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850-487-1824

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Building

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M10921		/G1-21 Part V			
Date Submitted	03/08/2024	**Section**	306.1	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Term ‘accessible’ is understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with defined terms or phrases that are not attributed to requiring access for the physically disabled.

Rationale

See attached

M10921Text Modification

See attached

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Mod10921_TextOfModification.pdf

M10921Text Modification

G1-21 Part V

Original Proposal

PART V - IMC: 306.1, 506.3.2.2; IFGC: [M]306.1; ICCPC: SECTION 202 (New)

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

306.1 Access. *Appliances*, controls devices, heat exchangers and HVAC system components that utilize energy shall~~be accessible~~ provide access for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other appliances, venting systems or any other piping or ducts not connected to the *appliance* being inspected, serviced, repaired or replaced. A level working space not less than 30 inches deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an *appliance*.

506.3.2.2 Duct-to-hood joints. Duct-to-hood joints shall be made with continuous internal or external liquid-tight welded or brazed joints. Such joints shall be smooth, ~~accessible~~ available for inspection, and without grease traps.

Exceptions: This section shall not apply to:

1. A vertical duct-to-hood collar connection made in the top plane of the hood in accordance with all of the following:
   1.1. The hood duct opening shall have a 1-inch-deep (25 mm), full perimeter, welded flange turned down into the hood interior at an angle of 90 degrees (1.57 rad) from the plane of the opening.
   1.2. The duct shall have a 1-inch-deep (25 mm) flange made by a 1-inch by 1-inch (25 mm by 25 mm) angle iron welded to the full perimeter of the duct not less than 1 inch (25 mm) above the bottom end of the duct.
   1.3. A gasket rated for use at not less than 1,500ºF (816ºC) is installed between the duct flange and the top of the hood.
   1.4. The duct-to-hood joint shall be secured by stud bolts not less than 1/4 inch (6.4 mm) in diameter welded to the hood with a spacing not greater than 4 inches (102 mm) on center for the full perimeter of the opening. The bolts and nuts shall be secured with lockwashers.
2. *Listed* and *labeled* duct-to-hood collar connections installed in accordance with Section 304.1.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term 'access (to)' or 'ready access (to)' for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed 'door' from the definitions for 'access (to)' and 'ready access (to)'. That coordination item did not happen across codes and this proposal seeks to complete that effort.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

Public Hearing Results

Committee Action ***As Submitted***

Committee Reason: The proposal was approved as submitted because it provides coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities, the proposal deletes the word accessible from the code and replaces it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes. (Vote: 11-0)

Final Hearing Results

G1-21 Part V AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Building

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M11673		/ADM52-22			
Date Submitted	05/14/2024	**Section**	35	**Proponent**	Mo Madani
Chapter	35	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Modification lists the updated standards in the IBC.

Rationale

See attached

M11673Text Modification

See attached

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M11673Text Modification

ADM52-22

ACCA	Air Conditioning Contractors of America		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/ACCA 1 Manual D—~~2016~~ 2023	Residential Duct Systems	IMC	IRC
ANSI/ACCA 10 Manual SPS —~~2010 RA~~ 2017	~~HVAC~~ Design for Swimming Pools and Spas	IMC	
ANSI/ACCA 3 Manual S—~~14~~ 2023	Residential Equipment Selection	IECC®	
ANSI/ACCA 3 Manual S—~~2014~~ 2023	Residential Equipment Selection	IRC	
ANSI/ASHRAE/ACCA 183—2007 (reaffirmed 2014)	Peak Cooling and Heating Load Calculations in Buildings Except Low-rise Residential Buildings	IMC	

AFSI	Architectural Fabric Structures Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~FSAAS—16~~ AFSI-77	~~Fabric Structures Associated Air Structures 2016~~ Air Structures Design and Standards Manual	IFC

AHAM	Association of Home Appliance Manufacturers	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/AHAM RAC-1—~~2015~~ 2020	Room Air Conditioners	IECC®

AHRI	Air-Conditioning, Heating, & Refrigeration Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
1160 (I-P) —~~2014~~ 2022	Performance Rating of Heat Pump Pool Heaters ~~(with Addendum 1)~~	IECC®
1160 (I-P)—~~2014~~ 2022	Performance Rating of Heat Pump Pool Heaters ~~(with Addendum 1)~~	ISPSC

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1200 (I-P)—~~2013~~ 2022	Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets	IECC®
1230 (I-P)—~~2014~~ 2021	Performance Rating of Variable Refrigerant Flow (VRF) Multi-split Air-Conditioning and Heat Pump Equipment ~~(with Addendum 1)~~	IECC®
1250 (I-P)—~~2014~~ (2020)	Standard for Performance Rating in Walk-in Coolers and Freezers	IECC®
1360 (I-P)—2017	Performance Rating of Computer and Data Processing Room Air Conditioners	IECC®
210/240—~~2017 and~~ 2023 (2020)	Performance Rating of Unitary Air-conditioning and Air-source Heat Pump Equipment	IECC®
340/360—~~2019~~ 2022	Performance Rating of Commercial and Industrial Unitary Air-conditioning and Heat Pump Equipment	IECC®
390 (I-P)—~~2003~~ 2021	Performance Rating of Single Package Vertical Air-conditioners and Heat Pumps	IECC®
440 (I-P)—~~2008~~ 2019	Performance Rating of Room Fan Coils~~—with Addendum 1~~	IECC®
550/590 (I-P)—~~2018~~ 2022	Performance Rating of Water-chilling and Heat Pump Water-heating Packages Using the Vapor Compression Cycle	IECC®
560—~~2018~~ 2000	Absorption Water Chilling and Water Heating Packages	IECC®
700—~~2017~~ 2019	~~with Addendum 1:~~ Specifications for Refrigerants	IMC
910 (I-P)—2014	Performance Rating of Indoor Pool Dehumidifiers	IECC®
920 (I-P)—~~2015~~ 2020	Performance Rating of DX-Dedicated Outdoor Air System Units	IECC®

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AISC	American Institute of Steel	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/AISC 341—~~16~~ 22	Seismic Provisions for Structural Steel Buildings	IBC
ANSI/AISC 360—~~16~~ 22	Specification for Structural Steel Buildings	IBC
ANSI/AISC 358—~~16/s1—18~~ 22	Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications, ~~IncludingSupplement No. 1~~	IBC

AISI	American Iron and Steel Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
AISI S100—16 (2020) w/S2—20:	~~North American~~ Specification for the Design of Cold-Formed Steel Structural Members, 2016 Edition (Reaffirmed 2020), with Supplement 2, 2020 Edition	IBC
AISI S100—16 (2020) w/S2—20	~~North American~~ Specification for the Design of Cold-Formed Steel Structural Members, 2016 Edition (Reaffirmed 2020), with Supplement 2, 2020 Edition	IRC®

ALI	Automotive Lift Institute, Inc.	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ALI ALCTV—~~2016~~ 2022	Standard for Automotive Lifts—Safety Requirements for Construction, Testing and Validation (ANSI)	IBC

AMCA	Air Movement and Control Association International	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~ANSI/~~AMCA 550—~~09 (Rev. 09/18)~~ 22	Test Method for High Velocity Wind Driven Rain Resistant Louvers	IMC

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ANSI/AMCA 220—~~19~~ 21	Laboratory Methods of Testing Air Curtain Units for Aerodynamic Performance Rating	IECC®	
ANSI/AMCA 230—~~15~~ 23	Laboratory Methods of Testing Air Circulating Fans for Rating and Certification	IMC	IECC®
ANSI/AMCA 540—~~13~~ 23	Test Method for Louvers Impacted by Wind Borne Debris	IBC	
ANSI/AMCA 210-ANSI/ASHRAE 51—~~16~~ 23	Laboratory Methods of Testing Fans for Aerodynamic Performance Rating	IRC®	
ANSI/AMCA 210—16/ANSI/ASHRAE 51—16	Laboratory Methods of Testing Fans for Aerodynamic Performance Rating	IMC	

ANSI	**American National Standards Institute**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
~~ANSI LC 4/CSA 6.32—2012~~ CSA/ANSI LC 4:23/CSA 6.32:23	Press-connect Metallic Fittings and valves for Use in Fuel Gas Distribution Systems	IFGC	IRC	
~~ANSI/CSA FC 1—2014~~ CSA/ANSI FC 1:21/CSA C22.2 NO. 62282-3-100:21	Fuel Cell Technologies—Part 3-100: Stationary Fuel Cell Power Systems—Safety	IFGC	IMC	IRC®
~~LC1/CSA 6.26—2016~~ CSA/ANSI LC 1:19/CSA 6.26:19	Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST)	IFGC	IRC®	
ANSI Z21.41 (R2019)/CSA 6.9-~~2014~~ (R2019)	Quick Disconnect Devices for Use with Gas Fuel Appliances	IFGC	IRC®	
ANSI Z21.22—~~99 (R2003)~~ 2015 (R2020)/CSA 4.4-2015(R2020)	Relief Valves for Hot Water Supply Systems~~ with Addenda Z21.22a—2000 (R2003) and Z21.22b—2001 (R2003)~~	IPC	IRC®	
ANSI Z21.24 -2015(R2020)/CSA 6.10— 2015(R2020)	Connectors for Gas Appliances	IFGC	IRC®	
ANSI Z21.40.1-1996 (R2017)/CGA 2.91—~~1996~~ M96(R2017)	Gas-fired Heat Activated Air Conditioning and Heat Pump ~~Appliances~~	IFGC	IRC	

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ANSI Z21.50 :19/CSA 2.22—~~2016~~ :19	Vented Decorative Gas Fireplaces	IFGC		IRC®
ANSI Z21.69 -2015 (R2020)/CSA 6.16—2015 (R2020)	Connectors for Movable Gas Appliances	IFGC		IRC®
ANSI Z21.75 -2016/CSA 6.27—2016 (R2020)	Connectors for Outdoor Gas Appliances and Manufactured Homes	IFGC		IRC®
ANSI Z83.11 -2016 (R2021)/CSA 1.8—2016 (R2021)	Gas Food Service Equipment	IFGC		
ANSI Z83.18—2017 (R2021)	Recirculating Direct Gas-fired Heating and Forced Ventilation Appliances for Commercial and Industrial Applications	IFGC		
CSA/ANSI Z21.11.2—~~2016~~ :19	Gas-fired Room Heaters—Volume II—Unvented Room Heaters	IFGC		IRC®
CSA/ANSI Z21.56 :19/CSA 4.7—~~17~~ :19	Gas-fired Pool Heaters	IFGC	ISPSC	IRC®
CSA/ANSI Z21.10.3 :19/CSA 4.3—~~2017~~ :19	Gas Water Heaters—Volume III—Storage, Water Heaters with Input Ratings above 75,000 Btu per Hour, Circulating and Instantaneous	IFGC	IECC®	IRC®
CSA/ANSI Z21.15 :22/CSA 9.1—~~09(R2014)~~ :22	Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves	IFGC		IRC®
CSA/ANSI Z21.19 :19/CSA 1.4—~~2014~~ :19	Refrigerators Using Gas Fuel	IFGC		
CSA/ANSI Z21.42—~~20~~13 (R2018)	Gas-fired Illuminating Appliances	IFGC		IRC®
CSA/ANSI Z21.47 :21/CSA 2.3—~~16~~ :21	Gas-fired Central Furnaces	IECC®		
CSA/ANSI Z21.58 :22/CSA 1.6—~~2015~~ :22	Outdoor Cooking Gas Appliances	IFGC		IRC®
CSA/ANSI Z21.80 :19CSA 6.22—~~11(R2016)~~ :19	Line Pressure Regulators	IFGC		IRC®

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CSA/ANSI Z21.90 :19/CSA 6.24~~-2015~~ :19	Gas Convenience Outlets and Optional Enclosures	IRC®	
CSA/ANSI Z21.91~~—2017~~ :20	Ventless Firebox Enclosures for Gas-fired Unvented Decorative Room Heaters	IFGC	IRC®
CSA/ANSI Z21.10.1 :19/CSA 4.1 ~~—2017~~ :19	Gas Water Heaters—Volume I—Storage, Water Heaters with Input Ratings of 75,000 Btu per Hour or Less	IFGC	IRC®
CSA/ANSI Z21.54 :19~~—2014~~ /CSA 8.4:19	Gas Hose Connectors for Portable Outdoor Gas-fired Appliances	IFGC	IRC®
A108.11~~—10~~ 18	Interior Installation of Cementitious Backer Units	IRC®	
A108.4~~—09~~ 19	Installation of Ceramic Tile with Organic Adhesives or Water-cleanable Tile-setting Epoxy Adhesive	IBC	IRC®
A108.5~~—19~~ 21	~~Installation of Ceramic Tile with Dry-set Portland Cement Mortar or Latex-Portland Cement Mortar~~ Setting of Ceramic Tile with Dry-Set Cement Mortar, Modified Dry Set Cement Mortar, EGP (Exterior Glue Plywood) Modified Dry-Set Cement Mortar, or Improved Modified Dry-Set Cement Mortar	IBC	IRC®
A108.6~~—19~~ 99(R2019)	Installation of Ceramic Tile with Chemical-resistant, Water Cleanable Tile-setting and -grouting Epoxy	IBC	IRC®
A108.8~~—19~~ 99(R2019)	Installation of Ceramic Tile with Chemical-resistant Furan Resin Mortar and Grout	IBC	
A108.9~~—19~~ 99(2019)	Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout	IBC	
A118.10— 14(R2019)	Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin- Set Ceramic Tile and Dimension Stone Installation	IPC	IRC®

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A118.1—~~18~~ 19	American National Standard Specifications for Dry-set ~~Portland~~ Cement Mortar	IBC	IRC®
A118.3—~~20~~ 21	American National Standard Specifications for Chemical~~-~~resistant, Water-cleanable Tile-setting and -grouting Epoxy and Water Cleanable Tile-setting Epoxy Adhesive	IBC	IRC®
A118.4—~~18~~ 19	American National Standard Specifications for Modified Dry-set Cement Mortar	IBC	IRC®
A118.5—99(R2021)	American National Standard Specifications for Chemical Resistant Furan Mortar and Grouts for Tile Installation	IBC	
A118.6—19	American National Standard Specifications for Standard Cement Grouts for Tile Installation	IBC	
A136.1—~~19~~ 20	American National Standard Specifications for Organic Adhesives for ~~the~~ Installation of Ceramic Tile	IBC	IRC®
A137.1—~~19~~ 22	American National Standard Specifications for Ceramic Tile	IBC	IRC®
A137.3—~~17~~ 22	American National Standard Specifications for Gauged Porcelain Tiles and Gauged Porcelain Tile Panel/Slabs	IBC	
ANSI E1.21—~~2013~~ 2020	Entertainment Technology: Temporary Structures Used for Technical Production of Outdoor Entertainment Events	IFC	
CSA/ANSI NGV 5.1—~~2016~~ :22	Residential Fueling Appliances	IFGC	
CSA/ANSI NGV 5.2—~~2017~~ :22	Vehicle Fueling Appliances (VFA)	IFGC	
CSA/ANSI Z21.88:19/CSA 2.33—~~16~~ : 19	Vented Gas Fireplace Heaters	IFGC	IRC®

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LC 1/CSA 6.26~~—2016~~ :19	Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing ~~(CSST)~~	IFGC		
LC4/CSA 6.32—12	Press-connect Metallic Fittings for Use in Fuel Gas Distribution Systems	IRC®		
Z21.1/CSA 1.1~~—2016~~ 2018	Household Cooking Gas Appliances	IFGC	IMC	IRC
Z21.40.2/CGA 2.92—1996 (R2017)	Gas-fired Work Activated Air Conditioning and Heat Pump Appliances (Internal Combustion)	IFGC		
Z21.40.2/CSA 2.92—96 (R2017)	Gas-fired Work Activated Air-conditioning and Heat Pump Appliances (Internal Combustion)	IRC®		
Z21.41(R2019)/CSA 6.9—2014 (R2019)	Quick Disconnect Devices for use with Gas Fuel Appliances	IFGC		
Z21.47/CSA 2.3—2016	Gas-fired Central Furnaces	IFGC	IRC®	
Z21.56/CSA 4.7—2017	Gas-fired Pool Heaters	IFGC		
Z21.56a:19/CSA 4.7~~—2017~~ :19	Gas Fired Pool Heaters	ISPSC		
Z21.88/CSA 2.33~~—2016~~ :19	Vented Gas Fireplace Heaters	IFGC		
Z21.8~~—1994 (R2012)~~ 94(R2017)	Installation of Domestic Gas Conversion Burners	IFGC	IMC	IRC
Z83.20~~—08~~ 2016	Gas-fired Tubular Low-intensity Infrared Heaters Outdoor Decorative Appliances	IFGC	IRC®	
Z97.1~~—2014~~ 2015(R2020)	Safety Glazing Materials Used in Buildings—Safety Performance Specifications and Methods of Test	IBC	IRC®	

APA	APA - Engineered Wood Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/A190.1~~—2017~~ 2022	Product Standard for Structural Glued-laminated Timber	IRC®

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ANSI/APA A190.1—~~2017~~ 2022	Product Standard for Structural Glued Laminated Timber	IBC
ANSI/APA PRR 410—~~16~~ 2021	Standard for Performance-Rated Engineered Wood Rim Boards	IBC
ANSI/APA PRR 410—~~2016~~ 2021	Standard for Performance-rated Engineered Wood Rim Boards	IRC®
ANSI/APA PRS 610.1—~~2018~~ 2023	Standard for Performance-Rated Structural Insulated Panels in Wall Applications	IRC®
APA PDS Supplement 1—~~12~~ 23	Design and Fabrication of Plywood Curved Panels ~~(revised 2013)~~	IBC
APA PDS Supplement 2—~~12~~ 23	Design and Fabrication of Plywood-lumber Beams ~~(revised 2013)~~	IBC
APA PDS Supplement 3—~~12~~ 23	Design and Fabrication of Plywood Stressed-skin Panels ~~(revised 2013)~~	IBC
APA PDS Supplement 4—~~12~~ 23	Design and Fabrication of Plywood Sandwich Panels ~~(revised 2013)~~	IBC
APA PDS Supplement 5—~~16~~ 23	Design and Fabrication of All-plywood Beams ~~(revised 2013)~~	IBC
APA T300—~~16~~ 23	Glulam Connection Details	IBC
APA X440—~~17~~ 23	Product Guide: Glulam	IBC
APA X450—~~18~~ 23	Glulam in Residential Construction—Building—Construction Guide	IBC
API	**American Petroleum Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~Publ~~ RP 2028 ~~3rd~~ 4th Edition—~~(2002, R2010)~~ (2024)	Flame Arrestors in Piping Systems	IFC
~~Publ~~ RP 2009—~~7th~~ 8th Edition ~~(2002, R2012)~~ (2022)	Safe Welding and Cutting Practices in Refineries, Gas Plants and Petrochemical Plants	IFC

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Publ 2201 ~~5th~~ 6th Edition~~—(2003, R2010)~~ (2023)	Procedures for Welding or Hot Tapping on Equipment in Service	IFC
RP 1604—3rd Edition ~~(1996 R2010)~~ (1996) (4th edition 2021)	Closure of Underground Petroleum Storage Tanks	IFC
RP 1615—(1996) (6th Edition R2020) ~~(2011)~~	Installation of Underground-petroleum Storage Systems	IFC
RP 2001—~~9th~~ 10th Edition ~~(2012)~~ (2022)	Fire Protection in Refineries~~, 8th Edition~~	IFC
RP 2003—~~8th~~ 9th Edition ~~(2015)~~ (2023)	Protection Against Ignitions Arising out of Static, Lightning and Stray Currents	IFC
RP 2023—~~3rd~~ 4th Edition ~~(2001, R2006)~~ (2023)	Guide for Safe Storage and Handling of Heated Petroleum-derived Asphalt Products and Crude-oil Residue	IFC
RP 651—~~4th~~ 5th Edition ~~(2014)~~ (2022)	Cathodic Protection of Aboveground Petroleum Storage Tanks	IFC
RP 752— ~~3rd~~ 4th Edition ~~(2009)~~ (2022)	Management of Hazards Associated with Location of Process Plant Buildings, CMA Managers Guide	IFC
Std 2000~~—7th Edition (2014)~~ (7th edition R2020) 8th edition (2023)	Venting Atmosphere and Low-pressure Storage Tanks: Nonrefrigerated and Refrigerated	IFC
Std 2015~~—8th Edition 2001 (2018)~~ (2023)	Requirements for Safe Entry and Clearing of Petroleum Storage Tanks	IFC
Std 2350— ~~4th~~ 5th Edition ~~(2012)~~ (2021)	Overfill Protection for Storage Tanks in Petroleum Facilities	IFC
Std 653 Addendum 3,~~—~~5th Edition ~~(2018)~~ (2022)	Tank Inspection, Repair, Alteration and Reconstruction	IFC

ASABE	**American Society of Agricultural and Biological Engineers**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
EP 484.3 DEC2017 (R2022)	Diaphragm Design of Metal-clad, Wood-frame Rectangular Buildings	IBC

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EP 486.3 SEP2017 (R2021)	Shallow-post and Pier Foundation Design	IBC			
EP 559.1 ~~W/Corr.~~ AUG2010~~(R2014)~~ (R2019)	Design Requirements and Bending Properties for Mechanically Laminated Wood Assemblies	IBC			
S640—JUL2017 (R2022)	Quantities and Units of Electromagnetic Radiation for Plants (Photosynthetic Organisms)	IECC®			
ASCE/SEI	**American Society of Civil Engineers Structural Engineering Institute**				
Standard Reference Number	**Title**	**Referenced in Code(s):**			
19~~—16~~ 22	Structural Applications of Steel Cables for Buildings	IBC			
29~~—19~~ 05	Standard Calculation Methods for Structural Fire Protection	IBC			
49~~—12~~ 21	Wind Tunnel Testing for Buildings and Other Structures	IBC			
55~~—16~~ 22	Tensile Membrane Structures	IBC			
7~~—16~~ 22	Minimum Design Loads and Associated Criteria for Buildings and Other Structures	IBC	IRC®		
8~~—20~~ 21	Standard Specification for the Design of Cold-formed Stainless Steel Structural Members	IBC			
ASCE/SEI 24~~—20~~ 14	Flood Resistant Design and Construction	IFC	IRC	ISPSC	IBC
ASHRAE	**ASHRAE**				
Standard Reference Number	**Title**	**Referenced in Code(s):**			
140~~—2014~~ 2020	~~Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs~~ Method of Test for Evaluating Building Performance Simulation Software	IECC®			

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146~~—2011~~ 2020	~~Testing~~ Method of Test for Rating Pool Heaters	IECC®		
15~~—2019~~ 2022	Safety Standard for Refrigeration Systems	IMC	IFC	
170~~—2017~~ 2021	Ventilation of Health Care Facilities	IMC	IBC	IFC
34~~—2019~~ 2022	Designation ~~and Safety~~ Classification of Refrigerants	IMC	IRC®	
55~~—2017~~ 2020	Thermal Environmental Conditions for Human Occupancy	IECC®		
62.1~~-2019~~ 2022	Ventilation for Acceptable Air Quality	ISPSC		
62.1~~—2019~~ 2022	Ventilation for Acceptable Indoor Air Quality	IMC	IEBC	IECC®
90.1~~—2016~~ 2022	Energy Standard for Buildings Except Low-rise Residential Buildings	IMC	IECC®	
90.1~~—2019~~ 2022	Energy Standard for Buildings Except Low-rise Residential Buildings	IECC®		
90.4~~—2016~~ 2022	Energy Standard for Data Centers	IECC®		
ANSI/ASHRAE/ACCA Standard 183~~—(RA2017)~~ 2007 (RA 2020)	Peak Cooling and Heating Load Calculations in Buildings~~,~~ Except Low-rise Residential Buildings	IECC®		

ASME	American Society of Mechanical Engineers	
Standard Reference Number	**Title**	**Referenced in Code(s):**
A112.1.3—2000 (~~Reaffirmed 2020~~ 2024)	Air Gap Fittings for Use with Plumbing Fixtures, Appliances and Appurtenances	IRC®
A112.1.3~~—2000 (R2020)~~ 2024	Air Gap Fittings for Use with Plumbing Fixtures, Appliances and Appurtenances	IPC

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A112.14.1—2003 (R2022)	Backwater Valves	IPC	
A112.14.1—2003 ~~(R2017)~~ (2022)	Backwater Valves	IRC®	
A112.14.3—~~2021~~ 2023	Grease Interceptors	IPC	
A112.14.4—2001-~~(R2017)~~ (R2022)	Grease Removal Devices	IPC	
A112.14.6—2010 ~~(R2020)~~ (R2024)	FOG (Fats, Oils and Greases) Disposal Systems	IPC	
A112.18.1—~~2020~~ /CSA B125.1 —~~2020~~ 2023	Plumbing Supply Fittings	IPC	IRC®
A112.18.2—~~2019~~ 2023/CSA B125.2—~~19~~ 2023	Plumbing Waste Fittings	IPC	
A112.18.2—~~2019~~ 2023 /CSA B125.2—~~2019~~ 2023	Plumbing Waste Fittings	IRC®	
A112.18.3~~M~~—2002~~(R2020)~~ (R2022)	Performance Requirements for Backflow Protection Devices and Systems in Plumbing Fixture Fittings	IRC®	
A112.18.6—2021/CSA B125.6—21	Flexible Water Connectors	IPC	IRC®
A112.19.12—~~2019~~ 2024	Wall Mounted and Pedestal Mounted, Adjustable, Elevating, Tilting and Pivoting Lavatory, Sink, and Shampoo Bowl Carrier Systems and Drain Waste Systems	IPC	IRC®
A112.19.14—2013 (R~~2018~~ 2023)	Six-Liter Water Closets Equipped with Dual Flushing Device	IRC®	
A112.19.14—2013 ~~(R2018)~~ (R2023)	Six-liter Water Closets Equipped with a Dual Flushing Device	IPC	
A112.19.15—~~2012 () R201~~ 2012 (R2022)	Bathtub/Whirlpool Bathtubs with Pressure Sealed Doors	IPC	IRC
A112.19.19 ~~2016 (R2021)~~ 2021	Vitreous China Nonwater Urinals	IPC	
A112.19.1—~~2020~~ 2022/CSA B45.2—~~20~~ 2022	Enameled Cast Iron and Enameled Steel Plumbing Fixtures	IPC	

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A112.19.1—~~2020~~ 2022/CSA B45.2—~~2020~~ 2022	Enameled Cast-iron and Enameled Steel Plumbing Fixtures	IRC®	
A112.19.2—/CSA B45.1—~~20 2020 20~~ 2021	Ceramic Plumbing Fixtures	IPC	
A112.19.2—~~2020~~ 2021/CSA B45.1—~~2020~~ 2021	Ceramic Plumbing Fixtures	IPC	IRC®
A112.19.3—2021/CSA B45.4—~~08 (R~~2021~~)~~	Stainless Steel Plumbing Fixtures	IPC	IRC®
A112.19.5—~~2021~~ 2022/CSA B45.15—~~2021~~ 2022	Flush Valves and Spuds for Water Closets, Urinals, and Tanks	IPC	IRC®
A112.19.7-~~2012~~ 2023/CSA B45.10—~~2012 (R2021)~~ 2023	Hydromassage Bathtub Systems	IRC®	
A112.19.7—CSA B45.10—~~R 2012/ 2012 (2021)~~ 2012(R2023)	Hydromassage Bathtub Systems	IPC	
A112.21.3—~~1985 (R2017)~~ 2022	Hydrants for Utility and Maintenance Use	IPC	
A112.3.4—~~2020~~ 2022/CSA B45.9—~~20~~ 2022	Macerating Toilet Systems and Related Components	IRC®	
A112.36.2M—1991 ~~(R2017)~~ (R2022)	Cleanouts	IPC	IRC®
A112.4.14—~~2004 (R2019)~~ 2022	Manually Operated, Quarter-Turn Shutoff Valves for Use in Plumbing Systems	IPC	IRC®
A112.4.14—~~2019~~ 2022/CSA B125.14-~~19~~ 2022	Manually Operated Valves for Use in Plumbing Systems	IPC	IRC®
A112.4.1—~~2019~~ 2024	Water Heater Relief Valve Drain Tubes	IRC®	
A112.4.2—~~2020~~ 2021/CSA B45.16—~~20~~ 2021	Water Closet Personal Hygiene Devices	IPC	
A112.4.3—~~1999 (R2020)~~ 2024	Plastic Fittings for Connecting Water Closets to the Sanitary Drainage System	IPC	IRC®

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A112.4.4—~~2017~~ 2022	Plastic Push-Fit Drain, Waste, and Vent (DWV) Fittings	IPC		IRC®	
A112.6.1M — ~~1997(R2017)~~ 2022	Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use	IPC			
A112.6.2—~~2017~~ 2022	Framing-Affixed Supports for Off-the-Floor Water Closets with Concealed Tanks	IPC		IRC®	
A112.6.3—~~2019~~ 2022	Floor and Trench Drains	IPC		IRC®	
A112.6.4—~~2003 (R2012)~~ (R2020)	Roof, Deck, and Balcony Drains	IPC			
A112.6.7—2010 ~~(R2020)~~ (R2024)	Sanitary Floor Sinks	IPC			
A112.6.9—2005 ~~(R2020)~~ (R2024)	Siphonic Roof Drains	IPC			
A17.1—~~2019~~ 2022/CSA B44—~~19~~ 2022	Safety Code for Elevators and Escalators	IBC	IEBC	IFC	IRC®
A17.3—~~2020~~ 2023	Safety Code for Existing Elevators and Escalators	IEBC		IFC	
A18.1—~~2020~~ 2023	Safety Standard for Platform Lifts and Stairway Chairlifts	IBC	IEBC	IRC®	
ASME A17.1—~~2019~~ 2022/CSA B44—~~19~~ 2022	Safety Code for Elevators and Escalators	IPMC		IECC®	
ASME A17.1—~~2019~~ 2022/CSA B44—~~2019~~ 2022	Safety Code for Elevators and Escalators	IRC®			
ASSE 1016—~~2020~~ 2021/ASME 112.1016—~~2020~~ 2021/CSA B125.16—~~2020~~ 2021	Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations	IPC		IRC®	
B1.13M—~~2006~~ 2020	Metric Screw Threads: M Profile	IMC			
B1.1—~~2003~~ 2024	Unified Inch Screw Threads, UN and UNR Thread Form	IMC			
B1.20.1—~~2019~~ 2023	Pipe Threads, General Purpose (inch)	IFGC	IMC	IPC	IRC®

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B1.20.3~~—1976~~ 2023	Dryseal Pipe Threads, Inch	IMC				
B16.12~~—2009 (R2019)~~ 2024	Cast Iron Threaded Drainage Fittings	IPC	IRC®			
B16.15~~—2013~~ 2023	Cast Alloy Threaded Fittings~~: Classes 125 and 250~~	ISPSC				
B16.15~~—2018~~ 2023	Cast Alloy Threaded Fittings~~: Classes 125 and 250~~	IMC	IPC	IRC®		
B16.18~~—2018~~ 2023	Cast Copper Alloy Solder Joint Pressure Fittings	IMC	IPC	IBC	IFC	IRC®
B16.22~~—2018~~ 2023	Wrought-Copper and Copper-Alloy Solder Joint Pressure Fittings	IMC	IPC	IBC	IFC	IRC®
B16.26~~—2018~~ 2023	Cast Copper Alloy Fittings for Flared Copper Tubes	IMC	IPC	IRC®		
B16.29~~—2017~~ 2022	Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings (DWV)	IPC	IRC®			
B16.33~~—2012 (R2017)~~ 2022	Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 psig (Sizes $^1/_2$ through 2)	IRC®				
B16.33~~—2012(2017)~~ 2022	Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 psig (Sizes $^1/_2$ through 2)	IFGC				
B16.34~~—2020~~ 2023	Valves—Flanged, Threaded and Welding End	IPC	IRC®			
B16.44~~—2012 (R2017)~~ 2022	Manually Operated Metallic Gas Valves for Use in Above-ground Piping Systems up to 5 psi	IFGC	IRC®			
B16.47~~—2020~~ 2023	Large Diameter Steel Flanges: NPS 26 through NPS 60 Metric/Inch Standard	IFGC				
B16.5~~—2019~~ 2024	Pipe Flanges and Flanged Fittings: NPS $^1/_2$ through NFPS 24 Metric/Inch Standard	IFGC	IMC			

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B16.9—~~2018~~ 2023	Factory-Made Wrought Steel Buttwelding Fittings	IMC	IPC	IRC®
B20.1—~~2021~~ 2024	Safety Standard for Conveyors and Related Equipment	IBC		
B251/B251M—2017	Specification for General Requirements for Wrought Seamless Copper and Copper-alloy Tube	IPSDC		
B31.12—~~2019~~ 2024	Hydrogen Piping and Pipelines	IFGC		
B31.1—~~2020~~ 2022	Power Piping	IFC		
B31.3—~~2020~~ 2022	Process Piping	IFGC	IBC	IFC
B31.4—~~2019~~ 2022	Pipeline Transportation Systems for Liquids and Slurries	IFC		
B31.5—~~2019~~ 2022	Refrigeration Piping and Heat Transfer Components	IMC	IPC	
B31.9—~~2020~~ 2023	Building Services Piping	IMC	IFC	
B36.10M—~~2018~~ 2023	Welded and Seamless Wrought-steel Pipe	IFGC	IRC®	
BPVC—~~2019~~ 2023	ASME Boiler and Pressure Vessel Code (Sections I, II, IV, V & VI, VIII)	IFGC	IMC	IFC	IRC®
CSD-1—~~2021~~ 2024	Controls and Safety Devices for Automatically Fired Boilers	IFGC	IMC	IRC®	

ASPE	**American Society of Plumbing Engineers**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
45—~~2013~~ 2018	Siphonic Roof Drainage ~~Systems~~	IPC
ASPE/IAPMO Z1034—2015 (R2020)	Test Method for Evaluating Roof Drain Performance	IPC

ASSE	**ASSE International**	
Standard Reference Number	**Title**	**Referenced in Code(s):**

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1003—~~09~~ 2020	Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution	IPC	
1003—~~2011~~ 2020	Performance Requirements for Water-pressure-reducing Valves for Domestic Water Distribution Systems	IRC®	
1008—~~06~~ 2020	Performance Requirements for Plumbing Aspects of Food Waste Disposer Units	IPC	
1008—~~2006~~ 2020	Performance Requirements for Plumbing Aspects of Residential Food Waste Disposer Units	IRC®	
1013—~~2017~~ 2021	Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies ~~Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers~~	IRC®	
1015—~~2017~~ 2021	Performance Requirements for Double Check Backflow Prevention Assemblies ~~and Double Check Fire Protection Backflow Prevention Assemblies~~	IPC	IRC®
1018—~~2001~~ 2021	Performance Requirements for Trap Seal Primer Valves; Potable Water Supplied	IPC	IRC®
1019—~~2011~~ ~~(R2016)~~	~~Performance Requirements for Vacuum Breaker Wall Hydrants, Freeze Resistant, Automatic Draining Type~~ Performance Requirements for Freeze-resistant, Wall Hydrants, Vacuum Breaker, Draining Types	IPC	IRC®
1020—~~04~~ 2020	Performance Requirements for Pressure Vacuum Breaker Assembly	IPC	
1020—~~2004~~ 2020	Performance Requirements for Pressure Vacuum Breaker Assembly	IRC®	
1022—~~2017~~ 2021	Performance Requirements for Backflow Preventer for Beverage Dispensing Equipment	IPC	

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1023—~~1979~~ 2020	Performance Requirements for Electrically Heated or Cooled ~~Hot~~ Water Dispensers~~, Household storage type—Electrical~~	IRC®	
1024—~~2017~~ 2021	Performance Requirements for Dual Check Valve Type Backflow Preventers, Anti-siphon-type, Residential Applications	IPC	IRC®
1035—~~08~~ 2020	Performance Requirements for Laboratory Faucet Backflow Preventers	IPC	
1035—~~2008~~ 2020	Performance Requirements for Laboratory Faucet Backflow Preventers	IRC®	
1044—~~2015~~ 2020	Performance Requirements for Trap Seal Primer Devices—Drainage Types and Electronic Design Types	IPC	IRC®
1047—~~2011~~ 2021	Performance Requirements for Reduced Pressure Detector Fire Protection Backflow Prevention Assemblies	IPC	IRC®
1048—~~2011~~ 2021	Performance Requirements for Double Check Detector Fire Protection Backflow Prevention Assemblies	IPC	IRC®
1049—~~2009~~ 2021	Performance Requirements for Individual and Branch Type Air Admittance Valves for Chemical Waste Systems	IPC	
1050—~~2009~~ 2021	Performance Requirements for Stack Air Admittance Valves for Sanitary Drainage Systems	IPC	IRC®
1051—~~2009~~ 2021	Performance Requirements for Individual and Branch Type Air Admittance Valves for Sanitary Drainage Systems ~~fixture and Branch Devices~~	IPC	IRC®
1056—~~2013~~ 2021	Performance Requirements for Spill-Resistant Vacuum Breaker	IPC	IRC®

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1060—~~2016~~ 2020	Performance Requirements for Outdoor Enclosures for Fluid-conveying Components	IRC®		
1060—~~2017~~ 2020	Performance Requirements for Outdoor Enclosures for Fluid Conveying Components	IPC		
1061—~~2015~~ 2020	Performance Requirements for Push Fit Fittings	IMC	IPC	IRC®
1062—~~2017~~ 2021	Performance Requirements for Temperature Actuated, Flow Reduction (TAFR) Valves to Individual Supply Fittings	IPC	IRC®	
1064—~~2006 (R2011)~~ 2020	Performance Requirements for Backflow Prevention Assembly Field Test Kits	IPC		
1069—~~05~~ 2020	Performance Requirements for Automatic Temperature Control Mixing Valves	IPC		
1071—~~2012~~ 2021	~~Performance Requirements for~~ Temperature Actuated Mixing Valves for Plumbed Emergency Equipment	IPC		
1072—~~07~~ 2020	Performance Requirements for Barrier Type Floor Drain Tap Seal Protection Devices	IPC		
1072—~~2007~~ 2020	Performance Requirements for Barrier-type Trap Seal Protection for Floor Drain s ~~Trap Seal Protection Devices~~	IRC®		
1079—~~2005~~ 2021	Performance Requirements for Dielectric Pipe Unions	IMC	IPC	
1081—~~2014~~ 2020	Performance Requirements for Backflow Preventers with Integral Pressure Reducing Boiler Feed Valve and Intermediate Atmospheric Vent Style for Domestic and Light Commercial Water Distribution Systems	IPC	IRC®	

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5013—2015	~~Performance Requirements for Testing~~ Reduced Pressure Principle Backflow ~~Prevention Assembly~~ Preventers (RPA) and Reduced Pressure Principle Fire Protection Backflow Preventers (RFP)	IPC
ASSE/IAPMO 1055—~~2018~~ 2020	Performance Requirements for Chemical Dispensing Systems with Integral Backflow Protection	IPC

ASSP	American Society of Safety Professionals		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/ASSP Z359.1 -2020	The Fall Protection Code	IFGC	
ANSI/ASSE Z359.1—~~2019~~ 2020	The Fall Protection Code	IBC	
ANSI/ASSP Z359.1—~~2019~~ 2020	The Fall Protection Code	IMC	IFC

ASTM	ASTM International			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
A105/A105M—~~18~~ 21	Standard Specification for Carbon Steel Forgings for Piping Applications	IMC		
A106/A106M—~~2018~~ 2019a	Specification for Seamless Carbon Steel Pipe for High-temperature Service	IFGC	IMC	IRC®
A126—04(~~2014~~ 2019)	Standard Specification for Gray Iron Castings for Valves, Flanges , and Pipe Fittings	IMC	IRC®	
A181/A181M—14(2020)	Standard Specification for Carbon Steel Forgings, for General-purpose Piping	IMC		
A182/A182M—~~2018A~~ 21	Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-temperature Service	ISPSC		

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A193/A193M—~~19~~ 20	Standard Specification for Alloy-steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications	IMC			
A234/A234M—~~18A~~ 19	Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service	IMC			
A240/A240M—~~17~~ 20a	Standard Specification for Chromium and Chromium-~~n~~ Nickel Stainless Steel Plate, Sheet , and Strip for Pressure Vessels and for General Applications	IMC	IBC	ISPSC	IRC®
A252—~~2010(2018)~~ /A252M-19	Specification for Welded and Seamless Steel Pipe Piles	IBC			
A254—~~2010(2018)~~ /A254M-12(2019)	Specification for Copper Brazed Steel Tubing	IFGC	IMC	IRC®	
A268/A268M—~~2010(16)~~ 20	Standard Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service	IRC®			
A268/A268—~~2010(16)~~ 20	Standard Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service	IFGC			
A269/A269M-15a 2019	Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service	IFGC	IMC	IPC	IRC®
A307—~~2014E1~~ 21	Specification for Carbon Steel Bolts ~~and~~ Studs, and Threaded Rod 60,000 ~~psi~~ PSI Tensile Strength	IRC®			
A312/A312M— ~~2018~~ 21	Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes	IPC			
A312/A312M—~~2018~~ 21	Standard Specification for Seamless, Welded and Heavily Cold Worked Austenitic Stainless Steel Pipes	IFGC	ISPSC		

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A312/A312M ~~—17~~ 21	Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes	IMC		
A312/A312M~~—2018~~ 21	Specification for Seamless, Welded and Heavily Cold Worked Austenitic Stainless Steel Pipes	IRC®		
A334/A334M—04a(~~2016~~ 2021)	Standard Specification for Seamless and Welded Carbon and Alloy-steel Tubes for Low-temperature Service	IMC		
A36/A36M~~—14~~ 19	Specification for Carbon Structural Steel	IBC	IRC®	
A395/A395M—99(~~2014~~) 2018	Standard Specification for Ferritic Ductile Iron Pressure-retaining Castings for Use at Elevated Temperatures	IMC		
A403/A403M~~—2018A~~ 20	Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings	ISPSC		
A416/A416M~~—2017A~~ 18	Standard Specification for Low-Relaxation , ~~Uncoated~~ Seven-~~W~~wire Steel Strand for Prestressed Concrete	IBC		
A420/A420M~~—2016~~ 20	Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-temperature Service	IMC		
A463/A463M—15 (2020)e1	Standard Specification for Steel Sheet, Aluminum-coated, by the Hot-dip Process	IBC	IRC®	
A53/A53M— ~~2018~~ 2020	Specification for Pipe, Steel, Black and Hot-dipped, Zinc-coated Welded and Seamless	IPC		
A53/A53M~~—2018~~ 2020	Specification for Pipe, Steel, Black and Hot Dipped Zinc-coated Welded and Seamless	IFGC	IMC	IRC®
A536—84~~(2014)~~ (2019)e1	Standard Specification for Ductile Iron Castings	IMC		
A563/A563M~~—15~~ 21a	Standard Specification for Carbon and Alloy Steel Nuts	IRC®		

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A572/A572M—~~2018~~ 21e1	Specification for High-strength Low-alloy Columbium-Vanadium Structural Steel	IBC	
A588/A588M—~~15~~ 19	Standard Specification for High-~~s~~Strength Low-~~a~~ Alloy Structural Steel , ~~with~~ up to 50 ksi ~~(~~ [345 MPa~~)~~] Minimum Yield Point with Atmospheric Corrosion Resistance	IBC	
A6/A6M—~~2017A~~ 2019	Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling	IBC	
A615/A615M—~~15ae1~~ 20	StandardSpecification for Deformed and Plain Carbon-~~s~~ Steel Bars for Concrete Reinforcement	IBC	
A615/A615M—~~2015aE1~~ 20	Standard Specification for Deformed and Plain Carbon- s Steel Bars for Concrete Reinforcement	IRC®	
A641/A641M—~~09a(2014)~~ 19	Specification for Zinc-coated (Galvanized) Carbon Steel Wire	IRC®	
A653/A653M—~~2017~~ 2020	Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-iron Alloy-coated (Galvannealed) by the Hot-dip Process	IRC®	
A653/A653M—~~2017~~ 2020	Specification for Steel Sheet, Zinc-coated Galvanized or Zinc-iron Alloy-coated Galvannealed by the Hot-dip Process	IBC	
A706/A706M—2016	Standard Specification for Deformed and Plain Low-~~a~~ Alloy Steel Bars for Concrete Reinforcement	IBC	IRC®
A74— ~~17~~ 2021	Specification for Cast-iron Soil Pipe and Fittings	IPC	
A74—2017	Specification for Cast-iron Soil Pipe and Fittings	IRC®	

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A755/A755M—~~2016E1~~ 18	Specification for Steel Sheet, Metallic-coated by the Hot-dip Process and Prepainted by the Coil-coating Process for Exterior Exposed Building Products	IBC	
A755M/A755M—~~2016E1~~ 18	Specification for Steel Sheet, Metallic Coated by the Hot-dip Process and Prepainted by the Coil-coating Process for Exterior Exposed Building Products	IRC®	
A778/A778M— 16(2021)	Specification for Welded Unannealed Austenitic Stainless Steel Tubular Products	IPC	
A778M/A778M—~~20~~16 (2021)	Specification for Welded Unannealed Austenitic Stainless Steel Tubular Products	IRC®	
A792/A792M—~~10(2015)~~ 21a	Specification for Steel Sheet, 55% Aluminum-zinc Alloy-coated by the Hot-dip Process	IBC	IRC®
A875/A875M—~~13~~ 21	Standard Specification for Steel Sheet, Zinc-5%, Aluminum Alloy-coated by the Hot-dip Process	IBC	IRC®
A888— ~~2018~~ 21a	Specification for Hubless Cast-iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Application	IPC	IRC®
A924/A924M—~~2017A~~ 20	Standard Specification for General Requirements for Steel Sheet, Metallic-coated by the Hot-dip Process	IBC	
A924M—~~2017A~~ 20	Standard Specification for General Requirements for Steel Sheet, Metallic-coated by the Hot-dip Process	IRC®	
B101—12(2019)	Specification for Lead-coated Copper Sheet and Strip for Building Construction	IBC	IRC®
B152/B152M—~~13~~ 19	Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar	IPC	
B209—~~14~~ 21	Specification for Aluminum and Aluminum Alloy Steel and Plate	IBC	IRC®

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B210/B210M—19a	Standard Specification for Aluminum and Aluminum-alloy Drawn Seamless Tubes	IFGC				IMC		
B280—~~18~~ 20	Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service	IFGC	IMC	IFC	IRC	IBC		
B306—~~13~~ 20	Specification for Copper Drainage Tube (DWV)	IPC				IRC®		
B32—~~08(2014)~~ 20	Specification for Solder Metal	IMC		IPC		IRC®		
B370—12(2019)	Specification for Copper Sheet and Strip for Building Construction	IBC				IRC®		
B42—~~15a~~ 20	Specification for Seamless Copper Pipe, Standard Sizes	IMC	IPC	IFC	IRC	IBC		
B43—~~15~~ 20	Specification for Seamless Red Brass Pipe, Standard Sizes	IMC	IPC	IBC	IFC	IRC®		
B447—12a(2021)	Specification for Welded Copper Tube	IPC		ISPSC		IRC®		
B68/B68M—~~11~~ 19	Standard Specification for Seamless Copper Tube, Bright Annealed ~~(Metric)~~	IMC		IBC		IFC		
B75/B75M—~~11~~ 20	Specification for Seamless Copper Tube	IMC		IPC		IRC®		
B819—~~2018~~ 19	Standard Specification for Seamless Copper Tube for Medical Gas Systems	IMC						
B88—~~2016~~ 20	Specification for Seamless Copper Water Tube	IFGC	IMC	IPC	IBC	IFC	ISPSC	IRC®
C1002—~~2018~~ 20	Specification for Steel Self-piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs	IBC				IRC®		
C1007—~~11a(2015)~~ 20	Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories	IBC						

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C1029—~~15~~ 20	Specification for Spray-applied Rigid Cellular Polyurethane Thermal Insulation	IBC		IRC®
C1047—~~14a~~ 19	Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base	IRC®		
C1063—~~2018B~~ 21	Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-based Plaster	IBC		IRC®
C1088—~~2018~~ 20	Specification for Thin Veneer Brick Units Made from Clay or Shale	IBC		IRC®
C1107/C1107M—~~2017~~ 20	Standard Specification for Packaged Dry, Hydraulic-cement Grout (Nonshrink)	IRC®		
C1157/C1157M—~~2017~~ 20a	Standard Performance Specification for Hydraulic Cement	IBC		
C126—~~2017~~ 19	Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units	IRC®		
C1277—~~2018~~ 20	Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings	IPC	IPSDC	IRC®
C1280—~~13a~~ 18	Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing	IBC		
C1283—2015(2021)	Practice for Installing Clay Flue Lining	IBC		IRC®
C1288—2017	Standard Specification for ~~Discrete Nonasbestos~~ Fiber-~~c~~ Cement Interior Substrate Sheets	IBC		IRC®
C1289—~~2018~~ 21	Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board	IBC		IRC®
C1313/C1313M—13(2019)	Standard Specification for Sheet Radiant Barriers for Building Construction Applications	IBC		

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C1325—~~2018~~ 21	Standard Specification for Nonasbestos Fiber-mat Reinforced Cement Backer Units	IBC		IRC®
C1328/C1328M—~~12~~ 19	Specification for Plastic (Stucco Cement)	IBC		IRC®
C1363—~~11~~ 19	Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus	IECC®		IRC®
C1364—~~2017~~ 19	Standard Specification for Architectural Cast Stone	IBC		IRC®
C140/C140M—~~2018~~ 21	Test Method Sampling and Testing Concrete Masonry Units and Related Units	IBC		
C1405—~~2016~~ 20a	Standard Specification for Glazed Brick (Single Fired, Brick Units)	IRC®		
C143/C143M—~~15A~~ 20	Test Method for Slump of Hydraulic Cement Concrete	IRC®		
C1440— ~~2017~~ 21	Specification for Thermoplastic Elastomeric (TPE) Gasket Materials for Drain, Waste, and Vent (DWV), Sewer, Sanitary and Storm Plumbing Systems	IPC	IPSDC	IRC
C1440—~~2017~~ 21	Specification for Thermoplastic Elastomeric (TPE) Gasket Materials for Drain, Waste and Vent (DWV), Sewer, Sanitary and Storm Plumbing Systems	IRC®		
C1460— ~~2017~~ 21	Specification for Shielded Transition Couplings for Use with Dissimilar DWV Pipe and Fittings Above Ground	IPC	IPSDC	IRC®
C1460—~~2017~~ 21	Specification for Shielded Transition Couplings for Use with Dissimilar DWV Pipe and Fittings Above Ground	IRC®		

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C1461— ~~2008(2017)~~ 21	Specification for Mechanical Couplings Using Thermoplastic Elastomeric (TPE) Gaskets for Joining Drain, Waste and Vent (DWV) Sewer, Sanitary and Storm Plumbing Systems for Above and Below Ground Use	IPC	
C14—~~15a~~ 20	Specification for Nonreinforced Concrete Sewer, Storm Drain and Culvert Pipe	IPC	IRC®
C150/C150M—~~2018~~ 21	Specification for Portland Cement	IBC	IRC®
C1540— ~~2018~~ 20	Specification for Heavy Duty Shielded Couplings Joining Hubless Cast-iron Soil Pipe and Fittings	IPC	
C1563— 2008~~(201 7)~~ (2021)	Standard Test Method for Gaskets for Use in Connection with Hub and Spigot Cast Iron Soil Pipe and Fittings for Sanitary Drain, Waste, Vent and Storm Piping Applications	IPC	
C1568—08~~(2013)~~ (2020)	Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Mechanical Uplift Resistance Method)	IBC	
C1600/C1600M—~~2017~~ 19	Standard Specification for Rapid Hardening Hydraulic Cement	IBC	
C1629/C1629M—~~2018A~~ 19	Standard Classification for Abuse-resistant Nondecorated Interior Gypsum Panel Products and Fiber-reinforced Cement Panels	IBC	
C1634—~~2017~~ 20	Standard Specification for Concrete Facing Brick and Other Concrete Masonry Facing Units	IRC®	
C1658/C1658M—~~2018~~ 19e1	Standard Specification for Glass Mat Gypsum Panels	IBC	IRC®
C1668—~~13a~~ 20	Standard Specification for Externally Applied Reflective Insulation Systems on Rigid Duct in Heating, Ventilation, and Air Conditioning (HVAC) Systems	IRC®	

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C1670/1670M—~~2018~~ 2021a	Standard Specification for Adhered Manufactured Stone Masonry Veneer Units	IRC®			
C1670/C1670M—~~2018~~ 21a	Standard Specification for Adhered Manufactured Stone Masonry Veneer Units	IBC			
C1766—2015(2019)	Standard Specification for Factory-laminated Gypsum Panel Products	IBC	IRC®		
C1788—~~14~~ 20	Standard Specification for Non Metallic Plaster Bases (Lath) Used with Portland Cement Based Plaster in Vertical WallApplications	IBC			
C208—2012(2017)~~E1~~ e2	Specification for Cellulosic Fiber Insulating Board	IBC	IRC®		
C212—~~2017~~ 21	Standard Specification for Structural Clay Facing Tile	IRC®			
C216—~~2017A~~ 21	Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)	IBC	IRC®		
C22/C22M—00(~~2015~~) (2021)	Specification for Gypsum	IBC	IRC®		
C270—~~14A~~ 19ae1	Specification for Mortar for Unit Masonry	IRC®			
C28/C28M—10(~~2015~~) 2020	Specification for Gypsum Plasters	IBC	IRC®		
C31/C31M—~~2018B~~ 21a	Practice for Making and Curing Concrete Test Specimens in the Field	IBC			
C315—2007(~~2016~~) (2021)	Specification for Clay Flue Liners and Chimney Pots	IFGC	IMC	IBC	IRC®
C317/C317M—2000 ~~(2015)~~ (2019)	Specification for Gypsum Concrete	IBC			
C34—2017	Standard Specification for Structural Clay ~~Load-bearing~~ Loadbearing Wall Tile	IRC®			

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C35/C35M—~~(2014)~~ 01(2019)	Specification for Inorganic Aggregates for Use in Gypsum Plaster	IRC®		
C35/C35—01~~(2014)~~ (2019)	Specification for Inorganic Aggregates for Use in Gypsum Plaster	IBC		
C411—~~2017~~ 2019	Test Method for Hot-surface Performance of High-temperature Thermal Insulation	IMC	IRC®	
C425— ~~2004(2018)~~ 21	Specification for Compression Joints for Vitrified Clay Pipe and Fittings	IPC	IPSDC	IRC
C443— ~~2012(2017)~~ 20	Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets	IPC		
C443—~~2012(2017)~~ 20	Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets	IRC®		
C472—~~99(2014)~~ 20	Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete	IBC		
C473—~~2017~~ 2019	Test Methods for Physical Testing of Gypsum Panel Products	IBC		
C474—15(2020)	Test Methods for Joint Treatment Materials for Gypsum Board Construction	IBC		
C475M—2017	Specification for Joint Compound and Joint Tape for Finishing Gypsum Wallboard	IRC®		
C476—~~2018~~ 2020	Specification for Grout for Masonry	IRC®		
C503M/C503M—2015	Standard Specification for Marble Dimension Stone	IRC®		
C514—04~~(2014)~~ (2020)	Specification for Nails for the Application of Gypsum Board	IBC	IRC®	
C516—~~2008(2014)E1~~ 19	Specifications for Vermiculite Loose Fill Thermal Insulation	IBC		

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C547—~~2017~~ 19	Specification for Mineral Fiber Pipe Insulation	IBC	
C549—~~06(2012)~~ 18	Specification for Perlite Loose Fill Insulation	IBC	
C552—~~2017E1~~ 21a	Standard Specification for Cellular Glass Thermal Insulation	IBC	IRC®
C564—~~14~~ 20a	Specification for Rubber Gaskets for Cast-iron Soil Pipe and Fittings	IPC	IRC®
C578—~~2018~~ 19	Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation	IBC	IRC®
C59/C59M—00~~(2015)~~ (2020)	Specification for Gypsum Casting Plaster and Molding Plaster	IBC	IRC®
C595/C595M—~~2018~~ 21	Specification for Blended Hydraulic Cements	IBC	IRC®
C61/C61M—00~~(2015)~~ (2020)	Specification for Gypsum Keene's Cement	IBC	IRC®
C631—09~~(2014)~~ 2020	Specification for Bonding Compounds for Interior Gypsum Plastering	IBC	IRC®
C636/C636M—~~13~~ 19	Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels	IBC	
C652—~~2017A~~ 21	Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale)	IBC	IRC®
C67/C67M—~~2018~~ 21	Test Methods of Sampling and Testing Brick and Structural Clay Tile	IBC	
C754—~~2018~~ 20	Specification for Installation of Steel Framing Members to Receive Screw-attached Gypsum Panel Products	IBC	
C76—~~2018A~~ 20	Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe	IPC	

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C76—~~2018A~~ 20	Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe	IPC	IPSDC	IRC®
C840—~~2018A~~ 20	Specification for Application and Finishing of Gypsum Board	IBC		
C842—05~~(2015)~~ (2021)	Specification for Application of Interior Gypsum Plaster	IBC		IRC®
C844—2015 (2021)	Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster	IBC		IRC®
C847—~~14a~~ 2018	Specification for Metal Lath	IBC		
C887—~~13~~ 20	Specification for Packaged, Dry Combined Materials for Surface Bonding Mortar	IBC		IRC®
C897—15 (2020)	Specification for Aggregate for Job-mixed Portland Cement-based Plaster	IBC		IRC®
C926—~~2018B~~ 20b	Specification for Application of Portland Cement-based Plaster	IBC		IRC®
C932—06~~(2013)~~ (2019)	Specification for Surface-applied Bonding Compounds for Exterior Plastering	IBC		
C94/C94M—~~17A~~ 21b	Specification for Ready-mixed Concrete	IEBC		
C94/C94M—~~2017A~~ 21b	Specification for Ready-mixed Concrete	IBC		IRC®
C956—04~~(2015)~~ (2019)	Specification for Installation of Cast-in-place Reinforced Gypsum Concrete	IBC		
D1003—~~13~~ 21	Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics	IECC®		
D1143/D1143M—~~2007(2013)E1~~ 20	Standard Test Methods for Deep Foundations~~~~ Elements Under Static Axial Compressive Load	IBC		

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D1227—13(2019)e1	Specification for Emulsified Asphalt Used as a Protective Coating for Roofing	IBC	IRC®	
D1557—12~~e1~~ (2021)	Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort [56,000 ft-lb/ft^3 (2,700 kN m/m^3)]	IBC		
D1593—~~13~~ 19	Standard Specification for Nonrigid Vinyl Chloride Plastic Film and Sheeting	ISPSC		
D1693—15e1	Test Method for Environmental Stress-cracking of Ethylene Plastics	IMC	IRC®	
D1784—~~11~~ 20	Standard ~~Specification~~ Classification System and Basis for Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds	IRC®		
D1785— ~~2015E1~~ 21a	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120	IPC		
D1785—15E1	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120	IMC	ISPSC	IRC®
D1929—~~16~~ 20	Standard Test Method for Determining Ignition Temperature of Plastics	IBC		
D1970/D1970M—~~2017A~~ 21	Specification for Self-adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roof Underlayment for Ice Dam Protection	IBC	IRC®	
D2178/D2178M—15A(2021)	Specification for Asphalt Glass Felt Used in Roofing and Waterproofing	IBC	IRC®	
D2239—~~12A~~ 21	Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter	IRC®		

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D2241—~~15~~ 20	Specification for Poly (Vinyl Chloride) (PVC) Pressure-rated Pipe (SDR-Series)	IMC	IPC	ISPSC	IRC®
D2412—~~11(2018)~~ 21	Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-plate Loading	IMC			
D2466— ~~2017~~ 21	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40	IMC	IPC	ISPSC	IRC
D2466—~~2017~~ 21	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40	IMC	ISPSC	IRC®	
D2467—~~15~~ 20	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80	IMC	IPC	ISPSC	IRC®
D2487—~~2017~~ 17e1	Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)	IBC			
D2513—~~2018A~~ 20	Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing and Fittings	IFGC		IRC®	
D2564— ~~2012(2018)~~ 20	Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems	IMC	IPC	IRC	
D2609—~~15~~ 21	Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe	IPC		IRC®	
D2626/D2626M—04 ~~(2012)e1~~ (2020)	Specification for Asphalt-saturated and Coated Organic Felt Base Sheet Used in Roofing	IBC		IRC®	
D2665— ~~2014~~ 20	Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	IPC			
D2672—~~14~~ 20e1	Specification for Joints for IPS PVC Pipe Using Solvent Cement	IPC	ISPSC	IRC®	
D2680—~~01(2014)~~ 20	Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping	IPC		IRC®	

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D2683—~~14~~ 20	Specification for Socket-type Polyethylene Fittings for Outside Diameter-controlled Polyethylene Pipe and Tubing	IMC	IPC	IRC®
D2737—~~12a~~ 21	Standard Specification for Polyethylene (PE) Plastic Tubing	IMC	IPC	IBC
D2822/D2822M—2005(2011)e1	Specification for Asphalt Roof Cement, Asbestos Containing	IBC		IRC®
D2843—~~16~~ 19	Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics	IBC		
D2846/D2846M— ~~2017BE1~~ 19a	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems	IPC		
D2846/D2846M—2017BE1	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-water Distribution Systems	IMC	ISPSC	IRC®
D2855— ~~2015~~ 2020	~~Standard Practice for Making Solvent-cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings~~ Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets	IPC		
D2859—2016	Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials	IBC		
D2859—~~16~~ 2016(2021)	Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials	IFC		
D2949—~~10~~ 18	Specification for 3.25-in. Outside Diameter Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	IPC		IRC®
D3035—~~15~~ 21	Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter	IMC	IPC	IRC®

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D312/D312M—2016~~M~~ a	Specification for Asphalt Used in Roofing	IBC	IRC®	
D3138—04(2011)	Standard Specification for Solvent Cements for Transition Joints Between Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Non-Pressure Piping Components	IRC®		
D3139—~~98(2011)~~ 19	Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals	IPC		
D3161/D3161M—~~2016A~~ 20	Test Method for Wind Resistance of Steep Slope Roofing Products (Fan Induced Method)	IBC	IRC®	
D3201/D3201M—~~13~~ 20	Test Method for Hygroscopic Properties of Fire-retardant-treated Wood and Wood-based Products	IBC	IRC®	
D3212—~~07(2013)~~ 20	Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals	IPC	IRC®	
D323—~~15A~~ 20a	Test Method for Vapor Pressure of Petroleum Products (Reid Method)	IFC		
D3278—~~96(2011)~~ 21	Test Methods for Flash Point of Liquids by Small Scale Closed-cup Apparatus	IMC	IBC	IFC
D3350—~~14~~ 21	Specification for Polyethylene Plastic Pipe and Fitting Materials	IRC®		
D3462/D3462M—2016	Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules	IBC		
D3462/D3462M—~~10A~~ 19	Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules	IRC®		
D3468/D3468M—99~~(2013)E1~~ (2020)	Specification for Liquid-applied Neoprene and Chlorosulfanated Polyethylene Used in Roofing and Waterproofing	IBC	IRC®	

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D3498—~~03(2011)~~ 19a	~~Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems~~ Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing	IBC	
D3679—~~2017~~ 21	Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding	IBC	IRC®
D3957—2009~~(2015)~~ (2020)	Standard Practices for Establishing Stress Grades for Structural Members Used in Log Buildings	IBC	
D4434/D4434M—~~2015~~ 21	Specification for Poly (Vinyl Chloride) Sheet Roofing	IBC	IRC®
D449/D449M—~~03(2014)E1~~ 2003(2021)	Specification for Asphalt Used in Dampproofing and Waterproofing	IRC®	
D4601/D4601M—04~~(2012)e1~~ (2020)	Specification for Asphalt-coated Glass Fiber Base Sheet Used in Roofing	IBC	IRC®
D4829—~~11~~ 21	Test Method for Expansion Index of Soils	IBC	IRC®
D4869/D4869M—2016A(2021)	Specification for Asphalt-saturated (Organic Felt) Underlayment Used in Steep Slope Roofing	IBC	IRC®
D4990—1997a~~(2013)~~ (2020)	Specification for Coal Tar Glass Felt Used in Roofing and Waterproofing	IRC®	
D4990—97a(2013)	Specification for Coal Tar Glass Felt Used in Roofing and Waterproofing	IBC	
D5055—~~2016~~ 2019e1	Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-joists	IBC	IRC®
D5456—~~2018~~ 21e1	Specification for Evaluation of Structural Composite Lumber Products	IBC	IRC®

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D56—2016A	Test Method for Flash Point by Tag Closed Cup Tester	IMC	IBC
D56—~~16a~~ 21	Test Method for Flash Point by Tag Closed Cup Tester	IFC	
D5726—98~~(2013)~~ (2020)	Specification for Thermoplastic Fabrics Used in Hot-applied Roofing and Waterproofing	IBC	IRC®
D6083/D6083M—~~2018~~ 21	Specification for Liquid Applied Acrylic Coating Used in Roofing	IBC	IRC®
D6305—~~08(2015)E1~~ 21	Practice for Calculating Bending Strength Design Adjustment Factors for Fire-retardant-treated Plywood Roof Sheathing	IRC®	
D635—~~14~~ 18	Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position	IBC	
D6841—~~2016~~ 21	Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-retardant Treated Lumber	IBC	IRC®
D6878/D6878M—~~2017~~ 19	Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing	IBC	IRC®
D7147—~~2011(2018)~~ 21	Specification for Testing and Establishing Allowable Loads of Joist Hangers	IBC	
D7158/D7158M—~~2019~~ 20	Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)	IBC	IRC®
D7254—~~2017~~ 20	Standard Specification for Polypropylene (PP) Siding	IBC	IRC®
D7425/D7425M—13(2019)	Standard Specification for Spray Polyurethane Foam Used for Roofing Applications	IBC	IRC®
D7672—~~14E1~~ 19	Standard Specification for Evaluating Structural Capacities of Rim Board Products and Assemblies	IBC	IRC®

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D86—~~2017~~ 20b	Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure	IBC				
D93—~~18~~ 20	Test Method for Flash Point by Pensky-Martens Closed Up Tester	IMC	IFC			
D93—~~2018~~ 20	Test Methods for Flash Point by Pensky-Martens Closed Cup Tester	IMC	IBC	IFC		
E1007—~~16~~ 21	Test Method f or Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures	IBC				
E108—~~17~~ 20a	Standard Test Methods for Fire Tests of Roof Coverings	IWUIC	IEBC	IFC	IRC	
E108—~~2017~~ 20a	Standard Test Methods for Fire Tests of Roof Coverings	IWUIC	IBC	IRC®		
E119—~~2018B~~ 20	Standard Test Methods for Fire Tests of Building Construction and Materials	IMC	IWUIC	IBC	IRC®	
E119—~~2018b~~ 20	Standard Test Methods for Fire Tests of Building Construction and Materials	IWUIC				
E136—2019a	Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C	IFGC	IMC	IWUIC	IBC	IRC®
E136—~~16A~~ 19a	Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C	IEBC				
E1677—~~11~~ 19	Specification for Air Barrier (AB) Material or Systems for Low-rise Framed Building Walls	IECC®				
E1886—~~2013A~~ 19	Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials	IBC	IRC®			

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E1918—~~06(2016)~~ 21	Standard Test Method for Measuring Solar Reflectance of Horizontal or Low-sloped Surfaces in the Field	IECC®		
E1966—15(2019)	Standard Test Method for Fire-resistant Joint Systems	IFC	IBC	
E1980—11(2019)	Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-sloped Opaque Surfaces	IECC®		
E1996—~~2017~~ 20	Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes	IBC	IRC®	
E2174—~~2018~~ 20a	Standard Practice for On-site Inspection of Installed Fire Stops	IBC		
E2178—~~13~~ 21a	Standard Test Method~~ for Air Permeance of Building Materials~~ for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials	IBC	IRC	IECC®
E2178—~~2013~~ 21a	Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permanence of Building Materials	IECC®	IRC®	
E2231—~~2018~~ 19	Standard Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics	IMC	IRC®	
E2307—~~15BE1~~ 20	Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using the Intermediate-scale, Multistory Test Apparatus	IBC		
E2336—~~16~~ 20	Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems	IMC		
E2353—~~2016~~ 21	Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards and Balustrades	IBC		

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E2393—~~10a(2015)~~ 20a	Standard Practice for On-site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers	IBC	
E2570/E2570M—07~~(2014)E1~~ (2019)	Standard Test Methods for Evaluating Water-resistive Barrier (WRB) Coatings Used Under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage	IRC®	
E2573—~~17~~ 19	Standard Practice for Specimen Preparation and Mounting of Site-fabricated Stretch Systems to Assess Surface Burning Characteristics	IFC	
E2579—~~15~~ 21	Standard Practice for Specimen Preparation and Mounting of Wood Products to Assess Surface Burning Characteristics	IFC	IBC
E2652—~~16~~ 18	Standard Test Method for ~~Behavior~~ Assessing Combustibility of Materials Using ~~in~~ a Tube Furnace with a Cone-shaped Airflow Stabilizer at 750°C	IBC	
E283/E283M—~~04(2012)~~ 19	Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences across the Specimen	IBC	
E2925—~~17~~ 19a	Standard Specification for Manufactured Polymeric Drainage and Ventilation Materials Used to Provide a Rainscreen Function	IBC	IRC®
E3082—~~17~~ 20	Standard Test Methods for Determining the Effectiveness of Fire-retardant Treatments for Natural Christmas Trees	IFC	

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E336—~~17a~~ 20	Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings	IBC	
E408—13(2019)	Test Methods for Total Normal Emittance of Surfaces Using Inspection-meter Techniques	IECC®	
E605/E605M—~~93(2015)e1~~ 19	Test Method for Thickness and Density of Sprayed Fire-resistive Material (SFRM) Applied to Structural Members	IBC	
E648—~~17a~~ 19ae1	Standard Test Method for Critical Radiant Flux of Floor-covering Systems Using a Radiant Heat Energy Source	IFC	
E736/E736M—~~2017~~ 19	Test Method for Cohesion/Adhesion of Sprayed Fire-resistive Materials Applied to Structural Members	IBC	
E779—2010(2018)	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	IECC®	IRC®
E779—~~10(2018)~~ 19	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	IECC®	
E84—~~18b~~ 21a	Standard Test Method for Surface Burning Characteristics of Building Materials	IFC	
E903—~~2012~~ 20	Standard Test Method Solar Absorptance, Reflectance and Transmittance of Materials Using Integrating Spheres ~~(Withdrawn 2005)~~	IECC®	
E96/E96M—2016	Standard Test Methods for Water Vapor Transmission of Materials	IBC	IRC®
F1085—~~14~~ 19	Standard Specification for Mattress and Box Springs for Use in Berths in Marine Vessels	IFC	
F1361—~~2017~~ 21	Standard Test Method for Performance of Open ~~Deep Fat~~ Vat Fryers	IECC®	

