

blood brothers

On the face of it there would seem to be very little commonality between diplomats and paint chemists but, scratch the surface a little, and a deep vein of similarity is revealed. It is said that diplomacy is the art of compromise - and the ability to compromise is something that is a fundamental necessity for even a partially sane paint chemist.

The very essence of modern paint design is itself a huge conflict. Almost everyone, quite rightly, looks to using product which has a minimal impact on the planet, is non-polluting and in harmony with nature. Paint is designed to battle nature and revels in its ability to combat and turn back nature's attempts to biodegrade materials!

But compromise occurs on much smaller and simpler scales also. Consider, for example, non-skid paints. The technology behind non-skid is relatively simple - embed within the paint matrix a relatively large, hard, sharply faceted particle that protrudes above the binder surface. One can draw the comparison of sandpapers applied by a brush or a roller. Such coatings will not only stop you dead in a skid, but, if you still tumble due to the rapid deceleration, will rip open any bare skin that may have made contact with it.

Such a coating needs to be kept clean so that the protruding particles remain effective and therein lies the conflict. Have you ever tried to clean such a rough surface? Character building is the only vague positive! Cleanability can be improved by overcoating with a standard coating but the skid resistance drops - swings and roundabouts!

Users want primers and undercoats to provide tough resilient barriers. They also want them to be easily sanded - roundabouts and swings!

As even the layperson would know, waterborne paints contain, as an absolute necessity for maintaining paint stability in its can, a variety of detergent-like surfactants. These vital ingredients come along with the tendency to reduce water resistance of films; can bring about surface-disfiguring 'surfactant leaching' and, possibly most irritatingly, the tendency to create unwanted bubbles on the paint surface during application, which often remain as a permanent feature of the film.

Fortunately, we have in our armoury, a series of defoamers and antifoams to address this issue. Defoamers do have the drawback of impacting negatively on the colour acceptance of the paint and hence the colour accuracy. Equally fortunately, the defect can be overcome by the addition of a suitable surfactant, which has the tendency of producing more foam! A very circular problem so one which must be consigned to the roundabouts!

Waterborne paints consist of a range of ingredients which combine to form a film and, yes you guessed it - water. Resene has long had a philosophy of, and built a successful business around, designing paints containing a maximum of film forming material and a minimum of water. A minimum of water requires very little evaporation of that water before the film sets into a semi-solid gel. Such 'high volume solids' paints bring along their own problem of short 'open times' (i.e. drying too quickly), which was overcome by the use of non-toxic propylene glycol. This additive slows the drying of the paint to manageable times before evaporating into the atmosphere leaving the film behind perfectly intact.

The declaration of propylene glycol as a VOC did put us into somewhat of a 'tizz' with many gnashings of teeth and renting of clothes. The addition of more (slightly thickened water) facetly solves the ease of application problem but at the expense of film thickness and protection. New techniques have and are being investigated but it would be fair to say that the gnashing and renting may continue a while.

It is the removal, or significant reduction, of another VOC which causes the chemist the most concern, conniptions and the need to compromise.

Paint films are typically at their best when they are tough, generally hard and of very high molecular weight. It is not hard making waterborne polymers to fit the above parameters - the problem is that they are too tough and form films at ambient temperatures. The answer was to add copious amounts of solvents (called coalescing agents) to render these polymers tractable; soft enough to form a film and then evaporate to return the polymers to their original tough state.

Several elegant strategies are being researched in order not to resile from the above ideal while striving for reduced VOC and they are not without success. Nonetheless, the compromises to be yet overcome are keeping thousands of polymer and paint chemists around the world in gainful employment. Plus ça change, plus c'est la même chose!

I'll finish with a story which happened to me earlier this month. One of our raw material suppliers, ever on the hunt for mutually beneficial materials, unearthed what they considered something of significant interest. The data claimed that "XXX is a levelling agent; defoamer, flow and rheology modifier and adds soil resistance. It is useful in waterborne paints to extend open time and for use in solventborne coatings and stains, to impact oil and water repellency, stain resistance and anti-block performance". Stunning claims indeed! (Well, maybe only to a chemist!) I followed up by checking the Safety Data Sheet and found (and I kid you not!) the phrase "Fatal by inhalation"!!! She's a hard road finding the perfect paint additive but!

Tip: When you're cleaning a non-skid painted finish, use Resene Paint Prep and Housewash to make the job easier.



Architect Memos

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visit www.resene.com.au

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