COMPOSITION
WHAT	<p>Forbid for cleaning and washoff operations the use of solvent mixtures containing listed pollutants at concentrations that would subject them to OSHA's MSDS reporting rules (29 CFR 1910.1200.) That is, if the MSDS for a solvent mixture lists one of these chemicals, you can't use it for cleaning or washoff.</p>
NOTE	Appendix A - Part 2 lists these pollutants.

ITEM	TABLE 8 - SPRAY BOOTH CLEANING
WHAT	<p>Forbid use of solvents containing more than 8.0 weight percent of VOCs for cleaning spray booth components other than conveyors, continuous coaters/enclosures, or metal filters unless the booth coating/protection is being replaced.</p> <p>Limit the solvent used for preparing a booth's surface for coating / protection application to 1.0 gallon per booth.</p>

ITEM	TABLE 9 - STORAGE REQUIREMENTS
WHAT	<p>Specify and make certain normally closed containers are used for storing all finishing, gluing, cleaning, and washoff materials.</p>

ITEM	TABLE 10 - APPLICATION EQUIPMENT
WHAT	<p>Specify and establish recordkeeping procedures to validate that conventional air spray guns are used only for a limited number of special purposes.</p>
DETAILS	<p>The NESHAP permits use of conventional air sprays only for the following applications:</p> <ul style="list-style-type: none"> • To apply finishing materials with an as applied VOC content no greater than 1.0 lb VOC/lb solids. • For touchup and repair spraying after completion of the finishing operation. • For touchup and repair spraying after staining but before application of another finish if the application container's volume does not exceed 2.0 gallons. • When aimed and triggered automatically. • When emissions from the finishing application station are directed to a control device. • When the amount of finishing materials applied using the gun represents no more than 5.0% of the total amount used during that semiannual period. • To apply stain on a part for which it is infeasible to use any other spraying technology.
NOTE	<p>Technical or economic infeasibility must be demonstrated satisfactorily to the permitting authority.</p>

ITEM	TABLE 11 - LINE CLEANING
WHAT	Specify and make certain all organic solvents used for line cleaning are pumped or drained to a <i>normally closed container</i> .

ITEM	TABLE 12 - GUN CLEANING
WHAT	Specify and make certain all organic solvents used for gun cleaning are collected into a normally closed container.

ITEM	TABLE 13 - WASHOFF OPERATIONS
WHAT	Specify and make certain normally closed tanks are used for washoff operations, and parts removed from washoff get tilted or rotated to drain as much solvent as possible.

ITEM	TABLE 14 - FINISHING OPERATION FORMULATION ASSESSMENT
WHAT	Establish procedures for identifying and determining usage in the finishing operation of materials classed as " <i>VHAP of Potential Concern;</i> " for this manual VHAP-PCs.
Note 1	Appendix B lists all VHAP-PCs. Part 1 lists the ten (10) VHAP-PCs likely to be found in coatings and adhesives used by the wood furniture industry. Part 1 also shows EPA's " <i>de minimis</i> (i.e. inconsequential) <i>usage values</i> " for these common VHAP-PCs.
Note 2	Part 2 lists the VHAP-PCs identified as Non-threshold, High Concern, and Unrankable Pollutants by EPA.
DETAILS	Establish a baseline usage level for each of the ten (10) chemicals listed in Appendix B - Part 1; VHAP-PC(1), using the highest annual usage from 1994, 1995, or 1996. Track annual usage of VHAP-PC(1) chemicals. After November 1998, if annual usage of VHAP-PC(1) chemicals exceeds your established baseline you must notify the permitting authority, indicate the amount of the increase and give reasons for the exceedance.
NOTE 1	For formaldehyde, the baseline level of usage is based on the amount of free formaldehyde present in the finishing material as it is applied.
NOTE 2	For styrene, calculate the baseline level of usage by multiplying finishing material as applied styrene monomer content by 0.16.
	<i>continued</i>

TABLE 14 continued

VALID EXCUSES Sources exceeding their VHAP-PC(1) baseline for the following reasons generally have no duties other than to provide an explanation.

- You did not exceed the baseline by more than 15%.
- You actually used less than the de minimis level specified for this VHAP-PC(1). See Appendix B - Part 1.
- You comply with your permitting authority's regulations and guidelines for this VHAP-PC(1).
- The VHAP-PC(1)'s source is a finishing material with an as applied VOC content no greater than 1.0 lb VOC/lb solids.

ADDED DUTIES Sources exceeding their VHAP-PC(1) baseline, but for other reasons must:

- Confer with their permitting authority about practical and reasonable technology based means for reducing the usage.
- Develop a plan and timetable for reducing usage whenever practical and reasonable means exist for doing so.

After November 1998, the baseline for use of any VHAP-PC for which no baseline was established earlier will be the de minimis level based on 70 year exposure levels.

NOTE It may be prudent to establish baseline data for chemicals listed in Appendix B - Part 2, although no requirement exists to do so.

RECORDS



WHAT RECORDS MUST I KEEP?

The NESHAP requires you to keep records validating actions you've taken in three basic areas:

- Your use of compliant materials.
- How you're fulfilling your Work Practices Implementation Plan.
- Your timely submittal of accurate compliance status reports.

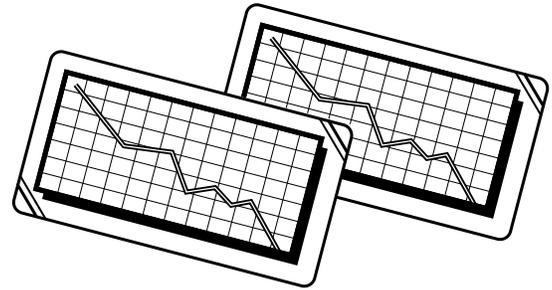
TABLES 15 through 17 review the specific requirements.

ITEM	TABLE 15 - COMPLIANT MATERIALS USE RECORDS
WHAT	Data on the formulations of materials used and, where appropriate, amount used and formulation viscosity.
HOW LONG	Records must be kept five (5) years. The past two (2) years must be kept on site. <i><Consider using a computer spreadsheet program></i>
BASIC ITEMS	<ul style="list-style-type: none"> • A Certified Product Data Sheet for each finishing material, thinner, contact adhesive and strippable booth coating. • The VHAP content, lb. VHAP/lb. Solids, for all finishing materials and contact adhesives used. • The VOC content, lb. VOC/lb. Solids, of each strippable coating used. • The HAP content, weight %, of each thinner used.
ADDED ITEMS	<p>IF you use averaging calculations to demonstrate compliance with finishing standards, keep records showing:</p> <ul style="list-style-type: none"> • The amount of each coating used. • The amount of each thinner used.
NOTE	Appendix C shows sample computations. Form R Reports often require this data, too.
ADDED ITEMS	<p>IF you use continuous coaters, record:</p> <ul style="list-style-type: none"> • The quantity, type of material, date, and time for all additions made to the coater's reservoir. <p>IF you intend using viscosity control to show compliance, record:</p> <ul style="list-style-type: none"> • Routine viscosity monitoring measurements. You also should be prepared to show viscosity as a valid surrogate for VHAP content.

ITEM	TABLE 16 - WORK PRACTICE PLAN RECORDS
WHAT	Records demonstrating you've taken action to fulfill your Work Practice Implementation Plan. You should have some record supporting effort in each of the eleven (11) work practice elements reviewed in TABLES 4 through 14.
HOW LONG	Records must be kept five (5) years. The past two (2) years must be kept on site.
BASIC ITEMS	<ul style="list-style-type: none"> • Operator training: Name, job description, subject matter, date trained, class duration, tests, test scores, etc. • Inspection and maintenance: Leak inspection/repair records, replacement part purchases, etc. • Cleaning solvent accounting: Washoff and cleaning solvent use, washed part counts and reasons for washing, etc. • Conventional spray gun use: Touchup/repair usage, cumulative use <5% of total finishing materials. • Formulation base line and annual use assessments. • Logs demonstrating other elements; <i>e.g.</i>, use of closed equipment for storage of every solvent bearing liquid used - waste coatings, line and gun cleaning solvents, washoff solvents, etc.

ITEM	TABLE 17 - COMPLIANCE CERTIFICATION RECORDS
WHAT	<p>Records demonstrating you submitted timely compliance status reports containing required information.</p> <p>Send required reports to your permitting authority via certified mail, return receipt requested. The returned receipt demonstrates reporting timeliness.</p>
HOW LONG	Records must be kept five (5) years. The past 2 years must be kept on site.
BASIC ITEMS	Copies of your compliance status reports including all relevant information submitted with them.

REPORTS



WHAT REPORTS MUST I SUBMIT?

The NESHAP requires you to submit reports that both demonstrate and certify your compliance with its provisions.

You make one **Initial Compliance Demonstration** during the sixty (60) days following your compliance date.

Every six (6) months thereafter you must make a **Continuous Compliance Demonstration**. Permitting authorities cannot reduce this semiannual reporting period.

TABLES 18 and 19 detail specific requirements for these demonstration reports.

ITEM	TABLE 18 - INITIAL COMPLIANCE DEMONSTRATION REPORT
WHAT	A report showing you complied with all NESHAP provisions on or before the date you were required to be in compliance. Your initial report must cover the entire month in which your compliance date falls.
EXAMPLE	Include data from 11/1/97 thru 11/30/97 for a compliance date of 11/21/97.
NOTE	Appendix F contains a form suggested for this report.
WHEN	During the sixty (60) days following your compliance date.
NOTE	The manual gives compliance dates in the Basics section.
COMMON ITEMS	<ul style="list-style-type: none"> • Cite 40 CFR Part 63, Subpart JJ - National Emission Standards for Wood Furniture Manufacturing Operations as the applicable standard requiring this report. • Provide your facilities name and both its physical and mailing addresses if they differ. • Provide the report's date and the reporting period's beginning and ending dates. • A statement reflecting the compliance status of the facility, and if in noncompliance, a review of measures you've taken to achieve compliance. • A statement affirming that you developed a work practice implementation plan and established procedures to achieve its provisions. • Where applicable, a statement affirming use of compliant strippable spray booth coatings. • As a responsible official, certify that the reported information is accurate. <p>Include your name, title, and signature. <i>continued</i></p>

<p>ADDED ITEMS</p> <p>EXAMPLE</p> <p>NOTE</p>	<p>TABLE 18 continued</p> <p>IF you comply by using compliant coating and/or contact adhesive materials.</p> <ul style="list-style-type: none"> •As applicable, state that you used compliant stains, washcoats, sealers, topcoats, basecoats, enamels, thinners, and/or contact coatings during the reporting period. <p>IF your finishing operation complies by using an averaging calculation for the first month of operation.</p> <ul style="list-style-type: none"> •Submit results of an averaging calculation that includes data for the entire month in which the compliance date falls. <p>Include data from 11/1/97 thru 11/30/97 for a compliance date of 11/21/97.</p> <p>Appendix C shows examples of the averaging calculation.</p>
<p>ADDED ITEMS</p>	<p>IF you apply coatings using continuous coaters</p> <ul style="list-style-type: none"> •State that you used compliant coatings as determined by the VHAP content of coatings in the reservoir and the VHAP content as calculated from records. Also state that you used compliant thinners. <p>OR</p> <ul style="list-style-type: none"> •State that you used compliant coatings as determined by the VHAP content of coatings in the reservoir. Also state that you monitored the viscosity of coatings in the reservoir and used compliant thinners. •Submit data showing viscosity to be an appropriate parameter for demonstrating compliance.

<p>ITEM</p>	<p>TABLE 19 - CONTINUOUS COMPLIANCE DEMONSTRATION REPORT</p>
<p>WHAT</p> <p>NOTE</p>	<p>A report demonstrating you complied with all NESHAP provisions during the preceding six months of operation.</p> <p>Appendix F contains a form suggested for this report.</p>
<p>WHEN</p>	<p>During the thirty (30) days following completion of each six-month operating period commencing with your compliance date.</p> <p>If your compliance date was 11/21/97, you submitted an initial compliance demonstration report covering the entire month of November 1997. Your first six-month operating period begins on December 1, 1997, and ends on May 30, 1998. You must submit your first continuous compliance report before June 30, 1998.</p> <p style="text-align: right;"><i>continued</i></p>

<p>COMMON ITEMS</p>	<p>TABLE 19 continued</p> <ul style="list-style-type: none"> •Cite 40 CFR Part 63, Subpart JJ - National Emission Standards for Wood Furniture Manufacturing Operations as the applicable standard requiring this report. •Provide your facility’s name and both its physical and mailing addresses if they differ. •Provide the report’s date and the reporting period’s beginning and ending dates. •A statement reflecting the compliance status of the facility, and if in noncompliance, a review of measures you’ve taken to achieve compliance. •A statement affirming that the work practice implementation plan was developed and procedures were established to achieve its provisions. •Where applicable, a statement affirming use of compliant strippable spray booth coatings. •As a responsible official, certify that the reported information is accurate. Include your name, title, and signature.
<p>ADDED ITEMS</p> <p>NOTE</p>	<p>IF you comply by using compliant coating and/or contact adhesive materials.</p> <ul style="list-style-type: none"> •As applicable, certify that compliant stains, washcoats, sealers, topcoats, basecoats, enamels, thinners, and/or contact coatings were used each day during the reporting period. •Identify and provide reasons for any days in which non-complying materials were used. Such uses constitute violations of the standard. <p>IF your finishing operation complies by using an averaging calculation for each month of the six-month operating period.</p> <ul style="list-style-type: none"> •Certify that the results of the averaging calculation for each month within the period complied with the relevant standard emission limitation value; $E \leq 1.0$ for existing sources and $E \leq 0.8$ for new/reconstructed sources. •Unless records show any exceedance of your standard is attributable to specific operating days, the exceedance constitutes a violation for the entire month in which it occurs. <p>Appendix C shows examples of the averaging calculation.</p> <p>IF you apply coatings using continuous coaters</p> <ul style="list-style-type: none"> •Certify that compliant coatings were used each day of the reporting period as determined by the VHAP content of coating in the reservoir and the VHAP content as calculated from records. •Certify that compliant thinners were used. •Identify and provide reasons for any days in which non complying materials were used. Such uses constitute violations of the standard. <p>OR</p> <p style="text-align: right;"><i>continued</i></p>

<p>ADDED ITEMS</p>	<p>TABLE 19 continued</p> <ul style="list-style-type: none"> • Certify that compliant coatings were used each day of the reporting period as determined by the VHAP content of the coating in the reservoir. • Certify that the viscosity of the coating in the reservoir each day was not less than the viscosity of the coating initially mixed and placed into the reservoir for that day. • Identify and explain any day during which the viscosity of coating in the reservoir was less than the viscosity of the initial coating. Each such occurrence constitutes a violation of the standard. <p>Compliance certifications involving reservoir viscosity control require use of compliant thinners, recording of all thinner additions to the reservoir, and recording of reservoir viscosity measurements. Viscosity monitoring can be done continuously with a viscosity meter or by measurement of the viscosity of the initial coating followed by re-measurement each time you add thinner.</p>
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THOUGHTS ABOUT POLLUTION PREVENTION



The term “pollution prevention,” often called P2, embraces the many beneficial practices associated with waste reduction, recycling, and material substitution. The waste or misuse of resources, *i.e.*, manpower, materials, or energy, causes most environmental pollution. Material substitution reduces the environmental impact of resource waste, but generally does not affect the amount of waste generated.

The readily quantified monetary benefits derived from waste reduction and recycling projects generally justify their implementation. They always pay out the capital investment required, although sometimes at an economically impractical rate. Conversely, the environmental cost savings accruing from use of less toxic materials usually can’t be quantified so readily. This results in less toxic materials being used generally as a response to regulatory mandate. Significantly, the NESHAP for wood furniture manufacturing operations relies heavily upon compelled material substitution to accomplish its goals.

Wastes are generated for the same fundamental reasons at every plant that spray coats furniture. The NESHAP requires wood furniture manufacturers to implement work practices in 11 of these areas. Existing P2 literature explains the desirability of implementing these mandated practices. Appendix H lists a few documents that discuss these P2 practices.

This section of the manual reviews some less well documented, non-mandated, P2 opportunities. Undoubtedly, other P2 practices exist because wood furniture manufacturing processes vary so extensively. Phil Crosby, a “quality” guru, once said, “A company’s product always looks exactly like what its management wants.” Paraphrased for the purposes of this discussion his statement means, how much gets done about every waste generating situation relates directly to how much attention the management gives it.

SOME P2 PRACTICES TO CONSIDER

An Overriding Principle: Reduce Waste, Don’t Make Any!

Use the minimum amount of resources needed to get a job done right the first time.

Waste Data — Collection, Reporting and Use

Waste measures an operation’s overall *efficiency*, the difference between resources *used* and the **minimum** resources *needed* to do a job. Yet, waste statistics kept by industry rarely compare current resource consumption to the minimum amount theoretically required. Instead, they compare current with past consumption, a comparison that fails to show the true extent of waste generation because the past includes all ongoing waste generating mistakes.

Waste statistics should compare resource use to the minimum amount needed. They also should focus efforts on determining why waste is generated, alert you to all out-of-control situations, and give assurance that waste generation is being kept under control.

Assume your shop applied a multi-component finish consisting of stain, washcoat, sealer, glaze, and topcoat to 200 bookcases. You made what seemed to be a lot of waste. The plant accountant reports total waste to be X% of purchased materials, Y% higher than budget. Does knowing those statistics lead you to any specific remedial action?

