

**State of Vermont  
Agency of Natural Resources  
Department of Environmental Conservation**



**Air Pollution Control Division  
Waterbury, Vermont**

**Technical Support Document  
For:**

**Title V  
Air Pollution Control Permit to Construct and Operate  
#AOP-04-042**

**Green Mountain Prestain, Inc.  
Bowen Road  
Bennington, Vermont**

*This document is intended to provide additional technical information, discussion and clarification in support of the Permit. It is not intended to provide a comprehensive review of the Facility or permit process or duplicate the information contained in the Permit.*

▫ **FACILITY AND PERMIT SUMMARY:**

Green Mountain Prestain, Inc. (GMP) owns and operates a prestaining facility on Bowen Road in the town of Bennington, Vermont (Facility). The prestaining facility currently roll applies oil based and latex exterior house primers and paints to wooden clapboards and trim boards using a single roll coating machine limited to less than fifty (50) tons per year of volatile organic compound (VOC) emissions. The Permittee has proposed to install a second roll coating line which also will be limited to less than fifty (50) tons per year of VOC emissions for a Facility total of less than one-hundred (100) tons per year of VOC. The modification is considered major under the Vermont Air Pollution Control Regulations (Regulations) but is not considered major under the federal New Source Review Regulations. Consequently the Facility is subject to the Most Stringent Emission Rate under Vermont regulations but is not subject to the emission offset requirements of Federal regulations.

▫ **PROCESS DESCRIPTION:**

GMP applies primers and paints using machine roll coaters to wooden clapboards, trim boards and various other wood trim and building siding products used predominantly for residential building construction. These facilities are typically referred to as “prestain” facilities. Precut clapboards and trim boards are shipped to the facility by wholesalers or local retail lumber yards for coating. The prestain facilities typically apply an oil based primer to all four sides and may also apply the first coat of paint, typically a waterbased latex paint. A final coat of paint would then be applied at the job site once the material is nailed onto the structure. The prestain facilities do not own the lumber and only provide the service of prestaining. No woodworking operations are typically performed at these facilities.

When the uncoated lumber is received at the Facility, the wooden boards are inspected and a knot sealer is spot applied when and where necessary and allowed to dry overnight. The boards are then ready for prime coating. Each board is manually placed on a conveyor belt (length-wise) one at a time and the drive roller then pulls the boards through the machine. The Olympic Model 7000 machine coater is capable of processing boards up to 4 inches thick and 50 inches in width. Speeds are infinitely variable from 0 to 240 linear feet per minute (100 feet per minute for plywood size materials). The coating is pumped from a storage tank and either floods the boards at the top and bottom or is forced through the four roller applicators to coat all four sides. A catch basin beneath the boards collects excess coating and returns it back to the tank. The boards are then typically followed by pressure rollers to force the coating into the wood and then subsequent rollers to even out the coating and provide the proper surface appearance. After coating the boards are manually unloaded and placed onto drying racks which when full are stored throughout the open floor area of the facility. After the production run is completed the boards on the racks are left to cure and the facility is closed up until the next morning. This area has an air flow of approximately 30,000 cfm vented to the ambient air through two side wall vents with manual control systems to discharge the air from the coating operation. The building is heated by 15 propane fired space heaters rated at 0.250 MMBTU/hr each.

The primary base coat is designed to provide a waterproof seal and provide a surface for subsequent paints to adhere. There are several different types of base coats that are applied. The primary base coat is typically a “gray” color oil based primer which is applied in anticipation of a top coat. While waterbased primers are available they are inferior in their ability to control tannin bleed through which is a main concern with the most common siding material, cedar. Clear sealers that are designed to provide a clear waterproof seal may also be used but do not comprise a significant amount of production. It is applied to boards that will not be further treated. It is designed to provide a water proof seal that will allow the natural color of the wood to be visible when in place on a building.

▫ **EQUIPMENT SPECIFICATIONS:**

- (2) Olympic Model 7000 4-sided Roll Coating Machines, each with a 50” max. width and 240 linear feet per minute capacity, or equivalent.
- (15) 0.25 MMBTU/hr<sup>1</sup> Propane Space Heating Units

<sup>1</sup>MMBTU/hr equals million british thermal units per hour rated heat input capacity

▫ **EMISSION CALCULATIONS:**

▫ Two (2) Machine Roll Coating Operations:

The permit limits each of the coating lines to less than fifty (50) tons per year of volatile organic compounds. Since the coatings are roll applied rather than spray applied there are not expected to be any particulate matter emissions and VOC would be the only emission.

pollutant	Coating Line #1	Coating Line #2	Total VOC Emissions tons/year
VOC	<50 tpy	<50 tpy	<100 tpy

▫ Propane Space Heating Units:

