

# Energy Efficient Re-roofing

It is important to understand that when retrofitting over existing sloped metal or solid deck roof systems, the Roof Hugger sub-purlin will create an air-space/cavity between the old roof and underside of the new roof. This air-space presents several options to the contractor and building owner. Simply stated, the space can be used to improve the building inhabitant's comfort and environment as well as provide significant energy benefits through alternative energy resources. Consider the following before finalizing your re-roofing plans.

## Insulated Systems



*Unfaced Fiberglass*



*Rigid Board Insulation*

Metal building construction over the years has historically used low R-value insulation between the existing purlins and metal roofing. Because of this, these buildings may be inefficient in reducing heat gain through the roof assembly in the

summer as well as heat loss during the winter months. Adding insulation between the old and new roofs is a cost-effective measure to decrease the building's energy consumption while paving the way to pay for itself in a relative short time frame.

As shown in the photos above, fiberglass insulation is predominantly used in a "Metal-over-Metal" assembly, but to gain even more

thermal resistance in the minimal space, rigid board (polyiso) can be easily incorporated. With fiberglass, unfaced without a vapor barrier is typically used, but in some cases for projects located in the far northern climates, a laminated vapor barrier has been used.

Please note that the thickness of the insulation may vary dependent on code requirements, as may be required with the ASHRAE 90.1 Model Energy Code or IECC 2015. If the code does require a minimum R-Value, the depth of the Huggers can easily be increased to permit thicker insulation without adding major cost to the project.

Actual project case studies have illustrated up to 25% reduction in energy fuel source consumption for heated and air-conditioned buildings.

The following Tables on this page and the next provide published thermal resistance values (R-Value) for the type and thicknesses commonly found in existing metal building roofs. These values are recognized as being accurate for currently available insulation:

<i>Vinyl-Faced Fiberglass insulation typically found in existing metal buildings</i>	
<b>Thickness</b>	<b>R-Value</b>
1½"	5.0
2"	7.0
3"	10.0
4"	13.0
6"	19.0

*Tables are Cont'd next page*

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<i>Low Density Unfaced Fiberglass insulation (Laminated Fiberglass is not recommended)</i>	
Thickness	R-Value
2"	7.0
3.4"	10.0
3.7"	12.0
4.3"	13.5
5.3"	16.5
6.3"	20.0

<i>Rigid Board polyisocyanurate insulation (Dow™ Thermax or equal) being added between and/or top of Huggers</i>	
Thickness	R-Value
1"	6.5
2"	13.0
3"	19.0
4"	25.2

Notes pertaining to tables on the previous page:

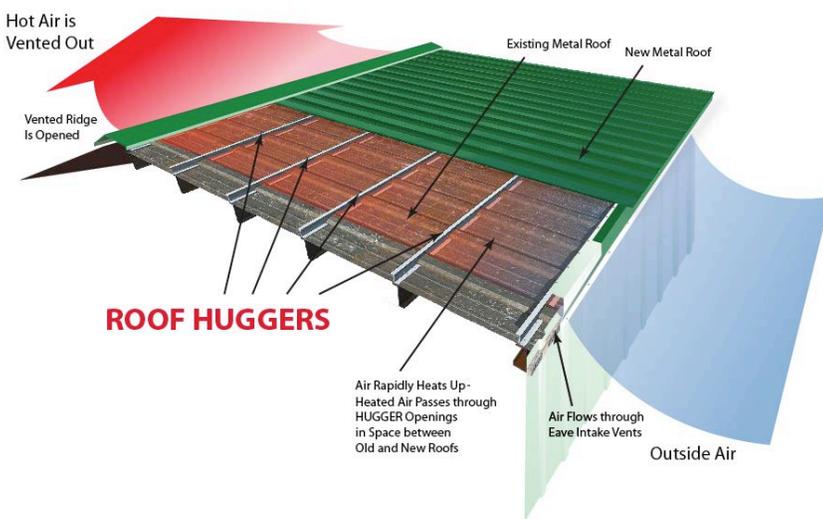
1. When adding insulation to comply with locally adopted Energy Codes, the existing insulation should be included in the overall R-Value.
2. When using rigid board insulation, it has been recommended that the air-space void between the existing roof panel's ribs to be filled with unfaced low-density fiberglass to prevent moisture from infiltration of warmer air from the building
3. Polystyrene is not an acceptable rigid insulation board for Metal-over-Metal assembly's due to fire class ratings and it may require a minimum 22-gauge deck/existing roof.
4. If "Continuous Insulation" (CI) is required by the building code, at least one-layer of minimum thickness rigid insulation must be installed over the Huggers with joints taped,

therefore requiring the new metal roof system to use a roof clip with a bearing plate. "CI" cannot be accomplished with screw-down/thru-fastened metal roofs or using fiberglass insulation

## Ventilated Systems

If the building that is being retrofitted is not thermally controlled, then adding insulation may not be of benefit. If this is the case, then the air-space should be ventilated. This is easily accomplished using economical ventilation products at the low eave and high point (ridge, high eave, etc.) of the roof. When ventilated, the air in the cavity becomes a radiant barrier that reduces heat gain/loss. This roofing technology is known throughout the metal roofing industry as Above Sheathing Ventilation or "ASV".

Please note that this assembly is very effective for buildings that are temperature controlled. Case studies for these systems have illustrated



nearly 21% decrease in energy consumption. In warmer climates, this system is very effective in

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improving the building's interior environment. This is especially true for buildings that have working occupants such as livestock confinement, manufacturing and warehousing.

## Ventilated and Insulated Systems

It is possible to incorporate both new insulation and ventilation in the cavity between the old and new roofs as shown in the illustration below. In fact, building envelope industry experts claim this is the best of both worlds. To accomplish this, the thickness of insulation is determined and the Roof Hugger sub-purlins are then manufactured approximately two inches taller to permit air-flow above the insulation. Another technique can be used by installing a Cor-A-Vent strip atop the Huggers for systems using new standing seam metal roofs with tall stand-off type clips.

