

**PERMIT BOILERPLATE PROCEDURES FOR
WOOD FURNITURE AND FIXTURES MANUFACTURING FACILITIES**

I. PURPOSE

This procedure provides a guideline for the minimum requirements of the Department of Environmental Quality for air permit approval of all wood furniture and fixtures manufacturing facilities. These facilities are defined by the major group source industrial classification number "25" (see the SIC Manual).

II. REFERENCES

Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution: Part V, Rules 5-1 (9 VAC 5-50-60 et seq.) through 5-5 (9 VAC 5-50-400 et seq.); Part VIII, 9 VAC 5-80-10.

III. DEFINITIONS

The following definitions are for use in this guideline and do not necessarily have the same meaning in other portions of the regulations.

complete enclosure - the particulate emissions are not vented to the ambient air. Air flow is completely restricted while allowing for material flow.

control device - air pollution control equipment (i.e., fabric filter, baghouse or equivalent, scrubber, or complete enclosure which will control the particulate emissions from the woodworking equipment or the pneumatic transfer of collected wood waste).

conveyors - includes, but not limited to belt conveyors, augers, ribbons, screws, etc.

emission unit - one or more pieces of woodworking equipment or a combination of woodworking equipment. The woodworking equipment may be grouped together as a production line and considered a single "emission unit". A "system" composed of woodworking equipment grouped with its transfer

cyclone and control device could also be considered an emission unit. In some cases the entire woodworking facility can be considered as an emission unit.

woodworking equipment - equipment that is used for planing, sawing, routing, boring, moulding, lathing, sanding and/or hogging wood. Also included are the collection, transferring and loadout systems of the wood waste generated by the types of equipment included in this definition.

woodworking operation - operation in which wood is processed by use of woodworking equipment.

wood waste - sawdust, sander dust, woodchips and/or shavings
(wood dust) generated by the woodworking equipment.

IV. REQUIREMENTS

A. Applicability

This boilerplate applies to construction, reconstruction, installation, modification, or relocation of woodworking equipment/operations for the facilities stated in Part I of this procedure.

Although this boilerplate is not applicable to certain facilities (see Part I), the conditions in this boilerplate and some of the information in the procedures could be helpful in permitting of new or modified non-applicable facilities (e.g., the sawing of plywood at plywood manufacturing operations).

Also, this boilerplate can be combined with other boilerplates as applicable (e.g., silos for wood storage, boilers, finishing, etc.). This may be necessary since most facilities covered by this procedure will probably have silos, gluing and finishing operations, and boiler(s).

The woodworking equipment can be listed in Condition 2 of the boilerplate as follows:

1. New or modified, existing registered (non-permitted) equipment or previously permitted woodworking equipment. This would allow for the combining of previously issued permits.
2. The woodworking equipment (a group or each individual piece) with the corresponding pollution

control device. The make and model number, as well as the control capacity of the device, can be stated.

3. The different woodworking production lines (including the wood waste collection/transfer system) with the corresponding pollution control device.

A permit will not be required for the source to add or replace woodworking equipment, provided baghouses (or equivalent DEQ-approved control equipment) control the permitted woodworking equipment, and the subsequent transfer of the wood waste collected is adequately controlled. The source is required to submit a document certifying that the added equipment will not exceed the system capacity or reduce control equipment efficiency.

B. Permit Limits

1. Grain loading - A permit limit of 0.01 grains/dscf is required for all control devices. Baghouses (fabric filtration) can meet this grain loading based on information obtained from baghouse vendors. Cyclones are assumed not to meet it unless source proves that it does meet this standard when applied to its operations.

2. Hourly and annual emission limits

Pounds per hour and tons per year permit limits are required when calculated particulate emissions (i.e., TSP and PM-10) equal or exceed 0.5 tons per year. In cases of less than 0.5 tons per year, only the permitted grains per dry standard cubic foot will be required for compliance purposes; tracking of emissions for inventory purposes is not required.

Stack testing can be required to demonstrate compliance with the 0.01 grains/dscf requirement, as determined on a case-by-case basis.

