BSR/ASHRAE/IES Addendum bf
to ANSI/ASHRAE/IES Standard 90.1-2022

Public Review Draft

Proposed Addendum bf to Standard 90.1-2022, Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings

First Public Review (December 2024)
(Draft Shows Proposed Changes to Current Standard)

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ASHRAE, 180 Technology Parkway NW, Peachtree Corners, GA 30092

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FOREWORD

This addendum increases baseline prescriptive requirements where incremental insulation can be added without significant changes to the construction system.

A cost effectiveness analysis was conducted both with and without the social cost of carbon. This analysis was used, along with professional judgment, to inform the changes made within this addendum.

[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by <u>underlining</u> (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]

Addendum bf to 90.1-2022

Revise Section 5.5, Table 5.5-0 as shown (IP and SI Units)

Table 5.5-0 Building Envelope Requirements for Climate Zone 0 (A,B)

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-0.039	R-25 *c.i.*	U-0.032	R-30 c.i.	U-0.218	R-3.8 *c.i.*
Metal building [a]	U-0.041	R-10 + R-19 FC	U-0.041	R-10 + R-19 FC	U-0.115	R-10
Attic and other	U-0.027	R-38	U-0.027	R-38	U-0.081	R-13
			Walls, above-Grade			
Mass	U-0.580	NR	U-0.151 [b]	R-5.7 c.i. [b]	U-0.580	NR
Metal building	U-0.094	R-0 + R-9.8 *c.i.*	U-0.094	R-0 + R-9.8 c.i.	~~U-0.352~~ U-1.18	NR
Steel-framed	~~U-0.124~~ U-0.118	~~R-13~~ R-15	~~U-0.124~~ U-0.118	~~R-13~~ R-15	U-0.352	NR
Wood-framed and other	U-0.089	R-13	U-0.089	R-13	U-0.292	NR
			Wall, below-Grade			
Below-grade wall	C-1.140	NR	C-1.140	NR	C-1.140	NR
			Envelope Floors			
Mass	U-0.322	NR	U-0.322	NR	U-0.322	NR
Steel joist	~~U-0.350~~ U-0.069	~~NR~~ R-13	~~U-0.350~~ U-0.069	~~NR~~ R-13	U-0.350	NR
Wood-framed and other	~~U-0.282~~ U-0.066	~~NR~~ R-13	~~U-0.282~~ U-0.066	~~NR~~ R-13	U-0.282	NR
			Slab-on-Grade Floors			
Unheated	F-0.730	NR	F-0.730	NR	F-0.730	NR
Heated	F-1.020	R-7.5 for 12 in.	F-1.020	R-7.5 for 12 in.	F-1.020	R-7.5 for 12 in.
			[. . .]			

* The following definitions apply: *c.i.* = *continuous insulation* (see Section 3.2), FC = filled cavity (see Section A2.3.2.5), 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).
b. Exception to Section 5.5.3.2 applies for *mass walls* above *grade*.

Revise Section 5.5, Table 5.5-1 as shown (IP and SI Units)

Table 5.5-1 Building Envelope Requirements for Climate Zone 1 (A,B)

	Nonresidential		Residential		Semiheated	
Opaque Elements	**Assembly Maximum**	**Insulation Min. R-Value**	**Assembly Maximum**	**Insulation Min. R-Value**	**Assembly Maximum**	**Insulation Min. R-Value**
			Roofs			
Insulation entirely above deck	U-0.048	R-20 *c.i.*	U-0.039	R-25 *c.i.*	U-0.218	R-3.8 *c.i.*
Metal building [a]	U-0.041	R-10 + R-19 FC	U-0.041	R-10 + R-19 FC	U-0.115	R-10
Attic and other	U-0.027	R-38	U-0.027	R-38	U-0.081	R-13
			Walls, above Grade			
Mass	U-0.580	NR	U-0.151[b]	R-5.7 *c.i.*[b]	U-0.580	NR
Metal building	U-0.094	R-0 + R-9.8 *c.i.*	U-0.094	R-0 + R-9.8 *c.i.*	~~U-0.352~~ U-1.18	NR
Steel-framed	~~U-0.124~~ U-0.118	~~R-13~~ R-15	~~U-0.124~~ U-0.118	~~R-13~~ R-15	U-0.352	NR
Wood-framed and other	U-0.089	R-13	U-0.089	R-13	U-0.292	NR
			Wall, below, Grade			
Below-grade wall	C-1.140	NR	C-1.140	NR	C-1.140	NR
			Envelope Floors			
Mass	U-0.322	NR	U-0.322	NR	U-0.322	NR
Steel joist	~~U-0.350~~ U-0.069	~~NR~~ R-13	~~U-0.350~~ U-0.069	~~NR~~ R-13	U-0.350	NR
Wood-framed and other	~~U-0.282~~ U-0.066	~~NR~~ R-13	~~U-0.282~~ U-0.066	~~NR~~ R-13	U-0.282	NR
			Slab-on-Grade Floors			
Unheated	F-0.730	NR	F-0.730	NR	F-0.730	NR
Heated	F-1.020	R-7.5 for 12 in.	F-1.020	R-7.5 for 12 in.	F-1.020	R-7.5 for 12 in.

