

## Additions and Corrections

This report includes additional information and technical errors found between June 15, 2000, and April 1, 2003, in the SI edition of the 2000, 2001, and 2002 *ASHRAE Handbooks*. Occasional typographical errors and nonstandard symbol labels will be corrected in future volumes. The most current list of Handbook additions and corrections is on the ASHRAE web site ([www.ashrae.org](http://www.ashrae.org)).

The authors and editor encourage you to notify them if you find other technical errors. Please send corrections to: Handbook Editor, ASHRAE, 1791 Tullie Circle NE, Atlanta, GA 30329, or e-mail [mowen@ashrae.org](mailto:mowen@ashrae.org).

### 2000 HVAC Systems and Equipment

**p. 7.13, 2nd column.** In the Space requirements paragraph the first sentence should read:

“A decentralized system may or may not have an equipment room.”

**p. 7.3, 2nd column, 3rd full paragraph, 5th line down.** Number should be:

$$4090 \text{ kJ/kWh} (3.133 \text{ kJ/kJ}) (1.136)$$

two lines lower:

$$11 \ 640 \text{ kJ/kWh} (3.233)$$

$$2490 \text{ kJ/kWh} (0.692)$$

**p. 7.11, 2nd column, 4th paragraph.** Change last sentence to read:

“The exhaust of a gas turbine has about 1.5 to 3 kW of available heat per kilowatt of power output.”

**p. 7.11, 2nd column, 5th paragraph.** Change “40 MJ” to read “12 kW.”

**p. 7.20, 2nd column, 3rd full paragraph.** Change “1.4 to 4 MJ per kilowatt” to read “0.3 to 0.9 kW steam per kilowatt.”

**p. 7.20, 2nd column, 4th paragraph.** Change “5.5 to 15 MJ/kW per kilowatt” to read “1 to 3 kW steam per kilowatt.”

**p. 7.20, 2nd column, 5th paragraph.** Change “11 to 55 MJ/kW” to read “2.3 to 11.4 kW.”

**p. 7.28, 1st column, 3rd paragraph.** Change “600V” to “600 V.”

**p. 7.28, 1st column, 3rd paragraph.** Change “5 Hz” to read “5 cycles.”

**p. 7.33, 1st column, last paragraph.** Change “32 kg/h” to read “3200 kg,” and change “3.2 kg/h” to read “3.2 kg.”

**p. 7.33, 1st column, last paragraph.** Change “Thus, the total energy requirement...” to read “Thus, the total power requirement...”

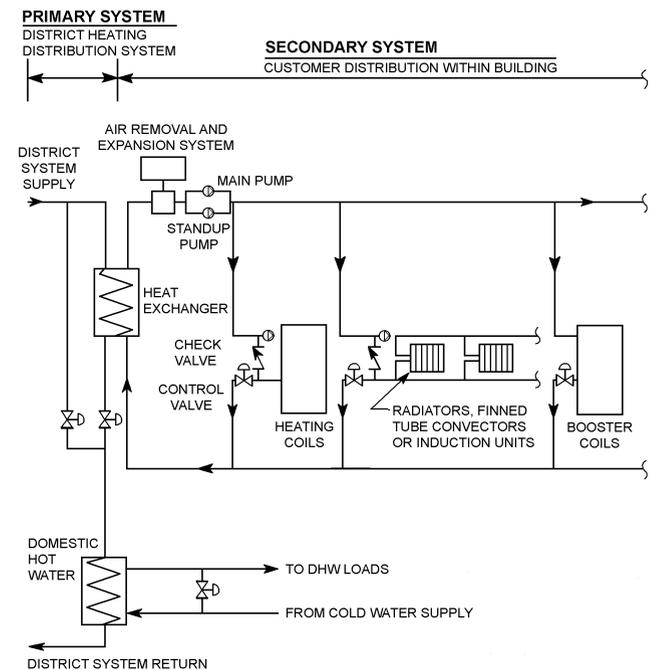
**p. 7.33, 2nd column, 1st full paragraph.** Change “energy” to read “power.”

**p. 7.33, 2nd column, last sentence in Example 1.** Change “energy” to read “power.”

**p. 7.44, 2nd column, last full paragraph.** Change “0.012” to “0.04” and “0.024” to “0.07.” Change “\$/MJ” to “\$/10<sup>3</sup> MJ.”

**p. 9.4, 2nd column, 1st full paragraph.** Delete “by more than 25% of the sensible load.”

**p. 11.27, Fig. 22.** Replace Fig. 22 with the following figure, in which the primary and secondary systems are not shown to be connected.



