KNIGHT WALL SYSTEMS



ADJUSTAKLIP™ CLADDING SUPPORT

Thermal Performance Summary

Version 01, 11/12/2026

KNIGHT® WALL SYSTEMS

SUMMARY OVERVIEW
ADJUSTAKLIP™ CLADDING SUPPORT SYSTEM

UNDERSTANDING WHOLE-WALL THERMAL PERFORMANCE

Modern energy codes evaluate the thermal performance of the complete opaque wall assembly, not simply the nominal R-value of the insulation or "thermal efficiency". Compliance therefore depends on the effects of framing, cladding attachments, and other thermal bridges within the assembly.

Whole-wall thermal performance is expressed as a U-factor. A lower U-factor indicates less heat flow through the wall and better overall thermal performance.

U-FACTOR VERSUS THERMAL EFFICIENCY

"Thermal efficiency" is commonly used to describe the percentage effectiveness of exterior insulation. However, it is not a standardized or code recognized performance metric, and calculation methods may vary among manufacturers. Thermal efficiency percentages therefore provide an incomplete or inconsistent basis for comparing cladding support systems.

U-factor provides a more meaningful comparison because it represents the calculated thermal performance of the complete wall assembly and can be used directly in energy-code compliance calculations.

ABOUT THIS ANALYSIS

This summary presents the thermal performance of ADJUSTAKLIP™ with continuous L-rails in several common backup-wall assemblies and system configurations.

The three-dimensional thermal simulations were completed using Siemens NX CAD and finite element analysis software. The analysis and results were independently completed through the expert services of Morrison Hershfield/Stantec.

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 1365-RP Thermal Performance of Building Envelope Details for Mid- and High-Rise Construction and for the Building Envelope Thermal Bridging Guide (BETB). The procedures also meet the requirements of CSA Z5010 for thermal simulations of opaque building envelope assemblies.

The reported U-factors may be used to support compliance calculations under applicable energy codes and standards, including ASHRAE 90.1, International Energy Conservation Code (IECC), National Energy Code of Canada for Buildings (NECB).

Applicable requirements and compliance pathways should be confirmed for the project location and adopted code.

Contact Knight Wall Systems® to request the complete thermal analysis report, which includes additional modeling data, configurations, and wall assemblies.

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HOW TO USE THIS SUMMARY

ADJUSTAKLIP™ CLADDING SUPPORT SYSTEM

The following tables and graphs provide clear field U-factors for opaque wall assemblies incorporating ADJUSTAKLIP™.

USING THE TABLES

Each table corresponds to a specific backup-wall assembly and ADJUSTAKLIP™ configuration.

1. Select the applicable backup-wall assembly.
2. Identify the ADJUSTAKLIP™ spacing and L-rail orientation.
3. Locate the nominal R-value of the exterior insulation.
4. Read the corresponding whole-wall U-factor.

The tables provide results for specific nominal exterior insulation R-values.

USING THE GRAPHS

The graphs allow users to estimate performance across a broader range of exterior insulation R-values.

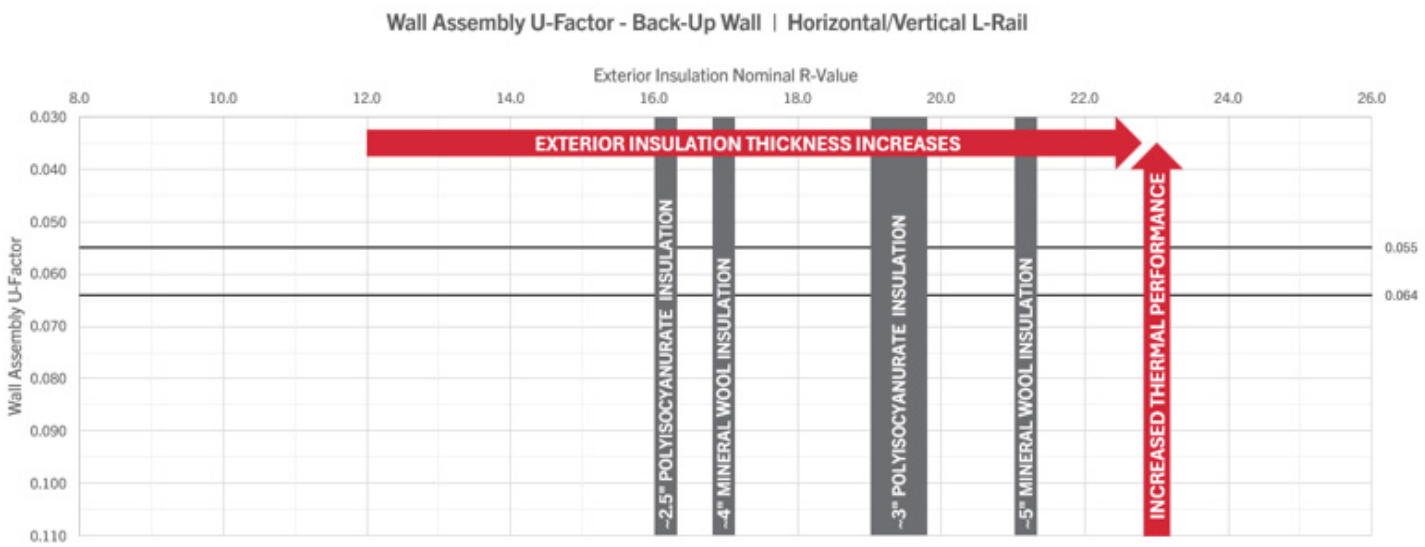
1. Select the graph for the applicable backup-wall assembly.
2. Identify the line representing the ADJUSTAKLIP™ spacing and L-rail orientation.
3. Locate the nominal exterior insulation R-value on the horizontal axis.
4. Move vertically to the appropriate configuration line.
5. Move horizontally to the vertical axis to determine the approximate whole-wall U-factor.

