ADDENDA

ANSI/ASHRAE/IES Addendum ai to
ANSI/ASHRAE/IES Standard 90.1-2013

Energy Standard for Buildings Except Low-Rise Residential Buildings

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FOREWORD

This addendum revises the fenestration prescriptive criteria in Tables 5.5-0 through 5.5-8. Proposed changes were developed using both cost effectiveness analysis and engineering judgment. The performance indices, incremental cost, and energy savings associated with a total of 305 fenestration assemblies using different glazing, frame, spacer, and gas technologies were calculated to determine what performance levels met the cost effectiveness criteria of the ASHRAE 90.1 committee in nonresidential and residential building types, with the focus on lower U-factor in the northern climate zones and lower SHGC in extremely hot climates (climate zone 0 introduced in addendum w to ASHRAE 90.1-2013). Energy savings and incremental cost data were provided by Pacific Northwest National Laboratory in consultation with ASHRAE 90.1 envelope subcommittee, industry representatives, and other stakeholders. Practical considerations of potential limitations of different technologies in different applications, distinctions between product categories, product costs, supply and distribution, and comparison to other codes & standards were also used in setting the final proposed requirements. Additionally, section 5.5.4.1 is clarified that area-weighted averaging is allowed across different categories of vertical fenestration (nonmetal framing, metal framing fixed, metal framing operable, metal framing entrance door) within a single space conditioning category (nonresidential, residential, semiheated) but not across multiple space conditioning categories.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and strikethrough (for deletions) unless the instructions specifically mention some other means of indicating the changes. Additional material is provided for context only and is not open for comment except as it relates to the proposed substantive changes.

Addendum ai to 90.1-2013

Revise Section 5.5.4 as follows (I-P and SI):

5.5.4 Fenestration

5.5.4.1 General. Compliance with U-factors, SHGC, and VT/SHGC shall be demonstrated for the overall fenestration product. Gross wall areas and gross roof areas shall be calculated separately for each space-conditioning category for the purposes of determining compliance.

Exceptions:

1. If there are multiple assemblies within a single class of construction for a single space-conditioning category, it shall be permitted to demonstrate compliance ~~shall be~~ based on an area-weighted average U-factor, SHGC, VT/SHGC, or LSG. The area-weighted average across multiple classes of construction or multiple space-conditioning categories shall not be permitted for use to demonstrate compliance.
2. Vertical fenestration shall be permitted to demonstrate compliance based on an area-weighted average U-factor, SHGC, VT/SHGC, or LSG across multiple classes of construction for a single space-conditioning category, but not across multiple space-conditioning categories. ~~It is not acceptable to do an area-weighted average across multiple classes of construction or multiple space-conditioning categories~~.

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Revise Table 5.5-0 and 5.5-1 through 5.5-8 and as follows (I-P and SI).

Table 5.5-0 Building Envelope Requirements for Climate Zone 0 (A,B)* [I-P]

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall	(for all frame types)			(for all frame types)			(for all frame types)		
Nonmetal framing, all	U-0.32			U-0.32			U-0.93		
Metal framing, fixed	U-0.50			U-0.50			U-1.20		
Metal framing, operable	U-0.65	SHGC-~~0.25~~ 0.22	1.10	U-0.65	SHGC-~~0.25~~ 0.22	1.10	U-1.20	NR	NR
Metal framing, entrance door	U-0.83			U-0.83			U-1.10		
Skylight, 0%–3% of Roof									
All types	U-0.75	SHGC-0.35	NR	U-0.75	SHGC-0.35	NR	U-1.80	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).

b. Exception to Section 5.5.3.2 applies for mass walls above grade.

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Table 5.5-0 Building Envelope Requirements for Climate Zone 0 (A,B)* [SI]

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-1.82			U-1.82			U-5.28		
Metal framing, fixed	U-2.84			U-2.84			U-6.81		
Metal framing, operable	U-3.69	SHGC-~~0.25~~ 0.22	1.10	U-3.69	SHGC-~~0.25~~ 0.22	1.10	U-6.81	NR	NR
Metal framing, entrance door	U-4.71			U-4.71			U-6.25		
Skylight, 0%–3% of Roof									
All types	U-4.26	SHGC-0.35	NR	U-4.26	SHGC-0.35	NR	U-10.22	NR	NR

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Table 5.5-2 Building Envelope Requirements for Climate Zone 2 (A,B)* [I-P]

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-~~0.40~~ 0.37			U-~~0.40~~ 0.37			U-0.93		
Metal framing, fixed	U-~~0.57~~ 0.54	SHGC-0.25	1.10	U-~~0.57~~ 0.54	SHGC-0.25	1.10	U-1.20	NR	NR
Metal framing, operable	U-0.65			U-0.65			U-1.20		
Metal framing, entrance door	U-0.83			U-0.77			U-0.83		
Skylight, 0%–3% of Roof									
All types	U-0.65	SHGC-0.35	NR	U-0.65	SHGC-0.35	NR	U-1.80	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).

b. Exception to Section 5.5.3.2 applies for mass walls above grade.

