IRC — Mechanical

2018 GROUP A PROPOSED CHANGES TO THE I-CODES COLUMBUS COMMITTEE ACTION HEARINGS

April 15–23, 2018
Columbus Convention Center
Columbus, Ohio

ICC
INTERNATIONAL CODE COUNCIL®

First Printing

Publication Date: February 2018

PRINTED IN THE U.S.A.

2018 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE – PLUMBING/ MECHANICAL

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TENTATIVE ORDER OF DISCUSSION
2018 PROPOSED CHANGES TO THE
INTERNATIONAL RESIDENTIAL CODE – MECHANICAL

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some RM code change proposals may not be included on this list, as they are being heard by another committee.

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RM1-18

IRC: Chapter 21, 202 (New)

Proponent: Mark Fasel, representing Viega LLC (mark.fasel@viega.us)

2018 International Residential Code

CHAPTER 21 HYDRONIC PIPING

Add new definition as follows:

PRESS-CONNECT JOINT A permanent mechanical joint incorporating an elastomeric seal or an elastomeric seal and corrosion-resistant grip or bite ring. The joint is made with a pressing tool and jaw or ring approved by the fitting manufacturer.

Reason:

Currently the IRC does not include the definition of Press-Connect Joint which is used in the text of the code in IRC section M2103.3. Including this definition will align the definitions as similarly provided for in the IMC and IPC.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

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This proposed definition will not increase or decrease cost of construction as it defines a pipe joining method already referenced in the code.

Internal ID: 787

RM2-18

IRC: M1305.1.4 (New), M1305.1.4.1 (New), M1305.1.4.2 (New)

Proponent: Brent Ursenbach, representing Salt Lake County Planning and Development Services (bursenbach@slco.org)

2018 International Residential Code

Add new text as follows:

M1305.1.4 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).Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall. Roof access shall not require the use of portable ladders except where roof access is from the building interior through an attic space, or through a hatch in the roof assembly, and the height necessary to climb on such portable ladder does not exceed 16 feet. Roof hatches used for access shall comply with the dimension requirements for an attic access. 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.

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.

M1305.1.4.1 Sloped roofs. Where appliances, equipment, fans or other components that require service are installed on a roof having a slope of three units vertical in 12 units horizontal (25-percent slope) or greater and having an edge more than 30 inches (762 mm) above grade at such edge, a level platform shall be provided on each side of the appliance or equipment to which access is required for service, repair or maintenance. The platform shall be not less than 30 inches (762 mm) in any dimension and shall be provided with guards. The guards shall extend not less than 42 inches (1067 mm) above the platform, shall be constructed so as to prevent the passage of a 21-inch-diameter (533 mm) sphere and shall comply with the loading requirements for guards specified in this code. Access shall not require walking on roofs having a slope greater than four units vertical in 12 units horizontal (33-percent slope). Where access involves obstructions greater than 30 inches (762 mm) in height, such obstructions shall be provided with ladders installed in accordance with Section M1305.1.4 or stairways installed in accordance with the requirements specified in this code in the path of travel to and from appliances, fans or equipment requiring service.

M1305.1.4.2 Electrical requirements. Electrical requirements. A receptacle outlet shall be provided at or near the equipment location in accordance with Section E3901.12.

Reason:

The IRC and IMC have always included provisions for the safe access to appliances and equipment, for inspection, maintenance, repair and replacement, in rooms, attics and under-floor spaces. The IMC has also included requirements for appliances located on roofs or elevated structures, the location where the greatest hazards exist; however, the IRC is silent on access to appliances and equipment on roofs or elevated structures.

It's not logical to have a code which protects safety of those servicing commercial HVAC systems located on roofs and ignores the safety of those servicing HVAC equipment located roofs of SFD, duplexes and townhouses. Homeowners often perform annual maintenance on their own HVAC systems. Is their safety less important than the safety of the HVAC technician?

This proposal is similar to the requirements from the IMC; however this proposal allows the use of a portable ladder, for use inside the dwelling, for access to the attic or directly on the roof through roof rafters and a roof access.

This has become a significant issue in recent years with the trend of building 2 and 3 story townhouses, with RTU's or condensing units located on the roof. Many of these projects have roof more than 30' above grade.

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Cost Impact

The code change proposal will increase the cost of construction .

This proposal will increase the cost of construction only in situations where HVAC systems are installed on roofs or elevated structures higher than 16 feet.

Internal ID: 1444

RM3-18

IRC: M1307.7 (New)

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Residential Code

Add new text as follows:

M1307.7 Prohibited support. Gypsum board shall not be used as a support base under an appliance.

Reason:

If appliances are installed resting on gypsum board, the board can compress, degrade from heat, moisture and vibration and crumble, with the result being movement and settling of the appliance which would put stress on gas piping, vent connectors, chimney connectors, electrical connections and ductwork. Gypsum board is not intended to be a support base for vertical deadloads.

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 to pursue opportunities to improve and enhance the International Codes or portions thereof that were under the purview of the PMG CAC. In 2017 the PMG CAC held one face-to-face meeting and 11 conference call meetings. Numerous interested parties attended the committee meetings and offered their input.

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.

Internal ID: 379

RM4-18

IRC: M1308.3 (New)

Proponent: Howard Ahern, representing Airex Manufacturing (howard.ahern@airexmfg.com)

2018 International Residential Code

Add new text as follows:

M1308.3 Wall Penetration Sealing. Where pipe penetrates a building envelope wall, the annular space between the outside of the pipe and the inside of a pipe sleeve and the annular space between the outside of a pipe sleeve and the opening in a building envelope wall shall be sealed with caulking material or closed with a gasketing system. Caulking materials, and gasketing systems shall allow for expansion and contraction of material and mechanical vibration, shall be designed for the conditions at the location of the penetration, and shall be compatible with the pipe, sleeve and building materials in contact with the sealing materials. Annular spaces created by pipes penetrating fire-resistance-rated assemblies or membranes of such assemblies shall be sealed or closed in accordance with this code

Reason:

There are no sections for sealing wall pipe penetrations for mechanical systems.

This change provides for the annular sealing of pipe penetrations for mechanical systems, some mechanical piping may vibrate and this change shall allow for the proper sealing of these penetrations.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

Sealing of the pipe wall penetration should be part of standard construction practice,and not lead to increased cost , however sealing of refrigerant piping should not increase cost , also the IBC requires rodent proofing as well

Internal ID: 385

RM5-18

IRC: M1309 (New)

Proponent: Craig Conner, representing self (craig.conner@mac.com); Jani Palmer (Palmer.Janise@epa.gov)

2018 International Residential Code

Add new text as follows:

M1309 Radon testing. Radon testing shall be performed for radon zone 1, as defined in Appendix F. This section requires that tests be performed and the results be provided to the owner, but does not require a specific test result..

Exceptions:

1. Testing is not required where the authority having jurisdiction has defined the radon zone as Zone 2 or 3.
2. Testing is not required where the occupied space is located above an open space.

Testing shall be performed as specified in items 1 through 10:

1. Testing shall be performed after the dwelling passes its air tightness test.
2. Testing shall be performed after the radon control system installation is complete. If the system has an active fan, the residence shall be tested with the fan operating.
3. Testing shall be performed at the lowest floor level that will be occupied, whether or not the space is finished. Spaces that are physically separated and served by different HVAC systems shall be tested separately.
4. Testing shall not performed in a closet, hallway, stairway, laundry room, furnace room, bathroom or kitchen.
5. Testing shall be performed with a commercially available radon test kit or with a continuous radon monitor that can be calibrated. Testing with test kits shall include two tests, and the test results shall be averaged. Testing shall be in accordance with the testing device manufacturer's instructions.
6. Testing shall be performed by the builder, a registered design professional, or an approved third party.
7. Testing shall be conducted over a period of not less than 48 hours or not less that the period specified by the testing device manufacturer, whichever is longer. The initial testing shall begin prior to occupancy, but need not be completed prior to occupancy.
8. Test results shall be provided directly to the owner by the test lab or testing party and shall be delivered either before or after occupancy.
9. An additional pre-paid test kit shall be provided to the owner to utilize at the owner's discretion. The test kit shall include mailing or emailing the results from the testing lab to the owner.
10. The owner or registered design professional shall be notified in writing prior to occupancy, stating one of the following:
    - 10.1. A radon test result of 4 pCi/L or above is the ‘action level' set by EPA. The EPA recommends radon reduction measures to lower radon levels below 4 pCi/L.".
    - 10.2. For a radon test result of 4 pCi/L or above [name of builder or authority having jurisdiction] recommends radon reduction measures to lower radon levels below 4 pCi/L."

Reason:

Radon tests are the only way to know if a residence has significant levels of radon. The test kits are inexpensive and easy to use. This change is designed not to delay the sale or occupancy of the home. Testing in radon zone 1 provides information for areas that tend to have higher levels of radon.

Cost Impact

The code change proposal will increase the cost of construction .

Multiple companies make inexpensive radon test kits. This change would require two tests which are averaged, plus a third test kit to be left with the owners. Three tests including pre-paid testing, postage and tax will cost less that $80, often less than $50.

RM6-18

IRC: M1305.1.4.4 (New)

Proponent: Guy McMann, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us); Troy Jones, representing Jefferson County Division of Building Safety (tjones@jeffco.us)

2018 International Residential Code

Add new text as follows:

M1305.1.4.4 Ladder Required. Where mechanical equipment or appliances that require servicing are located in under floor spaces that are greater than 30 inches in depth below the floor level, the access openings to such spaces shall be equipped with an approved, permanently affixed ladder capable of withstanding a 300-pound (136.1 kg) load. Such ladders shall be securely fastened to the structure at the top and bottom, shall have a rung spacing of not less than 14 inches (356 mm) on center and a rail spacing of not less than 18 inches (457 mm) between rails. Ladders constructed of dimensional lumber shall be not less than nominal two by four members. Fasteners shall be in accordance with Table R602.3 (1) item 16 for end nailing or other approved fastening methods.

Reason:
The code tells us how to go up but it doesn't tell us how to go down. Ladders constructed of wood in many instances lack the quality in construction to support the weight imposed on them. Often the rungs break exposing the fasteners that can seriously wound the person accessing the ladder. There needs to be a ladder capable of withstanding the repeated use that accessing appliances and equipment in crawlers and under floor spaces require. The spacing requirements are the same as found in the IMC along with the loading requirements. This proposal provides much flexibility in construction. Guidance for using wood has been provided. Other methods of construction shall be up for approval by the AHJ.

