ADDENDA

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

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on January 23, 2016; by the ASHRAE Board of Directors on January 27, 2016; by the IES Board of Directors on December 31, 2015; and by the American National Standards Institute on January 28, 2016.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE website (www.ashrae.org) or in paper form from the Senior Manager of Standards.

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FOREWORD

This addendum addresses three (3) updates as follows:

1. *A change to control setpoint for the cooling tower to better scale with its climate*
2. *A clarification to operation of the condenser water pump as a constant-volume pump*
3. *A modification to the exception for pump W/gpm for water-side economizer by changing the increased power of 5 W/gpm to 3 W/gpm*

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 ck to 90.1-2013

Revise the Standard as follows (IP Units).

G3.1.4.11 Heat Rejection (Systems 7, 8, 11, and 12). The heat rejection device shall be an axial fan open circuit cooling tower with variable-speed fan control and shall meet the performance requirements of Table 6.8.1-7. Condenser water design supply temperature shall be calculated using the cooling tower approach to the 0.4% evaporation design wetbulb temperature as generated by the formula below, with a design temperature rise of 10°F.

Approach10°F Range = 25.72 – (0.24 × WB)

where WB is the 0.4% evaporation design wet-bulb temperature in °F; valid for wet bulbs from 55°F to 90°F.

The tower shall be controlled to maintain a leaving water temperature where weather permits per Table G3.1.4.11, floating up to the design leaving water temperature for the cooling tower.

Table G3.1.4.11 Heat Rejection Leaving Water Temperature

Climate Zone	Leaving Water Temperature
5B, 5C, 6B, 8	65°F
0B, 1B, 2B, 3B, 3C, 4B, 4C, 5A, 6A, 7	70°F
3A,4A	75°F
0A, 1A, 2A	80°F

~~70°F leaving water temperature where weather permits, floating up to leaving water temperature at design conditions~~. The baseline building design condenser-water pump power shall be 19 W/gpm and modeled as constant volume. For computer room systems using System 11 with an integrated water-side economizer, the baseline building design condenser water pump power shall be increased 3 W/gpm for flow associated with the

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water-side economizer. Each chiller shall be modeled with separate condenser water and chilled-water pumps interlocked to operate with the associated chiller.

Revise the Standard as follows (SI Units)

G3.1.4.11 Heat Rejection (Systems 7, 8, 11, and 12). The heat rejection device shall be an axial fan open circuit cooling tower with variable-speed fan control and shall meet the performance requirements of Table 6.8.1-7. Condenser water design supply temperature shall be calculated using the cooling tower approach to the 0.4% evaporation design wetbulb temperature as generated by the formula below, with a design temperature rise of 5.6°C .

$$\text{Approach}_{5.6°C\ Range} = 10.02 - (0.24 \times \text{WB})$$

where WB is the 0.4% evaporation design wet-bulb temperature in °C; valid for wet bulbs from 12.8°C to 32.2°C.

The tower shall be controlled to maintain a leaving water temperature where weather permits per Table G3.1.4.11, floating up to the design leaving water temperature for the cooling tower.

Table G3.1.4.11 Heat Rejection Leaving Water Temperature

Climate Zone	Leaving Water Temperature
5B, 5C, 6B, 8	18 °C
0B, 1B, 2B, 3B, 3C, 4B, 4C, 5A, 6A, 7	21 °C
3A,4A	24 °C
0A, 1A, 2A	27 °C

~~70°F leaving water temperature where weather permits, floating up to leaving water temperature at design conditions~~. The baseline building design condenser-water pump power shall be 310 kW/1000 L/s~~.~~ and modeled as constant volume. For computer room systems using System 11 with an integrated water-side economizer, the baseline building design condenser water pump power shall be increased 48 kW/1000 L/s for flow associated with the water-side economizer. Each chiller shall be modeled with separate condenser water and chilled-water pumps interlocked to operate with the associated chiller.

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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