The horizontal axis represents the nominal R-value of the exterior insulation. The vertical axis represents the resulting whole-wall U-factor.

As the nominal R-value and thickness of the exterior insulation increase, the wall assembly's U-factor generally decreases. A lower U-factor indicates better thermal performance.

Actual insulation thickness will vary based on the insulation type, manufacturer, and published R-value per inch.

HOW TO USE THIS SUMMARY
ADJUSTAKLIP™ CLADDING SUPPORT SYSTEM



UNDERSTANDING THE CODE REFERENCE LINES

The horizontal black lines identify commonly prescribed maximum U-factors for the corresponding backup-wall type. These lines are provided for general comparison.

Energy-code requirements vary by jurisdiction, climate zone, occupancy, construction type, and compliance pathway. Always verify the maximum allowable U-factor for the specific project.

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ASSEMBLIES & ASSUMPTIONS
ADJUSTAKLIP™ CLADDING SUPPORT SYSTEM

BACK-UP WALL ASSEMBLIES

The modeled wall assemblies are listed from interior to exterior.

STEEL STUD

1/2-inch gypsum board • 6-inch steel studs at 16 inches on-center • 5/8-inch gypsum sheathing • ADJUSTAKLIP™ • Exterior insulation

STEEL STUD WITH BATT INSULATION

1/2-inch gypsum board • 6-inch steel studs at 16 inches on-center • R-19 batt insulation • 5/8-inch gypsum sheathing • ADJUSTAKLIP™ • Exterior insulation

WOOD STUD

1/2-inch gypsum board • 2x6 wood studs at 16 inches on-center • 5/8-inch plywood sheathing • ADJUSTAKLIP™ • Exterior insulation

WOOD STUD WITH BATT INSULATION

1/2-inch gypsum board • 2x6 wood studs at 16 inches on-center • R-19 batt insulation • 5/8-inch plywood sheathing • ADJUSTAKLIP™ • Exterior insulation

CONCRETE MASONRY UNIT

8-inch standard concrete masonry unit • ADJUSTAKLIP™ • Exterior insulation

MODELING ASSUMPTIONS

- Each ADJUSTAKLIP™ configuration was modeled with the L-rail adjusted fully inward. This position places the maximum amount of L-rail within the exterior insulation layer and produces the most conservative modeled result.
- The analysis determines clear-field U-factors and effective R-values for the evaluated backup-wall assemblies and ADJUSTAKLIP™ configurations.
- Thermal properties used in the simulations were obtained from the NFRC 101-2020 material database and the ASHRAE Handbook of Fundamentals.
- Results apply only to the wall assemblies and configurations represented in the analysis.
- Clear-field values do not account for localized thermal bridges at penetrations, transitions, slab edges, windows, parapets, or other project-specific conditions unless specifically identified in the complete report.

ADDITIONAL INFORMATION

Contact Knight Wall Systems for the complete ADJUSTAKLIP™ Thermal Performance Report, additional configuration data, or assistance applying these results to a specific wall assembly.

THERMAL MODELING RESULTS
ADJUSTAKLIP™ HORIZONTAL STEEL STUD ASSEMBLY

MODELED ASSEMBLY CONFIGURATIONS

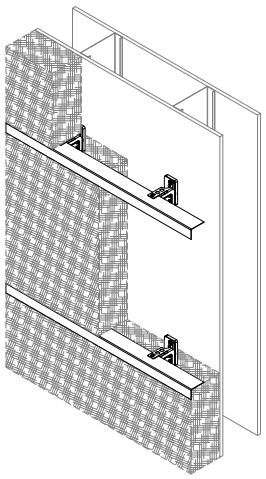


FIGURE 01 - STEEL STUD
1/2-inch gypsum board • 6-inch steel studs at 16 inches on-center • 5/8-inch gypsum sheathing • ADJUSTAKLIP™ • Exterior insulation

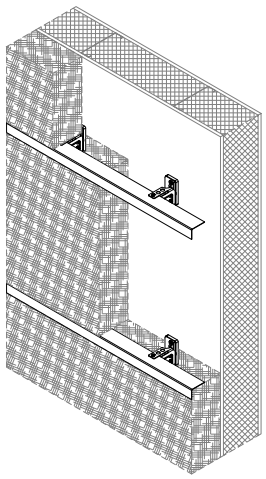


FIGURE 02 - STEEL STUD WITH BATT INSULATION
1/2-inch gypsum board • 6-inch steel studs at 16 inches on-center • R-19 batt insulation • 5/8-inch gypsum sheathing • ADJUSTAKLIP™ • Exterior insulation