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F1476—07~~(2013)~~ (2019)	Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications	IMC	IPC
F1488—~~14E1~~ 14(2019)	Specification for Coextruded Composite Pipe	IRC®	
F1495—~~2014a~~ 20	Standard Specification for Combination Oven Electric or Gas Fired	IECC®	
F1496—~~2013~~ 13(2019)	Standard Test Method for Performance of Convection Ovens	IECC®	
F1504—~~2014~~ 21	Standard Specification for Folded Poly (Vinyl Chloride) (PVC) for Existing Sewer and Conduit Rehabilitation	IRC®	
F1554—~~2018~~ 20	Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength	IRC®	
F1667—~~2018~~ 21	Specification for Driven Fasteners: Nails, Spikes and Staples	IBC	IRC®
F1696—~~2018~~ 20	Standard Test Method for Energy Performance of Stationary-Rack, Door-Type Commercial Dishwashing Machines	IECC®	
F1807— ~~2018~~ 19b	Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring, or Alternate Stainless Steel Clamps, for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	IPC	
F1871—~~2011~~ 20	Standard Specification for Folded/Formed Poly (Vinyl Chloride) Pipe Type A for Existing Sewer and Conduit Rehabilitation	IRC®	
F1920—~~2015~~ 20	Standard Test Method for Performance of Rack Conveyor Commercial Dishwashing Machines	IECC®	

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F1924—~~12~~ 19	Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing	IMC			IRC®
F1960— ~~2018~~ 21	Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing	IPC			
F1970— ~~2018~~ 19	Special Engineered Fittings, Appurtenances or Valves for Use in Poly (Vinyl Chloride) (PVC) OR Chlorinated Poly (Vinyl Chloride) (CPVC) Systems	IPC			
F1974—09~~(2015)~~ (2020)	Specification for Metal Insert Fittings for Polyethylene/Aluminum/Polyethylene and Cross-linked Polyethylene/ Aluminum/Cross-linked Polyethylene Composite Pressure Pipe	IPC			IRC®
F2006—~~17~~ 21	Standard/Safety Specification for Window Fall Prevention Devices for Nonemergency Escape (Egress) and Rescue (Ingress) Windows	IBC	IEBC		IFC
F2080— ~~2016~~ 2019	~~Specifications for Cold-expansion Fittings with Metal Compression-sleeves for Cross-linked Polyethylene (PEX) Pipe~~ Standard Specification for Cold-Expansion Fittings with Metal Compression-Sleeves for Crosslinked Polyethylene (PEX) Pipe and SDR9 Polyethylene of Raised Temperature (PE-RT) Pipe	IMC	IPC		IRC
F2090—~~17~~ 21	Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms	IBC	IEBC	IFC	IRC®
F2098— ~~2015~~ 2018	Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) to Metal Insert and Plastic Fittings	IPC			

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F2098—~~2015~~ 2018	Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) to Metal Insert and Plastic Insert Fittings	IMC	IRC®	
F2144—~~2017~~ 21	Standard Test Method for Performance of Large Open Vat Fryers	IECC®		
F2159— ~~2018~~ 21	Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring , or Alternate Stainless Steel Clamps for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	IPC		
F2159—~~2018~~ 21	Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring or Alternate Stainless Steel Clamps for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	IMC	IRC®	
F2200—~~17~~ 20	Standard Specification for Automated Vehicular Gate Construction	IFC		
F2306/F2306M— ~~2018~~ 20	12″ to 60″ Annular Corrugated Profile-wall Polyethylene (PE) Pipe and Fittings for Gravity Flow Storm Sewer and Subsurface Drainage Applications	IPC		
F2389— ~~2017A~~ 21	Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems	IPC		
F2389—2017A	Specification for Pressure-rated Polypropylene Piping Systems	IMC	IRC®	
F2434—~~14~~ 19	Standard Specification for ~~Metal~~ Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene (PEX-AL-PEX) Tubing	IMC	IPC	IRC®

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F2561—~~17~~ 20	Standard Practice for Rehabilitation of a Sewer Service Lateral and its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner	IPC		
F2599—~~16~~ 20	Standard Practice for The Sectional Repair of Damaged Pipe by Means of an Inverted Cured-in-Place Liner	IPC		
F2623—~~14~~ 19	Standard Specification for Polyethylene of Raised Temperature (PE-RT) Systems for Non-Potable Water Applications ~~SDR9 Tubing~~	IMC	IRC®	
F2648/F2648M— ~~2017~~ 20	Standard Specification for 2 to 60 inch [50 to 1500 mm] Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Land Drainage Applications	IPC		
F2735— ~~2009 (2016)~~ 21	Standard Specification for Plastic Insert Fittings for SDR9 Cross-linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing	IPC		
F2764/F2764M— ~~2018~~ 19	~~Standard Specification for 30 to 60 in. [750 to 1500 mm] Polypropylene (PP) Triple Wall Pipe and Fittings for Non-pressure Sanitary Sewer Applications~~ Standard Specification for 6 to 60 in. [150 to 1500 mm] Polypropylene (PP) Corrugated Double and Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications	IPC		
F2769— 2018	Standard Specification for Polyethylene or Raised Temperature (PE-RT) Plastic Hot- and Cold-water Tubing and Distribution Systems	IMC	IPC	IRC
F2806—~~10(2015)~~ 20	Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (Metric SDR-PR)	IMC	IRC®	

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F2831— ~~2012(2017)~~ 19	Standard Practice for Internal Non Structural Epoxy Barrier Coating Material Used in Rehabilitation of Metallic Pressurized Piping Systems	IPC			
F2855—~~12~~ 19	Standard Specification for Chlorinated Poly(Vinyl Chloride)/Aluminum/Chlorinated Poly(Vinyl Chloride) (CPVC-AL-CPVC) Composite Pressure Tubing	IMC	IPC	IRC®	
F2861—~~2017~~ 20	Standard Test Method for Enhanced Performance of Combination Oven in Various Modes	IECC®			
F2881 /F2881M— ~~2018~~ 21	Standard Specification for 12 to 60 in. [300 to 1500 mm] Polypropylene (PP) Dual Wall Pipe and Fittings for Non-pressure Storm Sewer Applications	IPC			
F2969—12(2020)	Standard Specification for Acrylonitrile-butadiene-styrene (ABS) IPS Dimensioned Pressure Pipe	IRC®			
F3226/F3226M—~~16~~ 19	Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems	IPC	IRC®		
F3240—~~17~~ 19e1	Standard Practice for Installation of Seamless Molded Hydrophilic Gaskets (SMHG) for Long Term Watertightness of Cured-in-Place Rehabilitation of Main and Lateral Pipelines	IPC			
F3253—~~2017~~ 19	Standard Specification for Crosslinked Polyethylene (PEX) Tubing with Oxygen Barrier for Hot- and Cold-water Hydronic Distribution Systems	IMC	IRC®		
F437—~~15~~ 21	Specification for Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80	IMC	IPC	ISPSC	IRC®

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F439—~~13~~ 19	Specification for Socket Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80	IMC	IPC	ISPSC	IRC®
F441/F441M—~~15~~ 20	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80	IMC	IPC	IRC®	
F442/F442M—~~13E1~~ 20	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)	IRC®			
F477—14(2021)	Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe	IPC	IRC®		
F493—~~14~~ 20	Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings	IMC	IPC	IRC®	
F656— ~~2015~~ 21	Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings	IPC			
F667 /F667M — ~~20~~16 (2021)	Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings	IPC			
F714—~~13~~ 21a	Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter	IMC	IRC®		
F844—~~07a(2013)~~ 19	Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use	IRC®			
F876— ~~2017~~ 20b	Specification for Cross-linked Polyethylene (PEX) Tubing	IPC			
F876—2018A	Specification for Cross-linked Polyethylene (PEX) Tubing	IMC			
F877— ~~2018A~~ 20	Specification for Cross-linked Polyethylene (PEX) Hot- and Cold-water Distribution Systems	IPC			

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G152—13(2021)	Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials	IBC
G154—2016A	Standard Practice for Operating Fluorescent Ultraviolet (UV) Light Lamp Apparatus for UV Exposure of Nonmetallic Materials	IBC
G155—13 21	Standard Practice for Operating Xenon Arc Light Lamp Apparatus for Exposure of Nonmetallic Materials	IBC

AWC	American Wood Council		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/AWC NDS—2018 2024	National Design Specification (NDS) for Wood Construction—with 2018 NDS Supplement	IBC	IRC®
ANSI/AWC WFCM—2018 2024	Wood Frame Construction Manual for One- and Two-Family Dwellings	IBC	IRC®
AWC STJR—2021 2024	Span Tables for Joists and Rafters	IBC	IRC®

AWPA	American Wood Protection Association		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
M4—15 21	Standard for the Handling, Storage, Field Fabrication, and Field Treatment of Care of Preservative-treated Wood Products	IBC	IRC®
U1—20 23	USE CATEGORY SYSTEM: User Specification for Treated Wood Except Commodity Specification H	IBC	IRC®

AWS	American Welding Society	
Standard Reference Number	**Title**	**Referenced in Code(s):**
A5.8/A5.8—2011-AMD1 :2019	Specifications for Filler Metals for Brazing and Braze Welding	IMC

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A5.8M/A5.8~~—2011-AMD1~~ :2019	Specifications for Filler Metals for Brazing and Braze Welding	IPC
A5.8M/A5.8~~—2011—AMD1~~ :2019	Specifications for Filler Metals for Brazing and Braze Welding	IRC®
D1.4/D1.4M—2018-AMD1	Structural Welding Code—Steel Reinforcing Bars	IBC

AWWA	American Water Work Association			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
C110/A21.10~~—12~~ 21	~~Standard for~~ Ductile Iron & Gray Iron Fittings	IMC	IPC	IRC®
C115/A21.15~~—11~~ 20	~~Standard for~~ Flanged Ductile-iron Pipe with Ductile Iron or Grey-iron Threaded Flanges	IMC	IPC	IRC®
C153/A21.53~~—11~~ 19	Ductile-iron Compact Fittings for Water Service	IMC		IRC®
C500~~—09~~ 19	Standard for Metal-seated Gate Valves for Water Supply Service	IPC		IRC®
C507~~—15~~ 18	Standard for Ball Valves, 6 In. Through 60 in. (150 mm through 1,500 mm).	IPC		IRC®
C510~~—07~~ 17	Double Check Valve Backflow Prevention Assembly	IRC®		
C652~~—11~~ 19	Disinfection of Water-storage Facilities	IPC		
C901~~—16~~ 20	Polyethylene (PE) Pressure Pipe and Tubing, 3/4 in. (19 mm) through 3 in. (76 mm) for Water Service	IMC	IPC	IRC®
C903~~—16~~ 21	Polyethylene-aluminum-polyethylene (PE-AL-PE) Composite Pressure Pipe, 12 mm ($^1/_2$ in.) through 50 mm (2 in.), for Water Service	IRC®		

CGA	Compressed Gas Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**

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ANSI/CGA P-18~~—(2013)~~ (2018)	Standard for Bulk Inert Gas Systems	IFC	
C-7~~—(2014)~~ (2020)	Guide to Classification and Labeling of Compressed Gases	IFC	
S-1.1~~—(2011)~~ (2019)	Pressure Relief Device Standards—Part 1—Cylinders for Compressed Gases	IFGC	IFC
S-1.2~~—(2009)~~ 2019	Pressure Relief Device Standards—Part 2—Cargo and Portable Tanks for Compressed Gases	IFGC	IFC
S-1.3~~—(2008)~~ (2020)	Pressure Relief Device Standards—Part 3—Stationary Storage Containers for Compressed Gases	IFGC	IFC
V-1~~—(2013)~~ (2021)	Standard for Gas Cylinder Valve Outlet and Inlet Connections	IFC	

CISPI	**Cast Iron Soil Pipe Institute**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
301~~—18~~ 21	Standard Specification for Hubless Cast-iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications	IPC	IPSDC	IRC®
310~~—18~~ 20	Standard Specification for Coupling for Use in Connection with Hubless Cast-iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications	IPC	IPSDC	IRC®

CPA	**Composite Panel Association**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI A135.4—2012 (R2020)	Basic Hardboard	IBC	IRC®
ANSI A135.5—2012 (R2020)	Prefinished Hardboard Paneling	IBC	IRC®
ANSI A135.6~~—2012~~ (R2020)	Engineered Wood Siding	IBC	IRC®

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ANSI A135.7—2012 (R2020)	Engineered Wood Trim	IRC®		
CRRC	**Cool Roof Rating Council**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
ANSI/CRRC-S100—~~2020~~ 2021	Standard Test Methods for Determining Radiative Properties of Materials	IECC®		
CSA	**Canadian Standards Association**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
~~ANSI/CSA FC 1—2014~~ CSA/ANSI FC 1:21/CSA C22.2 NO. 62282-2-100:21	Fuel Cell Technologies—Part 3-100; Stationary fuel cell power systems—Safety	IFGC	IMC	IRC®
~~ANSI/CSA FC1—2014~~ CSA/ANSI FC 1:21/CSA C22.2 NO. 62282-3-100:21	Fuel Cell Technologies—Part 3-100; Stationary fuel cell power systems-Safety	IFGC	IMC	
~~ANSI/CSA~~ CSA/ANSI NGV 5.1—~~2016~~ :22	Residential Fueling Appliances	IFGC		
~~CAN/~~CSA-C22.2 No. 60335-2-40 —~~2012~~ :19	~~Safety of~~ Household and Similar Electrical Appliances, Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers	IMC	ISPSC	IRC®
A257.1—~~14~~ :19	Non-reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe and Fittings	IPC		
A257.2—~~14~~ :19	Reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe and Fittings	IPC	IPSDC	IRC®
A257.3—~~14~~ : 19	Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections and Fittings Using Rubber Gaskets	IPC	IPSDC	IRC®
AAMA/WDMA/CSA 101/I.S.2/A440—~~17~~ 22	North American Fenestration Standard/Specifications for Windows, Doors and Unit Skylights	IBC	IECC®	IRC®
ANSI Z21.69-2015 (R2020)/CSA 6.16—~~2015~~ (R2020)	Connectors for Movable Gas Appliances	IFC	IRC	

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ANSI Z83.26/CSA 2.37—2014	Gas-fired Outdoor Infrared Patio Heaters	IFC	
ANSI/CSA/IGSHPA C448 Series —16 (R2021)	Design and Installation of Ground Source Heat Pump Systems for Commercial and Residential Buildings	IMC	IRC®
ASME A112.18.1—~~2018~~ 2022/CSA B125.1—~~18~~ :22	Plumbing Supply Fittings	IPC	
ASME A112.18.1—~~2018~~ 2023/CSA B125.1—~~2018~~ :23	Plumbing Supply Fittings	IRC®	
ASME A112.18.2—2019/CSA B125.2—~~2019~~ 2023	Plumbing Waste Fittings	IRC®	
ASME A112.18.2—~~2015~~ 2023/CSA B125.2—~~2015~~ 2023	Plumbing Waste Fittings	IPC	
ASME A112.18.6—~~2017~~/CSA B125.6— 17(R2022)	Flexible Water Connectors	IPC	
ASME A112.19.1—~~2018~~ 2023/CSA B45.2—~~18~~ :23	Enameled Cast-iron and Enameled Steel Plumbing Fixtures	IRC®	
ASME A112.19.1—~~2020~~ 2023/CSA B45.2—~~20~~ :23	Enameled Cast-iron and Enameled Steel Plumbing Fixtures	IPC	
ASME A112.19.2—~~2018~~ 2023/CSA B45.1—~~18~~ :23	Ceramic Plumbing Fixtures	IRC®	
ASME A112.19.2—~~2020~~ :23/B45.1—~~2020~~ :23	Ceramic Plumbing Fixtures	IPC	
ASME A112.19.3—~~2017~~ 2022/CSA B45.4—~~2017~~ 22	Stainless Steel Plumbing Fixtures	IRC®	
ASME A112.19.3—~~2021~~ 2022/CSA B45.4— ~~2021~~ :22	Stainless Steel Plumbing Fixtures	IPC	
ASME A112.19.5—~~2021~~ 22/CSA B45.15—~~21~~ 22	Flush Valves and Spuds for Water Closets, Urinals and Tanks	IPC	
ASME A112.19.7—2020/CSA B45.10 :20~~1221 2012 (R20)~~	Hydromassage Bathtub Systems	IPC	

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ASME A112.3.4~~—2013~~ 2018/CSA B45.9—18 (R2023)	Macerating Toilet Systems and Related Components	IRC®		
ASME A112.3.4—2018/CSA B45.9— 2018 ~~18~~ (R2023)	Macerating Toilet Systems and Waste Pumping Systems for Plumbing Fixtures	IPC		
ASME A112.4.2~~—2020~~ 2021/CSA B45.16—~~20~~ 21	Personal Hygiene Devices for Water Closet s	IPC		
ASME A112.4.2~~—2015~~ 2021/CSA B45.16—~~15~~ 21	Personal Hygiene Devices for Water-closet s	IRC®		
ASME A17.1/CSA B44~~—2019~~ 2022	Safety Code for Elevators and Escalators	IRC®		
ASME A17.1—~~2019~~ 2023/CSA B44-— 23	Safety Code for Elevators and Escalators	IBC		
ASME A17.7—2007/CSA B44.7 —~~07(R2017)~~ 07(R2021)	Performance-based Safety Code for Elevators and Escalators	IBC		
ASSE 1002—2020/ASME A112.1002—2020/CSA B125.12 —2020	Anti-Siphon Fill Valves for Water Closet Tanks	IPC		
ASSE 1016—2017/ASME 112.1016—2017/CSA B125.16 —~~2017~~ (R2022)	Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations	IPC	IRC®	
ASSE 1037—~~2015~~ 2020/ASME A112.1037—~~2015~~ 2020/CSA B125.37—~~15~~ :20	Performance requirements for Pressurized Flushing Devices for Plumbing Fixtures	IPC		
ASSE 1070—2020/ASME A112.1070—2020/CSA B125.~~1070—~~ :20	Performance requirements for Water Temperature Limiting Devices	IPC		
ASSE 1070—~~2015~~ 2020/ASME A112.1070—~~2015~~ 2020/CSA B125.70—~~15~~ :20	Performance Requirements for Water-temperature-limiting Devices	IRC®		
B125.3—~~18~~ :23	Plumbing Fittings	IPC	IRC®	
B137.10—~~17~~ :23	Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene (PEX-AL-PEX) Composite Pressure-pipe Systems	IMC	IPC	IRC®

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B137.11—~~17~~ :23	Polypropylene (PP-R) Pipe and Fittings for Pressure Applications	IMC	IPC		IRC®
B137.18—~~17~~ :23	Polyethylene of Raised Temperature Resistance (PE-RT) Tubing Systems for Pressure Applications	IMC	IPC		IRC®
B137.1—~~17~~ : 23	Polyethylene (PE) Pipe, Tubing and Fittings for Cold-water Pressure Services	IMC	IPC		IRC®
B137.2—~~17~~ :23	Polyvinylchloride (PVC) Injection-moulded Gasketed Fittings for Pressure Applications	IMC	IPC	ISPSC	IRC®
B137.3—~~17~~ :23	Rigid ~~Poly (Vinyl Chloride)~~ polvinylchloride (PVC) Pipe and Fittings for Pressure Applications	IMC	IPC	IPSDC	ISPSC	IRC®
B137.5—~~17~~ :23	Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications	IMC	IPC		IRC®
B137.6—~~17~~ :23	Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing and Fittings for Hot- and Cold-water Distribution Systems	IMC	IPC	ISPSC	IRC®
B137.9—~~17~~ :23	Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure-pipe Systems	IMC	IPC		IRC®
B181.1—~~18~~ :21	Acrylonitrile-Butadiene-Styrene ABS Drain, Waste and Vent Pipe and Pipe Fittings	IPC	IPSDC		IRC®
B181.2—~~18~~ :21	Polyvinylchloride PVC and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings	IPC	IPSDC		IRC®
B181.3—~~18~~ :21	Polyolefin and Polyvinylidene Fluoride (PVDF) Laboratory Drainage Systems	IPC			IRC®
B182.13—~~18~~ :21	Profile Polypropylene (PP) Sewer Pipe and Fittings for Leak-proof Sewer Applications	IPC			
B182.1—~~18~~ :21	Plastic Drain and Sewer Pipe and Pipe Fittings	IPC	IPSDC		IRC®

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B182.2~~—18~~ :21	PSM Type Polyvinylchloride PVC Sewer Pipe and Fittings	IPC	IPSDC	IRC®
B182.4~~—18~~ :21	Profile Polyvinylchloride PVC Sewer Pipe and Fittings	IPC	IPSDC	IRC®
B182.6~~—18~~ :21	Profile Polyethylene (PE) Sewer Pipe and Fittings for Leak-proof Sewer Applications	IPC		IRC®
B182.8~~—18~~ :21	Profile Polyethylene (PE) Storm Sewer and Drainage Pipe and Fittings	IPC		IRC®
B481.1—12(R2017)	Testing and Rating of Grease Interceptors Using Lard	IPC		
B481.3—12(R2017)	Sizing, Selection, Location and Installation of Grease Interceptors	IPC		
B483.1~~—07(R2017)~~ :22	Drinking Water Treatment Systems	IPC		IRC®
B55.1—~~2015~~ 20	Test Method for Measuring Efficiency and Pressure Loss of Drain Water Heat Recovery Units	IECC®		IRC®
B55.2—~~2015~~ :20	Drain Water Heat Recovery Units	IRC®		
B602~~—16~~ :20	Mechanical Couplings for Drain, Waste and Vent Pipe and Sewer Pipe	IPC	IPSDC	IRC®
B64.1.1~~—11(R2016)~~ :21	Atmospheric Type Vacuum Breakers, (AVB)	IPC		IRC®
B64.1.2~~—11(R2016)~~ :21	Pressure Vacuum Breakers, (PVB)	IPC		IRC®
B64.1.3~~—11(R2016)~~ :21	Spill-r~~R~~esistant p~~P~~ressure v~~V~~acuum b~~B~~reakers (SRPVB)	IPC		IRC®
B64.10—17	~~Manual for the~~ Selection and Installation of Backflow ~~Prevention Devices~~ Preventers	IPC		
B64.2.1.1~~—11(2016)~~ :21	Hose Connection Dual Check Vacuum Breakers (HCDVB)	IPC		IRC®

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B64.2.1~~—11(2016)~~ :21	Hose Connection Vacuum Breakers, (HCVB) with Manual Draining Feature	IPC	
B64.2.1~~—11(R2016)~~ :21	Hose Connection Vacuum Breakers (HCVB) with Manual Draining Feature	IRC®	
B64.2.2~~—11(2016)~~ :21	Hose Connection Vacuum Breakers, ~~Type~~ (HCVB) with Automatic Draining Feature	IPC	IRC®
B64.2~~—11(R2016)~~ :21	Hose Connection Vacuum Breakers, ~~Type~~ (HCVB)	IPC	IRC®
B64.3~~—11(2016)~~ :21	Dual Check Valve Backflow Preventers with Atmospheric Port (DCAP)	IRC®	
B64.3~~—11(R2016)~~ :21	Backflow Preventers, Dual Check Valve Type with Atmospheric Port (DCAP)	IPC	
B64.4.1~~—11(2016)~~ :21	Reduced Pressure Principle backflow preventers for Fire ~~Sprinklers (RPF)~~ protection systems (RPF)	IPC	IRC®
B64.4.1~~—11(R2016)~~ :21	Reduced Pressure Principle for Fire Sprinklers (RPF)	IPC	
B64.4~~—11(2016)~~ :21	Reduced Pressure Principle ~~Type~~ (RP) Backflow Preventers~~,~~	IRC®	
B64.4~~—11(R2016)~~ :21	Backflow Preventers, Reduced Pressure Principle Type (RP)	IPC	
B64.5.1~~—11(R2016)~~ :21	Double Check Valve Backflow Preventers for Fire Protection Systems (DCVAF)	IPC	
B64.5.1~~—11(2016)~~ :21	Double Check Valve Backflow Preventers, Type for Fire Systems (DCVAF)	IRC®	
B64.5~~—11(R2016)~~ :21	Double Check Valve Backflow Preventers (DCVA)	IPC	
B64.5~~—11(2016)~~ :21	Double Check Valve Backflow Preventers (DCVA)	IRC®	

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B64.6~~—11(2016)~~ :21	Dual Check Valve Backflow Preventers (DuC)	IRC®		
B64.6~~—11(R2016)~~ :21	Dual Check Valve (DuC) Backflow Preventers	IPC		
B64.7~~—11(2016)~~ :21	Laboratory Faucet Vacuum Breakers (LFVB)	IRC®		
B64.7~~—11(R2016)~~ :21	Laboratory Faucet Vacuum Breakers (LFVB)	IPC		
B79—08(R2018)	Commercial and Residential Drains and Cleanouts	IPC		
C22.2 No. 108—14(R2019)	Liquid Pumps	ISPSC		
C22.2 No. 236—15	Heating and Cooling Equipment	IMC	ISPSC	IRC®
CSA B45.5~~—17~~ :22/IAPMO Z124 ~~—2017 with errata dated August 2017~~ 2022	Plastic Plumbing Fixtures	IPC		
CSA B45.5~~—2017~~ :22/IAPMO Z124~~—2017 with Errata dated August 2017~~ 2022	Plastic Plumbing Fixtures	IRC®		
CSA B55.1~~—2015~~ :20	Test Method for Measuring Efficiency and Pressure Loss of Drain Water Heat Recovery Units	IECC®		
CSA B55.2~~—2015~~ :20	Drain Water Heat Recovery Units	IECC®	IRC®	
CSA B805~~-18-~~ 17/ICC 805-2018 (R2023)	Rainwater Harvesting Systems	IPC		
CSA O325~~—16~~ :21	Construction Sheathing	IRC®		
CSA/ANSI NGV 2~~—2016~~ :19	Compressed Natural Gas Vehicle Fuel Containers	IFC		
CSA/ANSI NGV 5.1~~—2016~~ :22	Residential Fueling Appliances	IFC		
CSA/ANSI NGV 5.2~~—2017~~ :22	Vehicle Fueling Appliances (VFA)	IFGC	IFC	
Z21.56a/CSA 4.7—2017	Gas Fired Pool Heaters	ISPSC		

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CTI	Cooling Technology Institute		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ATC 105DS—~~2018~~ 2019	Acceptance Test Code for Dry Fluid Coolers	IECC®	
ATC 105S—~~11~~ 2021	Acceptance Test Code for Closed Circuit Cooling Towers	IECC®	
CTI STD 201 RS~~(17)~~ 2021	Performance Rating of Evaporative Heat Rejection Equipment	IECC®	

DASMA	Door & Access Systems Manufacturers Association International		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/DASMA 105—~~2017~~ 2020	Test Method for Thermal Transmittance and Air Infiltration of Garage Doors and Rolling Doors	IECC®	IRC®
ANSI/DASMA 107—~~2017~~ 2020	Room Fire Test Standard for Garage Doors Using Foam Plastic Insulation	IBC	

DHA	Decorative Hardwoods Association		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/HPVA HP-1—~~2016~~ 2022	American National Standard for Hardwood and Decorative Plywood	IBC	IRC®

DOC	U.S. Department of Commerce		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
PS 1—~~19~~ 22	Structural Plywood	IBC	IRC®
PS 20—~~05~~ 20	American Softwood Lumber Standard	IBC	IRC®
PS 2—18	Performance Standard for Wood-~~based~~ Structural-~~use~~ Panels	IBC	IRC®

FEMA	Federal Emergency Management Agency

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Standard Reference Number	Title	Referenced in Code(s):	
FEMA TB-11—~~01~~ 23	Crawlspace Construction for Buildings Located in Special Flood Hazard Area	IRC®	
FEMA TB-2—~~08~~ 23	Flood Damage-resistant Materials Requirements	IRC®	
FEMA-TB-11—~~01~~ 23	Crawlspace Construction for Buildings Located in Special Flood Hazard Areas	IBC	
FGIA	**Fenestration & Glazing Alliance (formerly AAMA)**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
711—~~20~~ 23	Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products	IBC	IRC®
712—~~14~~ 23	Voluntary Specification for Mechanically Attached Flexible Flashing	IRC®	
714—~~20~~ 23	Voluntary Specification for Liquid Applied Flashing Used to Create a Water-resistive Seal around Exterior Wall Openings in Buildings	IBC	IRC®
AAMA/NSA 2100—~~20~~ 22	Specifications for Sunrooms	IRC®	
AAMA/WDMA/CSA 101/I.S.2/A ~~C~~440—~~17~~ 22	North American Fenestration Standard/Specifications for Windows, Doors and Unit Skylights	IECC®	
FM	**FM Approvals**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
4474—~~2011~~ 2020	American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures	IBC	IRC®
GA	**Gypsum Association**		

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Standard Reference Number	Title	Referenced in Code(s):
GA 216—~~2018~~ 2021	Application and Finishing of Gypsum Panel Products	IBC
GA 600—~~2018~~ 2021	Fire-resistance and Sound Control Design Manual, ~~22nd~~ 23rd Edition	IBC
GA-253—~~2018~~ 2021	Application of Gypsum Sheathing	IRC®

IAPMO	IAPMO Group	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/CAN/IAPMO Z1001—~~2016~~ 2021	Prefabricated Gravity Grease Interceptors	IPC
ASPE/IAPMO Z1034-2015(R2020)	Test Method for Evaluating Roof Drain Performance	IPC
CSA B45.5—~~17~~ :22 /IAPMO Z124—~~2017~~ 2022 ~~with errata dated August 2017~~	Plastic Plumbing Fixtures	IPC
IAPMO Z124.7—2013(R2018)	Prefabricated Plastic Spa Shells	ISPSC
IAPMO/ANSI Z1157—2014e1(R2019)	Ball Valves	IPC

IES	Illuminating Engineering Society	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/ASHRAE/IES~~NA~~ 90.1—~~2019~~ 2022	Energy Standard for Buildings, Except Low-rise Residential Buildings	IECC®

IIAR	International Institute of Ammonia Refrigeration	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/IIAR 2—~~2014, including Addendum A~~ 2021	Design of Safe Closed-circuit Ammonia Refrigeration Systems	IFC

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ANSI/IIAR 9—~~2018~~ 2020	~~Standard for Recognized and Generally Accepted Good Engineering Practices (RAGAGEP) for Existing Closed-circuit Ammonia Refrigeration Systems~~ Minimum System Safety Requirements for Existing Closed-Circuit Ammonia Refrigeration Systems	IFC

IKECA	International Kitchen Exhaust Cleaning Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/IKECA C10—~~2016~~ 2021	Standard for the Methodology for Cleaning of Commercial Kitchen Exhaust Systems	IFC

MHI	Material Handling Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI MH29.1—~~08~~ 2020	Safety Requirements for Industrial Scissors Lifts	IBC
ANSI/MH16.1—~~12~~ 2021	Design, Testing and Utilization of Industrial Steel Storage Racks	IBC

MSS	Manufacturers Standardization Society of the Valve and Fittings Industry			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
ANSI SP 58—~~2018~~ 2023	Pipe Hangers and Supports—Materials, Design and Manufacture, Selection, Application and Installation	IFGC	IMC	IRC®
SP-110—~~2010~~ 2023	Ball Valves, Threaded, Socket Welding, Solder Joint, Grooved and Flared Ends (incl. a 2010 Errata Sheet)	IPC	IRC®	
SP-122—~~2017~~ 2023	Plastic Industrial Ball Valves	IPC	IRC®	
SP-139—~~2014~~ 2022	Copper Alloy Gate, Globe, Angle and Check Valves for Low Pressure/Low Temperature Plumbing Applications	IPC	IRC®	

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SP-42—~~2013~~ 2022	Corrosion Resistant Gate, Globe, Angle and Check Valves with Flanged and Butt Weld Ends (Glasses 150, 300 & 600)	IRC®	
SP-67—~~2011~~ 2022	Butterfly Valves	IPC	IRC
SP-70—~~2011~~ 2023	Gray Iron Gate Valves, Flanged and Threaded Ends	IPC	IRC®
SP-70—~~2013~~ 2023	Gray Iron Gate Valves, Flanged and Threaded Ends	IPC	
SP-72—~~2010a~~ 2023	Ball Valves with Flanged or Butt-welding Ends for General Service	IPC	IRC®
SP-78—~~2011~~ 2023	Cast Iron Plug Valves, Flanged and Threaded Ends	IPC	
SP-78—~~2011~~ 2023	Cast Iron Plug Valves, Flanged and Threaded Ends	IRC®	
SP-80—~~2013~~ 2019	Bronze Gate, Globe, Angle and Check Valves	IPC	IRC®

NBBI	**National Board of Boiler and Pressure Vessel Inspectors**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
NBIC—~~2017~~ 2023	National Board Inspection Code, Part 3 (ANSI/NB23)	IMC

NCMA	**National Concrete Masonry Association**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
TEK 5—~~84~~ B(2005)	~~Details~~ Detailing ~~for~~ Concrete Masonry Fire Walls	IBC

NEMA	**National Electrical Manufacturers Association**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
250—~~2018~~ 2020	Enclosures for Electrical Equipment (1,000 Volt Maximum)	IFC
~~NEMA~~ ANSI Z535.1—2017	~~ANSI/NEMA Color Chart~~ American National Standard for Safety Colors	ISPSC

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NEMA MG1—2016	Motors and Generators	IECC®

NFPA	National Fire Protection Association				
Standard Reference Number	**Title**	**Referenced in Code(s):**			
02—~~19~~ 23	Hydrogen Technologies Code	IFC			
04—~~21~~ 24	Standard for Integrated Fire Protection and Life Safety System Testing	IBC	IFC		
105—~~19~~ 22	Standard for Smoke Door Assemblies and Other Opening Protectives	IMC	IPMC	IBC	IFC
10—~~21~~ 22	Standard for Portable Fire Extinguishers	IPMC	IBC	IFC	
110—~~19~~ 22	Standard for Emergency and Standby Power Systems	IBC	IFC		
111—~~19~~ 22	Standard on Stored Electrical Energy Emergency and Standby Power Systems	IBC	IFC		
1123—~~18~~ 22	Code for Fireworks Display	IFC			
1124—~~06~~ 22	Code for the Manufacture, Transportation, Storage and Retail Sales of Fireworks and Pyrotechnic Articles	IFC			
1124—~~17~~ 22	Code for the Manufacture, Transportation and Storage of Fireworks and Pyrotechnic Articles	IBC	IFC		
1125—~~17~~ 22	Code for the Manufacture of Model Rocket and High-power Rocket Motors	IFC			
1142—~~17~~ 22	Standard on Water Supplies for Suburban and Rural Fire Fighting	IFC			
11—~~16~~ 21	Standard for Low-, Medium, and High Expansion Foam	IBC	IFC		
12A—~~18~~ 22	Standard on Halon 1301 Fire Extinguishing Systems	IPMC	IBC	IFC	

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12~~—15~~ 22	Standard on Carbon Dioxide Extinguishing Systems	IBC			
12~~—18~~ 22	Standard on Carbon Dioxide Extinguishing Systems	IPMC	IFC		
13D~~—19~~ 22	Standard for the Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes	IBC	IFC	IRC®	
13R~~—19~~ 22	Standard for the Installation of Sprinkler Systems in Low-rise Residential Occupancies	IBC	IFC	IRC®	
13~~—19~~ 22	Standard for Installation of Sprinkler Systems, 2022 and 2019 editions	IBC	IFC		
14~~—19~~ 22	Standard for the Installation of Standpipe and Hose System	IBC	IFC		
15~~—17~~ 22	Standard for Water Spray Fixed Systems for Fire Protection	IFC			
170~~—18~~ 21	Standard for Fire Safety and Emergency Symbols	IBC	IFC		
2001~~—18~~ 22	Standard on Clean Agent Fire Extinguishing Systems	IPMC	IBC	IFC	
204~~—18~~ 21	Standard for Smoke and Heat Venting	IPMC	IFC		
20~~—19~~ 22	Standard for the Installation of Stationary Pumps for Fire Protection	IBC	IFC		
211~~—19~~ 22	Standard for Chimneys, Fireplaces, Vents and Solid Fuel-burning Appliances	IFGC	IMC	IBC	IRC®
221~~—21~~ 24	Standard for High Challenge Fire Walls, Fire Walls and Fire Barrier Walls	IBC			
22~~—18~~ 23	Standard for Water Tanks for Private Fire Protection	IFC			
232~~—17~~ 22	Standard for the Protection of Records	IFC			

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241—~~19~~ 22	Standard for Safeguarding Construction, Alteration and Demolition Operations	IFC	
24—~~19~~ 22	Standard for Installation of Private Fire Service Mains and Their Appurtenances	IFC	
252—~~17~~ 22	Standard Methods of Fire Tests of Door Assemblies	IBC	
253—~~19~~ 23	Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source	IBC	IFC
257—~~17~~ 22	Standard for Fire Test for Window and Glass Block Assemblies	IBC	
259—~~18~~ 23	Standard Test Method for Potential Heat of Building Materials	IBC	IRC®
25—~~20~~ 23	Standard for the Inspection, Testing and Maintenance of Water-based Fire Protection Systems	IPMC	IFC
260—~~19~~ 23	Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture	IFC	
261—~~18~~ 23	Standard Method of Test for Determining Resistance of Mock-up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes	IFC	
262—~~19~~ 23	Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-handling Spaces	IMC	
265—~~19~~ 23	Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile or Expanded Vinyl Wall Coverings on Full Height Panels and Walls	IBC	IFC

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268—~~19~~ 22	Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source	IBC	
275—~~17~~ 22	Standard Method of Fire Tests for the Evaluation of Thermal Barriers	IBC	IRC®
276—19	Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-deck Roofing Components	IBC	
276—~~15~~ 23	Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-Deck Roofing Components	IRC®	
285—~~19~~ 22	Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior ~~Nonload-bearing Wall Assemblies Containing Combustible Components~~	IBC	
286—~~15~~ 23	Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth	IBC	
288—~~17~~ 22	Standard Methods of Fire Tests of Horizontal Fire Door Assemblies Installed in Horizontal in Fire-resistance ~~related floor Systems~~ Rated Assemblies	IBC	
289—~~19~~ 23	Standard Method of Fire Test for Individual Fuel Packages	IBC	IFC
2—19	Hydrogen Technologies Code	IFGC	IMC
30A—~~21~~ 24	Code for Motor Fuel Dispensing Facilities and Repair Garages	IFGC / IMC	IBC / IFC
30B—~~19~~ 23	Code for the Manufacture and Storage of Aerosol Products	IFC	
30—~~21~~ 24	Flammable and Combustible Liquids Code	IBC	IFC

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318—~~18~~ 22	Standard for the Protection of Semiconductor Fabrication Facilities	IFC		
32—~~16~~ 21	Standard for Dry Cleaning Facilities	IBC	IFC	
33—~~18~~ 21	Standard for Spray Application Using Flammable or Combustible Materials	IFC		
34—~~18~~ 21	Standard for Dipping, Coating and Printing Processes Using Flammable or Combustible Liquids	IFC		
35—~~16~~ 21	Standard for the Manufacture of Organic Coatings	IFC		
37—~~18~~ 21	Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	IFGC	IMC	
385—~~17~~ 22	Standard for Tank Vehicles for Flammable and Combustible Liquids	IFC		
400—~~19~~ 22	Hazardous Materials Code	IFC		
407—~~17~~ 22	Standard for Aircraft Fuel Servicing	IFC		
409—~~16~~ 22	Standard ~~for~~ on Aircraft Hangars	IFGC	IBC	IFC
40—~~19~~ 22	Standard for the Storage and Handling of Cellulose Nitrate Film	IBC	IFC	
418—~~16~~ 21	Standard for Heliports	IBC		
45—~~19~~ 23	Standard on Fire Protection Laboratories Using Chemicals (2015 Edition)	IBC	IFC	
484—~~19~~ 22	Standard for Combustible Metals	IBC	IFC	
495—~~18~~ 23	Explosive Materials Code	IFC		
498—~~18~~ 23	Standard for Safe Havens and Interchange Lots for Vehicles Transporting Explosives	IFC		

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501—~~17~~ 22	Standard on Manufactured Housing	IRC®			
505—~~18~~ 23	Fire Safety Standard for Powered Industrial Trucks, Including Type Designations, Areas of Use, Maintenance and Operation	IFC			
51—~~18~~ 23	Design and Installation of Oxygen-fuel Gas Systems for Welding, Cutting and Allied Processes	IFGC	IPC	IFC	
52—~~19~~ 22	Vehicular Gaseous Fuel System Code	IFC			
55—~~19~~ 23	Compressed Gases and Cryogenic Fluids Code	IPC	IFC		
56—~~20~~ 23	Standard for Fire and Explosion Prevention during Cleaning and Purging of Flammable Gas Piping Systems	IFC			
58—~~17~~ 23	Liquefied Petroleum Gas Code	IFGC			
58—~~20~~ 23	Liquefied Petroleum Gas Code	IMC	IBC	IFC	IRC®
59A—~~19~~ 22	Standard for the Production, Storage and Handling of Liquefied Natural Gas (LNG)	IFC			
655—~~17~~ 19	Standard for the Prevention of Sulfur Fires and Explosions	IBC	IFC		
68—~~13~~ 23	Standard on Explosion Protection by Deflagration Venting	IFC			
701—~~19~~ 23	Standard Methods of Fire Tests for Flame Propagation of Textiles and Films	IBC	IFC		
703—~~21~~ 24	Standard for Fire Retardant-treated Wood and Fire-retardant Coatings for Building Materials	IFC			
704—~~17~~ 22	Standard System for the Identification of the Hazards of Materials for Emergency Response	IMC	IBC	IFC	

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72—~~19~~ 22	National Fire Alarm and Signaling Code	IMC				
750—~~19~~ 23	Standard on Water Mist Fire Protection Systems	IPMC	IBC	IFC		
76—~~16~~ 20	Standard for the Fire Protection of Telecommunications Facilities	IFC				
77—~~14~~ 24	Recommended Practice on Static Electricity	IFC				
780—~~17~~ 23	Standard for the Installation of Lightning Protection Systems	IFC				
80—~~19~~ 22	Standard for Fire Doors and Other Opening Protectives	IMC	IPMC	IBC	IFC	
85—~~19~~ 23	Boiler and Combustion System Hazards Code	IFGC	IMC	IBC	IFC	IRC®
86—~~19~~ 23	Standard for Ovens and Furnaces	IFC				
88A—~~19~~ 23	Standard for Parking Structures	IFGC				
914—~~19~~ 23	Code for Fire Protection of Historic Structures	IFC				
92—~~18~~ 21	Standard for Smoke Control Systems	IMC	IBC	IFC		
96—~~20~~ 24	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations	IMC	IFC			
99—~~21~~ 24	Health Care Facilities Code	IMC	IPC	IBC	IFC	
~~1221~~ 1225—~~19~~ 2022	Standard for the ~~Installation, Maintenance and Use of~~ Emergency Services Communications ~~Systems~~	IFC				
NFPA 101—~~21~~ 24	Life Safety Code	IEBC				
NFPA 13R—19	Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height	IEBC				

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NFPA 99—21	Health Care Facilities Code	IEBC	
NFRC	**National Fenestration Rating Council, Inc.**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
100—~~2020~~ 2023	Procedure for Determining Fenestration Products *U*-factors	IECC®	IRC®
200—~~2020~~ 2023	Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence	IECC®	IRC®
203—~~2017~~ 2023	~~Procedure for Determining Translucent Fenestration Product Visible Transmittance at Normal Incidence~~ Procedure for Determining Visible Transmittance of Tubular Daylighting Devices	IECC®	
400—~~2020~~ 2023	Procedure for Determining Fenestration Product Air Leakage	IECC®	IRC®
NSF	**NSF International**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
14—~~2017~~ 2020	Plastic Piping System Components and Related Materials	IMC	IRC®
14—~~2018~~ 2020	Plastic Piping System Components and Related Materials	IPC	
184—~~2014~~ 2019	Residential Dishwashers	IPC	
18—~~2016~~ 2020	Manual Food and Beverage Dispensing Equipment	IPC	
350—~~2017a~~ 2020	Onsite Residential and Commercial Water Reuse Treatment Systems	IPC	IRC®
358-1—~~2017~~ 2021	Polyethylene Pipe and Fittings for Water-based Ground-source "Geothermal" Heat Pump Systems	IMC	IRC®

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358-3~~—2016~~ 2021	Cross-linked Polyethylene (PEX) Pipe and Fittings for Water-based Ground-source (Geothermal) Heat Pump Systems	IMC	IRC®
358-4~~—2017~~ 2018	Polyethylene of Raised Temperature (PE-RT) Pipe and Fittings for Water-based Ground-source (Geothermal) Heat Pump Systems	IMC	IRC®
359~~—2011(R2016)~~ 2018	Valves for Crosslinked Polyethylene (PEX) Water Distribution Tubing Systems	IPC	IRC®
372~~—2016~~ 2020	Drinking Water Systems Components—Lead Content	IPC	IRC®
3~~—2017~~ 2019	Commercial Warewashing Equipment	IPC	
40~~—2018~~ 2020	Residential Wastewater Treatment Systems	IPSDC	
41~~—2016~~ 2018	Nonliquid Saturated Treatment Systems (Composing Toilets)	IPSDC	IRC®
42~~—2017~~ 2021	Drinking Water Treatment Units—Aesthetic Effects	IRC®	
50~~—2017~~ 2020	Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities	IPC	IRC®
53~~—2017~~ 2020	Drinking Water Treatment Units—Health Effects	IPC	IRC®
58~~—2017~~ 2020	Reverse Osmosis Drinking Water Treatment Systems	IPC	IRC®
61~~—2018~~ 2020	Drinking Water System Components—Health Effects	IPC	IRC®
62~~—2017~~ 2021	Drinking Water Distillation Systems	IPC	IRC®

PDI	Plumbing and Drainage Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**

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PDI G101 ~~(2012)~~ (2017)	Testing and Rating Procedure for Hydro Mechanical Grease Interceptors with Appendix of ~~Sizing and~~ Installation ~~Data~~ and Maintenance	IPC

PHTA	Pool & Hot Tub Alliance (formerly APSP)	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/APSP/ICC 15~~—2011~~ 2021	American National Standard for Residential Swimming Pool and Spa Energy Efficiency ~~Includes Addenda A Approved January 9, 2013~~	ISPSC
ANSI/APSP/ICC 16~~—2017~~ 2022	American National Standard for Suction Outlet Fittings (SOFA) for Use in Pools, Spas, and Hot Tubs	ISPSC
ANSI/APSP/ICC 4~~—2012~~ 2022	American National Standard for Aboveground/Onground Residential Swimming Pools~~—Includes Addenda A Approved April 4, 2013~~	ISPSC
ANSI/APSP/ICC/NPC 12 - ~~2016~~ 2023	American National Standard for the Plastering of Swimming Pools	ISPSC

PLIB	Pacific Lumber Inspection Bureau (formerly WCLIB)	
Standard Reference Number	**Title**	**Referenced in Code(s):**
AITC 200~~—09~~ 20	Manufacturing Quality Control Systems Manual for Structural Glued Laminated Timber	IBC

PSAI	Portable Sanitation Association International	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~PSAI/ANSI~~ ANSI/PSAI Z4.3—2016	American National Standard: for Sanitation: ~~for~~ Non-sewered Waste-disposal Systems : Minimum Requirements	IPC

RESNET	Residential Energy Services Network, Inc.	
Standard Reference Number	**Title**	**Referenced in Code(s):**

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ANSI/RESNET/ICC 301—~~2019~~ 2022	Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index	IECC®
ANSI/RESNET/ICC 380—~~2019~~ 2022	Standard for Testing Airtightness of Building, Dwelling Unit and Sleeping Unit Enclosures; Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems	IECC®

RMI	**Rack Manufacturers Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/MH16.1—~~12~~ 21	~~Specification for~~ Design, Testing and Utilization of Industrial Steel Storage Racks	IBC

SDI	**Steel Deck Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
SDI-~~QA/QC~~ SD—~~2017~~ 2022	~~Standard for Quality Control and Quality Assurance for Installation of Steel Deck~~ Standard for Steel Deck	IBC

SJI	**Steel Joist Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
SJI 100—2020	45th Edition Standard Specifications, Load Tables and Weight Tables for K-Series, LH-Series, DLH-Series and Joist Girders	IBC

SMACNA	**Sheet Metal and Air Conditioning Contractors' National Association, Inc.**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
~~SMACNA/ANSI~~ ANSI/SMACNA 4th Edition—~~2016~~ 2020	HVAC Duct Construction Standards—Metal and Flexible, ~~4th Edition (ANSI)~~ (ANSI/SMACNA 006-2020)	IFGC	IMC	IRC®

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~~SMACNA/ANSI~~ ANSI/SMACNA ~~—~~ 2nd edition 2013	Round Industrial Duct Construction Standards~~, 3rd Edition~~ (ANSI/SMACNA 005-2013)	IMC
~~SMACNA/ANSI~~ ANSI/SMACNA ~~—2011~~ 2nd Edition 2004	Rectangular Industrial Duct Construction Standards, ~~2nd Edition~~ (ANSI/SMACNA 002-2004)	IMC
SMACNA~~—~~ 1st edition 2015	~~SMACNA~~ Phenolic Duct Construction Standards~~, 1st Edition (ANSI)~~ (ANSI/SMACNA 022-2015)	IMC
SMACNA~~—10~~ 2021	Fibrous Glass Duct Construction Standards ~~7th~~ 8th edition	IRC®
SMACNA~~—2010~~ 2021	Fibrous Glass Duct Construction Standards~~, 7th Edition~~ 8th edition	IMC
SMACNA~~—~~2nd edition 2012	HVAC Air Duct Leakage Test Manual ~~Second Edition~~ (ANSI/SMACNA 016-2012)	IECC®

SPRI	Single-Ply Roofing Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/SPRI GT-1~~—2016~~ 21	Test Standard for Gutter Systems	IBC
ANSI/SPRI VF-1~~—17~~ 21	External Fire Design Standard for Vegetative Roofs	IBC
ANSI/SPRI/FM 4435-ES-1~~—17~~ 21	Wind Test Design Standard for Edge Systems Used with Low Slope Roofing Systems	IBC

TIA	Telecommunications Industry Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/TIA 222-~~H—2017~~ I-2023	Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures	IBC

TMS	The Masonry Society

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Standard Reference Number	Title	Referenced in Code(s):	
216—~~2013~~ 14 (19)	~~Standard Method~~ Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies	IBC	
302—2018	Standard Method for Determining the Sound Transmission ~~Class~~ Rating s for Masonry ~~Walls~~ Assemblies	IBC	
402—~~2016~~ 2022	Building Code Requirements for Masonry Structures	IBC	IRC®
404—~~2016~~ 2023	Standard for the Design of Architectural Cast Stone	IBC	IRC®
504—~~2016~~ 2023	Standard for the Fabrication of Architectural Cast Stone	IBC	
602—~~2016~~ 2022	Specification for Masonry Structures	IBC	IRC®
604—~~2016~~ 2023	Standard for the Installation of Architectural Cast Stone	IBC	

TPI	Truss Plate Institute		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/TPI 1—~~2014~~ 2022	National Design Standard for Metal-plate-connected Wood Truss Construction	IBC	IRC®

UL	UL LLC		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
1004-1—12	Rotating Electrical Machines General Requirements—with revisions through ~~August 2018~~ November 2020	ISPSC	
1026—2012	Electric Household Cooking and Food Serving Appliances—with revisions through ~~July 2018~~ March 2021	IRC®	

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103—2010	Factory-built Chimneys, for Residential Type and Building Heating Appliances—with Revisions through ~~March 2017~~ September 2021	IFGC	IMC	IBC	IRC®	
1042—2009	Electric Baseboard Heating Equipment—with revisions through ~~December 2016~~ February 2021	IRC®				
1081—2016	Swimming Pool Pumps, Filters and Chlorinators—with revisions through ~~October 2017~~ July 2020	ISPSC				
109—97	Tube Fittings for Flammable and Combustible Fluids, Refrigeration Service and Marine Use with revisions through May 2020	IMC				
10A—2009	Tin Clad Fire Doors—with Revisions through July 20, 2018	IBC				
10B—2008	Fire Tests of Door Assemblies—with Revisions through ~~February 2015~~ May 2020	IBC				
10C—2016	Positive Pressure Fire Tests of Door Assemblies - with revisions through May 2021	IBC	IFC			
10D—2017	~~Standard for~~ Fire Tests of Fire Protective Curtain Assemblies	IBC				
1240—2005	Electric Commercial Clothes-Drying Equipment—with revisions through ~~March 2018~~ September 2021	IMC				
1261—2001	Electric Water Heaters for Pools and Tubs—with revisions through September 2017	IMC				
1275—~~2014~~ 2021	Flammable Liquid Storage Cabinets~~—with revisions through February 2018~~	IFC				
127—2011	Factory-built Fireplaces—with Revisions through ~~July 2016~~ February 2020	IFGC	IMC	IBC	IECC®	IRC®

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Mod_11673_Text_ADM52.pdf

M11673Text Modification

1316—~~1994~~ 2018	~~Glass~~ Fiber Reinforced ~~Plastic~~ Underground ~~Storage~~ Tanks for ~~Petroleum Products, Alcohols and Alcohol-gasoline Mixtures~~ Flammable and Combustible Liquids—with revisions through ~~May 2006~~ March 2019	IFC		
1369—18	~~Standard for~~ Aboveground Piping for Flammable and Combustible Liquids -with revisions through August 2020	IMC		
1370—11	Unvented Alcohol Fuel Burning Decorative Appliances—with revisions through March ~~25,~~ 2016	IMC		
1389—~~2017~~ 19	Plant Oil Extraction ~~Units~~ Equipment for Installation and Use in Ordinary (Unclassified) Locations and Hazardous (Classified) Locations - with revisions through October 2020	IFC		
142—2006	Steel Aboveground Tanks for Flammable and Combustible Liquids—with revisions through ~~August 2014~~ January 2021	IFC		
1479—2015	Fire Tests of Penetration Firestops with revisions through May 2021	IMC	IBC	IRC®
1482—2011	Solid-fuel Type Room Heaters—with Revisions through ~~August 2015~~ February 2020	IMC	IBC	IRC®
1489—2016	Fire Tests of Fire Resistant Pipe Protection Systems Carrying Combustible Liquids -with revisions through October 2021	IBC	IFC	
14B—2008	Sliding Hardware for Standard Horizontally Mounted Tin Clad Fire Doors—with Revisions through ~~July 2017~~ September 2021	IBC		
14C—2006	Swinging Hardware for Standard Tin Clad Fire Doors Mounted Singly and in Pairs—with Revisions through ~~July 2017~~ October 2021	IBC		

M11673Text Modification

1563—2009	Standard for Electric Spas, Hot Tubs and Associated Equipment —with revisions through ~~October 2017~~ September 2020	IMC	ISPSC	IRC®
1703—2002	Flat-plate Photovoltaic Modules and Panels—with Revisions through ~~September 2018~~ November 2019	IBC		IRC®
1738—2010	Venting Systems for Gas Burning Appliances, Categories II, III and IV ~~with revisions through November 2014~~ August 2021	IFGC		IRC®
1741—2010	Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources—with Revisions through ~~February 2018~~ June 2021	IBC	IFC	IRC®
174—04	Household Electric Storage Tank Water Heaters—with revisions through ~~December 2016~~ October 2021	IMC		
1777—~~2007~~ 2015	Chimney Liners—with Revisions through April ~~2014~~ 2019	IFGC	IMC	IBC
1784—2015	Air Leakage Tests of Door Assemblies-with revisions through February 2020	IBC		
180—~~2012~~ 2019	Liquid-level Indicating Gauges for Oil Burner Fuels and Other Combustible Liquids—with revisions through ~~May 2017~~ August 2021	IMC		IRC®
1812—2013	Ducted Heat Recovery Ventilators—with revisions through ~~July 2018~~ April 2021	IMC		
1815—2012	Nonducted Heat Recovery Ventilators—with revisions through ~~July 2018~~ April 2021	IMC		
181—~~05~~ 13	Factory-made Air Ducts and Air Connectors~~—with revisions through April 2017~~	IMC		

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1887—04	Fire Tests of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics—with revisions through ~~July 2017~~ October 2021	IMC			
1897—2015	Uplift Tests for Roof Covering Systems with revisions through September 2020	IBC	IRC®		
1974—~~2017~~ 2018	~~Standard for~~ Evaluation for Repurposing Batteries	IFC			
1978—2010	Grease Ducts—with revisions through ~~April 2017~~ October 2021	IMC			
1994—2015	Luminous Egress Path Marking Systems with revisions through July 2020	IBC	IFC		
1996—2009	Electric Duct Heaters—with revisions through ~~July 2016~~ September 2021	IMC	IRC®		
2011—2019	Outline for investigation for Machinery with revisions through October 2020	IFC			
2017—2008	General-purpose Signaling Devices and Systems—with revisions through ~~January 2016~~ December 2016	IFC	ISPSC		
2024—2014	~~Safety Optical fiber~~ Cable Routing Assemblies and Communications Cable Raceway —with revisions through August 2015	IMC			
2075—2013	~~Standard for~~ Gas and Vapor Detectors and Sensors with Revisions through ~~December 2017~~ August 2021	IMC	IBC	IFC	IRC®
2079—2015	Tests for Fire Resistance of Building Joint Systems - with revisions through July 2020	IBC	IFC		
207—2009	Refrigerant-containing Components and Accessories, Nonelectrical—with revisions through ~~June 2014~~ January 2020	IMC			

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2152—~~2016~~ 2021	Outline of Investigation for Special Purpose Nonmetallic Containers and Tanks for Specific Combustible or Noncombustible Liquids	IFC				
2158A—2013	~~Outline of Investigation for~~ Clothes Dryer Transition Duct—with revisions through ~~April 2017~~ October 2021	IFGC	IMC	IRC®		
2158—~~2018~~ 2021	Electric Clothes Dryers	IMC				
2162—2014	~~Outline of Investigation for~~ Commercial Wood-fired Baking Ovens—Refractory Type - with revisions through August 2019	IMC				
217—2015	Single and Multiple Station Smoke Alarms—with Revisions through ~~November 2016~~ April 2021	IBC	IFC	IRC®		
2196—2017	~~Standard for~~ Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables - with revisions through December 2020	IBC	IFC			
2200—~~2012~~ 2020	Stationary Engine Generator Assemblies~~—with Revisions through October 2015~~	IFGC	IMC	IBC	IFC	IRC®
2208—2010	Solvent Distillation Units—with revisions through June 2020	IFC				
2518—2016	Air Dispersion Systems - with revisions June 2021	IMC				
2524—2019	~~Standard for~~ In-building 2-way Emergency Radio Communication Enhancement Systems - revisions through February 2019	IFC				
263—11	Fire Test~~s~~ of Building Construction and Materials—with Revisions through ~~March 2018~~ August 2021	IBC				
268A—2008	Smoke Detectors for Duct Application—with revisions through August ~~2016~~ 2020	IMC				

M11673Text Modification

268—2016	Smoke Detectors for Fire Alarm Systems-with revisions through ~~July 2016~~ October 2019	IMC	IPMC	IBC	IFC	IRC®
2703—2014	Mounting Systems, Mounting Devices, Clamping/Retention Devices and Ground Lugs for Use with Flat-plate Photovoltaic Modules and Panels-with Revisions through ~~December 2019~~ March 2021	IBC		IRC®		
2846—2014	Fire Test of Plastic Water Distribution Plumbing Pipe for Visible Flame and Smoke Characteristics—with revisions through ~~December 2016~~ January 2021	IMC				
300—~~2005~~ 2019	Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment~~—with revisions through December 2014~~	IFC				
30—1995	Metal Safety Cans—with revisions through ~~June 2014~~ September 2019	IFC				
325—2017	Door, Drapery, Gate, Louver and Window Operations and Systems with revisions through February 2020	IBC		IFC		IRC®
343—~~2017~~ 2008	Pumps for Oil-burning Appliances with revisions through December 2017	IMC		IRC®		
372—2007	Automatic Electrical Controls for Household and Similar Use—Part 2: Particular Requirements for Burner Ignition Systems and Components—with revisions through ~~July 2012~~ June 2012	ISPSC				
391—2010	Solid-fuel and Combination-fuel Central and Supplementary Furnaces—with revisions through ~~June 2014~~ August 2019	IMC				
399—2017	Drinking-Water Coolers—with revisions through ~~August 2018~~ July 2020	IPC				

M11673Text Modification

427—11	Standard for Refrigerating Units with revisions through February 2014	IMC		
430—2015	Waste Disposers—with revisions through ~~February 2018~~ September 2021	IPC		
441—16	Gas Vents—with revisions through ~~July 2016~~ August 2019	IRC®		
471—2010	Commercial Refrigerators and Freezers—with revisions through ~~November 2018~~ September 2019	IMC		
484—14	~~Standard for~~ Room Air Conditioners with revisions through May 2019	IMC		
507—2017	Electric Fans—with revisions through ~~August 2018~~ May 2020	IMC	IRC®	
508—2018	Industrial Control Equipment with revisions through July 2021	IMC	IPC	IRC®
515—2015	~~Standard for~~ Electric~~al~~ Resistance Trace Heating for Commercial Applications	IECC®		
536—~~2014~~ 2021	Flexible Metallic Hose	IMC	IRC®	
555C—2014	Ceiling Dampers—with Revisions through ~~May 2017~~ January 2021	IMC	IBC	
555S—2014	Smoke Dampers—with Revisions through October ~~2016~~ 2020	IMC	IBC	
555—2006	Fire Dampers—with Revisions through October ~~2016~~ 2020	IBC		
55A—2004	Materials for Built-up Roof Coverings	IBC	IRC®	
580—2006	Test for Uplift Resistance of Roof Assemblies—with Revisions through ~~October 2018~~ March 2019	IBC	IRC®	

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60335-2-1000-17	~~Standard for~~ Household and Similar Electrical Appliances: Particular Requirements for Electrically Powered Pool Lifts~~,~~ ~~with revisions through September 29, 2017~~	ISPSC		
60601-1—2003	Medical Electrical Equipment, Part I: General Requirements for Safety - with revisions through April 2006	IFC		
60950-1—~~2014~~ 2007	Information Technology Equipment—Safety Requirements with revisions through May 2019	IFC		
61730-1—2017	Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction - with revisions through April 2020	IBC	IRC®	
61730-2—2017	Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing - with revisions through April 2020	IBC	IRC®	
62368-1—~~2014 19~~	Audio/video, Information and Communication Technology Equipment—Safety Requirements - with revisions through October 2021	IFC		
651—2011	Schedule 40 and Schedule 80~~, Type EB and A~~ Rigid PVC Conduit and Fittings—with Revisions through ~~June 2016~~ March 2020	IFGC	IRC®	
705—2017	Power Ventilators—with revisions through ~~October 2018~~ August 2021	IFGC	IMC	IRC®
710B—2011	Recirculating Systems—with Revisions through ~~August 2014~~ February 2019	IMC	IBC	IFC
710—12	Exhaust Hoods for Commercial Cooking Equipment—with Revisions through ~~November 2013~~ February 2021	IECC®		

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791—2006	~~Standard for~~ Residential Incinerators—with revisions through ~~November 2014~~ February 2021	IMC		IFC
795—2016	Commercial-Industrial Gas Heating Equipment with revisions through 2020	IFGC		IRC®
80—2007	Steel Tanks for Oil-burner Fuels and Other Combustible Liquids—with revisions through ~~January 2014~~ April 2019	IFC		IRC®
817—2015	~~Standard for~~ Cord Sets and Power-supply Cords—with revisions through ~~August 2018~~ September 2021	IFC		
834—04	Heating, Water Supply and Power Boilers Electric—with revisions through ~~September 2018~~ July 2019	IMC		
834—2004	Heating, Water Supply and Power Boilers—Electric—with revisions through ~~September 2018~~ July 2019	IRC®		
842—~~2015~~ 2019	Valves for Flammable Fluids—~~with revisions through May 2015~~	IMC		IRC®
858—2014	Household Electric Ranges—with revisions through ~~June 2018~~ September 2019	IMC		IRC®
864—2014	Control Units and Accessories for Fire Alarm Systems—with Revisions through ~~March 2018~~ May 2020	IMC	IBC	IFC
867—2011	Electrostatic Air Cleaners—with revisions through August ~~2018~~ 2021	IMC		
875—09	Electric Dry-bath Heaters—with revisions through ~~September 2017~~ January 2021	IRC®		

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87A—2015	Power-operated Dispensing Devices for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent—with revisions through ~~June 2017~~ September 2019	IFC		
923—2013	Microwave Cooking Appliances—with revisions through ~~July 2017~~ August 2020	IMC	IRC®	
924—2016	Standard for Safety Emergency Lighting and Power Equipment—with Revisions through May ~~2018~~ 2020	IBC	IFC	
9540A—~~2017~~ 2019	Standard for Safety Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems	IFC		
9540—~~2016~~ 2020	Energy Storage Systems and Equipment - with revisions through April 2021	IFC	IRC®	
959—2010	Medium Heat Appliance Factory-built Chimneys—with Revisions through ~~June 2014~~ August 2019	IFGC	IMC	IRC®
9—2009	Fire Tests of Window Assemblies—with Revisions through ~~February 2015~~ March 2020	IBC		
UL/CSA 60335-2-40—~~17~~ 2019	Household and Similar Electrical Appliances—Safety—Part 2-~~40~~: Particular Requirements for ~~Electrical Heat Pumps, Air-Conditioners and Dehumidifiers~~ Motor-Compressors	IMC		
UL/CSA 60335-2-89—~~17~~ 21	Household and Similar Electrical Appliances—Safety—Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor	IMC		

WDMA	Window and Door Manufacturers Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**

M11673Text Modification

AAMA/WDMA/CSA 101/I.S.2/A440—~~17~~ 22	Specifications for Windows, Doors and Unit Skylights	IBC	IECC®	IRC®
I.S. 11—~~16~~ 23	Industry Standard Analytical Method for Design Pressure (DP) Ratings of Fenestration Products	IRC®		

WMA	**World Millwork Alliance (formerly Association of Millwork Distributors Standards AMD)**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI WMA 100—~~2018~~ 2023	Standard Method of Determining Structural Performance Ratings of Side-Hinged Exterior Door Systems and Procedures for Component Substitution	IRC®

Reason: The CP28 Code Development Policy, Section 4.6 requires the updating of referenced standards to be accomplished administratively, and be processed as a Code Change Proposal for consideration by the Administrative Code Change Committee. In September 2021, a letter was sent to each developer of standards that is referenced in the International Codes, asking them to provide ICC with a list of their standards in order to update to the current edition. Listed are the referenced standards that are to be updated based upon responses received from standard developers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Not applicable.

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M10930		/ADM1-22 Part I			
Date Submitted	03/18/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	1	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds definition for "listed" and clarifying language

Rationale

See attached

M10930Text Modification

See attached

Page: 1

Mod10930_TextOfModification.pdf

M10930Text Modification

ADM1-22 Part I

Original Proposal

IBC: SECTION 202; IEBC: SECTION 202 (New); IFC: SECTION 202; IFGC: SECTION 202 (New); IMC: SECTION 202 (New); ISPSC: SECTION 202 (New)

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Mechanical Code

Revise as follows:

[A] LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the code official and concerned with evaluation of products or
services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. Terms that are used to identify listed equipment, products, or materials include “listed”, “certified”, “classified” or other terms as determined appropriate by the listing organization.

Reason: The proposed revision to the definitions for “Listed” recognizes that listing organizations may use other terms to identify “listed” equipment, products, or materials. Two examples of other terms used meet the definition of listed include “certified” and “classified”. The term “certified” is a more globally recognized term used by listing organizations compared to the term “listed”. The term “classified” has historically referred to building materials evaluated for specific performance aspects such as surface burning characteristics that has also been accepted by code officials as meeting the definition of “Listed".

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply modifying the existing definitions of Listed, and adding a definition of Listed where one does not exist.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the addition of the terminology improves the definition and is something that is needed. (Vote: 8-5)

Final Hearing Results

ADM1-22 Part I AS

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Mod_10930_Text_ADM1-22 Part I.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

M10928	/G3-21 Part IV		4

Date Submitted	03/08/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds new definition "[BG] AMBULATORY CARE FACILITY"

Rationale

See attached

M10928Text Modification

See attached

Mod10928_TextOfModification.pdf Page: 1

M10928Text Modification

G3-21 Part IV

Original Proposal

PART IV - IMC: SECTION 202(New)

Proponents: John Williams, Chair, Healthcare Committee (ahc@iccsafe.org)

2021 International Mechanical Code

Add new definition as follows:

[BG] 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.

Reason: The term "ambulatory care facility" is currently defined in the IBC and IFC. It should be defined in the other codes where the term is used. When this item was first introduced to the codes, it was believed that it was needed to add 'Group B' in front of the term. This proposal removes it as no longer necessary, and will make this consistent with the numerous other locations throughout the codes where 'Group B' in not included. The intent is to not appear to have two different types of 'ambulatory care facilities'.
There will also be a Group B proposal to IEBC to add the definition and correct the terms in 302.2.1, 503.15 and 805.11.

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

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Cost Impact: The code change proposal will not increase or decrease the cost of construction
This an editorial clarification for consistent terminology

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal passed as submitted because it correlates with other i-codes. The term "ambulatory care facility" is currently defined in the IBC and IFC. It should be defined in the other codes where the term is used. When this item was first introduced to the codes, it was believed that it was needed to add 'Group B' in front of the term. This proposal removes it as no longer necessary, and will make this consistent with the numerous other locations throughout the codes where 'Group B' in not included. The intent is to not appear to have two different types of 'ambulatory care facilities'. (Vote: 11-0)

Final Hearing Results

G3-21 Part IV AS

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Mod_10928_Text_G3-21 Part IV.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

M11228	/FS47-21 Part III		5

Date Submitted	03/18/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review				
Commission Action	Pending Review			Staff Classification	Correlates Directly

Comments

General Comments No

Related Modifications

Summary of Modification

Adds definition for DRAFTSTOP

Rationale

See attached

M11228Text Modification

See attached

Page: 1

Mod11228_TextOfModification.pdf

M11228Text Modification

FS47-21 Part III

Original Proposal

IMC: SECTION 202 (New), 504.2

Proponents: Andrew Bevis, National Fire Sprinkler Association, National Fire Sprinkler Association (bevis.andrew1988@gmail.com); Jeffrey Hugo, National Fire Sprinkler Association, NFSA (hugo@nfsa.org)

2021 International Mechanical Code

Add new definition as follows:

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.

