

ThermaZee™ THERMAL PERFORMANCE SUMMARY



3D THERMAL MODELING RESULTS OVERVIEW

With up to 93% exterior insulation effectiveness, the Knight Wall ThermaZee™ easily meets the requirements of the IECC in all climate zones (maximum U-Value 0.064) with only 3.5" of exterior mineral wool insulation without the need for interior batt insulation. This performance is superior to published data for fiberglass thermal spacers/clips and normal Z-furring.

For split assemblies with the Knight Wall ThermaZee, adding R-19 batt insulation in the stud cavity adds between R-7.8-R-9.3 to the effective thermal resistance for steel stud assemblies and R-15.7-R-16.2 for wood stud assemblies. Note that there are other considerations (such as condensation risk) which should be accounted for when using split insulated assemblies.

A sensitivity analysis was performed comparing the thermal performance of the ThermaZee versus an industry standard continuous metal Z-furring with horseshoe shims used as thermal isolation. The dimensions of the Z profiles and wall

assemblies were identical. The results showed the ThermaZee has a substantial increase in thermal performance compared to standard Z-furring with "thermal isolation." In fact, the standard Z-furring is well below most North American code minimum requirements.

For the 3D thermal analysis, Knight Wall used the expert services provided by Morrison-Hershfield. The CAD/FEA analysis software NX, from Siemens was used for the actual modeling. Using this software, MH had previously conducted a research project for the ASHRAE in which a 3D thermal model was developed and calibrated to within 5% of hotbox measurements. Please feel free to contact Knight Wall Systems for the full report which includes further modeling data and wall assemblies.

The U-Values provided in the report can be used for compliance calculation through any of the compliance paths set forth in relevant energy codes and standards such as ASHRAE 90.1, IECC, and/or NECB.

MODELED ASSEMBLY CONFIGURATION

1/2" interior drywall • 6" studs (16" O.C.) • 5/8" exterior sheathing • R4.3/in mineral wool insulation • ThermaZee™

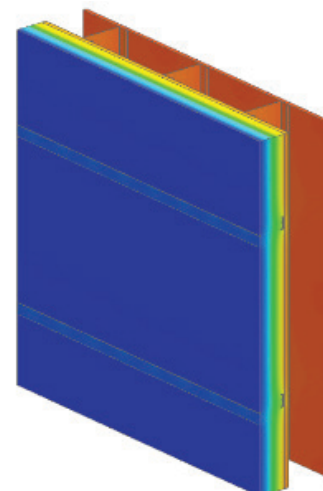
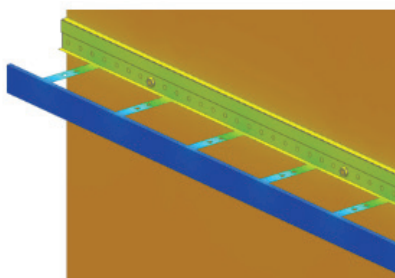
THERMAL MODELING RESULTS (STEEL STUDS)

Horizontal ThermaZee™					
ThermaZee Spacing	Exterior Insulation Thickness (inches)	Insulation Rated R-Value (ft²·°F·hr/BTU)	Effective Assembly R-Value (ft²·°F·hr/BTU)	Assembly U-Value (BTU/ft²·°F·hr)	Percent Effective
16"	1.5	6.5	8.7	0.115	89%
	2.0	8.6	10.3	0.097	87%
	2.5	10.8	11.6	0.086	82%
	3.0	12.9	13.3	0.075	82%
	3.5	15.1	14.5	0.069	79%
	4.0	17.2	16.1	0.062	79%
	4.5	19.4	17.2	0.058	76%
24"	1.5	6.5	9.0	0.111	92%
	2.0	8.6	10.8	0.093	91%
	2.5	10.8	12.3	0.081	87%
	3.0	12.9	14.1	0.071	87%
	3.5	15.1	15.6	0.064	85%
	4.0	17.2	17.3	0.058	84%
	4.5	19.4	18.7	0.053	82%
32"	1.5	6.5	9.1	0.110	93%
	2.0	8.6	11.0	0.091	92%
	2.5	10.8	12.7	0.079	90%
	3.0	12.9	14.6	0.069	90%
	3.5	15.1	16.3	0.061	89%
	4.0	17.2	18.0	0.056	88%
	4.5	19.4	19.6	0.051	86%

Vertical ThermaZee™					
ThermaZee Spacing	Exterior Insulation Thickness (inches)	Insulation Rated R-Value (ft²·°F·hr/BTU)	Effective Assembly R-Value (ft²·°F·hr/BTU)	Assembly U-Value (BTU/ft²·°F·hr)	Percent Effective
16"	1.5	6.5	8.7	0.115	89%
	2.0	8.6	10.3	0.097	87%
	2.5	10.8	11.6	0.086	82%
	3.0	12.9	13.3	0.075	82%
	3.5	15.1	14.5	0.069	79%
	4.0	17.2	16.1	0.062	79%
	4.5	19.4	17.2	0.058	76%
32"	1.5	6.5	9.1	0.110	93%
	2.0	8.6	11.0	0.091	92%
	2.5	10.8	12.7	0.079	90%
	3.0	12.9	14.6	0.069	90%
	3.5	15.1	16.3	0.061	89%
	4.0	17.2	18.0	0.055	88%
	4.5	19.4	19.6	0.051	86%

