

1.1 **Department of Labor and Industry**

1.2 **Proposed Permanent Rules Adopting the 2012 International Energy Conservation**
1.3 **Code (IECC), Commercial Provisions**

1.4 **1323.0010 INCORPORATION BY REFERENCE OF THE INTERNATIONAL**
1.5 **ENERGY CONSERVATION CODE - COMMERCIAL ENERGY PROVISIONS.**

1.6 Subpart 1. General. For purposes of this chapter, "ASHRAE Standard 90.1" means
1.7 ANSI/ASHRAE/IESNA Standard 90.1-2004, titled Energy Standard for Buildings Except
1.8 Low-Rise Residential Buildings, promulgated by the American Society of Heating,
1.9 Refrigerating and Air-Conditioning Engineers, Inc., 1791 Tullie Circle, N.E., Atlanta, GA
1.10 30329. ASHRAE Standard 90.1-2004, is incorporated by reference and made part of the
1.11 Minnesota Commercial Energy Code, as amended in this chapter. Portions of this chapter
1.12 reproduce text and tables from ASHRAE Standard 90.1. ASHRAE Standard 90.1 is not
1.13 subject to frequent change and a copy of ASHRAE Standard 90.1 is available in the office
1.14 of the commissioner of labor and industry. ASHRAE Standard 90.1 is copyright 2004 by
1.15 the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. All
1.16 rights reserved. The 2012 edition of the International Energy Conservation Code (IECC)
1.17 as promulgated by the International Code Council, Inc. (ICC), Washington, D.C., is
1.18 incorporated by reference and made part of the Minnesota State Building Code except as
1.19 qualified by the applicable provisions in Minnesota Rules, chapter 1300, and as amended
1.20 in this rule chapter. Portions of this publication reproduce excerpts from the 2012 IECC,
1.21 International Code Council, Inc., Washington, D.C., copyright 2012, reproduced with
1.22 permission, all rights reserved. The IECC is not subject to frequent change, and a copy
1.23 of the IECC, with amendments for use in Minnesota, is available in the office of the
1.24 commissioner of labor and industry.

1.25 Subp. 2. Mandatory chapters. The commercial provisions of the 2012 IECC-CE
1.26 chapters 2 (CE) to 5 (CE), shall be administered by any municipality that has adopted the

2.1 code, except as qualified by the applicable provisions in Minnesota Rules, chapter 1300,
2.2 and as amended by this rule chapter.

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

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

2.8 **1323.0020 REFERENCES TO OTHER INTERNATIONAL CODE COUNCIL**
2.9 **(ICC) CODES.**

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

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

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

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

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

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

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

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

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

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

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

3.19 **1323.0030 ADMINISTRATIVE PROCEDURE CRITERIA.**

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

3.23 **1323.0100 ADMINISTRATION FOR COMMERCIAL ENERGY CODE.**

3.24 Subpart 1. **Application.** In addition to the requirements in Minnesota Rules, part
3.25 1323.0030, the administrative provisions in this part apply.

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

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

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

4.13 1. Storm windows installed over existing fenestration.

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

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

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

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

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

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

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

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

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

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

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

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

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

6.1 A. Those with a peak design rate of energy usage less than 3.4 Btu/h-ft² (10.7
6.2 W/m²) or 1.0 watt/ft² (10.7 W/m²) of floor area for space conditioning purposes.

6.3 B. Those that do not contain conditioned space.

6.4 Subp. 10. **Information on construction documents.** Construction documents shall
6.5 be drawn to scale on suitable material. Electronic media documents are permitted to be
6.6 submitted when approved by the building official. Construction documents shall indicate
6.7 the location, nature, and extent of the work proposed, and show in detail pertinent data
6.8 and features of the building, systems, and equipment as governed in this code. Examples
6.9 of this detail include insulation materials and their R-values; fenestration U-factors and
6.10 SHGCs; area-weighted U-factor and SHGC calculations; mechanical system design
6.11 criteria; mechanical and service water heating system and equipment types, sizes,
6.12 and efficiencies; economizer description; equipment and systems controls; fan motor
6.13 horsepower (hp) and controls; duct sealing, duct sizing, duct and pipe insulation and
6.14 location, terminal air or water design flow rates; electrical distribution diagram(s); lighting
6.15 fixture schedule with wattage and control narrative; and air sealing details. Air sealing
6.16 details shall clearly delineate the air barrier location and show continuity between roof,
6.17 wall, foundation, around frames and sleeves, and at other similar openings.

