

VOC Emission Factors for Use of Organic-Containing Materials – December 2014

VOC Emission Factors for Organic-Containing Material

VOC and TAC/ODC emission factors for organic-containing material should be estimated from Material Safety Data Sheet (MSDS) Technical Data Sheet (TDS).

VOC Content (Emission Factor) of Mixed Materials

Where organic-containing materials are mixed before application, the following equation can be used to estimate emission factors:

$$\text{VOC} = [(\text{VOC of Component A} \times \text{Parts of A}) + (\text{VOC of Component B} \times \text{Parts of B}) + (\text{VOC of Component C} \times \text{Parts of C})] / (\text{Total Parts of the Mix})$$

Operator can obtain VOC of the components from the MSDS or TDS. The following example illustrates how to calculate the VOC of material as applied.

Product	VOC of Component, lb/gal	Parts
Component A (Paint)	2.5	8
Component B (Reducer)	3.0	4
Component C (Hardener)	1.0	1

Step #1: Multiply VOC of Component by Number of parts as follows:

$$\begin{array}{rcl} 2.5 & \times & 8 & = & 20.0 \\ 3.0 & \times & 4 & = & 12.0 \\ 1.0 & \times & 1 & = & \underline{1.0} \\ & & \text{Total} & & 33.0 \end{array}$$

Step #2: Total Parts of the Mix = 8 + 4 + 1 = 13

Step #3: Divide TOTAL VOC by Total Number of Parts:

$$33.0/13 = 2.54 \text{ lb/gal}$$

Hence, VOC of mixed material as applied = 2.54 lb/gal

Default Emission Factors for Organic-Containing Material

Default factors with units of pounds per gallon can only be used with material usage reported in gallons. Default factors with units of pound per pound can only be used with material usage reported in pounds. The following emission factors may be used only when actual VOC data from MSDS is not available or cannot be obtained from the manufacturer.

Material Description	Emission Factor	
	(lbs/gal)	(lb/lb)
Coating Materials		
Adhesives	5.2	
Enamel	2.8	
Lacquer	2.3	
Urethane / Polyurethane (Hi-Gloss)	3.5	
Urethane / Polyurethane (Non-Hi-Gloss)	2.8	
Primer	2.3	
Sealer	2.3	
Shellac (Clear)	6.1	
Shellac (Pigmented)	4.6	
Stains	4.6	
Varnish	4.1	
Other Coating Material-Use ONLY	MSDS	
Printing Materials		
Blanket Wash	6.7	
Flexo Inks - Water borne	1.5	0.18
Flexo Inks - Solvent borne	4.5	0.60
Fountain Solution	0.8	
Gravure Inks	2.5	0.32
Letter Press Inks	2.5	0.32
Lithographic Inks - Heatset (Gas/Electric) Including RF	2.0	0.24
Lithographic Inks - Non-heatset Including RF	0.13	0.015
Lithographic Inks - Non-heatset (IR) Including RF	0.13	0.015
Screen Printing Inks - Water borne	1.0	0.12
Screen Printing Inks - Solvent borne	5.2	0.59
Overprint Varnish, Oil Based	2.2	
Overprint Varnish, Water Based	1.5	
Roller Wash	6.7	
Other Printing Material-Use ONLY	MSDS	
Solvents		
Butyl Acetate	7.2	
Butyl Alcohol	6.7	
Butyl Cellosolve	7.5	
Cellosolve Acetate	8.1	
Cellosolve Solvent	7.7	
Dimethyl Formamide	7.9	
Ethyl Alcohol	6.8	

Material Description	Emission Factor	
	(lbs/gal)	(lb/lb)
Freon 11	12.5	
Freon 12	12.4	
Freon 113	13.0	
Furfuryl Alcohol	9.4	
Hexane	5.5	
Hexylene Glycol	7.7	
Isopropyl Acetate	7.2	
Isopropyl Alcohol	6.6	
MEK	6.7	
Methanol	6.6	
Methylene Chloride (TAC only)	11.13	
Mineral Spirits	6.5	
Naphtha Solvent	7.3	
Perchloroethylene (TAC only)	13.58	
Petroleum Solvent (Stoddard)	6.5	
Toluene	7.2	
Turpentine	7.2	
Xylene	7.2	
1,1,1 Trichloroethane	11.05	
Other Solvent Material-Use ONLY	MSDS	
Miscellaneous Materials		
Contact Cement	2.1	
Epoxy Primer	2.8	
Glaze	4.6	
Linings (Can or Drums)	4.2	
Paint Remover	1.7	
Quench Oil (Heat Treatment)	7.5	
Treating Oil	7.5	
Lubricant Oil	1.5	
Rust Inhibitors	6.7	
Vanishing Oil	6.7	
Other Specialty Material-Use ONLY	MSDS	
Polyester Resin Coating Materials		
Resin - Manual	0.067	
Resin - Spray	0.120	
Resin - Mechanical Flow/Roll	0.050	
Gel Coat	0.360	
Resin Additives	0.050	
Other Related Material-Use ONLY	MSDS	