Module I

Introductions, Goals, Identifying Code Changes, Chapters 1-3 IMC® and UMC®

Jim Cika

International Code Council
Director, PMG Technical Resources

- Provide code-related resources and education to AHJs, Engineers, and Contractors on the various editions of I-codes related to PMG: IPC, IMC, IFGC, ISPSC, and IPSDC.
- Responsible for state specific PMG technical support in the states of AL, AR, FL, GA, IA, MA, NE, ND, OK, SC, PR, and USVI.
- Director, Engineering and Product Management of PMG Comfort Solutions, the chief technical executive responsible for the development, testing, and product engineering matters.
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- International Code Council subsidiary
- Evaluates products using codes and standards for the built environment
- Accredited by:
  - American National Standard Institute (ANSI) to ISO/IEC 17065
  - Standards Council of Canada (SCC)
  - American Association for Laboratory Accreditation (A2LA)
  - EMA to conduct Plumbing Product listing to the Mexican NOMs
- Expert in developing and interpreting ICC-ES Acceptance Criteria (ACs) for innovative products
Objectives:

• Identify the differences between code year requirements
• Apply the updated code requirements to maintain the health and safety of the community
• Identify changes in the organization of code requirements
• Apply the changes to codes for design, plan review, and inspection requirements
Formatting changes to 2024 I-Codes

- 2024 I-Codes have undergone substantial formatting changes as part of the digital transformation strategy of the International Code Council (ICC) to improve the user experience.

- The resulting product better aligns the print and PDF versions of the I-Codes with the ICC’s Digital Code content.

- Additional information can be found at iccsafe.org/design-updates.
Formatting changes to 2024 I-Codes

Style Changes to the 2024 International Codes

- Updated style changes to improve readability and page count and support sustainability

Replacement of Marginal Markings w/QR Codes

- Through 2021, print editions of the I-Codes identified technical changes from prior code cycles with marginal markings:
  - Solid vertical lines for new text
  - Arrows for deletion
  - Asterisks for relocations

- 2024 I-Code print editions replace the marginal markings with QR codes to identify code changes precisely.
Through 2021, print editions of the I-Codes identified technical changes from prior code cycles with marginal markings:

- A QR code is placed at the beginning of any section that has undergone technical revision. If there is no QR code, that section has no technical changes.

In the following example from the 2024 IMC®, a QR code indicates there are changes to Section 301 from the 2021 IMC®.

- Note that the change may occur in the main section or one or more subsections.

In the following example from the 2024 IMC®, a QR code indicates changes to Chapter 3 of 2021 IMC®.
Replacement of Marginal Markings w/ QR Codes

- To see the code changes, scan the QR code with a smart device.

- If scanning a QR code is not an option, changes can be accessed by entering the 7-digit code beneath the QR code at the end of the following URL: qr.iccsafe.org/

In the example: https://qr.iccsafe.org/9d8fb64

All methods take the user to the appropriate section on ICC’s Digital Codes website, where technical changes from the prior cycle can be viewed.

All other users will be directed to the Digital Codes Basic free view.

Both views show new code language in blue text along with deletion arrows for deleted text and relocation markers for relocated text.

Digital Codes Premium subscribers who are logged in will be automatically directed to the Premium view.
Replacement of Marginal Markings w QR Codes

- Digital Codes Premium offers additional ways to enhance code compliance research, including revision histories, commentary by code experts and an advanced search function.

- A full list of features can be found at codes.iccsafe.org/premium-features.

Revision Markings:

- Solid vertical lines in the margins indicate a technical change from the requirements of the 2021 edition.

- An arrow (↓) in the margin indicates where an entire section, paragraph, exception, figure, or table has been deleted or an item in a list of items or a table has been deleted.

- A double right angle («) in the margin indicates that the text, table, or figure has been relocated within the code.
Revision Markings:

- The table on page xiv of the UMC® points out the relocations in the 2024 edition of the Uniform Mechanical Code.

- TIA indicates that the revision is the result of a Tentative Interim Amendment.

- A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another document.

Revision Markings:

- A reference in brackets { } following a section or paragraph indicates material that has been extracted from another document and has been modified further by the Technical Committee.

IAPMO Publishes 2024 Editions of Uniform Plumbing Code (UPC), Uniform Mechanical Code (UMC):

- Significant changes to the UMC include:
  - New minimum air filtration requirements for occupied spaces of mechanically ventilated buildings.
  - Revised outdoor air intake requirements for transient occupancies.
IAPMO Publishes 2024 Editions of Uniform Plumbing Code (UPC), Uniform Mechanical Code (UMC):

- Significant changes to the UMC include:
  - New air balancing requirements for ventilation systems
  - New exceptions for materials exposed with ducts or plenums
  - New provisions for high-probability systems using Group A2L refrigerants for human comfort applications

- Significant changes to the UMC include:
  - New design requirements for geothermal district ambient temperature loop (ATL) systems
  - New Appendix H providing minimum qualifications for installers, inspectors, or employers for systems covered by the UMC

- Significant changes to the UMC include:
  - New Appendix I addressing mechanical system requirements for indoor horticultural facilities
  - New Appendix J addressing CO2 monitoring and clean air delivery for adequate ventilation in occupied spaces
IAPMO Publishes 2024 Editions of Uniform Plumbing Code (UPC), Uniform Mechanical Code (UMC):

To access the full IAPMO press release, please visit:


READ IAPMO CODES ONLINE:

The codes of practice attempt to minimize public risk by specifying technical standards of design, materials, workmanship and maintenance for various systems.

The main aims of the Uniform codes are:

• To ensure that planners, administrators and plumbers develop the required competency to ensure that the codes are applied and upheld;

• That standards are set to ensure that plumbing assemblies, materials and technologies are safe and effective;
READ IAPMO CODES ONLINE:
The codes of practice attempt to minimize public risk by specifying technical standards of design, materials, workmanship and maintenance for various systems.

The main aims of the Uniform codes are:

- To ensure that plumbing installations meet these standards;
- To ensure safety and effectiveness continuously through the proper maintenance of these installations.

IAPMO and ASSE Offer Access to Library of Standards
104 Duties and Powers of the Code Official

104.1 General. The code official is hereby authorized and directed to enforce the provisions of this code.

104.2 Determination of compliance. The code official shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[Due to space constraints, only portions of Sections 104 are shown.]

104.3.1 Construction Documents

- This section has been updated to allow for the submittal to include the use of digital documents.
Ambulatory Care Facility. Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less than 24-hour basis to persons who are rendered incapable of self-preservation by the services provided or staff has accepted responsibility for care recipients already incapable.

