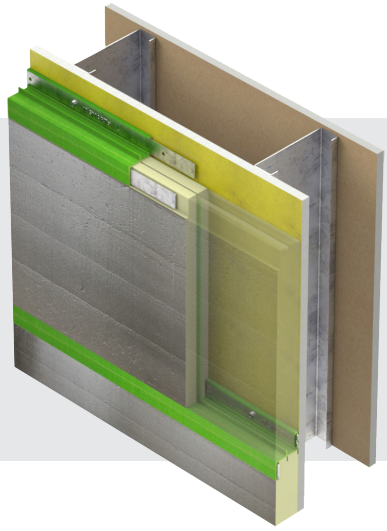
SMARTci™

by a2p ADVANCED ARCHITECTURAL PRODUCTS

Thermal Performance Summary

The SMARTci building enclosure system leads the industry with up to 97% thermal efficiency and the highest R-value per inch.



SMARTci® (on closed framing) is an air- and water-tight building enclosure system comprised of GreenGirt CMH sub-framing, integrated custom-profiled insulation panels, expert engineering support, and necessary accessories. Created by Advanced Architectural Products, SMARTci systems install in a single pass with thermal efficiencies of up to 97%, eliminates thermal bypass, and provides the highest R-value available.

This complete thermal performance analysis was conducted by Morrison Hershfield/Stantec at the request of Advanced Architectural Products. A summary of results is provided here; further details are available upon request.

Analysis Results

Steel-frame wall assembly includes:
5/8-inch gypsum, 6-inch steel stud at 16 inches o.c. with uninsulated stud cavity, 1/2-inch gypsum sheathing, horizontal or vertical composite metal hybrid GreenGirt CMH at various spacing, and exterior polyisocyanurate insulation (R-6.5/in) at various thicknesses.

Continuous SMARTci (on closed framing) System on Steel-Frame Wall Assembly

Vertical or Horizontal Girt Spacing*	Girt Depth	Exterior Insulation Thickness	Exterior Insulation Nominal R-Value** h.ft2·°F/Btu	Assembly Effective R-Value h.ft2·°F/Btu	Overall Assembly Efficiency***
16"	1.5"	1.5"	9.8	12.2	92%
	2"	2"	13.0	15.2	92%
	2.5"	2.5"	16.3	18.3	93%
	3"	3"	19.5	21.3	93%
	3.5"	3.5"	28.8	24.4	93%
	4"	4"	26.0	27.4	93%
24"	1.5"	1.5"	9.8	12.6	96%
	2"	2"	13.0	15.7	96%
	2.5"	2.5"	16.3	18.8	96%
	3"	3"	19.5	21.9	96%
	3.5"	3.5"	22.8	25.0	96%
	4"	4"	26.0	28.2	96%
32"	1.5"	1.5"	9.8	12.6	96%
	2"	2"	13.0	15.7	96%
	2.5"	2.5"	16.3	18.9	96%
	3"	3"	19.5	22.0	96%
	3.5"	3.5"	22.8	25.2	97%
	4"	4"	26.0	28.3	97%

Concrete wall assembly includes:
8-inch concrete wall, horizontal or vertical composite metal hybrid GreenGirt CMH at various spacing, and exterior polyisocyanurate insulation (R-6.5/in) at various thicknesses.

Continuous SMARTci (on closed framing) System on Concrete Wall Assembly

Vertical or Horizontal Girt Spacing*	Girt Depth	Exterior Insulation Thickness	Exterior Insulation Nominal R-Value** h.ft2·°F/Btu	Assembly Effective R-Value h.ft2·°F/Btu	Overall Assembly Efficiency***
16"	2"	2"	13.0	13.9	92%
	2.5"	2.5"	16.3	17.0	92%
	3"	3"	19.5	20.0	93%
	3.5"	3.5"	22.8	23.1	93%
	4"	4"	26.0	26.1	93%
24"	1.5"	1.5"	9.8	11.2	94%
	2"	2"	13.0	14.3	95%
	2.5"	2.5"	16.3	17.4	95%
	3"	3"	19.5	20.5	95%
	3.5"	3.5"	22.8	23.7	95%
	4"	4"	26.0	26.8	95%
32"	1.5"	1.5"	9.8	11.3	96%
	2"	2"	13.0	14.5	96%
	2.5"	2.5"	16.3	17.6	96%
	3"	3"	19.5	20.8	96%
	3.5"	3.5"	22.8	23.9	96%
	4"	4"	26.0	27.1	96%

* *The difference between horizontal and vertical thermal numbers is negligible, so either orientation of girt can be used for each specific spacing.*

** *This value is the nominal R-value of the exterior insulation ONLY. Additional components, such as the gypsum, stud cavity, exterior sheathing, and air films all contribute an additional R-3.2 towards the nominal R-value of the entire assembly.*

*** *Thermal bypass reduces assembly efficiency and increases energy loss. GreenGirt CMH and SMARTci eliminate thermal bypass—delivering maximum thermal performance. Discover how at GreenGirt.com.*

The effective R-values and overall assembly efficiency of exterior insulated steel-frame and concrete wall assemblies featuring the SMARTci building enclosure system were evaluated using both 3D thermal simulations and approximations derived from those simulations. These 3D simulations were conducted using Siemens' NX and SimCenter 3D software package. The thermal solver and modeling procedures employed were calibrated/validated to within +/-5% of hotbox testing, as referenced in ASHRAE Research Project 1365-RP Thermal Performance of Building Envelope Details for Mid- and High-Rise Construction and the Building Envelope Thermal Bridging Guide 1, and also meet the CSA Z5010 standard for thermal simulations of opaque building envelope assemblies.

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