

# Air Program Fact Sheet

## VOC RACT Rules for Specific Industries

January 2017

To help decrease air pollution in the southeastern portion of Wisconsin, the Department of Natural Resources (DNR) created regulations to control emissions from operations with volatile organic compound (VOC) emissions. VOCs are a primary component in the formation of bad ozone (smog). These regulations, called VOC RACT (Reasonably Available Control Technology) rules, require specific industries to reduce VOC emissions. The complete rules can be found in chapter NR 422 of the Wisconsin Administrative Code (Wis. Adm. Code).

### Do these Rules Affect my Business?

Depending on your location, industry type and level of VOC emissions these rules may apply to your business. Each section of chapter NR 422, Wis. Adm. Code, is written specific to an industry. There are a range of emissions thresholds that dictate whether that business is affected. They range from only a facility that is a "major source" of VOC emissions, to those with very low actual emissions being affected by rules with a Part 2 version issued in 2009.

A "major source" is one with maximum theoretical emissions of at least 100 tons VOC per year (TPY). In the past, some counties in the southeast corner of Wisconsin had a lower threshold for VOC emissions, 25 TPY. Operations installed prior to the new thresholds must continue to meet the rules that applied at the lower thresholds.

**Maximum theoretical emissions** means the potential VOC emissions that your facility could produce if processes operated at the highest production levels allowed by their design. Restrictions written in a permit, which limit the amount of VOCs you can emit, can be taken into account when figuring maximum theoretical emissions. Any control device used to reduce emissions cannot be considered.

Maximum theoretical emissions are not simply the highest level at which you have operated a process line. They reflect the maximum possible in process design and thus could be much higher. For example, the process design factor may be the maximum conveyor line speed if you paint parts attached to an overhead conveyor line, maximum press speed, etc.

For example, if your facility has a construction permit that limits your total VOC emissions to 90 tons per year, you would not be considered a major source and would be exempt from these VOC rules.

### Location

The southeastern corner of Wisconsin for many years did not meet air quality standards set by EPA. Facilities in certain counties may be subject to additional requirements because those areas were once designated as nonattainment air quality areas by the federal government.

The former ozone nonattainment areas for the VOC rules cover the southeast shoreline of Lake Michigan. Affected counties include:

Kenosha	Milwaukee	Sheboygan
Kewaunee	Ozaukee	Washington
Manitowoc	Racine	Waukesha
(Door and Walworth, in some rules)		

Counties that border the former nonattainment areas may be affected by some of these rules as well. The border counties include:

Brown	Dodge	Outagamie
Calumet	Fond du Lac	Rock
Dane	Jefferson	Winnebago

## Are there Exemptions to these Rules?

There are multiple exemptions in chapter NR 422, Wis. Adm. Code. One exemption is available to any facility affected by chapter NR 422 which uses coatings or inks that don't meet the limits specified in the rule, but uses them in very small quantities. The coatings or inks are exempt from limits on VOC content or emissions reductions if a facility uses **less than 55 gallons during any 12 consecutive months**. To show that it meets this exemption, a facility must maintain monthly records and determine at the end of each month whether its usage over the previous 12 consecutive months was less than 55 gallons.

Other exemptions in the rule depend on industry sector. **Table 1** lists coating processes or industries and the section of NR 422 listing exemptions. Two possible exemptions exist:

1. any affected coating process(es) with less than 15 pounds VOC per day, or
2. facilities located outside the nonattainment and border counties and which emit less than 100 tons per year (TPY) of VOCs.

For example, a facility with a flat wood panel coating line, located in Waupaca County, with maximum VOCs totaling 120 TPY, would be affected by the limits in s. NR 422.13, Wis. Adm. Code.

**Table 2** lists coating processes and industries that have three possible exemptions.

1. First, all facilities located outside the nonattainment counties are exempt.
2. In the nonattainment counties, there are two possible exemptions:
  - a. any affected coating process(es) with less than 15 pounds VOC per day, or
  - b. facilities with VOCs less than 100 TPY and located in Door, Kewaunee, Manitowoc or Sheboygan counties or less than 25 TPY and located in one of the other nonattainment counties listed above.

**Table 3** lists the coating processes with **other** exemptions. The exemptions for the coating processes or industry sectors in Table 3 are so varied that it is best to refer to the specific rule if your facility fits within these categories.

## What if my Facility is Exempt?

How you show that you are exempt from the VOC rules depends on which exemption you meet. If you are exempt solely because of location, you don't need to do anything else. If you are exempt because your emissions are below exemption levels, then you will need to keep some records.

Each exemption level is based on some quantity of VOC emissions over a specified period of time. The time period in the exemption determines how often you need to keep records. For example, for the 15 pounds per day exemption, **daily records** must be kept to show emissions below 15 pounds every day of operation. The most difficult part of this is calculating the quantity of your VOC emissions.