Condensing Unit. A specific refrigerating machine combination for a given refrigerant, consisting of one or more power-driven compressors, condensers and, where required, liquid receivers, and the regularly furnished accessories. A factory-made assembly of refrigeration components designed to compress and liquefy a specific refrigerant. The unit consists of one or more power-driven compressors, condensers, liquid receivers (where required) and factory-supplied accessories.
202 Definitions - Draftstop

Draftstop. A material, device or construction installed to restrict the movement of air within open spaces of concealed areas of building components such as crawl spaces, floor/ceiling assemblies, roof/ceiling assemblies and attics.

202 Definitions - Grease Duct

Grease Duct. A duct serving a Type I hood, or cooking appliances equipped with integral down-draft exhaust systems that produce grease, to convey grease-laden air from the hood or cooking appliance directly to the outdoors.

202 Definitions - Lower Flammability Limit (LFL)

Lower Flammability Limit (Refrigerant) (LFL). The minimum concentration of refrigerant that is at which a flame is capable of propagating a flame through a homogeneous mixture of refrigerant and air under specific test conditions in accordance with ASHRAE 34.
202 Definitions – Refrigerant Safety Group Classification

Refrigerant Safety Group Classification. The alphabetical/numerical designation that indicates both the toxicity and flammability classifications of refrigerants in accordance with ASHRAE 34.

Flammability Classification (Refrigerant). The alphabetical/numerical designation used to identify the flammability of refrigerants.

Class 1. Indicates a refrigerant with no flame propagation.
Class 2. Indicates a refrigerant with low flammability.
Class 2L. Indicates a refrigerant with low flammability and low burning velocity.
Class 3. Indicates a refrigerant with high flammability.
202 Definitions – Refrigerant Safety

Group Classification

Toxicity Classification (Refrigerant). An alphabetical designation used to identify the toxicity of refrigerants. Class A indicates a refrigerant with low toxicity. Class B indicates a refrigerant with high toxicity.

202 Definitions – Steam Bath Equipment

Steam bath equipment. Includes steam bath generators, combination room and steam generator systems, and steam bath cabinets intended for high-humidity concentrated heating at elevated temperatures for personal bathing.
Chapter 2:

- Air, Recirculated
- Air, Return
- Air, Supply
- Air, Transfer
- Air Exfiltration
- Air-Handling Unit
- Air Infiltration
- Anchors
- Backflow

- Borehole
- Chilled Water
- Conditioned Space
- Direct Exchange (DX)
- Direct Gas-Fired
  Nonrecirculating Heating and Forced Ventilation Appliances for Commercial and Industrial Application

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Chapter 2:

- Appliance
  - Sub definitions Include
  - Appliance, Closed Combustion Solid-Fuel-Burning
  - Appliance, Direct Vent
  - Appliance, Electric Heating
  - Appliance, Fan-Assisted Combustion System
  - Appliance, Low-Heat
  - Appliance, Medium-Heat
  - Appliance, Portable Heating
  - Appliance, Vented
Chapter 2:

- The damper definition was not changed
  - A new Sub definitions was added
    - Corridor Damper

Chapter 2:

- Direct Gas-Fired Recirculating Heating and Forced Ventilation Appliances for Commercial and Industrial Application
- Driver Building
- Dual Purpose Water Heater
- Duct Sealing:
  - Sub classes include
    - Seal Class A
    - Seal Class B
    - Seal Class C
- Duct Sealing
- Energy Recovery Ventilation (ERV) System

Chapter 2:

- Engineering Methods
- Evaporative Cooling System
- Expansion Tank
- Fire Barrier
- Flue Collar
- Gas
  - Sub Definition
    - Utility Gas
- Geothermal Energy System
  - Sub definitions include:
    - Geothermal Energy System, Closed-Loop
    - Geothermal Energy System, Open-Loop
- Grade
- Grounding Electrode
Chapter 2:

- Groundwater
- Groundwater Source
- Heat Pump
- Heat Recovery Ventilation (HRV) System
- Joint, Heat Fusion
- Liquid-Tight
- Mechanical System
- Mid-Story Guide
- PEL (Permissible Exposure Limit)
- Plumbing Code
- Portable Evaporative Cooler
- Power Ventilator, Dryer
- Exhaust Duct
- Pressure, Design
- Pressure, Design (Refrigeration)

Chapter 2:

- Hydronic System
  - Sub definitions include
    - Hydronic System, Ambient Temperature Loop
    - Hydronic System, Closed-Loop
    - Hydronic System, District Ambient Temperature
    - Hydronic System, Fifth Generation (5G) System Configurations
    - Hydronic System, Fourth Generation (4G) System Configurations
    - Hydronic System, Geothermal Closed-Loop
    - Hydronic System, Geothermal Open-Loop
    - Hydronic System, Non-Oxygen Barrier Closed-Loop
    - Hydronic System, Open-Loop

Chapter 2:

- Property Line
- Public Way
- Refrigerant Concentration Limit (RCL)
- Refrigeration System, Mechanical
- Smoke Control System
- Solid Cooking Fuel
- Solvent
- Supports
- System Coefficient of Performance (SCOP)
- Thermal Highway
- Thermal Resources
Chapter 2:
- Refrigerant Safety Classification Definition for 2024 added in the 2L per the Flammability classification below.
- Flammability Classification
  - Sub definitions include:
    - Class 1
    - Class 2
    - Class 2L (NEW FOR 2024)
    - Class 3

Chapter 2:
- Thermosiphon
- Unconditioned Space
- Vent Connector, Gas
- Water Well

Chapter 2:
- Vent
  - Sub Definitions
    - Vent Type B Gas
    - Vent, Type B-W Gas
    - Vent, Type L Gas
306.5 Equipment and Appliances on Roofs or Elevated Structures

306.5 Equipment and appliances on roofs or elevated structures. [Text unchanged. Design criteria changes as follows:]

1. The side railing shall extend above the parapet or roof edge or landing platform not less than 30 inches (762 mm), 42 inches (1067 mm).

2. Ladders shall have rung spacing not less than 10 inches (254 mm) and not to exceed 14 inches (356 mm) on center. The uppermost rung shall be not greater than 24 inches (610 mm) below the upper edge of the roof hatch, roof or parapet, as applicable.

3. Ladders shall have a toe spacing not less than 6 inches (152 mm), 7 inches (178 mm) and not more than 12 inches (305 mm) deep.

4. There shall be not less than 18 inches (457 mm)-16 inches (406 mm) between rails.
306.5 Equipment and Appliances on Roofs or Elevated Structures

306.5 Equipment and appliances on roofs or elevated structures. [Text unchanged. Design criteria changes as follows:]

11. Top landing required. The ladder shall be provided with a clear and unobstructed landing on the exit side of the roof hatch having a minimum space of 30 inches deep and be of the same width as the hatch.

