

# MFI™ System

## THERMAL PERFORMANCE SUMMARY



### 3D THERMAL MODELING RESULTS OVERVIEW

With 80%-96% exterior insulation effectiveness, the Knight Wall MFI™ System 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.

For split assemblies with the Knight Wall MFI System, adding R-19 batt insulation in the stud cavity adds, approximately, R-8.2 and R-15.4 to the effective thermal resistance for steel stud and wood frame assemblies respectively. 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 performance of various types of insulation used in conjunction with the MFI System resulting in no variance of the insulations degradation.

Therefore, the U- and Effective R-Values shown can reasonably apply to any typical insulation of equivalent nominal rated value.

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.) • 1/2" exterior sheathing • R4.2/in mineral wool insulation • MFI™ System

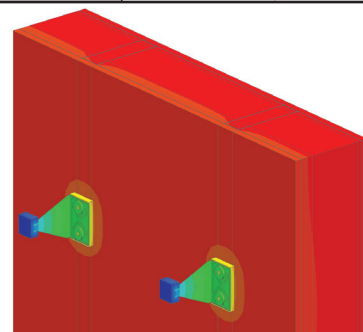
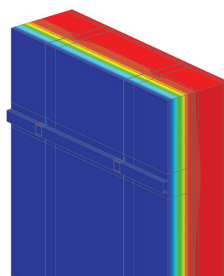
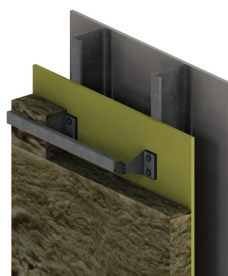
### THERMAL MODELING RESULTS (STEEL STUDS)

Bracket 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" x 24"	2.0	8.4	10.8	0.093	93%
	3.0	12.6	14.1	0.071	89%
	3.5	14.7	15.7	0.064	88%
	4.0	16.8	17.2	0.058	86%
	5.0	21	20.1	0.050	83%
	6.0	25.2	22.7	0.044	80%
16" x 36"	2.0	8.4	11	0.091	95%
	3.0	12.6	14.5	0.069	92%
	3.5	14.7	16.3	0.061	91%
	4.0	16.8	18.1	0.055	91%
	5.0	21	21.4	0.047	88%
	6.0	25.2	24.8	0.040	87%
16" x 42"	2.0	8.4	11.1	0.090	95%
	3.0	12.6	14.7	0.068	93%
	3.5	14.7	16.5	0.060	92%
	4.0	16.8	18.4	0.054	92%
	5.0	21	21.8	0.046	90%
	6.0	25.2	25.3	0.039	89%

Bracket 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
32" x 16"	2.0	8.4	10.9	0.092	94%
	3.0	12.6	14.4	0.069	91%
	3.5	14.7	16.1	0.062	90%
	4.0	16.8	17.9	0.056	90%
	5.0	21	21.2	0.047	88%
	6.0	25.2	24.5	0.041	86%
32" x 20"	2.0	8.4	11	0.090	95%
	3.0	12.6	14.6	0.068	92%
	3.5	14.7	16.3	0.061	91%
	4.0	16.8	18.2	0.055	91%
	5.0	21	21.6	0.046	89%
	6.0	25.2	25	0.040	88%
32" x 24"	2.0	8.4	11.1	0.090	96%
	3.0	12.6	14.8	0.068	94%
	3.5	14.7	16.6	0.060	93%
	4.0	16.8	18.5	0.054	93%
	5.0	21	22	0.045	91%
	6.0	25.2	25.6	0.039	90%

\*Base wall configuration adds R-3.2 (drywall, sheathing, air films, etc)