Revise as follows:

504.2 Exhaust penetrations. Where a clothes dryer exhaust duct penetrates a wall or ceiling membrane, the annular space shall be sealed with noncombustible material, *approved* fire caulking or a noncombustible dryer exhaust duct wall receptacle. Ducts that exhaust clothes dryers shall not penetrate or be located within any fireblocking, ~~draftstopping~~ *draftstops* or any wall, floor/ceiling or other assembly required by the *International Building Code* to be fire-resistance rated, unless such duct is constructed of galvanized steel or aluminum of the thickness specified in Section 603.4 and the fire-resistance rating is maintained in accordance with the *International Building Code* . Fire dampers, combination fire/smoke dampers and any similar devices that will obstruct the exhaust flow shall be prohibited in clothes dryer exhaust ducts.

Reason: This is an editorial change. The word draftstopping is used multiple times throughout the IBC, IFC, IMC and IPC. This term is used with no definition. However, the term draftstop is a defined term in the IBC and IFC. These are the same terms. This development replaces all occurrences of draftstopping with the defined term of draftstop. Additionally, this development inserts the definition for draftstop into the IMC and IPC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial change.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee all agree that the term "draftstop" is a more appropriate term than "draftstopping".The word draftstopping is used multiple times throughout the IBC, IFC, IMC and IPC. This term is used with no definition. However, the term draftstop is a defined term in the IBC and IFC. These are the same terms. This proposal replaces all occurrences of draftstopping with the defined term of draftstop. Additionally, this proposal inserts the definition for draftstop into the IMC and IPC. (Vote: 11-0)

Final Hearing Results

FS47-21 Part III AS

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11229		/G1-21 Part V			
Date Submitted	03/18/2024	**Section**	306.1	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds clarifying language on access

Rationale

See attached

M11229Text Modification

See attached

Page: 1

Mod11229_TextOfModification.pdf

M11229Text Modification

G1-21 Part V

Original Proposal

PART V - IMC: 306.1, 506.3.2.2; IFGC: [M]306.1; ICCPC: SECTION 202 (New)

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

306.1 Access. *Appliances*, controls devices, heat exchangers and HVAC system components that utilize energy shall~~be accessible~~ provide access for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other appliances, venting systems or any other piping or ducts not connected to the *appliance* being inspected, serviced, repaired or replaced. A level working space not less than 30 inches deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an *appliance*.

506.3.2.2 Duct-to-hood joints. Duct-to-hood joints shall be made with continuous internal or external liquid-tight welded or brazed joints. Such joints shall be smooth, ~~accessible~~ available for inspection, and without grease traps.

Exceptions: This section shall not apply to:

1. A vertical duct-to-hood collar connection made in the top plane of the hood in accordance with all of the following:
   1.1. The hood duct opening shall have a 1-inch-deep (25 mm), full perimeter, welded flange turned down into the hood interior at an angle of 90 degrees (1.57 rad) from the plane of the opening.
   1.2. The duct shall have a 1-inch-deep (25 mm) flange made by a 1-inch by 1-inch (25 mm by 25 mm) angle iron welded to the full perimeter of the duct not less than 1 inch (25 mm) above the bottom end of the duct.
   1.3. A gasket rated for use at not less than 1,500ºF (816ºC) is installed between the duct flange and the top of the hood.
   1.4. The duct-to-hood joint shall be secured by stud bolts not less than $^1/_4$ inch (6.4 mm) in diameter welded to the hood with a spacing not greater than 4 inches (102 mm) on center for the full perimeter of the opening. The bolts and nuts shall be secured with lockwashers.
2. *Listed* and *labeled* duct-to-hood collar connections installed in accordance with Section 304.1.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term 'access (to)' or 'ready access (to)' for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed 'door' from the definitions for 'access (to)' and 'ready access (to)'. That coordination item did not happen across codes and this proposal seeks to complete that effort.

M11229Text Modification

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as submitted because it provides coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities, the proposal deletes the word accessible from the code and replaces it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes. (Vote: 11-0)

Final Hearing Results

G1-21 Part V AS

Page: 2

Mod_11229_Text_G1-21 Part V.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11232		/M2-21			
Date Submitted	03/18/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds clarifying language for condensing unit

Rationale

See attached

M11232Text Modification

See attached

Mod11232_TextOfModification.pdf Page: 1

M11232Text Modification

M2-21

Original Proposal

IMC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

International Mechanical Code

2021 International Mechanical Code

Revise as follows:

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.

Reason: There are two different definitions in the I-codes for "condensing unit". The IECC definition does not identify the compressors as "power-driven", whereas the IMC definition does. The proposed common definition for use in the I-codes is an amalgamation of the IECC and IMC definitions, which also correlate with the definition of this term in the two refrigeration standards referenced in the I-codes, ASHRAE 15 and UL 60335-2-40.

For information purposes, the following are the other definitions:

From the**IECC: CONDENSING UNIT**. A factory-made assembly of refrigeration components designed to compress and liquefy a specific refrigerant. The unit consists of one or more refrigerant compressors, refrigerant condensers (air-cooled, evaporatively cooled, or water-cooled), condenser fans and motors(where used) and factory-supplied accessories.
From the IMC: 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.

From ASHRAE 15: CONDENSING UNIT a combination of one or more power-driven compressors, condensers, liquid receivers (when required), and regularly furnished accessories. From UL 60335-2-40: CONDENSING UNIT factory-made assembly that includes one or more motor-compressors, CONDENSER in cooling mode and motor-driven fan, blower or pump to circulate the heat transfer fluid through the CONDENSER with associated operational controls in addition to the necessary wiring

A change in Group B will be needed for IECC

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only provides clarity and consistency for the use of this term throughout the I-codes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This is editorial and is important to have consistency within the family of I-codes. (Vote: 7-4)

Final Hearing Results

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Mod_11232_Text_M2-21.pdf

M11232Text Modification

M2-21 AS

Mod_11232_Text_M2-21.pdf Page: 2

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

8

M11233		/M3-21			
Date Submitted	03/18/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds Definitions GYPSUM BOARD and GYPSUM WALLBOARD

Rationale

See attached

M11233Text Modification

See attached

Mod11233_TextOfModification.pdf Page: 1

M11233Text Modification

M3-21

Original Proposal

IMC: SECTION 202 (New)

Proponents: Tim Earl, GBH International, The Gypsum Association (tearl@gbhinternational.com)

2021 International Mechanical Code

Add new definition as follows:

GYPSUM BOARD

. A type of gypsum panel product consisting of a noncombustible core primarily of gypsum with paper surfacing.

GYPSUM WALLBOARD

. A gypsum board used primarily as an interior surfacing for building structures.

Reason: This defines terms already used in the code, using definitions already in the IBC and proposed for several other I-Codes this cycle that are also harmonized to ASTM and the industry.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a simple terminology update with no impact on cost.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee felt that terms currently defined in other I-codes should be revised in the code of origin before being duplicated in this code. The change should come back after that is accomplished. (Vote: 8-3)

Public Comments

Public Comment 1

Proponents: Tim Earl, GBH International, The Gypsum Association (tearl@gbhint.com) requests As Submitted

Commenter's Reason: These terms are used in the IMC and should be defined there. Some committee members questioned the harmonization of the terms across the I-codes. However, as one committee member pointed out, some of those terms are in sections to be addressed in Group B. In order to achieve complete harmonization across the codes, this change must be approved first, to match already drafted changes for Group B codes.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This is a terminology update with no impact on cost.

Final Hearing Results

M3-21 AS

Page: 1

Mod_11233_Text_M3-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

M11235	/M4-21 Part I		9

Date Submitted	03/18/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Provides definition for HEATPUMP

Rationale

See attached

M11235Text Modification

See attached

Page: 1

Mod11235_TextOfModification.pdf

M11235Text Modification

M4-21 Part I

Original Proposal

IMC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Delete and substitute as follows:

~~**HEAT PUMP**. A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.~~

HEAT PUMP.

A refrigeration system or factory-made appliance that utilizes refrigerant to transfer heat into a space or substance.

Reason: There are two different definitions in the I-codes for "heat pump". The IRC definition identifies heat pumps as an appliance, and the IMC identifies heat pumps as are refrigeration system. This definition is clarifying that a heat pump could be either an appliance or a refrigeration system. This definition is also simplified that a heat pump is transferring heat into a space or substance. The reference to "beneficial purpose" in the IMC is commentary. The proposed new common definition is closely aligned with the term used in the two refrigeration standards referenced in the I-codes, ASHRAE 15 and UL 60335-2-40.
For information purposes, the following are the other definitions:

From the IRC: [MP] HEAT PUMP. An appliance having heating or heating and cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.

From the IMC: HEAT PUMP. A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.

From ASHRAE 15: HEAT PUMP a refrigerating system used to transfer heat into a space or substance.
From UL 60335-2-40: HEAT PUMP appliance which takes up heat at a certain temperature and releases heat at a higher temperature

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity and consistency for the use of this term throughout the I-codes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agrees this is editorial. Based on the reason statement, the definition is clarifying and is closely aligned with the term used in the two refrigeration standards referenced in the I-codes (ASHRAE 15 and UL 60335-2-40). (Vote: 6-5)

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Mod_11235_Text_M4-21 Part I.pdf

M11235Text Modification

Final Hearing Results

M4-21 Part I AS

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Mod_11235_Text_M4-21 Part I.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

M11239	/M5-21				10
Date Submitted	03/18/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Provides clarifying language for LOWER FLAMMABLE LIMIT (REFRIGERANT) (LFL)

Rationale

See attached

M11239Text Modification

See attached

Page: 1

Mod11239_TextOfModification.pdf

M11239Text Modification

M5-21

Original Proposal

IMC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

LOWER FLAMMABLE 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.

Reason: The current definition implies that it is the concentration that is the substance capable of propagating the flame, instead of the flame being what is capable. This proposal clarifies that the flame propagation is determined under specific test conditions in ASHRAE 34.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The clarification of this definition does not change what is required by the code and as such, it doesn't change the materials or labor required to comply with the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The current definition implies that it is the concentration that is the substance capable of propagating the flame, instead of the flame being what is capable. This proposal clarifies that the flame propagation is determined under specific test conditions in ASHRAE 34. (Vote: 7-4)

Final Hearing Results

M5-21 AS

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Mod_11239_Text_M5-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11266		/M6-21			
Date Submitted	03/19/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds clarifying language to NON-COMBUSTIBLE MATERIALS definition

Rationale

See attached

M11266Text Modification

See attached

Page: 1

Mod11266_TextOfModification.pdf

M11266Text Modification

M6-21

Original Proposal

IMC: SECTION 202

Proponents: Tim Earl, GBH International, GBH International (tearl@gbhinternational.com)

2021 International Mechanical Code

Revise as follows:

NONCOMBUSTIBLE MATERIALS. A material that passes ASTM E136. ~~Materials that, when tested in accordance with ASTM E136, have not fewer than three of four specimens tested meeting all of the following criteria:~~

1. ~~The recorded temperature of the surface and interior thermocouples shall not at any time during the test rise more than 54ºF (30ºC) above the furnace temperature at the beginning of the test.~~
2. ~~There shall not be flaming from the specimen after the first 30 seconds~~.
3. ~~If the weight loss of the specimen during testing exceeds 50 percent, the recorded temperature of the surface and interior thermocouples shall not at any time during the test rise above the furnace air temperature at the beginning of the test, and there shall not be flaming of the specimen.~~

Reason: This proposal revises the definition of NONCOMBUSTIBLE to match the other codes. The current definition contains specific test details taken from ASTM E136 which is unnecessary. ASTM E136 contains clear pass/fail criteria, so the new definition is accurate, and consistent with the other ICC codes which were revised last cycle.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply revises the definition to make it simpler, with no impact on cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal revises the definition of NONCOMBUSTIBLE to match the other codes. The standard will align with definition done during last cycle, defining material that passes ASTM. (Vote: 11-0)

Final Hearing Results

M6-21 AS

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Mod_11266_Text_M6-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11267		/M8-21 Part I			
Date Submitted	03/19/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Revises definition for REFRIGERANT

Rationale

See attached

M11267Text Modification

See attached

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Mod11267_TextOfModification.pdf

M11267Text Modification

M8-21 Part I

Original Proposal

IMC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A THREE PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART III WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Delete and substitute as follows:

~~**REFRIGERANT**. A substance utilized to produce refrigeration by its expansion or vaporization~~.

REFRIGERANT.

The fluid used for heat transfer in a refrigeration system that undergoes a change of state to absorb heat

Reason: There are three different definitions in the I-codes for "refrigerant". This proposal is to use the current definition for the term in the IFC. The IFC definition provides the best detail as to what a refrigerant is, and aligns with ASHRAE 15, which is referenced in the IMC. The IRC and IMC definitions are not as precise.
For information purposes, the following are the other definitions:

From the IRC: [MP] REFRIGERANT. A substance used to produce refrigeration by its expansion or evaporation.

From the IMC: REFRIGERANT. A substance utilized to produce refrigeration by its expansion or vaporization.

From ASHRAE 15: REFRIGERANT the fluid used for heat transfer in a refrigerating system; the refrigerant absorbs heat and transfers it at a higher temperature and a higher pressure, usually with a change of state.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity and consistency for the use of this term throughout the I-codes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Necessary for correlation of other ICC I-codes and aligns with ASHRAE 15, which is referenced in the IMC.. (Vote: 10-0)

Final Hearing Results

M8-21 Part I AS

Page: 1

Mod_11267_Text_M8-21 Part I.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

13

M11288		/M9-21			
Date Submitted	03/19/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - M.

Summary of Modification

Adds ASHRAE 34 requirements for clarity

Rationale

See attached

M11288Text Modification

See attached

Page: 1

Mod11288_TextOfModification.pdf

M11288Text Modification

M9-21

Original Proposal

IMC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

REFRIGERANT SAFETY GROUP CLASSIFICATION. The ~~alphabetical/numerical~~ alphanumeric designation that indicates both the toxicity and flammability classifications of refrigerants in accordance with ASHRAE 34.

Delete without substitution:

~~**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.~~

~~**FLAMMABILITY CLASSIFICATION (REFRIGERANT).** The alphabetical/numerical designation used to identify the flammability of refrigerants.~~

Reason: This proposal clarifies that the method for determining the various flammability and toxicity classifications are in accordance with Chapter 6 of ASHRAE 34. Relocating the definitions for “flammability classification” and “toxicity classification” as sub-definitions directly under the definition “refrigerant safety classification” provides for easier use and application of the code. These two relocated terms only apply to the main definition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity as to what specific conditions differentiate between the various flammability and toxicity classes of refrigerants.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

FLAMMABILITY CLASSIFICATION (REFRIGERANT). The alphabetical/numerical designation usedto identify the flammability of refrigerants.

Class 1. Indicates a refrigerant with no flame propogation.

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.

TOXICITY CLASSIFICATION (REFRIGERANT). An alphabetical designation used to identify thetoxicityof refrigerants. Class A indicates a refrigerant with low toxicity. Class B indicates arefrigerant with high toxicity.

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Mod_11288_Text_M9-21.pdf

M11288Text Modification

Committee Reason: This proposal clarifies that refrigerant safety group classifications are determined in accordance with ASHRAE 34.

The modification appropriately relocates the definitions for "flammability classification" and "toxicity classification" as sub-definitions directly under the definition "refrigerant safety classification" provides for easier use and application of the code. These two relocated terms only apply to the main definition.(Vote: 10-0, 1 abstained)

Final Hearing Results	
M9-21	AM

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

14

M11289	/M10-21 Part I

Date Submitted	03/19/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review				
Commission Action	Pending Review			Staff Classification	Correlates Directly

Comments

General Comments No

Related Modifications

Summary of Modification

Clarifies definition for REFRIGERATION

Rationale

See attached

M11289Text Modification

See attached

Page: 1

Mod11289_TextOfModification.pdf

M11289Text Modification

M10-21 Part I

Original Proposal

IMC: SECTION 202; IFC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Revise as follows:

REFRIGERATION ~~REFRIGERATING~~ SYSTEM

.

A combination of interconnected parts in which a refrigerant is enclosed and ~~refrigerant-containing parts constituting one closed refrigerant circuit in which a refrigerant~~ is circulated for the purpose of extractingthen rejecting heat.

Reason: The proposal will better correlate the I-Codes with the industry standards, ASHRAE 15, for using the term refrigeration system rather than refrigerating systems. No technical change is intended.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity and consistency for the use of this term throughout the I-codes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed that he proposal will better correlate the I-Codes with the industry standards, ASHRAE 15, for using the term refrigeration system rather than refrigerating systems. (Vote: 10-0)

Final Hearing Results

M10-21 Part I AS

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Mod_11289_Text_M10-21 Part I.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

15

M11299		/M23-21			
Date Submitted	03/20/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Updates definition BALANCED VENTILATION

Rationale

See attached

M11299Text Modification

See attached

Page: 1

Mod11299_TextOfModification.pdf

M11299Text Modification

M23-21

Original Proposal

IMC: SECTION 202, 403.3.2.1

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2021 International Mechanical Code

Revise as follows:

BALANCED VENTILATION SYSTEM

.

~~Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10 percent of the total mechanical supply airflow rate.~~ A ventilation system where the total mechanical supply airflow and total mechanical exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the mechanical supply and mechanical exhaust airflows.

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.

$$Q_{OA} = 0.01 A_{floor} + 7.5(N_{br} + 1)$$ **(Equation 4-9)**

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:
      2.1.1. Living room.
      2.1.2. Dining room.
      2.1.3. Kitchen.
   2.2. The whole-house ventilation system is a *balanced ventilation* ~~system~~ *system*.

Reason: The 2021 versions of the IMC and IRC introduced a 30% ventilation rate credit for dwelling units with systems providing balanced ventilation. Because these changes were based on the approval of multiple proposals, their approval resulted in different definitions for *balanced ventilation* and *balanced ventilation system* across the IRC and IMC. This proposal and its companion proposal to the IRC are

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Mod_11299_Text_M23-21.pdf

M11299Text Modification

correlation proposals that will align the terminology, definitions, and their application across both codes. The change that is proposed in Section 403.3.2.1 is italicizing the word "system" within the phrase "*balanced ventilation system*" so that the user is directed to the corresponding definition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial and therefore will not increase or decrease the cost of construction.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposal is poorly worded using words such as "average". It is not clearly defined text and is confusing, implying that air force rate should be within 10% of their average. (Vote: 11-0)

Public Comments

Public Comment 1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

BALANCED VENTILATION SYSTEM.
~~A ventilation system where the total mechanical supply airflow and total mechanical exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the mechanical supply and mechanical exhaust airflows.~~

A ventilation system that simultaneously supplies outdoor air to and exhausts air from a space, where the mechanical supply airflow rate and the mechanical exhaust airflow rate are each within 10% of the average of the two airflow rates.

Commenter's Reason: The PMGCAC worked with the proponent to revise the language in response to the IMC Committee's comments. All parties agree that this definition better clarifies the meaning of the current term. The PMGCAC and the proponent are submitting a coordinating public comment to revise the IRC definition under RM16.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This change is a non-substantive clarification of an existing definition.

Final Hearing Results

M23-21 AMPC1

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Mod_11299_Text_M23-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

16

M11327		/M62-21			
Date Submitted	03/22/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds definition for STEAM BATH EQUIPMENT

Rationale

See attached

M11327Text Modification

See attached

Page: 1

Mod11327_TextOfModification.pdf

M11327Text Modification

M62-21

Original Proposal

IMC: SECTION 202 (New), SECTION 931 (New), 931.1 (New)

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

2021 International Mechanical Code

Add new definition as follows:

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

Add new text as follows:

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.

Reason: This proposal provides introduces requirements for steam bath equipment listings, and installation criteria. This section is being proposed since steam bath equipment is acting as a boiler and not a water heater and therefore should be located in the IMC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This does not require the installation of steam bath equipment, but provides requirements where installed.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as submitted because it adds an appropriate definition for steam bath equipment and the appropriate UL standard for equipment being referenced. (Vote: 10-0)

Final Hearing Results

M62-21 AS

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Mod_11327_Text_M62-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

17

M10888		/P6-21 Part III			
Date Submitted	03/08/2024	**Section**	305.5.1	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language for shield plates to prevent structural damage

Rationale

See attached

M10888Text Modification

See attached

Mod10888_TextOfModification.pdf Page: 1

M10888Text Modification

P6-21 Part III

Original Proposal

IMC: 305.5.1 (New), 305.5, 504.8, 504.8.1 (New), 1109.3.1, 1109.3.1.1 (New)

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Mechanical Code

Add new text as follows:

305.5.1 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

Revise as follows:

305.5 Protection against physical damage. In concealed locations where piping, other than cast-iron or steel, is installed through holes or notches in studs, joists, rafters or similar members less than ~~1 1/2 inches (38 mm)~~ 1 1/4 inches (32 mm) from the nearest edge of the member, the pipe shall be protected by shield plates. Protective steel shield plates ~~having a minimum thickness of 0.0575 inch (1.463 mm) (No. 16 gage)~~ shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.

504.8 Protection ~~required~~ against physical damage. Protective shield plates shall be placed where nails or screws from finish or other work are likely to penetrate the clothes dryer exhaust duct. Shield plates shall be placed on the finished face of all framing members where there is less than $1^{1}/_{4}$ inches (32 mm) between the duct and the finished face of the framing member. Protective shield plates shall~~be constructed of steel, have a thickness of 0.062 inch (1.6 mm) and~~ extend not less than 2 inches (51 mm) above sole plates and below top plates.

Add new text as follows:

504.8.1 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

Revise as follows:

1109.3.1 ~~Pipe protection~~ Protection against physical damage,. In addition to the requirements of Section 305.5, aluminum, copper and steel tube used for Group A2L and B2L refrigerants and located in concealed locations where tubing is installed in studs, joists, rafters or similar member spaces, and located less than ~~$1^{1}/_{2}$ inches (38 mm).~~ 1 1/4 inches (32 mm) from the nearest edge of the member, shall be continuously protected by shield plates. Protective steel shield plates h~~aving a minimum thickness of 0.0575 inch (1.46 mm) (No. 16 gage)~~ shall cover the area of the tube plus the area extending not less than 2 inches (51 mm) beyond both sides of the tube.

Add new text as follows:

1109.3.1.1 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

Reason: The safest place to install piping is in the middle of the wall. But in a typical 3-1/2 inch stud wall, even a 1/2-inch pipe (5/8-inch OD) ends up slightly nearer than the requisite 1-1/2 inch setback from either edge. Depending on enforcement, installers are often required to put shield plates on both sides of the stud. This makes no sense. By simply reducing the setback from 1-1/2 inches to 1-1/4 inches, both 1/2-inch and 3/4-inch piping can be safely installed in the center of the wall without triggering the need for shield plates on both sides. This encourages quality workmanship instead of penalizing it. The pipes are still safely out of range of drywall screws up to 1-1/2 inches long. This proposal is consistent with the National Electrical Code, which specifies a 1-1/4 inch setback from the edge of a stud. It is also

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consistent with the IRC, which also specifies a 1-1/4 inch setback. Note that the Uniform Plumbing Code allows a 1-inch distance before a shield plate is required . This proposal will bring consistency to the I-Codes.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 12.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Reducing the distance from the face of the stud for where shield plates are required could result in*fewer* plates needed for a project. The need for fewer plates would reduce cost of construction but that cost reduction would be insignificant.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1109.3.1 Protection against physical damage,.

In addition to the requirements of Section 305.5, aluminum, copper and steel tube used for Group~~A2L~~ A2, A3, B2, and ~~B2L~~ B3 refrigerants and located in concealed locations where tubing is installed in studs, joists, rafters or similar member spaces, and located less than 1 1/4 inches (32 mm) from the nearest edge of the member, shall be continuously protected by shield plates. Protective steel shield plates hshall cover the area of the tube plus the area extending not less than 2 inches (51 mm) beyond both sides of the tube.

Committee Reason: The proposal has passed because the committee agreed that the proposal brought consistency between the IMC and the NEC, with respect to shield plate requirements. The modification brings in language that is consistent with other proposals dealing with revisions to refrigerant groups. (Vote: 10-0, 1 abstained)

Final Hearing Results

P6-21 Part III AM

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

18

M11291		/M12-21			
Date Submitted	03/19/2024	**Section**	305.4	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Removes PB tubing

Rationale

See attached

M11291Text Modification

See attached

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Mod11291_TextOfModification.pdf

M11291Text Modification

M12-21

Original Proposal

IMC: TABLE 305.4

Proponents: Lance MacNevin, Director of Engineering – Building & Construction Division, Plastics Pipe Institute, Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2021 International Mechanical Code

Revise as follows:

TABLE 305.4 PIPING SUPPORT SPACING[a]

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
ABS pipe	4	10[c]
Aluminum pipe and tubing	10	15
Cast-iron pipe[b]	5	15
Copper or copper-alloy pipe	12	10
Copper or copper-alloy tubing	8	10
CPVC pipe or tubing, 1 inch and smaller	3	10[c]
CPVC pipe or tubing, 1 1/4-inches and larger	4	10[c]
Lead pipe	Continuous	4
~~PB pipe or tubing~~	~~2 2/3 (32 inches)~~	4
PE-RT 1 inch and smaller	2 2/3 (32 inches)	10[c]
PE-RT 1 1/4 inches and larger	4	10[c]
PEX tubing 1 inch and smaller	2 2/3 (32 inches)	10[c]
PEX tubing 1 1/4 inches and larger	4	10[c]
Polypropylene (PP) pipe or tubing, 1 inch and smaller	2 2/3 (32 inches)	10[c]
Polypropylene (PP) pipe or tubing, 1 1/4 inches and larger	4	10[c]
PVC pipe	4	10[c]
Steel pipe	12	15
Steel tubing	8	10

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. See Section 301.18.

b. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.

c. Mid-story guide.

Reason: Polybutylene (PB) tubing has not been manufactured for sale in the US since the late 1990s. PB was previously removed from Table 1202.4 “Hydronic Pipe” at some time before 2015. The referenced product standard, ASTM D3309 “Polybutylene (PB) Plastic Hot- and Cold-Water Distribution Systems” was withdrawn in 2010.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PB pipe or tubing is no longer available and has already been removed from other sections of the IMC.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved As Submitted, as there is no need for Polybutylene (PB) tubing to be referenced in code. Polybutylene (PB) tubing has not been manufactured for sale in the US since the late 1990s. PB was previously removed from Table 1202.4 “Hydronic Pipe” at some time before 2015. The referenced product standard, ASTM D3309 “Polybutylene (PB) Plastic Hot- and Cold-Water

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Distribution Systems" was withdrawn in 2010.(Vote: 10-0 w/ 1 abstained)

Final Hearing Results

M12-21 AS

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

19

M11292		/M13-21			
Date Submitted	03/19/2024	**Section**	306.5	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Updates ladder requirements

Rationale

See attached

M11292Text Modification

See attached

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Mod11292_TextOfModification.pdf

M11292Text Modification

M13-21

Original Proposal

IMC: 306.5

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Mechanical Code

Revise as follows:

306.5 Equipment and appliances on roofs or elevated structures. Where *equipment* requiring access or *appliances* are located on an elevated structure or the roof of a building such that personnel will have to climb higher than 16 feet (4877 mm) above grade to access such *equipment* or *appliances*, an interior or exterior means of access shall be provided. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) in height or walking on roofs having a slope greater than four units vertical in 12 units horizontal (33-percent slope). Such access shall not require the use of portable ladders. Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall. Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

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)~~ 7 inches (178 mm) and not more than 12 inches (305 mm) between rails.
5. Rungs shall have a diameter not less than 0.75-inch (19.1 mm) and be capable of withstanding a 300-pound (136 kg) load.
6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding 100 pounds per square foot (488 kg/m^2). Landing dimensions shall be not less than 18 inches (457 mm) and not less than the width of the ladder served. A guard rail shall be provided on all open sides of the landing.
7. Climbing clearance. The distance from the centerline of the rungs to the nearest permanent object on the climbing side of the ladder shall be not less than 30 inches (762 mm) measured perpendicular to the rungs. This distance shall be maintained from the point of ladder access to the bottom of the roof hatch. A minimum clear width of 15 inches (381 mm) shall be provided on both sides of the ladder measured from the midpoint of and parallel with the rungs except where cages or wells are installed.
8. Landing required. The ladder shall be provided with a clear and unobstructed bottom landing area having a minimum dimension of 30 inches (762 mm) by 30 inches (762 mm) centered in front of the ladder.
9. Ladders shall be protected against corrosion by *approved* means.
10. Access to ladders shall be provided at all times.

Catwalks installed to provide the required access shall be not less than 24 inches (610 mm) wide and shall have railings as required for service platforms.

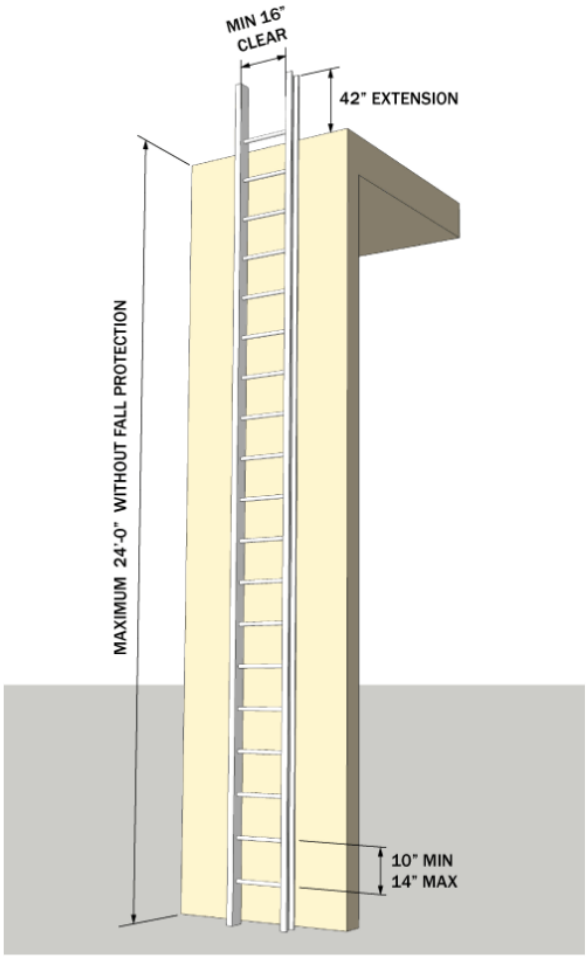
Exception: This section shall not apply to Group R-3 *occupancies*.

Reason: · In 2018 OSHA revised its permanent ladder standards. Its time to revise the code to prevent confusion among designers and code officials as to what dimensions should be followed. Item #1 can be located in OSHA Standard Section 1910.23 (d) (7). Item 2 in Section 1910.27 (b) (1) (ii), Item 3 in Section1910.23 (12) (i). and item 4 in 1910.23 (b) (4).

· The American Ladder Institute estimates that about 500,000 ladder accidents happen each year in this country resulting in almost 300

M11292Text Modification

deaths and 11 billion in medical costs. Its important for the code to keep up with the changing Standard in the name of safety.



Ladder Design Criteria - be sure to check the latest OSHA regulations

Cost Impact: The code change proposal will increase the cost of construction
There may be slight increases in cost as some of the dimensions have increased such as side rail height etc.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

306.5 Equipment and appliances on roofs or elevated structures.

Where *equipment* requiring access or *appliances* are located on an elevated structure or the roof of a building such that personnel will have

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to climb higher than 16 feet (4877 mm) above grade to access such *equipment* or *appliances*, an interior or exterior means of access shall be provided. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) in height or walking on roofs having a slope greater than four units vertical in 12 units horizontal (33-percent slope). Such access shall not require the use of portable ladders. Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

1. The side railing shall extend above the parapet or roof edge or landing platform not less than). 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 7 inches (178 mm) and not more than 12 inches (305 mm) deep
4. There shall be not less than ~~7 inches (178 mm) and not more than 12 inches (305 mm) between rails. 18 inches (547 mm)~~16 inches (406 mm) between rails.
5. Rungs shall have a diameter not less than 0.75-inch (19.1 mm) and be capable of withstanding a 300-pound (136 kg) load.
6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding 100 pounds per square foot (488 kg/m^2). Landing dimensions shall be not less than 18 inches (457 mm) and not less than the width of the ladder served. A guard rail shall be provided on all open sides of the landing.
7. Climbing clearance. The distance from the centerline of the rungs to the nearest permanent object on the climbing side of the ladder shall be not less than 30 inches (762 mm) measured perpendicular to the rungs. This distance shall be maintained from the point of ladder access to the bottom of the roof hatch. A minimum clear width of 15 inches (381 mm) shall be provided on both sides of the ladder measured from the midpoint of and parallel with the rungs except where cages or wells are installed.
8. Landing required. The ladder shall be provided with a clear and unobstructed bottom landing area having a minimum dimension of 30 inches (762 mm) by 30 inches (762 mm) centered in front of the ladder.
9. Ladders shall be protected against corrosion by *approved* means.
10. Access to ladders shall be provided at all times.

Catwalks installed to provide the required access shall be not less than 24 inches (610 mm) wide and shall have railings as required for service platforms.

Exception: This section shall not apply to Group R-3 *occupancies*.

FLOOR MODIFICATION # 2607

Committee Reason: Aligning equipment access requirements with OSHA requirements is critical. The modification corrects a typographical error between 3 & 4. (Vote: 10-0 w/ 1 abstained)

Final Hearing Results	
M13-21	AM

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

20

M11293		/M14-21			
Date Submitted	03/19/2024	**Section**	306.5	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Top landing requirements for ladders

Rationale

See attached

M11293Text Modification

See attached

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Mod11293_TextOfModification.pdf

M11293Text Modification

M14-21

Original Proposal

IMC: 306.5

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us); Nancy Swearengin, Pikes Peak Regional Building Department, Self

2021 International Mechanical Code

Revise as follows:

306.5 Equipment and appliances on roofs or elevated structures. Where *equipment* requiring access or *appliances* are located on an elevated structure or the roof of a building such that personnel will have to climb higher than 16 feet (4877 mm) above grade to access such *equipment* or *appliances*, an interior or exterior means of access shall be provided. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) in height or walking on roofs having a slope greater than four units vertical in 12 units horizontal (33-percent slope). Such access shall not require the use of portable ladders. Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

1. The side railing shall extend above the parapet or roof edge not less than 30 inches (762 mm).
2. Ladders shall have rung spacing 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) deep.
4. There shall be not less than 18 inches (457 mm) between rails.
5. Rungs shall have a diameter not less than 0.75-inch (19.1 mm) and be capable of withstanding a 300-pound (136 kg) load.
6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding 100 pounds per square foot (488 kg/m^2). Landing dimensions shall be not less than 18 inches (457 mm) and not less than the width of the ladder served. A guard rail shall be provided on all open sides of the landing.
7. Climbing clearance. The distance from the centerline of the rungs to the nearest permanent object on the climbing side of the ladder shall be not less than 30 inches (762 mm) measured perpendicular to the rungs. This distance shall be maintained from the point of ladder access to the bottom of the roof hatch. A minimum clear width of 15 inches (381 mm) shall be provided on both sides of the ladder measured from the midpoint of and parallel with the rungs except where cages or wells are installed.
8. Landing required. The ladder shall be provided with a clear and unobstructed bottom landing area having a minimum dimension of 30 inches (762 mm) by 30 inches (762 mm) centered in front of the ladder.
9. Ladders shall be protected against corrosion by *approved* means.
10. Access to ladders shall be provided at all times.
11. <u>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.</u>

Catwalks installed to provide the required access shall be not less than 24 inches (610 mm) wide and shall have railings as required for service platforms.

Exception: This section shall not apply to Group R-3 *occupancies*.

Reason: Safety for personnel is paramount. A person must have an area at the roof hatch opening that allows them to safely get onto and off of the roof.

- Without the proposed change the code official has nothing with which to enforce any requirement for a safe landing area for people attempting to access or exit the roof.

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- The top of the permanent ladder is often 16 feet or more above the ground.
- Personnel should not be required to hang onto the top of a ladder, open the roof hatch and then try to figure out a safe way to step onto a roof.
- Balancing on the edge of the roof hatch opening is not an acceptable option for entry onto or exit off of a roof.
- Personnel should not find themselves staring into a parapet wall only inches from the roof hatch opening.
- Workers are often carrying supplies, wearing backpacks filled with tools or standing at the hatch using a rope to pull needed service items up to the roof. Not having a place to stand or set down tools, backpacks or repair parts at the top of the ladder creates a serious hazard.
- People are required to get on roofs in all types of weather including when it is raining and snowing. Roofs, especially rubber and metal ones, are slick and difficult to navigate when there is any type of moisture on them. Personnel deserve a safe area upon which to stand when getting onto or off of the roof.
- The ladder to the roof is often located in a dark area of the building. Upon opening the hatch personnel can momentarily be blinded by the sun and by reflections off of the roofing material. Not having a safe way to access the roof creates even more of a hazard.
- It is difficult to find the ladder rungs when coming through a roof hatch onto the fixed ladder. Not having a safe place to stand on the roof when attempting to find a ladder rung makes a difficult situation a dangerous one.

OSHA states that 20 percent of all fatal and lost workdays in general industry are due to falls from ladders. The American Ladder Institute estimates that about 500,000 ladder accidents occur annually in the United States resulting in almost 300 fatalities and $11 billion in injury costs.



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Cost Impact: The code change proposal will not increase or decrease the cost of construction
There should be no additional cost associated with properly placing a roof hatch in a safe manner.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal as it does address a safety issue, however the committee also agreed the proposal should come back in the public comment process to address any conflicts with OSHA and to provide similar language in the IBC. (Vote: 6-5)

Final Hearing Results

M14-21 AS

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

21

M11450		/S196-22			
Date Submitted	03/26/2024	**Section**	302.5.2	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds requirements for cold-formed steel

Rationale

See attached

M11450Text Modification

See attached

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M11450Text Modification

S196-22

Original Proposal

IBC: 2211.3 (New); IPC: 307.2, 307.3 (New), [BS] C101.5, [BS] C101.6; IMC: [BS] 302.5, [BS] 302.5.2, [BS] 302.5.3; IFGC: [BS] 302.6, [BS] 302.7

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

[BS] 302.5 Cutting, notching and boring in cold-formed steel framing. The cutting, notching and boring of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members. The cutting, notching and boring of steel framing members shall comply with Sections 302.5.1 through 302.5.3.

Delete without substitution:

~~**[BS] 302.5.2 Cutting, notching and boring holes in cold-formed steel framing.** Flanges and lips of load-bearing cold-formed steel framing members shall not be cut or notched. Holes in webs of load-bearing cold-formed steel framing members shall be permitted along the centerline of the web of the framing member and shall not exceed the dimensional limitations, penetration spacing or minimum hole edge distance as prescribed by the *registered design professional*. Cutting, notching and boring holes of steel floor/roof decking shall be as prescribed by the *registered design professional*.~~

~~**[BS] 302.5.3 Cutting, notching and boring holes in non-structural cold-formed steel wall framing.** Flanges and lips of nonstructural cold-formed steel wall studs shall not be cut or notched. Holes in webs of nonstructural cold-formed steel wall studs shall be permitted along the centerline of the web of the framing member, shall not exceed 1 1/2 inches (38 mm) in width or 4 inches (102 mm) in length, and shall not be spaced less than 24 inches (610 mm) center to center from another hole or less than 10 inches (254 mm) from the bearing end.~~

Reason: This proposal sets uniform requirements for field modifications to cold-formed steel framing members (cutting, notching, and boring holes) in accordance with AISI standards.
Currently, the IFGC, IMC, and IPC all provide guidance on modification of cold-formed steel framing elements within the path of utilities. Although the guidance provided by each code is similar, they are not identical in wording or scope and are handled differently within each document.

Differences include but are not limited to:

- IFGC, IMC: The cutting and notching criteria is within the main body of the code.
- IFGC, IMC: Includes direction for wood, steel, cold-formed steel, and non-structural cold-formed steel materials.
- IPC: Points to the IBC for cutting and notching criteria but provides Appendix C as an alternate.
- IPC Appendix C:
  - Includes some, but not all, cutting and notching criteria and limitations found within the IFGC and IMC.
  - Does not address steel and cold-formed materials.

This will provide clear and consistent criteria across all trades on how to field modify framing members and when modification of such members requires input from a design professional.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International

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Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a coordination of existing cutting, notching and boring provisions that are already used in practice but are not identical between codes or fully aligned with AISI standards.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2021 International Building Code

2211.3 Cutting~~,~~ and notching~~, and boring~~. The cutting~~,~~ and notching ~~and boring~~ of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members.

2021 International Plumbing Code

307.3 Cutting~~,~~ and notching ~~and boring~~ in cold-formed steel framing. The cutting~~,~~ and notching ~~and boring~~ of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members.

2021 International Mechanical Code

[BS]302.5 Cutting~~,~~ and notching ~~and boring~~ in cold-formed steel framing. The cutting~~,~~ and notching ~~and boring of~~ holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members. ~~The cutting, notching and boring of steel framing members shall comply with Sections 302.5.1 through 302.5.3.~~

2021 International Fuel Gas Code

[BS]302.6 Cutting~~,~~ and notching ~~and boring~~ in cold-formed steel framing. The cutting~~,~~ and notching ~~and boring~~ of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for non-structural members.

Committee Reason: Approved as modified as the proposal coordinates the requirements across the I-Codes and adds the needed reference to ANSI S240. The modification correctly removes reference to boring for steel. (Vote: 13-0)

Final Hearing Results

S196-22 AM

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

22

M11451		/S224-22			
Date Submitted	03/26/2024	**Section**	302	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Clarifies and moves reference section to 2308.3

Rationale

See attached

M11451Text Modification

See attached

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Mod11451_TextOfModification.pdf

M11451Text Modification

S224-22

Original Proposal

IBC: SECTION 2308.3 (New), 2308.3.1 (New), 2308.3.2 (New), 2308.3.2.1 (New), 2308.3.3 (New), 2308.3.4 (New), 2308.3.5 (New), 2308.4.2.4, 2308.5.9, 2308.5.10, 2308.7.4; IPC: 307.2, 307.3 (New), [BS] C101.1, [BS] C101.2, [BS] C101.3; IMC: [BS] 302.3, [BS] 302.3.1, [BS] 302.3.2, [BS] 302.3.3; IFGC: [BS] 302.3, [BS] 302.3.2, [BS] 302.3.3, [BS] 302.3.4

Proponents: Mike Nugent, Chair, Building Code Action Committee (bcac@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

[BS] 302.3 Cutting, notching and boring in wood framing. The cutting, notching and boring of wood framing members shall comply with Section~~s~~ 2308.3 of the *International Building Code*. ~~302.3.1 through 302.3.4~~.

Delete without substitution:

~~**[BS] 302.3.1 Joist notching.** Notches on the ends of joists shall not exceed one-fourth the joist depth. Holes bored in joists shall not be within 2 inches (51 mm) of the top or bottom of the joist, and the diameter of any such hole shall not exceed one-third the depth of the joist. Notches in the top or bottom of joists shall not exceed one-sixth the depth and shall not be located in the middle third of the span.~~

~~**[BS] 302.3.2 Stud cutting and notching.** In exterior walls and bearing partitions, a wood stud shall not be cut or notched in excess of 25 percent of its depth. In nonbearing partitions that do not support loads other than the weight of the partition, a stud shall not be cut or notched in excess of 40 percent of its depth.~~

~~**[BS] 302.3.3 Bored holes.** The diameter of bored holes in wood studs shall not exceed 40 percent of the stud depth. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in nonbearing partitions. The diameter of bored holes in wood studs shall not exceed 60 percent of the stud depth in any wall where each stud is doubled, provided that not more than two such successive doubled studs are so bored. The edge of the bored hole shall be not closer than 5/8 inch (15.9 mm) to the edge of the stud. Bored holes shall be not located at the same section of stud as a cut or notch.~~

Reason: This proposal consolidates similar wood cutting, notching and boring criteria from the IFGC, IMC, IPC, and IBC into a single location in the IBC, and does not impose new requirements or restrict any practices currently allowed within the I-Codes. The proposed language draws from current language in the IPC, IMC, and IFGC and IBC provisions in the conventional light-framed section. The existing language was used to the greatest extent possible and relocated to minimize technical changes.
Within the IBC, existing wood framing notching, cutting and boring provisions have been relocated into a single new Section 2308.3. This reorganization into one location makes the IBC provisions easy to find and will provide clear and consistent criteria across all trades on how to field modify framing members and when modification of such members requires input from a design professional.

Structural framing members are frequently modified in the field by non-structural trades, to facilitate the installation of mechanical, electrical, plumbing, and other utilities. Especially in conventional light-framed wood construction, such modifications are rarely overseen by a design professional with knowledge of critical framing elements that should remain unmodified and the role they play within the structure.

It is unrealistic to expect field personnel to continually seek the guidance of a design professional for every framing member requiring modification. However, modifications of critical framing members have the potential to negatively impact the integrity of the structure and the utility systems that rely on that structure for support. The resulting structural deficiencies caused by field modifications to framing members may only be realized during significant high-wind, seismic, impact, or other loading events that, while within the normal structure design criteria, are outside every day operating conditions. At best, such deficiencies may be realized by local deformation of finish materials and at worst, by partial or full collapse of a structure.

Currently, the IFGC, IMC, IPC, and IBC all provide guidance on modification of structural framing elements within the path of utilities. Although the guidance provided by each code is similar, they are not identical in wording or scope and are handled differently within each

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M11451Text Modification

document.

Differences include but are not limited to:

- IFGC, IMC: The cutting and notching criteria is within the main body of the code.
- IFGC, IMC: Includes direction for wood, steel, cold-formed steel, and non-structural cold-formed steel materials.
- IPC: Points to the IBC for cutting and notching criteria but provides Appendix C as an alternate. · IPC Appendix C
  - Includes some, but not all, cutting and notching criteria and limitations found within the IFGC and IMC.
  - Does not address steel and cold-formed materials.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal consolidates existing and slightly varied provisions from multiple locations into one location within the wood chapter of the International Building Code.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved as the proposal needs additional work as it affects multiple codes which address different multiple trades and it is appropriate to leave the requirements in each code as is currently done. (Vote: 11-3)

Final Hearing Results

S224-22 AS

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

23

M11294		/M16-21			
Date Submitted	03/19/2024	**Section**	401.4	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds clarifying language for in/out exhaust fittings

Rationale

See attached

M11294Text Modification

See attached

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Mod11294_TextOfModification.pdf

M11294Text Modification

M16-21

Original Proposal

IMC: 401.4, 501.3.1

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2021 International Mechanical Code

Revise as follows:

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

1. Intake openings shall be located not less than 10 feet (3048 mm) from lot lines or buildings on the same lot.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.3.1. Outdoor air intake openings shall be permitted to be located less than 10 feet (3048 mm) horizontally from streets, alleys, parking lots and loading docks provided that the openings are located not less than 25 feet (7620 mm) vertically above such locations. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way.
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 *appliance* manufacturer's instructions.
4. Intake openings on structures in flood hazard areas shall be at or above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant *equipment*.

501.3.1 Location of exhaust outlets. The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property lines; 10 feet (3048 mm) from operable openings into buildings; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into buildings that are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above adjoining grade.
3. For all *environmental air* exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings 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 *appliance* manufacturer's instructions.
4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant *equipment*.

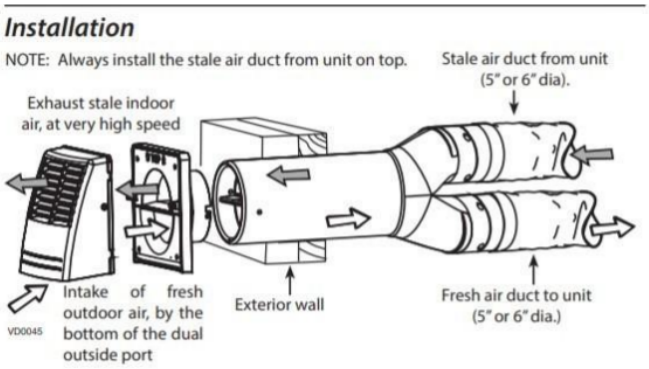
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M11294Text Modification

5. For specific systems, see the following sections:
   5.1. Clothes dryer exhaust, Section 504.4.
   5.2. Kitchen hoods and other kitchen exhaust *equipment*, Sections 506.3.13, 506.4 and 506.5.
   5.3. Dust, stock and refuse conveying systems, Section 511.2.
   5.4. Subslab soil exhaust systems, Section 512.4.
   5.5. Smoke control systems, Section 513.10.3.
   5.6. Refrigerant discharge, Section 1105.7.
   5.7. *Machinery room* discharge, Section 1105.6.1.

Reason: Factory-built intake/exhaust combination termination fittings are regularly provided by manufacturers and installed by builders to separate mechanical air intakes from mechanical exhaust serving dwelling unit or sleeping unit mechanical ventilation systems. The included image from a ventilation system manufacturer's installation instructions provides an example of a typical fitting serving this purpose.



IMC Sections 401.4 and 501.3.1 approve the use of "approved factory-built intake/exhaust combination termination fittings" to separate the air streams associated with mechanical intake air openings and living space exhaust air, when the fitting is provided in accordance with manufacturer's instructions. Similarly, Section G2407.1 of the Fuel Gas Code (see below for reference) approves the use of concentric vent termination fittings to separate combustion air from flue gases provided that such fittings are installed "in accordance with the appliance manufacturer's instructions". Like the Fuel Gas Code's treatment of concentric vent termination fittings, no special approval should be required for factory-built intake/exhaust combination termination fittings when installed in accordance with appliance manufacturer's instructions.

Fuel Gas Code reference: "G2407.1 (304.1) General ..... Direct-vent appliances, gas appliances of other than natural draft design, vented gas appliances not designated as Category I and appliances equipped with power burners, shall be provided with combustion, ventilation and dilution air in accordance with the appliance manufacturer's instructions."

Cost Impact: The code change proposal will decrease the cost of construction
Removing requirements for special approval of factory-built intake/exhaust combination termination fittings can be expected to reduce labor costs for builders, contractors, and code officials.

Public Hearing Results

Committee Action **As Submitted**

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Committee Reason: This proposal was approved as submitted based on the proponent reason statement. Factory-built intake/exhaust combination termination fittings are regularly provided by manufacturers and installed by builders to separate mechanical air intakes from mechanical exhaust serving dwelling unit or sleeping unit mechanical ventilation systems. Special approval should not be required for these types of fittings when installed in accordance with the manufacturer installation instructions. (Vote: 6-5)

Public Comments

Public Comment 1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

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

1. Intake openings shall be located not less than 10 feet (3048 mm) from lot lines or buildings on the same lot.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.3.1. Outdoor air intake openings shall be permitted to be located less than 10 feet (3048 mm) horizontally from streets, alleys, parking lots and loading docks provided that the openings are located not less than 25 feet (7620 mm) vertically above such locations. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way.
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 a factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the ~~*appliance*~~ fan manufacturer's instructions.
4. Intake openings on structures in flood hazard areas shall be at or above the elevation required by Section 1612 of the*International Building Code* for utilities and attendant *equipment*.

501.3.1 Location of exhaust outlets . The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property lines; 10 feet (3048 mm) from operable openings into buildings; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into buildings that are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above adjoining grade.
3. For all *environmental air* exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings 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 a factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the ~~*appliance*~~ fan manufacturer's instructions.
4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant *equipment*.

5. For specific systems, see the following sections:
   5.1. Clothes dryer exhaust, Section 504.4.
   5.2. Kitchen hoods and other kitchen exhaust *equipment*, Sections 506.3.13, 506.4 and 506.5.
   5.3. Dust, stock and refuse conveying systems, Section 511.2.
   5.4. Subslab soil exhaust systems, Section 512.4.
   5.5. Smoke control systems, Section 513.10.3.
   5.6. Refrigerant discharge, Section 1105.7.
   5.7. *Machinery room* discharge, Section 1105.6.1.

Commenter's Reason: The PMGCAC believes that use of the word "fan" instead of "appliance" will better clarify the intent of this proposal that factory-built intake/exhaust combination terminations are approved when recognized for use by the manufacturer of the connected ventilation fan.
In the case that a voter is not familiar with these terminations, which were first approved in the 2021 IMC, intake/exhaust combination terminations are regularly installed with heating and energy recovery ventilators (H/ERVs) used for dwelling units. Their use reduces building penetrations, labor, and associated system costs. By reducing the number of penetrations, air leakage can also be reduced, resulting in space conditioning energy savings. Further, the durability of the structure can be improved through reducing entry pathways for bulk water. Manufacturer tests conducted by Natural Resources Canada (NRC) have demonstrated that use of intake/exhaust combination terminations results in minimum cross-contamination of airflows (i.e., not exceeding 4%; see NRC report A1- 007793). These results are aligned with ASHRAE 62.2 approval of such devices, which limits cross-contamination to 10%, as verified by the manufacturer. Approval of this proposed modification is expected to result in an easier path to approval for these more affordable and architecturally flexible terminations.

Bibliography: Ouazia, B. 2016. Evaluation of a dual hood performance in term of contaminant re-entrainment from exhaust to supply. A1-007793. National Research Council Canada. For a copy of the report, please contact the proponent at the email address provided.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
This PC is aligned with the intent of the original proposal that was approved by the committee and can decrease the cost of construction for the same reasons provided in the original proposal.

Final Hearing Results

M16-21 AMPC1

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11295		/M19-21			
Date Submitted	03/19/2024	**Section**	403.3.1	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Updates language for airflow requirements

Rationale

See attached

M11295Text Modification

See attached

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M11295Text Modification

M19-21

Original Proposal

IMC: 403.3.1, 403.3.2, 403.3.2.1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

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.

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.

$$Q_{OA} = 0.01 A_{floor} + 7.5(N_{br} + 1)$$ **(Equation 4-9)**

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   - 2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:
     - 2.1.1. Living room.
     - 2.1.2. Dining room.
     - 2.1.3. Kitchen.
   - 2.2. The whole-house ventilation system is a *balanced ventilation* system.

Reason: Prior to 2015, the IMC used the same mechanical ventilation outdoor airflow rate calculation procedure for all R-2, R-3, and R-4 dwelling units. Beginning in 2015, a new calculation procedure was introduced in the IMC for low-rise R-2, R-3, and R-4 dwelling units. This 2015 calculation procedure was based on the airflow equation used in ASHRAE 62.2-2010, which was developed for leaky, detached,

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single-family homes (bad assumption!). Applying this ventilation equation and associated assumptions to tight, attached, low-rise R-2, R-3, and R-4 dwelling units results in extremely low flow rates that are a fraction of what was previously required by the IMC (1/3 less), what is currently required by ASHRAE 62.2 (1/3 less), and what is currently required by ASHRAE 62.1 (1/2 less).
Since 2015, ASHRAE 62.2 has revised its airflow rate calculation procedure for attached dwelling units, based on infiltration assumptions that are relevant to attached dwelling units, and the result is much closer to that required by required by the 2012 IMC for all private dwelling units and by the 2021 IMC for all private dwelling units that are not in low-rise R-2, R-3, and R-4 buildings. The rate required for IMC low-rise R-2, R-3, and R-4 dwelling units should also be revised to avoid under-ventilation that can lead to poor IAQ and negative health outcomes. Avoiding under-ventilating is especially important for IAQ in high-density multifamily dwelling units.

Following are calculations showing the outdoor airflow rate (QOA) required by various methods and demonstrating the deficiency of the ventilation rates for IMC low-rise R-2, R-3, and R-4 dwelling units. The rate calculated is for a 2-bedroom, 800 ft2 apartment with 8 ft ceilings (volume = 6400 ft3)

Method A: 2015-2021 IMC, dwelling units in low-rise R-2, R-3, and R-4 buildings (same equation used in ASHRAE 62.2-2010):

QOA = 0.01 cfm/ft2*ConditionedFloorArea + 7.5*(NumberBedrooms + 1)

= 0.01*800 + 7.5*(2+1)

= 8 + 22.5

= 30.5 cfm [This rate is 1/3 less than the 2012 IMC, 1/3 less than ASHRAE 62.2-2019, and ½ less than ASHRAE 62.1-2019]

Method B: 2012 IMC, all private dwelling units (same equation used in 2021 IMC for all private dwelling units that are not in low-rise R-2, R-3, and R-4 buildings):

QOA = Max [0.35 ACH, (15 cfm/person)*(2 persons for first bedroom and 1 person for second bedroom)]

= Max [0.35ACH*(6400 ft3)*(1-hr/60-min), 45]

= Max [37, 45]

= 45 cfm

Method C: ASHRAE 62.2-2019, all non-transient vertically attached dwelling units

QOA = 0.03 cfm/ft2*ConditionedFloorArea + 7.5*(NumberBedrooms + 1)

= 0.03*800 + 7.5*(2+1)

= 24 + 22.5

= 46.5 cfm [This method is proposed within this proposal. Note that this method produces values that are very close to those in Method B (i.e., the 2012 IMC for all private dwelling units and the 2021 IMC for all private dwelling units that are not in low-rise R-2, R-3, and R-4 buildings]

Method D: ASHRAE 62.1-2019, all transient dwelling units:

QOA = 0.06 cfm/ft2*ConditionedFloorArea + (5 cfm/person)*(2 persons for first bedroom and 1 person for second bedroom)

= 0.06*800 + 5*3

= 0.06*800 + 5*3

= 48 + 15

= 63 cfm

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website

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at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 38.

Cost Impact: The code change proposal will increase the cost of construction
An increase in required ventilation rate could, in some situations, require a "step up" to the next size of ventilation equipment or a "step up" to the next duct size in some parts of systems. Generally, next size "step-ups" will have some increased material costs but this would not always be the case for every project.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
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~~ 0.03 A_{floor} +7.5(N_{br}+1) **(Equation 4-9)**

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:
      2.1.1. Living room.
      2.1.2. Dining room.
      2.1.3. Kitchen.
   2.2. The whole-house ventilation system is a *balanced ventilation* system.

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M11295Text Modification

Committee Reason: The proposal has passed as modified as the language is trying to align with ASHRAE 62.2 to avoid underventilation of spaces. (Vote: 7-4)

Final Hearing Results	
M19-21	AM

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

25

M11296		/M20-21			
Date Submitted	03/19/2024	**Section**	403.3.1.1	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review				
Commission Action	Pending Review			Staff Classification	Correlates Directly

Comments

General Comments No

Related Modifications

Summary of Modification

Adds requirements for adult changing station

Rationale

See attached

M11296Text Modification

See attached

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Mod11296_TextOfModification.pdf

M11296Text Modification

M20-21

Original Proposal

IMC: TABLE 403.3.1.1

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Adult Changing Table Committee (JBEngineer@aol.com)

2021 International Mechanical Code

Revise as follows:

TABLE 403.3.1.1 MINIMUM VENTILATION RATES

Portions of table not shown remain unchanged.

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^2 [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^2 [a]	EXHAUST AIRFLOW RATE CFM/FT^2 [a]
Public spaces				
Corridors	—	—	0.06	—
Courtrooms	70	5	0.06	—
Elevator car	—	—	—	1.0
Legislative chambers	50	5	0.06	—
Libraries	10	5	0.12	—
Museums (children's)	40	7.5	0.12	—
Museums/galleries	40	7.5	0.06	—
Places of religious worship	120	5	0.06	—
Shower room (per shower head) [g]	—	—	—	50/20 [f]
Smoking lounges [b]	70	60	—	—
Toilet rooms — public [g]	—	—	—	50/70 [e]
Room with adult changing station				50/70 [e]

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 $m^3/(s \cdot m^2)$, °C = [(°F) – 32]/1.8, 1 square foot = 0.0929 m^2.

a. Based on *net occupiable floor area*.

b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1 , Item 3).

c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.

d. Ventilation systems in enclosed parking garages shall comply with Section 404 .

e. Rates are per water closet, ~~or~~ urinal or adult changing station. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

g. Mechanical exhaust is required and recirculation from such spaces is prohibited . For occupancies other than science laboratories, where there is a wheel - type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1 , Items 2 and 4).

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M11296Text Modification

h. For nail salons, each manicure and pedicure station shall be provided with a *source capture system* capable of exhausting not less than 50 cfm per station. Exhaust inlets shall be located in accordance with Section 502.20 . Where one or more required source capture systems operate continuously during occupancy, the exhaust rate from such systems shall be permitted to be applied to the exhaust flow rate required by Table 403.3.1.1 for the nail salon.

Reason: This change is being submitted by the Adult Changing Table Committee of ICC A117.1. There are proposals to the Building Code and Plumbing Code related to the adult changing stations. The Committee believed that the ventilation requirements in the Mechanical Code needed to address the additional ventilation for an adult changing station. Since the station involves the changing of adult diapers, it was believed that the ventilation should mirror the requirements for a public toilet room. The proposed change is consistent with the ventilation required for each water closet and urinal. It adds "adult changing station" as the third item for determining the ventilation rate.

Cost Impact: The code change proposal will increase the cost of construction
This change will mandate a level of ventilation of a rooms having an adult changing station. The net increase in ventilation will add cost to construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal provides ventilation levels for adult change tables that are appropriate. (Vote: 11-0)

Final Hearing Results

M20-21 AS

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11297 | **/M21-21**

Date Submitted	03/20/2024	**Section**	403.3.1.1	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

To update the ventilation rate table to the latest AHRAE reference standard

Rationale

See attached

M11297Text Modification

See attached

Page: 1

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M11297Text Modification

M21-21

Original Proposal

IMC: TABLE 403.3.1.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2021 International Mechanical Code

Revise as follows:

TABLE 403.3.1.1 MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT [2 a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT [2 a]	EXHAUST AIRFLOW RATE CFM/FT [2 a]
Animal Facilities				
Animal exam room (veterinary office)	20	10	0.12	-
Animal imaging (MRI/CT/PET)	20	10	0.18	0.9
Animal operating rooms	20	10	0.18	3.00
Animal postoperative recovery room	20	10	0.18	1.50
Animal preparation rooms	20	10	0.18	1.50
Animal procedure room	20	10	0.18	2.25
Animal surgery scrub	20	10	0.18	1.50
Large-animal holding room	20	10	0.18	2.25
Necropsy	20	10	0.18	2.25
Small-animal cage room (static cages)	20	10	0.18	2.25
Small-animal-cage room (ventilated cages)	20	10	0.18	1.50
Correctional facilities				
Booking/waiting	50	7.5	0.06	—
Cells without plumbing fixtures with plumbing fixtures [g]	 25 25	 5 5	 0.12 0.12	 — 1.0
Day room	30	5	0.06	—
Dining halls (see "Food and beverage service")	—	—	—	—
Guard stations	15	5	0.06	—
Dry cleaners, laundries				
Coin-operated dry cleaner	20	15	—	—
Coin-operated laundries	20	7.5	0.12	—
Commercial dry cleaner	30	30	—	—
Commercial laundry	10	5	0.12	—
Storage, pick up	30	7.5	0.12	—
Education				
Art classroom [g]	20	10	0.18	0.7
Auditoriums	150	5	0.06	—
Classrooms (ages 5–8)	25	10	0.12	—
Classrooms (age 9 plus)	35	10	0.12	—
Computer lab	25	10	0.12	—
Corridors (see "Public spaces")	—	—	—	—
Day care (through age 4)	25	10	0.18	—
Lecture classroom	65	7.5	0.06	—
Lecture hall (fixed seats)	150	7.5	0.06	—
Locker/dressing rooms [g]	—	—	—	0.25
Media center	25	10	0.12	—
Multiuse assembly	100	7.5	0.06	—
Music/theater/dance	35	10	0.06	—
Science laboratories [g]	25	10	0.18	1.0
Smoking lounges [b]	70	60	—	—
Sports locker rooms [g]	—	—	—	0.5
Wood/metal shops [g]	20	10	0.18	0.5
Food and beverage service				
Bars, cocktail lounges	100	7.5	0.18	—
Break rooms	25	5	0.06	-
Cafeteria, fast food	100	7.5	0.18	—
Coffee stations	20	5	0.06	-
Corridors	-	-	0.06	-
Dining rooms	70	7.5	0.18	—

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M11297Text Modification

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, *R* CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, *R* CFM/FT	EXHAUST AIRFLOW RATE CFM/FT
Kitchens (cooking) [b]	20	7.5	0.12	0.7
Occupiable storage rooms for liquids or gels	2	5	0.12	-
Hotels, motels, resorts and dormitories				
Bathrooms/toilet—private [g]	—	—	—	25/50 [f]
Bedroom/living room	10	5	0.06	—
Conference/meeting	50	5	0.06	—
Dormitory sleeping areas	20	5	0.06	—
Gambling casinos	120	7.5	0.18	—
Laundry rooms, central	10	5	0.12	-
Laundry rooms within dwelling units	10	5	0.12	-
Lobbies/prefunction	30	7.5	0.06	—
Multipurpose assembly	120	5	0.06	—
Offices				
Break rooms	50	5	0.12	-
Conference rooms	50	5	0.06	—
Main entry lobbies	10	5	0.06	—
Occupiable storage rooms for dry materials	2	5	0.06	-
Office spaces	5	5	0.06	—
Reception areas	30	5	0.06	—
Telephone/data entry	60	5	0.06	—
Outpatient healthcare facilities[i, j]				
Birthing room	15	10	0.18	-
Class 1 imaging room	5	5	0.12	-
Dental operatory[k]	20	10	0.18	-
General examination room	20	7.5	0.12	-
Other dental treatment areas	5	5	0.06	-
Physical therapy exercise area	7	20	0.18	-
Physical therapy individual room	20	10	0.06	-
Physical therapeutic pool area	-	-	0.48	-
Prosthetics and orthotics room	20	10	0.18	-
Psychiatric consultation room	20	5	0.06	-
Psychiatric examination room	20	5	0.06	-
Psychiatric group room	50	5	0.06	-
Psychiatric seclusion room	5	10	0.06	-
Speech therapy room	20	5	0.06	-
Urgent care examination room	20	7.5	0.12	-
Urgent care observation room	20	5	0.06	-
Urgent care treatment room	20	7.5	0.18	-
Urgent care triage room	20	10	0.18	-
Private dwellings, single and multiple				
Garages, common for multiple units [b]	—	—	—	0.75
Kitchens [b]	—	—	—	50/100 [f]
Living areas [c]	Based on number of bedrooms. First bedroom, 2; each additional bedroom, 1	0.35 ACH but not less than 15 cfm/person	—	—
Toilet rooms and bathrooms [g]	—	—	—	25/50 [f]
Public spaces				
Corridors	—	—	0.06	—
Courtrooms	70	5	0.06	—
Elevator car	—	—	—	1.0
Legislative chambers	50	5	0.06	—
Libraries	10	5	0.12	—
Museums (children's)	40	7.5	0.12	—
Museums/galleries	40	7.5	0.06	—
Places of religious worship	120	5	0.06	—
Shower room (per shower head) [g]	—	—	—	50/20 [f]
Smoking lounges [b]	70	60	—	—
Toilet rooms — public [g]	—	—	—	50/70 [e]
Retail stores, sales floors and showroom floors				
Dressing rooms	—	—	—	0.25
Mall common areas	40	7.5	0.06	—
Sales	15	7.5	0.12	—
Shipping and receiving	2	10	0.12	—
Smoking lounges [b]	70	60	—	—
Storage rooms	—	—	0.12	—
Warehouses (see "Storage")	—	10	0.06	—
Specialty shops				
Automotive motor fuel-dispensing stations [b]	—	—	—	1.5
Banks or lobbies	15	7.5	0.06	-
Barber	25	7.5	0.06	0.5
Beauty salons [b]	25	20	0.12	0.6

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M11297Text Modification

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, *R* CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, *R* CFM/FT	EXHAUST AIRFLOW RATE CFM/FT
Embalming room[b]	—	—	—	2.0
Nail salons [b, n]	25	20	0.12	0.6
Pet shops (animal areas)[b]	10	7.5	0.18	0.9
Supermarkets	8	7.5	0.06	—
Sports and amusement				
Bowling alleys (seating areas)	40	10	0.12	—
Disco/dance floors	100	20	0.06	—
Game arcades	20	7.5	0.18	—
Gym, stadium, arena (play area)	7	20	0.18	—
Health club/aerobics room	40	20	0.06	—
Health club/weight room	10	20	0.06	—
Ice arenas without combustion engines	—	—	0.30	0.5
Spectator areas	150	7.5	0.06	—
Swimming pools (pool and deck area)	—	—	0.48	—
Storage				
Refrigerated warehouses/freezers (<50°F)	—	10	—	0.75
Repair garages, enclosed parking garages[b, d]	—	—	—	0.75
Warehouses	—	10	0.06	—
Theaters				
Auditoriums (see "Education")	—	—	—	—
Lobbies	150	5	0.06	—
Stages, studios	70	10	0.06	—
Ticket booths	60	5	0.06	—
Transportation				
Platforms	100	7.5	0.06	—
Transportation waiting	100	7.5	0.06	—
Workrooms				
Bank vaults/safe deposit	5	5	0.06	—
Computer (without printing)	4	5	0.06	—
Copy, printing rooms	4	5	0.06	0.5
Darkrooms	—	—	—	1.0
Manufacturing where hazardous materials are not used	7	10	0.18	-
Manufacturing where hazarous materials are used (excludes heavy industrial and chemical processes)	7	10	0.18	-
Meat processing [c]	10	15	—	—
Pharmacy (prep. area)	10	5	0.18	—
Photo studios	10	5	0.12	—
Sorting, packing, light assembly	7	7.5	0.12	-
Telephone closets	-	-	0.00	-

For SI: 1 cubic foot per minute = 0.0004719 m^3 /s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 m^3 /(s • m^2), °C = [(°F) – 32]/1.8, 1 square foot = 0.0929 m^2 .

a. Based on *net occupiable floor area.*

b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1 , Item 3).

c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.

d. Ventilation systems in enclosed parking garages shall comply with Section 404 .

e. Rates are per water closet or urinal. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

g. Mechanical exhaust is required and recirculation from such spaces is prohibited . For occupancies other than science laboratories, where there is a wheel - type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1 , Items 2 and 4).