General Regulations

2024 UMC® Chapter 3

303.8.5 Electrical Power

- Requires compliance with NFPA 70
303.11 Installation in Commercial Garages

- 303.11.1 Parking Structures
- 303.11.2 Repair Garages

304.4 Appliances in Attics and Under-Floor Spaces

- 304.4.1 The Length of the Passageway was updated to allow for a passageway up to 50 feet in length, providing that the height was 6 feet.

305.1 Installation in Residential Garages

- Section was reorganized with the FVIR now being an exception and not in the charging statement
- Also added in was the term heating elements
  - This clarifies that electric water heater elements are an ignition source and must be elevated.
305.5 Drainage Pan

- Section was reworked and now includes items 1-4
  1. Drain pan drain line no smaller than ¾ inch
  2. Drain Pan depth on less than 1 ½ inches
  3. Material for the drainage piping shall be approved for use based on the liquid being discharged
  4. Relief valve prohibited from discharging into the pan

305.6 Outdoor Locations

- Newly added section that includes.
  1. Listing requirements for outdoor installations
  2. Approved outdoor element protection
  3. Compliance with Section 922.0 for outdoor cooking appliances

309.3 Installation Practices

- Section now requires that the installation meet with the approval of the construction documents.
310.2 Condensate Control

- Added in to (1) that the devices need to be installed per the manufacturer’s installation instructions
- Items (2) and (4) remain unchanged.
- Item (3) had the word additional added in front of Separate for the drain line

310.3 Condensate Waste Pipe Material and Sizing

- Newly added paragraph at the end of the section
- Drain lines serving air-conditioning that are ≥ 1 ¼ inches need to meet the requirements in the plumbing code.
- Drain lines serving AC units that are < 1 ¼ inches can be of specified material or approved by the AHJ

311.2 Air Filters

- Item 1 was reworded with no significant changes
- New subsection 311.2.1 added
  - Applies to mechanically ventilated buildings
    - All occupied areas must have an air filtration media for the outside air MERV of 13 or per the AHJ.
    - Filter must be labeled with the MERV rating.
316.6 Steel Nail Plates

- Fuel Gas piping protection now listed and required to comply with section 1310.4.3

401.4 Intake Opening Location

401.4 Intake opening location. Air intake openings shall comply with all of the following:

3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening. Separation is not required between intake air openings and living space exhaust air openings of an individual dwelling unit or sleeping unit where an approved factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the fan manufacturer’s instructions.

[No changes to items not shown]
403.3.1 & 403.3.2 Mechanical Ventilation in Group R-2, R-3 and R-4 Occupancies

403.3.1 Other buildings intended to be occupied. The design of local exhaust systems and ventilation systems for outdoor air for occupancies other than Group R-2, R-3 and R-4 three-stories and less above grade plane shall comply with Sections 403.3.1.1 through 403.3.1.4.

403.3.2 Group R-2, R-3, and R-4 occupancies, three-stories and less. The design of local exhaust systems and ventilation systems for outdoor air in Group R-2, R-3 and R-4 occupancies three-stories and less in height above grade plane shall comply with Sections 403.3.2.1 through 403.3.2.5.

“Low-rise R-2, R-3, and R-4 dwelling units, no longer treated differently”

Table 403.3.1.1 Minimum Ventilation Rates

![Table 403.3.1.1 Minimum Ventilation Rates](image)

Table 403.3.1.1 Minimum Ventilation Rates

<table>
<thead>
<tr>
<th>Building Classification</th>
<th>Occupant Density (psf)</th>
<th>Person Airflow (cmm/person)</th>
<th>Total Airflow (cmm/sq ft)</th>
<th>Person Airflow (cmm/person)</th>
<th>Total Airflow (cmm/sq ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential - R-2</td>
<td>20</td>
<td>0.02</td>
<td>0.02</td>
<td>20</td>
<td>0.02</td>
</tr>
<tr>
<td>Commercial - R-2</td>
<td>20</td>
<td>0.02</td>
<td>0.02</td>
<td>20</td>
<td>0.02</td>
</tr>
<tr>
<td>Institutional - R-2</td>
<td>20</td>
<td>0.02</td>
<td>0.02</td>
<td>20</td>
<td>0.02</td>
</tr>
<tr>
<td>Residential - R-3</td>
<td>20</td>
<td>0.02</td>
<td>0.02</td>
<td>20</td>
<td>0.02</td>
</tr>
<tr>
<td>Commercial - R-3</td>
<td>20</td>
<td>0.02</td>
<td>0.02</td>
<td>20</td>
<td>0.02</td>
</tr>
<tr>
<td>Institutional - R-3</td>
<td>20</td>
<td>0.02</td>
<td>0.02</td>
<td>20</td>
<td>0.02</td>
</tr>
<tr>
<td>Residential - R-4</td>
<td>20</td>
<td>0.02</td>
<td>0.02</td>
<td>20</td>
<td>0.02</td>
</tr>
<tr>
<td>Commercial - R-4</td>
<td>20</td>
<td>0.02</td>
<td>0.02</td>
<td>20</td>
<td>0.02</td>
</tr>
<tr>
<td>Institutional - R-4</td>
<td>20</td>
<td>0.02</td>
<td>0.02</td>
<td>20</td>
<td>0.02</td>
</tr>
</tbody>
</table>

* Based on not occupiable floor area.
Table 403.3.1.1 Minimum Ventilation Rates

<table>
<thead>
<tr>
<th>Occupancy Classification</th>
<th>Outdoor Airflow Rate, cfm</th>
<th>People/Bed Airflow Rate, cfm</th>
<th>Room, Area</th>
<th>Equipment Airflow Rate, cfm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital, Intensive Care Unit</td>
<td>10</td>
<td>0.3</td>
<td>30</td>
<td>0.1</td>
</tr>
<tr>
<td>Hospital, Operating Room</td>
<td>10</td>
<td>0.3</td>
<td>30</td>
<td>0.1</td>
</tr>
<tr>
<td>Hospital, Other Rooms</td>
<td>10</td>
<td>0.3</td>
<td>30</td>
<td>0.1</td>
</tr>
<tr>
<td>Hospital, Administrative</td>
<td>10</td>
<td>0.3</td>
<td>30</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Exceptions: Unchanged.