6.18 **1323.0201 SECTION C201, GENERAL.**

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

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

7.1 **1323.0202 SECTION C202, GENERAL DEFINITIONS.**

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

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

7.6 1. inspection, investigation, or testing;

7.7 2. accepted principles;

7.8 3. computer simulations;

7.9 4. research reports; or

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

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

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

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

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

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

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

8.3 **1323.0303 SECTION C303, MATERIALS, SYSTEMS, AND EQUIPMENT.**

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

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

8.11 **1323.0402 SECTION C402, BUILDING ENVELOPE REQUIREMENTS.**

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

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

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

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

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

- 9.5 1. The air barrier shall be continuous for all assemblies that are the
9.6 thermal envelope of the building and across the joints and assemblies.
9.7 2. Air barrier joints and seams shall be sealed, including sealing
9.8 transitions in places and changes in materials. Air barrier penetrations
9.9 shall be sealed in accordance with section C402.4.2. The joints and seals
9.10 shall be securely installed in or on the joint for its entire length so as not
9.11 to dislodge, loosen, or otherwise impair its ability to resist positive and
9.12 negative pressure from wind, stack effect, and mechanical ventilation.
9.13 3. Recessed lighting fixtures shall comply with section C402.4.8.
9.14 Where similar objects are installed that penetrate the air barrier,
9.15 provisions shall be made to maintain the integrity of the air barrier.

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

9.18 **C402.4.5.1 Stairway and shaft vents.** Stairway and shaft vents shall be
9.19 provided with Class I motorized dampers with a maximum leakage rate of 4
9.20 cfm/ft² (20.3 L/s·m²) at 1.0 inch water gauge (w.g.) (249 Pa) when tested
9.21 in accordance with AMCA 500D.

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

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

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

10.1 **C402.4.5.2 Outdoor air intakes and exhausts.** Outdoor air supply and
10.2 exhaust openings shall be provided with Class IA motorized dampers with a
10.3 maximum leakage rate of 4 cfm/ft² (20.3 L/s·m²) at 1.0 inch water gauge
10.4 (w.g.) (249 Pa) when tested in accordance with AMCA 500D.

10.5 **Exceptions:**

10.6 1. For exhaust and relief dampers in buildings less than three stories
10.7 in height above grade plane or, where the design outdoor air intake
10.8 or exhaust capacity does not exceed 300 cfm, (141 L/s), gravity
10.9 (nonmotorized) dampers having a maximum leakage rate of 20 cfm/ft²
10.10 (101.6 L/s m²) at 1.0-inch water gauge) (w.g.) (249 Pa) when tested in
10.11 accordance with AMCA 500D are permitted to be used.

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

10.14 2. Nonmotorized dampers smaller than 24 inches (610 mm) in either
10.15 dimension shall be permitted to have a leakage of 40 cfm/ft² (203.2
10.16 L/s·m²) at 1.0 inch water gauge (w.g.) (249 Pa) when tested in
10.17 accordance with AMCA 500D.

