

Exterior Wall Framing & Accessories ThermaFast® Continuous Rigid Insulation Framing System

Introduction

Recent changes in the IECC Energy Conservation Code and ASHRAE Standard 90.1 necessitate the installation of 1 to 4 inches of continuous rigid insulation layer on the outside surface of exterior metal stud walls. Existing building component systems lack sufficient accommodation for cladding assemblies, like cement board panels, siding, metal panels, EIFS, stucco, etc. since there is no viable means to attach to a stable substrate like plywood or gypsum sheathing over the thick rigid insulation layer other than long and unstable cantilevered screws.

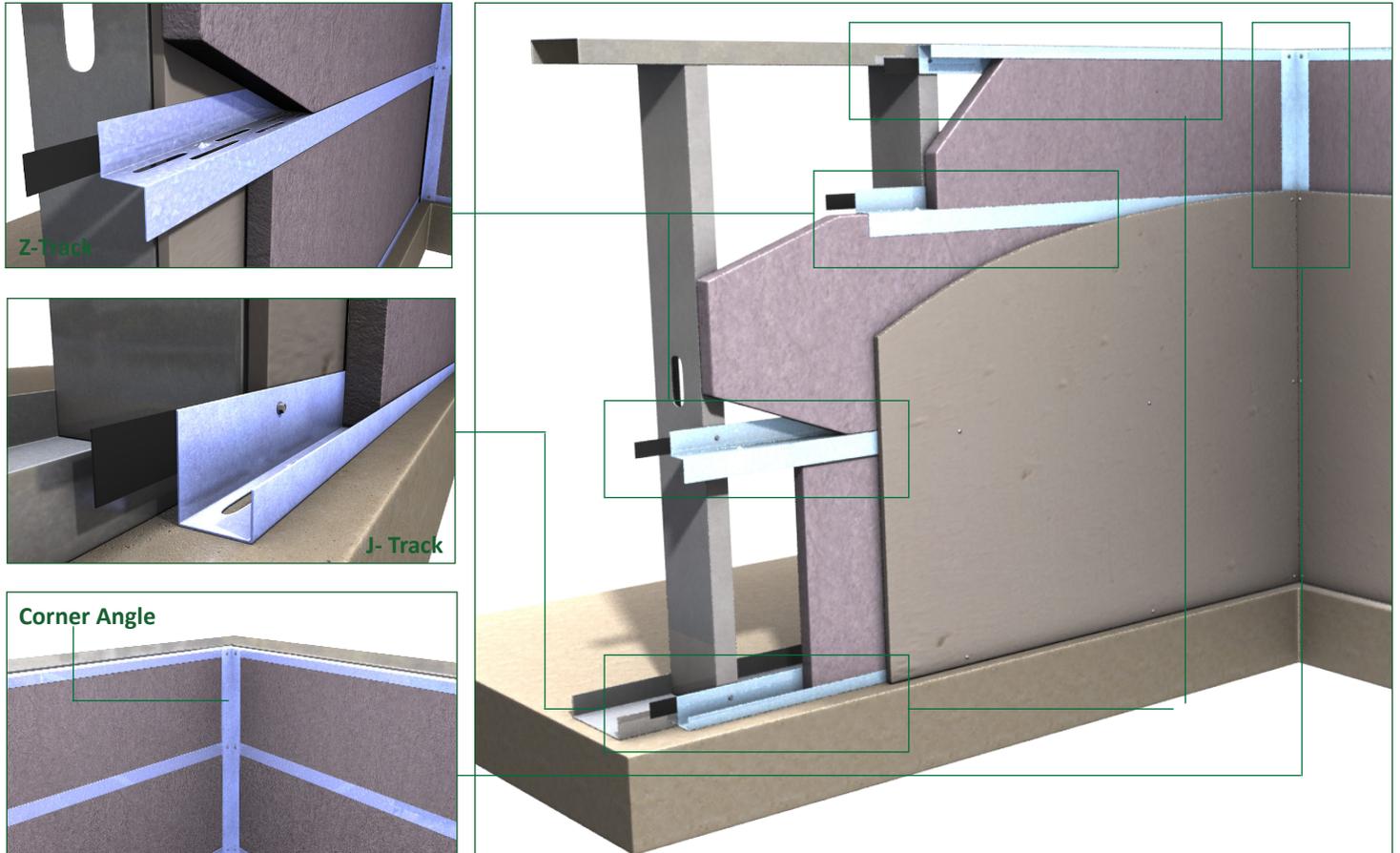
Over time, and lacking a product that addressed this need, Architects have either reduced or abandoned altogether the use of such cladding in their designs, waiting for the steel framing industry to provide a solution.