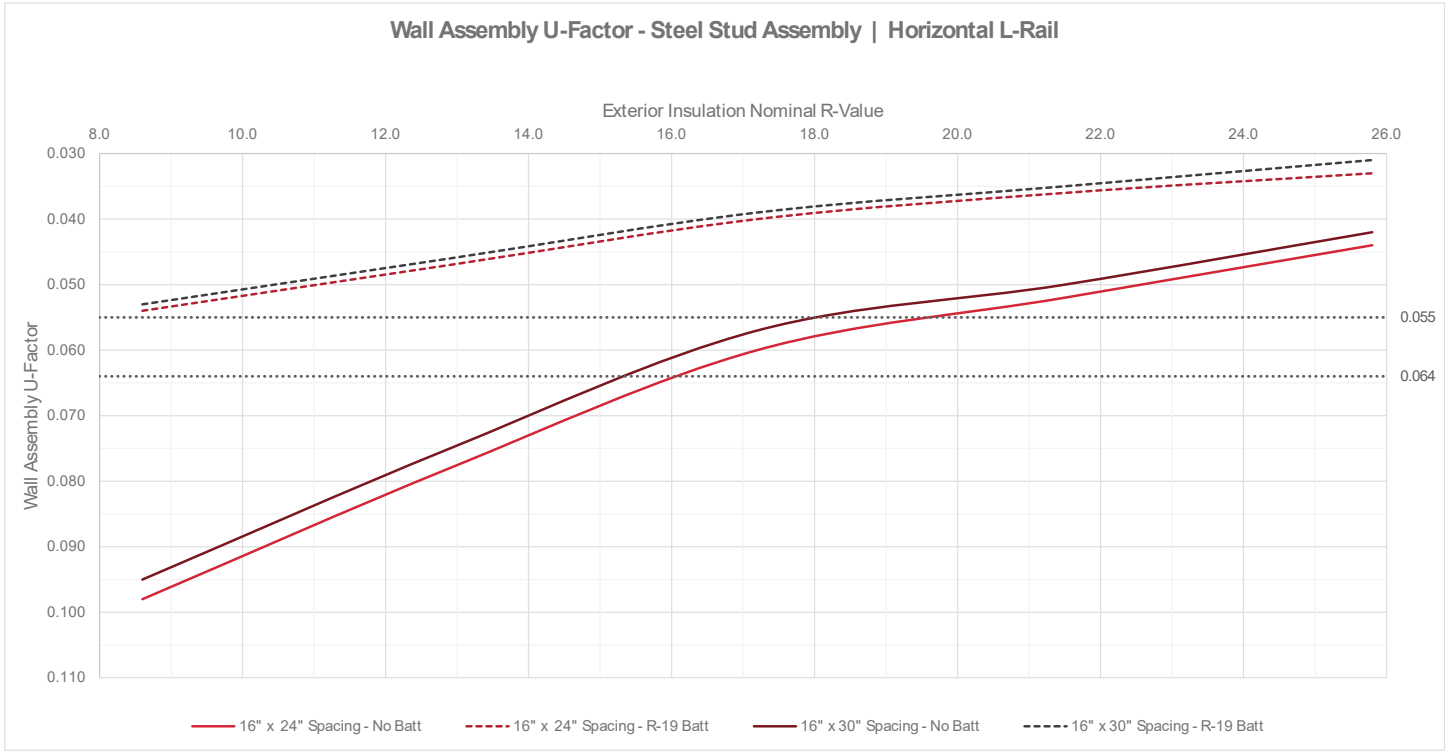


FIGURE 03

THERMAL MODELING RESULTS
ADJUSTAKLIP™ VERTICAL STEEL STUD ASSEMBLY

MODELED ASSEMBLY CONFIGURATIONS

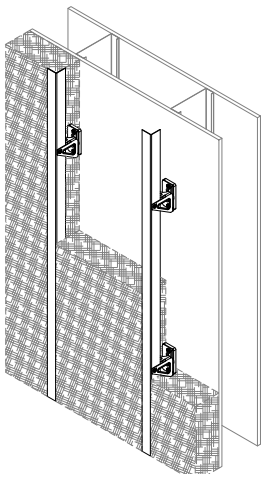


FIGURE 04 - STEEL STUD
1/2-inch gypsum board • 6-inch steel studs at 16 inches on-center • 5/8-inch gypsum sheathing • ADJUSTAKLIP™ • Exterior insulation

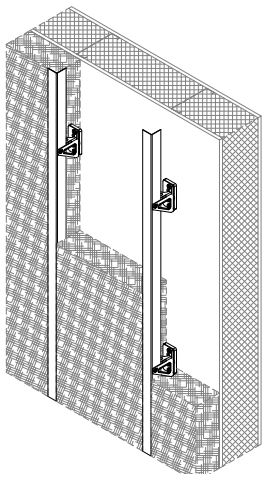


FIGURE 05 - STEEL STUD WITH BATT INSULATION
1/2-inch gypsum board • 6-inch steel studs at 16 inches on-center • R-19 batt insulation • 5/8-inch gypsum sheathing • ADJUSTAKLIP™ • Exterior insulation