\*Add R-8.2 to effective values when R-19 batt insulation is used in stud cavity



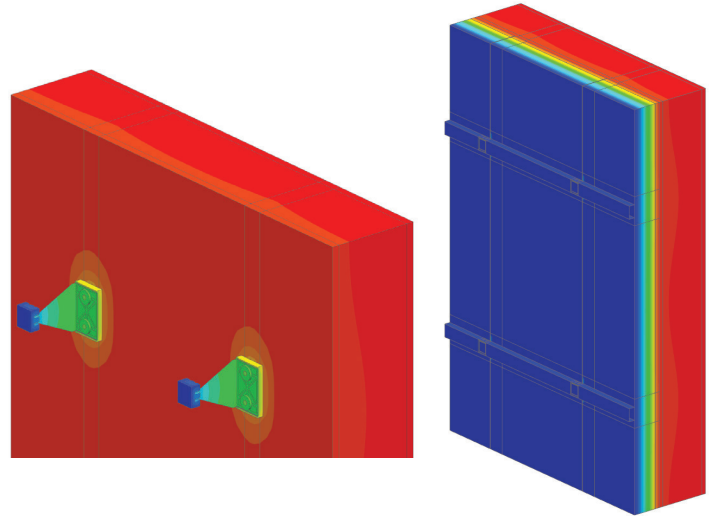
# MFI™ System

## THERMAL PERFORMANCE SUMMARY



### THERMAL MODELING RESULTS (WOOD STUDS)

Bracket Spacing	Exterior Insulation Thickness (inches)	Insulation Rated R-Value (ft <sup>2</sup> °F-hr/BTU)	Effective Assembly R-Value (ft <sup>2</sup> °F-hr/BTU)	Assembly U-Value (BTU/ft <sup>2</sup> °F-hr)	Percent Effective
16" x 24"	2.0	8.4	11.1	0.090	96%
	3.0	12.6	14.6	0.069	92%
	3.5	14.7	16.2	0.062	91%
	4.0	16.8	17.8	0.056	89%
	5.0	21	20.8	0.048	86%
	6.0	25.2	23.6	0.042	83%
16" x 36"	2.0	8.4	11.2	0.089	97%
	3.0	12.6	14.8	0.067	94%
	3.5	14.7	16.6	0.060	93%
	4.0	16.8	18.6	0.053	93%
	5.0	21	21.7	0.046	90%
	6.0	25.2	25.2	0.040	89%
16" x 42"	2.0	8.4	11.2	0.089	97%
	3.0	12.6	15	0.066	95%
	3.5	14.7	16.8	0.059	94%
	4.0	16.8	18.6	0.053	93%
	5.0	21	22	0.045	91%
	6.0	25.2	25.5	0.039	90%

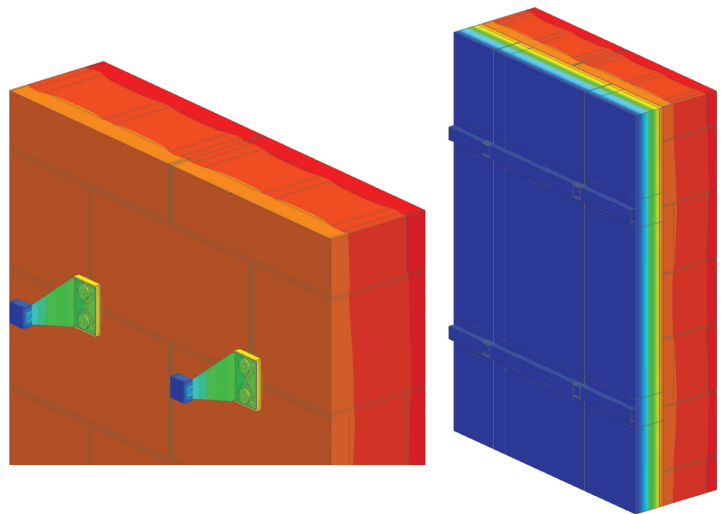


\*Base wall configuration adds R-3.2 (drywall, sheathing, air films, etc)

\*Add R-15.4 to effective values when R-19 batt insulation is used in stud cavity

### THERMAL MODELING RESULTS (CMU)

Bracket Spacing	Exterior Insulation Thickness (inches)	Insulation Rated R-Value (ft <sup>2</sup> °F-hr/BTU)	Effective Assembly R-Value (ft <sup>2</sup> °F-hr/BTU)	Assembly U-Value (BTU/ft <sup>2</sup> °F-hr)	Percent Effective
16" x 24"	2.0	8.4	10.1	0.099	92%
	3.0	12.6	13.5	0.074	89%
	3.5	14.7	15.2	0.066	88%
	4.0	16.8	16.7	0.060	86%
	5.0	21	19.8	0.051	84%
	6.0	25.2	22.7	0.044	82%
16" x 32"	2.0	8.4	10.3	0.097	94%
	3.0	12.6	13.9	0.072	91%
	3.5	14.7	15.5	0.065	90%
	4.0	16.8	17.2	0.058	89%
	5.0	21	20.6	0.049	87%
	6.0	25.2	23.6	0.042	85%



\*Base wall configuration adds R-2.6 (CMU, air films, etc)

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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.

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**Knight Wall Systems, Inc**  
 2401 East 6<sup>th</sup> Street  
 Deer Park, WA 99006  
 509.262.0104  
[knightwallsystems.com](http://knightwallsystems.com)  
[info@knightwallsystems.com](mailto:info@knightwallsystems.com)