To get more useful data, set a “Use Target” based on an item’s minimum theoretical use. Don’t try setting targets on everything. Start with a few specific large dollar material items. If a “Use Target” can’t be calculated, estimate one. Estimates for materials are easier to make than those for manpower and energy, but as your skill in making these estimates increases, you should make manpower and energy estimates, too. Most operating personnel will continuously reduce waste when given a target and means for measuring their performance against that target.

“Use Targets” sometimes must be adjusted for known process inefficiency. For example, adjust spray coating “Use Targets” for expected coating transfer efficiency. Management should estimate every manufactured article’s spray transfer efficiency based on its size, shape, open area, etc. Start with articles representing a high percentage of total production. Some day you may be able to estimate everything.

For example, you could categorize articles as shown in Table 20. Then, determine **the minimum amount of coating needed to cover the article** based on the article’s size and shape and the coating thickness desired. With the help of operators, collect data on the actual amount of coating material used to “finish” each article.

TABLE 20 - Transfer Efficiency, %			
	Large, > 2 sq.ft.	Medium, > 1 sq.ft.	Small, <1 sq.ft.
Flat Solid Wood	65	45	25
Narrow Edged Parts	50	25	10
Round Parts	20	10	5

Generally, the collected data quickly identifies what’s “normal,” how much variation exists in the “normal” value, and where “actual” and “theoretical” may need to be reconciled. The reconciliation often discloses opportunities for improvement. Once established, “normal” actual consumption values can be used to provide day-to-day validation of ongoing system control or to

support the need for additional attention, operator training, etc. In most circumstances, an ongoing, day-to-day data review coupled with action based on that review results in the “normal” value improving.

Assign Reasons — Tie Each Increment Of Waste Generated To A Reason

Many manufacturing facilities already know THE PROBLEMS causing their waste. They may even know how much waste is generated during a day and all the myriad reasons for its being generated. But, few can accurately assess how much came from where. Therefore, only a few can accurately associate waste costs with the problem(s) causing the waste and properly direct corrective actions.

A “complete” waste record assigns a reason for the waste’s generation and estimates how much was generated. Most finishing operation waste comes from two basic sources — EXCESS MATERIALS - using more than needed to do a job right the first time - and CLEANUP wastes. In turn, the waste generated by each of these sources can be divided into those elements best controlled by OPERATORS and MANAGEMENT.

Table 21 shows allocation of an undoubtedly incomplete listing of control responsibilities. It should be evident some control responsibilities overlap, but operators can deliver control only when management provides them with a target plus the means to measure and do something about their performance with respect to that target.

TABLE 21	EXCESS MATERIALS	CLEANUP
<p>MANAGEMENT CONTROLLED</p>	<p>Training: Operators coat bad parts. Bad spraying technique. Pressure too high/low. Material & article quality: Wood grain too coarse/fine. Wood too dry/wet. Coating too hot/cold. Coating dries too fast/slow. Spraying equipment: Gages broken/inoperable. Regulators broken. Tips too big/small. Worn out tips. Leaks. Equipment maintenance: Filters plugged. Booth fan drive slipping. Article complexity. Coating quality variation: Viscosity too high/low. Dry rate too fast/slow. Finish room conditions: Cleanliness. Temperature too hot/cold.</p>	<p>Training: Excessive thinner use. Coating inventory control: Ordered too much/too little. Obsolete coatings. Production scheduling: Short duration runs.</p> <p style="text-align: right;"><i>continued</i></p>

TABLE 21 continued	EXCESS MATERIALS	CLEANUP
<p>OPERATOR CONTROLLED <i>If you think the three biggest waste problems are due to PEOPLE, PEOPLE & PEOPLE, you'll find the best solution is TRAINING, TRAINING, & more TRAINING.</i></p>	<p>Coating viscosity. Spray gun settings. Spray gun cleanliness. Spraying technique: Overlap too much/too little. Gun speed too fast/too slow. Gun too close/ too far. Gun not triggered. Gun being arced. Article coverage. Used improper coating. Booth cleanliness.</p>	<p>Too much coating mixed. Excessive thinner use. Waste segregation.</p>

Prepare and Use Formal Standards

Quality standards help reduce waste by assuring delivery of consistent product quality. A finished product returned for credit or replacement due to a manufacturing defect, or a product that doesn't sell because of poor quality represent the most expensive wastes a furniture manufacturing company produces.

The furniture marketplace tends to classify a product's quality as:

- Low-end: often sold as “some assembly required” (economical, if not cheap).
- Medium-end: fair quality, by far the widest category (average price).
- High-end: very good quality, the best (expensive by most standards).

Furniture manufacturing operations, particularly finishing, require a high level of craftsmanship. Acceptable finishes can be achieved with as few as two steps, while superior or custom finishes can require two or three *dozen* steps. Furniture finished to call attention to the quality or grain of the wood requires the manufacturer to consider the species, quality of the wood, and the finish. In the case of “high-end” furniture this level of craftsmanship is an “art.”

Regardless of the “end” to which a manufacturer's products may be directed, success in the marketplace requires the delivery of **consistent** product quality. In turn, **quality standards** represent the key to product consistency. Typically, a minimal list of items requiring quality standards includes:

- Lumber grade
- Drying and conditioning
- Humidity control in storage building
- Defect cutting
- Machining (sizing and turning)
- Surface preparation (sanding and cleaning)
- Sealing and drying
- Wash coating or staining
- Final sanding
- Top coating

Simply stated, a **quality standard** provides a means for assuring that a raw material, a part, a sub-assembly or a process is totally acceptable for use in making the product and that the finished product will be totally acceptable to the customer. Make quality standards a formal part of the manufacturing process.

Write down your quality standards in language everyone can understand. Use clear, short sentences. Standards form the basis for employee training, material purchases and process control. A written standard assures that the “standard” does not change depending on how a worker or supervisor feels on a particular day. The standard must specify a way to measure what’s being required. It can be a direct measurement; *i.e.*, a board is to be 13/16” thick, or it may be comparative; *i.e.*, the gloss must match a sample piece. A sample used for comparison must be maintained in “mint condition,” and great care must be used if it becomes necessary to duplicate it.

Standard operating procedures provide a means for consistently achieving quality standards. If followed, they help assure that the job is done correctly, first and second shift and day after day. The methods or procedures used to produce a product equal the raw materials in importance. The very best piece of wood can be ruined by an incorrect saw set-up; failure to drain the water separator or clean the filter on the air compressor can ruin the coating, too.

Job set-up and machinery and tool maintenance are a few areas where benefits from simple standard procedures can be immediate and substantial. Keep instructions short and simple. Complicated and highly detailed instructions tend to be self-defeating. A checklist accomplishes the objectives of a standard operating procedure in most cases.

Rework - Quantifying The Most Costly In-house Waste

A NESHAP work practice directed at reducing emissions from cleaning and washoff operations compels affected sources to account for solvent used by these operations. This is a desirable goal; however, when considered from a manufacturing cost basis, the costs of solvent loss represent only the “tip of the iceberg.”

In order to properly prioritize corrective action efforts, management should know what rework costs. Management often knows the percent of product being reworked but seldom knows what rework truly costs. Washoff costs include all reworking activities; *i.e.*, stripping, regluing, resurfacing, recoating, plus waste handling and disposal. Each of these non-value added activities has a labor, material, and overhead cost equalling and at times exceeding the cost for doing the job right the first time.

Historically, accounting systems fail to clearly identify rework costs by burying them in larger labor, material, and overhead accounts. A technique called “activity based costing” (ABC) records the consumption of resources as costs in an activity account. ABC may be the best way to find the real cost of doing rework — and the true cost of manufacturing, too. However, more traditional work sampling or time study methods can be used to estimate time and materials consumed by each reworking step.

Rework — Some Additional Ways To Reduce It

- Control coating viscosity:
 - Store coatings year round at a constant temperature.
 - Measure as received coating viscosity and adjust to a constant starting point.
 - Secure supplier certification of as supplied viscosity.
- Make intermediate quality inspections:
 - Don't do value added work on unfit articles. Inspect individual parts and subassemblies as well as final assemblies.
 - Introduce article pre-inspection as part of every coating operator's job.
- Require workmanship certification:
 - Establish proficiency tests.
 - Require achievement of specified proficiency levels during training.



APPENDIX A - Air Pollutants

Part 1 - VHAPs Arranged Alphabetically

CHEMICAL NAME	CAS NO.	CHEMICAL NAME	CAS NO.
1,1-Dimethylhydrazine	57147	Acrylonitrile	107131
1,1,2-Trichloroethane	79005	Allyl chloride	107051
1,1,2,2-Tetrachloroethane	79345	Aniline	62533
1,2-Dibromo-3-chloropropane	96128	Benzene	71432
1,2-Diphenylhydrazine	122667	Benzidine	92875
1,2-Epoxybutane	106887	Benzotrichloride	98077
1,2-Propylenimine (2-Methyl aziridine)	75558	Benzyl chloride	100447
1,2,4-Trichlorobenzene	120821	beta-Propiolactone	57578
1,3-Butadiene	106990	Biphenyl	92524
1,3-Dichloropropene	542756	Bis(2-ethylhexyl)phthalate (DEHP)	117817
1,3-Propane sultone	1120714	Bis(chloromethyl)ether	542881
1,4-Dichlorobenzene	106467	Bromoform	75252
1,4-Dioxane (1,4-Diethyleneoxide)	123911	Caprolactam	105602
2-Acetylaminofluorine	53963	Carbon disulfide	75150
2-Chloroacetophenone	532274	Carbon tetrachloride	56235
2-Nitropropane	79469	Carbonyl sulfide	463581
2,2,4-Trimethylpentane	540841	Catechol	120809
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	Chloroacetic acid	79118
2,4-D (2,4-Dichlorophenoxyacetic acid, including salts and esters)	94757	Chlorobenzene	108907
2,4-Dinitrophenol	51285	Chloroform	67663
2,4-Dinitrotoluene	121142	Chloromethyl methyl ether	107302
2,4-Toluenediamine	95807	Chloroprene	126998
2,4,5-Trichlorophenol	95954	Cresols (isomers and mixture)	1319773
2,4,6-Trichlorophenol	88062	Cumene	98828
3,3'-Dichlorobenzidine	91941	DDE (1,1-Dichloro-2,2-bis (p-chlorophenyl)ethylene)	72559
3,3'-Dimethoxybenzidine	119904	Diazomethane	334883
3,3'-Dimethylbenzidine	119937	Dibenzofuran	132649
4-Aminobiphenyl	92671	Dibutylphthalate	84742
4-Dimethylaminoazobenzene	60117	Dichloroethyl ether (Bis(2-chloroethyl)ether)	111444
4-Nitrobiphenyl	92933	Diethanolamine	111422
4-Nitrophenol	100027	Diethyl sulfate	64675
4,4'-Methylenebis(2-chloroaniline)	101144	Dimethyl phthalate	131113
4,4'-Methylenedianiline	101779	Dimethyl sulfate	77781
4,4'-Methylenediphenyl diisocyanate (MDI)	101688	Dimethylcarbamoyl chloride	79447
4,6-Dinitro-o-cresol, and salts	na	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	106898
Acetaldehyde	75070	Ethyl acrylate	140885
Acetamide	60355	Ethyl carbamate (Urethane)	51796
Acetonitrile	75058	Ethyl chloride (Chloroethane)	75003
Acetophenone	98862	Ethylbenzene	100414
Acrolein	107028	Ethylene dibromide (Dibromoethane)	106934
Acrylamide	79061	Ethylene dichloride (1,2-Dichloroethane)	107062
Acrylic acid	79107	Ethylene glycol	107211

CHEMICAL NAME	CAS NO.	CHEMICAL NAME	CAS NO.
Ethylene oxide	75218	p-Xylene	106423
Ethylenethiourea	96457	Quinone	106514
Ethylidene dichloride (1,1-Dichloroethane)	75343	Styrene	100425
Formaldehyde	50000	Styrene oxide	96093
Glycol ethers (footnote "a")	na	Tetrachloroethylene (Perchloroethylene)	127184
Hexachloro-1,3-butadiene	87683	Toluene	108883
Hexachlorobenzene	11874	Toluene-2,4-diisocyanate	584849
Hexachloroethane	67721	Trichloroethylene	79016
Hexamethylene-1,6-diisocyanate	822060	Triethylamine	121448
Hexamethylphosphoramide	680319	Trifluralin	1582098
Hexane	110543	Vinyl acetate	108054
Hydrazine	302012	Vinyl bromide	59360
Hydroquinone	123319	Vinyl chloride	75014
Isophorone	78591	Vinylidene chloride (1,1-Dichloroethylene)	75354
Maleic anhydride	108316	Xylenes (isomers and mixture)	1330207
m-Cresol	108394		
Methanol	67561		
Methyl bromide (Bromomethane)	74839		
Methyl chloride (Chloromethane)	74873		
Methyl chloroform (1,1,1-Trichloroethane)	71556		
Methyl ethyl ketone (2-Butanone)	78933		
Methyl iodide (Iodomethane)	74884		
Methyl isobutyl ketone (Hexone)	108101		
Methyl isocyanate	624839		
Methyl methacrylate	80626		
Methyl tert-butyl ether	1634044		
Methylene chloride (Dichloromethane)	75092		
Methylhydrazine	60344		
m-Xylene	108383		
Naphthalene	91203		
Nitrobenzene	98953		
N-Nitrosodimethylamine	62759		
N-Nitrosomorpholine	59892		
N-Nitroso-N-methylurea	684935		
N,N-Dimethylaniline	121697		
N,N-Dimethylformamide	68122		
o-Anisidine	90040		
o-Cresol	95487		
o-Toluidine	95534		
o-Xylene	95476		
p-Cresol	106445		
Phenol	108952		
Phosgene	75445		
Phthalic anhydride	85449		
Polychlorinated biphenyls (Aroclors)	1336363		
Polycyclic Organic Matter (footnote "b")	na		
p-Phenylenediamine	106503		
Propionaldehyde	123386		
Propoxur (Baygon)	114261		
Propylene dichloride (1,2-Dichloropropane)	78875		
Propylene oxide	75569		

Footnotes:

- a. Includes mono- and di-ethers of ethylene glycol, diethylene glycols and triethylene glycol; R-(OCH₂CH₂)_nRR-OR where:
 - n = 1, 2, or 3,
 - R = alkyl or aryl groups
 - R' = R, H, or groups which, when removed, yield glycol ethers with the structure: R-(OCH₂CH₂)_n - OH. Polymers are excluded from the glycol category.
- b. Includes organic compounds with more than one benzene ring and which have a boiling point greater than or equal to 100°C.

VHAPs - Arranged by CAS Number

CAS NO.	CHEMICAL NAME	CAS NO.	CHEMICAL NAME
na	4,6-Dinitro-o-cresol, and salts	79005	1,1,2-Trichloroethane
na	Glycol ethers (footnote "a")	79016	Trichloroethylene
na	Polycyclic Organic Matter (footnote "b")	79061	Acrylamide
50000	Formaldehyde	79107	Acrylic acid
51285	2,4-Dinitrophenol	79118	Chloroacetic acid
51796	Ethyl carbamate (Urethane)	79345	1,1,2,2-Tetrachloroethane
53963	2-Acetylaminofluorine	79447	Dimethylcarbamoyl chloride
56235	Carbon tetrachloride	79469	2-Nitropropane
57147	1,1-Dimethylhydrazine	80626	Methyl methacrylate
57578	beta-Propiolactone	84742	Dibutylphthalate
59892	N-Nitrosomorpholine	85449	Phthalic anhydride
60117	4-Dimethylaminoazobenzene	87683	Hexachloro-1,3-butadiene
60344	Methylhydrazine	88062	2,4,6-Trichlorophenol
60355	Acetamide	90040	o-Anisidine
62533	Aniline	91203	Naphthalene
62759	N-Nitrosodimethylamine	91941	3,3'-Dichlorobenzidine
64675	Diethyl sulfite	92524	Biphenyl
67561	Methanol	92671	4-Aminobiphenyl
67663	Chloroform	92875	Benzidine
67721	Hexachloroethane	92933	4-Nitrobiphenyl
68122	N,N-Dimethylformamide	94757	2,4-D (2,4-Dichlorophenoxyacetic acid, including salts and esters)
71432	Benzene		o-Xylene
71556	Methyl chloroform (1,1,1-Trichloroethane)	95476	o-Cresol
72559	DDE (1,1-Dichloro-2,2-bis(p-chlorophenyl)ethylene)	95487	o-Toluidine
74839	Methyl bromide (Bromomethane)	95534	2,4-Toluediamine
74873	Methyl chloride (Chloromethane)	95807	2,4,5-Trichlorophenol
74884	Methyl iodide (Iodomethane)	95954	Styrene oxide
75003	Ethyl chloride (Chloroethane)	96093	1,2-Dibromo-3-chloropropane
75014	Vinyl chloride	96128	Ethylenethiourea
75058	Acetonitrile	96457	Benzotrichloride
75070	Acetaldehyde	98077	Cumene
75092	Methylene chloride (Dichloromethane)	98828	Acetophenone
75150	Carbon disulfide	98862	Nitrobenzene
75218	Ethylene oxide	98953	4-Nitrophenol
75252	Bromoform	100027	Ethylbenzene
75343	Ethylidene dichloride (1,1-Dichloroethane)	100414	Styrene
75354	Vinylidene chloride (1,1-Dichloroethylene)	100425	Benzyl chloride
75445	Phosgene	100447	4,4'-Methylenebis(2-chloroaniline)
75558	1,2-Propylenimine (2-Methyl aziridine)	101144	4,4'-Methylenediphenyl diisocyanate (MDI)
75569	Propylene oxide	101688	4,4'-Methylenedianiline
77781	Dimethyl sulfate	101779	Caprolactam
78591	Isophorone	105602	p-Xylene
78875	Propylene dichloride (1,2-Dichloropropane)	106423	p-Cresol
78933	Methyl ethyl ketone (2-Butanone)	106445	1,4-Dichlorobenzene
		106467	p-Phenylenediamine
		106503	Quinone
		106514	1,2-Epoxybutane
		106887	