10.18 **1323.0403 SECTION C403, BUILDING MECHANICAL SYSTEMS.**

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

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

10.26 **TABLE C403.2.1 Climatic Data Design Conditions**

11.1	<u>City</u>	<u>Summer Db/Wb °F</u>	<u>Winter Db °F</u>
11.2	<u>Aitkin</u>	<u>82/72</u>	<u>-24</u>
11.3	<u>Albert Lea</u>	<u>85/72</u>	<u>-15</u>
11.4	<u>Alexandria</u>	<u>86/70</u>	<u>-21</u>
11.5	<u>Bemidji</u>	<u>84/68</u>	<u>-24</u>
11.6	<u>Cloquet</u>	<u>82/68</u>	<u>-20</u>
11.7	<u>Crookston</u>	<u>84/70</u>	<u>-27</u>
11.8	<u>Duluth</u>	<u>81/67</u>	<u>-20</u>
11.9	<u>Ely</u>	<u>82/68</u>	<u>-29</u>
11.10	<u>Eveleth</u>	<u>82/68</u>	<u>-26</u>
11.11	<u>Faribault</u>	<u>86/73</u>	<u>-16</u>
11.12	<u>Fergus Falls</u>	<u>86/71</u>	<u>-21</u>
11.13	<u>Grand Rapids</u>	<u>81/67</u>	<u>-23</u>
11.14	<u>Hibbing</u>	<u>82/68</u>	<u>-19</u>
11.15	<u>International Falls</u>	<u>83/67</u>	<u>-28</u>
11.16	<u>Litchfield</u>	<u>85/71</u>	<u>-18</u>
11.17	<u>Little Falls</u>	<u>86/71</u>	<u>-20</u>
11.18	<u>Mankato</u>	<u>86/72</u>	<u>-15</u>
11.19	<u>Minneapolis/St. Paul</u>	<u>88/72</u>	<u>-15</u>
11.20	<u>Montevideo</u>	<u>86/72</u>	<u>-17</u>
11.21	<u>Mora</u>	<u>84/70</u>	<u>-21</u>
11.22	<u>Morris</u>	<u>84/72</u>	<u>-21</u>
11.23	<u>New Ulm</u>	<u>87/73</u>	<u>-15</u>
11.24	<u>Owatonna</u>	<u>86/73</u>	<u>-16</u>
11.25	<u>Pequot Lakes</u>	<u>84/68</u>	<u>-23</u>
11.26	<u>Pipestone</u>	<u>85/73</u>	<u>-15</u>
11.27	<u>Redwood Falls</u>	<u>89/73</u>	<u>-17</u>
11.28	<u>Rochester</u>	<u>85/72</u>	<u>-17</u>
11.29	<u>Roseau</u>	<u>82/70</u>	<u>-29</u>
11.30	<u>St. Cloud</u>	<u>86/71</u>	<u>-20</u>

12.1	<u>Thief River Falls</u>	<u>82/68</u>	<u>-25</u>
12.2	<u>Tofte</u>	<u>75/61</u>	<u>-14</u>
12.3	<u>Warroad</u>	<u>83/67</u>	<u>-29</u>
12.4	<u>Wheaton</u>	<u>84/71</u>	<u>-20</u>
12.5	<u>Willmar</u>	<u>85/71</u>	<u>-20</u>
12.6	<u>Winona</u>	<u>88/74</u>	<u>-13</u>
12.7	<u>Worthington</u>	<u>84/71</u>	<u>-14</u>
12.8	<u>Db = dry bulb temperature, degrees Fahrenheit</u>		
12.9	<u>Wb = wet bulb temperature, degrees Fahrenheit</u>		

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

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

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

12.18 **C403.2.4.3.1 Thermostatic setback capabilities.** Heating systems
 12.19 shall be equipped with controls that have the capacity to automatically
 12.20 restart and temporarily operate the systems to maintain zone
 12.21 temperatures above a heating setpoint adjustable down to 55°F (13°C)
 12.22 or lower. Cooling systems shall be equipped with controls that have the
 12.23 capacity to automatically restart and temporarily operate the system to
 12.24 maintain zone temperatures below a cooling setpoint adjustable up to
 12.25 90°F (32°C) or higher or to prevent high space humidity levels.

12.26 **Exceptions:**

12.27 1. Radiant floor and radiant ceiling heating systems.

13.1 2. Spaces where constant temperature conditions must be
13.2 maintained.