403.3.2.1 Outdoor Air for Dwelling Units.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each dwelling unit. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

\[ Q_{OA} = 0.01 \times A_{floor} + 7.5(N_{br} + 1) \]

where:
- \( Q_{OA} \) = outdoor airflow rate, cfm
- \( A_{floor} \) = conditioned floor area, ft
- \( N_{br} \) = number of bedrooms; not to be less than one

Exceptions: Unchanged.
401.2 Indoor Swimming Pools

- New section requires that the ventilation system for indoor pools comply with the USPSHTC.

- Section 417.4 of the USPSHTC houses Equation 417.4.

- This equation must be done to determine compliance with Table 417.4

402.1.2 Ventilation in Health Care Facilities.

- now requires that the ventilation also meet NFPA 99
402.2 Natural Ventilation Procedure.

• This section has been entirely reworked in the 2024 UMC®

• ASHRAE 62.1 ventilation rates and calculations are directly referenced or duplicated in this section

402.2 Natural Ventilation Procedure.

• Subsections as follows:
  • 402.2.1 Prescriptive Compliance Path
  • 402.2.1.1 Ceiling Height
  • 402.2.1.2 Floor Area to be Ventilated
  • 402.2.1.3 Single Side Opening
  • 402.2.1.4 Double Side Opening
  • 402.2.1.5 Corner Openings
  • 402.2.1.6 Location and Size of Openings
  • 402.2.1.6(A) Sizing Openings
  • 402.2.2 Engineered System Compliance Path
  • 402.2.3 Control and Accessibility

402.2 Natural Ventilation Procedure.

• Section also includes two tables from ASHRAE 62.1:
  
  **TABLE 402.2.1.6(A)(1)**
  MINIMUM OPENABLE AREAS:
  SINGLE OPENINGS*
  [ASHRAE 62.1: TABLE 6-5]

  **TABLE 402.2.1.6(A)(2)**
  MINIMUM OPENABLE AREAS:
  TWO VERTICALLY SPACED OPENINGS*
  [ASHRAE 62.1: TABLE 6-6]
402.4 Outdoor Air Intakes

- This section has been entirely reworked in the 2024 UMC®
- ASHRAE 62.1 outdoor requirements are directly referenced or duplicated in this section
- The charging statement requires that outdoor intakes comply with sections 402.4.1-402.4.5.

Subsections as follows:

- 402.4.1 Location
- 402.4.1.1 Exhaust/Relief Outlets
- 402.4.1.2 Fuel-Burning Equipment
- 402.4.1.3 Roof, Landscaped Grade, or Another Surface Directly Below Intake
- 402.4.1.4 Laboratory Exhaust

ASHRAE Table included

TABLE 402.4.1
AIR INTAKE MINIMUM SEPARATION DISTANCE
[ASHRAE 62.1:TABLE 5-1]
402.4.2 Rain Entrainment
- Subsections as follows:
  - 402.4.3 Rain Intrusion
  - 402.4.4 Snow Entrainment
  - 402.4.5 Bird

403.0 Ventilation Rates
- This section has been entirely reworked in the 2024 UMC®
- ASHRAE 170 and 62.1 requirements are directly referenced or duplicated in this section

403.0 Ventilation Rates
- Subsections as follows:
  - 403.1 General
  - 403.2 Zone Calculations
    - 403.2.1 Breathing Zone Outdoor Airflow
    - 403.2.2 Zone Air Distribution Effectiveness
  - 403.2.2.1 Stratified Air Distribution Systems
    - 403.2.2.1.1 Supply Air
    - 403.2.2.1.2 Return Air
    - 403.2.2.1.3 Stratification
403.0 Ventilation Rates
• Subsections as follows:
  • 403.2.1.3 Stratification
  • 403.2.2.2.1 Personalized Air
  • 403.2.2.2.2 Return Air
  • 403.2.3 Zone Outdoor Airflow
  • 403.2.2.2 Return Air
  • 403.3 Single-Zone Systems
  • 403.4 One Hundred Percent Outdoor Air Systems
  • 403.5 Multiple-Zone Recirculating Systems
    • 403.5.1 Uncorrected Outdoor Air Intake
      • 403.5.1.1 Occupant Diversity
      • 403.5.1.2 System Ventilation Efficiency
      • 403.5.1.3 Simplified Procedure for System Ventilation Efficiency
      • 403.5.1.4 Zone Minimum Primary Airflow
    • 403.5.2 Outdoor Air Intake
  • 403.6 Design for Varying Operating Conditions
  • 403.7 Exhaust Ventilation
    • 403.7.1 Parking Garages
    • 403.7.2 Enclosed Parking Garages
  • 403.8 Dynamic Reset
  • 403.9 Air Classification and Recirculation
    • TABLE 403.9 AIRSTREAMS OR SOURCES DESCRIPTION
  • 403.10 Air Balance

404.0 Alternative Procedure for Multiple-Zone Systems Ventilation Efficiency
• This section has been entirely reworked in the 2024 UMC®
• ASHRAE 62.1 requirements are directly referenced or duplicated in this section
Chapter 4 Tables:

- All tables updated to reflect changes in ASHRAE 62.1

**TABLE 402.1**
MINIMUM VENTILATION RATES IN BREATHING ZONE
[ASHRAE 62.1: TABLE 6-1]

**TABLE 403.2.2**
ZONE AIR DISTRIBUTION EFFECTIVENESS
[ASHRAE 62.1: TABLE 6-4]

**TABLE 403.7**
MINIMUM EXHAUST RATES
[ASHRAE 62.1: TABLE 6-2]
501.3.1 Location of Exhaust Outlets

501.3.1 Location of exhaust outlets. Text unchanged. Minimum distances changed as follows:

Items 1 & 2: Text unchanged.

1. For all environmental air exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings, except where the exhaust opening is located not less than 1 foot (305 mm) above the gravity air intake opening into buildings for all occupancies other than Group U; and 10 feet (3048 mm) from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious. Separation is not required between intake air openings and living space exhaust air openings of an individual dwelling unit or sleeping unit where an approved factory built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the manufacturer’s instructions.

Items 4 & 5: Text unchanged.

501.6 Common Ducts

501.6 Common ducts. The discharge from exhaust fans serving separate dwelling or sleeping units shall not be connected to a common duct or shaft, except where the common duct or shaft is maintained at a negative pressure.