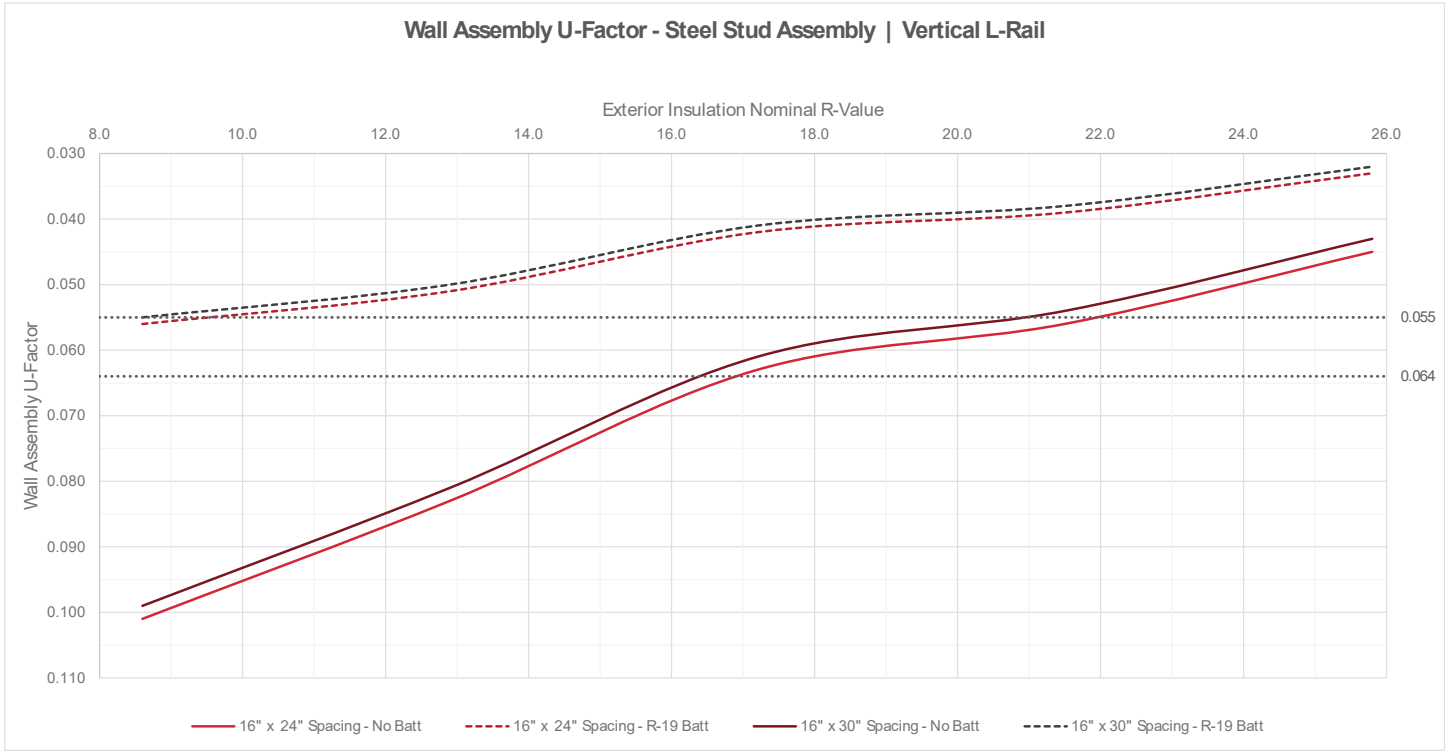


FIGURE 06

KNIGHT® WALL SYSTEMS

THERMAL MODELING RESULTS

ADJUSTAKLIP™ STEEL STUD ASSEMBLY

				Steel Stud Assembly + No Batt Insulation		Steel Stud Assembly + R-19 Batt Insulation	
ADJUSTAKLIP™ Bracket Spacing Inch	L-Rail Orientation	Exterior Insulation Thickness Inch	Exterior Insulation R-Value $ft^2 \cdot hr \cdot °F/Btu$	Assembly U-Factor $Btu/ft^2 \cdot hr \cdot °F$	Assembly Effective R-Value $ft^2 \cdot hr \cdot °F/Btu$	Assembly U-Factor $Btu/ft^2 \cdot hr \cdot °F$	Assembly Effective R-Value $ft^2 \cdot hr \cdot °F/Btu$
16 x 18	Horizontal	2.0	8.6	0.102	9.8	0.056	17.9
		3.0	12.9	0.083	12.1	0.050	20.0
		4.0	17.2	0.063	15.8	0.042	23.7
		5.0	21.5	0.056	18.0	0.039	25.9
		6.0	25.8	0.047	21.1	0.035	28.9
	Vertical	2.0	8.6	0.104	9.6	0.058	17.3
		3.0	12.9	0.086	11.6	0.052	19.1
		4.0	17.2	0.066	15.1	0.044	22.8
		5.0	21.5	0.059	16.9	0.041	24.4
		6.0	25.8	0.048	20.8	0.035	28.5
16 x 24	Horizontal	2.0	8.6	0.097	10.3	0.054	18.5
		3.0	12.9	0.078	12.9	0.047	21.1
		4.0	17.2	0.060	16.7	0.040	25.0
		5.0	21.5	0.052	19.3	0.036	27.5
		6.0	25.8	0.044	22.7	0.033	30.7
	Vertical	2.0	8.6	0.101	9.9	0.056	17.8
		3.0	12.9	0.083	12.0	0.051	19.7
		4.0	17.2	0.063	15.9	0.042	23.8
		5.0	21.5	0.056	17.8	0.039	25.6
		6.0	25.8	0.045	22.1	0.033	30.1
16 x 30	Horizontal	2.0	8.6	0.095	10.5	0.053	19.0
		3.0	12.9	0.075	13.4	0.046	21.9
		4.0	17.2	0.057	17.4	0.039	25.8
		5.0	21.5	0.050	20.2	0.035	28.6
		6.0	25.8	0.042	23.7	0.031	32.0
	Vertical	2.0	8.6	0.099	10.1	0.055	18.2
		3.0	12.9	0.081	12.3	0.050	20.1
		4.0	17.2	0.061	16.4	0.041	24.4
		5.0	21.5	0.054	18.4	0.038	26.3
		6.0	25.8	0.043	23	0.032	31.2
16 x 36	Horizontal	2.0	8.6	0.093	10.7	0.052	19.3
		3.0	12.9	0.072	13.8	0.045	22.4
		4.0	17.2	0.056	17.8	0.038	26.4
		5.0	21.5	0.048	20.8	0.034	29.4
		6.0	25.8	0.041	24.5	0.030	32.9
	Vertical	2.0	8.6	0.098	10.2	0.054	18.4
		3.0	12.9	0.080	12.5	0.049	20.4
		4.0	17.2	0.060	16.8	0.040	25.0
		5.0	21.5	0.053	18.8	0.037	26.9
		6.0	25.8	0.042	23.7	0.031	32.0

