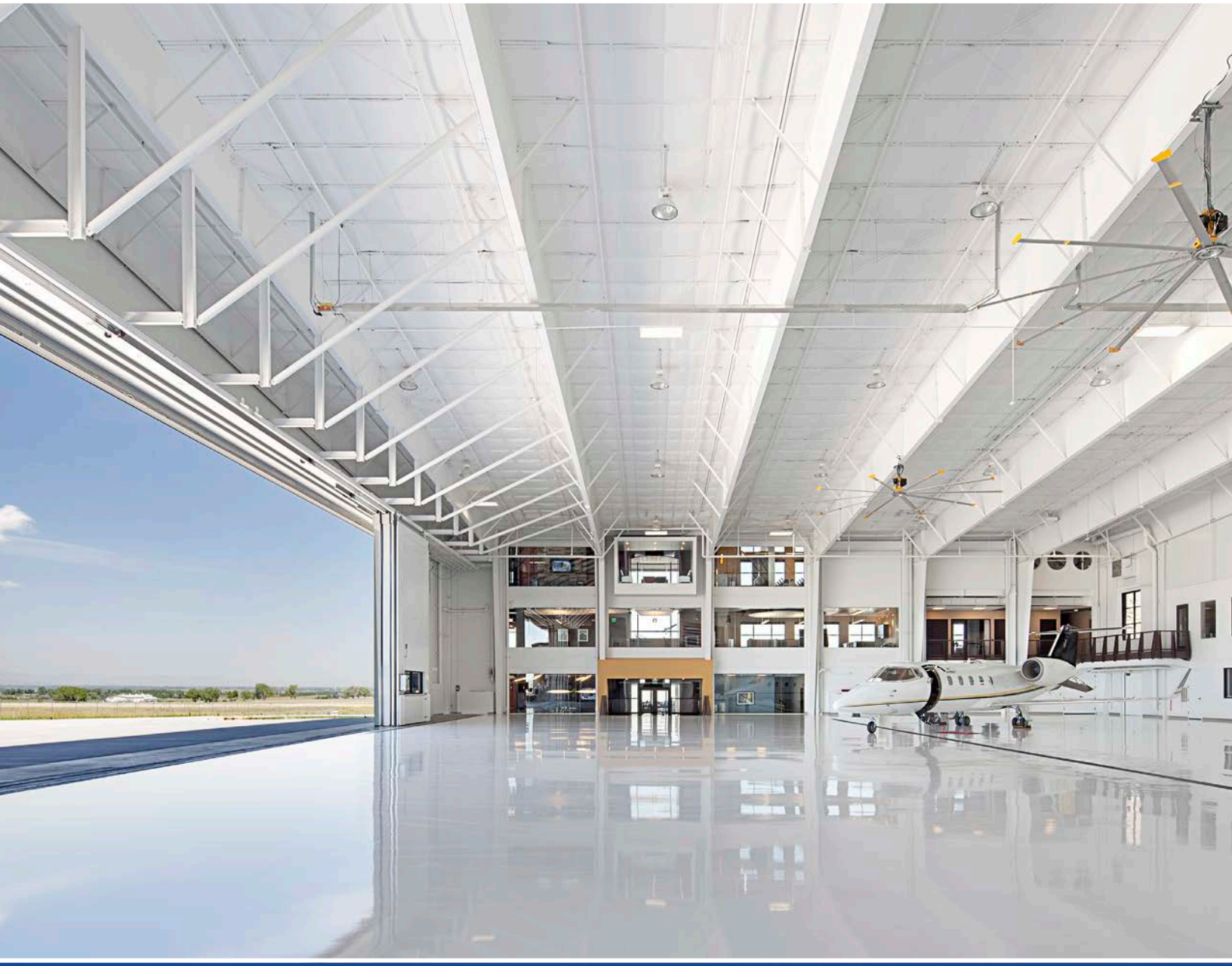
ARCHITECT'S GUIDE:

Filled Cavity Systems for Metal Buildings



LAMTEC® CORPORATION

The Most Specified Name in Metal Building Vapor Retarders

THE COMPANY

LAMTEC'S 260,000 square foot facility is situated on a 45-acre site in Northeastern Pennsylvania, convenient to all New York metropolitan area ports and major north-south and east-west interstate highways.

Established in 1975, LAMTEC has grown into a leadership role in the industry. Our philosophy is simple: "Design and manufacture the very best in laminated insulation facings, offer them at competitive pricing, deliver them on time and follow-up with comprehensive technical support."

LAMTEC is ready to help you meet the challenges of today...and tomorrow.

