TECHNICAL BULLETIN

METAL BUILDING INSULATION ENERGY CODE COMPLIANCE GUIDE

SUMMARY

This guide has the intent of providing guidance on energy code compliance in metal building roof and wall assemblies of the building's envelope per ASHRAE 90.1 standard or the International Energy Conservation Code.

Depending on what building code has been adopted and is enforced in the jurisdiction where the site is located, metal buildings usually must meet the insulation requirements of either:

1. ASHRAE Standard 90.1, or
2. The ICC International Energy Conservation Code (IECC)

While both ASHRAE 90.1 and the IECC use the same climate zone map for the U.S. (see Figures 1 and 2), the insulation requirements in each climate zone for the two documents vary.

In addition, both ASHRAE 90.1 and the IECC provide two compliance paths which either follow the prescriptive or performance method.

The information provided in the guide on the prescriptive requirements of the codes provide some pre-calculated U-Factors for roof and wall assemblies referenced from ASHRAE 90.1-2022.

Figure 1 — ASHRAE 90.1 (2013 and prior) and IECC (2015 and prior)

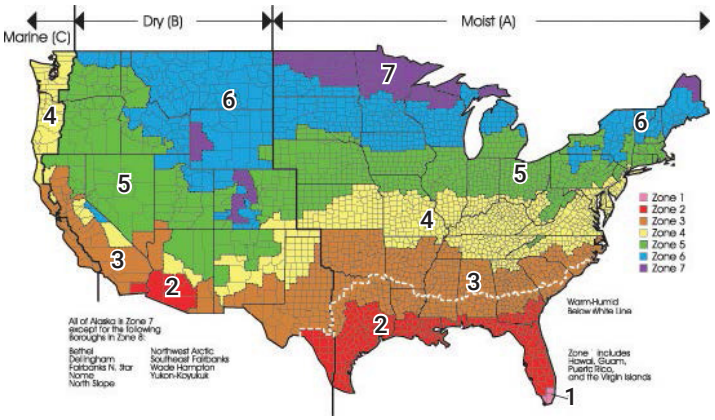
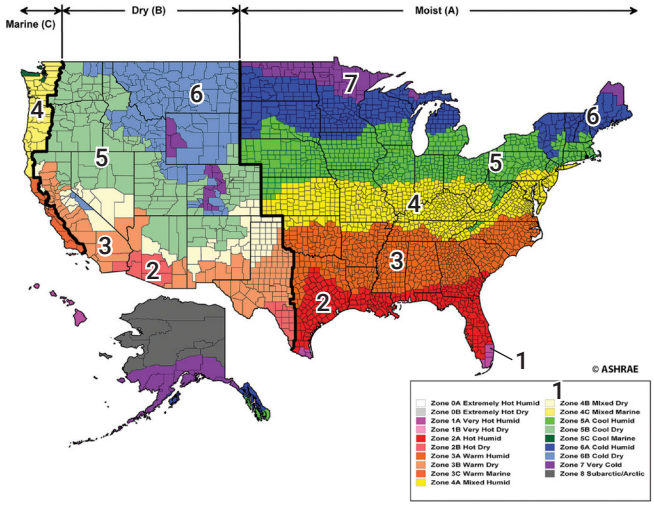


Figure 2 - ASHRAE 90.1 (2016 and later) and IECC (2018 and later)



