



**BSR/ASHRAE/IES Addendum cz
to ANSI/ASHRAE/IES Standard 90.1-2022**

Public Review Draft

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

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

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FOREWORD

This update is needed to replace the Standard's reference to AMCA 208 for calculating Fan Energy Index (FEI) to the Energy Conservation Program: Test Procedure for Fans and Blowers, published by the U.S. Department of Energy (DOE), on May 1, 2023.

The test procedure establishes separate methods of test for "general fans and blowers", as Appendix A, and "air circulating fans (ACF)" as Appendix B.

In January of 2025, the U.S. DOE [withdrew](#) the proposed minimum efficiency standards for both fans and blowers as well as air circulating fans.

Compliance with the Code of Federal Regulations (CFR) test procedures is required within the U.S. and U.S. territories; however, the proposed addendum continues the allowance of AMCA 208 to calculate Fan Energy Index (FEI) ratings for fans sold for use outside the U.S. There is no significant anticipated cost impact related to increased efficiency of fans and blowers, as this addendum does not change the minimum FEI levels.

The proposed addendum seeks to require air circulating fans (ACF) be tested and rated per the requirements of the CFR and in a manner consistent with fans and blowers and ceiling fans.

The proposed addendum adds definitions established by the CFR test procedure as necessary and to provide clarity and efficiency. For example, DOE established a statutory definition for "safety fan" that allows the list of exemptions for the fans and blowers provision to be shortened, and which provides clarity for certain conditions, such as what is meant by "explosion proof."

The proposed addendum would require that FEI values be indicated on the construction documents to allow for compliance verification by the authority having jurisdiction.

[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 cz to 90.1-2022

Add the following definitions to Section 3.2 (I-P and SI):

Note to reviewers: the following definitions are taken straight from 10 CFR Part 431.

air circulating fan: a fan that has no provision for connection to ducting or separation of the fan inlet from its outlet using a pressure boundary, operated against zero external pressure loss, and is not a jet fan or a ceiling fan.

ceiling fan: a nonportable (~~permanently installed~~) device that is suspended from a ceiling or overhead structure for circulating air via the rotation of fan blades. For the purpose of this definition, circulating air means the discharge of air in an upward or downward direction. A ceiling fan that has a ratio of fan blade span (in inches) to maximum rotation rate (in revolutions per minute) greater than 0.06 (1.524 mm/rpm) provides circulating air.

fan: a rotary bladed machine used to convert electrical or mechanical power to air power, with an energy output limited to 25 kilojoule (kJ)/kilogram (kg) (10.75 Btu/lb_m) of air. It consists of an impeller, a shaft and bearings and/or driver to support the impeller, as well as a structure or housing. A fan or blower may include a transmission, driver, and/or motor controller.

fan energy index (FEI): the ratio of the electric input power of a reference fan to the electric input power of the actual fan as calculated per ~~AMCA 208~~ 10 CFR Part 431 for U.S. applications or per AMCA 208 for applications outside the U.S.

induced flow fan: a type of laboratory exhaust fan with nozzle and windband; the fan's outlet airflow is greater than the inlet airflow due to induced airflow. All airflow entering the inlet exits through the nozzle. Airflow exiting the windband includes the nozzle airflow as well as the induced airflow.

jet fan: a fan designed and marketed specifically for producing a high velocity air jet in a space to increase its air momentum. Jet fans are rated using thrust. Inlets and outlets are not ducted but include acoustic silencers.

radial housed fan: a fan with a radial impeller in which airflow exits into a housing that is generally scroll-shaped to direct the air through a single fan outlet. Inlets and outlets can optionally be ducted.

radial housed unshrouded fan: a radial housed fan for which the impeller blades are attached to a backplate and hub (i.e., open radial blade), or to a hub only (i.e., open paddle wheel), and with an open front at the impeller's inlet.

safety fan:

(1) a reversible axial fan in cylindrical housing that is designed and marketed for use in ducted tunnel ventilation that will reverse operations under an emergency ventilation condition;

(2) a fan for use in explosive atmospheres tested and marked according to ISO 80079-36:2016, Explosive atmospheres -- Part 36: Non-electrical equipment for explosive atmospheres -- Basic method and requirements;

(3) an electric-motor-driven-Positive Pressure Ventilator as defined AMCA 240; or

(4) fans complying with ANSI/UL 705 Standard for Safety for Power Ventilators and listed as "Power Ventilators for Smoke Control Systems"; or

(5) a laboratory exhaust fan designed and marketed specifically for exhausting contaminated air vertically away from a building using high-velocity discharge.

