

Steel Buildings & Winter Construction

Common construction practice(s) can create problems

By: Steve Neff

Every year, numerous condensation problems start to surface as the winter months move along. Many of our customers do not realize that most of these are generated **during the construction process**. Customers will describe how they poured the concrete in an enclosed structure and used propane fired heaters (commonly called "salamanders") to heat the building. Many feel that this provides the ideal environment for the concrete to cure. Unfortunately, this procedure can trap an enormous amount of water vapor (24 gallons of water evaporate from every 100 sf of 4" of curing concrete) within the building interior. The heaters actually compound the problem, as water vapor is a by product of the combustion of any carbon based fuel (30 gallons of water evaporate from every 200 pounds of propane).

Remember too, that facing materials are vapor *retarders*, not vapor *barriers*. Simply stated, high humidity is a gas that is under pressure trying to migrate to a location where the pressure is lower (called equilibrium). This water vapor literally presses itself against the facing materials while trying to escape the building. No matter how well the tabs are sealed, when building interior humidity exceeds 40%, water vapor will go straight through the facing, only to condense on the roof and wall panels and, of course, drip back into the insulation. The process of literally pumping gallons of water into the fiberglass will continue as long as the humidity is stays high. Anyone who has seen this happen knows that it can take months (or more?) for this water to evaporate out.

It is very important for the contractor to give this water somewhere to go (other than through the facing!) - especially during winter construction. ***Ideally the concrete should be poured before the building is sheeted.*** Many customers say that can't (practically) be done; if so, they must leave doors wide open. Many erectors will leave portions of wall areas un-sheeted, until the concrete has cured.

At GBP Silvercote, we own several temperature/humidity data recorders which work in conjunction with computer software. The recorders are placed in a problem environment for a couple of weeks. Once returned, the software will create a graph of the temperature and humidity readings over that period of time. Most condensation problems are the result of the environment described above, or of an abnormally high interior humidity once the building is in use. These recorders can be used to decisively evaluate the conditions such that corrective actions (most likely starting with a discussion with a mechanical engineer) can take place. During or after construction, *the most effective way to control condensation* is through adequate ventilation.