IMC

2015 GROUP A PUBLIC COMMENT AGENDA

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LONG BEACH, CA

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M9-15
202

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

SECTION 202 DEFINITIONS

VENTILATION. The natural or mechanical process of ~~supplying~~ introducing conditioned or unconditioned outdoor air to~~, or removing such~~ a space and removing air from~~, any~~ such space at an approximately equal rate.

Reason: The current definition dates back to when ventilation involved recirculation and has caused confusion because it still implies that ventilation involves recirculated air, when in fact, it does not. In the IMC, ventilation is by means of outdoor air only. There is no recognition of ventilation by recirculated indoor air. The revised definition makes this clear and also states a fundamental principal that ventilation does not occur without a balance of supplied air and removed air. If a system supplies 1000 cfm of outdoor ventilation air to a space, then it must exhaust, relieve or otherwise remove air at an equal rate or else the space will positively or negatively pressurize and the ventilation rate will not be realized. The revised definition is open such that it will recognize any means of supplying the outdoor air, such as by supply fans with relief fans or gravity openings and by means of exhaust fans and supply fans or gravity intake openings.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes.

Cost Impact: Will not increase 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 nor are the code requirements made more stringent.

M9-15 : 202-VENTILATION-SNYDER3253

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Ventilation in Section 403 of the IMC is not solely supplying outdoor air. The proposal will cause confusion and conflicts with Section 401 of the IMC and also ASHRAE 62.1.

Assembly Action : **None**

Individual Consideration Agenda

Public Comment 1:

Proponent : Janine Snyder, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

SECTION 202 DEFINITIONS

VENTILATION. The natural or mechanical process of introducing conditioned or unconditioned outdoor air to a space and removing air from such space ~~at an approximately equal rate.~~ . .

Commenter's Reason: The IMC committee seemed to take issue with the words "at an approximate equal rate," even though Section 403.1 states the same requirement. Those words are not essential to the definition, however, and can be omitted. Chapter 4 does indeed deal only with outdoor air for ventilation. There is no allowance for recirculated ventilation air in Chapter 4. Whether by mechaical or natural means, ventilation is the process of bringing in outdoor air and releiving or exhausting the same amount of air. The proposed definition reflects this.

M9-15

M10-15

313 (New), Chapter 15

Proposed Change as Submitted

Proponent : Ronald George, Self, representing Self (Ron@Plumb-TechLLC.com)

2015 International Mechanical Code

Add new text as follows:

SECTION 313
SYSTEM DESIGN CONSIDERATIONS

313.1 Design of Building Water Systems The design of building water systems shall be in accordance with ASHRAE 188.

Add new standard(s) as follows: ASHRAE 188 - DRAFT_4th Public Review_09262014 Legionellosis: Risk Management for Building Water Systems

Reason: There are many design considerations in the ASHRAE standard that will help minimize Legionella bacteria growth in building water systems which can lead to Legionnaires Disease when water droplets are aerosolized and breathed in. Following the ASHRAE Standard will minimize the risk of a person contracting Legionnaires' disease or Legionellosis by having the design team consider system maintenance proceedures to control the risk of legionellosis associated with plumbing & mechanical systems.

Bibliography: See the folowing websites for more information:
www.LegionellaPrevention.org.

http://www.cdc.gov/legionella/about/,

www.Legionella.com, www.hcinfo.com

http://www.who.int/water_sanitation_health/emerging/legionella.pdf

Cost Impact: Will increase the cost of construction
Buildings without a history of Legionella and not fitting the requirements will not need to add to the cost of construction. A water management plan will need to be done if a building meets certain minimum requirements. The cost of construction to address temperature, stagnation and water treatment will slightly increase the cost of construction and maintenance. Any building that is operating without growing Legionella should already has these processes in place, this will simply require documentation as part of a water management plan. This will provide for system design, operation and treatment that will minimize legionella bacteria growth and help prevent Leginnaires Disease.

Analysis: A review of the standard proposed for inclusion in the code, ASHRAE 188, 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, 2015.

M10-15 : 313 (New)-GEORGE5826

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed standard is in draft form and not likely to be completed by the Public Comment Hearings. The content could change before the draft is finalized.

Assembly Action **:** None

Individual Consideration Agenda

Public Comment 1:

Proponent : **Steven Ferguson, representing American Society of Heating Refrigerating and Air-Conditioning Engineers (sferguson@ashrae.org) requests Approve as Modified by this Public Comment.**

Modify as Follows:

2015 International Mechanical Code

313.1 Design of building water systems. The design of building water systems shall be in accordance with ASHRAE 188.

Modify standard(s) as follows: ANSI/ASHRAE 188 - ~~DRAFT_4th Public Review_09262014~~ 2015 - Legionellosis: Risk Management for Building Water Systems

Commenter's Reason: The reason for disapproval of this proposal at the committee hearings was
"The proposed standard is in draft form and not likely to be completed by the Public Comment Hearings. The content could change before the draft is finalized."

The Staff analysis on this standard was "Appears to be written in enforceable language. No proprietary references were noted. Consensus process stated."

In addition to the original proponent's reason statement. ASHRAE Standard 188 was developed with the intent of providing code officials and building operators information on how to manage the risk of legionellosis. ASHRAE Standard 188 was published on June 26, 2015, and is now publicly available as a final, published ANSI Standard. No substantive changes were made from the version previously provided to ICC for review.

For more information on the standard, go here: http://www.techstreet.com/ashrae/products/1897561

M10-15

M19-15
401.2

Proposed Change as Submitted

Proponent : Luis Escobar, representing Air Conditioning Contractors of America (luis.escobar@acca.org)

2015 International Mechanical Code

Revise as follows:

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or ~~by mechanical means in accordance with Section 403. Where the air infiltration rate in a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch water column (50 Pa) in accordance with Section R402.4.1.2 of the *International Energy Conservation Code*, the dwelling unit shall be ventilated~~ by mechanical means in accordance with Section 403. Ambulatory care facilities and Group I-2 occupancies shall be ventilated by mechanical means in accordance with Section 407.

Reason: This proposal is intended to clarify a current point of contention in the code.
Section 401.2 begins by allowing either natural or mechanical ventilation in the design. It then goes on to require mechanical ventilation if the infiltration rate is less than 5 air changes per hour (ACH) when tested per IECC section R402.4.1.2. However, IECC section R402.4.1.2 contains the procedures for verifying that the air leakage rate not exceed 5 ACH (climate zones 1 and 2) or 3 ACH (climate zones 3 - 8). This effectively allows the designer to pick natural ventilation up front only to get failed ultimately because of a catch-22 resulting from post-construction testing.

Further, it should be noted that the testing requirements ("air infiltration rate", i.e., "uncontrolled inward air leakage") does not comply with the IMC's definition of natural ventilation ("the movement of air into and out of a space through intentionally provided openings…").

The proposed change reverts back to the requirements in the 2009 IMC which simply allows for either natural or mechanical ventilation.

Cost Impact: Will not increase the cost of construction
This proposal allows the option of not installing mechanical ventilation, saving on construction costs.

M19-15 : 401.2-ESCOBAR5800

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Buildings are constructed to be more airtight. Occupants don't open windows as needed for natural ventilation. This section should not revert back to 2009 text as this is a step in the wrong direction.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Luis Escobar, representing ACCA (luis.escobar@acca.org) requests Approve as Submitted.

Commenter's Reason: During discussion of this and a subsequent proposal, the committee was self-contradictory. They stated clearly that they did not wish to make mechanical ventilation mandatory but were opposed to this original proposal's intent to clarify exactly that.
Furthermore, the current language causes the problem that it points to a more stringent code IECC that may not be adopted or enforced within many jurisdictions. In those places where both are not effective, it's proven to be distinctly problematic for contractors and home builders separately and together.

The original proposed change simply and clearly allows either option, natural or mechanical ventilation. If the IECC is effective in a particular jurisdiction then its requirements remain intact.

Public Comment 2:

Proponent : Donald Surrena, NAHB, representing NAHB (dsurrena@nahb.org) requests Approve as Submitted.

Commenter's Reason: The section as currently written in the 2015 IMC, mixes commercial, residential mechanical ventilation with IECC residential air infiltration tightness requirements. As written the section mixes dwelling units and buildings limiting how multifamily testing is done. Not allowing testing by a floor or series of dwelling units. That limiting criteria is in the energy code but it is only in the 2012 and 2015 IECC Residential section R402.4.1.2 Testing. There is no other use of the term "air infiltration" in the Mechanical Code. The issue as to whether or not natural or mechanical ventilation is needed is satisfied correctly in Section 402 (Natural Ventilation) or 403 (Mechanical Ventilation) The section as it is currently written is a hindrance to the Mechanical Code. A majority of states and jurisdictions have not adopted the 2012 or 2015 IECC and this section as written is in conflict with what states and jurisdictions have adopted. The Mechanical Code should not contain criteria from the IECC when that criteria does not represent energy code requirements most states and jurisdictions have adopted. The number of Blower door tests increases from what is required by dwelling unit compared to testing by the floor. Blower door testing for buildings by the story will be significantly increased by as much as $164 per additional test.[(a)]
Cost Impact: This will reduce the cost of construction.

Bibliography:
2012 cost efficiency study (Home Innovation Research Laboratory)

M19-15

M20-15

202 (New), 401.2

Proposed Change as Submitted

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

2015 International Mechanical Code

Add new definition as follows:

SECTION 202 DEFINITIONS

NONTRANSIENT Characterized by occupancy of a dwelling unit for greater than 30 days by occupants who are primarily permanent in nature.

Revise as follows:

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. ~~Where the air infiltration rate~~ Dwelling units in ~~a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch water column (50 Pa) in accordance with Section R402.4.1.2 of the *International Energy Conservation Code*, the dwelling unit~~ nontransient residential occupancies shall be ventilated by mechanical means in accordance with Section 403. Ambulatory care facilities and Group I-2 occupancies shall be ventilated by mechanical means in accordance with Section 407.

