ADDENDA

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

Energy Standard for Buildings Except Low-Rise Residential Buildings

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FOREWORD

When provisions were moved to Section 6.5.3.2.1 for DX cooling multispeed fan control, they were intended to apply to units with fans smaller than 5 hp; however, the provisions were placed under a parent requirement that was restricted to fan systems larger than 5 hp. The intention is clear because simplified requirements include DX units down to 65,000 Btu/h that typically have smaller fans and Section 6.3.2 refers directly to Section 6.5.3.1. Fractional horsepower fan motors are also currently subject to the horsepower limit under Section 6.5.3.

This addendum places the scope limitation of 5 hp fans so that it applies to fan horsepower limitation and VAV reset requirements but not to fan airflow control or fractional horsepower fan motor efficiency, and clarifies that VAV setpoint reset is required only for multiple-zone VAV systems. Fractional horsepower motors are exempt from sizing limits. A clarification is added that the fans included in the power limit are those operating at fan system design conditions. The definition of "fan system design conditions" is modified to clarify that the fan peak is selected at a condition other than during economizer operation.

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.

Addendum ap to 90.1-2013

Modify the standard as follows.
Modify the following definition in Section 3 (IP and SI units):

fan system design conditions: operating conditions that can be expected to occur during normal system operation that result in the highest supply airflow rate to conditioned spaces served by the system, other than during air economizer operation.

Modify Section 6 as follows (IP units)

6.5.3 Air System Design and Control. ~~Each HVAC system having a total fan system motor nameplate hp exceeding 5 hp shall meet the provisions of Sections 6.5.3.1 through 6.5.3.5.~~

6.5.3.1 Fan System Power and Efficiency

6.5.3.1.1 Each HVAC system having a total fan system motor nameplate horsepower exceeding 5 hp at fan system design conditions shall not exceed the allowable fan system motor nameplate hp (Option 1) or fan system bhp (Option 2) as shown in Table 6.5.3.1-1. This includes supply fans, return/relief fans, exhaust fans, and fan-powered terminal units associated with systems providing heating or cooling capability that operate at fan system design conditions. Single-zone variable-air-volume systems shall comply with the constant-volume fan power limitation.

Exceptions:

1. Hospital, vivarium, and laboratory systems that utilize flow control devices on exhaust and/or return to maintain space pressure relationships necessary for occupant health and safety or environmental control may use variable-volume fan power limitation.
2. Individual exhaust fans with motor nameplate horsepower of 1 hp or less.

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6.5.3.1.2 Motor Nameplate Horsepower. For each fan, the selected fan motor shall be no larger than the first available motor size greater than the bhp. The fan bhp must be indicated on the design documents to allow for compliance verification by the code official.

Exceptions:

1. For fans less than 6 bhp, where the first available motor larger than the bhp has a nameplate rating within 50% of the bhp, the next larger nameplate motor size may be selected.
2. For fans 6 bhp and larger, where the first available motor larger than the bhp has a nameplate rating within 30% of the bhp, the next larger nameplate motor size may be selected.
3. Systems complying with Section 6.5.3.1.1, Option 1.
4. Fans with motor nameplate horsepower of less than 1 hp.

6.5.3.1.3 Fan Efficiency. Fans shall have a fan efficiency grade (FEG) of 67 or higher based on manufacturers' certified data, as defined by AMCA 205. The total efficiency of the fan at the design point of operation shall be within 15 percentage points of the maximum total efficiency of the fan.

Exceptions:

1. ~~Single~~ Individual fans with a motor nameplate horsepower of 5 hp or less that are not part of a group operated as the functional equivalent of a single fan
2. Multiple fans in series or parallel (e.g., fan arrays) that have a combined motor nameplate horsepower of 5 hp or less and are operated as the functional equivalent of a single fan
3. Fans that are part of equipment listed under Section 6.4.1.1
4. Fans included in equipment bearing a third-party- certified seal for air or energy performance of the equipment package
5. Powered wall/roof ventilators (PRV)
6. Fans outside the scope of AMCA 205
7. Fans that are intended to only operate during emergency conditions

6.5.3.2 Fan Control

[No changes to Sections 6.5.3.2.1 and 6.5.3.2.2.]