CAS NO.	CHEMICAL NAME	CAS NO.	CHEMICAL NAME
106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	624839	Methyl isocyanate
106934	Ethylene dibromide (Dibromoethane)	680319	Hexamethylphosphoramide
106990	1,3-Butadiene	684935	N-Nitroso-N-methylurea
107028	Acrolein	822060	Hexamethylene-1,6-diisocyanate
107051	Allyl chloride	1120714	1,3-Propane sultone
107062	Ethylene dichloride (1,2-Dichloroethane)	1319773	Cresols (isomers and mixture)
107131	Acrylonitrile	1330207	Xylenes (isomers and mixture)
107211	Ethylene glycol	1336363	Polychlorinated biphenyls (Aroclors)
107302	Chloromethyl methyl ether	1582098	Trifluralin
108054	Vinyl acetate	1634044	Methyl tert-butyl ether
108101	Methyl isobutyl ketone (Hexone)	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin
108316	Maleic anhydride		
108383	m-Xylene		
108394	m-Cresol		
108883	Toluene		
108907	Chlorobenzene		
108952	Phenol		
110543	Hexane		
111422	Diethanolamine		
111444	Dichloroethyl ether (Bis(2-chloroethyl)ether)		
114261	Propoxur (Baygon)		
117817	Bis(2-ethylhexyl)phthalate (DEHP)		
118741	Hexachlorobenzene		
119904	3,3'-Dimethoxybenzidine		
119937	3,3'-Dimethylbenzidine		
120809	Catechol		
120821	1,2,4-Trichlorobenzene		
121142	2,4-Dinitrotoluene		
121448	Triethylamine		
121697	N,N-Dimethylaniline		
122667	1,2-Diphenylhydrazine		
123319	Hydroquinone		
123386	Propionaldehyde		
123911	1,4-Dioxane (1,4-Diethyleneoxide)		
126998	Chloroprene		
127184	Tetrachloroethylene (Perchloroethylene)		
131113	Dimethyl phthalate		
132649	Dibenzofuran		
140885	Ethyl acrylate		
302012	Hydrazine		
334883	Diazomethane		
463581	Carbonyl sulfide		
532274	2-Chloroacetophenone		
540841	2,2,4-Trimethylpentane		
542756	1,3-Dichloropropene		
542881	Bis(chloromethyl)ether		
584849	Toluene-2,4-diisocyanate		
593602	Vinyl bromide		

Footnotes:

- a. Includes mono- and di-ethers of ethylene glycol, diethylene glycols and triethylene glycol; R-(OCH₂CH₂)_nRR-OR where:
 - n = 1, 2, or 3,
 - R = alkyl or aryl groups
 - R' = R, H, or groups which, when removed, yield glycol ethers with the structure: R-(OCH₂CH₂)_n - OH.
 Polymers are excluded from the glycol category.
- b. Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100°C.

Part 2 - Pollutants Excluded From Use In Cleaning And Washoff Solvents, Arranged Alphabetically

CHEMICAL NAME	CAS NO.	CHEMICAL NAME	CAS NO.
1,1-Dimethyl hydrazine	57147	Coke Oven Emissions	99999908
1,2 - Diphenylhydrazine	122667	DDE (1,1-p-chlorophenyl 1-2 dichloroethylene)	72559
1,2-Dibromo-3-chloropropane	96128	Dibenz (ah) anthracene	53703
1,2-Propylenimine (2-Methyl aziridine)	75558	Dichloroethyl ether (Bis(2-chloroethyl)ether)	111444
1,2:7,8-Dibenzopyrene	189559	Dichlorvos	62737
1,3-Butadiene	106990	Diethyl sulfate	64675
1,3-Dichloropropene	542756	Dimethyl aminoazobenzene	60117
1,3-Propane sultone	1120714	Dimethyl carbamoyl chloride	79447
1,4-Dichlorobenzene(p)	106467	Dimethyl formamid	68122
1,4-Dioxane (1,4-Diethyleneoxide)	123911	Epichlorohydrin	106898
2-Acetylaminoflourine	53963	Ethyl acrylate	140885
2-Nitropropane	79469	Ethyl carbamate (Urethane)	51796
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	Ethylene dibromide(1,2-Dibromoethane)	106934
2,4-Dinitrotoluene	121142	Ethylene dichloride (1,2-Dichloroethane)	107062
2,4-Toluene diamine	95807	Ethylene oxide	75218
2,4,6-Trichlorophenol	88062	Ethylene thiourea	96457
3,3'-Dichlorobenzidine	53963	Formaldehyde	50000
3,3'-Dimethoxybenzidine	119904	Heptachlor	76448
3,3'-Dimethyl benzidine	119937	Hexachlorobenzene	118741
4-Aminobiphenyl	92671	Hexamethylphosphoramide	680319
4,4'-Methylene bis(2-chloroaniline)	101144	Hydrazine	302012
4,4'-Methylenedianiline	101779	Indeno(1,2,3-cd)pyrene	193395
7, 12-Dimethylbenz(a)anthracene	57976	Lindane (hexachlorcyclohexane, gamma)	58899
Acetaldehyde	75070	Methyl hydrazine	60344
Acetamide	60355	Methylene chloride (Dichloromethane)	75092
Acrylamide	79061	Nickel refinery dust	-
Acrylonitrile	107131	Nickel subsulfide	12035722
Aniline	62533	N-Nitrosodimethylamine	62759
Antimony trioxide	1309644	N-Nitrosomorpholine	59892
Arsenic and inorganic arsenic compounds	99999904	N-Nitroso-N-methylurea	684935
Benzene	71432	o-Anisidine	90040
Benazidine	92875	o-Toluidine	95534
Benzo (a) anthracene	56553	Pentachlorophenol	87865
Benzo (a) pyrene	50328	Polychlorinated biphenyls (Aroclors)	1336363
Benzo (b) fluoranthene	205992	Propoxur	114261
Benz(c)acridine	225514	Propylene dichloride (1,2-Dichloropropane)	78875
Beryllium compounds	7440417	Propylene oxide	75569
Beryllium salts	-	Selenium sulfide (mono and di)	7488564
Bis(2-ethylhexyl)phthalate (DEHP)	117817	Styrene oxide	96093
Bis(chloromethyl)ether	542881	Tetrachloroethylene (Perchloroethylene)	127184
Bromoform	75252	Toxaphene (chlorinated camphene)	8001352
Cadmium compounds	-	Trichloroethylene	79016
Captan	133062	Vinyl bromide (bromoethene)	593602
Carbon tetrachloride	56235	Vinyl chloride	75014
Chlordane	57749		
Chlorobenzilate	510156		
Chloroform	67663		
Chromium compounds (hexavalent)	-		
Chrysene	218019		

Part 2 - Pollutants Excluded From Use In Cleaning And Washoff Solvents, Arranged by CAS Number

CAS NO.	CHEMICAL NAME	CAS NO.	CHEMICAL NAME
na	Cadmium compounds	95534	o-Toluidine
na	Nickel refinery dust	95807	2,4-Toluene diamine
na	Chromium compounds (hexavalent)	96093	Styrene oxide
na	Beryllium salts	96128	1,2-Dibromo-3-chloropropane
50000	Formaldehyde	96457	Ethylene thiourea
50328	Benzo (a) pyrene	101144	4,4'-Methylene bis(2-chloroaniline)
51796	Ethyl carbamate (Urethane)	101779	4,4'-Methylenedianiline
53703	Dibenz (ah) anthracene	106467	1,4-Dichlorobenzene(p)
53963	3,3'-Dichlorobenzidine	106898	Epichlorohydrin
53963	2-Acetylaminoflourine	106934	Ethylene dibromide(1,2-Dibromoethane)
56235	Carbon tetrachloride	106990	1,3-Butadiene
56553	Benzo (a) anthracene	107062	Ethylene dichloride (1,2-Dichloroethane)
57147	1,1-Dimethyl hydrazine	107131	Acrylonitrile
57749	Chlordane	111444	Dichloroethyl ether (Bis(2-chloroethyl)ether)
57976	7, 12-Dimethylbenz(a)anthracene		Propoxur
58899	Lindane (hexachlorcyclohexane, gamma)	114261	Bis(2-ethylhexyl)phthalate (DEHP)
59892	N-Nitrosomorpholine	117817	Hexachlorobenzene
60117	Dimethyl aminoazobenzene	118741	3,3'-Dimethoxybenzidine
60344	Methyl hydrazine	119904	3,3'-Dimethyl benzidine
60355	Acetamide	119937	2,4-Dinitrotoluene
62533	Aniline	121142	1,2 - Diphenylhydrazine
62737	Dichlorvos	122667	1,4-Dioxane (1,4-Diethyleneoxide)
62759	N-Nitrosodimethylamine	123911	Tetrachloroethylene (Perchloroethylene)
64675	Diethyl sulfate	127184	Captan
67663	Chloroform	133062	Ethyl acrylate
68122	Dimethyl formamide	140885	1,2:7,8-Dibenzopyrene
71432	Benzene	189559	Indeno(1,2,3-cd)pyrene
72559	DDE (1,1-p-chlorophenyl 1-2 dichloroethylene)	193395	Benzo (b) fluoranthene
75014	Vinyl chloride	205992	Chrysene
75070	Acetaldehyde	218019	Benz(c)acridine
75092	Methylene chloride (Dichloromethane)	225514	Hydrazine
75218	Ethylene oxide	302012	Chlorobenzilate
75252	Bromoform	510156	1,3-Dichloropropene
75558	1,2-Propylenimine (2-Methyl aziridine)	542756	Bis(chloromethyl)ether
75569	Propylene oxide	542881	Vinyl bromide (bromoethene)
76448	Heptachlor	593602	Hexamethylphosphoramide
78875	Propylene dichloride (1,2-Dichloropropane)	680319	N-Nitroso-N-methylurea
79016	Trichloroethylene	684935	1,3-Propane sultone
79061	Acrylamide	1120714	Antimony trioxide
79447	Dimethyl carbamoyl chloride	1309644	Polychlorinated biphenyls (Aroclors)
79469	2-Nitropropane	1336363	2,3,7,8-Tetrachlorodibenzo-p-dioxin
87865	Pentachlorophenol	1746016	Beryllium compounds
88062	2,4,6-Trichlorophenol	7440417	Selenium sulfide (mono and di)
90040	o-Anisidine	7488564	Toxaphene (chlorinated camphene)
92671	4-Aminobiphenyl	8001352	Nickel subsulfide
92875	Benzidine	12035722	Arsenic & inorganic arsenic compounds
		99999904	Coke Oven Emissions
		99999908	

APPENDIX B - VHAP OF POTENTIAL CONCERN

Part 1 - Pollutants Identified by Industry

CAS NUMBER	CHEMICAL NAME	EPA <i>DE MINIMIS</i> , tons/yr
11422	Diethanolamine	5
50000	Formaldehyde	0.2
68122	Dimethyl formamide	1
75092	Methylene chloride	4
78591	Isophorone	0.7
79469	2-Nitropropane	1
100425	Styrene monomer	1
108952	Phenol	0.1
109864	2-Methoxyethanol	10
111159	2-Ethoxyethyl acetate	5

Part 2 - Pollutants Listed in the NESHAP

“Non-threshold” Pollutants

CAS NO.	CHEMICAL NAME	CAS NO.	CHEMICAL NAME
57147	1,1-Dimethyl hydrazine	119904	3,3'-Dimethoxybenzidine
79005	1,1,2-Trichloroethane	119937	3,3'-Dimethyl benzidine
79345	1,1,2,2-Tetrachloroethane	92671	4-Aminobiphenyl
122667	1,2 - Diphenylhydrazine	92933	4-Nitrobiphenyl
106887	1,2 - Epoxybutane	101144	4,4'-Methylene bis(2-chloroaniline)
96128	1,2-Dibromo-3-chloropropane	101779	4,4'-Methylenedianiline
75558	1,2-Propylenimine (2-Methyl aziridine)	57976	7, 12-Dimethylbenz(a)anthracene
189559	1,2:7,8-Dibenzopyrene	75070	Acetaldehyde
106990	1,3-Butadiene	60355	Acetamide
542756	1,3-Dichloropropene	79061	Acrylamide
1120714	1,3-Propane sultone	107131	Acrylonitrile
106467	1,4-Dichlorobenzene(p)	107051	Allyl chloride
123911	1,4-Dioxane (1,4-Diethyleneoxide)	62533	Aniline
53963	2-Acetylaminofluorine	71432	Benzene
79469	2-Nitropropane	92875	Benzidine
1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxindioxin	56553	Benzo (a) anthracene
121142	2,4-Dinitrotoluene	50328	Benzo (a) pyrene
95807	2,4-Toluene diamine	205992	Benzo (b) fluoranthene
95954	2,4,5 - Trichlorophenol	225514	Benz(c)acridine
88062	2,4,6-Trichlorophenol	117817	Bis(2-ethylhexyl)phthalate (DEHP)
53963	3,3'-Dichlorobenzidine	542881	Bis(chloromethyl)ether

CAS NO.	CHEMICAL NAME	CAS NO.	CHEMICAL NAME
75252	Bromoform	95534	o-Toluidine
133062	Captan	106445	p-Cresol
56235	Carbon tetrachloride	82688	Pentachloronitrobenzene (Quintobenzene)
133904	Chloramben		
57749	Chlordane	87865	Pentachlorophenol
510156	Chlorobenzilate	1336363	Polychlorinated biphenyls (Aroclors)
67663	Chloroform	114261	Propoxur
126998	Chloroprene	78875	Propylene dichloride (1,2-Dichloropropane)
218019	Chrysene		
1319773	Cresols/Cresylic acid (isomers and mixture)	75569	Propylene oxide
72559	DDE (1,1-p-chlorophenyl 1-2 dichloroethylene)	91225	Quinoline
334883	Diazomethane	96093	Styrene oxide
53703	Dibenz (ah) anthracene	100425	Styrene (footnote "a")
111444	Dichloroethyl ether (Bis(2-chloroethyl)ether)	127184	Tetrachloroethylene (Perchloroethylene)
62737	Dichlorvos	8001352	Toxaphene (chlorinated camphene)
64675	Diethyl sulfate	79016	Trichloroethylene
60117	Dimethyl aminoazobenzene	1582098	Trifluralin
79447	Dimethyl carbamoyl chloride	108054	Vinyl acetate
68122	Dimethyl formamide	593602	Vinyl bromide (bromoethene)
106898	Epichlorohydrin	75014	Vinyl chloride
140885	Ethyl acrylate	75354	Vinylidene chloride (1,1-Dichloroethylene)
51796	Ethyl carbamate (Urethane)		
106934	Ethylene dibromide(1,2-Dibromoethane)		
107062	Ethylene dichloride (1,2-Dichloroethane)		
75218	Ethylene oxide		
96457	Ethylene thiourea		
75343	Ethylidene dichloride (1,1-Dichloroethane)		
50000	Formaldehyde		
76448	Heptachlor		
118741	Hexachlorobenzene		
87683	Hexachlorobutadiene		
67721	Hexachloroethane		
80319	Hexamethylphosphoramide		
123319	Hydroquinone		
193395	Indeno(1,2,3-cd)pyrene		
78591	Isophorone		
58899	Lindane (hexachlorcyclohexane, gamma)		
108394	m-Cresol		
74873	Methyl chloride (Chloromethane)		
74884	Methyl iodide (Iodomethane)		
75092	Methylene chloride (Dichloromethane)		
62759	N-Nitrosodimethylamine		
59892	N-Nitrosomorpholine		
684935	N-Nitroso-N-methylurea		
90040	o-Anisidine		
95487	o-Cresol		

“High Concern” Pollutants

CAS NO.	CHEMICAL NAME
532274	2-Chloroacetophenone
108864	2-Methoxyethanol
584849	2,4 - Toluene diisocyanate
51285	2,4-Dinitrophenol
534521	4,6-Dinitro-o-cresol, and salts
98862	Acetophenone
107028	Acrolein
98077	Benzotrichloride
100447	Benzyl chloride
57578	beta-Propiolactone
75150	Carbon disulfide
79118	Chloroacetic acid
107302	Chloromethyl methyl ether
10210681	Cobalt carbonyl
77781	Dimethyl sulfate
151564	Ethylene imine
75218	Ethylene oxide
62207765	Fluomine
77474	Hexachlorocyclopentadiene
108316	Maleic anhydride
62384	Mercury, (acetato-o) phenyl
74839	Methyl bromide (Bromomethane)
60344	Methyl hydrazine
624839	Methyl isocyanate
12108133	Methylcyclopentadienyl manganese
101688	Methylene diphenyl diisocyanate
13463393	Nickel Carbonyl
98953	Nitrobenzene
121697	N,N-Dimethylaniline
56382	Parathion
108952	Phenol
78002	Tetraethyl lead
75741	Tetramethyl lead

“Unrankable” Pollutants

CAS NO.	CHEMICAL NAME
540841	2,2,4-Trimethylpentane
100027	4-Nitrophenol
463581	Carbonyl sulfide
120809	Catechol
132649	Dibenzofurans
11422	Diethanolamine
-	Glycol ethers (footnote “b”)
822060	Hexamethylene-1,6-diisocyanate
85449	Phthalic anhydride
-	Polycyclic organic matter (footnote “c”)
123386	Propionaldehyde
106514	Quinone

Part 2 Footnotes:

* = Currently an EPA weight of evidence classification is under review

- a. The EPA does not currently have an official weight-of-evidence classification for styrene. For purposes of this rule, styrene is treated as a “nonthreshold” pollutant. (See data report form in appendix A of the hazard ranking technical background document.)
- b. Except for 2-ethoxy ethanol, ethylene glycol monobutyl ether, and 2-methoxy ethanol.
- c. Except for benzo(b)fluoranthene, benzo(a)anthracene, benzo(a)pyrene, 7,12-dimethylbenz(a)anthracene, benz(c)acridine, chrysene, dibenz(ah) anthracene, 1,2:7,8-dibenzopyrene, indeno(1,2,3-cd)pyrene, but including dioxins and furans.