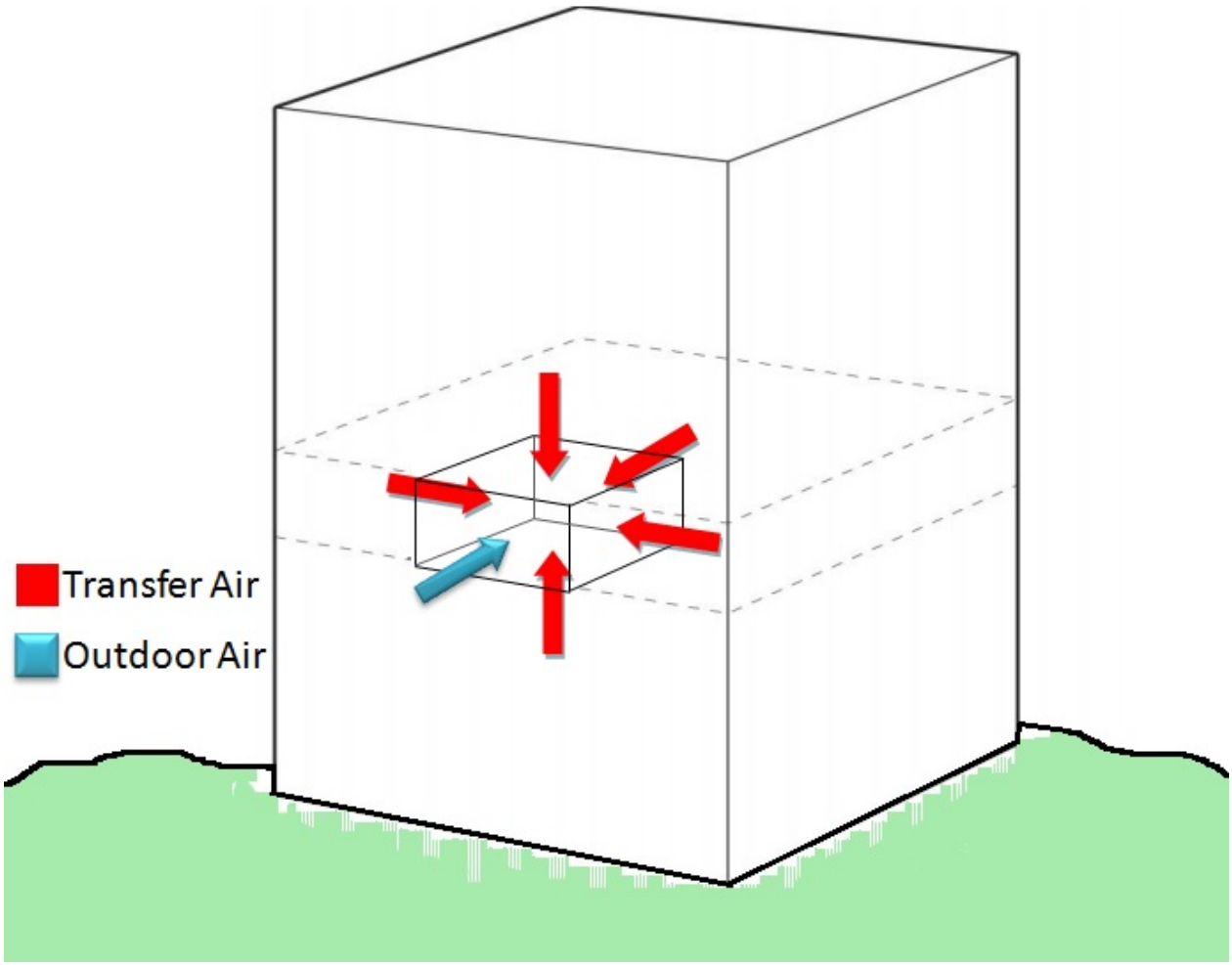
Reason: Compartmentalized Units are Tight and Should Require Mechanical Ventilation!

Attached dwelling units are being built tighter than ever, with increasing focus on compartmentalization of dwelling units for suppression of fire, smoke, odors, and environmental tobacco smoke; reduced energy use for heating and cooling; improved acoustics; and improved occupant comfort. Despite dwelling units being built tighter, there is no requirement for these tight units to be provided with mechanical ventilation. This proposal introduces a requirement for mechanical ventilation in today's tight and energy efficient buildings to provide occupants with minimum acceptable indoor air quality.

So, how tight are these dwelling units covered by the IMC being built? Unfortunately, we don't know, because very little data are available on new, code-minimum units. We do know that in general, dwelling units are getting much tighter over time (see Figure 1), but how much, we're not sure. For argument's sake, let's say they're TWICE as leaky as ENERGY STAR multifamily high rise units. Sound reasonable? This would put them at about 12 ACH50.[12] That sounds plenty leaky to provide sufficient natural ventilation, until you consider that a significant portion of the infiltration of attached dwelling units is likely to be transfer air from neighboring units, since much less of an attached unit's surface area is adjacent to the outdoors.

For example, interior dwelling units have only 1/6 surfaces exposed to the exterior, or about 10% of the total surface area for a unit with a square floor plan. Let's assume that up to 40% of the dwelling unit leakage comes through the 10% of the surface area accounted for by the exterior wall. This number can vary widely, but is a reasonable assumption based on multiple sources and feedback from builders, developers, and energy professionals that the most difficult area to air seal in attached units is the fire rated assembly wall separating dwelling units. So, for attached dwelling units that are twice as leaky as ENERGY STAR units, the effective outdoor air leakage rate would be about 5 ACH50 (40% of 12 ACH50). This is the

leakage rate that triggers mechanical ventilation requirements in both the IRC and IMC.



ENERGY STAR Tight	Typical Tightness	
Total Leakage	**Total Leakage**	**Leakage to Outdoors**
~6 ACH50 (0.3 cfm50/sqft)	~12 ACH50 (assuming twice as leaky as ENERGY STAR)	~5 ACH50 (assuming 40% of leakage comes from outdoors)

Table 1. Estimating the tightness of typical attached dwelling units.

In other words, by the IRC and IMC's own standards, typical dwelling units, regardless of whether or not they have a blower door test, should be provided with mechanical ventilation. This proposal limits the requirements for mechanical ventilation to the dwelling units that will have the highest impact on occupant health - those units whose occupants are expected to be nontransient, since these account for the lion's share of pollutant exposure over time. The definition of nontransient is adapted from the IBC definition of transient.

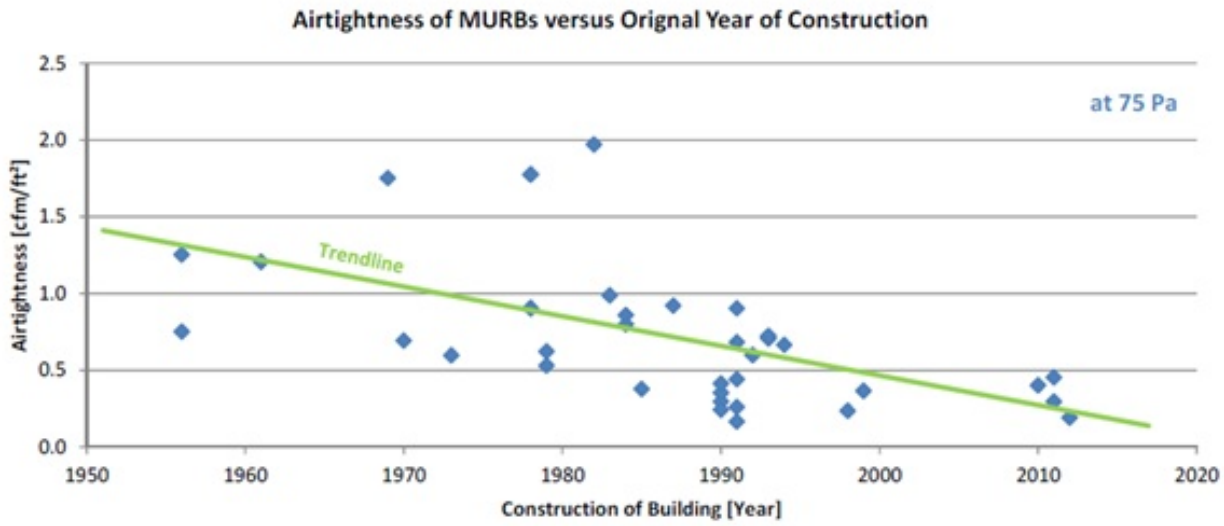


Figure 1. Airtightness of Multi-Unit Residential Buildings (MURB), by year.[14] The 0.4 cfm75/sqft metric for units built after 1995 would translate to about 0.3 cfm50/sqft. However, because this data set is limited and includes some high performance buildings across the U.S. and Canada, it should only be used to indicate a trend in tightness over time (dwelling units are getting tighter!) and should not be used to validate a specific leakage rate.

Building Tight without Mechanically Ventilating Can Have Huge Health Impacts

Building tight, compartmentalized dwelling units (5 ACH50 and below) has become the new standard practice, regardless of whether or not a developer confirms the tightness with a blower door test. Of course, the one potential problem with building tight is the negative impact it has on indoor air quality if mechanical ventilation is not provided. Without mechanical ventilation, tight dwelling units can experience elevated humidity levels; increased condensation potential on windows; higher concentrations of dust mites and allergens; and higher concentrations of pollutants such as particulate matter (which can be transmitted to the circulatory system and organs after being introduced to the lungs), radon (the second leading cause of lung cancer; has also been detected in high-rise units[13]), formaldehyde, acetaldehyde, and other VOCs that have negative health impacts.

We spend 90% of our time indoors, so it's no wonder that health impacts associated with poor indoor air quality include increased risk or exacerbation of asthma, stroke, neurotoxicity, and cancer, among others.[6,9,10] Many indoor air pollutants originate from building materials and finishes. Recent studies have shown that air pollution levels in dwelling units that are not mechanically ventilated can exceed outdoor national air quality standards for CO in 7-8% of homes and NO_2 in 55-70% of homes, during a typical week.[3] Other sources point to the increase in flame retardants in building materials and finishes driven by codes and standards as contributing to the presence of these chemicals in indoor dust and air and ultimately in the bodies of people (33 different flame retardants products have now been discovered in people's bodies; health effects of many of these are still largely unknown).[11]

Estimates for the cost of poor indoor air quality are staggering. The cost of asthma triggered by dampness and mold in U.S. residences has been estimated at $3.5 billion annually[5], and asthma now affects one in five Americans[4]. While dampness and mold should be controlled as much as possible at the source, there are other pollutants where source control is not an option for many households. Even when you exclude radon and second hand smoke from the list of indoor pollutants, poor indoor air quality in U.S. residences is estimated to account for 14% of all years of life lost and years of disability associated with "noncommunicable and nonpsychiatric diseases."[6] Based on another study, this is roughly equal to the negative health impacts of alcohol use, diabetes, and HIV/AIDS combined.[7]

Relying on Natural Ventilation Alone Doesn't Cut it In Tight Dwelling Units
A prominent study on occupant window operation in new (2002-2004 era) single family homes concluded that "a substantial percentage of homeowners never open their windows, especially in the winter" and that window operation coupled with natural infiltration does not provide the airflow rates necessary to achieve minimum indoor air quality.[8]

Nonetheless, natural ventilation through operable windows provides a useful and sometimes necessary function. Operable windows offer natural ventilation in addition to daylight and egress. Even with mechanical ventilation, a home occupant needs to be able to control their own environment, particularly in the case of an emergency such as a power failure (e.g., being able to open windows for airflow in the aftermath of a storm or blackout or in the case of equipment failure). The intention of this proposal is not to supplant natural ventilation, but to complement it. Experience shows that where mechanical ventilation is required (i.e., all ENERGY STAR homes, low-rise dwelling units built to the 2012 IECC, all new low-rise dwelling units in CA, etc.), builders are not generally using it to trade off against natural ventilation requirements. The exception for this would be toilet rooms, which for decades have often been provided with local exhaust instead of an operable window.

At this point, mechanical ventilation is needed to provide minimum acceptable air quality for code-minimum construction. This change will ensure that the comfortable, energy efficient homes that builders and developers are now building are also provided with the systems required by national consensus standards to provide for this need.

Bibliography:
1. Lstiburek, J.W. (2011). Just right and airtight. ASHRAE Journal: 53(5): 58-66.
2. States/jurisdictions that do not have a mechanical ventilation requirement include all of those that are currently enforcing the 2009 IECC. These figures were developed from the following sources:

a. State data: U.S. DOE Building Energy Codes Program, "Status of State Energy Code Adoption, Residential: Current" accessed from http://www.energycodes.gov/adoption/states on Dec 3, 2014.
b. State data: ICC, "International Codes – Adoption by State (September 2014)" accessed from http://www.iccsafe.org/gr/Documents/stateadoptions.pdf on Dec 3, 2014.
c. Jurisdictional data: Building department websites of various jurisdictions.
d. 2014 housing starts: National Association of Home Builders Total Housing Starts Forecast, October 2014.

