TECHNICALLY SPEAKING

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VOC: It's Not Simply a Number

I receive many requests each month to provide customers with the VOC content of our solvent-based products. Many callers are perplexed why we do not already have this information on our product MSDS. At one time, the weight percent of all **non-exempt** chemicals in our products was listed on each product MSDS, but this information had been removed for several reasons. There is a Federal list of exempt chemicals, and many state and municipal lists of exempt chemicals; however these lists do not always agree. Furthermore there are five EPA approved ways to calculate VOC content and each method can yield different values for the same product. The choice of a particular calculation method can depend on the users location, the air quality regulations for his region of the country and locality, and the applicability of a NESHAP (National Emissions Standards For Hazardous Air Pollutants). Even then more than one method must be used for calculating VOC, depending on the different ways in which the same product can be used, in the same facility!

Let's take a brief look here on what a VOC is and why it's important. VOC stands for "volatile organic compound". These are chemicals whose vapors have been found to chemically react with nitrogen oxides (NOx - which are produced by auto exhaust, the burning of fossil fuels for power generation, and other industrial processes) in the air, in the presence of sunlight, to produce ground level ozone and "smog". The ability of certain chemical vapors to produce smog, when sunlight makes them react with nitrogen oxides, is referred to as **photochemical reactivity.** It's the **emissions** of these photochemically reactive vapors into the air with which the EPA is concerned.

Chemicals whose vapors are not photochemically reactive, that is, they don't react with NOx to form smog, are considered **exempt** and are not counted when you add up the amount of VOC ingredients in a product. Some chemicals that we use, such as acetone, are not photo-chemically reactive, and are therefore exempt from VOC calculations.

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The federal EPA publishes a list of exempt chemicals, and many states publish their own list of exempt chemicals. In addition, some localities and municipalities publish their own lists. A chemical that is listed as exempt on the EPA list may not appear on the individual state or municipal listings.

A quick Internet search for "methods of calculating VOC' turned up well over 1000 "hits". One of the documents listed is a report by the Virginia State Advisory Board on Air Pollution Subcommittee on VOCs. An excerpt from this document sums up the current state of VOC determination in the United States:

"**The subcommittee found that, there is a wide range of approaches to VOC testing in use by various states**. VOC test results are used for a variety of purposes, namely emission fees, new source review applicability, and compliance with permit limits and control efficiencies. **Most permits do not specify VOC test methodology for purposes of demonstrating compliance with VOC limits**. There are inconsistencies and lack of guidance among states and EPA regions in implementation of VOC test methodology. **Due to the wide range of industries and types of emissions from sources within an industry, it is technically difficult to specify any one single method (out of the many EPA approved methods) for VOC measurement."** (Emphasis mine)

This pretty well sums up the reasons why it is so difficult to specify a simple value for the VOC content of ITW Chemtronics cleaning products. Without specific knowledge of the area of the country in which the customer is located, the EPA region under whose regulations they operate, if they are operating under a Federal NESHAP, the existence of state and local emission regulations, and the specific application or way in which the product will be used, it is unwise to list any VOC information on our product MSDS. A value calculated for a particular product, for a particular customer, would not be applicable for another customer in another region of the country, especially if he is using the same product for a different application.

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Many states do not recognize all of the chemicals on the EPA lists as being exempt, and some states publish their own special lists of exempt chemicals, and even here exemption of a chemical from VOC consideration may depend on how it is being used. As an example Chemtronics uses three chemicals that are currently considered exempt under Federal EPA and California's state regulations, but in 2006 a new consumer product safety regulation will take effect in California, under which these same chemicals will no longer be exempt. (California is generally the most extreme case and all industry there is moving toward water-based cleaning).

The EPA also maintains a list of chemicals that are considered to be hazardous air pollutants (HAPs). Specific industries which use these chemicals, regardless of where they operate, can fall under a Federally mandated NESHAP regulation, which specifies the permitted level of emissions for each HAP and any MACT (maximum achievable control technology) that must be used to restrict HAP emissions to the mandated levels. If a particular company operates under a NESHAP, it must calculate VOC emissions in a totally different way, looking primarily at the volatility (vapor pressure) of the chemicals they are using, rather than their photochemical reactivity. Further complicating this situation is that many customers **will not know** if they are operating under a NESHAP regulation. We would need to know this before we could offer them any guidance in calculating the VOC content of our products.

In most cases air pollution or smog problems are local in nature, and the best treatment is a local solution. Therefore, some municipalities are promulgating their own VOC regulations, to solve their own specific smog problems. If the multiple Federal regulations and their state's own general or specific emissions requirements do not solve the city's particular problems, then it is up to the municipality to develop and enforce its own laws to solve the problem. They may have to include certain chemicals in their "non-exempt" list, even if these same chemicals are considered exempt at the state or federal level.

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To eliminate the confusion caused by all of these conflicting legal requirements, we are not placing VOC information on our product MSDS or TDS. We would rather have the customer contact ITW Chemtronics directly for this information. If they require the VOC content to be given in specific units (usually grams of VOC per liter of liquid product) we can question them to determine: the state they operate in; the air quality region in which they operate; if they are operating under a Federal NESHAP; any state or municipal regulations which may be applicable; and the way in which the product is being used. We can then **guide** them in determining the proper way to calculate the VOC content of the Chemtronics product(s) they are using.

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