APPENDIX C - Example Compliance Calculations

Data for Example Calculations

Sources must keep a *Certified Product Data Sheet (CPDS)* for each coating or adhesive used for wood furniture manufacturing operations. They also must record how much of each material is used. The three (3) physical properties of a coating given in a CPDS - density, weight percent solids, and weight percent VHAP - plus each coating's monthly usage provide all necessary data to make the calculations required by this NESHAP.

Individual Material _(n) Equations

C_n = NESHAP VHAP Content of an Individual Material

$$C_n = \frac{\text{Material}_n \text{ VHAP Weight, lbs.}}{\text{Material}_n \text{ Solids Weight, lbs.}} = \frac{V_n}{S_n}$$

$$V_n = \text{Density}_n \text{ (lbs./gallon)} \times \frac{\text{Weight Percent VHAP}_n}{100} \times \text{Gallons}_n$$

$$S_n = \text{Density}_n \text{ (lbs./gallon)} \times \frac{\text{Weight Percent Solids}_n}{100} \times \text{Gallons}_n$$

As Applied Mixture Equation

$$C_{\text{Applied}} = \frac{V_{\text{Applied}} = V_1 + V_S}{S_{\text{Applied}} = S_1 + S_S}$$

Material Averaging Equations

$$C_{\text{Average}} = \frac{V_{\text{Total}}}{S_{\text{Total}}} = \frac{\text{Total VHAP Weight For Month}_x}{\text{Total Solids Weight For Month}_x}$$

$$V_{\text{total}} = V_1 + V_2 + V_3 + \dots + V_n$$

$$S_{\text{total}} = S_1 + S_2 + S_3 + \dots + S_n$$

Example Data

For these example calculations, assume that the CPDS and monthly use data tabulated below were for the coatings and thinner solvent used by your facility:

CPDS DATA	Lacquer	Sealer	Stain	Basecoat	Solvent
DENSITY, lbs./gallon	7.24	7.68	7.38	8.16	6.67
VHAP CONTENT, Wt. %	14.85	30.48	4.42	24.51	8.03
SOLIDS CONTENT, Wt. %	16.85	30.47	3.25	24.51	0.00

USE DATA	Lacquer	Sealer	Stain	Basecoat	Solvent
GALLONS, USED THIS MONTH	553	325	390	228	55

1. COMPLIANT SINGLE COATING and SOLVENTS

On an individual basis, use the equation for NESHAP VHAP Content to determine if each coating or thinner solvent complies.

$$C_n = \text{NESHAP VHAP Content} = \frac{V_n}{S_n} = \frac{\text{Material}_n \text{ VHAP Weight, lbs.}}{\text{Material}_n \text{ Solids Weight, lbs.}}$$

$$C_1 = \frac{V_1 (\text{Lacquer})}{S_1 (\text{Lacquer})} = \frac{7.24 \times 14.85/100 \times 553}{7.24 \times 16.85/100 \times 553} = \frac{594.6}{674.7} = 0.8813 \text{ Pounds VHAP/Pound Solids}$$

The calculated C_1 is less than 1.0.

Per Table 1, page 2, this lacquer is a compliant coating.

NOTE: Individual coating compliance can be calculated by dividing the coatings weight percent VHAP Content by its weight percent Solids Content as is done below for other example coatings. This works for individual coating calculations because density and usage values cancel when using the full equation for single materials. Thinners, which contain no solids, must meet a maximum weight percent VHAP content limitation standard.

$$C_2 (\text{Sealer}) = 30.48/30.47 = 1.0004, \text{ Not Compliant}$$

$$C_3 (\text{Stain}) = 4.42/3.25 = 1.3600, \text{ Not Compliant}$$

$$C_4 (\text{Basecoat}) = 24.51/24.51 = 1.0000, \text{ Compliant}$$

$$C_s (\text{Solvent}) = 8.03, \text{ which is less than 10\% VHAP, Compliant*$$

* This solvent is not compliant if used for on-site formulation of washcoats, basecoats, and enamels.

2. AS APPLIED VHAP CONTENT

Determine compliance of the as applied material mixture consisting of four (4) gallons of basecoat and one (1) gallon of solvent.

A. Compute Weight of VHAP in Materials Mixed, and then total

$$V_1 (\text{Basecoat}) = 8.16 \times 24.51/100 \times 4 = 8.00$$

$$V_s (\text{Solvent}) = 6.67 \times 8.03/100 \times 1 = 0.54$$

$$\mathbf{V_{\text{applied}} = 8.54 \text{ Pounds of VHAP}}$$

B. Compute Weight of Solids in Materials Mixed, and then total

$$S_1 (\text{Basecoat}) = 8.16 \times 24.51/100 \times 4 = 8.00$$

$$S_s (\text{Solvent}) = 6.67 \times 0/100 \times 1 = 0.00$$

$$\mathbf{S_{\text{applied}} = 8.00 \text{ Pounds of VHAP}}$$

C. Compute As Applied VHAP Content of Mixture

$$C_{\text{Applied}} = \frac{V_{\text{Applied}}}{S_{\text{Applied}}} = \frac{V_1 + V_s}{S_1 + S_s} = \frac{8.54}{8.00} = 1.07$$

This is a non-compliant mixture, demonstrating the misuse of a compliant cleaning solvent for thinning applications.

NOTE: Purchase and use of a compliant 3.0% maximum VHAP content thinner also computes to be in non-compliance. **BUT**, by rule, as applied mixtures prepared using a compliant 3.0% maximum VHAP content thinner and a compliant basecoat, washcoat, or enamel comply with the NESHAP and no calculations are required.

3. AVERAGE MONTHLY VHAP CONTENT

Calculate the average VHAP content of emissions from all finishing materials used at the facility for a month. An existing source must maintain a value of C_{Average} no greater than 1.0 to achieve compliance.

A. Compute Weight of VHAP Emitted From Materials Used, and then Total

$$\begin{aligned} V_1 \text{ (Lacquer)} &= 7.24 \times 14.85/100 \times 553 = 594.6 \\ V_2 \text{ (Sealer)} &= 7.68 \times 30.48/100 \times 325 = 760.8 \\ V_3 \text{ (Stain)} &= 7.38 \times 4.42/100 \times 390 = 127.2 \\ V_4 \text{ (Basecoat)} &= 8.16 \times 24.51/100 \times 228 = 456.0 \\ V_t \text{ (Solvent)} &= 6.67 \times 8.03/100 \times 55 = 29.5 \\ \\ \mathbf{V_{\text{total}} = 1968.1 \text{ Pounds of VHAP}} \end{aligned}$$

B. Compute Weight of Solids In Materials Used, and then Total

$$\begin{aligned} S_1 \text{ (Lacquer)} &= 7.24 \times 16.85/100 \times 553 = 674.7 \\ S_2 \text{ (Sealer)} &= 7.68 \times 30.47/100 \times 325 = 760.5 \\ S_3 \text{ (Stain)} &= 7.38 \times 3.25/100 \times 390 = 93.6 \\ S_4 \text{ (Basecoat)} &= 8.16 \times 24.51/100 \times 228 = 456.0 \\ S_t \text{ (Solvent)} &= 6.67 \times 0/100 \times 55 = 0.0 \\ \\ \mathbf{S_{\text{total}} = 1984.8 \text{ Pounds of Solids}} \end{aligned}$$

C. Compute Average Emission For The Month In NESHAP Limitation Units

$$C_{\text{Average}} = \frac{V_{\text{total}}}{S_{\text{total}}} = \frac{1968.1}{1984.8} = 0.9916 \frac{\text{Pounds VHAP}}{\text{Pound Solids}}$$

NOTE: This calculation illustrates how both complying and non-complying materials can be used while remaining in compliance via the averaging procedure.

4. COMPUTER SPREADSHEET PROGRAM COMPUTES AVERAGE VHAP

CPDS Information				Records	Calculated Data		
Material Type	Solids, Wt. %	VHAP, Wt. %	Density, Lbs/Gal	Amt. Used Gal./Mo.	SOLIDS Lbs./Mo.	VHAP Lbs./Mo.	VHAP Cont. Lb V/Lb S
Lacquer	16.85	14.85	7.24	553	674.7	594.6	0.8813
Sealer	30.47	30.28	7.68	325	760.5	760.8	1.0004
Stain	3.25	4.42	7.38	390	93.5	127.2	1.3600
Basecoat	24.51	24.51	8.16	228	456.0	456.0	1.0000
Solvent	0.00	8.03	6.67	55	0.0	29.5	ERR
					1984.7	1968.1	0.9916

5. AREA SOURCE, 12-MONTH MOVING TOTAL USE CALCULATIONS

Coatings and Thinner Use Data		
Month	Gallons	12 Mo. Total
Jan 96	322	
Feb 96	205	
Mar 96	283	
Apr 96	200	
May 96	384	
Jun 96	325	
Jul 96	220	
Aug 96	152	
Sep 96	84	
Oct 96	328	
Nov 96	156	
Dec 96	253	2912
Jan 97	139	2729
Fab 97	361	2885
Mar 97	198	2800
Apr 97	166	2766
May 97	357	2739
Jun 97	42	2456
Jul 97	81	2317
Aug 97	92	2257
Sep 97	378	2551
Oct 97	258	2481
Nov 97	228	2553
Dec 97	373	2673

* Totals 01/96 thru 12/96
 * Totals 02/96 thru 01/97
 * Totals 07/96 thru 06/97
 * Totals 08/96 thru 07/97



APPENDIX D - Definitions

Definitions appearing in this appendix were obtained from 40 CFR 63, Subpart A - General Provisions, and 40 CFR 63, Subpart JJ - National Emission Standards for Wood Furniture Manufacturing Operations. Clarifying annotations have been inserted as appropriate.

Act means the Clean Air Act (42 U.S.C. 7401 et seq., as amended by Pub. L. 101-549, 104 Stat. 2399).

Actual emissions means the actual rate of emissions of a pollutant, but does not include excess emissions from a malfunction, or startups and shutdowns associated with a malfunction. Actual emissions shall be calculated using the source's actual operating rates, and types of materials processed, stored, or combusted during the selected time period.

Adhesive means any chemical substance that is applied for the purpose of bonding two surfaces together other than by mechanical means. *Under Subpart JJ, adhesives shall not be considered coatings or finishing materials.* Products used on humans and animals, adhesive tape, contact paper, or any other product with an adhesive incorporated onto or in an inert substrate shall not be considered adhesives under this subpart.

Administrator means the Administrator of the United States Environmental Protection Agency or his or her authorized representative; e.g., a State that has been delegated the authority to implement the provisions of this part (40CFR 63).

Aerosol adhesive means an adhesive that is dispensed from a pressurized container as a suspension of fine solid or liquid particles in gas.

Affected source, for the purposes of this part (40CFR 63), means the stationary source, the group of stationary sources, or the portion of a stationary source that is regulated by a relevant standard or other requirement established pursuant to section 112 of the Act. *Each relevant standard will define the "affected source" for the purposes of that standard.* The term "affected source," as used in this part, is separate and distinct from any other use of that term in EPA regulations such as those implementing title IV of the Act. Sources regulated under part 60 or part 61 of this chapter are not affected sources for the purposes of part 63.

Affected source for this standard (40 CFR 63, Subpart JJ), means a wood furniture manufacturing facility that is engaged, either in part or in whole, in the manufacture of wood furniture or wood furniture components and that is located at a plant site that is a major source as defined in 40 CFR Part 63.2, excluding sources that meet the criteria established in Sec. 63.800(a), (b) and (c) of this subpart.

Alternative emission limitation means conditions established pursuant to sections 112(I)(5) or 112(I)(6) of the Act by the Administrator or by a State with an approved permit program.

Alternative emission standard means an alternative means of emission limitation that, after notice and opportunity for public comment, has been demonstrated by an owner or operator to the Administrator's satisfaction to achieve a reduction in emissions of any air pollutant at least equivalent to the reduction in emissions of such pollutant achieved under a relevant design, equipment, work practice, or operational emission standard, or combination thereof, established under this part (40CFR 63) pursuant to section 112(h) of the Act.

Alternative method means any method of sampling and analyzing for an air pollutant that is not a reference or equivalent method but has been demonstrated to the Administrator's satisfaction to, in specific cases, produce results adequate for a determination of compliance.

Alternative test method means any method of sampling and analyzing for an air pollutant that is not a reference or equivalent method but has been demonstrated to the Administrator's satisfaction to, in specific cases, produce results adequate for a determination of compliance.

Approved permit program means a State permit program approved by the Administrator as meeting the requirements of Part 70 of this chapter or a Federal permit program established in this chapter pursuant to Title V of the Act (42 U.S.C. 7661).

Area source means any stationary source of hazardous air pollutants that is not a major source as defined in this part (40CFR 63).

As applied means the HAP and solids content of the coating or contact adhesive that is actually used for coating or gluing the substrate. It includes the contribution of materials used for in-house dilution of the coating or contact adhesive.

Basecoat means a coat of colored material, usually opaque, that is applied before graining inks, glazing coats, or other opaque finishing materials, and is usually topcoated for protection.

Baseline conditions means the conditions that exist prior to an affected source implementing controls, such as a control system.

Building enclosure means a building housing a process that meets the requirements of a temporary total enclosure. EPA Method 204E is used to identify all emission points from the building enclosure and to determine which emission points must be tested. For additional information see Guidelines for Determining Capture Efficiency, January 1994. Docket No. A-93-10, Item No. IV-B-1.

Capture device means a hood, enclosed room, floor sweep, or other means of collecting solvent emissions or other pollutants into a duct so the pollutant can be directed to a pollution control device such as an incinerator or carbon adsorber.

Capture efficiency means the fraction of all organic vapors generated by a process that is directed to a control device.

Certified product data sheet (CPDS) means documentation furnished by coating or adhesive suppliers or an outside laboratory that provides the HAP content of a finishing material, contact adhesive, or solvent, by percent weight, measured using the *EPA Method 311* (as promulgated in Subpart JJ) <In this manual, EPA's Method 311 is given in Appendix G >, or an equivalent or alternative method (or formulation data if the coating meets the criteria specified in Sec. 63.805(a)); the solids content of a finishing material or contact adhesive by percent weight, determined using data from the *EPA Method 24*, <Found at 40 CFR Part 60, Appendix A or ASTM MNL-4, a group of standards describing the measurement of density, solids, volatiles, water, and other data required to calculate VOC content> or an alternative or equivalent method (or formulation data if the coating meets the criteria specified in Sec. 63.805(a)); and the density, measured by EPA Method 24 or an alternative or equivalent method. Therefore, the reportable HAP content should represent the maximum aggregate emissions potential of the finishing material, adhesive, or solvent in concentrations greater than or equal to 1.0 percent by weight or 0.1 percent for HAP that are carcinogens, as defined by the Occupational Safety and Health Administration Hazard Communication Standard (29 CFR Part 1910), as formulated. The purpose of the CPDS is to assist the affected source in demonstrating compliance with the emission limitations presented in Sec. 63.802.

Note: Because optimum analytical conditions under EPA Method 311 vary by coating, the coating or adhesive supplier may choose to include on the CPDS the optimum analytical conditions for analysis of the coating, adhesive, or solvent using EPA Method 311. Such information may include, but not be limited to, separation column, oven temperature, carrier gas, injection port temperature, extraction solvent, and internal standard.

Cleaning operations means operations in which organic solvent is used to remove coating materials or adhesives from equipment used in wood furniture manufacturing operations.

Coating means a protective, decorative, or functional film applied in a thin layer to a surface. Such materials include, but are not limited to, paints, topcoats, varnishes, sealers, stains, washcoats, basecoats, enamels, inks, and temporary protective coatings.

Coating application station means the part of a coating operation where the coating is applied, *e.g.*, a spray booth.

Coating operation means those activities in which a coating is applied to a substrate and is subsequently air-dried, cured in an oven, or cured by radiation.

Coating solids (or solids) means the part of the coating which remains after the coating is dried or cured; solids content is determined using data from the EPA Method 24, or an equivalent or alternative method.

Commenced means, with respect to construction or reconstruction of a stationary source, that an owner or operator has undertaken a continuous program of construction or reconstruction or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or reconstruction.

Compliance date means the date by which an affected source is required to be in compliance with a relevant standard, limitation, prohibition, or any federally enforceable requirement established by the Administrator (or a State with an approved permit program) pursuant to section 112 of the Act.