The Facility utilizes approximately fifteen (15) propane fired space heating units rated at 0.25 MMBTU/hr input each for a combined total of 3.75 MMBTU/hr each. If these units were operated at their maximum rated capacity on a continuous basis they would consume a maximum of 365,000 gallons per year of propane combined [3.75 MMBTU/hr x 8,760 hrs/yr /0.09 MMBTU/gal propane].

pollutant	Emission Factor <sup>1</sup>	Fuel Use	Emissions tons/year
PM/PM <sub>10</sub>	0.4 lbs/1000gal	365,000 gal/yr	0.1
SO <sub>2</sub>	0.10(S) lbs/1000gal <sup>2</sup>	365,000 gal/yr	0
NO <sub>x</sub>	14 lbs/1000gal	365,000 gal/yr	2.6
CO	1.9 lbs/1000gal	365,000 gal/yr	0.3
HC	0.3 lbs/1000gal	365,000 gal/yr	0.1

<sup>1</sup> Emission factors from AP42 section 1.5 Liquefied Petroleum Gas Combustion table 1.5-1 (ver. 10/96).

<sup>2</sup> S equals the sulfur content expressed in gr/100 ft<sup>3</sup> and a typical propane sulfur content of 0.2 gr/100ft<sup>3</sup>.

▫ **Total Facility Emissions:**

Facility Allowable Air Contaminant Emissions (tons/year) <sup>1</sup>					
PM/PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOCs	HAPs
0.1	0	2.6	0.3	<100	<10/25

▫ **APPLICABLE REQUIREMENTS DISCUSSION:**

Section 5-211(2) - Prohibition of Visible Air Contaminants, Installations Constructed Subsequent to April 30, 1970. The Facility is not expected to be a source of visible emissions. The coating lines are roll coating rather than spray applied which do not generate overspray particulate matter which can be a source of visible emissions. In addition, the fuel burning equipment is propane fired and is not expected to result in visible emissions.

Section 5-231 - Prohibition of Particulate Matter. The Facility is not expected to be significant source of particulate matter. As noted above, the coating lines are roll coating lines rather than spray applied which do not generator overspray particulates. The propane fuel combustion units are expected to readily comply with the particulate matter combustion emission limitation of 0.5 lbs/MMBTU based on an expected emission rate (from AP42) of 0.004 lbs/MMBTU.

Section 5-241 – Prohibition of Nuisance and Odor. Since the Facility will have potential emissions of VOCs of close to 100 tons per year, the potential exists for odors. Past experience with these and other potentially odorous operations strongly indicate that location is one of the most important factors in determining if a facility will result in odor problems. Facilities such as the proposed facility which are located in more industrial areas where occasionally odors are not unexpected during the work day are better located than facilities in residential areas. Odor problems are not expected to be a significant issue with the proposed facility due to its location.

Section 5-253.16 - Wood Furniture Manufacturing. Prestain operations are not considered to be wood furniture manufacturing since it does not fall within any of the listed SIC codes for applicability to this regulation. The Facility also is not a major source of HAPs.

Section 5-253.20 – Other Sources that Emit VOCs. This section applies to sources with allowable VOC emissions of 50 tons per year or more and which are not subject to any other subsection of 5-253. Fuel combustion, surface coating of wood and waste water treatment plants are specifically exempt. Although the exemption states the exemption applies to the surface coating of wood it was intended to exempt only wood furniture manufacturing until 5-253.16 was adopted. The surface coating of wood was the name first given by EPA to the wood furniture CTG that was being developed and they later changed its name to wood furniture. The exemption was intended to provide relief from requiring facility by facility review of wood furniture manufacturing operations under 5-253.20 knowing a specific regulation (5-253.16) was being developed to address this source category. The Agency considers prestain operations to be applicable sources subject to this regulation. Thus the emission limits of 5-253.20 are minimum standards this Facility must comply with. However, more stringent emission limits are imposed under the state major source review requirements of 5-502. Under 5-502 a source must achieve the “most stringent emission rate” (MSER) limit which can be no less stringent than other applicable emission standards such as those under 5-253.20.

Section 5-261 – Control of Hazardous Air Contaminants. See below.

40 CFR Part 59 - National Volatile Organic Compound Emission Standards for Architectural Coatings. The architectural coatings rule adopted in 1998 applies manufacturers of coatings not users of those coatings. It applies to coatings “recommended for field application to stationary structures and their appurtenances, to portable buildings, to pavements, or to curbs.” Therefore, the rule does not apply to coatings that are marketed solely for shop application, such as in a manufacturing setting, or coatings marketed solely for application to non-stationary structures, such as aircraft and ships. However, a coating that is recommended by the manufacturer or

importer for use as an architectural coating is subject to the architectural coatings rule even if the coating is also recommended for non-architectural uses. The fact that a coating regulated by the architectural coatings rule may also be subject to other rules with different requirements does not alter the manufacturer's or importer's obligation to meet the requirements of the architectural coatings rule. With respect to prestain operations their coatings would NOT be subject if they were sold only as shop/machine applied coatings. But if the same coating is also sold to the public then it would be subject. The limit for primer coatings is 2.9 lbs voc/gal. While the prestain facilities may use only coatings marketed only to them for machine application and thus not be subject, this rule provides a presumption that such coatings should be readily available for machine application.