Cost Impact
The code change proposal will increase the cost of construction .

This requirement may increase cost as it has not been required to install a ladder in a under floor access opening to date although many just do it anyway in a haphazard way.

Internal ID: 170

RM7-18

IRC: M1401.1

Proponent: David Bixby, Air Conditioning Contractors of America (ACCA), representing Air Conditioning Contractors of America (bixster1953@yahoo.com)

2018 International Residential Code

M1401.1 Installation. Heating and cooling *equipment* and *appliances* shall be installed in accordance with the manufacturer's instructions and the requirements of this code. HVAC systems shall be installed in compliance with ACCA 5 QI.

Reason:

ACCA 5 QI details nationally-recognized minimum criteria for the proper installation of HVAC systems in new and existing residential and commercial buildings. This Standard provides a universally accepted definition for quality installation across a broad spectrum of the HVAC industry (e.g., manufacturers, distributors, contractors, user groups, customers, utilities, efficiency advocates, trade associations, professional societies, and governmental agencies). In this Standard, the QI elements focus on the application and how well the system is selected and actually installed. ACCA 5 QI is also a consensus-based ANSI standard. A proposal to add ACCA 5 QI to Chapter 44, Referenced Standards, has also been submitted.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

Cost impacts for using ACCA 5 QI would be minimal, other than some extra time involved. Installers will have to perform calculations for ventilation, heat loss/gain, ensure proper equipment sizing and selection, in order to comply. This is a guide for making sure the industry performs quality installations based on current industry practice. Code officials will have to verify and document compliance.

Analysis: A review of the standard proposed for inclusion in the code, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2018.

Internal ID: 1873

RM8-18

IRC: M1404.1

Proponent: Jim Tidwell, representing Honeywell (jimtidwell@tccfire.com)

2018 International Residential Code

Revise as follows:

M1404.1 Compliance. Refrigeration cooling *equipment* shall comply with Section M1411 and ANSI/ASHRAE 15.

Reason:

ASHRAE 15 is the accepted standard for the installation of refrigeration equipment, and should be referenced by the IRC. We believe this was an oversight, and this change corrects that oversight. The IMC references this standard as well.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

The code change may change the cost of construction, either by increasing it or decreasing it depending upon the system being installed. Referencing a national standard for installation criteria should streamline the overall process.

Internal ID: 2258

RM9-18

IRC: M1411.3.1.2 (New)

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

2018 International Residential Code

Add new text as follows:

M1411.3.1.2 Appliance, equipment and insulation in pans. Where appliances, equipment or insulation are subject to water damage when auxiliary drain pans fill, that portion of the appliance, equipment and insulation shall be installed above the rim of the pan. Supports located inside of the pan to support the appliance or equipment shall be water resistant and approved.

Reason:
This is editorial in nature and is missing from this code. This can be found in the IMC Section 307.2.3.2 and in the IPC. This addition will make the IRC consistant with the other codes.

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

This change is editorial in nature.

Internal ID: 152

RM10-18

IRC: M1411.6

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Residential Code

Revise as follows:

M1411.6 Insulation of refrigerant piping. Piping and fittings for refrigerant vapor (suction) lines shall be insulated with insulation having a thermal resistivity of not less than R-~~4~~ 3 and having external surface permeance not exceeding 0.05 perm [2.87 ng/(s • m^2 • Pa)] when tested in accordance with ASTM E96.

Reason:

This change is simply for consistency with the Chapter 11 energy provisions. The two insulation requirements did not match and caused confusion.

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 to pursue opportunities to improve and enhance the International Codes or portions thereof that were under the purview of the PMG CAC. In 2017 the PMG CAC held one face-to-face meeting and 11 conference call meetings. Numerous interested parties attended the committee meetings and offered their input.

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.

Internal ID: 484

RM11-18

IRC: M1411.8 (New)

Proponent: Howard Ahern, Airex Manufacturing, representing Airex Manufacturing (howard.ahern@airexmfg.com)

2018 International Residential Code

Add new text as follows:

M1411.8 Support of Refrigerant piping. Refrigerant piping & tubing shall be securely fastened to a permanent support within 6 feet of the compressor and within 3 feet of each subsequent bend or angle.

Reason:

This proposal will require support of the Refrigerant piping which vibrates and that can lead to damage of piping and joints from vibration and stress. Unfortunately many refrigerant pipes are not supported from the condenser, or the only support is foam , caulking in the walls penetration. This proposal will require supporting of the piping to ensure safety, reduce piping ,and joints damage from vibration and stress.

Bibliography:

Howard Ahern

representing Airex Manufacturing

National Sales and Technical Manager

Cost Impact

The code change proposal will decrease the cost of construction .

The piping should already be supported .

Internal ID: 2362

RM12-18

IRC: M1503.3

Proponent: Mike Moore, Newport Ventures, representing Broan-NuTone (mmoore@newportventures.net)

2018 International Residential Code

M1503.3 Exhaust discharge. Domestic cooking exhaust equipment shall discharge to the outdoors through a duct. The duct shall have a smooth interior surface, shall be air tight, shall be equipped with a backdraft damper and shall be independent of all other exhaust systems. Ducts serving domestic cooking exhaust equipment shall not terminate in an attic or crawl space or areas inside the building.

Listed and labeled ductless range hoods shall not be required to discharge to the outdoors where all of the following conditions are met:

> ~~**Exception:** Where installed in accordance with the manufacturer's instructions, and where mechanical or natural ventilation is otherwise provided, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.~~
>
> 1. The equipment is installed in accordance with the manufacturer's instructions.
> 2. Mechanical or natural ventilation is otherwise provided in the cooking area.
> 3. The equipment is installed in a newly constructed dwelling unit other than single family, or is installed in an existing kitchen not having an existing range hood exhaust duct to the outdoors.

Reason:

Cooking is typically the largest source of indoor air pollution in homes, with concentrations of key pollutants frequently exceeding U.S. National Ambient Air Quality Standards. Over time, exposure to these pollutants has been shown to reduce length and quality of life. Clearly, kitchen ventilation is needed to comply with the purpose of the IRC to "safeguard public safety, health, and general welfare through…ventilation" (among other means). Unless captured and exhausted at the source, cooking pollutants spread rapidly through a home and deposit themselves on surfaces, only to be released again into the breathing zone when disturbed at a later time. For new construction in detached buildings, where the builder elects to install a range hood, requiring that the range hood be ducted is a very low-cost item with high returns in terms of occupant health. For reasons of constructability and cost sensitivity (not health), this proposal would only permit ductless range hoods when they are installed in an attached dwelling unit of new construction or when they are installed in an existing kitchen that doesn't have an pre-existing range hood exhaust duct.

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Cost Impact

The code change proposal will increase the cost of construction .

Where builders are already installing ducts with range hoods, there will not be any increase in the cost of construction. Where new, single-family dwelling units are not currently provided with ducts for their range hoods, this proposal would increase the cost of construction. Installed duct costs can be estimated at ~ $9.85 per linear foot for 3.25"x10" galvanized sheet metal (RS Means, 2015, Section 23 31 13.13.0500), and a damper would cost about $15 retail.

Internal ID: 1744

RM13-18

IRC: M1502.3

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Residential Code

Revise as follows:

M1502.3 Duct termination. Exhaust ducts shall terminate on the outside of the building. Exhaust duct terminations shall be in accordance with the dryer manufacturer's installation instructions. If the manufacturer's instructions do not specify a termination location, the exhaust duct shall terminate not less than 3 feet (914 mm) in any direction from openings into buildings including openings in ventilated soffits. Exhaust duct terminations shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination.

Reason:

The code does not address ventilated soffits as building openings, which indeed they are.

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 to pursue opportunities to improve and enhance the International Codes or portions thereof that were under the purview of the PMG CAC. In 2017 the PMG CAC held one face-to-face meeting and 11 conference call meetings. Numerous interested parties attended the committee meetings and offered their input.

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.

Internal ID: 529

RM14-18

IRC: 1502.3.2 (New)

Proponent: Rick Harpenau, representing self (rick@dryerbox.com)

2018 International Residential Code

Add new text as follows:

1502.3.2 Animal Grills. Where grilles are provided on dryer exhaust duct terminals to prevent entry of animals, the grille shall consist entirely of vertical slots without horizontal or diagonal members, the slots shall have a width of not less than 5/8 inch, and the total open area of the grille shall be not less than 4 times the opening area of the exhaust duct.

Reason:

Rural areas across our country experience sufficient intrusion of squirrels, rodents and birds. So much so that homeowners seek or create their own protection. Many resort to mechanical cloth wraps with wire spacing of less than ½". Plastic grills are common as well but due to the lack of material strength, the grill partitions are large and flat promoting accelerated lint build up. Some plastic wall vent hoods incorporate an integral defensive grill. Generally, this design does not provide an adequate area spread and aperture size of each opening is insufficient to allow the lint accumulation to release and exit.

Currently Section 1502.3 clearly indicates screens shall not be installed at the duct termination. Grills and screens could be considered equivalent in description causing confusion. A separate section defining acceptable grills seems logical and removes the equal comparison argument for grills and screens and their use at or near the dryer termination.

Vertical bars resist accelerated lint build up.

The text simply lays out criteria for cages to feature vertical bars.









Bibliography:

Inventor of the Dryerbox. Owner of In-O-Vate Technologies Inc.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

A rodent/bird defensive grill or cage is an owner/occupant discretionary item.

Wording is necessary to distinguish grills from disallowed screens.

Internal ID: 426

RM15-18

IRC: M1502.4.2

Proponent: Rick Harpenau, representing self (rick@dryerbox.com)

2018 International Residential Code

Revise as follows:

M1502.4.2 Duct installation. Exhaust ducts shall be supported at intervals not to exceed ~~12~~ 4 feet (~~3658~~ 1219 mm) and shall be secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. Exhaust duct joints shall be sealed in accordance with Section M1601.4.1 and shall be mechanically fastened. Ducts shall not be joined with screws or similar fasteners that protrude more than $^1/_8$ inch (3.2 mm) into the inside of the duct. Where dryer exhaust ducts are enclosed in wall or ceiling cavities, such cavities shall allow the installation of the duct without deformation.

