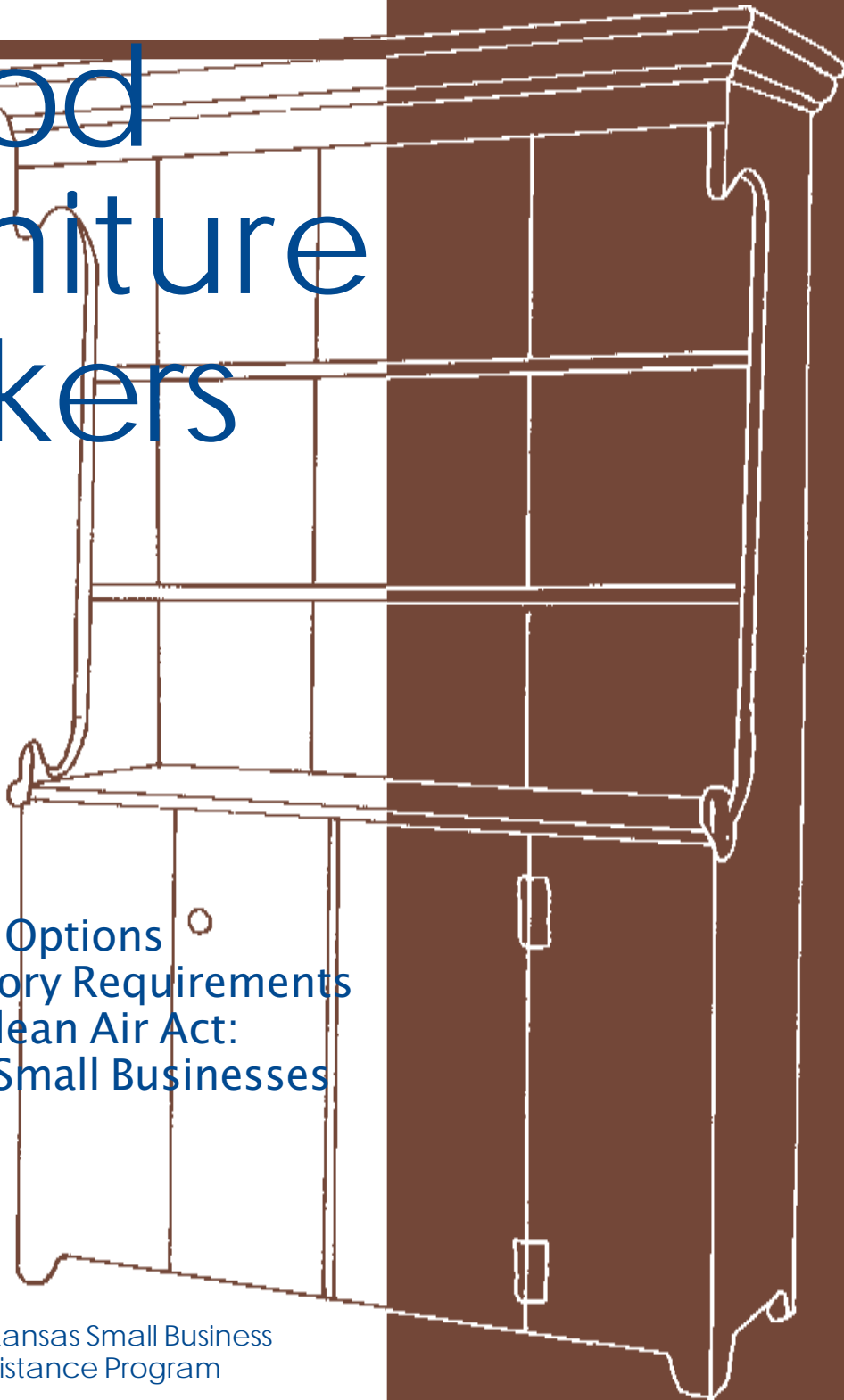
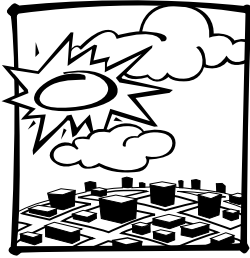


Wood Furniture Makers

Compliance Options
and Regulatory Requirements
under the Clean Air Act:
A Guide for Small Businesses

Prepared by the Kansas Small Business
Environmental Assistance Program





What Is SBEAP?

The Clean Air Act Amendments of 1990 affect many small businesses that previously were unregulated. As a result, Congress mandated that every state provide free nonregulatory technical assistance to its small businesses. In Kansas, this assistance is provided by the Small Business Environmental Assistance Program (SBEAP). All SBEAP services are completely confidential, nonregulatory, and free.

SBEAP provides guidance in compliance and technical matters to businesses that otherwise would not have access to such help because of financial constraints. SBEAP emphasizes assistance designed to diminish the burden of compliance. Its staff can introduce you to pollution prevention practices such as changes in product design, substitu-

tion of materials, process optimization, waste minimization, and recycling.

SBEAP operates independently of the Kansas Department of Health and Environment (KDHE), but coordinates with the agency to ensure that SBEAP's interpretation of Kansas air quality regulations is consistent with KDHE's intent.

The consortium operating SBEAP is composed of the University of Kansas' Center for Environmental Education and Training (CEET), Kansas State University's Pollution Prevention Institute (PPI), and Wichita State University's Center for Technology Application (CTA).

Acknowledgments

This pamphlet was written by Julie Peters and edited by Felice Stadler. Jean Waters, Tim Piero, and Dennis Murphey made significant contributions. Special thanks to David Tweedie for reviewing the pamphlet.

This pamphlet was prepared by the Kansas Small Business Environmental Assistance Program. SBEAP is funded through a contract with the Kansas Department of Health and Environment.

Contents

Introduction	4
Overview	4
Who is Affected?	4
Who is Exempt?	4
Where to Turn	5
Compliance Options	6
Compliance and Monitoring Procedures	6
Work Practice Standards	11
Housekeeping Requirements	11
Conventional Air Spray Gun Use	11
Inspection and Maintenance Plan	12
Operator Training Program	12
Solvent Accounting System	12
Formulation Assessment Plan	12
Recordkeeping Requirements	14
Reporting Requirements	15
Definitions for Major and Area HAP Sources	15
State Permit Requirements	18
Preventing Pollution in Your Wood Shop	20
Improving Operation and Maintenance	20
Managing Inventory	21
Substituting Materials	22
Modifying the Production Process	23
Recovering, Recycling, and Reusing Materials	24
Definitions	25
Appendix One: Volatile Hazardous Air Pollutants	28
Appendix Two: Pollutants Excluded from Use in Cleaning and Washoff Solvents	31
Resources	33
Where to Find Help	34

Introduction

Overview

Kansas businesses that manufacture wood products face new clean air regulations. A U.S. Environmental Protection Agency (EPA) standard—the National Emissions Standard for Hazardous Air Pollutants (NESHAP)—is part of a national effort to curb chemical emissions threatening human health and the environment.