CODE REQUIREMENTS: METAL BUILDING ROOFS

ASHRAE 90.1 Metal Building Roofs

CLIMATE ZONE	NONRESIDENTIAL (CONDITIONED)									
	ASSEMBLY U-FACTOR					INSULATION MIN. R-VALUE				
	2010	2013	2016	2019	2022	2010[a]	2013[b]	2016[b]	2019[b]	2022[b]
0	N/A	N/A	0.041	0.041	0.041	N/A	N/A	R-10 + R-19 f.c.	R-10 + R-19 f.c.	R-10 + R-19 f.c.
1	0.065	0.041	0.041	0.041	0.041	R-19	R-10 + R-19 f.c.	R-10 + R-19 f.c.	R-10 + R-19 f.c.	R-10 + R-19 f.c.
2	0.055	0.041	0.041	0.041	0.041	R-13 + R-13	R-10 + R-19 f.c.	R-10 + R-19 f.c.	R-10 + R-19 f.c.	R-10 + R-19 f.c.
3	0.055	0.041	0.041	0.041	0.041	R-13 + R-13	R-10 + R-19 f.c.	R-10 + R-19 f.c.	R-10 + R-19 f.c.	R-10 + R-19 f.c.
4	0.055	0.037	0.037	0.037	0.037	R-13 + R-13	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.
5	0.055	0.037	0.037	0.037	0.037	R-13 + R-13	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.
6	0.049	0.031	0.031	0.031	0.031	R-13 + R-19	R-25 + R-11 l.s.	R-25 + R-11 l.s.	R-25 + R-11 l.s.	R-25 + R-11 l.s.
7	0.049	0.029	0.029	0.029	0.029	R-13 + R-19	R-30 + R-11 l.s.	R-30 + R-11 l.s.	R-30 + R-11 l.s.	R-30 + R-11 l.s.
8	0.035	0.026	0.026	0.026	0.026	R-11 + R-19 l.s.	R-25 + R-11 + R-11 l.s.	R-25 + R-11 + R-11 l.s.	R-25 + R-11 + R-11 l.s.	R-25 + R-11 + R-11 l.s.

ASHRAE 90.1 Metal Building Roofs (Cont.)

CLIMATE ZONE	SEMIHEATED									
	ASSEMBLY U-FACTOR					INSULATION MIN. R-VALUE				
	2010	2013	2016	2019	2022	2010[a]	2013[a]	2016[a]	2019[a]	2022[a]
0	N/A	N/A	0.115	0.115	0.115	N/A	N/A	R-10	R-10	R-10
1	0.167	0.115	0.115	0.115	0.115	R-6.0	R-10	R-10	R-10	R-10
2	0.097	0.096	0.096	0.096	0.096	R-10	R-16	R-16	R-16	R-16
3	0.097	0.096	0.096	0.096	0.096	R-10	R-16	R-10	R-16	R-16
4	0.097	0.082	0.082	0.082	0.082	R-10	R-19	R-19	R-19	R-19
5	0.083	0.082	0.082	0.082	0.082	R-13	R-19	R-19	R-19	R-19
6	0.072	0.060	0.060	0.060	0.060	R-16	R-19 + R-19	R-19 + R-19	R-19 + R-19	R-19 + R-19
7	0.072	0.037	0.037	0.037	0.037	R-16	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.
8	0.065	0.037	0.037	0.037	0.037	R-19	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.	R-19 + R-11 l.s. R-25 + R-8 l.s.

IECC Metal Building Roofs

CLIMATE ZONE	METAL BUILDING ROOFS							
	ASSEMBLY U-FACTOR				INSULATION MIN. R-VALUE			
	2009	2012/2015	2018	2021	2009[c]	2012/2015[a]	2018[a]	2021[a]
0	N/A	N/A	N/A	0.035	N/A	N/A	N/A	R-19 + R-11 l.s.
1	0.065	0.044	0.044	0.035	R-19	R-19 + R-11 l.s.	R-19 + R-11 l.s.	R-19 + R-11 l.s.
2	0.055	0.035	0.035	0.035	R-13 + R-13	R-19 + R-11 l.s.	R-19 + R-11 l.s.	R-19 + R-11 l.s.
3	0.055	0.035	0.035	0.035	R-13 + R-13	R-19 + R-11 l.s.	R-19 + R-11 l.s.	R-19 + R-11 l.s.
4	0.055	0.035	0.035	0.035	R-13 + R-13	R-19 + R-11 l.s.	R-19 + R-11 l.s.	R-19 + R-11 l.s.
5	0.055	0.035	0.035	0.035	R-13 + R-13	R-19 + R-11 l.s.	R-19 + R-11 l.s.	R-19 + R-11 l.s.
6	0.049	0.031	0.031	0.031	R-13 + R-19	R-25 + R-11 l.s.	R-25 + R-11 l.s.	R-25 + R-11 l.s.
7	0.049	0.029	0.029	0.029	R-13 + R-19	R-30 + R-11 l.s.	R-30 + R-11 l.s.	R-30 + R-11 l.s.
8	0.035	0.029	0.029	0.026	R-11 + R-19 l.s.	R-30 + R-11 l.s.	R-30 + R-11 l.s.	R-25 + R-11 + R-11 l.s.

a. Requires R-3 thermal blocks.
b. R-5 thermal blocks in filled cavity (f.c.) and R-3 thermal blocks in liner system (l.s.).

