CHAPTER 1323

DEPARTMENT OF LABOR AND INDUSTRY

COMMERCIAL ENERGY CODE

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1323.0001 TITLE.

This chapter is known as the Minnesota Commercial Energy Code.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106; 326B.13*

History: *33 SR 1473*

Published Electronically: *June 17, 2009*

1323.0005 ADMINISTRATION AND PURPOSE.

Subpart 1. **Administration.** This code shall be administered in accordance with chapter 1300.

Subp. 2. **Purpose.** The purpose of this chapter is to establish a minimum code of standards for the construction, reconstruction, alteration, and repair of buildings governing matters including design and construction standards regarding heat loss control, illumination, and climate control pursuant to Minnesota Statutes, sections 326B.101, 326B.106, and 326B.13.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106; 326B.13*

History: *33 SR 1473*

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1323.0010 INCORPORATION BY REFERENCE OF THE INTERNATIONAL ENERGY CONSERVATION CODE - COMMERCIAL ENERGY PROVISIONS.

Subpart 1. **General.** The 2012 edition of the International Energy Conservation Code (IECC) as promulgated by the International Code Council, Inc. (ICC), Washington, D.C., is incorporated by reference and made part of the Minnesota State Building Code except as qualified by the applicable provisions in Minnesota Rules, chapter 1300, and as amended in this rule chapter. Portions of this publication reproduce excerpts from the 2012 IECC, International Code Council, Inc., Washington, D.C., copyright 2012, reproduced with permission, all rights reserved. The IECC is not subject to frequent change, and a copy of the IECC, with amendments for use in Minnesota, is available in the office of the commissioner of labor and industry.

Subp. 2. **Mandatory chapters.** The commercial provisions of the 2012 IECC-CE chapters 2 (CE) to 5 (CE), shall be administered by any municipality that has adopted the code, except as qualified by the applicable provisions in Minnesota Rules, chapter 1300, and as amended by this rule chapter.

Subp. 3. **Replacement chapters.** The following 2012 IECC chapter is being deleted and replaced with the provisions listed below:

References to Chapter 1 (CE) of the 2012 IECC and any references to code administration in this code are deleted and replaced with Minnesota Rules, chapter 1300, Administration of the State Building Code.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106; 326B.13*

History: *33 SR 1473; 39 SR 1616*

Published Electronically: *June 8, 2015*

1323.0020 REFERENCES TO OTHER INTERNATIONAL CODE COUNCIL (ICC) CODES.

Subpart 1. **General.** References to other codes and standards promulgated by the ICC in the IECC are modified in subparts 2 to 11.

Subp. 2. **Building code.** References to the International Building Code in this code mean the Minnesota Building Code, Minnesota Rules, chapter 1305, adopted pursuant to Minnesota Statutes, section 326B.106, subdivision 1.

Subp. 3. **Residential code.** References to the International Residential Code in this code mean the Minnesota Residential Code, Minnesota Rules, chapter 1309, adopted pursuant to Minnesota Statutes, section 326B.106, subdivision 1.

Subp. 4. **Electrical code.** References to the International Code Council, Electrical Code in this code mean the Minnesota Electrical Code, Minnesota Rules, chapter 1315, adopted pursuant to Minnesota Statutes, section 326B.35.

Subp. 5. **Fuel gas code.** References to the International Fuel Gas Code in this code mean the Minnesota Fuel Gas Code, Minnesota Rules, chapter 1346, adopted pursuant to Minnesota Statutes, section 326B.106, subdivision 1.

Subp. 6. **Mechanical code.** References to the International Mechanical Code in this code mean the Minnesota Mechanical Code, Minnesota Rules, chapter 1346, adopted pursuant to Minnesota Statutes, section 326B.106, subdivision 1.

Subp. 7. **Plumbing code.** References to the International Plumbing Code in this code mean the Minnesota Plumbing Code, Minnesota Rules, chapter 4715, or its successor, adopted pursuant to Minnesota Statutes, section 326B.106, subdivisions 1 and 2.

