

# Condensation Control & Multiple Layer Insulation Thickness

It is a generally accepted design principle that air cavities between a vapor retarder<sup>1</sup> and a potentially cold surface should be avoided for optimum condensation control. When constructing a steel building, every effort should be made to fill any spaces that exist between the facing material and the roof or wall panels with fiberglass insulation. Some air pockets may be unavoidable, but filling the cavity minimizes potentially moist convective air movement which can easily condense given certain circumstances.

This topic is of little relevance when installing faced blanket products over the purlins. It can be very important, however, when designing high R-value systems. The lowest layer in

high R-value systems is installed parallel to the purlins and is usually supported at the bottom of the purlin space by banding. The resulting distance between the facing material and the roof panels is clearly a function of the purlin height. It could be quite problematic, therefore, if you were to purchase an R-33 system (9½" of fiberglass) for a building that has 12" purlins. Customers should verify the total insulation thickness recommendation once the purlin heights and roof types are known. Since Silvercote is often not aware of the purlin sizes, it is the responsibility of the design professional and the steel building contractor to ensure that the requested insulation will fill the cavity. We have prepared the following chart in order to assist you with this important selection.

## RECOMMENDED MULTIPLE LAYER INSULATION THICKNESS

### Screw Down Roof with NO Spacer Block(s):

Purlin Height	System Depth <sup>2</sup>	Recommended Insulation Thickness
8"	9"	R-33 (8" + 2⅝")
9"	10"	R-35 (8" + 3")
10"	11"	R-38 (9¼" + 2⅝")
12"	13"	R-43 (9¼" + 4")

### Standing Seam Roof with 1" Spacer Block(s) and clip:

Purlin Height	System Depth <sup>2</sup>	Recommended Insulation Thickness
8"	9½"	R-33 (8" + 2⅝")
9"	10½"	R-36 (8" + 3½")
10"	11½"	R-38 (9¼" + 2⅝")
12"	13½"	R-46 (9¼" + 5") or (6" + 6" + 2⅝")

**Note:** <sup>1</sup>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.

<sup>2</sup> System depth is the dimension from the roof panel to the bottom of the purlin, although extra thickness (1½" or so) is factored into these recommendations to account for the fact that the insulation will not sit directly at the bottom of the purlin space (it will drape slightly).