CODE REQUIREMENTS: METAL BUILDING WALLS (ABOVE GRADE)

ASHRAE 90.1 Metal Building Walls

CLIMATE ZONE	NONRESIDENTIAL (CONDITIONED)									
	ASSEMBLY U-FACTOR					INSULATION MIN. R-VALUE				
	2010	2013	2016	2019	2022	2010	2013	2016	2019	2022
0	N/A	N/A	0.094	0.094	0.094	N/A	N/A	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.
1	0.093	0.094	0.094	0.094	0.094	R-16	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.
2	0.093	0.094	0.094	0.094	0.094	R-16	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.
3	0.084	0.094	0.094	0.094	0.094	R-19	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.
4	0.084	0.060	0.060	0.060	0.060	R-19	R-0 + R-15.8 c.i.	R-0 + R-15.8 c.i.	R-0 + R-15.8 c.i.	R-0 + R-15.8 c.i.
5	0.069	0.050	0.050	0.050	0.050	R-13 + R-5.6 c.i.	R-0 + R-19 c.i.	R-0 + R-19 c.i.	R-0 + R-19 c.i.	R-0 + R-19 c.i.
6	0.069	0.050	0.050	0.050	0.050	R-13 + R-5.6 c.i.	R-0 + R-19 c.i.	R-0 + R-19 c.i.	R-0 + R-19 c.i.	R-0 + R-19 c.i.
7	0.057	0.044	0.044	0.044	0.044	R-19 + R-5.6 c.i.	R-0 + R-22.1 c.i.	R-0 + R-22.1 c.i.	R-0 + R-22.1 c.i.	R-0 + R-22.1 c.i.
8	0.057	0.039	0.039	0.039	0.039	R-19 + R-5.6 c.i.	R-0 + R-25 c.i.	R-0 + R-25 c.i.	R-0 + R-25 c.i.	R-0 + R-25 c.i.

ASHRAE 90.1 Metal Building Walls (Cont.)

CLIMATE ZONE	SEMIHEATED									
	ASSEMBLY U-FACTOR					INSULATION MIN. R-VALUE				
	2010	2013	2016	2019	2022	2010	2013	2016	2019	2022
0	N/A	N/A	0.352	0.352	0.352	N/A	N/A	NR	NR	NR
1	0.113	0.352	0.352	0.352	0.352	R-13	NR	NR	NR	NR
2	0.113	0.162	0.162	0.162	0.162	R-13	R-13	R-13.0	R-13.0	R-13
3	0.113	0.162	0.162	0.162	0.162	R-13	R-13	R-13.0	R-13.0	R-13
4	0.113	0.162	0.162	0.162	0.162	R-13	R-13	R-13.0	R-13.0	R-13
5	0.113	0.094	0.094	0.094	0.094	R-13	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.
6	0.113	0.094	0.094	0.094	0.094	R-13	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.	R-0 + R-9.8 c.i.
7	0.113	0.072	0.072	0.072	0.072	R-13	R-0 + R-13 c.i.	R-0 + R-13 c.i.	R-0 + R-13 c.i.	R-0 + R-13 c.i.
8	0.113	0.060	0.060	0.060	0.060	R-13	R-0 + R-15.8 c.i.	R-0 + R-15.8 c.i.	R-0 + R-15.8 c.i.	R-0 + R-15.8 c.i.

IECC Metal Building Walls (Above Grade)

CLIMATE ZONE	METAL BUILDING ROOFS							
	ASSEMBLY U-FACTOR				INSULATION MIN. R-VALUE			
	2009	2012/2015	2018	2021	2009[c]	2012/2015[a]	2018[a]	2021[b]
0	N/A	N/A	N/A	0.079	N/A	N/A	N/A	R-13 + R-6.5 c.i.
1	0.093	0.079	0.079	0.079	R-16	R-13 + R-6.5 c.i.	R-13 + R-6.5 c.i.	R-13 + R-6.5 c.i.
2	0.093	0.079	0.079	0.079	R-16	R-13 + R-6.5 c.i.	R-13 + R-6.5 c.i.	R-13 + R-6.5 c.i.
3	0.084	0.079	0.079	0.079	R-19	R-13 + R-6.5 c.i.	R-13 + R-13 c.i.	R-13 + R-6.5 c.i.
4	0.084	0.052	0.052	0.052	R-19	R-13 + R-13 c.i.	R-13 + R-13 c.i.	R-13 + R-13 c.i.
5	0.069	0.052	0.052	0.050	R-13 + R-5.6 c.i.	R-13 + R-13 c.i.	R-13 + R-13 c.i.	R-13 + R-14 c.i.
6	0.069	0.052	0.052	0.050	R-13 + R-5.6 c.i.	R-13 + R-13 c.i.	R-13 + R-13 c.i.	R-13 + R-14 c.i.
7	0.057	0.052	0.052	0.044	R-19 + R-5.6 c.i.	R-13 + R-13 c.i.	R-13 + R-13 c.i.	R-13 + R-17 c.i.
8	0.057	0.052	0.052	0.039	R-19 + R-5.6 c.i.	R-13 + R-13 c.i.	R-13 + R-13 c.i.	R-13 + R-19.5 c.i.