Compliance plan means a plan that contains all of the following:

- (1) A description of the compliance status of the affected source with respect to all applicable requirements established under this part (40CFR 63);
- (2) A description as follows:
 - (i) For applicable requirements for which the source is in compliance, a statement that the source will continue to comply with such requirements;
 - (ii) For applicable requirements that the source is required to comply with by a future date, a statement that the source will meet such requirements on a timely basis;
 - (iii) For applicable requirements for which the source is not in compliance, a narrative description of how the source will achieve compliance with such requirements on a timely basis;
- (3) A compliance schedule, as defined in this section; and
- (4) A schedule for the submission of certified progress reports no less frequently than every 6 months for affected sources required to have a schedule of compliance to remedy a violation.

Compliance schedule means:

- (1) In the case of an affected source that is in compliance with all applicable requirements established under this part (40 CFR 63), a statement that the source will continue to comply with such requirements; or
- (2) In the case of an affected source that is required to comply with applicable requirements by a future date, a statement that the source will meet such requirements on a timely basis and, if required by an applicable requirement, a detailed schedule of the dates by which each step toward compliance will be reached; or
- (3) In the case of an affected source not in compliance with all applicable requirements established under this part, a schedule of remedial measures, including an enforceable sequence of actions or operations with milestones and a schedule for the submission of certified progress reports, where applicable, leading to compliance with a relevant standard, limitation, prohibition, or any federally enforceable requirement established pursuant to section 112 of the Act for which the affected source is not in compliance. This compliance schedule shall resemble and be at least as stringent as that contained in any judicial consent decree or administrative order to which the source is subject. Any such schedule of compliance shall be supplemental to, and shall not sanction noncompliance with, the applicable requirements on which it is based.

Compliant coating/contact adhesive means a finishing material, contact adhesive, or strippable booth coating that meets the emission limits specified in Table 3 of this subpart (40 CFR 63, Subpart JJ).

Construction means the on-site fabrication, erection, or installation of an affected source.

Contact adhesive means an adhesive that is applied to two substrates, dried, and mated under only enough pressure to result in good contact. The bond is immediate and sufficiently strong to hold pieces together without further clamping, pressure, or airing.

Continuous coater means a finishing system that continuously applies finishing materials onto furniture parts moving along a conveyor. Finishing materials that are not transferred to the part are recycled to a reservoir. Several types of application methods can be used with a continuous coater including spraying, curtain coating, roll coating, dip coating, and flow coating.

Continuous compliance means that the affected source is meeting the emission limitations and other requirements of the rule at all times and is fulfilling all monitoring and recordkeeping provisions of the rule in order to demonstrate compliance.

Continuous emission monitoring system (CEMS) means the total equipment that may be required to meet the data acquisition and availability requirements of this part (40 CFR 63), used to sample, condition (if applicable), analyze, and provide a record of emissions.

Continuous monitoring system (CMS) is a comprehensive term that may include, but is not limited to, continuous emission monitoring systems, continuous opacity monitoring systems, continuous parameter monitoring systems, or other manual or automatic monitoring that is used for demonstrating compliance with an applicable regulation on a continuous basis as defined by the regulation.

Continuous opacity monitoring system (COMS) means a continuous monitoring system that measures the opacity of emissions.

Continuous parameter monitoring system means the total equipment that may be required to meet the data acquisition and availability requirements of this part (40 CFR 63), used to sample, condition (if applicable), analyze, and provide a record of process or control system parameters.

Control device means any equipment that reduces the quantity of a pollutant that is emitted to the air. The device may destroy or secure the pollutant for subsequent recovery. Includes, but is not limited to, incinerators, carbon adsorbers, and condensers.

Control device efficiency means the ratio of the pollutant released by a control device and the pollutant introduced to the control device.

Control system means the combination of capture and control devices used to reduce emissions to the atmosphere.

Conventional air spray means a spray coating method in which the coating is atomized by mixing it with compressed air and applied at an air pressure greater than 10 pounds per square inch (gauge) at the point of atomization. Airless and air assisted airless spray technologies are not conventional air spray because the coating is not atomized by mixing it with compressed air. Electrostatic spray technology is also not considered conventional air spray because an electrostatic charge is employed to attract the coating to the workpiece.

Data quality objective (DQO) approach means a set of approval criteria that must be met so that data from an alternative test method can be used in determining the capture efficiency of a control system. For additional information, see Guidelines for Determining Capture Efficiency, January 1994. (Docket No. A-93-10, Item No. IV-B-1).

Day means a period of 24 consecutive hours beginning at midnight local time, or beginning at a time consistent with a facility's operating schedule.

Disposed offsite means sending used organic solvent or coatings outside of the facility boundaries for disposal.

Effective date means:

- (1) With regard to an emission standard established under this part (40 CFR 63), the date of promulgation in the Federal Register of such standard; or
- (2) With regard to an alternative emission limitation or equivalent emission limitation determined by the Administrator (or a State with an approved permit program), the date that the alternative emission limitation or equivalent emission limitation becomes effective according to the provisions of this part (40 CFR 63). The effective date of a permit program established under Title V of the Act (42 U.S.C. 7661) is determined according to the regulations in this chapter establishing such programs.

Emission means the release or discharge, whether directly or indirectly, of HAP into the ambient air.

Emission standard means a national standard, limitation, prohibition, or other regulation promulgated in a subpart of this part (40 CFR 63) pursuant to sections 112(d), 112(h), or 112(f) of the Act.

Emissions averaging is a way to comply with the emission limitations specified in a relevant standard, whereby an affected source, if allowed under a subpart of 40 CFR Part 63, may create emission credits by reducing emissions from specific points to a level below that required by the relevant standard, and those credits are used to offset emissions from points that are not controlled to the level required by the relevant standard.

Enamel means a coat of colored material, usually opaque, that is applied as a protective topcoat over a basecoat, primer, or previously applied enamel coats. In some cases, another finishing material may be applied as a topcoat over the enamel.

Equipment leak means emissions of volatile hazardous air pollutants from pumps, valves, flanges, or other equipment used to transfer or apply coatings, adhesives, or organic solvents.

Equivalent method means any method of sampling and analyzing for an air pollutant that has been demonstrated to the Administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method, under specific conditions.

EPA means the United States Environmental Protection Agency.

Equivalent emission limitation means the maximum achievable control technology emission limitation (MACT emission limitation) for hazardous air pollutants that the Administrator (or a State with an approved permit program) determines on a case-by-case basis, pursuant to section 112(g) or section 112(j) of the Act, to be equivalent to the emission standard that would apply to an affected source if such standard had been promulgated by the Administrator under this part (40 CFR 63) pursuant to section 112(d) or section 112(h) of the Act.

Excess emissions and continuous monitoring system performance report is a report that must be submitted periodically by an affected source in order to provide data on its compliance with relevant emission limits, operating parameters, and the performance of its continuous parameter monitoring systems.

Existing source means any affected source that is not a new source.

Federally enforceable means all limitations and conditions that are enforceable by the Administrator and citizens under the Act or that are enforceable under other statutes administered by the Administrator. Examples of federally enforceable limitations and conditions include, but are not limited to:

- (1) Emission standards, alternative emission standards, alternative emission limitations, and equivalent emission limitations established pursuant to section 112 of the Act as amended in 1990;
- (2) New source performance standards established pursuant to section 111 of the Act, and emission standards established pursuant to section 112 of the Act before it was amended in 1990;
- (3) All terms and conditions in a title V permit, including any provisions that limit a source's potential to emit, unless expressly designated as not federally enforceable;
- (4) Limitations and conditions that are part of an approved State Implementation Plan (SIP) or a Federal Implementation Plan (FIP);
- (5) Limitations and conditions that are part of a Federal construction permit issued under 40 CFR 52.21 or any construction permit issued under regulations approved by the EPA in accordance with 40 CFR Part 51;
- (6) Limitations and conditions that are part of an operating permit issued pursuant to a program approved by the EPA into a SIP as meeting the EPA's minimum criteria for Federal enforceability, including adequate notice and opportunity for EPA and public comment prior to issuance of the final permit and practicable enforceability;
- (7) Limitations and conditions in a State rule or program that has been approved by the EPA under subpart E of this part (40 CFR 63) for the purposes of implementing and enforcing section 112; and
- (8) Individual consent agreements that the EPA has legal authority to create.

Finishing material means a coating used in the wood furniture industry. Such materials include, but are not limited to, stains, basecoats, washcoats, enamels, sealers, and topcoats.

Finishing operation means those operations in which a finishing material is applied to a substrate and is subsequently air-dried, cured in an oven, or cured by radiation.

Foam adhesive means a contact adhesive used for gluing foam to fabric, foam to foam, and fabric to wood.

Fixed capital cost means the capital needed to provide all the depreciable components of an existing source.

Fugitive emissions means those emissions from a stationary source that could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening. Under section 112 of the Act, all fugitive emissions are to be considered in determining whether a stationary source is a major source.

Gluing operation means those operations in which adhesives are used to join components, for example, to apply a laminate to a wood substrate or foam to fabric.

Hazardous air pollutant means any air pollutant listed in or pursuant to section 112(b) of the Act.

Incidental wood furniture manufacturer means a major source that is primarily engaged in the manufacture of products other than wood furniture or wood furniture components and that uses no more than 100 gallons per month of finishing material or adhesives in the manufacture of wood furniture or wood furniture components.

Incinerator means, for the purposes of this industry, an enclosed combustion device that thermally oxidizes volatile organic compounds to CO and CO₂. This term does not include devices burning municipal or hazardous waste material.

Issuance of a part 70 permit will occur, if the State is the permitting authority, in accordance with the requirements of part 70 of this chapter and the applicable, approved State permit program. When the EPA is the permitting authority, issuance of a title V permit occurs immediately after the EPA takes final action on the final permit.

Janitorial maintenance means the upkeep of equipment or building structures that is not directly related to the manufacturing process, for example, cleaning of restroom facilities.

Lesser quantity means a quantity of a hazardous air pollutant that is or may be emitted by a stationary source that the Administrator establishes in order to define a major source under an applicable subpart of this part (40CFR 63).

Lower confidence limit (LCL) approach means a set of approval criteria that must be met so that data from an alternative test method can be used in determining the capture efficiency of a control system. For additional information, see Guidelines for Determining Capture Efficiency, January 1994. (Docket No. A-93-10, Item No. IV-B-1).

Major source means any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants, unless the Administrator establishes a lesser quantity, or in the case of radionuclides, different criteria from those specified in this sentence.

Malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Material safety data sheet (MSDS) means the documentation required for hazardous chemicals by the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR Part 1910) for a solvent, cleaning material, contact adhesive, coating, or other material that identifies select reportable hazardous ingredients of the material, safety and health considerations, and handling procedures.

New source means any affected source the construction or reconstruction of which is commenced after the Administrator first proposes a relevant emission standard under this part (40CFR 63).

NOTE: Subpart JJ, the proposed NESHAP for wood furniture manufacturing operations, was published in the Federal Register on December 6, 1994.

Noncompliant coating/contact adhesive means a finishing material, contact adhesive, or strippable booth coating that has a VHAP content (VOC content for the strippable booth coating) greater than the emission limitation presented in Table 3 of this subpart (40 cfr 63 Subpart JJ). ([A summary of emission limitations appears in this manual's Table 1.](#))

Nonporous substrate means a surface that is impermeable to liquids. Examples include metal, rigid plastic, flexible vinyl, and rubber.

Normally closed container means a container that is closed unless an operator is actively engaged in activities such as emptying or filling the container.

One-hour period, unless otherwise defined in an applicable subpart, means any 60-minute period commencing on the hour.

Operating parameter value means a minimum or maximum value established for a control device or process parameter that, if achieved by itself or in combination with one or more other operating parameter values, determines that an owner or operator has complied with an applicable emission limit.

Opacity means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background. For continuous opacity monitoring systems, opacity means the fraction of incident light that is attenuated by an optical medium.

Organic solvent means a volatile organic liquid that is used for dissolving or dispersing constituents in a coating or contact adhesive, adjusting the viscosity of a coating or contact adhesive, or cleaning equipment. When used in a coating or contact adhesive, the organic solvent evaporates during drying and does not become a part of the dried film.

Overall control efficiency means the efficiency of a control system, calculated as the product of the capture and control device efficiencies, expressed as a percentage.

Owner or operator means any person who owns, leases, operates, controls, or supervises a stationary source.

Part 70 permit means any permit issued, renewed, or revised pursuant to part 70 of this chapter.

Performance audit means a procedure to analyze blind samples, the content of which is known by the Administrator, simultaneously with the analysis of performance test samples in order to provide a measure of test data quality.

Performance evaluation means the conduct of relative accuracy testing, calibration error testing, and other measurements used in validating the continuous monitoring system data.

Performance test means the collection of data resulting from the execution of a test method (usually three emission test runs) used to demonstrate compliance with a relevant emission standard as specified in the performance test section of the relevant standard.

Permanent total enclosure means a permanently installed enclosure that completely surrounds a source of emissions such that all emissions are captured and contained for discharge through a control device. For additional information, see Guidelines for Determining Capture Efficiency, January 1994. (Docket No. A-93-10, Item No. IV-B-1).

Permit modification means a change to a title V permit as defined in regulations codified in this chapter to implement title V of the Act (42 U.S.C. 7661).

Permit program means a comprehensive State operating permit system established pursuant to title V of the Act (42 U.S.C. 7661) and regulations codified in part 70 of this chapter and applicable State regulations, or a comprehensive Federal operating permit system established pursuant to title V of the Act and regulations codified in this chapter.

Permit revision means any permit modification or administrative permit amendment to a title V permit as defined in regulations codified in this chapter to implement title V of the Act (42 U.S.C. 7661).

Permitting authority means:

- (1) The State air pollution control agency, local agency, other State agency, or other agency authorized by the Administrator to carry out a permit program under part 70 of this chapter; or
- (2) The Administrator, in the case of EPA-implemented permit programs under title V of the Act (42 U.S.C. 7661).

Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the stationary source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable.

Reconstruction means the replacement of components of an affected or a previously unaffected stationary source to such an extent that:

- (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source; and
- (2) It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s) established by the Administrator (or a State) pursuant to section 112 of the Act. Upon reconstruction, an affected source, or a stationary source that becomes an affected source, is subject to relevant standards for new sources, including compliance dates, irrespective of any change in emissions of hazardous air pollutants from that source.

Notes:

- (a) Costs associated with the purchase and installation of air pollution control equipment; *e.g.*, incinerators, carbon adsorbers, are not considered in determining whether the facility has been reconstructed, unless the control equipment is required as part of the process; *e.g.*, product recovery.
- (b) Costs for installing equipment specifically to achieve compliance with this NESHAP that require retrofit and replacement of existing equipment are not considered reconstruction costs. For example, an affected source may convert to waterborne coatings to meet NESHAP requirements. At most facilities this conversion requires replacement of existing storage tanks, mix equipment, and transfer lines. These costs are not considered in determining whether the facility has been reconstructed.

Recycled onsite means the reuse of an organic solvent in a process other than cleaning or washoff.

Reference method means any method of sampling and analyzing for an air pollutant that is published in Appendix A of 40 CFR Part 60.

Regulation promulgation schedule means the schedule for the promulgation of emission standards under this part (40CFR 63), established by the Administrator pursuant to section 112(e) of the Act and published in the Federal Register.

Relevant standard means:

- (1) An emission standard;
- (2) An alternative emission standard;
- (3) An alternative emission limitation; or
- (4) An equivalent emission limitation established pursuant to section 112 of the Act that applies to the stationary source, the group of stationary sources, or the portion of a stationary source regulated by such standard or limitation.

A relevant standard may include or consist of a design, equipment, work practice, or operational requirement, or other measure, process, method, system, or technique (including prohibition of emissions) that the Administrator (or a State) establishes for new or existing sources to which such standard or limitation applies. Every relevant standard established pursuant to section 112 of the Act includes subpart A of this part (40CFR 63) and all applicable appendices of this part (40CFR 63) or of other parts of this chapter that are referenced in that standard.

Research or laboratory facility means any stationary source whose primary purpose is to conduct research and development to develop new processes and products where such source is operated under the close supervision of technically trained personnel and is not engaged in the manufacture of products for commercial sale in commerce, except in a de minimis manner.

Responsible official means one of the following:

- (1) For a corporation: A president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities and either:
 - (i) The facilities employ more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars); or
 - (ii) The delegation of authority to such representative is approved in advance by the Administrator.
- (2) For a partnership or sole proprietorship: a general partner or the proprietor, respectively.
- (3) For a municipality, State, Federal, or other public agency: either a principal executive officer or ranking elected official. For purposes of this part (40CFR 63), a principal executive officer of a Federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., a Regional Administrator of the EPA).
- (4) For affected sources (as defined in this part (40CFR 63)) applying for or subject to a title V permit: “responsible official” shall have the same meaning as defined in part 70 or Federal title V regulations in this chapter (42 U.S.C. 7661), whichever is applicable.

Run means one of a series of emission or other measurements needed to determine emissions for a representative operating period or cycle as specified in this part (40CFR 63).

Sealer means a finishing material used to seal the pores of a wood substrate before additional coats of finishing material are applied. Special purpose finishing materials that are used in some finishing systems to optimize aesthetics are not sealers.

Shutdown means the cessation of operation of an affected source for any purpose.

Six-minute period means, with respect to opacity determinations, any one of the 10 equal parts of a one-hour period.

Solvent means a liquid used in a coating or contact adhesive to dissolve or disperse constituents and/or to adjust viscosity. It evaporates during drying and does not become a part of the dried film.

Stain means any color coat having a solids content by weight of no more than 8.0 percent that is applied in single or multiple coats *directly to the substrate*. It includes, but is not limited to, nongrain raising stains, equalizer stains, prestains, sap stains, body stains, no-wipe stains, penetrating stains, and toners.