TSN's ThermaFast® Rigid Insulation Framing system is "The" solution. ThermaFast is an engineered installer-friendly set of steel framing tracks and angles designed to be an integral part of the continuous rigid insulation, and at the same time provide a stable component for direct substrate attachment. ThermaFast parts include preinstalled thermal tape on each piece and slotted webs on the Z-Tracks to minimize thermal conductivity through the rigid insulation layer. Unique rigid insulation engagement to keep foam layers from sliding or popping out of place.

System Components



System Configuration



Request TSN catalog of thermal resistances and thermal transmittances of wall assemblies with ThermaFast® Continuous Rigid Insulation Framing System.

Exterior Wall Framing & Accessories ThermaFast® Continuous Rigid Insulation Framing System

Nomenclature

150ZT-54, 50 ksi

Rigid Foam Insulation Depth (in) x 100

Ex: 1.5" = 150

For all "CA" sections, this dimension is the leg length
ex: 2" leg = 200

Style

Ex: ZT = Z-Track Section

Other designators are as follows:

JT = J-Track

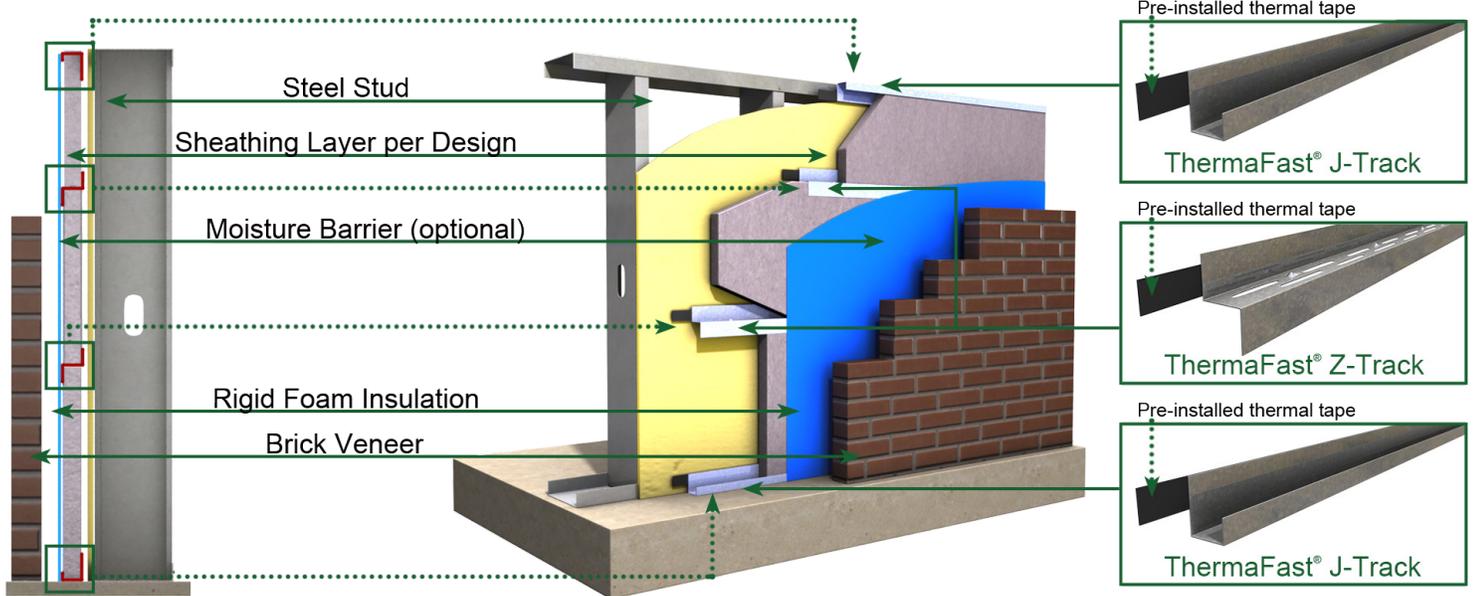
CA = Corner Angle

Material Thickness (mils)