Table 01: Exterior Insulation R-Value is the nominal R-Value of the insulation only. Additional elements of the back-up wall assembly such as gypsum sheathing, air films, etc. all contribute an additional R-3.3 to the nominal R-Value of the entire back-up wall assembly (R1d).

THERMAL MODELING RESULTS
ADJUSTAKLIP™ HORIZONTAL WOOD STUD ASSEMBLY

MODELED ASSEMBLY CONFIGURATIONS

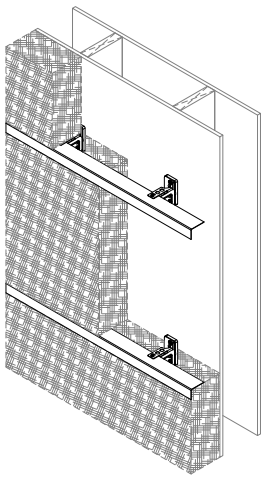


FIGURE 07 - WOOD STUD
1/2-inch gypsum board • 2x6 wood studs at 16 inches on-center • 5/8-inch plywood sheathing • ADJUSTAKLIP™ • Exterior insulation

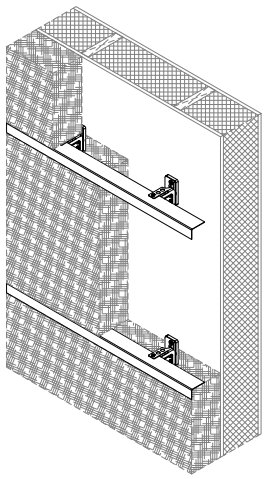


FIGURE 08 - WOOD STUD WITH BATT INSULATION
1/2-inch gypsum board • 2x6 wood studs at 16 inches on-center • R-19 batt insulation • 5/8-inch plywood sheathing • ADJUSTAKLIP™ • Exterior insulation

