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VOC and Sto Products

What is VOC?

VOC stands for “volatile organic compounds”. In the case of Sto products, “volatile” refers to the ability of a substance to evaporate during drying of the coating. “Organic” indicates that these volatile substances are carbon-based.*

* Examples: gasoline, alcohol, toluene, benzene, etc., which are not used in Sto products.

Why is VOC a concern?

Many VOCs are considered “greenhouse gases” which can harm the environment. Also many VOCs are hazardous materials that can be dangerous when inhaled in large quantities or in enclosed spaces.

Considering the volume of coatings applied all over the world, the potential effects of the evaporation of VOCs on the environment are a concern which has resulted in government and various agency regulation.

In the case of industrial products such as coatings, a primary concern can be the health of the coating installer and other construction personnel that are present when the coating is emitting volatiles. (Some volatiles may also be released over time as the coating progresses through late stages of curing.)

VOC is most often thought of as an issue for solvent-based coatings like oil-based paints, urethanes and epoxies. However, some components in water-based coatings may be VOC. The presence and amount of volatiles in these coatings must be determined to verify compliance with applicable VOC regulations.

VOCs are typically reported in grams of VOC per liter of coating (g/L). Some entities may also publish VOCs in English units of pounds per gallon (lb/gal). Regulation is based on the VOC contents of coatings not including water or other “exempt” materials.

What are the limits for VOC? Who determines the limits?

VOC is limited based on the type of coating and its end use. Clean air legislation established the need and basis for identifying and reducing VOCs in all products that contain them. In addition to the US Environmental Protection Agency (EPA), several state and local air quality bureaus have been established to develop and enforce VOC requirements. The EPA has a set of requirements for different families of products, but some air quality bureaus are setting more stringent requirements. The most stringent air quality group is the South Coast Air Quality Management District (SCAQMD) of southern California. Sto Corp. uses the SCAQMD requirements as the VOC target for coating products, because products that meet SCAQMD requirements will also satisfy other regulatory bodies such as LEED and Green Seal.



How is VOC of a coating determined?

Two methods of determining VOC of coatings are accepted: laboratory testing or calculation.

Laboratory Testing:

The standard test method used is ASTM D 3960, *Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings*. VOC is measured by removing the volatiles from the liquid coating and determining the mass loss. This is done by oven drying a known mass of the coating and measuring the mass of solids that remain. The total amount that was lost in the oven is the VOC of the material, including water.

Calculation:

The VOC for each raw material is determined (usually by the raw material supplier) and the total VOC for the coating is calculated by adding up the contribution of each raw material to the total VOC based on the formula proportions. The typical calculation method required by SCAQMD is written below:

$$\text{VOC}_{\text{Regulatory}} \text{ (g/l)} = \frac{(W_{vm} - W_w - W_{es})}{(100 - V_w - V_{es})}$$

- Where: W_{vm} = Total weight of volatile compounds, g/L
- W_w = Weight of water, g/L
- W_{es} = Weight of exempt compounds, g/L
- C_d = Coating density, g/cc
- V_w = Volume of water (%)
- V_e = Volume of exempt compounds (%)

VOC contents of Sto Products

Sto Corp. reports VOC of coatings based on the calculation method. Sto products are labeled with the applicable VOC limit in accordance with EPA and SCAQMD requirements.

Materials that do not contain hydrocarbons, such as cementitious base coats and stucco do not have VOC.

VOC Contents for Sto Products

All values in g/L

| Product | Product Number | Calculated VOC ¹ | July 1, 2008 SCAQMD Requirement | Green Seal | LEED | EPA Requirement ² |
|--|----------------|-----------------------------|---------------------------------|------------|------|------------------------------|
| Flat Exterior Coatings | | | | | | |
| StoColor [®] Acryl | 201 | 43 | 50 | 50 | 50 | 250 |
| StoColor Coat | 202 | 48 | 50 | 50 | 50 | 250 |
| StoColor Coat Sand | 230 | 45 | 50 | 50 | 50 | 250 |
| StoColor [®] Lastic | 212 | 47 | 50 | 50 | 50 | 250 |
| StoColor [®] Lastic - Sand | 211 | 43 | 50 | 50 | 50 | 250 |
| StoColor [®] Lotusan [®] | 216 | 83 | 50 | 50 | 50 | 250 |
| StoColor [®] Silcolastic | 222 | 48 | 50 | 50 | 50 | 250 |
| StoSilco [®] Shield | 228 | 48 | 50 | 50 | 50 | 250 |
| StoPrime UV | 806 | 34 | 100 | 100 | 150 | 350 |
| StoColor [®] Acryl Plus | 648 | 45 | 50 | 50 | 50 | 250 |
| StoColor [®] Texture - Fine | 657 | 28 | 50 | 50 | 50 | 250 |
| Stolit | all | 27 | 100 | 50 | 50 | 250 |
| StoSilco Lit | all | 27 | 100 | 50 | 50 | 250 |
| Sto Powerflex | all | 48 | 100 | 50 | 50 | 250 |
| Sto Powerflex Silco | all | 48 | 100 | 50 | 50 | 250 |