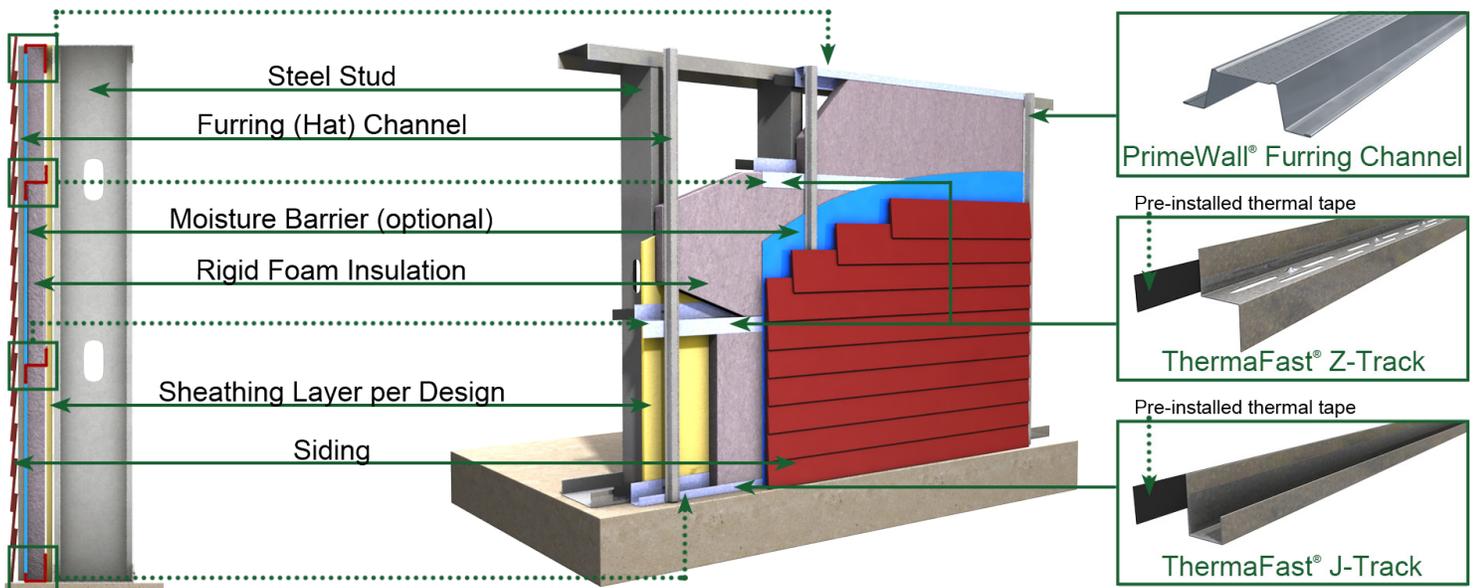
Ex: 0.054" = 54 mils (16ga)

Material Thickness is the minimum base metal thickness in mils, representing 95% of the design thickness.

Example Details*



Example Details - ThermaFast® used with Furring Channel



* Refer to project specification and/or architectural sections for wall assembly details related to fire and acoustical performance as well as water resistance.