504.10 Commercial Clothes Dryers

504.10 Commercial clothes dryers. The installation of dryer exhaust ducts serving commercial clothes dryers shall comply with the appliance manufacturer’s installation instructions. Exhaust fan motors installed in exhaust systems shall be located outside of the airstream. In multiple installations, the fan shall operate continuously or be interlocked to operate when any individual unit is operating. Ducts shall have a minimum clearance of 6 inches (152 mm) to combustible materials. Clothes dryer transition ducts used to connect the appliance to the exhaust duct system shall be limited to single lengths not to exceed 8 feet (2438 mm) in length and shall be listed and labeled in accordance with UL 2158A for the application. Transition ducts shall not be concealed within construction.
505.3 Exhaust Ducts

505.3 Exhaust ducts. Domestic cooking exhaust equipment shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls, shall be airtight and shall be equipped with a backdraft damper. Installations in Group I-1 and I-2 occupancies shall be in accordance with the International Building Code and Section 904.14 of the International Fire Code and Section 505.7 or 505.8.

Exceptions:
1. In other than Groups I-1 and I-2, where installed in accordance with the manufacturer’s instructions and where mechanical or natural ventilation is otherwise provided in accordance with Chapter 4, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.

Section 505.7 Group I-1 Occupancies

505.7 Group I-1 occupancies. In Group I-1 occupancies, hood installations over domestic cooking equipment installed in accordance with Section 420.9 of the International Building Code shall comply with the following:

1. Range hoods shall have a minimum air flow rate of 500 cfm (14 000 L/min).
2. Mechanical ventilation shall be provided to the rooms or spaces containing the domestic cooking equipment in accordance with Section 403.3.1.
3. Range hood exhaust shall discharge to the outdoors.

Exception: A listed and labeled ductless range hood shall be permitted where a charcoal filter is provided in the hood to reduce smoke and odors.

Section 505.8 Group I-2 Occupancies

505.7 Group I-2 occupancies. In Group I-2 occupancies, hood installations over domestic cooking equipment installed in accordance with Section 407.2.7 of the International Building Code shall comply with the following:

1. Range hoods shall have a minimum air flow rate of 500 cfm (14 000 L/min).
2. Mechanical ventilation shall be provided to the rooms or spaces containing the domestic cooking equipment in accordance with Section 403.3.1.
3. Range hood exhaust shall discharge to the outdoors.

Exception: A listed and labeled ductless range hood shall be permitted where a charcoal filter is provided in the hood to reduce smoke and odors.
506.3.2.5 Grease Duct Test

A field test shall be performed prior to the use or concealment of any portion of a grease duct system. Grease ducts shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the grease duct from being visually inspected on all sides. The permit holder shall be responsible to provide the necessary equipment and perform the grease duct leakage test. A light test shall be performed to determine that all welded and brazed joints are liquid tight. A light test shall be performed by passing a lamp having a power rating of not less than 100 watts through the entire section of ductwork to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls.

A test shall be performed for the entire grease duct system, including the hood-to-duct connection. The grease duct system shall be permitted to be tested in sections, provided that every joint is tested. For listed factory-built grease ducts, this test shall be limited to duct joints assembled in the field and shall exclude factory welds. The test shall be performed in accordance with either Section 506.3.2.5.1 or Section 506.3.2.5.2.

506.3.2.5.1 Light Test

A duct test shall be performed by passing a lamp, having not less than 1600 lumens, through the entire section of ductwork to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls. A successful test shall be where the light from the lamp is not visible at any point on the exterior of the duct.

506.3.2.5.2 Water Spray Test

A duct test shall be performed by simulating a cleaning operation of the interior of the duct. A water pump capable of a flowing outlet pressure of not less than 1,200 psi (8274 kPa) shall be used, along with any necessary hoses and spray nozzles, to apply high-pressure water to the inside surfaces of the duct. A successful test shall be where there is no evidence of cleaning water at any point on the exterior of the duct.
507.1 Commercial Kitchen Hoods
507.1 General. [For brevity, only exceptions 3 – 5 are shown.]

Exceptions:
3. Ovens listed and labeled for use with wood fuel in accordance with UL 2162 and vented in accordance with the manufacturer’s instructions.
4. An electric cooking appliance listed and labeled in accordance with UL 197 for reduced grease emissions.
5. Commercial electric dishwashers incorporating a self-contained condensing system listed and labeled in accordance with UL 921.

507.1.3 Fuel-burning Appliances

507.1.3 Fuel-burning appliances. Where vented fuel-burning appliances are located in the same room or space as the hood, provisions shall be made to prevent the hood system from interfering with normal operation of the appliance vents. Appliances equipped with draft hoods or atmospheric burners shall not be located in the same room or space containing a Type I or Type II hood except where the appliance is located in a sealed enclosure equipped with a self-closing device with combustion air obtained from the outdoors or from other spaces in the building in accordance with Chapter 7 of the International Fuel Gas Code.
502.2 Termination of Exhaust Ducts

This section was expanded to include three sub-sections:

- 502.2.1 Environmental, Class 1, and Class 2 Air Ducts
- 502.2.2 Class 3 Air Ducts
- 502.2.3 Product Conveying, Flammable, and Class 4 Air Ducts
- Also included in the section is an exemption for Type I hood exhausts. Those remain under section 530.9

504.2 Independent Exhaust Systems

Now includes guidance for combined exhaust and clothes dryer exhaust systems.

504.3 Domestic Cooking Exhaust Equipment

Section underwent a complete rewrite for the 2024 UMC®.
504.4.6 Multistory Exhausting of Dryers
A new section requiring Cleanouts or access doors on each vertical riser

505.7.3 Smoke Control Systems
A new section requiring smoke control systems to meet the requirements in NPFA 92 and UL 864

505.8 Product-Conveying Duct Classifications
Now includes Class 4
506.6 Explosion Venting

New paragraph added that requires the explosion relief system to comply with NFPA 69.

506.9 Protection from Physical Damage

The new section requires that ducts installed where they can be damaged be protected.

508.0 Type I Hoods

Exception one was rewritten for clarity.

Two new exceptions were added in Section 508.1.
(3) Solid fuel fire ovens that meet UL 2162 and are vented in compliance with UL 103 and UL 1978 are now exempt from requiring the Type I hood.
508.0 Type I Hoods

Exception one was rewritten for clarity

Two new exceptions were added in Section 508.1.
(4) adds an exception for integral downdraft on listed and labeled cooking appliances.

510.1.8 Independent Grease Duct System

A new subsection clarifies that a single or a combined Type I system should not be combined with other exhaust systems.

513.4 Fuel and Electric Power Shutoff

The section was reworked to meet NFPA 96 requirements
519.3 Type II Hood Exhaust System Net Airflow

The section was reworked to allow for Type II over light-duty cooking appliances.

The old section 519.3 for dishwashing appliances is now subsection 519.3.1
601.5 Return Air Openings

Return air openings. Return air openings for heating, ventilation and air-conditioning systems shall comply with all of the following:

2. Return air for heating or air-conditioning systems shall not be taken from a hazardous or insanitary location or a refrigeration room as defined in this code.

