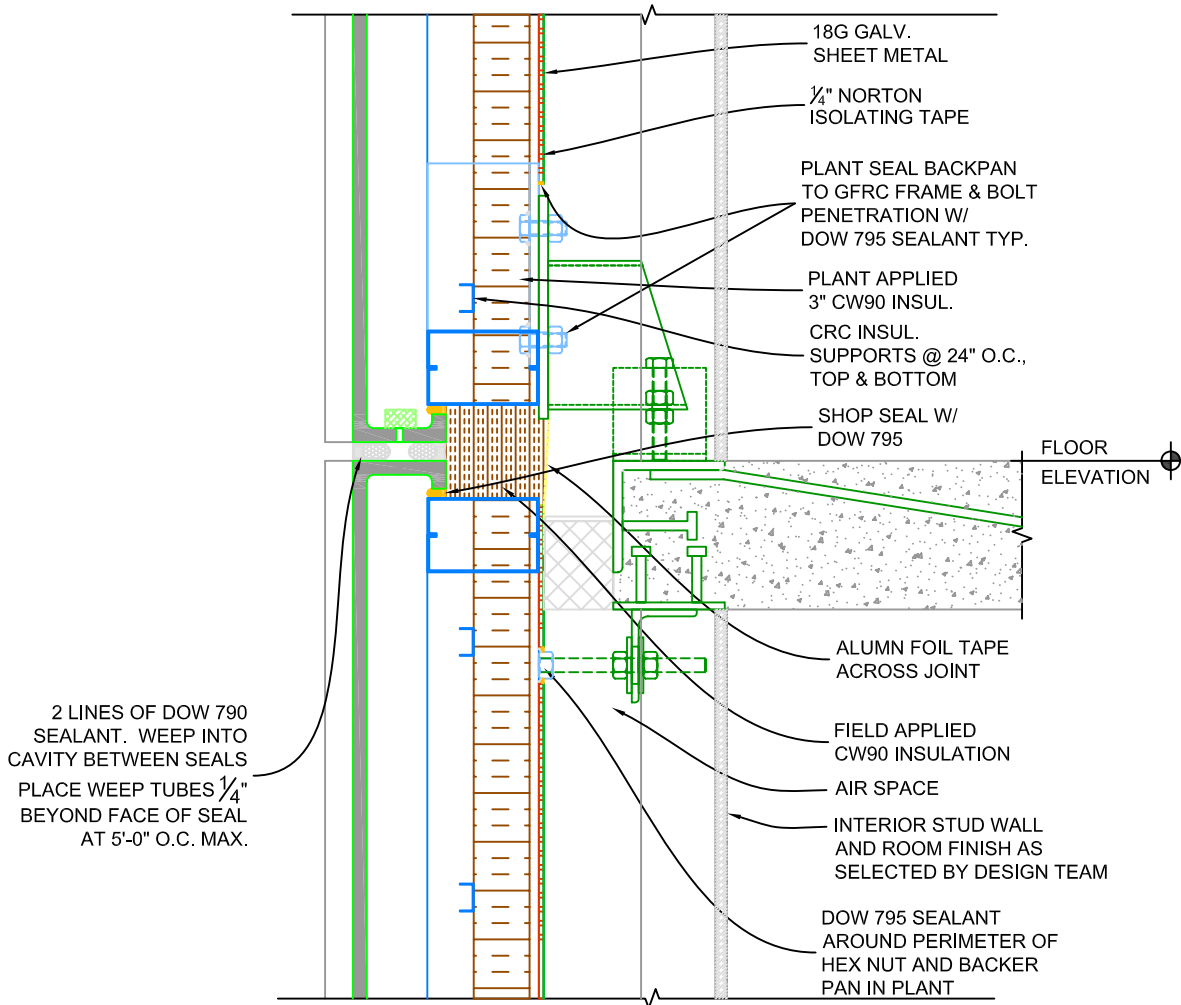




GFRC Cladding Systems, LLC

Glass Fiber Reinforced Concrete	118 North Shiloh Rd. Garland, Texas 75042	Telephone: 972-494-9000 Fax: 972-494-1900
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GFRC CLADDING SYSTEMS, LLC. UNITIZED PANEL SYSTEM