Subp. 8. **Private sewage disposal code.** References to the International Private Sewage Disposal Code in this code mean the Minnesota Pollution Control Agency's minimum standards and criteria for individual sewage treatment systems in Minnesota Rules, chapter 7080, adopted pursuant to Minnesota Statutes, chapters 103F, 103G, 115, and 116.

Subp. 9. **Energy conservation code.** References to the International Energy Conservation Code in this code mean the Minnesota Energy Code, Minnesota Rules, chapters 1322 and 1323, adopted pursuant to Minnesota Statutes, section 326B.106.

Subp. 10. **Property maintenance code.** References to the International Property Maintenance Code in this code do not apply and are deleted.

Subp. 11. **Accessibility code.** References to accessibility in this code mean the Minnesota Accessibility Code, Minnesota Rules, chapter 1341.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

History: *39 SR 1616*

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1323.0030 ADMINISTRATIVE PROCEDURE CRITERIA.

Procedures relating to the administration and enforcement of this code under Minnesota Statutes, section 326B.101, are contained in Minnesota Rules, chapter 1300, Minnesota Administration Code, which govern the application of this code.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

History: *39 SR 1616*

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1323.0100 ADMINISTRATION FOR COMMERCIAL ENERGY CODE.

Subpart 1. **Application.** In addition to the requirements in Minnesota Rules, part 1323.0030, the administrative provisions in this part apply.

Subp. 2. **Scope.** This code applies to commercial buildings, building sites, and the associated systems and equipment.

Subp. 3. **Additions, alterations, renovations, or repairs.** Additions, alterations, renovations, or repairs to an existing building, building system, or portion thereof shall conform to this code as they relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with this code. Additions, alterations, renovations, or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.

Exceptions: The following conditions are not required to comply with this code if the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.

2. Glass-only replacements in an existing sash and frame.

3. Existing ceiling, wall, or floor cavities exposed during construction, provided that these cavities are filled with insulation.

4. Construction where the existing roof, wall, or floor cavity is not exposed.

5. Reroofing for roofs not covered by section C402.2.1.2, where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.

6. Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a conditioned space from the exterior shall not be removed.

7. Alterations that replace less than 50 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.

8. Alterations that replace only the bulb and ballast within the existing luminaires in a space, provided that the alteration does not increase the installed interior lighting power.

Subp. 4. **Change of occupancy or use.** Spaces undergoing a change in occupancy that would result in an increase in demand for either fossil fuel or electrical energy shall comply with this code. Where the use in a space changes from one use in Table C405.5.2(1) or (2) to another use in Table C405.5.2(1) or (2), the installed lighting wattage shall comply with section C405.5.

Subp. 5. **Change in space conditioning.** Any nonconditioned space that is altered to become conditioned space shall be required to be brought into full compliance with this code.

Subp. 6. **Compliance.** Residential buildings shall meet the provisions of IECC - Residential Provisions (RE). Commercial buildings shall meet the provisions of IECC - Commercial Provisions (CE).

Subp. 7. **Mixed occupancy.** Where a building includes both residential and commercial occupancies, each occupancy shall be separately considered and meet the applicable provisions of IECC - Commercial Provisions or IECC - Residential Provisions.

Subp. 8. **Compliance materials.** The building official is authorized to approve specific computer software, worksheets, compliance manuals, and other similar materials that meet the intent of this code.

Subp. 9. **Low-energy buildings.** The following buildings, or portions thereof, separated from the remainder of the building by building thermal envelope assemblies complying with this code shall be exempt from the building thermal envelope provisions of this code:

A. Those with a peak design rate of energy usage less than 3.4 Btu/h-ft^2 (10.7 W/m^2) or 1.0 watt/ft^2 (10.7 W/m^2) of floor area for space conditioning purposes.

