



**BSR/ASHRAE/IES Addendum cr
to ANSI/ASHRAE/IES Standard 90.1-2019**

Second Public Review Draft

Proposed Addendum cr to Standard 90.1-2019, Energy Standard for Buildings Except Low-Rise Residential Buildings

**Second Public Review (February 2020)
(Draft Shows Proposed Independent Substantive
Changes to Previous Public Review Draft)**

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FOREWORD

This second public review draft of Addendum cr modifies the original addendum to that it only applies to new buildings.

Currently, Section 11 and Appendix G allow unlimited trade-offs between building envelope and other building systems. Studies such as “Preserving Envelope Efficiency in Performance Based Code Compliance” (PNNL-24359, BA Thornton, GP Sullivan, MI Rosenberg, MC Baechler) and “Can High-Performance Equipment Lead to a Low-Performance Building?” (D Jonlin, B Thornton, M Rosenberg) have concluded that weaker building envelopes can permanently limit building energy performance even as lighting and HVAC components are upgraded over time, because retrofitting the envelope is less likely and more expensive. This issue has been raised by states and jurisdictions around the country. A language to limit the envelope tradeoffs on projects following performance path of compliance, aka the envelope backstop, will be included in the New York City and Washington State energy codes among others.

The proposed addendum builds on this prior work, striving to preserve design flexibility and minimize documentation effort while improving the long-term building performance. Projects can comply with the proposed envelope backstop by either meeting the prescriptive envelope requirements in Section 5.5 or using Section 5.6 “Building Envelope Trade-Off Option” to demonstrate that the energy cost penalty from the proposed below-code envelope does not exceed the set margins. The backstop margins (15% for residential building area types and 7% for nonresidential building area types) were tested on projects in climate zones 2A, 4A and 6A, building types including multifamily, hotel, office, school/university and stand-alone retail, light weight and mass wall construction, with high and low window area. Examples of tested projects and the backstop compliance outcomes are shown in the table below.

Building Type	CZ	Wall Construction	WWR	Wall U-value	Window U-value	SHGC	Pass Backstop?
Multifamily	2A/4A/6A	steel frame	20%	0.124	0.65	0.68	No
Multifamily	2A/4A	mass	20%	0.189	0.65	0.68	Yes
Office	2A/4A/6A	steel frame	20%	0.124	0.65/0.45/0.45	0.68	Yes
Multifamily, N/S long axis	2A/4A/6A	steel frame	70%	0.064/0.64/0.049	0.54/0.38/0.36	0.25/0.36/0.4	Yes
Multifamily, E/W long axis	2A/4A/6A	steel frame	70%	0.064/0.64/0.049	0.54/0.38/0.36	0.25/0.36/0.4	No
Office, N/S long axis	2A/4A/6A	steel frame	70%	0.084/0.64/0.049	0.54/0.38/0.36	0.25/0.36/0.4	Yes
Office, E/W long axis	2A/4A/6A	steel frame	70%	0.084/0.64/0.049	0.54/0.38/0.36	0.25/0.36/0.4	No

It is expected that most projects following the Building Envelope Trade-Off Option will use ComCheck to document compliance with the envelope backstop, with the scope of required inputs limited to description of the proposed envelope. This CMP limits the scope of the addendum to new construction projects, in response to a

This addendum impacts an optional performance path in the standard designed to provide increased flexibility and therefore was not subjected to cost effectiveness analysis.

[Note to Reviewers: This public review draft makes proposed independent substantive changes to the previous public review draft. These changes are indicated in the text by underlining (for additions) and ~~striketrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the previous draft 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 substantive changes.]

Addendum cr to 90.1-2019

Revise the Standard as follows (IP Units)

11.2 Compliance

Compliance with Section 11 will be achieved if

...

- d. For new buildings, ~~One~~ of the following is met:

...

G1.2.1 Performance Rating Calculation

This *performance rating method* requires conformance with the following provisions:

...

- c. For new buildings, ~~One~~ of the following is met:

...