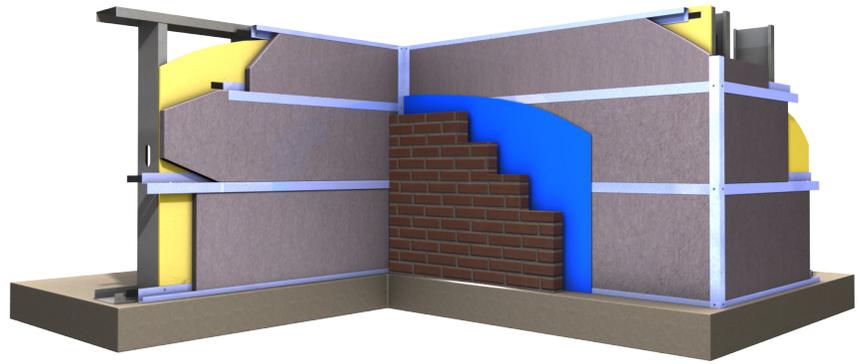
Exterior Wall Framing & Accessories

Introduction

This catalog provides thermal performance data (R- and U-values) of the ThermaFast® Rigid Insulation Framing System produced by the Steel Network Inc. The ThermaFast System is used in exterior wall assemblies to support rigid foam insulation with thicknesses ranging from 1.0 inch to 4.0 inch. In addition, the ThermaFast System provides viable means to attach the cladding assemblies, like cement board, siding, metal panels, to a stable substrate instead of using long and unstable cantilevered screws to the sheathing layer. This summary allows designers to have fast and straightforward access to information with sufficient accuracy to reduce uncertainty in the thermal performance of building envelope components.

Thermal modelling for this project was completed using a 3D finite element analysis heat transfer software package by SolidWorks®; SW Thermal Solver and follows ASHRAE/IES Standard 90.1 requirements.

Thermal Resistances & Thermal Transmittances of Wall Assemblies



Assembly # ¹	Steel Stud Size	Exterior Rigid Insulation Thickness	Stud Cavity Insulation (min.)	ThermaFast® Z-Track Size	Nominal Resistance R ₀	Transmittance U ₀
					m ² ·K/W (hr·ft ² ·°F/Btu)	W/m ² ·K (Btu/ft ² ·hr·°F)
6" Steel Stud Walls						
1 ²	600S162-43	2"	None	200ZT-54	1.88 (R-10.67)	0.532 (0.093)
2	600S162-43	1.5"	R-19 Batt	150ZT-54	3.12 (R-17.71)	0.321 (0.056)
3	600S162-43	2"	R-19 Batt	200ZT-54	3.50 (R-19.89)	0.285 (0.050)
4	600S162-43	2"	1 ½" Spray Foam	200ZT-54	2.94 (R-16.7)	0.340 (0.060)
5	600S162-43	2"	3" Spray Foam	200ZT-54	3.50 (R-19.89)	0.286 (0.050)
6	600S162-43	3"	R-19 Batt	300ZT-54	4.04 (R-22.97)	0.248 (0.044)
7	600S162-43	4"	R-19 Batt	400ZT-54	4.50 (R-25.55)	0.222 (0.039)
8" Steel Stud Walls						
8	800S162-43	2"	R-25 Batt	200ZT-54	3.91 (R-22.18)	0.258 (0.045)
9	800S162-43	3"	R-25 Batt	300ZT-54	4.44 (R-25.2)	0.225 (0.040)
10	800S162-43	4"	R-25 Batt	400ZT-54	4.89 (R-27.75)	0.205 (0.036)

Table Notes:

¹ Details of input and output data for each assembly are provided in Section 5 of the full report "Thermal Analysis of ThermaFast® Rigid Insulation Framing System" by the Steel Network, Inc.

² Assembly 1 is only presented as a reference for other assemblies.

Exterior Wall Framing & Accessories ThermaFast® Corner Angle Product Profile

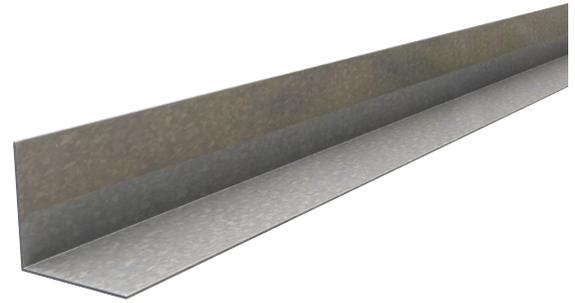
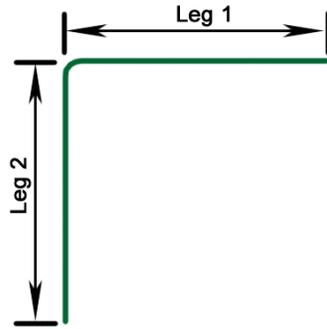
200CA-54, 50 ksi