c.i. Continuous Insulation

METAL BUILDING ROOF ASSEMBLIES

Standing Seam Roof Assemblies with Single Layer of Faced Insulation

The rated R-value of insulation is for insulation installed perpendicular to and draped over purlins and then compressed when the metal roof panels are attached. A minimum R-3 thermal spacer block between the purlins and the metal roof panels is required unless compliance is shown by the overall assembly U-factor. Continuous insulation (uncompressed and uninterrupted by framing members) may be added either above or below the purlins to provide additional performance. A standing seam roof clip that provides a minimum 1.5-inch distance between the top of the purlin and the underside of the metal roof panel is required.

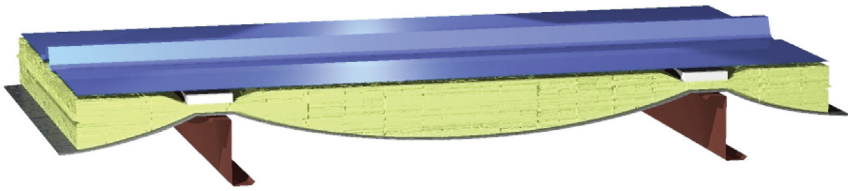


Image provided by NAIMA.

STANDING SEAM ROOFS, SINGLE LAYER, WITH THERMAL SPACER BLOCKS

RATED R-VALUE OF FACED INSULATION	THERMAL SPACER BLOCK	OVERALL U-FACTOR FOR ENTIRE BASE ROOF ASSEMBLY	OVERALL U-FACTOR FOR ASSEMBLY OF BASE ROOF PLUS CONTINUOUS INSULATION (UNINTERRUPTED BY FRAMING) OVERALL U-FACTOR BTU/(H•FT²•°F)								
			RATED R-VALUE OF CONTINUOUS INSULATION								
			R-6.5	R-9.8	R-13	R-15.8	R-19	R-22.1	R-25	R-32	R-38
None	R-3	1.280	0.137	0.095	0.073	0.060	0.051	0.044	0.039	0.031	0.026
R-10	R-3	0.115	0.066	0.054	0.046	0.041	0.036	0.032	0.030	0.025	0.021
R-11	R-3	0.107	0.063	0.052	0.045	0.040	0.035	0.032	0.030	0.024	0.021
R-13	R-3	0.101	0.061	0.051	0.044	0.039	0.035	0.031	0.029	0.024	0.021
R-16	R-3	0.096	0.059	0.049	0.043	0.038	0.034	0.031	0.028	0.024	0.021
R-19	R-3	0.082	0.053	0.045	0.040	0.036	0.032	0.029	0.027	0.023	0.020

Standing Seam Roof Assemblies Double Layers of Insulation

The first rated R-value of insulation is for insulation installed perpendicular to and draped over purlins. The second rated R-value of insulation is for unfaced insulation installed above the first layer and parallel to the purlins and then compressed when the metal roof panels are attached. A minimum R-3 thermal spacer block between the purlins and the metal roof panels is required unless compliance is shown by the overall assembly U-factor. Continuous insulation (uncompressed and uninterrupted by framing members) may be added either above or below the purlins to provide additional performance. A standing seam roof clip that provides a minimum 1.5-inch distance between the top of the purlin and the underside of the metal roof panel is required.