3. Singer et al. (2014). Pollutant exposures from natural gas cooking burners: a simulation based assessment for Southern California." Lawrence Berkeley National Laboratory. LBNL-6712E.
4. Asthma and Allergy Foundation of America. "Asthma Facts and Figures" accessed from https://www.aafa.org/display.cfm?sub=42&id=8#_ftn1 on Dec 3, 2014.
5. Mudarri, D. and W.J. Fisk. (2007). Public health and economic impacts of dampness and mold. Indoor Air 17:226-235.
6. Logue et al. (2012). A method to estimate the chronic health impact of air pollutants in U.S. residences. Environmental Health Perspectives: 120(2): 216–222.
7. McKenna, M.T., C.M. Michaud, C.J.L. Murray, and J.S. Marks. (2005). Assessing the burden of disease in the United States using disability-adjusted life years. Am J Prev Med.: 28(5):415–423.
8. Offerman, F.J. (2009). Ventilation and indoor air quality in new homes. PIER Collaborative Report. California Energy Commission & California Environmental Protection Agency Air Resources Board.
9. ASHRAE. 2009. Indoor air quality guide. American Society of Heating Refrigerating and Air Conditioning Engineers, Inc. ISBN 978-1-933742-59-5.
10. Anderson, E.L. and Albert, R.E. (1999). Risk assessment and indoor air quality. Lewis Publishers, New York, NY.
11. Dedeo, M. & S. Drake. (2014). Healthy Environments: Strategies for Avoiding Flame Retardants in the Built Environment. Available at:

http://perkinswill.com/sites/default/files/PerkinsWill_FlameRetardantAlternatives.pdf. Accessed December 11, 2014.
12. The ENERGY STAR requirement for maximum total air leakage in high-rise multifamily dwelling units is 0.3 cfm50/sqft of the dwelling unit's envelope surface area. For a square, 1000 sqft unit with 9 foot ceilings, this translates to 6.3 ACH50 (the ENERGY STAR requirement for low-rise and mid-rise multifamily units is even tighter, at 3-6 ACH50, depending on climate zone). Assuming typical units are twice as leaky as high rise units would place them at ~12 ACH50 total leakage. Then, assuming that these units have 40% of their leakage to outdoors means that the effective outdoor air leakage rate would be ~5 ACH50.
13. Slack, H. & Palmer, J. (2011). Radon and Ventilation In Residential High-rise Buildings. Proceedings of Indoor Air 2011, Paper 447.
14. Canada Mortgage and Housing Corporation. (2013). Air Leakage Control in Multi-Unit Residential Buildings. Project 5314.00.

Cost Impact: Will increase the cost of construction
For those dwelling units that are not already provided with outdoor air, retail incremental costs for compliant systems can be less than $70. This is based on the incremental, retail cost difference between an entry-level exhaust fan (Broan 688 at $11.56) and a quiet, higher-efficiency exhaust fan that meets the requirements of the 2012 IECC (Broan QTR080 at $79.15). Prices were sourced from zoro.com on December 19, 2014.

M20-15 : 401.2-MOORE4859

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal addresses only dwelling units and is too extreme for single family dwellings. The proposed definition of nontransient is confusing relative to multi-family buildings verses hotels. The term transient is already defined and the proposed definition omits sleeping rooms. In some cliamtes, the proposal is overkill. The proposal should be climatic location oriented. Cost is an issue for installing makeup air systems.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Mike Moore, Newport Ventures, representing Broan-NuTone (mmoore@newportventures.net) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

SECTION 202 DEFINITIONS

~~**NONTRANSIENT** Characterized by occupancy of a dwelling unit for greater than 30 days by occupants who are primarily permanent in nature.~~

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in

accordance with Section 403. Dwelling units in nontransient residential occupancies shall be ventilated by mechanical means in accordance with Section 403. Ambulatory care facilities and Group I-2 occupancies shall be ventilated by mechanical means in accordance with Section 407.

Exception: Mechanical ventilation is not required for dwelling units in nontransient residential occupancies where at least one of the following conditions is met:

1. The building does not have mechanical cooling and it is in Climate Zone 1 or 2.
2. The building is intended to be thermally conditioned for less than 876 hours per year.

Commenter's Reason: This comment is intended to address all the committee's concerns with the original proposal, as follows:

1. Committee: The proposed definition is confusing and "transient" is already defined.

Response: The definition of "nontransient" has been removed to avoid confusion and misinterpretation.The IBC already contains a definition of "transient" and multiple references to "transient" and "nontransient", which have been in use since at least the 2003 version of the IBC, so we will assume that the industry is familiar with these terms and their meanings.

2. Committee: The proposal is overkill in some climates.

Response: An exception has been introduced to exempt dwelling units in temperate climates where thermal conditioning is not provided or is not expected to occur more than 10% of the year (876 hours). This exception is derived from and aligned with ASHRAE 62.2. The term "Climate Zone" is defined in the IBC and is used in the IBC and IECC.

3. Committee: Cost is an issue for installing makeup air systems.

Response: No intentional makeup air is required by this proposal. Based on the current code requirements, exhaust, supply, or balanced systems may be used to provide dwelling unit ventilation without triggering any makeup air requirements.

4. Committee: This is "too extreme".

Response: Building and energy codes are requiring tighter construction practices for dwelling units. Benefits of these air-sealing requirements include fire resistance, sound attenuation, rodent control, odor control, and a reduction in space conditioning energy use. However, air sealing also reduces natural infiltration and leads to the need for mechanical ventilation. Additionally, air pollutants are often not discernable by occupants, so occupants are often unaware of the need to ventilate. Finally, window operation is not always a reliable form of ventilation in MF units, where opening a window could simply introduce more transfer air into a dwelling unit instead of providing required outdoor air. Following are examples of air sealing requirements in the codes that point to efforts/requirements for compartmentalization and the need for mechanical ventilation.

1. IBC, air transfer to the corridor: This is not permitted. IBC Section 1020.5: "*Corridors* shall not serve as supply, return, exhaust, relief or ventilation air ducts."
2. ASHRAE 90.1 and IECC, air transfer through exterior walls: This is limited by requirements of ASHRAE 90.1 and the IECC, which have been widely adopted across states and include requirements to seal, caulk, gasket, or weather-strip joints, junctions, penetrations, seams, and openings in the building envelope, as well as air tightness targets in more recent versions.
3. IBC, Air transfer between units: Air transfer between units does not provide

ventilation air, but transfer air. Further, transfer air may be restricted by efforts to meet fire-resistance rating requirements of Chapters 6 and 7 of the IBC, fire-stop and fire-blocking requirements of the IRC and manufacturers of rated assemblies, sound attenuation requirements of Chapter 12 of the IBC specific to dwelling and sleeping units, and building owner efforts to manage rodents (see the IBC's optional appendix F101.3 for recommended sealing measures) and odors.

M20-15

M21-15
401.2, 501.3
Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. ~~Where~~ Mechanical ventilation shall be required for the following:

1. Dwelling units where the air infiltration rate ~~in a dwelling unit~~ is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2-inch water column (50 Pa) in accordance with Section R402.4.1.2 of the *International Energy Conservation Code*. ~~, the~~
2. Kitchens in dwelling ~~unit shall be ventilated by mechanical means in accordance with Section 403~~ units.
3. Ambulatory care facilities and Group I-2 occupancies. Such ventilation shall be ~~ventilated by mechanical means~~ in accordance with Section 407.

501.3 Exhaust discharge. The air removed by every mechanical exhaust system shall be discharged outdoors at a point where it will not cause a public nuisance and not less than the distances specified in Section 501.3.1. The air shall be discharged to a location from which it cannot again be readily drawn in by a ventilating system. Air shall not be exhausted into an attic, crawl space, or be directed onto walkways.

Exceptions:

1. Whole-house ventilation-type attic fans shall be permitted to discharge into the attic space of *dwelling units* having private attics.
2. Commercial cooking recirculating systems.
3. Where installed in accordance with the manufacturer's instructions and where mechanical ~~or *natural*~~ *ventilation* is otherwise provided in accordance with Chapter 4, *listed* and *labeled* domestic ductless range hoods shall not be required to discharge to the outdoors.

Reason:
Pollutants from cooking have been identified as some of the worst in the home, in terms of health impacts. Pollution during cooking events includes NO_2, CO, HCHO (formaldehyde), acrolein (produced when cooking meats and oils; used as a nerve agent in WWI), polycyclic aromatic hydrocarbons, and particulate matter (which can become lodged in the lungs or pass through the lungs to the circulatory system.[1,2,3,4,5,6,17,18,19,20,21] Overall, indoor air pollution from residential dwelling units (excluding the impacts of radon and second hand smoke) is estimated to account for 14% of all years of life lost and years of disability associated with

"noncommunicable and nonpsychiatric diseases."[7] Based on another study, this is roughly equal to the negative health impacts of alcohol use, diabetes, and HIV/AIDS combined.[8] The lion's share of the health impacts of poor indoor air quality in dwelling units has been linked to particulate matter, and indoor particulate matter is emitted when cooking on both electric and gas stoves.[3,7,9]

Overall, the primary source of particulate matter in non-smoking dwelling units is unvented cooking.[1] Natural ventilation alone is an insufficient means to provide required ventilation because it relies on pressure differentials that may or may not exist, and when they exist, the pressure differential could be equally as likely to spread the pollutant throughout the dwelling unit and neighboring units as it would be to exhaust the pollutant directly to the outdoors. Further, studies have shown that occupants often do not operate windows for ventilation.[10,11] Concerns with window operation include security and discomfort (including severe draft in winter).

To improve the health and life safety of dwelling unit occupants, this proposal would require that mechanical ventilation be provided for all kitchens in dwelling units. Some compelling facts and quotes on kitchen pollutants and ventilation follow.

- Simulations show that where a natural gas cooktop is used without a vented range hood, "62%, 9%, and 53% of occupants are routinely exposed to NO_2, CO, and HCHO (formaldehyde) levels that exceed acute health-based standards and guidelines."[12]
- "Emissions of nitrogen dioxide in homes with gas stoves exceed the EPA's definition of clean air in an estimated 55 percent to 70 percent of those homes, according to one model; a quarter of them have air quality worse than the worst recorded smog (nitrogen dioxide) event in London. Cooking represents one of the single largest contributors, generating particulate matter (formally known as PM2.5) at concentrations four times greater than major haze events in Beijing."[13]
- Increased exposure to NO_2 in dwelling units has been associated with an increased number of asthma attacks.[14,15,16]
- "People don't need to radically change their lifestyles. We need to change the building codes so that everyone gets a venting range hood."- Dr. Jennifer Logue, Research Scientist with Lawrence Berkeley National Laboratory[13]

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Cost Impact: Will increase the cost of construction

For those units that do not already install kitchen exhaust, the cost of construction will increase, depending on equipment selection. Exhaust hoods start around $30 retail (e.g., Broan economy hood #403001, 2-speed, moving 160 cfm, priced on zoro.com at $33.36 with free shipping on December 19, 2014). Most dwelling units have some sort of recirculating exhaust hood at a minimum, so the actual incremental cost could probably be disregarded for the equipment itself. For units that are recirculating only, installed cost to the GC for ducting is estimated at ~$13/linear foot for 3.25x10" duct (RS Means 2013 Residential Cost Data, adjusted for inflation).

M21-15 : 401.2-MOORE4909

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Not every kitchen needs mechanical ventilation. The proposed text belongs in Section 505. The proposal is not considerate of the kitchen size. It would be difficult to size the exhaust system. The requirements should be tailored to the climatic location.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Mike Moore, Newport Ventures, representing Broan-NuTone (mmoore@newportventures.net) requests Approve as Modified by this Public Comment.