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M11297Text Modification

h. For nail salons, each manicure and pedicure station shall be provided with a*source capture system* capable of exhausting not less than 50 cfm per station. Exhaust inlets shall be located in accordance with Section 502.20 . Where one or more required source capture systems operate continuously during occupancy, the exhaust rate from such systems shall be permitted to be applied to the exhaust flow rate required by Table 403.3.1.1 for the nail salon.

i. Outpatient facilities to which the rates apply are freestanding birth centers, urgent care centers, neighborhood clinics and physicians' offices, Class 1 imaging facilities, outpatient psychiatric facilities, outpatient rehabilitation facilities, and outpatient dental facilities.

j. The requirements of this table provide for acceptable IAQ. The requirements of this table do not address the airborne transmission or airborne viruses, bacteria, and other infectious contagions.

k. These rates are intended only for outpatient dental clinics where the amount of nitrous oxide is limited. They are not intended for dental operatories in institutional buildings where nitrous oxide is piped.

Reason: This proposal seeks to update the existing ventilation rate table in the IMC. Standard 62.1 is the source material for this table, and this updates table 403.3.1.1 to match the appropriate ventilation rates in 62.1-2019.

Bibliography: ASHRAE Standard 62.1-2019, Ventilation for Acceptable Indoor Air Quality

Cost Impact: The code change proposal will decrease the cost of construction
This proposal revises ventilation rates for specific spaces within varying occupancy classifications. However, this does not dictate system design to meet those requirements and therefore does not increase the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

407.1 General.

Mechanical ventilation for ambulatory care facilities and Group I-2*occupancies* shall be designed and installed in accordance with this code, ASHRAE/ASHE 170 and NFPA 99.

CHAPTER15REFERENCED STANDARDS

Revise as follows:

ASHRAE ASHRAE/ASHE	ASHRAE1791 Tullie Circle NE Atlanta, GA 30329

~~170—2017~~ 170-2021	Ventilation of Health Care Facilities

Committee Reason: This proposal appropriately updates the existing ventilation rate table in the IMC. Standard 62.1 is the source material for this table, and this updates table 403.3.1.1 to match the appropriate ventilation rates in 62.1-2019. The modification updates the edition year of the ASHRAE/ ASHE 170-2021 Standard. (Vote: 11-0)

Final Hearing Results

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M11297Text Modification

M21-21 AM

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

27

M11298 | **/M22-21**

Date Submitted	03/20/2024	**Section**	403.3.1.1	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Updates table for storage occupancies

Rationale

See attached

M11298Text Modification

See attached

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Mod11298_TextOfModification.pdf

M11298Text Modification

M22-21

Original Proposal

IMC: TABLE 403.3.1.1

Proponents: Andrew Klein, Self Storage Association (andrew@asklein.com)

2021 International Mechanical Code

Revise as follows:

TABLE 403.3.1.1 MINIMUM VENTILATION RATES

Portions of table not shown remain unchanged.

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^2 [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^2 [a]	EXHAUST AIRFLOW RATE CFM/FT^2 [a]
Storage				
Refrigerated warehouses/freezers	—	10	—	0.75
Repair garages, enclosed parking garages[b, d]	—	—	—	0.75
Warehouses[i]	—	10	0.06	—

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 m^3/(s • m^2), °C = [(°F) – 32]/1.8, 1 square foot = 0.0929 m^2.

a. Based on *net occupiable floor area.*

b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1 , Item 3).

c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.

d. Ventilation systems in enclosed parking garages shall comply with Section 404 .

e. Rates are per water closet or urinal. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

g. Mechanical exhaust is required and recirculation from such spaces is prohibited . For occupancies other than science laboratories, where there is a wheel - type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1 , Items 2 and 4).

h. For nail salons, each manicure and pedicure station shall be provided with a*source capture system* capable of exhausting not less than 50 cfm per station. Exhaust inlets shall be located in accordance with Section 502.20 . Where one or more required source capture systems operate continuously during occupancy, the exhaust rate from such systems shall be permitted to be applied to the exhaust flow rate required by Table 403.3.1.1 for the nail salon.

i. <u>The occupiable floor area in warehouses shall not include the floor area of self-storage units, floor areas under rack storage, or designated palletized storage floor areas.</u>

Reason: This proposal clarifies the application of Section 403.3.1.1, regarding required minimum outdoor airflow rates, in storage occupancies. The current code language is inconsistently applied when there are fixed storage areas that do not change without a permit. Examples of such floor areas may include those dedicated to high-piled rack storage, self-storage facility units that are not fully partitioned

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M11298Text Modification

off from interior corridors, and other floor areas that are designated solely for storage.
Ignoring the volume taken up by storage and the thermal mass it provides in helping with temperature regulation results in the oversizing of HVAC equipment, increasing energy use and limiting the effectiveness of humidity control that properly-sized systems provide. By adding this footnote, the minimum outdoor airflow rates for occupiable space in storage occupancies can be properly calculated and consistently enforced.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is simply a clarificatoin of how occupiable floor area in storage occupancies is to be calculated. This code change proposal will decrease the cost of construction from when the occupiable floor area in warehouses was incorrectly calculated, due to smaller mechanical system requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed that this was a reasonable approach based upon the proponent reason statement. This proposal clarifies the application of Section 403.3.1.1, regarding required minimum outdoor airflow rates, in storage occupancies. The current code language is inconsistently applied when there are fixed storage areas that do not change without a permit. Examples of such floor areas may include those dedicated to high-piled rack storage, self-storage facility units that are not fully partitioned off from interior corridors, and other floor areas that are designated solely for storage.(Vote: 8-3)

Final Hearing Results

M22-21 AS

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

28

M11300		/M24-21			
Date Submitted	03/20/2024	**Section**	403.3.2.3	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Consistency with IMC Table 403.3.1.1 (which is consistent with ASHRAE 62.1)

Rationale

See attached

M11300Text Modification

See attached

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Mod11300_TextOfModification.pdf

M11300Text Modification

M24-21

Original Proposal

IMC: TABLE 403.3.2.3

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

TABLE 403.3.2.3 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR GROUP R-2, R-3 AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or ~~25~~ 50 cfm continuous
Bathrooms and toilet rooms	50 cfm intermittent or ~~20~~ 25 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.

Reason: Consistency with IMC Table 403.3.1.1 (which is consistent with ASHRAE 62.1)
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 39.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Builders specifying exhaust equipment that is sized to meet the intermittent rate requirement will see no increase in the cost of construction. Builders specifying in-suite exhaust equipment that is sized to meet the continuous rate should also see no increase in the cost of exhaust fans, which typically have a nominal rated flow of at least 50 cfm. Builders electing to use central exhaust equipment serving multiple dwelling units and using the continuous rate may see an increase in the cost of equipment; however, such equipment is often provisioned with high speed settings that can achieve flow rates that are 2-3x that provided by the low speed setting. So, there are multiple paths to implement this code change proposal without increasing the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Proposal correctly aligns Tables 403.3.1.1 with Table 403.3.2.3. (Vote: 11-0)

Final Hearing Results

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M11300Text Modification

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

29

M11301		/M25-21			
Date Submitted	03/20/2024	**Section**	403.4	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review				
Commission Action	Pending Review			Staff Classification	Correlates Directly

Comments

General Comments No

Related Modifications

Summary of Modification

Updates language for clean air delivery

Rationale

See attached

M11301Text Modification

See attached

Page: 1

Mod11301_TextOfModification.pdf

M11301Text Modification

M25-21

Original Proposal

IMC: SECTION 403, 403.4 (New), 403.4.1 (New), 403.4.2 (New)

Proponents: Mark Lessans, Johnson Controls, Johnson Controls (mark.lessans@jci.com)

2021 International Mechanical Code

SECTION 403
MECHANICAL VENTILATION

Add new text as follows:

403.4 Clean Air Delivery Capability. Each mechanical system shall meet the requirements in 403.4.1. Each occupiable space shall meet the requirements in 403.4.2.

Exception: Occupiable spaces where 100% of the supply air meets High-efficiency Particulate Air filtration.

403.4.1 Airflow for Increased Filtration. Mechanical systems shall be sized to accommodate a design airflow at a total static pressure drop which assumes the utilization of a supply air filter with a Minimum Efficiency Reporting Value of no less than 13.

403.4.2 Zonal Filtration or Disinfection Capability. Each occupiable space shall have 120-volt receptacles which provide at least 0.2 watts per square foot of occupiable space above the requirements of the National Electrical Code to support supplemental air cleaning devices.

Exception: Rooms with less than 500 square feet of occupiable space.

Reason: This proposal seeks to "ready" buildings for retrofits and other changes if indoor clean air delivery needs to be increased – such as in response to mitigating an airborne contaminant – per ASHRAE and CDC guidance on reopening buildings during the COVID-19 pandemic. If the mechanical system is not designed with a MERV 13 filter, it would at least be sized to accommodate the use of one later on without having to redesign or replace the system. This is important, as MERV 13 filters are often at the balance point between filtration effectiveness and energy efficiency. However, these filters are thicker and have a larger airflow resistance when compared to conventional filters, and often existing systems cannot accommodate them. This proposal also requires that occupiable spaces be equipped with the electrical infrastructure needed to increase clean air delivery at the zonal level, such as using a HEPA room air cleaning machine.

Cost Impact: The code change proposal will increase the cost of construction
These additional requirements will result in a modest increase in construction costs, but this cost pales in comparison to the burden of adding them post-construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: APPENDIX DClean Air Delivery
~~403.4~~ D101 Clean Air Delivery Capability.

Each mechanical system shall meet the requirements in ~~403.4.1~~Section D101.1. Each occupiable space shall meet the requirements in

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M11301Text Modification

~~403.4.2~~Section D101.2.

Exceptions:
1. Group R occupancies.
2. Occupiable spaces where 100% of the supply air meets High-efficiency Particulate Air filtration.
3. Rooms with less than 500 square feet of occupiable space.

~~403.4101.1~~ D101.1 Airflow for Increased Filtration.

Mechanical systems shall be sized to accommodate a design airflow at a total static pressure drop which assumes the utilization of a supply air filter with a Minimum Efficiency Reporting Value of no less than 13.

~~403.4.2~~ D101.2 Zonal Filtration or Disinfection Capability.

Each occupiable space greater than 500 square feet shall have at least one 125-volt, single-phase, 15- or 20-ampere receptacle outlet installed in an accessible location for the cord-and-plug connection of a supplemental air cleaning appliance. One additional receptacle outlet shall be installed for each additional 1000 square feet of occupiable space. The installation shall comply with NFPA 70. ~~shall have 120-volt receptacles which provide at least 0.2 watts per square foot of occupiable space above the requirements of the National Electrical Code to support supplemental air cleaning devices.~~ which provide at least 0.2 watts per square foot of occupiable space above the requirements of the National Electrical Code to support supplemental air cleaning devices.

Committee Reason: The committee has appropriately agreed that current code language must be clarified between residential and commercial in the appendix, Exempt Group 8 and electrical equipment. This proposal also requires that occupiable spaces be equipped with the electrical infrastructure needed to increase clean air delivery at the zonal level. The modifications further clarify acceptable industry practices and gives opportunities for jurisdictions. (Vote: 6-5)

Public Comments

Public Comment 1

Proponents: John Catlett, J.D. Catlett Consulting, LLC, BOMA International (catlettcodeconsulting@gmail.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Mechanical Code

D101 Clean Air Delivery Capability . Each mechanical system shall meet the requirements in D101.1. ~~Each occupiable space shall meet the requirements in D101.2.~~

Exceptions:
1. Group R occupancies.
2. Occupiable spaces where 100% of the supply air meets High-efficiency Particulate Air filtration.

~~**D101.2 Zonal Filtration or Disinfection Capability .** Each occupiable space greater than 500 square feet shall have at least one 125-volt, single-phase, 15- or 20-ampere receptacle outlet installed in an accessible location for the cord-and-plug connection of a supplemental air cleaning appliance. One additional receptacle outlet shall be installed for each additional 1000 square feet of occupiable space. The installation shall comply with NFPA 70.~~

Commenter's Reason: BOMA supported the proposal as originally written as long as it was an appendix item. It provides good guidance to building owners who may choose to prepare for future pandemic needs or could be adopted locally by choice.
BOMA is deeply involved with the ICC Pandemic Task Force. It has been made clear that not all diseases that could potentially rise to

Page: 2

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pandemic status can be treated the same. So the proposal provides an option to consider for new or altered buildings.

However, a floor modification was added at the last minute that added the proposed deleted language.

The additional electrical outlet is not needed. Period. If it were, it should be added to the NEC, not the mechanical code.

The consumption associated with individual room air filtration systems is no more than normal cord and plug connected appliances that are already covered under the general load calculation found in the NEC. No evidence was provided to support the need. Portable heaters, small desk refrigerators, fans and similar devices do not require additional load calculation as they are assumed in the general calculation. The only benefit of the proposal is to the electrical manufacturing, suppliers, and installers.

The cost/benefit is just not there. We ask that the proposal be modified to remove the electrical outlets and additional calculation.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
This public comment will decrease the cost of compliance. The additional electrical outlet will serve no purpose other than a cost increase. Should there be a consideration of the actual need for the dedicated outlets, this should be considered by the appropriate NFPA 70 committee and not the ICC Mechanical Code Committee.

Public Comment 2

Proponents: Jeffrey Shapiro, International Code Consultants, IIAR (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Mechanical Code

D101 Clean Air Delivery Capability. ~~Each~~ In Groups A, B, E and I occupancies,each mechanical system shall meet the requirements in D101.1. Each occupiable space in such occupancies shall meet the requirements in D101.2.

~~Exceptions~~Exception:

~~1. Group R occupancies.~~

~~2.~~ Occupiable spaces where 100% of the supply air meets High-efficiency Particulate Air filtration.

Commenter's Reason: The proposed requirements are an over-reach for factory, storage, high-hazard, industrial, mercantile, and utility occupancies and should not apply in any case, even though they are already relegated to an optional appendix. Residential occupancies were already exempted, so this public comment just retained that exemption.

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
Reducing the scope of application for this appendix will result in cost savings for occupancies that are not included.

Final Hearing Results	
M25-21	AMPC1,2

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

30

M11302		/M26-21			
Date Submitted	03/20/2024	**Section**	405.2	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language for requirements for ventilation

Rationale

See attached

M11302Text Modification

See attached

Page: 1

Mod11302_TextOfModification.pdf

M11302Text Modification

M26-21

Original Proposal

IMC: 405.2 (New), 405.2.1 (New), 405.2.2 (New), 405.2.3 (New), 405.2.3.1 (New)

Proponents: Mark Lessans, Johnson Controls, Johnson Controls (mark.lessans@jci.com)

International Mechanical Code

2021 International Mechanical Code

Add new text as follows:

405.2 Demand Control Ventilation. Each occupiable space shall be equipped with a carbon dioxide sensor which meets the requirements in 405.2.1 and 405.2.3. Mechanical equipment serving each zone(s) shall be equipped with controls which meet the requirements in 405.2.2.

405.2.1 Carbon Dioxide Sensor Performance Specifications. Each carbon dioxide sensor installed in accordance with Section 405.2 shall meet the following carbon dioxide measurement specifications as certified by the equipment manufacturer:

1. Range lower bound less than or equal to 400 parts per million
2. Range upper bound greater than or equal to 2,000 parts per million
3. Accuracy within ±75 parts per million at a reading of 1,000 parts per million
4. Output resolution less than or equal to 5 parts per million

405.2.2 Mechanical System Controls. Controls installed in accordance with Section 405.2 shall:

1. Receive data from the carbon dioxide sensor in the occupiable zone(s) at least once per 5 minutes
2. Be calibrated to provide pre-established outdoor airflow rates, or be equipped with the necessary instrumentation to measure outdoor airflow
3. Be capable of adjusting the outdoor airflow in response to an adjustable outdoor airflow setpoint
4. Increase the amount of outdoor air provided to each occupiable zone until the carbon dioxide level in each occupiable zone falls below a maximum threshold as defined by the user

405.2.3 Ventilation Rate Alarming. When carbon dioxide levels are above a maximum level as defined by the user, sensors installed in accordance with Section 405.2 shall alert the occupants with a visual and audible indication in the zone or through a building monitoring system.

405.2.3.1 Default Carbon Dioxide Threshold Level. The threshold level for carbon dioxide measurement above which triggers an alert in accordance with Section 405.2.3 shall be set to 1,100 parts per million by default.

Reason: Several recently published studies[1,2] have demonstrated that a large portion of indoor occupied spaces to not meet minimum requirements for ventilation as set in ASHRAE Standard 62.1, and have documented the impacts on occupant health, comfort, and productivity. Additionally, providing adequate ventilation is the most effective first step in mitigating the transmission of viruses carried by airborne particulates, an issue that has been highlighted during the COVID-19 pandemic.

This proposal seeks to ensure building occupants have access to adequate ventilation by bringing Demand Control Ventilation (DCV) to each occupiable zone and managing carbon dioxide levels – the best proxy we have for determining inadequate ventilation and/or above-

normal occupancy. The proposal requires that every occupiable zone have a basic CO2 sensor, that the CO2 sensor communicate with the building mechanical system, and that the mechanical system be capable of adjusting airflow rates to keep CO2 levels (and therefore ventilation adequacy) within acceptable levels. It also requires that the CO2 sensor notify either the occupants, or the building manager, when ventilation is inadequate. This can be especially helpful first step in helping building occupants understand when indoor may be at unhealthy levels and take mitigating action.

If successfully deployed, this proposal would go a long way toward maintaining adequate ventilation, as well as assist in saving energy by preventing overventilation of spaces.

Bibliography: [1]University of California at Davis, Ventilation rates in California classrooms: Why many recent HVAC retrofits are not delivering sufficient ventilation, January 2020
[2]United States Government Accountability Office, School Districts Frequently Identified Multiple Building Systems Needing Updates or Replacement, June 2020

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction as additional sensors will be required.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proponent references studies tied to school facilities only. Providing demand control ventilation to each occupiable space is too broad. (Vote: 11-0)

Public Comments

Public Comment 1

Proponents: Mark Lessans, Johnson Controls, Johnson Controls (mark.lessans@jci.com) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

~~**405.2 Demand Control Ventilation.** Each occupiable space shall be equipped with a carbon dioxide sensor which meets the requirements in 405.2.1 and 405.2.3. Mechanical equipment serving each zone(s) shall be equipped with controls which meet the requirements in 405.2.2.~~

~~**405.2.1 Carbon Dioxide Sensor Performance Specifications.** Each carbon dioxide sensor installed in accordance with Section 405.2 shall meet the following carbon dioxide measurement specifications as certified by the equipment manufacturer:~~

1. ~~Range lower bound less than or equal to 400 parts per million~~
2. ~~Range upper bound greater than or equal to 2,000 parts per million~~
3. ~~Accuracy within ±75 parts per million at a reading of 1,000 parts per million~~
4. ~~Output resolution less than or equal to 5 parts per million~~

~~**405.2.2 Mechanical System Controls.** Controls installed in accordance with Section 405.2 shall:~~

1. ~~Receive data from the carbon dioxide sensor in the occupiable zone(s) at least once per 5 minutes~~

M11302Text Modification

2. ~~Be calibrated to provide pre-established outdoor airflow rates, or be equipped with the necessary instrumentation to measure outdoor airflow~~
3. ~~Be capable of adjusting the outdoor airflow in response to an adjustable outdoor airflow setpoint~~
4. ~~Increase the amount of outdoor air provided to each occupiable zone until the carbon dioxide level in each occupiable zone falls below a maximum threshold as defined by the user~~

~~**405.2.3 Ventilation Rate Alarming.** When carbon dioxide levels are above a maximum level as defined by the user, sensors installed in accordance with Section 405.2 shall alert the occupants with a visual and audible indication in the zone or through a building monitoring system.~~

~~**405.2.3.1 Default Carbon Dioxide Threshold Level.** The threshold level for carbon dioxide measurement above which triggers an alert in accordance with Section 405.2.3 shall be set to 1,100 parts per million by default.~~

Appendix D Clean Air Delivery

User Note . *The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*
About this appendix: *Appendix D provides criteria for an increased protection level for occupant health by delivering and monitoring clean air in occupied areas of the certain buildings.*

D101 Demand control ventilation . Group A, B, E and I occupancies shall be equipped with a minimum of one carbon dioxide sensor for every 500 square feet of occupiable space. Carbon dioxide sensors installed in accordance with this section shall meet the requirements in Sections D101.1 and D101.3. Mechanical equipment serving each zone(s) shall be equipped with controls which meet the requirements in Section D101.2.

Exception: Occupiable zones less than 500 square feet.

D101.1 Carbon dioxide sensor performance specifications . Each carbon dioxide sensor installed in accordance with Section D101 shall meet the following carbon dioxide measurement specifications as certified by the equipment manufacturer:

1. Range lower bound less than or equal to 400 parts per million
2. Range upper bound greater than or equal to 2,000 parts per million
3. Accuracy within ±75 parts per million at a reading of 1,000 parts per million
4. Output resolution less than or equal to 20 parts per million

D101.2 Mechanical system controls . Controls for the mechanical equipment installed in accordance with Section D101 shall:

1. Receive data from the carbon dioxide sensor in the occupiable zone(s) at least once per 5 minutes
2. Be calibrated to provide pre-established outdoor airflow rates, or be equipped with the necessary instrumentation to measure the outdoor airflow rate
3. Be capable of adjusting the outdoor airflow rate in response to an adjustable outdoor airflow setpoint
4. Increase the amount of outdoor air provided to each occupiable zone until the carbon dioxide level in each occupiable zone falls below a maximum threshold as defined by the user

D101.3 Carbon dioxide detection threshold level . The default detection threshold level for carbon dioxide measurement above which triggers an alert in accordance with Section D101.4 shall be set to 1,100 parts per million. The end user can modify the detection threshold level based on specific operations and needs.

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M11302Text Modification

D101.4 Carbon dioxide detection threshold level exceeded . When carbon dioxide levels exceed the detection threshold level established in Section D101.3, the mechanical equipment shall modify the outdoor airflow rate as required in Section D101.2. When the carbon dioxide concentration remains above the detection threshold level for a period of 30 minutes or more, the occupants in the zone shall be alerted by approved audible and visual notification devices or through a building monitoring system.

Commenter's Reason: The code development committee disapproved this proposal because it was too broad in its application. This Public Comment contains revisions to address the committee's concerns in addition to clarifications.
First, the committee agreed with moving this proposal to a new Appendix D. Appendix D is created along with renumbering of sections as appropriate. The standard appendix note is added indicating that as an appendix chapter, these provisions will only apply when specifically referenced in the adopted ordinance.

Second, this Public Comment limits application of these requirements. The requirements are only applicable to Groups A, B, E and I occupancies. These occupancies fall into similar characteristics for level of hazard and occupant density. Industrial type facilities such as Groups F, H and S are not included. Additionally, the exception eliminates the requirements for occupiable spaces where the air handling zone is less than 500 square feet.

Third, a revision is added to limit the number of carbon dioxide sensing devices to one per 500 square feet. This eliminates the need for a device in every room or space.

Fourth, clarification is added in Section D101.4 as far the actions required when excess levels of carbon dioxide are detected.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This Public Comment moves the code change proposal into an Appendix, thus making the requirements not mandatory, and not increasing or decreasing the cost of construction.

Final Hearing Results

M26-21 AMPC1

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

31

M11303		/M28-21			
Date Submitted	03/20/2024	**Section**	501.3.1	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

clarifies exhaust opening distance requirements

Rationale

See attached

M11303Text Modification

See attached

Page: 1

Mod11303_TextOfModification.pdf

M11303Text Modification

M28-21

Original Proposal

IMC: 501.3.1

Proponents: Brent Ursenbach, West Coast Code Consultants, Inc, Utah Governor's Office of Energy Development (brentu@wc-3.com)

2021 International Mechanical Code

Revise as follows:

501.3.1 Location of exhaust outlets. The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property lines; 10 feet (3048 mm) from operable openings into buildings; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into buildings that are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above adjoining grade.
3. 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.
4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant *equipment*.
5. For specific systems, see the following sections:
   5.1. Clothes dryer exhaust, Section 504.4.
   5.2. Kitchen hoods and other kitchen exhaust *equipment*, Sections 506.3.13, 506.4 and 506.5.
   5.3. Dust, stock and refuse conveying systems, Section 511.2.
   5.4. Subslab soil exhaust systems, Section 512.4.
   5.5. Smoke control systems, Section 513.10.3.
   5.6. Refrigerant discharge, Section 1105.7.
   5.7. *Machinery room* discharge, Section 1105.6.1.

Reason: With the increased popularity of multi-family units, many times with limited wall areas on the front and back of these dwellings, quite often it's difficult to find sufficient wall area to locate terminations compliant with the exhaust opening 3' clearance requirements in this section. The exhaust from dryers, bath fans and domestic ranges is not considered noxious or hazardous, and poses little if any health risk. Taking into account the buoyancy of the exhaust air, the chance of the exhaust air migrating down into an opening is minimal to none. Imagine the simplification of the exhaust duct installation if terminations were allowed above windows with this 1' clearance requirement.

In IFGC 503.8 clearance requirements for direct vent gas appliance from these openings are in many cases less than these requirements for these environment exhausts. In fact the requirement for a through the wall direct vent termination < 10,000 Btu/hr. is 6" in any direction. These gas vents exhaust hazardous productions of combustion to outside, not *environment air*.

Meeting the current requirements often adds extra elbows and pipe to the exhaust duct system, reducing the airflow through the duct. This is a wasted expense of no value.

M11303Text Modification

Cost Impact: The code change proposal will decrease the cost of construction
This proposal reduces materials and labor expense required to offset exhaust duct terminations away from windows.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was passed As Submitted based on the proponent reason statement. With the increased popularity of multi-family units, many times with limited wall areas on the front and back of these dwellings, quite often it's difficult to find sufficient wall area to locate terminations compliant with the exhaust opening 3' clearance requirements in this section. The exhaust from dryers, bath fans and domestic ranges is not considered noxious or hazardous, and poses little if any health risk. Taking into account the buoyancy of the exhaust air, the chance of the exhaust air migrating down into an opening is minimal to none.
Imagine the simplification of the exhaust duct installation if terminations were allowed above windows with this 1' clearance requirement.

In IFGC 503.8 clearance requirements for direct vent gas appliance from these openings are in many cases less than these requirements for these environment exhausts. In fact the requirement for a through the wall direct vent termination < 10,000 Btu/hr. is 6" in any direction. These gas vents exhaust hazardous productions of combustion to outside, not *environment air*.

Meeting the current requirements often adds extra elbows and pipe to the exhaust duct system, reducing the airflow through the duct. This is a wasted expense of no value.
(Vote: 9-2)

Final Hearing Results

M28-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

32

M11304		/M29-21 Part I			
Date Submitted	03/20/2024	**Section**	501.6	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language regarding Common ducts

Rationale

See attached

M11304Text Modification

See attached

Page: 1

Mod11304_TextOfModification.pdf

M11304Text Modification

M29-21 Part I

Original Proposal

IMC: 501.6 (New)

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Add new text as follows:

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.

Reason: Exhaust ducts that are under positive pressure cannot be joined because the airflow from one fan will leak out through the fan that is not running. Only if the fans that share an exhaust duct are all running simultaneously, could backflow be prevented. Backdraft dampers in common exhaust fans have a significant leakage rate, thus the fan that is not running will see backflow from the common duct and the exhaust air from one space will dump into another space. If the fans discharge to a common exhaust shaft that is under negative pressure, there is no problem and this proposal would not prevent that arrangement. It is extremely undesirable (and unthinkable) to use a common duct for fans that serve different dwelling and sleeping units because odors, smoke, pathogens, chemical irritants, etc. would be carried from one unit to another.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 4.

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction only where the cost of an additional roof, wall or soffit penetration is more than the cost of larger common ducts, tee and wye fittings, fasteners, sealants and hangers and the extra labor to assemble common duct arrangements. This proposal will increase the cost of construction if additional roof or wall penetrations cost more than combined exhaust discharge ducts. Combining ducts into a common duct adds material costs, as does making roof and wall penetrations.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Positive pressure would be problematic in negative pressure environments. Exhaust ducts that are under positive pressure cannot be joined because the airflow from one fan will leak out through the fan that is not running. Only if the fans that share an exhaust duct are all running simultaneously, could backflow be prevented. Backdraft dampers in common exhaust fans have a significant leakage rate, thus the fan that is not running will see backflow from the common duct and the exhaust air from one space will dump into another space. If the fans discharge to

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M11304Text Modification

a common exhaust shaft that is under negative pressure, there is no problem and this proposal would not prevent that arrangement. It is extremely undesirable (and unthinkable) to use a common duct for fans that serve different dwelling and sleeping units because odors, smoke, pathogens, chemical irritants, etc. would be carried from one unit to another.

(Vote: 11-0)

Final Hearing Results

M29-21 Part I AS

Mod_11304_Text_M29-21 Part I.pdf Page: 2

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

33

M11305		/M31-21			
Date Submitted	03/20/2024	**Section**	504.10	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds reference standard UL 2158A compliance reference

Rationale

See attached

M11305Text Modification

See attached

Page: 1

Mod11305_TextOfModification.pdf

M11305Text Modification

M31-21

Original Proposal

IMC: 504.10

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

2021 International Mechanical Code

Revise as follows:

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.

Reason: Clothes dryer transition ducts for both domestic and commercial applications are required to be listed and labeled. Section 504.9.3 requires UL 2158A for listing these types of ducts to UL 2158A for domestic installations. This proposal would also require UL 2158A in Section 504.10 for commercial installations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code already requires these products to be listed and labeled. This proposal clarifies what standard is used.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal adds the appropriate UL standard for commercial clothes dryer installations. (Vote: 8-1)

Final Hearing Results

M31-21 AS

Page: 1

Mod_11305_Text_M31-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

34

M11306		/M32-21			
Date Submitted	03/20/2024	**Section**	505.3	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -M.

Summary of Modification

Clarifies exhaust duct language for I-1 and I-2 occupancies

Rationale

See attached

M11306Text Modification

See attached

Page: 1

Mod11306_TextOfModification.pdf

M11306Text Modification

M32-21

Original Proposal

IMC: 505.3, 505.7 (New), 505.8 (New)

Proponents: John Williams, Healthcare Committee (ahc@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

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~~ this section and Section 505.7 or 505.8.

Exceptions:

1. ~~In other than Groups I-1 and I-2, where~~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.
2. Ducts for domestic kitchen cooking *appliances* equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
   2.1. The duct shall be installed under a concrete slab poured on grade.
   2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.
   2.3. The PVC duct shall extend not more than 1 inch (25 mm) above the indoor concrete floor surface.
   2.4. The PVC duct shall extend not more than 1 inch (25 mm) above grade outside of the building.
   2.5. The PVC ducts shall be solvent cemented.

Add new text as follows:

505.7 Group I-1 Occupancies. In Group I-1 occupancies, hood installations over domestic cooking equipment shall be installed in accordance with one of the following:

1. Domestic hoods over cooktops and ranges installed in accordance with Section 420.9 of the International Building Code shall comply with the following:
   1.1. Protection from fire shall be in accordance with Section 904.14 of the International Fire code.
   1.2. Mechanical ventilation shall be provided to the rooms or spaces containing the cooking facility in accordance with Section 403.3.1.
   1.3. Hood systems shall have a minimum air flow of 500 cfm (14,000 L/min).
   1.4. Listed and labeled ductless range hoods shall have a charcoal filter to reduce smoke and odors.
2. Commercial kitchen hoods complying with Section 507 shall be provided over cooktops and ranges serving greater than 30 care recipients.

505.8 Group I-2 Occupancies. In Group I-2 Occupancies, Hood installations over domestic cooking equipment shall be installed in accordance with one of the following:

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1. Domestic hoods over cooktops and ranges installed in accordance with Section 407.2.7 of the International Building Code shall comply with the following:
   1.1. Protection from fire shall be in accordance with Section 904.14 of the International Fire code.
   1.2. Mechanical ventilation shall be provided to the rooms or spaces containing the cooking facility in accordance with Section 407.
   1.3. Hood systems shall have a minimum air flow of 500 cfm (14,000 L/min).
   1.4. Listed and labeled ductless range hoods shall have a charcoal filter to reduce smoke and odors.

2. Commercial kitchen hoods complying with Section 507 shall be provided over cooktops and ranges serving greater than 30 care recipients.

Reason: In I-1 and I-2 Occupancies, Section 407.2.6 and 420.8 set up a number of safeguards that allow for meal preparation for up to 30 care recipients. These cooking operations are on a lower scale than commercial cooking facilities and do not generate the same level of smoke and vapors. The aroma of food cooking is beneficial to the care recipients who live in I-1 and I-2 occupancies as it stimulates appetite and signals them that mealtime is near.
The hoods in question are not your standard domestic range hood. Hoods for I-1 and I-2 Occupancies must comply with Section 904.14 of the *International Fire Code*. This section requires hoods that are listed and labeled per UL 300A, have fire suppression built in, and have an interlock that cuts the fuel or power source upon activation of the extinguishing system. Stovetops must also have a timer that automatically turns off the cooking device after 120 minutes, preventing unattended cooking.

Federal Guidelines that govern I-2 Occupancies permit recirculating hoods with a charcoal filter and also require a higher airflow rate. This added language is being added to allow equivalent facilitation.

For commercial cooking facilities, compliance with NFPA 96 is required. However, NFPA 96 (Chapter 13) allows for the use of re-circulating hoods in commercial cooking operations, there is no justification to prohibit the use in these domestic uses.The issue at hand is that sometimes, especially in a renovation of a multi-story building, it can be impractical or impossible to run an exhaust duct to the outside. By requiring a vented hood, it would prevent many communities from being able to provide better food quality and a social experience that can be critical to quality of life.

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The code change proposal will decrease the cost of construction
The cost of a domestic hood is less than a commercial hood and associate duct work.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The committee agrees that the the proposal language as written is problematic in this section and is missing the option of ducted installations for domestic hoods provided over cook tops. (Vote: 11-0)

Public Comments

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M11306Text Modification

Public Comment 1

Proponents: John Williams, Healthcare Committee (ahc@iccsafe.org) requests As Modified by Public Comment

Replace as follows:

2021 International Mechanical Code

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~~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.
2. Ducts for domestic kitchen cooking *appliances* equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
   2.1. The duct shall be installed under a concrete slab poured on grade.
   2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.
   2.3. The PVC duct shall extend not more than 1 inch (25 mm) above the indoor concrete floor surface.
   2.4. The PVC duct shall extend not more than 1 inch (25 mm) above grade outside of the building.
   2.5. The PVC ducts shall be solvent cemented.

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.

505.8 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.

Commenter's Reason: The intent of this code change is to allow listed and labeled ductless domestic range hoods, that meet specific criteria, over domestic cooking appliances in limited applications for I-1 and I-2 Occupancies. This Public Comment proposal addresses the comments the CHC heard from the committee and opponents:
First, we were told it was confusing to bring the language referencing commercial kitchen hoods into Section 505, which only addresses domestic cooking, so we have removed that language. This doesn't change any requirements when using commercial appliances, or

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prevent a designer from choosing to provide a type 1 hood over a domestic range.

Secondly, we heard that it was not clear in the initial proposal that it was a choice between ducting to the outdoors OR using a ductless (re-circulating) exhaust hood in these applications. For this reason, we have changed the ductless hood to be an exception to the requirement to vent to the outdoors. There are some conditions that arise, that make it difficult, or impossible, to vent a hood to the outdoors. We feel that this proposal is providing the adequate levels of safety for I-1 and I-2 care recipients, whether vented or ductless.

Please keep in mind that, by referencing Section 420.9 and Section 407.2.7 of the International Building Code, the range hoods in question are used only over domestic cooking appliances (cooktops and ranges) and are located either within individual dwelling units (I-1 only), in kitchens serving 30 or fewer care recipients, or in areas like a Physical Therapy or staff break room. The sections referenced also require additional safeguards like staff access to turn on the appliance and a timer that shuts off the appliance after 120 minutes, if not attended. These cooking provisions have been in the Codes since 2015, for nursing homes.

Further, the reference to the International Fire Code points to the requirement for fire suppression to be built into the hood, with manual activation and interconnection that turns off the cooking appliance. As I-1 and I-2 Occupancies are already required to be sprinkled, this brings another level of safety. NFPA data, NIST Special Report 1066 and further research by NIST (TN 1969), has shown that a single residential sprinkler head can extinguish a cooking oil fire in a skillet.

The addition of the charcoal filter in the ductless hood was meant to address the concerns from opponents on smoke, vapors and particulate matter being circulated through the space. This charcoal filtration matches the requirements in NFPA 96 for ductless (re-circulating) Commercial Kitchen hoods. NFPA 96 does allow for ductless hoods in commercial cooking applications. Keep in mind that the application this proposal addresses is only serving up to 30 residents total, which is at a much lower rate of meal service than a typical restaurant or other commercial application.

Setting the airflow requirement through the hood at 500 cfm, this matches the federal guidelines for this type of cooking operation and does a better job of capturing any fumes, grease laden vapors, etc from cooking operations. Standard domestic range hoods typically only provide 220 – 375 cfm so this is a significant increase. Several research studies have shown that higher air flow rates result in higher capture efficiencies and provide better indoor air quality.

Further, per Section 505.4, any exhaust hood over 400 cfm is required to be provided with equivalent make-up air systems. This ensures that sufficient fresh air is being brought into the space to offset impacts of cooking operations. The requirement in this text for mechanical ventilation, not natural ventilation, reinforces this requirement and ensures that adequate ventilation will be provided to mitigate air quality concerns.

This is the last part of a package of code changes around cooking that recognize what has been “done for years” in I-1 Assisted Living and I-2 Nursing Home occupancies but to get it in the codes as a consistent and safe application nationwide and so that AHJ’s have one set of rules that are easier to enforce. The Center for Medicare and Medicaid Services (CMS), who oversee Hospitals, Nursing Homes and Ambulatory Care Occupancies has allowed these cooking applications with re-circulating domestic range hoods since 2012. The CHC was established to work towards bringing the I-Codes in line with the Federal Guidelines and enable the I-codes to stand as an equivalent option. This code change is a needed piece to this equivalency status.

M11306Text Modification



Example kitchen



Example kitchen

M11306Text Modification



Range with timer control and grease collecting hood.

Bibliography: Singer, Brett C. 2011 Experimental Evaluation of Installed Cooking Exhaust Fan Performance, Lawrence Berkeley National Lab, LBNL-4183E

EPA website: https://www.epa.gov/indoor-air-quality-iaq/improving-indoor-air-quality

EPA Indoor Air Plus Program: https://www.epa.gov/sites/production/files/2018-03/documents/indoor_airplus_fillable_verification_checklist.pdf

Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
The cost of a domestic hood is less than a commercial hood and associate duct work.

Final Hearing Results	
M32-21	AMPC1

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11307		/M34-21			
Date Submitted	03/20/2024	**Section**	506.2	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds new language for exhaust equipment

Rationale

See attached

M11307Text Modification

See attached

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M11307Text Modification

M34-21

Original Proposal

IMC: 506.2

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

506.2 Corrosion protection. Ducts and exhaust equipment exposed to the outside atmosphere or subject to a corrosive environment shall be protected against corrosion in an *approved* manner.

Reason: Any portion of the commercial kitchen hood ventilation duct system and exhaust equipment that is exposed to the outside atmosphere, regardless of whether for Type I or Type II applications, should be protected against corrosion.
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 1-3B.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Exhaust equipment (such as fans) that are*listed* for outdoor service are already protected against corrosion. The proposal is stating what is already required through the listing of the equipment. The equipment isn't any different than what is being selected for outdoor service.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal passed based on the proponent reason statement that exhaust equipment exposed to the exterior would have to be protected against corrosion. (Vote: 6-5)

Final Hearing Results

M34-21 AS

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11308		/M35-21			
Date Submitted	03/20/2024	**Section**	506.3	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Clarifying terminology for ducts

Rationale

See attached

M11308Text Modification

See attached

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M11308Text Modification

M35-21

Original Proposal

MC: (New), 506.3, 506.3.1, 506.3.1.1, 506.3.2, 506.3.2.1, 506.3.2.2, 506.3.2.3, 506.3.2.4, 506.3.2.5, 506.3.3, 506.3.4, 506.3.5, 506.3.7, 506.3.7.1, 506.3.8, 506.3.8.1, 506.3.8.2, 506.3.9, 506.3.10, 506.3.11, 506.3.11.1, 506.3.11.2, 506.3.11.3, 506.3.12, 506.3.13, 506.5.1.2, 506.5.2, 506.5.4, 507.1 [IFC 606.2] , 507.2.4, 506.3.1.2

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Add new definition as follows:

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.

Revise as follows:

506.3 ~~Ducts serving Type I hoods~~ Grease duct systems. ~~Type I exhaust ducts shall be independent of all other exhaust systems except as provided in Section 506.3.5. Commercial kitchen~~ *Grease* duct systems ~~serving Type I hoods~~ shall be designed, constructed and installed in accordance with Sections 506.3.1 through 506.3.13.3.

Delete without substitution:

~~506.3.1 Duct materials.~~ ~~Ducts serving Type I hoods shall be constructed of materials in accordance with Sections 506.3.1.1 and 506.3.1.2.~~

Revise as follows:

506.3.1.1 506.3.1 Grease duct materials. Grease ducts ~~serving Type I hoods~~ shall be constructed of steel having a minimum thickness of 0.0575 inch (1.463 mm) (No. 16 gage) or stainless steel not less than 0.0450 inch (1.14 mm) (No. 18 gage) in thickness.

Exception: Factory-built commercial kitchen grease ducts *listed* and *labeled* in accordance with UL 1978 and installed in accordance with Section 304.1.

~~506.3.2~~ Joints, seams and penetrations of grease ducts. Joints, seams and penetrations of grease ducts shall be made with a continuous liquid-tight weld or braze made on the external surface of the grease duct system.

Exceptions:

1. Penetrations shall not be required to be welded or brazed where sealed by devices that are *listed* for the application.
2. Internal welding or brazing shall not be prohibited provided that the joint is formed or ground smooth and is provided with ready access for inspection.
3. Factory-built commercial kitchen grease ducts *listed* and *labeled* in accordance with UL 1978 and installed in accordance with Section 304.1.

506.3.2.1 Grease ~~Duct~~ duct joint types. Grease duct ~~Duct~~ joints shall be butt joints, welded flange joints with a maximum flange depth of $^1/_2$ inch (12.7 mm) or overlapping duct joints of either the telescoping or bell type. Overlapping joints shall be installed to prevent ledges and obstructions from collecting grease or interfering with gravity drainage to the intended collection point. The difference between the inside cross-sectional dimensions of overlapping sections of duct shall not exceed $^1/_4$ inch (6.4 mm). The length of overlap for overlapping duct joints shall not exceed 2 inches (51 mm).

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506.3.2.2 Grease ~~Duct~~ duct-to-hood joints. Grease ~~Duct~~ duct-to-hood joints shall be made with continuous internal or external liquid-tight welded or brazed joints. Such joints shall be smooth, accessible for inspection, and without grease traps.

Exceptions: This section shall not apply to:

1. A vertical duct-to-hood collar connection made in the top plane of the hood in accordance with all of the following:
   1.1. The ~~hood duct opening~~ the exhaust outlet of the hood shall have a 1-inch-deep (25 mm), full perimeter, welded flange turned down into the hood interior at an angle of 90 degrees (1.57 rad) from the plane of the opening.
   1.2. The grease duct shall have a 1-inch-deep (25 mm) flange made by a 1-inch by 1-inch (25 mm by 25 mm) angle iron welded to the full perimeter of the grease duct not less than 1 inch (25 mm) above the bottom end of the duct.
   1.3. A gasket rated for use at not less than 1,500ºF (816ºC) is installed between thegrease duct flange and the top of the hood.
   1.4. The grease duct-to-hood joint shall be secured by stud bolts not less than 1/4 inch (6.4 mm) in diameter welded to the hood with a spacing not greater than 4 inches (102 mm) on center for the full perimeter of the opening. The bolts and nuts shall be secured with lockwashers.
2. *Listed* and *labeled grease* duct-to-hood collar connections installed in accordance with Section 304.1.

506.3.2.3 Grease ~~Duct~~ duct-to-exhaust fan connections. Grease ~~Duct~~ duct-to-exhaust fan connections shall be flanged and gasketed at the base of the fan for vertical discharge fans; shall be flanged, gasketed and bolted to the inlet of the fan for side-inlet utility fans; and shall be flanged, gasketed and bolted to the inlet and outlet of the fan for in-line fans. Gasket and sealing materials shall be rated for continuous duty at a temperature of not less than 1,500ºF (816ºC).

506.3.2.4 Vibration isolation. A vibration isolation connector for connecting a grease duct to a fan shall consist of noncombustible packing in a metal sleeve joint of *approved* design or shall be a coated-fabric flexiblegrease duct connector *listed* and *labeled* for the application. Vibration isolation connectors shall be installed only at the connection of a grease duct to a fan inlet or outlet.

506.3.2.5 Grease duct test. Prior to the use or concealment of any portion of a grease duct system, a leakage test shall be performed. Grease ducts ~~Ducts~~ shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the ~~ductwork~~ grease ducts 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 ~~odf uctwork~~ grease ducts 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 ~~work~~ 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.

506.3.3 Grease duct supports. Grease duct bracing and supports shall be of noncombustible material securely attached to the structure and designed to carry gravity and seismic loads within the stress limitations of the *International Building Code* . Bolts, screws, rivets and other mechanical fasteners shall not penetrate grease duct walls.

506.3.4 Air velocity. Grease duct systems ~~serving a Type I hood~~ shall be designed and installed to provide an air velocity within thegrease duct system of not less than 500 feet per minute (2.5 m/s).

Exception: The velocity limitations shall not apply within grease duct transitions utilized to connect grease ducts to differently sized or shaped openings in hoods and fans, provided that such transitions do not exceed 3 feet (914 mm) in length and are designed to prevent the trapping of grease.

506.3.5 Separation of grease duct system. A separate grease duct system shall be provided for each Type I hood. A separate grease duct system is not required where all of the following conditions are met:

1. All interconnected hoods are located within the same story.
2. All interconnected hoods are located within the same room or in adjoining rooms.

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3. Interconnecting grease ducts do not penetrate assemblies required to be fire-resistance rated.
4. The grease duct system does not serve solid-fuel-fired *appliances*.

506.3.7 Prevention of grease accumulation in grease ducts. ~~Duct~~ Grease duct systems serving a Type I hood shall be constructed and installed so that grease cannot collect in any portion thereof, and the system shall slope not less than one-fourth unit vertical in 12 units horizontal (2-percent slope) toward the hood or toward a grease reservoir designed and installed in accordance with Section 506.3.7.1. Where horizontal grease ducts exceed 75 feet (22 860 mm) in length, the slope shall be not less than one unit vertical in 12 units horizontal (8.3-percent slope).

Exception: Factory-built grease ducts shall be installed at a slope that is in accordance with the listing and manufacturer's installation instructions.

506.3.7.1 Grease duct reservoirs. Grease duct reservoirs shall:

1. Be constructed as required for the grease duct they serve.
2. Be located on the bottom of the horizontal grease duct or the bottommost section of the grease duct riser.
3. Extend across the full width of thegrease duct and have a length of not less than 12 inches (305 mm).
4. Have a depth of not less than 1 inch (25 mm).
5. Have a bottom that slopes to a drain.
6. Be provided with a cleanout opening constructed in accordance with Section 506.3.8 and installed to provide direct access to the reservoir. The cleanout opening shall be located on a side or on top of the grease duct so as to permit cleaning of the reservoir.
7. Be installed in accordance with the manufacturer's instructions where manufactured devices are utilized.

506.3.8 Grease duct cleanouts and openings. Grease duct cleanouts and openings shall comply with all of the following:

1. Grease ducts shall not have openings except where required for the operation and maintenance of the system.
2. Sections of grease ducts that are inaccessible from the hood or discharge openings shall be provided with cleanout openings spaced not more than 20 feet (6096 mm) apart and not more than 10 feet (3048 mm) from changes in direction greater than 45 degrees (0.79 rad).
3. Cleanouts and openings shall be equipped with tight-fitting doors constructed of steel having a thickness not less than that required for the grease duct.
4. Cleanout doors shall be installed liquid tight.
5. Door assemblies including any frames and gaskets shall be approved for the application and shall not have fasteners that penetrate the grease duct.
6. Gasket and sealing materials shall be rated for not less than 1,500ºF (816ºC).
7. Listed door assemblies shall be installed in accordance with the manufacturer's instructions.

506.3.8.1 Personnel entry. Where a grease duct ~~ductwork~~ is large enough to allow entry of personnel, not less than one*approved* or *listed* opening having dimensions not less than 22 inches by 20 inches (559 mm by 508 mm) shall be provided in the horizontal sections, and in the top of vertical risers. Where such entry is provided, the grease duct and its supports shall be capable of supporting the additional load, and the cleanouts specified in Section 506.3.8 are not required.

506.3.8.2 Cleanouts serving in-line fans. A cleanout shall be provided for both the inlet side and outlet side of an in-line fan except where a grease duct does not connect to the fan. Such cleanouts shall be located within 3 feet (914 mm) of the fan duct connections.

506.3.9 Grease duct horizontal cleanouts. Cleanouts serving horizontal sections of grease ducts shall:

1. Be spaced not more than 20 feet (6096 mm) apart.
2. Be located not more than 10 feet (3048 mm) from changes in direction that are greater than 45 degrees (0.79 rad).

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3. Be located on the bottom only where other locations are not available and shall be provided with internal damming of the opening such that grease will flow past the opening without pooling. Bottom cleanouts and openings shall be approved for the application and installed liquid tight.
4. Not be closer than 1 inch (25 mm) from the edges of thegrease duct.
5. Have opening dimensions of not less than 12 inches by 12 inches (305 mm by 305 mm). Where such dimensions preclude installation, the opening shall be not less than 12 inches (305 mm) on one side and shall be large enough to provide access for cleaning and maintenance.
6. Be located at grease reservoirs.
7. Be located within 3 feet (914 mm) of horizontal discharge fans.

506.3.10 Underground grease duct installation. Underground grease duct installations shall comply with all of the following:

1. Underground grease ducts shall be constructed of steel having a minimum thickness of 0.0575 inch (1.463 mm) (No. 16 gage) and shall be coated to provide protection from corrosion or shall be constructed of stainless steel having a minimum thickness of 0.0450 inch (1.140 mm) (No. 18 gage).
2. The underground grease duct system shall be tested and approved in accordance with Section 506.3.2.5 prior to coating or placement in the ground.
3. The underground grease duct system shall be completely encased in concrete with a minimum thickness of 4 inches (102 mm).
4. Ducts shall slope toward grease reservoirs.
5. A grease reservoir with a cleanout to allow cleaning of the reservoir shall be provided at the base of each verticalgrease duct riser.
6. Cleanouts shall be provided with access to permit cleaning and inspection of thegrease duct in accordance with Section 506.3.
7. Cleanouts in horizontal grease ducts shall be installed on the topside of thegrease duct.
8. Cleanout locations shall be legibly identified at the point of access from the interior space.

506.3.11 Grease duct enclosures. A commercial kitchen grease duct serving a Type I hood that penetrates a ceiling, wall, floor or any concealed space shall be enclosed from the point of penetration to the outlet terminal. In-line exhaust fans not located outdoors shall be enclosed as required for grease ducts. A grease duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the *International Building Code* . The grease duct enclosure shall serve a single grease duct and shall not contain other ducts, piping or wiring systems. Grease duct ~~Duct~~ enclosures shall be a shaft enclosure in accordance with Section 506.3.11.1, a field-applied enclosure assembly in accordance with Section 506.3.11.2 or a factory-built grease duct enclosure assembly in accordance with Section 506.3.11.3. Grease duct ~~Duct~~ enclosures shall have a fire-resistance rating of not less than that of the assembly penetrated and not less than 1 hour. Fire dampers and smoke dampers shall not be installed in grease ducts.

Exception: A grease duct enclosure shall not be required for a grease duct that penetrates only a nonfire-resistance-rated roof/ceiling assembly.

506.3.11.1 Shaft enclosure. Grease ducts constructed in accordance with Section 506.3.1 shall be permitted to be enclosed in accordance with the *International Building Code* requirements for shaft construction. Such grease duct systems and exhaust *equipment* shall have a *clearance* to combustible construction of not less than 18 inches (457 mm), and shall have a*clearance* to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 6 inches (152 mm). Shaft ~~Duct~~ enclosures shall be sealed around the grease duct at the point of penetration and vented to the outside of the building through the use of weather-protected openings.

506.3.11.2 Field-applied grease duct enclosure. Grease ducts constructed in accordance with Section 506.3.1 shall be enclosed by a *listed* and *labeled* field-applied grease duct enclosure material, systems, product, or method of construction specifically evaluated for such purpose in accordance with ASTM E2336. The surface of the grease duct shall be continuously covered on all sides from the point at which the grease duct originates to the outlet terminal. Grease duct ~~Duct~~ penetrations shall be protected with a through-penetration firestop system tested and *listed* in accordance with ASTM E814 or UL 1479 and having a “F” and “T” rating equal to the fire-resistance rating of the assembly being penetrated. The grease duct enclosure and firestop system shall be installed in accordance with the listing and the manufacturer’s instructions. Partial application of a field-applied grease duct enclosure shall not be installed for the sole purpose of reducing

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clearances to combustibles at isolated sections of grease duct. Exposed duct-wrap systems shall be protected where subject to physical damage.

506.3.11.3 Factory-built grease duct enclosure assemblies. Factory-built grease ducts incorporating integral enclosure materials shall be *listed* and *labeled* for use as grease duct enclosure assemblies specifically evaluated for such purpose in accordance with UL 2221. Grease duct ~~Duct~~ penetrations shall be protected with a through-penetration firestop system tested and*listed* in accordance with ASTM E814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. The grease duct enclosure assembly and firestop system shall be installed in accordance with the listing and the manufacturer's instructions.

506.3.12 Grease duct fire-resistive access opening. Where cleanout openings are located ingrease ducts within a fire-resistance-rated enclosure, access openings shall be provided in the enclosure at each cleanout point. Access openings shall be equipped with tight-fitting sliding or hinged doors that are equal in fire-resistive protection to that of the shaft or enclosure. An *approved* sign shall be placed on access opening panels with wording as follows: "ACCESS PANEL. DO NOT OBSTRUCT."

506.3.13 Exhaust outlets ~~serving Type I hoods.~~ Exhaust outlets for grease ducts ~~serving Type I hoods~~ shall conform to the requirements of Sections 506.3.13.1 through 506.3.13.3.

506.5.1.2 In-line fan location. Where enclosed grease duct systems are connected to in-line fans not located outdoors, the fan shall be located in a room or space having the same fire-resistance rating as the grease duct enclosure. Access shall be provided for servicing and cleaning of fan components. Such rooms or spaces shall be ventilated in accordance with the fan manufacturer's installation instructions.

506.5.2 Pollution-control units. The installation of pollution-control units shall be in accordance with all of the following:

1. Pollution-control units shall be *listed* and *labeled* in accordance with UL 8782.
2. Fans serving pollution-control units shall be *listed* and *labeled* in accordance with UL 762.
3. Bracing and supports for pollution-control units shall be of noncombustible material securely attached to the structure and designed to carry gravity and seismic loads within the stress limitations of the *International Building Code*.
4. Pollution-control units located indoors shall be *listed* and *labeled* for such use. Where enclosed grease duct systems, as required by Section 506.3.11, are connected to a pollution control unit, such unit shall be *listed* and *labeled*, in accordance with UL 2221 or ASTM E2336, for location in an enclosure having the same fire-resistance rating as the duct enclosure. Access shall be provided for servicing and cleaning of the unit. The space or enclosure shall be ventilated in accordance with the manufacturer's installation instructions.
5. *Clearances* shall be maintained between the pollution-control unit and combustible material in accordance with the listing.
6. Roof-mounted pollution-control units shall be listed for outdoor installation and shall be mounted not less than 18 inches (457 mm) above the roof.
7. Exhaust outlets for pollution-control units shall be in accordance with Section 506.3.13.
8. An airflow differential pressure control shall be provided to monitor the pressure drop across the filter sections of a pollution-control unit. When the airflow is reduced below the design velocity, the airflow differential pressure control shall activate a visual alarm located in the area where cooking operations occur.
9. Pollution-control units shall be provided with a factory-installed fire suppression system.
10. Service space shall be provided in accordance with the manufacturer's instructions for the pollution control unit and the requirements of Section 306.
11. Wash-down drains shall discharge through a grease interceptor and shall be sized for the flow. Drains shall be sealed with a trap or other approved means to prevent air bypass. Where a trap is utilized it shall have a seal depth that accounts for the system pressurization and evaporation between cleanings.
12. Protection from freezing shall be provided for the water supply and fire suppression systems where such systems are subject to freezing.

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M11308Text Modification

13. Grease duct ~~Duct~~ connections to pollution-control units shall be in accordance with Section 506.3.2.3. Where water splash or carryover can occur in the transition duct as a result of a washing operation, the transition duct shall slope downward toward the cabinet drain pan for a length not less than 18 inches (457 mm). Grease ducts ~~Ducts~~ shall transition to the full size of the unit's inlet and outlet openings.
14. Extra-heavy-duty *appliance* exhaust systems shall not be connected to pollution-control units except where such units are specifically designed and listed for use with solid fuels.
15. Pollution-control units shall be maintained in accordance with the manufacturer's instructions.

506.5.4 Exhaust fan mounting. Upblast fans serving Type I hoods and installed in a vertical or horizontal position shall be hinged, supplied with a flexible weatherproof electrical cable to permit inspection and cleaning and shall be equipped with a means of restraint to limit the swing of the fan on its hinge. The grease duct system ~~ductwork~~ shall extend not less than 18 inches (457 mm) above the roof surface.

507.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues. A Type I or Type II hood shall be installed at or above *appliances* in accordance with Sections 507.2 and 507.3. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. Where a Type I hood is installed, the installation of the entire system, including the hood, grease ducts, exhaust *equipment* and *makeup air* system shall comply with the requirements of Sections 506, 507, 508 and 509.

Exceptions:

1. Factory-built commercial exhaust hoods that are *listed* and *labeled* in accordance with UL 710, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5.
2. Factory-built commercial cooking recirculating systems that are *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual *appliance* shall be considered as occupying not less than 100 square feet (9.3 m^2).
3. Where cooking *appliances* are equipped with integral down-draft exhaust systems and such *appliances* and exhaust systems are *listed* and *labeled* for the application in accordance with NFPA 96, a hood shall not be required at or above them.
4. Smoker ovens with integral exhaust systems, provided that the *appliance* is installed in accordance with the manufacturer's installation instructions, is listed and tested for the application, and complies with Chapter 5.

507.2.4 Type I supports. Type I hoods shall be secured in place by noncombustible supports. Type I hood supports shall be adequate for the applied load of the hood, the unsupported grease duct system ~~ductwork~~, the effluent loading and the possible weight of personnel working in or on the hood.

~~506.3.1.2~~ 508.1.2 Makeup air ducts. *Makeup air* ducts connecting to or within 18 inches (457 mm) of a Type I hood shall be constructed and installed in accordance with Sections 603.1, 603.3, 603.4, 603.9, 603.10 and 603.12. Duct insulation installed within 18 inches (457 mm) of a Type I hood shall be noncombustible or shall be *listed* for the application.

Reason: This proposal addresses four issues for the purpose of clarifying the code. There are no technical substantive changes.

1. **Terminology** – The term "grease ducts" is a common term throughout the IMC, used 60 times throughout Sections 506 and 507. By definition, a "duct serving Type I hoods" is a "grease duct". It is redundant for the code to state "grease ducts serving Type I hoods", because they have no other purpose. This proposal clarifies the code by clearly defining what a "grease duct" is, and by using the term consistently in all the locations that apply to these specific types of ducts. The term "ductwork" is replaced with "grease duct" or "grease duct system", depending on the context of each application, in order to provide clarity.
2. **Grease ducts independent of other exhaust systems –** Section 506.3.5 already requires grease ducts to be independent of all other exhaust systems, except where four conditions are met. This is unnecessary language in the code, because the second sentence of this Section already requires compliance of these grease ducts to Section 506.3.5. This also removes a conflict, because there are no exceptions to Section 506.3.5.
3. **Ducts for cooking appliances equipped with integral down-draft exhaust systems**- Exception 3 of Section 507.1 exempts

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cooking appliances equipped with integral down-draft exhaust systems from the requirements for Type I hoods, but does not identify any requirements for the duct system serving these appliances. This proposal is intended to provide direction on the type of duct system to be used for these installations. NFPA 96 requires the duct system serving these cooking appliances to comply with the requirements for grease ducts.

4. **Makeup air duct construction relocation** - Section 506.3.1.1 is regarding the construction and installation of the makeup air ducts, not grease ducts that are serving Type I hoods. Thus, this requirement belongs in Section 508, not as a sub-section for Section 506.3.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 1-3A.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies/reorganizes the current code requirements. No additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code. As such, there is no impact to the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal is editorial and adds a new definition of Grease Duct for more clarification. (Vote: 11-0)

Final Hearing Results

M35-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

37

M11309		/M36-21			
Date Submitted	03/20/2024	**Section**	506.5.2	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -M.

Summary of Modification

Clarifying language for pollution control units

Rationale

See attached

M11309Text Modification

See attached

Page: 1

Mod11309_TextOfModification.pdf

M11309Text Modification

M36-21

Original Proposal

IMC: 506.5.2

Proponents: Richard Grace, Fairfax County, Virginia, Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA) (richard.grace@fairfaxcounty.gov)

2021 International Mechanical Code

Revise as follows:

506.5.2 Pollution-control units. The installation of pollution-control units shall be in accordance with all of the following:

1. Pollution-control units shall be *listed* and *labeled* in accordance with UL 8782.
2. Fans serving pollution-control units shall be *listed* and *labeled* in accordance with UL 762.
3. Bracing and supports for pollution-control units shall be of noncombustible material securely attached to the structure and designed to carry gravity and seismic loads within the stress limitations of the *International Building Code*.
4. Pollution-control units located indoors shall be *listed* and *labeled* for such use. ~~Where enclosed duct systems, as required by Section 506.3.11, are connected to a pollution control unit, such unit shall be *listed* and *labeled*, in accordance with UL 2221 or ASTM E2336, for location in an enclosure having the same fire-resistance rating as the duct enclosure. Access shall be provided for servicing and cleaning of the unit. The space or enclosure shall be ventilated in accordance with the manufacturer's installation instructions.~~
5. Clearances shall be maintained between the pollution-control unit and combustible material in accordance with the listingWhere enclosed duct systems, as required by Section 506.3.11, are connected to a pollution control unit installed indoors, all of the following shall apply:
   - 5.1. The unit shall be listed and labeled, in accordance with UL 2221 or ASTM E2336, for location in an enclosure.
   - 5.2. The unit shall be installed in a dedicated room or space enclosure, constructed as required by Section 506.3.11, having the same fire-resistance rating as the duct enclosure.
   - 5.3. Access shall be provided for servicing and cleaning of the unit.
   - 5.4. The dedicated room or space enclosure shall be ventilated in accordance with the manufacturer's installation instructions.
6. ~~5~~. *Clearances* shall be maintained between the pollution-control unit and combustible materials in accordance with the listing.
7. ~~6~~. Roof-mounted pollution-control units shall be listed for outdoor installation and shall be mounted not less than 18 inches (457 mm) above the roof.
8. ~~7~~. Exhaust outlets for pollution-control units shall be in accordance with Section 506.3.13.
9. ~~8~~. An airflow differential pressure control shall be provided to monitor the pressure drop across the filter sections of a pollution-control unit. When the airflow is reduced below the design velocity, the airflow differential pressure control shall activate a visual alarm located in the area where cooking operations occur.
10. ~~9~~. Pollution-control units shall be provided with a factory-installed fire suppression system.
11. ~~10~~. Service space shall be provided in accordance with the manufacturer's instructions for the pollution control unit and the requirements of Section 306.
12. ~~11~~. Wash-down drains shall discharge through a grease interceptor and shall be sized for the flow. Drains shall be sealed with a trap or other approved means to prevent air bypass. Where a trap is utilized it shall have a seal depth that accounts for the system pressurization and evaporation between cleanings.

Mod_11309_Text_M36-21.pdf

M11309Text Modification

~~12~~13. Protection from freezing shall be provided for the water supply and fire suppression systems where such systems are subject to freezing.

~~13~~14. Duct connections to pollution-control units shall be in accordance with Section 506.3.2.3. Where water splash or carryover can occur in the transition duct as a result of a washing operation, the transition duct shall slope downward toward the cabinet drain pan for a length not less than 18 inches (457 mm). Ducts shall transition to the full size of the unit's inlet and outlet openings.

~~14~~15. Extra-heavy-duty appliance exhaust systems shall not be connected to pollution-control units except where such units are specifically designed and listed for use with solid fuels.

~~15~~16. Pollution-control units shall be maintained in accordance with the manufacturer's instructions.

Reason: This change serves to clarify the multiple conditions listed in item four.
1. The first sentence in item four was left to remain, however we have no objections to deleting it all together should there be consensus. Reason - item one states that pollution-control units be listed and labeled in accordance to UL 8782. It is our understanding that this standard covers listing and labeling of pollution-control units installed indoors, as well as outdoors, thereby making the first sentence redundant. The remainder of the section was extracted and rewritten.

2. The second sentence as written doesn't express precisely it's intent, and was separated into 5.1 and 5.2. Multiple interpretations can be derived from this sentence. One interpretation is that the PCU has to be listed and labeled for location within an enclosure, but no longer actually requires that an enclosure be provided. Note - "shall be located in a room or space …" was deleted when this language was added. Another interpretation is that the unit itself is listed and labeled through UL 2221 or ASTM E2336 as an enclosure, so an additional enclosure is not required. A third interpretation is that the PCU can be wrapped in a UL 2221 or ASTM E2336 duct wrap system that can serve as the enclosure. We don't believe any of these interpretations are correct, but that the intent was to have the PCU, installed for indoor use, use only the test methods contained within UL 2221 or ASTM E2336 to evaluate the enclosure's effect on the pollution control unit. Subsection b brings back the requirement for the PCU to be installed in a rated room or space. It also adds the distinction of a "dedicated" room or space in order to discourage installation of a PCU in a rated trash room or machinery room or similar room which can create more hazard should there be a fire with in the grease duct system.

3. Subsection 5.3. has not changed.

4. Subsection 5.4. clarified the existing language of "space or enclosure" to be in line with subsection 5.2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code requirements are not proposed to be changed but rather clarified as to the intent of the current code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal is editorial and removes redundant language. (Vote: 11-0)

Final Hearing Results

M36-21 AS

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Mod_11309_Text_M36-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

38

M11310		/M38-21			
Date Submitted	03/20/2024	**Section**	506.3.2.5	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds options for field tests on grease ducts

Rationale

See attached

M11310Text Modification

See attached

Page: 1

Mod11310_TextOfModification.pdf

M11310Text Modification

M38-21

Original Proposal

IMC: 506.3.2.5, 506.3.2.5.3.1 (New), 506.3.2.5.2 (New)

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

506.3.2.5 Grease duct test. A field test shall be performed ~~Prior~~ prior to the use or concealment of any portion of a grease duct system~~, a leakage test shall be performed~~. Ducts shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the ductwork 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 duct system, including the hood-to-duct connection. The duct work 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.

Add new text as follows:

506.3.2.5.3.1 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 1200 psi (8,274 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.

Reason: There are several reasons for this proposal.
Some installers are using LED lamps for testing and such lamps are not rated, in terms of light output, in watts of power but instead in lumens of visible light. LED lamps are more rugged that incandescent lamps and are often preferred for field use.
The ASHRAE 154 (Ventilation for Commercial Cooking Standard) committee is moving away from light testing of grease ducts to simulated duct cleaning using water. Actual duct cleaning in the future should not result in water damage to the structure or to any materials that are used to wrap the duct. Furthermore, if a water leak is present, then almost certainly, grease will be present on the exterior of the duct. Grease on the exterior of a duct presents a fire hazard.

The installer has a choice as to which test to use.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 14.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an alternative for testing grease ducts. Although the alternative for water spray testing would cost more to perform than the light test, the alternative will not be mandated by the code and therefore, the proposal does not add any labor or material to impact the

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cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as submitted because, as opposed to M37-21, it helps give better directive and tools to use with respect to testing of Grease Ducts. (Vote: 7-4)

Public Comments

Public Comment 1

Proponents: Nancy Swearengin, Pikes Peak Regional Building Department, Self requests As Submitted

Commenter's Reason: 506.3.2.5.3.1 Light Test: Allowing the use of LED lights for grease duct testing would be a welcome addition in the field. Most mechanical contractors are only using LED lights on site, this addition to the code would allow inspections to be completed using equipment readily available. LED lights are brighter, more durable and operate at much cooler temperatures reducing the potential for harm to personnel performing the test. Vote to approve.
506.3.2.5.2 Water Spray Test: While the intent to provide more options for grease duct testing is admirable this method should not be allowed. Introducing water onto a job site presents many problems. Often times water is not available, testing is done in the winter with cold temperaturs (below freezing), power to the area is being supplied through temporary wiring and other personnel not involved in the testing are working in the same area. On all job sites any spills are supposed to be immediately cleaned up to prevent slips and falls, intentionally spraying water goes against all normal safety protocols. Testing of grease ducts is often done in sections, not after the entire system has been installed. In the real world of testing, during the rough phase of construction, it would almost impossible to truly simulate duct cleaning as described in this proposal. Vote to disapprove.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
506.3.2.5.3.1 Light Test will not increase the cost of construction.

506.3.2.5.2 Water Spray Test will increase the cost of construction due to the equipment required, cost of water and the time spent for clean up.

Final Hearing Results

M38-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

39

M11311		/M39-21			
Date Submitted	03/20/2024	**Section**	506.5.1	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Updates section to new reference standard UL 705

Rationale

See attached

M11311Text Modification

See attached

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Mod11311_TextOfModification.pdf

M11311Text Modification

M39-21

Original Proposal

IMC: 506.5.1, 506.5.2

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

2021 International Mechanical Code

Revise as follows:

506.5.1 Exhaust fans. Exhaust fan housings serving a Type I hood shall be constructed as required for grease ducts in accordance with Section 506.3.1.1.

