Resene

Resene Paints Limited

# Architects Memo

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# DOES YOUR PAINT BREATHE?

## Yes — quite deeply when it gets excited!

Buzz words come and buzz words go, but 'breathability' of paints is one that has hung on for quite a while. It is in danger however of being ousted by a new word from Europe, namely 'microporosity'. As both words relate to the same phenomenon, and because there seems to be some confusion surrounding this area, we have decided to make it a subject of a memo.

'Breathability' in essence has come to mean the ability of a film to transmit a gaseous material at a far greater rate than the same material in liquid form. Theoretically this applies to any liquid, but in practice it means water; and a paint is said to have the ability to breathe when it will keep rain off a substrate, but will allow that substrate to dry out through the paint without damaging the film.

Permeability is measured by a unit weight of transmitted material (e.g. water vapour) passing through a unit area for a unit time, through a specific thickness of film. It is obvious, but worth underlining, that the breathability of any film decreases the thicker the film is applied.

The actual mechanics of 'breathing' is that of a molecule of water wriggling its way through and between adjacent molecules in the film. The size and the shape of these molecular gaps affects the rate at which the water molecule can penetrate. Polyvinyl acetates and acrylics are known as 'polar' polymers because of their characteristic molecular arrangement, and generally allow water vapour to pass through readily. On the other hand 'non-polar' polymers such as chlorinated rubber and polystyrene greatly restrict the passage of water and vapour.

The introduction of pigments and fillers into films can also influence the water vapour transmission by providing extra channels for water to get through if the pigment or filler is of an irregular-shaped porous nature, or by increasing barriers if it is of a 'platey', reinforcing nature. Levels of these materials also affect the transmission particularly if they are at such a high level that there is insufficient polymer present to bind everything into a continuous film. In such circumstances rather large 'holes' can be left in the film.

To get some indication of the size of a 'hole' needed to allow a molecule of water to pass through it, one droplet of water contains about thirty billion, trillion molecules; there are very few materials that can totally prevent one or two of these little fellows squeezing through.

In conclusion we can say that virtually every paint can breathe and that the major differences are in the rate of breathing. This rate alters with polymer type and with type and level of pigments. A flat P.V.A. will be one of the most water permeable paints available whilst a gloss chlorinated rubber the least. A system breathes sufficiently if, for any specific job, any moisture in the substrate can escape (to prevent the build up of damp patches) without causing blistering or flaking of the paint. This becomes a numbers game and a successful system can fail when another coat of the same material is added!

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