Replace Proposal as Follows:

2015 International Mechanical Code

505.1 Domestic systems. Where domestic ~~range hoods and~~ cooktops, ranges, or open-top broilers are installed, they shall be provided with a domestic ~~appliances equipped with downdraft~~ cooking exhaust ~~are provided, such hoods and appliances~~ system. Domestic cooking exhaust systems shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls, shall be air tight, shall be equipped with a backdraft damper, and shall be independent of all other exhaust systems.

Exceptions:

1. In Group R occupancies, domestic cooking exhaust systems are not required where at least one of the following conditions is met:
    - 1.1. The building does not have mechanical cooling and it is in Climate Zone 1 or 2.
    - 1.2. The building is intended to be thermally conditioned for less than 876 hours per year.
2. In other than Group I-1 and I-2, where installed in accordance with the manufacturer's instructions and where mechanical ~~or natural~~ ventilation is otherwise provided in accordance with Chapter 4, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.
3. Ducts for domestic kitchen cooking appliances equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
    - 3.1. The duct shall be installed under a concrete slab poured on grade.
    - 3.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.
    - 3.3. The PVC duct shall extend not more than 1 inch (25 mm) above the indoor concrete floor surface.
    - 3.4. The PVC duct shall extend not more than 1 inch

(25 mm) above grade outside of the building.
3.5. The PVC ducts shall be solvent cemented.

~~**505.4 Other than Group R.** In other than Group R occupancies, where domestic cooking appliances are utilized for domestic purposes, such appliances shall be provided with domestic range hoods. Hoods and exhaust systems shall be in accordance with Sections 505.1 and 505.2.~~

Commenter's Reason: The original proposal's reason statement provides extensive rationale behind why exhaust should be provided for kitchens, based on well documented health concerns, and will not be repeated here. This comment revises and improves upon the original proposal based on the following committee input:

1. Committee: Not every kitchen needs mechanical ventilation. The requirement should be tailored to the climatic location.

Response: This comment introduces an exception that does not require mechanical ventilation in Group R occupancies when window operation might be expected to occur regularly (i.e., Climate Zones 1 and 2 where no space conditioning system is installed or where space conditioning is expected to happen very infrequently; 876 hours corresponds to 10% of the year). This exception was derived from ASHRAE 62.2. "Climate zone" is defined and used in the IBC and IECC, so no new definition is required here. This exception does not apply to "other than Group R occupancies", as they are already required to have a range hood under 505.4. Please note that the text of 505.4 has been deleted, but the requirement still remains; it is just rolled up into 505.1 to streamline and simplify the text in this section. This exception does not apply to "other than Group R occupancies", as they are already required to have a range hood under 505.4. Please note that the text of 505.4 has been moved to exception #1 of 505.1 to improve the organization of the section. No changes are made to the existing requirement of 505.4.

2. Committee: The proposed text belongs in Section 505.

Response: We agree and have incorporated this suggestion.

3. Committee: The proposal is not considerate of the kitchen size. It would be difficult to size the exhaust system.

Response: Requirements for kitchen exhaust air flow rates are located in Chapter 4, Table 403.3.2.3 and Table 403.3.1.1. Depending on the type of occupancy, the requirements are either static (as is the case for dwelling units: 100 cfm required for intermittent or 25 cfm continuous), or they are determined as a function of the kitchen size for food service operations (i.e., cfm/sqft). Where domestic range hoods are installed in dwelling units, the static requirement still applies. And where domestic kitchen exhaust systems are installed in locations other than dwelling units, the calculation of cfm based on kitchen square footage is very simple. This proposal and comment do not make any changes to existing kitchen exhaust rates within the code.

Please note that exception #2 has been retained to permit specification of other exhaust systems within the kitchen, such as wall or ceiling mounted exhaust fans. This can be a cost-savings measure in some cases and may be pursued when ducting a range hood could otherwise prove difficult. Finally, this comment was drafted after consulting ICC staff to ensure that it could merge easily with M44, in the case that M44 is approved in the public comment hearings.

M21-15

M23-15

202 (New), 403.1, 403.3, 403.3.1, 403.3.2, 403.3.2.1, 403.3.2.2, 403.3.2.3

Proposed Change as Submitted

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

2015 International Mechanical Code

Add new definition as follows:

SECTION 202 DEFINITIONS

NONTRANSIENT Characterized by occupancy of a dwelling unit for greater than 30 days by occupants who are primarily permanent in nature.

Revise as follows:

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air* except that mechanical ventilation air requirements for ~~Group R-2, R-3 and R-4 occupancies three stories and less~~ dwelling units in ~~height above grade plane~~ nontransient residential occupancies shall be provided by an exhaust system, supply system or combination thereof. The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6.

403.3 Outdoor air and local exhaust airflow rates. ~~Group R-2, R-3 and R-4 occupancies three stories and less~~
Dwelling units in ~~height above grade plane~~ nontransient residential occupancies shall be provided with outdoor air and local exhaust in accordance with Section 403.3.2. All other buildings intended to be occupied shall be provided with outdoor air and local exhaust in accordance with Section 403.3.1.

403.3.1 Other buildings intended to be occupied. The design of local exhaust systems and ventilation systems for outdoor air for occupancies other than ~~Group R-2, R-3 and R-4 three stories and less above grade plane~~ dwelling units in nontransient residential occupancies shall comply with Sections 403.3.1.1 through 403.3.1.5.

403.3.2 ~~Group R-2, R-3 and R-4~~ Dwelling units in nontransient residential occupancies, ~~three stories and less~~. The design of local exhaust systems and ventilation systems for outdoor air in ~~Group R-2, R-3 and R-4 occupancies three stories and less~~ dwelling units in ~~height above grade plane~~ nontransient residential occupancies shall comply with Sections 403.3.2.1 through 403.3.2.3.

403.3.2.1 Outdoor air for dwelling units in nontransient residential occupancies. *No change to text.*

Delete without substitution:

~~**403.3.2.2 Outdoor air for other spaces.** Corridors and other common areas within the conditioned space shall be provided with outdoor air at a rate of not less than 0.06 cfm per square foot of floor area.~~

Revise as follows:

TABLE 403.3.2.3
MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ~~GROUP R-2, R-3, AND R-4~~ DWELLING UNITS IN NONTRANSIENT RESIDENTIAL OCCUPANCIES

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

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

Reason: This proposal is intended to simplify the optional mechanical ventilation compliance path for all dwelling units in nontransient residential occupancies, regardless of building height. This change is aligned with a recent scope change in standards ASHRAE 62.2 and 62.1 that moved jurisdiction of dwelling units in nontransient residential occupancies to the scope of ASHRAE 62.2, regardless of building height.[1] This change was strongly supported by both committees, primarily for the following reason:

- Ventilation rates for dwelling units in nontransient residential occupancies should be consistent across all units, regardless of building height. Why should a dwelling unit in a 4 story building require an outdoor air ventilation rate that is up to two times greater than that in a 3 story building?

Approval of this particular proposal to the IMC would have the following benefits:

- More closely align the IMC's ventilation requirements with consensus standards without requiring the user to access or purchase those standards.
- Simplify the design, specification, and enforcement of outdoor air ventilation and exhaust requirements for dwelling units in nontransient residential occupancies, regardless of building height.
- Save significant energy: As an example, the IMC currently requires a 1000 sqft, 2 bedroom apartment with 9 foot ceilings to be provided with 53 cfm of outdoor air when located in a three story building (using equation 4-9). For the identical unit in a four story building, the IMC requires 53-105 cfm of outdoor air, depending on the type of HVAC system installed (equations 4-1 and 4-2, and tables 403.3.1.1 and 403.3.1.1.1.2). So, up to 50% of the ventilation energy currently required for high-rise dwelling units can be saved by simply transitioning all ventilation requirements for dwelling units in nontransient residential occupancies to those currently contained in Section 403.3.2.

Bibliography:

1. ASHRAE 62.2-2013 Addendum G. To access a free copy, please contact ASHRAE at (404) 636-8400.

Cost Impact: Will not increase the cost of construction
This change is not expected to increase the cost of construction because it serves to simplify the design, specification, and enforcement of outdoor air ventilation and exhaust requirements for dwelling units in nontransient residential occupancies, regardless of building height.

M23-15 : 403-MOORE4858

Public Hearing Results

Committee Action: Disapproved

Committee Reason: With the deletion of Section 403.2.2, corridors would no longer be covered. Nontransient is not the exact opposite of transient. Sleeping rooms are not addressed.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Mike Moore, Newport Ventures, representing Broan-NuTone (mmoore@newportventures.net) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

SECTION 202 DEFINITIONS

~~**NONTRANSIENT** Characterized by occupancy of a dwelling unit for greater than 30 days by occupants who are primarily permanent in nature.~~

403.3 Outdoor air and local exhaust airflow rates. Dwelling units in nontransient residential occupancies shall be provided with outdoor air and local exhaust in accordance with Section 403.3.2. ~~All other~~ Other spaces in buildings intended to be occupied shall be provided with outdoor air and local exhaust in accordance with Section 403.3.1.

403.3.1 Other spaces within buildings intended to be occupied. *No change to text.*

Commenter's Reason: It is important to note that this proposal does not introduce any new requirements for mechanical ventilation. The intent of this proposal is to align the IMC with recent revisions to the scopes of ASHRAE 62.1 and ASHRAE 62.2. The proposal is meant to simplify and streamline mechanical ventilation provisions for dwelling units where required**.** This will lead to greater consistency in design, specification, and enforcement of code provisions. Unfortunately, there was confusion with the proposal and its effects at the first hearing, which I hope to resolve here by responding to the committee's objections.
1. Committee: With the deletion of Section 403.2.2, corridors would no longer be covered.

Response: Corridors are not considered residential dwelling units, and so would no longer be covered under Section 403.2.2. Instead, corridors,

common areas, and other areas of residential occupancies that are not within residential dwelling units would be addressed in Section 403.3.1, as they have been historically. No change will result in the ventilation requirements for these areas.

2. Committee: Sleeping rooms are not addressed.

   Response: sleeping rooms have different facilities than dwelling units and so do not have the same ventilation requirements. Moving forward, ventilation requirements for sleeping units will still be covered under Section 403.2.2, as they are currently.

3. Committee: Nontransient is not the exact opposite of transient.

   Response: "Transient" is defined in the IBC and both "nontransient" and "transient" are used in IBC Section 310. I've deleted the proposed definition of "nontransient" to avoid any confusion that could otherwise be caused. We can assume that industry is familiar with the terms "nontransient" and "transient" since they have been used in the IBC since at least 2003.

M23-15

M31-15
501.3.1

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

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

1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property lines; 10 feet (3048 mm) from operable openings into buildings; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into buildings which are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above adjoining grade.
3. For all *environmental air* exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings into buildings for all occupancies other than Group U, and 10 feet (3048 mm) from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious. Where a combined exhaust and intake terminal is used to separate intake air from exhaust air originating in living space other than kitchens, a minimum separation distance between these two openings shall not be required, provided that the exhaust air concentration within the intake air flow does not exceed 10%, as established by the manufacturer of such terminal.
4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment.
5. For specific systems see the following sections:
    - 5.1. Clothes dryer exhaust, Section 504.4.
    - 5.2. Kitchen hoods and other kitchen exhaust *equipment*, Sections 506.3.13, 506.4 and 506.5.
    - 5.3. Dust stock and refuse conveying systems, Section 511.2.
    - 5.4. Subslab soil exhaust systems, Section 512.4.
    - 5.5. Smoke control systems, Section 513.10.3.
    - 5.6. Refrigerant discharge, Section 1105.7.
    - 5.7. Machinery room discharge, Section 1105.6.1.

