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TECHNICAL DATA SHEET

MULTIPLE VAPOR RETARDERS WITHIN A SINGLE INSULATION SYSTEM

Building owners who want to add insulation to older steel buildings often ask if the original vapor retarder should be left intact or if it should be cut and/or removed. Before addressing this topic we need to review how insulation and facing materials work together to control condensation.

First, it's important to have some understanding of the dew point. We all know that water exists either as a gas, liquid, or solid. Another physical property of water is that colder air will hold less moisture than warmer air. In other words, as air at a given temperature and humidity cools the water vapor within it will rise. The dew point is the temperature when water vapor within the air reaches saturation (100% humidity) and condenses into water (or to frost/ice when below freezing). The dew point is a function of temperature and humidity and is highly predictable. Charts which demonstrate the relationship between temperature and humidity are readily available on the internet or by contacting Silvercote.

Many people think that it is the vapor retarder (facing material) alone that controls condensation but it is the combination of the facing and insulation that do the job. The objective is simple: design and install an insulation system such that the facing material is warmer than the dew point. In a typical steel building (not a cooler or freezer which present unique challenges) the presence of insulation on the outside of the facing helps the facing to be at or near the interior building temperature. Given acceptable indoor humidity (see note below), the facing will be warmer than the dew point and can then do its' job; that is, to retard moisture transmission. If there were no insulation it is possible for the facing material to be colder than the dew point and for water to condense directly on it.

We've reviewed the fact that the dew point temperature exists somewhere between the facing material and the exterior sheeting. The problem with adding additional insulation is that you move the dew point to a location that is closer to the building interior; possibly beneath/inside the original vapor barrier. If so, warm potentially moist air migrating through the insulation would run into that cold film and potentially condense on it. In severe cases it will continue to build. Moisture that is trapped between two vapor retarders would present a considerable challenge, as reversing the process (evaporating the moisture back out) could be quite difficult. This is the argument for cutting the existing facing material.

Here's where there is a debate on this topic: some argue that cutting the facing will simply allow the moisture to continue its' migration and eventually condense on the roof or wall panels. This statement is true, so why does it matter where condensation forms? The key difference is that condensation at or near the roof has a much better opportunity to evaporate. Contributing factors would be warmth (sometimes considerable) from the sun and convection currents (air movement) within the panel corrugations. We've seen numerous severe condensation problems that dry out completely over a few months; all due to hot roof panels which contribute to rapid evaporation.

So what should you do? If you are in ASHRAE climate zones 1, 2, or 3, condensation is unlikely and you probably don't need to concern yourself with this issue. It is in the northern zones where problems typically occur. If your new insulation system is adding considerable R-value to the total insulation, you are most likely moving the dew point beneath the old facing material. It is in those cases where you should consider cutting (occasional cross cuts) the existing facing. Appearance is not an issue and it is no longer needed to retard moisture transmission. This is assuming that the new insulation has a good vapor retarder and is installed properly (i.e., in a consistent manner), which is always a very important goal.

Note: Facing materials or vapor retarders are not vapor barriers. A good facing has a low perm rating but there are no zero perm facing materials. Indoor Relative humidity must be maintained within acceptable levels in order to properly control condensation. ASHRAE guidelines vary by the 8 climate zones within the U.S., but in general it is recommended that indoor RH not exceed 35% on a constant basis or 40% on an intermittent basis.
Humidity levels higher than this will create very high indoor vapor pressure which can overwhelm the facing material; likely resulting in a condensation problem.

PLEASE CONTACT YOUR SILVERCOTE SALES REPRESENTATIVE FOR MORE INFORMATION AT (844) 232-3701 OR INFO@SILVERCOTE.COM