

Method for VOC Classification Based on Analysis of Paint Films

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Summary of Proposed Method

- A known quantity of the target substance is added to a formulated coating representative of the type of coating for which the substance is designed.
- Solids determinations are done at 110°C for times ranging from one to twenty-four hours.
- The films remaining after solids determination are placed in sealed vials and solvent is added to extract any remaining target substance.
- Internal standard is added and the solution is analyzed using ASTM D6886 or AQMD Method 313

Example paint preparation

- A new coalescent to be tested is added at 5% by weight to a near-zero VOC coating known not to contain the new product
- The coating sample with the target substance is analyzed using ASTM D6886 or AQMD Method 313
- The amount of the target substance in the coating is verified by comparing to the known formulated value.
- The relative response factor of the target substance should have been determined previously.

Solids samples preparation

- Twelve samples are prepared according to ASTM Method D2369 for solids determination.
- All twelve samples are placed in an oven at 110°C.
- After one hour, three samples are removed and weighed.
- Three more samples are withdrawn after two hours, eight hours and twenty-four hours.
- The fraction solids is determined for each sample.

Extraction of films

- Immediately after the triplicate determination of the solids content of the coating at a particular temperature, cut the aluminum pans containing the coatings solid films into several small pieces or peel the coating off the pans. Place in a 40 mL vial and seal with a Teflon-faced septum cap
- Weigh approximately 0.3-0.5 g of the film (or pieces of pan with film) in a headspace vial containing ceramic beads.
- Weigh 3-5 mL of appropriate extraction solvent (acetone, THF, Methanol, etc.) containing 1 mg/mL EGDE internal standard to the vial and seal.
- Sonicate, shake or otherwise mix the contents for one hour (this time may need to be modified).

Analysis of extracted films

- The solution used to extract possible remaining target substance is chromatographed using either ASTM D6886 or AQMD Method 313.
- The fraction target substance remaining in the film is calculated based on chromatographic data.
- This fraction can be converted to fraction of target substance in original coating remaining in film.

Analysis of data from different heating times

- Results from chromatographic data obtained from films heating at 110°C for different times can be plotted versus time of heating.
- Plots for different semi-volatile materials can be compared.
- A determination of what is or is not to be considered a VOC can be made based on these plots.
- It may be necessary to adjust the heating temperature or times to obtain appropriate data.