Reason:

Combined exhaust/supply 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. Combined terminations are regularly approved and installed in single family and multifamily dwelling units across the country, and manufacturer tests have demonstrated that minimum cross-contamination of airflow results from these terminations. There is currently no industry standard by which to test these units, so we have simply proposed that their performance be verified by the manufacturer, as is the practice in other areas of the code (IMC Sections 513.10.1, 801.14, 1002.2, 1006.3, 1006.7, 1007.2, 1102.2.2.3, 1108.1 exception 3, 1206.7, 1210.6.6.2, etc.). The 10% cross contamination metric is based on language in ASHRAE 62.1 that limits cross contamination of exhaust and supply streams to 10% for "air with moderate contaminant concentration, mild sensory-irritation intensity, or mildly offensive odors"; a similar exception exists in the IMC, Section 514.4. In both the IMC and ASHRAE 62.1, no standard is cited for determining cross-contamination, presumably because none yet exists.

Cost Impact: Will not increase the cost of construction

This proposal is expected to reduce construction costs by eliminating the need for a second wall cap and extra ducting that would otherwise be required to separate intake and exhaust airstreams.

M31-15 : 501.3.1-MOORE4876

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Research does exist to support the required separation requirements in the IMC and ASHRAE 62.1.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Mike Moore, Newport Ventures, representing Broan-NuTone (mmoore@newportventures.net) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

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

1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property lines; 10 feet (3048 mm)

from operable openings into buildings; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into buildings which are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.

2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above adjoining grade.
3. For all *environmental air* exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings into buildings for all occupancies other than Group U, and 10 feet (3048 mm) from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious. Where a factory-built combined exhaust and intake ~~terminal~~ termination is used to separate intake air from exhaust air originating in dwelling unit living ~~space~~ spaces other than kitchens, a minimum separation distance between these two openings shall not be required, provided that the exhaust air concentration within the intake air flow does not exceed 10%, as established by the manufacturer of ~~such terminal~~ the termination.
4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment.
5. For specific systems see the following sections:
    - 5.1. Clothes dryer exhaust, Section 504.4.
    - 5.2. Kitchen hoods and other kitchen exhaust *equipment*, Sections 506.3.13, 506.4 and 506.5.
    - 5.3. Dust stock and refuse conveying systems, Section 511.2.
    - 5.4. Subslab soil exhaust systems, Section 512.4.
    - 5.5. Smoke control systems, Section 513.10.3.
    - 5.6. Refrigerant discharge, Section 1105.7.
    - 5.7. Machinery room discharge, Section 1105.6.1.

Commenter's Reason: The original proposal was recently approved unanimously by the ASHRAE 62.2 committee as addendum h to ASHRAE 62.2-2013. In transferring the language to the IMC, a couple valid concerns were raised as follows:
1. The proposal would exempt site-built combined terminations from the minimum separation requirements, which was not the intent, as such terminations are not expected to be designed and tested to confirm effective separation of exhaust and supply air, and

2. The proposal does not clarify that this exception only applies to dwelling units.

This comment clarifies that the exception applies only to dwelling units and to combined exhaust/intake terminations that are factory-built, and will align the IMC with ASHRAE 62.2, whose scope now applies to both low-rise and high-rise dwelling units.

Public Comment 2:

Proponent : Steven Ferguson, representing American Society of Heating Refrigerating and Air-Conditioning Engineers (sferguson@ashrae.org) requests Disapprove.

Commenter's Reason: This proposal would permit cross-contamination of the intake air with up to 10% of the exhaust air, and cites a provision in ASHRAE Standard 62.1 which is intended to only be limtied to energy recovery applications, and should not be applied more broadly as this proposal would permit. ASHRAE supports the disapproval of this proposal as written.

M31-15

M32-15

501.6 (New)

Proposed Change as Submitted

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

2015 International Mechanical Code

Add new text as follows:

501.6 Discharge from multiple exhaust fans. The discharge outlets of multiple exhaust fans shall not be connected to a common duct. The discharge outlets of exhaust fans serving separate dwelling units shall not be connected to a common duct.

Reason: If exhaust fans such as toilet and kitchen exhaust fans are connected together on the positive pressure (discharge) side of the fans, exhaust air will flow through any fan that is not running. The typical backdraft dampers do not prevent leakage and are not reliable unless cleaned and maintained. If the fans operate in parallel or have effective backdraft dampers, they could share a common discharge duct if such duct was properly sized and configured. Often such connections involve no engineering and consist of fans duct taped to a tee fitting without even increasing the duct size as necessary. If the fans serve different dwelling units, the exhaust air from one dwelling would discharge into another dwelling unit and this is unacceptable.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes.

Cost Impact: Will increase the cost of construction
This proposal will increase the cost of construction in those cases where the discharge side of exhaust fans would have been connected to a common duct, because separate exhaust terminations are required by the proposed text.

M32-15 : 501.5-SNYDER3260

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal would not allow individual fans to discharge to a multi-story exhaust shaft having a fan on the top of the shaft. The proposal would require more roof penetrations.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Amanda Hickman, InterCode Incorporated, representing Air Movement and Control Association International (amanda@intercodeinc.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

501.6 Discharge from multiple exhaust fans. The discharge outlets of multiple exhaust fans shall not be connected to a common duct.

> **Exception:** The discharge outlets of exhaust fans ~~serving separate dwelling units~~ shall not be ~~connected~~ prohibited from connecting to a common duct where the pressure in such common duct is maintained at a negative pressure with respect to the spaces served by the exhaust fans.

Commenter's Reason: Multiple exhaust fans are commonly exhausted into common ducts. Backdraft dampers are sometimes insufficient, or in the case of clothes dryer exhausts, non-existent. We support this intent of the proposal to avoid cross contamination between dwellings, however, exhausting into a common duct with a larger powered shared exhaust fan maintaining a lower pressure in the common duct than that in the dwellings is a well proven and working practice. The pressure level in the common duct is typically controlled by a barometric damper or by a constant pressure system controlling the speed of the larger powered shared exhaust fan.

Public Comment 2:

Proponent : Janine Snyder, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

501.6 Discharge from multiple exhaust fans. The discharge outlets of multiple exhaust fans shall not be connected to a common duct. The discharge outlets of exhaust fans serving separate dwelling units shall not be connected to a common duct. This section does not apply to exhaust fans that discharge to a common multiple story exhaust duct system that complies with Section 505.3.

Commenter's Reason: The committee was concerned that the proposed text does not allow muti-story exhaust shafts that have a common fan on the terminus. The IMC currently addresses such systems only for clothes dryers and domestic kitchen exhaust. The modification proposed will recognize the domestic kitchen mult-story shaft systems. The clothes dryer application is not relavent to this proposal. The committee was also concerned about requiring additional roof penetrations if exhaust fans are not combined for a common discharge duct. Going through the roof, soffit or sidewall with each exhaust duct is typically the best choice because joining together exhausts fans from different locations will require long duct runs which adds expense, increases duct resistance, impedes exhaust flow, invites condensation formation in the duct interior and requires sizing calculations. And of course, combining the exhaust fans to a common exhaust duct means that exhaust will flow backwards through any exhaust fan that is not running. The integral

backdraft dampers in exhaust fans will not prevent such backflow.

M32-15

M34-15
504.3

Proposed Change as Submitted

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies (JBENGINEER@aol.com)

2015 International Mechanical Code

Revise as follows:

504.3 Cleanout. Each vertical riser shall be provided with a means for cleanout. Dryer duct terminations shall by design, provide access for cleaning the exhaust duct.

Reason: The routine cleaning of the dryer exhaust ducts minimizes the potential for a fire in the duct as well as increasing the efficiency of the appliance. Duct cleaning services now provide this service for dryer exhaust ducts using a wand and brush. Many duct cleaning service companies enter the dryer exhaust duct through the duct termination. This offers an easy access to the dryer exhaust duct system. If a proper dryer exhaust terminal is not provided that allows ease of access, some companies have been known to wrongly remove the termination lid or cover creating a potential leak situation.

Examples of vent caps that duct cleaners wrongly disassemble to gain access.

Examples of vent caps that duct cleaners wrongly disassemble to gain access.

Cost Impact: Will increase the cost of construction
The cost may increase for a vent terminal that allows cleaning.

M34-15 : 504.3-BALLANCO4121

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Lack of maintenance is the problem, not lack of access. The proposal is too vague regarding the type of access. The current code requires a means for cleanout. Short duct runs may not need access for cleaning.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies (JBENGINEER@aol.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

504.3 Cleanout. Each vertical riser shall be provided with a means for cleanout. Dryer exhaust ducts that are installed in enclosed wall or ceiling cavitities or in an attic area shall have duct terminations ~~shall by design,~~ that provide access for cleaning the ~~exhaust~~ duct.

Commenter's Reason: It was pointed out at the first hearing that some ducts penetrate the basement wall or sidewall of the building and are readily available for cleaning on the inside of the building. The intent of this requirement was to apply to long duct runs that are not readily accessible on the interior of the building. This will allow the cleaning of the dryer exhaust duct from the outside.

The lint build up on the interior of the dryer exhaust duct presents a fire hazard. These ducts need regular cleaning to reduce the fire hazard and increase the efficiency of the dryer.

The majority of dryer exhaust terminations are held in place with screws. Removing these screws allows easy access for cleaning. This change would prevent the use of roof jacks that are not intended to be used as dryer exhaust terminals.

M34-15

M35-15
504.4

Proposed Change as Submitted

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies (JBENGINEER@aol.com)

2015 International Mechanical Code

Revise as follows:

504.4 Exhaust installation. Dryer exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. Exhaust duct penetrations of exterior wall and roof assemblies shall be sealed air-tight to prevent dryer exhaust from re-entering the building. Ducts shall not be connected or installed with sheet metal screws or other fasteners that will obstruct the exhaust flow. Clothes dryer exhaust ducts shall not be connected to a vent connector, vent or *chimney*. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums.

Reason: This change clarifies that the dryer exhaust must vent to the outside without the possibility of having the dryer exhaust return to the building. In some regions, friction-fitting a ducts' end into a roof cap appears to still be acceptable. This change adds the language to require a positive leak-proof assembly that will prevent the dryer exhaust from reentering the building. The high humidity of the dryer exhaust can cause all sorts of problems within the building elements if the dryer exhaust can reenter the building. Humidity control is an important part of any building design. As such, humid lint-laden air should never be given a path to enter the building after being exhausted.

Cost Impact: Will not increase the cost of construction
This change is simply clarifying the intent of the code.

M35-15 : 504.4-BALLANCO4118

Public Hearing Results

Committee Action: Disapproved

Committee Reason: If flashed properly, lint cannot enter the building. No justification for singling out dryers as opposed to other exhaust terminals. The example photos were all installations that were improperly installed to begin with.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies (JBENGINEER@aol.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

302.6 Roof penetrations. Where a pipe, duct, vent, chimney, or exhaust termination penetrates a roof, a flashing shall be installed or the penetration shall be sealed water tight.

302.7 Penetrations of exterior walls. Where a pipe, duct, vent, chimney, or exhaust termination penetrates an exterior wall, a waterproof seal shall be made on the exterior of the wall by one of the following methods:

1. A waterproof sealant applied at the joint between the wall and the penetrating item.
2. A flashing of an approved elastomeric material.

504.4 Exhaust installation. Dryer exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. ~~Exhaust duct penetrations of exterior wall and roof assemblies shall be sealed air tight to prevent dryer exhaust from re-entering the building.~~ Ducts shall not be connected or installed with sheet metal screws or other fasteners that will obstruct the exhaust flow. Clothes dryer exhaust ducts shall not be connected to a vent connector, vent or *chimney*. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums.