Coating process/industry	Section of NR 422
Can (beverage)	422.05
Coil	422.06
Paper coating - Part 1	422.07
Fabric/vinyl	422.08
Auto/light truck	422.09
Metal furniture - Part 1	422.10
Large appliances - Part 1	422.11
Magnet wire	422.12
Flat wood panel - Part 1	422.13

Coating process/industry	Section of NR 422
Leather	422.085
Wood door*	422.132
Molded wood*	422.135
Graphic arts	422.14
Screen printing*	422.145
* These do not include Door as a nonattainment county.	

Coating process/industry	Section of NR 422
Paper coating - Part 2	422.075
Auto refinishing	422.095
Metal furniture - Part 2	422.105
Large appliances - Part 2	422.115
Wood furniture	422.125
Adhesives	422.127
Flat wood panel - Part 2	422.131
Lithographic printing - Part 1	422.142
Lithographic printing - Part 2	422.143
Miscellaneous metal parts	422.15
Fire/emergency vehicle	422.155

1. Find records of the amount of coatings used for the time period in the exemption. You may be able to get monthly purchase records from your supplier if you don't retain your own records. The information from your supplier will only give you an idea of usage amounts. **Once you determine that you are exempt, begin maintaining your own records appropriate to the exemption level you meet.**
2. Get copies of the Safety Data Sheets (SDS) for each coating you use. These can be obtained from your coating supplier. Verify that the Physical Characteristics section of the SDS contains information for:
  - ✓ VOC content in pounds per gallon (lb/gal), or
  - ✓ VOC content in percent (%) by weight (wt) and density of coating in lb/gal.
3. If any MSDS does not list VOC content in pounds per gallon, obtain that information from your supplier. Suppliers should know the VOC content of the materials they supply. If that information is not available, you can still calculate VOC content in pounds per gallon using the VOC content in percent by weight (% by wt) and the coating density. VOC content is more commonly listed in percentage by weight than in pounds per gallon.

When calculating emissions of VOCs, **do not** use the VOC content in units of "pounds VOC per gallon, excluding water" that may be listed on the SDS. That value would be used for demonstrating compliance with certain RACT limits. It is also important to know that you cannot swap VOC content in "percent by **volume**" for "percent by **weight**". These are different values and the percent by volume is not appropriate for calculating VOC emissions from the coatings used.

**Equation for VOC content:**

$$\text{Coating Density (lb/gal)} \times \text{VOC Content (\% by wt)} / 100 = \text{VOC Content (lb VOC/gal)}$$

**MSDS information:**

Coating Density = 14 lb/gal

VOC Content = 40% by wt

**Calculate:**

$$14 \text{ lb/gal} \times 40 / 100 = 5.6 \text{ lb VOC/gal}$$

4. Once you determine the VOC content in lb/gal, you can calculate VOC emissions. Multiply the VOC content by the amount of each coating used in a day, measured in gallons, to calculate pounds of VOCs per day for that coating. If you used 2.5 gallons of the coating with 5.6 lb VOC for one day:

Product	Usage (gal/day)	x	Density (lb/gal)	x	VOC Content (% by wt)	=	VOC Emissions (lbs/day)	
Coating ABC	2.5	x	14.0	x	0.4	=	14.0	
Total Pounds VOC/day								14.0

5. Do this calculation for each coating used, determining amounts for each day of operations.

Include VOCs from clean up solvents directly related to the process, like gun cleaner for painting operations. Then, total the VOC emissions from all coatings and solvents used to obtain the total VOC emissions in pounds per day. In the example above, if the daily emissions are less than 15 pounds VOC, then the facility would meet one of the exemptions.

The calculations required are similar, regardless of which exemption a facility meets. Add emissions from coatings used for the period of time indicated in the exemption (pounds per month, tons per year, etc.). Keep records of these calculations to verify that you met an exemption. Any records, whether paper or electronic, must be kept on site for five years.

## How Does My Business Comply with these Regulations?

Again, rules vary as to required limits and the records necessary to show that those limits have been met. All rules are based on the amount of VOCs in the material used to coat products rather than the volume of material either used or coated.

Limits in the rules are measured in units such as:

- ✓ pounds VOC per gallon of coating applied, excluding water in the coating
- ✓ percent by weight or volume of VOC in the coating applied
- ✓ pounds VOC per pound of coating applied
- ✓ pounds VOC emitted per square foot of material coated

To comply with each of the limits, you must keep regular records of coatings used. Those records should include the following at a minimum:

- ✓ name or an identifying number for each coating
- ✓ VOC content for each coating, in pounds VOC per gallon, excluding water (or whatever unit of measure the limit requires)

You might need to average the VOC contents of all coatings you use because some coatings are well below the limit while others are higher. The rules require that averages be calculated over each day of operation. If you do any kind of averaging, you must keep records of the amount of each coating used. Contact DNR or SBEAP staff to be sure you are averaging according to the rule requirements.

The unit of "pounds VOC per gallon, excluding water" is used by the majority of sections in NR 422, Wis. Adm. Code. You must calculate this value to show compliance if any coatings contain some fraction of water. Some MSDSs may provide this number directly. If coatings do not have any water content, then this calculation is unnecessary, and the VOC content calculation shown previously is all you need.