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Table 5.5-2 Building Envelope Requirements for Climate Zone 2 (A,B)* [SI]

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall	(for all frame types)			(for all frame types)			(for all frame types)		
Nonmetal framing, all	U-~~2.27~~ 2.10			U-~~2.27~~ 2.10			U-5.28		
Metal framing, fixed	U-~~3.24~~ 3.07	SHGC-0.25	1.10	U-~~3.24~~ 3.07	SHGC-0.25	1.10	U-6.81	NR	NR
Metal framing, operable	U-3.69			U-3.69			U-6.81		
Metal framing, entrance door	U-4.71			U-4.37			U-4.71		
Skylight, 0%–3% of Roof									
All types	U-3.69	SHGC-0.35	NR	U-3.69	SHGC-0.35	NR	U-10.22	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).

b. Exception to Section 5.5.3.2 applies for mass walls above grade.

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

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall	(for all frame types)			(for all frame types)			(for all frame types)		
Nonmetal framing, all	U-~~0.35~~ 0.33			U-0.35			U-0.87		
Metal framing, fixed	U-~~0.50~~ 0.45	SHGC-0.25	1.10	U-~~0.50~~ 0.49	SHGC-0.25	1.10	U-1.20	NR	NR
Metal framing, operable	U-0.60			U-0.60			U-1.20		
Metal framing, entrance door	U-0.77			U-0.68			U-0.77		
Skylight, 0%–3% of Roof									
All types	U-0.55	SHGC-0.35	NR	U-0.55	SHGC-0.35	NR	U-1.70	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).

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

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-~~1.99~~ 1.87			U-1.99			U-4.94		
Metal framing, fixed	U-~~2.84~~ 2.56	SHGC-0.25	1.10	U-~~2.84~~ 2.78	SHGC-0.25	1.10	U-6.81	NR	NR
Metal framing, operable	U-3.41			U-3.41			U-6.81		
Metal framing, entrance door	U-4.37			U-3.86			U-4.37		
Skylight, 0%–3% of Roof									
All types	U-3.12	SHGC-0.35	NR	U-3.12	SHGC-0.35	NR	U-9.65	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).

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

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-~~0.35~~ 0.31			U-~~0.35~~ 0.31			U-0.51		
Metal framing, fixed	U-~~0.42~~ 0.38	SHGC-0.~~40~~36	1.10	U-~~0.42~~ 0.38	SHGC-0.~~40~~36	1.10	U-0.73	NR	NR
Metal framing, operable	U-~~0.50~~ 0.46			U-~~0.50~~ 0.46			U-0.81		
Metal framing, entrance door	U-~~0.77~~ 0.68			U-0.68			U-0.77		
Skylight, 0%–3% of Roof									
All types	U-0.50	SHGC-0.40	NR	U-0.50	SHGC-0.40	NR	U-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).

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

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-~~1.99~~ 1.76			U-~~1.99~~ 1.76			U-2.90		
Metal framing, fixed	U-~~2.38~~ 2.16	SHGC-0.~~40~~36	1.10	U-~~2.38~~ 2.16	SHGC-0.~~40~~36	1.10	U-4.14	NR	NR
Metal framing, operable	U-~~2.84~~ 2.61			U-~~2.84~~ 2.61			U-4.60		
Metal framing, entrance door	U-~~4.37~~ 3.86			U-3.86			U-4.37		
Skylight, 0%–3% of Roof									
All types	U-2.84	SHGC-0.40	NR	U-2.84	SHGC-0.40	NR	U-6.53	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).

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

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-~~0.32~~ 0.31			U-~~0.32~~ 0.31			U-0.45		
Metal framing, fixed	U-~~0.42~~ 0.38	SHGC-0.~~40~~38	1.10	U-~~0.42~~ 0.38	SHGC-0.~~40~~38	1.10	U-0.62	NR	NR
Metal framing, operable	U-~~0.50~~ 0.46			U-~~0.50~~ 0.46			U-0.70		
Metal framing, entrance door	U-~~0.77~~ 0.68			U-0.68			U-0.77		
Skylight, 0%–3% of Roof									
All types	U-0.50	SHGC-0.40	NR	U-0.50	SHGC-0.40	NR	U-0.98	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).

b. Exception to Section 5.5.3.2 applies for mass walls above grade.

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

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-~~1.82~~ 1.76	SHGC-0.~~40~~38	1.10	U-~~1.82~~ 1.76	SHGC-0.~~40~~38	1.10	U-2.56	NR	NR
Metal framing, fixed	U-~~2.38~~ 2.16			U-~~2.38~~ 2.16			U-3.52		
Metal framing, operable	U-~~2.84~~ 2.61			U-~~2.84~~ 2.61			U-3.97		
Metal framing, entrance door	U-~~4.37~~ 3.86			U-3.86			U-4.37		
Skylight, 0%–3% of Roof									
All types	U-2.84	SHGC-0.40	NR	U-2.84	SHGC-0.40	NR	U-5.56	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).

b. Exception to Section 5.5.3.2 applies for mass walls above grade.