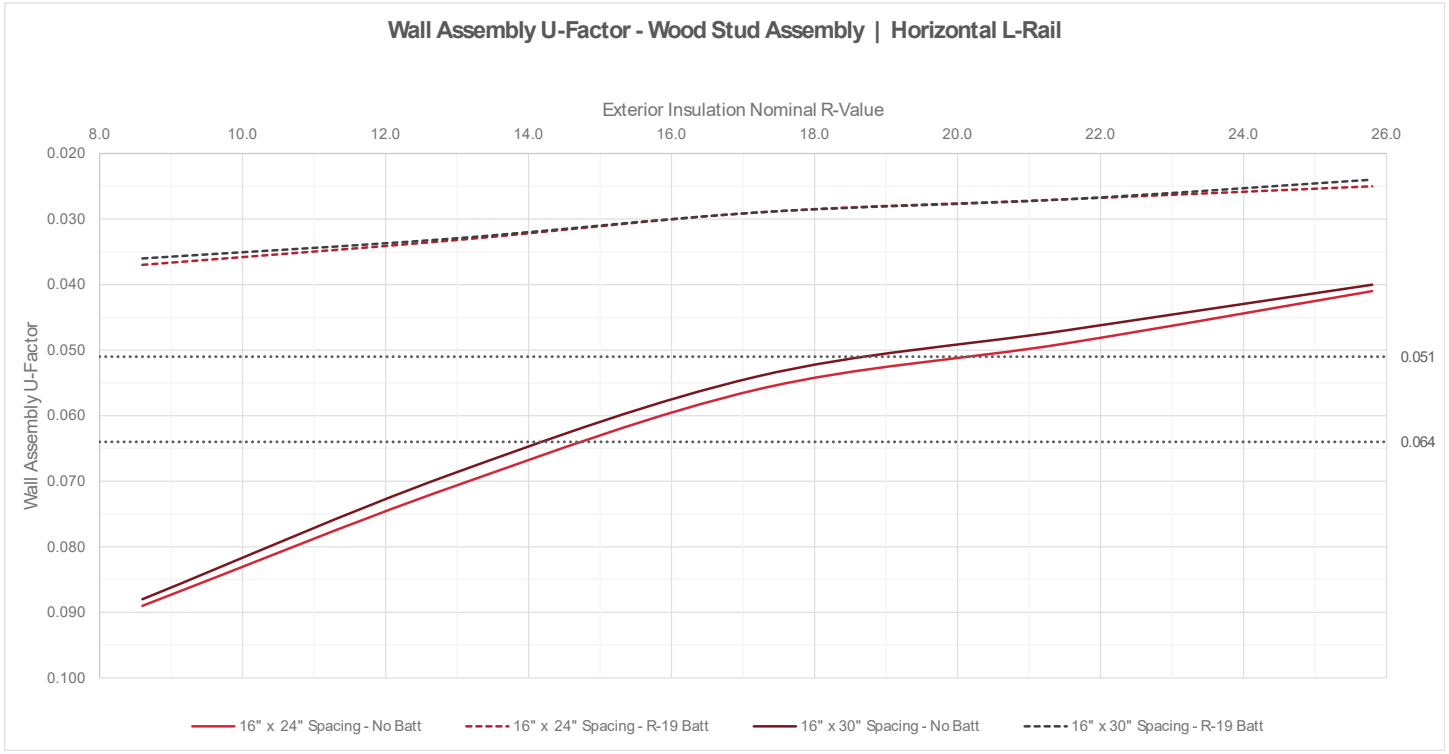


FIGURE 09

THERMAL MODELING RESULTS
ADJUSTAKLIP™ VERTICAL WOOD STUD ASSEMBLY

MODELED ASSEMBLY CONFIGURATIONS

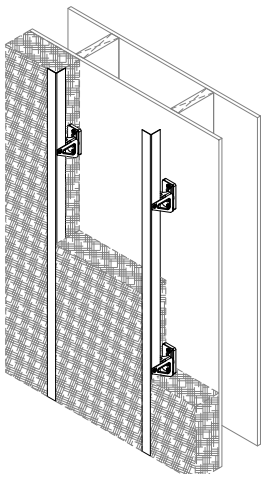


FIGURE 10 - WOOD STUD
1/2-inch gypsum board • 2x6 wood studs at 16 inches on-center • 5/8-inch plywood sheathing • ADJUSTAKLIP™ • Exterior insulation

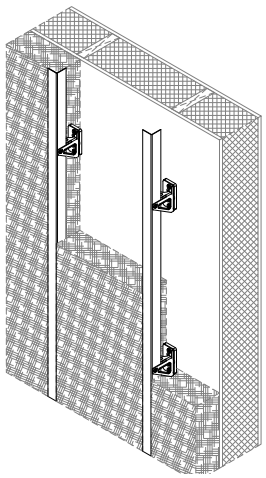


FIGURE 11 - WOOD STUD WITH BATT INSULATION
1/2-inch gypsum board • 2x6 wood studs at 16 inches on-center • R-19 batt insulation • 5/8-inch plywood sheathing • ADJUSTAKLIP™ • Exterior insulation