The standard requires the application of maximum achievable control technology (MACT) to meet emission limits; for this reason, the NESHAP commonly is referred to as a MACT standard.

This pamphlet provides an overview of your compliance requirements. A list of definitions for terms used begins on page 25. Note that not all aspects of the standard (such as test methods) are included. If you would like more information or assistance about your compliance requirements, contact the Kansas Small Business Environmental Assistance Program at 800-578-8898.

Who is Affected?

The new MACT standard sets emission limits and specifies work practices that minimize emissions from the storage, transfer, and application of coatings and solvents. Your business must comply with the standard if you manufacture any of the wood products listed below and have the potential to emit 10 tons of a single hazardous air pollutant (HAP) or 25 tons of a combination of HAPs annually. Standard Industrial Classification (SIC) codes



are in parentheses:


-  wood kitchen cabinets (2434)
-  wood household furniture—nonupholstered (2511)
-  wood household furniture—upholstered (2512)
-  wood television, radio, phonograph, and sewing cabinets (2517)
-  household furniture not elsewhere classified (2519)
-  wood office furniture (2521)
-  public building and related furniture (2531)
-  wood office fixtures, partitions, shelving, and lockers (2541)
-  furniture and fixtures not elsewhere classified (2599)
-  furniture stores (5712)

Material Safety Data Sheets (MSDS) provide information on the chemical content and concentration of solvent in your materials. The standard applies to all finishing materials (such as stains, sealers, enamels, and thinners), adhesives, and strippable spray booth coatings.

Who is Exempt?

The rule does not apply to businesses that:

-  use less than or equal to 250 gal/month of coating, gluing, cleaning, and washoff materials; or
-  use less than or equal to 3,000 gal/rolling 12-month period of these same materials; or

 use materials containing no more than five tons of one HAP or 12.5 tons of a combination of HAPs per rolling 12-month period, and where these materials account for at least 90 percent of the facility's HAP emissions associated with wood furniture manufacturing.

Businesses must keep records on site to demonstrate that they are meeting the usage and emission criteria.

Also exempt are incidental wood manufacturers who use less than 100 gal/ month of finishing materials or adhesives in the manufacture of wood furniture or wood furniture components.

You are considered an incidental manufacturer if you are a major source that manufactures products other than wood furniture or wood furniture components (for example, an aircraft manufacturer who has a wood shop). However, these facilities will have to maintain purchase or usage records for coatings and adhesives to demonstrate that they are incidental wood furniture manufacturers.

Where to Turn

For general information, fact sheets, *Kansas AIRLines* newsletter, or other SBEAP publications:
SBEAP Resource Center at KU
913-864-3968

For assistance with audits, technical information, or permits:
SBEAP Technical Assistance at KSU
800-578-8898

If you have a complaint, a question, or are unsure of whom to call:
Office of the Public Advocate
800-357-6087
(in Topeka, 296-0669)

Compliance Options

If you produce wood furniture and are affected by this rule, you must comply with emission limits set for each step in the wood furniture manufacturing process. The rule sets emission limits for volatile hazardous air pollutants (VHAPs). See Appendix One for a list of VHAPs. Many ways are available to comply with the finishing and gluing limits. However, you must use compliant spray booth materials in the cleaning process. Table 1 summarizes emission limits and lists the compliance options for finishing and gluing. Monitoring, recordkeeping, and reporting responsibilities vary, depending on the compliance method chosen.

Compliance and Monitoring Procedures

After reviewing options and emission limits, your business must choose a compliance approach. As with many EPA rules, your monitoring responsibilities are considerably fewer if you choose a compliance option that does not require the use of control equipment. For instance, using compliant coatings substantially minimizes your monitoring and recordkeeping requirements. Monitoring requirements for each compliance option are outlined below, as well as procedures for demonstrating initial and ongoing compliance.

Finishing

Compliance Option A.

Weighted average

Record the VHAP and solids content for each finishing material used in your facility. Look on your certified product data sheet (CPDS).

Using the first month's usage data, calculate the average lb VHAP/lb solids for all finishing materials, as applied, using the following equation:

$$E = \frac{(M_1C_1+S_1W_1)+(M_2C_2+S_2W_2)+(\dots)+(M_NC_N+S_NW_N)}{M_1 + M_2 + \dots + M_N}$$

Where:

E = Emission limit (lb VHAP/lb solids)

M = lb solids/month (for each finishing material)

C = lb VHAP/lb solids (for each finishing material)

S = lb VHAP/lb solvent (for each solvent added)

W = lb solvent/month (added to finishing material)

[Note that M_1 is one material used, M_2 is another material, etc., through M_N for however many different materials used.]

Table 1—Emission Limits

Emission Point	Existing Source (lb VHAP/lb solids as applied)*	New Source (lb VHAP/lb solids as applied)
Finishing Operations:		
Compliance Option A. Weighted Average	1.0	0.8
Compliance Option B. Compliant Coatings		
Stains	1.0	1.0
Washcoats	1.0 ^a	0.8 ^a
Sealers	1.0	0.8
Topcoats	1.0	0.8
Basecoats	1.0 ^a	0.8 ^a
Enamels	1.0 ^a	0.8 ^a
Thinners (maximum percent HAP)	10 percent	10 percent
Compliance Option C. Control Device	1.0 ^b	0.8 ^b
Compliance Option D. Combination of A, B, and C	1.0	0.8
All Cleaning Operations: (lb VOC/lb solids)**		
Strippable Spray Booth Material	0.8	0.8
Gluing Operations:		
Compliance Option A. Weighted Average Method not available. Choose Option B or Option C.		
Compliance Option B. Compliant Contact Adhesives		
Aerosol adhesives and contact adhesives applied to nonporous substrates	No Limit ^c	No Limit ^c
Foam adhesives subject to flame test	1.8	0.2
All other contact adhesives	1.0	0.2
Compliance Option C. Control Device	1.0 ^d	0.2 ^d

* lb VHAP/lb solids means pound of volatile organic HAP per pound of solids as applied.

** lb VOC/lb solids means pound of volatile organic compounds per pound of solids as applied.

- a. If washcoats, basecoats, and enamels are purchased premade, they may not contain more than 1 lb VHAP/lb of solids; thinners may not contain more than 10 percent HAP by weight. If they are formulated on site, they must be formulated using compliant finishing materials (those that meet the limits specified in this table) and thinners containing no more than 3 percent HAP by weight.
- b. The control device must operate at a sufficient efficiency so that no more than 1 pound (for existing sources) or 0.8 pound (for new sources) of VHAP is being emitted per pound of solids used.
- c. There is no limit on the VHAP content of these adhesives.
- d. The control device must operate at a sufficient efficiency so that no more than 1 pound (for existing sources) or 0.2 pound (for new sources) of VHAP is being emitted per pound of solids used.

