

# How to Use Your SDS for Air Pollution Requirements

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Raw materials that a business might use to create a product may, in the process, create air pollution. Air pollution from a business may be regulated under one of the air pollution control requirements carried out and enforced by DNR's Bureau of Air Management (or Air Program). The Safety Data Sheet (SDS), provided by each supplier or manufacturer, is a tool used to determine if raw materials may have hazardous components. The listing of hazardous components can also indicate the types of air pollution that may be generated when using the material. There is a consistent format for the SDS, based on the Global Harmonization System adopted by the Occupational Health and Safety Administration. All SDS were required to meet the new format as of July 1, 2015. This fact sheet will show you how to determine if materials used at your facility will create air pollution and, if so, in what quantities.

## What Is in a SDS?

Every SDS must include:

- ❖ Section 1—Identification
- ❖ Section 2—Hazard(s) identification
- ❖ Section 3—Composition/information on ingredients
- ❖ Section 4—First-aid measures
- ❖ Section 5—Fire-fighting measures
- ❖ Section 6—Accidental release measures
- ❖ Section 7—Handling and storage
- ❖ Section 8—Exposure controls/personal protection
- ❖ Section 9—Physical and chemical properties
- ❖ Section 10—Stability and reactivity
- ❖ Section 11—Toxicological information
- ❖ Section 12—Ecological information
- ❖ Section 13—Disposal considerations
- ❖ Section 14—Transport information
- ❖ Section 15—Regulatory information
- ❖ Section 16—Other information

## What Do I Need to Know?

SDSs are not intended as guides for air pollution emissions calculations. If information from the SDS is used for emissions calculations, multiple steps could be necessary to collect required data. More appropriate for this purpose is the *Certified Product Data Sheet* that should be available from the material's supplier or manufacturer. If a Certified Product Data Sheet is not available, data from the SDS must be used instead.

For air pollution control requirements, the information about what the material is and why it's hazardous is usually what you need to know from the SDS. This information is found in the **Composition** section and the **Physical and chemical properties** section of the SDS.

### Section 3—Composition

This section includes a list of the material's hazardous components, their Chemical Abstract System (CAS) numbers, and the percentage contained within the material by. Many SDS provide a range within which each component may be found. If your SDS provides ranges, you should contact the supplier to obtain more precise values. It is important to know the exact amount of each hazardous component in each material used at your facility. This data is used to determine if you meet air pollution requirements. If the supplier or manufacturer will not provide exact values for each component for your emissions calculations, the **highest value** in the range should be used.

You must calculate specific hazardous air pollutant emission rates for:

- ❖ any air pollution permit applications
- ❖ the state hazardous air pollutant rule
- ❖ reporting on your annual air emissions inventory



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## Section 9—Physical and Chemical Properties OR Section 15- Regulatory Information

These sections may contain information about the material which can be useful for air pollution calculations. The key pieces of information needed include:

- ⇒ specific gravity
- ⇒ solids content (in weight percent)
- ⇒ VOC content (in weight % or pounds/gallon)
- ⇒ density of the material (in pounds per gallon)

These data provide enough information to calculate volatile organic compound (VOC) or particulate matter (PM) emissions. When combined with hazardous component content values, you can calculate emissions of the hazardous components.

## Example Calculations

### VOC Emissions

The data needed for VOC emissions calculations are:

- ⇒ density or specific gravity
- ⇒ VOC content or solids content (in weight percent or pounds per gallon)
- ⇒ the amount of the material used over a certain period of time.

The SDS or supplier information may provide the density of the coating. If not, you must first do an initial calculation. Using the specific gravity, which is a comparison of the density of the material to water's density, multiply the specific gravity by the density of water:

$$\begin{aligned} \text{Specific Gravity (sg)} &= 0.84 \\ \text{Density} &= \text{specific gravity} \times \text{density of water} \\ &= 0.84 \times 8.34 \text{ lbs/gal} = 7.00 \text{ pounds per gallon} \end{aligned}$$

Next, figure the VOC content. If it is provided in pounds per gallon on the MSDS, then you can directly calculate the emissions. If not, you may need to do one or more other calculations first. If the VOC content is provided in volume percent, but not in weight percent, you need to use the solids content (in % by weight or wt) in the first calculation:

$$\begin{aligned} \text{Solids content} &= 60\% \text{ by wt.} \\ \text{VOC content} &= 1 - (\text{solids content \% by weight}/100) \\ &= 1 - (60/100) = 0.40 \times 100 \\ &= 40\% \text{ by wt} \end{aligned}$$

You need to end with VOC content in pounds per gallon to calculate emissions. To do so, multiply the VOC content in weight percent by the density of the material (step 1).

$$\begin{aligned} \text{VOC content} &= (\text{VOC \% by weight}/100) \times \text{density} \\ &= (40 / 100) \times 7.00 \text{ lb/gal} \\ &= 2.80 \text{ pounds per gallon} \end{aligned}$$

If you have additional materials, repeat these calculations for each, depending on data provided in the SDS.

