



ADVISORY COMMITTEE COMMENT FORM FOR PROPOSED CODE CHANGES

(This form must be submitted electronically)

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1323 CE-26b

Proposed Code Change - Language

Please provide your proposed code change in strikeout/underline format. Provide the *specific* language you would like to see changed, with new words underlined and words to be deleted should be ~~stricken~~. Also, state whether the language contained in your proposal is from a code book or from an amendment currently found in Minnesota Rule. (You may provide the language (electronically) on a separate, attached sheet).

IECC Section C403.2.7 is amended to read as follows:

C403.2.7 Duct and plenum insulation and sealing. Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance and wind. Insulation exposed to weather shall be suitable for outdoor service and shall be protected by aluminum, sheet metal, painted canvas, plastic cover or other similar materials approved by the building official. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material. All exhaust, supply, and return and relief air ducts and plenums shall be insulated according to Table C403.2.7, with a minimum of R-6 insulation where located in unconditioned spaces and a minimum of R-8 insulation where located outside the building. Where located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by a minimum of R-8 insulation.

Exceptions:

1. Where located within equipment.
2. Where the design temperature difference between the interior and exterior of the duct or plenum does not exceed 15°F (8°C).
2. Except as required to prevent condensation, ducts for which heat gain or loss, without insulation, will not increase the energy requirements of the building.

All ducts, air handlers and filter boxes shall be sealed. Joints and seams shall comply with Section 603.9 of the *International Mechanical Code*.

C403.2.7.1 Duct construction. Ductwork shall be constructed and erected in accordance with the *International Mechanical Code*.

C403.2.7.1.1 Low-pressure duct systems. All longitudinal and transverse joints, seams and connections of supply and return ducts operating at a static pressure less than or equal to 2 inches water gauge (w.g.) (500 Pa) shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes installed in accordance with the manufacturer's installation instructions. Pressure classifications specific to the duct system shall be clearly indicated on the construction documents in accordance with the *International Mechanical Code*.

Exception: Continuously welded and locking-type longitudinal joints and seams on ducts operating at static pressures less than 2 inches water gauge (w.g.) (500 Pa) pressure classification.

C403.2.7.1.2 Medium-pressure duct systems. All ducts and plenums designed to operate at a static pressure greater than 2 inches water gauge (w.g.) (500 Pa) but less than or equal to 3 inches w.g. (750 Pa) shall be insulated and sealed in accordance with Section C403.2.7. Pressure classifications specific to the duct system shall be clearly indicated on the construction documents in accordance with the *International Mechanical Code*.

C403.2.7.1.3 High-pressure duct systems. Ducts designed to operate at static pressures in excess of 3 inches water gauge (w.g.) (750 Pa) shall be insulated and sealed in accordance with Section C403.2.7. In addition, ducts and plenums shall be leak-tested in accordance with the *SMACNA HVAC Air Duct Leakage Test Manual* with the rate of air leakage (CL) less than or equal to 4.0 ~~6.0~~ as determined in accordance with Equation 4-5.

$$CL = F/P^{0.65} \quad \text{(Equation 4-5)}$$

where:

F = The measured leakage rate, in cfm per 100 square feet of duct surface area.

P = The static pressure of the test, which shall be equal to the design duct pressure class rating, in. w.c

Documentation shall be furnished by the designer demonstrating that representative sections totaling at least 25 percent of the duct area have been tested and that all tested sections meet the requirements of this section. Positive pressure leakage testing is acceptable for negative pressure ductwork.

**TABLE C403.2.7
MINIMUM REQUIRED DUCT AND PLENUM INSULATION**

Ducts for Other Than Dwelling Units^{a,b}	Supply Duct Requirements^{c,d}	Return, Relief Requirements^{c,d}	Exhaust Duct Requirements^{c,d,e}
Exterior of building	R-8, V and W	R-8, V and W	R-8, V and W
Attics, garages and ventilated crawl spaces	R-8 and V	R-8 and V	R-6 and V
TD greater than 40°F	R-6 and V	None	R-3.5 and V
TD greater than 15°F and less than or equal to 40°F	R-3.5 and V	None	R-3.5 and V
Within cement slab or within ground	R-3.5 and V	R-3.5 and V	R-3.5 and V
Within conditioned spaces	None ^f	None	R-3.5 and V
TD less than or equal to 15°F	None	None	R-3.5 and V