Continuous coaters using Option B may choose between two methods for demonstrating initial and ongoing compliance:

Continuous Coaters—Method One

To demonstrate initial compliance, submit an initial compliance status report stating that you are using compliant coatings and compliant thinners.

To demonstrate ongoing compliance, submit a signed compliance certification stating that you used compliant coatings and thinners during the entire reporting period. If you used noncompliant coatings, identify the days on which you used them and explain why you used them.

You are out of compliance if you use a noncompliant coating.

Continuous Coaters—Method Two

To demonstrate initial compliance, submit an initial compliance status report stating that you

are using compliant coatings, showing that viscosity is an appropriate operating parameter, monitoring the viscosity of the coating in the reservoir, and using compliant thinners.

To demonstrate ongoing compliance, submit a compliance certification stating that you used compliant coatings and thinners each day and that the viscosity of the coating in the reservoir was not less than the viscosity of the initial coating. The initial coating is the coating initially mixed and placed in the reservoir for any day in the reporting period. Continuously monitor the viscosity, or measure the initial viscosity and measure each time after adding solvent. Maintain records of solvent additions.

You are out of compliance if the coating's viscosity in the reservoir is less than the viscosity of the initial coating or the coatings exceed the limits listed in Table 1.

Table 2—Control Devices

Control Device	Operating Parameters
Thermal Incinerator	Minimum combustion temperature.
Catalytic Incinerator Fixed catalyst bed	Minimum gas temperature up and downstream from bed.
Fluidized catalyst bed	Minimum gas temperature upstream from bed plus pressure drop across catalyst bed.
Carbon Adsorber	Total regeneration mass stream flow and carbon bed temperature after each regeneration, or the concentration level of organic compounds exiting the adsorber.
Other	Establish your own (see text).

Compliance Option C. Control device

Identify and submit operating parameters that will be monitored to demonstrate compliance with the emission limits. See Table 2 for example operating parameters.

Conduct a performance test and calculate the overall control efficiency to show that you meet the emission limits listed in Table 1. For more information on performance testing, contact SBEAP.

Demonstrate ongoing compliance by continuously measuring and recording the values of site-specific operating parameters, which you establish during the initial performance test. If you exceed the emission limits, submit an excess emission report and a summary report.

If you use a control device not listed in Table 2, submit a description of the equipment with test data verifying its performance capabilities, as well as operating parameters that will be monitored to demonstrate ongoing compliance.

Compliance Option D. Combination of Options A, B, and C

If you choose this option, you are required to follow all applicable requirements listed under each separate compliance option.

Cleaning

All cleaning operations

Use strippable spray booth coatings with no more than 0.8 lb VOC/lb solids (see Table 1). Maintain copies of CPDS for each strippable spray booth material used.

Submit an initial compliance status report

stating that you are using compliant strippable spray booth coatings.

To demonstrate ongoing compliance, submit a signed compliance certification stating that you used compliant coatings during the entire reporting period.

Gluing

Compliance Option A. Weighted average

You cannot use this method for contact adhesives. Use Option B or Option C.

Compliance Option B. Compliant materials

Use compliant materials that will meet the VHAP content for contact adhesives listed in Table 1.

To demonstrate initial compliance, submit an initial compliance status report stating that you are using compliant contact adhesives.

To demonstrate ongoing compliance, submit a signed compliance certification stating that you used compliant contact adhesives during the entire reporting period.

You are out of compliance if the VHAP content of your contact adhesives exceeds the limits listed in Table 1.

Compliance Option C. Control device

Meet all requirements listed under compliance Option C for Finishing.

Work Practice Standards

In addition to meeting emission limits, you must comply with work practice standards at each step in the wood furniture manufacturing process. Your business is responsible for writing a Work Practice Implementation Plan to ensure compliance with the work practice requirements. This plan must be kept on site and must include documentation on conventional air spray gun usage, an inspection and maintenance plan, an operator training program, a solvent accounting system, and a formulation assessment plan. In addition, the MACT standard outlines specific housekeeping requirements for line cleaning, gun cleaning, and washoff operations. You have to maintain records such as logs to demonstrate your adherence to these requirements. The housekeeping requirements are presented in the form of a checklist. Other elements of the Work Practice Implementation Plan are detailed after the checklist.

Housekeeping Requirements

- Close all storage containers when they are not being used.
- Collect solvent from gun cleaning and line flushing in a closed container.
- Use a closed washoff tank.
- Minimize dripping. Tilt the part and rotate it to drain as much solvent as possible.
- Use appropriate washoff and cleaning materials. (See Appendix Two for a list of prohibited solvents.)

- Use appropriate spray booth cleaners. You may not use cleaners that contain more than 8 percent VOC by weight—except for cleaning conveyors, continuous coaters, or metal filters—unless the booth is being refurbished. In that case, you may not use more than one gallon of organic solvent per booth.

Conventional Air Spray Gun Use

The MACT standard restricts the use of conventional air spray guns; however, they may be used in a few instances. If you use conventional air spray guns, you must keep records showing the total amount of finishing materials used and the percentage of coatings applied with these guns. You may use conventional air spray guns when:

- ✍ they are used in conjunction with coatings that emit less than 1 lb VHAP/lb of solids used;
- ✍ they are used under limited conditions for touchup and repair;
- ✍ spray is automated;
- ✍ add-on controls are employed;
- ✍ the cumulative application is less than 5 percent of the total gallons of coatings applied; or
- ✍ the permitting agency determines that it is economically or technically unfeasible to use other application technologies.

Inspection and Maintenance Plan

At a minimum, do a monthly leak inspection of all equipment used to transfer or apply finishing materials, adhesives, or solvents.

Record the date and results of each leak inspection and any repairs made.

Initial repairs should be made within five days and final repairs should be made within 15 days. If new equipment is required to replace leaking equipment, it must be installed within three months.

Operator Training Program

Train all current employees within six months of the compliance date and conduct annual refresher training. New employees must be trained upon hire.

Maintain a list by name and job description of all current personnel who require training.

Maintain a list of subjects and lesson plans to be covered at the initial and annual refresher training courses. Topics must include application techniques, appropriate cleaning and washoff procedures, appropriate equipment setup, and appropriate management of cleaning wastes.

Document successful completion of each training session; there is no single prescribed method for documenting training.

Solvent Accounting System

Record monthly the quantity and type of solvent used for washoff and cleaning.

Record monthly the number of pieces washed and reasons why washing is required.

Record monthly the quantity of spent material generated from each washoff and cleaning operation.

Indicate whether materials are recycled on site, disposed off site, or both.

Formulation Assessment Plan

Identify any VHAPs from Table 3 that your facility uses in finishing operations.

Establish a baseline level for each VHAP listed in Table 3; this level will be the highest annual usage from 1994, 1995, or 1996.

Track annual usage of each VHAP.