Exception: Fans *listed* and *labeled* in accordance with ~~UL 762~~. UL 705

506.5.2 Pollution-control units. The installation of pollution-control units shall be in accordance with all of the following:

1. Pollution-control units shall be *listed* and *labeled* in accordance with UL 8782.
2. Fans serving pollution-control units shall be *listed* and *labeled* in accordance with ~~UL 762~~.UL 705.
3. Bracing and supports for pollution-control units shall be of noncombustible material securely attached to the structure and designed to carry gravity and seismic loads within the stress limitations of the *International Building Code*.
4. Pollution-control units located indoors shall be *listed* and *labeled* for such use. Where enclosed duct systems, as required by Section 506.3.11, are connected to a pollution control unit, such unit shall be *listed* and *labeled*, in accordance with UL 2221 or ASTM E2336, for location in an enclosure having the same fire-resistance rating as the duct enclosure. Access shall be provided for servicing and cleaning of the unit. The space or enclosure shall be ventilated in accordance with the manufacturer's installation instructions.
5. *Clearances* shall be maintained between the pollution-control unit and combustible material in accordance with the listing.
6. Roof-mounted pollution-control units shall be listed for outdoor installation and shall be mounted not less than 18 inches (457 mm) above the roof.
7. Exhaust outlets for pollution-control units shall be in accordance with Section 506.3.13.
8. An airflow differential pressure control shall be provided to monitor the pressure drop across the filter sections of a pollution-control unit. When the airflow is reduced below the design velocity, the airflow differential pressure control shall activate a visual alarm located in the area where cooking operations occur.
9. Pollution-control units shall be provided with a factory-installed fire suppression system.
10. Service space shall be provided in accordance with the manufacturer's instructions for the pollution control unit and the requirements of Section 306.
11. Wash-down drains shall discharge through a grease interceptor and shall be sized for the flow. Drains shall be sealed with a trap or other approved means to prevent air bypass. Where a trap is utilized it shall have a seal depth that accounts for the system pressurization and evaporation between cleanings.
12. Protection from freezing shall be provided for the water supply and fire suppression systems where such systems are subject to freezing.
13. Duct connections to pollution-control units shall be in accordance with Section 506.3.2.3. Where water splash or carryover can occur in the transition duct as a result of a washing operation, the transition duct shall slope downward toward the cabinet drain pan for a length not less than 18 inches (457 mm). Ducts shall transition to the full size of the unit's inlet and outlet openings.

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M11311Text Modification

14. Extra-heavy-duty *appliance* exhaust systems shall not be connected to pollution-control units except where such units are specifically designed and listed for use with solid fuels.
15. Pollution-control units shall be maintained in accordance with the manufacturer's instructions.

Reason: The requirements for UL 762 have been completely incorporated into UL 705. The product certification listings are moving from UL 762 to UL 705.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The product testing and certification requirements have only been relocated, not changed.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was passed as submitted based on the fact that it references the actual standard that equipment is being held to. The requirements for UL 762 have been completely incorporated into UL 705. The product certification listings are moving from UL 762 to UL 705. (Vote: 10-0)

Final Hearing Results

M39-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

40

M11312 | **/M40-21**

Date Submitted	03/20/2024	**Section**	507.1	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review				
Commission Action	Pending Review			Staff Classification	Correlates Directly

Comments

General Comments No

Related Modifications

Summary of Modification

Reorganize section to clarify language

Rationale

See attached

M11312Text Modification

See attached

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Mod11312_TextOfModification.pdf

M11312Text Modification

M40-21

Original Proposal

IMC: 507.1[IFC 606.2], 507.1.1, 507.1.2, 507.4, 507.4.1, 507.4.2, 507.6, 507.6.1, 507.5.1, 507.5.2, 507.5.3, 507.5, 509.1, 507.3, 507.3.4 (New), 507.5.4, 507.5.5

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

507.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues. A Type I hood shall be installed at or above appliances in accordance with Section 507.2. ~~or~~ A Type II hood shall be installed at or above *appliances* in accordance with ~~Sections 507.2 and~~ Section 507.3. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. Where a Type I hood is installed, the installation of the entire system, including the hood, ducts, exhaust *equipment* and *makeup air* system shall comply with the requirements of Sections 506, 507, and 508 ~~and 509~~.

Exceptions:

1. Factory-built commercial exhaust hoods that are *listed* and *labeled* in accordance with UL 710, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.1.6 507.2.3, 507.2.5, 507.2.8, 507.2.10 507.3.1, and 507.3.3~~, 507.4 and 507.5~~.
2. Factory-built commercial cooking recirculating systems that are *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.1.6 507.2.3, 507.2.5, 507.2.8, 507.2.10 507.3.1, and 507.3.3~~, 507.4 and 507.5~~. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual *appliance* shall be considered as occupying not less than 100 square feet (9.3 m^2).
3. Where cooking *appliances* are equipped with integral down-draft exhaust systems and such *appliances* and exhaust systems are *listed* and *labeled* for the application in accordance with NFPA 96, a hood shall not be required at or above them.
4. Smoker ovens with integral exhaust systems, provided that the *appliance* is installed in accordance with the manufacturer's installation instructions, is listed and tested for the application, and complies with Chapter 5.

507.1.1 Operation. Commercial kitchen exhaust hood systems shall operate during the cooking operation. The hood exhaust rate shall comply with either the listing of the hood Section 507.2.10, or ~~shall comply with~~ Section 507.3.4 ~~507.5~~. The exhaust fan serving a Type I hood shall have automatic controls that will activate the fan when any *appliance* that requires such Type I hood is turned on, or a means of interlock shall be provided that will prevent operation of such *appliances* when the exhaust fan is not turned on. Where one or more temperature or radiant energy sensors are used to activate a Type I hood exhaust fan, the fan shall activate not more than 15 minutes after the first *appliance* served by that hood has been turned on. A method of interlock between an exhaust hood system and *appliances* equipped with standing pilot burners shall not cause the pilot burners to be extinguished. A method of interlock between an exhaust hood system and cooking *appliances* shall not involve or depend on any component of a fire-extinguishing system. The net exhaust volumes for hoods shall be permitted to be reduced during part-load cooking conditions, where engineered or *listed* multispeed or variable speed controls automatically operate the exhaust system to maintain capture and removal of cooking effluents as required by this section. Reduced volumes shall not be below that required to maintain capture and removal of effluents from the idle cooking *appliances* that are operating in a standby mode.

507.1.2 Domestic cooking appliances used for commercial purposes. Domestic cooking *appliances* utilized for commercial purposes shall be provided with either Type I or Type II hoods as required for the type of *appliances* and processes in accordance with Sections 507.2 and 507.3. Domestic cooking *appliances* utilized for domestic cooking shall comply with Section 505.

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Mod_11312_Text_M40-21.pdf

M11312Text Modification

~~507.4~~ **507.1.6 Hood size and location.** Hoods shall comply with the overhang, setback and height requirements in accordance with Sections ~~507.4.1~~ 507.6.1 and ~~507.4.2~~ 507.1.6.2, based on the type of hood.

~~507.4.1~~ **507.1.6.1 Canopy size and location.** The inside lower edge of canopy-type Type I and II commercial hoods shall overhang or extend a horizontal distance of not less than 6 inches (152 mm) beyond the edge of the top horizontal surface of the *appliance* on all open sides. The vertical distance between the front lower lip of the hood and such surface shall not exceed 4 feet (1219 mm).

Exception: The hood shall be permitted to be flush with the outer edge of the cooking surface where the hood is closed to the*appliance* side by a noncombustible wall or panel.

~~507.4.2~~ **507.1.6.2 Noncanopy size and location.** Noncanopy-type hoods shall be located not greater than 3 feet (914 mm) above the cooking surface. The edge of the hood shall be set back not greater than 1 foot (305 mm) from the edge of the cooking surface.

~~507.6~~ **507.1.7 Performance test.** A performance test shall be conducted upon completion and before final approval of the installation of a ventilation system serving *commercial cooking appliances*. The test shall verify the rate of exhaust airflow required by Section ~~507.5~~ 507.2.10 or Section 507.3.4, makeup airflow required by Section 508 and proper operation as specified in this chapter. The permit holder shall furnish the necessary test *equipment* and devices required to perform the tests.

~~507.6.1~~ **507.1.7.1 Capture and containment test.** The permit holder shall verify capture and containment performance of the exhaust system. This field test shall be conducted with all *appliances* under the hood at operating temperatures, with all sources of outdoor air providing *makeup air* for the hood operating and with all sources of recirculated air providing conditioning for the space in which the hood is located operating. Capture and containment shall be verified visually by observing smoke or steam produced by actual or simulated cooking, such as that provided by smoke generators. .

~~507.5.1~~ **507.2.2.10.1 Extra-heavy-duty cooking appliances.** The minimum net airflow for hoods~~, as determined by Section 507.1~~, used for *extra-heavy-duty cooking appliances* shall be determined as follows:

Type of Hood	CFM per linear foot of hood
Backshelf/pass-over	Not allowed
Double island canopy (per side)	550
Eyebrow	Not allowed
Single island canopy	700
Wall-mounted canopy	550

For SI: 1 cfm per linear foot = 1.55 L/s per linear meter.

~~507.5.2~~ **507.2.2.10.2 Heavy-duty cooking appliances.** The minimum net airflow for hoods~~, as determined by Section 507.1~~, used for *heavy-duty cooking appliances* shall be determined as follows:

Type of Hood	CFM per linear foot of hood
Backshelf/pass-over	400
Double island canopy (per side)	400
Eyebrow	Not allowed
Single island canopy	600
Wall-mounted canopy	400

For SI: 1 cfm per linear foot = 1.55 L/s per linear meter.

~~507.5.3~~ **507.2.2.10.3 Medium-duty cooking appliances.** The minimum net airflow for hoods~~, as determined by Section 507.1~~, used for *medium-duty cooking appliances* shall be determined as follows:

Type of Hood	CFM per linear foot of hood

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M11312Text Modification

Backshelf/pass-over	300
Double island canopy (per side)	300
Eyebrow	250
Single island canopy	500
Wall-mounted canopy	300

For SI: 1 cfm per linear foot = 1.55 L/s per linear meter.

~~507.5~~ **507.2.10 Capacity of Tye I hoods.** Commercial food service hoods shall exhaust a minimum net quantity of air determined in accordance with this section and Sections ~~507.5.1~~ 507.2.10.1 through ~~507.5.5~~ 507.2.10.4. The net quantity of *exhaust air* shall be calculated by subtracting any airflow supplied directly to a hood cavity from the total exhaust flow rate of a hood. Where any combination of *heavy-duty, medium-duty* and *light-duty cooking appliances* are utilized under a single hood, the exhaust rate required by this section for the heaviest duty *appliance* covered by the hood shall be used for the entire hood.

~~509.1~~ **507.2.11 ~~Where required~~ Fire suppression systems.** ~~*Cooking appliances* required by Section 507.2 to have~~ a Type I hood shall be provided with an *approved* automatic fire suppression system complying with Section 904.12 of the *International Building Code* and the *International Fire Code* .

507.3 Type II hoods. Type II hoods shall be installed above *light-duty cooking appliances* dishwashers and *appliances* that produce heat or moisture and do not produce grease or smoke as a result of the cooking process, except where the heat and moisture loads from such *appliances* are incorporated into the HVAC system design or into the design of a separate removal system. Type II hoods shall be installed above all *appliances* that produce products of combustion and do not produce grease or smoke as a result of the cooking process. Spaces containing cooking *appliances* that do not require Type II hoods shall be provided with exhaust at a rate of 0.70 cfm per square foot (0.00356 $m^3/(s \cdot m^2)$. For the purpose of determining the floor area required to be exhausted, each individual *appliance* that is not required to be installed under a Type II hood shall be considered as occupying not less than 100 square feet (9.3 m^2). Such additional square footage shall be provided with exhaust at a rate of 0.70 cfm per square foot [0.00356 $m^3/(s \cdot m^2)$].

Add new text as follows:

507.3.4 Capacity of Type II hoods. Type II hoods shall exhaust a minimum net quantity of air determined in accordance with this section and Sections 507.3.4.1 through 507.3.4.2. The net quantity of exhaust air shall be calculated by subtracting any airflow supplied directly to a hood cavity from the total exhaust flow rate of a hood.

Revise as follows:

~~507.5.4~~ **507.3.4.1 Light-duty cooking appliances.** The minimum net airflow for hoods~~, as determined by Section 507.1~~, used for *light-duty* cooking *appliances* and food service preparation shall be determined as follows:

Type of Hood	CFM per linear foot of hood
Backshelf/pass-over	250
Double island canopy (per side)	250
Eyebrow	250
Single island canopy	400
Wall-mounted canopy	200

For SI: 1 cfm per linear foot = 1.55 L/s per linear meter.

~~507.5.5~~ **507.3.4.2 Dishwashing appliances.** The minimum net airflow for Type II hoods used for dishwashing *appliances* shall be 100 cfm per linear foot (155 L/s per linear meter) of hood length.

Exception: Dishwashing *appliances* and *equipment* installed in accordance with Section 507.3.

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Mod_11312_Text_M40-21.pdf

M11312Text Modification

Reason: This proposal is intended to reorganize the existing requirements in Section 507 into a logical order of application, while not making any substantive technical changes. There are other proposals from the PMGCAC that are intended to address specific technical issues within the existing requirements. This proposal:

1. Reorganized Section 507 into three main sections –
   Section 507.1 addresses general requirements that apply to both Type I and Type II hoods
   Section 507.2 addresses additional requirements that apply to Type I hoods
   Section 507.3 addresses additional requirements that apply to Type II hoods
2. Added "light duty cooking appliances to Section 507.3 (Type II hoods) because the existing code requirements do not include these appliances specifically under either Type I or Type II hoods.
3. Removed the pointer in the sections containing the prescriptive code calculations to determine hood capacities (originally under Section 507.5), because there is nothing in Section 507.1 regarding the determination.4. Relocated the requirement in Section 509 to Section 507.2 because Section 509 has only one application, which is for use in Type I hoods. This section should be included with all the other requirements for Type I hoods in Section 507.2.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 1-3C.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this proposal only clarifies/reorganizes the current code requirements, no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code. As such, there is no impact to the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal passed as submitted based on the proponent reason statement. This proposal appropriately reorganizes the existing requirements in Section 507 into a logical order of application, while not making any substantive technical changes. (Vote: 11-0)

Final Hearing Results

M40-21 AS

Page: 4

Mod_11312_Text_M40-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

41

M11313		/M41-21			
Date Submitted	03/20/2024	**Section**	507.1	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Moved sentence for clarity for Type II hoods

Rationale

See attached

M11313Text Modification

See attached

Mod11313_TextOfModification.pdf Page: 1

M11313Text Modification

M41-21

Original Proposal

IMC: 507.1[IFC 606.2], 507.3

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

507.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues. A Type I or Type II hood shall be installed at or above *appliances* in accordance with Sections 507.2 and 507.3. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. ~~Where a Type I hood is installed, the installation of the entire system, including the hood, ducts, exhaust *equipment* and *makeup air* system shall comply with the requirements of Sections 506, 507, 508 and 509.~~

Exceptions:

1. Factory-built commercial exhaust hoods that are *listed* and *labeled* in accordance with UL 710, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5.
2. Factory-built commercial cooking recirculating systems that are *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual *appliance* shall be considered as occupying not less than 100 square feet (9.3 m^2).
3. Where cooking *appliances* are equipped with integral down-draft exhaust systems and such *appliances* and exhaust systems are *listed* and *labeled* for the application in accordance with NFPA 96, a hood shall not be required at or above them.
4. Smoker ovens with integral exhaust systems, provided that the *appliance* is installed in accordance with the manufacturer's installation instructions, is listed and tested for the application, and complies with Chapter 5.

507.3 Type II hoods. Type II hoods shall be installed above dishwashers and *appliances* that produce heat or moisture and do not produce grease or smoke as a result of the cooking process, except where the heat and moisture loads from such *appliances* are incorporated into the HVAC system design or into the design of a separate removal system. Type II hoods shall be installed above all *appliances* that produce products of combustion and do not produce grease or smoke as a result of the cooking process. A Type I hood shall be permitted to be installed for a required Type II hood provided that the Type I hood installation complies with all of the requirements for a Type I hood installation. Where such a Type I hood serves only dishwashers and appliances that require a Type II hood, the Type I hood shall not be required to have fire suppression or grease filters. Spaces containing cooking *appliances* that do not require Type II hoods shall be provided with exhaust at a rate of 0.70 cfm per square foot (0.00356 $m^3/(s \cdot m^2)$. For the purpose of determining the floor area required to be exhausted, each individual *appliance* that is not required to be installed under a Type II hood shall be considered as occupying not less than 100 square feet (9.3 m^2). Such additional square footage shall be provided with exhaust at a rate of 0.70 cfm per square foot [0.00356 $m^3/(s \cdot m^2)$].

Reason: The deleted sentence in 507.1 has been widely misunderstood since it was added to the code many cycles ago. There is a market for pre-owned Type I hoods. Commercial kitchen outfitters commonly utilize used kitchen equipment for new and remodeled kitchens. However, where the application only requires a Type II hood, installers have been known to only install Type II ductwork to the hood. Should a reorganization of the kitchen locate an appliance requiring a Type I hood under this hood, the ductwork (usually concealed) would not comply with that required for a Type I hood. This is dangerous. The sentence was reworded for clarity and placed in the Type II hood paragraph where it belongs.

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Mod_11313_Text_M41-21.pdf

M11313Text Modification

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 1-3J.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The allowance (along with the requirements) are in the existing code but were difficult to understand. This proposal only clarifies the code and clarifications do not impact material or labor costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal is not requiring anyone to use a Type I hood in applications requiring a Type II hood, rather it is allowing the Type I hood if it is installed in full compliance with Type I hood installation requirements. (Vote: 11-0)

Final Hearing Results

M41-21 AS

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Mod_11313_Text_M41-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

42

M11314		/M42-21			
Date Submitted	03/20/2024	**Section**	507.1	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

To clarify the three existing exceptions

Rationale

See attached

M11314Text Modification

See attached

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Mod11314_TextOfModification.pdf

M11314Text Modification

M42-21

Original Proposal

IMC: 507.1[IFC 606.2]

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

507.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues. A Type I or Type II hood shall be installed at or above *appliances* in accordance with Sections 507.2 and 507.3. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. Where a Type I hood is installed, the installation of the entire system, including the hood, ducts, exhaust *equipment* and *makeup air* system shall comply with the requirements of Sections 506, 507, 508 and 509.

Exceptions:

1. Factory-built commercial exhaust hoods that are *listed* and *labeled* in accordance with UL 710, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5.
2. A hood shall not be required at or above any of the following:
   2.1. Factory-built commercial cooking recirculating systems ~~that are~~ listed and labeled in accordance with UL 710B, and installed in accordance with Section 304.1~~, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5~~. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual appliance shall be considered as occupying not less than 100 square feet (9.3 m2).

   3 2.2. ~~Where~~ cooking appliances are equipped with integral down-draft exhaust systems and such appliances and exhaust systems are listed and labeled for the application in accordance with NFPA 96~~, a hood shall not be required at or above them~~.

   4 2.3. Smoker ovens with integral exhaust systems~~, provided~~ that ~~the appliance is installed in accordance with the manufacturer's installation instructions, is~~ are listed and tested for the application~~, and complies with Chapter 5~~.

Reason: The purpose of this proposal is to clarify the three existing exceptions for Section 507.1 where because of the particular type of product or cooking operation, a hood is not required above the product or cooking operation.

1. Factory-built commercial cooking recirculating systems listed and labeled in accordance with UL 710B include a hood to capture and contain the cooking effluents, which are processed through a series of filters. The filtered air is returned back into the same space as the system. Thus, these systems are an alternative to all the requirements in Section 507, and do not require an additional hood or any grease duct system. There is no need to identify all the sections that these systems are exempt.
2. The exception for cooking appliances that are equipped with integral down-draft exhaust systems. ovens with integral exhaust systems is revised editorially.
3. The exception for smoker ovens with integral exhaust systems is revised editorially. Section 304.1 of the IMC already requires listed equipment and appliances to be installed in accordance with the manufacturer's installation instructions. The general reference to compliance with Chapter 5 does not provide specific direction. Section 507 provides hood requirements. Section 506 will apply to the grease duct and exhaust equipment that is serving these types of smoker ovens.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee

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Mod_11314_Text_M42-21.pdf

M11314Text Modification

meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 1-3D.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this proposal only clarifies the current code requirements, no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code. As such, there is no impact to the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal passed as submitted based on the reason statement provided by the proponent. This proposal appropriately clarifies the three existing exceptions for Section 507.1 where because of the particular type of product or cooking operation, a hood is not required above the product or cooking operation. (Vote: 11-0)

Final Hearing Results

M42-21 AS

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Mod_11314_Text_M42-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

43

M11315		/M43-21			
Date Submitted	03/20/2024	**Section**	507.1	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds manufacturer's installation instructions to requirements for venting

Rationale

See attached

M11315Text Modification

See attached

Page: 1

Mod11315_TextOfModification.pdf

M11315Text Modification

M43-21

Original Proposal

IMC: 507.1[IFC 606.2]

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

507.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues. A Type I or Type II hood shall be installed at or above *appliances* in accordance with Sections 507.2 and 507.3. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. Where a Type I hood is installed, the installation of the entire system, including the hood, ducts, exhaust *equipment* and *makeup air* system shall comply with the requirements of Sections 506, 507, 508 and 509.

Exceptions:

1. Factory-built commercial exhaust hoods that are *listed* and *labeled* in accordance with UL 710, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5.
2. Factory-built commercial cooking recirculating systems that are *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual *appliance* shall be considered as occupying not less than 100 square feet (9.3 m^2).
3. Where cooking *appliances* are equipped with integral down-draft exhaust systems and such *appliances* and exhaust systems are *listed* and *labeled* for the application in accordance with NFPA 96, a hood shall not be required at or above them.
4. Smoker ovens with integral exhaust systems, provided that the *appliance* is installed in accordance with the manufacturer's installation instructions, is listed and tested for the application, and complies with Chapter 5.
5. Ovens listed and labeled for use with wood fuel in accordance with UL 2162 and vented in accordance with the manufacturer's instructions.

Reason: Some solid fuel-fired ovens that are listed and labeled in accordance with UL 2162 have integral venting/exhaust combination. The manufacturer's installation instructions for these types of cooking equipment provide specifics on what venting and exhaust systems are to be used, and that they are to be vented directly outside. Typically what is used is a factory built chimney that has been tested and listed to both UL 103 (factory built chimneys) and UL 1978 (grease ducts). A hood above these types of oven installations would be redundant.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 1-3E.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

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Mod_11315_Text_M43-21.pdf

M11315Text Modification

Because this proposal only provides an alternative to the current code requirements, there is no additional labor, materials, equipment, appliances or devices mandated beyond what is currently required by the code. Alternatives generally lower the cost of construction. As such, there is no impact to the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Passed as submitted because the committee agreed that the UL standard is appropriate to allow the exception for ovens. (Vote: 11-0)

Final Hearing Results

M43-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

44

M11316		/M44-21			
Date Submitted	03/20/2024	**Section**	507.1	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds exception for electric cooking appliance

Rationale

See attached

M11316Text Modification

See attached

Page: 1

Mod11316_TextOfModification.pdf

M11316Text Modification

M44-21

Original Proposal

IMC: 507.1[IFC 606.2], 507.2

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

507.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues. A Type I or Type II hood shall be installed at or above *appliances* in accordance with Sections 507.2 and 507.3. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. Where a Type I hood is installed, the installation of the entire system, including the hood, ducts, exhaust *equipment* and *makeup air* system shall comply with the requirements of Sections 506, 507, 508 and 509.

Exceptions:

1. Factory-built commercial exhaust hoods that are *listed* and *labeled* in accordance with UL 710, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5.
2. Factory-built commercial cooking recirculating systems that are *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual *appliance* shall be considered as occupying not less than 100 square feet (9.3 m^2).
3. Where cooking *appliances* are equipped with integral down-draft exhaust systems and such *appliances* and exhaust systems are *listed* and *labeled* for the application in accordance with NFPA 96, a hood shall not be required at or above them.
4. Smoker ovens with integral exhaust systems, provided that the *appliance* is installed in accordance with the manufacturer's installation instructions, is listed and tested for the application, and complies with Chapter 5.
5. An electric cooking appliance listed and labeled in accordance with UL 197 for reduced grease emissions.

507.2 Type I hoods. Type I hoods shall be installed where cooking *appliances* produce grease or smoke as a result of the cooking process. Type I hoods shall be installed over *medium-duty, heavy-duty* and *extra-heavy-duty cooking appliances*.

~~**Exception:** A Type I hood shall not be required for an electric cooking *appliance* where an approved testing agency provides documentation that the *appliance* effluent contains 5 mg/m^3 or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m^3/s) in accordance with UL 710B.~~

Reason: The exception in Section 507.2 for electric cooking appliances that the effluent emitted from the contains 5 mg/m3 or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m3/s) in accordance with UL 710B should be relocated as an additional exception to Section 507.1. A hood above these types of appliances would be redundant. The requirements for “reduced grease emissions” evaluation and testing for cooking appliances have been moved to an appendix of UL 197, which contains specific details on how to run these tests with this criteria, as well as providing product marking requirements. Providing documentation of a test performed of a particular product does not demonstrate that the specific product installed at the jobsite is constructed in the same manner with the same materials as the sample that was originally tested, whereas a listing (certification) mark does.
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee

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Mod_11316_Text_M44-21.pdf

meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 1-3F.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this proposal only provides an alternative to the current code requirements, there is no additional labor, materials, equipment, appliances or devices mandated beyond what is currently required by the code. Alternatives generally lower the cost of construction. As such, there is no impact to the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal appropriately aligns the code requirements while acknowledging the relocation of test methods within the body of UL197. (Vote: 11-0)

Final Hearing Results

M44-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

45

M11317		/M45-21			
Date Submitted	03/20/2024	**Section**	507.1	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language for commercial electric dishwashers

Rationale

See attached

M11317Text Modification

See attached

Page: 1

Mod11317_TextOfModification.pdf

M11317Text Modification

M45-21

Original Proposal

IMC: 507.1[IFC 606.2], UL Chapter 15 (New)

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

507.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues. A Type I or Type II hood shall be installed at or above *appliances* in accordance with Sections 507.2 and 507.3. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. Where a Type I hood is installed, the installation of the entire system, including the hood, ducts, exhaust *equipment* and *makeup air* system shall comply with the requirements of Sections 506, 507, 508 and 509.

Exceptions:

1. Factory-built commercial exhaust hoods that are *listed* and *labeled* in accordance with UL 710, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5.
2. Factory-built commercial cooking recirculating systems that are *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual *appliance* shall be considered as occupying not less than 100 square feet (9.3 m^2).
3. Where cooking *appliances* are equipped with integral down-draft exhaust systems and such *appliances* and exhaust systems are *listed* and *labeled* for the application in accordance with NFPA 96, a hood shall not be required at or above them.
4. Smoker ovens with integral exhaust systems, provided that the *appliance* is installed in accordance with the manufacturer's installation instructions, is listed and tested for the application, and complies with Chapter 5.
5. Commercial electric dishwashers incorporating a self-contained condensing system listed and labeled in accordance with UL 921.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

921-20 Standard for Commercial Dishwashers

Reason: UL 921 includes requirements for evaluating and certifying self-contained condensing systems that do not require a Type II hood above. A hood above a UL 921 dishwasher would be redundant.
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 1-3G.

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M11317Text Modification

Cost Impact: The code change proposal will decrease the cost of construction
This proposal provides an alternative to providing Type II hoods for specific appliances. Not having to provide and install a Type II hood for UL 921 dishwashers saves significant material costs and labor costs for Type II hoods.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Appropriately adds an existing exception with commercial dishwasher listed and incorporating a self-contained condensing system. (Vote: 11-0)

Final Hearing Results

M45-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

46

M11318	/M46-21				
Date Submitted	03/20/2024	**Section**	507.1	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language specific to heat and moisture loads from dishwashers

Rationale

See attached

M11318Text Modification

See attached

Page: 1

Mod11318_TextOfModification.pdf

M11318Text Modification

M46-21

Original Proposal

IMC: 507.1[IFC 606.2], 507.3, 507.5.5

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

507.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues. A Type I or Type II hood shall be installed at or above *appliances* in accordance with Sections 507.2 and 507.3. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. Where a Type I hood is installed, the installation of the entire system, including the hood, ducts, exhaust *equipment* and *makeup air* system shall comply with the requirements of Sections 506, 507, 508 and 509.

Exceptions:

1. Factory-built commercial exhaust hoods that are *listed* and *labeled* in accordance with UL 710, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5.
2. Factory-built commercial cooking recirculating systems that are *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual *appliance* shall be considered as occupying not less than 100 square feet (9.3 m^2).
3. Where cooking *appliances* are equipped with integral down-draft exhaust systems and such *appliances* and exhaust systems are *listed* and *labeled* for the application in accordance with NFPA 96, a hood shall not be required at or above them.
4. Smoker ovens with integral exhaust systems, provided that the *appliance* is installed in accordance with the manufacturer's installation instructions, is listed and tested for the application, and complies with Chapter 5.
5. Where the heat and moisture loads from dishwashers and appliances that produce heat or moisture and do not produce grease or smoke as a result of the cooking process are incorporated into the HVAC system design or into the design of a separate removal system. Spaces containing such cooking appliances that do not require Type II hoods shall be provided with exhaust at a rate of 0.70 cfm per square foot (0.00356 m3/(s • m2). For the purpose of determining the floor area required to be exhausted, each individual appliance that is not required to be installed under a Type II hood shall be considered as occupying not less than 100 square feet (9.3 m2). Such additional square footage shall be provided with exhaust at a rate of 0.70 cfm per square foot [0.00356 m3/(s • m2)].

507.3 Type II hoods. Type II hoods shall be installed above dishwashers and *appliances* that produce heat or moisture and do not produce grease or smoke as a result of the cooking process~~, except where the heat and moisture loads from such *appliances* are incorporated into the HVAC system design or into the design of a separate removal system~~. Type II hoods shall be installed above all *appliances* that produce products of combustion and do not produce grease or smoke as a result of the cooking process. ~~Spaces containing cooking *appliances* that do not require Type II hoods shall be provided with exhaust at a rate of 0.70 cfm per square foot (0.00356 $m^3/(s \cdot m^2)$. For the purpose of determining the floor area required to be exhausted, each individual *appliance* that is not required to be installed under a Type II hood shall be considered as occupying not less than 100 square feet (9.3 m^2). Such additional square footage shall be provided with exhaust at a rate of 0.70 cfm per square foot [0.00356 $m^3/(s \cdot m^2)$].~~

507.5.5 Dishwashing appliances. The minimum net airflow for Type II hoods used for dishwashing *appliances* shall be 100 cfm per linear

M11318Text Modification

foot (155 L/s per linear meter) of hood length.

Exception: ~~Dishwashing *appliances* and *equipment* installed in accordance with Section 507.3~~.

Reason: Where the heat and moisture loads from dishwashers and appliances that produce heat or moisture and do not produce grease or smoke as a result of the cooking process are incorporated into the HVAC system, a Type II hood above is not needed. This "exception", that is currently within Section 507.3, should be included with all the other exceptions for not requiring a hood in Section 507.1.
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 1-3H.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides an alternative to the provision of Type II hoods for specific appliances. Not having to install a Type II hood will significantly lower material and labor costs however increasing the exhaust rate for some spaces could require slightly larger ventilation equipment or ductwork sizes in some situations. The larger ventilation equipment and ductwork might slightly increase costs but not as much as the cost savings for deletion of the hoods.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal passes as submitted based on the proponent reason statement. Where the heat and moisture loads from dishwashers and appliances that produce heat or moisture and do not produce grease or smoke as a result of the cooking process are incorporated into the HVAC system, a Type II hood above is not needed. (Vote: 11-0)

Final Hearing Results

M46-21 AS

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Mod_11318_Text_M46-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

47

M11319		/M47-21			
Date Submitted	03/20/2024	**Section**	507.1.3	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds requirements for fuel-burning requirements and draft hoods

Rationale

See attached

M11319Text Modification

See attached

Mod11319_TextOfModification.pdf Page: 1

M11319Text Modification

M47-21

Original Proposal

IMC: 507.1.3

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Mechanical Code

Delete and substitute as follows:

~~**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.~~

507.1.3 Fuel-burning appliances. 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 or the International Fuel Gas code.

Reason: It's an unfair competition for a draft hood appliance or an appliance with an open atmospheric burner to be located in a space with exhaust systems as large as that associated with commercial kitchens. It doesn't take much to overcome a gravity vent system. As little as 5 pascals can affect a vent system. Kitchens do not stay balanced very long as many things affect the dynamics over time often leading to negative pressures that can that can affect the gravity system. This can be a dangerous situation leading to combustion products spilling into the space. This language is the "provisions" the original section speaks of and will eliminate the subjectivity of this section by replacing it with mandatory language.

Cost Impact: The code change proposal will increase the cost of construction
This change could possibly increase cost if combustion air must be obtained from the outdoors where it might not have under the existing language.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has passed as submitted. It's an unfair competition for a draft hood appliance or an appliance with an open atmospheric burner to be located in a space with exhaust systems as large as that associated with commercial kitchens. Kitchens do not stay balanced very long as many things affect the dynamics over time often leading to negative pressures that can that can affect the gravity system. This can be a dangerous situation leading to combustion products spilling into the space. This language is the "provisions" the original section speaks of and will eliminate the subjectivity of this section by replacing it with mandatory language. (Vote:11-0)

Final Hearing Results

M47-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

48

M11321 | **/M49-21**

Date Submitted	03/22/2024	**Section**	508.1.1	**Proponent**	Mo Madani
Chapter	5	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review				
Commission Action	Pending Review			Staff Classification	Correlates Directly

Comments

General Comments No

Related Modifications

Summary of Modification

Provides new language for Makeup Air Temperature section

Rationale

See attached

M11321Text Modification

See attached

Mod11321_TextOfModification.pdf Page: 1

M11321Text Modification

M49-21

Original Proposal

IMC: 508.1.1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Delete and substitute as follows:

~~**508.1.1 Makeup air temperature.** The temperature differential between *makeup air* and the air in the conditioned space shall not exceed 10ºF (6ºC) except where the added heating and cooling loads of the *makeup air* do not exceed the capacity of the HVAC system~~.

508.1.1 Makeup air temperature. HVAC systems that serve the kitchen space shall have the additional capacity necessary for the latent and sensible loads that are introduced by the makeup air supplied to the kitchen space, or the makeup air shall be conditioned by dedicated systems such that the difference in temperature between the makeup air supplied to the kitchen space and the design setpoint temperature in the kitchen space is not greater than 10 degrees F (6 degrees C).

Exception: Makeup air supplied to a compensating hood shall not not be required to be conditioned.

Reason: This rewrite of the section intends to clarify the intent which was to either design the HVAC system for the kitchen to handle makeup air loads, or to have a dedicated makeup air conditioning system. It is also clarified that the 10 degree differential applies to the thermostat setpoint temperature in the kitchen, not the temperature of the kitchen as it happens to be at any given point in the day. If the HVAC system can handle the loads from makeup air, then the kitchen space temperature will reflect the thermostat setpoint. If a dedicated makeup air system is installed, then it must adhere to the delta 10 degree criterion. The exception recognizes that makeup air fed directly to the integral makeup air plenum of a hood or directly into the mouth of a hood need not be conditioned, since it might not affect the comfort of the employees.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 5.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal passed as submitted based on the proponent reason statement which intends to clarify the intent which was to either design the HVAC system for the kitchen to handle makeup air loads, or to have a dedicated makeup air conditioning system. It is also clarified that the 10 degree differential applies to the thermostat setpoint temperature in the kitchen, not the temperature of the kitchen as it happens to be at any given point in the day. If the HVAC system can handle the loads from makeup air, then the kitchen space temperature will reflect the thermostat setpoint. If a dedicated makeup air system is installed, then it must adhere to the delta 10 degree criterion. The exception recognizes that

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M11321Text Modification

makeup air fed directly to the integral makeup air plenum of a hood or directly into the mouth of a hood need not be conditioned, since it might not affect the comfort of the employees. (Vote: 11-0)

Final Hearing Results

M49-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

49

M11322 | **/M51-21**

Date Submitted	03/22/2024	**Section**	601.5	**Proponent**	Mo Madani
Chapter	6	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC-M.

Summary of Modification

Clarifies language for return air openings

Rationale

See attached

M11322Text Modification

See attached

Page: 1

Mod11322_TextOfModification.pdf

M11322Text Modification

M51-21

Original Proposal

IMC: 601.5

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2021 International Mechanical Code

Revise as follows:

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

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
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.
3. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
4. Return and transfer openings shall be sized in accordance with the *appliance* or *equipment* manufacturer's installation instructions, ACCA Manual D or the design of the registered design professional.
5. Return air taken from one *dwelling unit* shall not be discharged into another *dwelling unit*.
6. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
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 for heating or air-conditioning systems shall not be taken from indoor swimming pool enclosures and associated deck areas.

   Exceptions:

   1. Where the air from such spaces is dehumidified in accordance with Section 403.2.1, Item 2.
   2. Dedicated HVAC systems serving only such spaces.

Exceptions:

1. Taking return air for heating or air-conditioning systems from a kitchen is not prohibited where such return air openings serve the kitchen and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Taking return air for heating or air-conditioning systems from a kitchen is not prohibited in a *dwelling unit* where the kitchen and living spaces are in a single room and the cooking *appliance* is electric and located not less than 5 feet (1524 mm) in any direction from the return air intake opening.
3. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

Reason: The IMC defines return air as "Air removed from an approved conditioned space or location and recirculated or exhausted." The IMC defines exhaust air as "Air being removed from any space, appliance or piece of equipment and conveyed directly to the atmosphere by means of openings or ducts."

Based on these definitions, exhaust air may be considered as a subset of return air.

Section 601.5 establishes requirements for return air for "heating, ventilation, and air-conditioning systems" that are clearly not meant to apply to exhaust air from ventilation systems. For example, 601.5.7 requires that "Return air shall not be taken from a closet, bathroom,

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toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic." Clearly, this section is not meant to prohibit taking exhaust air from kitchens, garages, bathrooms, etc., since exhaust of these spaces is required elsewhere in the code. This proposal is meant to clarify the intent of this section without changing its meaning.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is editorial and therefore will not increase or decrease the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal clarifies the intent of this section without changing its meaning. Section 601.5 establishes requirements for return air for "heating, ventilation, and air-conditioning systems" that shall not be taken from a closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic. (Vote: 6-5)

Final Hearing Results

M51-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

50

M11323		/M53-21			
Date Submitted	03/22/2024	**Section**	601.5	**Proponent**	Mo Madani
Chapter	6	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -M.

Summary of Modification

Adds clarifying language to return air openings section

Rationale

See attached

M11323Text Modification

See attached

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Mod11323_TextOfModification.pdf

M11323Text Modification

M53-21

Original Proposal

IMC: 601.5

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com)

2021 International Mechanical Code

Revise as follows:

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

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. Return air shall not be taken from a hazardous or insanitary location or a refrigeration room as defined in this code.
3. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
4. Return and transfer openings shall be sized in accordance with the *appliance* or *equipment* manufacturer's installation instructions, ACCA Manual D or the design of the registered design professional.
5. Return air taken from one *dwelling unit* shall not be discharged into another *dwelling unit*.
6. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
7. Return air 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 ft^2 (2.8 m^2) shall require the closet door be undercut not less than $1^1/_2$ inches (38 mm), or be either a louvered door or include an air transfer grille both having a net free area of not less than 30 in^2 (19355 m^2)

~~8~~ 10. Return air shall not be taken from indoor swimming pool enclosures and associated deck areas.

Exceptions:

1. Where the air from such spaces is dehumidified in accordance with Section 403.2.1, Item 2.
2. Dedicated HVAC systems serving only such spaces.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Taking return air from a kitchen is not prohibited in a *dwelling unit* where the kitchen and living spaces are in a single room and the cooking *appliance* is electric and located not less than 5 feet (1524 mm) in any direction from the return air intake opening.
3. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

Reason: Mold growth is now common in closets due to higher interior moisture loads and less heat gain in closets. Allowing a limited amount of return air provides a means of controlling closet moisture levels. Providing supply air to a closet exacerbates the problem by making closet surfaces colder.
This is one of six separate proposed changes related to controlling mold in closets, bathrooms and mechanical room. The six changes fix

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M11323Text Modification

problems caused by an increase in code thermal resistance over the past several code cycles.

For a more detailed explanation see:

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this*code change is not a requirement. It gives builders an option to solve and avoid problems.*

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal has passed as submitted based on the published proponent reason statement and the fact that these return openings are being sized so as to not produce negative pressure in the closet. (Vote: 10-1)

Final Hearing Results

M53-21 AS

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

51

M11324		/M55-21			
Date Submitted	03/22/2024	**Section**	602.1	**Proponent**	Mo Madani
Chapter	6	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

To provide clarity as to what various materials are permitted within a plenum under specific conditions

Rationale

See attached

M11324Text Modification

See attached

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Mod11324_TextOfModification.pdf

M11324Text Modification

M55-21

Original Proposal

IMC: 602.1, 602.1.1 (New), 602.1.2 (New), 602.1.3 (New), 602.2, 602.3, 602.2.1.4, 602.2.1.4.1, 602.2.1.4.2, 602.2.1, 602.2.1.1, 602.2.1.2, ~~602.2.1.3~~ , 602.2.1.5, 602.2.1.6, 602.2.1.7, 602.2.1.8, 602.3.10 (New)

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

~~602.1~~ General. Supply, return, exhaust, relief and ventilation air *plenums* shall be in accordance with this section. ~~limited to uninhabited crawl spaces,areas above a ceiling or below the floor, attic spaces, mechanical *equipment* rooms and the framing cavities addressed in Section 602.3. *Plenums* shall be limited to one fire area. Air systems shall be ducted from the boundary of the fire area served directly to the air-handling *equipment*.~~ Fuel-fired *appliances* shall not be installed within a *plenum*.

Add new text as follows:

602.1.1 Locations limited. Plenums shall be limited to uninhabited crawl spaces, above a ceiling or below the floor, attic spaces, mechanical equipment rooms and the framing cavities addressed in Section 602.2.

602.1.2 Limited to a fire area. . Plenums shall be limited to one fire area. Air systems shall be ducted from the boundary of the fire area served directly to the air-handling equipment.

602.1.3 Fuel fired appliances. . Fuel-fired appliances shall not be installed within a plenum.

Revise as follows:

602.2 Construction of plenums.. *Plenum* enclosure construction materials that are exposed to the airflow shall comply with the requirements of Section 703.3 of the International Building Code or such materials shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E84 or UL 723.The use of gypsum boards to form *plenums* shall be limited to systems where the air temperatures do not exceed 125ºF (52ºC) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature. Supply air *plenums* formed by gypsum boards shall not be incorporated in air-handling systems utilizing*direct evaporative cooling* systems.

~~602.3~~602.2.1 Stud cavity and joist space plenums. Stud wall cavities and the spaces between solid floor joists to be utilized as air *plenums* shall comply with the following conditions:

1. Such cavities or spaces shall not be utilized as a*plenum* for supply air.
2. Such cavities or spaces shall not be part of a required fire-resistance-rated assembly.
3. Stud wall cavities shall not convey air from more than one floor level.
4. Stud wall cavities and joist space *plenums* shall comply with the floor penetration protection requirements of the *International Building Code*.
5. Stud wall cavities and joist space *plenums* shall be isolated from adjacent concealed spaces by *approved* fireblocking as required in the *International Building Code*.
6. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air*plenums*.

Delete without substitution:

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M11324Text Modification

~~**602.2.1.4 Electrical equipment in plenums.** Electrical *equipment* exposed within a *plenum* shall comply with Sections 602.2.1.4.1 and 602.2.1.4.2.~~

~~**602.2.1.4.1 Equipment in metallic enclosures.** Electrical *equipment* with metallic enclosures exposed within a *plenum* shall be permitted.~~

~~**602.2.1.4.2 Equipment in combustible enclosures.** Electrical *equipment* with combustible enclosures exposed within a *plenum* shall be *listed* and *labeled* for such use in accordance with UL 2043.~~

Revise as follows:

~~**602.2.1**~~ **602.3 Materials within plenums.** ~~Except as required by Sections 602.2.1.1 through 602.2.1.8, m~~Materials within *plenums* shall be noncombustible or shall be in compliance with the applicable requirements in Sections 602.3.1 through 602.3.10. ~~*listed* and *labeled* as having a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E84 or UL 723.~~

Exception~~s~~: This section shall not apply to the following:

1. ~~Rigid and flexible ducts and connectors shall conform to Section 603.~~Materials exposed within plenums in one- and two-family dwellings.
2. ~~Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.~~ Combustible materials fully enclosed within one of the following:
3. ~~This section shall not apply to materials exposed within *plenums* in one- and two-family dwellings.~~
4. ~~This section shall not apply to smoke detectors.~~
5. ~~Combustible materials fully enclosed within one of the following:~~
   5.1. 2.1 Continuous noncombustible raceways or enclosures.

   5.2. 2.2 Approved gypsum board assemblies.

   5.3. 2.3 Materials *listed* and *labeled* for installation within a *plenum* and listed for the application.

6.3. Materials in Group H, Division 5 fabrication areas and the areas above and below the fabrication area that share a common air recirculation path with the fabrication area.

~~**602.2.1.1**~~ **602.3.3 Wiring.** Combustible electrical wires and cables and optical fiber cables exposed within a *plenum* shall be *listed* and *labeled* as having a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm) when tested in accordance with NFPA 262, or shall be installed in metal raceways or metal sheathed cable. Combustible optical fiber and communication raceways exposed within a *plenum* shall be *listed* and *labeled* as having a peak optical density not greater than 0.5, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm) when tested in accordance with UL 2024. Only plenum-rated wires and cables shall be installed in plenum-rated raceways.

~~**602.2.1.2**~~ **602.3.4 Fire sprinkler piping.** Plastic fire sprinkler piping exposed within a *plenum* shall be used only in wet pipe systems and shall be *listed* and *labeled* as having a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm) when tested in accordance with UL 1887.

~~**602.2.1.3**~~ **602.3.5 Pneumatic tubing.** Combustible pneumatic tubing exposed within a *plenum* shall be *listed* and *labeled* as having a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm) when tested in accordance with UL 1820.

~~**602.2.1.5**~~ **602.3.6 Discrete electrical, plumbing and mechanical products in plenums.**Where discrete electrical, plumbing and mechanical products and appurtenances are located in a *plenum* and have exposed combustible material, they shall be*listed* and *labeled* for such use in accordance with UL 2043.
Exception: Electrical equipment with metallic enclosures exposed within a plenum.

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M11324Text Modification

~~602.2.1.6~~ **602.3.7 Foam plastic in plenums as interior finish or interior trim.** Foam plastic in *plenums* used as interior wall or ceiling finish or interior trim shall exhibit a flame spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, and shall be tested in accordance with NFPA 286 and meet the acceptance criteria of Section 803.1.2 of the International Building Code. As an alternative to testing to NFPA 286, the foam plastic shall be approved based on tests conducted in accordance with Section 2603.9 of the International Building Code.

Exceptions:

1. Foam plastic in *plenums* used as interior wall or ceiling finish or interior trim shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the *plenum* by a thermal barrier complying with Section 2603.4 of the International Building Code.
2. Foam plastic in *plenums* used as interior wall or ceiling finish or interior trim, shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the *plenum* by corrosion-resistant steel having a base metal thickness of not less than 0.0160 inch (0.4 mm).
3. Foam plastic in *plenums* used as interior wall or ceiling finish or interior trim, shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the *plenum* by not less than a 1-inch (25 mm) thickness of masonry or concrete.

~~602.2.1.7~~ 602.3.8 **Plastic plumbing piping and tubing.** Plastic piping and tubing used in plumbing systems shall be *listed* and *labeled* as having a flame spread index not greater than 25 and a smoke-developed index not greater than 50 when tested in accordance with ASTM E84 or UL 723.

Exception: Plastic water distribution piping and tubing *listed* and *labeled* in accordance with UL 2846 as having a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm), and installed in accordance with its listing.

~~602.2.1.8~~ 602.3.9 **Pipe and duct insulation within plenums.** Pipe and duct insulation contained within *plenums*, including insulation adhesives, shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Pipe and duct insulation 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). Pipe and duct insulation shall be *listed* and *labeled*. Pipe and duct insulation shall not be used to reduce the maximum flame spread and smoke-developed indices except where the pipe or duct and its related insulation, coatings, and adhesives are tested as a composite assembly in accordance with Section ~~602.2.1.7~~ 602.3.9.

Add new text as follows:

602.3.10 Other combustible materials. Other combustible materials not covered by Section 602.3 shall be listed and labeled as having a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E84 or UL 723.

Reason: The intent of this code proposal is to provide clarity as to what various materials are permitted within a plenum under specific conditions. The current Sections 602.2 and 602.3 are requirements for the constructing the plenum, and thus the current Section 602.3 should be a subsection of Section 602.2. Section 602.2.1 and its subsections are not for the construction of the plenum, but what materials are permitted within the plenum, and thus should not be a subsection of Section 602.2.
Section 602 is reformatted to provide clarity as to four aspects regarding plenums –

- 602.1 – General requirements – provides the charging language for plenums, with the scope and limitations of where plenums are permitted to be used.
- 602.2 – Construction of the plenum – provides the requirements for the construction of the plenum.
- 602.3 – Materials within the plenum – provides the requirements for materials that are permitted to be within the plenum, but are not required for the plenum to function, or are part of the construction of the plenum

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M11324Text Modification

"Construction" of the plenums is currently covered in both Section 602.2 (but not its subsections) and 602.3. Thus, the current Section 602.3 should be a subsection of Section 602.2. Section 602.2.1 and its subsections are not for the construction of the plenum, but what materials are permitted within the plenum, and thus should not be a subsection of Section 602.2.

"Materials permitted within" (Section 602.2.1 and following subsections) is currently written as several exceptions for a number of different materials. Reorganizing this section provides a straightforward list of requirements for specific materials, while retaining "the effect of applying" all the original requirements.

The following is the outline of proposed reorganization for the materials permitted within the plenum:

Section does not apply to (original exceptions):

1. Materials in one and two family dwellings
1. Combustible materials fully enclosed
1. Materials in Group H, Division 5

Section does apply to (combustible materials that are permitted within the plenum, under specific conditions):

1. Ducts, connectors, linings, and tapes – IMC Sections 603 and 604
1. Smoke detectors and sampling tubes – UL 268
1. Wiring – NFPA 262 or UL 2024
1. Nonmetallic sprinkler pipe – UL 1887
1. Pneumatic tubing – UL 1820
1. Discrete electrical, plumbing, and mechanical devices – UL 2043
1. Foam plastic insulation – ASTM E84/UL 723 or NFPA 286
1. Plastic plumbing pipe – ASTM E84/UL 723 or UL 2846
1. Pipe and duct insulation – ASTM E84/UL 723 with ASTM E2231
1. Any other combustible materials – ASTM E84/UL 723

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is purely editorial for the purposes of clarifying existing requirements by better organizing the text. Material or labor to comply with the requirements are not different and as such, there is no to impact on the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
Add new text as follows:

602.3.1 Ducts, connectors, duct coverings, linings, and tape. .
Rigid and flexible ducts and connectors shall conform to Section 603. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.

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M11324Text Modification

602.3.2 Smoke detectors. .
Smoke detectors shall be listed and labeled.

Committee Reason: The committee agreed that the proposed provides clarityas to what various materials are permitted within a plenum under specific conditions. The current Sections 602.2 and 602.3 are requirements for the constructing the plenum, and thus the current Section 602.3 should be a subsection of Section 602.2. Section 602.2.1 and its subsections are not for the construction of the plenum, but what materials are permitted within the plenum, and thus should not be a subsection of Section 602.2. The modification brings in language that was originally intended to be part of the submittal. (Vote: 11-0)

Final Hearing Results

M55-21 AM

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

52

M11325		/M60-21			
Date Submitted	03/22/2024	**Section**	604.3	**Proponent**	Mo Madani
Chapter	6	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language for duct-linings to section

Rationale

See attached

M11325Text Modification

See attached

Page: 1

Mod11325_TextOfModification.pdf

M11325Text Modification

M60-21

Original Proposal

IMC: 604.3

Proponents: Cory Wasniewski, Roberts Environmental Control Corp, Roberts Environmental Control Corp (CJW@RobertsHVAC.com)

2021 International Mechanical Code

Revise as follows:

604.3 Coverings and linings. Duct coverings ~~and linings~~, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than ~~50~~450, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. ~~Duct coverings and linings 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*.

Duct linings, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than 50, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Duct coverings and linings 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). Linings shall be *listed* and *labeled*.

~~**Exception**~~ **Exceptions:**

1. Polyurethane foam insulation that is spray applied to the exterior of ducts in attics and crawl spaces shall be subject to all of the following requirements:
   1. The foam plastic insulation shall have a flame spread index not greater than 25 and a smoke-developed index not greater than 450, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231.
   2. The foam plastic insulation 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).
   3. The foam plastic insulation complies with the requirements of Section 2603 of the International Building Code.
   4. The foam plastic insulation is protected against ignition in accordance with the requirements of Section 2603.4.1.6 of the International Building Code.
2. Ductwork coverings and linings, including adhesives where used, located in a plenum rated cavity, shall have a flame spread index not more than 25 and a smoke-developed index not more than 50, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Duct coverings and linings 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 and linings shall be *listed* and *labeled*.

Reason: ***Specific to ductwork insulation coverings not in Plenum-Rated Spaces.***

1. Ductwork coverings both indoors and outdoors, not located within a plenum rated space, are not in the air stream. They are in the same building space as all other construction materials.
2. Weatherproof and protective barriers that are atop of ductwork coverings (insulations) are required per section IMC 603.16, however, per IMC Sections 604.12 these barriers are not classified for a required flame and smoke index rating. This forces you to reference back to the IBC and NFPA 90A, allowing IBC Class A which defines a flame and smoke rating as ASTM E84 **25/450** equal to everything else in the building.
   1. *IBC allows all building insulation products, materials, and facings, again outside of a plenum-rated cavity, in its highest classification (Class A, I) to have an ASTM E84 rating of* ***25/450.*** *With the ONLY exception being materials*

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within a plenum rated cavity.

2. *NFPA 90A Section 4.3.3.1.2 Specifically states the flame spread and smoke-developed index requirements of section 4.3.3.1.1 shall NOT apply to air duct weatherproof coverings where they are located entirely outside of a building, do not penetrate a wall or roof, and do not create an exposure hazard.*

3. There is a direct conflict of the NFPA 90A Section 4.3.3.1.2 allowing weather covering directly atop of the ductwork covering to meet ASTM E84 25/**450.** But then per IMC 604.3 not allowing the covering itself to meet the same specifications of ASTM E84 25**4**/**50**. The covering and the weatherproof barrier would become the same assembly but then have conflicting requirements.
4. There is a conflict of the IBC allowing all interior and exterior to the building materials (with the only exception being materials within a plenum space) to meet the IBC Class A, I specification of ASTM E84 **25/450**. But the IMC section 604.3 ductwork coverings, that are in the same building space, do not follow the same NFPA and IBC specifications.

Bibliography:

- IBC
- IMC
- NFPA 90A

Cost Impact: The code change proposal will decrease the cost of construction

- Closed Cell (polyisocyanurates) foams that meet IBC Class A/I and NFPA specifications (ASTM E84**25/450**) for use in ductwork coverings would reduce costs and improve energy efficiencies.
- Closed Cell (polyisocyanurates) foams have some of the highest R-values per inch and the lowest costs in the current markets when compared to other board insulations.
- Closed Cell (polyisocyanurates) foams are Green Building, GreenGuard, and LEED qualified building materials.
- Closed Cell (polyisocyanurates) foams when compared to equivalent R-Value Fiber Board insulations are not only more cost-effective, they have a 50% or more reduced weight load.
- Achieving a R-6.5 @ 1", R-9.8 @ 1.5", R-13.1 @ 2"
- Closed Cell (polyisocyanurates) foams weigh significantly less leading to installation cost savings.
- Closed Cell (polyisocyanurates) foams meet equivalent R-Values to FIber Board are 50% thickness. Saving space, time, and efficiency during construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
Revise as follows:

604.3Coverings and linings.
Duct coverings and linings, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than ~~450~~ 50, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Duct coverings and linings 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 and linings ~~Linings~~ shall be listed and labeled.
~~Duct linings, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than 50, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Duct coverings and linings 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). Linings shall be *listed* and *labeled*.~~

Exceptions:

M11325Text Modification

1. Polyurethane foam insulation that is spray applied to the exterior of ducts in attics and crawl spaces shall be subject to all of the following requirements:
   1. The foam plastic insulation shall have a flame spread index not greater than 25 and a smoke-developed index not greater than 450, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231.
   2. The foam plastic insulation 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).
   3. The foam plastic insulation complies with the requirements of Section 2603 of the International Building Code.
   4. The foam plastic insulation is protected against ignition in accordance with the requirements of Section 2603.4.1.6 of the International Building Code.

2. ~~Ductwork~~ Duct coverings added to the outside of ducts and not contained in plenums~~and linings~~, including adhesives where used, ~~located in a plenum rated cavity~~, shall have a flame spread index not more than 25 and a smoke-developed index not more than 450 ~~50~~, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Duct coverings ~~and linings~~ 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 ~~and linings~~ shall be *listed* and *labeled*.

Committee Reason: This is necessary for fire safety in duct coverings, linings and plenums. Coverings that are not plenums are treated like other building materials. The modification appropriately places the allowance for the higher smoke development (450) in the exception and the lower smoke development (50) in the base requirement. (Vote: 10-1)

Final Hearing Results

M60-21 AM

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

53

M11326		/M61-21			
Date Submitted	03/22/2024	**Section**	912.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds reference standard requirements for Permanently Installed Space Heaters

Rationale

See attached

M11326Text Modification

See attached

Page: 1

Mod11326_TextOfModification.pdf

M11326Text Modification

M61-21

Original Proposal

IMC: SECTION 912, 912.1, 912.3, 912.2, UL Chapter 15 (New)

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

2021 International Mechanical Code

Revise as follows:

SECTION 912
~~INFRARED RADIANT~~ ELECTRIC SPACE HEATERS

912.1 General. Permanently installed electric ~~infrared radiant~~ space heaters shall ~~comply~~ be listed and labeled in accordance with ~~UL 499~~ UL 2021, and installed in accordance with the manufacturer's instructions.

912.3 Clearances. Heaters shall be installed with *clearances* from combustible material in accordance with the manufacturer's installation instructions.

Revise as follows:

912.2 Support. ~~Infrared radiant~~ Electric space heaters shall be fixed in a position independent of ~~fuel and~~ electric supply lines. Hangers and brackets shall be noncombustible material.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

UL 2021-15 Fixed and Location-Dedicated Electric Room Heaters (with revisions through December 14, 2016)

Reason: UL 499 is a general heating appliance and equipment standard, whereas UL 2021 is specifically for electric space heaters that are fixed in place and dedicated to a room. Infrared is a technology, not an application. There are other means for providing the heat. The reference to fuel lines is removed from Section 912.2, because the fuel-fired infrared heaters are covered in Section 630 of the IFGC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Clarifies the use of the standards to list these types of heaters.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was passed as submitted because it references appropriate standards and electrical components. (Vote: 10-0)

Final Hearing Results

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M11326Text Modification

M61-21 AS

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

54

M11649		/FG7-21 Part II			
Date Submitted	05/14/2024	**Section**	907.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Modifies text of Section 907.1 "General". Adds new standard UL 2790-2010.

Rationale

See attached

M11649Text Modification

See attached

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Mod11649_TextOfModification.pdf

M11649Text Modification

FG7-21 Part II

Original Proposal

IMC: 907.1, UL Chapter 15 (New)

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IFGC COMMITTEE. PART II WILL BE HEARD BY THE IMC COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

2021 International Mechanical Code

Revise as follows:

907.1 General. Factory built cremation furnaces and commercial direct-fed incinerators shall be listed and labeled in accordance with UL 2790. Factory-built incinerators for domestic applications shall be listed and labeled in accordance with UL 791.Incinerators and ~~crematories~~ cremation furnaces shall be ~~listed and labeled in accordance with UL 791 and shall be~~installed in accordance with the manufacturer's instructions.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

2790-2010 Commercial Incinerators - with revisions through June, 2019

Reason: The types of equipment covered by this section are incinerators and cremation furnaces. Cremation furnaces are used in crematories. These types of equipment are factory-built and can be installed as a packaged unit or assembled in the field from factory built subassemblies.
This proposal identifies the correct standards used for listing these types of equipment.

UL 2790 covers factory-built cremation furnaces and commercial direct-fed incinerators, including those of the gas and electric ignition types, designed primarily for use in a crematory.

UL 791 covers direct-fed incinerators, including those of the gas and electric ignition types, designed primarily for use in one-and two-family dwellings for the burning of ordinary combustible waste materials and garbage incidental to domestic occupancy and having a firebox or charging compartment of not over 5 cubic feet capacity. Incinerators of this type may also be employed in other occupancies including commercial establishments and institutions where the refuse is of a character for which the incinerator is designed and is not excessive in amount.

Currently there are seven manufacturers with listed incinerators and cremation furnaces.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since these standards are currently in use in the industry the cost will not increase.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has passed as submitted because the proponent submitted correct UL standard references for devices. **UL 2790** covers factory-built cremation furnaces and commercial direct-fed incinerators, including those of the gas and electric ignition types, designed primarily for use in a crematory.

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Mod_11649_Text_FG7-21 Part II.pdf

M11649Text Modification

UL 791 covers direct-fed incinerators, including those of the gas and electric ignition types, designed primarily for use in one-and two-family dwellings for the burning of ordinary combustible waste materials and garbage incidental to domestic occupancy and having a firebox or charging compartment of not over 5 cubic feet capacity. Incinerators of this type may also be employed in other occupancies including commercial establishments and institutions where the refuse is of a character for which the incinerator is designed and is not excessive in amount. (Vote: 10-1)

Final Hearing Results

FG7-21 Part II AS

Page: 2

Mod_11649_Text_FG7-21 Part II.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

55

M11328 | **/M63-21**

Date Submitted	03/22/2024	**Section**	1001.1	**Proponent**	Mo Madani
Chapter	10	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language for pressure vessels from CHapter 9

Rationale

See attached

M11328Text Modification

See attached

Page: 1

Mod11328_TextOfModification.pdf

M11328Text Modification

M63-21

Original Proposal

IMC: 1001.1

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

2021 International Mechanical Code

Revise as follows:

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

Exceptions:

1. Pressure vessels used for unheated water supply.
2. Portable unfired pressure vessels and Interstate Commerce Commission containers.
3. Containers for bulk oxygen and medical gas.
4. Unfired pressure vessels having a volume of 5 cubic feet (0.14 m^3) or less operating at pressures not exceeding 250 pounds per square inch (psi) (1724 kPa) and located within *occupancies* of Groups B, F, H, M, R, S and U.
5. Pressure vessels used in refrigeration systems that are regulated by Chapter 11 of this code.
6. Pressure tanks used in conjunction with coaxial cables, telephone cables, power cables and other similar humidity control systems.
7. Any boiler or pressure vessel subject to inspection by federal or state inspectors.
8. Pressure vessels used in specific appliances and equipment that are regulated by Chapter 9 of this code.

Reason: The specific appliances and equipment that are regulated by Chapter 9 of the IMC have specific requirements within the referenced standards that address any pressure vessels or parts subject to pressure within those appliances and equipment. This aligns with the Exception 5 in this section.
The applicable referenced standards in Chapter 9 that address the requirements for Pressure Vessels and Parts Subject to Pressure are UL 197 (Section 41), UL 499 (Section 30), UL 1261 (Section 6), UL 1995 (Section 34), and UL 60335-2-40 (Section 22).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The requirements for pressure vessels are already covered with the referenced standards for the specific appliances and equipment regulated by Chapter 9.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was passed as submitted because the reference to pressure vessel requirements in Chapter 9 of the code is appropriate. (Vote: 10-0)

Final Hearing Results

M63-21 AS

Page: 1

Mod_11328_Text_M63-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

56

M11329		/M64-21			
Date Submitted	03/22/2024	**Section**	1002.4	**Proponent**	Mo Madani
Chapter	10	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language for water heater pan

Rationale

See attached

M11329Text Modification

See attached

Page: 1

Mod11329_TextOfModification.pdf

M11329Text Modification

M64-21

Original Proposal

IMC: 1002.4 (New)

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Mechanical Code

Add new text as follows:

1002.4 Water heater pan required. Where a storage type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan constructed by one of the following:

1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.
2. Plastic of not less than 0,036 inch (0.9 mm) in thickness.
3. Other approved materials.
4. A plastic pan installed beneath a water heater shall be constructed of material having a flame spread index of 25 or less and a smoked developed index of 450 or less when tested in accordance with ASTM E-84 or UL-723

Reason: REASON: This language will make the IMC consistent with the IPC, IRC and IFGC regardless of the fuel or energy source. Water heaters are notorious for leaking at some point. The IMC is silent on this matter.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial in nature and is for consistency reasons only. There are no new requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
Revise as follows:

1002.4Water heater pan required.
Where a storage type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan constructed by one of the following:

1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.
2. Plastic of not less than 0,036 inch (0.9 mm) in thickness constructed of material having a flame spread index of 25 or less and a smoked developed index of 450 or less when tested in accordance with ASTM E-84 or UL-723
3. Other approved materials.
4. ~~A plastic pan installed beneath a water heater shall be constructed of material having a flame spread index of 25 or less and a smoked developed index of 450 or less when tested in accordance with ASTM E-84 or UL-723~~

Committee Reason: Good change on water heater pan, aligning what exists currently in IPC Section 504.7. The modification appropriately combines 2 requirements into 1 for simplification. (Vote: 11-0)

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Mod_11329_Text_M64-21.pdf

M11329Text Modification

Final Hearing Results

M64-21 AM

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

57

M11330		/M65-21			
Date Submitted	03/22/2024	**Section**	1006.6	**Proponent**	Mo Madani
Chapter	10	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -M.

Summary of Modification

Adds remote monitoring of relief valve discharge

Rationale

See attached

M11330Text Modification

See attached

Page: 1

Mod11330_TextOfModification.pdf

M11330Text Modification

M65-21

Original Proposal

IMC: 1006.6

Proponents: Chris Haldiman, Watts Water Technologies, Watts Water Technologies (chris.haldiman@wattswater.com)

2021 International Mechanical Code

Revise as follows:

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:

1. Not be directly connected to the drainage system.
2. Discharge through an air break located in the same room as the *appliance*.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or *equipment*.
5. Discharge to the floor, to the pan serving the boiler or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. ~~Discharge to a termination point that is readily observable by the building occupants.~~ ~~Where the discharge termination point is not readily observable, discharge monitoring is required.~~
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Not terminate more than 6 inches (152 mm) above the floor or waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 of the *International Plumbing Code* or materials tested, rated and approved for such use in accordance with ASME A112.4.1.

Reason: Continuous low-level discharge (“dribble”) of T&P valve due to over-pressure (failed expansion tank, lack of secondary pressure relief device for thermal expansion, etc.) with hard water conditions can cause build-up of scale in the relief valve discharge port. Such obstruction of discharge port can compromise the relieving capacity of the valve and pose a safety risk to building occupants. Remote monitoring of relief valve discharge will ensure that the condition is immediately known.

Cost Impact: The code change proposal will increase the cost of construction
If the discharge piping is not readily visible this addition will increase the cost of construction but will also provide added safety for the occupants.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

Page: 1

Mod_11330_Text_M65-21.pdf

M11330Text Modification

1006.6Safety 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:

1. Not be directly connected to the drainage system.
2. Discharge through an air break located in the same room as the*appliance*.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or*equipment*.
5. Discharge to the floor, to the pan serving the boiler or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
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.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Not terminate more than 6 inches (152 mm) above the floor or waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 of the*International Plumbing Code* or materials tested, rated and approved for such use in accordance with ASME A112.4.1.

Committee Reason: The committee agreed that this proposal provides clarity to the requirements for safety and relief valves. The modification further clarifies that language. (Vote:11-0)

Final Hearing Results

M65-21 AM

Page: 2

Mod_11330_Text_M65-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

58

M11331 | **/M66-21 Part I**

Date Submitted	03/22/2024	**Section**	1006.6	**Proponent**	Mo Madani
Chapter	10	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - M.

Summary of Modification

Adds consistency of language for requirements for a discharge pipe from any pressure (or temperature) relief valve

Rationale

See attached

M11331Text Modification

See attached

Page: 1

Mod11331_TextOfModification.pdf

M11331Text Modification

M66-21 Part I

Original Proposal

IMC: 1006.6

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Revise as follows:

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:

1. Not be directly connected to the drainage system.
2. Discharge through an air break located in the same room as the *appliance*.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or *equipment*.
5. Discharge to the floor, to the pan serving the boiler or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. ~~Not terminate~~ Terminate not more than 6 inches (152 mm) and not less than two times the discharge pipe diameter above the floor or flood level rim of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 of the *International Plumbing Code* or materials tested, rated and approved for such use in accordance with ASME A112.4.1.

Reason: Part I REASONING: The text for the requirements for a discharge pipe from any pressure (or temperature) relief valve should be identical between all the codes that have such requirements. It doesn't matter what the relief valve is protecting. Uniformity across the codes on these requirements will improve compliance.
PART II REASONING: Oddly, Section M2002.4 has minimal requirements for pressure relief valve discharge pipes. A boiler doesn't "know" what type of building it is located in. The requirements for a pressure relief valve discharge pipe should be identical to what is in the IMC for the same application. Uniformity across the codes on these requirements will improve compliance.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee

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Mod_11331_Text_M66-21 Part I.pdf

meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 31.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The relief valve piping already has to be installed and if relief valve manufacturers' instructions are being followed, many of these requirements are already being followed.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1006.6Safety 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:

1. Not be directly connected to the drainage system.
2. Discharge through an air break located in the same room as the*appliance*.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or*equipment*.
5. Discharge to the floor, to the pan serving the boiler or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Terminate not more than 6 inches (152 mm)~~and not less than two times the discharge pipe diameter~~ above the floor or flood level rim of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 of the *International Plumbing Code* or materials tested, rated and approved for such use in accordance with ASME A112.4.1.

Committee Reason: The committee agreed that the text for the requirements for a discharge pipe from any pressure (or temperature) relief valve should be identical between all the codes that have such requirements. It doesn't matter what the relief valve is protecting. Uniformity across the codes on these requirements will improve compliance. The modification further clarifies acceptable industry practices. (Vote: 11-0)

Final Hearing Results

M66-21 Part I AM

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

59

M11333		/M67-21			
Date Submitted	03/22/2024	**Section**	1006.6	**Proponent**	Mo Madani
Chapter	10	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - M.