Standard conditions means a temperature of 293 K (68°F) and a pressure of 101.3 kilopascals (29.92 in. Hg).

Startup means the setting in operation of an affected source for any purpose.

State means all non-Federal authorities, including local agencies, interstate associations, and State-wide programs, that have delegated authority to implement: (1) The provisions of this part (40CFR 63) and/or (2) the permit program established under part 70 of this chapter. The term State shall have its conventional meaning where clear from the context.

Stationary source means any building, structure, facility, or installation which emits or may emit any air pollutant.

Storage containers means vessels or tanks, including mix equipment, used to hold finishing, gluing, cleaning, or washoff materials.

Strippable spray booth material means a coating that:

- (1) Is applied to a spray booth wall to provide a protective film to receive overspray during finishing operations;
- (2) Is subsequently peeled off and disposed; and
- (3) By achieving (1) and (2), reduces or eliminates the need to use organic solvents to clean spray booth walls.

Substrate means the surface onto which a coating or contact adhesive is applied (or into which a coating or contact adhesive is impregnated).

Temporary total enclosure means an enclosure that meets the requirements of Sec. 63.805(e)(1) (I) through (iv) and is not permanent, but constructed only to measure the capture efficiency of pollutants emitted from a given source. Additionally, any exhaust point from the enclosure shall be at least four equivalent duct or hood diameters from each natural draft opening. For additional information, see Guidelines for Determining Capture Efficiency, January 1994. (Docket No. A-93-10, Item No. IV-B-1).

Test method means the validated procedure for sampling, preparing, and analyzing for an air pollutant specified in a relevant standard as the performance test procedure. The test method may include methods described in an appendix of this chapter, test methods incorporated by reference in this part (40CFR 63), or methods validated for an application through procedures in Method 301 of Appendix A, 40 CFR 63.

Title V permit means any permit issued, renewed, or revised pursuant to Federal or State regulations established to implement title V of the Act (42 U.S.C. 7661). A title V permit issued by a State permitting authority is called a part 70 permit in this part (40CFR 63).

Thinner means a volatile liquid that is used to dilute coatings or contact adhesives (to reduce viscosity, color strength, and solids, or to modify drying conditions).

Topcoat means the last film-building finishing material that is applied in a finishing system.

Touchup and repair means the application of finishing materials to cover minor finishing imperfections.

VHAP means any volatile hazardous air pollutant listed in Table 2 to Subpart JJ. (In this manual, we list VHAPs from Table 2 in Appendix A - Part 1.)

VHAP of potential concern means any VHAP from the nonthreshold, high concern, or unrankable list in Table 6 of Subpart JJ. (In this manual, we list VHAP of potential concern from Table 6 in Appendix B. - Part 2.)

Visible emission means the observation of an emission of opacity or optical density above the threshold of vision.

Volatile organic compound (VOC) means any organic compound which participates in atmospheric photochemical reactions, that is, any organic compound other than those which the Administrator designates as having negligible photochemical reactivity. A VOC may be measured by a reference method, an equivalent method, an alternative method, or by procedures specified under any rule. A reference method, an equivalent method, or an alternative method, however, may also measure nonreactive organic compounds. In such cases, the owner or operator may exclude the nonreactive organic compounds when determining compliance with a standard. For a list of compounds that the Administrator has designated as having negligible photochemical reactivity, refer to 40 CFR Part 51.100.

Washcoat means a transparent special purpose finishing material having a solids content by weight of 12.0 percent by weight or less. Washcoats are applied over initial stains to protect, to control color, and to stiffen the wood fibers in order to aid sanding.

Washoff operations means those operations in which organic solvent is used to remove coating from wood furniture or a wood furniture component.

Wood furniture means any product made of wood, a wood product such as rattan or wicker, or an engineered wood product such as particleboard that is manufactured under any of the following standard industrial classification codes: 2434, 2511, 2512, 2517, 2519, 2521, 2531, 2541, 2599, or 5712.

Wood furniture component means any part that is used in the manufacture of wood furniture. Examples include, but are not limited to, drawer sides, cabinet doors, seat cushions, and laminated tops.

Wood furniture manufacturing operations means the finishing, gluing, cleaning, and washoff operations associated with the production of wood furniture or wood furniture components.



APPENDIX E - 40 CFR Part 63

Subpart JJ

You can secure an electronic copy of the wood furniture manufacturing operations NESHAP by going to <ftp://tnftp.rtpnc.epa.gov/e-drive/caaa/rsr/> and downloading the file named “prereg.zip” to your computer.

EPA made this 81 Kb Zip Compressed Data file containing the preamble and the regulation available on Nov 27, 1995, thereby preceding the December 7, 1995, date of publication in the Federal Register. You will need to insert the publication date at appropriate places noted in the document.

NOTE:

The amendment of 40 CFR Part 63, Appendix A containing the Method 311 Test Method appears in this manual’s Appendix G.

The text of the wood furniture manufacturing NESHAP has been omitted from this document. If you would like a paper copy of the NESHAP from the Federal Register, please call UT CIS at (615) 532-8657.



APPENDIX F - Forms

INITIAL NOTIFICATION REPORT

Applicable Rule: 40 CFR Part 63, Subpart JJ--National Emission Standards for Wood Furniture Manufacturing Operations

1. Print or type the following information for each plant in which wood furniture manufacturing operations are performed:

Owner/Operator/Title _____

Company Name _____

Mailing Address _____

City _____ State _____ ZIP Code _____

Plant* Address (if different than owner/operator's)

Street Address _____

City _____ State _____ ZIP Code _____

Plant Phone Number _____

Plant Contact/Title _____

* Physical location of affected source.

2. Briefly describe the wood furniture manufacturing process used. Include data on the nature, size, operating design capacity, and method of operation.

3. Estimate the total annual use of coatings, adhesives, cleaning, and washoff materials:

_____ Gallons

4. Indicate your anticipated compliance approach (optional):

Finishing Operations

- Compliant coatings
- Averaging
- Control device
- Combination:

Contact Adhesives

- Compliant coatings
- Control device
- Combination:

5. Identify each VHAP emission point or source. Provide the number of items in each classification, as appropriate:

Finishing Operations

- Spray Guns
- Continuous Coaters
- Spray Booths
- Flash-off Areas
- Drying Ovens

Contact Adhesives

- Spray Guns
- Spray Booths
- Flash-off Areas
- Drying Ovens

Other Operations

- Transfer Systems (Pumps,etc.)
- Washoff and Cleaning Areas

Control Devices

- Outlet Vent

6. **Print or type** the name of the person making this notification for the plant:

(Name) (Title)

I certify the information contained in this report to be accurate and true to the best of my knowledge.

(Signature) (Date)

INITIAL COMPLIANCE STATUS REPORT

Applicable Rule: 40 CFR Part 63, Subpart JJ--National Emission Standards for Wood Furniture Manufacturing Operations

1. Print or type the following information for each plant in which wood furniture manufacturing operations are performed:

Owner/Operator/Title _____

Company Name _____

Mailing Address _____

City _____ State _____ ZIP Code _____

Plant* Address (if different than owner/operator's)

Street Address _____

City _____ State _____ ZIP Code _____

Plant Phone Number _____

Plant Contact/Title _____

* Physical location of affected source.

2. Indicate whether the facility is a new or existing source:

New source (construction commenced on or after December 6, 1994)

Existing source

3. Indicate the facility's compliance date: ____ / ____ / ____

4. Indicate the facility's compliance approach:

Compliant Coatings/Adhesives -The facility uses compliant coatings, thinners, and/or adhesives.

Averaging - The facility uses a group of compliant and non-compliant materials whose calculated average VHAP content achieves the required limitation, A copy of the calculations for the month in which the compliance date fell is attached.

Compliant Coatings with continuous coaters.

The facility uses compliant coatings, as determined by the VHAP content of the coating in the reservoir and the calculated VHAP content, and compliant thinners.

The facility uses compliant coatings and thinners and monitors the viscosity of the coating in the reservoir. Attach data showing the relationship between viscosity and VHAP content of the coating.

- Control Device - A copy of the facility’s monitoring plan and results from the initial performance test are attached.
- Combination of methods - Indicate what combination of compliance methods are being used. Requirements for both methods are attached.

5. Work Practice Standards

- The facility developed a work practice implementation plan and established procedures for implementing provisions of the plan.

6. **Print or type** the name of the Responsible Official for the plant:

(Name) (Title)

A Responsible Official can be:

- The president, vice-president, secretary, or treasurer of the company that owns the plant;
- The owner of the plant;
- The plant engineer or supervisor;
- A government official if the plant is owned by the Federal, State, city, or county government; or
- A ranking military officer if the plant is located on a military base.

I certify the information contained in this report to be accurate and true to the best of my knowledge.

(Signature of Responsible Official) (Date)

CONTINUOUS COMPLIANCE STATUS REPORT

Applicable Rule: 40 CFR Part 63, Subpart JJ--National Emission Standards for Wood Furniture Manufacturing Operations

1. Print or type the following information for each plant in which wood furniture manufacturing operations are performed:

Owner/Operator/Title _____

Company Name _____

Mailing Address _____

City _____ State _____ ZIP Code _____

Plant* Address (if different than owner/operator's)

Street Address _____

City _____ State _____ ZIP Code _____

Plant Phone Number _____

Plant Contact/Title _____

* Physical location of affected source.

2. Indicate the beginning and ending dates of the reporting period:

Beginning: ____ / ____ / ____ Ending: ____ / ____ / ____

3. Check all that apply for the facility's compliance approach:

Facilities using compliant coatings/adhesives.

- This facility used compliant thinners, coatings, and/or adhesives each day in this reporting period.
- This facility used noncompliant materials during the reporting period. <Show dates and explain why this occurred. Use additional pages if needed.>

Facilities using averaging:

- This facility met the emission limits specified in 40 CFR 63.802 for finishing operations every month by using an averaging approach. < Attach calculations for each month within this reporting period.>
- This facility has not met the monthly average emission limits specified in 40 CFR 63.802 for finishing operations. < Attach calculation for each month within this reporting period. Also show dates and explain why this occurred. Use additional pages if needed.>

Unless an affected source demonstrates through records that a violation can be attributed to specific days during the month a violation occurred, the violation of a monthly average is a separate violation of the standard for each day of operation.

Facilities using compliant coatings with continuous coaters:

- This facility used compliant coatings (as determined by the VHAP content of the coating in the reservoir and the VHAP content of the coating as calculated from records) and compliant thinners each day in this reporting period.
- This facility used compliant coatings (as determined by the VHAP content of the coating in the reservoir) and compliant thinners each day in the reporting period and the viscosity of the coating in the reservoir has not been less than the initial coating's viscosity.
- This facility used noncompliant coatings or thinners during the reporting period. <Show dates and explain why this occurred. Use additional pages if needed.>

Facilities using a control device:

- The facility operated its capture or control devices as required to achieve the appropriate daily average operating parameter values established in the initial performance test.
- The facility failed to operate its capture or control devices as required to achieve the appropriate daily average operating parameter values established in the initial performance test. <Show dates and explain why this occurred. Use additional pages if needed.>

Facilities using a combination of compliance methods:

- Indicate below the combination of compliance methods used (averaging and control device or compliant coatings and control device). Also check appropriate boxes above to show the compliance methods used and compliance status. <Attach required records.>

4. Work Practice Standards

- During this reporting period, the work practices in 40 CFR 63.803 were followed in accordance with the work practice implementation plan and the inspection and maintenance plan for this source.
- During this reporting period, the work practices in 40 CFR 63.803 were not followed in accordance with the work practice implementation plan and the inspection and maintenance plan for this source. <Indicate below which plan was not followed and provide an explanation. Also make an assessment of whether any excess emissions and/or parameter monitoring exceedances occurred, and a copy of the appropriate records documenting which plan was not followed. Please state whether either plan is being revised accordingly. Use additional pages if needed.>

Work Practice Failure Explanation, if required:

5. Please describe any changes in monitoring, processes, or controls since the last reporting period. Use additional pages if needed.

6. Print or type the name of the Responsible Official for the plant:

(Name)

(Title)

A Responsible Official can be:

- The president, vice-president, secretary, or treasurer of the company that owns the plant;
- The owner of the plant;
- The plant engineer or supervisor;
- A government official if the plant is owned by the Federal, State, city, or county government;
or
- A ranking military officer if the plant is located on a military base.

I certify the information contained in this report to be accurate and true to the best of my knowledge.

(Signature of Responsible Official)

(Date)

NOTIFICATION OF CONSTRUCTION / RECONSTRUCTION

1. The company named below plans to: (If applicable, check both boxes.)

- Construct a new source of VHAPs
- Reconstruct an existing source of VHAPs

2. Print or type the following information for new or reconstructed facilities which will conduct wood furniture manufacturing operations.

Owner/Operator/Title _____

Company Name _____

Mailing Address _____

City _____ State _____ Zip Code _____

Plant* Address (if different than owner/operator's)

Street Address _____

City _____ State _____ Zip Code _____

Plant Phone Number _____

Plant Contact/Title _____

* Physical location of affected source.

2. Indicate the date the planned effort is expected to begin and end.

Beginning: ____ / ____ / ____ Ending: ____ / ____ / ____

3. Indicate the expected startup date for the new or reconstructed facility.

Startup: ____ / ____ / ____

4. Describe the type of operation to be performed. Use additional pages if needed.

5. Indicate the anticipated compliance approach.

- Compliant coatings
- Averaging
- Control device: requires preliminary design drawings and capacity estimates to be provided.
- Combination: requires preliminary design drawings and capacity estimates of the control device to be provided.

6. Estimate the type and quantity of VHAPs which will be emitted. Provide calculation details, expressing in units consistent with applicable emission limitations.

Additional Items Required for Reconstruction Notices

7. Describe the existing source and components to be replaced. Use additional pages if needed.

8. Indicate the existing compliance method.

- Compliant coatings
- Averaging
- Control device
- Combination

9. Upon completion the reconstructed source (check applicable box):

- Will have no limitation preventing it from complying with relevant emission standards.
- Will have technical or economic limitations affecting its ability to comply with relevant emission standards. **Checking this box requires the owner or operator to provide a discussion of limitations affecting compliance, an estimate of the fixed capital cost of the reconstruction, an estimate of the fixed capital cost for constructing a comparable new source, and an estimate of the life of the reconstructed source.**

10. Print or type the name of the Responsible Official for the plant:

(Name)

(Title)

A Responsible Official can be:

- The president, vice-president, secretary, or treasurer of the company that owns the plant;
- The owner of the plant;
- The plant engineer or supervisor;
- A government official if the plant is owned by the Federal, State, city, or county government; or
- A ranking military officer if the plant is located on a military base.

I certify the information contained in this report to be accurate and true to the best of my knowledge.

(Signature of Responsible Official)

(Date)



APPENDIX G - TEST METHODS



Method 311 - Analysis of Hazardous Air Pollutant Compounds in Paints and Coatings by Direct Injection into a Gas Chromatograph

1. Scope and Application

1.1 Applicability. This method is applicable for determination of most compounds designated by the U. S. Environmental Protection Agency as volatile hazardous air pollutants (HAP's) (See Reference 1) that are contained in paints and coatings. Styrene, ethyl acrylate, and methyl methacrylate can be measured by ASTM D 4827-93 or ASTM D 4747-87. Formaldehyde can be measured by ASTM PS 9-94 or ASTM D 1979-91. Toluene diisocyanate can be measured in urethane prepolymers by ASTM D 3432-89. Method 311 applies only to those volatile HAP's which are added to the coating when it is manufactured, not to those which may form as the coating cures (reaction products or cure volatiles). A separate or modified test procedure must be used to measure these reaction products or cure volatiles in order to determine the total volatile HAP emissions from a coating. Cure volatiles are a significant component of the total HAP content of some coatings. The term "coating" used in this method shall be understood to mean paints and coatings.

1.2 Principle. The method uses the principle of gas chromatographic separation and quantification using a detector that responds to concentration differences. Because there are many potential analytical systems or sets of operating conditions that may represent useable methods for determining the concentrations of the compounds cited in Section 1.1 in the applicable matrices, all systems that employ this principle, but differ only in details of equipment and operation, may be used as alternative methods, provided that the prescribed quality control, calibration, and method performance requirements are met. Certified product data sheets (CPDS) may also include information relevant to the analysis of the coating sample including, but not limited to, separation column, oven temperature, carrier gas, injection port temperature, extraction solvent, and internal standard.

2. Summary of Method

Whole coating is added to dimethylformamide and a suitable internal standard compound is added. An aliquot of the sample mixture is injected onto a chromatographic column containing a stationary phase that separates the analytes from each other and from other volatile compounds contained in the sample. The concentrations of the analytes are determined by comparing the detector responses for the sample to the responses obtained using known concentrations of the analytes.

3. Definitions [Reserved]

4. Interferences

4.1 Coating samples of unknown composition may contain the compound used as the internal standard. Whether or not this is the case may be determined by following the procedures of Section 11 and deleting the addition of the internal standard specified in Section 11.5.3. If necessary, a different internal standard may be used.

4.2 The GC column and operating conditions developed for one coating formulation may not ensure adequate resolution of target analytes for other coating formulations. Some formulations may contain nontarget analytes that coelute with target analytes. If there is any doubt about the identification or resolution of any gas chromatograph (GC) peak, it may be necessary to analyze the sample using a different GC column or different GC operating conditions.

4.3 Cross-contamination may occur whenever high-level and low-level samples are analyzed sequentially. The order of sample analyses specified in Section 11.7 is designed to minimize this problem.

