

### ARE WE TESTING FOR AND REPORTING VOC'S (VOLATILE ORGANIC COMPOUNDS)

**THE PROBLEM:** Cork is currently reporting VOC content data of water based coatings at levels higher than ever reported in the past. These higher values are not reflective of actual VOC content or release during the use of our coatings.

**THE REASON:** USEPA has mandated the use of test Method 24 to determine VOC content. This test requires a sample to be baked at 110 C. for 1 hour. The weight loss, subtracting water content, is considered the VOC content. The conditions of this test do not reflect those experienced by the coating during application. These test conditions cause the release of components from solid materials and other non-controlled volatiles producing artificially high VOC content results.

**VOC DEFINITION:** According to USEPA: "Volatile organic compound (VOC) - Any organic compound which participates in atmospheric photochemical reactions; that is, any organic compound other than those which the Administrator designates as having negligible photochemical reactivity. VOC may be measured by a reference method, an equivalent method, an alternative method, or by procedures specified under any regulation." Ref: EPA-450/3-84-019. Further, VOC content is to be measured by Method 24 which encompasses three ASTM procedures: D2369 for total volatiles, D3792 for water content using gas chromatography, or D4017 using Karl Fisher analysis for water content.

**COATING VOC CONTENT AND USE:** Most aqueous coatings contain solid component polymers, waxes and additives, which comprise 40% of a typical coating. The volatile compounds are water, ammonia or amine, and perhaps co-solvent. Volatile organic compounds would include organic amines, low-boiling glycols, glycol ethers and/or other listed substances. Amines and/or ammonia, are necessary to maintain alkali-soluble polymers in solution or dispersion. Ammonia is not an organic compound and does not contribute to VOC levels. However, when a supplier determines VOC's of a coating by means of ASTM D2369-81 as specified by reference Method 24 (wherein coating is dried (baked) at 110 C for up to 1 hour), certain coating components that are non VOC's are driven off.

**THE LAW:** The 1990 Clean Air Act Amendments provide definitive direction to the USEPA to develop and implement programs to control the release of air pollutants.

These amendments are targeted to resolve chronic air pollution problems such as toxic air emissions, ozone depletion, urban air pollution and acid rain. The main air pollution issue concerning the Graphic Arts Industry is ozone and its formation. Ozone stems from chemical reactions created when VOC's, oxygen, and oxides of nitrogen are exposed to sunlight. Low level ozone can cause health problems, damage ecosystems and property. Ozone created by pollution does not add to the disappearing upper atmosphere protective ozone layer, which shields us from harmful UV radiation. Geographic areas where air pollution is high (Ozone nonattainment areas) are classified as extreme, severe, serious, moderate and marginal. Printers emitting VOC's above certain levels located in or near these areas will be classified as major sources and be required to reduce VOC emissions.

Major source definition varies by region and state, but as a minimum, those in areas classified as extreme are those who have the potential to emit 10 tons/year (TPY), or 25 TPY in severe areas, 50 TPY in serious areas and in ozone transport areas, and 100 TPY in moderate, and marginal areas. The potential to emit VOC's is calculated based on the maximum production capacity of equipment running 24 hours a day, 365 days a year, for a total of 8,760 hrs/yr. There are no allowances for downtime or part time use. All major VOC sources in these areas must obtain permits to operate and use Reasonably Available Control Technology (RACT). USEPA is to issue a Control Technique Guideline (CTG) by Nov 15, 93 for offset litho which will define RACT for existing sources. CTG's only set minimum requirements, but states can mandate tougher ones.

New installations as major sources in nonattainment areas will be required to reduce VOC emissions even more than existing sources will under the CTG's. All new equipment installations will have to use the best demonstrated VOC reduction technology available to reach the Lowest Achievable Emission Rate (LAER). For new flexo, gravure and screen printers using solvent-based inks and coatings, total emission capturing enclosure is being required before construction permits are issued. Even new offset operations have been requested to study enclosure. All businesses subject to regulation will have to obtain state and/or locally issued permits for construction, installation/operation.

In addition, USEPA has identified a list of 189 air toxics to be controlled. Major sources have the potential of emitting 10 TPY of a single air toxic or 25 TPY of any air toxic combination.

OVER

(MACT) Maximum Available Control Technology standards will eventually be imposed. While gravure, is the largest printing industry source of air toxics, the standards may also cover litho.

**CONCLUSION/SOLUTION:** Printers need to monitor and interact with local EPA because states/local emission control agencies will implement air pollution permits, testing, monitoring and record requirements. Further, it is important that printers, suppliers and Graphics Arts organizations, weigh the viability of VOC determining test methods, and develop appropriate emission factors to use in determining VOC releases from end users. VOC content is not the same as VOC emission. Clearly a solution is needed so that we stop the reporting of higher VOC product content than is ever emitted when a water based coating is used. Remember, USEPA'S position is that formula calculations to determine VOC's are not acceptable and VOC determination must be based on Ref. Method 24.

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