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

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

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

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

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

- 14.1 1. Where energy recovery systems are prohibited by the International
14.2 Mechanical Code, as amended in Minnesota Rules, chapter 1346.
- 14.3 2. Laboratory fume hood systems that include at least one of the following
14.4 features:
- 14.5 2.1 Variable-air-volume hood exhaust and room supply systems capable
14.6 of reducing exhaust and makeup air volume to 50 percent or less of
14.7 design values except when higher volumes are required to maintain
14.8 safe operating conditions.
- 14.9 2.2 Direct makeup (auxiliary) air supply equal to at least 75 percent
14.10 of the exhaust rate, heated no warmer than 2°F (1.1°C) above room
14.11 setpoint, cooled to no cooler than 3°F (1.7°C) below room setpoint, no
14.12 humidification added, and no simultaneous heating and cooling used for
14.13 dehumidification control.
- 14.14 3. Systems serving spaces that are heated to less than 60°F (15.5°C) and are
14.15 not cooled.
- 14.16 4. Where more than 60 percent of the outdoor heating energy is provided
14.17 from site-recovered or site solar energy.
- 14.18 5. Heating energy recovery in Climate Zones 1 and 2.
- 14.19 6. Cooling energy recovery in Climate Zones 3C, 4C, 5B, 5C, 6B, 7, and 8.
- 14.20 7. Systems requiring dehumidification that employ energy recovery in series
14.21 with the cooling coil.
- 14.22 8. Where the largest source of air exhausted at a single location at the
14.23 building exterior is less than 75 percent of the design outdoor air flow rate.
- 14.24 9. Systems expected to operate less than 20 hours per week at the outdoor
14.25 air percentage covered by Table C403.2.6.
- 14.26 10. Systems exhausting paint fumes; toxic, flammable, or corrosive fumes;
14.27 or dust.

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

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

15.5 TABLE C403.2.6 EXHAUST AIR ENERGY RECOVERY REQUIREMENT.

15.6 Subp. 7. IECC section C403.2.7 Duct and plenum insulation and sealing. IECC
15.7 section C403.2.7 is amended to read as follows:

15.8 C403.2.7 Duct and plenum insulation and sealing. Insulation shall be
15.9 protected from damage, including damage from sunlight, moisture, equipment
15.10 maintenance, and wind. Insulation exposed to weather shall be suitable for
15.11 outdoor service and shall be protected by aluminum, sheet metal, painted canvas,
15.12 plastic cover, or other similar materials approved by the building official. Cellular
15.13 foam insulation shall be protected as required by this subpart or painted with a
15.14 coating that is water-retardant and provides shielding from solar radiation that
15.15 causes degradation of the material. All supply, return, exhaust, and relief air ducts
15.16 and plenums shall be insulated according to Table C403.2.7, located in subpart 13.

15.17 Exception: Where located within equipment.

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

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

15.23 C403.2.7.1.1 Low-pressure duct systems. All longitudinal and
15.24 transverse joints, seams, and connections of supply and return ducts
15.25 operating at a static pressure less than or equal to 2 inches water gauge
15.26 (w.g.) (500 Pa) shall be securely fastened and sealed with welds,
15.27 gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems,

16.1 or tapes installed in accordance with the manufacturer's installation
16.2 instructions. Pressure classifications specific to the duct system shall be
16.3 clearly indicated on the construction documents in accordance with the
16.4 International Mechanical Code, as amended.

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

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

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

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

16.22 where:

