Table 5.5-4 *Building Envelope* Requirements for Climate Zone 4 (A,B,C)*

Opaque Elements	*Nonresidential*		*Residential*		Semiheated	
	Assembly Maximum	Insulation Min. *R-Value*	Assembly Maximum	Insulation Min. *R-Value*	Assembly Maximum	Insulation Min. *R-Value*
Roofs						
Insulation entirely above deck	U-0.032	R-30 c.i.	U-0.032	R-30 c.i.	U-0.093	R-10 c.i.
Metal building[a]	U-0.037	R-19 + R-11 *Ls* or R-25 + R-8 *Ls*	U-0.037	R-19 + R-11 *Ls* or R-25 + R-8 *Ls*	U-0.082	R-19
Attic and other	U-0.021	R-49	U-0.021	R-49	U-0.034	R-30
Walls, above Grade						
Mass	U-0.104	R-9.5 c.i.	U-0.090	R-11.4 c.i.	U-0.580	NR
Metal building	U-0.060	R-0 + R-15.8 c.i.	U-0.050	R-0 + R-19 c.i.	U-0.162	R-13
Steel-framed	U-0.064	R-13 + R-7.5 c.i.	U-0.064	R-13 + R-7.5 c.i	U-0.124	R-13
Wood-framed and other	U-0.064	R-13 + R-3.8 c.i. or R-20	U-0.064	R-13 + R-3.8 c.i. or R-20	U-0.089	R-13
Wall, below Grade						
Below-grade wall	C-0.119	R-7.5 c.i.	C-0.092	R-10 c.i.	C-1.140	NR
Floors						
Mass	U-0.057	R-14.6 c.i.	U-0.051	R-16.7 c.i.	U-0.107	R-6.3 c.i.
Steel joist	U-0.038	R-30	U-0.038	R-30	U-0.052	R-19
Wood-framed and other	U-0.033	R-30	U-0.033	R-30	U-0.051	R-19
Slab-on-Grade Floors						
Unheated	F-0.520	R-15 for 24 in.	F-0.520	R-15 for 24 in.	F-0.730	NR
Heated	F-0.843	R-20 for 24 in.	F-0.688	R-20 for 48 in.	F-0.900	R-10 for 24 in.
Opaque Doors						
Swinging	U-0.370		U-0.370		U-0.370	
Nonswinging	U-0.310		U-0.310		U-0.360	

Fenestration	Assembly Max. U	Assembly Max. *SHGC*	Assembly Min. *VT/SHGC*	Assembly Max. U	Assembly Max. *SHGC*	Assembly Min. *VT/SHGC*	Assembly Max. U	Assembly Max. *SHGC*	Assembly Min. *VT/SHGC*
Vertical Fenestration, 0% to 40% of *Wall*		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	0.31	0.36	1.10	0.31	0.36	1.10	0.51	NR	NR
Metal framing, fixed	0.38			0.38			0.73		
Metal framing, operable	0.46			0.46			0.81		
Metal framing, entrance door	0.68			0.68			0.77		
Skylight, 0% to 3% of *Roof*									
All types	0.50	0.40	NR	0.50	0.40	NR	1.15	NR	NR

* The following definitions apply: c.i. = *continuous insulation* (see Section 3.2), FC = filled cavity (see Section A2.3.2.5), *Ls* = *liner system* (see Section A2.3.2.4), NR = no (insulation) requirement.

a. When using the *R-value* compliance method for *metal building roofs*, a thermal spacer block is required (see Section A2.3.2).

Service Water Heating Compliance Report

Project Name:		
Project Address:		Date:
Designer of Record:	Email:	Telephone:
Contact Person:	Email:	Telephone:
City:		

Mandatory Provisions Checklist

- ❑ Load calculations have been provided for sizing of systems and equipment. (Section 7.4.1)
- ❑ Equipment efficiencies meet or exceed the requirements of Table 7.8. (Section 7.4.2)
- ❑ Circulating systems are fully insulated (per Table 6.8.3-1) and have automatic pump controls. (Sections 7.4.3 and 7.4.4.2)
- ❑ Noncirculating systems have heat traps (Section 7.4.6) and outlet piping insulation (per Table 6.8.3-1) for 8 ft (2.4 m) from the storage tank. (Section 7.4.3)
- ❑ All water heating systems have temperature controls that are adjustable down to 120°F (49°C) or lower. (Section 7.4.4.1)
- ❑ Systems designed with pipe heating systems such as heat trace have temperature or time controls. (Section 7.4.4.2)
- ❑ Public lavatories have outlet temperature controls that limit the discharge temperature to 110°F (43°C). (Section 7.4.4.3)
- ❑ Tanks with remote heaters have circulation pump controls. (Section 7.4.4.4)
- ❑ Pool heaters have readily accessible controls and gas-fired heaters do not have standing pilot lights. (Section 7.4.5.1)
- ❑ Heated swimming pools have vapor-retardant covers. (Section 7.4.5.2)
- ❑ Pool heaters and circulation pumps have time switches. (Section 7.4.5.3)

Equipment Efficiency Worksheet (Section 7.4.1)

System Tag	Equipment Type (From Table 7.8)	Subcategory or Rating Condition (From Table 7.8)	Input Rating (Btu/h or kW)	Volume (gal or L)	Energy Factor (EF) or thermal efficiency (E_t) Rated ≥ Required	Standby Loss Specified ≤ Nameplate
					≥	≤
					≥	≤
					≥	≤
					≥	≤

Combination Space and Water Heating Worksheet (Section 7.5.1)

System Tag	Standby Loss Method Equipment ≤ Requirement	or Energy Use Exception (attach calculations) Equipment < Requirement	or Size Exception Equipment < Requirement
	≤	<	< 150,000 Btu/h (44 kW)
	≤	<	< 150,000 Btu/h (44 kW)
	≤	<	< 150,000 Btu/h (44 kW)
	≤	<	< 150,000 Btu/h (44 kW)