SCALE: 1 1/2"=1'-0"

THE SYSTEM PRESENTED ABOVE IS DESIGNED FOR AN OUTSIDE TEMPERATURE OF -20 F, INSIDE TEMPERATURE OF 75 F AND A RELATIVE HUMIDITY OF 30%. ENGINEERING AND TESTING OF THE SYSTEM CONFIRMS NO CONDENSATION OR MOISTURE PRESENT ON THE ROOM SIDE OF THE SHEET METAL VAPOR BARRIER.

THE OVERALL R VALUE FOR THE WALL COUNTING THE GFRC PANEL AND THE INTERIOR AIR SPACE EXCEEDED R19 FOR THIS PROJECT DESIGN. OTHER DESIGNS YEILDED VALUES UP TO R23 USING 3" INSULATION. (SEE ATTACHED ANALYSIS) EACH PROJECT IS DIFFERENT AND GFRC WILL PERFORM A PROJECT SPECIFIC ANALYSIS FOR EACH NEW PROJECT DESIGNED WITH OUR UNITIZED PANEL SYSTEM.

FOR MORE INFORMATION RELATED TO THERMAL PERFORMANCE, CONDENSATION CONTROL, OR WATER CONTROL AND DRAINAGE. PLEASE CONTACT JIMMY LEE @ 972-494-9000 OR jlee@gfrc.us

PROJECT: GFRC THERMAL ANALYSIS TYPICAL
GFRC PANEL

CLIENT: GFRC CLADDING SYSTEMS, LLC

SUBJECT: R VALUE CALCULATION
GFRC PANELS

DATE: JUNE 29, 2009

**PREVIOUS
SUBMITTALS:**

SUMMARY

Design conditions for U Factor calculations are based on NFRC 100-2001 winter night time conditions:

$$T_{out} = 0 \text{ F}$$

$$\text{Wind} = 12.3 \text{ mph}$$

$$T_{in} = 70 \text{ F}$$

R-values were calculated for the GFRC system for two configurations:

1. Galvanized Steel back pan flush with Thermafiber insulation
2. Galvanized Steel back pan offset ¼" from Thermafiber insulation

For configuration 1, the simulated overall thermal transmittance (U Factor) is:

$$U_t = 0.0449 \text{ BTU}/(\text{h}\cdot\text{ft}^2\cdot^\circ\text{F})$$

For configuration 1, the simulated overall thermal resistance (R Value) is:

$$R_t = 22 \text{ (h}\cdot\text{ft}^2\cdot^\circ\text{F)/BTU}$$

For configuration 2, the simulated overall thermal transmittance (U Factor) is:

$$U_t = 0.0427 \text{ BTU}/(\text{h}\cdot\text{ft}^2\cdot^\circ\text{F})$$

For configuration 2, the simulated overall thermal resistance (R Value) is:

$$R_t = 23 \text{ (h}\cdot\text{ft}^2\cdot^\circ\text{F)/BTU}$$

THERM MODELS

Created by:
 Created for:

Therm Filename: C:\Documents and Settings\phutley\My Documents\data\C01367 - Baylor Cancer Center\GFRC Cladding Updated
 1.THM
 Cross Section Type: Sill
 Underlay Name:

U-factors

Name	Length in.	Basis	U-factor Btu/h-ft ² -F
Frame	12.00	Projected Y	0.0449

Solid Materials

Name	Conductivity Btu/h-ft-F	Emissivity
Steel - Galvanized Sheet (0.14 %C)*	35.82	0.20
GFRC	0.58	0.90
Thermafiber CW 90	0.02	0.90
Gyp Board	0.14	0.90