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

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

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

17.6 Subp. 8. IECC Table C403.2.7 Minimum required duct and plenum insulation.

17.7 IECC section C403.2 is amended by adding Table C403.2.7 to read as follows:

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

17.10 <u>Ducts for Other</u> 17.11 <u>Than Dwelling</u> 17.12 <u>Units</u> ^{a,b}	<u>Supply Duct</u> <u>Requirements</u> ^{c,d}	<u>Return Duct</u> <u>Requirements</u> ^{c,d}	<u>Exhaust Duct</u> <u>and Relief Duct</u> <u>Requirements</u> ^{c,d,e}
17.13 <u>Exterior of building</u>	<u>R-8, V and W</u>	<u>R-8, V and W</u>	<u>R-8, V and W</u>
17.14 <u>Attics, garages, and</u> 17.15 <u>ventilated crawl</u> 17.16 <u>spaces</u>	<u>R-8 and V</u>	<u>R-8 and V</u>	<u>R-6 and V</u>
17.17 <u>TD greater than 40°F</u>	<u>R-5 and V</u>	<u>None</u>	<u>R-5 and V</u>
17.18 <u>TD greater than 15°F</u> 17.19 <u>and less than or equal</u> 17.20 <u>to 40°F</u>	<u>R-3.3 and V</u>	<u>None</u>	<u>R-3.3 and V</u>
17.21 <u>Within concrete slab</u> 17.22 <u>or within ground</u>	<u>R-3.5 and V</u>	<u>R-3.5 and V</u>	<u>None</u>
17.23 <u>Within conditioned</u> 17.24 <u>spaces</u>	<u>None</u> ^f	<u>None</u>	<u>None</u>
17.25 <u>TD less than or equal</u> 17.26 <u>to 15°F</u>	<u>None</u>	<u>None</u>	<u>None</u>
17.27 <u>Ducts for Dwelling Units</u> ^a		<u>Requirements</u> ^{c,d}	
17.28 <u>Exterior of building</u>		<u>R-8, V and W</u>	
17.29 <u>Attics, garages, and ventilated crawl spaces</u> 17.30 <u>(except exhaust ducts)</u>		<u>R-8 and V</u>	
17.31 <u>Exhaust ducts in attics, garages, and</u> 17.32 <u>ventilated crawl spaces</u>		<u>R-3.3 and V</u>	

- 18.1 Outdoor air intakes within conditioned
 18.2 spaces R-3.3 and V
- 18.3 Exhaust ducts within conditioned spaces^e R-3.3 and V
- 18.4 Within concrete slab or within ground R-3.5 and V
- 18.5 Within conditioned spaces None
- 18.6 a. Ducts located within the building thermal envelope shall be located completely on the
 18.7 conditioned side of the air barrier.
- 18.8 b. TD = Design temperature difference between the air in the duct and the ambient
 18.9 temperature outside of the duct, unless the duct type and location are specifically
 18.10 identified above.
- 18.11 c. V = Vapor retarder required in accordance with IMC section 604.11. When a vapor
 18.12 retarder is required, duct insulation required by this section shall be installed without
 18.13 respect to other building envelope insulation.
- 18.14 d. W = Approved weatherproof barrier.
- 18.15 e. Insulation is only required in the conditioned space for a distance of 3 feet (914 mm)
 18.16 from the exterior or unconditioned space.
- 18.17 f. If temperature rise is greater than 3°F from supply air to furthest outlet, duct insulation
 18.18 shall be required.

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

- 18.21 **C403.2.8.1 Protection of piping insulation.** Piping insulation shall
 18.22 be protected from damage, including damage from sunlight, moisture,
 18.23 equipment maintenance, and wind, and shall provide shielding from solar
 18.24 radiation to deter degradation of the material. Adhesive tape shall not
 18.25 be permitted. Piping insulation shall comply with both of the following
 18.26 requirements:
- 18.27 1. Insulation exposed to weather shall be suitable for outdoor service
 18.28 and shall be protected by aluminum, sheet metal, painted canvas, plastic
 18.29 cover, or other similar materials approved by the building official.
 18.30 Cellular foam insulation shall be protected as above or painted with

19.1 a coating that is water-retardant and provides shielding from solar
 19.2 radiation; and
 19.3 2. Unless the insulation is vapor-retardant, insulation covering
 19.4 chilled-water piping or refrigerant suction piping located outside the
 19.5 conditioned space shall include a vapor retardant located outside the
 19.6 insulation. All penetrations and joints shall be sealed.