| | | | | | | |
|--------------------------------------|-------|-----|-----|-----|-----|-----|
| Sto Powerwall Finish | all | 35 | 100 | 50 | 50 | 250 |
| Sto Essence DPR | all | 25 | 100 | 50 | 50 | 250 |
| Sto AAC Finish | all | 35 | 100 | 50 | 50 | 250 |
| Sto Powercyl | all | 25 | 100 | 50 | 50 | 250 |
| Sto Silco Shield | 228 | 48 | 100 | 50 | 50 | 250 |
| Sto Stucco Finisher | all | 48 | 100 | 50 | 50 | 250 |
| Sto Concrete Coating Smooth | 232 | 47 | 100 | 50 | 50 | 250 |
| Non Flat Exterior Coating | | | | | | |
| StoTique | 203 | 45 | 50 | 50 | 50 | 250 |
| Multicolor Coating | | | | | | |
| Sto Decocoat | 119 | 21 | 250 | 50 | 50 | 250 |
| Sto Granitex | 171 | 21 | 250 | 50 | 50 | 250 |
| Sto Creativ Granite | 173 | 19 | 250 | 50 | 50 | 250 |
| Primers and Undercoaters | | | | | | |
| Sto Prime Conditioner | 831 | 94 | 100 | 100 | 150 | 350 |
| StoPrime Sand | 801 | 69 | 100 | 100 | 150 | 350 |
| StoPrime | 814 | 50 | 100 | 100 | 150 | 350 |
| StoPrime Hot | 805 | 99 | 100 | 100 | 150 | 350 |
| Sto Bonding Agent | 245 | 22 | 100 | 100 | 50 | 350 |
| Sto Bonding and Anti-Corrosion Agent | 246 | 42 | 100 | 100 | 50 | 350 |
| Sto RFP | 225 | 27 | 100 | 100 | 50 | 350 |
| Sto Primer Adhesive | 100 | 19 | 100 | 100 | 50 | 350 |
| Sto Dispersion Adhesive | 829 | 17 | 100 | 100 | 50 | 350 |
| Sto Flexible Skim Coat | 213 | 20 | 100 | 100 | 50 | 350 |
| Waterproof Treatment | | | | | | |
| Sto Hydrotight | 206 | 55 | 100 | 100 | 200 | 400 |
| Sto Flexyl | 235 | 48 | 100 | 100 | 200 | 400 |
| Sto Watertight Coat | 214 | 48 | 100 | 100 | 200 | 400 |
| Sto Emerald Coat | 264 | 51 | 100 | 100 | 200 | 400 |
| Sto Gold Coat | 265 | 28 | 100 | 100 | 200 | 400 |
| Sto Gold Fill | 266 | 75 | 100 | 100 | 200 | 400 |
| Sto Vapor Seal | 263 | 51 | 100 | 100 | 200 | 400 |
| Mastic Texture | | | | | | |
| Sto Flexible Crack Filler | CR214 | 20 | 100 | 100 | 200 | 350 |
| Waterproof Sealers | | | | | | |
| Sto Clear Coat Sealer | CR512 | 154 | 100 | 100 | 200 | 400 |
| Sto Penetrating Sealer | CR650 | 32 | 100 | 150 | 250 | 400 |
| Sto Acrylic Urethane Sealer | CR514 | 328 | 100 | 150 | 250 | 400 |

1 Calculated using SCAQMD formula for VOC less water and exempt materials.

2 US EPA requirement per 40 CFR Part 59, Subpart D, as amended June 9, 2006