Cavities

Name: Frame Cavity NFRC 100-2001*
 Gas Fill: Air
 Convection Model: ISO 15099
 Radiation Model: Standard

Poly ID	Heat Flow Dir	Side 1		Side 2		Dimension		Nu #	Keff Btu/h-ft-F	Cavity Height in.
		Temp F	Emis	Temp F	Emis	Horz. in.	Vert. in.			
2	Horizontal	4.63	0.90	0.55	0.90	4.25	12.00	7.71	0.2734	N/A
38	Horizontal	66.27	0.90	59.98	0.20	7.95	12.00	14.51	0.3329	N/A

Glazing Systems

None

Standard Boundary Conditions

None

Advanced Boundary Conditions

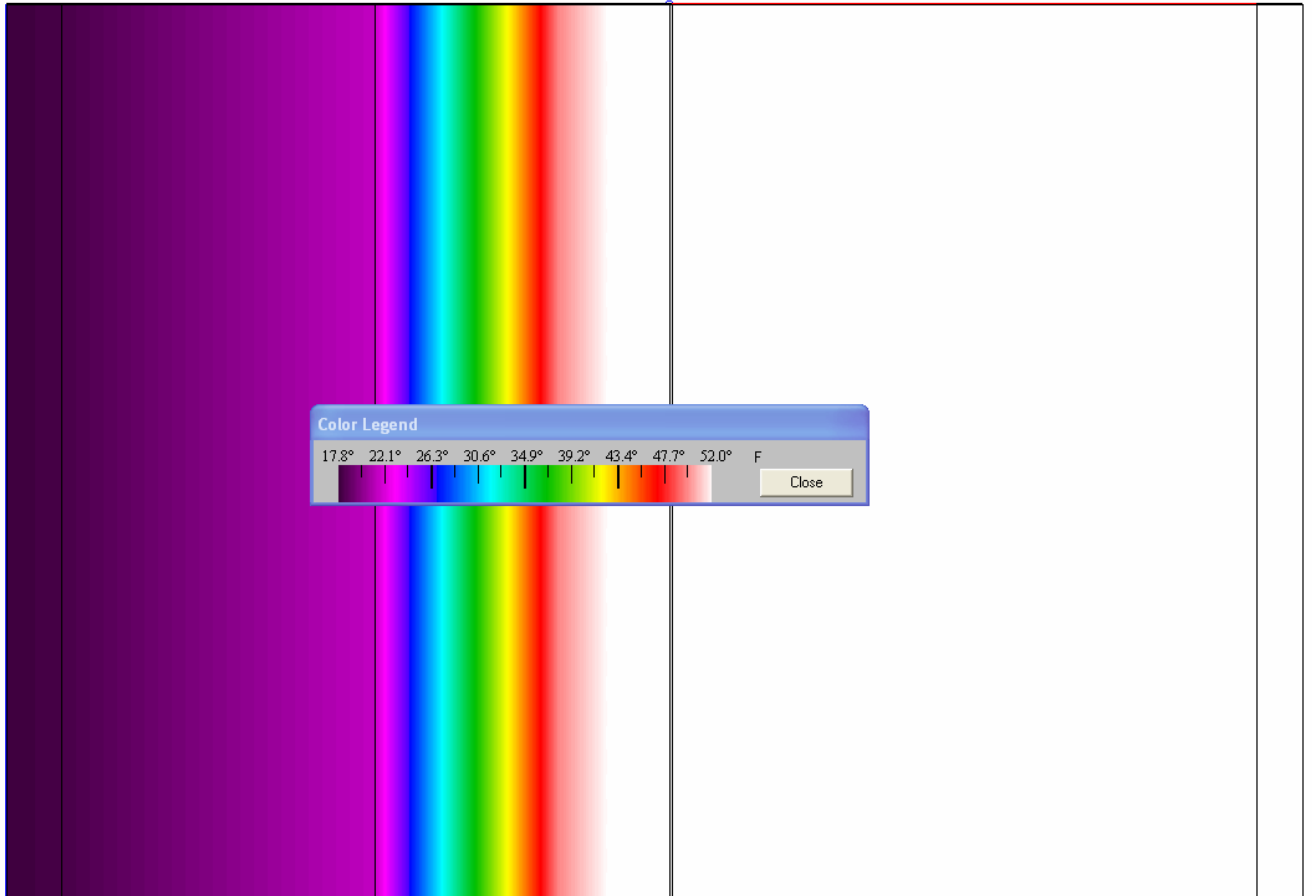
Name	Convection		Const Flux Heat Btu/h-ft ²	Black Body Radiation		Const Temp Temp F
	Temp F	Film Coef Btu/h-ft ² -F		View Fact	Temp F	
Interior Wood/Vinyl Frame (convection only)*	69.80	0.430		Enc. Model		
NFRC 100-2001 Exterior*	-0.40	4.579		1.00	-0.40	