Commenter's Reason: What this code change pointed out is that the code is remiss regarding penetrations of mechanical system. The Plumbing Code provides detailed requirements regarding pipe penetrations of roofs and exterior walls. It also has requirements for protection of the structure. While the Mechanical Code has requirements for protection of the structure, there are no requirements for penetration of the roof or exterior wall.

This modification will correct the oversight in the Mechanical Code. Everyone acknowledged that sealing the opening around a duct termination was necessary. However, the claim was that this is addressed in the Energy Code. Exterior penetrations are not addressed in the Energy Code, only penetrations of the envelope are addressed. Quite often, exterior penetrations are not envelope penetrations.

M35-15

M36-15
504.4, 504.8.2

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

504.4 Exhaust installation. Dryer exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. ~~Ducts shall not be connected or installed with sheet metal screws or other fasteners that will obstruct the exhaust flow.~~ _Clothes dryer exhaust ducts shall not be connected to a vent connector, vent or *chimney*. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums.

504.8.2 Duct installation. Exhaust ducts shall be supported at 4-foot (1219 mm) intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. 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.

Reason: As a result of the newer language in Section 504.8.2, this language is no longer required and will only cast doubt on Section 504.8.2.

Cost Impact: Will not increase the cost of construction
.There is no cost impact as this modification is strictly editorial in nature

M36-15 : 504.4-MCMANN4352

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Section 504.4 applies to both commercial and residential and this proposal would eliminate coverage for commercial installations.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Guy McMann, Jefferson County, Co., representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

504.4 Exhaust installation. Dryer exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. 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. Clothes dryer exhaust ducts shall not be connected to a vent connector, vent or *chimney*. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums.

Commenter's Reason: The committee was correct in that the proposal as originally written would leave 504.4 lacking in fastening detail for commercial ducts. The correct solution is to add this minimal fastening requirement so as not to leave it up to subjective judgment as the committee recomended. This makes this section consistent with 504.8.2

M36-15

M39-15
504.4.1 (New)

Proposed Change as Submitted

Proponent : Rick Harpenau, In-O-Vate Technologies, representing Self

2015 International Mechanical Code

Add new text as follows:

504.4.1 Exhaust termination pathways. Dryer exhaust duct terminal pathways that cause a change in direction of air flow between 45 and 90 degrees shall have an area not less than 20 percent larger that the cross sectional area of the exhaust duct served. Dryer exhaust duct terminal pathways that cause a change in direction of air flow greater than 90 degrees shall have an area not less than 30 percent larger than the cross sectional area of the exhaust duct served. Exhaust duct terminal passageways shall maintain throughout an area of not less than 12.5 square inches (8,065 sq mm).

Reason: The code is very sensitive and detailed as it relates to 90 degree elbows and their respective friction loss but does not prohibit or penalize for termination hoods that grossly create back pressure, reducing the efficiency of the dryer. There are wall vents and roof vents on the market that with minimal testing equipment show clearly they create as much back pressure as 3 and 4 elbows. Short of requiring testing standards for every vent termination, the council should consider language whereby the passageway increases in size to make up for the friction causing bends. If this addition to the codes makes sense, actual calculations can be provided. Bottom line, treat terminations the same as elbows and run lengths. Video Links:

www.youtube.com/watch?v=5KnRp3eXNbk

http://youtu.be/ZL2zV1-GjdI?t=50s

Cost Impact: Will increase the cost of construction
A larger opening at the termination may cost more.

M39-15 : 504.4.1 (New)-HARPENAU4551

Public Hearing Results

Committee Action: Disapproved

Committee Reason: No justification was offered for the percentage increases in area. It would be hard to determine the direction of flow changes regarding the angles. For engineered systems, the proposed text may not apply. The proposed text should apply only to dryers that depend solely on the integral blower.

Assembly Action : None

Public Comment 1:

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies (JBENGINEER@aol.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

~~**504.4.1 Exhaust termination pathways.** Dryer exhaust duct terminal pathways that cause a change in direction of air flow between 45 and 90 degrees shall have an area not less than 20 percent larger that the cross sectional area of the exhaust duct served. Dryer exhaust duct terminal pathways that cause a change in direction of air flow greater than 90 degrees shall have an area not less than 30 percent larger than the cross sectional area of the exhaust duct served. Exhaust duct terminal passageways shall maintain throughout an area of not less than 12.5 square inches (8,065 sq mm).~~

504.4.1.1 Increase in exhaust termination outlet size. Where the passageway of a dryer exhaust duct terminal changes direction more than 90 degrees, the open area of the outlet of the terminal shall be not less than 15 square inches (9,677 sq mm).

Commenter's Reason: The Committee indicated that this language was too confusing. The modified language coordinates with the new section 504.4.1. SMACNA lists the K factor for a 90 degree elbow as being 1 and a 130 degree elbow as being 1.2. To equal the pressure loss through the termination, the outlet open area would have to be increased by a factor of 1.2. This results in an open area of 15 square inches. The pressure drop through the termination outlet would be consistent.

M39-15

M40-15

504.6.1 (New)

Proposed Change as Submitted

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies, Inc. (JBENGINEER@aol.com)

2015 International Mechanical Code

Add new text as follows:

504.6.1 Make-up air for tight construction. Make up air shall be provided for clothes dryers where the air infiltration rate is known to be less than 0.4 air changes per hour (ACH). Make-up air shall be provided by a duct that communicates with the outdoors, a ventilated crawl space, or a ventilated attic space and such duct shall have a cross sectional area not less than that of a 4 inch round duct. The make-up air duct shall open into the room in which the clothes dryer is located. Make-up air duct inlets shall be provided with a screen having a mesh size not less than ¼ inch and not greater than ½ inch. The make-up air inlet shall be equipped with an air admitting damper that opens during the operation of the clothes dryer.

Exception: Condensing dryers shall not require make-up air.

Reason: Today homes are much more tightly constructed, creating an inadequate condition for the proper operation of a clothes dryer. The exhaust rate for a residential dryer ranges from 125 to 200 cfm with newer dryers favoring 200 cfm. When the air infiltration rate drops to less than 0.4 air changes per hour, this creates a condition of inadequate make-up for the clothes dryer. When there is inadequate ambient air to pull from, the dryer is starved and not capable of efficiently drying the clothes any longer. This extends the length of time for the dryer cycle wasting energy. It also reduce the life of the dryer since the fan is attempting to exhaust air that is not available.

Many clothes dryers are located in the basement of a home. When located in the basement, they have the available air in the basement as make-up air for exhausting the moisture. If a basement in 25 feet by 25 feet with an 8 foot ceiling, there is 5,000 cubic feet of available air. However, with an air exchange rate of 0.4, the available air for exhaust is 2000 cubic feet. That translates to 33.3 cfm of air. This means that the dryer has to draw air from other locations in order to properly operate, potentially pulling it from other unsafe sources.

Outside air is normally required by combustion air when the air infiltration rate is less than 0.4 as identified in Section G2407.5. This code change is consistent by requiring make-up air when the air exchange rate is below this value. The amount of air required for combustion air is normally less than the amount of make-up air for a dryer exhaust. An 80,000 Btu/hr furnace only requires between 16.6 and 26.6 cfm for combustion air, whereas the dryer requires between 125 and 200 cfm.

With a 4 inch duct, the make-up air can be provided at an acceptable rate. Furthermore, the fan in the clothes dryer would draw the make-up air through the make-up air duct.

A screened air admitting damper or equivalent device is necessary to prevent outside air from entering the home when the clothes dryer is not in use. The screen dimension are taken from Table 401.5 of the IMC for residential occupancies. The air admitting damper also prevents the loss of conditioned air when the dryer is not in use.

Cost Impact: Will increase the cost of construction
There is a cost to installing a make up air supply system.

M40-15 : 504.6.1 (New)-BALLANCO3702

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The more appropriate location is Section 504.8. This text belongs in the IRC, not the IMC.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies (JBENGINEER@aol.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

504.6.1 ~~Make-up~~ Domestic clothes dryer make-up air ~~for tight construction~~. Make up air shall be provided for domestic clothes dryers ~~where the air infiltration rate is known to be~~ located in rooms or spaces having a volume less than ~~0.4 air changes per hour (ACH)~~ 15,000 cubic feet. Make-up air shall be provided ~~by a duct~~ through an opening that ~~communicates with the outdoors, a ventilated crawl space, or a ventilated attic space and such duct shall have a cross sectional area~~ is not less than 60 square inches in area and that ~~of a 4 inch round duct. The make-up air~~ communicates directly or through a duct ~~shall open into the room in which the clothes dryer is located. Make-up air duct inlets shall be provided~~ with ~~a screen~~ indoor spaces having a ~~mesh size not less than ¼ inch and not greater than ½ inch. The make-up air inlet shall be equipped~~ volume of 15,000 cubic feet or more, the outdoors, or spaces that freely communicate with ~~an air admitting damper that opens during~~ the ~~operation of the clothes dryer~~ outdoors.

Exception: Condensing dryers shall not require make-up air.

Commenter's Reason: It was suggested that this section belongs in 504.8, however, that section is related to exhaust duct. Section 504.6 is the section for make-up air. The current requirements apply to commercial clothes dryers since domestic clothes dryer exhaust between 125 and 200 cfm.

It was clearly agreed that make up air is necessary for a clothes dryer to operate effectively and efficiently. The make-up air required is not combustion air as assumed by a few. The make-up air is needed for the clothes to be dried. The clothes dryer moves the air, either heated or not, to remove the moisture from the clothing. This air is exhausted to the outdoors. The rate of exhaust air for a dryer varies based on the length of the dryer exhaust vent.

One of the concern expressed was having a definitive number to use when a dryer

requires make-up air. Using an exhaust rate of 125 cfm and an air exchange rate of 0.5 air changes per hour, the volume of air required without make-up air would be 15,000 cubic feet. Again using the 125 cfm exhaust rate and the passive air movement of 300 feet per minute, the minimum size opening would be 60 square inches. This would allow the dryer to use air from either the adjacent spaces or from outdoors.

M40-15

M41-15 Part II

M1502.4.1

Proposed Change as Submitted

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

NOTE: PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART I IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY FOLLOWING ALL OF PART II.

2015 International Residential Code

Revise as follows:

M1502.4.1 Material and size. Exhaust ducts shall have a smooth interior finish and shall be constructed of metal ~~having a minimum thickness of~~ not less than 0.0157 ~~inches (0.3950~~ inch(0.3950 mm) in thickness (No. 28 gage). The exhaust duct shall be round and the size shall be 4 inches (102 mm) nominal in diameter.

Reason: The code assumes that the dryer ducts are 4 inch round duct, but this not stated in the code. Square, rectangular and oval ducts all have differing flow characteristics and the exhaust system design is based on round duct. The code states 4 inch diameter which clearly indicates round duct, but it would be very clear to state that it must be round.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes.

Cost Impact: Will not increase 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 nor are the code requirements made more stringent.

M41-15 Part II :
M1502.4.1-SNYDER5975

Public Hearing Results

Part II

Committee Action: Approved as Submitted

Committee Reason: Approval is based on the proponent's published reason statements.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Donald Surrena, representing NAHB (dsurrena@nahb.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Residential Code

M1502.4.1 Material and size. Exhaust ducts shall have a smooth interior finish and shall be constructed of metal not less than 0.0157 inch(0.3950 mm) in thickness (No. 28 gage). The ~~exhaust~~ duct ~~shall be round and the size~~ shall be 4 inches (102 mm) nominal in diameter.