Reason:

12 feet spacing does not provide adequate support for sections of pipe that feature a maximum length of 5 feet. Also, for consistency, the Mechanical Code requires 4 feet support intervals. For the most part, the Res and Mech codes mirror themselves except for the support intervals. These images show the importance of both mechanical fastening, seam taping and 4 foot interval support spacing.

Bibliography:

Inventor of the Dryerbox receptacle, president of In-O-Vate Technologies Inc

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

Clarification and consistency between the Res and Mech codes.

Internal ID: 323

RM16-18

IRC: M1502.4.2

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Residential Code

Revise as follows:

M1502.4.2 Duct installation. Exhaust ducts shall be supported at intervals not to exceed ~~12~~ 4 feet (3658 mm) and shall be secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. Exhaust duct joints shall be sealed in accordance with Section M1601.4.1 and shall be mechanically fastened. Ducts shall not be joined with screws or similar fasteners that protrude more than $^{1}/_{8}$ inch (3.2 mm) into the inside of the duct. Where dryer exhaust ducts are enclosed in wall or ceiling cavities, such cavities shall allow the installation of the duct without deformation.

Reason:

This proposal will correlate the IRC provision with that of the IMC. 12 foot spacing is not allowed in the IMC and could cause light gage ducts to fail during duct cleaning operations. A 12 foot run of dryer exhaust duct would have one or more joints in it, thus compromising duct integrity where supports are at 12 foot intervals.

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 to pursue opportunities to improve and enhance the International Codes or portions thereof that were under the purview of the PMG CAC. In 2017 the PMG CAC held one face-to-face meeting and 11 conference call meetings. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact

The code change proposal will increase the cost of construction .

Additional hangars/supports will be required based on shorter intervals.

Internal ID: 482

RM17-18

IRC: M1504.3

Proponent: Mike Moore, representing The Home Ventilating Institute (mmoore@newportventures.net)

2018 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 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 a 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:

This proposal is very similar to a PMGCAC proposal on the same subject. The only difference is that this proposal does not include the word "approved" in front of "factory-built intake/exhaust termination combination fitting". In some jurisdiction, equipment or products requiring approval will trigger an "alternative means and methods" process to secure a permit. As explained in the reason statement below, these products have been determined to perform well across manufacturers and models. With good performance and insignificant deviation across products, there is no need to further scrutinize these products or delay permits for dwelling units that specify them. This is the position of the Home Ventilating Institute.

The rest of the reason statement echoes that in the PMGCAC proposal:

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[1]). 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”. The use of the term “environmental air” was also considered, but was abandoned because “environmental air” can also include exhaust air from parking garages and clothes dryers, which we want to exclude from this exception.

Bibliography:

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 decrease the cost of construction .

This proposal can reduce the number of intake and exhaust penetrations required for a dwelling unit, thereby reducing the cost of construction.

Internal ID: 1899

RM18-18

IRC: M1505.4.1

Proponent: Joseph Hill, representing New York State Department of State, Division of Building Standards and Codes (Joseph.Hill@dos.ny.gov)

2018 International Residential Code

Revise as follows:

M1505.4.1 System design. The whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as a part of such a system. Outdoor air ducts connected to the return side of an air handler shall be considered as providing supply ventilation. Where building infiltration provides all or a portion of the outdoor air intake for whole-house ventilation, such air intake shall be demonstrated by calculations, otherwise, the whole-house ventilation system shall be designed to provide outdoor air intake by means other than building infiltration.

Reason:

The use of exhaust only ventilation has been the subject of intense debate in the industry, whether exhaust only ventilation can effectively exchange indoor air with outdoor air as is the defined purpose of a Whole House Mechanical Ventilation System**.** In the case of supply air supplied by building infiltration only, it is hard to justify supply air provided by means of building infiltration only, especially at the rates of infiltration which single family dwellings are required to be tested. When a single-family residence is tested at less than 5 Air Changes per hour, at ACH 50, Code Section R303.4 indicates that Mechanical ventilation is required. All climate design zones throughout the United States are required to be tested at 5 or less air changes per hour. It is the learned opinion of many in the building science industry that exhaust only ventilation does not work to provide the fresh air required by code, and additionally, may be the cause of increasing indoor contaminants, rather than alleviating them.

This science is not very complex,by adding an exhaust fan any given dwelling , you effectively decrease the internal pressure. This will cause an increase in infiltration, drawing with it any contaminants held within the building envelope, as well as a very likely increase radon. The following reasoning may illustrate this point and rationalize the need for this modification. The following quotation are in support this statement;

From Green Builder magazine (September 2009): “Because exhaust-only ventilation pulls air through the building envelope, this approach can bring contaminants from the garage, dust from attics, pesticides from the outdoors, mold spores, and even radon into the house.”[1]

From NSERDA’s “Homeowner’s Guide to Ventilation”: “Exhaust-only ventilation is a good choice for homes that do not have existing ductwork to distribute heated or cooled air. However, if there is radon in the soil around the house, this method can increase indoor radon levels.[1]

From Chapter 9 of the Alaska Residential Building Manual: “Exhaust-only ventilation systems, because they depressurize the house, may increase the amount of radon that enters the living space.”[1]

Section M1507 Mechanical Ventilation was introduced into the 2012 IRC, being a derivation of the requirements of ASHRAE 62.2 -2004 Ventilation and Acceptable Indoor Air Quality In Residential Buildings. There are additional provisions of ASHRAE 62.2 which require the determination of infiltration air, thereby **allowing** (not requiring) a portion of the supply air for the mechanical ventilation systems to be provided by building infiltration. There is no allowance that can be found within 62.2 which allows for 100% of the supply air for mechanical ventilation systems to be provided by building infiltration. The following calculations are present within ASHRAE 62.2 -2016 which require the determination for the allowable amount of building infiltration air which can be utilized by the mechanical ventilation system.

Section 4.1.2 Infiltration Credit states that if a blower door test has been performed, then a credit for estimated infiltration may be taken for non-attached dwelling units using the procedure in Section 4.1.2 (a) [2]

4.1.2 (a) Effective Annual Average Infiltration Rate (O inf) shall be calculated using the normalized leakage calculated from measurements of envelope leakage using either ASTM E779, or CGSB 149.10. The authority having jurisdiction may approve other means of calculating effective leakage area (ELA) , such as RESNET Mortgage Industry National; Home Energy Systems Standard.[2]

The procedure described by 62.2-2016 is represented by Equation 4.2 which states;

[2] ELA= (Lpress+Ldepress)/2

The reference, or test pressure = 4 Pa

Where ELA = effective leakage area, ft2

L press= leakage area from pressurization , ft2

L depress= leakage area from depressurization , ft2

[2] Normalized Leakage

Normalized Leakage shall be calculated using Equation 4.4

Equation 4.4- NL= 1000 x ELA/A floor x $[H/Hr]^Z$

NL= Normalized Leakage

ELA= effective leakage area, ft2

A floor= Floor area of Residence

H= Vertical Distance between the lowest and highest above grade points within the pressure boundary, in feet.

Hr= Refence height, 8.2 feet

Z= 0.4

[2] The Effective Annual Average Infiltration Rate (Q inf)

The Effective annual average infiltration rate (Q inf) shall be calculated using Equation 4.5a (or 4.5b)

Equation 4.5a - Q inf (cfm) = NL x WSF x A floor/7.3

NL= Normalized Leakage

WSF= Weather shielding Factor (Normative Appendix B)

A floor= Floor area of Residence

[1]Sources taken from the Green Building Advisor. http://www.greenbuildingadvisor.com/blogs/dept/musings/exhaust-only-ventilation-systems-and-radon#ixzz53nGgGB6N

[2] Code Sections and Calculations taken from ASHRAE 62.2 -2016 Ventilation and Acceptable Indoor Air Quality In Residential Buildings.

Bibliography:

Cost Impact

The code change proposal will increase the cost of construction .

The Code change may require the addition of ducts and mechanical and/or gravity damper's.

Internal ID: 1845

RM19-18

IRC: M1505.4.4

Proponent: Anthony Floyd, City of Scottsdale, representing City of Scottsdale (afloyd@scottsdaleaz.gov)

2018 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. Intermittently operated exhaust fans in bathrooms and toilet rooms shall be provided with a delay-shutoff timer or humidity sensor control.

Exception: A delay-shutoff timer or humidity sensor control switch is not required for exhaust fans that function as a component of a programmed whole-house ventilation system.

Reason:

This code change provides compliance options for intermittently operated exhaust fans when the bathroom is occupied (manual or humidity sensor activation) and for a limited period of time after the user leaves the room (delay timer or humidity sensor deactivation). Delay timer and humidity sensor exhaust fan controls are a consistent and effective means of removing indoor moisture and pollutants.

During a bath or shower, the humidity level in a bathroom can be a perfect breeding ground for mold, mildew and microorganisms that can negatively impact occupant health. Excess moisture has tremendous potential for damaging the structure. It cracks and peels paint, ruins gypsum wallboard, causes exterior paint failure, warps doors and rusts cabinets and fixtures. It can cause deterioration of joists and framing. As it condenses on windows, walls, ceilings and cabinets, it attracts dirt. It encourages mildew on tile grout and generally provides an environment for increased bacterial growth.

According to the Home Ventilation Institute, an intermittently operated exhaust fan needs to run at least 20 minutes after each shower to sufficiently remove moisture from an average size bathroom. Bathroom exhaust systems reduce the risk of mildew and mold growth, which is a sanitation and durability concern in all homes, regardless of climate. Delay timer and moisture sensor controlled exhaust fans are more effective than a manually operated fan or an operable window that is usually left closed during the winter and summer months of the year.

Automatic shut-off controls help to ensure exhaust fan operates when the bathroom is in use and for a limited period of time after the user leaves the room. Automatic controls also save energy by ensuring fans don’t run unnecessarily after removal of moisture and pollutants.

Bibliography:

ASHRAE 62.2-2016 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
Home Ventilating Institute - http://www.hvi.org/publications/HowMuchVent.cfm

Cost Impact

The code change proposal will increase the cost of construction .

A basic dial delay timer switch costs $15, while a basic humidity sensor switch costs $46. Timer and moisture controlled exhaust fans reduce the potential of making costly moisture damage repairs to correct problems that is easy to avoid with adequate local exhaust.