Summary of Modification

Clarifies use of piping to use hydronic piping section 1202

Rationale

See attached

M11333Text Modification

See attached

Page: 1

Mod11333_TextOfModification.pdf

M11333Text Modification

M67-21

Original Proposal

IMC: 1006.6

Proponents: Julius Ballanco, JB Engineering and Code Consulting, P.C., Self (JBENGINEER@aol.com)

2021 International Mechanical Code

Revise as follows:

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:

1. Not be directly connected to the drainage system.
2. Discharge through an air break located in the same room as the*appliance*.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or*equipment*.
5. Discharge to the floor, to the pan serving the boiler or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Not terminate more than 6 inches (152 mm) above the floor or waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. ~~Be constructed of those materials listed in Section 605.4 of the *International Plumbing Code* or materials tested, rated and approved for such use in accordance with ASME A112.4.1.~~ Utilize piping material complying with Section 1202.

Reason: It is inappropriate to reference the Plumbing Code potable water piping section to regulate the piping material for boiler relief valves. The appropriate reference is to the hydronic piping section in the Mechanical Code. One of the differences is the allowance of black steel pipe. Prior to the change made during the last cycle, black steel pipe was always permitted to be used for a relief valve discharge pipe. This material has been used on boilers for relief valve discharge for many years. No problem were presented during the last cycle whereby black steel pipe did not properly perform as a discharge pipe for a relief valve. There were only perceptions that galvanized steel pipe should be used rather than black steel pipe. Section 1202, referenced in the new text, is the hydronic piping material section.

Cost Impact: The code change proposal will decrease the cost of construction
Black steel pipe costs less than galvanized steel pipe. Hence, the allowance of black steel pipe will lower the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was passed as submitted because it will appropriately allow use of black pipe for hydronic

Page: 1

Mod_11333_Text_M67-21.pdf

M11333Text Modification

equipment. (Vote: 11-0)

Final Hearing Results

M67-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

60

M11226		/FB54-21 Part II			
Date Submitted	03/18/2024	**Section**	1101.1	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text for the proposed code change is not part of the 2023 FBC -M.

Summary of Modification

Language regarding refrigerant and ammonia

Rationale

See attached

M11226Text Modification

See attached

Page: 1

Mod11226_TextOfModification.pdf

M11226Text Modification

F54-21 Part II

Original Proposal

IMC: 1101.1, 1101.1.1, 1101.1.2

Proponents: Jeffrey Shapiro, International Code Consultants, IIAR (jeff.shapiro@intlcodeconsultants.com)

2021 International Mechanical Code

Revise as follows:

1101.1 Scope. This chapter shall govern the design, installation, construction and repair of refrigeration systems that vaporize and liquefy a fluid during the refrigerating cycle. Permanently installed refrigerant storage systems and other components shall be considered as part of the refrigeration system to which they are attached.

1101.1.1 Refrigerants other than ammonia. Refrigeration systems using ~~Refrigerant 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*.

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 shall not be required to comply with this chapter.

Reason: This proposal was developed and approved by FCAC, as the proponent, but just before the submittal deadline, it was identified that staff could not find a record of PMGCAC also supporting it, which would be required for the proposal to go forward as a CAC proposal because it touches on the IMC. Rather than have this go unsubmitted, I agreed to sponsor the proposal and submitted it.
The scoping for provisions regulating refrigeration systems in the IFC and IMC are not correlated. This proposal accomplishes correlation and provides proper references to ASHRAE and IIAR standards. It also modifies the IMC by adding a needed reference to the IFC for refrigerants other than ammonia. The IFC includes regulations for such refrigerants that are not duplicated in the IMC. A companion change has been submitted to the IFC that will remove ammonia-specific regulations covered by reference standards. The IMC removed ammonia-specific requirements last cycle in deference to ANSI standards published by IIAR, which is the approach now used by all model codes, pending the correlating change to the IFC. Ammonia refrigeration systems are comprehensively regulated by IIAR standards, and the latest version of IIAR 2 serves as both a code and a standard, incorporating content that was previously handled by model fire and mechanical codes.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is not related to construction and has no impact on construction costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal has passed as submitted because it clarifies mechanical refrigeration systems, other than ammonia, shall be in accordance with ASHRAE 15. (Vote: 11-0)

Final Hearing Results

F54-21 Part II AS

Page: 1

Mod_11226_Text_F54-21 Part II.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

61

M11334 | **/M68-21**

Date Submitted	03/22/2024	**Section**	1101.1	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - M/Section 1101.1.

Summary of Modification

To clarify and simplify language for the scoping section

Rationale

See attached

M11334Text Modification

See attached

Page: 1

Mod11334_TextOfModification.pdf

M11334Text Modification

M68-21

Original Proposal

IMC: 1101.1, 1101.6, SECTION 202

Proponents: Jeffrey Shapiro, International Code Consultants, Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Mechanical Code

Revise as follows:

1101.1 Scope. This chapter shall govern the design, installation, construction and repair of refrigeration systems ~~that vaporize and liquefy a fluid during the refrigerating cycle~~. Permanently installed refrigerant storage systems and other components shall be considered as part of the refrigeration system to which they are attached.

1101.6 Maintenance. ~~Mechanical r~~Refrigeration systems shall be maintained in proper operating condition, free from accumulations of oil, dirt, waste, excessive corrosion, other debris and leaks.

Delete without substitution:

~~**REFRIGERATION SYSTEM, MECHANICAL.** A combination of interconnected refrigeration-containing parts constituting one closed refrigerant circuit in which a refrigerant is circulated for the purpose of extracting heat and in which a compressor is used for compressing the refrigerant vapor.~~

Reason: Changes are intended for clarity and simplification. The scope of Chapter 11 needn't repeat what is already in the definition of "refrigeration/refrigerating system" and includes the concept of fluid phase change. This recommendation is consistent with revised definitions related to refrigeration submitted by PMGCAC, but was not picked up in time for PMGCAC to address the revision in their changes.

In addition, following PMGCAC's work on the topic, I noticed that the term "refrigeration system, mechanical" contains an inaccuracy related to only being a single circuit, but rather than fixing that, it made more sense to simply delete the definition. The term is only used once in the code (1101.6), and it really doesn't belong there as a limitation. All refrigeration systems, whether mechanical, absorption, or whatever, should be properly maintained per the requirements in 1101.6.

Although I represent IIAR on some issues related to refrigeration systems, this proposal is submitted on my own behalf. It does not impact IIAR and IIAR had no input to this submittal.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal has no connection to construction, so there is no construction cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was passed as submitted because the definition is no longer needed based on previous committee actions. (Vote: 11-0)

Final Hearing Results

M68-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

62

M11335 | **/M69-21**

Date Submitted	03/22/2024	**Section**	1101.1.1	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - M.

Summary of Modification

Adds reference standard BSR/IIAR CO2-2021

Rationale

See attached

M11335Text Modification

See attached

Page: 1

Mod11335_TextOfModification.pdf

M11335Text Modification

M69-21

Original Proposal

IMC: 1101.1.1, IIAR Chapter 15 (New)

Proponents: Jeffrey Shapiro, International Code Consultants, IIAR (jeff.shapiro@intlcodeconsultants.com)

2021 International Mechanical Code

Revise as follows:

1101.1.1 Refrigerants other than ammonia. Refrigerant 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. Refrigeration systems containing carbon dioxide as the refrigerant shall also comply with BSR/IIAR CO2.

Add new standard(s) as follows:

IIAR

International Institute of Ammonia Refrigeration
1001 N. Fairfax Street, Suite 503
Arlington, VA 22314

BSR/IIAR CO2-2021 Safety Standard for Closed-Circuit Carbon Dioxide Refrigeration Systems

Reason: BSR/IIAR CO2 is in the process of completion for issuance in 2021. It is a new standard governing refrigeration systems that use carbon dioxide as the refrigerant, and it is designed to be a companion to ASHRAE 15, providing additional design requirements that are unique to carbon dioxide systems to supplement ASHRAE 15 and going beyond the scope of ASHRAE 15 by regulating the complete life-cycle of carbon dioxide systems. Carbon dioxide has become increasingly popular as an industrial refrigerant because it is considered efficient and climate friendly. Including IIAR's new standard will assure that these systems are properly regulated.

Cost Impact: The code change proposal will increase the cost of construction
The new standard includes requirements that reflect industry good practice but are not currently mandatory. By including the standard as a mandatory reference standard in the IMC, following industry good practice will no longer be optional for carbon dioxide systems.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1101.1.1Refrigerants other than ammonia.
Refrigerant 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. Refrigeration systems containing carbon dioxide as the refrigerant shall also comply with ~~BSR/~~IIAR CO2.

ANSI~~BSR~~/IIAR CO2-2021	Safety Standard for Closed-Circuit Carbon Dioxide Refrigeration Systems

Committee Reason: The committee agreed that the proposal appropriately adds a new standard that governs refrigeration and based on the proponent reason statement. The modification simply clarifies the acronym of the new standard. (Vote: 11-0)

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Mod_11335_Text_M69-21.pdf

M11335Text Modification

Final Hearing Results

M69-21 AM

Mod_11335_Text_M69-21.pdf Page: 2

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

63

M11336 | **/M70-21**

Date Submitted	03/22/2024	**Section**	1101.1.2	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - M.

Summary of Modification

Adds reference standard ANSI/IIAR 6-2019

Rationale

See attached

M11336Text Modification

See attached

Page: 1

Mod11336_TextOfModification.pdf

M11336Text Modification

M70-21

Original Proposal

IMC: 1101.1.2, IIAR Chapter 15 (New)

Proponents: Jeffrey Shapiro, International Code Consultants, IIAR (jeff.shapiro@intlcodeconsultants.com)

2021 International Mechanical Code

Revise as follows:

1101.1.2 Ammonia refrigerant. Refrigeration systems using ammonia as the refrigerant shall comply with IIAR 2, IIAR 3, IIAR 4, ~~and~~ IIAR 5, and IIAR 6 and shall not be required to comply with this chapter.

Add new standard(s) as follows:

IIAR

International Institute of Ammonia Refrigeration
1001 N. Fairfax Street, Suite 503
Arlington, VA 22314

ANSI/IIAR 6-2019 Standard for Inspection, Testing, and Maintenance of Closed-Circuit Ammonia Refrigeration Systems

Reason: IIAR 6 is a new standard covering inspection, testing and maintenance of closed-circuit ammonia refrigeration systems and is part of the suite of IIAR standards regulating ammonia refrigeration systems referenced by the IFC and IMC. Because this standard addresses system maintenance, which is part of the IMC scope in Section 101.2, it is important to have the standard referenced by the IMC. It adds mandatory system maintenance regulations covering ammonia refrigeration to the IMC to help assure safe operation of these systems and provides inspectors with a needed tool for ensuring compliance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed standard is scoped to inspection, testing and maintenance and does not impact construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was passed as submitted because by adopting this standard it allows for evaluation of older systems and makes sure all components have been looked at. (Vote: 11-0)

Final Hearing Results

M70-21 AS

Page: 1

Mod_11336_Text_M70-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

64

M11337 | **/M71-21**

Date Submitted	03/22/2024	**Section**	1101.2	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Clarifies which section should be referenced for refrigerant fitting requirements

Rationale

See attached

M11337Text Modification

See attached

Page: 1

Mod11337_TextOfModification.pdf

M11337Text Modification

M71-21

Original Proposal

IMC: 1101.2, TABLE 1101.2

Proponents: Julius Ballanco, JB Engineering and Code Consulting, P.C., Daikin US (JBENGINEER@aol.com)

2021 International Mechanical Code

1101.2 Factory-built equipment and appliances. *Listed* and *labeled* self-contained, factory-built *equipment* and *appliances* shall be tested in accordance with the applicable standards specified in Table 1101.2. Such *equipment* and *appliances* are deemed to meet the design, manufacture and factory test requirements of this code if installed in accordance with their listing and the manufacturer's instructions.

Revise as follows:

TABLE 1101.2 FACTORY-BUILT EQUIPMENT AND APPLIANCES

EQUIPMENT	STANDARDS
~~Refrigeration fittings, including press-connect, flared and threaded~~	~~UL 109 and UL 207~~
Air-conditioning equipment	UL 1995 or UL/CSA 60335-2-40
Packaged terminal air conditioners and heat pumps	UL 484 or UL/CSA 60335-2-40
Split-system air conditioners and heat pumps	UL 1995 or UL/CSA 60335-2-40
Dehumidifiers	UL 474 or UL/CSA 60335-2-40
Unit coolers	UL 412 or UL/CSA 60335-2-89
Commercial refrigerators, freezers, beverage coolers and walk-in coolers	UL 471 or UL/CSA 60335-2-89
Refrigerating units and walk-in coolers	UL 427 or UL 60335-2-89
Refrigerant-containing components and accessories	UL 207

Reason: This table was added during the last cycle at the same time that the refrigerant piping rewrite was added. This resulted in refrigerant fitting requirements appearing in two locations. The appropriate location for referencing fitting requirements in in Section 1107. It should be noted that UL 207 is included in 1107.5. By deleting this row, it avoids confusion in which section applies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial in nature. As such, it has no impact on the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal has passed as submitted because it corrects UL standards removed from table for fittings as they currently exist, and are more appropriate in Section 1107. Further, the applicable portions of UL107 are now contained in UL207 that is referenced in Section 1107.5. (Vote: 11-0)

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Mod_11337_Text_M71-21.pdf

M11337Text Modification

Final Hearing Results

M71-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

65

M11338 **/M72-21**

Date Submitted	03/22/2024	**Section**	1101.2.1	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Clarifies reference standard for high probability equipment

Rationale

See attached

M11338Text Modification

See attached

Page: 1

Mod11338_TextOfModification.pdf

M11338Text Modification

M72-21

Original Proposal

IMC: 1101.2.1 (New), UL Chapter 15

Proponents: Helen Walter-Terrinoni, AHRI, AHRI; Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Daikin US (JBENGINEER@aol.com); Andrew Klein, A S Klein Engineering, The Chemours Company (andrew@asklein.com); Joe Nebbia, Newport Partners, Natural Resources Defense Council (jnebbia@newportpartnersllc.com)

2021 International Mechanical Code

Add new text as follows:

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.

Revise as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

UL/CSA 60335-2-40—~~17~~2019 Household and Similar Electrical Appliances—Safety—Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers

Reason: During the last code cycle, Table 1101.2 was added to reference all of the appropriate standard for factory-built equipment. Included in the list are standards that regulate the use of Group A2L, A2, A3, and B1 refrigerants. However, that is not separated out in the table. To assist the code official, this new section will add the appropriate reference to the standards that regulate equipment using these refrigerant in high probability systems. The application of these refrigerants include the use of Group A2L in equipment providing human comfort. Group A2l, A2, A3, and B1 refrigerants are also used in high probability equipment such as water coolers, refrigeration equipment in supermarkets, and freezers and cooler in restaurants and similar facilities. There are strict limitation on the charge size of these refrigerants specified in the standards referenced.

The reference to ASHRAE 15-2019 opened the code to the use of Group A2L refrigerants in high probability systems for human comfort. ASHRAE 15 has since added specific reference to the standards regulating equipment using Group A2L refrigerants. Thus, this proposal is consistent with the requirements in the addendums to ASHRAE 15.The 2019 edition of UL/CSA 60335-2-40 added additional safety requirements for equipment using Group A2L, A2, A3, and B1 refrigerants.
The update to the 2019 edition of UL/CSA 60335-2-40 includes additional safety requirements. This edition added electrical and refrigerant safety requirements. There are provisions for refrigerant detection systems, UL-C germicidal lamp systems, CO2 systems, photovoltaic systems and new marking requirements. With the increased use of Group A2L A2, and A3 refrigerants, it is important to reference the latest edition of the standard.

NRDC Reason:

By adding a requirement for A2L, A2, A3, and B1 to comply with UL 484, UL/CSA 60335-2-40 or UL/CSA 60335-2-89, the code will clarify for the user what safety standards should be used for equipment with these refrigerants. The proposed update of referenced standard UL 484, UL/CSA 60335-2-40 to the 2019 version provides new safety measures for equipment using the A2L refrigerant class, which were not separately addressed in earlier versions of the standard. These changes are especially important in the case of A2L refrigerants, which are expected to increase in use as a substitute for hydrofluorocarbon (HFC) refrigerants. HFCs are extremely potent greenhouse gases and in December 2020 the U.S. Congress passed a new law that will require an 85% economy-wide phasedown of HFC refrigerants over the next 15 years. The phasedown is expected to avoid HFC emissions of 900 million metric tons of CO2-equivalent by 2035. In addition, 9 states - 8 of which adopt the ICC codes - have already prohibited the use of HFC refrigerants in several high volume applications.1 Human comfort systems account for more HFC use than any other end-use application in the U.S., so a large portion of the HFC reductions are expected

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to come from them. A2L refrigerants have significantly lower global warming potential than A1-class HFCs, so A2L use is a key part of the HFC reduction plan. These restrictions on the supply of HFC refrigerant will drive up consumption of A2L substitutes. Permitting use of alternative refrigerants, including A2L refrigerants, in high probability systems for human comfort will enable states and local jurisdictions to meet their heating and cooling needs while also complying with applicable HFC regulations. Without this change, jurisdictions adopting the code will be forced to enact their own amendments to the code in order to support their HFC reduction goals. This change allows the ICC to provide an off the shelf solution to those jurisdictions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is a clarification of the requirements for listing factory-built equipment. Therefore, there is no increase or decrease in the cost of construction. The code user still has the option as to what type of refrigeration equipment to install.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was passed as submitted based on the proponents reason statement. By adding a requirement for A2L, A2, A3, and B1 to comply with UL 484, UL/CSA 60335-2-40 or UL/CSA 60335-2-89, the code will clarify for the user what safety standards should be used for equipment with these refrigerants. The proposed update of referenced standard UL 484, UL/CSA 60335-2-40 to the 2019 version provides new safety measures for equipment using the A2L refrigerant class, which were not separately addressed in earlier versions of the standard. These changes are especially important in the case of A2L refrigerants, which are expected to increase in use as a substitute for hydrofluorocarbon (HFC) refrigerants. HFCs are extremely potent greenhouse gases and in December 2020 the U.S. Congress passed a new law that will require an 85% economy-wide phasedown of HFC refrigerants over the next 15 years. The phasedown is expected to avoid HFC emissions of 900 million metric tons of CO2-equivalent by 2035. In addition, 9 states - 8 of which adopt the ICC codes - have already prohibited the use of HFC refrigerants in several high volume applications.1 Human comfort systems account for more HFC use than any other end-use application in the U.S., so a large portion of the HFC reductions are expected to come from them. A2L refrigerants have significantly lower global warming potential than A1-class HFCs, so A2L use is a key part of the HFC reduction plan. These restrictions on the supply of HFC refrigerant will drive up consumption of A2L substitutes. Permitting use of alternative refrigerants, including A2L refrigerants, in high probability systems for human comfort will enable states and local jurisdictions to meet their heating and cooling needs while also complying with applicable HFC regulations. Without this change, jurisdictions adopting the code will be forced to enact their own amendments to the code in order to support their HFC reduction goals. (Vote: 10-0)

Final Hearing Results

M72-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

66

M11369 | **/M73-21**

Date Submitted	03/26/2024	**Section**	1101.7	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Updates REFRIGERATION DEIGNATION definition and refrigeration changing language

Rationale

See attached

M11369Text Modification

See attached

Page: 1

Mod11369_TextOfModification.pdf

M11369Text Modification

M73-21

Original Proposal

IMC: SECTION 202 (New), 1101.7, 1102.2.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2021 International Mechanical Code

Add new definition as follows:

Refrigerant Designation. The unique identifying alphanumeric value or refrigerant number assigned to an individual refrigerant and published in ASHRAE Standard 34.

Delete and substitute as follows:

~~**1101.7 Change in refrigerant type.** The type of refrigerant in refrigeration systems having a refrigerant circuit containing more than 220 pounds (99.8 kg) of Group A1 or 30 pounds (13.6 kg) of any other group refrigerant shall not be changed without prior notification to the code official and compliance with the applicable code provisions for the new refrigerant type.~~

1101.7 Changing Refrigerant. Changes of refrigerant in an existing system to a refrigerant with a different refrigerant designation shall only be allowed where in accordance with the following:

1. The change of refrigerant shall be approved by the owner.
2. The change in refrigerant shall be in accordance with one of the following.
   - 2.1 Written instructions of the original equipment manufacturer.
   - 2.2 An evaluation of the system by a registered design professional or by an approved agency that validates safety and suitability of the replacement refrigerant.
   - 2.3 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.

~~**1102.2.1 Mixing.** 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.~~

1102.2.1 Mixing.

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.

Reason: With the onset of flammable refrigerants, the need to address change of refrigerant from one safety class to another was identified. ASHRAE published addendum e to ASHRAE 15-2016 to address this concern (which is now part of the ASHRAE 15-2019

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Mod_11369_Text_M73-21.pdf

M11369Text Modification

version, Section 5.3).

Bibliography: 1. ANSI/ASHRAE 15-2019, Safety Standard for Refrigeration Systems
2. ANSI/ASHRAE 34-2019, Designation and Safety Classification of Refrigerants

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides a clarification to address the use of new systems but does not introduce any additional requirements that would impact cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was passed as submitted because it provides clear criteria of what will be required in changing of refrigerants in this code and ASHRAE15 to be used. (Vote: 10-1)

Public Comments

Public Comment 1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

1101.7 Changing Refrigerant . Changes of refrigerant in an existing system to a refrigerant with a different refrigerant designation shall only be allowed where in accordance with the following:

1. ~~The change of refrigerant shall be approved by the owner. owner.~~ 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.
   2.1 Written instructions of the original equipment manufacturer.
   2.2 An evaluation of the system by a registered design professional or by an approved agency that validates safety and suitability of the replacement refrigerant.
   2.3 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.

Commenter's Reason: The intent of notifying the owner or owner's agent is to ensure the owner of the building is aware of the change and can address any consequences to the building or occupancy that might be tied to the change of refrigerant. The owner notification can be made by the designer, contractor, installer or any other party involved in the proposed refrigerant change. This modification to the originally submitted language is more appropriate than requiring owner "approval."

Bibliography: ANSI/ASHRAE 15-2019, Safety Standard for Refrigeration Systems

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M11369Text Modification

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This proposal provides a clarification to address the use of new systems but does not introduce any additional requirements that would impact cost.

Final Hearing Results	
M73-21	AMPC1

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

67

M11370 | **/M74-21**

Date Submitted	03/26/2024	**Section**	1103.1	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -R.

Summary of Modification

Updates table to new ASHRAE requirements

Rationale

See attached

M11370Text Modification

See attached

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Mod11370_TextOfModification.pdf

M11370Text Modification

M74-21

Original Proposal

IMC: TABLE 1103.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2021 International Mechanical Code

Revise as follows:

TABLE 1103.1 REFRIGERANT CLASSIFICATION, AMOUNT AND OEL

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							OEL[d]	[F] DEGREES OF HAZARD[a]
				RCL			LFL					
				~~Pounds per 1,000 cubic feet~~ lb/MCf	ppm	g/m^3	lb/MCf	ppm	g/m^3		~~OEL~~[e] ppm	
R-11[f][g]	CCl_3F	trichlorofluoromethane	A1	0.39	1,100	~~6.2~~ 6.1					~~C~~ 1,000	2-0-0[b]
R-12[f][g]	CCl_2F_2	dichlorodifluoromethane	A1	5.6	18,000	90					1,000	2-0-0[b]
R-13[f][g]	$CClF_3$	chlorotrifluoromethane	A1	—	—	—					1,000	2-0-0[b]
R-13B1[f][g]	$CBrF_3$	bromotrifluoromethane	A1	—	—	—					1,000	2-0-0[b]
R-13I1	CF_3I	trifluoroiodomethane	A1	1.0	2,000	16					500	
R-14	CF_4	tetrafluoromethane (carbon tetrafluoride)	A1	25	110,000	400					1,000	2-0-0[b]
R-22	$CHClF_2$	chlorodifluoromethane	A1	13	59,000	210					1,000	2-0-0[b]
R-23	CHF_3	trifluoromethane (fluoroform)	A1	7.3	41,000	120					1,000	2-0-0[b]
R-30	CH_2Cl_2	dichloromethane (methylene chloride)	B1	—	—	—					—	—
R-31	CH_2ClF	chlorofluoromethane	—	—	—	—					—	—
R-32	CH_2F_2	difluoromethane (methylene fluoride)	A2LA2[b]	4.8	36,000	77	19.1	144,000	306	1,000	1-4-0	
R-40	CH_3Cl	chloromethane (methyl chloride)	B2	—	—	—					—	—
R-41	CH_3F	fluoromethane (methyl fluoride)	—	—	—	—					—	—
R-50	CH_4	methane	A3	—	—	—		50,000		1,000	—	
R-113[f][g]	CCl_2FCClF_2	1,1,2-trichloro-1,2,2-trifluoroethane	A1	1.2	2,600	20					1,000	2-0-0[b]
R-114[f][g]	$CClF_2CClF_2$	1,2-dichloro-1,1,2,2-tetrafluoroethane	A1	8.7	20,000	140					1,000	2-0-0[b]
R-115	$CClF_2CF_3$	chloropentafluoroethane	A1	47	120,000	760					1,000	—
R-116	CF_3CF_3	hexafluoroethane	A1	34	97,000	550					1,000	1-0-0
R-123	$CHCl_2CF_3$	2,2-dichloro-1,1,1-trifluoroethane	B1	3.5	9,100	57					50	2-0-0[b]
R-124	$CHClFCF_3$	2-chloro-1,1,1,2-tetrafluoroethane	A1	3.5	10,000	56					1,000	2-0-0[b]
R-125	CHF_2CF_3	pentafluoroethane	A1	23	75,000	370					1,000	2-0-0[b]
R-134a	CH_2FCF_3	1,1,1,2-tetrafluoroethane	A1	13	50,000	210					1,000	2-0-0[b]
R-141b	CH_3CCl_2F	1,1-dichloro-1-fluoroethane	—	0.78	2,600	12	17.8	60,000	287	500	2-1-0	
R-142b	CH_3CClF_2	1-chloro-1,1-difluoroethane	A2	5.1	20,000	~~33~~82	20.4	80,000	329	1,000	2-4-0	
R-143a	CH_3CF_3	1,1,1-trifluoroethane	A2LA2[b]	~~4.5~~4.4	21,000	70	17.5	82,000	282	1,000	2-0-0[b]	
R-152a	CH_3CHF_2	1,1-difluoroethane	A2	2.0	12,000	32	8.1	48,000	130	1,000	1-4-0	
R-170	CH_3CH_3	ethane	A3	0.54	7,000	~~8.7~~ 8.6	2.4	31,000	38	1,000	2-4-0	
R-E170	CH_3OCH_3	Methoxymethane (dimethyl ether)	A3	1.0	8,500	16	4.0	34,000	64	1,000	—	
R-218	$CF_3CF_2CF_3$	octafluoropropane	A1	43	90,000	690					1,000	2-0-0[b]
R-227ea	CF_3CHFCF_3	1,1,1,2,3,3,3-heptafluoropropane	A1	36	84,000	580					1,000	—
R-236fa	$CF_3CH_2CF_3$	1,1,1,3,3,3-hexafluoropropane	A1	21	55,000	340					1,000	2-0-0[b]
R-245fa	$CHF_2CH_2CF_3$	1,1,1,3,3-pentafluoropropane	B1	12	34,000	190					300	2-0-0[b]
R-290	$CH_3CH_2CH_3$	propane	A3	~~0.56~~0.59	5,300	9.5	2.4	21,000	38	1,000	2-4-0	
R-C318	$-(CF_2)_4-$	octafluorocyclobutane	A1	41	80,000	~~660~~ 650					1,000	—
R-400[f][g]	zeotrope	R-12/114 (50.0/50.0)	A1	10	28,000	160					1,000	2-0-0[b]
R-400[f][g]	zeotrope	R-12/114 (60.0/40.0)	A1	11	30,000	170					1,000	—
R-401A	zeotrope	R-22/152a/124 (53.0/13.0/34.0)	A1	6.6	27,000	110					1,000	2-0-0[b]
R-401B	zeotrope	R-22/152a/124 (61.0/11.0/28.0)	A1	7.2	30,000	120					1,000	2-0-0[b]
R-401C	zeotrope	R-22/152a/124 (33.0/15.0/52.0)	A1	5.2	20,000	84					1,000	2-0-0[b]
R-402A	zeotrope	R-125/290/22 (60.0/2.0/38.0)	A1	17	66,000	270					1,000	2-0-0[b]
R-402B	zeotrope	R-125/290/22 (38.0/2.0/60.0)	A1	15	63,000	240					1,000	2-0-0[b]
R-403A	zeotrope	R-290/22/218 (5.0/75.0/20.0)	A2	7.6	33,000	120					1,000	2-0-0[b]

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M11370Text Modification

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE								[F] DEGREES OF HAZARD
				RCL			LFL			OEL		
				~~Pounds per 1,000 cubic feet~~ lb/MCf	ppm	g/m	lb/MCf	ppm	g/m	~~OEL~~ ppm		
R-403B	zeotrope	R-290/22/218 (5.0/56.0/39.0)	A1	18	~~70,000~~ 68,000	290				1,000		2-0-0[b]
R-404A	zeotrope	R-125/143a/134a (44.0/52.0/4.0)	A1	31	130,000	500				1,000		2-0-0[b]
R-405A	zeotrope	R-22/152a/142b/C318 (45.0/7.0/5.5/42.5)	—	16	57,000	260				1,000		—
R-406A	zeotrope	R-22/600a/142b (55.0/4.0/41.0)	A2	4.7	21,000	~~25~~75	18.8	82,000	301.9	1,000		—
R-407A	zeotrope	R-32/125/134a (20.0/40.0/40.0)	A1	19	83,000	300				1,000		2-0-0[b]
R-407B	zeotrope	R-32/125/134a (10.0/70.0/20.0)	A1	21	79,000	330				1,000		2-0-0[b]
R-407C	zeotrope	R-32/125/134a (23.0/25.0/52.0)	A1	18	81,000	290				1,000		2-0-0[b]
R-407D	zeotrope	R-32/125/134a (15.0/15.0/70.0)	A1	16	68,000	250				1,000		2-0-0[b]
R-407E	zeotrope	R-32/125/134a (25.0/15.0/60.0)	A1	17	80,000	280				1,000		2-0-0[b]
R-407F	zeotrope	R-32/125/134a (30.0/30.0/40.0)	A1	20	95,000	320				1,000		—
R-407G	zeotrope	R-32/125/134a (2.5/2.5/95.0)	A1	13	52,000	210				1,000		—
R-407H	zeotrope	R-32/125/134a (32.5/15.0/52.5)	A1	19	92,000	300				1,000		—
R-407I	zeotrope	R-32/125/124a (19.5/8.5/72.0)	A1	16	71,100	250				1,000		—
R-408A	zeotrope	R-125/143a/22 (7.0/46.0/47.0)	A1	21	~~95,000~~ 94,000	~~340~~ 330				1,000		2-0-0[b]
R-409A	zeotrope	R-22/124/142b (60.0/25.0/15.0)	A1	7.1	29,000	110				1,000		2-0-0[b]
R-409B	zeotrope	R-22/124/142b (65.0/25.0/10.0)	A1	7.3	30,000	120				1,000		2-0-0[b]
R-410A	zeotrope	R-32/125 (50.0/50.0)	A1	26	140,000	420				1,000		2-0-0[b]
R-410B	zeotrope	R-32/125 (45.0/55.0)	A1	27	140,000	430				1,000		2-0-0[b]
R-411A	zeotrope	R-127/22/152a (1.5/87.5/11.0)	A2	2.9	14,000	46	11.6	55,000	185.6	~~990~~ 970		—
R-411B	zeotrope	R-1270/22/152a (3.0/94.0/3.0)	A2	2.8	13,000	45	14.8	70,000	238.3	~~980~~ 940		—
R-412A	zeotrope	R-22/218/142b (70.0/5.0/25.0)	A2	5.1	22,000	82	20.5	87,000	328.6	1,000		—
R-413A	zeotrope	R-218/134a/600a (9.0/88.0/3.0)	A2	5.8	22,000	~~94~~93	23.4	88,000	374.9	1,000		—
R-414A	zeotrope	R-22/124/600a/142b (51.0/28.5/4.0/16.5)	A1	6.4	26,000	100				1,000		—
R-414B	zeotrope	R-22/124/600a/142b (50.0/39.0/1.5/9.5)	A1	6.0	23,000	~~95~~96				1,000		—
R-415A	zeotrope	R-22/152a (82.0/18.0)	A2	2.9	14,000	47	11.7	56,000	187.9	1,000		—
R-415B	zeotrope	R-22/152a (25.0/75.0)	A2	2.1	12,000	34	8.4	47,000	135.1	1,000		—
R-416A	zeotrope	R-134a/124/600 (59.0/39.5/1.5)	A1	3.9	14,000	62				1,000		2-0-0[b]
R-417A	zeotrope	R-125/134a/600 (46.6/50.0/3.4)	A1	3.5	13,000	~~56~~55				1,000		2-0-0[b]
R-417B	zeotrope	R-125/134a/600 (79.0/18.3/2.7)	A1	4.3	15,000	~~70~~69				1,000		—
R-417C	zeotrope	R-125/134a/600 (19.5/78.8/1.7)	A1	5.4	21,000	87				1,000		—
R-418A	zeotrope	R-290/22/152a (1.5/96.0/2.5)	A2	4.8	22,000	77	19.2	89,000	308.4	1,000		—
R-419A	zeotrope	R-125/134a/E170 (77.0/19.0/4.0)	A2	4.2	15,000	67	16.7	60,000	268.6	1,000		—
R-419B	zeotrope	R-125/134a/E170 (48.5/48.0/3.5)	A2	4.6	17,000	74	18.5	69,000	297.3	1,000		—
R-420A	zeotrope	R-134a/142b (88.0/12.0)	A1	12	~~45,000~~ 44,000	~~190~~ 180				1,000		2-0-0[b]
R-421A	zeotrope	R-125/134a (58.0/42.0)	A1	17	61,000	280				1,000		2-0-0[b]
R-421B	zeotrope	R-125/134a (85.0/15.0)	A1	21	69,000	330				1,000		2-0-0[b]
R-422A	zeotrope	R-125/134a/600a (85.1/11.5/3.4)	A1	18	63,000	290				1,000		2-0-0[b]
R-422B	zeotrope	R-125/134a/600a (55.0/42.0/3.0)	A1	16	56,000	250				1,000		2-0-0[b]
R-422C	zeotrope	R-125/134a/600a (82.0/15.0/3.0)	A1	18	62,000	290				1,000		2-0-0[b]
R-422D	zeotrope	R-125/134a/600a (65.1/31.5/3.4)	A1	16	58,000	260				1,000		2-0-0[b]
R-422E	zeotrope	R-125/134a/600a (58.0/39.3/2.7)	A1	16	57,000	260				1,000		—
R-423A	zeotrope	R-134a/227ea (52.5/47.5)	A1	19	59,000	~~310~~ 300				1,000		2-0-0[b]
R-424A	zeotrope	R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6)	A1	6.2	23,000	100				~~970~~ 990		2-0-0[b]
R-425A	zoetrope	R-32/134a/227ea (18.5/69.5/12.0)	A1	16	72,000	260				1,000		2-0-0[b]
R-426A	zeotrope	R-125/134a/600a/601a (5.1/93.0/1.3/0.6)	A1	5.2	20,000	83				990		—
R-427A	zeotrope	R-32/125/143a/134a (15.0/25.0/10.0/50.0)	A1	18	79,000	290				1,000		2-1-0
R-428A	zeotrope	R-125/143a/290/600a (77.5/20.0/0.6/1.9)	A1	23	~~83,000~~ 84,000	370				1,000		—
R-429A	zeotrope	R-E170/152a/600a (60.0/10.0/30.0)	A3	0.81	6,300	13	3.2	25,000	83.8	1,000		—
R-430A	zeotrope	R-152a/600a (76.0/24.0)	A3	1.3	8,000	21	5.2	32,000	44.0	1,000		—
R-431A	zeotrope	R-290/152a (71.0/29.0)	A3	~~0.69~~0.68	5,500	11	2.7	22,000	38.6	1,000		—
R-432A	zeotrope	R-1270/E170 (80.0/20.0)	A3	0.13	1,200	2.1	2.4	22,000	39.2	~~700~~ 550		—

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CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							[F] DEGREES OF HAZARD
				RCL			LFL			OEL	
				~~Pounds per 1,000 cubic feet~~ lb/MCf	ppm	g/m	lb/MCf	ppm	g/m	~~OEL~~ ppm	
R-433A	zeotrope	R-1270/290 (30.0/70.0)	A3	0.34	3,100	5.5	2.4	20,000	32.4	~~880~~ 760	—
R-433B	zeotrope	R-1270/290 (5.0-95.0)	A3	~~0.51~~0.39	~~4,500~~ 3,500	~~8.1~~ 6.3	2.0	18,000	32.1	950	—
R-433C	zeotrope	R-1270/290 (25.0-75.0)	A3	0.41	~~3,600~~ 3,700	~~6.6~~ 6.5	2.0	18,000	83.8	790	—
R-434A	zeotrope	R-125/143a/600a (63.2/18.0/16.0/2.8)	A1	20	73,000	320				1,000	—
R-435A	zeotrope	R-E170/152a (80.0/20.0)	A3	1.1	8,500	17	4.3	34,000	68.2	1,000	—
R-436A	zeotrope	R-290/600a (56.0/44.0)	A3	0.50	4,000	8.1	2.0	16,000	32.3	1,000	—
R-436B	zeotrope	R-290/600a (52.0/48.0)	A3	0.51	4,000	~~8.1~~ 8.2	2.0	16,000	32.7	1,000	—
R-436C	zeotrope	R-290/600a (95.0/5.0)	A3	0.57	5,000	9.1	2.3	20,000	36.5	1,000	
R-437A	zeotrope	R-125/134a/600/601 (19.5/78.5/1.4/0.6)	A1	~~5.0~~5.1	19,000	82				990	—
R-438A	zeotrope	R-32/125/134a/600/601a (8.5/45.0/44.2/1.7/0.6)	A1	4.9	20,000	79				990	—
R-439A	zeotrope	R-32/125/600a (50.0/47.0/3.0)	A2	4.7	26,000	76	18.9	104,000	303.3	~~990~~ 1,000	—
R-440A	zeotrope	R-290/134a/152a (0.6/1.6/97.8)	A2	1.9	12,000	31	7.8	46,000	124.7	1,000	—
R-441A	zeotrope	R-170/290/600a/600 (3.1/54.8/6.0/36.1)	A3	0.39	3,200	6.3	2.0	16,000	31.7	1,000	—
R-442A	zeotrope	R-32/125/134a/152a/227ea (31.0/31.0/30.0/3.0/5.0)	A1	21	100,000	330				1,000	—
R-443A	zeotrope	R-1270/290/600a (55.0/40.0/5.0)	A3	0.19	1,700	3.1	2.2	20,000	35.6	~~580~~ 640	—
R-444A	zeotrope	R-32/152a/1234ze(E) (12.0/5.0/83.0)	A2LA2[b]	5.1	21,000	81	19.9	82,000	324.8	850	—
R-444B	zeotrope	R-32/152a/1234ze(E) (41.5/10.0/48.5)	A2LA2[b]	4.3	23,000	69	17.3	93,000	277.3	~~890~~ 930	—
R-445A	zeotrope	R-744/134a/1234ze(E) (6.0/9.0/85.0)	A2LA2[b]	4.2	16,000	67	2.7	63,000	347.4	930	—
R-446A	zeotrope	R-32/1234ze(E)/600 (68.0/29.0/3.0)	A2LA2[b]	2.5	16,000	39	13.5	62,000	217.4	960	—
R-447A	zeotrope	R-32/125/1234ze(E) (68.0/3.5/28.5)	A2LA2[b]	2.6	16,000	42	18.9	65,000	303.5	~~900~~ 960	—
R-447B	zeotrope	R-32/125/1234ze(E) (68.0/8.0/24.0)	A2LA2[b]	~~23~~2.6	~~30,000~~ 16,000	~~360~~ 42	20.6	121,000	312.7	970	—
R-448A	zeotrope	R-32/125/1234yf/134a/1234ze(E) (26.0/26.0/20.0/21.0/7.0)	A1	24	110,000	390				~~890~~ 860	—
R-449A	zeotrope	R-32/125/1234yf/134a (24.3/24.7/25.3/25.7)	A1	23	100,000	370				~~830~~ 840	—
R-449B	zeotrope	R-32/125/1234yf/134a (25.2/24.3/23.2/27.3)	A1	23	100,000	370				850	—
R-449C	zeotrope	R-32/125/1234yf/134a (20.0/20.0/31.0/29.0)	A1	23	98,000	360				800	—
R-450A	zeotrope	R-134a/1234ze(E) (42.0/58.0)	A1	20	72,000	320				880	—
R-451A	zeotrope	R-1234yf/134a (89.8/10.2)	A2LA2[b]	~~5.3~~5.0	18,000	81	20.3	70,000	326.6	~~520~~ 530	—
R-451B	zeotrope	R-1234yf/134a (88.8/11.2)	A2LA2[b]	~~5.3~~5.0	18,000	81	20.3	70,000	326.6	530	—
R-452A	zeotrope	R-32/125/1234yf (11.0/59.0/30.0)	A1	27	~~10,000~~ 100,000	440				~~780~~ 790	—
R-452B	zeotrope	R-32/125/1234yf (67.0/7.0/26.0)	A2LA2[b]	~~23~~4.8	30,000	~~360~~ 77	19.3	119,000	310.5	870	—
R-452C	zeotrope	R-32/125/1234yf (12.5/61.0/26.5)	A1	27	100,000	430				~~800~~ 810	—
R-453A	zeotrope	R-32/125/134a/227ea/600/601a (20.0/20.0/53.8/5.0/0.6/0.6)	A1	7.8	34,000	120				1,000	—
R-454A	zeotrope	R-32/1234yf (35.0/65.0)	A2LA2[b]	~~28~~3.2	16,000	~~450~~ 52	18.3	63,000	293.9	690	—
R-454B	zeotrope	R-32/1234yf (68.9/31.1)	A2LA2[b]	~~22~~3.1	19,000	~~360~~ 49	22.0	77,000	352.6	850	—
R-454C	zeotrope	R-32/1234yf (21.5/78.5)	A2LA2[b]	~~29~~4.4	19,000	~~460~~ 71	18.0	62,000	289.5	620	—
R-455A	zeotrope	R-744/32/1234yf (3.0/21.5/75.5)	A2LA2[b]	~~23~~4.9	~~30,000~~ 22,000	~~380~~ 79	26.9	118,000	432.1	650	—
R-456A	zeotrope	R-32/134a/1234ze(E) (6.0/45.0/49.0)	A1	20	77,000	320				900	—
R-457A	zeotrope	R-32/1234yf/152a (18.0/70.0/12.0)	A2LA2[b]	~~26~~3.4	15,000	~~400~~ 54	13.5	60,000	216.3	650	—
R-457B	zeotrope	R-32/1234yf/152a (35.0/55.0/10.0)	A2L	3.7	19,000	59	14.9	76,000	239	730	

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CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							[F] DEGREES OF HAZARD
				RCL			LFL			OEL	
				~~Pounds per 1,000 cubic feet~~ lb/MCf	ppm	g/m	lb/MCf	ppm	g/m	~~OEL~~ ppm	
R-458A	zeotrope	R-32/125/134a/227ea/236fa (20.5/4.0/61.4/13.5/0.6)	A1	18	76,000	280				1,000	—
R-459A	zeotrope	R-32/1234yf/1234ze(E) (68.0/26.0/6.0)	A2LA2[b]	~~234.3~~	27,000	~~360~~ 69	17.4	107,000	278.7	870	—
R-459B	zeotrope	R-32/1234yf/1234ze(E) (21.0/69.0/10.0)	A2LA2[b]	30	~~16,000~~ 25,000	~~470~~ 92	23.3	99,000	373.5	640	—
R-460A	zeotrope	R-32/125/134a/1234ze(E) (12.0/52.0/14.0/22.0)	A1	24	92,000	380				~~650~~ 950	—
R-460B	zeotrope	R-32/125/134a/1234ze(E) (28.0/25.0/20.0/27.0)	A1	25	120,000	400				950	—
R-460C	zeotrope	R-32/125/134a/1234ze(E) (2.5/2.5/46.0/49.0)	A1	20	73,000	310				900	
R-461A	zeotrope	R-125/143a/134a/227ea/600a (55.0/5.0/32.0/5.0/3.0)	A1	17	61,000	270				1,000	—
R-462A	zeotrope	R-32/125/143a/134a/600 (9.0/42.0/2.0/44.0/3.0)	A2	3.9	16,000	62	16.6	105,000	265.8	1,000	—
R-463A	zeotrope	R-744/32/125/1234yf/134a (6.0/36.0/30.0/14.0/14.0)	A1	19	98,000	300				990	—
R-464A	zeotrope	R-32/125/1234ze(E)/227ea (27.0/27.0/40.0/6.0)	A1	27	120,000	430				930	
R-465A	zeotrope	R-32/290/1234yf (21.0/7.9/71.1)	A2	2.5	12,000	40	10.0	98,000	160.9	660	
R-466A	zeotrope	R-32/125/13I1 (49.0/11.5/39.5)	A1	6.2	30,000	99				860	
R-467A	zeotrope	R-32/125/134a/600a (22.0/5.0/72.4/0.6)	A2L	6.7	31,000	110				1,000	
R-468A	zeotrope	R-1132a/32/1234yf (3.5/21.5/75.0)	A2L	4.1	18,000	66				610	
R-469A	zeotrope	R-744/R-32/R-125 (35.0/32.5/32.5)	A1	8	53,000					1,600	
R-470A	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	17	77,000	270				1,100	
R-470B	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	16	72,000	270				1,100	
R-471A	zeotrope	R-1234ze(E)/227ea/1336mzz(E) (78.7/4.3/17.0)	A1	9.7	31,000	160				710	
R-472A	zeotrope	R-744/32/134a (69.0/12.0/19.0)	A1	4.5	35,000	72				2,700	
R-500[a][d]	azeotrope	R-12/152a (73.8/26.2)	A1	~~7.6~~7.4	~~30,000~~ 29,000	120				1,000	~~200~~ [b]
R-501[a][c]	azeotrope	R-22/12 (75.0/25.0)	A1	13	54,000	210				1,000	—
R-502[a][d]	azeotrope	R-22/115 (48.8/51.2)	A1	21	73,000	330				1,000	~~200~~ [b]
R-503[a][d]	azeotrope	R-23/13 (40.1/59.9)	—	—	—	—				1,000	~~200~~ [b]
R-504[a][c]	azeotrope	R-32/115 (48.2/51.8)	—	28	140,000	450				1,000	—
R-507A	azeotrope	R-125/143a (50.0/50.0)	A1	32	130,000	~~620~~ 510				1,000	~~200~~ [b]
R-508A	azeotrope	R-23/116 (39.0/61.0)	A1	14	55,000	220				1,000	~~200~~ [b]
R-508B	azeotrope	R-23/116 (46.0/54.0)	A1	13	52,000	200				1,000	~~200~~ [b]
R-509A	azeotrope	R-22/218 (44.0/56.0)	A1	24	75,000	~~390~~ 380				1,000	~~200~~ [b]
R-510A	azeotrope	R-E170/600a (88.0/12.0)	A3	0.87	7,300	14	3.5	29,000	56.1	1,000	—
R-511A	azeotrope	R-290/E170 (95.0/5.0)	A3	0.59	5,300	9.5	2.4	21,000	38.0	1,000	—
R-512A	azeotrope	R-134a/152a (5.0/95.0)	A2	1.9	11,000	31	7.7	45,000	123.9	1,000	—
R-513A	azeotrope	R-1234yf/134a (56.0/44.0)	A1	20	72,000	320				650	—
R-513B	azeotrope	R-1234yf/134a (58.5/41.5)	A1	21	74,000	330				640	—
R-514A	azeotrope	R-1336mzz(S)/1130(E) (74.7/25.3)	B1	0.86	2,400	~~14~~				320	—
R-515A	azeotrope	R-1234ze(E)/227ea (88.0/12.0)	A1	19	~~82,000~~ 63,000	300				810	—
R-515B	azeotrope	R-1234ze(E)/227ea (91.1/8.9)	A1	18	61,000	290				810	
R-516A	azeotrope	R-1234yf/134a/152a (77.5/8.5/14.0)	A2	~~7.0~~3.2	~~27,000~~ 13,000	~~110~~ 52	13.1	50,000	210.1	590	—
R-600	$CH_3CH_2CH_2CH_3$	butane	A3	0.15	1,000	2.4	3.0	20,000	48	1,000	1-4-0
R-600a	$CH(CH_3)2CH_3$	2-methylpropane (isobutane)	A3	0.59	4,000	~~9.6~~ 9.5	2.4	16,000	38	1,000	2-4-0
R-601	$CH_3CH_2CH_2$ CH_2CH_3	pentane	A3	0.18	1,000	2.9	2.2	12,000	35	600	—
R-601a	$(CH_3)2CHCH_2CH_3$	2-methylbutane (isopentane)	A3	0.18	1,000	2.9	2.4	13,000	38	600	—
R-610	$CH_3CH_2OCH_2CH_3$	ethoxyethane (ethyl ether)	—	—	—	—				400	—
R-611	$HCOOCH_3$	methyl formate	B2	—	—	—				100	—
~~R-717~~	NH_3	~~ammonia~~	B2L	0.014	320	0.22	7.2	~~167,000~~	116	25	3-3-0[c]
R-718	$H2O$	water	A1	—	—	—				—	0-0-0
R-744	CO_2	carbon dioxide	A1	4.5	40,000	72				5,000	2-0-0 [b]
R-1130(E)	CHCl=CHCl	trans-1,2-dichloroethene	~~B1~~B2	0.25	1,000	4	16	~~65,000~~	~~258~~	200	—

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Mod_11370_Text_M74-21.pdf

M11370Text Modification

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							[F] DEGREES OF HAZARD
				RCL			LFL			OEL	
				Pounds per 1,000 cubic feet lb/MCf[f]	ppm	g/m	lb/MCf	ppm	g/m	OEL ppm	
R-1132a	$CF_2=CH_2$	1,1-difluoroethylene	A2	2.0	13,000	33	8.1	50,000	131	500	—
R-1150	$CH_2=CH_2$	ethene (ethylene)	A3	—	—	—	2.2	31,000	36	200	1-4-2
R-1224yd(Z)	$CF_3CF=CHCl$	(Z)-1-chloro-2,3,3,3-tetrafluoroethylene	A1	23	60,000	360 370				1,000	—
R-1233zd(E)	$CF_3CH=CHCl$	trans-1-chloro-3,3,3-trifluoro-1-propene	A1	5.3	16,000	85				800	—
R-1234yf	$CF_3CF=CH_2$	2,3,3,3-tetrafluoro-1-propene	A2LA2[c]	4.74.5	16,000	75	18.0	62,000	289	500	—
R-1234ze(E)	$CF_3CH=CHF$ $CF_3CH=CFH$	trans-1,3,3,3-tetrafluoro-1-propene	A2LA2[c]	4.7	16,000	7576	18.8	65,000	303	800	—
R-1270	$CH_3CH=CH_2$	Propene (propylene)	A3	0.1	1,000	1.7				500	1-4-1
R-1336mzz(E)	$CF_3CHCHCF_3$	trans 1,1,1,4,4,4-hexafluoro-2- butene	A1	3.0	7,200	48				400	
R-1336mzz(Z)	$CF_3CHCHCF_3$	cis-1,1,1,4,4,4-hexaflouro-2-butene	A1	5.45.2	13,000	8784				500	—

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.0283m^3

a. Degrees of hazard are for health, fire, and reactivity, respectively, in accordance with NFPA 704.

b. Reduction to 1-0-0 is allowed if analysis satisfactory to the code official shows that the maximum concentration for a rupture or full loss of refrigerant charge would not exceed the IDLH, considering both the refrigerant quantity and room volume.

c. ~~The ASHRAE Standard 34 flammability classification for this refrigerant is 2L, which is a subclass of Class 2.~~

c d. Class I ozone depleting substance; prohibited for new installations.

d e. Occupational Exposure Limit based on the OSHA PEL, ACGIH TLV-TWA, the TERA WEEL or consistent value on a time-weighed average (TWA) basis (unless noted C for ceiling) for an 8 hr/d and 40 hr/wk.

Reason: The Refrigerant Classifications (except Degrees of Hazard) are determined by ASHRAE SSPC 34 and published in ASHRAE Standard 34. This proposal seeks to update the refrigerant table with the new refrigerants added to Standard 34 since the last code cycle. The reasons for the additions of new refrigerants can be found at https://www.ashrae.org/standards-research--technology/standards-addenda. All proposed changes are either incorporated into ASHRAE Standard 34-2019 or the published addenda to ASHRAE Standard 34-2019 located at the link above.

Bibliography: ASHRAE Standard 34-2019, Designation and Safety Classification of Refrigerants, with addenda c, d, e, f, g, h, l, m, p, t, u, x, y - https://www.ashrae.org/standards-research--technology/standards-addenda

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Updating the table of refrigerants that could be used in systems does not add labor or material costs because the choice of refrigerant is up to the owner and designer.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE 1103.1 REFRIGERANT CLASSIFICATION, AMOUNT AND OEL**Portions of table not shown remain unchanged.**

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							[F] DEGREES OF HAZARD[a]
				RCL			LFL			OEL[d]	
				lb/MCf	ppm	g/m^3	lb/MCf	ppm	g/m^3	ppm	

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Mod_11370_Text_M74-21.pdf

M11370Text Modification

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							[F] DEGREES OF HAZARD
				RCL			LFL			OEL	
				lb/MCf	ppm	g/m	lb/MCf	ppm	g/m	ppm	
~~R-717~~	~~NH_3~~	~~ammonia~~	~~B2L~~	~~0.014~~	~~320~~	~~0.22~~	~~7.2~~	~~167,000~~	~~116~~	~~25~~	~~3-3-0[6]~~

Committee Reason: This proposal has passed as it appropriately updates the Table to match SSPC-34 2019 requirements. The modification recognizes that this chapter does not cover ammonia by removing it from the Table. (Vote: 11-0)

Final Hearing Results

M74-21 AM

Page: 6

Mod_11370_Text_M74-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11371 | **/M75-21**

Date Submitted	03/26/2024	**Section**	1104.3.1	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds exceptions to section regarding refrigerant and ASHRAE 15 updates

Rationale

See attached

M11371Text Modification

See attached

Page: 1

Mod11371_TextOfModification.pdf

M11371Text Modification

M75-21

Original Proposal

IMC: 1104.3.1, 1104.3.2, TABLE 1104.3.2

Proponents: Helen Walter-Terrinoni, AHRI, AHRI (helen.a.walter-terrinoni@outlook.com); Julius Ballanco, JB Engineering and Code Consulting, P.C., Daikin US (JBENGINEER@aol.com); Andrew Klein, A S Klein Engineering, The Chemours Company (andrew@asklein.com); Joe Nebbia, Newport Partners, Natural Resources Defense Council (jnebbia@newportpartnersllc.com)

International Mechanical Code

2021 International Mechanical Code

Revise as follows:

1104.3.1 Air conditioning for human comfort. ~~In other than industrial occupancies where the quantity in a single independent circuit does not exceed the amount in Table 1103.1, Group B1, B2 and B3 refrigerants shall not be used in high-probability systems for air conditioning for human comfort.~~ High probability systems used for human comfort shall use Group A1 or A2L refrigerant.

Exceptions:

1. Listed equipment for residential occupancies containing a maximum of 6.6 pounds (3 kg) of refrigerant.
2. Listed equipment for commercial occupancies containing a maximum of 22 pounds (10 kg) of refrigerant.
3. Industrial occupancies.

1104.3.2 ~~Nonindustrial occupancies~~Group A3 and B3 refrigerants. ~~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.~~ Group A3 and B3 refrigerants shall not be used except where *approved*.

~~Exception~~ Exceptions: This section does not apply to:

1. ~~laboratories~~ 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.

Delete without substitution:

~~TABLE 1104.3.2 MAXIMUM PERMISSIBLE QUANTITIES OF REFRIGERANTS~~

TYPE OF REFRIGERATION SYSTEM	MAXIMUM POUNDS FOR VARIOUS OCCUPANCIES			
	Institutional	Public a ssembly	Residential	All other occupancies
Sealed absorption system				
In exit access	0	0	3.3	3.3
In adjacent outdoor locations	0	0	22	22
In other than exit access	0	6.6	6.6	6.6
Unit systems				
In other than exit access	0	0	6.6	6.6

~~For SI: 1 pound = 0.454 kg.~~

Reason: These requirements are based on previous editions of ASHRAE 15. ASHRAE 15 has been updated numerous times resulting in the modification to the requirement similar to this proposal. High probability direct systems for human comfort must use either Group A1 or

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M11371Text Modification

A2L refrigerant. Other refrigerants can be used provided the maximum charge does not exceed 6.6 pound for residential applications and 22 pounds for commercial units. Plus, these unit must be listed for use with these other refrigerants. The revision to Section 1104.3.1 becomes consistent with Section 7.5.2 of ASHRAE 15. Although, ASHRAE lists the refrigerants prohibited for this application, whereas this proposal lists the refrigerants required to be used.
Section 1104.3.2 text being stricken is addressed in the revised text to Section 1104.3.1. The remaining text is consistent with the requirements in Section 7.5.3 of ASHRAE 15.

Addendum i of ASHRAE 15-2019 deleted the table that is equivalent to Table 1104.3.2. This table is no longer necessary with the change to ammonia refrigerant requirements during the last two cycles and with the change adding the exceptions to Section 1104.3.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is a clarification of the current requirements that allow Group A1 and A2L for high probability system used for human comfort. There is no impact to the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

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

Exceptions:

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

1104.3.2Group A2, A3, B2 and B3 refrigerants.
Group A2 and B2 refrigerants shall not be used in high-probability systems. GroupA3 and B3 refrigerants shall not be used except where *approved*.

Exceptions: 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.

Committee Reason: This proposal has been approved as modified because it clarifies and matches up with change made in ASHRAE15 group A3 and B3 requirements. (Vote: 10-0)

Final Hearing Results

M75-21 AM

Page: 2

Mod_11371_Text_M75-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

69

M11372 | **/M77-21 Part I**

Date Submitted	03/26/2024	**Section**	1106.3	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			Staff Classification	Correlates Directly

Comments

General Comments No

Related Modifications

FBC-M/Section 1106.4.

Summary of Modification

Updates refrigerant types from ASHRAE 15 update

Rationale

See attached

M11372Text Modification

See attached

Mod11372_TextOfModification.pdf Page: 1

M11372Text Modification

M77-21 Part I

Original Proposal

IMC: 1106.3

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Daikin US (JBENGINEER@aol.com)

THIS IS A TWO PART CODE CHANGE. PART I AND PART II WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2021 International Mechanical Code

Revise as follows:

1106.3 ~~Flammable~~Class 2 and 3 refrigerants. Where refrigerants of Groups A2, A3, B2 and B3 are used, the *machinery room* shall conform to the Class I, Division 2, *hazardous location* classification requirements of NFPA 70.

~~Exception:~~ ~~*Machinery rooms* for systems containing Group A2L *refrigerants* that are provided with ventilation in accordance with Section 1106.4.~~

Reason: The second exception in the Fire Code and the exception in the Mechanical Code are no long necessary with the revision in the 2021 International Mechanical Code regarding refrigerant classification. A2L is a separate group of refrigerant. Both sections state that the requirements apply to A2, A3, B2, and B3. Hence, A2L is not included in the requirements so the two exceptions proposed for deletion no longer are needed.
ASHRAE 15 has been modified removing the term "flammable refrigerant" and replacing it with the specific Class of refrigerant. Section 1106.3 has thus been modified to indicate Class 2 and 3 refrigerants.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial in nature. As a result, there is no impact to the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has passed as submitted because it cleans up the language based on revisions to ASHRAE 15 and the 2021 IMC with respect to the hazardous location requirements in NFPA70. (Vote: 11-0)

Final Hearing Results

M77-21 Part I AS

Page: 1

Mod_11372_Text_M77-21 Part I.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

70

M11374 | **/M78-21 Part I**

Date Submitted	03/26/2024	**Section**	1106.4	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - M.

Summary of Modification

Updates language for refrigerants from ASHRAE 15 update

Rationale

See attached

M11374Text Modification

See attached

Page: 1

Mod11374_TextOfModification.pdf

M11374Text Modification

M78-21 Part I

Original Proposal

IMC: 1106.4, 1106.4.1 (New), 1106.4.2, TABLE 1106.4.2 (New), TABLE 1106.4.2, 1106.4.3

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Mechanical Code

Delete and substitute as follows:

~~**1106.4 Special requirements for Group A2L refrigerant machinery rooms.** *Machinery rooms* with systems containing Group A2L *refrigerants* that do not conform to the Class I, Division 2, hazardous location electrical requirements of NFPA 70, as permitted by the exception to Section 1106.3, shall comply with Sections 1106.4.1 through 1106.4.3.~~

~~**Exception:** *Machinery rooms* conforming to the Class I, Division 2, hazardous location classification requirements of NFPA 70 are not required to comply with Sections 1106.4.1 and 1106.4.2.~~

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

Add new text as follows:

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.

Delete and substitute as follows:

~~**1106.4.2 Emergency ventilation system.** An emergency ventilation system shall be provided at the minimum exhaust rate specified in ASHRAE 15 or Table 1106.4.2. Shutdown of the emergency ventilation system shall be by manual means.~~

1106.4.2 Refrigerant Detector. In addition to the requirements of Section 1105.3, refrigerant detectors shall signal an alarm and activate the ventilation system in accordance with the response time specified in Table 1106.4.2.

Add new text as follows:

TABLE 1106.4.2 GROUP A2L and B2L DETECTOR ACTIVATION

Activation Level	Maximum Response Time (seconds)	ASHRAE 15 Ventilation Level	Alarm Reset	Alarm Type
Less than or equal to the OEL in Table 1103.1	300	1	Automatic	Trouble
Less than or equal to the refrigerant concentration level in Table 1103.1	15	2	Manual	Emergency

Delete without substitution:

~~**TABLE 1106.4.2 MINIMUM EXHAUST RATES**~~

Page: 1

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M11374Text Modification

REFRIGERANT	Q(m/sec)	Q(cfm)
REFRIGERANT	Q(m/sec)	Q(cfm)
R32	15.4	32,600
R143	13.6	28,700
R444A	6.46	13,700
R444B	10.6	22,400
R445A	7.83	16,600
R446A	23.9	50,700
R447A	23.8	50,400
R451A	7.04	15,000
R451B	7.05	15,000
R1234yf	7.80	16,600
R1234ze(E)	5.92	12,600

Delete and substitute as follows:

~~**1106.4.3 Emergency ventilation system discharge.** The emergency ventilation system point of discharge to the atmosphere shall be located outside of the structure at not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, *ventilation* opening or *exit*.~~

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

Reason: The machinery room requirements in the 2019 edition of ASHRAE 15 have been completely revised for Group A2L and B2L refrigerants. The table in the current code was part of the original draft to ASHRAE 15 that was subsequently rejected as being inaccurate. This is proposed for deletion.
With Group A2L and B2L refrigerants, research has proven that open flames and hot surfaces can be at a higher temperature than Group A2, A3, B2, and B3 refrigerants. Section 1106.4.1 adds special provisions for Group A2L and B2L refrigerants regarding hot surfaces. New ventilation requirements were added to ASHRAE 15 for machinery rooms using Group A2L and B2L refrigerants. There are two levels of ventilation that are required based on the response of the refrigerant detector. This proposal references ASHRAE 15 for the ventilation requirement (note that the latest standard can be viewed free of charge at https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards.) A table is included that identifies the two levels of annunciation in the event of a refrigerant leak in a machinery room. The first activation is a trouble alarm for a small leak. This requires a minimal amount of ventilation. The second level is an emergency alarm. This signals the activation of the full amount of ventilation for the room.

Bibliography: 1. ANSI/ASHRAE 15-2019, Safety Standard for Refrigeration Systems.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change clarifies the requirements for ventilation of a machinery room. The use of A2L refrigerant is optional.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has passed as submitted because it aligns IMC with ASHRAE regarding temperature controls in refrigerator rooms based upon detection levels. (Vote: 10-1)

Final Hearing Results

M78-21 Part I AS

Page: 2

Mod_11374_Text_M78-21 Part I.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

71

M11375 | **/M78-21 Part II**

Date Submitted	03/26/2024	**Section**	1106.4.1	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not part of the 2023 FBC - M.

Summary of Modification

Deletes entire section in line with ASHRAE 15 updates

Rationale

See attached

M11375Text Modification

See attached

Page: 1

Mod11375_TextOfModification.pdf

M11375Text Modification

M78-21 Part II

Original Proposal

IMC: [F] 1106.4.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Mechanical Code

Delete without substitution:

~~**[F] 1106.4.1 Ventilation system activation.** Ventilation shall be activated by the refrigerant detection system in the *machinery room*. Refrigerant detection systems shall be in accordance with Section 605.8 of the International Fire Code and all of the following:~~

~~1. The detectors shall activate at or below a refrigerant concentration of 25 percent of the LFL.~~

~~2. Upon activation, the detection system shall activate the emergency ventilation system required by Section 1106.4.2.~~

~~3. The detection, signaling and control circuits shall be supervised.~~

Reason: The machinery room requirements in the 2019 edition of ASHRAE 15 have been completely revised for Group A2L and B2L refrigerants. The table in the current code was part of the original draft to ASHRAE 15 that was subsequently rejected as being inaccurate. This is proposed for deletion.
With Group A2L and B2L refrigerants, research has proven that open flames and hot surfaces can be at a higher temperature than Group A2, A3, B2, and B3 refrigerants. Section 1106.4.1 adds special provisions for Group A2L and B2L refrigerants regarding hot surfaces. New ventilation requirements were added to ASHRAE 15 for machinery rooms using Group A2L and B2L refrigerants. There are two levels of ventilation that are required based on the response of the refrigerant detector. This proposal references ASHRAE 15 for the ventilation requirement (note that the latest standard can be viewed free of charge at https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards.) A table is included that identifies the two levels of annunciation in the event of a refrigerant leak in a machinery room. The first activation is a trouble alarm for a small leak. This requires a minimal amount of ventilation. The second level is an emergency alarm. This signals the activation of the full amount of ventilation for the room.

Bibliography: 1. ANSI/ASHRAE 15-2019, Safety Standard for Refrigeration Systems.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change clarifies the requirements for ventilation of a machinery room. The use of A2L refrigerant is optional.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal better aligns the IMC with ASHRAE 15. ASHRAE 15 already requires supervision of ventilation detection, signaling and control circuits and does not need to also be addressed in the IMC. (Vote: 14-0)

Final Hearing Results

Page: 1

Mod_11375_Text_M78-21 Part II.pdf

M11375Text Modification

M78-21 Part II AS

Mod_11375_Text_M78-21 Part II.pdf Page: 2

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

72

M11402 | **/M79-21**

Date Submitted	03/26/2024	**Section**	1107.3	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -M.

Summary of Modification

Updates refrigerant to refrigeration

Rationale

See attached

M11402Text Modification

See attached

Page: 1

Mod11402_TextOfModification.pdf

M11402Text Modification

M79-21

Original Proposal

IMC: 1107.3, 1107.6, 1107.7, 1108.1, 1108.3.3, 1109.8.1, 1109.8.2, 1110.3, 1110.5.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2021 International Mechanical Code

Revise as follows:

1107.3 Materials rating. Materials, joints and connections shall be rated for the operating temperature and pressure of the refrigerant system. Materials shall be suitable for the type of refrigerant and type of lubricant in the ~~refrigerant~~refrigeration system. Magnesium alloys shall not be used in contact with any halogenated refrigerants. Aluminum, zinc, magnesium and their alloys shall not be used in contact with R-40 (methyl chloride).

1107.6 Valves. Valves shall be of materials that are compatible with the type of piping material, refrigerants and oils in the system. Valves shall be *listed* and *labeled* and rated for the temperatures and pressures of the ~~refrigerant~~refrigeration systems in which the valves are installed.

1107.7 Flexible connectors, expansion and vibration compensators. Flexible connectors and expansion and vibration control devices shall be *listed* and *labeled* for use in ~~refrigerant~~refrigeration systems.

1108.1 Approval. Joints and connections shall be of an *approved* type. Joints and connections shall be tight for the pressure of the ~~refrigerant~~refrigeration system when tested in accordance with Section 1110.

1108.3.3 Soldered joints. Joint surfaces to be soldered shall be cleaned and a flux conforming to ASTM B813 shall be applied. The joint shall be soldered with a solder conforming to ASTM B32. Solder joints shall be limited to ~~refrigerant~~refrigeration systems using Group A1 refrigerant and having a pressure of less than or equal to 200 psi (1378 kPa).

1109.8.1 ~~Refrigerating~~Refrigeration systems containing more than 6.6 pounds (3.0 kg) of refrigerant. Stop valves shall be installed in the following locations on ~~refrigerating~~refrigeration systems containing more than 6.6 pounds (3.0 kg) of refrigerant:

1. The suction inlet of each compressor, compressor unit or condensing unit.
2. The discharge outlet of each compressor, compressor unit or condensing unit.
3. The outlet of each liquid receiver.

1109.8.2 ~~Refrigerating~~Refrigeration systems containing more than 100 pounds (45 kg) of refrigerant. In addition to stop valves required by Section 1109.8.1, systems containing more than 100 pounds (45 kg) of refrigerant shall have stop valves installed in the following locations:

1. Each inlet of each liquid receiver.
2. Each inlet and each outlet of each condenser where more than one condenser is used in parallel.

Exceptions:

1. Stop valves shall not be required at the inlet of a receiver in a condensing unit nor at the inlet of a receiver that is an integral part of the condenser.
2. Systems utilizing nonpositive displacement compressors.

1110.3 Test gases. The medium used for pressure testing the ~~refrigerant~~refrigeration system shall be one of the following inert gases: oxygen-free nitrogen, helium or argon. For R-744 ~~refrigerant~~refrigeration systems, carbon dioxide shall be allowed as the test medium. For

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R-718 ~~refrigerant~~refrigeration systems, water shall be allowed as the test medium. Oxygen, air, combustible gases and mixtures containing such gases shall not be used as a test medium. Systems erected on the premises with tubing not exceeding $^{5}/_{8}$ inch (15.9 mm) outside diameter shall be allowed to use the refrigerant identified on the nameplate label or marking as the test medium.

1110.5.1 Joints and refrigerant-containing parts in air ducts. Joints and all refrigerant-containing parts of a ~~refrigerating~~refrigeration system located in an air duct of an air-conditioning system that conveys conditioned air to and from human-occupied spaces shall be tested at a pressure of 150 percent of the higher of the design pressure or pressure relief device setting.

