

ANSI/ASHRAE Addendum k to  
ANSI/ASHRAE Standard 90.2-2001



# ASHRAE<sup>®</sup> STANDARD

## Energy-Efficient Design of Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on June 26, 2004;  
by the ASHRAE Board of Directors on July 1, 2004; and by the  
American National Standards Institute on July 1, 2004.

This standard is under continuous maintenance 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 web site, <http://www.ashrae.org>, or in paper form from the Manager of Standards. The latest edition of an ASHRAE Standard and printed copies of a public review draft may be purchased from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: [orders@ashrae.org](mailto:orders@ashrae.org). Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in U.S. and Canada).

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ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Manager of Standards of ASHRAE should be contacted for:

- a. interpretation of the contents of this Standard,
- b. participation in the next review of the Standard,
- c. offering constructive criticism for improving the Standard,
- d. permission to reprint portions of the Standard.

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In referring to this Standard or Guideline and in marking of equipment and in advertising, no claim shall be made, either stated or implied, that the product has been approved by ASHRAE.

(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.)

**FOREWORD**

*This addendum revises the piping insulation requirements in ASHRAE Standard 90.2 to be consistent with the requirements in ANSI/ASHRAE/IESNA Standard 90.1-2001.*

**ADDENDUM k to 90.2-2001**

*Delete existing Section 6.3.2.1.1 and Tables 6-4a and 6-4b in Standard 90.2-2001 and replace them with the following revised section and table:*

**6.3.2.1.1 Insulation for Piping.** HVAC system piping installed to serve buildings and to carry fluids within buildings shall be thermally insulated in accordance with Table 6.4.

**TABLE 6.4 Minimum Pipe Insulation Thickness (in inches)<sup>a, e</sup>**

Fluid Design Operating Temp. Range (°F)	Insulation Conductivity		Nominal Pipe Diameter (in.)				
	Conductivity Btu*in./ (h*ft <sup>2</sup> *°F)	Mean Rating Temp. °F	<1	1 to 1-1/4	1-1/2 to 3-1/2	4 to 6	≥8
Heating Systems (Steam, Steam Condensate, and Hot Water) <sup>b,c</sup>							
201-250	0.27-0.30	150	1.5	1.5	2.0	2.0	2.0
141-200	0.25-0.29	125	1.0	1.0	1.0	1.5	1.5
105-140	0.22-0.28	100	0.5	0.5	1.0	1.0	1.0
Cooling Systems (Chilled Water, Brine, and Refrigerant) <sup>d</sup>							
40-55	0.22-0.28	100	0.5	0.5	1.0	1.0	1.0
Below 40	0.22-0.28	100	0.5	1.0	1.0	1.0	1.5

<sup>a</sup> For insulation outside the stated conductivity range, the minimum thickness (*T*) shall be determined as follows:

$$T = r[(1 + t/r)^{K/k} - 1]$$

where *T* = minimum insulation thickness (in.), *r* = actual outside radius of pipe (in.), *t* = insulation thickness listed in this table for applicable fluid temperature and pipe size, *K* = conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature (Btu-in./h-ft<sup>2</sup>-°F), and *k* = the upper value of the conductivity range listed in this table for the applicable fluid temperature.

<sup>b</sup> These thicknesses are based on energy efficiency considerations only. Additional insulation is sometimes required due to safety issues related to surface temperature.

<sup>c</sup> Piping insulation is not required between the control valve and coil on run-outs when the control valve is located within 4 ft of the coil and the pipe size is 1 in. or less.

<sup>d</sup> These thicknesses are based on energy efficiency considerations only. Issues such as water vapor permeability or surface condensation sometimes require vapor retarders and/or additional insulation.

<sup>e</sup> For piping exposed to outdoor air, increase insulation thickness by 0.5 in. For example, piping in attic spaces and crawlspaces is considered to be exposed to outdoor air.

## **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.