B. Those that do not contain conditioned space.

Subp. 10. **Information on construction documents.** Construction documents shall be drawn to scale on suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall indicate the location, nature, and extent of the work proposed, and show in detail pertinent data and features of the building, systems, and equipment as governed in this code. Examples of this detail include insulation materials and their *R*-values; fenestration *U*-factors and SHGCs; area-weighted *U*-factor and SHGC calculations; mechanical system design criteria; mechanical

and service water heating system and equipment types, sizes, and efficiencies; economizer description; equipment and systems controls; fan motor horsepower (hp) and controls; duct sealing, duct sizing, duct and pipe insulation and location, terminal air or water design flow rates; electrical distribution diagram(s); lighting fixture schedule with wattage and control narrative; and air sealing details. Air sealing details shall clearly delineate the air barrier location and show continuity between roof, wall, foundation, around frames and sleeves, and at other similar openings.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

History: *39 SR 1616*

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1323.0201 SECTION C201, GENERAL.

IECC section C201.4 is amended to read as follows:

C201.4 Terms not defined. Where terms are not defined through the methods authorized by this chapter, the Merriam-Webster Collegiate Dictionary, available at www.m-w.com, shall be considered as providing ordinarily accepted meanings. The dictionary is incorporated by reference, is subject to frequent change, and is available through the Minitex interlibrary loan system.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

History: *39 SR 1616*

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1323.0202 SECTION C202, GENERAL DEFINITIONS.

A. IECC section C202 is amended by modifying the following definitions to read as follows:

APPROVED. "Approved" means approval by the building official, pursuant to the Minnesota State Building Code, by reason of:

1. inspection, investigation, or testing;

2. accepted principles;

3. computer simulations;

4. research reports; or

5. testing performed by either a licensed engineer or by a locally or nationally recognized testing laboratory.

BUILDING THERMAL ENVELOPE. The basement walls, exterior walls, floor, roof, air barrier, and any other building envelope components that enclose conditioned space or provide a boundary between conditioned space and exempt or unconditioned space.

INFILTRATION. The uncontrolled inward air leakage into a building caused by the pressure effects of wind, the effect of differences in the indoor and outdoor air density, or the imbalance between supply and exhaust air systems.

B. Section C202 is amended by adding the following definitions to read as follows:

CODE. "This code" or "the code" means the Minnesota Commercial Energy Code, Minnesota Rules, chapter 1323.

CONTINUOUS INSULATION (c.i.). Insulation that is continuous across all structural members without thermal bridges other than fasteners and service openings. It is installed on the interior or exterior or is integral to any opaque surface of the building thermal envelope.

ROOF REPLACEMENT. An alteration consisting of the removal of the existing roof covering, repairing any damaged substrate, and installing a new roof covering.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

History: *39 SR 1616*

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1323.0230 [Repealed, 39 SR 1616]

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1323.0303 SECTION C303, MATERIALS, SYSTEMS, AND EQUIPMENT.

IECC section C303.1 is amended to read as follows:

C303.1 Identification. Materials, systems, and equipment shall be identified in a manner that will allow a determination of compliance with the applicable provisions of this code. Materials shall be designed for the intended use, and installed in accordance with the manufacturer's installation instructions, any listing, or certifications required. Subsections C303.1.1, C303.1.1.1, C303.1.2, C303.1.3, C303.1.4, and Tables C303.1.3(1), C303.1.3(2), and C303.1.3(3) are maintained without amendment.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

History: *39 SR 1616*

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1323.0320 [Repealed, 39 SR 1616]

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1323.0401 SECTION C401, GENERAL.

Subpart 1. **C401 General.** IECC section C401 is amended by adding three new sections C401.3, C401.4, and C401.5 to read as follows:

Subp. 2. **C401.3 Heating of commercial parking facilities prohibited.** Heating commercial parking facilities is prohibited in accordance with Minnesota Statutes, section 216C.20, subdivision 3.

Subp. 3. **C401.4 Prohibition of once-through water use permits.** Once-through water use permits are prohibited in accordance with Minnesota Statutes, section 103G.271, subdivision 5.

Subp. 4. **C401.5 Parking lot lighting.** Parking lot lighting is regulated by the Minnesota Department of Transportation in Minnesota Rules, chapter 8885.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

History: *39 SR 1616*

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1323.0402 SECTION C402, BUILDING ENVELOPE REQUIREMENTS.