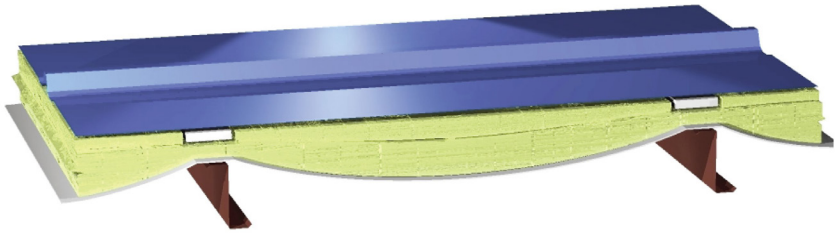


Image provided by NAIMA.

STANDING SEAM ROOFS, DOUBLE LAYER, WITH THERMAL SPACER BLOCKS

RATED R-VALUE OF FACED INSULATION	THERMAL SPACER BLOCK	OVERALL U-FACTOR FOR ENTIRE BASE ROOF ASSEMBLY	OVERALL U-FACTOR FOR ASSEMBLY OF BASE ROOF PLUS CONTINUOUS INSULATION (UNINTERRUPTED BY FRAMING) OVERALL U-FACTOR BTU/(H•FT²•°F)								
			RATED R-VALUE OF CONTINUOUS INSULATION								
			R-6.5	R-9.8	R-13	R-15.8	R-19	R-22.1	R-25	R-32	R-38
R-10 + R-10	R-3	0.088	0.056	0.047	0.041	0.037	0.033	0.030	0.028	0.023	0.020
R-10 + R-11	R-3	0.086	0.055	0.047	0.041	0.036	0.033	0.030	0.027	0.023	0.020
R-11 + R-11	R-3	0.085	0.055	0.046	0.040	0.036	0.033	0.030	0.027	0.023	0.020
R-10 + R-13	R-3	0.084	0.054	0.046	0.040	0.036	0.032	0.029	0.027	0.023	0.020
R-11 + R-13	R-3	0.082	0.053	0.045	0.040	0.036	0.032	0.029	0.027	0.023	0.020
R-13 + R-13	R-3	0.075	0.050	0.043	0.038	0.034	0.031	0.028	0.026	0.022	0.019
R-10 + R-19	R-3	0.074	0.050	0.043	0.038	0.034	0.031	0.028	0.026	0.022	0.019
R-11 + R-19	R-3	0.072	0.049	0.042	0.037	0.034	0.030	0.028	0.026	0.022	0.019
R-13 + R-19	R-3	0.068	0.047	0.041	0.036	0.033	0.030	0.027	0.025	0.021	0.019
R-16 + R-19	R-3	0.065	0.046	0.040	0.035	0.032	0.029	0.027	0.025	0.021	0.019
R-19 + R-19	R-3	0.060	0.043	0.038	0.034	0.031	0.028	0.026	0.024	0.021	0.018

Standing Seam Roof Assemblies with Liner Systems

A continuous membrane is installed below the purlins and uninterrupted by framing members. Uncompressed unfaced insulation rests on top of the membrane between the purlins. For multilayer installations, the last rated R-value of insulation is for unfaced insulation draped over purlins and then compressed when the metal roof panels are attached. A minimum R-3 thermal spacer block between the purlins and the metal roof panels is required unless compliance is shown by the overall assembly U-factor. A standing seam roof clip that provides a minimum 1.5-inch distance between the top of the purlin and the underside of the metal roof panel is required.

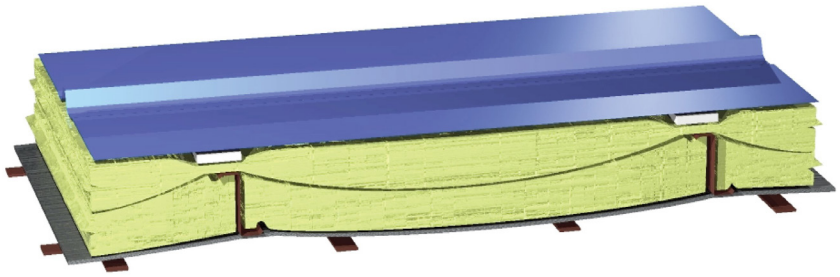


Image provided by NAIMA.