Make the following changes to Section 6.4.7(I-P and SI):

Table 6.4.7 Performance Rating Procedures for Equipment Without Minimum Efficiency Requirements System Components

Equipment	Rating Procedure
Plate-type liquid-to-liquid heat exchangers	AHRI 400
Fin-and-tube heating and cooling coils (hydronic and DX)	AHRI 410
Exhaust air energy recovery heat exchangers	AHRI 1060
<u>Air circulating fans with input power $\geq 200W$</u>	<u>Subpart J to Appendix B of 10 CFR Part 431</u>

6.4.7 Performance Rating Requirements for Equipment Without Minimum Efficiency Requirements System Components. The *equipment* listed in Table 6.4.7 shall be rated in accordance with the rating procedure listed.

Make the following changes to Section 6.5.3.1.3 (I-P and SI):

6.5.3.1.3 Fan Efficiency. Each fan and *fan array* shall have a *fan energy index (FEI)* of 1.00 or higher at its highest design airflow rate. Each fan and *fan array*-used for a *variable-air-volume system* that meets the requirements of Section 6.5.3.2.1 shall have an *FEI* of 0.95 or higher at its highest design airflow rate.

~~The *FEI* for *fan arrays* shall be calculated in accordance with AMCA 208 Annex C.~~

6.5.3.1.3.1 The FEI for individual fans shall be determined in accordance with 10 CFR Part 431 or AMCA 208, outside of the U.S. The fan *FEI* shall be indicated on the construction documents to allow for compliance verification by the AHJ.

6.5.3.1.3.2 Fan Array Efficiency. *Fan arrays* with a combined motor nameplate horsepower greater than 5 hp or with a fan system electrical input power greater than 4.1 kW shall have an *FEI* of 1.00 or greater calculated in accordance with AMCA 208 Annex C. Any fan in the fan array with a shaft input power greater than or equal to 1 hp or with a fan electrical input power greater than or equal to 0.89 kW shall have an *FEI* of 1.00 or greater. Each fan and fan array used for a variable-air-volume system that meets the requirements of Section 6.5.3.2.1 shall have an *FEI* of 0.95 or higher at its highest design airflow rate. All fan array *FEI* values shall be indicated on the construction documents.

Exceptions to 6.5.3.1.3:

1. Fans that are not *embedded fans* with a motor nameplate horsepower of less than 1.0 hp or with a fan nameplate electrical input power of less than 0.89 kW or where airpower at the design airflow results in greater than 150 hp (111 kW).
2. *Embedded fans* and *fan arrays* with a combined motor nameplate horsepower of 5 hp or less or with a fan system electrical input power of 4.1 kW or less.
3. *Embedded fans* that are part of *equipment* listed under Section 6.4.1.1.
4. *Embedded fans* included in *equipment* bearing a third-party-certified seal for air performance or energy performance of the *equipment* package.
5. Ceiling fans.
6. Fans used for moving gases at temperatures above 482°F (250°C).
- ~~7. Fans used for operation in explosive atmospheres.~~
- ~~8. Reversible fans used for tunnel ventilation.~~
- ~~97.~~ Fans outside the scope of AMCA 208.
- ~~108.~~ Fans when operating during emergency conditions.
- ~~119.~~ Radial housed unshrouded fans with blade diameter at tip less than 30 inches [76 cm] or a blade width of less than 3 inches [76 mm].
- ~~110.~~ Safety fans.
- ~~121.~~ Induced flow fans.

12. Jet fans.

Add the following to Section 13 (I-P and SI):

ANSI/AMCA 230-23 with Errata Laboratory Methods of Testing Air Circulating Fans for Rating and Certification

ISO 80079-36:2016, Explosive atmospheres -- Part 36: Non-electrical equipment for explosive atmospheres -- Basic method and requirements

ANSI/AMCA 240-15 Laboratory Methods of Testing Positive Pressure Ventilators for Aerodynamic Performance Rating.

ANSI/UL 705 Standard for Safety for Power Ventilator