▫ **HAZARDOUS MOST STRINGENT EMISSION RATE DISCUSSION (HMSER):**

The Facility is not expected to have regulated emissions of any hazardous air contaminant in excess of a respective Action Level therefore this regulation, 5-261 Control of Hazardous Air Contaminants, does not apply.

Hazardous Air Contaminant Emissions						
Contaminant	Maximum Gallons/yr <sup>1</sup>	Maximum % by wt	Maximum density (lbs/gal)	Lbs/yr	Lbs/8hrs	Action level <sup>3</sup> lbs/8hrs
Stoddard solvent <sup>2</sup>	58,000	29.1%	10.96	184,983	169	1,040 (346.7)
Ethyl benzene <sup>2</sup>	58,000	0.16%	10.96	1,017	0.93	1,830 (4.2)
Xylene <sup>2</sup>	58,000	0.7	10.96	4,450	4.1	86.3 (8.3)

<sup>1</sup> The maximum gallon used is based on the current coating usage ratio scaled up to a usage level that corresponds to 100 tons per year of VOC emissions.

<sup>2</sup> Stoddard solvent (8052-41-3), ethyl benzene (100-41-4) and xylenes (1330-20-7) are all contained in the three primary primers used at the Facility: PPG Alkyd Wood Primer (Antique), PPG Exterior Alkyd Wood Primer (CCgray), and PPG Garden State Primer. The gallons used are a combination of all three. The maximum density of the three coatings is used. The maximum contaminant content in % by weight of the three coatings respectively is also used.

<sup>3</sup> The Action Level for each of the above contaminants has been recommend to be lowered to the values in ( ) based on the most recent available literature and the Agency intends to proceed with amendment of the regulations to reflect the lower values in the near future. However, the facility is below the current and proposed values so the regulation will still not apply at this time.

▫ **MOST STRINGENT EMISSION RATE DISCUSSION (MSER):**

The proposed project is designated as a major modification of a stationary source and therefore is subject to review under the MSER requirements in §5-502 of the Regulations. The following MSER determination was made for the current modification:

<b>Most Stringent Emission Rate Determinations</b>		
Date of determination/ Permit #	Pollutant	Description/Emission limit
September 20, 2005 AOP-04-042	VOCs	Oil based primer coatings limited to maximum of 2.9 lbs VOC/gal (less water and exempt compounds), as applied.

In making the above determination the Agency evaluated the following options:

- Add on Emission Controls, including
  - Regenerative thermal oxidizer
  - Catalytic thermal oxidizer
  - Carbon adsorption
  - Biofiltration
  - Refrigerated condenser
- Process Modifications
- Product Substitution
- Product Reformulation

Due to the high volume of conveying air and the resultant low concentration of VOC emissions, the add on emission control options were found to be too expensive, ineffective or had unacceptable secondary impacts to be considered MSER. However, should the facility propose any higher levels of VOC emissions in the future, such add on emission controls may be considered cost effective given the greater level of emission reductions that could be achieved. See the Most Stringent Emission Rate Analysis, March 14, 2005 for further information.

The Agency then evaluated possible process modifications that could lower potential emissions. Given that the coatings are roll applied, there was no potential improvements to be made in coating transfer efficiency. Drying ovens, while speeding up the coating process, would not result in reduced emissions. Likewise, the Agency determined that there was little room for improvement in cleanup operations which could decrease clean up solvent usage and that such emissions were not a significant contribution to the facility emissions.

Finally the Agency evaluated product reformulations and substitutions. The MA DEP has done a significant amount of research into this area as a result of permitting and enforcement actions with the prestaining operations in that state. They have, and continue to, investigate waterborne coatings, UV curable coatings and high solids coatings with limited success at this point. The Agency will continue to monitor the developments with these technologies but has determined that they are not yet demonstrated in practice for this industry and do not constitute MSER at this time.

Cabot and Pittsburg Paint are the two main coating suppliers for machine application coaters.

These companies have gradually reduced the VOC content per gallon for the machine applied coatings over the past several years. The applicant currently uses and has proposed use of oil based primers with a VOC content of 3.17 pounds per gallon. In researching availability of lower VOC content coatings the Agency determined that similar oil based products sold to other consumers are limited to 2.9 pounds per gallon by the federal architectural coating rule in 40 CFR Part 59. While the prestain facilities may use coatings marketed only to them for machine application and thus not be subject to this rule, this rule does provide a presumption that such coatings should be readily available for machine application and the applicant has not demonstrated why such coatings can not be used. The Agency has therefore determined that such coatings are MSER for the proposed facility at this time.

- **AMBIENT AIR QUALITY IMPACT EVALUATION DISCUSSION (AQIE):** Not applicable