

**ERRATA SHEET FOR  
ENERGY CODE  
FOR  
COMMERCIAL AND HIGH-RISE RESIDENTIAL BUILDINGS**

**Codification of  
ASHRAE/IESNA 90.1-1989  
ENERGY EFFICIENT DESIGN OF NEW BUILDINGS  
EXCEPT LOW-RISE RESIDENTIAL BUILDING**

**May 24, 2000**

The corrections listed in this errata sheet apply to all copies of the *Energy Code for Commercial and High-Rise Residential Buildings*, Codification of ASHRAE/IESNA 90.1-1989.

Page   Erratum

- 66     Table 403.2.9.1. In column 1 move the title “Fluid Design Operating Temperature Range, °F” into the first row of column 1 (make it **bold print**) and replace with the following temperature ranges: “Above 350”, “251-350”, “201-250”, “141-200”, and “ 105-140”. These temperature ranges shall correspond to the following column 2 conductivity ranges: “0.32-0.34”, “0.29-0.31”, “0.27-0.30”, “0.25-0.29”, and “0.24-0.28”, respectively.
- 66     Table 403.2.9.1. In column titled “1 and less” under Nominal Pipe Diameter (in.), replace “1.5”, “1.5”, “1.0”, “0.5”, and “0.5” with “2.5”, “2.0”, “1.5”, “1.5”, and “1.0”, respectively.
- 66     Table 403.2.9.1. In column titled “5 & 6” under Nominal Pipe Diameter (in.), replace the last value “1.0” with “1.5”.

The second page contains a corrected Table 403.2.9.1 suitable for cutting-and-pasting into the existing Code.

**TABLE 403.2.9.1**  
**Minimum Pipe Insulation (in.)<sup>a</sup>**

Fluid Design Operating Temperature Range, °F	Insulation Conductivity <sup>a</sup>		Nominal Pipe Diameter (in.)					
	Conductivity Range Btu · in./- (h · ft <sup>2</sup> · °F)	Mean Rating Temperature °F	Runouts <sup>b</sup> Up to 2	1 and less	1-1¼ to 2	2 ½ to 4	5 & 6	8 & up
<b>Heating systems (Steam, Steam Condensate, and Hot Water)</b>								
Above 350	0.32-0.34	250	1.5	2.5	2.5	3.0	3.5	3.5
251-350	0.29-0.31	200	1.5	2.0	2.5	2.5	3.5	3.5
201-250	0.27-0.30	150	1.0	1.5	1.5	2.0	2.0	3.5
141-200	0.25-0.29	125	0.5	1.5	1.5	1.5	1.5	1.5
105-140	0.24-0.28	100	0.5	1.0	1.0	1.0	1.5	1.5
<b>Domestic and Service Hot Water systems<sup>c</sup></b>								
105 and Greater	0.24-0.28	100	0.5	1.0	1.0	1.5	1.5	1.5
<b>Cooling systems (Chilled Water, Brine, and Refrigerant)<sup>d</sup></b>								
40-55	0.23-0.27	75	0.5	0.5	0.75	1.0	1.0	1.0
Below 40	0.23-0.27	75	1.0	1.0	1.5	1.5	1.5	1.5

<sup>a</sup>For insulation outside the stated conductivity range, the minimum thickness (T) shall be determined as follows:  $T = PR [(1 + t/PR)^{Kk} - 1]$ , where T = minimum insulation thickness for material with conductivity K, in.; PR = actual outside radius of pipe, in.; t = insulation thickness, in.; K = conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature; and k = the lower value of the conductivity range listed for the applicable fluid temperature.

<sup>b</sup>Runouts to individual terminal units not exceeding 12 ft in length.

<sup>c</sup>Applies to recirculating sections of service or domestic hot water systems and first 8 ft from storage tank for nonrecirculating systems.

<sup>d</sup>The required minimum thickness does not consider water vapor transmission and condensation.