**Fig. 22 Basic Heating System Schematic**

**p. 11.30, 2nd column, 1st bulleted paragraph.** Change “thermal capacity” to read “thermal power.”

**p. 12.2, 2nd column, Eq. (7).** Add to definitions:

$$1000 = \text{constant to change kJ in } c_p \text{ to J}$$

**p. 18.7, 2nd column, Fig. 13.** Should read:

“Curve shows performance of a fixed fan size running at a fixed speed.”

**p. 20.2, 1st column, last paragraph.** Delete second sentence.

**p. 25.22, 2nd column, Eq. (11).** Change “g·mol/s” to read “mol/s.”

**p. 25.22, 2nd column, Eq. (13).** Change “m<sup>3</sup>/g·mol” to read “m<sup>3</sup>/mol.”

**p. 25.23, 2nd column, Figures 33 and 34.** Change “g·mol” to read “mol” in the equation between 85-90% on the lower right.

**p. 25.24, 1st column, Table 10.** Change “g·mol” to read “mol” in the third column heading.

**p. 25.26, 2nd column, 1st full paragraph.** Change “140 J/g·mol” to read “140 J/mol.”

**p. 26.9, Fuel Oil Preparation System section, 3rd paragraph.** Change “156 m<sup>2</sup>/s” to “156 mm<sup>2</sup>/s.”

**p. 32.3, 2nd column.** In the definition for *n*, replace the last two definitions with “1.0 for ceiling heating and floor cooling panels, and 1.1 for floor heating and ceiling cooling panels.”

**p. 37.1, 1st column, last paragraph, 2nd to last sentence.** Delete “the volume of the.”

**p. 41.11, 1st column.** In the section on L Bends, change references from Equation (4) to Equation (5). Change references from Equation (5) to Equation (6). Change the reference from Equation (6) to Equation (7).

**p. 42.14, 2nd column, last reference.** The year should be 1998 and the edition should be 3rd.

**p. 44.4, Eqs. (3) and (4).** The equations should read as follows:

$$x_2 = x_1 + \varepsilon \left( \frac{w_{min}}{w_s} \right) (x_3 - x_1) \quad (3)$$

$$x_4 = x_3 - \varepsilon \left( \frac{w_{min}}{w_e} \right) (x_3 - x_1) \quad (4)$$

## 2001 Fundamentals

**p. 1.8, Example 2, Solution (1), 5th line.** Change “Chapter 20” to read “Chapter 19 of the 1997 *ASHRAE Handbook—Fundamentals*.”

**p. 1.11, Example 4, Solution, 2nd line.** Change “Chapter 20” to read “Chapter 19 of the 1997 *ASHRAE Handbook—Fundamentals*.”

**p. 1.14, Fig. 16.** Change “Heat Amplifier” to read “Temperature Amplifier.”

**p. 2.1, 2nd column, last equation.** The kinematic viscosity of dry air ( $\nu_{air}$ ) should be

$$16 \times 10^{-6} \text{ m}^2/\text{s}$$

**p. 2.10, Table 2.** The units for  $\varepsilon$  should be  $\mu\text{m}$ , not feet.

**Table 2 Effective Roughness of Conduit Surfaces**

Material	$\varepsilon$ , $\mu\text{m}$
Commercially smooth brass, lead, copper, or plastic pipe	1.52
Steel and wrought iron	46
Galvanized iron or steel	152
Cast iron	259

**p. 3.24, Symbols.** Delete “mechanical equivalent of heat; or” from the definition for *J*.

**p. 8.21, 2nd column, Wind Chill Index section.** Replace Equation (80) with the following equation, and delete the text “and WCI units are kcal/(h·m<sup>2</sup>). Multiply WCI by 1.162 to convert to SI units of W/m<sup>2</sup>.”

$$\text{WCI} = \frac{(10.45 + 10\sqrt{V} - V)(33 - t_z)}{1.162} \text{ in W/m}^2 \quad (80)$$

**p. 8.27, 1st column.** For SKBF, replace “lb/h·ft<sup>2</sup>” with “g/(m<sup>2</sup>·s).” For WCI, replace “kcal/(h·m<sup>2</sup>)” with “W/m<sup>2</sup>.”

