TECHNICAL BULLETIN DP-232

SUBJECT: RBS Thermal Analysis Report Desana Brick Rainscreen System

Date: June 14, 2018

Project No: RBS2018-RES-37
Version: 1.0

Project Name: N/A
Project Location: New York, NY
Primary Contact: Steve Collins, Desana Partners Inc.

Author: Alejandra Nieto
Reviewer: Vincent Chiu

The information provided within this document is for illustration purposes only. Actual results may vary as ROCKWOOL™ has no control over the final design, workmanship, necessary materials or applicable conditions which can impact predicted performance. Thus, the information contained herein provides no performance warranty as to any specific end use application of ROCKWOOL™ products.

Effective Thermal Performance

Based on the details and information provided by Desana Partners Inc., and the previous work conducted by ROCKWOOL (EDC2016-198_Thermal Analysis_v2.0), the overall thermal performance of the Desana Sub- Framing System was calculated using HEAT3 6.0. Typical 6" steel frame and CMU substrates were analysed, using both 2" and 4" exterior stone wool insulation, with and without a thermal break pad.

A. Assumptions

The following notes and assumptions apply to the thermal modelling and calculations:

[1] Calculations were conducted using HEAT3 6.0 3d thermal modelling software.
[2] Thermal resistance values for surfaces based on values from ASHRAE Fundamentals (2013), Table 10 Surface Film Coefficients/Resistances.
[3] Thermal resistance values for all materials, excluding those of the insulation material, are based on values from ASHRAE Fundamentals (2013), Table 1 Building and Insulating Materials: Design Values (refer to list below).
[4] The sub-framing brackets were assumed to be aluminum, spaced 32" vertically and 36" horizontally. For comparison purposes, the brackets were also modelled spaced at 16" vertically and 36" horizontally.
[5] The sub-framing brackets are assumed to include 2 stainless steel fasteners per bracket/clip.
[6] The thermal break pad was based on the technical data from SIMONA® SIMOPOR lightweight PVC material.

[7] The exterior air space and cladding have not been included into the calculation since the air space is assumed to be ventilated. Any actual added thermal performance can be assumed as a bonus.

[8] Calculations only consider the opaque portion of the wall. They do not consider thermal bridges caused at connections (i.e. floor to wall) or windows/doors.

The following thermal conductivities were assumed in the models:

Material	Thermal Conductivity	
	[W/m·K]	[BTU·in/ (ft²·hr·F)]
ROCKWOOL COMFORTBATT®	0.033	0.229
ROCKWOOL CAVITYROCK®	0.036	0.249
Aluminum	160.000	1109.570
Stainless Steel	17.000	117.892
Thermal Pad (SINOMA)	0.090	0.624
Concrete	2.700	18.720

B. Discussion

The following tables outline the thermal performance of the different configurations that were modelled.

Table 1: Effective Thermal Performance for Steel Frame Substrate

Substrate		6" Metal Stud @ 16" o.c. w/ R24 ROCKWOOL COMFORTBATT®							
Bracket Spacing		32" x 36"				16" x 36"			
Assembly Description		U-Value [W/m²·k]	RSI [m²·K/W]	U-Value [BTU/(hr·°F.ft²)]	R Value [(hr·°F.ft²)/BTU]	U-Value [W/m²·k]	RSI [m²·K/W]	U-Value [BTU/(hr·°F.ft²)]	R Value [(hr·°F.ft²)/BTU]
Desana Sub-Frame System w/ stainless steel screws									
No Thermal Spacer	2" ROCKWOOL CAVITYROCK® Insulation	0.244	4.100	0.043	23.284	0.250	4.000	0.044	22.716
	4" ROCKWOOL CAVITYROCK® Insulation	0.180	5.557	0.032	31.559	0.188	5.315	0.033	30.184
5mm Thermal Spacer	2" ROCKWOOL CAVITYROCK® Insulation	0.243	4.114	0.043	23.363	0.250	4.006	0.044	22.752
	4" ROCKWOOL CAVITYROCK® Insulation	0.177	5.636	0.031	32.005	0.187	5.342	0.033	30.334
10mm Thermal Spacer	2" ROCKWOOL CAVITYROCK® Insulation	0.243	4.116	0.043	23.376	0.250	4.008	0.044	22.758
	4" ROCKWOOL CAVITYROCK® Insulation	0.177	5.645	0.031	32.056	0.185	5.416	0.033	30.756

Table 2: Effective Thermal Performance for Concrete Substrate

Substrate		8" CMU							
Bracket Spacing		32" x 36"				16" x 36"			
Assembly Description		U-Value [W/m²·k]	RSI [m²·K/W]	U-Value [BTU/(hr·°F.ft²)]	R Value [(hr·°F.ft²)/BTU]	U-Value [W/m²·k]	RSI [m²·K/W]	U-Value [BTU/(hr·°F.ft²)]	R Value [(hr·°F.ft²)/BTU]
Desana Sub-Frame System w/ stainless steel screws									
No Thermal Spacer	2" ROCKWOOL CAVITYROCK® Insulation	0.533	1.877	0.094	10.658	0.540	1.852	0.095	10.515
	4" ROCKWOOL CAVITYROCK® Insulation	0.298	3.353	0.053	19.041	0.309	3.236	0.054	18.378
5mm Thermal Spacer	2" ROCKWOOL CAVITYROCK® Insulation	0.532	1.879	0.094	10.669	0.539	1.856	0.095	10.541
	4" ROCKWOOL CAVITYROCK® Insulation	0.297	3.367	0.052	19.118	0.307	3.262	0.054	18.524
10mm Thermal Spacer	2" ROCKWOOL CAVITYROCK® Insulation	0.532	1.880	0.094	10.677	0.538	1.858	0.095	10.551
	4" ROCKWOOL CAVITYROCK® Insulation	0.296	3.374	0.052	19.161	0.305	3.276	0.054	18.603

10 Worthington Road Suite K● Cranston, RI 02920 ● Phone 401.942.5640 ● www.desanapartners.com ● info@desanapartners.com