LAMTEC CORPORATION IS ACTIVELY INVOLVED WITH THE FOLLOWING ORGANIZATIONS:

ASHRAE

Proud Member of NIA National Insulation Association™

Metal Building Contractors & Erectors Association

Associate MBMA Member

ASTM International Member

NFPA Member

LAMTEC® CORPORATION

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WWW.LAMTEC.COM

LAMTEC® products are proudly manufactured in the USA.

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Don’t spec without Lamtec

For 40 years, Lamtec has been developing and manufacturing insulation facings and vapor retarders for Pre-Engineered Metal Buildings.

Lamtec offers the largest line of Underwriters Laboratories (UL) Classified and Factory Mutual (FM) Approved insulation facings for the Metal Building industry. The entire WMP® series of products have been specifically designed for Metal Building applications.

Metal building insulation facing and vapor retarders are an integral part of an aesthetic and functional building envelope.

About Lamtec Products

Condensation Control

Moisture Permeance

Water vapor passing through insulation to the cold exterior surfaces of the building can condense, degrading the thermal performance of the insulation system as well as contributing to corrosion, mold, mildew, and odor. Left unchecked, condensation will degrade the effectiveness of the insulation system and reduce the service life of the building components.

Lamtec’s insulation facings are designed to reduce condensation and its damaging effects by controlling moisture movement through the insulation system. With permeance ratings as low as 0.02 Perm, Lamtec’s facings are tested, effective vapor retarders.

Air Permeance

Air leakage has the potential to transport significant quantities of moisture though the insulation to the cold exterior cladding resulting in wintertime condensation. Controlling air leakage with an effective air barrier is an important aspect in reducing condensation and its damaging effects.

With an air permeance rating well below the code specified air barrier requirements of 0.004 cfm/ft2 at 1.57 psf, Lamtec’s WMP Metal Building facings are tested, effective air barriers. Lamtec facings are both low permeance air barriers and low permeance vapor retarders.

Fire Performance

Lamtec’s insulation facings are tested in accordance with ASTM E84 and have Flame Spread Ratings ≤25 and Smoke Developed Ratings ≤50. In addition, many of Lamtec’s metal building facings are UL Classified, and FM Approved for use with fiberglass insulation in accordance with FM 4880 (a full-scale room fire test).

Aesthetics and Functionality

Lamtec’s facings protect the insulation from physical damage as well as water vapor intrusion.

Lamtec’s proprietary white facings provide a clean white interior surface with outstanding light reflectivity, which may allow for reduced lighting loads.

Lamtec’s foil based vapor retarders provide radiant barrier properties for use in applications requiring low emittance surfaces, such as Ice Rinks and Hockey Arenas.

For buildings with extreme artificial and natural lighting conditions, Lamtec offers WMP-UV HD with enhanced UV resistance.

For architectural open ceiling designs, many of Lamtec’s facings are also available in an attractive black finish that is UL Classified.

Lamtec's Metal Building Product Line

Most Popular Facings - General Purpose

WMP-VR - Low Cost Standard Duty (Excellent for Most Chemical Environments)
WMP-VR-R PLUS - Low Cost Standard Duty (Excellent for High Humidity Environments)
WMP-10 - Standard Duty
WMP-30 - Heavy Duty
WMP-50 - Premium Heavy Duty with Added Abuse Resistance

Specialty Facings

WMP-UV HD - Premium Heavy Duty with Added UV Resistance
GYMGUARD - Athletic Facilities and High Traffic Areas (Highly Abuse Resistant)

Low (0.03) Emissivity Facings

ARENASHIELD - Ice Arena Roofs (Highly Abuse Resistant)
RADIANT ICE - Ice Arena and General Purpose (Double Sided Foil with Tear Resistance)
R-3035 HD - Heavy Duty Foil/Scrim/Kraft (FSK)

Facings Available in Black

WMP-VR, WMP-VR-R PLUS, WMP-10, and WMP-50

Applications

✓ GOOD ✓✓ BETTER ✓✓✓ BEST ○ NOT APPLICABLE

This document is intended as a general product guide only. You should consult with your building design professional before making your product selection.

