**ANSI/ASHRAE Addendum a to
ANSI/ASHRAE Standard 84-2013**

Method of Testing Air-to-Air Heat/Energy Exchangers

This addendum was approved by the ASHRAE Standards Committee on June 22, 2013; by the ASHRAE Board of Directors on June 26, 2013; and by the American National Standards Institute on June 27, 2013.

This addendum is for an ASHRAE Standard scheduled to be updated on a five-year cycle; the date following the standard number is the year of ASHRAE Board of Directors approval.

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ANSI

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FOREWORD

This addendum clarifies the standard in three areas. Equation 14 is modified to clarify for which airstream the specific heat C_p is evaluated. Text near Equations 22 and 23 is rearranged for clarity. Two sets of uncertainty limits had been provided for Equations 24, 25, and 26; in this addendum each equation is provided with a single, unambiguous uncertainty limit.

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 a to Standard 84-2013

In Section 6.1, replace the current Equation 14 as shown below. The remainder of Section 6.1 is unchanged.

$$\frac{\dot{n}_1 C_{p1}t_1 - \dot{m}_2 C_{p2}t_2 + \dot{m}_3 C_{p3}t_3 - \dot{m}_4 C_{p4}t_4}{(\dot{m}C_p)_{\text{minimum}(1,3)}|t_1 - t_3|} < 0.20 \quad (14)$$

$$\frac{\dot{m}_1 C_p t_1 - \dot{m}_2 C_p t_2 + \dot{m}_3 C_p t_3 - \dot{m}_4 C_p t_4}{\dot{m}_{\text{minimum}(1,3)} C_p |t_1 - t_3|} < 0.20 \quad \cancel{(14)}$$

…

Revise Section 7.1 as shown below. The remainder of Section 7.1 is unchanged.

7.1 Laboratory Testing

For testing of effectiveness, pretest and post-test uncertainties shall satisfy the following equations:

$$U(\varepsilon_s) < \pm 5\% \quad (19)$$

$$U(\varepsilon_l) < \pm 7\% \quad (20)$$

$$U(\varepsilon_t) < \pm \frac{|\varepsilon_l - \varepsilon_t|5\% + |\varepsilon_t - \varepsilon_s|7\%}{|\varepsilon_l - \varepsilon_s|} \quad (21)$$

Otherwise, the results do not satisfy this standard and cannot be reported. Equation 21 ensures that

$$\pm 5\% > U(\varepsilon_s) \leq U(\varepsilon_t) < U(\varepsilon_l) < \pm 7\% \quad (22)$$

~~and~~ If $\varepsilon_s = \varepsilon_t$ or when ε_l is not calculated because $U(\varepsilon_l)$ is too large based on the findings of an uncertainty analysis, then Equation 22 cannot be used and instead,

$$U(\varepsilon_t) = U(\varepsilon_s) \quad (23)$$

~~in either of the following situations: when $\varepsilon_s = \varepsilon_t$ or when ε_l is not calculated because $U(\varepsilon_l)$ is too large based on the findings of an uncertainty analysis.~~

For RER testing, the pretest and post-test uncertainties shall satisfy the following equations:

$$\frac{U(\text{RER})}{\text{RER}} < 0.10 \quad (24)$$

$$\frac{U(\text{RER})}{\text{RER}} < 0.10 \quad \text{or} \quad \frac{4U(\text{pressure transducer})}{(\Delta p_s + \Delta p_e)} \quad \cancel{(24)}$$

For pressure drop testing, the pretest and post-test uncertainties shall satisfy Equations 25–26:

$$\frac{U(\Delta p_s)}{\Delta p_s} < 0.10 \quad (25)$$

$$\frac{U(\Delta p_s)}{\Delta p_s} < 0.10 \quad \text{or} \quad \frac{2U(\text{pressure transducer})}{\Delta p_s} \quad \cancel{(25)}$$

and

$$\frac{U(\Delta p_e)}{\Delta p_e} < 0.10 \quad (26)$$

~~and~~

$$\frac{U(\Delta p_e)}{\Delta p_e} < 0.10 \quad \text{or} \quad \frac{2U(\text{pressure transducer})}{\Delta p_e} \quad \cancel{(26)}$$

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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.

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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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