Reason: This proposed change cleans up the language added during the last cycle. ASHRAE 15 has used refrigerant systems and refrigeration systems interchangeably for many years. ASHRAE SSPC 15 has voted to convert all of the text in the standard to "refrigeration systems." This change will keep the Mechanical Code consistent with ASHRAE 15.

Bibliography: ASHRAE 15-2019, Safety Standard for Refrigeration Systems

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial text clarification only.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
SECTION1102REFRIGERATION SYSTEM REQUIREMENTS

1102.1General.
The refrigeration system classification, allowable refrigerants, maximum quantity, enclosure requirements, location limitations, and field pressure test requirements shall be determined as follows:

1. Determine the refrigeration system's classification, in accordance with Section 1103.3.
2. Determine the refrigerant classification in accordance with Section 1103.1.
3. Determine the maximum allowable quantity of refrigerant in accordance with Section 1104, based on type of refrigerant, refrigeration system classification and *occupancy*.
4. Determine the refrigeration system enclosure requirements in accordance with Section 1104.
5. Refrigeration *equipment* and *appliance* location and installation shall be subject to the limitations of Chapter 3.
6. Nonfactory-tested, field-erected *equipment* and *appliances* shall be pressure tested in accordance with Section 1108.

1102.2.1Mixing.
Refrigerants, including refrigerant blends, with different designations in ASHRAE 34 shall not be mixed in arefrigeration 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.

SECTION1104REFRIGERATION SYSTEM APPLICATION REQUIREMENTS

1104.2Machinery room.
Except as provided in Sections 1104.2.1 and 1104.2.2, all components containing the refrigerant shall be located either outdoors or in a*machinery room* where the quantity of refrigerant in an independent circuit of arefrigeration system exceeds the amounts shown in Table 1103.1. For refrigerant blends not listed in Table 1103.1, the same requirement shall apply where the amount for any blend component exceeds that indicated in Table 1103.1 for that component. This requirement shall also apply where the combined amount of the blend components exceeds a limit of 69,100 parts per million (ppm) by volume. *Machinery rooms* required by this section shall be constructed and maintained in accordance with Section 1105 for Group A1 and B1 refrigerants and in accordance with Sections 1105 and 1106 for Group

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A2, B2, A3 and B3 refrigerants.

Exceptions:

1. *Machinery rooms* are not required for *listed equipment* and *appliances* containing not more than 6.6 pounds (3 kg) of refrigerant, regardless of the refrigerant's safety classification, where installed in accordance with the *equipment's* or *appliance's* listing and the *equipment* or *appliance* manufacturer's installation instructions.
2. Piping in compliance with Section 1107 is allowed in other locations to connect components installed in a*machinery room* with those installed outdoors.

1104.2.2Industrial occupancies and refrigerated rooms.
This section applies only to rooms and spaces that: are within industrial occupancies; contain a refrigerant evaporator; are maintained at temperatures below 68°F (20°C); and are used for manufacturing, food and beverage preparation, meat cutting, other processes and storage. Where a*machinery room* would otherwise be required by Section 1104.2, a*machinery room* shall not be required where all of the following conditions are met:

1. The space containing the machinery is separated from other occupancies by tight construction with tight-fitting doors.
2. Access is restricted to authorized personnel.
3. Refrigerant detectors are installed as required for*machinery rooms* in accordance with Section 1105.3.

   Exception: Refrigerant detectors are not required in unoccupied areas that contain only continuous piping that does not include valves, valve assemblies, *equipment* or *equipment* connections.
4. Surfaces having temperatures exceeding 800°F (427°C) and open flames are not present where any Group A2, B2, A3 or B3 refrigerant is used (see Section 1104.3.4).
5. All electrical *equipment* and appliances conform to Class I, Division 2,*hazardous location* classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
6. All refrigerant-containing parts in refrigeration systems with a total connected compressor power exceeding 100 horsepower (hp) (74.6 kW)—except evaporators used for refrigeration or dehumidification, condensers used for heating, control and pressure relief valves for either, low-probability pumps and connecting piping—are located either outdoors or in a *machinery room*.

1106.3Flammable refrigerants.
Where refrigerants of Groups A2, A3, B2 and B3 are used, the*machinery room* shall conform to the Class I, Division 2,*hazardous location* classification requirements of NFPA 70.

Exception: *Machinery rooms* for refrigeration systems containing Group A2L *refrigerants* that are provided with ventilation in accordance with Section 1106.4.

1106.4Special requirements for Group A2L refrigerant machinery rooms.
Machinery rooms with refrigeration systems containing Group A2L *refrigerants* that do not conform to the Class I, Division 2, hazardous location electrical requirements of NFPA 70, as permitted by the exception to Section 1106.3, shall comply with Sections 1106.4.1 through 1106.4.3.

Exception: *Machinery rooms* conforming to the Class I, Division 2, hazardous location classification requirements of NFPA 70 are not required to comply with Sections 1106.4.1 and 1106.4.2.

1107.1Piping.
Refrigerant piping material for other than R-717 (ammonia)refrigeration systems shall conform to the requirements in this section. Piping material and installations for R-717 (ammonia) refrigeration systems shall comply with IIAR 2.

1107.6Valves.
Valves shall be of materials that are compatible with the type of piping material, refrigerants and oils in the refrigeration system. Valves shall be listed and labeled and rated for the temperatures and pressures of the refrigeration systems in which the valves are installed

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1109.2.5Refrigerant pipe shafts.
Refrigerant piping that penetrates two or more floor/ceiling assemblies shall be enclosed in a fire-resistance-rated shaft enclosure. The fire-resistance-rated shaft enclosure shall comply with Section 713 of the*International Building Code*.

Exceptions:

1. Refrigeration ~~S~~systems using R-718 refrigerant (water).
2. Piping in a direct refrigeration system using Group A1 refrigerant where the refrigerant quantity does not exceed the limits of Table 1103.1 for the smallest occupied space through which the piping passes.
3. Piping located on the exterior of the building where vented to the outdoors.

1109.8.2Refrigeration systems containing more than 100 pounds (45 kg) of refrigerant.
In addition to stop valves required by Section 1109.8.1, refrigeration systems containing more than 100 pounds (45 kg) of refrigerant shall have stop valves installed in the following locations:

1. Each inlet of each liquid receiver.
2. Each inlet and each outlet of each condenser where more than one condenser is used in parallel.

Exceptions:

1. Stop valves shall not be required at the inlet of a receiver in a condensing unit nor at the inlet of a receiver that is an integral part of the condenser.
2. Refrigeration ~~S~~systems utilizing nonpositive displacement compressors.

1110.6Booster compressor.
Where a compressor protected by a pressure relief device is used as a booster to obtain an intermediate pressure, and such compressor discharges into the suction side of another compressor, the booster compressor shall be considered to be a part of the low-pressure side of the refrigeration system.

1110.7Centrifugal/nonpositive displacement compressors.
Where testing refrigeration systems using centrifugal or other nonpositive displacement compressors, the entire system shall be considered to be the low-pressure side for test purposes.

1110.8Contractor or engineer declaration.
The installing contractor or*registered design professional* of record shall issue a certificate of test to the code official for allrefrigeration systems containing 55 pounds (25 kg) or more of refrigerant. The certificate shall give the test date, name of the refrigerant, test medium and the field test pressure applied to the high-pressure side and the low-pressure side of the refrigeration system. The certification of test shall be signed by the installing contractor or *registered design professional* and shall be made part of the public record.

Committee Reason: The proposal has been passed as modified because the published reason correlates with actions on M10-21. This proposed change cleans up the language added during the last cycle. ASHRAE 15 has used refrigerant systems and refrigeration systems interchangeably for many years. ASHRAE SSPC 15 has voted to convert all of the text in the standard to “refrigeration systems.” This change will keep the Mechanical Code consistent with ASHRAE 15.(Vote: 11-0)

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11403		/M81-21			
Date Submitted	03/26/2024	**Section**	1108.5	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - M.

Summary of Modification

Removes brass and relocates it to copper alloy section

Rationale

See attached

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See attached

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M11403Text Modification

M81-21

Original Proposal

IMC: 1108.5

Proponents: Pennie L Feehan, Pennie L Feehan Consulting, Copper Development Association (penniefeehan@me.com)

2021 International Mechanical Code

Delete without substitution:

~~**1108.5 Brass (copper alloy) pipe.** Joints between brass pipe or fittings shall be brazed, mechanical, press-connect, threaded or welded joints conforming to Section 1108.3.~~

Reason: Because brass is a copper alloy, this section is not needed and is covered in Section 1108.6.

Bibliography: 1108.6 Copper pipe. Joints between copper or copper-alloy pipe or fittings shall be brazed, mechanical, press-connect, soldered, threaded or welded joints conforming to Section 1108.3.

Cost Impact: The code change proposal will increase the cost of construction
This is simply an elimination of duplication of requirements in code. It is a clarification of the code that does not affect materials or labor.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was passed as submitted because it appropriately deletes Section 1108.5 dealing with Brass Pipe, as brass is simply one of several copper alloys. Section 1108.6 covers it. (Vote: 11-0)

Final Hearing Results

M81-21 AS

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11404		/M82-21			
Date Submitted	03/26/2024	**Section**	1109.4.1	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - M.

Summary of Modification

Changes brass and updates to copper alloy

Rationale

See attached

M11404Text Modification

See attached

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M11404Text Modification

M82-21

Original Proposal

IMC: 1109.4.1

Proponents: Pennie L Feehan, Pennie L Feehan Consulting, Copper Development Association (penniefeehan@me.com)

2021 International Mechanical Code

Revise as follows:

1109.4.1 Piping material. Piping material for Group A2, A3, B2 or B3 refrigerant located inside the building, except for *machinery rooms*, shall be copper pipe, ~~brass~~ copper alloy pipe or steel pipe. Pipe joints located in areas other than the*machinery room* shall be welded. Self-contained *listed* and *labeled equipment* or *appliances* shall have piping material based on the listing requirements.

Reason: Brass and Bronze are Copper Alloys. Copper Alloy is the correct term.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is editorial to update the use of terms in the code. Editorial changes do not affect material or labor costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was passed as submitted because it is editorial and cleans up language based on actions in previous years, with respect to copper alloys.
(Vote: 11-0)

Final Hearing Results

M82-21 AS

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TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11420		/M83-21			
Date Submitted	03/26/2024	**Section**	1107.4	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section is not part of the 2023 FBC - M.

Summary of Modification

Several updates from updated Reference standards ASTM and ASHRAE

Rationale

See attached

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See attached

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Original Proposal

IMC: TABLE 1107.4, TABLE 1107.5, 1107.7, 1109.2.2, 1109.2.3, 1109.2.6, 1109.2.7, 1109.3, 1109.3.1, 1109.3.2, 1109.4, 1109.4.1, 1109.4.2, 1109.7, 1110.3, 1110.3.1 (New), 1110.5, 1110.5.2, 1110.5.1, 1110.6, 1110.7, ASTM Chapter 15 (New)

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2021 International Mechanical Code

Revise as follows:

TABLE 1107.4 REFRIGERANT PIPE

PIPING MATERIAL	STANDARD
Aluminum tube	ASTM B210/ASTM B210M, ASTM B491/B491M
Brass (copper alloy) pipe	ASTM B43
Copper linesets	ASTM B280, ASTM B1003
Copper pipe	ASTM B42, ASTM B302
Copper tube[a]	ASTM B68, ASTM B75, ASTM B88, ASTM B280, ASTM B819
Steel pipe[b]	ASTM A53, ASTM A106, ASTM A333
Steel tube	ASTM A254, ASTM A334

a. Soft annealed copper tubing larger than $1^3/_8$ inch (35 mm) O.D. shall not be used for field-assembled refrigerant piping unless it is protected from mechanical damage.

b. ASTM A53, Type F steel pipe shall ~~not be used for refrigerant lines having an operating temperature less than -20°F (-29°C)~~o. nly be permitted for discharge lines in pressure relief systems.

TABLE 1107.5 REFRIGERANT PIPE FITTINGS

FITTING MATERIAL	STANDARD
Aluminum	ASTM B361
~~Brass (copper alloy)~~	~~ASME B16.15, ASME B16.24~~
Copper and Copper Alloy (Brass)	ASME B16.15, ASME B16.18, ASME B16.22, ASME B16.24, ASME B16.26, ASME B16.50
Steel	ASTM A105, ASTM A181, ASTM A193, ASTM A234, ASTM A420, ASTM A707

1107.7 Flexible connectors, expansion and vibration compensators. Flexible connectors and expansion and vibration control devices shall be *listed* and *labeled* for use in refrigerant systems, and pressures for which the components are installed.

1109.2.2 Refrigerant pipe enclosure. Refrigerant piping shall be protected by locating it within the building elements or within protective enclosures.

Exception: Piping protection within the building elements or protective enclosure shall not be required in any of the following locations:

1. Where installed without ready access or located more than 7 feet 3 inches (2210 mm) above the finished floor.
2. Where located within 6 feet (1829 mm) of the refrigerant unit or *appliance*.

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3. Where located in a *machinery room* complying with Section 1105.
4. Outside the building:
   4.1. Protected from damage from the weather, including, but not limited to, hail, ice, and snow loads, and
   4.2. Protected from damage within the expected foot or traffic path
   4.3. Outside underground installed not less than 8 inches (200 mm) below finished grade and protected against corrosion.

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 w~~W~~ithin 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. Exposed piping with ready access to nonauthorized personnel 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. 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 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. In addition to the requirements of Section 305.5, aluminum, copper and steel tube used for Group ~~A2L~~A2, A3, ~~and~~ B2L, B2, and B3 refrigerants and located in concealed locations where tubing is installed in studs, joists, rafters or similar member spaces, and located less than 1 1/2 inches (38 mm) from the nearest edge of the member, shall be continuously protected by shield plates. Protective steel shield plates having a minimum thickness of 0.0575 inch (1.46 mm) (No. 16 gage) shall cover the area of the tube plus the area extending not less than 2 inches (51 mm) beyond both sides of the tube.

1109.3.2 Shaft ventilation. Refrigerant pipe shafts with systems using Group A2L or B2L refrigerant shall be naturally or mechanically ventilated. Refrigerant pipe shafts with one or more systems using any Group A2, A3, B2, or B3 refrigerant shall be continuously mechanically ventilated and shall include a refrigerant detector. The shaft ventilation exhaust outlet shall comply with Section 501.3.1. Naturally ventilated shafts shall have a pipe, duct or conduit not less than 4 inches (102 mm) in diameter that connects to the lowest point of the shaft and extends to the outdoors. The pipe, duct or conduit shall be level or pitched downward to the outdoors. Mechanically ventilated shafts shall have a minimum airflow velocity in accordance with Table 1109.3.2. The mechanical ventilation shall be continuously operated or activated by a refrigerant detector. Systems utilizing a refrigerant detector shall activate the mechanical ventilation at a maximum refrigerant concentration of 25 percent of the lower flammable limit of the refrigerant. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The shaft shall not be required to be ventilated for double-wall refrigerant pipe where the interstitial space of the double-wall pipe is vented to the outdoors.

Delete without substitution:

~~**1109.4 Installation requirements for Group A2, A3, B2 or B3 refrigerant.** Piping systems using Group A2, A3, B2 or B3 refrigerant shall~~

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~~comply with the requirements of Sections 1109.4.1 and 1109.4.2.~~

~~**1109.4.1 Piping material.** Piping material for Group A2, A3, B2 or B3 refrigerant located inside the building, except for *machinery rooms*, shall be copper pipe, brass pipe or steel pipe. Pipe joints located in areas other than the *machinery room* shall be welded. Self-contained *listed* and *labeled equipment* or *appliances* shall have piping material based on the listing requirements.~~

~~**1109.4.2 Shaft ventilation.** Refrigerant pipe shafts with systems using Group A2, A3, B2 or B3 refrigerant shall be continuously mechanically ventilated. The shaft ventilation exhaust outlet shall comply with Section 501.3.1. Mechanically ventilated shafts shall have a minimum airflow velocity as specified in Table 1109.3.2. The shaft shall not be required to be ventilated for double-wall refrigerant pipe where the interstitial space of the double-wall pipe is vented to the outdoors.~~

~~**1109.7 Condensate control.** Refrigerating piping and fittings that, during normal operation, will reach a surface temperature below the dew point of the surrounding air, and are located in spaces or areas where condensation has the potential to cause a safety hazard to the building occupants, structure, electrical *equipment* or any other *equipment* or *appliances*, shall be insulated or protected in an *approved* manner to prevent damage from condensation.~~

Revise as follows:

1110.3 Test gases. The medium used for pressure testing the refrigerant system shall be one of the following inert gases: oxygen-free nitrogen, helium, ~~or~~ argon or premixed nonflammable oxygen-free nitrogen with a tracer gas of hydrogen or helium. For R-744 refrigerant systems, carbon dioxide shall be allowed as the test medium. For R-718 refrigerant systems, water shall be allowed as the test medium. ~~Oxygen, air, combustible gases and mixtures containing such gases shall not be used as a test medium. Systems erected on the premises with tubing not exceeding 5/8 inch (15.9 mm) outside diameter shall be allowed to use the refrigerant identified on the nameplate label or marking as the test medium.~~

Add new text as follows:

1110.3.1 Test Gases Not Permitted. Oxygen, air, refrigerants other than those identified in Section 1110.3, combustible gases and mixtures containing such gases shall not be used as the pressure test medium.

Revise as follows:

1110.5 Piping system strength test ~~pressure test and leak test~~. Refrigerating system components and refrigerant piping shall be tested in accordance with ASME B31.5 or this section. Separate tests for isolated portions of the system are permitted provided that all required portions are tested at least once. Pressurize with test gas for a minimum of 10 minutes to not less than the lower of (a) the lowest design pressure for any system component, or (b) the lowest value of set pressure for any pressure relief devices in the system. The design pressures for determination of test pressure shall be the pressure identified on the label nameplate of the condensing unit, compressor, compressor unit, pressure vessel, or other system component with a nameplate. A passing test result shall have no rupture or structural failure of any system component or refrigerant piping.

Refrigerant piping and tubing greater than 3/4 inches in diameter shall be tested in accordance with ASHRAE 15.

~~The refrigerant piping system shall be tested as a whole or separate tests shall be conducted for the low-pressure side and high-pressure side of the piping system. The refrigerant piping system shall be tested in accordance with both of the following methods:~~

1. ~~The system shall be pressurized for a period of not less than 60 minutes to not less than the lower of the design pressures or the setting of the pressure relief device(s). The design pressures for testing shall be the pressure listed on the label nameplate of the condensing unit, compressor, compressor unit, pressure vessel or other system component with a nameplate. Additional test gas shall not be added to the system after the start of the pressure test. The system shall not show loss of pressure on the test pressure measuring device during the pressure test. Where using refrigerant as a test medium in accordance with Section 1110.3, the test pressure shall be not less than the saturation dew point pressure at 77°F (25°C).~~
2. ~~A vacuum of 500 microns shall be achieved. After achieving a vacuum, the system shall be isolated from the vacuum pump. The system pressure shall not rise above 1,500 microns for a period of not less than 10 minutes.~~

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Delete without substitution:

~~**1110.5.2 Limited charge systems.** Limited charge systems with a pressure relief device, erected on the premises, shall be tested at a pressure not less than one and one-half times the pressure setting of the relief device. *Listed* and *labeled* limited charge systems shall be tested at the *equipment* or *appliance* design pressure.~~

~~**1110.5.1 Joints and refrigerant-containing parts in air ducts.** Joints and all refrigerant-containing parts of a refrigerating system located in an air duct of an air-conditioning system that conveys conditioned air to and from human-occupied spaces shall be tested at a pressure of 150 percent of the higher of the design pressure or pressure relief device setting.~~

~~**1110.6 Booster compressor.** Where a compressor protected by a pressure relief device is used as a booster to obtain an intermediate pressure, and such compressor discharges into the suction side of another compressor, the booster compressor shall be considered to be a part of the low-pressure side of the system.~~

~~**1110.7 Centrifugal/nonpositive displacement compressors.** Where testing systems using centrifugal or other nonpositive displacement compressors, the entire system shall be considered to be the low-pressure side for test purposes.~~

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A333-18	Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service and other Applications with required Notch Toughness

Reason: For Table 1107.4, ASHRAE 15 modified the piping requirements by adding ASTM A333, which is a steel pipe used in refrigerant piping systems. The other change is to modification of Note b. ASHRAE 15 added restrictions to the use of Type F pipe. For many years, Type F pipe ceased to be manufactured in the United States. Hence, the requirements were basically ignored. With the influx of foreign made steel pipe, Type F pipe has reemerged in the United States. That is why it is important to add the limitation since Type F pipe does not have strength and longevity of ERW pipe. Note: ASTM will provide the documentation required to add ASTM A333 to the Chapter 15 references.

For Table 1107.5 , the change is editorial. ASHRAE SSPC 15 Refrigerant Piping Working Group combined brass and copper fittings since the fittings can be used for either piping material. The fitting standard shown being removed are already located under the current heading of copper.

For Section 1107.7, we propose to add a reference to UL 207, which has been modified to add requirements for flexible connectors and expansion and vibration compensators. The other change is a mandate that the components be rated for the pressure of the refrigerant piping system. While this is already implied, it is better to include the wording to avoid improper interpretation of the requirement.

For Sections 1109.2-1109.4, There are two changes made by the ASHRAE 15 Committee regarding piping installation requirements. New requirements were added for piping protection when installed on the outside of the building. This includes buried pipe. The other change relates to interior exit stairways. These spaces are often heated and cooled by individual heat pumps. Thus, there is refrigerant piping within the exit stairs, however, the piping is not exposed creating a hazard. Furthermore, the quantity of refrigerant in the piping must be below the RCL (refrigerant concentration limit). The installation requirements for flammable refrigerants were also simplified by combining the sections of A2L and B2L with A2, A3, B2, and B3. The changes that resulted from the combining of the sections was the allowance of steel, stainless steel, and copper tubing for A2, A3, B2, and B3. ASHRAE 15 Committee found no reason for the continued requirement of limiting A2, A3, B2, and B3 refrigerants to pipe while not allowing tube. Both materials can handle the refrigerants and pressures. Furthermore, there are protection requirements for the tubing. In the tubing protection section, Group A2L was removed. This is based on testing showing that continuous protection is unnecessary for Group A2L refrigerants. The protection of stud and joist penetrations remain. The other changes include a statement on nonauthorized personnel for protection of the piping. This would allow exposed piping in machinery rooms. The last change is a marking requirement for A2L and B2L piping. This added marking of the piping is consistent with the labeling required by UL/CSA 60335-2-40.

For Section 1109.7, The ASHRAE 15 Committee was of the opinion that this section would be very difficult for a code official to enforce. To eliminate unintended consequences of the uncertainty associated with dew point will in a given space, this section was deleted during the

M11420Text Modification

updating of the piping requirements.

For Section 1110, The proposed Test Gas requirements adds an allowance for the use of premixed nitrogen with a tracer gas or either hydrogen or helium. The tracer gas makes it easier to detect a leak in larger refrigeration piping systems. The use of tracer gases for testing piping systems is common practice in larger refrigeration systems. The changes to the testing section reflect modifications made in ASHRAE 15 to expand the requirements for large piping systems in which a greater duration is appropriate. Note that the latest standard can be viewed free of charge at https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards.

Bibliography: 1. ASTM A333-18, Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service and Other Applications with Required Notch Toughness.
2. ANSI/ASHRAE Standard 15-2019, Safety Standard for Refrigeration Systems.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
While some times for testing are increased, technicians can normally be completing other tasks associated with the refrigeration system during these times.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has been passed as submitted. The language clarifies refrigerant series already approved. (Vote: 11-0)

Final Hearing Results

M83-21 AS

Page: 5

Mod_11420_Text_M83-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

76

M11426 | **/M84-21**

Date Submitted	03/26/2024	**Section**	1110.3	**Proponent**	Mo Madani
Chapter	11	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R.

Summary of Modification

Updates language for test gases

Rationale

See attached

M11426Text Modification

See attached

Page: 1

Mod11426_TextOfModification.pdf

M11426Text Modification

M84-21

Original Proposal

IMC: 1110.3

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2021 International Mechanical Code

Delete and substitute as follows:

~~**1110.3 Test gases.** The medium used for pressure testing the refrigerant system shall be one of the following inert gases: oxygen-free nitrogen, helium or argon. For R-744 refrigerant systems, carbon dioxide shall be allowed as the test medium. For R-718 refrigerant systems, water shall be allowed as the test medium. Oxygen, air, combustible gases and mixtures containing such gases shall not be used as a test medium. Systems erected on the premises with tubing not exceeding $^{5}/_{8}$ inch (15.9 mm) outside diameter shall be allowed to use the refrigerant identified on the nameplate label or marking as the test medium.~~

1110.3 Test gases.
Tests shall be performed with dry nitrogen or other nonflammable, nonreactive, dried gas. Oxygen, air, or mixtures containing them shall not be used. The means used to build up the test pressure shall have either a pressure limiting device or a pressure-reducing device and a gauge on the outlet side. The pressure-relief device shall be set above the test pressure but low enough to prevent permanent deformation of the system's components.

Exceptions:

1. Mixtures of dry nitrogen, inert gases, or a combination of them with Class 1 refrigerant in concentrations of a refrigerant weight fraction (mass fraction) not exceeding 5 percent shall be permitted for tests.
2. Mixtures of dry nitrogen, inert gases, or a combination of them with Class 2L, Class 2 and Class 3 refrigerants in concentrations not exceeding the lower of a refrigerant weight fraction (mass fraction) of 5 percent or 25 percent of the LFL shall be permitted for tests.
3. Compressed air without added refrigerants shall be permitted for tests, provided the system is subsequently evacuated to less than 1000 microns (0.1333 kPa) before charging with refrigerant. The required evacuation level is atmospheric pressure for systems using R-718 (water) or R-744 (carbon dioxide) as the refrigerant.
4. Systems erected on the premises using Group A1 refrigerant and with copper tubing not exceeding 0.62 of an inch (15.7 mm) outside diameter shall be tested by means of the refrigerant charged into the system at the saturated vapor pressure of the refrigerant at not less than 68°F (20°C).

Reason: This proposal aligns the IMC with ASHRAE 15, 2019 edition requirements for test gases, and specifies how to appropriately use refrigerants as tracer gases to minimize the use of and ensure only de minimis release of these products during testing. The proposed language is an extraction from ASHRAE 15-2019, Section 10.1.2

Bibliography: ASHRAE 15-2019, Safety Standard for Refrigeration Systems

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides clarity on test gas requirements.

Public Hearing Results

Committee Action **As Submitted**

Page: 1

Mod_11426_Text_M84-21.pdf

M11426Text Modification

Committee Reason: The proposal was passed as submitted because it aligns with ASHRAE15-2019. (Vote: 11-0)

Final Hearing Results

M84-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

77

M11427 | **/M85-21**

Date Submitted	03/26/2024	**Section**	1201.1	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Updates the scope to include other types of hydronic piping

Rationale

See attached

M11427Text Modification

See attached

Page: 1

Mod11427_TextOfModification.pdf

M11427Text Modification

M85-21

Original Proposal

IMC: 1201.1

Proponents: Lance MacNevin, Director of Engineering – Building & Construction Division, Plastics Pipe Institute, Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2021 International Mechanical Code

Revise as follows:

1201.1 Scope. The provisions of this chapter shall govern the construction, installation,*alteration* and repair of hydronic piping systems. This chapter shall apply to hydronic piping systems that are part of heating, ventilation and air-conditioning systems. Such piping systems shall include steam, hot water, radiant heating, radiant cooling, chilled water, steam condensate, ~~and~~ ground source heat pump loop systems and snow- and ice-melting. Potable cold and hot water distribution systems shall be installed in accordance with the*International Plumbing Code* .

Reason: The hydronic applications known as radiant heating & cooling and snow & ice melting are currently listed within Ch. 12 in Section 1209 Embedded Piping, but are missing from the Scope. Therefore, these types of hydronic systems should be listed within the Scope. Subsequent proposals, if accepted, will add new requirements for radiant heating & cooling and snow & ice melting tubing systems.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The hydronic applications known as radiant heating & cooling and snow & ice melting are currently listed within Ch. 12 in Section 1209 Embedded Piping, but are missing from the Scope.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has been passed as submitted based on the published reason statement of the proponent. The hydronic applications known as radiant heating & cooling and snow & ice melting are currently listed within Ch. 12 in Section 1209 Embedded Piping, but are missing from the Scope. Therefore, these types of hydronic systems should be listed within the Scope. (Vote: 11-0)

Final Hearing Results

M85-21 AS

Page: 1

Mod_11427_Text_M85-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

78

M11428 | **/M86-21**

Date Submitted	03/26/2024	**Section**	1202.4	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Removes lead pipe reference from table

Rationale

See attached

M11428Text Modification

See attached

Page: 1

Mod11428_TextOfModification.pdf

M11428Text Modification

M86-21

Original Proposal

IMC: TABLE 1202.4

Proponents: Lance MacNevin, Director of Engineering – Building & Construction Division, Plastics Pipe Institute, Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2021 International Mechanical Code

Revise as follows:

TABLE 1202.4 HYDRONIC PIPE

MATERIAL	STANDARD (see Chapter 15)
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D1527; ASTM F2806
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846; ASTM F441; ASTM F442
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tube (Type K, L or M)	ASTM B75; ASTM B88; ASTM B135; ASTM B251
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pressure pipe	ASTM F1281; CSA CAN/CSA-B-137.10
Cross-linked polyethylene (PEX) tubing	ASTM F876; ASTM F3253; CSA B137.5
Ductile iron pipe	AWWA C115/A21.15; AWWA C151/A21.51
~~Lead pipe~~	~~FS WW-P-325B~~
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9
Polypropylene (PP) plastic pipe	ASTM F2389
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785; ASTM D2241
Raised temperature polyethylene (PE-RT)	ASTM F2623; ASTM F2769; CSA B137.18
Steel pipe	ASTM A53; ASTM A106
Steel tubing	ASTM A254

Reason: The referenced ABS specification ASTM D1527 was withdrawn by ASTM in 2013, so it should be removed from Table 1202.4. Lead pipe should not be used for hydronic systems due to health and safety reasons, and should be removed from this table. The referenced Federal Specification (FS) WW-P-325B has been cancelled. Searchable here https://fedspecs.gsa.gov/FedSpecsSearchPage

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact because the two reference standards which are proposed for deletion from Table 1202.4 are no longer published.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has passed as submitted because standards (FS WW-P-325B) and materials (lead) reference in this application are no longer used or manufactured. (Vote: 11-0)

Final Hearing Results

M86-21 AS

Page: 1

Mod_11428_Text_M86-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

79

M11429		/M87-21			
Date Submitted	03/26/2024	**Section**	1202.4	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Updates to ASTM reference standard

Rationale

See attached

M11429Text Modification

See attached

Page: 1

Mod11429_TextOfModification.pdf

M11429Text Modification

M87-21

Original Proposal

IMC: TABLE 1202.4, ASTM Chapter 15 (New)

Proponents: Lisa Reiheld, Viega LLC, Viega LLC (lisa.reiheld@viega.us)

2021 International Mechanical Code

Revise as follows:

TABLE 1202.4 HYDRONIC PIPE

MATERIAL	STANDARD (see Chapter 15)
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D1527; ASTM F2806
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846; ASTM F441; ASTM F442
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tube (Type K, L or M)	ASTM B75; ASTM B88; ASTM B135; ASTM B251
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pressure pipe	ASTM F1281; CSA CAN/CSA-B-137.10
Cross-linked polyethylene (PEX) tubing	ASTM F876; ASTM F3253; CSA B137.5
Ductile iron pipe	AWWA C115/A21.15; AWWA C151/A21.51
Lead pipe	FS WW-P-325B
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9
Polypropylene (PP) plastic pipe	ASTM F2389
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785; ASTM D2241
Raised temperature polyethylene (PE-RT)	ASTM F2623; ASTM F2769; CSA B137.18
Steel pipe	ASTM A53; ASTM A106;
Steel tubing	ASTM A254
Stainless Steel pipe	ASTM A269; ASTM A312; ASTM A554; ASTM A778
Stainless Steel tubing	ASTM A269; ASTM A312; ASTM A554; ASTM A778

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM A554-16 Standard Specification for Welded Stainless Steel Mechanical Tubing

Add new text as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM A778/A778M-16 Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products

Reason: Stainless steel material is proposed to be added for hydronic applications where stainless steel pipe, tubing and fittings are necessary for corrosion resistance. The proposed stainless steel standards are also referenced in other nationally recognized codes and are commonly used for potable water distribution and hydronic applications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal of including stainless steel as another recognized material for the use in hydronic systems will not increase the cost of construction due to the fact that stainless steel piping and tubing would be only one of multiple material options the user of the code could specify.

Public Hearing Results

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Mod_11429_Text_M87-21.pdf

M11429Text Modification

Committee Action **As Modified**

Committee Modification:

TABLE 1202.4 HYDRONIC PIPE

MATERIAL	STANDARD (see Chapter 15)
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D1527; ASTM F2806
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846; ASTM F441; ASTM F442
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tube (Type K, L or M)	ASTM B75; ASTM B88; ASTM B135; ASTM B251
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pressure pipe	ASTM F1281; CSA CAN/CSA-B-137.10
Cross-linked polyethylene (PEX) tubing	ASTM F876; ASTM F3253; CSA B137.5
Ductile iron pipe	AWWA C115/A21.15; AWWA C151/A21.51
Lead pipe	FS WW-P-325B
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9
Polypropylene (PP) plastic pipe	ASTM F2389
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785; ASTM D2241
Raised temperature polyethylene (PE-RT)	ASTM F2623; ASTM F2769; CSA B137.18
Steel pipe	ASTM A53; ASTM A106;
Steel tubing	ASTM A254
Stainless Steel pipe	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless Steel tubing	ASTM A269; ASTM A312; ~~ASTM A554~~; ASTM A778

Committee Reason: The proposal has been approved based on the addition of stainless steel pipe and stainless steel tubing with hydronic systems along with the proponent reason statement. Stainless steel material is proposed to be added for hydronic applications where stainless steel pipe, tubing and fittings are necessary for corrosion resistance. The proposed stainless steel standards are also referenced in other nationally recognized codes and are commonly used for potable water distribution and hydronic applications. The modification removes reference to ASTM 554 and language is consistent with previous actions in the IPC. (Vote: 11-0)

Final Hearing Results

M87-21 AM

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Mod_11429_Text_M87-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

80

M11430		/M88-21			
Date Submitted	03/26/2024	**Section**	1202.5	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Updates to ASTM reference standard

Rationale

See attached

M11430Text Modification

See attached

Page: 1

Mod11430_TextOfModification.pdf

M11430Text Modification

M88-21

Original Proposal

IMC: TABLE 1202.5, ASTM Chapter 15 (New)

Proponents: Lisa Reiheld, Viega LLC, Viega LLC (lisa.reiheld@viega.us)

2021 International Mechanical Code

Revise as follows:

TABLE 1202.5 HYDRONIC PIPE FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.24; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1974 ; ASTM F3226
CPVC	ASSE 1061; ASTM D2846; ASTM F438; ASTM F439
Ductile iron and gray iron	ANSI/AWWA C110/A21.10; ASTM A395; ASTM A536; ASTM F1476; ASTM F1548; AWWA C153/A21.53
Ductile iron	ANSI/AWWA C153/A21.53
Gray iron	ASTM A126
Malleable iron	ASME B16.3
PE-RT fittings	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.1; CSA B137.18
PEX fittings	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F3253
Plastic	ASTM D2466; ASTM D2467; ASTM D2846; ASTM F877; ASTM F2389; ASTM F2735
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28; ASTM A53; ASTM A106; ASTM A234; ASTM A395; ASTM A420; ASTM A536; ASTM F1476; ASTM F1548; ASTM F3226
Stainless Steel	ASTM A269; ASTM A312; ASTM A554; ASTM A778; ASTM F3226

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A554-16	Standard Specification for Welded Stainless Steel Mechanical Tubing
A778/A778M-16	Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products

Reason: ASTM F3226 Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems is now published and includes Carbon Steel, Stainless Steel, Copper and Copper-Alloy materials. By including this standard will provide a reference standard for press-connect technology for each of the alloys.
Stainless steel material is proposed to be added for applications where stainless steel pipe, tubing and fittings are necessary for corrosion resistance. The proposed stainless steel standards are also referenced in other nationally recognized codes and are commonly used for potable water distribution and hydronic applications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This standard is not the only standard that the pipe fittings can meet in accordance with the Pipe Fittings Table, this is just an alternative standard that some manufacturer's have tested their products to and would like to see recognized as an acceptable standard for pipe fittings. Testing to this standard is optional and no existing standards have been removed or replaced by the proposed addition of this standard.

Public Hearing Results

Committee Action **As Modified**

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Mod_11430_Text_M88-21.pdf

M11430Text Modification

Committee Modification:

TABLE 1202.5 HYDRONIC PIPE FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.24; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1974; ASTM F3226
CPVC	ASSE 1061; ASTM D2846; ASTM F438; ASTM F439
Ductile iron and gray iron	ANSI/AWWA C110/A21.10; ASTM A395; ASTM A536; ASTM F1476; ASTM F1548; AWWA C153/A21.53
Ductile iron	ANSI/AWWA C153/A21.53
Gray iron	ASTM A126
Malleable iron	ASME B16.3
PE-RT fittings	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.1; CSA B137.18
PEX fittings	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F3253
Plastic	ASTM D2466; ASTM D2467; ASTM D2846; ASTM F877; ASTM F2389; ASTM F2735
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28; ASTM A53; ASTM A106; ASTM A234; ASTM A395; ASTM A420; ASTM A536; ASTM F1476; ASTM F1548; ASTM F3226
Stainless Steel	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778; ASTM F3226

Committee Reason: The committee agreed that stainless steel pipe, tubing and fittings, and their associated reference standards are appropriate for hydronic pipe fittings. The modification matches past actions in the IPC and what was done by previous committee in M87-21. (Vote: 11-0)

Final Hearing Results

M88-21 AM

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Mod_11430_Text_M88-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11431 | **/M89-21**

Date Submitted	03/26/2024	**Section**	1203.3.4	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language for green solvent color for solvent cement

Rationale

See attached

M11431Text Modification

See attached

Page: 1

Mod11431_TextOfModification.pdf

M11431Text Modification

M89-21

Original Proposal

IMC: 1203.3.4

Proponents: Forest Hampton, Lubrizol, Inc., Lubrizol, Inc. (forest.hampton@lubrizol.com)

2021 International Mechanical Code

Revise as follows:

1203.3.4 Solvent-cemented joints. Joint surfaces shall be clean and free from moisture. An *approved* primer shall be applied to CPVC and PVC pipe-joint surfaces. Joints shall be made while the cement is wet. Solvent cement conforming to the following standards shall be applied to all joint surfaces:

1. ASTM D2235 for ABS joints.
2. ASTM F493 for CPVC joints.
3. ASTM D2564 for PVC joints.

CPVC joints shall be made in accordance with ASTM D2846.

Exception: For CPVC pipe joint connections, a primer is not required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM F493.
2. The solvent cement is yellow or green in color.
3. The solvent cement is used only for joining $^{1}/_{2}$-inch (12.7 mm) through 2-inch (51 mm) diameter CPVC pipe and fittings.
4. The CPVC pipe or fittings are manufactured in accordance with ASTM D2846.

Reason: Currently, it can be difficult to see the yellow solvent cement ring on a tan CTS CPVC joint during inspection. A high contrast cement has been asked for from the field to aid in the inspection of CPVC joints. The color green was chosen because of its high contrast against the tan pipe and fittings and green is not currently used to identify any other type of cement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The addition of another one-step solvent cement color will not change the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has passed as submitted because it adds different type color for allowed glue, which is better for inspection, and is consistent with IRC and IPC actions. (Vote: 11-0)

Final Hearing Results

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Mod_11431_Text_M89-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

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M11434 | **/M90-21**

Date Submitted	03/26/2024	**Section**	1203.9	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

FBC -M/Section 1203.11.

Summary of Modification

Removes polybutylene language (PB) due to discontinued use

Rationale

See attached

M11434Text Modification

See attached

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Mod11434_TextOfModification.pdf

M11434Text Modification

M90-21

Original Proposal

IMC: 1203.9, 1203.9.1

Proponents: Lance MacNevin, Director of Engineering – Building & Construction Division, Plastics Pipe Institute, Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2021 International Mechanical Code

Delete without substitution:

~~**1203.9 Polybutylene plastic pipe and tubing.** Joints between polybutylene plastic pipe and tubing or fittings shall be mechanical joints conforming to Section 1203.3 or heat-fusion joints conforming to Section 1203.9.1.~~

~~**1203.9.1 Heat-fusion joints.** Joints shall be of the socket-fusion or butt-fusion type. Joint surfaces shall be clean and free from moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM D3309.~~

Reason: Polybutylene (PB) tubing has not been manufactured for sale in the US since the late 1990s. PB was previously removed from Table 1202.4 “Hydronic Pipe” at some time before 2015. The referenced product standard, ASTM D3309 “Polybutylene (PB) Plastic Hot- and Cold-Water Distribution Systems” was withdrawn in 2010.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Polybutylene (PB) tubing has not been manufactured for sale in the US since the late 1990s, and PB was previously removed from Table 1202.4 “Hydronic Pipe” at some time before 2015.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has passed as submitted because the material is no longer manufactured. (Vote: 11-0)

Final Hearing Results

M90-21 AS

Page: 1

Mod_11434_Text_M90-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

83

M11438		/M91-21			
Date Submitted	03/26/2024	**Section**	1203.14	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language stainless steel piping and tubing

Rationale

See attached

M11438Text Modification

See attached

Page: 1

Mod11438_TextOfModification.pdf

M11438Text Modification

M91-21

Original Proposal

IMC: 1203.14 (New), 1203.15 (New)

Proponents: Lisa Reiheld, Viega LLC, Viega LLC (lisa.reiheld@viega.us)

International Mechanical Code

2021 International Mechanical Code

Add new text as follows:

1203.14 Stainless Steel Pipe. Joints between stainless steel pipe or fittings shall be mechanical joints that are made with an approved elastomeric seal, or shall be threaded or welded joints conforming to Section 1203.3.

1203.15 Stainless Steel Tubing. Joints between stainless steel tubing or fittings shall be mechanical or welded joints conforming to Section 1203.3.

Reason: Stainless steel pipe and tubing are not currently recognized in the IMC as materials for use in hydronic applications. However, these materials are often specified for use in hydronic applications and are selected due to the corrosion resistance provided by stainless steel. The inclusion of stainless steel pipe and tubing in the body of this code for hydronic applications will allow the specifier and/or installer the option to use a much more corrosive resistant material for applications where this is important to the integrity of the hydronic installation. IMC Section 1203 Joints and Connections, specifies particular materials that can be joined in hydronic applications and currently includes steel but not stainless steel. Stainless steel pipe and tubing joints are being added to replicate their use as equivalent to Sections 1203.12 Steel pipe and 1203.13 Steel tubing for joints as well as state the suitable equivalent methods of joining as stated for Steel pipe and tubing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal of including stainless steel as another recognized material for the use in hydronic systems will not increase the cost of construction due to the fact that stainless steel piping and tubing would be only one of multiple material options the user of the code could specify.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has passed as submitted based on proponents statement indicating that the addition of stainless steel pipe and tubing for hydronic applications is appropriate and gives the designer additional options. (Vote: 11-0)

Final Hearing Results

M91-21 AS

Page: 1

Mod_11438_Text_M91-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

84

M11439		/M92-21			
Date Submitted	03/26/2024	**Section**	1205.1	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

FBC - M/ Section 1205.1.

Summary of Modification

Requires valves to have full access to controls

Rationale

See attached

M11439Text Modification

See attached

Page: 1

Mod11439_TextOfModification.pdf

M11439Text Modification

M92-21

Original Proposal

IMC: 1205.1

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Mechanical Code

Revise as follows:

1205.1 Where required. Shutoff valves shall be installed in hydronic piping systems in the locations indicated in Sections 1205.1.1 through 1205.1.6. Access shall be provided to all full open valves and shutoff valves.

Reason: Although Section 306.1 alludes to access for devices if you want to call a valve a device, it doesn't just come out and include valves. This change will make it clear that valves will be required to have access.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial in nature is done for consistency purposes only.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was passed as submitted because it adds clarification. If you have a valve, you would want to have access to it. (Vote: 11-0)

Final Hearing Results

M92-21 AS

Page: 1

Mod_11439_Text_M92-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

85

M11440		/M93-21			
Date Submitted	03/26/2024	**Section**	1210.4	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds reference to ASTM F3253

Rationale

See attached

M11440Text Modification

See attached

Page: 1

Mod11440_TextOfModification.pdf

M11440Text Modification

M93-21

Original Proposal

IMC: 1210.4, TABLE 1210.4

Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

2021 International Mechanical Code

1210.4 Piping and tubing materials standards. Ground-source heat pump ground-loop pipe and tubing shall conform to the standards listed in Table 1210.4.

Revise as follows:

TABLE 1210.4 GROUND-SOURCE LOOP PIPE

MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F441; ASTM F442
Cross-linked polyethylene (PEX)	ASTM F876; ASTM F3253; CSA B137.5; CSA C448; NSF 358-3
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9
High-density polyethylene (HDPE)	ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2241
Raised temperature polyethylene (PE-RT)	ASTM F2623; ASTM F2769; CSA B137.18; CSA C448; NSF 358-4

Reason: ASTM F3253 is titled, "Standard Specification for *Crosslinked Polyethylene (PEX) Tubing* with Oxygen Barrier for Hot- and Cold-Water Hydronic Distribution Systems" and contains information for PEX systems for hydronic applications where an oxygen barrier is used. This standard for PEX tubing and fittings is already included in the hydronics fittings table and is missing in the piping table, so we are correcting its absence.

Bibliography: ASTM F3253 is already included in the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction. The proposal simply adds an additional ASTM standard for inclusion of approved PEX piping. There is not expected to be an increase or decrease in construction costs by the inclusion of another approved piping material defined by the ASTM product standard for tubing to this section of the code. This standard is for PEX tubing and fittings and is already included in the hydronics fittings table and is only missing in the piping table.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal because it adds ASTM F3253 titled, "Standard Specification for *Crosslinked Polyethylene (PEX) Tubing* with Oxygen Barrier for Hot- and Cold-Water Hydronic Distribution Systems" and contains information for PEX systems for hydronic applications where an oxygen barrier is used by Boiler/ Hydronic manufacturer to prevent rusting inside. (Vote: 11-0)

Final Hearing Results

M93-21 AS

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Mod_11440_Text_M93-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

86

M11441 | **/M95-21**

Date Submitted	03/26/2024	**Section**	1209.1	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

removes polybutylene language

Rationale

See attached

M11441Text Modification

See attached

Page: 1

Mod11441_TextOfModification.pdf

M11441Text Modification

M95-21

Original Proposal

IMC: 1209.1

Proponents: Lance MacNevin, Director of Engineering – Building & Construction Division, Plastics Pipe Institute, Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2021 International Mechanical Code

Revise as follows:

1209.1 Materials. Piping for heating panels shall be standard-weight steel pipe, Type L copper tubing, ~~polybutylene~~ or ~~other~~ *approved* plastic pipe or tubing rated at 100 psi (689 kPa) at 180°F (82°C).

Reason: Polybutylene (PB) tubing has not been manufactured for sale in the US since the late 1990s. PB was previously removed from Table 1202.4 “Hydronic Pipe” at some time before 2015.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Polybutylene (PB) tubing has not been manufactured for sale in the US since the late 1990s. PB was previously removed from Table 1202.4 “Hydronic Pipe” at some time before 2015.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has passed as submitted based on previous actions regarding materials no longer being used. (Vote: 11-0)

Final Hearing Results

M95-21 AS

Page: 1

Mod_11441_Text_M95-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

87

M11442		/M96-21			
Date Submitted	03/26/2024	**Section**	1209.6	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language for radiant tubing

Rationale

See attached

M11442Text Modification

See attached

Page: 1

Mod11442_TextOfModification.pdf

M11442Text Modification

M97-21

Original Proposal

IMC: 1209.6 (New), 1209.6.1 (New), TABLE 1209.6.1 (New), 1209.6.2 (New), 1209.6.3 (New)

Proponents: Lance MacNevin, Director of Engineering – Building & Construction Division, Plastics Pipe Institute, Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2021 International Mechanical Code

Add new text as follows:

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.

TABLE 1209.6.1 MAXIMUM CIRCUIT LENGTH OF RADIANT TUBING FROM A SUPPLY-AND-RETURN MANIFOLD ARRANGEMENT

NOMINAL TUBE SIZE	MAXIMUM CIRCUIT LENGTH (FEET)
1/4	125
5/16	200
3/8	250
1/2	300
5/8	400
3/4	500
1	750

For SI units: 1 foot = 304.8 mm

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 report shall be provided to the building owner or the designated representative of the building owner.

Reason: Manufacturers of radiant heating and cooling tubing recognize that the proper installation of radiant heating and cooling tubing is critical to the successful operation of these systems. One of the most fundamental aspects of installation is the length of each tubing circuit, because if installed lengths are too short or too long, or not labelled, it may be impossible to balance the radiant system correctly for proper operation, comfort and efficiency. For tubing that is to be embedded, this topic is critical, yet is very inspectable and enforceable.
The circuit lengths in the proposed Table 1209.1 are based on existing industry practices, and take into account the allowable temperature gain or loss from the hydronic fluid, and the typical pressure loss in radiant circuits of those diameters. These values match those found in other codes.

The proposed language makes it clear that tubing circuit lengths are to be installed according to system design or the default Table 1209.1 and are to be inspected for such compliance.

Also, it is important for radiant tubing circuits to be tagged or labelled, and for the final drawings/design to be given to the building owner, in case the tubing routing and locations need to be identified at a later date.

Page: 1

Mod_11442_Text_M97-21.pdf

M11442Text Modification

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code sections are based on existing industry practices used by trained experienced professionals, and do not alter the design or construction of radiant systems.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Although there were some concerns over the clarity of the language, the content of the design report and the need for design documents, the committee approved the proposal because most times systems are designed with maximum lengths depending on the square footage of a room. (Vote: 6-5)

Final Hearing Results

M97-21 AS

Page: 2

Mod_11442_Text_M97-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

88

M11443 | **/M98-21**

Date Submitted	03/26/2024	**Section**	1209.7	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds language for snow and ice melt equipment

Rationale

See attached

M11443Text Modification

See attached

Page: 1

Mod11443_TextOfModification.pdf

M11443Text Modification

M98-21

Original Proposal

IMC: 1209.7 (New), 1209.7.1 (New), TABLE 1209.7.1 (New), 1209.7.2 (New)

Proponents: Lance MacNevin, Director of Engineering – Building & Construction Division, Plastics Pipe Institute, Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2021 International Mechanical Code

Add new text as follows:

1209.7 Snow & ice melt tubing placement. Hydronic tubing to be embedded for the purpose of snow & 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.

TABLE 1209.7.1 MAXIMUM CIRCUIT LENGTH OF SNOW- AND ICE-MELT TUBING FROM A SUPPLY-AND-RETURN MANIFOLD ARRANGEMENT

NOMINAL TUBE SIZE	MAXIMUM CIRCUIT LENGTH (FEET)
1/2	140
5/8	250
3/4	325
1	475

For SI units: 1 foot = 304.8
mm

1209.7.2 Snow- and ice-melt tubing drawings. The snow- and ice-melt tubing drawings and design report shall be provided to the building owner or the designated representive of the building owner.

Reason: Manufacturers of snow & ice melt (SIM) system tubing recognize that the proper installation of this tubing is critical to the successful operation of these systems. One of the most fundamental aspects of installation is the length of each tubing circuit, because if installed lengths are too short or too long, it may be impossible to balance the system correctly for proper operation, efficiency and safety. For tubing that is to be embedded, this topic is critical, yet is very inspectable and enforceable.
The circuit lengths in the proposed Table 1209.2 are based on existing industry practices, and take into account the allowable temperature loss from the hydronic fluid and the typical pressure loss in snow & ice melt circuits of those diameters. The actual lengths are based on the typical on-center spacing of tubing in a SIM system and the typical heat energy required per square foot of outdoor area. These values match those found in other codes.

The proposed language makes it clear that tubing circuit lengths are to be installed according to system design or the default Table 1209.2 and are to be inspected for such compliance.Also, it is important that the final drawings/design be provided to the building owner in case the tubing routing and locations need to be identified at a later date.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed requirements are based on existing industry practices, and match those found in other codes.

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Mod_11443_Text_M98-21.pdf

M11443Text Modification

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has passed as submitted because heating lengths will be different depending on systems and locations. +/- 10% will not affect the performance of the system. (Vote: 8-3)

Final Hearing Results

M98-21 AS

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

89

M11444		/M99-21 Part I			
Date Submitted	03/26/2024	**Section**	1210.5	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds reference standard ASTM F3347-20a

Rationale

See attached

M11444Text Modification

See attached

Page: 1

Mod11444_TextOfModification.pdf

M11444Text Modification

M99-21 Part I

Original Proposal

IMC: TABLE 1210.5, TABLE 1202.5, ASTM Chapter 15 (New)

Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Revise as follows:

TABLE 1210.5 GROUND-SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434;ASTM F3347; CSA B137.5; CSA C448; NSF 358-3
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F1282; ASTM F2434; CSA B137.9
High-density polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769;ASTM F3347; CSA B137.1; CSA B137.18; CSA C448; NSF 358-4

TABLE 1202.5 HYDRONIC PIPE FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.24; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1974
CPVC	ASSE 1061; ASTM D2846; ASTM F438; ASTM F439
Ductile iron and gray iron	ANSI/AWWA C110/A21.10; ASTM A395; ASTM A536; ASTM F1476; ASTM F1548; AWWA C153/A21.53
Ductile iron	ANSI/AWWA C153/A21.53
Gray iron	ASTM A126
Malleable iron	ASME B16.3
PE-RT fittings	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769;ASTM F3347; CSA B137.1; CSA B137.18
PEX fittings	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F3253;ASTM F3347
Plastic	ASTM D2466; ASTM D2467; ASTM D2846; ASTM F877; ASTM F2389; ASTM F2735
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28; ASTM A53; ASTM A106; ASTM A234; ASTM A395; ASTM A420; ASTM A536; ASTM F1476; ASTM F1548

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F3347-20a — Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Reason: ASTM F3347 is titled, "Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing" and contains information for metallic fittings for both PEX and PERT systems intended for use in residential and commercial, hot and cold, potable water distribution systems as well as sealed central heating, including under-floor heating/cooling systems, and residential fire sprinkler systems.

Bibliography: ASTM F3347 Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction. The proposal simply adds an additional ASTM standard

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M11444Text Modification

for inclusion of approved PEX and PERT fitting products and is therefore not expected to either raise or lower the cost of construction by offering another potential product to the application, it only increases additional options.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was passed as submitted based on the proponent reason statement. ASTM F3347 is titled, "Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing" and contains information for metallic fittings for both PEX and PERT systems intended for use in residential and commercial, hot and cold, potable water distribution systems as well as sealed central heating, including under-floor heating/cooling systems, and residential fire sprinkler systems. (Vote: 11-0)

Final Hearing Results

M99-21 Part I AS

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Mod_11444_Text_M99-21 Part I.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

90

M11446		/M100-21 Part I			
Date Submitted	03/26/2024	**Section**	1210.5	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds reference standard ASTM F3348-20b

Rationale

See attached

M11446Text Modification

See attached

Page: 1

Mod11446_TextOfModification.pdf

M11446Text Modification

M100-21 Part I

Original Proposal

IMC: TABLE 1210.5, TABLE 1202.5, ASTM Chapter 15 (New)

Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Mechanical Code

Revise as follows:

TABLE 1210.5 GROUND-SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434;ASTM F3348; CSA B137.5; CSA C448; NSF 358-3
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F1282; ASTM F2434; CSA B137.9
High-density polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769;ASTM F3348; CSA B137.1; CSA B137.18; CSA C448; NSF 358-4

TABLE 1202.5 HYDRONIC PIPE FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.24; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1974
CPVC	ASSE 1061; ASTM D2846; ASTM F438; ASTM F439
Ductile iron and gray iron	ANSI/AWWA C110/A21.10; ASTM A395; ASTM A536; ASTM F1476; ASTM F1548; AWWA C153/A21.53
Ductile iron	ANSI/AWWA C153/A21.53
Gray iron	ASTM A126
Malleable iron	ASME B16.3
PE-RT fittings	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769;ASTM F3348; CSA B137.1; CSA B137.18
PEX fittings	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F3253;ASTM F3348
Plastic	ASTM D2466; ASTM D2467; ASTM D2846; ASTM F877; ASTM F2389; ASTM F2735
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28; ASTM A53; ASTM A106; ASTM A234; ASTM A395; ASTM A420; ASTM A536; ASTM F1476; ASTM F1548

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM F3348-20b — Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Reason: ASTM F3348 is titled, "Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing" and contains information on plastic fittings for PEX and PERT systems and should be included in the fittings table. The fittings are intended for use in residential and commercial, hot and cold, potable water distribution systems as well as sealed central heating, including under-floor heating/cooling systems, and residential fire sprinkler systems.

Bibliography: ASTM F3348 Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Page: 1

Mod_11446_Text_M100-21 Part I.pdf

M11446Text Modification

The code change proposal will not increase or decrease the cost of construction. The proposal simply adds an additional ASTM standard for inclusion of approved PEX and PERT fitting products and is therefore not expected to either raise or lower the cost of construction by offering another potential product to the application, it only increases additional options.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has passed as submitted because it appropriately adds an additional standard for materials that can be used. (Vote: 11-0)

Final Hearing Results

M100-21 Part I AS

Page: 2

Mod_11446_Text_M100-21 Part I.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

91

M11448		/M101-21			
Date Submitted	03/26/2024	**Section**	1210.6	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Changes language from approved to approved type

Rationale

See attached

M11448Text Modification

See attached

Page: 1

Mod11448_TextOfModification.pdf

M11448Text Modification

M101-21

Original Proposal

IMC: 1210.6

Proponents: Lisa Reiheld, Viega LLC, Viega LLC (lisa.reiheld@viega.us)

2021 International Mechanical Code

Revise as follows:

1210.6 Joints. Joints and connections shall be of an approved type. Joints and connections shall be tight for the pressure of the ground-source loop system. Joints used underground shall be of an approved type for buried applications.

Reason: The use of the word "approved" by itself by definition in the IMC indicates being approved the Authority Having Jurisdiction. Modifying this language to indicate that it is of an "approved type" indicates that it is listed to a standard that has been approved for this type of product rather than at the discretion of the AHJ.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This does not increase or decrease the cost but merely clarifies the type of approval necessary for underground installation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal has been approved as submitted because it clears up confusion of what is an approved type of joint used underground and whether the authority having jurisdiction needs to approve the joint. (Vote: 11-0)

Final Hearing Results

M101-21 AS

Page: 1

Mod_11448_Text_M101-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Mechanical

92

M11669		/M97-21			
Date Submitted	05/14/2024	**Section**	1209.6.1	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

The proposed language makes it clear that tubing circuit lengths are to be installed according to system design or the default Table 1209.1 and are to be inspected for such compliance.

Rationale

See attached

M11669Text Modification

See attached

Page: 1

Mod11669_TextOfModification.pdf

M11669Text Modification

M97-21

Original Proposal

IMC: 1209.6 (New), 1209.6.1 (New), TABLE 1209.6.1 (New), 1209.6.2 (New), 1209.6.3 (New)

Proponents: Lance MacNevin, Director of Engineering – Building & Construction Division, Plastics Pipe Institute, Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2021 International Mechanical Code

Add new text as follows:

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.

TABLE 1209.6.1 MAXIMUM CIRCUIT LENGTH OF RADIANT TUBING FROM A SUPPLY-AND-RETURN MANIFOLD ARRANGEMENT

NOMINAL TUBE SIZE	MAXIMUM CIRCUIT LENGTH (FEET)
1/4	125
5/16	200
3/8	250
1/2	300
5/8	400
3/4	500
1	750

For SI units: 1 foot = 304.8 mm

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 report shall be provided to the building owner or the designated representative of the building owner.

Reason: Manufacturers of radiant heating and cooling tubing recognize that the proper installation of radiant heating and cooling tubing is critical to the successful operation of these systems. One of the most fundamental aspects of installation is the length of each tubing circuit, because if installed lengths are too short or too long, or not labelled, it may be impossible to balance the radiant system correctly for proper operation, comfort and efficiency. For tubing that is to be embedded, this topic is critical, yet is very inspectable and enforceable.
The circuit lengths in the proposed Table 1209.1 are based on existing industry practices, and take into account the allowable temperature gain or loss from the hydronic fluid, and the typical pressure loss in radiant circuits of those diameters. These values match those found in other codes.

The proposed language makes it clear that tubing circuit lengths are to be installed according to system design or the default Table 1209.1 and are to be inspected for such compliance.

Also, it is important for radiant tubing circuits to be tagged or labelled, and for the final drawings/design to be given to the building owner, in case the tubing routing and locations need to be identified at a later date.

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Mod_11669_Text_M97-21.pdf

M11669Text Modification

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code sections are based on existing industry practices used by trained experienced professionals, and do not alter the design or construction of radiant systems.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Although there were some concerns over the clarity of the language, the content of the design report and the need for design documents, the committee approved the proposal because most times systems are designed with maximum lengths depending on the square footage of a room. (Vote: 6-5)

Final Hearing Results

M97-21 AS

Page: 2

Mod_11669_Text_M97-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

93

M11236 | **/M4-21 Part II**

Date Submitted	03/18/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Provide Residential definition for HEATPUMP

Rationale

See attached

M11236Text Modification

See attached

Page: 1

Mod11236_TextOfModification.pdf

M11236Text Modification

M4-21 Part II

Original Proposal

IRC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Residential Code

Delete and substitute as follows:

~~**[MP] HEAT PUMP.** An *appliance* having heating or heating and cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.~~

[MP] HEAT PUMP.

A refrigeration system or factory-made appliance that utilizes refrigerant to transfer heat into a space or substance.

Reason: There are two different definitions in the I-codes for "heat pump". The IRC definition identifies heat pumps as an appliance, and the IMC identifies heat pumps as are refrigeration system. This definition is clarifying that a heat pump could be either an appliance or a refrigeration system. This definition is also simplified that a heat pump is transferring heat into a space or substance. The reference to "beneficial purpose" in the IMC is commentary. The proposed new common definition is closely aligned with the term used in the two refrigeration standards referenced in the I-codes, ASHRAE 15 and UL 60335-2-40.
For information purposes, the following are the other definitions:

From the IRC: [MP] HEAT PUMP. An appliance having heating or heating and cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.

From the IMC: HEAT PUMP. A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.

From ASHRAE 15: HEAT PUMP a refrigerating system used to transfer heat into a space or substance.
From UL 60335-2-40: HEAT PUMP appliance which takes up heat at a certain temperature and releases heat at a higher temperature

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity and consistency for the use of this term throughout the I-codes.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The definition is not consistent for the consumer trying to do construction, which may be the homeowner. (6-5)

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Mod_11236_Text_M4-21 Part II.pdf

M11236Text Modification

Public Comments

Public Comment 1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org) requests As Submitted

Commenter's Reason: M4-21 Part I was approved as submitted. For consistency between the IRC mechanical and the IMC. A term that is used throughout the I-codes should have the same definition. This proposal needs to be approved for consistency. There was no opposing testimony on this proposal.
The PMGCAC is puzzled by the Committee's published reason statement for disapproval. We do not understand why "consumers" or "homeowners" would be confused by the revised definition in a *code*. Code definitions are only for support of the code text where that defined term is used.

One committee member mentioned that the revised definition does not meet the "Websters" definition... Here is Webster's definition (note the underline):

": an apparatus for heating or cooling (such as a building) by transferring heat by mechanical means from or to an external reservoir (such as the ground, water, or outside air)"

From the Energy.gov webpage on Heat Pumps:

"For climates with moderate heating and cooling needs, heat pumps offer an energy-efficient alternative to furnaces and air conditioners. Like your refrigerator, heat pumps use electricity to move heatfrom a cool space to a warm space, making the cool space cooler and the warm space warmer. During the heating season, heat pumps move heat from the cool outdoors into your warm house and during the cooling season, heat pumps move heat from your cool house into the warm outdoors. Because they move heat rather than generate hea,t heat pumps can provide equivalent space conditioning at as little as one quarter of the cost of operating conventional heating or cooling appliances."

We urge the voters to approve this proposal to make terminology consistent across the codes and in agreement with other standards.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal is only a clarification of a definition.

Final Hearing Results

M4-21 Part II AS

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Mod_11236_Text_M4-21 Part II.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

94

M11270		/M8-21 Part III			
Date Submitted	03/19/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds REFRIGERANT definition to IRC

Rationale

See attached

M11270Text Modification

See attached

Page: 1

Mod11270_TextOfModification.pdf

M11270Text Modification

M8-21 Part III

Original Proposal

IRC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A THREE PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART 3 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Residential Code

Delete and substitute as follows:

~~**[MP] REFRIGERANT**. A substance used to produce refrigeration by its expansion or evaporation.~~
[MP] REFRIGERANT.
The fluid used for heat transfer in a refrigeration system that refrigerant undergoes a change of state to absorb heat.

Reason: There are three different definitions in the I-codes for "refrigerant". This proposal is to use the current definition for the term in the IFC. The IFC definition provides the best detail as to what a refrigerant is, and aligns with ASHRAE 15, which is referenced in the IMC. The IRC and IMC definitions are not as precise.
For information purposes, the following are the other definitions:

From the IRC: [MP] REFRIGERANT. A substance used to produce refrigeration by its expansion or evaporation.

From the IMC: REFRIGERANT. A substance utilized to produce refrigeration by its expansion or vaporization.

From ASHRAE 15: REFRIGERANT the fluid used for heat transfer in a refrigerating system; the refrigerant absorbs heat and transfers it at a higher temperature and a higher pressure, usually with a change of state.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity and consistency for the use of this term throughout the I-codes.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
[MP] REFRIGERANT. The fluid used for heat transfer in a refrigeration system that ~~refrigerant~~ undergoes a change of state to absorb heat.

Committee Reason: For the modification: The modification makes more sense. It correlates between the codes and clarifies the IRC definition.
For the proposal as modified: It will correlate between the three codes. (11-0)

Final Hearing Results

M8-21 Part III AM

Page: 1

Mod_11270_Text_M8-21 Part III.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

95

M11290		/M10-21 Part II			
Date Submitted	03/19/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds clarification for REFRIGERATION definition to IRC

Rationale

See attached

M11290Text Modification

See attached

Page: 1

Mod11290_TextOfModification.pdf

M11290Text Modification

M10-21 Part II

Original Proposal

IRC: SECTION 202

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE AND FIRE CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

[MP]
~~REFRIDGERATING~~ REFRIGERATION SYSTEM

.

A combination of interconnected parts ~~forming a closed circuit~~ in which refrigerant is enclosed and is circulated for the purpose of extracting, then rejecting, heat. ~~A direct refrigerating system is one in which the evaporator or condenser of the refrigerating system is in direct contact with the air or other substances to be cooled or heated. An indirect refrigerating system is one in which a secondary coolant cooled or heated by the refrigerating system is circulated to the air or other substance to be cooled or heated.~~

Reason: The proposal will better correlate the I-Codes with the industry standards, ASHRAE 15, for using the term refrigeration system rather than refrigerating systems. No technical change is intended.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity and consistency for the use of this term throughout the I-codes.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Correlates the I-codes under one definition. (11-0)

Final Hearing Results

M10-21 Part II AS

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Mod_11290_Text_M10-21 Part II.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

96

M11608	/RM4-21				
Date Submitted	04/02/2024	**Section**	1402.1	**Proponent**	Mo Madani
Chapter	14	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

This proposal clarifies that various types of equipment shall be “listed and labeled”, which are defined terms in the code, and is consistent with the style used in other sections of the code, such as M1403.1.

Rationale

See attached

M11608Text Modification

See attached

Page: 1

Mod11608_TextOfModification.pdf

M11608Text Modification

RM4-21

Original Proposal

IRC: M1402.1, M1403.1, M1412.1, M2006.1

Proponents: Jonathan Roberts, UL LLC, UL LLC (jonathan.roberts@ul.com)

2021 International Residential Code

Revise as follows:

M1402.1 General. Oil-fired central furnaces shall ~~conform to~~ be *listed* and *labeled* in accordance with ~~ANSI /~~UL 727. Electric furnaces shall ~~conform to~~ be *listed* and *labeled* in accordance with UL 1995 or UL/CSA~~/ANCE~~ 60335-2-40.

M1403.1 Heat pumps. Electric heat pumps shall be *listed* and *labeled* in accordance with UL 1995 or UL/CSA~~/ANCE~~ 60335-2-40.

M1412.1 ~~Approval of~~ Listed equipment. Absorption systems shall be installed in accordance with the manufacturer's instructions. Absorption *equipment* shall ~~comply~~ be *listed* and *labeled* in accordance with UL 1995 or UL/CSA~~/ANCE~~ 60335-2-40.

M2006.1 General. Pool and spa heaters shall be installed in accordance with the manufacturer's installation instructions. Oil-fired pool heaters shall ~~comply~~ be *listed* and *labeled* in accordance with UL 726. Electric pool and spa heaters shall~~comply be *listed* and *labeled* in accordance~~ with UL 1261. Pool and spa heat pump water heaters shall~~comply~~ be *listed* and *labeled* in accordance with UL 1995, or UL/CSA~~/ANCE~~ 60335-2-40 ~~or CSA C22.2 No. 236~~.

Exception: Portable residential spas and portable residential exercise spas shall~~comply~~ be *listed* and *labeled* in accordance with UL 1563 or CSA C22.2 No. 218.1.

Reason: This proposal clarifies that these various types of equipment shall be "listed and labeled", which are defined terms in the code, and is consistent with the style used in other sections of the code, such as M1403.1.
The first edition of the UL/CSA 60335-2-40 was jointly published with ANCE, but subsequent editions have not. The designation used for UL 727 should be shown without the prefix "ANSI/" for consistency with how all other UL standards are referenced in the I-codes.

CSA C22.2 No. 236 has been withdrawn due to the publication of UL/CSA 60335-2-40. The referenced standard of "C22.2 No. 218.1" in the exception for M2006.1 needs to be clearly identified as a CSA standard.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Clarifies the requirements and corrects the references of existing standards.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed with the published reason statement. (11-0)

Final Hearing Results

RM4-21 AS

Page: 1

Mod_11608_Text_RM04-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

97

M11609	/RM05-21

Date Submitted	04/02/2024	**Section**	1404	**Proponent**	Mo Madani
Chapter	14	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

This code change removes the reference to Section 1411 and adds the appropriate standards that regulate refrigeration cooling equipment.