### How are "pounds VOC per gallon of coating applied, excluding water" calculated?

Use information from the SDS to calculate the lb VOC/gal, excluding water. If you need to calculate "excluding water and exempt solvents" then you treat the exempt solvents (like acetone or others excluded from the definition of VOC) as water in the calculation.

- Water content, in percent by weight (% by wt). See the calculation example above. Use 5% as percentage by weight.
- Total volatile content, in percent by weight (% by wt). Use 40% VOC + 5% water = 45% from above example.
- Density of coating, in pounds per gallon (lb/gal). Use 14 lb/gal from above example.
- Density of water = 8.34 pounds per gallon.

Once you have the items listed above, calculate the "pounds VOC per gallon coating applied, excluding water" for each coating used as follows:

1. *Water in coating:*

$$\frac{14 \text{ lb coating}}{\text{gal coating}} \times \frac{5 \text{ lb H}_2\text{O}}{100 \text{ lb coating}} = \frac{0.70 \text{ lb H}_2\text{O}}{\text{gal coating}}$$

2. *Volume water in coating:*

$$\frac{0.7 \text{ lb H}_2\text{O}}{\text{gal coating}} \div \frac{8.34 \text{ lb water}}{\text{gal water}} = \frac{0.084 \text{ gal H}_2\text{O}}{\text{gal coating}}$$

3. *Mass of VOC in coating:*

$$45\% \text{ volatile} - 5\% \text{ water} = 40\% \text{ VOC}$$

$$\frac{14 \text{ lb coating}}{\text{gal coating}} \times \frac{40 \text{ lb VOC}}{100 \text{ lb coating}} = \frac{5.6 \text{ lb VOC}}{\text{gal coating}}$$

4. lbs VOC per gallon, less water:

$$\frac{5.6 \text{ lb VOC}}{\text{gal coating}} \div \frac{(1-0.084) \text{ gal-H}_2\text{O}}{\text{gal coating}} = \frac{6.11 \text{ lbs VOC}}{\text{gal-H}_2\text{O}}$$

The value of **6.11 lb VOC per gallon, excluding water**, is what you would record after using this calculation in order to show that you meet the VOC content limit. Repeat this calculation with the values specific to each coating.

Another value you may have to calculate is "lb VOC per 1000 square feet coated." This applies to the leather or flat wood paneling RACT rules. For this value, you need three items:

- ✓ VOC content of the coatings used, in pounds VOC per gallon
- ✓ amount of coatings used for a specified time period, in gallons
- ✓ amount of material coated for a specified time period, in square feet of surface area coated

Calculating lb VOC per 1000 square feet coated is similar to the daily emissions calculations shown previously in the exemption section.

1. Multiply the VOC content by the amount of coating used to get pounds of VOC emitted for a particular time period.
2. Divide the VOC emissions by the total square footage of surface area coated for the same time period. The resulting value shows lb VOC per 1 square foot.
3. Multiply this value by 1000/1000 to calculate the emissions rate in lb VOC/1000 square feet.

#### Example:

VOC content = 5.6 lb/gal

Amount of coating used = 50 gal/mo

Amount of material coated = 13,485 square feet/mo

VOC emissions

$$= 5.6 \text{ lb VOC/gal} \times 50 \text{ gal/mo} \div 13485 \text{ sq ft/mo}$$

$$= \frac{0.02076 \text{ lb VOC}}{1 \text{ sq ft}} \times \frac{1000}{1000}$$

$$= 20.76 \text{ lb VOC/1000 sq ft}$$

Similar calculations can be followed for all the units in the different VOC rules. Contact the SBEAP or DNR regional staff for assistance with calculations or help determining how you are affected by these rules.

#### For More Information:

- To read NR 422: [https://docs.legis.wisconsin.gov/code/admin\\_code/nr/400/422.pdf](https://docs.legis.wisconsin.gov/code/admin_code/nr/400/422.pdf)
- More information for Painting and Coating operations: <http://dnr.wi.gov/topic/SmallBusiness/Resources/Painting.html>
- Contact the SBEAP at [DNRSsmallBusiness@wisconsin.gov](mailto:DNRSsmallBusiness@wisconsin.gov) or 1-855-889-3021

**DISCLAIMER** — *This document is intended solely as guidance and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations and is not finally determinative of any of the issues addressed. This guidance does not create any rights enforceable by any party in litigation with the State of Wisconsin or the Department of Natural Resources. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.*

*The Wisconsin Department of Natural Resources provides equal opportunity in employment, programs, services and functions under an Affirmative Action Plan. If you have any questions, please write to Equal Opportunity Office, Department of Interior, Washington, DC 20240. This publication is available in alternative format (large print, Braille, audio tape, etc.) upon request. Please contact the Bureau of Air Management, phone 608-266-7718, for more information.*



Wisconsin Department of Natural Resources  
Bureau of Air Management  
Box 7921- AM/7  
Madison, WI 53707  
PHONE 608-266-7718 • FAX 608-267-0560  
**Publication AM-414 2017**