[. . .]

* The following definitions apply: *c.i.* = *continuous insulation* (see Section 3.2), FC = filled cavity (see Section A2.3.2.5), 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).
b. Exception to Section 5.5.3.2 applies for *mass walls* above *grade*.

Revise Section 5.5, Table 5.5-2 as shown (IP and SI Units)

Table 5.5-2 Building Envelope Requirements for Climate Zone 2 (A,B)

	Nonresidential		Residential		Semiheated	
Opaque Elements	**Assembly Maximum**	**Insulation Min. R-Value**	**Assembly Maximum**	**Insulation Min. R-Value**	**Assembly Maximum**	**Insulation Min. R-Value**
			Roofs			
Insulation entirely above deck	U-0.039	R-25 *c.i.*	U-0.039	R-25 *c.i.*	U-0.173	R-5 *c.i.*
Metal building [a]	U-0.041	R-10 + R-19 FC	U-0.041	R-10 + R-19 FC	U-0.096	R-16
Attic and other	U-0.027	R-38	U-0.027	R-38	U-0.053	R-19
			Walls, above Grade			
Mass	U-0.151[b]	R-5.7 *c.i.*[b]	~~U-0.123~~ U-0.104	~~R-7.6 *c.i.*~~ R-9.5 c.i.	U-0.580	NR
Metal building	~~U-0.094~~ U-0.084	~~R-0 + R-9.8 *c.i.*~~ R-11+R-6.5 *c.i.* or R-11.1 *c.i.*	~~U-0.094~~ U-0.084	~~R-0 + R-9.8 *c.i.*~~ R-11+R-6.5 *c.i.* or R-11.1 *c.i.*	U-0.162	R-13
Steel-framed	~~U-0.084~~ U-0.082	~~R-13 + R-3.8 *c.i.*~~ R-15 + R-3.8 *c.i.* or R-0 + R-9.2 *c.i.*	~~U-0.064~~ U-0.063	~~R-13 + R-7.5 *c.i.*~~ R-15 + R-7.5 *c.i.* or R-0 + R-13 *c.i.*	U-0.124	R-13
Wood-framed and other	~~U-0.089~~ U-0.083	~~R-13~~ R-15	~~U-0.089~~ U-0.083	~~R-13~~ R-15	U-0.089	R-13
			Wall, below Grade			
Below-grade wall	C-1.140	NR	C-1.140	NR	C-1.140	NR
			Envelope Floors			
Mass	U-0.107	R-6.3 *c.i.*	U-0.087	R-8.3 *c.i.*	U-0.322	NR
Steel joist	U-0.038	R-30	U-0.038	R-30	U-0.069	R-13
Wood-framed and other	U-0.033	R-30	U-0.033	R-30	U-0.066	R-13
			Slab-on-Grade Floors			
Unheated	F-0.730	NR	F-0.730	NR	F-0.730	NR
Heated	F-0.900	R-10 for 24 in.	F-0.860	R-15 for 24 in.	F-1.020	R-7.5 for 12 in.

[. . .]

* The following definitions apply: *c.i.* = *continuous insulation* (see Section 3.2), FC = filled cavity (see Section A2.3.2.5), 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).
b. Exception to Section 5.5.3.2 applies for *mass walls* above *grade*.