**p. 9.13, Table 6.** Replace Table 6 with the following table:

**Table 6 Approximate Surface Temperature Limits to Avoid Pain and Injury**

Material	Contact Time				
	1 s	10 s	1 min	10 min	8 h
Metal, water	65°C	56°C	51°C	48°C	43°C
Glass, concrete	80°C	66°C	54°C	48°C	43°C
Wood	120°C	88°C	60°C	48°C	43°C

**p. 10.5, 1st column, 3rd paragraph.** Replace the “ppm (mg/kg)” with “mg/kg” throughout [e.g., “25 ppm (18 mg/kg)” should be “25 mg/kg”].

**p. 17.3, 1st column, 9th line.** Change “970 MJ/m<sup>2</sup>·yr” to read “580 MJ/m<sup>2</sup>·yr.”

**p. 23.2, Thermal Insulation section, 1st sentence.** Delete “transfer” from “radiative transfer modes” and add “transfer” after “heat.”

**p. 25.5, Table 4.** The conductivity for waferboard should be 0.091.

**p. 25.24, 1st column, after 3rd entry.** Add the following reference: Lotz, W.A. 1964. Vapor barrier design, neglected key to freezer insulation effectiveness. *Quick Frozen Foods* (November):122.

**p. 26.8, Fig. 6A.** The label  $P_{outside}$  should indicate the more diagonal line.

**p. 26.18, 2nd column, Particulates section.** Change “3 mm” to “3  $\mu\text{m}$ .”

**p. 26.28, Symbols.** Change the definition for *g* to read “gravitational constant,” and add “ $G$  = wind speed multiplier (Table 10).”

**p. 26.30, References.** Add the following source below Klauss et al.: Klote, J.H. and J.A. Milke. 1992. *Design of smoke management systems*. ASHRAE.

**p. 27.1.** The second paragraph under the Climatic Design Conditions should read, “Information on station location, period analyzed, heating design conditions, mean annual extreme, and standard deviation of minimum and maximum dry-bulb temperature are listed in Tables 1A, 2A, and 3A. Information on the design conditions for cooling and humidity control, along with the mean daily temperature range for the warmest month, is provided in Tables 1B, 2B, and 3B.”

**p. 28.7, Table 12.** The first row should refer to Chapter 25, Tables 1, 2, and 4.

**p. 29.14, Eq. (13).** Should read:

$$q_b = AE_D \text{ SHGC}(\theta)\text{IAC} \quad (13)$$

**p. 29.37, Table 29.** Change the units for Conditional Heat Gain and Total Diffusion and Conduction from “Btu/h” to “W.”

**p. 30.14, 1st column.** Change “2130 W/(m<sup>2</sup>·K)” to “2130 W/(m<sup>2</sup>· $\mu\text{m}$ ).”

**p. 30.21, 1st column, ASHRAE “Standard” Glass section.** Change “eighth-inch” to “3.2 mm”

**p. 30.33, Table 13.** In the footnote, change the reference for ID numbers from “Table 5” to “Table 4.”

**p. 30.38, 2nd column, 2nd paragraph.** The reference to Tables 16 through 22 should be to Tables 15 through 22.

**p. 31.22, Example 4.** The reference should be to Table 7, not Table 8.

**p. 31.30, 2nd column, last paragraph.** The reference to Table 10 should be to Table 9.

**p. 33.4, Symbols.** Replace the units for following symbols:

$$c = \text{kJ}/(\text{kg}\cdot\text{K}) \quad k = \text{W}/(\text{m}\cdot\text{K}) \quad K = \text{m}^2/\text{s}^2$$

$$L = m \quad P = \text{Pa} \quad s = \text{m}$$

$$T = \text{K} \quad u, u_\tau, v, V, V' = \text{m/s} \quad x, \delta x, y = \text{m}$$

p. 34.5, 2nd column, Example 5. Delete “(-2.7 mm of water).”

p. 34.9, Fig. 9. Replace I-P value chart with SI value chart (page A.7).

p. 34.17, 2nd column, 1st paragraph. AMCA Standard 500-L should be AMCA Standard 500.

p. 34.23, Example 9, 2nd paragraph, 2nd line. Change “Figure 13 in Chapter 16” to read “Figure 2 in Chapter 43 of the 1999 ASHRAE Handbook—HVAC Applications.” Figure 2 is presented here for convenience.