WMP-VR	WMP-VR-R PLUS	WMP-10	WMP-30	WMP-50	WMP-UV HD*	GYMGUARD	ARENASHIELD	RADIANT ICE	R-3035 HD	
✓	✓	✓✓	✓✓	✓✓✓	✓✓✓	○	○	✓✓	✓	Agriculture
✓	✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	○	✓✓	○	Athletic Facility
✓	✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	○	✓✓	✓	Government/Military
○	○	○	○	○	○	○	✓✓✓	✓✓	✓	Ice Arena Roofs
✓	✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	○	✓✓	✓	Manufacturing/Industrial
✓	✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	○	✓✓	✓	Religious/Community
✓	✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	○	✓✓	✓	Service/Retail
✓	✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	○	✓✓	✓	Warehouse/Distribution

*Best for applications with high UV exposure from intense lighting (natural/artificial). Application examples include: Aircraft Hangars, Retail, Loading Docks, Auto Shops, etc.

Insulation Solutions for Metal Building Roofs:

Filled Cavity systems are the preferred option for insulating Metal Building roofs in order to meet today's stringent energy codes. The two most accepted Filled Cavity systems are Long Tab Banded (LTB) and Liner, with the Long Tab Banded option typically being the most cost effective. Both systems provide comparable enervgy performance.

The primary advantage of LTB is easier access to the purlins for installation and maintenance of electrical, HVAC, and sprinkler systems without unsightly penetrations which compromise the integrity of the vapor retarder and the insulation system. In addition, most of the scheduling complexities associated with other systems are eliminated.

LTB provides the building owner and design professional the most design flexibility with respect to the exposed vapor retarder. The designer can match the right vapor retarder with the application. The specifier can choose from one of Lamtec Corporation's fully engineered vapor retarders including: WMP-VR, WMP-VR-R Plus, WMP-10, WMP-30, WMP-50, WMP-UV HD, etc… In addition, the designer can match the roof and wall vapor retarder / facing for a continuous and finished appearance. Alternate High R-Value Systems typically offer only one or two vapor retarder options.

Key Benefits of a Long Tab Banded System:

- *Proven, cost effective High R-Value insulation system*
- *Meets or exceeds specified U-Values outlined in today's energy codes and standards*
- *Easier, unobstructed access to purlins for electrical, HVAC, sprinkler installation, and maintenance, which reduces the number of penetrations in the vapor retarder*
- *Match roof and wall facing for a more finished appearance*
- *Lamtec's bright white WMP facings provide an attractive installed appearance and may reduce costs associated with lighting requirements*
- *Wide selection of Lamtec's vapor retarders specifically engineered for Metal Building applications*
- *Lamtec is the most trusted and specified name in insulation vapor retarders with the most complete line of UL Classified and FM Approved Metal Building facings*

Installation Guide Can Be Downloaded at LAMTEC.COM

Filled Cavity (FC) / Long Tab Banded Tested U-Values

Thermal testing of Filled Cavity / Long Tab Banded systems, with Lamtec facing, was conducted in October 2010 and January 2011 at the Butler Manufacturing Research Center located in Grandview, MO, an independent certified laboratory.

Testing was conducted in accordance with ASTM C1363, "Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus".

Finite Element Analysis Modeling was conducted by Engrana LLC.

Filled Cavity / Long Tab Banded systems results:
(Based on standing seam roof panels with thermal spacer block)

ASSEMBLY DESCRIPTIONS	U-VALUE
R19 Faced / R11 Unfaced	0.037
R25 Faced / R11 Unfaced	0.035*
R25 Faced / R19 Unfaced	0.029

*Results based on Finite Element Analysis Modeling

Reports can be downloaded at the following links:

Faced R19 / Unfaced R11
http://www.lamtec.com/cdocs/TestReport2010-49.PDF

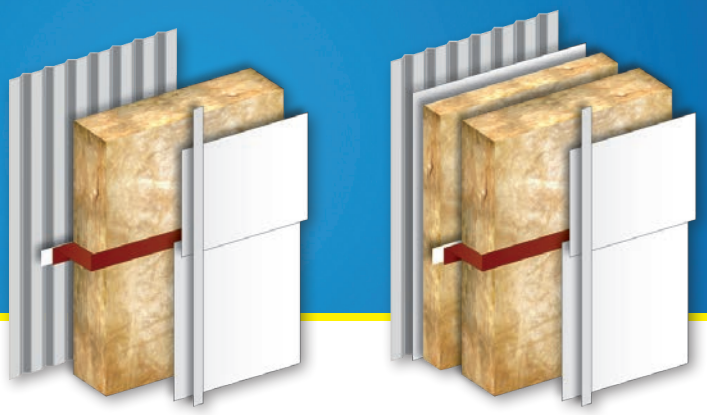
Faced R25 / Unfaced R11
http://www.lamtec.com/cdocs/LTBRoofFEM.pdf