Calculation Specifications

Mesh Parameter : 6
 Estimated Error: 3.5e-010%
 Calculations done in Version 5.2 (5.2.14)

GFRC Cladding

Color infrared image with temperatures at or below the dew point



EXTERIOR TEMPERATURE = 17 °F
INTERIOR TEMPERATURE = 70 °F
INTERIOR RELATIVE HUMIDITY = 50%
INTERIOR DEW POINT TEMPERATURE = 52 °F

Created by:
 Created for:

Therm Filename: C:\Documents and Settings\phutley\My Documents\data\C01367 - Baylor Cancer Center\GFRC Cladding Updated
 2.THM
 Cross Section Type: Sill
 Underlay Name:

U-factors

Name	Length in.	Basis	U-factor Btu/h-ft2-F
Frame	12.00	Projected Y	0.0427

Solid Materials

Name	Conductivity Btu/h-ft-F	Emissivity
GFRC	0.58	0.90
Thermafiber CW 90	0.02	0.90
Steel - Galvanized Sheet (0.14 %C)*	35.82	0.20
Gyp Board	0.14	0.90

Cavities

Name: Frame Cavity NFRC 100-2001*
 Gas Fill: Air
 Convection Model: ISO 15099
 Radiation Model: Standard

Poly ID	Heat Flow Dir	Side 1		Side 2		Dimension		Nu #	Keff Btu/h-ft-F	Cavity Height in.
		Temp F	Emis	Temp F	Emis	Horz. in.	Vert. in.			
2	Horizontal	4.41	0.90	0.50	0.90	4.25	12.00	7.60	0.2718	N/A
37	Horizontal	60.44	0.20	57.05	0.90	0.25	12.00	1.00	0.0185	N/A
38	Horizontal	66.44	0.90	60.44	0.20	7.70	12.00	13.93	0.3211	N/A