7. Return air for heating or air-conditioning systems shall not be taken from a closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic.

8. Return air from a closet shall serve only the closet and shall not require a dedicated closet supply duct.

9. Return air taken from a closet smaller than 30 square feet (2.8 m²) shall require the closet door be undercut not less than 11/2 inches (38 mm) or have either a louvered door or include an air transfer grilled, each with a net free area of not less than 30 square inches (193.55 m²).

10. Return air for heating or air-conditioning systems shall not be taken from indoor swimming pool enclosures and associated deck areas.

604.3 Duct Covers and Linings

604.3 Coverings and linings. [Text unchanged]

Exceptions:

1. [No changes to Exception 1]

2. Duct coverings added to the outside ducts and not contained in plenums, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than 450, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Duct coverings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Coverings shall be listed and labeled.
607.6.1 Through Penetrations

607.6.1 Through penetrations. In occupancies other than Groups I-2 and I-3, a duct constructed of approved materials in accordance with Section 603 that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection provided that a listed fire damper is installed at the floor line or the duct is protected in accordance with Section 714.5 of the International Building Code. For air transfer openings, see Item 6, Section 712.1.9 of the International Building Code.

Exception: In occupancies other than Groups I-2 and I-3, a duct is permitted to penetrate three floors or less without a fire damper at each floor provided that it meets all of the following requirements:

1. No changes to Items 1-5

602.2 Combustibles Within Ducts or Plenums

A new exception allows plastic water distribution piping as long as they meet specific UL 2846 requirements, optical density, average optical density, flame spread distance, and are installed in accordance with their product listing.
602.3 Tall Wood (Mass Timber) Buildings
A new section to address industry advancement in Type IV-A, B, C, and HT construction.

602.5.4 Fibrous Glass Duct
This new subsection of section 602.5 Nonmetallic Duct was created so that the AHJ did not have to determine compliance with section relocated 602.5.5 Other Material or Chapter 3 Alternate Materials.

603.1.1 Pressure Classification
Now requires all ducts to be sealed to Class A, regardless of the duct classification.
603.9.2 Duct Leakage Tests
Requires that the tester be certified by certain agencies or other approved equivalent agencies.

606.3 Ceiling Radiation Dampers
Expanding on the limitation of UL 555C and now allows for the CRD to be tested as part of a Fire-Resistance-Rated Floor/Roof-Ceiling assembly.

606.4 Combination Fire/Smoke Dampers
The new section addresses what Combination Fire/Smoke Dampers need to be listen and what section apply to them.
606.5 Corridor Dampers
The new section addresses what sections apply to Corridor Dampers.

606.6 Periodic Testing and Inspection
The new section requires periodic testing and a description of what NFPA documents shall be adhered to.

607.0 Ventilating Ceilings
Now specifically prohibits the use of Ventilating Ceilings in Health Care Facilities
701.11 Combustion Air Ducts
(6), (7), and (8) reworded to match NFPA 54
802.2.6.1 Through-the-Wall Vent Terminations

A new section to match NFPA 54 and to ensure that these are installed per section 802.8.1.
802.2.8 Incinerators, Commercial–Industrial
A new section to match NFPA 54 and to ensure that these are vented per NFPA 82.

802.6.3 Gas Vents Serving Appliances on More than One Floor
It was updated and reworded to ensure clarity on the code provisions.

TABLE 802.8.1
THROUGH-THE-WALL DIRECT VENT TERMINATION CLEARANCES
[NFPA 54: TABLE 12.9.1]
Table was updated to match NFPA 54
Chart matches with:

FIGURE 802.8.1
EXIT TERMINALS OF MECHANICAL DRAFT AND DIRECT VENT VENTING SYSTEMS
[NFPA 54: FIGURE 12.9.1]
931.1 Steam Bath Equipment

SECTION 931
STEAM BATH EQUIPMENT

931.1 General. Steam bath equipment shall be listed and labeled in accordance with UL 499 and shall be installed in accordance with their listing and the manufacturer's instructions.
903.2.1 Application

New subsection of 903.2 Gas-Fired Air Conditioners and Heat Pump to specify listing criteria and to align with NFPA 54.

904.1 Application.

New requirements for Listing and a line with NFPA 54.

905.1 Application

New section that requires duct furnaces ≤ 10 Mbtu/hr to be listed.
906.1 Application

New section that requires floor furnaces to be listed.

911.1 Application

A new section that requires decorative appliances installed in vented fireplaces be listed.

914.0 Non-Recirculating Direct Gas-Fired Industrial

This section was completely reworked to match. NFPA 54
914.0 Non-Recirculating Direct Gas-Fired Industrial

Subsections include:

- 914.1 Application
- 914.2 Prohibited Installations. 914.3 Installation.
  - 914.3.1 Fresh Air Ventilation
  - 914.3.2 Airex Requirements
- 914.4 Clearance from Combustible Materials.
- 914.5 Air Supply.
  - 914.5.1 Non-Recirculating Systems.
  - 914.5.2 Recirculating Systems.
  - 914.5.3 Dampers or Louvers.
- 914.6 Atmospheric Vents, Gas Reliefs, or Bleeds.
- 914.7 Relief Openings
  - 914.7.1 Infiltration Rate.
  - 914.7.2 Louver or Gravity Dampers.
- 914.8 Purging

915.0 Room Heaters

This section was completely reworked to match. NFPA 54
914.0 Non-Recirculating Direct Gas-Fired Industrial

Subsections that were updated include:

- 915.1 Application
- 915.1.1 Vented Room Heaters.
- 915.1.2 Unvented Room Heaters
- 915.3.4 Wall-Mounted Room Heaters.

Boilers, Water Heaters and Pressure Vessels

1001.1 Pressure Vessels

1001.1 Scope. This chapter shall govern the installation, alteration and repair of boilers, water heaters and pressure vessels.

Exceptions:

8. Pressure vessels used in specific appliances and equipment that are regulated by Chapter 9 of this code.
1006.6 Safety and Relief Valve Discharge.

1006.6 Safety and relief valve discharge. Safety and relief valve discharge pipes shall be of rigid pipe that is approved for the temperature of the system. High-pressure-steam safety valves shall be vented to the outside of the structure. The discharge piping serving pressure relief valves, temperature relief valves and combinations of such valves shall:

- Items 1-6 Text unchanged.
- 7. Discharge to a termination point that is readily visible and observable by the building occupants. If the discharge termination point is not readily visible and observable, a device for leak detection monitoring with alarm notification (and not automatic shut-off) is required.

Items 8-13 Text unchanged.