Revise Section 5.5, Table 5.5-3 as shown (IP and SI Units)

Table 5.5-3 Building Envelope Requirements for Climate Zone 3 (A,B,C)*

	Nonresidential		Residential		Semiheated	
Opaque Elements	**Assembly Maximum**	**Insulation Min. R-Value**	**Assembly Maximum**	**Insulation Min. R-Value**	**Assembly Maximum**	**Insulation Min. R-Value**
			Roofs			
Insulation entirely above deck	~~U-0.039~~ U-0.032	~~R-25~~ R-30 *c.i.*	~~U-0.039~~ U-0.032	~~R-25~~ R-30 *c.i.*	U-0.119	R-7.6 *c.i.*
Metal building [a]	U-0.041	R-10 + R-19 FC	U-0.041	R-10 + R-19 FC	U-0.096	R-16
Attic and other	U-0.027	R-38	U-0.027	R-38	U-0.053	R-19
			Walls, above Grade			
Mass	~~U-0.123~~ U-0.104	~~R-7.6 *c.i.*~~ R-9.5 *c.i.*	U-0.104	R-9.5 *c.i.*	U-0.580	NR
Metal building	~~U-0.094~~ U-0.079	~~R-0 + R-9.8 *c.i.*~~ R-13+R-6.5 *c.i.* or R-12.5 *c.i.*	U-0.072	R-0 + R-13 *c.i.*	U-0.162	R-13
Steel-framed	~~U-0.077~~ U-0.075	~~R-13 + R-5 *c.i.*~~ R-15 + R-5 *c.i.* or R-20.9 + R-3.8 *c.i.*	~~U-0.064~~ U-0.063	~~R-13 + R-7.5 *c.i.*~~ R-15 + R-7.5 *c.i.* or R-0 + R-13 *c.i.*	U-0.124	R-13
Wood-framed and other	~~U-0.089~~ U-0.083	~~R-13~~ R-15	~~U-0.064~~ U-0.063	~~R-13~~ R-15 +R-3.8 *c.i.* or ~~R-20~~ R-21	U-0.089	R-13
			Wall, below Grade			
Below-grade wall	C-1.140	NR	C-1.140	NR	C-1.140	NR
			Envelope Floors			
Mass	U-0.074	R-10 *c.i.*	U-0.074	R-10 *c.i.*	U-0.137	R-4.2 *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-0.730	NR	F-0.540	R-10 for 24 in.	F-0.730	NR
Heated	F-0.860	R-15 for 24 in.	F-0.860	R-15 for 24 in.	F-1.020	R-7.5 for 12 in.

[. . .]

* The following definitions apply: *c.i.* = *continuous insulation* (see Section 3.2), FC = filled cavity (see Section A2.3.2.5), 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).

Revise Section 5.5, Table 5.5-4 as shown (IP and SI Units)

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

	Nonresidential		Residential		Semiheated	
Opaque Elements	**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~~ U-0.091	~~R-10~~ R-11 *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~~ U-0.089	~~R-11.4 *c.i.*~~ R-12.5 *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~~ U-0.063	~~R-13 + R-7.5 *c.i.*~~ R-15 + R-7.5 *c.i.* or R-0 + R-13 *c.i.*	~~U-0.064~~ U-0.063	~~R-13 + R-7.5 *c.i.*~~ R-15 + R-7.5 *c.i.* or R-0 + R-13 *c.i.*	~~U-0.124~~ U-0.118	~~R-13~~ R-15
Wood-framed and other	~~U-0.064~~ U-0.063	~~R-13~~ R-15 + R-3.8 *c.i.* or ~~R-20~~ R-21	~~U-0.064~~ U-0.063	~~R-13~~ R-15+ R-3.8 *c.i.* or ~~R-20~~ R-21	~~U-0.089~~ U-0.083	~~R-13~~ R-15
			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
			Envelope 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.

[. . .]

* The following definitions apply: *c.i.* = *continuous insulation* (see Section 3.2), FC = filled cavity (see Section A2.3.2.5), 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).

