BSR/ASHRAE/IES Addendum t
to ANSI/ASHRAE/IES Standard 90.1-2025

Public Review Draft

Proposed Addendum t to Standard 90.1-2025, Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings

First Public Review (November 2026)
(Draft Shows Proposed Changes to Current Standard)

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FOREWORD

This addendum would do the following:

- Remove the requirement for insulation on refrigerant lines implied in Table 6.8.3-2
- Add informative language that the tables do not apply to refrigerant lines.
- Add missing language to Section 6.8.3 on pipe insulation

Members of SSPC 90.1 performed analysis of energy savings of using insulation on hot gas refrigerant lines, since are no requirements in the standard. However, the modeling showed that requiring insulation is not energy cost-effective. The modeling also showed that savings for cooling are even less cost-effective. Therefore, this draft addendum proposes to remove “refrigerant” from the title of Table 6.8.3-2 for cooling piping.

The initiative was a continuous maintenance proposal submitted by an insulation manufacturer. The impetus for that was a regular flow of questions to their application engineers about using Table 6.8.3-1 for hot gas refrigerant piping, and they wanted to be able to provide answers. To provide those answers, we propose adding an informative note to the tables that they do not apply to refrigerant piping and that manufacturers’ installation instructions should be followed. We did not find any instructions that do not require insulation, as there are other reasons, such as condensation and safety, to insulate. We expect that this change will not change construction practices.

The draft addendum would also fix a problem in the charging language of Section 6.8.3, which states correctly that the working fluids to which Table 6.8.3.1 applies are steam and hot water, but does not call out the working fluids for Table 6.8.3-2.

Cost justification: This change provides clarification about which piping systems are affected, so no cost justification is required.

[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by <u>underlining</u> (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard 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 changes.]

Addendum t to 90.1-2025

Modify Section 6.8.3 as follows:

6.8.3 Piping Insulation Tables. Hot-water heating, steam heating, and steam condensate *piping* shall be insulated to the minimum thickness required in Table~~s~~ 6.8.3-1. Chilled water and chilled brine ~~-~~*piping* shall be insulated to the minimum thickness required in Table~~and~~ 6.8.3-2. ~~and~~The insulation shall either ~~utilize insulation within the~~have a *thermal conductivity* within the ranges in the tables, or, when the insulation *thermal conductivity* is not within the range in the tables, the following equation shall be used to calculate the minimum insulation thickness:

Note to reviewers: The equation and the exception to 6.8.3 are not shown

Table 6.8.3-1 Minimum Piping Insulation Thickness Heating and Hot-Water Systems[a,b,c,d,e] (Steam, Steam Condensate, Hot-Water Heating and Domestic Water Systems)

Fluid Operating Temperature Range (°F) and Usage	Insulation Thermal Conductivity		Nominal Pipe or Tube Size, in.				
	Conductivity, Btu·in/h·ft²·°F	Mean Rating Temperature, °F	<1	1 to <1-1/2	1-1/2 to <4	4 to <8	≥8
			Insulation Thickness, in.				
>350	0.32 to 0.34	250	4.5	5.0	5.0	5.0	5.0
251 to 350	0.29 to 0.32	200	3.0	4.0	4.5	4.5	4.5
201 to 250	0.27 to 0.30	150	2.5	2.5	2.5	3.0	3.0
141 to 200	0.25 to 0.29	125	1.5	1.5	2.0	2.0	2.0
105 to 140	0.22 to 0.28	100	1.0	1.0	1.5	1.5	1.5

For *service water heating systems*, see Table 7.4-2.

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e. This table does not apply to refrigerant piping or tubing. Users should follow the manufacturer's installation instructions.

Table 6.8.3-2 Minimum Piping Insulation Thickness Cooling Systems (Chilled Water~~,~~ and Chilled Brine,~~ and Refrigerant~~)[a,b,c]

Fluid Operating Temperature Range (°F) and Usage	Insulation Thermal Conductivity		Nominal Pipe or Tube Size, in.				
	Conductivity, Btu·in/h·ft²·°F	Mean Rating Temperature, °F	<1	1 to <1-1/2	1-1/2 to <4	4 to <8	≥ 8
			Insulation Thickness, in.				
40 to 60	0.21 to 0.27	75	0.5	0.5	1.0	1.0	1.0
<40	0.20 to 0.26	50	0.5	1.0	1.0	1.0	1.5

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c. This table does not apply to refrigerant piping or tubing. Users should follow the manufacturer's installation instructions.