STANDING SEAM ROOFS WITH LINER SYSTEMS

RATED R-VALUE OF INSULATION	THERMAL SPACER BLOCK	OVERALL U-FACTOR FOR ENTIRE BASE ROOF ASSEMBLY OVERALL U-FACTOR BTU/(H•FT²•°F)
R-19 + R-11	None	0.040
R-19 + R-11	R-3	0.037
R-25 + R-8	R-3	0.037
R-25 + R-11	R-3	0.031
R-30 + R-11	R-3	0.029
R-25 + R-11 + R-11	R-3	0.026

Standing Seam Roof Assemblies with Filled Cavities (Long Tab Banded)

The first rated R-value of insulation represents faced or unfaced insulation installed between the purlins. The second rated R-value of insulation represents unfaced insulation installed above the first layer, perpendicular to the purlins and compressed when the metal roof panels are attached. A supporting structure retains the bottom of the first layer at the prescribed depth required for the full thickness of insulation. A minimum R-5 spacer block between the purlins and the metal roof panels is required unless compliance is shown by the overall assembly U-factor. A standing seam roof clip that provides a minimum 1.5-inch distance between the top of the purlin and the underside of the metal roof panel is required.

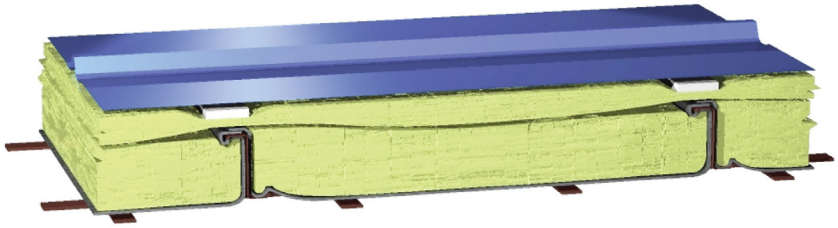


Image provided by NAIMA.

STANDING SEAM ROOFS, FILLED CAVITY WITH THERMAL SPACER BLOCKS

RATED R-VALUE OF FACED INSULATION	THERMAL SPACER BLOCK	OVERALL U-FACTOR FOR ENTIRE BASE ROOF ASSEMBLY	OVERALL U-FACTOR FOR ASSEMBLY OF BASE ROOF PLUS CONTINUOUS INSULATION (UNINTERRUPTED BY FRAMING) OVERALL U-FACTOR BTU/(H•FT²•°F)								
			RATED R-VALUE OF CONTINUOUS INSULATION								
			R-6.5	R-9.8	R-13	R-15.8	R-19	R-22.1	R-25	R-32	R-38
R-19 + R-10	R-5	0.041	0.032	0.029	0.027	0.025	0.023	0.022	0.020	0.018	0.016
R-19 + R-11	R-5	0.037									

Through-Fastened Roofs

The rated R-value of insulation is for insulation installed perpendicular to and draped over purlins and then compressed when the metal roof panels are attached. Normally, thermal blocks are not used in through-fastened roofs.

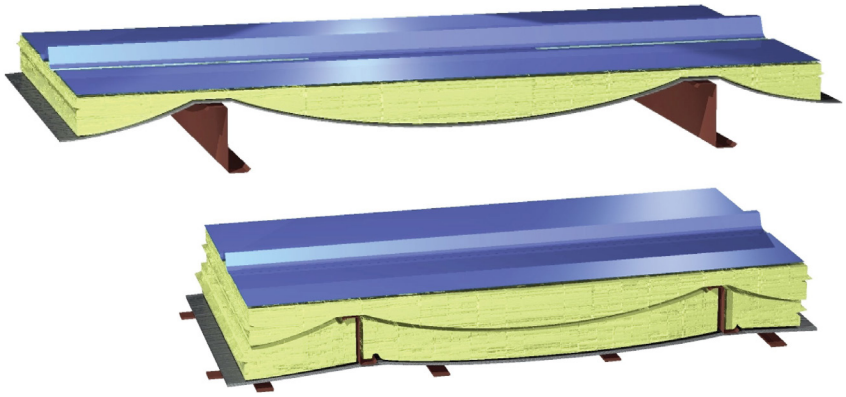


Image provided by NAIMA.