Internal ID: 550

RM20-18

IRC: SECTION M1505, 1505.5 (New)

Proponent: Craig Conner, representing self (craig.conner@mac.com)

2018 International Residential Code

SECTION M1505 MECHANICAL VENTILATION

Add new text as follows:

1505.5 Combustion venting into conditioned space. Permanently installed combustion devices that are designed to vent combustion products into conditioned space shall be approved by a licensed design professional.

Exception: Section 1505.5 shall not apply to stoves, ovens and pilot lights.

Reason:
Combustion devices which are designed to vent combustion products into the conditioned space are high risk from the perspective of indoor air quality. These devices also increase interior moisture and can add contaminants such as NOx (nitrous oxides).

Cost Impact
The code change proposal will increase the cost of construction .

There will likely be a cost associated with the review by a licensed design professional. However, it is also possible that the design professional will be less expensive than correcting any problem resulting from routinely venting combustion products into conditioned space.

Internal ID: 2010

RM21-18

IRC: M1505.4.3

Proponent: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Self (joe@buildingscience.com)

2018 International Residential Code

Revise as follows:

M1505.4.3 Mechanical ventilation rate. The whole house mechanical ventilation system shall ~~provide~~ be capable of providing outdoor air at a minimum continuous rate as determined in accordance with Table M1505.4.3(1) or Equation 15-1.

~~Ventilation rate in cubic feet per minute =0.01 × total square foot area of house + 7.5×number of bedrooms + 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)**

Exception: 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) or in accordance with Equation 15-1 is multiplied by the factor determined in accordance with Table M1505.4.3(2).

Reason:

This code change contains a number of improvements that clarify the intent and requirements of whole-house mechanical ventilation rates.

First, the ventilation system must “be capable of providing” the necessary ventilation air. A “manual override” (on/off switch) must be provided as defined in M1505.4.2. So, as written, if the system is switched off, the house would be out of code compliance.

Second, the ventilation rates are minimum values and it should be clearly stated in the code.

Third, the term “total square foot area of house” is not a defined term and could easily be interpreted to include unconditioned spaces (e.g. basements, garages, enclosed porches). "conditioned floor area" is a defined term and is appropriate for determining ventilation rates.

Last, Exception 1 intermittent ventilation rates should be able to be determined by either the table or the equation. Last code cycle the equation (15-1) was added to determine the ventilation rate, but was missed in the exception. This change fixes this omission.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

This change will clarify the code language as described in the "reason".

Internal ID: 1628

RM22-18

IRC: 202 (New), M1505.4.3

Proponent: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Self (joe@buildingscience.com)

2018 International Residential Code

BALANCED VENTILATION. Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate and the total mechanical supply airflow rate are substantially the same.

Revise as follows:

M1505.4.3 Mechanical ventilation rate. The whole house mechanical ventilation system shall provide outdoor air at a continuous rate as determined in accordance with Table M1505.4.3(1) or 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)**

~~Exception~~ Exceptions:

1. 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) is multiplied by the factor determined in accordance with Table M1505.4.3(2).
2. The minimum mechanical ventilation rate determined in accordance with Table M1505.4.3(1) or Equation 15-1 shall be reduced by 25%, provided that all of the following conditions apply:
   - 2.1. A ducted system supplies recirculated air directly to each bedroom and the largest common area.
   - 2.2. For continuously operating systems, not less than 70% of the air volume in the conditioned space is recirculated each hour through a ducted system, or for intermittently operating systems, an equivalent air recirculation is provided during each four hour period.
   - 2.3. The whole-house ventilation system is a balanced ventilation system.

Reason:

This code change credits the better performance of whole-building dilution ventilation systems that are distributed, mixed and balanced.

Distributed, mixed and balanced ventilation is more effective at controlling indoor contaminants than typical exhaust ventilation that provides no distribution and mixing. Ventilation with effective distribution and mixing prevents or minimizes high levels of contaminant concentration in various spaces within houses, especially rooms where people spend a lot of time with doors closed such as bedrooms. Distribution and mixing homogenizes interior conditions reducing potentially harmful high intermittent contaminant concentrations in interior spaces. Complex field testing and contaminate transport software analysis have shown that 70% mixing combined with a 25% reduced balanced ventilation is equally as effective as a typical exhaust ventilation.

This code change does not penalize exhaust ventilation, it justifiably credits balanced ventilation. Exhaust only ventilation should not be given the same indoor air quality credit in energy rating calculations since typical exhaust ventilation systems result in less air change than balanced ventilation systems and do not provide as effective control of contaminants. This code change rectifies that inequity.

Technical justification for this proposed code change can be found in the following links:

https://buildingscience.com/sites/default/files/migrate/pdf/CP-0909_ASHRAE_Calibrated_Multizone_Airflow.pdf

https://buildingscience.com/sites/default/files/migrate/pdf/CP-0908_ASHRAE_Modifying_Ventilation_Airflow.pdf

https://buildingscience.com/sites/default/files/migrate/pdf/CP-0802_Field_Test_Room_to_Room.pdf

http://www.nrcan.gc.ca/energy/efficiency/housing/home-improvements/18633

https://www.nrc-cnrc.gc.ca/ctu-sc/files/doc/ctu-sc/ctu-n15_eng.pdf

Cost Impact

The code change proposal will decrease the cost of construction .

Choosing to use a more effective type of ventilation will result in a lower ventilation rate which could reduce both construction and operating costs.

Internal ID: 1631

RM23-18

IRC: TABLE M1505.4.4

Proponent: Mike Moore, representing Broan-NuTone (mmoore@newportventures.net)

2018 International Residential Code

Revise as follows:

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.

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 wc in accordance with Section M1505.3.

Reason:

To ensure that exhaust fans provide the minimum CFM required by the IRC, the IRC was amended in recent cycles to require prescriptive duct sizing for exhaust rates taken at a static pressure of 0.25 inch water column (see Table M1504.2). For consistency, this change will align the flow rate requirements of Table 1505.4.4 with the duct sizing requirements of Table M1504.2 and the equipment listing requirements of Section M1505.3.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

The prescriptive duct sizing requirements of M1504.2 require that ducts be sized for flows taken at 0.25 in w.c. in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51. Because this change is a simple clarification of existing requirements, no change to construction cost is expected.

Internal ID: 1761

RM24-18

IRC: 202 (New), M1505.1, M1505.4.3

Proponent: Mike Moore, representing The Home Ventilating Institute (mmoore@newportventures.net)

2018 International Residential Code

Add new text as follows:

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

Revise as follows:

M1505.1 General. Where local exhaust or whole-house mechanical ventilation is provided, the ~~equipment~~ ventilation system shall be designed in accordance with this section.

M1505.4.3 Mechanical ventilation rate. The whole house mechanical ventilation system shall provide outdoor air at a continuous rate ~~as~~ 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. Where a whole-house mechanical balanced ventilation system is provided, the whole-house mechanical ventilation system rate shall be permitted to be adjusted by multiplying the ventilation rate determined in accordance with Table M1505.4.3(1) or by Equation 15-1 by 0.7.
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:

This proposal is very similar to a PMGCAC proposal that also proposes a ventilation rate credit for balanced systems. The only difference between the proposals is that this proposal does not reference ASHRAE 62.2 as an optional path.

Balanced mechanical ventilation systems provide superior ventilation to unbalanced systems, and should not be required to provide the same rate as less effective, unbalanced systems to provide equivalent ventilation. This proposed credit for balanced ventilation is a simplified version that was derived from ASHRAE 62.2-2016 Equation 4.2 (published in addendum s). The ASHRAE equation adjusts the balanced whole house ventilation flow rate as a function of building air leakage, building height, and weather and shielding factor (which approximates climate zone). To simplify application of the ASHRAE calculation, we developed a one-size-fits-all balanced system factor using the following methodology:

1. Define a typical new, single-family detached home. The home characteristics were as follows: 2600 ft2; 3-bedroom; heights of 8, 17, and 26 feet above grade for one-, two- and three-story versions of the typical home; and leakage rate of 4.5 ACH50 in CZ 1-2 and 2.5 ACH50 in CZ 3-8. Note: Higher values for air leakage provide larger credits for balanced ventilation systems. To be conservative, we assumed that the average home was slightly tighter than the 2018 IECC maximum leakage rates of 5 ACH50 in CZ 1-2 and 3 ACH50 in CZ 3-8 (i.e., 4.5 ACH50 instead of 5 ACH50 in CZ 1-2 and 2.5 ACH50 instead of 3 ACH50 in CZ 3-8).

2. Calculate the average weather and shielding factor across each climate zone using over 1000 weather stations catalogued in Appendix B of ASHRAE 62.2.

3. Calculate the ASHRAE 62.2-2016 flow rates for balanced and unbalanced systems in the one-, two-, and three-story versions of the typical home across all IECC climate zones using Equation 4.2 and the average weather and shielding factors calculated in step 2.

4. Calculate the percent reduction in the balanced system ventilation rate versus the unbalanced systems' ventilation rate for each case. Apply weightings to the percent reductions for one-, two-, and three-story cases in each climate zone based on average U.S. Census Data (i.e., 44% are assumed to be one-story; 52% are assumed to be two-story; 4% are assumed to be 3-story in each climate zone). Sum the weighted percent reductions for the various stories to develop an estimated percent reduction for each climate zone.

Following is a table that summarizes interim and aggregate results of these steps used to calculate the balanced ventilation system multiplier of 0.7. The weighted average percent reduction in flow rate for balanced systems across each climate zone varied from 22% to 41%. The average percent reduction in flow rate for balanced systems across all scenarios for the typical home is ~30%, resulting in a multiplier of 0.7 in this proposal.

Percent Reduction Possible in Ventilation Fan Flow Rate When Specifying Balanced vs. Unbalanced: 4.5 ACH50 in CZ 1-2 & 2.5 ACH50 in CZ 3-8				
	Stories and Distribution			Weighted Average Across All Stories
	44%	52%	4%	
CZ	1-story	2-story	3-story	
1A	31%	42%	50%	38%
2A	30%	41%	49%	37%
2B	34%	46%	55%	41%
3A	18%	25%	29%	22%
3B	20%	27%	32%	24%
3C	21%	28%	34%	25%
4A	20%	27%	32%	24%
4B	24%	33%	39%	29%
4C	23%	31%	36%	27%
5A	23%	31%	37%	28%
5B	24%	33%	39%	29%
6A	25%	34%	40%	30%
6B	27%	37%	44%	33%
7	29%	39%	46%	35%
8	34%	46%	54%	41%
Average of weighted averages				31%

Cost Impact

The code change proposal will decrease the cost of construction .