If after November 1998 annual usage of a VHAP exceeds its baseline level, write to the Kansas Department of Health and Environment (KDHE) describing the increase and explaining the reason for the increase. Several conditions are outlined in the rule that will relieve you from further action unless you are out of compliance with any other VHAP regulation.

If you use a chemical after November 1998 for which you have not established a baseline level, you are required to keep your VHAP usage below the EPA-established de minimus levels listed in Table 3.

Table 3—VHAPs of Potential Concern

Chemical Name	CAS No.*	De Minimus Levels (tons/yr)
Dimethyl Formamide	68122	1.0
Formaldehyde	50000	0.2
Methylene Chloride	75092	4.0
2-Nitropropane	79469	1.0
Isophorone	78591	0.7
Styrene Monomer	1000425	1.0
Phenol	108952	0.1
Diethanolamine	11422	5.0
2-Methoxyethanol	109864	10.0
2-Ethoxyethyl Acetate	111159	5.0

*Chemical Abstract Services number.

Recordkeeping Requirements

Your recordkeeping responsibilities are outlined in Table 4. You must keep all records for five years. Documentation required to

demonstrate initial and ongoing compliance is outlined under “Compliance Options” beginning on page 6.

Table 4—Recordkeeping Requirements

Compliance Option	Recordkeeping
All Owners	<ol style="list-style-type: none"> For each finishing material, thinner, and contact adhesive, keep copies of CPDS and document content of VHAPs in lb VHAP/lb solids, as applied. For each strippable spray booth coating, keep CPDS and document content of VOCs in lb VOC/lb solids, as applied. Information submitted with initial compliance status report and semiannual reports.
Finishing Operations Option A. Weighted Average Option B. Compliant Coatings (2, 3, and 4 only apply to continuous coaters) Option C. Control Device Option D. Combination	<ol style="list-style-type: none"> Copy of monthly averaging calculation. Data on coatings and thinners used to perform calculation. <ol style="list-style-type: none"> Copy of semiannual compliance certification. Solvent and coating additions to the continuous coater reservoir. Viscosity measurements. Data showing that viscosity is an appropriate operating parameter for demonstrating compliance. <ol style="list-style-type: none"> Calculations showing that the control efficiency meets limits shown in Table 1. Operating parameter values. Semiannual compliance reports. Requirements from A, B, and C.
Cleaning Operations Requirement	Copy of semiannual compliance certification.
Gluing Operations Option A. Weighted Average Option B. Compliant Coatings Option C. Control Device	Option not available. Choose Option B or Option C. Copy of semiannual compliance certification. <ol style="list-style-type: none"> Calculations showing that the overall control efficiency meets limits listed in Table 1. Operating parameter values. Semiannual compliance reports
Work Practice Standards Requirement	Records associated with fulfilling Work Practice Implementation Plan, including: <ol style="list-style-type: none"> Housekeeping Logs Conventional Air Spray Gun Usage Logs Inspection and Maintenance Plan Operator Training Program Solvent Accounting System Formulation Assessment Plan

Reporting Requirements

If you are affected by this MACT standard, you must comply with the following reporting requirements. These requirements are somewhat minimized if you use compliant materials to meet emission limits. Table 5 lists compliance dates and Table 6 summarizes the requirements of the Clean Air Act General Provisions. Table 7 outlines requirements specific to the wood furniture rule, while Table 8 outlines the requirements of the initial notification report.

The MACT standard applies to major wood furniture manufacturing sources. Area sources are exempt from the standard.

ally. See “State Permit Requirements,” page 18, for discussion on “potential-to-emit.” Note that there are two different compliance dates for major sources (see Table 5).

Area Source

Under this MACT standard, an area source is one that uses less than or equal to 250 gal/month, or 3,000 gal/rolling 12-month period of coating, gluing, cleaning, and washoff materials, provided that these materials account for at least 90 percent of the source’s annual HAP emissions from wood furniture manufacturing operations.

Definitions for Major and Area HAP Sources

Major Source

Under this MACT standard, a major source is one that emits or has the potential to emit 10 tons of a single hazardous air pollutant (HAP) or 25 tons of a combination of HAPs annu-

Table 5—Compliance Dates

Source Type	Compliance Date
Major Existing Sources*	
emitting less than 50 tons of HAP in 1996	12/07/98
emitting 50 tons or more of HAP in 1996	11/21/97
Area sources (existing) that become major	One year after change in status
Area sources (new) that become major	Immediately after change in status
New major sources**	12/07/95 or upon startup

* Existing Source—A source in operation before December 7, 1995.

** New Source—A source constructed or reconstructed after December 7, 1995.

Table 6—Requirements of General Provisions

Requirement	Due Date
Existing Sources: Submit Initial Notification Report (see Table 8)	September 7, 1996
New Sources: Notification of anticipated startup Notification of actual startup Notification of compliance status	30–60 days prior to startup 15 days after startup 60 days after demonstrating compliance (compliance must be demonstrated upon startup)
Sources using control devices: Operation and Maintenance Plans (includes startup, shutdown, and malfunction plans) Notification of performance test Completion of performance test Site-specific test plan Report of performance test results Startup, shutdown, and malfunction reports Excess emissions and summary report*	By the compliance date (see Table 5) 60 days prior to test 180 days after compliance date 60 days prior to test 60 days after test Semiannually Semiannually

* If your facility has excess emissions, quarterly reporting is required for at least one year after the exceedance and until a written request to reduce reporting frequency is approved.

Send original reports to:

Harish Agarwal
Chief, Air Compliance and Planning
Bureau of Air and Radiation
KDHE
Building 283, Forbes Field
Topeka, KS 66620-0001

Send copies to:

William A. Spratlin
Director of Air, RCRA, and Toxics
U.S. EPA, Region 7
726 Minnesota Avenue
Kansas City, KS 66101

Table 7—Specific Requirements

Requirements for All Sources	Due Date
<p>Initial Compliance Status Report:</p> <ul style="list-style-type: none"> • Calculations to demonstrate compliance with emission limits • Work practice implementation plan (see Table 4 for components of plan) • Performance test results (control device users only) 	<p>Sources not using a control device: 60 days after compliance date (see Table 5).</p> <p>Sources using a control device: 60 days after performance test results.</p>
<p>Continued Compliance Status Report:</p> <ul style="list-style-type: none"> • Calculations (if using averaging approach) • Compliance certification (if using compliant coatings, contact adhesives, and strippable spray booth materials) • Certification that work practice standards are being followed • Quantity of cleaning and washoff solvent that is used monthly when out of compliance, and a description of methods used to come into compliance 	<p>Semiannually, with first report due 30 days after first six-month period; subsequent reports due 30 days after each six-month period.</p>

Table 8—Initial Notification Report

Contents—Requirements for All Sources	Due Date
<p>Name and address of owner or operator</p> <p>Address of wood furniture manufacturing facility</p> <p>Compliance date (see Table 5)</p> <p>Brief description of facility and identification of air emissions sources</p> <p>Declaration of major or area source status</p>	<p>September 7, 1996</p>

State Permit Requirements

If you are a major source of hazardous air pollutants, you are required to get a Class I air operating permit from the Kansas Department of Health and Environment (KDHE). A major source emits or has the *potential to emit* 10 tons of a single HAP or 25 tons of a combination of HAPs. Potential-to-emit means maximum amount of air pollution your facility could possibly emit if it operated at 100 percent of design capacity; all equipment was operated 24 hours per day, 365 days per year; and no pollution control equipment was being used. Therefore, while your actual emissions may fall below the major source thresholds for HAPs, your potential emissions could classify you as a major source.