Glazing Systems

None

Standard Boundary Conditions

None

Advanced Boundary Conditions

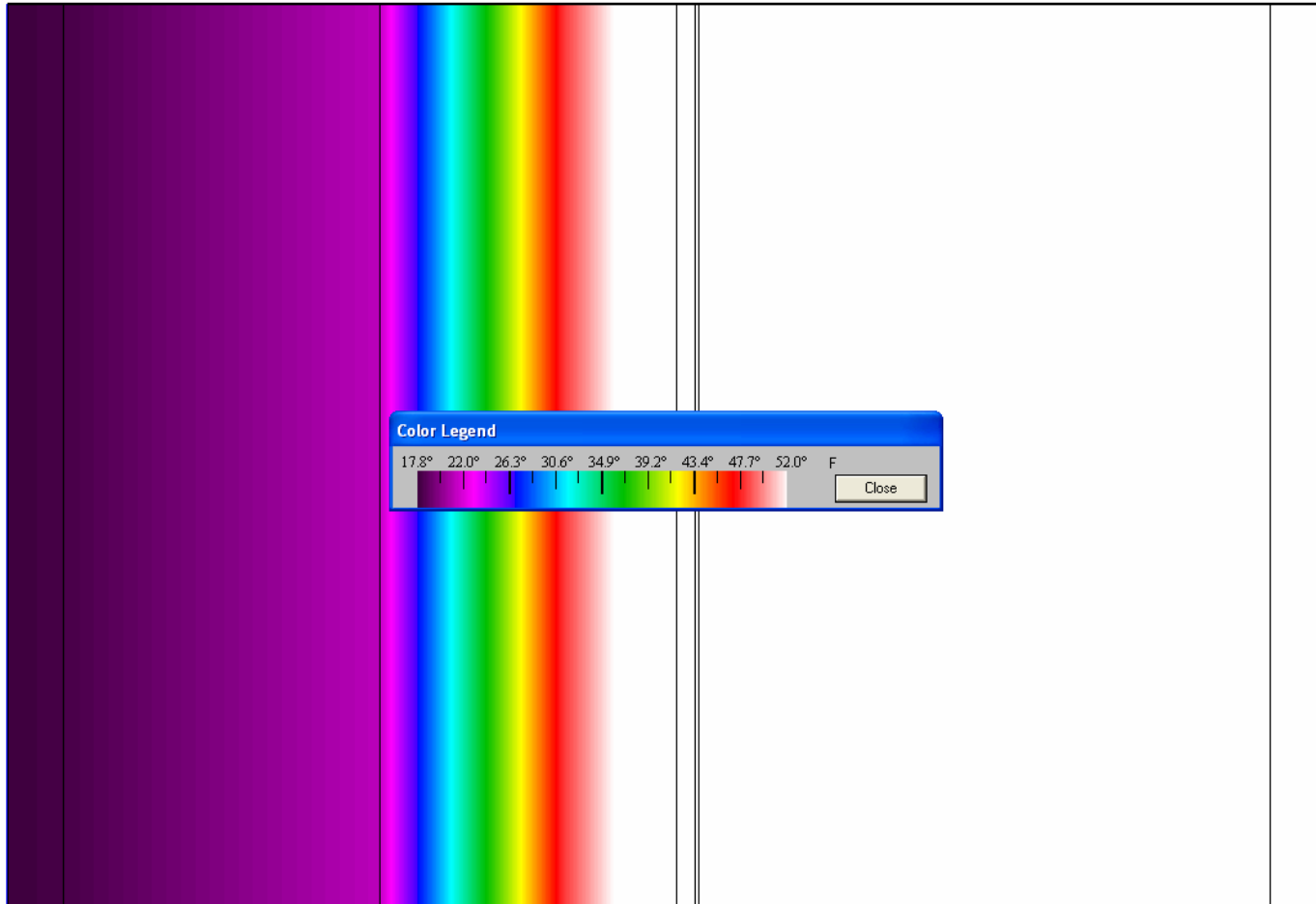
Name	Convection		Const Flux Heat Btu/h-ft2	Black Body Radiation		Const Temp Temp F
	Temp F	Film Coef Btu/h-ft2-F		View Fact	Temp F	
Interior Wood/Vinyl Frame (con vection only)*	69.80	0.430		Enc. Model		
NFRC 100-2001 Exterior*	-0.40	4.579		1.00	-0.40	

Calculation Specifications

Mesh Parameter : 6
 Estimated Error: 2.6e-010%
 Calculations done in Version 5.2 (5.2.14)

GFRC Cladding

Color infrared image with temperatures at or below the dew point



EXTERIOR TEMPERATURE = 17 °F
INTERIOR TEMPERATURE = 70 °F
INTERIOR RELATIVE HUMIDITY = 50%
INTERIOR DEW POINT TEMPERATURE = 52 °F