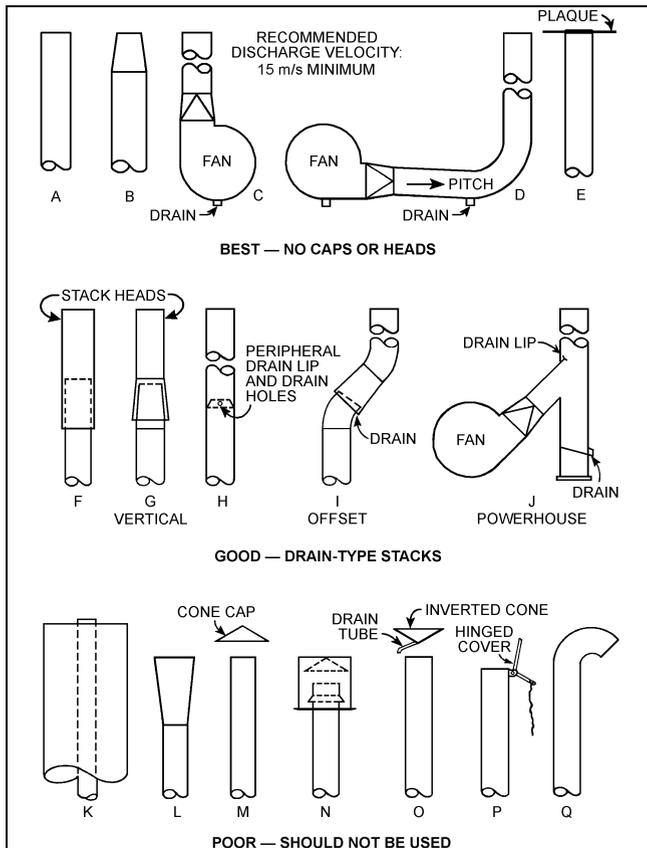


Fig. 2 Stack Designs Providing Vertical Discharge and Rain Protection

p. 34.57, table for CR-6 Screen (Only). In the cell for  $n = 0.65$  and  $A_1/A_o = 1.2$ , replace “0.36” with “0.52.”

p. 35.7, Example 6. The solution for  $\Delta h$  should be “0.126 m loss.”

p. 35.8, 1st column, 3rd full paragraph. Delete “in gallons per minute.”

p. 35.9, Fig. 9. Add “(12.7 mm)” after “1/2 in.” throughout.

p. 35.12, Fig. 10. Replace “0 to 200 psig” with “101 to 1500 kPa.”

p. 35.17, 1st column, last paragraph. Add the following sentence to the end of the paragraph:

“Typical pressures in the return line are given in Table 23.”

p. 35.17, 1st column, Eq. (17). Relocate Equation (17) to 2nd column, following the 4th paragraph, preceding “where.”

p. 35.17, 2nd column. In the second paragraph, replace “specific gravity” with “density.” In the third paragraph, delete “Btu.” In the fourth paragraph replace “specific gravity of 0.60” with “gas density of 0.735 kg/m<sup>3</sup>.”

p. 36.1, 2nd column, Letter Symbols section. Replace “ft for foot” with “m for metre.”

p. 36.11, 1st column. Change “1/2 in.” to “13 mm,” and “3/4 in.” to “20 mm.”

p. 38.4. Under Specific Heat, the reference should be to Table 4 in Chapter 25.

p. I.28, Index. The page numbers for the Louvers, sizing entry should be 34.17-18.

## 2002 Refrigeration

p. 2.2, Figures 1 and 2. In the captions, replace “ton of refrigeration” with “kilowatt of refrigeration.”

p. 2.10, 2nd column. In the first sentence under Refrigerant Line Capacity Tables, replace “tons of refrigeration” with “kilowatts of refrigeration.”

p. 12.1, 1st column, 5th line from bottom. Change “15 mph” to “25 km/h.”

p. 12.1, 2nd column. In the first full paragraph, change “These values decrease” to “These values increase.”

p. 12.7, Infiltration Load values. Delete “°C” from the definitions for  $h_f$ ,  $h_r$ , and  $\rho_i$ ; for  $\rho_i$ , the entire definition should read only “density incoming air, kg/m<sup>3</sup>.”

p. 16.10, 2nd column. The next to the last sentence under Fresh Pork Holding should read, “Care must be taken to maintain the ratio of kilograms of CO<sub>2</sub> to kilograms of meat for the retention period.”

p. 22.7, Airflow Requirements. The units for  $c_p$  should be J/(kg·K), and the symbol for mass flow rate of air should be  $\dot{m}$ .

p. 25.2, 16th line. Change “metre” to “cubic metre.”

p. 30.2, Controls. Change “several hundred feet” to “hundreds of metres.”

p. 31.3, 2nd column, 4th line. The text in parentheses should read “(i.e., a total area of 3.0 m<sup>2</sup> and a capacity of 0.33 m<sup>3</sup>).”

