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Working with Mortars in Cold Weather

When working with lime mortar in cold weather, establish a controlled working environment maintaining continuous temperatures of at least 40°F for a minimum of 72 hours. To ensure a proper, long-term cure for the lime mortar, maintain these favorable conditions for an additional 7 days after work is complete. Enhance work protection by implementing the following tips.

Tip 1: Control Water Amounts while Pre-Wetting and During Curing

When working in colder temperatures avoid excessive pre-wetting before starting or dampening after installation. In summer these steps slow down the curing process and ensure the mortar has enough water; but in cold weather as evaporation slows water doesn't exit the mortar quickly. Control suction *only as needed* by lightly wetting the work area before application. If misting is required during the process, use just enough water to prevent rapid drying from direct sun or wind, but refrain from saturating the wall.

Remember to never over-saturate the walls in cooler temperatures because walls that haven't properly dried may retain water that will freeze. Water freezing in lime mortar before it reaches its initial 72-hour set can lead to mortar failure or greatly diminished performance, even after the wall eventually dries in the Spring. During the workday when temperatures rise above 40°F open up the tarping around the work area to allow the wall to dry out. Tarping may be needed at night, but during the day the humidity under the tarp will rise as the air warms up and when the dew point drops in the evening, the trapped moisture can freeze.

The care and custody for the entire operation rests with the mason, who should possess familiarity with using lime mortars. Failures with lime mortar often result from inexperience, leading to issues like over-saturation or prolonged work in high humidity tents without allowing proper drying when temperatures rise above 40°F. The work should undergo a cycle of light misting with clean water, followed by mostly drying out, without introducing additional water if the work remains slightly damp.

Tip 2: Use Hot Water

Another valuable tip for working with lime mortar in cold weather is to use hot mixing water during mortar preparation. Hot water speeds up the setting process. We do not recommend using any chemical additives to accelerate the set or anti-freeze when working with lime mortar.

Tip 3: Cover Work and Keep It Warm with External Sources

The third crucial tip for working with lime mortar in cold weather is to cover your work at the end of each day using 6 mil plastic sheets or tarps positioned a few inches away from the wall. Because lime does not generate its own heat while curing, you need to add a small heat source under the tarp to diminish the chance of lime mortar freezing. Place small, bell-shaped clamp-lamps with each one equiped with 40-60 watt incandescent light bulb pointed up so heat will rise up the wall under the tarp every 6-feet both horizontally and vertically. Keep the lights on all night and they should add enough heat to keep the mortar from freezing. Do note use LED bulbs because they do not produce proper heat. If no rain is expected, you can even go one step further and cover the tarps with a quilted blanket for extra insulation. This setup will maintain the work's temperature above 40°F down to temperatures as low as 25°F outside the tarp.

External heat may be provided along the scaffolding to help protect mortar overnight in cold weather. Heating should be passive rather than blowing hot air, allowing the air under the protective tarp to warm gradually and remain above freezing. The specific method of heating may vary, but any heaters used should include a thermostat and tip-over protection, and all cords and electrical components must be appropriately rated for the heater's load and for outdoor exposure. An infrared thermometer is useful for verifying that temperatures at the wall surface remain above freezing. Check temperatures several times throughout the day whenever below-freezing temperatures are anticipating during the mortars initial 72-hour cure.

This system should be monitored daily and can work even if temperatures go as low as 25°F outside the tarp. If no rain is expected, you can even go one step further and cover the tarps with a quilted blanket for extra insulation if needed. Make sure the tarp is bound tightly at the top and sides of the wall to retain heat under the cover. Be certain that no flammable or meltable materials are near the lights or heaters.

To secure the tarp snuggly enough to restrict cold wind from blowing under the cover from outside the work area, pin the plastic sheeting using roofing nails set into mortar joints approximately one foot outside the perimeter of the freshly pointed area.

You may turn the lights and/or heaters off while working during the day, but ensure that daytime temperatures stay above 40°F degrees. Otherwise, consider not working with lime mortars on such cold days.

Remember, lime mortar *cannot* freeze while curing and must be kept in a controlled environment if the project cannot wait until better weather.

Tip 4: Extend the Number of Curing Days

The fourth tip to working with lime mortar in cold weather is to keep the lights or heaters on each night thoroughout the entire length of the project and for a time afterwards. The rule of thumb is to add one extra day of curing time on top of the initial three days required for lime mortar to cure for every degree below 45°F within any 24 hour cycle while the work is being installed or after completion.

So, if you anticipate nightly lows around 28°F (even if day time temperatures rise to a high of 50-60°F), plan for an additional 17 days of keeping the work under tarps with nighttime heating after the project's completion. As another example, if temperatures are averaging 38°F overnight during the first 10 days after the job, leave the heat on each night under the tarps for 10 days and nights after the job is finished.

Tip 5: Texture the Surface to Open the Pores

Always prioritize maintaining a textured open-pore finish rather than slicking smooth the surface of the lime mortar, especially when working in cold temperatures. Allowing air to penetrate deeply abd carbonate lime mortar during curing is vital, even when "water-setting" hydraulic limes are used. If the surface of the mortar joint is overly smooth it can resulting in a "case-hardened" finish where the inner section of the lime mortar may not cure adequately due to the hard surface layer impeding air penetration from the surface. Sometimes, the lime mortar surface flakes off in the following season, revealing an insufficiently cured inner part lacking substantial strength due to an improper set when the surface has been left slicked smooth during cold weather.

Tip 6: Wait until Spring

The absolute best answer to working with lime mortar in cold temperatures is to not do it and to just wait until Spring when conditions are more likely to be optimal during the days and nights.

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