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

Public Review Draft

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

First Public Review (March 2025)
(Draft Shows Proposed Changes to Current Standard)

This draft has been recommended for public review by the responsible project committee. To submit a comment on this proposed standard, go to the ASHRAE website at www.ashrae.org/standards-research--technology/public-review-drafts and access the online comment database. The draft is subject to modification until it is approved for publication by the Board of Directors and ANSI. Until this time, the current edition of the standard (as modified by any published addenda on the ASHRAE website) remains in effect. The current edition of any standard may be purchased from the ASHRAE Online Store at www.ashrae.org/bookstore or by calling 404-636-8400 or 1-800-727-4723 (for orders in the U.S. or Canada).

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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 addendum updates the definition of photosynthetic photon efficacy (PPE) to luminaire photosynthetic photon efficacy (PPE), so there is an even playing field for all products. The rating of all products will take into account the optical efficiency of the luminaire and the thermal impacts of luminaire design. The remainder of the definition is aligned with the metric developed by the American Society of Agricultural and Biological Engineers (ASABE) for the ANSI/ASABE S640 standard. This luminaire PPE definition is aligned with the Design Lights Consortium Draft Horticultural Technical Requirements V4.0, which are luminaire based, not lamp based.

This addendum increases the minimum allowed luminaire photosynthetic photon efficacy (PPE) to 2.5 µmol/J. This is a 31% increase over the 1.9 µmol/J minimum efficacy currently required for indoor grow spaces and a 47% increase over the 1.7 µmol/J minimum efficacy currently required for greenhouses but is still near the bottom (22nd percentile) of lighting efficacies in the DesignLights Consortium's database of horticultural LED lighting products. This addendum is similar to prior proposals targeted at large light source lighting such as outdoor lighting and warehouse lighting, where lower Lighting Power Density values in ASHRAE/IES Standard 90.1 and other energy codes resulted in selection of LED light sources with higher first costs but with cost-effective simple paybacks that save energy and reduce GHG emissions.

A cost effectiveness analysis was completed, and this addendum meets the ASHRAE/IES 90.1 Std scalar threshold for cost effectiveness for the development of the 2025 standard. With the social cost of carbon this addendum would be more cost-effective.

[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 bz to 90.1-2022

Modify the standard as follows for IP (and SI) units:

3.2 Definitions

luminaire photosynthetic photon efficacy ~~(PPE)~~: photosynthetic photon flux emitted by a ~~light source~~ luminaire between 400 and 700 nm divided by its electrical input power, expressed in units of micromoles per joule as defined by ANSI/ASABE S640-2017.

…

9.4.3 Horticultural Lighting. *Greenhouse horticultural lighting* shall follow the requirements of Section ~~9.4.4.1~~ 9.4.3.1. *Indoor grow horticultural lighting* shall follow the requirements of Section ~~9.4.4.2~~ 9.4.3.2.

9.4.3.1 *Luminaires* in *greenhouses* with at least 40 *kW* of connected load for *horticultural lighting* shall have a *luminaire photosynthetic photon efficacy* ~~(*PPE*)~~ of at least ~~1.7~~2.5 µmol/J ~~for integrated, nonserviceable *luminaires*, or a *PPE* of at least 1.7 µmol/J for *lamps* in *luminaires* with removable or serviceable *lamps*~~. *Horticultural lighting* in *greenhouse spaces* shall be controlled by a device that *automatically* turns off the *horticultural lighting* at specific programmed times.

9.4.3.2 *Luminaires* in *indoor grow spaces* used for *horticultural lighting* shall have a *luminaire photosynthetic photon efficacy ~~PPE~~* of at least ~~1.9~~2.5 µmol/J ~~for integrated, nonserviceable *luminaires*, or a *PPE* of at least 1.9 µmol/J for *lamps* in *luminaires* with removable or serviceable *lamps*~~. *Horticultural lighting* in *indoor grow spaces* shall be controlled by a device that *automatically* turns off the *horticultural lighting* at specific programmed times.

Exception to ~~9.4.4.2~~ 9.4.3.2: *Indoor grow buildings* with less than 40 *kW* of connected load for *horticultural lighting* shall have a *luminaire photosynthetic photon efficacy ~~PPE~~* of at least 1.7 µmol/J~~for integrated, nonserviceable *luminaires*, or a *PPE* of at least 1.7 µmol/J for *lamps* in *luminaires* with removable or serviceable *lamps*~~.