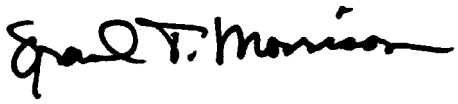
TC08.06 Comments on 2013 Building Efficiency Standards – 15 day language

Comments to 2013 Building Energy Efficiency Standards – 15 day language are shown in red on the following pages. ~~Strikethroughs~~ are used for suggested deletions and underline is used for suggested additions to the text.

Respectfully Submitted,



Frank Morrison (Baltimore Aircoil Company)

Chair, TC08.06 Subcommittee on Industry Standards

Subcommittee Members

Paul Lindahl – SPX Cooling Technologies

Daryn Kline – Evapco

Steve Kline – Baltimore Aircoil Company

Dick LeClaire - SPX Cooling Technologies

Ron Wood – US GSA

Attachment

Addendum "af" to ASHRAE Standard 90.1-2010

ASHRAE TC08.06 Cooling Towers and Evaporative Condensers

Comments to: *2013 Building Energy Efficiency Standards – 15 day language*

TC08.06, the ASHRAE Technical Committee for Cooling Towers and Evaporative Condensers, thanks the CEC for accepting the majority of our comments and suggestions to the Title 24 45-day language. Based upon a review of our 45-day comments and the current 15-day language, we have the following additional comments:

Substantive

Page 149 Table120.6-B - Minimum Efficiency Levels for Evaporative Condensers

TC08.06 once again supports the comments submitted by BAC and Evapco to reduce the proposed minimum efficiency requirements for evaporative condensers to a more realistic level for a first implementation. These levels would be 225 Btuh/Watt for THR > 8,000 MBH and 150 Btuh/Watt for THR < or = 8,000 MBH. Adoption of these more reasonable levels will help to avoid a shift to less energy efficient systems, maintain design flexibility for system designers, and allow time for the industry to adapt to the new requirements in a more measured way. Note also that TC08.06 will be working with SSPC 90.1 on inclusion of evaporative condenser requirements in Standard 90.1 in the near future.

Page 220 Exception 4 to Section 140.4(h)2

This exception should be deleted as it would conflict with the new requirements for multiple cell heat equipment (page 220, paragraph 5). This exception originally was included when VSD technology was very expensive, which is not the case today. Deletion of this exception will also match the corresponding Addendum to Standard 90.1-2010 (see Addendum "af" attached for reference).

Page 345 Add CTI Standard for Closed Circuit Cooling Towers

CTI ATC-105-00 Acceptance Test Code for Water Cooling Towers (2000)

CTI ATC-105S-11 Acceptance Test Code for Closed Circuit Cooling Towers (2011)

CTI STD-201-~~04~~ 11 Standard for the Certification of Water-Cooling Tower Thermal Performance (~~2004~~ 2011)

Addition of 105S is necessary to support the inclusion of the new closed circuit cooling tower minimum efficiency requirements in Table 110.2-G (page 97). STD-201 was also revised in 2011. Note that 105S has been added to the definition section of Title 24 (page 44).

Editorial

Page 66 Open Circuit Cooling Tower Definition

OPEN CIRCUIT COOLING TOWER is an open, or direct contact, cooling tower which exposes water directly to the cooling atmosphere, thereby transferring the source heat load from the water directly to the air by a combination of heat and mass transfer.

Page 219 Heat Rejection Systems

(h) **Heat Rejection Systems.**

1. **Scope.** Subsection 144140.4(h) applies to heat rejection equipment used in comfort cooling systems such as air-cooled condensers, dry coolers, open circuit cooling towers, closed-circuit cooling towers, and evaporative condensers.

Page 220 Tower Flow Turndown

3. **Tower Flow Turndown.** Open circuit cooling towers configured with multiple condenser water pumps shall be designed so that all cells can be run in parallel with the larger of:

BSR/ASHRAE/IES Addendum af
to ANSI/ASHRAE/IES Standard 90.1-2010

Public Review Draft

Proposed Addendum af to Standard 90.1-2010, *Energy Standard for Buildings Except Low-Rise Residential Buildings*

First Public Review (February 2012)
(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).

This standard is under continuous maintenance. To propose a change to the current standard, use the change submittal form available on the ASHRAE website, www.ashrae.org.

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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 covers two changes to Chapter 6 of the Standard incorporating open circuit cooling tower flow turndown and fan control for multi-fan heat rejection installations as follows:

- *The addition of a flow turndown requirement to the Standard will require the use of cooling towers capable of handling modulation of condenser water flow as a means to save energy. Manufacturers would need to design and supply spray water distribution systems, either gravity flow or pressurized, that will function properly at a reduced flow over the tower. The 50% flow turndown ratio was established to minimize the potential for scaling of the heat transfer surface in the tower, which can reduce the capacity of the tower and consequently lead to higher energy use. The 50% turndown ratio also corresponds with the latest proposal for a similar flow turndown requirement in California Title 24.*

- *As virtually all heat rejection equipment utilize VSDs on the 7.5 HP fans and above, a requirement to operate the maximum number of fans in a multi-fan installation to minimize energy for a given duty has been added as 6.5.5.2.2. All fans should be operated in tandem at the same fan speed as this control sequence for multi-fan installations is more energy efficient than on/off or sequenced fan operation. A note that the minimum fan speed must comply with the minimum allowable speed of the fan drive system per the heat rejection device manufacturer's recommendations was also added.*

Two other changes were also made:

- *6.5.5.1 was revised to include dry coolers as an example since they are common devices used for heat rejection and to clarify the two types of cooling towers referenced in this section (open-circuit and closed-circuit).*
- *6.5.5.2.1 was revised to eliminate exception d. as most heat transfer devices utilize VSDs due to the many benefits and declining costs of VSDs. This exception would also conflict with the fan speed requirement proposed in 6.5.5.2.2 for multi-cell heat rejection devices.*

Note that this change to the Standard is supported by the Standards Subcommittee of TC08.06, the ASHRAE technical committee for Cooling Tower and Evaporative Condensers.

