

Installed over 3-5/8" or 4" Metal Stud Framing

Wall Assembly				Exterior Insulation Thickness			
Wall Cavity	Exterior Insulation	Horizontal On-Center Spacing	Vertical On-Center Spacing	2"		4"	
				U-Value	R-Value	U-Value	R-Value
				(Btu/h·ft²·°F)	(ft²·°F·h/Btu)	(Btu/h·ft²·°F)	(ft²·°F·h/Btu)
Uninsulated	Polyisocyanurate (R-13 per 2in, R-25 per 4in)	16"	12"	0.065	15.3	0.041	24.7
			16"	0.064	15.5	0.039	25.5
			24"	0.063	15.8	0.038	26.4
			36"	0.063	16.0	0.037	27.0
		24"	12"	0.064	15.6	0.039	25.8
			16"	0.063	15.8	0.038	26.4
			24"	0.063	16.0	0.037	27.0
			36"	0.062	16.1	0.036	27.4
R-13 Cavity Insulation	Polyisocyanurate (R-13 per 2in, R-25 per 4in)	16"	12"	0.044	22.6	0.031	32.2
			16"	0.044	22.8	0.030	33.0
			24"	0.043	23.1	0.030	33.9
			36"	0.043	23.3	0.029	34.5
		24"	12"	0.041	24.3	0.029	34.6
			16"	0.041	24.5	0.028	35.2
			24"	0.041	24.7	0.028	35.8
			36"	0.040	24.8	0.028	36.2

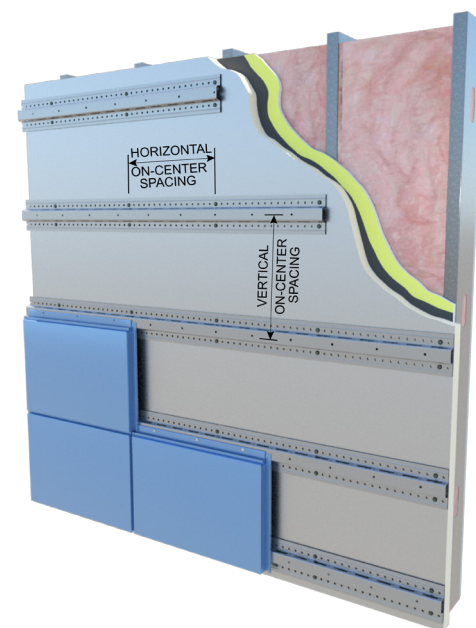
Installed over 6" Metal Stud Framing

Wall Assembly				Exterior Insulation Thickness			
Wall Cavity	Exterior Insulation	Horizontal On-Center Spacing	Vertical On-Center Spacing	2"		4"	
				U-Value	R-Value	U-Value	R-Value
				(Btu/h·ft²·°F)	(ft²·°F·h/Btu)	(Btu/h·ft²·°F)	(ft²·°F·h/Btu)
Uninsulated	Polyisocyanurate (R-13 per 2in, R-25 per 4in)	16"	12"	0.065	15.3	0.041	24.7
			16"	0.064	15.5	0.039	25.5
			24"	0.063	15.8	0.038	26.4
			36"	0.063	16.0	0.037	27.0
		24"	12"	0.064	15.6	0.039	25.8
			16"	0.063	15.8	0.038	26.4
			24"	0.063	16.0	0.037	27.0
			36"	0.062	16.1	0.036	27.4
R-19 Cavity Insulation	Polyisocyanurate (R-13 per 2in, R-25 per 4in)	16"	12"	0.040	24.8	0.029	34.5
			16"	0.040	25.1	0.028	35.3
			24"	0.039	25.3	0.028	36.1
			36"	0.039	25.5	0.027	36.8
		24"	12"	0.037	27.4	0.026	37.8
			16"	0.036	27.5	0.026	38.4
			24"	0.036	27.7	0.026	39.0
			36"	0.036	27.8	0.025	39.4

Notes:

- For horizontally installed ProChannel Ci include two fasteners at the outer flanges of the channel which are approximately 3-1/2 inch apart.
- The thermal performance of the wall assemblies was evaluated by 3D thermal simulations.
- The thermal solver and modeling procedures utilized for this study were extensively calibrated and validated to within +/- 5% of hotbox testing for ASHRAE Research Project Report RP-1365.
- Large enclosed air spaces greater than 1/2 inch in depth, such as stud cavities, were simulated with an equivalent thermal conductivity of the air that includes the impacts of convection and radiation within the enclosure. Calculations for this equivalent conductivity were based on 2017 ASHRAE Handbook - Fundamentals.