If your *actual* emissions are above the major source thresholds, you have to get a Class I permit. However, if your actual emissions are below these thresholds, but your potential emissions are above, you may be able to apply for a Class II permit. Class II permit applications are relatively simple, and they provide an opportunity for you to avoid the rigor, complexity, and expense of a Class I permit application.

The Class II permit puts a federally enforceable limit on your facility's potential-to-emit (PtE). This means that the limits are practicable (possible and workable) and provable (requiring some recordkeeping and reporting). Examples of this include:

- ✍ limiting operating hours (operating less than 8,760 hours per year);
- ✍ limiting production rates (producing a specific quantity);
- ✍ limiting material usage (restricting purchasing to a specific quantity); and
- ✍ limiting material content (using materials with a specific HAP content).

Under the Class II permit program, KDHE has developed a simplified process called the “permit-by-rule.” This allows certain industries to limit their potential emissions through some operational restrictions and recordkeeping. The permit-by-rule is an option for solvent evaporative sources, such as wood furniture manufacturers.

Table 9 illustrates the available permit options, depending on your actual and potential air emissions. If you determine that you need to apply for a permit, whether it be Class I or Class II, contact KDHE. If you need help calculating your air emissions to determine which permit may apply to you, contact SBEAP.

Table 9—Kansas Air Permits

Source Type	Class I Permit	Class II Permit
Major Source (actual emissions > major source levels)*	✓	N/A
Major Source (potential emissions > major source levels, actual emissions < major source levels)	✓ (or limit PtE)	✓
Area Source (potential and actual emissions < major source levels)	N/A	N/A

* > means greater than, < means less than.

Preventing Pollution in Your Wood Shop

Pollution prevention techniques can help you reduce emissions and save money while helping you comply with the MACT standard.

Generally speaking, one single technique or technology will not be adequate to achieve the level of performance required by the Clean Air Act. A combination of approaches is generally the best way to meet your requirements. The following section provides ideas for implementing pollution prevention practices in your facility. These practices can help reduce air emissions, hazardous waste generation, and worker exposure to toxic materials. Applicable pollution prevention techniques include:

- ✎ improving operation and maintenance procedures;
- ✎ managing inventory;
- ✎ substituting materials;
- ✎ modifying production processes; and
- ✎ recovering, recycling, and reusing materials.

Improving Operation and Maintenance

Equipment Setup

Simple modifications in your equipment setup often can result in more efficient use of raw materials. Make improvements to your operation and maintenance procedures that reduce

emissions and waste, and result in cost savings.

- ✎ When using spray guns, look for an ideal air and fluid pressure. It should be high enough to provide good atomization. Overspray, blowback, and worker exposure should be minimized.
- ✎ Position larger pieces behind smaller ones to catch overspray.
- ✎ Adjust spray patterns to fit the size of pieces you are spraying.
- ✎ Minimize cleanup solvent waste by dedicating guns for certain materials or scheduling jobs in batches.

Operator Training

You can train your employees to improve product quality and use materials more efficiently in several areas. Some operators produce high-quality finishes but are poorly trained in reducing material use. Differences caused by the painter's skill level with a single gun type often are greater than differences between gun types. A skilled operator will adjust for the type of coating being applied, atmosphere conditions, the size and shape of the object being coated, and the spray equipment being used. Proper coating techniques should be reinforced with periodic training.

Throughout all training, emphasize the benefits of waste reduction and energy conservation. Discuss the safety and health hazards associated with the equipment and material uses, and how employees can protect themselves and prevent accidents.

Spray Guns

- ✍ Position the spray gun 8 to 12 inches from workpiece.
- ✍ Use a perpendicular, sweeping arm motion when applying coating.
- ✍ Trigger the spray gun at the beginning and end of each pass.
- ✍ Overlap strokes by 50 percent.

Equipment Cleaning

- ✍ Determine whether cleaning is really necessary—you may find that it is not.
- ✍ Minimize the number of times you clean your equipment. Apply light-colored finishing materials first, then progressively use darker coatings whenever possible.
- ✍ Flush equipment first with dirty solvent before final cleaning with virgin solvent, or preclean items with rags before cleaning with solvents.
- ✍ Use enclosed gun cleaners.
- ✍ Use solvents until they lose their effectiveness, as opposed to when they look dirty.
- ✍ Use rubber wipers instead of rags to remove coatings from tank walls.

Too much inventory or lack of inventory control can lead to wasted materials, either through using more than needed or purchasing material that deteriorates before use. Managing inventory can reduce costs for unneeded materials, reduce waste disposal costs, increase floor space, and reduce risks associated with storing hazardous materials.

- ✍ Inspect materials upon delivery. Immediately return unacceptable materials. Date materials and use a first-in, first-out policy to ensure that older materials are used up before new ones are opened.
- ✍ Work closely with suppliers to provide just-in-time material delivery. Order accurate amounts needed for the job.
- ✍ Reduce the number of solvents used by finding one multipurpose solvent that can serve a variety of purposes. This can reduce the cost of managing waste and facilitate recycling.
- ✍ Return unused materials to your supplier (make arrangements up front, before purchase). Explore the possibility of returning materials with expired shelf life to your supplier, sell them to another shop, or trade them for another shop's unused materials.

Managing Inventory

Substituting Materials

The wood furniture MACT standard allows for the use of low VHAP coatings and cleaning solutions. Work closely with suppliers to identify substitutes for raw materials containing solvents.

High Solids Coatings

High solids coatings are solvent-borne coatings that are at least 50 percent solids in content.

- ✍ **Benefits**—Reduces VOC and HAP emissions, reduces solvent usage, reduces fire hazard, reduces number of spray applications required.
- ✍ **Drawbacks**—May need to use higher cure temperatures, coatings are sensitive to temperature and humidity, tacky overspray may be difficult to clean.

Waterborne Coatings

Waterborne coatings contain water as well as some solvent. They are used in the industry on open-pore and lighter-colored woods.

- ✍ **Benefits**—Reduces VOC and HAP emissions, allows use of conventional spray application processes, reduces hazards and odors associated with solvent-borne coatings, reduces fire hazard, and reduces hazardous waste generation.

- ✍ **Drawbacks**—Requires longer drying times or higher oven temperatures, costs more than solvent-borne coatings, may require converting coating line, may raise wood grain, and final appearance may not be of same quality as conventional coatings.

