

Volatile Organic Compound- VOC

An interview with Phil Holgate MRACI Ch Chem, of TAMSA International Consulting.

One could argue that we live in an increasingly alarmist society. Everything from environmental to health concerns can heavily regulate our lives, sometimes necessarily, sometimes not. Our industry is not shielded from this. It has long been accepted that the level of toxicity in some floor coatings should be addressed. The question is, how much regulation is required, and should it be at the expense of freedom of product choice?



At Lagler, we have traditionally held the view that the issue is not the existence of toxicity or potential health risk, since this surrounds us in everyday life. The issue is full awareness of the risks, the availability of choices and full disclosure to all stakeholders. Right now, solventborne polyurethanes are generally, the most cost-effective and durable options available, and so long as contractors and their customers are made aware of potential health issues, and the available alternatives, the choice should be theirs. However, in order to do this, there must be a uniform, and unanimous method of standardisation and measurement of “toxicity”.

VOC has emerged as the accepted industry measurement/ standard on “toxicity” in various products, including floor coatings. **Phil Holgate** is well known as a developer of coatings and provider of technical support to the coatings industry. Phil was the keynote speaker at the 2009 ATFA conference, and is regarded as the industry’s leading expert on the subject of VOC’s. Lagler Branch Manager Patrick Atherton posed a few questions to Phil about VOC’s.

PA: In layman’s terms, what does VOC mean and how is it relevant to the flooring contractor?

PH: VOC is an acronym for Volatile Organic Compound, in essence the solvent content in a coating. This may include hydrocarbons in a solvent borne, co-solvents in a waterborne and oils in hardwax oils. Relevance to the contractor is many fold, but at the forefront is health. All solvent exposure is potentially harmful. Respirator use can help but cartridges must be replaced daily (Qld Health / ATFA project) for effectiveness. A contractor needs to look after their own health. But also a contractor must, as part of their legal Duty of Care, advise their client of the coatings choices and the health risk potential of those choices. The general guideline is that if a homeowner is: pregnant, suffering a respiratory condition (such as asthma), aged, or known chemically sensitive, then low VOC options *must* be offered to comply with Duty of Care and avoid litigation against adverse reactions from the coating. Low VOC is now being specified. Increasingly architects and specifiers are avoiding higher risk more toxic high VOC coatings not just from the litigation potential but from the aspect of building energy ratings and star ratings.

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So there are proven health issues specifically attributed to exposure to high VOC in floor coatings?

Yes. TDI (Toluene Diisocyanate) in solvent based polyurethanes is a class 2 carcinogen. This has been known to cause things like peripheral nerve damage (hands and feet), set off skin sensitivities and industrial asthma and so on. Besides that, the 'gassing off' of trapped solvents continues well beyond the lingering smell. Solvent exposure in sensitive persons can create an adverse health response, and in fact have done so.

Okay, so let's be the devil's advocate here. Surely these examples are worse case scenarios. I mean, in the case of skin irritations or asthma (for example), surely it's more likely to provoke a pre-existent condition, than to "bring on a new one", so to speak? So why should this be an issue to the floorsanding contractor?

Well, both yourselves and the contractors who sell and handle a product must understand the legal context of 'Contributory Professional negligence'. This is where, as a professional, you know (or *should* know) that something can cause harm to a person and fail to inform the customer of the said hazard, and the choice of options available to the customer to reduce the hazard potential, and subsequently the customer incurs harm or injury.

Of course the adverse effects do occur mainly in persons with pre-existing condition. But 30% of the population has asthma, or some respiratory condition, or known reaction to allergic stimuli. This means that the chances are very high that one person in every household *could* be adversely impacted by solvent exposure. No one knows what they might be allergic to unless they have some exposure to that trigger. Once triggered, then lower levels of the allergen will trigger future allergic reactions. Does a contractor want to take that risk of not enquiring, as thoroughly as possible, as to the state of health of the occupants and not offering a low VOC alternative in case there is a concern? I have been involved in a court case where a person could not enter a premises after some 6 months due to outgassing. The contractor did not make the appropriate enquiries re health condition of occupants. It got messy because of the duty of care argument. So it was an exceptional sensitivity case. But this is a tested legal precedent and nobody, from a distributor to a contractor, is immune to the legal implications of a) not being informed and b) not informing others. I'm not trying to scare everybody off solvent polyurethanes, they are a cost-effective and highly durable option. It's about maintaining a professional standard of disclosure to protect everyone in the industry from potential litigation. Oh, and by the way, even the *household pets* must be considered in this equation!

How is VOC measured?

VOC is measured by considering the solvent content of the coating. For example, a 45% solids Moisture Cure Polyurethane coating has 55% solvent content, so VOC is around 550 grams per litre. All solvents with a boiling point of less than 250 degrees celsius are considered as VOC's

What types of products traditionally contain the lowest VOC's?

I compiled a guide on this for ATFA, in co-operation with coatings suppliers, and it lists the VOC content for virtually all coatings in use in Australia. For the higher durability polyurethane coatings, waterborne polyurethanes can have the lowest VOC's. For the lower durability non-polyurethanes, some hard oil waxes and penetrating oils can be very low VOC. However, just like the iconic "oils ain't oils" slogan, waterbornes can differ immensely with some not even being compliant to the ATFA / CBCA 140 gram per litre (14% solvent content). Yes, some waterbornes exceed this level. Again, I advise anyone interested to contact ATFA and ask how to get hold of the product listing.

What is the standard method of measurement or determination? Is it standardized worldwide or are there differing methods between countries?

That's a good question! There are some major differences in the way the USA calculates VOC compared to Europe. Australia has adopted the European method. This considers VOC's to be all solvents that boil below 250 deg centigrade. The USA method classifies a VOC solvent as one that contributes to photochemical smog. It's a different parameter, so much that, for example, Acetone is not considered a VOC in the USA as it does not contribute to photochemical smog. But Acetone boils well under 250 deg C, so it's classified as a VOC in Australia. The USA method also determines VOC content in a waterborne as the % of the solvent in the mix *less the water*. Our method includes the water content of the mix in determining the percentage VOC. Consequently the USA VOC's in a waterborne are around 40% inflated compared to our methodology. The method we use is simple as the VOC is essentially the solvent content.

Is VOC rating the most accurate barometer of "toxicity" for the layperson?

I would say it is the best but not always the most accurate. For health issues I say it is the best in that it is a simple value that in general does give a barometer of toxicity and no other simple method exists. The higher the solvent exposure the higher the health risk is a correct generalization, although exceptions naturally exist: it is possible to have a low VOC more toxic than a higher VOC because of more toxic solvents used, but this is the exception rather than the rule. A coatings company might say 'consult the MSDS'. My gripe is that the MSDS are more often than not, not written in plain English and trying to decipher actual toxicity from an MSDS is way beyond the man in the street. I often get calls, mainly from contractors, trying to decipher MSDS'.