Leg Length

CA

ThermaFast® Corner Angle

Material Thickness

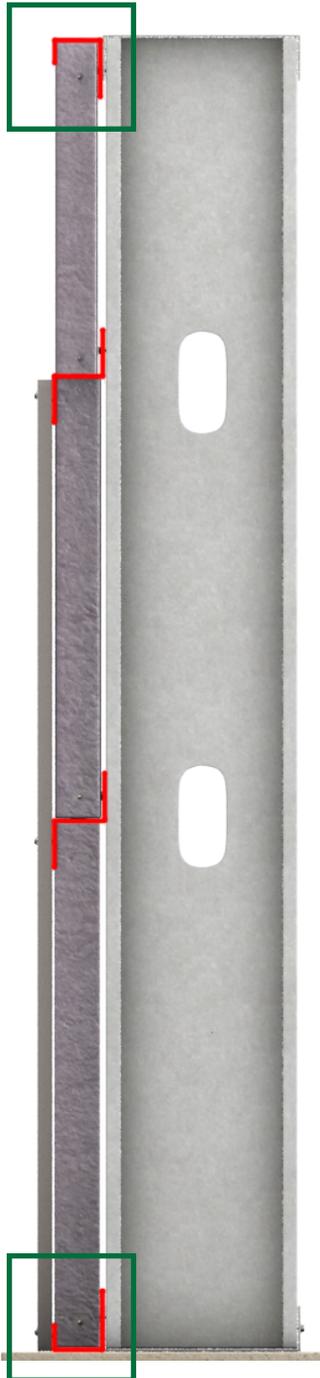
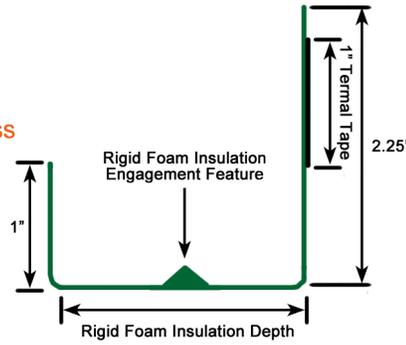
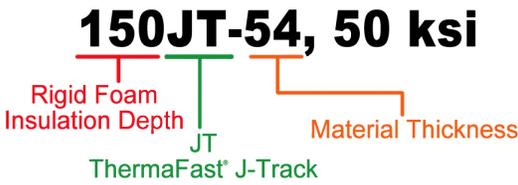


Material Properties

ASTM A1003/A1003M Structural Grade 50 (340) Type H, ST50H (ST340H): 50ksi (340MPa) minimum yield strength, 65ksi(450MPa) minimum tensile strength, with ASTM A653/A653M G90 (Z275) hot dipped galvanized coating. Available in 33mil minimum thickness (20 gauge, 0.0346" design thickness) or 54mil minimum thickness (16 gauge, 0.0566" design thickness).

ThermaFast® Corner Angle Product Profile						
Section	Leg Length	Gauge	Design Thickness	Min Steel Thickness	Inside Bend Radius	Unit Weight
	(in)	(ga)	(in)	(in)	(R)	(lbs/ft)
200CA-33, 50ksi	2.0	20	0.0346	0.0329	0.0625	0.46
200CA-54, 50ksi	2.0	16	0.0566	0.0538	0.0625	0.75

- Refer to project specification and/or architectural sections for wall assembly details related to fire and acoustical performance as well as water resistance.



Material Properties

Metal: ASTM A1003/A1003M Structural Grade 50 (340) Type H, ST50H (ST340H): 50ksi (340MPa) minimum yield strength, 65ksi(450MPa) minimum tensile strength, with ASTM A653/A653M G90 (Z275) hot dipped galvanized coating. Available in 33mil minimum thickness (20 gauge, 0.0346" design thickness) or 54mil minimum thickness (16 gauge, 0.0566" design thickness).