Revise Section 5.5, Table 5.5-5 as shown (IP and SI Units)

Table 5.5-5 Building Envelope Requirements for Climate Zone 5 (A,B,C)*

	Nonresidential		Residential		Semiheated	
Opaque Elements	**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-0.063~~ U-0.055	~~R-15~~ R-18 *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-0.090~~ U-0.089	~~R-11.4 *c.i.*~~ R-12.5 *c.i.*	~~U-0.080~~ U-0.076	~~R-13.3 *c.i.*~~ R-15.0 *c.i.*	~~U-0.151~~ [b] U-0.131	~~R-5.7 *c.i.*~~ [b] R-7.5 *c.i.*
Metal building	U-0.050	R-0 + R-19 *c.i.*	U-0.050	R-0 + R-19 *c.i.*	U-0.094	R-0 + R-9.8 *c.i.*
Steel-framed	~~U-0.055~~ U-0.053	~~R-13 + R-10 *c.i.*~~ R-15 + R-10.4 *c.i.* or R-21 + R-9.3 *c.i.*	~~U-0.055~~ U-0.053	~~R-13 + R-10 *c.i.*~~ R-15 + R-10.4 *c.i.* or R-21 + R-9.3 *c.i.*	~~U-0.084~~ U-0.081	~~R-13+R-3.8 *c.i.*~~ R-15 + R-3.8 *c.i.*
Wood-framed and other	~~U-0.051~~ U-0.049	~~R-13~~ R-15 + R-7.5 *c.i.* or ~~R-19~~ R-21 + R-5 *c.i.*	~~U-0.051~~ U-0.049	~~R-13~~ R-15 + R-7.5 *c.i.* or ~~R-19~~ R-21 + R-5 *c.i.*	~~U-0.089~~ U-0.083	R-13 R-15
			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
			Envelope 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-0.510	R-20 for 48 in.	F-0.730	NR
Heated	F-0.688	R-20 for 48 in.	F-0.688	R-20 for 48 in.	F-0.900	R-10 for 24 in.

[. . .]

* The following definitions apply: *c.i.* = *continuous insulation* (see Section 3.2), FC = filled cavity (see Section A2.3.2.5), 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).
~~b. Exception to Section 5.5.3.2 applies for *mass walls* above *grade*.~~

Revise Section 5.5, Table 5.5-6 as shown (IP and SI Units)

Table 5.5-6 Building Envelope Requirements for Climate Zone 6 (A,B)

	Nonresidential		Residential		Semiheated	
Opaque Elements	**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-0.063~~ U-0.055	~~R-15~~ R-18 *c.i.*
Metal building [a]	U-0.031	R-25 + R-11 *Ls*	U-0.029	R-30 + R-11 *Ls*	U-0.060	R-19 + 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-0.080~~ U-0.076	~~R-13.3 *c.i.*~~ R-15.0 *c.i.*	~~U-0.071~~ U-0.067	~~R-15.2 *c.i.*~~ R-17.5 *c.i.*	~~U-0.151~~[b] U-0.131	~~R-5.7 *c.i.*~~[b] R-7.5 *c.i.*
Metal building	U-0.050	R-0 + R-19 *c.i.*	U-0.050	R-0 + R-19 *c.i.*	U-0.094	R-0 + R-9.8 *c.i.*
Steel-framed	~~U-0.049~~ U-0.048	~~R-13~~ + ~~R-12.5 *c.i.*~~ R-15 + R-12.5 *c.i.*	~~U-0.049~~ U-0.048	~~R-13~~ + ~~R-12.5 *c.i.*~~ R-15 + R-12.5 *c.i.*	~~U-0.084~~ U-0.081	~~R-13+R-3.8 *c.i.*~~ R-15 + R-3.8 *c.i.*
Wood-framed and other	~~U-0.051~~ U-0.049	~~R-13~~ R-15 + R-7.5 *c.i.* or ~~R-19~~ R-21 + R-5 *c.i.*	~~U-0.051~~ U-0.049	~~R-13~~ R-15 + R-7.5 *c.i.* or ~~R-19~~ R-21 + R-5 *c.i.*	~~U-0.089~~ U-0.083	R-13 R-15
			Wall, below Grade			
Below-grade wall	C-0.092	R-10 *c.i.*	C-0.063	R-15 c.i.	C-0.119	R-7.5 c.i
			Envelope Floors			
Mass	U-0.051	R-16.7 *c.i.*	U-0.051	R-16.7 c.i.	U-0.087	R-8.3 *c.i.*
Steel joist	U-0.032	R-38	U-0.032	R-38	U-0.052	R-19
Wood-framed and other	U-0.027	R-38	U-0.027	R-38	U-0.051	R-19
			Slab-on-Grade Floors			
Unheated	F-0.510	R-20 for 24 in.	F-0.434	R-20 for 48 in	F-0.730	NR
Heated	F-0.688	R-20 for 48 in.	F-0.671	R-25 for 48 in.	F-0.860	R-15 for 24 in.
			[. . .]			

