Technical Bulletin

Cold Weather Painting

Technical Bulletin TB-01

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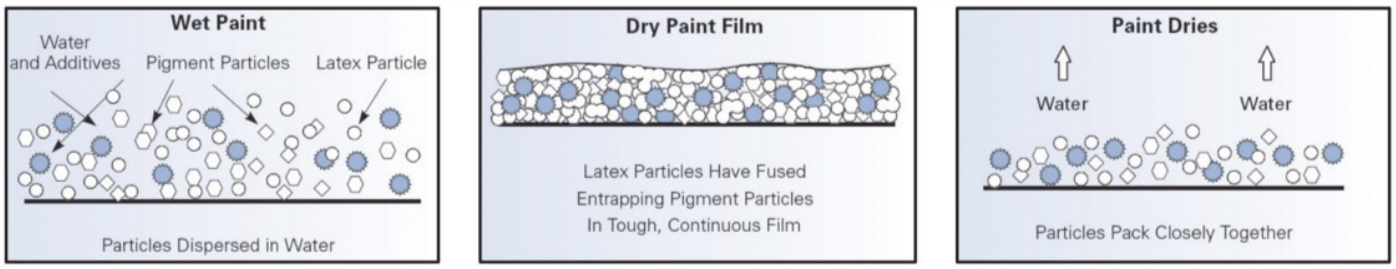
Painting in cold temperatures can cause several problems on a paint project. The temperature can affect the adhesion, color, sheen, drying time, curing time, flow and leveling as well as making the application process very difficult. Solvent based products will become more viscous (similar to motor oil or lubricants), water-based products will become much thicker and make application very difficult. We do not recommend adding water to lower the viscosity to improve workability as this will affect the chemistry of the paint and performance of the paint.

The purpose of this technical bulletin is to provide a better understanding of how application conditions can impact the overall appearance and performance of an exterior paint job.

Latex Paint Film Formation

Latex paint consists of dispersed pigment and resin, along with additives and liquid, which is mainly water. When the paint is still in its liquid state the particles of pigment and resin are evenly distributed and spaced out. After application, the water begins to evaporate, and the particles of pigment and resin come closer together. As the remaining liquid evaporates, the resin particles gradually become more densely packed, causing them to fuse and bind the pigment into a continuous film. This process is called coalescence and is shown in the graphic below. (Source: DOW Paint Quality Institute)

The mechanism of latex paint film formation has some limitations. Because the resin particles are thermoplastic (tending to get softer at higher temperature, and vice-versa), lower temperatures harden the latex particles preventing proper coalescence. In severe cases, this may result in the film actually cracking. In milder cases, the film may exhibit poor touch-up, holdout, color uniformity or uneven sheen.



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For this reason, Florida Paints states that our coatings should not be applied when the paint, air and substrate surface temperature fall at or below 50° F. While some latex paints will cure at low temperatures, it doesn't mean that the job will be without any issues. Stable conditions and temperatures are needed early in the paint's drying schedule. The first the first 48 hours after application are the most critical; therefore, the air and substrate temperature must remain above 50° F while the paint cures. In addition, condensation can also pose a problem in the fall and spring when the temperature drops during the evening causing condensation to form on freshly painted surfaces. As the water builds up on the surface, it runs down the wet film taking with it part of the paint and leaves streaks. It is impossible to control atmospheric conditions when painting in cold weather, and problems may occur even though the paint performs exactly the way it is designed to do.

Precautionary Measures

Check the weather forecast. Determine the weather pattern for the days you are going to paint. Cold-weather paints may take up to two days to dry, and the minimum temperature must be maintained during this time period. If the temperature is going to dip below the minimum mark during the drying phase, painting must be suspended until stable temperatures can be guaranteed.

Infrared Thermometer. Invest in an infrared thermometer to check substrate and material temperatures. They are readily available at many retail outlets. Remember that the temperature can be too hot as well, generally the substrate temperatures should not exceed 110°F.

Check your paint. The paint temperature must be 50° F or higher. Latex paint is not designed to be frozen and thawed. Check for the signs of thawed frozen paint: lumpy, thick or looking like cottage cheese. Do not use previously frozen paint! Dispose of in accordance with local and federal regulations.

Pay special attention to the substrate. Both air and substrate temperatures should be above the specified minimum 50°F.

Work midday. Focus on prep work in the early morning and late afternoon and apply paint between 10 am and 2 pm to allow surfaces to warm up and to allow time for curing before dew falls.

Follow the sun. In the summer, the rule is don't paint in the sun and follow the shade around the house. But in cold weather, it's the opposite. Follow the sun around the house as you work. Stop work around mid-afternoon, or when the temperature starts dropping.

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