



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

Public Review Draft

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

**Third ISC Public Review (November 2020)
(Draft Shows Proposed Independent Substantive
Changes to Previous Public Review Draft)**

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

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(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

This ISC is being prepared to correct an error in the original 1st public review document. Only the changes made by this ISC are shown in strike-out and underline text.

The following is the foreword from the first public review.

Historically, the required efficiency increases to eliminate economizer has been a point of confusion for the industry. The confusion stems from whether you need to increase both the full load efficiency and part load efficiency or just the part load efficiency of the equipment. Additionally, if the metric is not in the format of work out divided by energy in (ex. IPLV), then you could get different efficiency levels required based on how you do the math. This change should address both issues. (Note: the values in the table are not underlined and not up for public review/comment.). The language was also changed to allow for a broader range of rating metrics that are being utilized in different rating standards.

This Third Public Review ISC is based on a supportive comment received on the Second Public Review ISC. The only changes are:

- Replacing the word “work” with “thermal”
- Italicizing defined terms

There is no cost impact to this revision as it only clarifies existing requirements.

[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (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 f to 90.1-2019

Modify the standard as follows (IP Units); No changes are being made to the SI requirements in the ISC. There were changes in the 1st public review which can be seen in the reference sections below.

Table 6.5.1-2 Eliminate Required Economizer for Comfort Cooling by Increasing Cooling Efficiency

Climate Zone	Efficiency Improvement ^a
2A	17%
2B	21%
3A	27%
3B	32%
3C	65%
4A	42%
4B	49%
4C	64%
5A	49%
5B	59%
5C	74%
6A	56%
6B	65%
7	72%
8	77%

- a. If a unit is rated with an annualized or part-load metric, then to eliminate the required economizer, only the annualized or part-load minimum cooling ~~efficiency~~ *efficiency* of the unit must be increased by the percentage shown. If the unit is only rated with a full-load metric like EER cooling, then these must be increased by the percentage shown. To determine the ~~efficiency~~ *efficiency* required to eliminate the economizer when the unit *equipment efficiency* is rated with an energy-input divided by a ~~work~~*thermal*-output metric, the metric shall first be converted to COP and then the COP shall be increased prior to multiplying by the *efficiency* improvement percentage shown. The COP shall then be converted back to the original rated metric to establish the ~~efficiency~~ *efficiency* required to eliminate the economizer.

Informative note: Some examples of annualized or part-load metrics are: IPLV, IP, IEER, and SEER.

REFERENCE ONLY:

Note: The following is the final version the addendum as it would appear with the 1st full public review, 2nd ISC public review, and 3rd ISC public review combined. It represents the full change to the currently published version of the standard. It is provided for reference only:

Modify the standard as follows (IP Units)

Table 6.5.1-2 Eliminate Required Economizer for Comfort Cooling by Increasing Cooling Efficiency

Climate Zone	Efficiency Improvement ^a
2A	17%
2B	21%
3A	27%
3B	32%
3C	65%
4A	42%
4B	49%
4C	64%
5A	49%
5B	59%
5C	74%
6A	56%
6B	65%
7	72%
8	77%

- a. If a unit is rated with an annualized or part-load metric ~~IPLV, IEER, or SEER~~, then to eliminate the required economizer, only the annualized or part-load minimum cooling ~~efficiency~~ *efficiency* of the HVAC unit must be increased by the percentage shown. If the HVAC unit is only rated with a full-load metric like EER cooling, then these must be increased by the percentage shown. To determine the efficiency required to eliminate the economizer when the unit equipment efficiency is rated with an energy-input divided by a thermal-output metric, the metric shall first be converted to COP by the efficiency improvement percentage shown. The COP shall then be converted back to the original rated metric to establish the efficiency required to eliminate the economizer.

Informative note: Some examples of annualized or part-load metrics are: IPLV, IP, IEER, and SEER.

Modify the standard as follows (SI Units)

Table same as I-P version

- a. If a unit is rated with an annualized or part-load metric ~~IPLV, ICOP, or SEER~~, then to eliminate the required economizer, only the annualized or part-load minimum cooling *efficiency* of the HVAC unit must be increased by the percentage shown. If the HVAC unit is only rated with a full-load metric like COP cooling, then these must be increased by the percentage shown.

Informative note: Some examples of annualized or part-load metrics are: IPLV, SI, ISCO_C, and SCOP_C.