* The following definitions apply: *c.i.* = *continuous insulation* (see Section 3.2), FC = filled cavity (see Section A2.3.2.5), 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).
~~b.Exception to Section 5.5.3.2 applies for *mass walls* above *grade*.~~

Revise Section 5.5, Table 5.5-7 as shown (IP and SI Units)

Table 5.5-7 Building Envelope Requirements for Climate Zone 7 (A,B)

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-0.028	R-35 *c.i.*	U-0.028	R-35 *c.i.*	U-0.039	R-25 *c.i.*
Metal building [a]	U-0.029	R-30 + R-11 *Ls*	U-0.029	R-30 + R-11 *Ls*	U-0.037	R-19 + R-11 *Ls* or R-25 + R-8 *Ls*
Attic and other	U-0.017	R-60	U-0.017	R-60	U-0.027	R-38
			Walls, above Grade			
Mass	~~U-0.071~~ U-0.067	~~R-15.2 *c.i.*~~ R-17.5 *c.i.*	~~U-0.071~~ U-0.067	~~R-15.2 *c.i.*~~ R-17.5 *c.i.*	~~U-0.123~~ U-0.104	~~R-7.6 *c.i.*~~ R-9.5 *c.i.*
Metal building	U-0.044	R-0 + R.22.1 *c.i.*	U-0.044	R-0 + R.22.1 *c.i.*	U-0.072	R-0 + R-13 *c.i.*
Steel-framed	~~U-0.049~~ U-0.048	~~R-13~~ + ~~R-12.5 *c.i.*~~ R-15 + R-12.5 *c.i.*	~~U-0.042~~ U-0.041	~~R-13~~ + ~~R-15.6 *c.i.*~~ R-15 + R-15.7 *c.i.* or R-19 + R-15 *c.i.*	~~U-0.064~~ U-0.062	~~R-13~~ + ~~R-7.5 *c.i.*~~ R-15 + R-7.5 *c.i.* or R-0 + R-13 *c.i.*
Wood-framed and other	~~U-0.051~~ U-0.049	~~R-13~~ R-15 + R-7.5 *c.i.* or ~~R-19~~ R-21 + R-5 *c.i.*	~~U-0.051~~ U-0.049	~~R-13~~ R-15 + R-7.5 *c.i.* or ~~R-19~~ R-21 + R-5 *c.i.*	~~U-0.064~~ U-0.063	~~R-13 + R-3.8 *c.i.*~~ R-15+ R-3.8 *c.i.* or R-21
			Wall, below Grade			
Below-grade wall	C-0.063	R-15 *c.i.*	C-0.063	R-15 c.i.	C-0.119	R-7.5 *c.i.*
			Envelope Floors			
Mass	U-0.042	R-20.9 *c.i.*	U-0.042	R-20.9 *c.i.*	U-0.074	R-10.4 *c.i.*
Steel joist	U-0.032	R-38	U-0.032	R-38	U-0.052	R-19
Wood-framed and other	U-0.027	R-38	U-0.027	R-38	U-0.051	R-19
			Slab-on-Grade Floors			
Unheated	F-0.510	R-20 for 24 in.	F-0.434	R-20 for 48 in.	F-0.730	N R
Heated	F-0.671	R-25 for 48 in.	F-0.671	R-25 for 48 in.	F-0.860	R-15 for 24 in.
			[. . .]			