4.4 Cross-contamination may also occur if the devices used to transfer coating during the sample preparation process or for injecting the sample into the GC are not adequately cleaned between uses. All such devices should be cleaned with acetone or other suitable solvent and checked for plugs or cracks before and after each use.

5. Safety

5.1 Many solvents used in coatings are hazardous. Precautions should be taken to avoid unnecessary inhalation and skin or eye contact. This method may involve hazardous materials, operations, and equipment. This test method does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and to determine the applicability of regulatory limitations in regards to the performance of this test method.

5.2 Dimethylformamide is harmful if inhaled or absorbed through the skin. The user should obtain relevant health and safety information from the manufacturer. Dimethylformamide should be used only with adequate ventilation. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. If eyes are affected, consult a physician. Remove and wash contaminated clothing before reuse.

5.3 User's manuals for the gas chromatograph and other related equipment should be consulted for specific precautions to be taken related to their use.

6. Equipment and Supplies

NOTE: Certified product data sheets (CPDS) may also include information relevant to the analysis of the coating sample including, but not limited to, separation column, oven temperature, carrier gas, injection port temperature, extraction solvent, and internal standard.

6.1 Sample Collection.

6.1.1 Sampling Containers. Dual-seal sampling containers, four to eight fluid ounce capacity, should be used to collect the samples. Glass sample bottles or plastic containers with volatile organic compound (VOC) impermeable walls must be used for corrosive substances (*e.g.*, etch primers and certain coating catalysts such as methyl ethyl ketone (MEK) peroxide). Sample

containers, caps, and inner seal liners must be inert to the compounds in the sample and must be selected on a case-by-case basis.

6.1.1.1 Other routine sampling supplies needed include waterproof marking pens, tubing, scrappers/spatulas, clean rags, paper towels, cooler/ice, long handle tongs, and mixing/stirring paddles.

6.1.2 Personal safety equipment needed includes eye protection, respiratory protection, a hard hat, gloves, steel toe shoes, etc.

6.1.3 Shipping supplies needed include shipping boxes, packing material, shipping labels, strapping tape, etc.

6.1.4 Data recording forms and labels needed include coating data sheets and sample can labels.

NOTE: The actual requirements will depend upon the conditions existing at the source sampled.

6.2 Laboratory Equipment and Supplies.

6.2.1 Gas Chromatograph (GC). Any instrument equipped with a flame ionization detector and capable of being temperature programmed may be used. Optionally, other types of detectors (e.g., a mass spectrometer), and any necessary interfaces, may be used provided that the detector system yields an appropriate and reproducible response to the analytes in the injected sample. Autosampler injection may be used, if available.

6.2.2 Recorder. If available, an electronic data station or integrator may be used to record the gas chromatogram and associated data. If a strip chart recorder is used, it must meet the following criteria: A 1 to 10 millivolt (mV) linear response with a full scale response time of 2 seconds or less and a maximum noise level of ± 0.03 percent of full scale. Other types of recorders may be used as appropriate to the specific detector installed provided that the recorder has a full scale response time of 2 seconds or less and a maximum noise level of ± 0.03 percent of full scale.

6.2.3 Column. The column must be constructed of materials that do not react with components of the sample (e.g., fused silica, stainless steel, glass). The column should be of appropriate physical dimensions (e.g., length, internal diameter) and contain sufficient suitable stationary phase to allow separation of the analytes. DB-5, DB-Wax, and FFAP columns are commonly used for paint analysis; however, it is the responsibility of each analyst to select appropriate columns and stationary phases.

6.2.4 Tube and Tube Fittings. Supplies to connect the GC and gas cylinders.

6.2.5 Pressure Regulators. Devices used to regulate the pressure between gas cylinders and the GC.

6.2.6 Flow Meter. A device used to determine the carrier gas flow rate through the GC. Either a digital flow meter or a soap film bubble meter may be used to measure gas flow rates.

6.2.7 Septa. Seals on the GC injection port through which liquid or gas samples can be injected using a syringe.

6.2.8 Liquid Charging Devices. Devices used to inject samples into the GC such as clean and graduated 1, 5, and 10 microliter (μl) capacity syringes.

6.2.9 Vials. Containers that can be sealed with a septum in which samples may be prepared or stored. The recommended size is 25 ml capacity. Mininert® valves have been found satisfactory and are available from Pierce Chemical Company, Rockford, Illinois.

6.2.10 Balance. Device used to determine the weights of standards and samples. An analytical balance capable of accurately weighing to 0.0001 g is required.

7. Reagents and Standards

7.1 Purity of Reagents. Reagent grade chemicals shall be used in all tests. Unless otherwise specified, all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used provided it is first ascertained that the reagent is of sufficient purity to permit its use without lessening the accuracy of determination.

7.2 Carrier Gas. Helium carrier gas shall have a purity of 99.995 percent or higher. High purity nitrogen may also be used. Other carrier gases that are appropriate for the column system and analyte may also be used. Ultra-high purity grade hydrogen gas and zero-grade air shall be used for the flame ionization detector.

7.3 Dimethylformamide (DMF). Solvent for all standards and samples. Some other suitable solvent may be used if DMF is not compatible with the sample or coelutes with a target analyte.

NOTE: DMF may coelute with ethylbenzene or p-xylene under the conditions described in the note under Section 6.2.3.

7.4 Internal Standard Materials. The internal standard material is used in the quantitation of the analytes for this method. It shall be gas chromatography spectrophotometric quality or, if this grade is not available, the highest quality available. Obtain the assay for the internal standard material and maintain at that purity during use. The recommended internal standard material is 1-propanol; however, selection of an appropriate internal standard material for the particular coating and GC conditions used is the responsibility of each analyst.

7.5 Reference Standard Materials. The reference standard materials are the chemicals cited in Section 1.1 which are of known identity and purity and which are used to assist in the identification and quantification of the analytes of this method. They shall be the highest quality available. Obtain the assays for the reference standard materials and maintain at those purities during use.

7.6 Stock Reference Standards. Stock reference standards are dilutions of the reference standard materials that may be used on a daily basis to prepare calibration standards, calibration check standards, and quality control check standards. Stock reference standards may be prepared from the reference standard materials or purchased as certified solutions.

7.6.1 Stock reference standards should be prepared in dimethylformamide for each analyte expected in the coating samples to be analyzed. The concentrations of analytes in the stock reference standards are not specified but must be adequate to prepare the calibration standards required in the method. A stock reference standard may contain more than one analyte pro-

vided all analytes are chemically compatible and no analytes coelute. The actual concentrations prepared must be known to within 0.1 percent (e.g., 0.1000 ± 0.0001 g/g solution). The following procedure is suggested. Place about 35 ml of dimethylformamide into a tared ground-glass stoppered 50 ml volumetric flask. Weigh the flask to the nearest 0.1 mg. Add 12.5 g of the reference standard material and reweigh the flask. Dilute to volume with dimethylformamide and reweigh. Stopper the flask and mix the contents by inverting the flask several times. Calculate the concentration in grams per gram of solution from the net gain in weights, correcting for the assayed purity of the reference standard material.

NOTE: Although a glass-stoppered volumetric flask is convenient, any suitable glass container may be used because stock reference standards are prepared by weight.

7.6.2 Transfer the stock reference standard solution into one or more Teflon-sealed screw-cap bottles. Store, with minimal headspace, at -10°C to 0°C and protect from light.

7.6.3 Prepare fresh stock reference standards every six months, or sooner if analysis results from daily calibration check standards indicate a problem. Fresh stock reference standards for very volatile HAP's may have to be prepared more frequently.

7.7 Calibration Standards. Calibration standards are used to determine the response of the detector to known amounts of reference material. Calibration standards must be prepared at a minimum of three concentration levels from the stock reference standards (see Section 7.6). Prepare the calibration standards in dimethylformamide (see Section 7.3). The lowest concentration standard should contain a concentration of analyte equivalent either to a concentration of no more than 0.01% of the analyte in a coating or to a concentration that is lower than the actual concentration of the analyte in the coating, whichever concentration is higher. The highest concentration standard should contain a concentration of analyte equivalent to slightly more than the highest concentration expected for the analyte in a coating. The remaining calibration standard should contain a concentration of analyte roughly at the midpoint of the range defined by the lowest and highest concentration calibration standards. The concentration range of the standards should thus correspond to the expected range of analyte concentrations in the prepared coating samples (see Section 11.5). Each calibration standard should contain each analyte for detection by this method expected in the actual coating samples (e.g., some or all of the compounds listed in Section 1.1 may be included). Each calibration standard should also contain an appropriate amount of internal standard material (response for the internal standard material is within 25 to 75 percent of full scale on the attenuation setting for the particular reference standard concentration level). Calibration Standards should be stored for 1 week only in sealed vials with minimal headspace. If the stock reference standards were prepared as specified in Section 7.6, the calibration standards may be prepared by either weighing each addition of the stock reference standard or by adding known volumes of the stock reference standard and calculating the mass of the standard reference material added. Alternative 1 (Section 7.7.1) specifies the procedure to be followed when the stock reference standard is added by volume. Alternative 2 (Section 7.7.2) specifies the procedure to be followed when the stock reference standard is added by weight.

NOTE: To assist with determining the appropriate amount of internal standard to add, as required here and in other sections of this method, the analyst may find it advantageous to prepare a curve showing the area response versus the amount of internal standard injected into the GC.

7.7.1 Preparation Alternative 1. Determine the amount of each stock reference standard and dimethylformamide solvent needed to prepare approximately 25 ml of the specific calibration concentration level desired. To a tared 25 ml vial that can be sealed with a crimp-on or Mininert® valve, add the total amount of dimethylformamide calculated to be needed. As quickly as practical, add the calculated amount of each stock reference standard using new pipets (or pipet tips) for each stock reference standard. Reweigh the vial and seal it. Using the known weights of the standard reference materials per ml in the stock reference standards, the volumes added, and the total weight of all reagents added to the vial, calculate the weight percent of each standard reference material in the calibration standard prepared. Repeat this process for each calibration standard to be prepared.

7.7.2 Preparation Alternative 2. Determine the amount of each stock reference standard and dimethylformamide solvent needed to prepare approximately 25 ml of the specific calibration concentration level desired. To a tared 25 ml vial that can be sealed with a crimp-on or Mininert® valve, add the total amount of dimethylformamide calculated to be needed. As quickly as practical, add the calculated amount of a stock reference standard using a new pipet (or pipet tip) and reweigh the vial. Repeat this process for each stock reference standard to be added. Seal the vial after obtaining the final weight. Using the known weight percents of the standard reference materials in the stock reference standards, the weights of the stock reference standards added, and the total weight of all reagents added to the vial, calculate the weight percent of each standard reference material in the calibration standard prepared. Repeat this process for each calibration standard to be prepared.

8. Sample Collection, Preservation, Transport, and Storage

8.1 Copies of material safety data sheets (MSDS's) for each sample should be obtained prior to sampling. The MSDS's contain information on the ingredients, and physical and chemical properties data. The MSDS's also contain recommendations for proper handling or required safety precautions. Certified product data sheets (CPDS) may also include information relevant to the analysis of the coating sample including, but not limited to, separation column, oven temperature, carrier gas, injection port temperature, extraction solvent, and internal standard.

8.2 A copy of the blender's worksheet can be requested to obtain data on the exact coating being sampled. A blank coating data sheet form (see Section 18) may also be used. The manufacturer's formulation information from the product data sheet should also be obtained.

8.3 Prior to sample collection, thoroughly mix the coating to ensure that a representative, homogeneous sample is obtained. It is preferred that this be accomplished using a coating can shaker or similar device; however, when necessary, this may be accomplished using mechanical agitation or circulation systems.

8.3.1 Water-thinned coatings tend to incorporate or entrain air bubbles if stirred too vigorously; mix these types of coatings slowly and only as long as necessary to homogenize.

8.3.2 Each component of multicomponent coatings that harden when mixed must be sampled separately. The component mix ratios must be obtained at the facility at the time of sampling and submitted to the analytical laboratory.

8.4 Sample Collection. Samples must be collected in a manner that prevents or minimizes loss of volatile components and that does not contaminate the coating reservoir. A suggested

procedure is as follows. Select a sample collection container which has a capacity at least 25 percent greater than the container in which the sample is to be transported. Make sure both sample containers are clean and dry. Using clean, long-handled tongs, turn the sample collection container upside down and lower it into the coating reservoir. The mouth of the sample collection container should be at approximately the midpoint of the reservoir (do not take the sample from the top surface). Turn the sample collection container over and slowly bring it to the top of the coating reservoir. Rapidly pour the collected coating into the sample container, filling it completely. It is important to fill the sample container completely to avoid any loss of volatiles due to volatilization into the headspace. Return any unused coating to the reservoir or dispose as appropriate.

NOTE: If a company requests a set of samples for its own analysis, a separate set of samples, using new sample containers, should be taken at the same time.

8.5 Once the sample is collected, place the sample container on a firm surface and insert the inner seal in the container by placing the seal inside the rim of the container, inverting a screw cap, and pressing down on the screw cap which will evenly force the inner seal into the container for a tight fit. Using clean towels or rags, remove all residual coating material from the outside of the sample container after inserting the inner seal. Screw the cap onto the container.

8.5.1 Affix a sample label (see Section 18) clearly identifying the sample, date collected, and person collecting the sample.

8.5.2 Prepare the sample for transportation to the laboratory. The sample should be maintained at the coating's recommended storage temperature specified on the Material Safety Data Sheet, or, if no temperature is specified, the sample should be maintained within the range of 5°C to 38°C.

8.9 The shipping container should adhere to U.S. Department of Transportation specification DOT 12-B. Coating samples are considered hazardous materials; appropriate shipping procedures should be followed.

9. Quality Control

9.1 Laboratories using this method should operate a formal quality control program. The minimum requirements of the program should consist of an initial demonstration of laboratory capability and an ongoing analysis of blanks and quality control samples to evaluate and document quality data. The laboratory must maintain records to document the quality of the data generated. When results indicate atypical method performance, a quality control check standard (see Section 9.4) must be analyzed to confirm that the measurements were performed in an in-control mode of operation.

9.2 Before processing any samples, the analyst must demonstrate, through analysis of a reagent blank, that there are no interferences from the analytical system, glassware, and reagents that would bias the sample analysis results. Each time a set of analytical samples is processed or there is a change in reagents, a reagent blank should be processed as a safeguard against chronic laboratory contamination. The blank samples should be carried through all stages of the sample preparation and measurement steps.

9.3 Required instrument quality control parameters are found in the following sections:

9.3.1 Baseline stability must be demonstrated to be ≤ 5 percent of full scale using the procedures given in Section 10.1.

9.3.2 The GC calibration is not valid unless the retention time (RT) for each analyte at each concentration is within ± 0.05 min of the retention time measured for that analyte in the stock standard.

9.3.3 The retention time (RT) of any sample analyte must be within ± 0.05 min of the average RT of the analyte in the calibration standards for the analyte to be considered tentatively identified.

9.3.4 The GC system must be calibrated as specified in Section 10.2.

9.3.5 A one-point daily calibration check must be performed as specified in Section 10.3.

9.4 To establish the ability to generate results having acceptable accuracy and precision, the analyst must perform the following operations.

9.4.1 Prepare a quality control check standard (QCCS) containing each analyte expected in the coating samples at a concentration expected to result in a response between 25 percent and 75 percent of the limits of the calibration curve when the sample is prepared as described in Section 11.5. The QCCS may be prepared from reference standard materials or purchased as certified solutions. If prepared in the laboratory, the QCCS must be prepared independently from the calibration standards.

9.4.2 Analyze three aliquots of the QCCS according to the method beginning in Section 11.5.3 and calculate the weight percent of each analyte using Equation 1, Section 12.

9.4.3 Calculate the mean weight percent (\bar{w}) for each analyte from the three results obtained in Section 9.4.2.

9.4.4 Calculate the percent accuracy for each analyte using the known concentrations (T_i) in the QCCS using Equation 3, Section 12.

9.4.5 Calculate the percent relative standard deviation (percent RSD) for each analyte using Equation 7, Section 12, substituting the appropriate values for the relative response factors (RRF's) in said equation.

9.4.6 If the percent accuracy (Section 9.4.4) for all analytes is within the range 90 percent to 110 percent and the percent RSD (Section 9.4.5) for all analytes is ≤ 20 percent, system performance is acceptable and sample analysis may begin. If these criteria are not met for any analyte, then system performance is not acceptable for that analyte and the test must be repeated for those analytes only. Repeated failures indicate a general problem with the measurement system that must be located and corrected. In this case, the entire test, beginning at Section 9.4.1, must be repeated after the problem is corrected.

9.5 Great care must be exercised to maintain the integrity of all standards. It is recommended that all standards be stored at -10°C to 0°C in screw-cap amber glass bottles with Teflon liners.

9.6 Unless otherwise specified, all weights are to be recorded within 0.1 mg.

10. Calibration and Standardization

10.1 Column Baseline Drift. Before each calibration and series of determinations and before the daily calibration check, condition the column using procedures developed by the laboratory or as specified by the column supplier. Operate the GC at initial (*i.e.*, before sample injection) conditions on the lowest attenuation to be used during sample analysis. Adjust the recorder pen to zero on the chart and obtain a baseline for at least one minute. Initiate the GC operating cycle that would be used for sample analysis. On the recorder chart, mark the pen position at the end of the simulated sample analysis cycle. Baseline drift is defined as the absolute difference in the pen positions at the beginning and end of the cycle in the direction perpendicular to the chart movement. Calculate the percent baseline drift by dividing the baseline drift by the chart width representing full-scale deflection and multiply the result by 100.