STANDING SEAM ROOFS, THROUGH-FASTENED WITHOUT THERMAL SPACER BLOCKS

RATED R-VALUE OF FACED INSULATION	THERMAL SPACER BLOCK	OVERALL U-FACTOR FOR ENTIRE BASE ROOF ASSEMBLY	OVERALL U-FACTOR FOR ASSEMBLY OF BASE ROOF PLUS CONTINUOUS INSULATION (UNINTERRUPTED BY FRAMING) OVERALL U-FACTOR BTU/(H•FT²•°F)								
			RATED R-VALUE OF CONTINUOUS INSULATION								
			R-6.5	R-9.8	R-13	R-15.8	R-19	R-22.1	R-25	R-32	R-38
R-10	None	0.184	0.084	0.066	0.054	0.047	0.041	0.036	0.033	0.027	0.023
R-11	None	0.182	0.083	0.065	0.054	0.047	0.041	0.036	0.033	0.027	0.023
R-13	None	0.174	0.082	0.064	0.053	0.046	0.040	0.036	0.033	0.026	0.023
R-16	None	0.157	0.078	0.062	0.052	0.045	0.039	0.035	0.032	0.026	0.023
R-19	None	0.151	0.076	0.061	0.051	0.045	0.039	0.035	0.032	,026	0.022
R-19 ls + R-11	None	0.044									

METAL BUILDING WALL ASSEMBLIES (ABOVE GRADE)

Single Layer Compressed

The first rated R-value of insulation is for insulation compressed between metal wall panels and the steel structure. The continuous insulation (uncompressed and uninterrupted) by framing members may be added to the girts to provide additional performance.

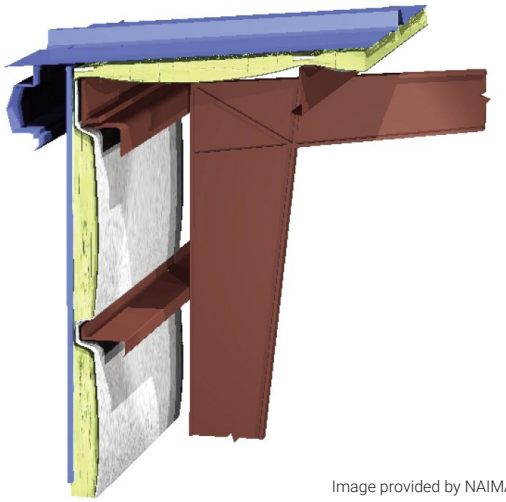


Image provided by NAIMA.

WALL ASSEMBLY: SINGLE LAYER COMPRESSED

RATED R-VALUE OF FACED INSULATION	OVERALL U-FACTOR FOR ENTIRE BASE WALL ASSEMBLY	OVERALL U-FACTOR FOR ASSEMBLY OF BASE WALL PLUS CONTINUOUS INSULATION (UNINTERRUPTED BY FRAMING) OVERALL U-FACTO BTU/(H•FT²•°F)								
		RATED R-VALUE OF CONTINUOUS INSULATION								
		R-6.5	R-9.8	R-13	R-15.8	R-19	R-22.1	R-25	R-32	R-38
None	1.180	0.136	0.094	0.072	0.060	0.050	0.044	0.039	0.030	0.026
R-10	0.186	0.084	0.066	0.054	0.047	0.041	0.036	0.033	0.027	0.033
R-11	0.185	0.084	0.066	0.054	0.047	0.041	0.036	0.033	0.027	0.033
R-13	0.162	0.079	0.063	0.052	0.046	0.040	0.035	0.032	0.026	0.033
R-16	0.155	0.077	0.062	0.051	0.045	0.039	0.035	0.032	0.026	0.032
R-19	0.147	0.075	0.060	0.050	0.044	0.039	0.035	0.031	0.026	0.032

Single Layer in Cavity

The insulation is installed in the cavity between the girts, not compressed by the framing. A membrane or facing, installed separately, or adhered to the insulation, is installed inside of the girts to form a continuous layer. A thermal spacer block or thermal break strip between the girts and metal wall panels is required when specified in table.

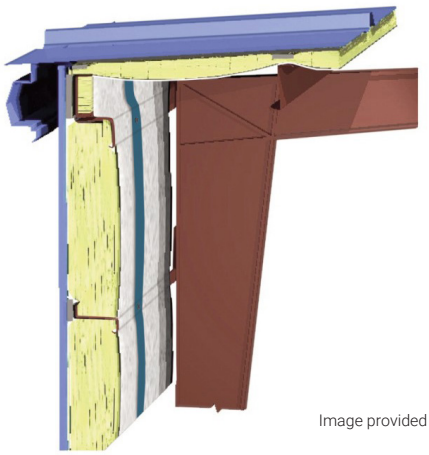


Image provided by NAIMA.

