



Cold Weather Painting

The adverse effects of cold weather on paint are well known and are the reason exterior painting is seasonal. Recognizing that painting in cold weather is sometimes unavoidable, it is important to understand how low temperature can affect a paint's application and drying characteristics, appearance and performance.

How Does Cold Weather Affect the Package Consistency?

Exterior alkyd and oil paints are based on alkyd resins and natural oils. At low temperatures the resin becomes more viscous (similar to automotive oil or lubricants). However, being water-free these paints will not freeze or become damaged even at sub-zero temperatures. They will, however, become very thick or semi-solid making application nearly impossible without excessive thinning.

Latex paints, on the other hand, contain water and will freeze at temperatures below 32°F. Special additives such as ethylene glycol (similar to the glycol used in anti-freeze to prevent engine coolant from freezing) are used to improve freeze/thaw resistance in paints. These solvents help to protect the latex emulsion from being damaged due to freezing. These same materials also improve wet edge for hot weather painting to ease brushing and rolling. Many of **GLIDDEN PROFESSIONAL™** latex paints are formulated to tolerate limited freeze/thaw cycles without adverse effects. However, as an extra precaution, latex paints should always be protected against freezing, particularly the more economical latex flat paints.

How can you Tell if a Latex Paint has Repeatedly Frozen and is Unusable?

In severe cases the paint will become very thick or solid even after it has thawed out. Latex paint may also become "ropy" or lumpy resembling cottage cheese in consistency. This indicates that the latex emulsion has been permanently damaged and is unusable.

How Does Cold Weather Affect Paint Drying?

The two key ingredients in paint that are affected by low temperature are the solvent and resin. The evaporation rate of both water and mineral spirits is considerably slower at 50°F than it is at 80°F. This means that in colder weather the slow evaporation rate of the mineral spirits in an alkyd paint will keep the film soft and also delay final oxidation curing. Latex paints are affected solely by the slower evaporation rate of water and volatile additives at low temperatures.

How Does Cold Weather Affect Recoat Times?

As we discussed above, low temperatures slow down drying. Therefore recoat times must be extended. For example, at 75°F a latex paint recoat time may be four hours. At 50°F it would be around six hours. The drying of alkyd paints may be slowed down even more, comparatively speaking. At 75°F the recoat time may be 16 hours. At 50°F it would be about 48 hours.

Why Shouldn't Latex Paints be Applied below 50°F?

To understand why latex paints should not be applied at low temperatures it is important to understand how latex paints form films. All latex resins are emulsions

latex film, the latex resin particles come closer together until they actually touch and "coalesce". 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, stain resistance, color uniformity or low sheen.

All **GLIDDEN PROFESSIONAL** latex paints are formulated to have good low temperature coalescence down to 40°F and some "low temp" latex paints will even coalesce at temperatures as low as 35°F. Coalescing solvents are added to soften the latex particles at lower temperatures to promote good coalescence and film formation. These agents are only effective down to 40°F (or 35°F in the case of "low temp" paints). This takes into account that at the lower end of the recommended application temperature range of 50°F the actual substrate temperature may possibly be lower than the ambient air temperature. In the case of "low temp" paints which can cure at temperatures as low as 35°F, it should be noted that this is the **minimum** application and curing temperature. If there is a possibility that the ambient air temperature or the substrate temperature could drop below 35°F during the application or curing stage painting should be delayed.

What are Some Other Cold Weather Paint Problems?

1. Alkyd and oil-based paints may exhibit sensitivity to blushing or exhibit poor color uniformity due to dampness condensation during drying.
2. Latex paints may be sensitive longer to surfactant leaching or water spotting problems.
3. Increased viscosity or thickness of cold paint may cause the application of heavy film builds slowing down drying even further.
4. Cold, thick paint may be more difficult to tint or mix. Longer shaking times may be required.

These are just a few of the problems that may occur due to painting in cold weather. If a problem does occur, generally the only solution is repainting in warmer weather or under more favorable conditions. Laboratory tests such as cold coalescence, freeze/thaw resistance and low temperature touch-up are run on **GLIDDEN PROFESSIONAL** to ensure they will tolerate cold weather conditions as well as if not better than any paint on the market.