by: Gary Porter

Cold Weather Masonry

As we move into February (already?) it is hard to believe that so far this winter Chicago has experienced just a few inches of snow. With artic cold temperatures and blistering winds that we randomly experience, Architects and Mason Contractors still need to follow the mandatory cold weather construction practices required by the International Building Code, IBC and Building Code Requirements for Masonry Structures. This information is made available at the Brick Industry Association BIA website: www.gobrick.com under technical notes and is summarized in the table below:

Normal Weather	100 °F to 40 °F (37.8 °C to 4.4 °C)	Normal Procedures.	Normal Procedures.	Normal Procedures.
Cold Weather	40 °F to 32 °F (4.4 °C to 0 °C)	Do not lay masonry units having either a temperature below 20°F (-6.7°C) or containing frozen moisture, visible ice, or snow on their surface. Remove visible ice and snow from the top surface of existing foundations and masonry to receive new construction. Heat these surfaces above freezing, using methods that do not result in damage.	Heat mixing water or sand to produce mortar between 40 °F (4.4 ºC) and 120 °F (48.9 ºC). Do not heat water or aggregates used in mortar or grout above 140 ºF (60 ºC). Heat grout materials when their temperature is below 32 ºF (0 ºC).	Completely cover newly constructed masonry with a weather-resistive membrane for 24 hr after construction.
	32 °F to 25 °F (0 °C to -3.9 °C)	Comply with cold weather requirements above.	Comply with cold weather requirements above. Maintain mortar temperature above freezing until used in masonry. Heat grout materials so grout is at a temperature between 70 ºF (21.1 ºC) and 120 ºF (48.9 ºC) during mixing and placed at a temperature above 70 ºF (21.1 ºC).	Comply with cold weather requirements above.
	25 °F to 20 °F (-3.9 °C to -6.7 °C)	Comply with cold weather requirements above.	Comply with cold weather requirements above. Heat masonry surfaces under construction to 40°F (4.4°C) and use wind breaks or enclosures when the wind velocity exceeds 15 mph (24 km/h). Heat masonry to a minimum of 40°F (4.4°C) prior to grouting.	Completely cover newly constructed masonry with weather-resistive insulating blankets or equal protection for 24 hr after completion of work. Extend time period to 48 hr for grouted masonry, unless the only cement in the grout is Type III portland cement.
	20 °F and Below (-6.7 °C and Below)	Comply with cold weather requirements above.	Comply with cold weather requirements above. Provide enclosure and heat to maintain air temperatures above 32 ºF (0 ºC) within the enclosure.	Maintain newly constructed masonry temperature above 32°F (0°C) for at least 24 hr after being completed by using heated enclosures, electric heating blankets, infrared lamps, or other acceptable methods. Extend time period to 48 hr for grouted masonry, unless the only cement in the grout is Type III portland cement.

1. **Preparation** and **Construction** requirements are based on *ambient temperatures*. **Protection** requirements, after masonry is placed, are based on *mean daily temperatures*.

MASONRY ADVISORY COUNCIL

Cold Weather Masonry (cont.)

Because of Chicago's geographic location and the history of extreme cold weather here, we can have a week or two where we fluctuate between needing to enclose a scaffolding and it's ok to work without an enclosure. Enclosing a scaffolding is costly, so let's not spend that money until it is absolutely necessary. In a city north of Chicago, there would be no doubt in enclosing the scaffolding prior to the cold weather setting in. In cities where it gets too cold to install masonry without an enclosure, there is no hesitation in providing an enclosed and heated scaffolding, it is part of the plan. In Chicago, the mason may luck out and not need the enclosure as the weather might fluctuate.

From my experience as a mason contractor, working through many winters with enclosed scaffoldings, the wind was always a great unknown! When you enclose a scaffolding with reinforced poly, you are basically building a temporary structure that will be exposed to all the wind that the completed building is designed to handle. The difference is this scaffolding is temporary and moves around with the wind. The building, when completed is a permanent structure. So, depending on the height of the enclosure, there may be some guy wires or other temporary bracing measures that have to be implemented into its design.

In the cold weather construction practices it is important to note that 40°F is important.

· This is the critical temperature when hydration of the cement slows and eventually stops.
· Research and decades of empirical research support this claim.
· Hydration is the ability of the cement to take on water and complete its chemical reaction. No hydration means no strength development.
· The chemical process of hydration produces heat.

Some very important items to strive to achieve on the jobsite are:

· Maintain mortar temperature between 40°F and 120°F.
· Do not lay frozen units or allow the masonry to freeze before initial set.
· Protect masonry from freezing after construction. (24 hr for mortar, 48 hr for grout)