



## Maclac Guide To

# Paint VOC Definitions and Calculations

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### VOC DEFINITION

VOC is defined as Volatile Organic Compound. These are *almost all* the solvents or thinners in paint. The amount of VOC is usually expressed as a ratio of weight of VOC to the volume of coating - such as grams per liter or pounds per gallon.

### VOC WEIGHT RATIO

An increasing number of government air quality districts are requiring the reporting of VOC as a weight ratio. This is the weight of VOC that is emitted when you have applied 1 weight unit (grams, pounds, kilograms) of paint solids. For example, this is expressed as pounds of VOC per pound applied solids - or as grams of VOC per gram applied solids. The weight units themselves do not matter, inasmuch as this is a ratio. Note: in this case - paint solids are percent solids by weight.

### EXEMPT VOC

At this time, water and some specific solvents are classified as exempt by the EPA and local state air quality districts. Water and exempt solvents are part of the volatile portion of the paint, but they are subtracted from most VOC calculations. NOTE: some Air Quality Management Districts or Air Pollution Control Districts have defined specific low solids products wherein water and exempt solvent are not subtracted.

Air quality regulations are always changing. Furthermore, air quality regulations are not consistent throughout the country, nor are they consistent within California. Therefore we strongly recommend that you refer to your local AQMD/APCD for the current rules.

**If a coating contains either water or one of the exempt solvents, then it will have two different VOC values, which are:**

#### 1. COATING VOC

This is an "artificial" VOC computation that the EPA and AQMD use to regulate paints and coatings that contain either water or exempt solvents. (All water and exempt solvents are first "mathematically subtracted" from the paint and then the VOC is calculated on the remainder).

The **COATING VOC** is sometimes called **REGULATORY VOC**, and this is the VOC that air quality districts use to determine whether or not a paint is in compliance with the limits set by a rule.

#### 2. MATERIAL VOC

This is the **actual or real amount of VOC that a gallon of paint contains** - it is the true weight of VOC in the paint as supplied to the user.

**Important Note:** Always use the **MATERIAL VOC** to calculate actual VOC emissions.

The VOC WEIGHT RATIO may also be used to calculate total VOC - but you will have to then calculate the total solids applied.

**If a coating does not contain water or exempt solvent, then the MATERIAL VOC and the COATING VOC will be the same.**

There is much confusion surrounding these VOC numbers. We recommend you become familiar with these definitions and the graphic representation on page 2.

NOTE- See next page: Maclac "Conventional and Exempt Solvent (275 G/L VOC) or Waterborne Lacquer

Comparisons" sheet on page 2 for a graphical representation of these calculations.

## Comparison of VOC content of a Conventional Lacquer with that of a 275 G/L VOC (or Waterborne) Lacquer

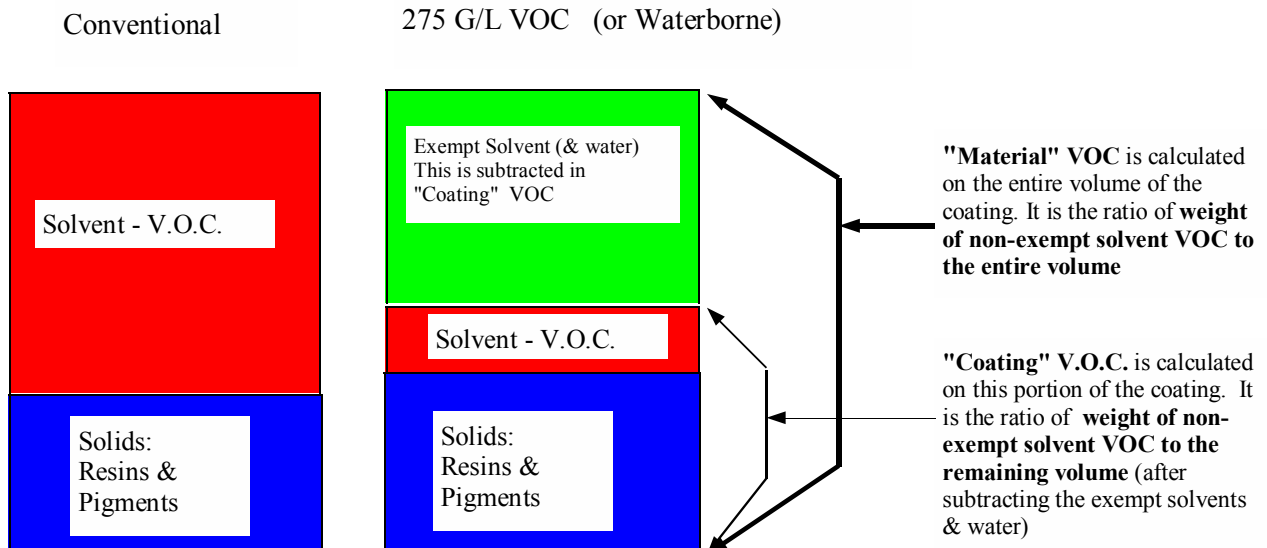
V.O.C. is defined as Volatile Organic Compound (which is almost all solvents) - and it is expressed as a ratio of weight to volume (e.g. pounds per gallon or grams per liter).

In Coatings without any exempt solvents (or water) V.O.C. is the amount of solvent in the coating.

In Coatings with exempt solvents (or water) Coating V.O.C. is calculated by first subtracting the amount of exempt solvent (and water) in the coating, and then calculating the ratio of the remaining (non-exempt) solvent to the remaining volume.

This is the E.P.A. method for calculating "Coating" V.O.C.

Material VOC is the actual VOC content of the paint as supplied.



Note: the figures presented below are for demonstration purposes only and should not be assumed to apply to all lacquer coatings.

Note: the conversion factor to convert grams per liter to pounds per gallon is 120 (Divide G/L by 120 to get Lbs/Gal).

**Conventional Lacquers**

Coating VOC is 680 Grams /Liter  
(Which is also Material VOC as it doesn't contain any water or exempt solvent)  
Actual VOC content is 5.67Lbs /Gallon

**Low VOC Lacquers With Exempt Solvents**

Coating VOC is 275 Grams/Liter (Exempt solvent is subtracted)  
Material (or true) VOC is 75 Grams/Liter  
Therefore actual VOC content is 0.625 Lbs/Gallon

**Pounds of VOC emitted per application of 100 gallons of coating**  
(in both cases we use MATERIAL VOC for the calculation)

Conventional Lacquer = 567 lbs.

275 G/L VOC Lacquer = 62.5 lbs.