This proposal may decrease the cost of construction by approving specification of balanced systems with lower flow rates.

Internal ID: 595

RM25-18

IRC: M1505.1, 44

Proponent: Mike Moore, representing The Home Ventilating Institute (mmoore@newportventures.net)

2018 International Residential Code

Revise as follows:

M1505.1 General. Where local exhaust or whole-house mechanical ventilation is provided, the ~~equipment~~ ventilation system shall be designed in accordance with this section, or the ventilation system shall be designed in accordance with ASHRAE 62.2.

Add new standard(s) follows:

ASHRAE

ASHRE
1791 Tullie Circle NE
Atlanta GA 30329
US

62.2-2016:

Ventilation and Acceptable Indoor Air Quality in Residential Buildings with Addenda b, d, k, l, q, and s.

Reason:
This proposed modification would provide builders with the OPTION of using ASHRAE Standard 62.2 to comply with the ventilation requirements of the IRC without requiring builders to use the standard. ASHRAE 62.2 is the ANSI standard for establishing minimum acceptable indoor air quality for dwelling units. There are several reasons that builders may want to use ASHRAE 62.2 instead of the IRC for compliance, including: greater flexibility for specifying climate-appropriate ventilation controls, ability to achieve energy and cost savings for homeowners by shifting operation of the ventilation system to times when ambient temperature and humidity are favorable, flexibility to specify innovative systems that can be demonstrated to provide equivalent exposure to pollutants, ability to down-size and save money on balanced ventilation equipment versus what may be required by the code, 62.2's use by code-plus programs such as ENERGY STAR and LEED, and ability to size the system as a function of measured dwelling unit air leakage instead of a one-size-fits-all approach.

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

Use of this standard is proposed as an OPTIONAL path. Costs associated with using 62.2 versus other compliance paths will vary based on the application. As such, this proposal will neither decrease nor increase the cost of construction.

Internal ID: 533

RM26-18

IMC: 202 (New); IRC: M1505.1, M1505.4.3, ordinal

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Mechanical Code

Add new definition as follows:

BALANCED VENTILATION SYSTEM. A ventilation system where the total supply fan airflow is within 20 percent of the total exhaust fan airflow. The balanced system airflow is the average of the supply and exhaust airflows.

2018 International Residential Code

Revise as follows:

M1505.1 General. Where local exhaust or whole-house mechanical ventilation is provided, the ~~equipment~~ ventilation system shall be designed in accordance with this ~~section.~~section, or the ventilation system shall be designed in accordance with ASHRAE 62.2.

M1505.4.3 Mechanical ventilation rate. The whole house mechanical ventilation system shall provide outdoor air at a continuous rate ~~as~~ 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)**

~~Exception:~~Exceptions:

1. Ventilation rate credit. Where a balanced whole-house mechanical ventilation system is provided, the whole-house mechanical ventilation system rate shall be permitted to be adjusted by multiplying the mechanical ventilation rate determined in accordance with Table M1505.4.3(1) or by Equation 15-1 by 0.7.
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).

Add new standard(s) follows:

ASHRAE

ASHRE
1791 Tullie Circle NE
Atlanta GA 30329
US

62.2-2016:

Ventilation and Acceptable Indoor Air Quality in Residential Buildings with Addenda b, d, k, l, g, and s

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Reason:

Balanced mechanical ventilation systems provide superior ventilation to unbalanced systems, and should not be required to provide the same rate as less effective, unbalanced systems to provide equivalent ventilation. This proposed credit for balanced ventilation is a simplified version that was derived from ASHRAE 62.2-2016 Equation 4.2 (published in addendum s). The ASHRAE equation adjusts the balanced whole house ventilation flow rate as a function of building air leakage, building height, and weather and shielding factor (which approximates climate zone). To simplify application of the ASHRAE calculation for the IRC, we developed a one-size-fits-all balanced system factor using the following methodology:

1. Define a typical new, single-family detached home. The home characteristics were as follows: 2600 ft2; 3-bedroom; heights of 8, 17, and 26 feet above grade for one-, two- and three-story versions of the typical home; and leakage rate of 4.5 ACH50 in CZ 1-2 and 2.5 ACH50 in CZ 3-8. Note: Higher values for air leakage provide larger credits for balanced ventilation systems. To be conservative, we assumed that the average home was slightly tighter than the 2018 IECC

maximum leakage rates of 5 ACH50 in CZ 1-2 and 3 ACH50 in CZ 3-8 (i.e., 4.5 ACH50 instead of 5 ACH50 in CZ 1-2 and 2.5 ACH50 instead of 3 ACH50 in CZ 3-8).

2. Calculate the average weather and shielding factor across each climate zone using over 1000 weather stations catalogued in Appendix B of ASHRAE 62.2.

3. Calculate the ASHRAE 62.2-2016 flow rates for balanced and unbalanced systems in the one-, two-, and three-story versions of the typical home across all IECC climate zones using Equation 4.2 and the average weather and shielding factors calculated in step 2.

4. Calculate the percent reduction in the balanced system ventilation rate versus the unbalanced systems' ventilation rate for each case. Apply weightings to the percent reductions for one-, two-, and three-story cases in each climate zone based on average U.S. Census Data (i.e., 44% are assumed to be one-story; 52% are assumed to be two-story; 4% are assumed to be 3-story in each climate zone). Sum the weighted percent reductions for the various stories to develop an estimated percent reduction for each climate zone.

Following is a table that summarizes interim and aggregate results of these steps used to calculate the balanced ventilation system flow rate multiplier of 0.7. The weighted average percent reduction in flow rate for balanced systems across each climate zone varied from 22% to 41%. The average percent reduction in flow rate for balanced systems across all scenarios for the typical home is ~30%, resulting in a multiplier of 0.7 in this proposal.

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 to pursue opportunities to improve and enhance the International Codes or portions thereof that were under the purview of the PMG CAC. In 2017 the PMG CAC held one face-to-face meeting and 11 conference call meetings. Numerous interested parties attended the committee meetings and offered their input.

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.

Percent Reduction Possible in Ventilation Fan Flow Rate When Specifying Balanced vs. Unbalanced: 4.5 ACH50 in CZ 1-2 & 2.5 ACH50 in CZ 3-8				
	Stories and Distribution			Weighted Average Across All Stories
	44%	52%	4%	
CZ	1-story	2-story	3-story	
1A	31%	42%	50%	38%
2A	30%	41%	49%	37%
2B	34%	46%	55%	41%
3A	18%	25%	29%	22%
3B	20%	27%	32%	24%
3C	21%	28%	34%	25%
4A	20%	27%	32%	24%
4B	24%	33%	39%	29%
4C	23%	31%	36%	27%
5A	23%	31%	37%	28%
5B	24%	33%	39%	29%
6A	25%	34%	40%	30%
6B	27%	37%	44%	33%
7	29%	39%	46%	35%
8	34%	46%	54%	41%
Average of weighted averages				31%

Analysis: A review of the standard proposed for inclusion in the code, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2018.

Internal ID: 569

RM27-18

IRC: M1504.3

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 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 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 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[1]). 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”.

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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.

Internal ID: 567

RM28-18

IRC: M1503.4

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Residential Code

Revise as follows:

M1503.4 Duct material. Ducts serving domestic cooking exhaust equipment shall be constructed of ~~galvanized steel, stainless steel or copper.~~smooth-wall metal of thicknesses consistent with Table M1601.1.1.

Exception: Ducts for domestic kitchen cooking *appliances* equipped with down-draft 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:

1. The duct is installed under a concrete slab poured on grade.
2. The underfloor trench in which the duct is installed is completely backfilled with sand or gravel.
3. The PVC duct extends not more than 1 inch (25 mm) above the indoor concrete floor surface.
4. The PVC duct extends not more than 1 inch (25 mm) above grade *outside of the building.*
5. The PVC ducts are solvent cemented.

Reason:

There is no reason why black steel and aluminum ducts can't be used. It is important that the ducts be metal and smooth-wall. A reference to the duct wall thickness table was missing.

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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.

Internal ID: 485

RM29-18

IRC: M1505.4.2

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Residential Code

Revise as follows:

M1505.4.2 System controls. The whole-house mechanical ventilation system shall be provided with controls that enable manual override. Controls shall include text or a symbol indicating their function.

Reason:

Tight dwelling units are being outfitted with code-mandated outdoor air/"whole-house" mechanical ventilation systems. These systems are often simply a bathroom exhaust fan expected to run continuously. The problem is that without a label indicating the system's function, occupants have no idea of the purpose of these systems and are likely to turn them off – thereby increasing the rate of accumulation of harmful indoor pollutants without their knowledge. At a minimum, these systems should be labeled to indicate that they are different than a typical bath fan. This proposed language would echo language in ASHRAE 62.2 and also within the 2018 IMC as follows: "403.3.2.4 System controls. Where provided within a dwelling unit, controls for outdoor air ventilation systems shall include text or a symbol indicating the system's function." The language is intended to be flexible enough to allow multiple options for the text or symbol, provided it achieves the intention of conveying that the control is for a system that is not merely a standard bath fan. For example, the Home Ventilating Institute (an industry association representing over 90% of the manufacturers of residential ventilating products in the U.S.), recently developed the following logo for this purpose:

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Cost Impact

The code change proposal will increase the cost of construction .

This proposal will increase the cost of construction because a label will be required on a switch cover.

Internal ID: 563

RM30-18

IRC: M1505.3

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Residential Code

Revise as follows:

M1505.3 Exhaust equipment. Exhaust ~~equipment serving single *dwelling units*~~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.

Reason:

Industry experience and research have shown that "for advertised airflows that are not certified, the actual installed airflow can be a small fraction of the advertised value".[1] The 2018 IMC and IRC now require listing and labeling flows in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51 for exhaust equipment serving single dwelling units. This requirement should be expanded to all fans under the scope of the ANSI standard to ensure that flows are reported on an equivalent basis. AMCA and HVI maintain listings of products tested in accordance with the standard.

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Bibliography:

1. Singer, B. C., Delp, W. W., Apte, M., & Price, P. N. (2011). Performance of Installed Cooking Exhaust Devices. LBNL-5265E. Berkeley, CA: Lawrence Berkeley National Laboratory.