A 120% factor may be included in calculating the hourly and annual emission limits to account for fluctuations in cfm, unless doing so would cause PSD, Title V or modeling problems. (However, a 120% factor is not applied to the grain loading limit.)

3. Production or throughput, and hours of operation limits

A minimum of a production or throughput annual limit, or an annual hours of operation limit, is required for determining compliance, tracking emissions for inventory purposes, and accessing potential operating permit fees. Therefore, the permit must contain either a production or a throughput limit, and/or a limit on hours of operation.

In some cases, it may be easier for the source to keep records of operating hours instead of amount of wood processed. The boilerplate contains an optional condition limiting the annual operating hours.

Caution should be used in setting both production and hourly limits. For sources whose production fluctuates, the limit on hours of operation could be exceeded before the production or throughput limit is exceeded.

C. Opacity

1. Visible emissions from control devices shall not exceed 5 percent opacity. This condition applies at all times except during startup, shutdown, or malfunction.
2. Visible fugitive emissions resulting from the conveying or handling of wood waste shall not exceed 10 percent opacity. This condition applies at all times except during startup, shutdown, or malfunction.

D. Toxic Pollutants

wood dust is not on the toxic priority list. However, some gluing may be performed in the woodworking operation that may need to be evaluated in accordance with current Agency policy. (See Part VI, Section C for examples of toxic emissions calculations for woodworking equipment that also performs gluing operations.)

E. Emissions and Control Equipment Monitoring

No emissions monitoring is required for the particulate control devices required by this procedure. However, if a baghouse is used, a device to continuously measure the differential pressure drop through the baghouse is required, except for a small baghouse, such as one which controls only the vent of a wood storage silo. Also, if a scrubber is used, it must be equipped with a flow meter and a device may be required to continuously measure the differential pressure through the scrubber.

F. Emissions/Compliance Testing

Performance testing (i.e., stack testing) is not a requirement for a baghouse designed to meet 0.01 grains/dscf. However, if there is reason to believe that the grain loading is being exceeded (i.e., the 5% opacity is not met), the source may be required to perform stack testing to demonstrate compliance. In addition, there may be cases where testing is required to gather emission data (including toxics). The boilerplate contains an optional condition that requires a stack test. If the performance testing condition is to be included in the permit, the condition concerning visible emissions during the stack test must also be included in the permit.

G. Recordkeeping/Reporting

1. All facilities must maintain the following records on site for the most recent five year period:
 - a. Short-term (hourly, monthly, or other) and annual records of wood or production throughput, as required by the permit. Annual throughput shall be calculated monthly as the sum of the throughput for the preceding twelve consecutive months.
 - b. (Optional) Monthly and annual hours of operation. Annual hours of operation shall be calculated monthly as the sum of the hours of

operation for the preceding twelve consecutive months.

- c. Malfunction of the control equipment, as required by the permit and/or regulations.
- d. Performance testing, if applicable, as required by the permit.

H. Modeling

Modeling analysis for particulate emissions and/or air toxics shall be conducted in accordance with current Agency policy.

I. Emission Inventory

Particulate emissions must be coded into the AIRS database system if the calculated annual particulate permitted limit(s) are greater than 0.5 tons per year. If less than 0.5 tons per year, only the permitted grains per dry standard cubic foot will be required.

V. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

- A. BACT for controlling wood particulate emissions from woodworking equipment and pneumatically transferring collected wood waste is a baghouse (fabric filter) or equivalent, closed loop and/or complete enclosure. Under normal conditions this would result in a limit of 0.01 grains per dry standard cubic foot and a 5% visible emissions limit.

Cyclones are **not** generally considered to be BACT for the purpose of this boilerplate. However, in some cases (e.g., a small facility conveying damp wood), a cyclone could be considered as BACT. Documentation showing that BACT is not fabric filtration would have to be provided.

Cyclones can be used as precleaners to a baghouse or as relays in pneumatic transfer systems, provided the cyclone exhaust is vented to a baghouse or is completely enclosed (e.g., vented back to the cyclone).

- B. BACT for controlling fugitive emissions from the collection and transferring of collected wood waste is the following:
 - 1. Collector to storage bin -
 - a. Preferred for large facilities is a pneumatic transfer system with all dust emissions controlled by closed loop and/or fabric filtration.