UV-Curable Coatings

UV-curable coatings can be 100 percent reactive liquids, and require UV light for curing. They are already being used in the industry.

- ✍ **Benefits**—Reduces VOC and HAP emissions, dries quickly, reduces fire and explosion hazard, increases transfer efficiency.
- ✍ **Drawbacks**—No pigment coatings are currently available, requires significant capital investment, curing is difficult when parts are not flat.

Alternative Cleaners

Additional opportunities exist for reducing waste from the use of cleaning solutions. Alternative cleaning solutions are available that contain small quantities of solvent. One alternative being used in the industry is n-methyl pyrrolidone, a water-soluble, biodegradable solvent that generates fewer emissions, is nonflammable, and can be cleaned using soap and water.

Modifying the Production Process

A more technical pollution prevention activity is modifying your production process. This includes substituting or modifying equipment, increasing automation, or redesigning or reformulating your end product. Begin making modifications in the equipment used to apply coatings to your wood surfaces.

Invest in equipment that increases transfer efficiency. A few options are available, all of which have been shown to reduce VOC and HAP emissions, raw material use, and waste from overspray. The following spray systems are alternatives to conventional air spray guns.

High Volume/Low Pressure (HVLP) Spray Equipment

HVLP spray guns operate at low pressure, such as 10 lb/square inch (psi), compared to 30–90 psi with conventional spray guns. HVLP spray guns are effective for both solvent- and water-borne materials and increase transfer efficiency up to 40–70 percent.

Airless Spray Equipment

Airless spray systems atomize the coating by increasing the coating's fluid pressure (ranges from 500–6,500 psi) without introducing a pressurized air flow. Transfer efficiency ranges from 35–65 percent.

Case Study

Thomson Crown Wood Products Conversion to HVLP Spray Equipment

Thomson Crown manufactures wood and wood-finished television cabinets. Cabinet parts were coated using air-assisted airless spray guns (high air pressure up to 55 psi), causing poor transfer efficiency and generating large amounts of VOC emissions. The company purchased HVLP spray guns to replace existing guns.

Cost—\$21,350

Waste reduction—13,300 gal/year

Savings—\$137,448

Payback period—Less than one year

Air-Assisted Airless Spray Equipment

These systems combine compressed air atomization with airless atomization. About 85 percent of the coating is atomized by fluid pressure (150–800 psi), and 15 percent is atomized by air pressure (5–30 psi) supplied at the nozzle. Transfer efficiency can range from 40–70 percent.

Case Study

Solvent Recovery and Reuse

Ethan Allen Furniture

The company installed a solvent distillation unit to recover solvents and reduce hazardous waste generation. A 7-gallon batch still, which is run twice daily, recovers 5 gallons of reusable solvent for every 7 gallons of cleanup waste.

Cost—\$4,500

Waste reduction—1,900 lb/year

Savings—\$3,200/year

Payback period—Less than two years

- ✍ Recover solvents, preferably on site. This may be a viable option for shops generating large enough volumes of solvent waste to offset the cost of a solvent distillation unit. Keep in mind that solvent sludge may be regulated as hazardous waste. Some recovery equipment (other than solvent distillation units) may be regulated as waste treatment systems, which would require a state permit prior to use. Check with KDHE to determine which recovery systems are regulated.
- ✍ Extend solvent life by filtering solids and using dirty solvent for jobs not requiring virgin solvent (such as rough cleaning).
- ✍ Reuse cleanup solvents or solvent distillation sludge for coating secondary surfaces when appearance is not a factor.
- ✍ If recycling on site is not feasible, work with a contractor who recycles spent solvents and exchanges them for clean solvents.

Recovering, Recycling, and Reusing Materials

Many opportunities exist for you to recycle finishing materials on site. On-site recycling reduces the amount of waste to be treated and disposed of, and reduces costs associated with disposal and compliance requirements. It also reduces the amount of new materials needed, thereby generating additional cost savings.

- ✍ Segregate your waste. Mixing waste can make it difficult to recycle raw materials, increasing your disposal costs.

Definitions

A complete set of definitions applicable to the wood furniture manufacturing MACT standard can be found in the Code of Federal Regulations: 40 CFR part 63.801.

Aerosol adhesive An adhesive dispensed from a pressurized container as a suspension of fine particles in gas.

Affected source 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.

Alternative method Any method of sampling and analyzing for an air pollutant that is not a reference or equivalent method but has been demonstrated to produce results adequate for determining compliance.

Area source Under this MACT standard, a source that uses less than or equal to 250 gal/month, or 3,000 gal/rolling 12-month period of coating, gluing, cleaning, and washoff materials, provided that these materials account for at least 90 percent of the source's annual hazardous air pollutant emissions. Area sources are exempt from this MACT standard.

As applied The HAP and solids content of the coating or contact adhesive that is actually used for coating or gluing the substrate, after any materials have been added in-house for thinning.

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

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

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

Certified Product Data Sheet (CPDS) Documentation furnished by coating or adhesive suppliers or an outside laboratory that provides the HAP content by percent weight of a finishing material, contact adhesive, or solvent.

Coating solids The part of the coating that remains after the coating is dried or cured.

Compliant coating/contact adhesive A finishing material, contact adhesive, or strippable booth coating that meets the emission limits specified in Table 1 of this pamphlet.

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

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

Control device Equipment that reduces the quantity of a pollutant emitted to the air. The device may destroy or secure the pollutant for subsequent recovery.

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

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

Conventional air spray 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 lb/square inch.

De minimus levels Emission levels established by the U.S. EPA for hazardous air pollutants. Emissions below the de minimus levels are not regulated by the Clean Air Act.

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

Equivalent method Any method of sampling and analyzing for an air pollutant that has been demonstrated to have a consistent and quantitatively known relationship to the referenced method.

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

Incidental wood furniture manufacturer 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 gal/month of finishing material or adhesives in the manufacture of wood furniture or wood furniture components. Incidental wood furniture manufacturers are facilities that manufacture small quantities of furniture primarily for on-site use. Sources falling under this definition are exempt from the standard. However, these facilities will have to maintain records of coating and adhesive usage to demonstrate that they are incidental wood furniture manufacturers.

Incinerator An enclosed combustion device that thermally oxidizes volatile organic compounds to carbon monoxide and carbon dioxide and water.

Major source Under this MACT standard, a source that has the potential to emit 10 tons of a single hazardous air pollutant (HAP) or 25 tons of a combination of HAPs annually. Major sources must comply with all provisions of this MACT standard, including obtaining an air operating permit from the state of Kansas. Under the Clean Air Act and the Kansas Air Quality Act, a major source is defined as one that emits or has the potential to emit annually 10 tons of a single HAP; 25 tons of a combination of HAPs; or 100 tons of nitrogen oxides, sulfur oxides, carbon monoxide, or particulate matters smaller than 10 microns.