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.

Internal ID: 568

RM31-18

IRC: M1601.1.1

Proponent: David Bixby, Air Conditioning Contractors of America (ACCA), representing Air Conditioning Contractors of America (bixster1953@yahoo.com)

2018 International Residential Code

Revise as follows:

M1601.1.1 Above-ground duct systems. Above-ground *duct systems* shall conform to the following:

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be listed and labeled in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Fibrous glass duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*.
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC *Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a flame spread index of not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
   - 7.1. These cavities or spaces shall not be used as a plenum for supply air.
   - 7.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
   - 7.3. Stud wall cavities shall not convey air from more than one floor level.
   - 7.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting fireblocking in accordance with Section R602.8.
   - 7.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.
8. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.
9. Zoned duct systems shall be designed and installed in accordance with ACCA Manual Zr.

Reason:
Currently there is no coverage in the residential code to address the design of zoned duct systems. ACCA Manual Zr provides procedures for designing zoned comfort systems for single family detached homes, duplex and triplex homes, row houses, town houses, and large multi-family structures that are compatible with ACCA Manual J procedures for residential load calculations. In addition, use of Manual Zr will avoid the potential for an improperly designed zoned duct system to adversely impact the safe operation and durability of the heating/cooling equipment. For code officials, Manual Zr has three normative sections to determine clear compliance. Manual Zr is also a consensus-based ANSI standard.

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

Cost impacts for using Manual Zr would be minimal, other than some extra time involved. Installers will have to ensure the installation of equipment and zoning devices complies with OEM installation instructions, as well as documenting such. Code officials will have to verify and document airflow rates, set-points for operation and safety controls, which will involve minimal time.

Analysis: A review of the standard proposed for inclusion in the code, with regard to the ICC criteria for referenced

standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2018.

Internal ID: 1860

RM32-18

IRC: M1601.1.1, M1601.4.5

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Residential Code

Revise as follows:

M1601.1.1 Above-ground duct systems. Above-ground *duct systems* shall conform to the following:

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be listed and labeled in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Fibrous glass duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*.
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC *Duct Construction Standards*—*Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a flame spread index of not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
   - 7.1. These cavities or spaces shall not be used as a plenum for supply air.
   - 7.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
   - 7.3. Stud wall cavities shall not convey air from more than one floor level.
   - 7.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting fireblocking in accordance with Section ~~R602.8.~~R302.11. Fireblocking materials used for isolation shall comply with Section R302.11.1.
   - 7.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.
8. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.

M1601.4.5 Fireblocking. Duct installations shall be fireblocked in accordance with Section ~~R602.8.~~R302.11.

Reason:

The current text creates an unnecessary step by taking the reader to R602.8, only to be redirected to R302.11.1. This proposal is a nontechnical cleanup of text.

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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.

Internal ID: 382

RM33-18

IRC: M1601.1.1.7 (New)

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Residential Code

Add new text as follows:

M1601.1.1.7 Sealing. Building cavities used as plenums shall be sealed.

Reason:

Where stud cavities and joist cavities are used for return air, the negative pressure in the cavities can draw in outdoor air at any point where the cavities abut attic spaces, crawl spaces and outside walls. Sealing of the interface with attics, crawls and outside walls will reduce unwanted infiltration of outdoor air and will improve system efficiency.

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 to pursue opportunities to improve and enhance the International Codes or portions thereof that were under the purview of the PMG CAC. In 2017 the PMG CAC held one face-to-face meeting and 11 conference call meetings. Numerous interested parties attended the committee meetings and offered their input.

Cost Impact

The code change proposal will increase the cost of construction .

This proposal will increase the cost of construction because additional labor and sealants are required

Internal ID: 381

RM34-18

IRC: M1802.4 (New)

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Residential Code

Add new text as follows:

M1802.4 **Blocked vent switch.** The venting system for oil-fired appliances shall be equipped with a device that will stop burner operation in the event that the venting system is obstructed. Such device shall have a manual reset, and shall be installed in accordance with the manufacturer's instructions.

Reason:

Such devices can save lives in the event that a chimney or Type L vent is blocked by debris, decaying masonry or dead animals. Gas furnaces are equipped with thermal and/or pressure devices that will sense failure of the venting system, but such is not known to be required for oil-fired appliances. Such devices have been installed for many decades, but not necessarily required. These devices are typically provided for or are an option for draft regulators that are commonly installed in the vent of oil-flred appliances.

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Cost Impact

The code change proposal will increase the cost of construction .

This proposal will increase the cost of construction because an additional device is mandated beyond what is currently required by the code.

Internal ID: 431

RM35-18

IRC: M2101.11 (New), M2101.21.6 (New), M2101.20.4 (New), M2101.21 (New), M2101.21.1 (New), M2101.21.2 (New), M2101.21.3 (New), M2101.21.4 (New), M2101.21.5 (New), M2101.22 (New), M2101.20.2 (New), M2101.23 (New), M2101.24 (New), M2101.25 (New), M2101.26 (New), M2101.27 (New), M2101.28 (New), M2101.28.1 (New), M2101.29 (New), M2101.20.3 (New), M2101.20.1 (New), M2101.12 (New), M2101.17 (New), M2101.13 (New), M2101.13.1 (New), M2101.14 (New), M2101.15 (New), M2101.15.1 (New), M2101.15.2 (New), M2101.16 (New), M2101.16.1 (New), M2101.17.1 (New), M2101.20 (New), M2101.17.2 (New), M2101.18 (New), M2101.18.1 (New), M2101.18.2 (New), M2101.18.3 (New), M2101.19 (New), M2101.19.1 (New), M2101.19.2 (New), M2101.30 (New)

Proponent: Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2018 International Residential Code

Add new text as follows:

M2101.11 Used materials. Used pipe, fittings, valves, and other materials shall not be reused in hydronic systems.

M2101.21.6 Expansion tanks. Shutoff valves shall be installed at connections to nondiaphragm-type expansion tanks.

M2101.20.4 Electrofusion joints. Joints shall be of the electrofusion type. Joint surfaces shall be clean and free from moisture and scoured to exp0ose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer and joined. The joint shall remain undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F105..

M2101.21 PVC plastic pipe. Joints between PVC plastic pipe or fittings shall be solvent-cemented in accordance with Section P2906.9.1.4. Threaded joints between fittings and PVC plastic pipe shall be in accordance with Section M2101.16.1.

M2101.21 Shutoff valves. Shutoff valves shall be installed in ground-source loop piping systems in the locations indicated in Sections M2101.21.1 through M2101.21.6.

M2101.21.1 Heat exchangers. Shut off valves shall be installed on the supply and return side of a heat exchanger.

> **Exception:** Shutoff valves shall not be required where heat exchangers are integral with a boiler or are a component of a manufacturer's boiler and heat exchanger packaged unit and are capable of being isolated from the hydronic system by the supply and return valves required by Section M2001.3.

M2101.21.2 Central systems. Shutoff valves shall be installed on the building supply and return of a central utility system.

M2101.21.3 Pressure vessels. Shutoff valves shall be installed on the connection to any pressure vessel.

M2101.21.4 Pressure-reducing valves. Shutoff valves shall be installed on both sides of a pressure-reducing valve.

M2101.21.5 Equipment and appliances. `Shutoff valves shall be installed on connections to mechanical equipment and appliances. This requirement does not apply to components of ground-source loop systems such as pumps, air separators, metering devices, and similar equipment.

M2101.22 Reduced pressure. A pressure relief valve shall be installed on the low-pressure side of a hydronic piping system that has been reduced in pressure. The relief valve shall be set at the maximum pressure of the system design. The valve shall be installed in accordance with Section M2002.

M2101.20.2 PE-RT-to-metal connections. Solder joints in a metal pipe shall not occur within 18 inches (457 mm) of a transition from such metal pipe to PE-RT pipe or tubing.

M2101.23 Installation. Piping, valves, fittings, and connections shall be installed in accordance with the manufacturer's instructions.

M2101.24 Protection of potable water. Where hydronic systems have a connection to a potable water supply,

the potable water system shall be protected from backflow in accordance with Section P2902.

M2101.25 Pipe penetrations. Openings for pipe penetrations in walls, floors and ceilings shall be larger than the penetrating pipe. Openings through concrete or masonry building elements shall be sleeved. The annular space surrounding pipe penetrations shall be protected in accordance with Section P2606.1.

M2101.26 Clearance from combustibles. A pipe in a piping system having an exterior surface temperature exceeding 250ºF (121ºC) shall have a clearance of not less than 1 inch (25 mm) from combustible materials.

M2101.27 Contact with building material. A piping system shall not be in direct contact with building materials that cause the piping or fitting material to degrade or corrode, or that interfere with the operation of the system.

M2101.28 Strains and stresses. Piping shall be installed so as to prevent detrimental strains and stresses in the pipe. Provisions shall be made to protect piping from damage resulting from expansion, contraction and structural settlement. Piping shall be installed so as to avoid structural stresses or strains within building components.

M2101.28.1 Flood hazard. . Piping located in a flood hazard area shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation.

M2101.29 Chemical compatibility. Antifreeze and other materials used in the system shall be chemically compatible with the pipe, tubing, fittings and mechanical systems.

M2101.20.3 Heat-fusion joints. Heat-fusion joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, and shall be joined in accordance with ASTM D2657. Joint surfaces shall be clean and free from moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall remain undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D2683 or ASTM D3261.

M2101.20.1 Compression-type fittings. Where compression-type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

M2101.12 Material rating. Pipe and tubing shall be rated for the operating temperature and pressure of the system. Fittings shall be suitable for the pressure applications and recommended by the manufacturer for installation with the pipe and tubing material installed. Where used underground, materials shall be suitable for burial.

M2101.17 Cross-linked polyethylene (PEX) plastic tubing. Joints between cross-linked polyethylene plastic tubing and fittings shall comply with Sections M2101.17.1 and M2101.17.2. Mechanical joints shall comply with Section M2101.15.1.

M2101.13 Joints and connections. Joints and connections shall be of an approved type. Joints and connections shall be tight for the pressure of the system. Joints used underground shall be approved for such applications.

M2101.13.1 Joints between different piping materials. Joints between different piping materials shall be made with approved transition fittings.