WALL ASSEMBLY: SINGLE LAYER IN CAVITY

RATED R-VALUE OF INSULATION	OVERALL U-FACTOR FOR ENTIRE BASE WALL ASSEMBLY	OVERALL U-FACTOR FOR ASSEMBLY OF BASE WALL PLUS CONTINUOUS INSULATION (UNINTERRUPTED BY FRAMING) OVERALL U-FACTOR BTU/(H•FT²•°F)								
		RATED R-VALUE OF CONTINUOUS INSULATION								
		R-6.5	R-9.8	R-13	R-15.8	R-19	R-22.1	R-25	R-32	R-38
R-25[a]	0.059	0.044	0.039	0.035	0.032	0.029	0.027	0.025	0.021	0.019
R-30[b]	0.052	0.042	0.037	0.033	0.031	0.028	0.026	0.024	0.021	0.019
R-32.5[c]	0.049	0.037	0.033	0.030	0.028	0.025	0.024	0.022	0.019	0.017
R-32.5[d]	0.044	0.034	0.031	0.028	0.026	0.024	0.022	0.021	0.018	0.017

a. A minimum R-0.375 thermal spacer block or thermal break strip is required when installed without continuous insulation.
b. A minimum R-0.75 thermal spacer block or thermal break strip is required when installed without continuous insulation.
c. A minimum 1/4" thermal tape is required, 8" Girts at 5'-0" on center.
d. A minimum 1/8" thermal tape is required, 8.5" Girts at 5'-0" on center.

Double Layer Insulation

The first rated R-value of insulation is for insulation installed in the cavity between the girts, not compressed by the framing. The second rated R-value of insulation is for the insulation compressed between metal wall panels and the steel structure. A membrane or facing, installed separately, or adhered to the insulation, is installed inside of the girts to form a continuous layer. A thermal spacer block or thermal break strip between the girts and metal wall panels is required as specified in table.

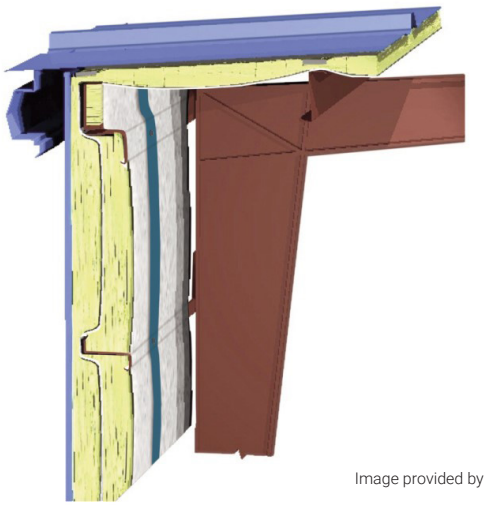


Image provided by NAIMA.

WALL ASSEMBLY: DOUBLE LAYER

RATED R-VALUE OF FACED INSULATION	OVERALL U-FACTOR FOR ENTIRE BASE WALL ASSEMBLY	OVERALL U-FACTOR FOR ASSEMBLY OF BASE WALL PLUS CONTINUOUS INSULATION (UNINTERRUPTED BY FRAMING) OVERALL U-FACTOR BTU/(H•FT²•°F)								
		RATED R-VALUE OF CONTINUOUS INSULATION								
		R-6.5	R-9.8	R-13	R-15.8	R-19	R-22.1	R-25	R-32	R-38
R-25 + R-10	0.047	0.038	0.034	0.031	0.028	0.026	0.024	0.023	0.020	0.018
R-25 + R-16	0.042	0.036	0.032	0.029	0.027	0.025	0.023	0.022	0.019	0.018
R-25 + R-10[c]	0.039	0.032	0.029	0.027	0.025	0.023	0.022	0.021	0.018	0.017
R-30 + R-16	0.039	0.036	0.032	0.029	0.027	0.025	0.023	0.022	0.019	0.017

c. A minimum thermal spacer block of R-3 is required.

OWENS CORNING INSULATING SYSTEMS, LLC
ONE OWENS CORNING PARKWAY
TOLEDO, OH 43659 USA

1-800-GET-PINK®
www.owenscorning.com

Pub. No. 10015581-J. Printed in U.S.A. September 2026.
© 2026 Owens Corning. All Rights Reserved.