Thermal Tape: Thickness 1/16", Density 25 lbs/ft³ (ASTM D3574), Thermal Conductivity k-factor 0.3 Btu-in/hour-ft²-°F (ASTM C518)

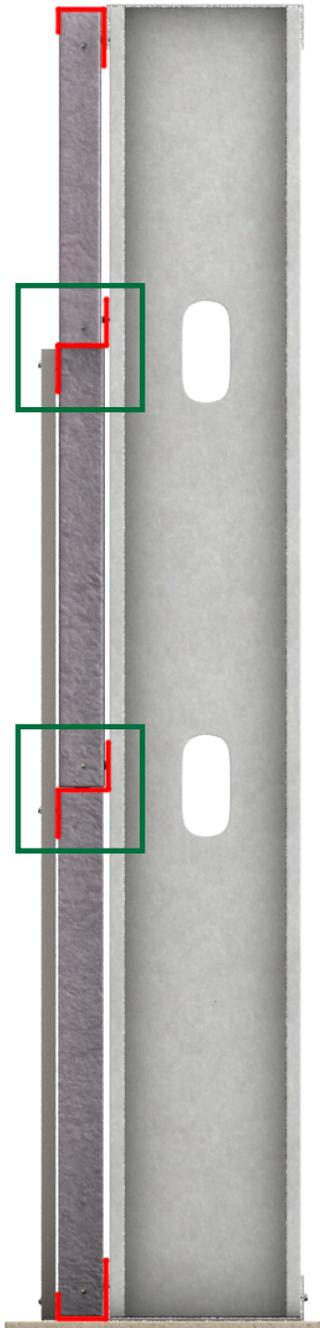
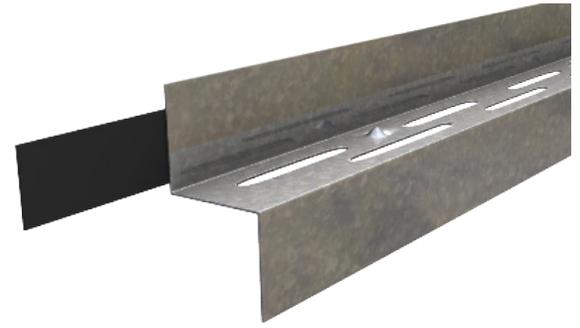
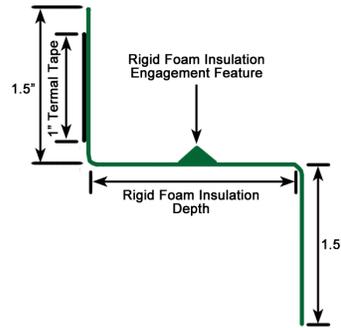
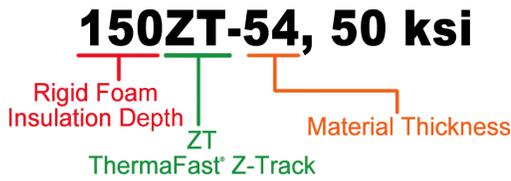
ThermaFast® J-Track Product Profile								
Section	Leg Length	Rigid Foam Insulation Depth	Return Lip	Gauge	Design Thickness	Min Steel Thickness	Inside Bend Radius	Unit Weight
	(in)	(in)	(in)	(ga)	(in)	(in)	(R)	(lbs/ft)
100JT-33, 50ksi	2.25	1.0	1.0	20	0.0346	0.0329	0.0625	0.49
150JT-33, 50ksi		1.5						0.54
200JT-33, 50ksi		2.0						0.57
300JT-33, 50ksi		3.0						0.69
400JT-33, 50ksi		4.0						0.80
100JT-54, 50ksi	2.25	1.0	1.0	16	0.0566	0.0538	0.0625	0.79
150JT-54, 50ksi		1.5						0.87
200JT-54, 50ksi		2.0						0.92
300JT-54, 50ksi		3.0						1.11
400JT-54, 50ksi		4.0						1.30