Faced R25 / Unfaced R19
http://www.lamtec.com/cdocs/TestReport2011-06.pdf

Using COMcheck to Meet Energy Codes

Today's stringent energy codes offer prescriptive solutions for compliance. Other more cost effective and / or better performing options can easily be substituted by following some simple steps:

1. Go to www.energycodes.gov and click on the DOE link to download the free COMcheck code compliance program.
2. Insert U-Value for a Filled Cavity / Long Tab Banded system shown above into COMcheck by clicking on:
   Envelope / Roof Assembly / Other / Metal Building Roof. This allows you to replace the default values in the prescriptive path with the above alternate U-Value.
3. Generate the Envelope Compliance Certificate and submit to the building official along with supporting test or modeling documentation.



Single Layer Wall System

Double Layer Wall System

Insulation Solutions for Metal Building Walls:

While today's stringent energy codes prescribe Continuous Insulation (CI) for Metal Building walls, there are other options that are tested, code-acceptable, and more cost effective.

Filled Cavity insulation systems, with either a single layer or a double layer of fiberglass, are a cost effective way to meet today's demanding energy codes for Metal Building walls. These systems can achieve U-Factors as low as 0.035. Tested systems are available for every climate zone and energy code.

Filled Cavity insulation systems featuring Lamtec facings provide the building owner and design professional the most design flexibility in terms of the exposed vapor retarders. The specifier can choose from one of Lamtec's industry leading vapor retarders including WMP-VR, WMP-VR-R Plus, WMP-10, WMP-30, WMP-50, WMP-UV HD, etc… In addition, the designer can match the roof and wall vapor retarder / facing for a continuous and finished appearance.

Alternate High R-Value systems typically offer only one or two vapor retarder options.

Key Benefits Include:

- *Proven, cost effective High R-Value insulation system*
- *Meets or exceeds prescribed U-Values as outlined in today's energy codes and standards*
- *Match roof and wall facing for a more finished appearance*
- *Lamtec's bright white WMP facings provide an attractive installed appearance and may reduce costs associated with lighting requirements*
- *Wide selection of Lamtec's vapor retarders specifically engineered for Metal Building applications*
- *Lamtec is the most trusted and specified name in vapor retarders with the most complete line of UL Classified and FM Approved Metal Building facings*

Installation Guide Can Be Downloaded at LAMTEC.COM

Filled Cavity Metal Building Wall Insulation Systems Hot Box Test Results

Thermal testing of the Filled Cavity Fiberglass Wall Insulation Systems was conducted at the Butler Manufacturing Research Center located in Grandview, MO, an independent certified laboratory.

Testing was conducted in accordance with ASTM C1363, "Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus".

Filled Cavity Fiberglass Wall Insulation Systems results:

ASSEMBLY DESCRIPTIONS*	U-VALUE*
R-25 with 1/8" Foam Thermal Break Strip:	0.059
R-30 with 1/4" Foam Thermal Break Strip:	0.052
R-25 / R-10:	0.047
R-25 / R-16:	0.042
R-30 / R-16:	0.039

*Per ASHRAE 90.1-2016, Appendix Table A3.2.3

Using COMcheck to Meet Energy Codes

Today's stringent energy codes offer prescriptive solutions for compliance. Other more cost effective and / or better performing options can easily be substituted by following some simple steps:

1. Go to www.energycodes.gov and click on the DOE link to download the free COMcheck code compliance program.
2. Insert U-Value for a Filled Cavity Wall system shown above into COMcheck by clicking on: Envelope / Exterior Wall Assembly / Other / Metal Building Wall. This allows you to replace the default values in the prescriptive path with the above alternate U-Value.
3. Generate the Envelope Compliance Certificate and submit to the building official along with supporting test or modeling documentation.

IECC 2018 / ASHRAE 2016
Fiberglass Solutions

IECC 2018 Building Envelope Requirements, Table C402.1.4 Metal Building Walls			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1	0.079	0.059*	Single Layer, Filled Cavity Fiberglass System - R-25 with 1/8" Foam Thermal Break Strip
2			
3			
4	0.052	0.052*	Single Layer, Filled Cavity Fiberglass System - R-30 with 1/4" Foam Thermal Break Strip
5			
6			
7			
8			