To calculate the emissions, multiply the VOC content by the number of gallons used. If you used 50 gallons in a month of just the one material, the emissions would be:

$$\begin{aligned} \text{VOC emissions} &= \text{material used} \times \text{VOC content} \\ &= 50 \text{ gal/mo} \times 2.80 \text{ lb VOC/gal} \\ &= 140 \text{ pounds VOC per month} \end{aligned}$$

If you have additional materials, you must calculate the VOC emissions for each and add them together.

$$\begin{aligned} \#1 &= 50 \text{ gal/mo} \times 2.8 \text{ lb VOC/gal} = 140 \text{ lb/mo} \\ \#2 &= 75 \text{ gal/mo} \times 3.6 \text{ lb VOC/gal} = 270 \text{ lb/mo} \\ \#3 &= 15 \text{ gal/mo} \times 5.4 \text{ lb VOC/gal} = 81 \text{ lb/mo} \\ \text{TOTAL VOC emissions} &= 140 + 270 + 81 = \mathbf{491 \text{ lb VOC/mo}} \end{aligned}$$

### PM Emissions

Calculation of PM emissions is similar to VOCs. You need:

- ⇒ density or specific gravity
- ⇒ solids content (in weight percent or pounds per gallon)
- ⇒ amount of material used

It is not likely that you will be provided the solids content in pounds per gallon, but that is the value you need to complete the emissions calculation.

- 1) The density calculation is the same as shown in step 0 for VOC emissions.
- 2) Next, figure the solids content. You want to end up with solids content in pounds per gallon to calculate emissions. So you multiply the solids content in weight percent by the density of the material. We'll use 60% by weight again:

$$\begin{aligned} \text{Solids Content} &= (\text{solids \% by weight} / 100) \times \text{density} \\ &= (60/100) \times 7.00 \text{ lb/gal} \\ &= 4.20 \text{ pounds per gallon} \end{aligned}$$

- 3) Calculating the PM emissions is then the same as the VOC process. Multiply the solids content by the amount of material used:

$$\begin{aligned} \text{PM Emissions} &= \text{material used} \times \text{PM content} \\ &= 50 \text{ gal/mo} \times 4.20 \text{ lb PM/gal} \\ &= 210 \text{ pounds PM per month} \end{aligned}$$

This data is needed for calculations for paints or coatings where there is a known percentage of the solids that are left on the part being painted. The fraction of solids left on the part compared to the total solids in the paint is called the transfer efficiency of the application method used.

The application method of electrostatic spray is known to have a transfer efficiency of 60%. Therefore, the true emission rate would be just the fraction of solids that does not stay on the part being painted:

$$\begin{aligned} \text{True PM Emissions} &= \text{total solids emitted} \times (1 - \{\text{transfer efficiency}/100\}) \\ &= 210 \text{ lb PM/mo} \times (1 - [60/100]) \\ &= 84 \text{ lb PM/mo} \end{aligned}$$

### Hazardous Air Pollutant Emissions (HAP)

The (HAP) emission calculation is very similar to the others. Before you begin the calculations, be sure to identify only those that are regulated by DNR or the US Environmental Protection Agency (EPA) as HAPs. Then, perform calculations only for those components that are regulated. Online (<http://www.epa.gov/ttn/atw/orig189.html>) you can find a HAP list, organized by CAS number so that you can match them with the compounds listed on your SDS. The CAS number is the ideal match as compounds commonly have multiple common that can make it confusing.



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- 1) Again, the density calculation is the same as used for VOC emissions above.
- 2) Using the example of the range of 10-25% by weight of n-Butyl Alcohol, without a precise value from the manufacturer or supplier you must use the high end of the range in the calculation.

$$\begin{aligned} \text{HAP Content} &= (\text{HAP \% by wt. /100}) \times \text{density} \\ &= (25/100) \times 7.00 \text{ lb/gal} \\ &= 1.75 \text{ lb HAP/gal} \end{aligned}$$

- 3) Calculating the emissions is the same as above:

$$\begin{aligned} \text{HAP Emissions} &= \text{material used} \times \text{HAP content} \\ &= 50 \text{ gal/mo} \times 1.75 \text{ lb HAP/gal} \\ &= 87.5 \text{ lb HAP/mo} \end{aligned}$$

The Small Business Environmental Assistance Program has designed a spreadsheet in MS Excel that can assist you with these calculations. You just need to collect the data from your SDS and enter it into the spreadsheet. Go to <http://dnr.wi.gov/topic/SmallBusiness/documents/air/EmissionsWorksheet.xls> for this spreadsheet.

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