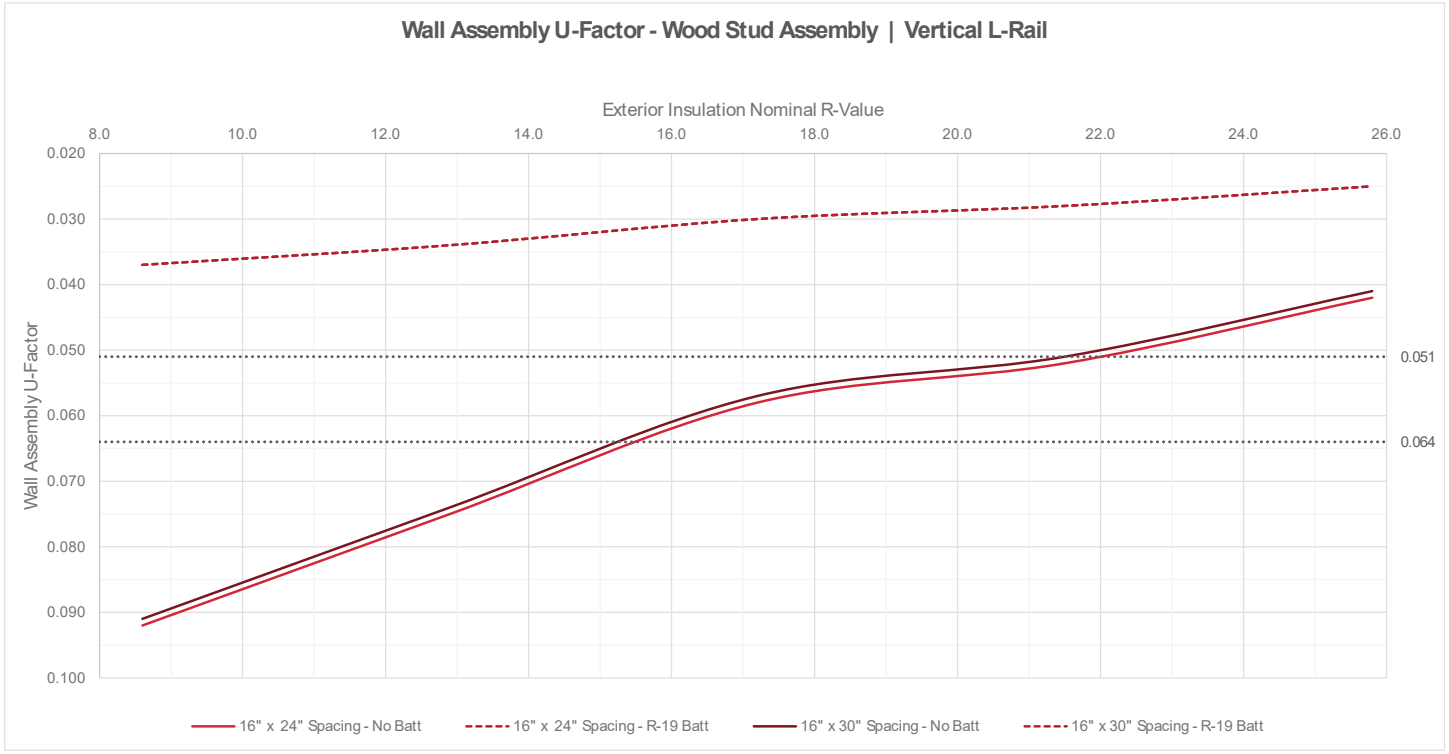


FIGURE 12

KNIGHT® WALL SYSTEMS

THERMAL MODELING RESULTS

ADJUSTAKLIP™ WOOD STUD ASSEMBLY

				Wood Stud Assembly + No Batt Insulation		Wood Stud Assembly + R-19 Batt Insulation	
ADJUSTAKLIP™ Bracket Spacing Inch	L-Rail Orientation	Exterior Insulation Thickness Inch	Exterior Insulation R-Value $ft^2 \cdot hr \cdot °F/Btu$	Assembly U-Factor $Btu/ft^2 \cdot hr \cdot °F$	Assembly Effective R-Value $ft^2 \cdot hr \cdot °F/Btu$	Assembly U-Factor $Btu/ft^2 \cdot hr \cdot °F$	Assembly Effective R-Value $ft^2 \cdot hr \cdot °F/Btu$
16 x 18	Horizontal	2.0	8.6	0.093	10.8	0.037	26.9
		3.0	12.9	0.075	13.3	0.034	29.5
		4.0	17.2	0.058	17.1	0.030	33.2
		5.0	21.5	0.052	19.4	0.028	35.6
		6.0	25.8	0.044	22.9	0.026	39.1
	Vertical	2.0	8.6	0.093	10.7	0.038	26.6
		3.0	12.9	0.076	13.1	0.034	29.1
		4.0	17.2	0.060	16.7	0.030	32.8
		5.0	21.5	0.054	18.6	0.029	34.8
		6.0	25.8	0.044	22.6	0.026	38.9
16 x 24	Horizontal	2.0	8.6	0.089	11.2	0.037	27.3
		3.0	12.9	0.071	14.0	0.033	30.2
		4.0	17.2	0.056	18.0	0.029	34.1
		5.0	21.5	0.049	20.6	0.027	36.9
		6.0	25.8	0.041	24.2	0.025	40.6
	Vertical	2.0	8.6	0.092	10.9	0.037	26.8
		3.0	12.9	0.075	13.4	0.034	29.3
		4.0	17.2	0.058	17.2	0.030	33.4
		5.0	21.5	0.052	19.3	0.028	35.5
		6.0	25.8	0.042	23.7	0.025	40.0
16 x 30	Horizontal	2.0	8.6	0.088	11.4	0.036	27.5
		3.0	12.9	0.069	14.5	0.033	30.7
		4.0	17.2	0.054	18.5	0.029	34.7
		5.0	21.5	0.047	21.4	0.027	37.7
		6.0	25.8	0.040	25.2	0.024	41.5
	Vertical	2.0	8.6	0.091	11.0	0.037	27.0
		3.0	12.9	0.074	13.5	0.034	29.5
		4.0	17.2	0.057	17.6	0.030	33.7
		5.0	21.5	0.051	19.8	0.028	35.9
		6.0	25.8	0.041	24.5	0.025	40.7
16 x 36	Horizontal	2.0	8.6	0.086	11.6	0.036	27.7
		3.0	12.9	0.068	14.8	0.032	31.1
		4.0	17.2	0.053	18.9	0.028	35.1
		5.0	21.5	0.045	22.0	0.026	38.3
		6.0	25.8	0.039	25.8	0.024	42.1
	Vertical	2.0	8.6	0.090	11.1	0.037	27.1
		3.0	12.9	0.073	13.7	0.034	29.6
		4.0	17.2	0.056	17.9	0.029	34.0
		5.0	21.5	0.050	20.1	0.028	36.3
		6.0	25.8	0.040	25.0	0.024	41.3

Table 02: Exterior Insulation R-Value is the nominal R-Value of the insulation only. Additional elements of the back-up wall assembly such as sheathing, air films, etc. all contribute an additional R-3.6 to the nominal R-Value of the entire back-up wall assembly (R1d).

THERMAL MODELING RESULTS
ADJUSTAKLIP™ CONCRETE MASONRY UNIT ASSEMBLY

MODELED ASSEMBLY CONFIGURATIONS

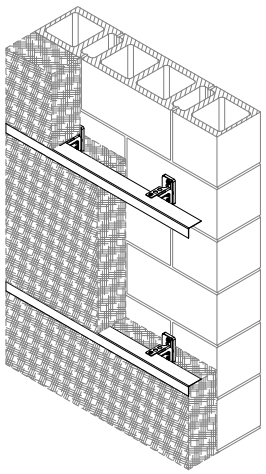


FIGURE 13 - CONCRETE MASONRY UNIT - HORIZONTAL
8-inch standard concrete masonry unit • ADJUSTAKLIP™ • Exterior insulation

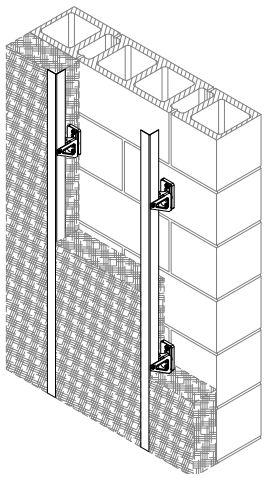


FIGURE 14 - CONCRETE MASONRY UNIT - VERTICAL
8-inch standard concrete masonry unit • ADJUSTAKLIP™ • Exterior insulation