Material Safety Data Sheet (MSDS) Documentation required for hazardous materials that identifies certain reportable hazardous ingredients, safety and health considerations, and safe handling procedures. These documents are furnished to the user by the supplier or manufacturer.

Noncompliant coating/contact adhesive A finishing material, contact adhesive, or strippable spray booth coating that has a VHAP content (or VOC content for the strippable booth coating) greater than the emission limits listed in Table 1.

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

Operating parameter value 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 operating parameter values, determines that an owner or operator has complied with an applicable emission limit.

Overall control efficiency The efficiency of a control system, expressed as a percentage, calculated by multiplying the capture and control device efficiencies.

Rolling 12-month period The time period that includes the previous 12 months of operation.

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

Strippable spray booth material A coating that: (1) is applied to a spray booth wall to provide a protective film to collect overspray during finishing operations; and (2) reduces or eliminates the need to use organic solvents to clean spray booth walls.

Substrate The surface onto which a coating or contact adhesive is applied.

Washcoat A transparent special-purpose finishing material having a solids content of 12 percent by weight or less.

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

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

Appendix One

Volatile Hazardous Air Pollutants

Chemical Name	CAS No.	Chemical Name	CAS No.
0-Xylene	95476	4-Aminobiphenyl	92671
1,1,2,2-Tetrachloroethane	79345	4-Dimethylaminoazobenzene	60117
1,1,2-Trichloroethane	79005	4-Nitrobiphenyl	92933
1,1-Dimethylhydrazine	57147	4-Nitrophenol	100027
1,2,4-Trichlorobenzene	120821	4,4'-Methylenebis (2-chloroaniline)	101144
1,2-Dibromo-3-chloropropane	96128	4,4'-Methylenedianiline	101779
1,2-Diphenylhydrazine	122667	4,4'-Methylenediphenyl diisocyanate (MDI)	101688
1,2-Epoxybutane	106887	4,6-Dinitro-o-cresol, and salts	75070
1,2-Propylenimine (2-Methyl aziridine)	75558	Acetaldehyde	75070
1,3-Butadiene	106990	Acetamide	60355
1,3-Dichloropropene	542756	Acetonitrile	75058
1,3-Propane sultone	1120714	Acetophenone	98862
1,4-Dichlorobenzene	106467	Acrolein	107028
1,4-Dioxane (1,4-Diethyleneoxide)	123911	Acrylamide	79061
2-Acetylaminofluorine	53963	Acrylic acid	79107
2-Chloroacetophenone	532274	Acrylonitrile	107131
2-Nitropropane	79469	Allyl chloride	107051
2,2,4-Trimethylpentane	540841	Aniline	62533
2,3,7,8-Tetrachlorodibenzo- p-dioxin	1746016	Benzene	71432
2,4-Dinitrophenol	51285	Benzidine	92875
2,4-Dinitrotoluene	121142	Benzotrichloride	98077
2,4-Toluenediamine	95807	Benzyl chloride	100447
2,4,5-Trichlorophenol	95954	beta-Propiolactone	57578
2,4,6-Trichlorophenol	88062	Biphenyl	92524
2,4-D (2,4-Dichlorophenoxy- acetic acid, including salts and esters)	94757	Bis(2-ethylhexyl)phthalate (DEHP)	117817
3,3'-Dichlorobenzidine	91941	Bis(chloromethyl) ether	542881
3,3'-Dimethoxybenzidine	119904	Bromoform	75252
3,3'-Dimethylbenzidine	119937	Caprolactam	105602
		Carbon disulfide	75150
		Carbon tetrachloride	56235

Chemical Name	CAS No.	Chemical Name	CAS No.
Carbonyl sulfide	463581	Hexachloro-1,3-butadiene	87683
Catechol	120809	Hexachlorobenzene	118741
Chloroacetic acid	79118	Hexachloroethane	67721
Chlorobenzene	108907	Hexamethylene-1,6-	
Chloroform	67663	diisocyanate	822060
Chloromethyl methyl ether	107302	Hexamethylphosphoramide	680319
Chloroprene	126998	Hexane	110543
Cresols (isomers and mixture)	1319773	Hydrazine	302012
Cumene	98828	Hydroquinone	123319
DDE (1,1-Dichloro-2,2-bis (p-chlorophenyl) ethylene)	72559	Isophorone	78591
Diazomethane	334883	m-Cresol	108394
Dibenzofuran	132649	m-Xylene	108383
Dibutylphthalate	84742	Maleic anhydride	108316
Dichloroethyl ether		Methanol	67561
(Bis(2-chloroethyl) ether)	111444	Methyl bromide	
Diethanolamine	111422	(Bromomethane)	74839
Diethyl sulfate	64675	Methyl chloride	
Dimethyl phthalate	131113	(Chloromethane)	74873
Dimethyl sulfate	77781	Methyl chloroform	
Dimethylcarbamoyl chloride	79447	(1,1,1-Trichloroethane)	71556
Epichlorohydrin (1-Chloro- 2,3-epoxypropane)	106898	Methyl ethyl ketone	
Ethyl acrylate	140885	(2-Butanone)	78933
Ethyl carbamate (Urethane)	51796	Methyl iodide (Iodomethane)	74884
Ethyl chloride (Chloroethane)	75003	Methyl isobutyl ketone	
Ethylbenzene	100414	(Hexone)	108101
Ethylene dibromide		Methyl isocyanate	624839
(Dibromoethane)	106934	Methyl methacrylate	80626
Ethylene dichloride		Methyl tert-butyl ether	1634044
(1,2-Dichloroethane)	107062	Methylene chloride	
Ethylene glycol	107211	(Dichloromethane)	75092
Ethylene oxide	75218	Methylhydrazine	60344
Ethylenethiourea	96457	N,N-Dimethylaniline	121697
Ethylidene dichloride		N,N-Dimethylformamide	68122
(1,1-Dichloroethane)	75343	N-Nitroso-N-methylurea	684935
Formaldehyde	50000	N-Nitrosodimethylamine	62759
Glycol ethers ^b	0	N-Nitrosomorpholine	59892
		Napthalene	91203
		Nitrobenzene	98953

Chemical Name	CAS No.	Chemical Name	CAS No.
o-Anisidine	90040	Triethylamine	121448
o-Cresol	95487	Trifluralin	1582098
o-Toluidine	95534	Vinyl acetate	108054
p-Cresol	106445	Vinyl bromide	593602
p-Phenylenediamine	106503	Vinyl chloride	75014
p-Xylene	106423	Vinylidene chloride (1,1-Dichloroethylene)	75354
Phenol	108952	Xylenes (isomers and mixture)	1330207
Phosgene	75445		
Phthalic anhydride	85449		
Polychlorinated biphenyls (Aroclors)	1336363	^a Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100 degrees Celsius	
Polycyclic Organic Matter ^a	0		
Propionaldehyde	123386	^b Includes mono- and di- ethers of ethylene glycols and triethylene glycol; R-(OCH ₂ CH ₂) _n RR-OR where:	
Propoxur (Baygon)	114261	n=1, 2, 3	
Propylene dichloride (1,2-Dichloropropane)	78875	R=alkyl or aryl groups	
Propylene oxide	75569	R'=R, H, or groups which, when re- moved, yield glycol ethers with the structure R-(OCH ₂ CH ₂) _n -OH. Polymers are excluded from the glycol category.	
Quinone	106514		
Styrene	100425		
Styrene oxide	96093		
Tetrachlorethylene (Perchloroethylene)	127184		
Toluene	108883		
Toluene-2,4-diisocyanate	584849		
Trichloroethylene	79016		