Subpart 1. **IECC section C402.2.1.2 Insulation requirements for roof replacement.** IECC section C402.2.1 is amended by adding a new subsection C402.2.1.2 to read as follows:

C402.2.1.2 Insulation requirements for roof replacement. For roof replacement on an existing building where the insulation is entirely above the deck and where the roof slope is less than two units vertical in 12 units horizontal, the insulation shall conform to the energy conservation requirements specified in Table C402.2, Opaque Thermal Envelope Requirements.

Exception: Where the required R-value cannot be provided because of the thickness limitations that occur with the existing rooftop conditions, including heating, ventilation and air-conditioning equipment, low door or glazing heights, parapet heights, or proper roof flashing heights, the maximum thickness of insulation compatible with the available space and existing rooftop conditions shall be installed.

Subp. 2. **IECC section C402.4.1.1 Air barrier construction.** IECC section C402.4.1.1 is amended to read as follows:

C402.4.1.1 Air barrier construction. The continuous air barrier shall be constructed to comply with the following:

1. The air barrier shall be continuous for all assemblies that are the thermal envelope of the building and across the joints and assemblies.

2. Air barrier joints and seams shall be sealed, including sealing transitions in places and changes in materials. Air barrier penetrations shall be sealed in accordance with section C402.4.2. The joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen, or otherwise impair its ability to resist positive and negative pressure from wind, stack effect, and mechanical ventilation.

3. Recessed lighting fixtures shall comply with section C402.4.8. Where similar objects are installed that penetrate the air barrier, provisions shall be made to maintain the integrity of the air barrier.

Subp. 3. **Section C402.4.5.1 Stairway and shaft vents.** IECC section C402.4.5.1 is amended to read as follows:

C402.4.5.1 Stairway and shaft vents. Stairway and shaft vents shall be provided with Class I motorized dampers with a maximum leakage rate of 4 cfm/ft^2 (20.3 L/s·m^2) at 1.0 inch water gauge (w.g.) (249 Pa) when tested in accordance with AMCA 500D.

Controls for operating stairway and shaft vents shall be provided in accordance with Minnesota Rules, chapter 1305.

(Items 1 and 2 of this subsection are deleted.)

Subp. 4. **IECC section C402.4.5.2 Outdoor air intakes and exhausts.** IECC section C402.4.5.2 is amended to read as follows:

C402.4.5.2 Outdoor air intakes and exhausts. Outdoor air supply and exhaust openings shall be provided with Class IA motorized dampers with a maximum leakage rate of 4 cfm/ft^2 (20.3 L/s·m^2) at 1.0 inch water gauge (w.g.) (249 Pa) when tested in accordance with AMCA 500D.

Exceptions:

1. For exhaust and relief dampers in buildings less than three stories in height above grade plane or, where the design outdoor air intake or exhaust capacity does not exceed 300 cfm, (141 L/s), gravity (nonmotorized) dampers having a maximum leakage rate of 20 cfm/ft^2(101.6 L/s m^2) at 1.0-inch water gauge) (w.g.) (249 Pa) when tested in accordance with AMCA 500D are permitted to be used.

Gravity (nonmotorized) dampers for ventilation air intakes shall be protected from direct exposure to wind.

2. Nonmotorized dampers smaller than 24 inches (610 mm) in either dimension shall be permitted to have a leakage of 40 cfm/ft^2 (203.2 L/s·m^2) at 1.0 inch water gauge (w.g.) (249 Pa) when tested in accordance with AMCA 500D.

3. Dampers for exhaust ducts 8 inches (203 mm) in diameter and smaller shall be permitted without being tested in accordance with AMCA 500D if equipped with a spring-loaded backdraft damper and a weather hood at the point of discharge.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

History: *39 SR 1616*

Published Electronically: *June 8, 2015*

1323.0403 SECTION C403, BUILDING MECHANICAL SYSTEMS.

Subpart 1. **IECC section C403.2.1 Calculation of heating and cooling loads.** IECC section C403.2.1 is amended to read as follows:

C403.2.1 Calculation of heating and cooling loads. Design loads shall be determined in accordance with the procedures described in ANSI/ASHRAE/ACCA Standard 183, Peak Cooling and Heating Load Calculations in Buildings Except Low-Rise Residential Buildings, and by using the design parameters specified in Table C403.2.1.