* Use with COMcheck - Other Metal Building Wall

IECC 2018 Building Envelope Requirements, Table C402.1.4 Metal Building Roof			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1[a]	0.044	0.037**	Filled Cavity / Long Tab Banded Insulation System - Faced R-19 plus Unfaced R-11 with Thermal Blocks and Standing Seam Roof
2[a]	0.035	0.035**	Filled Cavity / Long Tab Banded Insulation System - Faced R-25 plus Unfaced R-11 with Thermal Blocks and Standing Seam Roof
3[a]			
4			
5			
6	0.031	0.029**	Filled Cavity / Long Tab Banded Insulation System - Faced R-25 plus Unfaced R-19 with Thermal Blocks and Standing Seam Roof
7	0.029		
8			

** Use with COMcheck - Other Metal Building Roof

[a] Metal Building roofs with a slope less than 2:12, installed directly above cooled conditioned spaces in Climate Zones 1, 2, and 3 shall comply with one or more of the following options; 3 year aged Solar Reflectance of 0.55 and a 3 year aged Thermal Emittance of 0.75 or a 3 year aged Solar Reflectance Index of 64, see C402.3 for a list of exceptions.

ASHRAE 90.1-2016 Building Envelope Requirements, Table 5.5 Non-Residential Metal Building Walls			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1	0.094	0.059*	Single Layer, Filled Cavity Fiberglass System - R-25 with 1/8" Foam Thermal Break Strip
2			
3			
4	0.060		
5	0.050	0.042*	Double Layer, Filled Cavity Fiberglass System - R-25 plus R-16 (If both fiber-glass layers are faced with a vapor retarder, the vapor retarder toward the cold side of the building MUST be perforated)
6			
7	0.044		
8	0.039	0.039*	Double Layer, Filled Cavity Fiberglass System - R-30 plus R-16 (If both fiber-glass layers are faced with a vapor retarder, the vapor retarder toward the cold side of the building MUST be perforated)

* Use with COMcheck - Other Metal Building Wall

ASHRAE 90.1-2016 Building Envelope Requirements, Table 5.5 Non-Residential Metal Building Roof			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1[b]	0.041	0.037***	Filled Cavity / Long Tab Banded Insulation System - Faced R-19 plus Unfaced R-11 with Thermal Blocks and Standing Seam Roof
2			
3			
4	0.037		
5			
6	0.031	0.029***	Filled Cavity / Long Tab Banded Insulation System - Faced R-25 plus Unfaced R-19 with Thermal Blocks and Standing Seam Roof
7	0.029		
8	0.026	----	----

*** Use with COMcheck - Other Metal Building Roof

[b] Metal Building roof panels installed directly above cooled conditioned spaces in Climate Zone 1, shall comply with a minimum 3 year aged Solar Reflectance value of 0.55 and a minimum 3 year aged Thermal Emittance of 0.75 or a minimum 3 year aged Solar Reflectance Index of 64, if not, the roof insulation must be increased by installing a system with a maximum U - Factor of 0.028.

IECC 2015 / ASHRAE 2013
Fiberglass Solutions

IECC 2015 Building Envelope Requirements, Table C402.1.4 Metal Building Walls			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1	0.079	0.059*	Single Layer, Filled Cavity Fiberglass System - R-25 with 1/8" Foam Thermal Break Strip
2			
3			
4	0.052	0.052*	Single Layer, Filled Cavity Fiberglass System - R-30 with 1/4" Foam Thermal Break Strip
5			
6			
7			
8			

* Use with COMcheck - Other Metal Building Wall

IECC 2015 Building Envelope Requirements, Table C402.1.4 Metal Building Roof			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1[a]	0.044	0.037**	Filled Cavity / Long Tab Banded Insulation System - Faced R-19 plus Unfaced R-11 with Thermal Blocks and Standing Seam Roof
2[a]	0.035	0.035**	Filled Cavity / Long Tab Banded Insulation System - Faced R-25 plus Unfaced R-11 with Thermal Blocks and Standing Seam Roof
3[a]			
4			
5			
6	0.031	0.029**	Filled Cavity / Long Tab Banded Insulation System - Faced R-25 plus Unfaced R-19 with Thermal Blocks and Standing Seam Roof
7	0.029		
8			

** Use with COMcheck - Other Metal Building Roof

[a] Metal Building roofs with a slope less than 2:12, installed directly above cooled conditioned spaces in Climate Zones 1, 2, and 3 shall comply with one or more of the following options; 3 year aged Solar Reflectance of 0.55 and a 3 year aged Thermal Emittance of 0.75 or a 3 year aged Solar Reflectance Index of 64, see C402.3 for a list of exceptions.