Appendix Two

Pollutants Excluded from Use in Cleaning and Washoff Solvents

Chemical Name	CAS No.	Chemical Name	CAS No.
1,1-Dimethyl hydrazine	57147	Acrylonitrile	107131
1,2-Dibromo-3-chloropropane	96128	Aniline	62533
1,2-Diphenylhydrazine	122667	Antimony trioxide	1309644
1,2-Propylenimine (2-Methyl aziridine)	75558	Arsenic and inorganic arsenic compounds	99999904
1,2:7,8-Dibenzopyrene	189559	Benz(c)acridine	225514
1,3-Butadiene	106990	Benzene	71432
1,3-Dichloropropene	542756	Benzidine	92875
1,3-Propane sultone	1120714	Benzo (a) pyrene	50328
1,4-Dichlorobenzene(p)	106467	Benzo(a)anthracene	56553
1,4-Dioxane (1,4-Diethyleneoxide)	123911	Benzo(b)fluoranthene	205992
2-Acetylaminoflourine	53963	Beryllium compounds	7440417
2-Nitropropane	79469	Beryllium salts	
2,3,7,8-Tetrachlorodibenzo- p-dioxin	1746016	Bis(2-ethylhexyl)phthalate (DEHP)	117817
2,4-Dinitrotoluene	121142	Bis(chloromethyl)ether	542881
2,4-Toluene diamine	95807	Bromoform	75252
2,4,6-Trichlorophenol	88062	Cadmium compounds	
3,3'-Dichlorobenzidine	53963	Captan	133062
3,3'-Dimethoxybenzidine	119904	Carbon tetrachloride	56235
3,3'-Dimethylbenzidine	119937	Chlordane	57749
4,4'-Methylene bis (2-chloroaniline)	101144	Chlorobenzilate	510156
4,4'-Methylenedianiline	101779	Chloroform	67663
4-Aminobiphenyl	92671	Chromium compounds (hexavalent)	
7,12-Dimethylbenz (a)anthracene	57976	Chrysene	218019
Acetaldehyde	75070	Coke oven emissions	99999908
Acetamide	60355	DDE (1,1-p-chlorophenyl 1-2 dichloroethylene)	72559
Acrylamide	79061	Dibenz(ah)anthracene	53703
		Dichloroethyl ether (Bis(2-chloroethyl)ether)	111444

Chemical Name	CAS No.	Chemical Name	CAS No.
Dichlorvos	62737	N-Nitroso-N-methylurea	684935
Diethyl sulfate	64675	N-Nitrosodimethylamine	62759
Dimethyl carbamoyl chloride	79447	N-Nitrosomorpholine	59892
Dimethyl formamide	68122	Nickel refinery dust	
Dimethyl aminoazobenzene	60117	Nickel subsulfide	12035722
Epichlorohydrin	106898	o-Anisidine	90040
Ethyl acrylate	140885	o-Toluidine	95534
Ethyl carbamate (Urethane)	51796	Pentachlorophenol	87865
Ethylene dibromide (1,2-Dibromethane)	106934	Polychlorinated biphenyls (Aroclors)	1336363
Ethylene dichloride (1,2-Dichloroethane)	107062	Propoxur	114261
Ethylene oxide	75218	Propylene dichloride (1,2-Dichloropropane)	78875
Ethylene thiourea	96457	Propylene oxide	75569
Formaldehyde	50000	Selenium sulfide (mono and di)	7488564
Heptachlor	76448	Styrene oxide	96093
Hexachlorobenzene	118741	Tetrachloroethylene (Perchloroethylene)	127184
Hexamethylphosphoramide	680319	Toxaphene (chlorinated camphene)	8001352
Hydrazine	302012	Trichloroethylene	79016
Indeno(1,2,3-cd)pyrene	193395	Vinyl bromide (bromomethene)	593602
Lindane (hexachlorocyclo- hexane, gamma)	58899	Vinyl chloride	75014
Methyl hydrazine	60344		
Methylene chloride (Dichloromethane)	75092		

Resources

Accomplishments of North Carolina Industries—Case Summaries, “Wood Office Furniture Manufacturer Coats with Air-assisted Airless Spray Guns to Reduce Overspray and VOC Emissions,” Steelcase, Inc. Raleigh, N.C.: North Carolina Dept. of Natural Resources, July 1989.

Guidebook of Environmental Solutions for Small Businesses, Resource Dynamics Corporation. Vienna, Va., August 1993.

Pollution Prevention in the Finishing of Wood Furniture—A Resource Manual and Guide, Waste Reduction Assistance Program, Virginia Department of Environmental Quality. Richmond, Va.: Virginia Department of Environmental Quality, October 1993.

Wood Furniture Industry Waste Reduction Opportunities (Draft), Center for Environmental Research, Tennessee Valley Authority Waste Management, August 1994.

Wood Furniture Waste Reduction Opportunities, Doland-Friss Assoc., Preventative Environmental Management, and Radian Corp. U.S. EPA Center for Environmental Research Information/Tennessee Valley Authority Waste Management, August 1994.

Where to Find Help

Air emissions calculations (SBEAP)

800-578-8898

Air permits and emissions calculations (KDHE)

913-296-1593

Hazardous waste (KDHE)

913-296-1600

MACT compliance assistance—free and nonregulatory (SBEAP)

800-578-8898

Paint disposal and recycling (KDHE)

913-296-1600

Pollution prevention (KDHE)

913-296-6603

Recycling (KDHE)

913-296-1540

Stormwater (KDHE)

913-296-5557

Technical assistance—free and nonregulatory (SBEAP)

800-578-8898

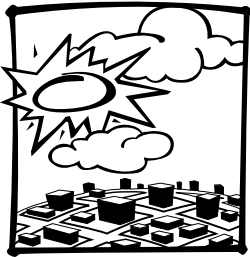
VOC emissions (KDHE)

913-296-1548

Water pollution (KDHE)

913-296-5500

The University of Kansas, Kansas State University, and Wichita State University
are committed to providing programs and activities regardless of race,
religion, color, sex, national origin, age, or disability.
For information, contact Dennis Murphey at 913-897-8530.



Kansas Small Business Environmental Assistance Program