ThermaFast® J-Track Section Properties		
Section	M _{xa}	M _{ya}
	(kips-in)	(kips-in)
100JT-33, 50ksi	0.07	0.10
150JT-33, 50ksi	0.10	0.28
200JT-33, 50ksi	0.10	0.46
300JT-33, 50ksi	0.13	0.84
400JT-33, 50ksi	0.17	1.24
100JT-54, 50ksi	0.26	0.31
150JT-54, 50ksi	0.32	0.80
200JT-54, 50ksi	0.37	1.37
300JT-54, 50ksi	0.45	2.96
400JT-54, 50ksi	0.47	4.66

Table Notes:

- M_{xa} is the ASD moment capacity in the gravity load direction based on 24" o.c. fastening to stud max.
- M_{ya} is the ASD moment capacity in the wind load direction based on 24" o.c. fastening to stud max.
- Attach track with minimum (1) #10-16 self-drilling screws to each stud. (2) screws may be required for high design wind pressures (higher than 30 psf service level)
- Refer to project specification and/or architectural sections for wall assembly details related to fire and acoustical performance as well as water resistance.

ThermaFast J-Track is installed first, at base and head of wall.



ThermaFast Z-Track is installed between every 24" rigid foam insulation.

Material Properties

ASTM A1003/A1003M Structural Grade 50 (340) Type H, ST50H (ST340H): 50ksi (340MPa) minimum yield strength, 65ksi(450MPa) minimum tensile strength, with ASTM A653/A653M G90 (Z275) hot dipped galvanized coating. Available in 33mil minimum thickness (20 gauge, 0.0346" design thickness) or 54mil minimum thickness (16 gauge, 0.0566" design thickness).

Thermal Tape: Thickness 1/16", Density 25 lbs/ft³ (ASTM D3574), Thermal Conductivity k-factor 0.3 Btu-in/hour-ft²-°F (ASTM C518)

ThermaFast® Z-Track Product Profile								
Section	Leg 1 Length (in)	Leg 2 Length (in)	Rigid Foam Insulation Depth (in)	Gauge (ga)	Design Thickness (in)	Min Steel Thickness (in)	Inside Bend Radius (R)	Unit Weight (lbs/ft)
100ZT-33, 50ksi	1.5	1.5	1.0	20	0.0346	0.0329	0.0625	0.47
150ZT-33, 50ksi			1.5					0.50
200ZT-33, 50ksi			2.0					0.53
300ZT-33, 50ksi			3.0					0.65
400ZT-33, 50ksi			4.0					0.76
100ZT-54, 50ksi	1.5	1.5	1.0	16	0.0566	0.0538	0.0625	0.76
150ZT-54, 50ksi			1.5					0.81
200ZT-54, 50ksi			2.0					0.85
300ZT-54, 50ksi			3.0					1.05
400ZT-54, 50ksi			4.0					1.24

ThermaFast® Z-Track Section Properties		
Section	M _{xa} (kips-in)	M _{ya} (kips-in)
100ZT-33, 50ksi	0.78	0.74
150ZT-33, 50ksi	0.78	1.33
200ZT-33, 50ksi	0.78	1.75
300ZT-33, 50ksi	0.78	2.81
400ZT-33, 50ksi	0.78	3.96
100ZT-54, 50ksi	1.86	1.65
150ZT-54, 50ksi	1.86	3.13
200ZT-54, 50ksi	1.86	4.22
300ZT-54, 50ksi	1.86	6.80
400ZT-54, 50ksi	1.86	9.64

Table Notes:

- M_{xa} is the ASD moment capacity in the gravity load direction based on 24" o.c. fastening to stud max.
- M_{ya} is the ASD moment capacity in the wind load direction based on 24" o.c. fastening to stud max.
- Attach track with minimum one #10-16 self-drilling screws to each stud. (2) screws may be required for high design wind pressures (higher than 30 psf service level)
- Refer to project specification and/or architectural sections for wall assembly details related to fire and acoustical performance as well as water resistance.