Boilers and Pressure Vessels

2024 UMC® Chapter 10

1001.1 Applicability

New exception (9) was added to specify that Pressure vessels used in specific alliances are done so in accordance with Chapter 9
1005.5 Vacuum Relief Valve

New listing requirement for Vacuum Relief Valves
1101.1.1 Refrigerants other than Ammonia

1101.1.1 Refrigerants other than ammonia. Refrigeration systems using piping design and installation for systems containing a refrigerant other than ammonia, including pressure vessels and pressure relief devices, shall comply with this chapter, and ASHRAE 15 and the International Fire Code. Refrigeration systems containing carbon dioxide as the refrigerant shall also comply with IIAR CO2.

1101.1.2 Ammonia Refrigerant

1101.1.2 Ammonia refrigerant. Refrigeration systems using ammonia as the refrigerant shall comply with IIAR 2 for system design, IIAR 3 for valves, IIAR 4 for installation, and IIAR 5 for start-up, and IIAR 6 and shall not be required to comply with this Chapter.
1101.2.1 Group A2L, A2, A3 and B1 high-probability equipment.

High probability equipment using Group A2L, A2, A3, or B1 refrigerant shall comply with UL 484, UL/CSA 60335-2-40, or UL/CSA 60335-2-89.

1101.7 Changing Refrigerant

Changes of refrigerant in an existing system to a refrigerant with a different refrigerant designation shall be allowed only where in accordance with the following:

1. The owner or the owner’s authorized agent shall be notified prior to making a change of refrigerant, and the change of refrigerant shall not be made where the owner objects to the change.

2. The change in refrigerant shall be in accordance with one of the following:
   - Written instructions of the original equipment manufacturer.
   - An evaluation of the system by a registered design professional or by an approved agency that validates safety and suitability of the replacement refrigerant.
   - Approved by the code official.

3. Where the replacement refrigerant is classified into the same safety group, requirements that were applicable to the existing system shall continue to apply.

4. Where the replacement refrigerant is classified into a different safety group, the system shall comply with the requirements of this standard for a new installation, and the change of refrigerant shall require code official approval.

[Deleted text not shown for brevity.]

1102.2.1 Mixing Refrigerants

Refrigerants with different refrigerant designations shall only be mixed in a system in accordance with both of the following:

1. The addition of a second refrigerant is allowed by the equipment manufacturer and is in accordance with the manufacturer’s written instructions.

2. The resulting mixture does not change the refrigerant safety group.

Refrigerants, including refrigerant blends, with different designations in ASHRAE 34 shall not be mixed in a system.

Exception: Addition of a second refrigerant is allowed where permitted by the equipment or appliance manufacturer to improve oil return at low temperatures. The refrigerant and amount added shall be in accordance with the manufacturer’s instructions.
1104.3.1 Air Conditioning

1104.3.1 Air conditioning for human comfort. High-probability systems used for human comfort shall use Group A1 or A2L refrigerant.

Exceptions:
1. Equipment listed for and used in residential occupancies containing a maximum of 6.6 pounds (3 kg) of refrigerant.
2. Equipment listed for and used in commercial occupancies containing a maximum of 22 pounds (10 kg) of refrigerant.
3. Industrial occupancies.

In other than industrial occupancies, where the quantity, in a single independent circuit, does not exceed the amount in Table 1104.3.1, Group B1, B2 and B3 refrigerants shall not be used in high-probability systems for air conditioning for human comfort.

1104.3.2 Group A2, A3, B2 and B3 Refrigerants

1104.3.2 Nonindustrial occupancies. Group A2, A3, B2 and B3 refrigerants. Group A2 and B2 refrigerants shall not be used in high-probability systems. Group A3 and B3 refrigerants shall not be used except where approved.

Exception: This section does not apply to:
1. Laboratories where the floor area per occupant is not less than 100 square feet (9.3 m2).
2. Listed self-contained systems having a maximum of 0.331 pounds (150 g) of Group A3 refrigerant.
3. Industrial occupancies.
4. Equipment listed for and used in residential occupancies containing a maximum of 6.6 pounds (3 kg) of Group A2 or B2 refrigerant.
5. Equipment listed for and used in commercial occupancies containing a maximum of 22 pounds (10 kg) of Group A2 or B2 refrigerant.

Group A2 and B2 refrigerants shall not be used in high-probability systems where the quantity of refrigerant in any independent refrigerant circuit exceeds the amount shown in Table 1104.3.2.

1106.4 Group A2L and B2L Refrigerant

1106.4 Group A2L and B2L refrigerant. Machinery rooms for Group A2L and B2L refrigerants shall comply with Sections 1106.4.1 through Section 1106.4.3.

1106.4.1 Elevated temperatures. Open flame-producing devices or continuously operating hot surfaces over 1290°F (700°C) shall not be permanently installed in the room.

1106.4.2 Refrigerant detector. In addition to the requirements of Section 1104.3, refrigerant detectors shall signal an alarm and activate the ventilation system in accordance with the response time specified in Table 1106.4.2.

1106.4.3 Mechanical ventilation. The machinery room shall have a mechanical ventilation system complying with ASHRAE 15.
1109.2.3 Prohibited Locations

1109.2.3 Prohibited locations. Refrigerant piping shall not be installed in any of the following locations:
1. Exposed within a fire-resistance-rated exit access corridor.
2. Exposed within an interior exit stairway.
3. Within an interior exit ramp.
4. Within an exit passageway.
5. Within an elevator, dumbwaiter or other shaft containing a moving object.

1109.2.6 Exposed Piping Surface Temperature

1109.2.6 Exposed piping surface temperature. Exposed piping having surface temperatures greater than 120°F (49°C) or less than 5°F (-15°C) shall be protected from contact or shall have thermal insulation that limits the exposed insulation surface temperature to a range of 5°F (-15°C) to 120°F (49°C).

1109.2.7 Pipe Identification

1109.2.7 Pipe identification. Refrigerant pipe located in areas other than the room or space where the refrigerating equipment is located shall be identified. The pipe identification shall be located at intervals not exceeding 20 feet (6096 mm) on the refrigerant piping or pipe insulation. The minimum height of lettering of the identification label shall be 1/2 inch (12.7 mm). The identification shall indicate the refrigerant designation and safety group classification of refrigerant used in the piping system. For Group A2L and B2L refrigerants, the identification shall also include the following statement: "WARNING—Risk of Fire. Flammable Refrigerant." For Group A2, A3, B2 and B3 refrigerants, the identification shall also include the following statement: "DANGER—Risk of Fire or Explosion. Flammable Refrigerant." For any Group B refrigerant, the identification shall also include the following statement: "DANGER—Toxic Refrigerant."
1109.3 Installation of Refrigerants

1109.3 Installation requirements for Group A2L, A2, A3, or B2L, B2 or B3 refrigerant. Piping systems using Group A2L, A2, A3, or B2L, B2 or B3 refrigerant shall comply with the requirements of Sections 1109.3.1 and 1109.3.2.

