

Building Envelope Requirements

IECC 2000 Table 802.2 (33) Building Envelope Requirements, Climate Zone 15

Area of windows/glazed door area 1,576 (incl. louvered openings)

Area of solid walls 6,007

Total area: 7,583

10% > Total glazed area < 25% total area

Window and Glazed Door Area over 10 percent but Not Greater than 25 percent of Above-grade Wall Area

Element	Value	
Slab or below grade wall	0	
Windows	SHGC	U-factor
PF < 0.25**	0.5	0.5
PF > .50**	0.7	0.5
Roof Assemblies	Cont. insulation	
Metal joist/truss	R-20	
Above grade walls	Metal Framing	
Framed:		
R-value cavity	R-13	
R-value continuous	R-3	
Other Masonry:		
R-value cavity	R-11	
R-value continuous	R-0	

Building Envelope Calculations

1. Exterior Walls:

The composition of exterior walls (and roof) is as follows: exterior weatherproof material, continuous rigid insulation, exterior gwb sheathing, metal stud backup with spray-icynene insulation, and interior gwb sheathing.

- a. Brick Veneer R = 32.45: "Wall Type W40" = 4" face brick (0.44), 1" air space (1), 2" polystyrene extruded insulation (10), self-adhered sheet waterproofing, 1/2" gwb sheathing (0.45), 6" metal studs with 6" icynene insulation (20), vapor retarder, 5/8" interior gwb sheathing (0.56)
- b. Corrugated Metal Panel R = 31.01: "Wall Type W70" = corrugated aluminum panels, 2" polystyrene extruded insulation (10), self-adhered sheet waterproofing, 1/2" gwb sheathing (0.45), 6" metal studs with 6" icynene insulation (20), vapor retarder, 5/8" interior gwb sheathing (0.56)
2. Roof R = 20.9: TPO Membrane, 1/2" coverboard (0.45), rigid insulation tapered to drain, min. 2", avg 4" (20), vapor barrier, 1/2" gwb sheathing (0.45), 3" metal deck
3. Curtainwall U = .33: Kawneer 1600, Wall System 2 [w/glazing as specified]
4. Glazing U = .21: 1" double-glazed insulated unit with heat mirror film
5. Doors R = 3.03: Stile and Rail Wood Door – Mahogany 1 3/4" thickness
6. Floors U-varies: 6 1/2" thick = 3" metal deck + 3 1/2" concrete (0.28); 1 1/2" finish varies
 - a. wood (3/4" plywd subfloor) = .68 + .93 = total U value of floor = 1.89
 - b. carpet (3/4" plywood subfloor) = .68 + 1.23 total U value of floor = 2.19
 - c. conc. topping slab = 0.12 total U value of floor = 0.4

As shown the project meets or exceeds the requirements for R and U values for exterior assemblies.

Maine Historical Society Research Library Addition and Renovation

**PF = Projection factor (decimal). $PF = A/B$ where:

A = Distance measured horizontally from the furthest continuous extremity of any overhang, eave, or permanently attached shading device to the vertical surface of the glazing.

B = Distance measured vertically from the bottom of the glazing to the underside of the overhang, eave, or permanently attached shading device.

Garden Level Glazing – West: A = 40.325" B = 29"	PF = 1.39
Garden Level Glazing North / South	PF = 0
Curtainwall West / South: A = 4" B = 317.25"	PF = 0.0126