Commenter's Reason: This proposal was modified by committee action to match M41.1-15. The committees reason was, "the proposed text is redundant with the appliance manufacturer's instructions. The current text refers to "diameter" which already implies that round duct is required".
Cost Impact: This will not increase the cost of construction

M41-15 Part II

M41-15 Part Part I

504.8.1

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

504.8.1 Material and size. Exhaust ducts shall have a smooth interior finish and shall be constructed of metal ~~a minimum~~ not less than 0.016 inch (0.4 mm) ~~thick~~ in thickness. The exhaust duct shall be round and the size shall be 4 inches (102 mm) nominal in diameter.

Reason: The code assumes that the dryer ducts are 4 inch round duct, but this not stated in the code. Square, rectangular and oval ducts all have differing flow characteristics and the exhaust system design is based on round duct. The code states 4 inch diameter which clearly indicates round duct, but it would be very clear to state that it must be round.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes.

Cost Impact: Will not increase 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 nor are the code requirements made more stringent.

M41-15 Part Part I : 504.8.1-SNYDER5974

Public Hearing Results

Part Part I

Committee Action: Disapproved

Committee Reason: The proposed text is redundant with the appliance manufacturer's instructions. The current text refers to "diameter" which already implies that round duct is required.

Assembly Motion: As Submitted

Online Vote Results: Failed

Support: 44.21% (84) Oppose: 55.79% (106)

Assembly Action : None

M42-15
504.8.2

Proposed Change as Submitted

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies (JBENGINEER@aol.com)

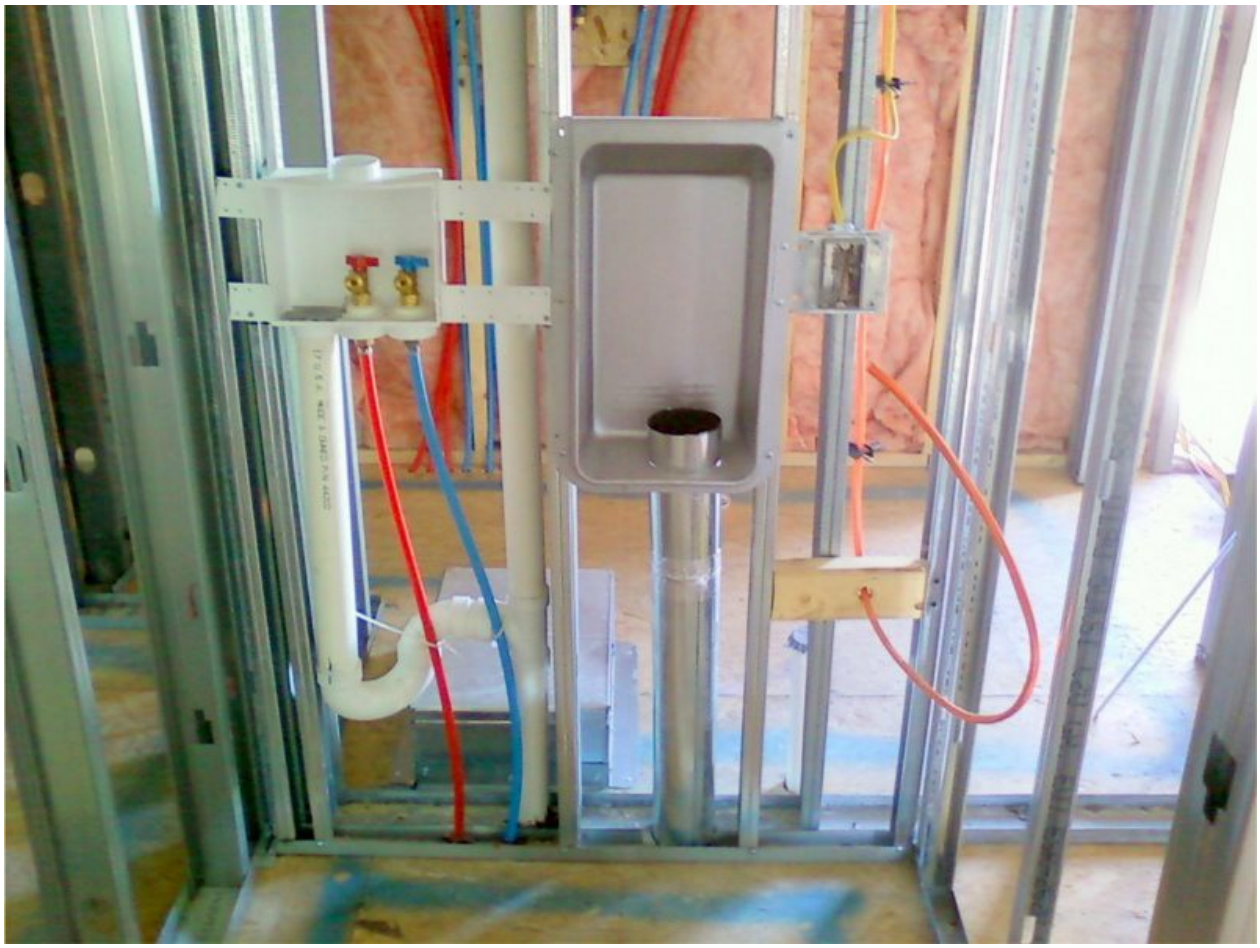
2015 International Mechanical Code

Revise as follows:

504.8.2 Duct installation. Exhaust ducts shall be supported at 4-foot (1219 mm) intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. 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 cavitiies shall have a least dimension of not less than 4.25 inches (108 mm). Round duct shall not be deformed.

Reason: The dryer exhaust duct must remain round in shape to reduce friction loss in the duct system. The length of the duct and termination are based on friction loss for round duct, not oval duct. The length of the dryer exhaust duct would have to be reduced if the 4 inch duct was oval in shape. In addition to the reduction in efficiency, the oval pipe creates a difficult connection for the consumer to make to the dryer exhaust transition hose.

A 1 inch furring strip (1x2) can be added to a 2 x 4 stud providing the 4.25 inches of space. In most cases, this "mechanical" wall is busy with other trades (plumbing drainage and vent stacks, gas piping, electric service, laundry services and water piping). A 4.25 inch space will benefit all of the trades working within that space. The minimum space required to keep the dryer exhaust duct round is 4.125 inches. This dimension could also be referenced here, however, most contractors will simply use a furring strip on a 2 x 4 to provide the minimum spacing for the duct.




MOVIE

Examples of "mechanical walls" showing the abundance of utilities in this wall, demonstrating the need to provide more than 3.5"

Cost Impact: Will increase the cost of construction
There is an added cost of adding furring strips to a 2 x 4 wall.

M42-15 : 504.8.2-BALLANCO4116

Public Hearing Results

Committee Action: Approved as Modified

Modification:

504.8.2 Duct installation. Exhaust ducts shall be supported at 4-foot (1219 mm) intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. 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 cavitiies shall ~~have a least dimension~~ allow the installation of ~~not less than 4.25 inches (108 mm). Round~~ the duct ~~shall not be deformed~~ without deformation.

Committee Reason: Approval is based on the proponent's published reason statements. Deformed ducts can fail during cleaning operations. The manufacturer's

instructions do not address cavity size and duct deformation. The modification eliminates an exact dimension.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Donald Surrena, representing NAHB (dsurrena@nahb.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

504.8.2 Duct installation. Exhaust ducts shall be supported at 4-foot (1219 mm) intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. 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 ~~cavitiies~~ cavities shall allow the installation of the duct without ~~deformation~~ reducing the cross-sectional area of the duct. Where oval duct is used, it shall have the same cross-sectional area as required for round duct and it shall be limited to installation in a wall cavity. The portion of oval duct installed in a dryer exhaust duct system shall not exceed a total of ten feet (3048mm) in length. The use of oval duct shall reduce the total allowable length of the dryer exhaust duct by five feet (1524mm).

Commenter's Reason: Reason: This modification would permit the use of oval duct in a 2x4 cavity. The restriction of length for oval duct as well as the reduction in total length insures the performance of the duct and allows optional construction methods.
Cost Impact: This will reduce the cost of construction.

M42-15

M43-15
504.8.2

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

504.8.2 Duct installation. Exhaust ducts shall be supported at ~~4 foot~~ intervals not to exceed 12 feet (~~1219~~ 3657 mm) ~~intervals and~~ 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. 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.

Reason: Twelve feet is what is found in the SMACNA Manual for 4 inch duct as strapping every 4 feet is unnecessarily restrictive.

Cost Impact: Will not increase the cost of construction
This proposal will actually *decrease* costs by not having to install as many hangers and the labor to do so.

M43-15 : 504.8.2-MCMANN3570

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The 12 foot interval is too great for ducts that are not mechanically fastened and rely on taped joints only. The current 4 foot interval provides stability for ducts being cleaned mechanically.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Guy McMann, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us) requests Approve as Submitted.

Commenter's Reason: The code section already states that the duct needs to be secured in place regardless of the hanger spacing. Mechanicl cleaning wont be an issue if ducts are secured in place as already required.The committee also stated this hanger spacing wont provide stability for joints that are taped only. Tape alone is not a fastening choice to begin with. The SMACNA Standard indicates a 4 inch duct can be properly installed at 12 foot intervals. Four foot intervals are over restrictive.

M44-15

505, 505.1 (New), 505.2 (New), 505.1, 505.4

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

SECTION 505
DOMESTIC ~~KITCHEN~~ COOKING EXHAUST EQUIPMENT

Add new text as follows:

505.1 General. Domestic cooking exhaust equipment shall comply with the requirements of this section.

505.2 Domestic cooking exhaust. Where domestic cooking exhaust equipment is provided it shall comply with the following as applicable:

1. Overhead range hoods and downdraft exhaust equipment not integral with the cooking appliance shall be listed and labeled in accordance with UL 507.
2. Domestic cooking appliances with integral downdraft exhaust equipment shall be listed and labeled in accordance with UL 858 or ANSI Z21.1.
3. Microwave ovens with integral exhaust for installation over the cooking surface shall be listed and labeled in accordance with UL 923.

Revise as follows:

~~**505.1**~~ **505.3** ~~**Domestic systems.**~~ **Exhaust ducts.** ~~Where domestic range hoods and domestic appliances equipped with downdraft~~ Domestic cooking exhaust ~~are provided, such hoods and appliances~~ equipment shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls, shall be air tight, shall be equipped with a backdraft damper, and shall be independent of all other exhaust systems.

Exceptions:

1. In other than Group I-1 and I-2, where installed in accordance with the manufacturer's instructions and where mechanical or natural ventilation is otherwise provided in accordance with Chapter 4, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.
2. Ducts for domestic kitchen cooking appliances equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
    - 2.1. The duct shall be installed under a concrete slab poured on grade.

2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.
2.3. The PVC duct shall extend not more than 1 inch (25 mm) above the indoor concrete floor surface.
2.4. The PVC duct shall extend not more than 1 inch (25 mm) above grade outside of the building.
2.5. The PVC ducts shall be solvent cemented.

505.4 Other than Group R. In other than Group R occupancies, where domestic cooktops, ranges, and open-top broilers are used for domestic purposes, domestic cooking ~~appliances are utilized for domestic purposes, such appliances shall be provided with domestic range hoods. Hoods and~~ exhaust systems shall be ~~in accordance with Sections 505.1 and 505.2.~~ provided.