- b. An enclosed chute to an enclosed bin. A rotary air lock from the collector to an enclosed bin is recommended. For some small woodworking facilities, a rotary air lock may not be cost effective.
- 2. Conveyors - All conveyors must be covered or enclosed.
- 3. wood waste loadout to trailers -
 - a. Mechanical conveyor - Depending on the type and size of the wood waste being collected and transferred (e.g., woodchips and some hog material versus sander dust), transfer by mechanical (non-pneumatic) conveyor to a trailer may be allowed. However, the trailer should be located inside a partial enclosure to prevent the wind from blowing the wood waste, causing it to become airborne. For material like sander dust, the conveying system and trailer would have to be completely enclosed or vented through a filter.
 - b. Pneumatic - For larger particles only (i.e., shavings, some hog material, chips, etc.) the trailer could be vented without controls. For wood waste containing sander dust and sawdust, emission controls are required.

VI. EMISSIONS CALCULATIONS

A. Particulate Emissions

1. Calculations

As of this writing in late 1997, there are no federal emission factors for these processes. If no emission factors are available, material balance shall be used to calculate the emissions.

Unless PM-10 factors are available, assume that PM-10 emissions equal the calculated Total Suspended Particulate (TSP) emissions.

In the absence of controlled emission factors, the permit writer should calculate emissions based on the cfm and required grain loading (i.e., 0.01 grains/dscf - see Part IV, Section B.1 of this procedure).

2. Emission Factors

- a. Typical wood furniture manufacturing (rough input to final product)

Unless specified and documented by the applicant, the following emission factors shall be used to calculate the uncontrolled emissions for a typical wood furniture manufacturing facility (i.e., the wood is processed from the rough input to the final product, with steps in between). These factors are based on numbers developed by the Department in a Department memo dated December 19, 1979 concerning estimating emissions from woodworking industries (attached). These factors assume a given cyclone transfer control. These factors can still be used even if a precleaner cyclone is not used.

EMISSIONS	EMISSION FACTOR UNITS	EMISSION FACTORS*
SAWDUST	LB _{part} /Ton Rough Mill Input	8
	LB _{part} /10 ³ Bd-Ft Rough Mill Input	10
	LB _{part} /10 ³ Ft ³ Rough Mill Input	120
SANDER DUST	LB _{part} /Ton Rough Mill Input	9
	LB _{part} /10 ³ Bd-Ft Rough Mill Input	11
	LB _{part} /10 ³ Ft ³ Rough Mill Input	135
SAWDUST/SANDER DUST MIX	LB _{part} /Ton Rough Mill Input	11
	LB _{part} /10 ³ Bd-Ft Rough Mill Input	14
	LB _{part} /10 ³ Ft ³ Rough Mill Input	165
HOG	LB _{part} /Ton Rough Mill Input	6
	LB _{part} /10 ³ Bd-Ft Rough Mill Input	7
	LB _{part} /10 ³ Ft ³ Rough Mill Input	90
MACHINING	None available at this time.	None available at this time.

* As discharged from cyclone precleaner or cyclonic entrance to bottom of baghouse. The following control efficiencies were used in calculating the emission factors:

- 99% from the hog
- 85% from sander
- 99% from rough mill

b. Furniture manufacturing utilizing particle board and/or plywood

For woodworking operations that process primarily particle board and/or plywood instead of solid wood stock (dimension pieces) there are no emission factors available as of this writing in late 1997. Emissions are to be calculated case-by-case based on material balance.

c. Miscellaneous emission factors - the following is a list of emission factors and the source of these factors:

(1) wood waste storage bin vent 1.0 lb/ton
AP-42 & SCC 3-07-030-01

(2) storage bin loadout 2.0 lb/ton
AP-42 & SCC 3-07-030-02

d. Miscellaneous factors - the following is a list of miscellaneous factors:

(1) average weight of a board foot - 3.5 lbs,
unless documented by the applicant

(2) one board foot (1" x 12" x 12") = 1/12
ft³

B. VOC Emissions

Gluing and finishing are usually performed at most facilities covered by this procedure. Therefore, these operations should be evaluated for VOC emissions.