Rationale

See attached

M11609Text Modification

See attached

Page: 1

Mod11609_TextOfModification.pdf

M11609Text Modification

RM5-21

Original Proposal

IRC: SECTION M1404, M1404.1, UL Chapter 44 (New), UL Chapter 44

Proponents: Helen Walter-Terrinoni, AHRI, AHRI; Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Daikin US (JBENGINEER@aol.com); Andrew Klein, A S Klein Engineering, The Chemours Company (andrew@asklein.com); Joe Nebbia, Newport Partners, Natural Resources Defense Council (jnebbia@newportpartnersllc.com)

2021 International Residential Code

SECTION M1404
REFRIGERATION COOLING EQUIPMENT

Revise as follows:

M1404.1 Compliance. Refrigeration cooling *equipment* shall comply with UL 474, UL 484, UL 1995, or UL/CSA 60335-2-40 ~~Section M1411~~.

Add new text as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 474-2015	Standard for Safety Dehumidifiers

Revise as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL/CSA~~/ANCE~~ 60335-2-40 ~~–2012~~ 2019	Standard for Household and Similar Electrical Appliances, Safety - Part 2-40: ~~Particular Requirements for Motor-compressors~~ Particular requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers

Add new text as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 484-2019	Standard for Room Air Conditioners

Reason: This code change removes the reference to Section 1411 and adds the appropriate standards that regulate refrigeration cooling equipment. UL 484, UL 1995, and UL/CSA 60335-2-40 are the three standards that regulate all residential air conditioning and refrigerant cooling equipment. UL 474 and UL 484 is a new standard being introduced to the code. UL 474 regulates dehumidifiers. UL 484 regulates room air conditioners such as window units and package terminal air conditioners (PTACs). UL 474, UL 484, and UL 1995 will eventually sunset with UL/CSA 60335-2-40 as the replacement standard. However, these three standards are still being used for listing of equipment. Currently, Section M1403.1 references UL 1995 and UL/CSA/ANCE 60335-2-40 for heat pumps. Similarly, Section M1412.1 references these two standards for absorption cooling equipment. The modification will compliment these two sections and their corresponding references to the standards. In addition, a revision to the IMC added these standards to Table 1101.2. This will keep the IRC consistent with the IMC regarding appropriate standards referenced for refrigeration equipment.

UL/CSA 60335-2-40 has been updated to the current edition since a significant number of new safety requirements were added to the

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Mod_11609_Text_RM05-21.pdf

standard.While Section 1411 is removed from a reference, the section still applies. It is not necessary to reference the section.

(Joe Nebbia,)
The current language in the 2021 IRC in section M1404 does not contain needed reference to UL 484, UL 1995, or UL/CSA 60335-2-40, the appropriate safety standards that establish requirements for this equipment. Rather the section points to M1411 unnecessarily. M1411 applies to both heating and cooling equipment regardless of the current statement in M1404. This code change replaces the unnecessary reference to M1411, without removing the requirements of M1411, while adding the necessary reference to equipment safety standards. This change is consistent with how other sections in Chapter 14 (M1402, M1403, M1412, M1413) reference equipment safety standards and mirrors the structure of M1403 (Heat Pump Equipment). It also allows the reference to the most up to date UL/CSA 60335-2-40 which includes safety requirements specific to A2L refrigerants.

These changes are especially important in the case of A2L refrigerants, which are expected to increase in use as a substitute for hydrofluorocarbon (HFC) refrigerants. HFCs are extremely potent greenhouse gases and in December 2020 the U.S. Congress passed a new law that will require an 85% economy-wide phasedown of HFC refrigerants over the next 15 years. The phasedown is expected to avoid HFC emissions of 900 million metric tons of CO2-equivalent by 2035. In addition, 9 states - 8 of which adopt the ICC codes - have already prohibited the use of HFC refrigerants in several high volume applications.1 Human comfort systems account for more HFC use than any other end-use application in the U.S., so a large portion of the HFC reductions are expected to come from them. A2L refrigerants have significantly lower global warming potential than A1-class HFCs, so A2L use is a key part of the HFC reduction plan.

These restrictions on the supply of HFC refrigerant will drive up consumption of A2L substitutes. Permitting use of alternative refrigerants, including A2L refrigerants, in high probability systems for human comfort will enable states and local jurisdictions to meet their heating and cooling needs while also complying with applicable HFC regulations. Without this change, jurisdictions adopting the code will be forced to enact their own amendments to the code in order to support their HFC reduction goals. This code change allows the ICC to provide an off the shelf solution to those jurisdictions.

Residential equipment represents a large portion of HFC emissions. Residential and light commercial air-conditioning make up 22% of nationwide refrigerant emissions,2 making this change an important piece to addressing the residential use of HFC refrigerants. Without this change, jurisdictions adopting the code will be forced to enact their own amendments to the code in order to support their HFC reduction goals. This change allows the ICC to provide an off the shelf solution to those jurisdictions.

1 https://www.nrdc.org/experts/christina-theodoridi/states-keep-steady-course-hfc-regulations2 https://www.epa.gov/sites/production/files/2015-09/documents/epa_hfc_residential_light_commercial_ac.pdfThe current language in the 2021 IRC in section M1404 does not contain needed reference to UL 484, UL 1995, or UL/CSA 60335-2-40, the appropriate safety standards that establish requirements for this equipment. Rather the section points to M1411 unnecessarily. M1411 applies to both heating and cooling equipment regardless of the current statement in M1404. This code change replaces the unnecessary reference to M1411, without removing the requirements of M1411, while adding the necessary reference to equipment safety standards. This change is consistent with how other sections in Chapter 14 (M1402, M1403, M1412, M1413) reference equipment safety standards and mirrors the structure of M1403 (Heat Pump Equipment). It also allows the reference to the most up to date UL/CSA 60335-2-40 which includes safety requirements specific to A2L refrigerants.

These changes are especially important in the case of A2L refrigerants, which are expected to increase in use as a substitute for hydrofluorocarbon (HFC) refrigerants. HFCs are extremely potent greenhouse gases and in December 2020 the U.S. Congress passed a new law that will require an 85% economy-wide phasedown of HFC refrigerants over the next 15 years. The phasedown is expected to avoid HFC emissions of 900 million metric tons of CO2-equivalent by 2035. In addition, 9 states - 8 of which adopt the ICC codes - have already prohibited the use of HFC refrigerants in several high volume applications.1 Human comfort systems account for more HFC use than any other end-use application in the U.S., so a large portion of the HFC reductions are expected to come from them. A2L refrigerants have significantly lower global warming potential than A1-class HFCs, so A2L use is a key part of the HFC reduction plan.

These restrictions on the supply of HFC refrigerant will drive up consumption of A2L substitutes. Permitting use of alternative refrigerants, including A2L refrigerants, in high probability systems for human comfort will enable states and local jurisdictions to meet their heating and cooling needs while also complying with applicable HFC regulations. Without this change, jurisdictions adopting the code will be forced to enact their own amendments to the code in order to support their HFC reduction goals. This code change allows the ICC to provide an off the shelf solution to those jurisdictions.Residential equipment represents a large portion of HFC emissions. Residential and light commercial air-conditioning make up 22% of nationwide refrigerant emissions,2 making this change an important piece to addressing the residential use of HFC refrigerants. Without this change, jurisdictions adopting the code will be forced to enact their own amendments to the code in order to support their HFC reduction goals. This change allows the ICC to provide an off the shelf solution to those jurisdictions.

M11609Text Modification

Bibliography: [1] https://www.nrdc.org/experts/christina-theodoridi/states-keep-steady-course-hfc-regulations
[2] https://www.epa.gov/sites/production/files/2015-09/documents/epa_hfc_residential_light_commercial_ac.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change only adds the appropriate standards that are used for testing and listing refrigeration cooling equipment. The code already requires such equipment to be listed.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

M1404.1 Compliance. Refrigeration cooling *equipment* shall ~~comply~~ be listed and labeled in accordance with ~~UL 474,~~ UL 484, UL 1995, or UL/CSA 60335-2-40.

~~UL 474-2015~~	~~Standard for Safety Dehumidifiers~~

Committee Reason: For the modification: The code should not reference a standard that has been withdrawn by the promulgator. The change of "comply," to, "listed and labeled in accordance with," make the text consistent with ICC code text format.For the proposal as modified: The proposed standards are necessary as they include the updated requirements for systems using A2L refrigerants. (11-0)

Final Hearing Results

RM5-21 AM

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Mod_11609_Text_RM05-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

98

M11610		/RM6-21			
Date Submitted	04/02/2024	**Section**	1411.1	**Proponent**	Mo Madani
Chapter	14	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

This proposed change adds requirements consistent with the provisions in ASHRAE 15.2

Rationale

See attached

M11610Text Modification

See attached

Page: 1

Mod11610_TextOfModification.pdf

M11610Text Modification

RM6-21

Original Proposal

IRC: M1411.1, M1411.2 (New), M1411.3 (New), M1411.4 (New), M1411.5 (New), M1411.6 (New), M1411.7 (New), ANCE Chapter 44, CSA Chapter 44, UL Chapter 44

Proponents: Helen Walter-Terrinoni, AHRI, AHRI (helen.a.walter-terrinoni@outlook.com); Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Daikin US (JBEngineer@aol.com)

2021 International Residential Code

M1411.1 Approved refrigerants. Refrigerants used in direct refrigerating systems shall conform to the applicable provisions of ANSI/ASHRAE 34.

Add new text as follows:

M1411.2 Refrigeration system listing. Refrigeration systems using Group A2L refrigerants shall be listed and labeled to UL 60335-2-40/CAN/CSA C22.2 No. 60335-2-40. Refrigeration systems using Group A1 refrigerants shall be listed to UL 60335-2-40/CAN/CSA C22.2 No. 6-335-2-40 or UL 1995/CSA C22.2 No. 236. The equipment shall be installed in accordance with the listing.

M1411.3 Refrigeration system installation. Refrigeration systems shall be installed in accordance with the manufacturer's installation instructions. After installation, the manufacturer's installation instructions, owner's manuals, service manuals, and any other product literature provided with the equipment shall be attached to the indoor unit or left with the homeowner.

M1411.4 Field installed accessories. All Field installed accessories shall be installed in accordance with the accessory and equipment manufacturer's installation instructions. Accessories installed in the ductwork of Group A2L refrigeration systems shall not contain electric heating elements, open flames, or devices switching electrical loads greater than 2.5 kVA.

M1411.5 Signs and identification. Each refrigeration system using Group A2L refrigerant shall have the following information legibly and permanently indicated on a markable label provided by the equipment manufacturer.

1. Contact information of the responsible company that installed the refrigeration system, and
2. The system refrigerant charge and the refrigerant number.

M1411.6 Refrigerant charge. All refrigeration systems shall have refrigerant charge in compliance with the equipment manufacturer's installation instructions and the requirements of the listing. Group A2L refrigerant charge for an individual refrigeration system shall not exceed 34.5 lbs (15.7 kg).

M1411.7 Group A2L refrigerant piping testing. The piping system containing Group A2L refrigerant shall be tested in accordance with the manufacturer's installation instructions and the requirements of the listing.

Delete without substitution:

ANCE

Association of Standardization and Certification
Av. Lázaro Cárdenas No. 869 Fraccion 3
Col. Nva. Industrial Vallejo Deleg. Gustavo A. Madero, México, D.F.

~~NMX-J-521/2-40-ANCE-2014/CAN/CSA-22.2 No. 60335-Safety of Household and Similar Electric Appliances, Part 2-40: Particular Requirements for Heat Pumps, Air-Conditioners and Dehumidifiers~~

~~2014/CAN/CSA-22.2 No. 60335~~

~~2-40-12/UL 60335-2-40~~

Page: 1

Mod_11610_Text_RM06-21.pdf

M11610Text Modification

Revise as follows:

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

UL 60335-2-40-2019/CAN/CSA/C22.2 No. 60335-2-40~~-2012~~19 — Standard for Safety of Household and Similar Electrical Appliances, Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL~~/CSA/ANCE~~ 60335-2-40~~-2012~~2019/CAN/CSA C22.2 No. 60335-2-40-19 — Standard for Safety Household and Similar Electrical Appliances,- Safety - Part 2-40: Particular Requirements for Electrical Heat Pumps, Air Conditioners and Dehumidifiers ~~Motor-compressors~~

Reason: ASHRAE has developed a new standard, ASHRAE 15.2, that addresses requirements for residential refrigeration systems and air conditioners. This proposed change adds requirements consistent with the provisions in ASHRAE 15.2. This code change was developed through the cooperation of ASHRAE SSPC 15 members, ASHRAE SPC 15.2 members, AHRI, and NAHB.
The general requirements list the specific standards that regulate refrigeration equipment. The change will mandate a listing to UL 60335-2-40/CAN/CSA C22.2 No. 60335-2-40 for any equipment using A2L refrigerant. The same standard will apply for systems using A1 refrigerants. Additionally UL 1995 is included for equipment using A1 refrigerants. UL 60335-2-40/CAN/CSA C22.2 No. 60335-2-40 has been updated to the 2019 edition which is the latest edition. In the latest edition, ANCE (from Mexico) withdrew their sponsorship. Hence, the ANCE listing is shown deleted. The standard is only bi-national between the United States and Canada.

The field marking of new equipment is required by the product standard. This requirement has been added to the code to keep the code consistent with the listing requirements.

The manufacturer specifies the charge limitation in the installation instructions for equipment using Group A2L refrigerant. This is also required by the product standard and assures the safe amount of charge based on room volume. The manufacturers also specify the testing requirements for refrigerant piping for residential equipment. Testing of the refrigerant piping is important to identify to allow the code official to observe that the piping can me the pressure requirements of the equipment.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The installation of air conditioning equipment is optional. Therefore there is no increase or decrease in cost. This change emphasizes the requirements currently in the code regarding general listing and installation of mechanical equipment.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The change provides a clear directive for the safe use of the new A2L refrigerants that are beginning to be used by appliance manufacturers. The development of these requirements through the cooperation of many stakeholders provides a solid basis for accepting appliances and systems using these refrigerants. (11-0)

Final Hearing Results

RM6-21 AS

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Mod_11610_Text_RM06-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

99

M11611		/RM8-21			
Date Submitted	04/02/2024	**Section**	1502.6	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds new Section 1502.6 "Makeup air".

Rationale

See attached

M11611Text Modification

See attached

Page: 1

Mod11611_TextOfModification.pdf

M11611Text Modification

RM8-21

Original Proposal

IRC: 1502.6 (New)

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Residential Code

Add new text as follows:

1502.6 Makeup air. Installations exhausting more than 200 cfm (0.09 3/s) shall be provided with make up air. Where a closet is designated for the installation of a clothes dryer, an opening having a area of not less than 100 sq. inches (0.o645 m2) for make up air shall be provided in the closet enclosure, or make up air shall be provided by other approved means.

Reason: This language does not appear in Section M1502 for dryer exhaust and is a logical location for the makeup air requirements for residential clothes dryers. This is the same language found in the IMC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
IRC-1502.6 ..... This IMC extraction should not increase the cost of construction as no new materials are required to provide and opening in a wall. A louvered door is over and above what the code calls for but would be an option and not a requirement possibly increasing cost.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The language is inconsistent and confusing with the use of the term "makeup air", which is undefined in the IRC. It is not clear what is needed, make-up air or transfer air, for the appliance. The term "designated" should be changed to "intended" when referring to the closet's intended use for a dryer. (11-0)

Public Comments

Public Comment 1

Proponents: Joseph J. Summers, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Public Comment

Replace as follows:

2021 International Residential Code

AIR, MAKEUP . Any combination of outdoor and transfer air intended to replace exhaust air and exfiltration.

AIR, OUTDOOR .
Ambient air that enters a building through a ventilation system, through intentional openings for natural ventilation, or by infiltration.

AIR, TRANSFER . Air moved from one indoor space to another.

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Mod_11611_Text_RM08-21.pdf

M11611Text Modification

M1502.6 Makeup air . Installations exhausting more than 200 cfm (0.09 m^3/s) shall be provided with makeup air.

M1502.6.1 Closet Installation . Where a closet is designed for the installation of a clothes dryer, makeup air shall be provided in accordance with the dryer manufacturer's installation instructions. If the manufacturer installation instructions do not include specifications for provision of makeup air, one or more permanent openings having a total area of not less than 100 square inches (645 mm^2) shall be provided in the closet enclosure, or makeup air shall be provided by other approved means.

M1503.6 Makeup air required . Where one or more gas, liquid or solid fuel-burning *appliance* that is neither direct-vent nor uses a mechanical draft venting system is located within a dwelling unit's air barrier, each exhaust system capable of exhausting in excess of 400 cubic feet per minute (0.19 m^3/s) shall be mechanically or passively provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with not fewer than one outdoor air duct and damper complying with Section M1503.6.2.

Exception: Makeup air is not required for exhaust systems installed for the exclusive purpose of space cooling and intended to be operated only when windows or other air inlets are open.

M1503.6.1 Location . Kitchen exhaust makeup air that is ducted from the outdoors shall be discharged into the same room in which the exhaust system is located or into rooms or *duct systems* that communicate through one or more permanent openings with the room in which such exhaust system is located. Such permanent openings shall have a net cross-sectional area not less than the required area of the makeup air supply openings.

Commenter's Reason: This PC represents a consensus position between proponents and opponents of RM8 that addresses the committee's concerns while establishing minimum and reasonable requirements for clothes dryer makeup air. It was also reviewed and approved by the PMGCAC. The PC borrows from the makeup air requirements of Section 504.7 of the IMC and Section G2439.5 of the IRC Fuel Gas chapter, recognizes the primacy of manufacturer installation instructions (similar to how clothes dryer exhaust duct equivalent length is addressed in Section M1502.4.6.2), and introduces definitions of makeup air, transfer air, and outdoor air that are also copied from the IMC. In the case that manufacturer instructions do not provide specifications for the provision of makeup air, the text and accompanying definitions clarify that transfer air can be used to meet makeup air requirements for clothes dryers in closets or that makeup air could be directly ducted from the outdoors to the clothes dryer closet, at the builder's discretion.

To ensure that the cross-walked definitions are compatible with other makeup air requirements in the IRC, slight modifications have been made to the kitchen range hood makeup air section. These modifications clarify that, where required by M1503.6, a kitchen range hood makeup air system shall have at least one outdoor air duct to provide makeup air. This modification is made to preserve the intent of Section M1503.6 when introducing the definition of makeup air to the IRC.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
In most cases, this language should not increase the cost of construction as it permits transfer air to serve as makeup air for clothes dryers and recognizes manufacturer instructions as the primary path for determining makeup air requirements for clothes dryers.

Final Hearing Results

RM8-21 AMPC1

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Mod_11611_Text_RM08-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

100

M11612 | **/RM12-21**

Date Submitted	04/02/2024	**Section**	1504.3	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R.

Summary of Modification

Modifies the text of Section M1504.3 "Exhaust openings".

Rationale

See attached

M11612Text Modification

See attached

Page: 1

Mod11612_TextOfModification.pdf

M11612Text Modification

RM12-21

Original Proposal

IRC: M1504.3

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Residential Code

Revise as follows:

M1504.3 Exhaust openings. Air exhaust openings shall terminate as follows:

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity air intake openings, operable windows and doors.
3. Not less than 10 feet (3048 mm) from mechanical air intake openings except where theeither of the following apply:
   3.1. The exhaust opening is located not less than 3 feet (914 mm) above the air intake opening.
   3.2 The exhaust opening is part of an approved factory-built intake/exhaust combination termination fitting installed in accordance with the manufacturer's instructions, and the exhaust air is drawn from a living space.
4. Openings shall comply with Sections R303.5.2 and R303.6.

Reason: Intake/exhaust combination terminations are regularly installed with heating and energy recovery ventilators (H/ERVs) used for dwelling units. Their use reduces building penetrations, labor, and associated system costs. By reducing the number of penetrations, air leakage can also be reduced, resulting in space conditioning energy savings. Further, the durability of the structure can be improved through reducing entry pathways for bulk water. Manufacturer tests conducted by Natural Resources Canada (NRC) have demonstrated that use of intake/exhaust combination terminations results in minimum cross-contamination of airflows(i.e., not exceeding 4%; see NRC report A1- 007793). These results are aligned with ASHRAE 62.2 approval of such devices, which limits cross-contamination to 10%, as verified by the manufacturer. If approved, this proposed modification to the IRC would limit application of intake/exhaust combination terminations to “approved”, “factory-built” units. Approval of this proposed modification is expected to result in more affordable and architecturally flexible terminations. Note: The IRC defines living space as, “space within a dwelling unit utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes”.
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 7.

Bibliography: Ouazia, B. 2016. Evaluation of a dual hood performance in term of contaminant re-entrainment from exhaust to supply. A1-007793. National Research Council Canada. For a copy of the report, please contact the proponent at the email address provided. Additional reports are available from the proponent upon request.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code.

M11612Text Modification

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Public Comments

Public Comment 1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1504.3 Exhaust openings . Air exhaust openings shall terminate as follows:

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity air intake openings, operable windows and doors.
3. Not less than 10 feet (3048 mm) from mechanical air intake openings except where the either of the following apply:
   3.1. The exhaust opening is located not less than 3 feet (914 mm) above the air intake opening.
   3.2 The exhaust opening is part of ~~an approved~~ a factory-built intake/exhaust combination termination fitting installed in accordance with the fan manufacturer's instructions, and the exhaust air is drawn from a living space.
4. Openings shall comply with Sections R303.5.2 and R303.6.

Commenter's Reason: This comment modifies language approved by the IRC Mechanical committee to align with the IMC Committee's action on M16.
Factory-built intake/exhaust combination termination fittings are regularly provided by fan manufacturers and installed by builders to separate mechanical air intakes from mechanical exhaust serving dwelling unit or sleeping unit mechanical ventilation systems. The included image from a fan manufacturer's installation instructions provides an example of a typical fitting serving this purpose.

The IRC Mechanical committee's approval of RM12 as submitted aligned with the 2018 IMC's Sections 401.4 and 501.3.1 approval of the use of "*approved* factory-built intake/exhaust combination termination fittings" to separate the air streams associated with mechanical intake air openings and living space exhaust air, when the fitting is provided in accordance with the fan manufacturer's instructions. Similarly, Section G2407.1 of the Fuel Gas Code (see below for reference) approves the use of concentric vent termination fittings to separate combustion air from flue gases provided that such fittings are installed "in accordance with the appliance manufacturer's instructions"; the primary difference between the 2018 IMC and the Fuel Gas Code in this respect is that the Fuel Gas Code does not require special approval for concentric vent termination fittings.

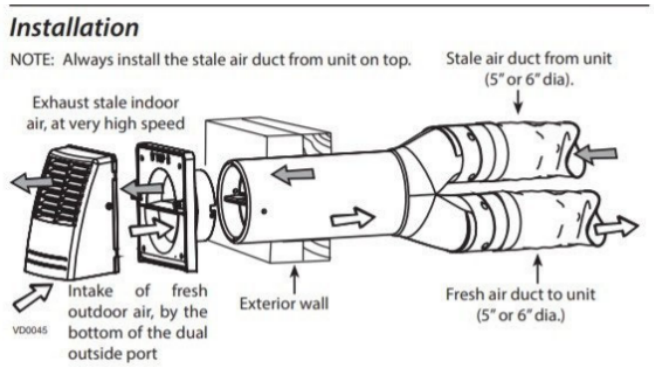
By approving M16 as submitted, the IMC Committee removed the requirement for factory-built intake/exhaust combination termination fittings to be "approved" when such terminations are installed in accordance with the "appliance" manufacturer's instructions (based on feedback received since the hearings, a PC will be submitted to M16 to change the word "appliance" to "fan" to better clarify that such terminations must be recognized by the fan manufacturer to be provided without special approval). This action aligned the 2024 IMC requirements for factory-built intake/exhaust combination termination fittings with the Fuel Gas Code's treatment of concentric vent termination fittings (i.e., no special approval is required when installed in accordance with the appliance/fan manufacturer's instructions). Approval of this public comment to RM12 and approval of M16 as modified with the PMGCAC's public comment will align the 2024 IRC, 2024 IMC, and 2024 FGC in this regard.

Fuel Gas Code reference: "G2407.1 (304.1) General ..... Direct-vent appliances, gas appliances of other than natural draft design, vented

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Mod_11612_Text_RM12-21.pdf

gas appliances not designated as Category I and appliances equipped with power burners, shall be provided with combustion, ventilation and dilution air in accordance with the appliance manufacturer's instructions."



Cost Impact: The net effect of the Public Comment and code change proposal will decrease the cost of construction
Removing requirements for special approval of factory-built intake/exhaust combination termination fittings can be expected to reduce labor costs
for builders, contractors, and code officials.

Final Hearing Results

RM12-21 AMPC1

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

101

M11613		/RM13-21			
Date Submitted	04/02/2024	**Section**	1504.3	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R. FBC - R/Section 1506.3.

Summary of Modification

With the increased popularity of townhouses, many times with limited wall areas on the front and back of these dwellings, quite often it's difficult to find sufficient wall area to locate terminations compliant with the exhaust opening 3' clearance requirements in this section.

Rationale

See attached

M11613Text Modification

See attached

Page: 1

Mod11613_TextOfModification.pdf

M11613Text Modification

RM13-21

Original Proposal

IRC: M1504.3

Proponents: Brent Ursenbach, West Coast Code Consultants, Inc, Utah Governor's Office of Energy Development (brentu@wc-3.com)

2021 International Residential Code

Revise as follows:

M1504.3 Exhaust openings. Air exhaust openings shall terminate as follows:

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity air intake openings, operable windows and doors<u>except where the exhaust opening is located not less than 1 foot (305 mm) above the gravity air intake opening, operable windows and doors</u>.
3. Not less than 10 feet (3048 mm) from mechanical air intake openings except where the exhaust opening is located not less than 3 feet (914 mm) above the air intake opening. Openings shall comply with Sections R303.5.2 and R303.6.

Reason: With the increased popularity of townhouses, many times with limited wall areas on the front and back of these dwellings, quite often it's difficult to find sufficient wall area to locate terminations compliant with the exhaust opening 3' clearance requirements in this section. The exhaust from dryers, bath fans and domestic ranges is not considered noxious or hazardous, and poses little if any health risk. The following paragraph #3, allows a 70% reduction from 10' above to 3' above for mechanical air intakes. It's reasonable to allow a 66% reduce from 3' above to 1" above for the gravity intakes, doors and operable windows in paragraph #2.

Imagine the simplification of the exhaust duct installations if terminations were allowed above windows, with this 1' clearance requirement.

In IRC Chapter 24 clearance requirements for direct vent gas appliance from these openings are in many cases less than these requirements for these environment exhausts. These gas vents exhaust hazardous productions of combustion to outside.

Meeting the current requirements often adds extra elbows and pipe to the exhaust duct system, reducing the airflow through the duct.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal reduces materials and labor expense required to offset exhaust duct terminations away from windows.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed with most of the published reason statement but took exception with the phrase, "exhaust from dryers." (10-1)

Final Hearing Results

RM13-21 AS

Page: 1

Mod_11613_Text_RM13-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

102

M11614		/RM16-21			
Date Submitted	04/02/2024	**Section**	1505.4.3	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R.

Summary of Modification

This proposal and its companion proposal to the IMC are correlation proposals that will align the terminology, definitions, and their application across both codes.

Rationale

See attached

M11614Text Modification

See attached

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Mod11614_TextOfModification.pdf

M11614Text Modification

RM16-21

Original Proposal

IRC: SECTION 202, M1505.4.3

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Delete without substitution:

~~**[MP] BALANCED VENTILATION.** Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10 percent of the total mechanical supply airflow rate.~~

Revise as follows:

[MP] BALANCED VENTILATION SYSTEM. A ventilation system where the total mechanical supply airflow and total mechanical exhaust airflow are simultaneously within 10 percent of their averages. The balanced ventilation system airflow is the average of themechanical supply and mechanical exhaust airflows.

M1505.4.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1505.4.3(1) or not less than that determined by Equation 15-1.

Ventilation rate in cubic feet per minute = (0.01 × total square foot area of house) + [7.5 × (number of bedrooms + 1)] **(Equation 15-1)**

Exceptions:

1. Ventilation rate credit. The minimum mechanical ventilation rate determined in accordance with Table M1505.4.3(1) or Equation 15-1 shall be reduced by 30 percent, provided that both of the following conditions apply:
   1.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:
      1.1.1. Living room.
      1.1.2. Dining room.
      1.1.3. Kitchen.
   1.2. The whole-house ventilation system is a *balanced ventilation system*.
2. Programmed intermittent operation. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1505.4.3(1), by Equation 15-1 or by Exception 1 is multiplied by the factor determined in accordance with Table M1505.4.3(2).

Reason: The 2021 versions of the IMC and IRC introduced a 30% ventilation rate credit for dwelling units with systems providing balanced ventilation. Because these changes were based on the approval of multiple proposals, their approval resulted in different definitions for *balanced ventilation* and *balanced ventilation system* across the IRC and IMC. This proposal and its companion proposal to the IMC are correlation proposals that will align the terminology, definitions, and their application across both codes. This proposal deletes the term "*balanced ventilation*", which is not used within the IRC, and modifies the term "*balanced ventilation system*" to incorporate the relevant components of "*balanced ventilation*". The proposed definition for "balanced ventilation system" is also proposed within the companion proposal to the IMC. The change that is proposed in Section M1505.4.3 exception 1.2 is italicizing the phrase "*balanced ventilation system*" so that the user is directed to the corresponding definition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial and therefore will not increase or decrease the cost of construction.

Page: 1

Mod_11614_Text_RM16-21.pdf

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed with the published reason statement. (11-0)

Public Comments

Public Comment 1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

[MP] BALANCED VENTILATION SYSTEM . ~~A ventilation system where the total mechanical supply airflow and total mechanical exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the mechanical supply and mechanical exhaust airflows.~~
A ventilation system that simultaneously supplies outdoor air to and exhausts air from a space, where the mechanical supply airflow rate and the mechanical exhaust airflow rate are each within 10% of the average of the two airflow rates.

Commenter's Reason: The PMGCAC worked with the proponent to revise the language in response to the IMC Committee's comments on M23, which is the coordinating proposal to align definitions across the IMC and IRC. All parties agree that this definition better clarifies the meaning of the current term. The PMGCAC and the proponent are submitting a coordinating public comment to revise the IMC definition under M23.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This change is a non-substantive clarification of an existing definition.

Final Hearing Results

RM16-21 AMPC1

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

103

M11615		/RM17-21			
Date Submitted	04/02/2024	**Section**	1506	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

FBC-M/ M1507

Summary of Modification

Local exhaust rates for kitchens and bathrooms should not be a subsection of whole house mechanical ventilation. This proposal creates a new subsection 305.5 "Local Exhaust Rates".

Rationale

See attached

M11615Text Modification

See attached

Page: 1

Mod11615_TextOfModification.pdf

M11615Text Modification

RM17-21

Original Proposal

IRC: M1506 (New), M1505.4.4, TABLE M1505.4.4, M1503.5

Proponents: Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com)

2021 International Residential Code

Add new text as follows:

M1506
LOCAL EXHAUST RATES

Revise as follows:

~~**M1505.4.4**~~ **M1506.1** ~~**Local exhaust rates**~~ **General.** *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1505.4.4.~~ M1506.1.

TABLE ~~M1505.4.4~~ M1506.1 MINIMUM REQUIRED LOCAL EXHAUST RATES ~~FOR ONE- AND TWO-FAMILY DWELLINGS~~

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.

M1503.5 Kitchen exhaust rates. Where domestic kitchen cooking *appliances* are equipped with ducted range hoods or down-draft exhaust systems, ~~the fans shall be sized in accordance with Section M1505.4.4~~. the minimum exhaust rate shall be in accordance with Section M1506.1

Reason: 1) Local exhaust rates for kitchens and bathrooms should not be a subsection of whole house mechanical ventilation. This proposal creates a new subsection 305.5 "Local Exhaust Rates"

2) There is no reason to state "one and two-family dwellings" unless this is meant to not apply to dwelling units in a townhouse. Technically (by definition), a townhouse contains "dwelling units" and is not a "dwelling". There is no reason this would not also apply to dwelling units in townhouses.
3) The reference to the minimum kitchen exhaust rate should be about exhaust rates, not "sizing of fans".

Cost Impact: The code change proposal will not increase or decrease the cost of construction
1) Striking out the term “for one- and two-family dwellings” will not change the cost of construction, because the provisions in the table are already applied to “dwelling units” in “townhouses” in industry standard practice. The IRC scope is only for one- and two-family dwellings and townhouses, and since the provisions in this table apply to all of those, there is no necessity to describe the building types in the table heading.

2) Moving Table M1506.1 into its own section does not change the application of the table and thus does not affect the cost of construction. It is simply a reorganization, as local exhaust rates are not directly associated with whole-house ventilation systems.

3) Changing the phrase “the fans” to “exhaust rate” used in Section M1503.5 to reference Table M1504.4 so that the object of the reference matches the title and purpose of the table (exhaust rate) will have no cost impact on construction.

Page: 1

Mod_11615_Text_RM17-21.pdf

M11615Text Modification

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

~~**M1506.1**~~ **M1505.5** ~~**General**~~ **Local exhaust rates.** *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1506.1~~ M1505.5

TABLE ~~M1506.1~~ M1505.5 MINIMUM REQUIRED LOCAL EXHAUST RATES

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.

M1503.5 Kitchen exhaust rates. Where domestic kitchen cooking *appliances* are equipped with ducted range hoods or down-draft exhaust systems, the exhaust rate shall equal or exceed the airflow required in Table M1505.5 at one or more speed settings.~~the minimum exhaust rate shall be in accordance with Section M1506.1~~

Committee Reason: For the modification: It clears up the language of the original proposal by applying the highest setting to the minimum requirement, which was the intent of the original proposal.
For the proposal as modified: It provides clarity for the minimum requirements. (7-4)

Public Comments

Public Comment 1

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com); Glenn Mathewson, BuildingCodeCollege.com, Self (glenn@glennmathewson.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

~~**M1506 LOCAL EXHAUST RATES .**~~

TABLE M1505.5 MINIMUM REQUIRED LOCAL EXHAUST RATES

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

Page: 2

Mod_11615_Text_RM17-21.pdf

M11615Text Modification

a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.

M1503.5 Kitchen exhaust rates . Where domestic kitchen cooking *appliances* are equipped with ducted range hoods or down-draft exhaust systems, the exhaust rate shall equal or exceed the airflow required in Table M1505.5 at one or more speed settings.

M1505.5 Local exhaust rates . *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1505.5.~~M1505.5 at one or more speed settings.

Commenter's Reason: Section 1506 has no text in it and should be stricken.
The text "mechanical exhaust capacity of" in Table M1505.5 is unnecessary because this table is located within the "Mechanical Ventilation" section, and it is understood that the local exhaust rates in Table M1505.5 are mechanical exhaust airflow rates. The text, "at one or more speed settings" should be included in M1505.5 to align with action that the committee took on M1503.5 and the intention that the minimum airflow rate required by Table M1505.5 be provided by at least one speed setting of the exhaust equipment. This text clarifies that single speed units can comply when the single speed provides an airflow rate no less than the relevant table value and that variable and multiple speed units can comply when at least one speed setting provides an airflow rate no less than the relevant table value.

This clarification is needed to ensure that popular bathroom exhaust fans with multiple speed settings (e.g., 30, 50, and 80 cfm) can be approved, and permits builders to order one SKU across multiple projects that can be customized as necessary to satisfy the targeted ventilation rate (e.g., Table M1505.5's 50 cfm intermittent or 20 cfm continuous). This modification also permits smart range hoods to comply with this section; smart range hoods can detect and respond to pollutant concentrations during cooking events by increasing airflows to 300-400 cfm on high speed as needed but can also throttle back to intermittent airflows of less than 100 cfm following a cooking event when lower airflows and quieter operation are desired to exhaust residual pollutant concentrations in the kitchen.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal and public comment clarify the current requirements of the code.

Final Hearing Results

RM17-21 AMPC1

Page: 3

Mod_11615_Text_RM17-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

104

M11620 | **/RM26-21**

Date Submitted	04/02/2024	**Section**	1505.4.4	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

FBC -M/M1507.4

Summary of Modification

Deletes footnote a from TABLE M1505.4.4 "MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS". Modifies Section M1505.4.4.

Rationale

See attached

M11620Text Modification

See attached

Page: 1

Mod11620_TextOfModification.pdf

M11620Text Modification

RM26-21

Original Proposal

IRC: M1505.4.4, TABLE M1505.4.4

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Revise as follows:

M1505.4.4 Local exhaust rates. *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table M1505.4.4. The listed exhaust airflow rate for bathrooms-toilet rooms shall equal or exceed the exhaust airflow rate in Table M1505.4.4 at a minimum static pressure of 0.25 inch wc in accordance with Section M1505.3.

TABLE M1505.4.4 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

~~a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.~~

Reason: Traditionally, airflow rates for bathroom-toilet room fans have been listed and reported at 0.1 inch wc; this is still common practice. However, engineering calculations, field measurements, and research have shown that higher static pressures are generally needed to achieve an airflow of 50 cfm through typical exhaust duct configurations. For this reason, Footnote A to Table M1505.4.4 of the IRC has established 0.25 inch wc as the minimum static pressure at which a bathroom-toilet room exhaust fan must achieve a minimum airflow of 50 cfm. An exhaust fan that is listed to provide 50 cfm at 0.1 inch wc may only exhaust 10-30 cfm when installed with a typical exhaust duct configuration. To ensure that builders are selecting fans that can be expected to achieve the required 50 cfm in the field, Footnote A should be moved to the main section.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial only and does not increase or decrease the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee agreed that moving the requirement from the table footnote to the section text was a better location this information. (9-2)

Public Comments

Public Comment 1

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com) requests As Modified by Public Comment

Page: 1

Mod_11620_Text_RM26-21.pdf

M11620Text Modification

Modify as follows:

2021 International Residential Code

M1505.4.4 Local exhaust rates . *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1505.4.4. The~~ M1505.4.4 at one or more speed settings. The listed exhaust airflow rate for ~~bathrooms-toilet rooms shall~~ a bathroom or toilet roomexhaust fan shall equal or exceed the exhaust airflow rate in Table M1505.4.4 at a minimum static pressure of 0.25 inch wc at one or more speed settings in accordance with Section M1505.3.

Commenter's Reason: Adding the phrase "at one or more speed settings" is needed to align RM26 with the committee's action on RM17 as modified by Mathewson 2. This phrase clarifies that variable speed and multiple speed fans may be used, provided that such fans have at least one speed setting that has "the capacity to exhaust the minimum airflow rate." This clarification is needed to ensure that popular bathroom exhaust fans with multiple speed settings (e.g., 30, 50, and 80 cfm) can be approved, and permits builders to order one SKU across multiple projects that can be customized as necessary to satisfy the targeted ventilation rate (e.g., Table M1505.4.4's 50 cfm intermittent or 20 cfm continuous).
The text is also modified to clarify that the listed airflow rate is a listing associated with the exhaust fan and not with a bathroom or toilet room.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal clarifies a current requirement and will therefore neither decrease nor increase the cost of construction.

Final Hearing Results	
RM26-21	AMPC1

Page: 2

Mod_11620_Text_RM26-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

105

M11668 | **/RM14-21**

Date Submitted	05/14/2024	**Section**	1505.3	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC-R.

Summary of Modification

IRC Table N1103.6.1 (R403.6.1) requires exhaust fan airflow to be determined in accordance with HVI 916, which is a test procedure that references ANSI/AMCA 210-ANSI/ASHRAE 51.

Rationale

See attached

M11668Text Modification

See attached

Page: 1

Mod11668_TextOfModification.pdf

M11668Text Modification

RM14-21

Original Proposal

IRC: M1505.3

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Revise as follows:

M1505.3 Exhaust equipment. Exhaust fans and whole-house mechanical ventilation fansshall be *listed* and *labeled* as providing the minimum required airflow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51 and HVI 916.

Reason: IRC Table N1103.6.1 (R403.6.1) requires exhaust fan airflow to be determined in accordance with HVI 916, which is a test procedure that references ANSI/AMCA 210-ANSI/ASHRAE 51. This change provides editorial clarification and consistency across sections of the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial; therefore, it will not increase or decrease the cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

M1505.3 Exhaust equipment. Exhaust fans and whole-house mechanical ventilation fans shall be *listed* and *labeled* as providing the minimum required airflow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51 ~~and~~ or HVI 916.

Committee Reason: For the modification: The modified language clarifies the purpose of the proposal by adding, "or," and removing, "and."
For the proposal as modified: It adds another way to test the equipment. (11-0)

Final Hearing Results

RM14-21 AM

Page: 1

Mod_11668_Text_RM14-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

106

M11616	/RM18-21				
Date Submitted	04/02/2024	**Section**	1602.2	**Proponent**	Mo Madani
Chapter	16	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments Yes

Related Modifications

FBC - R / M1602.3.

Summary of Modification

Modifies text of Section M1602.2 "Return air openings". Relying on bathroom exhaust fans exhausting to the exterior to control bathroom moisture does not effectively reduce bathroom moisture levels.

Rationale

See attached

1st Comment Period History

M11616-G1

Proponent Alan Gremillion Submitted 6/27/2024 3:17:27 PM Attachments No

Comment:

No additional cost to construction, since it is not required. If builder elects to install, then the cost to install is $300/drop or greater.

M11616Text Modification

See attached

Page: 1

Mod11616_TextOfModification.pdf

M11616Text Modification

RM18-21

Original Proposal

IRC: M1602.2

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com)

2021 International Residential Code

Revise as follows:

M1602.2 Return air openings. Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the*appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.
4. Return air shall not be taken from a closet,~~bathroom,~~ toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

   Exceptions:

   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
   2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.
5. For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,
6. Taking return air from an unconditioned*crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.
7. Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Reason: Return air from bathrooms is necessary to control bathroom moisture levels during cooling periods.
Increasing air change with the rest of the occupied space results in lower moisture levels in the bathroom and allows the air conditioning system to remove moisture. Relying on bathroom exhaust fans exhausting to the exterior to control bathroom moisture does not effectively reduce bathroom moisture levels. Exhaust ventilation in bathrooms should be used to control odors not moisture. Exhaust ventilation results in increasing air change in the entire occupied space and increasing moisture loads due to infiltration of exterior humid air throughout the occupied space. This higher air change rate (infiltration) supplies more moisture than the air conditioning system can remove. Odors are still controlled by bathroom exhaust fans exhausting air to the exterior. These bathroom exhaust fans do not have to operate continuously to control odors. Only providing supply air to bathrooms exacerbates the problem by making roof surfaces colder.

This is one of six separate proposed changes related to controlling mold in closets, bathrooms and mechanical room. The six changes fix problems caused by an increase in code thermal resistance over the past several code cycles.

For a more detailed explanation see:

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

https://www.buildingscience.com/documents/building-science-insights-newsletters/bsi-006-no-good-deed-shall-go-unpunished

Page: 1

Mod_11616_Text_RM18-21.pdf

M11616Text Modification

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal provides another option to reduce moisture levels in houses and prevent mold issues.(7-4)

Final Hearing Results

RM18-21 AS

Page: 2

Mod_11616_Text_RM18-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

107

M11617	/RM19-21				
Date Submitted	04/02/2024	**Section**	1602.2	**Proponent**	Mo Madani
Chapter	16	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments Yes

Related Modifications

FBC - R/M1602.3.

Summary of Modification

Allowing a limited amount of return air provides a means of controlling closet moisture levels. Providing supply air to a closet exacerbates the problem by making closet surfaces colder.

Rationale

See attached

1st Comment Period History

M11617-G1

Proponent Alan Gremillion Submitted 6/27/2024 3:18:25 PM Attachments No

Comment:

No additional cost to construction, since it is not required. If builder elects to install, then the cost to install is $300/drop or greater.

M11617Text Modification

See attached

Page: 1

Mod11617_TextOfModification.pdf

M11617Text Modification

RM19-21

Original Proposal

IRC: M1602.2

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com)

2021 International Residential Code

Revise as follows:

M1602.2 Return air openings. Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the*appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.
4. Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the return air shall be no more than 30 cfm (15 l/s), shall serve only the closet, and shall not require a dedicated supply duct.
5. Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the closet door shall be undercut a minimum of 1.5 inches (38 mm) or the closet shall include a louvered door or transfer grille with a minimum net free area of 30 inch2 (194 cm2).

4 6. Return air shall not be taken from a~~closet,~~ bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.
3. Return air taken from closets shall serve only the closet and may shall be permitted to be taken from closets that have no dedicated supply duct.

5 7. For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,

6 8. Taking return air from an unconditioned*crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.

7 9. Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Reason: Mold growth is now common in closets due to higher interior moisture loads and less heat gain in closets. Allowing a limited amount of return air provides a means of controlling closet moisture levels. Providing supply air to a closet exacerbates the problem by making closet surfaces colder.
This is one of six separate proposed changes related to controlling mold in closets, bathrooms and mechanical room. The six changes fix problems caused by an increase in code thermal resistance over the past several code cycles.

For a more detailed explanation see:

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

Page: 1

Mod_11617_Text_RM19-21.pdf

M11617Text Modification

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this code change is not a requirement. It gives builders an option to solve and avoid problems.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The supporting document indicated that ASHRAE needs to continue looking at the issue. The proposed language is confusing. (7-4)

Public Comments

Public Comment 1

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1602.2 Return air openings . Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the*appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.
4. ~~Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the return air shall be no more than 30 cfm (15 l/s), shall serve only the closet, and shall not require a dedicated supply duct.~~
5. ~~Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the closet door shall be undercut a minimum of 1.5 inches (38 mm) or the closet shall include a louvered door or transfer grille with a minimum net free area of 30 inch2 (194 cm2).~~
4. Where return air is taken from a closet the return air shall be no more than 30 cfm (15 l/s), shall serve only the closet, shall not require a dedicated supply duct and the closet door shall be undercut a minimum of 1.5 inches (38 mm) or the closet shall include a louvered door or transfer grille with a minimum net free area of 30 inch2 (194 cm2).

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Mod_11617_Text_RM19-21.pdf

M11617Text Modification

5. ~~6.~~ Return air shall not be taken from a bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

   Exceptions:

   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
   2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.
   3. Return air taken from closets shall serve only the closet~~and may shall~~ and ~~may~~ shall be permitted to be taken from closets that have no dedicated supply duct.

6. ~~7.~~ For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,
7. ~~8.~~ Taking return air from an unconditioned*crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.
8. ~~9.~~ Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Commenter's Reason: Modify the text to be less confusing and remove an unneeded restriction on the closet size.
The return openings are sized so as to not produce negative pressure in the closet.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this code change is not a requirement. It gives builders an option to solve and avoid problems.

Final Hearing Results

RM19-21 AMPC1

Page: 3

Mod_11617_Text_RM19-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

M11618	/RM20-21				108
Date Submitted	04/02/2024	**Section**	1602.2	**Proponent**	Mo Madani
Chapter	16	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments Yes

Related Modifications

FBC - R/M1602.3.

Summary of Modification

M1602.2 "Return air openings". Allowing a limited amount of return air provides a means of controlling room moisture levels. Providing supply air to such a space exacerbates the problem by making room surfaces colder.

Rationale

See attached

1st Comment Period History

M11618-G1

Proponent Alan Gremillion Submitted 6/27/2024 3:18:55 PM Attachments No

Comment:

No additional cost to construction, since it is not required. If builder elects to install, then the cost to install is $300/drop or greater.

M11618Text Modification

See attached

Page: 1

Mod11618_TextOfModification.pdf

M11618Text Modification

RM20-21

Original Proposal

IRC: M1602.2

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com)

2021 International Residential Code

Revise as follows:

M1602.2 Return air openings. Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space. Return air taken from mechanical rooms shall serve only the mechanical room and shall be permitted to be taken from mechanical rooms that have no dedicated supply duct.
3. Return and transfer openings shall be sized in accordance with the*appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.
4. Where return air is taken from a mechanical room with combustion appliances only sealed combustion appliances shall be permitted within the mechanical room.
5. Where return air is taken from a mechanical room the pressure differential across the mechanical room door shall be limited to 0.01 inch WC (2.5 pascals) or less by undercutting the door, or installing a louvered door or transfer grille, or by some other means.

~~4~~ 6. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage,~~mechanical room, boiler room, furnace room~~ or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

~~5~~ 7. For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,

~~6~~ 8. Taking return air from an unconditioned*crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.

~~7~~ 9. Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Reason: Mold growth is now common in boiler rooms, furnace rooms or mechanical rooms due to higher interior moisture loads and less heat gain in such rooms. Allowing a limited amount of return air provides a means of controlling room moisture levels. Providing supply air to such a space exacerbates the problem by making room surfaces colder.
This is one of six separate proposed changes related to controlling mold in closets, bathrooms and mechanical room. The six changes fix problems caused by an increase in code thermal resistance over the past several code cycles.

For a more detailed explanation see:

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

Page: 1

Mod_11618_Text_RM20-21.pdf

https://www.buildingscience.com/documents/building-science-insights-newsletters/bsi-006-no-good-deed-shall-go-unpunished

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this*code change is not a requirement. It gives builders an option to solve and avoid problems.*

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The proposed language is confusing. For example, the statement about return air taken from the mechanical room shall serve only the mechanical room. There is a contradiction in Item 5. The Committee agreed with the intent of the proposal but the language needs more work. The Committee would like to see this brought back in public comment. (8-3)

Public Comments

Public Comment 1

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1602.2 Return air openings . Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or~~space~~ space except mechanical rooms, boiler rooms or furnace rooms shall be not greater than the flow rate of supply air delivered to such room or space. Return air taken from mechanical rooms, boiler rooms or furnace roomsshall serve only the mechanical room and shall be permitted to be taken from mechanical rooms that have no dedicated supply duct.
3. Return and transfer openings shall be sized in accordance with the*appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.
4. Where return air is taken from a mechanical room, boiler room or furnace room with combustion appliances only sealed combustion appliances shall be permitted within the mechanical room.
5. Where return air is taken from a mechanical room, boiler room or furnace room the pressure differential across the mechanical ~~room door~~ room ~~door~~ , boiler room or furnace roomdoor shall be limited to 0.01 inch WC (2.5 pascals) or less by undercutting the door, or installing a louvered door or transfer grille, or by some other means.
6. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, or unconditioned attic.

   Exceptions:

   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
   2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

M11618Text Modification

7. For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,
8. Taking return air from an unconditioned *crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.
9. Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Commenter's Reason: Mold growth is now common in boiler rooms, furnace rooms or mechanical rooms due to higher interior moisture loads and less heat gain in such rooms. Allowing a limited amount of return air provides a means of controlling room moisture levels. Providing supply air to such a space exacerbates the problem by making room surfaces colder.
https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

https://www.buildingscience.com/documents/building-science-insights-newsletters/bsi-006-no-good-deed-shall-go-unpunished

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this code change is not a requirement. It gives builders an option to solve and avoid problems.

Final Hearing Results

RM20-21 AMPC1

Page: 3

Mod_11618_Text_RM20-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

109

M11619 | **/RM22-21**

Date Submitted	04/02/2024	**Section**	1805.4	**Proponent**	Mo Madani
Chapter	18	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds new Section M1805.4 "Factory built chimney offsets".

Rationale

See attached

M11619Text Modification

See attached

Page: 1

Mod11619_TextOfModification.pdf

M11619Text Modification

RM22-21

Original Proposal

IRC: M1805.4 (New)

Proponents: Guy McMann, Jefferson County Govt., Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Residential Code

Add new text as follows:

M1805.4 Factory built chimney offsets. Where a factory built chimney assembly incorporates offsets, no part of the chimney shall be at an angle of more than 30 degrees (0.52 rad.) from vertical at any point in the assembly and the chimney assembly shall not include more than 4 elbows.

Reason: This language has been in the IMC for several cycles and applies to the IRC as much as it does the IMC. Its important for the user to be aware of the limitations in HT piping assemblies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This extraction from the IMC will not result in an increase in cost because its already a requirement to follow the manufacturer's instructions for HT piping systems. It is not referenced in the IRC as it is in the IMC and needs to be to provide the user with guidance as to how to properly install the system.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

R1005.9 ~~**M1805.4**~~**Factory built chimney offsets**. Where ~~a~~ fireplace manufacturer's instructions do not address factory built chimney ~~assembly incorporates~~ offsets, no part of the chimney shall be at an angle of more than 30 degrees (0.52 rad.) from vertical at any point in the assembly and the chimney assembly shall not include more than 4 elbows.

Committee Reason: For the modification: The section number change places the new language in a more appropriate location in the code. The language revision incorporates the manufacturer's instructions so that the code doesn't override what the manufacturer's instructions might already address.
For the proposal as modified: The Committee agreed with the published reason statement. This is important guidance for factory built chimney offsets. (11-0)

Final Hearing Results

RM22-21 AM

Page: 1

Mod_11619_Text_RM22-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

110

M11332 | **/M66-21 Part II**

Date Submitted	03/22/2024	**Section**	2002.4	**Proponent**	Mo Madani
Chapter	20	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds consistent language for requirements for a discharge pipe from any pressure (or temperature) relief valve to the IRC

Rationale

See attached

M11332Text Modification

See attached

Page: 1

Mod11332_TextOfModification.pdf

M11332Text Modification

M66-21 Part II

Original Proposal

IRC: M2002.4, M2002.4.1 (New)

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

M2002.4 Pressure relief valve. Boilers shall be equipped with pressure relief valves with minimum rated capacities for the equipment served. Pressure relief valves shall be set at the maximum rating of the boiler. ~~Discharge shall be piped to drains by gravity to within 18 inches (457 mm) of the floor or to an open receptor.~~

M2002.4.1 Requirements for discharge pipe. The discharge piping serving a pressure relief valve, temperature relief valve or combination valve shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air gap located in the same room as the boiler.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air gap.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed to flow by gravity.
10. Terminate not more than 6 inches (152 mm) and not less than two times the discharge pipe diameter above the floor or waste receptor flood level rim.
11. Not have a threaded connection at the end of the piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials indicated in Section P2906.5 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief-valve outlet, where the relief-valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.
15. The end of the discharge pipe shall be cut at a 45-degree angle.

Reason: Part I REASONING: The text for the requirements for a discharge pipe from any pressure (or temperature) relief valve should be identical between all the codes that have such requirements. It doesn't matter what the relief valve is protecting. Uniformity across the codes on these requirements will improve compliance.
PART II REASONING: Oddly, Section M2002.4 has minimal requirements for pressure relief valve discharge pipes. A boiler doesn't "know" what type of building it is located in. The requirements for a pressure relief valve discharge pipe should be identical to what is in the IMC for

the same application. Uniformity across the codes on these requirements will improve compliance.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 31.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The relief valve piping already has to be installed and if relief valve manufacturers' instructions are being followed, many of these requirements are already being followed.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: The air gap verses the air break is confusing. It doesn't make sense that the boiler relief valve discharges to a water heater pan. (10-1)

Public Comments

Public Comment 1

Proponents: Pennie Feehan, Chair of PMGCAC, Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M2002.4.1 Requirements for discharge pipe. . The discharge piping serving a pressure relief valve, temperature relief valve or combination valve shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air ~~gap located gap~~break located in the same room as the boiler.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air~~gap. gap~~break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the ~~water heater~~ boiler or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed to flow by gravity.

M11332Text Modification

10. Terminate not more than 6 inches (152 mm) ~~and not less than two times the discharge pipe diameter~~ above the floor or waste receptor flood level rim.
11. Not have a threaded connection at the end of the piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials indicated in Section P2906.5 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.
14. ~~Be one nominal size larger than the size of the relief-valve outlet, where the relief-valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.~~
15. ~~The end of the discharge pipe shall be cut at a 45-degree angle.~~

Commenter's Reason: This public comment corrects Committee identified problems and also makes small changes to correlate the text with Part I of this proposal, As Modified.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This public comment is only a clarification of the original proposal.

Final Hearing Results	
M66-21 Part II	AMPC1

Page: 3

Mod_11332_Text_M66-21 Part II.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

111

M11351		/M100-21 Part II			
Date Submitted	03/25/2024	**Section**	2101.1	**Proponent**	Mo Madani
Chapter	21	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds new reference standard F3348-18 "Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing"

Rationale

See attached

M11351Text Modification

See attached

Page: 1

Mod11351_TextOfModification.pdf

M11351Text Modification

M100-21 Part II

Original Proposal

IRC: TABLE M2101.1, ASTM Chapter 44 (New)

Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

2021 International Residential Code

Revise as follows:

TABLE M2101.1 HYDRONIC PIPING AND FITTING MATERIALS

MATERIAL	USE CODE[a]	STANDARD[b]	JOINTS	NOTES
Acrylonitrile butadiene styrene (ABS) plastic pipe	1, 5	ASTM D1527, ASTM F2806, ASTM F2969	Solvent cement joints	—
Chlorinated poly (vinyl chloride) (CPVC) pipe and tubing	1, 2, 3	ASTM D2846	Solvent cement joints, compression joints and threaded adapters	—
Copper and copper-alloy pipe	1	ASTM B42, ASTM B43, ASTM B302	Brazed, soldered and mechanical fittings threaded, welded and flanged	—
Copper and copper-alloy tubing (Type K, L or M)	1, 2	ASME B16.51, ASTM B75, ASTM B88, ASTM B135, ASTM B251, ASTM B306	Brazed, soldered, press-connected and flared mechanical fittings	Joints embedded in concrete shall be brazed
Cross-linked polyethylene (PEX)	1, 2, 3	ASTM F876; ASTM F3253	(See PEX fittings)	Install in accordance with manufacturer's instructions
Cross-linked polyethylene/ aluminum/cross-linked polyethylene (PEX-AL-PEX) pressure pipe	1, 2	ASTM F1281 or CAN/CSA B137.10	Mechanical, crimp/insert	Install in accordance with manufacturer's instructions
PEX fittings	—	ASTM F877, ASTM F1807, ASTM F1960, ASTM F2098, ASTM F2159, ASTM F2735, ASTM F3253; ASTM F3348	Copper crimp/insert fittings, cold expansion fittings, stainless steel clamp, insert fittings	Install in accordance with manufacturer's instructions
Polybutylene (PB) pipe and tubing	1, 2, 3	ASTM D3309	Heat-fusion, crimp/insert and compression	Joints in concrete shall be heat-fused
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	1, 2, 3	ASTM F1282, CSA B137.9	Mechanical, crimp/insert	—
Polypropylene (PP)	1, 2, 3	ISO 15874, ASTM F2389	Heat-fusion joints, mechanical fittings, threaded adapters, compression joints	—
Raised temperature polyethylene (PE-RT)	1, 2, 3	ASTM F2623, ASTM F2769, CSA B137.18	Copper crimp/insert fitting, stainless steel clamp, insert fittings	—
Raised temperature polyethylene (PE-RT) fittings	1, 2, 3	ASTM D3261, ASTM F1807, ASTM F2098, ASTM F2159, ASTM F2735, ASTM F2769, ASTM F3348; CSA B137.18	Copper crimp/insert fitting, stainless steel clamp, insert fittings	—
Steel pipe	1, 2	ASTM A53, ASTM A106	Brazed, welded, threaded, flanged and mechanical fittings	Joints in concrete shall be welded. Galvanized pipe shall not be welded or brazed.
Steel tubing	1	ASTM A254	Mechanical fittings, welded	—

For SI: °C = [(°F) - 32]/1.8.

a. Use code:

1. Above ground.
2. Embedded in radiant systems.
3. Temperatures below 180°F only.
4. Low temperature (below 130°F) applications only.
5. Temperatures below 160°F only.

b. Standards as listed in Chapter 44.

Add new standard(s) as follows:

Page: 1

Mod_11351_Text_M100-21 Part II.pdf

M11351Text Modification

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F3348-18 Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Reason: ASTM F3348 is titled, "Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing" and contains information on plastic fittings for PEX and PERT systems and should be included in the fittings table. The fittings are intended for use in residential and commercial, hot and cold, potable water distribution systems as well as sealed central heating, including under-floor heating/cooling systems, and residential fire sprinkler systems.

Bibliography: ASTM F3348 Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Cost Impact: The proposal adds a standard for PEX and PERT fittings and is not expected to increase or decrease the costs of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

Final Hearing Results

M100-21 Part II AS

Page: 2

Mod_11351_Text_M100-21 Part II.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

112

M11621		/RM27-21			
Date Submitted	04/02/2024	**Section**	2103.3	**Proponent**	Mo Madani
Chapter	21	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds reference to ASTM F3226 into Section M2103.3 "Piping joints".

Rationale

See attached

M11621Text Modification

See attached

Page: 1

Mod11621_TextOfModification.pdf

M11621Text Modification

RM27-21

Original Proposal

IRC: M2103.3

Proponents: Lisa Reiheld, Viega LLC, Viega LLC (lisa.reiheld@viega.us)

2021 International Residential Code

Revise as follows:

M2103.3 Piping joints. Copper and copper-alloy systems shall be soldered, brazed, or press connected. Soldering shall be in accordance with ASTM B828. Fluxes for soldering shall be in accordance with ASTM B813. Brazing fluxes shall be in accordance with AWS A5.31. Press-connect joints shall be in accordance with ASME B16.51 or ASTM F3226. Piping joints that are embedded shall be installed in accordance with the following requirements:

1. Steel pipe joints shall be welded.
2. Copper tubing shall be joined by brazing complying with Section P3003.6.1.
3. Polybutylene pipe and tubing joints shall be installed with socket-type heat-fused polybutylene fittings.
4. CPVC tubing shall be joined using solvent cement joints.
5. Polypropylene pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings.
6. Cross-linked polyethylene (PEX) tubing shall be joined using cold expansion, insert or compression fittings.
7. Raised temperature polyethylene (PE-RT) tubing shall be joined using insert or compression fittings.

Reason: ASTM F3226 Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems includes Carbon Steel, Stainless Steel, Copper and Copper-Alloy materials. ASTM F3226 is copper and copper alloy press-connect standard and should be included along with ASME B16.51 to correctly reference the standards for copper press-connect fittings. ASTM F3226 is listed in multiple national codes for copper and copper alloy materials for these applications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an additional optional standard to which press-connect fittings can be listed and not a new additional mandatory standard requirement.

There is no impact on cost and if anything would reduce cost by including all applicable press-connect fittings standards in the IRC.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This addition simply provides another option for press-connect joints. (11-0)

Final Hearing Results

RM27-21 AS

Page: 1

Mod_11621_Text_RM27-21.pdf

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

113

M11352		/P6-21 Part II			
Date Submitted	03/25/2024	**Section**	2603	**Proponent**	Mo Madani
Chapter	26	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds new section P2603.2.1.1 "Shield plates". Modifies text of M1308.2.1, M1308.2.2/

Rationale

See attached

M11352Text Modification

See attached

Page: 1

Mod11352_TextOfModification.pdf

M11352Text Modification

P6-21 Part II

Original Proposal

IRC: P2603.2.1.1 (New), P2603.2.1, M1308.2.1, M1308.2.2

Proponents: Joeseph J. Summers, Chair of the PMGCAC, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Residential Code

Add new text as follows:

P2603.2.1.1 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

P2603.2.1 Protection against physical damage. In concealed locations, where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1 1/4 inches (31.8 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 Gage). Such plates shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.

Revise as follows:

M1308.2.1 Piping through bored holes or notches. Where *piping* is installed through holes or notches in framing members and is located less than ~~1 1/2 inches (38 mm)~~ 1 1/4 inches (32 mm) from the framing member face to which wall, ceiling or floor membranes will be attached, the pipe shall be protected by shield plates that cover the width of the pipe and the framing member and that extend 2 inches (51 mm) to each side of the framing member. Where the framing member that the piping passes through is a bottom plate, bottom track, top plate or top track, the shield plates shall cover the framing member and extend 2 inches (51 mm) above the bottom framing member and 2 inches (51 mm) below the top framing member.

M1308.2.2 Piping in other locations. Where piping is located within a framing member and is less than ~~1 1/2 inches (38 mm)~~ 1 1/4 inches (32 mm) from the framing member face to which wall, ceiling or floor membranes will be attached, the piping shall be protected by shield plates that cover the width and length of the piping. Where piping is located outside of a framing member and is located less than 1 1/2 inches (38 mm) from the nearest edge of the face of the framing member to which the membrane will be attached, the piping shall be protected by shield plates that cover the width and length of the piping.

Reason: The safest place to install piping is in the middle of the wall. But in a typical 3-1/2 inch stud wall, even a 1/2-inch pipe (5/8-inch OD) ends up slightly nearer than the requisite 1-1/2 inch setback from either edge. Depending on enforcement, installers are often required to put shield plates on both sides of the stud. This makes no sense. By simply reducing the setback from 1-1/2 inches to 1-1/4 inches, both 1/2-inch and 3/4-inch piping can be safely installed in the center of the wall without triggering the need for shield plates on both sides. This encourages quality workmanship instead of penalizing it. The pipes are still safely out of range of drywall screws up to 1-1/2 inches long. This proposal is consistent with the National Electrical Code, which specifies a 1-1/4 inch setback from the edge of a stud. It is also consistent with the IRC, which also specifies a 1-1/4 inch setback. Note that the Uniform Plumbing Code allows a 1-inch distance before a shield plate is required . This proposal will bring consistency to the I-Codes.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 12.

M11352Text Modification

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Reducing the distance from the face of the stud for where shield plates are required could result in *fewer* plates needed for a project. The need for fewer plates would reduce cost of construction but that cost reduction would be insignificant.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
P2603.2.1 Protection against physical damage.
In concealed locations, where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1
1/4 inches (31.8 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. ~~Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 Gage).~~ Such plates shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.

Committee Reason: For the modification: This eliminates a redundancy in the proposal.
For the proposal as modified: This change is to provide consistency in all the codes. (10-1)

Final Hearing Results

P6-21 Part II AM

TAC: Mechanical

Total Mods for **Mechanical** in **Pending Review : 114**

Total Mods for report: 114

Sub Code: Residential

114

M11350		/M99-21 Part II			
Date Submitted	03/25/2024	**Section**	2906.6	**Proponent**	Mo Madani
Chapter	29	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Adds new reference standard ASTM F3347 "Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Rationale

See attached

M11350Text Modification

See attached

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M99-21 Part II

Original Proposal

IRC: TABLE P2906.6, TABLE M2101.1, ASTM Chapter 44 (New)

Proponents: Michael Cudahy, PPFA, PPFA (mikec@cmservices.com)

2021 International Residential Code

Revise as follows:

TABLE P2906.6 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; ASTM F3347; CSA B137.5
Gray iron and ductile iron	AWWA C110/A21.10; AWWA C153/A21.53
Malleable iron	ASME B16.3
Insert fittings for Polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Polyethylene (PE) plastic	ASTM D2609; CSA B137.1
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel (Type 304/304L) pipe	ASTM A312; ASTM A778
Stainless steel (Type 316/316L) pipe	ASTM A312; ASTM A778
Steel	ASME B16.9; ASME B16.11; ASME B16.28

TABLE M2101.1 HYDRONIC PIPING AND FITTING MATERIALS

MATERIAL	USE CODE[a]	STANDARD[b]	JOINTS	NOTES
Acrylonitrile butadiene styrene (ABS) plastic pipe	1, 5	ASTM D1527, ASTM F2806, ASTM F2969	Solvent cement joints	—
Chlorinated poly (vinyl chloride) (CPVC) pipe and tubing	1, 2, 3	ASTM D2846	Solvent cement joints, compression joints and threaded adapters	—
Copper and copper-alloy pipe	1	ASTM B42, ASTM B43, ASTM B302	Brazed, soldered and mechanical fittings threaded, welded and flanged	—
Copper and copper-alloy tubing (Type K, L or M)	1, 2	ASME B16.51, ASTM B75, ASTM B88, ASTM B135, ASTM B251, ASTM B306	Brazed, soldered, press-connected and flared mechanical fittings	Joints embedded in concrete shall be brazed
Cross-linked polyethylene (PEX)	1, 2, 3	ASTM F876; ASTM F3253	(See PEX fittings)	Install in accordance with manufacturer's instructions
Cross-linked polyethylene/ aluminum/cross-linked polyethylene (PEX-AL-PEX) pressure pipe	1, 2	ASTM F1281 or CAN/CSA B137.10	Mechanical, crimp/insert	Install in accordance with manufacturer's instructions
PEX fittings	—	ASTM F877, ASTM F1807, ASTM F1960, ASTM F2098, ASTM F2159, ASTM F2735, ASTM F3253; ASTM F3347	Copper crimp/insert fittings, cold expansion fittings, stainless steel clamp, insert fittings	Install in accordance with manufacturer's instructions
Polybutylene (PB) pipe and tubing	1, 2, 3	ASTM D3309	Heat-fusion, crimp/insert and compression	Joints in concrete shall be heat-fused
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	1, 2, 3	ASTM F1282, CSA B137.9	Mechanical, crimp/insert	—
Polypropylene (PP)	1, 2, 3	ISO 15874, ASTM F2389	Heat-fusion joints, mechanical fittings, threaded adapters, compression joints	—
Raised temperature polyethylene (PE-RT)	1, 2, 3	ASTM F2623, ASTM F2769, CSA B137.18	Copper crimp/insert fitting, stainless steel clamp, insert fittings	—
Raised temperature polyethylene (PE-RT) fittings	1, 2, 3	ASTM D3261, ASTM F1807, ASTM F2098, ASTM F2159, ASTM F2735, ASTM F2769, ASTM F3347; CSA B137.18	Copper crimp/insert fitting, stainless steel clamp, insert fittings	—
Steel pipe	1, 2	ASTM A53, ASTM A106	Brazed, welded, threaded, flanged and mechanical fittings	Joints in concrete shall be welded. Galvanized pipe shall not be welded or brazed.
Steel tubing	1	ASTM A254	Mechanical fittings, welded	—

For SI: °C = [(°F) - 32]/1.8.

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M11350Text Modification

a. Use code:

1. Above ground.
2. Embedded in radiant systems.
3. Temperatures below 180°F only.
4. Low temperature (below 130°F) applications only.
5. Temperatures below 160°F only.

b. Standards as listed in Chapter 44.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM F3347	Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Reason: ASTM F3347 is titled, "Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing and contains information for metallic fittings for both PEX and PERT systems intended for use in residential and commercial, hot and cold, potable water distribution systems as well as sealed central heating, including under-floor heating/cooling systems, and residential fire sprinkler systems.

Bibliography: ASTM F3347, Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds a standard for PEX and PERT fittings and is not expected to increase or decrease the costs of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This new standard provides another option for hydronic piping. (11-0)

Final Hearing Results

M99-21 Part II AS

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