1109.3.1 Pipe protection. Protection against physical damage. [Text not shown]

1109.3.1.1 Shield plates. [Text not shown]

1109.3.2 Shaft ventilation. [Text not shown]

1109.4 Refrigerant pipe penetrations. [Text not shown]

1109.5 Stress and strain. [Text not shown]

1102.0 Refrigeration Systems

This update to ammonia refrigeration systems is similar to the IMC update we already reviewed.
1103.1.1 Safety Group

Section updated to allow for the use of newer refrigerants and for alignment with where the industry and Federal Regulations are going with the reduction of HFC’s.

Table 1103.1.1 was also updated with this effort.

1104.5 Flammable Refrigerants.

Section updated and reworked to address Machinery rooms, A2L for Human Comfort, concentration limits, Listing requirements, Nameplates, Labeling, detection systems, refrigerant limits, ignition sources in ductwork, mechanical ventilation, indoor compressors and pressure vessels, and sensors.
1104.8.4 Mixing

New section to address mixing of refrigerants

1104.9 Changing Refrigerants

New section to address changing refrigerants

1106.11 Machinery Room, A2L and B2L

New section to address machinery rooms for A2L and B2L refrigerants
Two tables were also included in this new section

**TABLE 1106.11.11.2**
LEVEL 1 VENTILATION RATE FOR CLASS 2L REFRIGERANTS
[ASHRAE 15: TABLE 8-2]

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Two tables were also included in this new section

**TABLE 1106.11.10.2**
REFRIGERANT DETECTOR SET POINTS, RESPONSE TIMES, ALARMS, AND VENTILATION LEVELS
[ASHRAE 15: TABLE 8-1]

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Updated section to clarify that refrigeration piping be metallic.

The addition of a table was included in the update

**TABLE 1109.1**
MATERIALS FOR REFRIGERANT PIPING, TUBING, AND FITTINGS
1110.1 More than 6.6 Pounds of Refrigerant

Updated section to address changes to ASHRAE 15

1110.1 More than 10 Pounds of Refrigerant

Updated section to address changes to ASHRAE 15

1115.5 Nameplate

A new section to address the nameplates for self-contained systems and separate condensers and compressor units.
1127.0 Water Supply

A new section addresses make-up water for cooling towers and that the water supply be sized for peak demand.

Table was updated to match ASHRAE 34.
1209.6 Radiant Tubing

1209.6 Radiant tubing placement. Hydronic tubing to be embedded for the purpose of radiant heating or cooling shall be installed in accordance with the manufacturer’s instructions and with the tube layout and spacing in accordance with the system design. Individual tubing circuit lengths shall be installed with a variance of not more than ±10 percent from the design.

1209.6.1 Radiant tubing circuit length. The maximum circuit length of radiant tubing from a supply-and-return manifold shall not exceed the lengths specified by the system design or, in the absence of manufacturer’s specifications, the lengths specified in Table 1209.6.1.

1209.6.2 Radiant tubing circuit tags. Each individual radiant tubing circuit shall have a tag or label securely affixed to each manifold outlet to indicate the length of each circuit and the areas served.

1209.6.3 Radiant tubing drawings. The radiant tubing drawings and design specifications provided to the building owner or the designated representative of the building owner.

1209.7 Snow- & Ice-Melt Tubing

1209.7 Snow- and ice-melt tubing placement. Hydronic tubing to be embedded for the purpose of snow- and ice-melt systems shall be installed in accordance with the manufacturer’s installation instructions and with the tube layout and spacing in accordance with the system design.

1209.7.1 Snow- and ice-melt tubing circuit length. The maximum circuit length of snow- and ice-melt tubing from a supply-and-return manifold shall not exceed the lengths specified by the system design or, in the absence of manufacturer’s specifications, the lengths specified in Table 1209.7.1. Individual tubing circuit lengths shall be installed with a variance of not more than ±10 percent from the design.
1201.1 Applicability
This section was updated to expand on the listed types of piping systems regulated by this chapter.

1201.6 Heat Transfer Fluid Quality
New section for Heat Transfer fluid Quality
- Subsections include:
  - 1201.6.1 Ethylene Glycol
  - 1201.7 Heat Emitters
  - 1201.8 Mechanical Devices
  - 1201.9 Flexible Connectors

1201.10 Freeze Protection
Updated section that now includes a Table

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<th>TABLE 1201.10 PERCENT GLYCOL MIXTURES</th>
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1201.10.1 Antifreeze Requirements

New section for antifreeze in closed hydronic systems.

1202.2 Chemical Injection

Updated section to expand listing criteria for backflow preventers and compatible of chemicals with components.

1204.7 Heat Transfer Fluid

New section to address Heat transfer fluids
1207.5 Heat Pumps

New section to address Heat Pumps ensuring compliance with listings.

1211.0 Joints and Connections

This section was updated to include specific requirements for PEX, PE, and PE-RT.

Table 1210.1 was also updated to reflect the proper listing requirements.

- Table 1211.2.2 minimum bend radius for pe pipe installed in open cut trench was also added.

1211.15 Stainless Steel Pipe and Joints

New section to address SS pipe and Joints

Included are provisions for mechanical joints and welded joints.
1212.12 District Energy and Central Utility Systems

New section requiring shut off valve on the building supply and return in these types of systems

1214.4 Automatic Makeup Fluid

Section was reworked and now includes specific provisions for Potable Makeup and Non-Potable Makeup fluid.

1217.3.1 Minimum Floor Temperatures

New subsection in 1217.3 Radiant Cooling Systems, that limits the floor surface area to a specific temp in general occupied applications.
1217.3.1 Minimum Floor Temperatures

New section for chilled water piping system insulation requirements along with an exception.

1217.11.2.1 Insulation

New subsection under 1217.11.2 Radiant Wall and Ceiling Panels requires an increased R-valve when installed on an exterior wall.

1217.11.2.2 Maximum Surface Temperatures

New subsection under 1217.11.2 Radiant Wall and Ceiling Panels limiting the surface temperatures for space heating.
1220.4.3 Multizone Systems

New subsection under 1220.4 Snow and Ice Melt Controls, requiring tags and labels at manifold locations.

New section requiring proper disposal of hydronic fluids when they contain certain additives.
1601.0 Stationary Fuel Cell Power Plants.

Updated section now includes specific listing requirements.