TABLE C403.2.1 Climatic Data Design Conditions

City	Summer Db/Wb °F	Winter Db °F
Aitkin	82/72	-24
Albert Lea	85/72	-15
Alexandria	86/70	-21

Bemidji	84/68	-24
Cloquet	82/68	-20
Crookston	84/70	-27
Duluth	81/67	-20
Ely	82/68	-29
Eveleth	82/68	-26
Faribault	86/73	-16
Fergus Falls	86/71	-21
Grand Rapids	81/67	-23
Hibbing	82/68	-19
International Falls	83/67	-28
Litchfield	85/71	-18
Little Falls	86/71	-20
Mankato	86/72	-15
Minneapolis/St. Paul	88/72	-15
Montevideo	86/72	-17
Mora	84/70	-21
Morris	84/72	-21
New Ulm	87/73	-15
Owatonna	86/73	-16
Pequot Lakes	84/68	-23
Pipestone	85/73	-15
Redwood Falls	89/73	-17
Rochester	85/72	-17
Roseau	82/70	-29
St. Cloud	86/71	-20
Thief River Falls	82/68	-25
Tofte	75/61	-14
Warroad	83/67	-29
Wheaton	84/71	-20
Willmar	85/71	-20
Winona	88/74	-13
Worthington	84/71	-14

Db = dry bulb temperature, degrees Fahrenheit

Wb = wet bulb temperature, degrees Fahrenheit

Subp. 2. **IECC section C403.2.2 Equipment and system sizing.** IECC section C403.2.2 is amended by adding a third exception to read as follows:

> 3. Heating and cooling equipment sizing is permitted to be up to ten percent greater than the calculated peak heating and cooling loads to allow for building pickup and cool down after temperature setback conditions.

Subp. 3. **IECC section C403.2.4.3.1 Thermostatic setback capabilities.** IECC section C403.2.4.3.1 is amended to read as follows:

> **C403.2.4.3.1 Thermostatic setback capabilities.** Heating systems shall be equipped with controls that have the capacity to automatically restart and temporarily operate the systems to maintain zone temperatures above a heating setpoint adjustable down to 55°F (13°C) or lower. Cooling systems shall be equipped with controls that have the capacity to automatically restart and temporarily operate the system to maintain zone temperatures below a cooling setpoint adjustable up to 90°F (32°C) or higher or to prevent high space humidity levels.
>
> **Exceptions:**
>
> 1. Radiant floor and radiant ceiling heating systems.
>
> 2. Spaces where constant temperature conditions must be maintained.

Subp. 4. **IECC section C403.2.4.5 Snow melt system controls.** IECC section C403.2.4.5, the title and the body, are amended to read as follows:

> **C403.2.4.5 Freeze protection and snow melt system controls.** Freeze protection systems, such as heat tracing of outdoor piping and heat exchangers, including self-regulating heat tracing, shall include automatic controls capable of shutting off the system when outdoor air temperatures are above 40°F (4°C) or when the conditions of the protected fluid prevent freezing. Snow and ice-melting systems, supplied through energy service to the building, shall include automatic controls capable of shutting off the system when the pavement temperature is above 50°F (10°C) and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F (4°C), so the potential for snow or ice accumulation is negligible.

Subp. 5. **IECC section C403.2.6 Energy recovery ventilation systems.** IECC section C403.2.6 is amended to read as follows:

> **C403.2.6 Energy recovery ventilation systems.** Where the supply airflow rate of a fan system exceeds the values specified in Table C403.2.6, the system shall include an energy recovery system. The energy recovery system shall have the capability to provide a change in the enthalpy of the outdoor air supply of not less than 50 percent of the difference between the outdoor air and return air enthalpies, at design conditions. Where an air economizer is required, the energy recovery system shall include a bypass or controls which permit operation of the economizer as required by section C403.4.