ASHRAE 90.1-2013 Building Envelope Requirements, Table 5.5 Non-Residential Metal Building Walls			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1	0.094	0.059*	Single Layer, Filled Cavity Fiberglass System - R-25 with 1/8" Foam Thermal Break Strip
2			
3			
4	0.060		
5	0.050	0.042*	Double Layer, Filled Cavity Fiberglass System - R-25 plus R-16 (If both fiber-glass layers are faced with a vapor retarder, the vapor retarder toward the cold side of the building MUST be perforated)
6			
7	0.044		
8	0.039	0.039*	Double Layer, Filled Cavity Fiberglass System - R-30 plus R-16 (If both fiber-glass layers are faced with a vapor retarder, the vapor retarder toward the cold side of the building MUST be perforated)

* Use with COMcheck - Other Metal Building Wall

ASHRAE 90.1-2013 Building Envelope Requirements, Table 5.5 Non-Residential Metal Building Roof			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1[b]	0.041	0.037***	Filled Cavity / Long Tab Banded Insulation System - Faced R-19 plus Unfaced R-11 with Thermal Blocks and Standing Seam Roof
2			
3			
4	0.037		
5			
6	0.031	0.029***	Filled Cavity / Long Tab Banded Insulation System - Faced R-25 plus Unfaced R-19 with Thermal Blocks and Standing Seam Roof
7	0.029		
8	0.026	----	----

*** Use with COMcheck - Other Metal Building Roof

[b] Metal Building roof panels installed directly above cooled conditioned spaces in Climate Zone 1, shall comply with a minimum 3 year aged Solar Reflectance value of 0.55 and a minimum 3 year aged Thermal Emittance of 0.75 or a minimum 3 year aged Solar Reflectance Index of 64, if not, the roof insulation must be increased by installing a system with a maximum U - Factor of 0.028.

IECC 2012 / ASHRAE 2010
Fiberglass Solutions

IECC 2012 Building Envelope Requirements, Table C402.1.2 Metal Building Walls			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1	0.079	0.059*	Single Layer, Filled Cavity Insulation System - R-25 with 1/8" Foam Thermal Break Strip
2			
3			
4	0.052	0.052*	Single Layer, Filled Cavity Insulation System - R-30 with 1/4" Foam Thermal Break Strip
5			
6			
7			
8			

* Use with COMcheck - Other Metal Building Wall

IECC 2012 Building Envelope Requirements, Table C402.1.2 Metal Building Roof			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1[a]	0.044	0.037**	Filled Cavity / Long Tab Banded Insulation System - Faced R-19 plus Unfaced R-11 with Thermal Blocks and Standing Seam Roof
2[a]	0.035	0.035**	Filled Cavity / Long Tab Banded Insulation System - Faced R-25 plus Unfaced R-11 with Thermal Blocks and Standing Seam Roof
3[a]			
4			
5			
6	0.031	0.029**	Filled Cavity / Long Tab Banded Insulation System - Faced R-25 plus Unfaced R-19 with Thermal Blocks and Standing Seam Roof
7	0.029		
8			

** Use with COMcheck - Other Metal Building Roof

[a] Metal Building roofs with a slope less than 2:12, installed directly above cooled conditioned spaces in Climate Zones 1, 2, and 3 shall comply with one or more of the following options; 3 year aged Solar Reflectance of 0.55 and a 3 year aged Thermal Emittance of 0.75 or an initial Solar Reflectance of 0.70 and an initial Thermal Emittance of 0.75 or a 3 year aged Solar Reflectance Index of 64 or an initial Solar Reflectance Index of 82, see C402.2.1.1 for a list of exceptions.

ASHRAE 90.1-2010 Building Envelope Requirements, Table 5.5 Non-Residential Metal Building Walls			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1	0.093	0.093	Single Layer, Faced R-16 Fiberglass Blanket
2			
3	0.084	0.084	Single Layer, Faced R-19 Fiberglass Blanket
4			
5	0.069	0.059*	Single Layer, Filled Cavity Insulation System - R-25 with 1/8" Foam Thermal Break Strip
6			
7	0.057	0.052*	Single Layer, Filled Cavity Insulation System - R-30 with 1/4" Foam Thermal Break Strip
8			

* Use with COMcheck - Other Metal Building Wall

ASHRAE 90.1-2010 Building Envelope Requirements, Table 5.5 Non-Residential Metal Building Roof			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1[b]	0.065	0.065	Single Layer, Faced R-19 Fiberglass Blanket with Thermal Blocks and Standing Seam Roof
2	0.055	0.055	Double Layer, Faced R-13 plus Unfaced R-13 Fiberglass Blanket with Thermal Blocks and Standing Seam Roof
3			
4			
5			
6	0.049	0.049	Double Layer, Faced R-13 plus Unfaced R-19 Fiberglass Blanket with Thermal Blocks and Standing Seam Roof
7			
8	0.035	0.035**	Filled Cavity / Long Tab Banded Insulation System - Faced R-25 plus Unfaced R-11 with Thermal Blocks and Standing Seam Roof