M2101.14 Preparation of pipe ends. Pipe shall be cut square, reamed, and shall be free of burrs and obstructions. CPVC, PE, and PVC pipe shall be chamfered. Pipe ends shall have full-bore openings and shall not be undercut.

M2101.15 Joint preparation and installation. Where required by Sections M2101.16 through M2101.18, the preparation and installation of mechanical and thermoplastic-welded joints shall comply with Sections M2101.15.1 and M2101.15.2.

M2101.15.1 Mechanical joints. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

M2101.15.2 Thermoplastic-welded joints. Joint surfaces for thermoplastic-welded joints shall be cleaned by an approved procedure. Joints shall be welded in accordance with the manufacturer's instructions.

M2101.16 CPVC plastic pipe. Joints between CPVC plastic pipe or fittings shall be solvent-cemented in accordance with Section P2906.9.1.2. Threaded joints between fittings and CPVC plastic pipe shall be in accordance with Section M2101.16.1

M2101.16.1 **Threaded joints.** Threads shall conform to ASME B1.20.1 The pipe shall be Schedule 80 40 or heavier plastic pipe and shall be threaded with dies specifically designed for plastic pipe. Thread lubricant, pipe-joint compound or tape shall be applied on the male threads only and shall be approved for application on the piping material.

M2101.17.1 **Compression-type fittings.** Where compression-type fittings include inserts and ferrules or O-rings, the fittings shall be installed without omitting the inserts and ferrules or O-rings.

M2101.20 **Raised temperature polyethylene (PE-RT) plastic tubing.** Joints between raised temperature polyethylene tubing and fittings shall comply with Sections M2101.20.1 through M2101.20.4. Mechanical joints shall comply with Section M2101.15.1.

M2101.17.2 **Plastic-to-metal.** Solder joints in a metal pipe shall not occur within 18 inches (457 mm) of a transition from such metal pipe to plastic pipe or tubing.

M2101.18 **Polyethylene plastic pipe and tubing.** Joints between polyethylene plastic pipe and tubing or fittings for systems shall be heat-fusion joints complying with Section M2101.18.1, electrofusion joints complying with Section M2101.18.2, or stab-type insertion joints complying with Section M2101.18.3.

M2101.18.1 **Heat-fusion joints.** Joints shall be of the socket-fusion, saddle-fusion or butt-fusion type, and joined in accordance with ASTM D2657. Joint surfaces shall be clean and free from moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall remain undisturbed until cool. Fittings shall be manufactured in accordance with ASTM D2683 or ASTM D3261.

M2101.18.2 **Electrofusion joints.** Joints shall be of the electrofusion type. Joint surfaces shall be clean and free from moisture, and scoured to expose virgin resin. Joint surfaces shall be heated to melt temperatures for the period of time specified by the manufacturer. The joint shall remain undisturbed until cool. Fittings shall be manufactured in accordance with ASTM F1055.

M2101.18.3 **Stab-type insert fittings.** Joint surfaces shall be clean and free from moisture. Pipe ends shall be chamfered and inserted into the fittings to full depth. Fittings shall be manufactured in accordance with ASTM F1924.

M2101.19 **Polyproplyene (PP) plastic.** Joints between PP plastic pipe and fittings shall comply with Sections M2101.19.1 and M2101.19.2.

M2101.19.1 **Heat-fusion joints.** Heat-fusion joints for polypropylene (PP) pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings, electrofusion polypropylene fittings or by butt fusion. Joint surfaces shall be clean and free from moisture. The joint shall remain undisturbed until cool. Joints shall be made in accordance with ASTM F2389.

M2101.19.2 **Mechanical and compression sleeve joints.** Mechanical and compression sleeve joints shall be installed in accordance with the manufacturer's instructions.

M2101.30 **Makeup water.** The transfer fluid shall be compatible with the makeup water supplied to the system.

Reason:

This proposal fills a gap in the code coverage for hydronic piping. The new text is simply borrowed from Section M1205 which is specific to ground-source heat-pump loop piping. The same requirements also need to apply to all hydronic piping systems under Section M2101, not just ground-source heat- pump systems. This proposal provides the same coverage for general hydronic systems as is currently required for ground-source heat-pump systems.

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 to pursue opportunities to improve and enhance the International Codes or portions thereof that were under the purview of the PMG CAC. In 2017 the PMG CAC held one face-to-face meeting and 11 conference call meetings. Numerous interested parties attended the committee meetings and offered their input.

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.

Internal ID: 432

RM36-18

IRC: TABLE M2105.4

Proponent: LANCE MacNevin, Plastics Pipe Institute, representing Plastics Pipe Institute (lmacnevin@plasticpipe.org); Mark Metzner, IGSHPA Canada, representing IGSHPA Canada (markmetzner@shaw.ca)

2018 International Residential Code

Revise as follows:

TABLE M2105.4
GROUND-SOURCE LOOP PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F441; ASTM F442; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F876; CSA B137.5; CSA C448
High-density polyethylene (HDPE)	ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; AWWA C 903; CSA B137.9
Polypropylene (PP-R)	ASTM F2389; CSA B137.11, NSF 358-2
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2241; CSA 137.3
Raised temperature polyethylene (PE-RT)	ASTM F2623; ASTM F2769, CSA B137.18; CSA C448

Reason:
This proposal is on behalf of the International Ground Source Heat Pump Association (IGSHPA); Mark Metzner – President of IGSHPA Canada and the Chairman of ANSI/CSA/IGSHPA C448; and The Plastics Pipe Institute.

ANSI/CSA/IGSHPA C448-16 "Design and installation of ground source heat pump systems for commercial and residential buildings" is an ANSI designated bi-national consensus standard for the design and installation of ground source heat pump systems. It was first published in February 2016.

ANSI/CSA/IGSHPA C448-16 replaces the original version known as CSA C448-02. ANSI/CSA/IGSHPA C448-16 is a greatly enhanced system standard which includes the industry knowledge of ground source geothermal systems gained since 2002.

ANSI/CSA/IGSHPA C448-16 contains specific requirements for HDPE, PEX and PE-RT piping systems (pipe and fittings) for use as ground loop piping systems. By adding reference to C448 in these rows, this will indicate that these materials (PEX and PE-RT) are explicitly approved in ANSI/CSA/IGSHPA C448-16.

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 because it is simply identifying another industry consensus standard (C448) to which existing materials PEX and PE-RT can comply.

Analysis: A review of the standard proposed for inclusion in the code, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2018.

Internal ID: 2263

RM37-18

IRC: M2105.17

Proponent: LANCE MacNevin, Plastics Pipe Institute, representing Plastics Pipe Institute (lmacnevin@plasticpipe.org); Mark Metzner, IGSHPA Canada, representing IGSHPA Canada (markmetzner@shaw.ca)

2018 International Residential Code

Revise as follows:

M2105.17 Installation. Piping, valves, fittings, and connections shall be installed in accordance with ANSI/CSA/IGSHPA C448 and the manufacturer's instructions.

Reason:

This proposal is on behalf of the International Ground Source Heat Pump Association (IGSHPA); Mark Metzner – President of IGSHPA Canada and the Chairman of ANSI/CSA/IGSHPA C448; and The Plastics Pipe Institute.

ANSI/CSA/IGSHPA C448-16 "Design and installation of ground source heat pump systems for commercial and residential buildings" is an ANSI designated bi-national consensus standard for the design and installation of ground source heat pump systems. It was first published in February 2016.

ANSI/CSA/IGSHPA C448-16 is the first ANSI approved consensus standard for the design and installation of ground source systems.

ANSI/CSA/IGSHPA C448-16 replaces the original version known as CSA C448-02. ANSI/CSA/IGSHPA C448-16 is a greatly enhanced system standard which includes the industry knowledge of ground source geothermal systems gained since 2002. Ground loop piping system installations should be in accordance with the requirements of this standard.

The Standard includes performance-based criteria that provides a consistent application of requirements and best practices throughout the United States and Canada. This Standard will ensure that stakeholders in the ground source heat pump systems market sector will supply and receive ground source heating / cooling systems that perform to design efficiency expectations and deliver true, long-term value.

This Standard was developed by a Binational Technical Committee which comprised of the industry's leaders from Canada and USA, including representatives of the following industry associations:

American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
Geothermal Exchange Organization (GEO)
International Ground Source Heat Pump Association (IGSPHA)
International Ground Source Heat Pump Association Canada (IGSPHA - Canada)
National Ground Water Association (NGWA)
The Plastics Pipe Institute (PPI)
Geothermal National & International Initiative (GEONII)
Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)

ANSI/CSA/IGSHPA C448-16 includes performance-based minimum requirements for industrial, commercial, institutional and residential applications. It addresses the following items related to ground source heat pump systems:

equipment and material selection (including ground loop piping)
site survey - geological and hydrogeological
open and closed loop ground source heat pump system design / engineering
direct expansion (DX) systems
installation
testing and verification
documentation
commissioning and decommissioning

ANSI/CSA/IGSHPA C448-16 applies to all ground source heat pump systems using outdoor ground loop heat exchangers as a thermal source or sink for heating and cooling, with or without supplementary heating or cooling source/s. The types of outdoor heat exchangers covered by this Standard include:

ground heat exchangers - vertical and horizontal
open-loop systems - drilled well and surface water
submerged closed loop systems - fresh water and sea water
standing column wells

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 because it is simply clarifying that ground loop pipes must be installed correctly, in accordance with the latest version of this industry consensus standard which is already referenced in the IMC and IRC.

Analysis: A review of the standard proposed for inclusion in the code, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2018.

Internal ID: 2274

RM38-18

IRC: TABLE M2105.5

Proponent: LANCE MacNevin, Plastics Pipe Institute, representing Plastics Pipe Institute (lmacnevin@plasticpipe.org); Mark Metzner, IGSHPA Canada, representing IGSHPA Canada (markmetzner@shaw.ca)

2018 International Residential Code

TABLE M2105.5
GROUND-SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F1970; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; CSA B137.5; CSA C448
High-density polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F1282; ASTM F2434; CSA B137.9
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; ASTM F1970, CSA B137.2; CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.1; CSA B137.18; CSA C448

Reason:
This proposal is on behalf of the International Ground Source Heat Pump Association (IGSHPA); Mark Metzner – President of IGSHPA Canada and the Chairman of ANSI/CSA/IGSHPA C448; and The Plastics Pipe Institute.