Exception: An energy recovery ventilation system shall not be required in any of the following conditions:

1. Where energy recovery systems are prohibited by the International Mechanical Code, as amended in Minnesota Rules, chapter 1346.

2. Laboratory fume hood systems that include at least one of the following features:

2.1 Variable-air-volume hood exhaust and room supply systems capable of reducing exhaust and makeup air volume to 50 percent or less of design values except when higher volumes are required to maintain safe operating conditions.

2.2 Direct makeup (auxiliary) air supply equal to at least 75 percent of the exhaust rate, heated no warmer than 2°F (1.1°C) above room setpoint, cooled to no cooler than 3°F (1.7°C) below room setpoint, no humidification added, and no simultaneous heating and cooling used for dehumidification control.

3. Systems serving spaces that are heated to less than 60°F (15.5°C) and are not cooled.

4. Where more than 60 percent of the outdoor heating energy is provided from site-recovered or site solar energy.

5. Heating energy recovery in Climate Zones 1 and 2.

6. Cooling energy recovery in Climate Zones 3C, 4C, 5B, 5C, 6B, 7, and 8.

7. Systems requiring dehumidification that employ energy recovery in series with the cooling coil.

8. Where the largest source of air exhausted at a single location at the building exterior is less than 75 percent of the design outdoor air flow rate.

9. Systems expected to operate less than 20 hours per week at the outdoor air percentage covered by Table C403.2.6.

10. Systems exhausting paint fumes; toxic, flammable, or corrosive fumes; or dust.

11. Commercial kitchen hoods used for collecting and removing grease vapors and smoke.

Subp. 6. **IECC Table C403.2.6 Energy recovery requirement.** IECC Table C403.2.6 is amended by modifying the title to read:

TABLE C403.2.6 EXHAUST AIR ENERGY RECOVERY REQUIREMENT.

Subp. 7. **IECC section C403.2.7 Duct and plenum insulation and sealing.** 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 damage from 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 required by this subpart or painted with a coating that is water-retardant and provides shielding from solar radiation that causes degradation of the material. All supply, return, exhaust, and relief air ducts and plenums shall be insulated according to Table C403.2.7, located in subpart 13.

Exception: Where located within equipment.

All ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with section 603.9 of the International Mechanical Code, as amended in Minnesota Rules, chapter 1346.

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

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, as amended.

Exception: Continuously welded and locking-type longitudinal joints and seams on ducts operating at static pressure 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 water gauge (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, as amended.

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 as determined in accordance with Equation 4-5.

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

where:

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

P = The static pressure of the test, which is equal to the design duct pressure class rating, inches w.g.

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.

Subp. 8. **IECC Table C403.2.7 Minimum required duct and plenum insulation.** IECC section C403.2 is amended by adding Table C403.2.7 to read as follows:

TABLE C403.2.7

MINIMUM REQUIRED DUCT AND PLENUM INSULATION

Ducts for Other Than Dwelling Units[a,b]	Supply Duct Requirements[c,d]	Return Duct Requirements[c,d]	Exhaust Duct and Relief 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-5 and V	None	R-5 and V
TD greater than 15°F and less than or equal to 40°F	R-3.3 and V	None	R-3.3 and V
Within concrete slab or within ground	R-3.5 and V	R-3.5 and V	None
Within conditioned spaces	None[f]	None	None
TD less than or equal to 15°F	None	None	None

Ducts for Dwelling Units[a]	Requirements[c,d]
Exterior of building	R-8, V and W
Attics, garages, and ventilated crawl spaces (except exhaust ducts)	R-8 and V
Exhaust ducts in attics, garages, and ventilated crawl spaces	R-3.3 and V
Outdoor air intakes within conditioned spaces	R-3.3 and V
Exhaust ducts within conditioned spaces[e]	R-3.3 and V
Within concrete slab or within ground	R-3.5 and V
Within conditioned spaces	None

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 are 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.