10.2 Calibration of GC. Bring all stock standards and calibration standards to room temperature while establishing the GC at the determined operating conditions.

10.2.1 Retention Times (RT's) for Individual Compounds.

NOTE: The procedures of this subsection are required only for the initial calibration. However, it is good laboratory practice to follow these procedures for some or all analytes before each calibration. The procedures were written for chromatograms output to a strip chart recorder. More modern instruments (e.g., integrators and electronic data stations) determine and print out or display retention times automatically.

The RT for each analyte should be determined before calibration. This provides a positive identification for each peak observed from the calibration standards. Inject an appropriate volume (see NOTE in Section 11.5.2) of one of the stock reference standards into the gas chromatograph and record on the chart the pen position at the time of the injection (see Section 7.6.1). Dilute an aliquot of the stock reference standard as required in dimethylformamide to achieve a concentration that will result in an on-scale response. Operate the gas chromatograph according to the determined procedures. Select the peak(s) that correspond to the analyte(s) [and internal standard, if used] and measure the retention time(s). If a chart recorder is used, measure the distance(s) on the chart from the injection point to the peak maxima. These distances, divided by the chart speed, are defined as the RT's of the analytes in question. Repeat this process for each of the stock reference standard solutions.

NOTE: If gas chromatography with mass spectrometer detection (GC-MS) is used, a stock reference standard may contain a group of analytes, provided all analytes are adequately separated during the analysis. Mass spectral library matching can be used to identify the analyte associated with each peak in the gas chromatogram. The retention time for the analyte then becomes the retention time of its peak in the chromatogram.

10.2.2 Calibration. The GC must be calibrated using a minimum of three concentration levels of each potential analyte. (See Section 7.7 for instructions on preparation of the calibration standards.) Beginning with the lowest concentration level calibration standard, carry out the analysis procedure as described beginning in Section 11.7. Repeat the procedure for each progressively higher concentration level until all calibration standards have been analyzed.

10.2.2.1 Calculate the RT's for the internal standard and for each analyte in the calibration standards at each concentration level as described in Section 10.2.1. The RT's for the internal standard must not vary by more than 0.10 minutes. Identify each analyte by comparison of the RT's for peak maxima to the RT's determined in Section 10.2.1.

10.2.2.2 Compare the retention times (RT's) for each potential analyte in the calibration standards for each concentration level to the retention times determined in Section 10.2.1. The calibration is not valid unless all RT's for all analytes meet the criteria given in Section 9.3.2.

10.2.2.3 Tabulate the area responses and the concentrations for the internal standard and each analyte in the calibration standards. Calculate the response factor for the internal standard (RF_{is}) and the response factor for each compound relative to the internal standard (RRF) for each concentration level using Equations 5 and 6, Section 12.

10.2.2.4 Using the RRF's from the calibration, calculate the percent relative standard deviation (percent RSD) for each analyte in the calibration standard using Equation 7, Section 12. The percent RSD for each individual calibration analyte must be less than 15 percent. This criterion must be met in order for the calibration to be valid. If the criterion is met, the mean RRF's determined above are to be used until the next calibration.

10.3 Daily Calibration Checks. The calibration curve (Section 10.2.2) must be checked and verified at least once each day that samples are analyzed. This is accomplished by analyzing a calibration standard that is at a concentration near the midpoint of the working range and performing the checks in Sections 10.3.1, 10.3.2, and 10.3.3.

10.3.1 For each analyte in the calibration standard, calculate the percent difference in the RRF from the last calibration using Equation 8, Section 12. If the percent difference for each calibration analyte is less than 10 percent, the last calibration curve is assumed to be valid. If the percent difference for any analyte is greater than 5 percent, the analyst should consider this a warning limit. If the percent difference for any one calibration analyte exceeds 10 percent, corrective action must be taken. If no source of the problem can be determined after corrective action has been taken, a new three-point (minimum) calibration must be generated. This criterion must be met before quantitative analysis begins.

10.3.2 If the RF_{is} for the internal standard changes by more than ± 20 percent from the last daily calibration check, the system must be inspected for malfunctions and corrections made as appropriate.

10.3.3 The retention times for the internal standard and all calibration check analytes must be evaluated. If the retention time for the internal standard or for any calibration check analyte changes by more than 0.10 min from the last calibration, the system must be inspected for malfunctions and corrections made as required.

11. Procedure

11.1 All samples and standards must be allowed to warm to room temperature before analysis. Observe the given order of ingredient addition to minimize loss of volatiles.

11.2 Bring the GC system to the determined operating conditions and condition the column as described in Section 10.1. **NOTE:** The temperature of the injection port may be an especially critical parameter. Information about the proper temperature may be found on the CPDS.

11.3 Perform the daily calibration checks as described in Section 10.3. Samples are not to be analyzed until the criteria in Section 10.3 are met.

11.4 Place the as-received coating sample on a paint shaker, or similar device, and shake the sample for a minimum of 5 minutes to achieve homogenization.

11.5 **NOTE:** The steps in this section must be performed rapidly and without interruption to avoid loss of volatile organics. These steps must be performed in a laboratory hood free from solvent vapors. All weights must be recorded to the nearest 0.1 mg.

11.5.1 Add 16 g of dimethylformamide to each of two tared vials (A and B) capable of being septum sealed.

11.5.2 To each vial add a weight of coating that will result in the response for the major constituent being in the upper half of the linear range of the calibration curve. **NOTE:** The magnitude of the response obviously depends on the amount of sample injected into the GC as specified in Section 11.8. This volume must be the same as used for preparation of the calibration curve, otherwise shifts in compound retention times may occur. If a sample is prepared that results in a response outside the limits of the calibration curve, new samples must be prepared; changing the volume injected to bring the response within the calibration curve limits is not permitted.

11.5.3 Add a weight of internal standard to each vial (A and B) that will result in the response for the internal standard being between 25 percent and 75 percent of the linear range of the calibration curve.

11.5.4 Seal the vials with crimp-on or Mininert® septum seals.

11.6 Shake the vials containing the prepared coating samples for 60 seconds. Allow the vials to stand undisturbed for ten minutes. If solids have not settled out on the bottom after 10 minutes, then centrifuge at 1,000 rpm for 5 minutes. The analyst also has the option of injecting the sample without allowing the solids to settle.

11.7 Analyses should be conducted in the following order: daily calibration check sample, method blank, up to 10 injections from sample vials (*i.e.*, one injection each from up to five pairs of vials, which corresponds to analysis of 5 coating samples).

11.8 Inject the prescribed volume of supernatant from the calibration check sample, the method blank, and the sample vials onto the chromatographic column and record the chromatograms while operating the system under the specified operating conditions. **NOTE:** The analyst has the option of injecting the unseparated sample.

12. Data Analysis and Calculations

12.1 Qualitative Analysis. An analyte (e.g., those cited in Section 1.1) is considered tentatively identified if two criteria are satisfied: (1) elution of the sample analyte within ± 0.05 min of the average GC retention time of the same analyte in the calibration standard; and (2) either (a) confirmation of the identity of the compound by spectral matching on a gas chromatograph equipped with a mass selective detector or (b) elution of the sample analyte within ± 0.05 min of the average GC retention time of the same analyte in the calibration standard analyzed on a dissimilar GC column.

12.1.1 The RT of the sample analyte must meet the criteria specified in Section 9.3.3.

12.1.2 When doubt exists as to the identification of a peak or the resolution of two or more components possibly comprising one peak, additional confirmatory techniques (listed in Section 12.1) must be used.

12.2 Quantitative Analysis. When an analyte has been identified, the quantification of that compound will be based on the internal standard technique.

12.2.1 A single analysis consists of one injection from each of two sample vials (A and B) prepared using the same coating. Calculate the concentration of each identified analyte in the sample as follows:

$$\text{HAP}_{\text{wt}\%} = 100 \times \frac{(A_x)(W_{\text{is}})}{(A_{\text{is}})(\text{RRF}_x)(W_x)} \quad \text{Eq. (1)}$$

where:

$\text{HAP}_{\text{wt}\%}$ = weight percent of the analyte in coating.

A_x = Area response of the analyte in the sample.

W_{is} = Weight of internal standard added to sample, g.

A_{is} = Area response of the internal standard in the sample.

RRF_x = Mean relative response factor for the analyte in the calibration standards.

W_x = Weight of coating added to the sample solution, g.

12.2.2 Report results for duplicate analysis (sample vials A and B) without correction.

12.3 Precision Data. Calculate the percent difference between the measured concentrations of each analyte in vials A and B as follows.

12.3.1 Calculate the weight percent of the analyte in each of the two sample vials as described in Section 12.2.1.

12.3.2 Calculate the percent difference for each analyte as:

$$\% \text{Dif}_i = 100 \times \frac{|A_i - B_i|}{\frac{(A_i + B_i)}{2}} \quad \text{Eq. (2)}$$

where A_i and B_i are the measured concentrations of the analyte in vials A and B.

12.4 Calculate the percent accuracy for analytes in the QCCS (See Section 9.4) as follows:

$$\% \text{Accuracy}_x = 100 \times \frac{X_x}{T_x} \quad \text{Eq. (3)}$$

where X_x is the mean measured value and T_x is the known true value of the analyte in the QCCS.

12.5 Obtain retention times (RT's) from data station or integrator or, for chromatograms from a chart recorder, calculate the RT's for analytes in the calibration standards (See Section 10.2.2.2) as follows:

$$RT = \frac{\text{Distance from injection to peak maximum}}{\text{Recorder chart speed}} \quad \text{Eq. (4)}$$

12.6 Calculate the response factor for the internal standard (See Section 10.2.2.3) as follows:

$$RF_{is} = \frac{A_{is}}{C_{is}} \quad \text{Eq. (5)}$$

where:

A_{is} = Area response of the internal standard.
 C_{is} = Weight percent of the internal standard.

12.7 Calculate the relative response factors for analytes in the calibration standards (See Section 10.2.2.3) as follows:

$$RRF_x = \frac{A_x}{RF_{is} C_x} \quad \text{Eq. (6)}$$

where:

RRF_x = Relative response factor for an individual analyte.
 A_x = Area response of the analyte being measured.
 C_x = Weight percent of the analyte being measured.

12.8 Calculate the percent relative standard deviation of the relative response factors for analytes in the calibration standards (See Section 10.2.2.4) as follows:

$$\%RSD = 100 \times \frac{\sqrt{\frac{\sum_{i=1}^n (RRF_x - \overline{RRF}_x)^2}{n-1}}}{\overline{RRF}_x} \quad \text{Eq. (7)}$$

where:

n = Number of calibration concentration levels used for an analyte.
 RRF_x = Individual RRF for an analyte.
 \overline{RRF}_x = Mean of all RRFs for an analyte.

12.9 Calculate the percent difference in the relative response factors between the calibration curve and the daily calibration checks (See Section 10.3) as follows:

$$\% \text{ Difference} = \frac{\overline{\text{RRF}}_x - \text{RRF}_c}{\overline{\text{RRF}}_x} \times 100 \quad \text{Eq. (8)}$$

where:

$\overline{\text{RRF}}_x$ = mean relative response factor from last calibration.

RRF_c = relative response factor from calibration check standard.

13. Measurement of Reaction Byproducts That are HAP [Reserved]

14. Method Performance [Reserved]

15. Pollution Prevention [Reserved]

16. Waste Management

16.1 The coating samples and laboratory standards and reagents may contain compounds which require management as hazardous waste. It is the laboratory's responsibility to ensure all wastes are managed in accordance with all applicable laws and regulations.

16.2 To avoid excessive laboratory waste, obtain only enough sample for laboratory analysis.

16.3 It is recommended that discarded waste coating solids, used rags, used paper towels, and other nonglass or nonsharp waste materials be placed in a plastic bag before disposal. A separate container, designated "For Sharp Objects Only," is recommended for collection of discarded glassware and other sharp-edge items used in the laboratory. It is recommended that unused or excess samples and reagents be placed in a solvent-resistant plastic or metal container with a lid or cover designed for flammable liquids. This container should not be stored in the area where analytical work is performed. It is recommended that a record be kept of all compounds placed in the container for identification of the contents upon disposal.

17. References

1. Clean Air Act Amendments, Public Law 101-549, Titles I-XI, November, 1990.
2. Standard Test Method for Water Content of Water-Reducible Paints by Direct Injection into a Gas Chromatograph. ASTM Designation D3792-79
3. Standard Practice for Sampling Liquid Paints and Related Pigment Coatings. ASTM Designation D3925-81.
4. Standard Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph. ASTM Designation D4457-85.
5. Standard Test Method for Determining the Unreacted Monomer Content of Latexes Using Capillary Column Gas Chromatography. ASTM Designation D4827-93.

6. Standard Test Method for Determining Unreacted Monomer Content of Latexes Using Gas-Liquid Chromatography. ASTM Designation D 4747-87.
7. Method 301 - "Field Validation of Pollutant Measurement Methods from Various Waste Media," 40 CFR 63, Appendix A.
8. "Reagent Chemicals, American Chemical Society Specifications," American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see "Reagent Chemicals and Standards" by Joseph Rosin, D. Van Nostrand Co., Inc., New York, NY and the "United States Pharmacopeia."

18. Tables, Diagrams, Flowcharts, and Validation Data

Sample Container Label

Agency: _____	Inspector: _____
Sample ID#: _____	Date/Time: _____
Source ID: _____	
Coating Name/Type: _____	
Plant Witness: _____	
Type Analysis Required: _____	
Special Handling: _____	

STOCK REFERENCE STANDARD

Name of Reference Material: _____

Supplier Name: _____

Lot Number: _____

Purity: _____

Name of Solvent Material: Dimethylformamide _____

Supplier Name: _____

Lot Number: _____

Purity: _____

Date Prepared: _____ Prepared By: _____

Notebook/page no.: _____

Preparation Information

1. Weight Empty Flask: _____,g

2. Weight Plus DMF: _____,g

3. Weight Plus Reference Material: _____,g

4. Weight After Made to Volume: _____,g

5. Weight DMF (lines 2-1+3-4): _____,g

6. Weight Ref. Material (lines 3-2): _____,g

7. Corrected Weight of Reference

Material (line 6 times purity) _____,g

8. Fraction Reference Material in

Standard (Line 7 ÷ Line 5): _____,g/g

soln

9. Total Volume of Standard Solution: _____,ml

10. Weight Reference Material per ml

of Solution (Line 7 ÷ Line 9): _____,g/ml

Laboratory ID No. for this Standard: _____

Expiration Date for this Standard: _____



APPENDIX H - Sources of Help

PUBLICATIONS

A Guide to the Wood Furniture CTG and NESHAP. US EPA. Contact EPA's Control Technology Center Hotline (919/541-0800) to get information on your state's small business and air program contacts (where copies are available) or to order single copies of this guidebook.

Pollution Prevention Options in Wood Furniture Manufacturing, A Bibliographic Report, U.S. EPA, Office of Pollution Prevention and Toxics, February 1992. (EPA/560/8-92/001C)

Sector Notebook Project, Profile of the Wood Furniture and Fixtures Industry, US EPA, Office of Compliance, September 1995. (EPA/310-R-95-003)

Internet accessible - <http://es.inel.gov/comply/sector/index.html#wood>

Pollution Prevention Options in Wood furniture Manufacturing, a Bibliographic Report. US EPA. EPA/560/8-92/001C.

TRADE ASSOCIATIONS

American Furniture Manufacturing Association (AFMA)

P. O. Box HP-7
High Point, NC 27261
phone: 910-884-5000
fax: 910-884-5303

Business and Institutional Furniture Manufacturing Association (BIFMA)

2680 Horizon Drive S. E., Suite A-1
Grand Rapids, MI 49546
phone: 616-285-3963
fax: 616-285-3765

Futon Association International (FAI)

P. O. Box 6548
Chico, CA 95927-6548
phone: 916-534-7833
800-327-3262
fax: 916-534-7875

Grands Rapids Area Furniture Manufacturers Association (GRAFMA)

4362 Cascade Road, S.E., Suite 113
Grand Rapids, MI 49506
phone: 616-942-6225
fax: 616-942-1730

International Home Furnishings Marketing Association (IHFMA)

P. O. Box 5687
High Point, NC 27262
phone: 910-889-0203
fax: 910-889-7460

International Wholesale Furniture Association (IWFA)

P. O. Box 2482
164 S. Main Street, Suite 404
High Point, NC 27261
phone: 910-884-1566

Kitchen Cabinet Manufacturing Association

1899 Preston White Drive
Reston, VA 22091-1690
phone: 703-264-1690

National Paint and Coatings Association

1500 Rhode Island Avenue, NW
Washington, DC 20005
phone: 202-462-6272

LOANS AND OTHER ASSISTANCE

Small Business Administration*
800-827-5722

* Offices are located in every state.

REGULATORY ASSISTANCE

US EPA Small Business Ombudsman*
800-368-5888

* Offices are located in every state.

ENVIRONMENTAL MANAGEMENT SOFTWARE

Many firms offer software suitable for managing data and computations required by air pollution regulation, and in most cases their products can accommodate requirements of this NESHAP. A few firms customize their software to deal with a specific regulation's requirements. The products listed below represent those known to deal specifically with wood furniture manufacturing materials.

RegMet	ERA Environmental Consultants	919- 493-6409
ENVIROCOMP™	AKZO Nobel Coatings	910-841-5111
I-steps	Pacific Environmental Services	919-941-0333

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EPA Assistance Agreement T 902878-01-0

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