Some woodworking equipment may be a combination of a glue machine and a saw. Therefore, the VOC emissions from glue need to be evaluated. Emissions calculations should be based on the information provided by the applicant. For example, the VOC emissions may consist of formaldehyde and vinyl acetate. Therefore, the total VOC emissions are the sum of these two components. Please see the example toxic emissions calculation as listed in section C below.

C. Toxic Emissions

1. wood dust - Is not on the priority list. Therefore, emission factors are not applicable.

2. Gluing and finishing -

These operations should be evaluated for toxic emissions. The toxic review should be performed in accordance with current Agency policy.

As stated in Section B above, gluing may be performed on a machine that is a combination of a gluer and a piece of woodworking equipment, usually a saw. The glue may contain chemicals (e.g., formaldehyde and vinyl acetate) which will require a toxic review.

Below is an example calculation for hourly toxic emissions from a glue/woodworking machine. Toxic emissions may vary due to type and amount of glue used. Emissions calculations should be based on the information provided by the applicant.

Example Calculation

The glue will be applied by a roller, not sprayed. A maximum of 4 gals per hour will be applied. The MSDS lists the formaldehyde as being less than 0.1% by weight and the vinyl acetate as being less than 0.5% by weight. The specific gravity of the glue is listed on the MSDS as 1.12.

for formaldehyde:

$$(0.001) \times (8.3 \text{ lb water/gal}) \times (1.12 \text{ gal water/gal glue}) \times (4.0 \text{ gal glue/hr}) \times (0.18) = 0.0067 \text{ lb/hr}$$

An 18% emission rate for formaldehyde (HCHO) was assumed based on a DEQ memo from the Air Toxics Program Coordinator dated December 27, 1988, subject "Policy for Formaldehyde Emission Estimates" (attached). This assumes formaldehyde content is less than 1% and the temperature does not exceed 340° F.

for vinyl acetate:

$$(0.005) \times (8.3 \text{ lb/gal}) \times (1.12) \times (4.0 \text{ gal/hr}) \times (0.18) = 0.0335 \text{ lb/hr}$$

The same 18% emission rate for formaldehyde was used for vinyl acetate. This is a conservative rate since the vapor pressure of vinyl acetate is much lower than formaldehyde.

VII. INSTRUCTIONS FOR THE ATTACHED BOILERPLATE

- A. Brackets [] are used in the boilerplate to indicate that the wording inside the brackets is not required, but may be used. Sometimes a selection has to be made concerning the different wording listed inside the brackets.

In order to avoid listing all of the selections inside of the brackets for certain conditions, the following terms are used to correspond to the selections. These terms appear in bold print inside the brackets.

1. Control device - state the device which is controlling the particulate emissions from the woodworking equipment or the pneumatic wood waste conveying system that is being permitted.
2. Emission unit - this could be one of the following:
 - a. a single piece of woodworking equipment
 - b. a group of assorted woodworking equipment
 - c. "x" production line or process - a production line that includes a number of pieces of woodworking equipment
 - d. one or all pneumatic pickup transferring/conveying systems
 - e. all of the woodworking equipment located at the facility (e.g., a small woodworking operation)

B. Specific Conditions

1. Condition #2
 - a. Lists new, modified, or existing non-permitted equipment or permitted woodworking equipment. This would allow for combining previously issued permits.
 - b. Lists woodworking equipment (i.e., as groups or individual pieces) with the corresponding pollution control device. The make and model number, as well as the control capacity of the device, can be stated.
 - c. Lists different woodworking production lines (including the wood waste collection/transfer system) with the corresponding pollution

control device.

2. Conditions regarding production or throughput limits

These conditions are very similar. Therefore, only one is required. Records of production or throughput can be kept in terms of tons of wood, wood dust or product, boardfeet of lumber or square feet of lumber/or product.

3. Condition regarding limiting operating hours

In some cases, it may be easier for the source to keep records of operating hours instead of amount of wood processed. This condition gives an "hours of operation" limit. Caution should be used in setting both production/throughput and hourly limits. For sources whose production fluctuates, an annual limit on hours of operation could be exceeded before a production/throughput limit.

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