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. Only these changes 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 substantive changes.

Addendum af to 90.1-2010

Revise the Standard as follows (I-P units)

6.5.5 Heat Rejection Equipment

6.5.5.1 General. Section 6.5.5 applies to heat rejection equipment used in comfort cooling systems such as air-cooled condensers, dry coolers, open-circuit cooling towers, closed-circuit cooling towers, and evaporative condensers.

Exception: Heat rejection devices whose energy usage is included in the equipment efficiency ratings listed in Tables 6.8.1A through 6.8.1D.

6.5.5.2 Fan Speed Control.

6.5.5.2.1 Each fan powered by a motor of 7.5 hp or larger shall have the capability to operate ~~that fan~~ at two-thirds of full speed or less and shall have controls that automatically change the fan speed to control the leaving fluid temperature or condensing temperature/pressure of the heat rejection device.

Exceptions:
a. Condenser fans serving multiple refrigerant circuits.
b. Condenser fans serving flooded condensers.
c. Installations located in climate zones 1 and 2.
~~d. Up to one-third of the fans on a condenser or tower with multiple fans, where the lead fans comply with the speed control requirement.~~

6.5.5.2.2 Multiple cell heat rejection equipment with variable speed fan drives shall:

a. Operate the maximum number of fans allowed that comply with the manufacturer's requirements for all system components and
b. Control all fans to the same fan speed required for the instantaneous cooling duty as opposed to staged (on/off) operation. Minimum fan speed shall comply with the minimum allowable speed of the fan drive system per the manufacturer's recommendations.

6.5.5.3 Limitation on Centrifugal Fan Open-Circuit Cooling Towers. Centrifugal fan open-circuit cooling towers with a combined rated capacity of 1100 gpm or greater at 95°F condenser water return, 85°F condenser water supply, and 75°F outdoor air wet-bulb temperature shall meet the energy efficiency requirement for axial fan open-circuit cooling towers listed in Table 6.8.1G.

Exception: Centrifugal open-circuit cooling towers that are ducted (inlet or discharge) or require external sound attenuation.

6.5.5.4 Tower Flow Turndown. Open circuit cooling towers used on water cooled chiller systems that are configured with multiple or variable speed condenser water pumps shall be designed so that all open circuit cooling tower cells can be run in parallel with the larger of:

A. The flow that is produced by the smallest pump at its minimum expected flow rate, or
B. 50 percent of the design flow for the cell.

Revise the Standard as follows (S-I units)

6.5.5 Heat Rejection Equipment

6.5.5.1 General. Section 6.5.5 applies to heat rejection equipment used in comfort cooling systems such as air-cooled condensers, dry coolers, open-circuit cooling towers, closed-circuit cooling towers, and evaporative condensers.

Exception: Heat rejection devices whose energy usage is included in the equipment efficiency ratings listed in Tables 6.8.1A through 6.8.1D.

6.5.5.2 Fan Speed Control.

6.5.5.2.1 Each fan powered by a motor of 5.6 kW or larger shall have the capability to operate ~~that fan~~ at two-thirds of full speed or less and shall have controls that automatically change the fan speed to control the leaving fluid temperature or condensing temperature/pressure of the heat rejection device.

Exceptions:
a. Condenser fans serving multiple refrigerant circuits.
b. Condenser fans serving flooded condensers.
c. Installations located in climate zones 1 and 2.
~~d. Up to one-third of the fans on a condenser or tower with multiple fans, where the lead fans comply with the speed control requirement.~~

6.5.5.2.2 Multiple cell heat rejection equipment with variable speed fan drives shall:

a. Operate the maximum number of fans allowed that comply with the manufacturer's requirements for all system components and
b. Control all fans to the same fan speed required for the instantaneous cooling duty as opposed to staged (on/off) operation. Minimum fan speed shall comply with the minimum allowable speed of the fan drive system per the manufacturer's recommendations.

6.5.5.3 Limitation on Centrifugal Fan Open-Circuit Cooling Towers. Centrifugal fan open-circuit cooling towers with a combined rated capacity of 69 L/s or greater at 35°C condenser water return, 29°C condenser water supply, and 24°C outdoor air wet-bulb temperature shall meet the energy efficiency requirement for axial fan open-circuit cooling towers listed in Table 6.8.1G.

Exception: Centrifugal open-circuit cooling towers that are ducted (inlet or discharge) or require external sound attenuation.

6.5.5.4 Tower Flow Turndown. Open circuit cooling towers used on water cooled chiller systems that are configured with multiple condenser water pumps shall be designed so that all open circuit cooling tower cells can be run in parallel with the larger of:

A. The flow that is produced by the smallest pump, or
B. 50 percent of the design flow for the cell.