*Base wall configuration adds R-3.3 (drywall, sheathing, air films, etc)

*If R-19 batt is used in stud cavity, total effective R-value increase will vary



ThermaZee™ THERMAL PERFORMANCE SUMMARY

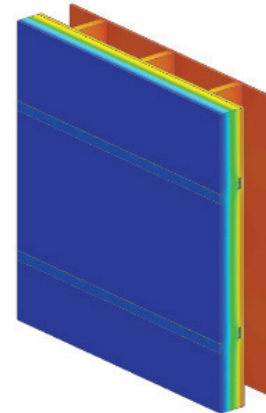


THERMAL MODELING RESULTS (WOOD STUDS)

Horizontal ThermaZee™					
ThermaZee Spacing	Exterior Insulation Thickness (inches)	Insulation Rated R-Value (ft ² ·°F·hr/BTU)	Effective Assembly R-Value (ft ² ·°F·hr/BTU)	Assembly U-Value (BTU/ft ² ·°F·hr)	Percent Effective
24"	1.5	6.5	9.6	0.104	95%
	2.0	8.6	11.4	0.088	93%
	2.5	10.8	13.0	0.077	90%
	3.0	12.9	14.7	0.068	89%
	3.5	15.1	16.2	0.062	87%
	4.0	17.2	18.0	0.056	87%
	4.5	19.4	19.4	0.052	84%

Vertical ThermaZee™					
ThermaZee Spacing	Exterior Insulation Thickness (inches)	Insulation Rated R-Value (ft ² ·°F·hr/BTU)	Effective Assembly R-Value (ft ² ·°F·hr/BTU)	Assembly U-Value (BTU/ft ² ·°F·hr)	Percent Effective
16"	1.5	6.5	9.4	0.107	93%
	2.0	8.6	11.0	0.091	90%
	2.5	10.8	12.4	0.081	86%
	3.0	12.9	14.0	0.071	85%
	3.5	15.1	15.3	0.065	82%
	4.0	17.2	16.9	0.059	81%
	4.5	19.4	18.1	0.055	79%

*Base wall configuration adds R-3.6 (drywall, sheathing, air films, etc)
*If R-19 batt is used in stud cavity, total effective R-value increase will vary

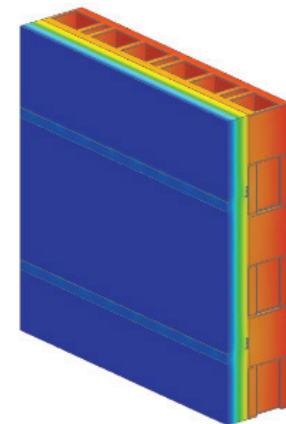


THERMAL MODELING RESULTS (CMU)

Horizontal ThermaZee™					
ThermaZee Spacing	Exterior Insulation Thickness (inches)	Insulation Rated R-Value (ft ² ·°F·hr/BTU)	Effective Assembly R-Value (ft ² ·°F·hr/BTU)	Assembly U-Value (BTU/ft ² ·°F·hr)	Percent Effective
24"	1.5	6.5	8.4	0.119	89%
	2.0	8.6	10.1	0.099	88%
	2.5	10.8	11.8	0.085	86%
	3.0	12.9	13.4	0.075	85%
	3.5	15.1	15.2	0.066	84%
	4.0	17.2	16.6	0.060	83%
	4.5	19.4	18.2	0.055	82%

Vertical ThermaZee™					
ThermaZee Spacing	Exterior Insulation Thickness (inches)	Insulation Rated R-Value (ft ² ·°F·hr/BTU)	Effective Assembly R-Value (ft ² ·°F·hr/BTU)	Assembly U-Value (BTU/ft ² ·°F·hr)	Percent Effective
16"	1.5	6.5	7.9	0.127	84%
	2.0	8.6	9.6	0.104	83%
	2.5	10.8	11.1	0.090	81%
	3.0	12.9	12.5	0.080	79%
	3.5	15.1	13.9	0.072	77%
	4.0	17.2	15.3	0.065	76%
	4.5	19.4	16.5	0.061	74%

*Base wall configuration adds R-2.9 (CMU, air films, etc)



NOTICE: No freedom from any patent owned by Knight Wall Systems or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use. NO EXPRESS WARRANTIES ARE GIVEN EXCEPT FOR ANY APPLICABLE WRITTEN WARRANTIES SPECIFICALLY PROVIDED BY KNIGHT WALL SYSTEMS. ALL IMPLIED WARRANTIES INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

Building and/or construction practices unrelated to building materials could greatly affect moisture and the potential for mold formation. No material supplier including Knight Wall Systems can give assurance that mold will not develop in any specific system or assembly.

CI, CI-Girt and MFI are registered trademarks controlled by Knight Wall Systems, Inc. ThermaZee, PanelRail, RevealRail, ThermaBracket and ThermaStop are trademarks of Knight Wall Systems, Inc. Patent US 8,429,866 B2 and others pending.



Knight Wall Systems, Inc
2401 East 6th Street
Deer Park, WA 99006
509.262.0104
knightwallsystems.com
info@knightwallsystems.com