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

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

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

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

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

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

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

20.1	<u>DEVICE</u>	<u>ADJUSTMENT</u>
20.2		<u>Credits</u>
20.3	<u>Fully ducted return and/or exhaust air</u>	<u>0.5 inch w.c. (2.15 in w.c. for laboratory</u>
20.4	<u>systems</u>	<u>and vivarium systems)</u>
20.5	<u>Return and/or exhaust air flow control</u>	
20.6	<u>devices</u>	<u>0.5 inch w.c.</u>
20.7	<u>Exhaust filters, scrubbers, or other exhaust</u>	<u>Pressure drop of device calculated at fan</u>
20.8	<u>treatment</u>	<u>system design conditions</u>
20.9	<u>Particulate filtration credit: MERV 9 to 12</u>	<u>0.5 inch w.c.</u>
20.10	<u>Particulate filtration credit: MERV 13 to 15</u>	<u>0.9 inch w.c.</u>
20.11	<u>Particulate filtration credit: MERV 16 and</u>	<u>Pressure drop calculated at 2 times clean</u>
20.12	<u>greater and electronically enhanced filters</u>	<u>filter pressure drop at fan system design</u>
20.13		<u>condition</u>
20.14	<u>Carbon and other gas-phase air cleaners</u>	<u>Clean filter pressure drop at fan system</u>
20.15		<u>design condition</u>
20.16	<u>Biosafety cabinet</u>	<u>Pressure drop of device at fan system design</u>
20.17		<u>condition</u>
20.18	<u>Energy recovery device, other than coil</u>	<u>(2.2 x energy recovery effectiveness) - 0.5</u>
20.19	<u>runaround loop</u>	<u>inch w.c. for each airstream</u>
20.20	<u>Coil runaround loop</u>	<u>0.6 inch w.c. for each airstream</u>
20.21	<u>Evaporative humidifier/cooler in series with</u>	<u>Pressure drop of device at fan system design</u>
20.22	<u>another cooling coil</u>	<u>conditions</u>
20.23	<u>Sound attenuation section</u>	<u>0.15 inch w.c.</u>
20.24	<u>Exhaust system serving fume hoods</u>	<u>0.35 inch w.c.</u>
20.25	<u>Laboratory and vivarium exhaust systems</u>	<u>0.25 inch w.c./100 feet of vertical duct</u>
20.26	<u>in high-rise buildings</u>	<u>exceeding 75 feet</u>
20.27	<u>Air blender</u>	<u>0.30 inch w.c.</u>
20.28	<u>Preheat coil</u>	<u>0.10 inch w.c.</u>
20.29	<u>w.c. = water column</u>	
20.30	<u>For SI: 1 inch w.c. = 249 Pa; 1 inch = 25.4 mm</u>	

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

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

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

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

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

21.15 **C403.4.5.4 Supply-air temperature reset controls.** Multiple zone HVAC
21.16 systems shall include controls that automatically reset the supply-air
21.17 temperature in response to representative building loads, or to outdoor
21.18 air temperature. The controls shall be capable of resetting the supply-air
21.19 temperature at least 25 percent of the difference between the design
21.20 supply-air temperature and the design room air temperature. New zones
21.21 with constant loads shall be designed for the fully reset supply temperature.

21.22 **Exceptions:**

21.23 1. Systems that prevent reheating, recooling, or mixing of heated and
21.24 cooled supply air.

21.25 2. 75 percent of the energy for reheating is from site-recovered or site
21.26 solar energy sources.

21.27 3. Zones with peak supply air quantities of 300 cfm (142 L/s) or less.

22.1 **1323.0404 SECTION C404, SERVICE WATER HEATING (MANDATORY).**

22.2 Subpart 1. IECC section C404.7.3 Covers. IECC section C404.7.3 is amended
22.3 to read as follows:

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

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

22.13 **1323.0405 SECTION C405, ELECTRICAL POWER AND LIGHTING SYSTEMS**
22.14 **(MANDATORY).**

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

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

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

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

22.24 **REPEALER.** Minnesota Rules, parts 1323.0230; 1323.0320; 1323.0513; 1323.0543;
22.25 1323.0550; 1323.0562; 1323.0581; 1323.0642; 1323.0643; 1323.0644; 1323.0651;
22.26 1323.0652; 1323.0653; 1323.0657; 1323.0672; 1323.0681; 1323.0690; 1323.0741;

23.1 1323.0745; 1323.0780; 1323.0871; 1323.0872; 1323.0891; 1323.0911; 1323.0944;

23.2 1323.0991; 1323.1114; 1323.1121; 1323.1132; and 1323.1300, are repealed.

23.3 **EFFECTIVE PERIOD.** The amendments to Minnesota Rules, chapter 1323, are

23.4 effective February 14, 2015, or five working days after publication of the amendments'

23.5 notice of adoption in the State Register, whichever is later.