** Use with COMcheck - Other Metal Building Roof

[b] Metal Building roof panels installed directly above cooled conditioned spaces in Climate Zone 1, shall comply with a minimum 3 year aged Solar Reflectance of 0.55 and a minimum 3 year aged Thermal Emittance of 0.75 or a minimum 3 year aged Solar Reflectance Index of 64, if not, the roof insulation must be increased by installing a system with a maximum U - Factor of 0.028.

IECC 2009 / ASHRAE 2007
Fiberglass Solutions

IECC 2009 Building Envelope Requirements, Table C502.1.2 Metal Building Walls			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1	0.093	0.059*	Single Layer, Filled Cavity Fiberglass System - R -25 with 1/8" Foam Thermal Break Strip
2			
3	0.084	0.059*	Single Layer, Filled Cavity Fiberglass System - R-25 with 1/8" Foam Thermal Break Strip
4			
5	0.069	0.059*	Single Layer, Filled Cavity Fiberglass System - R -25 with 1/8" Foam Thermal Break Strip
6			
7	0.057	0.052*	Single Layer, Filled Cavity Fiberglass System - R -30 with 1/4" Foam Thermal Break Strip
8			

* Use with COMcheck - Other Metal Building Wall

IECC 2009 Building Envelope Requirements, Table C502.1.2 Metal Building Roof			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1	0.065	0.065	Single Layer, Faced R-19 Fiberglass Blanket with Thermal Blocks and Standing Seam Roof
2	0.055	0.055	Double Layer, Faced R-13 plus Unfaced R-13 Fiberglass Blanket with Thermal Blocks and Standing Seam Roof
3			
4			
5			
6	0.049	0.049	Double Layer, Faced R-13 plus Unfaced R-19 Fiberglass Blanket with Thermal Blocks and Standing Seam Roof
7			
8	0.035	0.035**	Filled Cavity / Long Tab Banded Insulation System - Faced R-25 plus Unfaced R-11 with Thermal Blocks and Standing Seam Roof

** Use with COMcheck - Other Metal Building Roof

ASHRAE 90.1-2007 Building Envelope Requirements, Table 5.5 Non-Residential Metal Building Walls			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1	0.113	0.113	Single Layer, Faced R-13 Fiberglass Blanket
2			
3			
4			
5			
6			
7	0.057	0.052*	Single Layer, Filled Cavity Fiberglass System - R -30 with 1/4" Foam Thermal Break Strip
8			

* Use with COMcheck - Other Metal Building Wall

ASHRAE 90.1-2007 Building Envelope Requirements, Table 5.5 Non-Residential Metal Building Roof			
Climate Zone	Prescriptive Maximum U-Factor	Compliance Options	
		U - Factor	Assembly Description
1[a]	0.065	0.065	Single Layer, Faced R-19 Fiberglass Blanket with Thermal Blocks and Standing Seam Roof
2[a]			
3[a]			
4			
5			
6			
7			
8	0.049	0.049	Double Layer, Faced R-13 plus Unfaced R-19 Fiberglass Blanket with Thermal Blocks and Standing Seam Roof

[a] For Metal Building roof panels installed directly above conditioned spaces that are not cooled, where the exterior surface has a Solar Reflectance of 0.70 and a minimum Thermal Emittance of 0.75 or a Solar Reflectance Index of 82, the roof insulation shall comply with a maximum U - Factor of 0.084 for Climate Zone 1, U- Factor of 0.078 for Climate Zone 2, and a U-Factor of 0.076 for Climate Zone 3.

Frequently Asked Questions

1. Energy Codes and Standards use the term prescriptive path. Does prescriptive path mean it is the only option available to demonstrate energy code compliance?

No, alternate systems can easily be substituted using COMcheck or other compliance programs.

2. Can systems not listed in the ASHRAE tables be used to comply with the energy codes?

Absolutely, there are many higher performing and lower cost systems not listed in the tables. As long as there is supporting test or modeling data, the design professional can use alternative systems to satisfy compliance requirements for the building envelope.