Subp. 9. **IECC section C403.2.8.1 Protection of piping insulation.** IECC section C403.2.8.1 is amended to read as follows:

C403.2.8.1 Protection of piping insulation. Piping insulation shall be protected from damage, including damage from sunlight, moisture, equipment maintenance, and wind, and shall provide shielding from solar radiation to deter degradation of the material. Adhesive tape shall not be permitted. Piping insulation shall comply with both of the following requirements:

1. 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; and

2. Unless the insulation is vapor-retardant, insulation covering chilled-water piping or refrigerant suction piping located outside the conditioned space shall include a vapor retardant located outside the insulation. All penetrations and joints shall be sealed.

Subp. 10. **IECC section C403.2.10.1 Allowable fan motor horsepower.** IECC section C403.2.10.1 is amended to read as follows:

C403.2.10.1 Allowable fan motor horsepower. Each HVAC system at fan system design conditions shall not exceed the allowable fan system motor nameplate hp (Option 1) or fan system bhp (Option 2) as shown in Table C403.2.10.1(1). This includes supply fans, return/relief fans, exhaust fans, and fan-powered terminal units associated with systems providing heating or cooling capability. Single zone variable-air-volume systems shall comply with the constant volume fan power limitation.

Exceptions: The following fan systems are exempt from allowable fan motor horsepower requirements:

1. Hospital, vivarium, and laboratory systems that utilize flow control devices on exhaust or return to maintain space pressure relationships necessary for occupant health and safety or environmental control shall be permitted to use variable volume fan power limitation.

2. Individual exhaust fans with motor nameplate horsepower of 1 hp or less.

Subp. 11. **IECC Table C403.2.10.1(2) FAN POWER LIMITATION PRESSURE DROP ADJUSTMENT.** Table C403.2.10.1(2) is amended to read as follows:

TABLE C403.2.10.1(2) FAN POWER LIMITATION PRESSURE DROP ADJUSTMENT

DEVICE	ADJUSTMENT
Credits	
Fully ducted return and/or exhaust air systems	0.5 inch w.c. (2.15 in w.c. for laboratory and vivarium systems)
Return and/or exhaust air flow control devices	0.5 inch w.c.
Exhaust filters, scrubbers, or other exhaust treatment	Pressure drop of device calculated at fan system design conditions
Particulate filtration credit: MERV 9 to 12	0.5 inch w.c.
Particulate filtration credit: MERV 13 to 15	0.9 inch w.c.
Particulate filtration credit: MERV 16 and greater and electronically enhanced filters	Pressure drop calculated at 2 times clean filter pressure drop at fan system design condition
Carbon and other gas-phase air cleaners	Clean filter pressure drop at fan system design condition
Biosafety cabinet	Pressure drop of device at fan system design condition
Energy recovery device, other than coil runaround loop	(2.2 x energy recovery effectiveness) - 0.5 inch w.c. for each airstream
Coil runaround loop	0.6 inch w.c. for each airstream
Evaporative humidifier/cooler in series with another cooling coil	Pressure drop of device at fan system design conditions
Sound attenuation section	0.15 inch w.c.
Exhaust system serving fume hoods	0.35 inch w.c.
Laboratory and vivarium exhaust systems in high-rise buildings	0.25 inch w.c./100 feet of vertical duct exceeding 75 feet
Air blender	0.30 inch w.c.
Preheat coil	0.10 inch w.c.

w.c. = water column

For SI: 1 inch w.c. = 249 Pa; 1 inch = 25.4 mm

Subp. 12. **IECC section C403.4.2.1 Static pressure sensor location.** IECC section C403.4.2.1 is amended to read as follows:

> **C403.4.2.1 Static pressure sensor location.** Static pressure sensors used to control VAV fans shall be placed in a position such that the controller setpoint is no greater than one-third the total design fan static pressure, except for systems with zone reset control complying with section C.403.4.2.2. Sensors shall be located in a position so the controller setpoint is optimized to maintain the minimum static pressure required for system operation throughout its range.