p. 34.3, Example 2 values. Change the unit for Ceiling radiating area from “mm<sup>2</sup>” to “m<sup>2</sup>.”

p. 38.21, Figure 30. Along the x axis, change “10<sup>0</sup>” to “10<sup>2</sup>.”

p. I.30, Index. Add the following index entry after Load coefficients:

Louvers, F30.45  
sizing, F34.17-18

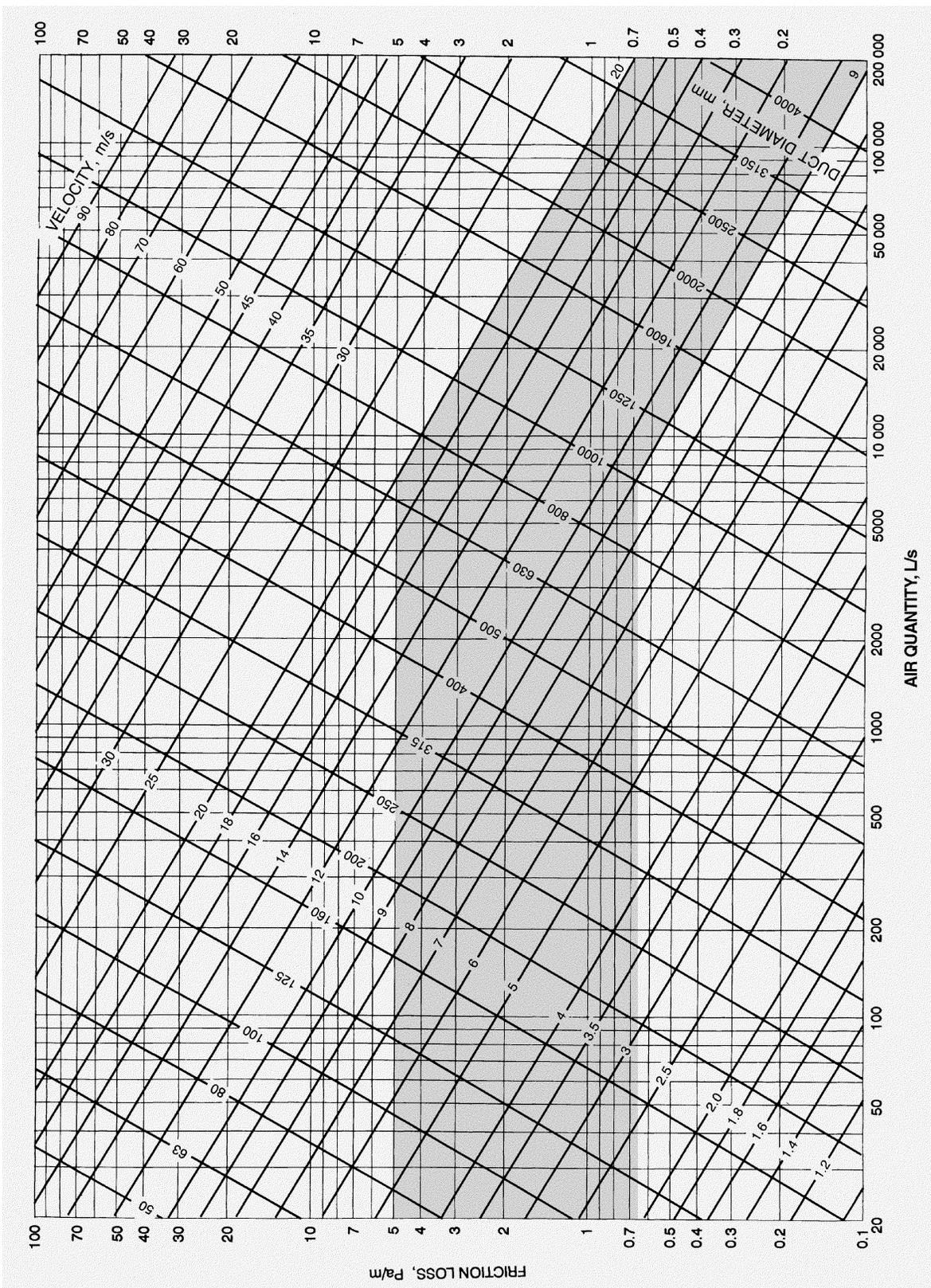


Fig. 9 Friction Chart for Round Duct ( $\rho = 1.20 \text{ kg/m}^3$  and  $\epsilon = 0.09 \text{ mm}$ )