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Table 5.5-6 Building Envelope Requirements for Climate Zone 6 (A,B)* [I-P]

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall	(for all frame types)			(for all frame types)			(for all frame types)		
Nonmetal framing, all	U-~~0.32~~ 0.30	SHGC-0.40	1.10	U-~~0.32~~ 0.30	SHGC-0.40	1.10	U-0.45	NR	NR
Metal framing, fixed	U-~~0.42~~ 0.36			U-~~0.42~~ 0.36			U-0.51		
Metal framing, operable	U-~~0.50~~ 0.45			U-~~0.50~~ 0.45			U-0.59		
Metal framing, entrance door	U-~~0.77~~ 0.68			U-0.68			U-0.77		
Skylight, 0%–3% of Roof									
All types	U-0.50	SHGC-0.40	NR	U-0.50	SHGC-0.40	NR	U-0.85	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).

b. Exception to Section 5.5.3.2 applies for mass walls above grade.

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Table 5.5-6 Building Envelope Requirements for Climate Zone 6 (A,B)* [SI]

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-~~1.82~~ 1.70			U-~~1.82~~ 1.70			U-2.56		
Metal framing, fixed	U-~~2.38~~ 2.04	SHGC-0.40	1.10	U-~~2.38~~ 2.04	SHGC-0.40	1.10	U-2.90	NR	NR
Metal framing, operable	U-~~2.84~~ 2.56			U-~~2.84~~ 2.56			U-3.35		
Metal framing, entrance door	U-~~4.37~~ 3.86			U-3.86			U-4.37		
Skylight, 0%–3% of Roof									
All types	U-2.84	SHGC-0.40	NR	U-2.84	SHGC-0.40	NR	U-4.83	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).

b. Exception to Section 5.5.3.2 applies for mass walls above grade.

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Table 5.5-7 Building Envelope Requirements for Climate Zone 7* [I-P]

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-~~0.32~~ 0.28			U-~~0.32~~ 0.28			U-0.32		
Metal framing, fixed	U-~~0.38~~ 0.33	SHGC-0.45	1.10	U-~~0.38~~ 0.33	SHGC-0.45	1.10	U-0.38	NR	NR
Metal framing, operable	U-0.40			U-0.40			U-0.44		
Metal framing, entrance door	U-~~0.77~~ 0.68			U-0.68			U-0.77		
Skylight, 0%–3% of Roof									
All types	U-0.50	NR	NR	U- 0.50	NR	NR	U-0.85	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).

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Table 5.5-7 Building Envelope Requirements for Climate Zone 7* [SI]

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-~~1.82~~ 1.59			U-~~1.82~~ 1.59			U-1.82		
Metal framing, fixed	U-~~2.16~~ 1.87	SHGC-0.45	1.10	U-~~2.16~~ 1.87	SHGC-0.45	1.10	U-2.16	NR	NR
Metal framing, operable	U-2.27			U-2.27			U-2.50		
Metal framing, entrance door	U-~~4.37~~ 3.86			U-3.86			U-4.37		
Skylight, 0%–3% of Roof									
All types	U-2.84	NR	NR	U-2.84	NR	NR	U-4.83	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).

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Table 5.5-8 Building Envelope Requirements for Climate Zone 8* [I-P]

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-~~0.32~~ 0.25			U-~~0.32~~ 0.25			U-0.32		
Metal framing, fixed	U-~~0.38~~ 0.29	SHGC-0.45	1.10	U-~~0.38~~ 0.29	SHGC-0.45	1.10	U-0.38	NR	NR
Metal framing, operable	U-~~0.40~~ 0.35			U-~~0.40~~ 0.35			U-0.44		
Metal framing, entrance door	U-~~0.77~~ 0.68			U-0.68			U-0.77		
Skylight, 0%–3% of Roof									
All types	U-~~0.50~~ 0.41	NR	NR	U-~~0.50~~ 0.41	NR	NR	U-0.85	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).

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Table 5.5-8 Building Envelope Requirements for Climate Zone 8* [SI]

	Nonresidential			Residential			Semiheated		
(Parts of table not shown are unchanged)									
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%–40% of Wall		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal framing, all	U-~~1.82~~ 1.42			U-~~1.82~~ 1.42			U-1.82		
Metal framing, fixed	U-~~2.16~~ 1.65	SHGC-0.45	1.10	U-~~2.16~~ 1.65	SHGC-0.45	1.10	U-2.16	NR	NR
Metal framing, operable	U-~~2.27~~ 1.99			U-~~2.27~~ 1.99			U-2.50		
Metal framing, entrance door	U-~~4.37~~ 3.86			U-3.86			U-4.37		
Skylight, 0%–3% of Roof									
All types	U-~~2.84~~ 2.33	NR	NR	U-~~2.84~~ 2.33	NR	NR	U-4.83	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).

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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