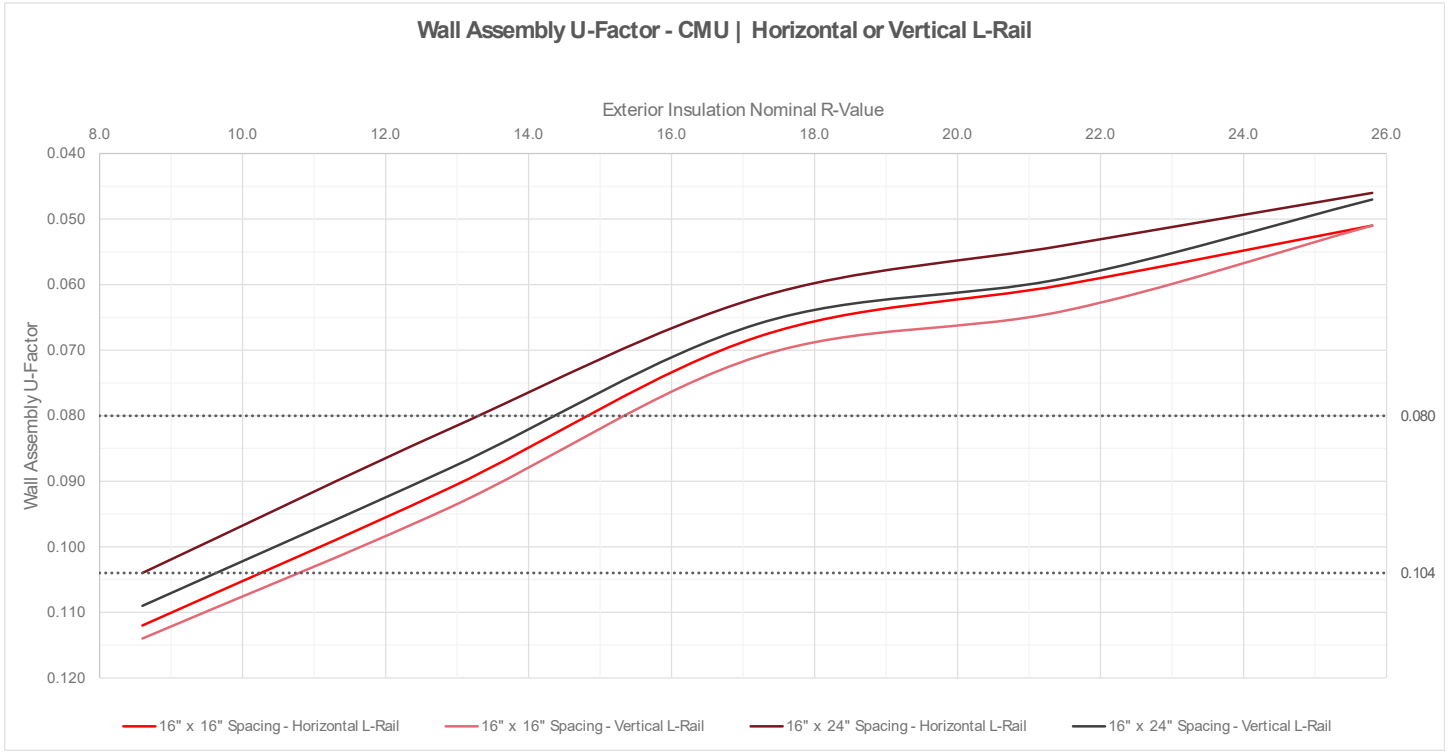


FIGURE 15

KNIGHT® WALL SYSTEMS

THERMAL MODELING RESULTS

ADJUSTAKLIP™ CONCRETE MASONRY UNIT ASSEMBLY

				CMU Wall Assembly	
ADJUSTAKLIP™ Bracket Spacing Inch	L-Rail Orientation	Exterior Insulation Thickness Inch	Exterior Insulation R-Value $ft^2 \cdot hr \cdot °F/Btu$	Assembly U-Factor $Btu/ft^2 \cdot hr \cdot °F$	Assembly Effective R-Value $ft^2 \cdot hr \cdot °F/Btu$
16 x 16	Horizontal	2.0	8.6	0.111	9.0
		3.0	12.9	0.091	11.0
		4.0	17.2	0.068	14.7
		5.0	21.5	0.060	16.7
		6.0	25.8	0.051	19.7
	Vertical	2.0	8.6	0.114	8.8
		3.0	12.9	0.093	10.7
		4.0	17.2	0.071	14.1
		5.0	21.5	0.064	15.7
		6.0	25.8	0.051	19.5
16 x 24	Horizontal	2.0	8.6	0.104	9.6
		3.0	12.9	0.082	12.2
		4.0	17.2	0.062	16.1
		5.0	21.5	0.054	18.6
		6.0	25.8	0.046	21.9
	Vertical	2.0	8.6	0.109	9.2
		3.0	12.9	0.088	11.3
		4.0	17.2	0.066	15.1
		5.0	21.5	0.059	17.0
		6.0	25.8	0.047	21.4
16 x 32	Horizontal	2.0	8.6	0.100	10.0
		3.0	12.9	0.078	12.9
		4.0	17.2	0.059	16.9
		5.0	21.5	0.051	19.7
		6.0	25.8	0.043	23.3
	Vertical	2.0	8.6	0.105	9.5
		3.0	12.9	0.085	11.7
		4.0	17.2	0.063	15.8
		5.0	21.5	0.056	17.8
		6.0	25.8	0.044	22.5

Table 03: Exterior Insulation R-Value is the nominal R-Value of the insulation only. Additional elements of the back-up wall assembly such as the CMU, air films, etc. all contribute an additional R-2.6 to the nominal R-Value of the entire back-up wall assembly (R1d).

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