Subp. 13. **IECC section C403.4.3.3.3 Two-position valve.** IECC section C403.4.3.3.3 is amended to read as follows:

> **C403.4.3.3.3 Two-position valve.** Each hydronic heat pump shall have a two-position automatic valve interlocked to shut off the water flow when the compressor is off.

Subp. 14. **IECC section C403.4.5.4 Supply-air temperature reset controls.** IECC section C403.4.5.4 is amended to read as follows:

> **C403.4.5.4 Supply-air temperature reset controls.** Multiple zone HVAC systems shall include controls that automatically reset the supply-air temperature in response to representative building loads, or to outdoor air temperature. The controls shall be capable of resetting the supply-air temperature at least 25 percent of the difference between the design supply-air temperature and the design room air temperature. Zones with constant loads shall be designed for the fully reset supply temperature.
>
> **Exceptions:**
>
> 1. Systems that prevent reheating, recooling, or mixing of heated and cooled supply air.
>
> 2. 75 percent of the energy for reheating is from site-recovered or site solar energy sources.
>
> 3. Zones with peak supply air quantities of 300 cfm (142 L/s) or less.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

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1323.0404 SECTION C404, SERVICE WATER HEATING (MANDATORY).

IECC section C404.7.3 Covers. IECC section C404.7.3 is amended to read as follows:

C404.7.3 Covers. Heated pools and inground, permanently installed spas shall be provided with a vapor-retardant cover. Covers for heated swimming pools shall comply with Minnesota Rules, part 4717.1575, the Minnesota Department of Health pool cover safety standard. Pools heated to more than 90°F shall have a pool cover with a minimum insulation value of R-12.

> **Exception:** A vapor-retardant cover is not required for pools deriving over 70 percent of the energy for heating from site-recovered energy, such as a heat pump or solar energy source computed over an operating season.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

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1323.0405 SECTION C405, ELECTRICAL POWER AND LIGHTING SYSTEMS (MANDATORY).

IECC section C405.8 Conductor sizing; voltage drop. IECC section C405 is amended by adding a new subsection to read as follows:

C405.8 Conductor sizing; voltage drop. Except for feeder conductors and branch circuit conductors that are dedicated to emergency services, conductors shall be sized as follows:

1. Feeder conductors shall be sized for a maximum voltage drop of 2 percent at design load.

2. Branch circuit conductors shall be sized for a maximum voltage drop of 3 percent at design load.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

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1323.0408 SYSTEM COMMISSIONING.

Subpart 1. **IECC section C408.2.** IECC section C408.2 is amended to read as follows:

C408.2 Mechanical systems commissioning and completion requirements. Prior to passing the final mechanical inspection, the registered design professional, the permit applicant, or an approved agency shall provide evidence of mechanical systems commissioning and completion in accordance with the provisions of this section.

Construction document notes or specifications shall clearly indicate provisions for commissioning and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner and made available to the code official upon request in accordance with Sections C408.2.4 and C408.2.5.

Exception: The following systems are exempt from the commissioning requirements:

1. Mechanical systems in buildings where the total mechanical equipment capacity is less than 480,000 Btu/h (140 690 W) cooling capacity and 600,000 Btu/h (175 860 W) heating capacity.

2. Systems included in Section C403.3 that serve dwelling units and sleeping units in hotels, motels, boarding houses, or similar units.

Subp. 2. **IECC subsection C408.2.2.1.** IECC subsection C408.2.2.1 is amended to read as follows:

C408.2.2.1 Air systems balancing. Each supply air outlet and zone terminal device shall be equipped with means for air balancing in accordance with the requirements of Chapter 6 of the International Mechanical Code. Discharge dampers are prohibited on constant volume fans and variable volume fans with motors 10 hp (18.6 kW) and larger. Air systems shall be balanced in a manner to first minimize throttling losses then, for fans with system power of greater than 1 hp (0.74 kW), fan speed shall be adjusted to meet design flow conditions.

Exception: Speed adjustment is not required for fan motors rated at 1 hp (0.74 kW) or less.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

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