

by a nose

When waterborne paints first started displacing solventborne, oil-based alkyd interior paints, they were welcomed, not only for their fast drying and ease of clean up and application, but also because their odour was so much lower and more pleasant than the smells associated with the solvents and the curing of the alkyds.

How quickly times change and how quickly we get 'spoilt'! Those original waterborne paints are nowadays considered far too odiferous, with too high levels of VOCs.

Now, compared to the grizzly bear or the bloodhound, the human nose is not considered overly sensitive but, with several million olfactory receptors, it can detect certain odours when present at less than one part per billion in air! Studies have shown that olfactory sensitivity peaks between the ages of 10-15 years and that women are invariably better at 'sniffing things out' than men. The state of one's health impacts on one's olfactory sensitivity with one group of researchers suggesting that smell tests should be part of psychiatric disorder diagnostics! So, the perception of odour is not uniform across the population.

Odour is often associated by chemophobes with 'toxic' chemicals but odour can be a real safety feature. The sensitivity of the human nose is such that it can often detect materials at levels well below the detection power of present analytical techniques and way, way below dangerous toxicity levels. So odour is often an 'early warning system'.

Your scribe grew up in England where 'coal gas' was reticulated to most urban houses. Now 'coal gas' was the name given to carbon monoxide, an odourless and toxic gas. As a safety measure, an odorous material was

added so that gas leaks could be detected well before gas levels became dangerous.

Responding to market demand to reduce odour levels of waterborne paints has set the industry on a bit of a rollercoaster ride with many unforeseen hurdles arising.

An obvious first move was to eliminate ammonia (which is used to maintain the pH of the paint at a level to promote maximum stability) with odour-free 'fixed' bases such as caustic soda or caustic potash. It turns out, however that not only does a significant portion of the population quite like the smell of a little ammonia, but also the ammonia was effectively masking some of the other odours in the paint.

This leads into the area of assessing odour, not just to a level, but also to a degree of acceptability. It doesn't help that the population does not always perceive odour uniformly and, in the case of androsterone, one man's 'floral bouquet' may be another man's 'pissoir'.

This feature is attempted to be assessed by the concept of a 'hedonic tone' of an odour. It scales from -10 (which is bloody awful) to +10 which is very, very nice.

From a personal point of view, Resene put out a uniquely good, niche product called Resene Waterborne Smooth Surface Sealer. It contains an irreducibly low level (a few parts per million) of a by-product called vinyl cyclohexane. I can't stand it – literally gets up my nose – and wouldn't use it if there was anything else on the market which works as well. It definitely gets a -10 on my hedonic scale, but most people find it very low odour, which technically speaking it is.

The above is an example of the hurdles that we come up against. Time and again, it appears that as the obvious odourants are dealt with, very low levels of by-products assume a 'non-intuitive' significance.



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The best way to deal with an odour is to remove it completely – if that is technically possible. There are, however, a range of products called odour maskers, which can be used to disguise unpleasant odours. The least sophisticated method is simply to add an industrial perfume, which 'swamps' the olfactory receptors. This approach is useful for disguising paint smells 'in the can' but can dissipate during application leaving the unwanted odour obvious once again during the drying and curing of the film on the wall.

A more sophisticated approach is to use a masking agent which, because of its molecular structure, will intimately associate with the targeted malodorous material. The intimate association prevents the 'locking in' with the olfactory sensors and the odour is not recognised. Such masking agents are highly specific and only a few

effective ones are available.

As with the mercaptan addition to coal gas, some residual odour is also useful in paint. Waterborne paints need good ventilation in order to achieve tough, well-cured films. Odourless paints provide no incentive to provide this necessary condition. As a result, the ensuing extended drying period can result in weaker than normal films with an increased incidence of the annoying phenomenon of surfactant leaching.

So there we have it! Products with diminishingly small amounts of odourless materials used by a variably sensitive group of users but with a growing sensitivity to chemical odours that are often associated with the bogeyman of 'toxic outgassing'! I probably produce more 'toxic outgassing' after a meal of chilli con carne – but that is another story!!



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