ProChannel Ci 54mil (16ga) System - Thermal Performance

ProChannel Ci Vertically oriented over Metal Stud framed wall

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

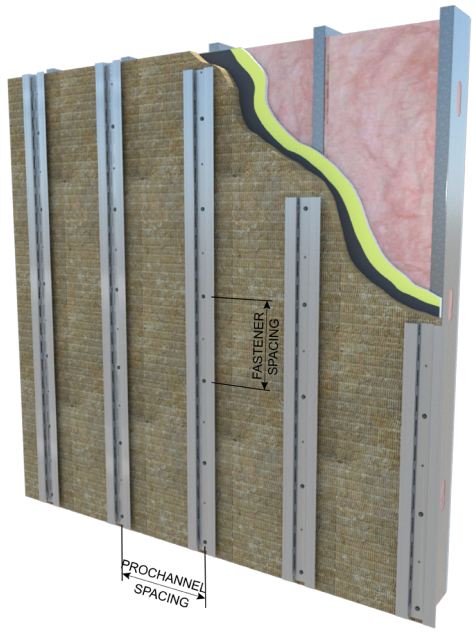
Wall Assembly				Exterior Insulation Thickness			
Wall Cavity	Exterior Insulation	ProChannel Spacing	Fastener Spacing	2"		4"	
				U-Value	R-Value	U-Value	R-Value
Uninsulated	Mineral Wool (R-4.2/in)	16"	6"	0.089	11.2	0.055	18.1
			12"	0.087	11.5	0.052	19.1
			18"	0.087	11.5	0.052	19.4
		24"	6"	0.088	11.4	0.053	18.8
			12"	0.087	11.5	0.052	19.4
			18"	0.086	11.6	0.051	19.6
R-13 Cavity Insulation	Mineral Wool (R-4.2/in)	16"	6"	0.054	18.4	0.039	25.5
			12"	0.053	18.7	0.038	26.5
			18"	0.053	18.7	0.037	26.8
		24"	6"	0.050	19.9	0.036	27.5
			12"	0.050	20.0	0.036	28.1
			18"	0.050	20.1	0.035	28.3

Installed over 6" Metal Stud Framing

Wall Assembly				Exterior Insulation Thickness			
Wall Cavity	Exterior Insulation	ProChannel Spacing	Fastener Spacing	2"		4"	
				U-Value	R-Value	U-Value	R-Value
Uninsulated	Mineral Wool (R-4.2/in)	16"	6"	0.089	11.2	0.055	18.1
			12"	0.087	11.5	0.052	19.1
			18"	0.087	11.5	0.052	19.4
		24"	6"	0.088	11.4	0.053	18.8
			12"	0.087	11.5	0.052	19.4
			18"	0.086	11.6	0.051	19.6
R-19 Cavity Insulation	Mineral Wool (R-4.2/in)	16"	6"	0.048	20.6	0.036	27.8
			12"	0.048	20.9	0.035	28.7
			18"	0.048	21.0	0.034	29.1
		24"	6"	0.044	23.0	0.033	30.6
			12"	0.043	23.1	0.032	31.3
			18"	0.043	23.2	0.032	31.5

Notes:

1. The thermal performance of the wall assemblies was evaluated by 3D thermal simulations.
2. 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.
3. 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.
4. 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.
5. Contact resistances between materials were simulated following procedures outlined in ASHRAE Research Project Report RP-1365.
6. Insulation and other components were considered tight to adjacent interfaces.
7. The clear field transmittances included in this analysis include repeating thermal bridges such as studs, girts, and fasteners.
8. The wall assemblies were evaluated over a temperature index, for full limitations of this modeling approach, see ASHRAE Research Project Report RP-1365.



ProChannel Ci 54mil (16ga) System - Thermal Performance

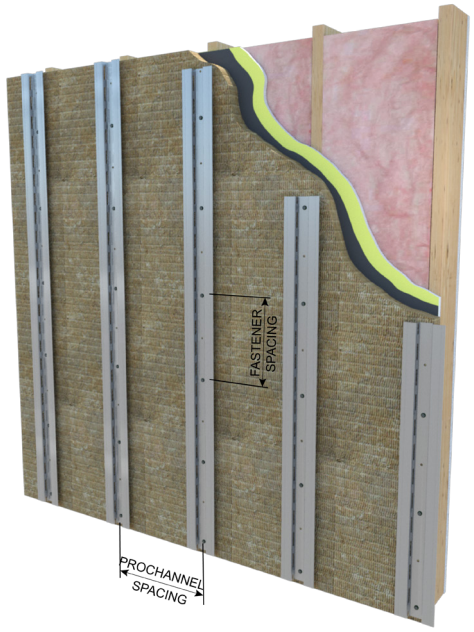
ProChannel Ci Vertically oriented over Wood framed wall

Installed over 2 x 4 Wood Framed Wall

Wall Assembly				Exterior Insulation Thickness			
Wall Cavity	Exterior Insulation	ProChannel Spacing	Fastener Spacing	2"		4"	
				U-Value	R-Value	U-Value	R-Value
Uninsulated	Mineral Wool (R-4.2/in)	16"	6"	0.084	11.9	0.053	19.0
			12"	0.083	12.1	0.051	19.8
			18"	0.083	12.1	0.050	20.1
		24"	6"	0.083	12.0	0.051	19.5
			12"	0.083	12.1	0.050	20.1
			18"	0.082	12.2	0.049	20.3
R-13 Cavity Insulation	Mineral Wool (R-4.2/in)	16"	6"	0.045	22.3	0.034	29.4
			12"	0.044	22.5	0.033	30.2
			18"	0.044	22.5	0.033	30.5
		24"	6"	0.044	22.9	0.033	30.4
			12"	0.043	23.0	0.032	31.0
			18"	0.043	23.1	0.032	31.2

Installed over 2 x 6 Wood Framed Wall

Wall Assembly				Exterior Insulation Thickness			
Wall Cavity	Exterior Insulation	ProChannel Spacing	Fastener Spacing	2"		4"	
				U-Value	R-Value	U-Value	R-Value
Uninsulated	Mineral Wool (R-4.2/in)	16"	6"	0.084	11.9	0.053	19.0
			12"	0.083	12.1	0.051	19.8
			18"	0.083	12.1	0.050	20.1
		24"	6"	0.083	12.0	0.051	19.5
			12"	0.083	12.1	0.050	20.1
			18"	0.082	12.2	0.049	20.3
R-19 Cavity Insulation	Mineral Wool (R-4.2/in)	16"	6"	0.036	27.7	0.029	34.8
			12"	0.036	27.9	0.028	35.6
			18"	0.036	27.9	0.028	35.9
		24"	6"	0.035	28.6	0.028	36.1
			12"	0.035	28.7	0.027	36.7
			18"	0.035	28.8	0.027	36.9

Notes:

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2. 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.
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