3. Is there an advantage to using a higher performing system than prescribed by code?

Yes, the trade-off option allows the specifying and design professional to trade an energy efficient component or assembly in one area with a less energy efficient component in another area, using COMcheck to verify conformity. An example of this approach would be to enter a higher performing roof system into COMcheck, which could offset a lesser performing system for the walls or other areas. The trade-off option can be less restrictive than the prescriptive approach. You are able to modify the components and assemblies of the building design and still satisfy the compliance requirements of the building envelope.

4. What is a Filled Cavity system?

A Filled Cavity system is one that fills the cavity between the purlins / roof panel or girts / wall panel with insulation. There are two types of Filled Cavity systems: Long Tab Banded and Liner.

5. Today's stringent energy codes appear very restrictive and costly with the prescribed insulation options. Do I have any flexibility to value engineer my insulation system design?

Yes, by using the COMcheck trade-off option process and selecting the "Other, Metal Building roof / wall" category, a filled cavity roof or wall insulation system can be substituted to demonstrate compliance. This option allows the specifying and design professionals to trade an energy efficient component or assembly in one area with a less energy efficient component in another area, using COMcheck to verify conformity. An example of this option would be to enter a higher performing roof insulation system which could offset more costly windows, skylights, doors, or other assemblies. This value engineering design approach can be less restrictive than the prescriptive path. You are able to utilize less costly components and assemblies in the building design while still satisfying the compliance requirements of the building envelope. Currently the COMcheck program does not allow trade-offs between the building envelope and lighting or HVAC equipment.

6. What is the difference between Long Tab Banded and Liner Systems? Is one system better than the other?

Both systems fill the cavity, the only difference is the orientation of the facing tabs.

- Long Tab Banded facing tabs are installed tight against the purlin and over-lapped on top of the flange to maintain the continuity of the vapor retarder, see Figure 1.

- Liner facings are installed under the purlins, see Figure 2.

A. Both can be considered Filled Cavity systems.

B. Both when properly installed, fill the cavity between the purlins.

C. Both systems will provide comparable U-Factor results.

D. Both systems, when installed properly, can provide a continuous vapor retarder.

E. Long Tab Banded systems allow for much easier access to the purlins for installation and maintenance of electrical, HVAC, and sprinkler systems without the unsightly penetrations associated with Liner systems. These penetrations can compromise the integrity of the vapor retarder and insulation system.

Figure 1 - Long Tab Banded

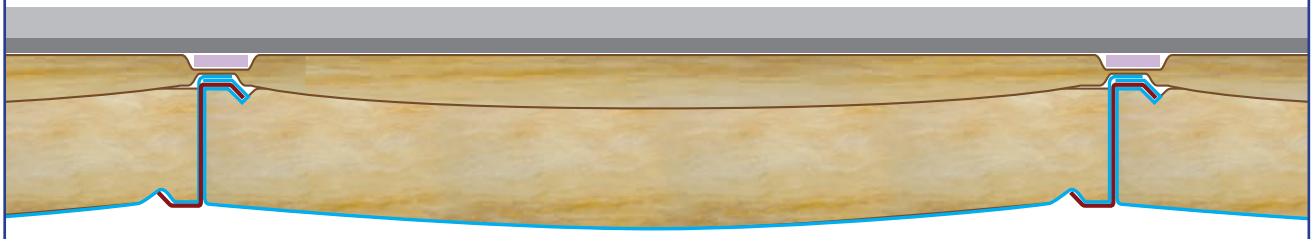
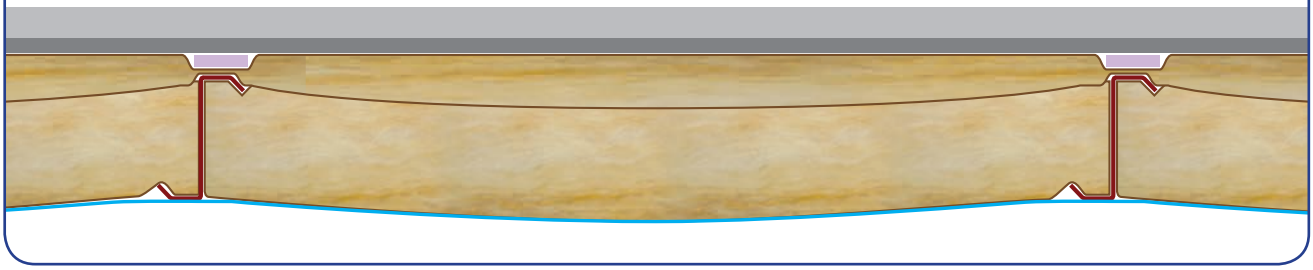


Figure 2 - Liner System



NOTE: The Vapor Retarders have been illustrated in blue for emphasis.

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