6.5.3.2.3 VAV Setpoint Reset. For multiple-zone VAV systems having a total fan system motor nameplate horsepower exceeding 5 hp with DDC of individual zones reporting to the central control panel, static pressure setpoint shall be reset based on the zone requiring the most pressure; i.e., the setpoint is reset lower until one zone damper is nearly wide open. Controls shall provide the following:

a. Monitor zone damper positions or other indicator of need for static pressure
b. Automatically detect those zones that may be excessively driving the reset logic and generate an alarm to the system operator
c. Readily allow operator removal of zone(s) from the reset algorithm

Modify Section 6 as follows (SI units)

6.5.3 Air System Design and Control. ~~Each HVAC system having a total fan system motor nameplate kW exceeding 4 kW shall meet the provisions of Sections 6.5.3.1 through 6.5.3.5.~~

6.5.3.1 Fan System Power and Efficiency

6.5.3.1.1 Each HVAC system having a total fan system motor nameplate kW exceeding 4 kW at fan system design conditions shall not exceed the allowable fan system motor nameplate kW (Option 1) or fan system input kW (Option 2) as shown in Table 6.5.3.1-1. This includes supply fans, return/relief fans, exhaust fans, and fan-powered terminal units associated with systems providing heating or cooling capability that operate at fan system design conditions. Single-zone variable-air-volume systems shall comply with the constant-volume fan power limitation.

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Exceptions:

1. Hospital, vivarium, and laboratory systems that utilize flow control devices on exhaust and/or return to maintain space pressure relationships necessary for occupant health and safety or environmental control may use variable-volume fan power limitation.
2. Individual exhaust fans with motor nameplate kW of 0.75 kW or less.

6.5.3.1.2 Motor Nameplate kW. For each fan, the selected fan motor shall be no larger than the first available motor size greater than the input kW. The fan input kW must be indicated on the design documents to allow for compliance verification by the code official.

Exceptions:

1. For fans less than 4.5 input kW, where the first available motor larger than the input kW has a nameplate rating within 50% of the input kW, the next larger nameplate motor size may be selected.
2. For fans 4.5 input kW and larger, where the first available motor larger than the input kW has a nameplate rating within 30% of the input kW, the next larger nameplate motor size may be selected.
3. Systems complying with Section 6.5.3.1.1, Option 1.
4. Fans with motor nameplate kW of less than 0.75 kW.

6.5.3.1.3 Fan Efficiency. Fans shall have a fan efficiency grade (FEG) of 67 or higher based on manufacturers' certified data, as defined by AMCA 205. The total efficiency of the fan at the design point of operation shall be within 15 percentage points of the maximum total efficiency of the fan.

Exceptions:

1. ~~Single~~ Individual fans with a motor nameplate kW of 4 kW or less that are not part of a group operated as the functional equivalent of a single fan
2. Multiple fans in series or parallel (e.g., fan arrays) that have a combined motor nameplate kW of 4 kW or less and are operated as the functional equivalent of a single fan
3. Fans that are part of equipment listed under Section 6.4.1.1
4. Fans included in equipment bearing a third-party- certified seal for air or energy performance of the equipment package
5. Powered wall/roof ventilators (PRV)
6. Fans outside the scope of AMCA 205
7. Fans that are intended to only operate during emergency conditions

. . .

6.5.3.2.3 VAV Setpoint Reset. For multiple-zone VAV systems having a total fan system motor nameplate kW exceeding 4 kW with DDC of individual zones reporting to the central control panel, static pressure setpoint shall be reset based on the zone requiring the most pressure; i.e., the setpoint is reset lower until one zone damper is nearly wide open. Controls shall provide the following:

a. Monitor zone damper positions or other indicator of need for static pressure
b. Automatically detect those zones that may be excessively driving the reset logic and generate an alarm to the system operator
c. Readily allow operator removal of zone(s) from the reset algorithm

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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