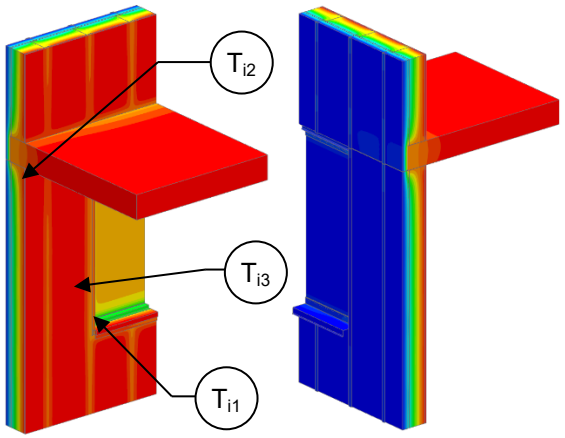
Detail 5.3.15

Exterior and Interior Insulated 6” x 1 5/8” Steel Stud (16” o.c.) Wall Assembly with Thermally Isolated Vertical Brackets and Rail System (24” o.c.) Supporting Metal Cladding and Owens Corning R-20 Batt in Stud Cavity – Double Glazed Aluminum Window and Intermediate Floor Intersection



View from Interior View from Exterior

Thermal Performance Indicators

Assembly 1D (Nominal) R-Value	R_{1D}	R-22.4 (3.94 RSI) + exterior insulation
Transmittance / Resistance without Anomaly	$U_{w,}$ $R_{w,}$ $U_{g,}$	“clear wall” U- and R-value: w = wall without intermediate floor g = glazing
Transmittance / Resistance	$U_{floor,}$ $R_{floor,}$ $U_{t,}$ R_t	U and R-values for: floor = wall + intermediate floor t = combined wall + floor + window
Surface Temperature Index[1]	T_i	0 = exterior temperature 1 = interior temperature
Linear Transmittance	Ψ	Incremental increase in transmittance per linear length

[1]Assumptions and limitations for surface temperatures identified in ASHRAE 1365-RP

Base Assembly – Glazing

$U_{centre\ of\ glass}$ Btu/ft² ·hr ·°F (W/m² K)	U_g Btu/ft² ·hr ·°F (W/m² K)
0.321 (1.82)	0.396 (2.25)

Nominal (1D) vs. Assembly Performance Indicators

Base Assembly – Steel Stud Clear Wall

Exterior Insulation 1D R-Value (RSI)	R_{1D} ft²·hr·°F / Btu (m² K / W)	R_w ft²·hr·°F / Btu (m² K / W)	U_w Btu/ft² ·hr ·°F (W/m² K)
R-8.4 (1.48)	R-30.8 (5.42)	R-18.3 (3.23)	0.055 (0.31)
R-21.0 (3.70)	R-43.4 (7.64)	R-25.8 (4.54)	0.039 (0.22)

Intermediate Floor Linear Transmittance

R_{floor} ft²·hr·°F / Btu (m² K / W)	U_{floor} Btu/ft² ·hr ·°F (W/m² K)	Ψ_{floor} Btu/ft² ·hr ·°F (W/m² K)
R-15.3 (2.69)	0.065 (0.37)	0.076 (0.132)
R-22.5 (3.96)	0.045 (0.25)	0.040 (0.069)

Window Transition Transmittance

Exterior Insulation 1D R-Value (RSI)	R_t ft²·hr·°F / Btu (m² K / W)	U_t Btu/ft² ·hr ·°F (W/m² K)	Ψ_{Head} Btu/ft ·hr ·°F (W/m K)	Ψ_{Sill} Btu/ft ·hr ·°F (W/m K)	Ψ_{Jamb} Btu/ft ·hr ·°F (W/m K)	Ψ_{Total} Btu/ft ·hr ·°F (W/m K)
R-8.4 (1.48)	R-5.8 (1.02)	0.173 (0.99)	0.308 (0.533)	0.146 (0.253)	0.094 (0.163)	0.159 (0.274)
R-21.0 (3.70)	R-6.2 (1.10)	0.161 (0.91)	0.303 (0.525)	0.158 (0.273)	0.102 (0.176)	0.164 (0.283)

Temperature Indices

	R8.4	R21	
T_{i1}	0.50	0.50	Min T on window frame, at bottom corner at edge of glass
T_{i2}	0.80	0.86	Max T on interior surface of sheathing, along bottom track
T_{i3}	0.28	0.28	Min T on interior surface of sheathing, at bracket along jamb