ANSI/CSA/IGSHPA C448-16 “Design and installation of ground source heat pump systems for commercial and residential buildings” is an ANSI designated bi-national consensus standard for the design and installation of ground source heat pump systems. It was first published in February 2016.

ANSI/CSA/IGSHPA C448-16 contains specific requirements for HDPE, PEX and PE-RT piping systems (pipe and fittings) for use as ground loop piping systems. By adding reference to C448 in this row, this will indicate that these materials (PEX and PE-RT) are explicitly approved in ANSI/CSA/IGSHPA C448-16.

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 because it is simply identifying another industry consensus standard (C448) to which existing fittings for use with PEX and PE-RT can comply.

Analysis: A review of the standard proposed for inclusion in the code, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2018.

Internal ID: 2267

RM39-18

IRC: TABLE M2105.4, TABLE M2105.5, ordinal

Proponent: Jeremy Brown, representing NSF International (brown@nsf.org)

2018 International Residential Code

Revise as follows:

TABLE M2105.4
GROUND-SOURCE LOOP PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F441; ASTM F442; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F876; CSA B137.5
High-density polyethylene (HDPE)	ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; AWWA C 903; CSA B137.9
Polypropylene (PP-R)	ASTM F2389; CSA B137.11, NSF 358-2
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2241; CSA 137.3
Raised temperature polyethylene (PE-RT)	ASTM F2623; ASTM F2769, CSA B137.18, NSF358-4

TABLE M2105.5
GROUND-SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F1970; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; CSA B137.5
High-density polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F1282; ASTM F2434; CSA B137.9
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; ASTM F1970, CSA B137.2; CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.1; CSA B137.18, NSF 358-4

Add new standard(s) follows:

NSF

NSF International
789 N. Dixboro RoadP.O. Box 130140
Ann Arbor MI 48105
US

NSF 358-4-2017:

Polyethylene of raised temperature (PE-RT) pipe and fittings for water-based ground-source (geothermal) heat pump systems

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Reason:

At the proposal deadline, NSF 358-4 was still a draft standard, but it is expected to be published prior to the public hearing. The balloted draft standard will be submitted with the proposal. Anyone may receive a complimentary copy of this draft standard for the purpose of reviewing this proposal by emailing brown@nsf.org.

These tables contain the acceptable materials for geothermal ground loop pipe and fittings. PE-RT piping and associated fittings are already accepted materials with referenced standards. NSF 358-4 is a proposed ANSI standard written specifically to contain requirements for PE-RT geothermal piping and fittings. Companion standards NSF 358-1 (PE) and NSF 358-3(PP) are already approved in this table. NSF 358-4 addresses performance pressure testing, long term strength, chemical resistance, constant tensile load joint testing, suitability for burial and marking specific to geothermal PE-RT piping systems.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

Providing an additional option is cost neutral.

Analysis: A review of the standard proposed for inclusion in the code, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2018.

Internal ID: 1088

RM40-18

IRC: TABLE M2105.4, TABLE M2105.5, ordinal

Proponent: Jeremy Brown, representing NSF International (brown@nsf.org)

2018 International Residential Code

Revise as follows:

TABLE M2105.4
GROUND-SOURCE LOOP PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F441; ASTM F442; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F876; CSA B137.5, NSF 358-3
High-density polyethylene (HDPE)	ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; AWWA C 903; CSA B137.9
Polypropylene (PP-R)	ASTM F2389; CSA B137.11, NSF 358-2
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2241; CSA 137.3
Raised temperature polyethylene (PE-RT)	ASTM F2623; ASTM F2769, CSA B137.18

TABLE M2105.5
GROUND-SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; ASTM F1970; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; CSA B137.5, NSF 358-3
High-density polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F1282; ASTM F2434; CSA B137.9
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; ASTM F1970, CSA B137.2; CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.1; CSA B137.18

Add new standard(s) follows:

NSF

NSF International
789 N. Dixboro RoadP.O. Box
130140
Ann Arbor MI 48105
US

358-3-2016:

Cross-linked polyethylene (PEX) pipe and fittings for water-based ground-source (geothermal) heat pump systems

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Reason:
These tables contain the acceptable materials for geothermal ground loop pipe and fittings. PEX piping and associated fittings are already accepted materials with referenced standards. NSF 358-3 is an ANSI standard written specifically to contain requirements for PEX geothermal piping and fittings. Companion standards NSF 358-1 (PE) and NSF 358-3(PP) are already approved in this table. NSF 358-3 addresses performance pressure testing, long term strength, chemical resistance, constant tensile load joint testing, suitability for burial and marking specific to geothermal PEX piping systems. Anyone wishing to receive a complimentary copy of this standard for the purpose of reviewing this code change can send an email to brown@nsf.org

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

Adding an additional standard choice will not increase the cost of construction.

Analysis: A review of the standard proposed for inclusion in the code, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2018.

Internal ID: 1082

RM41-18

IRC: TABLE M2101.1

Proponent: Gary Morgan, Viega LLC, representing Viega LLC (gary.morgan@viega.us); LANCE MacNevin, Plastics Pipe Institute, representing Plastics Pipe Institute (Lmacnevin@plasticpipe.org)

2018 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, B43, 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, B88, B135, B251, 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	Copper crimp/insert fittings, cold expan sion 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 B 137.9	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 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.

Reason:

ASTM's committee on plastics piping recently completed a new Standard, F3253 - Standard Specification for Crosslinked Polyethylene (PEX) Tubing with Oxygen Barrier for Hot - and Cold - Water Hydronic Distribution Systems. This new system standard covers both the oxygen barrier PEX tubing as well as the performance and material requirements for the fittings. While this standard essentially mirrors the existing ASTM F876 and F877 PEX standards from a dimensional standpoint and existing fittings interchangeability, it also mandates the inclusion of an oxygen barrier layer with defined pass/fail criteria essentially equal with the industry's long accepted norm of DIN 4726 concerning allowed oxygen permeation. This new standard also requires a minimum pull-out strength test for the fittings not included in ASTM F877 today. The inclusion of this new standard in no way changes the acceptance of the existing ASTM F876 and F877 which will remain in the mechanical hydronics code for the foreseeable future.

This standard's project has been in works for nearly 4 years and represents the work and input from nearly all of the PEX tubing manufacturers in North America. Your support of this proposal is most appreciated.

A similar proposal is being submitted for Chapter 12 of the IMC.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

The addition of this new standard simply offers an alternative product that uses products which are relatively identical in cost today to existing pipe and fitting materials.

Internal ID: 1762

RM42-18

IRC: M2105.7

Proponent: Gary Morgan, representing Viega LLC (gary.morgan@viega.us)

2018 International Residential Code

M2105.7 Preparation of pipe ends. Pipe shall be cut square ~~, reamed,~~ and shall be free of burrs and obstructions. ~~CPVC, PE and PVC pipe shall be chamfered.~~ Pipe ends shall have full-bore openings and shall ~~not be undercut.~~ be prepared in accordance with the pipe manufacturer's instructions.

Reason:

This section is specific to plastic pipes and some of the existing language refers to terms such as "reamed" and "undercut" which only apply to metallic pipes. The revised language is more appropriate by including reference to preparing pipe ends in accordance with manufacturer's instructions which will be specific to that particular type of plastic pipe.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

This is only a clarification of existing language and will not result in any increased cost of construction.

Internal ID: 1829

RM43-18

IRC: M2202.1

Proponent: Mark Fasel, Viega, representing Viega LLC (mark.fasel@viega.us)

2018 International Residential Code

Revise as follows:

M2202.1 Materials. Piping shall consist of steel pipe, copper and copper-alloy pipe and tubing, steel tubing conforming to ASTM A539 or stainless steel tubing conforming to ASTM A254 or ASTM ~~A539.~~ A269. Aluminum tubing shall not be used between the fuel-oil tank and the burner units.

Reason:
Stainless steel tubing is an accepted material in accordance with NFPA 31 Standard for the Installation of Oil-Burning Equipment section 8.2.2.1 and is widely used in these applications due to its corrosion-resistance.

Bibliography:
®NFPA

NFPA 31 Standard for the Installation of Oil-Burning Equipment

Section 8.2.2.1

2016

Page 24

http://www.nfpa.org/

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

This proposal simply adds stainless steel pipe as an additional piping material that can be used for these applications and therefore will not increase the costs of construction.

Internal ID: 768

RM44-18

IRC: Chapter 22, M2202.2

Proponent: Mark Fasel, representing Viega LLC (mark.fasel@viega.us)

2018 International Residential Code

CHAPTER 22 SPECIAL PIPING AND STORAGE SYSTEMS

Revise as follows:

M2202.2 Joints and fittings. Piping shall be connected with standard fittings compatible with the piping material. Cast-iron fittings shall not be used for oil piping. Unions requiring gaskets or packings, right or left couplings, and sweat fittings employing solder having a melting point less than 1,000°F (538°C) shall not be used for oil piping. Threaded joints and connections shall be made tight with a lubricant or pipe thread compound. Press-Connect joints shall be listed and labed and shall be installed in accodance with the manufacturer's instructions.

Reason:
Press-Connect joints have been tested and listed for use in fuel oil piping systems and are referenced in the International Mechanical Code in Chapter 13 Fuel Oil Piping and Storage.

Bibliography:

UL 180 Standard for Liquid-Level Indicating Gauges for Oil Burner Fuels.

Underwriters Laboratories

Published 2012

www.ul.com

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

This standard is not the only standard 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

Internal ID: 770

RM45-18

IRC: M2202.2

Proponent: Mark Fasel, representing Viega LLC (mark.fasel@viega.us)

2018 International Residential Code

Revise as follows:

M2202.2 Joints and fittings. Piping shall be connected with ~~standard~~ fittings compatible with the piping material. Cast-iron fittings shall not be used for oil piping. Unions requiring gaskets or packings, right or left couplings, and sweat fittings employing solder having a melting point less than 1,000°F (538°C) shall not be used for oil piping. Threaded joints and connections shall be made tight with a lubricant or pipe thread compound.

Reason:

Editorial: The term "standard fittings" is not used in any International codes and has no definition. There is no reason to state the word "standard".

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

The removal of the term standard fittings has no cost implications due to the fact this terminology has no requirements for listings or required testing associated with this proposal to remove this vague undefined terminology.

Internal ID: 861