* The following definitions apply: *c.i.* = *continuous insulation* (see Section 3.2), FC = filled cavity (see Section A2.3.2.5), 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).

Revise Section 5.5, Table 5.5-8 as shown (IP and SI Units)

Table 5.5-8 Building Envelope Requirements for Climate Zone 8 (A,B)

	Nonresidential		Residential		Semiheated	
Opaque Elements	**Assembly Maximum**	**Insulation Min. R-Value**	**Assembly Maximum**	**Insulation Min. R-Value**	**Assembly Maximum**	**Insulation Min. R-Value**
			Roofs			
Insulation entirely above deck	U-0.028	R-35 *c.i.*	U-0.028	R-35 *c.i.*	U-0.039	R-25 *c.i.*
Metal building [a]	U-0.026	R-25 + R-11+R-11 *Ls*	U-0.026	R-25 + R-11+R-11 *Ls*	U-0.037	R-19+R-11 *Ls* or R-25 + R-8 *Ls*
Attic and other	U-0.017	R-60	U-0.017	R-60	U-0.027	R-38
			Walls, above Grade			
Mass	~~U-0.048~~ U-0.046	~~R-19 c.i.~~ R-20 *c.i.*	~~U-0.048~~ U-0.046	~~R-19 c.i.~~ R-20 *c.i.*	U-0.104 U-0.090	~~R-9.5 c.i.~~ R-11.4 *c.i.*
Metal building	U-0.039	R-0 + R-25 *c.i.*	U-0.039	R-0 + R-25 *c.i.*	U-0.060	R-0 + R-15.8 *c.i.*
Steel-framed	~~U-0.037~~ U-0.035	~~R-13 + R-18.8 c.i.~~ R-15 + R-20 *c.i.* or R-21 + R-19.5 *c.i.*	~~U-0.037~~ U-0.035	~~R-13 + R-18.8 c.i.~~ R-15 + R-20 *c.i.* or R-21 + R-19.5 *c.i.*	U-0.064 U-0.062	~~R-13 + R-7.5 c.i.~~ R-15 + R-7.5 *c.i.* or R-0 + R-13 *c.i.*
Wood-framed and other	~~U-0.032~~ U-0.029	~~R-13 + R-18.8 c.i.~~ R-13 + R-22.3 *c.i.*	~~U-0.032~~ U-0.029	~~R-13 + R-18.8 c.i.~~ R-13 + R-22.3 *c.i.*	~~U-0.051~~ U-0.048	~~R-13 + R-7.5 c.i.~~ R-15 + R-7.5 *c.i.* or R-21 + R-5 *c.i.*
			Wall, below Grade			
Below-grade wall	C-0.063	R-15 *c.i.*	C-0.063	R-15 c.i.	C-0.119	R-7.5 *c.i.*
			Envelope Floors			
Mass	U-0.038	R-23 *c.i.*	U-0.038	R-23 *c.i.*	U-0.064	R-12.5 *c.i.*
Steel joist	U-0.032	R-38	U-0.032	R-38	U-0.052	R-19
Wood-framed and other	U-0.027	R-38	U-0.027	R-38	U-0.033	R-30
			Slab-on-Grade Floors			
Unheated	F-0.434	R-20 for 48 in.	F-0.424	R-25 for 48 in.	F-0.540	R-10 for 24 in.
Heated	F-0.671	R-25 for 48 in.	F-0.373	R-20 full slab	F-0.860	R-15 for 24 in.

[. . .]

* The following definitions apply: *c.i.* = *continuous insulation* (see Section 3.2), FC = filled cavity (see Section A2.3.2.5), 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).

[. . .]

Revise Exception to Section 5.5.3.2 as shown (IP and SI Units)

Exception to 5.5.3.2: For *mass walls*, where the requirement in Tables 5.5-0 through 5.5-8 is for a maximum assembly U-0.151 followed by footnote "b," concrete masonry unit (CMU) walls complying with ASTM C90 that are ungrouted or partially grouted at 32 in. or greater on center vertically and 48 in. or greater on center horizontally, shall have their ungrouted openings (e.g., cores, cells) filled with insulating material having a maximum thermal conductivity of 0.250.44 Btu·in./h·ft^2·°F.