Ducts for Dwelling Units^a	Requirements^{c,d}
<u>Exterior of building</u>	<u>R-8, V and W</u>
<u>Attics, garages and ventilated crawl spaces (except exhaust ducts)</u>	<u>R-8 and V</u>
<u>Exhaust ducts in attics, garages and ventilated crawl spaces</u>	<u>R-6 and V</u>
<u>Outdoor air intakes within conditioned spaces</u>	<u>R-6 and V</u>
<u>Exhaust ducts within conditioned spaces^e</u>	<u>R-3.5 and V</u>
<u>Within cement slab or within ground</u>	<u>R-3.5 and V</u>
<u>Within conditioned spaces</u>	<u>None required</u>

- a. Ducts located within the building thermal envelope shall be located completely on the conditioned side of the air barrier.
- b. TD = Design temperature difference between the air in the duct and the ambient temperature outside of the duct, unless the duct type and location is specifically identified above.
- c. V = Vapor retarder required in accordance with IMC Section 604.11. When a vapor retarder is required, duct insulation required by this section shall be installed without respect to other building envelope insulation.
- d. W = Approved weatherproof barrier.
- e. Insulation is only required in the conditioned space for a distance of 3 feet (914 mm) from the exterior or unconditioned space.
- f. If temperature rise is greater than 3°F from supply air to furthest outlet, duct insulation shall be required.

Proposed Code Change – Need and Reason

Please provide a thorough explanation of the need for this change and why this proposed code change is a reasonable change. During the rulemaking process, the Agency must defend the need and reasonableness of all its proposed changes. The Agency must submit evidence that it has considered all aspects of the proposal. (You may provide the need and reason (electronically) on a separate attached sheet).

This proposed amendment incorporates language from the current Minnesota Mechanical Code, along with provisions from ASHRAE Standard 90.1-2010. Several changes were made to the current requirements to clarify insulation values for duct locations that were not specifically identified in the past, and some of the R-values were changed slightly to be consistent with the latest edition of ASHRAE Standard 90.1-2010. In addition, provisions were added from ASHRAE Standard 90.1-2010 that explain in detail the requirements necessary to protect ducts from physical damage and from other sources of damage, such as moisture and weather-related elements. These changes are necessary so that the insulation values are appropriate for the installed locations and result in energy efficient and durable systems that are not likely to deteriorate due to the formation of condensation on the interior or exterior of the ducts or plenums. These requirements are reasonable because they are very similar to the duct insulation and vapor retarder requirements that have been in effect since the first mechanical code was adopted statewide in Minnesota in 1972.

Proposed Code Change – Cost/Benefit Analysis

Please consider whether this proposed code change will increase/decrease costs or indicate that it will not have any cost implications and explain how it will not. If there is an increased cost, will this cost be offset somehow by a life safety or other benefit? If so, please explain. Are there any cost increases/decreases to enforce or comply with this proposed code change? If so, please explain. (You may provide the cost/benefit analysis (electronically) on a separate, attached sheet).

Since it has nearly the same result as language in the current mechanical code, there are no cost implications.

Other Factors to Consider Related to Proposed Code Change

1. Is this proposed code change meant to:

change language contained in a published code book? If so, list section(s).

Section C403.2.7

change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

delete language contained in a published code book? If so, list section(s).

delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

neither; this language will be new language, not found in the code book or in Minnesota Rule.

2. Is this proposed code change required by a Minnesota Statute or new legislation? If so, please provide the citation to the Statute or legislation.

No

3. Will this proposed code change impact other sections of a published code book or of an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

No.

4. Will this proposed code change impact other parts of the Minnesota State Building Code? If so, please list the affected parts of the Minnesota State Building Code.

No.

5. Who are the parties affected or segments of industry affected by this proposed code change?

None.

6. Can you think of other means or methods to achieve the purpose of the proposed code change? If so, please explain what they are and why your proposed change is the preferred method or means to achieve the desired result.

No.

7. Are you aware of any federal requirement or regulation related to this proposed code change? If so, please list the regulation or requirement.

No.