- Interior/exterior air films were taken from 2017 ASHRAE Handbook – Fundamentals depending on surface orientation. The exterior air films were based on an exterior wind speed of 15 mph.
- Contact resistances between materials were simulated following procedures outlined in ASHRAE Research Project Report RP-1365.
- Insulation and other components were considered tight to adjacent interfaces.
- The clear field transmittances included in this analysis include repeating thermal bridges such as studs, girts, and fasteners.
- The wall assemblies were evaluated over a temperature index, for full limitations of this modeling approach, see ASHRAE Research Project Report RP-1365.



Installed over 2 x 4 Wood Framed Wall

Wall Assembly				Exterior Insulation Thickness			
Wall Cavity	Exterior Insulation	Horizontal On-Center Spacing	Vertical On-Center Spacing	2"		4"	
				U-Value	R-Value	U-Value	R-Value
				(Btu/h·ft²·°F)	(ft²·°F·h/Btu)	(Btu/h·ft²·°F)	(ft²·°F·h/Btu)
Uninsulated	Polyisocyanurate (R-13 per 2in, R-25 per 4in)	16"	12"	0.063	16.0	0.039	25.7
			16"	0.062	16.2	0.038	26.4
			24"	0.061	16.4	0.037	27.2
			36"	0.060	16.6	0.036	27.8
		24"	12"	0.062	16.2	0.038	26.6
			16"	0.061	16.4	0.037	27.1
			24"	0.061	16.5	0.036	27.7
			36"	0.060	16.6	0.036	28.1
R-13 Cavity Insulation	Polyisocyanurate (R-13 per 2in, R-25 per 4in)	16"	12"	0.038	26.4	0.028	36.1
			16"	0.038	26.6	0.027	36.8
			24"	0.037	26.8	0.027	37.6
			36"	0.037	27.0	0.026	38.2
		24"	12"	0.037	27.1	0.027	37.5
			16"	0.037	27.3	0.026	38.0
			24"	0.036	27.4	0.026	38.6
			36"	0.036	27.5	0.026	39.0

Installed over 2 x 6 Wood Framed Wall

Wall Assembly				Exterior Insulation Thickness			
Wall Cavity	Exterior Insulation	Horizontal On-Center Spacing	Vertical On-Center Spacing	2"		4"	
				U-Value	R-Value	U-Value	R-Value
				(Btu/h·ft²·°F)	(ft²·°F·h/Btu)	(Btu/h·ft²·°F)	(ft²·°F·h/Btu)
Uninsulated	Polyisocyanurate (R-13 per 2in, R-25 per 4in)	16"	12"	0.063	16.0	0.039	25.7
			16"	0.062	16.2	0.038	26.4
			24"	0.061	16.4	0.037	27.2
			36"	0.060	16.6	0.036	27.8
		24"	12"	0.062	16.2	0.038	26.6
			16"	0.061	16.4	0.037	27.1
			24"	0.061	16.5	0.036	27.7
			36"	0.060	16.6	0.036	28.1
R-19 Cavity Insulation	Polyisocyanurate (R-13 per 2in, R-25 per 4in)	16"	12"	0.031	31.8	0.024	41.5
			16"	0.031	32.0	0.024	42.2
			24"	0.031	32.2	0.023	43.0
			36"	0.031	32.4	0.023	43.6
		24"	12"	0.030	32.8	0.023	43.2
			16"	0.030	33.0	0.023	43.7
			24"	0.030	33.1	0.023	44.3
			36"	0.030	33.2	0.022	44.7

Notes:

- For horizontally installed ProChannel Ci include two fasteners at the outer flanges of the channel which are approximately 3-1/2 inch apart.
- The thermal performance of the wall assemblies was evaluated by 3D thermal simulations.
- The thermal solver and modeling procedures utilized for this study were extensively calibrated and validated to within +/- 5% of hotbox testing for ASHRAE Research Project Report RP-1365.
- Large enclosed air spaces greater than 1/2 inch in depth, such as stud cavities, were simulated with an equivalent thermal conductivity of the air that includes the impacts of convection and radiation within the enclosure. Calculations for this equivalent conductivity were based on 2017 ASHRAE Handbook - Fundamentals.
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