

DID YOU KNOW?



Hints and tips from the Technical Department

Coalescence of Acrylic Paints

With the winter painting season the occasional complaint of patchy drying, mud cracking, low gloss and a powdery finish is received for water borne paints. In winter, with its short days, high humidity and cold temperatures it is not uncommon for conditions for painting to be less than ideal for long periods of time.

With turps thinned alkyd paints these conditions result in a slowing down of their curing reaction. Though this leaves alkyds vulnerable to dust pickup and mechanical damage from handling or rain, the reaction will continue, albeit at a slower rate, and the finish will eventually cure with damage usually being confined to some dust pickup and/or gloss loss due to water falling or condensing on the surface.

Water based paints have a two stage drying process. The first is the loss of water from the film, the second is a combining or "coalescence" of the individual microscopic droplets of paint suspended in the water. This coalescence of paint droplets is assisted by using a "coalescing solvent" to soften the droplets, so helping them combine together. Low temperatures harden these droplets making it difficult for them to combine. High humidity's common in winter can result in the coalescing solvent escaping before the water, also making it difficult for the droplets to combine. Either or both of these factors can result in poor film integrity, gloss loss, patchiness in sheen and colour or, in severe cases, microscopic mud cracking and a powdery finish when water based paints are applied. These defects are irreversible. The only solution is to scrub, strip or sand the affected area back to a sound surface and repaint in more favourable conditions.

As the paint is applied to a surface, it is the temperature and the humidity at that surface that is critical, rather than the temperature and humidity in the bulk of the room being painted.

To avoid the problem in the first place the following steps are recommended;

1. Ensure temperatures of the paint and the surface are above the recommended minimum for curing, usually 5°C or 10°C.
2. Ensure relative humidity in the room is less than that specified for curing, usually 80%.
3. Ensure there is plenty of airflow through the room to remove the water evaporating from the surface of the paint, while at the same time ensuring that temperature remains above the specified minimum and relative humidity below the specified maximum for the duration of drying of the acrylic, usually 1-2 hours.

Heating the air increases its capacity to hold water, and this drops the relative humidity. If conditions are marginal, pre-warming the paint in a heated room and heating the room being painted, preferably with hot air blowers can assist in preventing the sort of defects observed when water borne paint fails to coalesce.