Add new standard(s) as follows:
ANSI Z21.1 - 2010 Household Cooking Gas Appliances

UL 507 - 2014 Standard for Safety Electric Fans

Reason: The IMC currently has no criteria for exhaust hoods and downdraft equipment. This proposal accomplishes the following:
1. Includes a new charging Section 505.1 that is similar to other charging sections in the IMC.
2. New section 505.2 describes the listing standards used to investigate the various types of exhaust equipment.
3. Section 505.3 (formerly Section 505.1) was retitled "Exhaust ducts" to more accurately reflect what is covered in the section. Some edits were made to clarify the wording. No substantive changes were made to the requirements for the exhaust ducts.
4. Section 505.4 was revised to clarify the types of domestic cooking appliance that requires a domestic cooking exhaust system. Without this change an exhaust system could be required for a coffee maker, wall mounted oven, rice cooker, etc.

Cost Impact: Will increase the cost of construction
In most cases there should be no increase in costs if exhaust hoods and downdraft equipment are listed to the specified standards, which appears to be common practice.

Analysis:
A review of the standard proposed for inclusion in the code, UL 507 , 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, 2015.

M44-15 : 505-ROBERTS5747

Public Hearing Results

Committee Action: Approved as Modified

Modification:

505.4 Other than Group R. In other than Group R occupancies, where domestic cooktops, ranges, and open-top broilers are ~~installed~~ used for domestic purposes, domestic cooking exhaust systems shall be provided.

Committee Reason: The code needs the added coverage for domestic exhaust equipment and needs to reference the relavent product standards. The modification limits the application to domestic uses as was intended in the revised text of Section 505.4, however, such distinction was lost as the section was originally revised.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing Self (JBENGINEER@aol.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

505.2 Domestic cooking exhaust. Where domestic cooking exhaust equipment is provided it shall comply with the following as applicable:

1. ~~Overhead~~ The fan for overhead range hoods and downdraft exhaust equipment not integral with the cooking appliance shall be listed and labeled in accordance with UL 507.
2. Overhead range hoods and downdraft exhaust equipment with integral fans shall comply with UL 507.
3. Domestic cooking appliances with integral downdraft exhaust equipment shall be listed and labeled in accordance with UL 858 or ANSI Z21.1.
~~3~~ 4. Microwave ovens with integral exhaust for installation over the cooking surface shall be listed and labeled in accordance with UL 923.

Commenter's Reason: This change as originally proposed exceeds the scope of UL 507. UL 507 is a standard for fans and blowers, not range hoods. Included in the scope of the standard are overhead range hoods and downdraft exhaust equipment that have integral hoods. UL 507 does not regulate stand-alone range hoods that do not have an integral fan.

These prefabricated range hoods have served the industry successfully for many years. There is no justification for removing a viable range hood. If the code change is approved as proposed, one could only install a range hood that has an integral fan. That would be overly restrictive.

The modification corrects the mistake with the original submittal. UL 507 regulates all fans used for overhead range hoods and downdraft exhaust equipment. It also addresses range hoods and downdraft exhaust equipment with integral fans.

UL 507 does not regulate range hoods, whether prefabricated or field made. Hence, it is inappropriate to reference the standard for this application.

If this modification is not accepted, the change must be denied since the reference to UL 507 exceeds the scope of the standard. This is a violation of ICC policy.

M46-15

505.2, 505.2.1 (New)

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

505.2 Makeup air required. ~~Exhaust hood systems~~
Where one or more gas, liquid, or solid-fuel burning appliances that are neither direct vent nor use a mechanical draft venting system are located within a dwelling unit's air barrier, each exhaust system capable of exhausting in excess of 400 cfm (0.19 m^3/s) shall be mechanically or passively provided with *makeup air* at a rate approximately equal to the *exhaust air* rate. Such *makeup air* systems shall be equipped with ~~a means~~ not less than one damper that complies with Section 505.2.1.

> **Exception:** Makeup air is not required for exhaust systems installed for the exclusive purpose of ~~closure~~ space cooling and ~~shall~~ intended to be ~~automatically controlled to start and operate simultaneously with the exhaust system.~~ operated only when windows or other air inlets are open.

Add new text as follows:

505.2.1 Makeup air dampers. Where makeup air is required by Section 505.2, such dampers shall comply with this section. Dampers shall be gravity or barometric dampers or electrically operated dampers that automatically open when the exhaust system operates. Dampers shall be accessible for inspection, service, repair and replacement without removing permanent construction or any other ducts not connected to the damper being inspected, serviced, repaired or replaced. Gravity or barometric dampers shall not be used in passive makeup air systems except where the dampers are rated to provide the design makeup airflow at a pressure differential of 0.01 in. w.c. (3 Pa) or less.

Reason:
Backdrafting of combustion appliances typically presents the greatest danger associated with depressurizing a space. Field tests have confirmed that naturally vented combustion appliances (i.e., those that are not mechanically vented or direct-vent) are the most susceptible to depressurization, and measures should be taken to provide makeup air (MUA) for large exhaust appliances when such appliances are located within the dwelling unit's air barrier. ASHRAE 62.2, the consensus standard for Ventilation and Acceptable Indoor Air Quality in residential dwelling units, does not require MUA when combustion appliances are mechanically vented or are direct-vent. The ASHRAE 62.2 committee recently reviewed the 62.2 section requiring MUA, and the general consensus (no vote taken) was a reaffirmation that the MUA requirement should not apply to mechanically vented or direct-vent combustion appliances, due to lack of data to substantiate their susceptibility to backdrafting.

This proposal would relax the MUA requirement in the IMC for dwelling units by aligning it more closely with ASHRAE 62.2. Similar changes have been made to this section in Florida's and Virginia's adoptions of the IRC, which has a similar requirement to the IMC.

The proposal introduces a new section to address MUA dampers specifically, with the second and third sentences in Section 505.2.1 taken verbatim from the 2015 IRC. The last sentence introduces a new requirement for gravity or barometric dampers. It makes no sense to design a system to provide MUA if the damper does not open before the combustion appliance starts spilling. So, the new requirement is intended to ensure that when MUA is required, any gravity or barometric damper used to provide MUA shall engage at the pressure differential above which naturally drafted combustion appliances can be expected to backdraft (3 Pa, based on an acceptable 5%-20% failure rate across all outdoor conditions)[1]. This proposed requirement only applies to gravity or barometric dampers in "passive" MUA systems, which are those provide MUA without the assistance of a fan. Gravity or barometric dampers in "active" MUA systems are excluded from this requirement because we assume that the fan will create a sufficient pressure differential to open the damper.

Bibliography:

1. Bohac, D., et al. (2002). Ventilation and Depressurization Information for Houses Undergoing Remodeling. Accessed on Dec 5, 2014 at: http://www.mncee.org/getattachment/eedb1afc-f50e-4833-b450-d52233f58ce0/.

Cost Impact: Will not increase the cost of construction
This proposal is expected to reduce construction costs by reducing the number of scenarios requiring makeup air for kitchen exhaust.

M46-15 : 505.2.1 (New)-MOORE4887

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Section 505.2 is under domestic kitchens. Space cooling and the exception are unrelated to Section 505. If electric appliances are used, they are no longer covered for makeup air. The code needs a holistic instead of a piece-meal approach to air balance and makeup air. The proposal elimantes the system control requirements and may relax the requirements for exhaust.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Mike Moore, Newport Ventures, representing Broan-NuTone (mmoore@newportventures.net) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

505.2 Makeup air required. Where one or more gas, liquid, or solid-fuel burning appliances that are neither direct vent nor use a mechanical draft venting system are located within a dwelling unit's air barrier, ~~each~~ kitchen exhaust ~~system~~ systems capable of exhausting in excess of 400 cfm (0.19 m^3/s) shall be mechanically or passively provided with *makeup air* at a rate approximately equal to the *exhaust air* rate. Such *makeup air* systems

shall be equipped with not less than one damper that complies with Section 505.2.1.

> ~~**Exception:** Makeup air is not required for exhaust systems installed for the exclusive purpose of space cooling and intended to be operated only when windows or other air inlets are open.~~

Commenter's Reason: The IRC mechanical committee unanimously approved a companion proposal to this one, so approval of this proposal will align the domestic kitchen range hood makeup air requirements of the IRC and IMC. Based on the IMC committee's input, this comment removes the exception for exhaust systems intended for space cooling. The committee noted that this section only pertains to domestic kitchen exhaust, so exempting something that is not addressed by the section is not necessary.

The committee rightly surmised that if electric appliances are not used, no makeup air requirements would exist for range hoods. This is correct, and it is the intention of this proposal to waive the kitchen exhaust makeup air requirements for this situation as well as for others that provide assurance that backdrafting will not occur during operation of the kitchen exhaust system. We are assuming that the primary purpose of requiring makeup air for kitchen exhaust systems is to ensure that they do not backdraft combustion appliances within a dwelling unit. This assumption is aligned with ASHRAE 62.2, which provides similar exemptions for makeup air requirements. A dwelling unit that has all electric appliances, direct vent appliances, or has located any non-direct vent combustion appliances outside of its air barrier is not expected to experience backdrafting of combustion gases during the operation of the kitchen exhaust system. So, these cases should be exempt from makeup air requirements.

The proposal and comment permit the use of gravity dampers for makeup air, as is already permitted in the IRC. However, these dampers may only be used if they meet a new minimum performance spec to ensure that they are designed to open before dangerous levels of depressurization are reached with respect to combustion appliances.

Approval of the proposal as modified will provide for the design of domestic kitchen exhaust makeup air to achieve a minimum acceptable level of life safety while reducing costs.

M46-15

M50-15
506.3.2.5

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

506.3.2.5 Grease duct test. Prior to the use or concealment of any portion of a grease duct system, a leakage test shall be performed. Ducts shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the ductwork from being visually inspected on all sides. The permit holder shall be responsible to provide the necessary *equipment* and perform the grease duct leakage test. A ~~light~~ water test shall be performed to determine that all welded and brazed joints are liquid tight.

A ~~light~~ water test shall be performed by passing ~~a lamp having a power rating of not less than 100 watts~~ grease duct pressure washing equipment through the entire section of ductwork to be tested and visually inspecting for leakage of water. The ~~lamp~~ pressure washing equipmnent shall be ~~open so as to emit light equally in all directions perpendicular to the duct walls~~ of a type used for professionally cleaning commercial kitchen grease ducts. A test shall be performed for the entire duct system, including the hood-to-duct connection. ~~The~~ Where the duct work ~~shall be permitted to be~~ is tested in sections, ~~provided that every~~ no joint ~~is tested~~ shall be excluded from testing. For *listed* factory-built grease ducts, this test shall be limited to duct joints assembled in the field and shall exclude factory welds.

Reason: The light test required currently has many deficiencies. Openings in overlapped joint welds would not allow light to reach the observer. Pinhole leaks may not allow enough light through to be observed. The faults in the joints could be on sides not observed during the test and some duct sides may not be visible at all when installed. How fast can the lamp be pulled through the duct? What if the ambient light is bright or it is sunlight? What are the chances that a light test will disclose any, much less, all of the faults in joints? A test with pressurized duct cleaning equipment will expose all faults in the joints by visible water leakage.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes.

Cost Impact: Will increase the cost of construction
This proposal will increase the cost of construction because the proposed water test will require more labor and equipment than the currently required light test.

M50-15 : 506.3.2.5-SNYDER3263

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal does not state the duration, pressure or temperature requirements for the water test. Light tests are used successfully. Power washing should be only an option, not the required test. This is overkill for short duct runs. If the duct gets wet during the test, it will impossible to find the leaks.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Steven Ferguson, representing American Society of Heating Refrigerating and Air-Conditioning Engineers (sferguson@ashrae.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

506.3.2.5 Grease duct test. Prior to the use or concealment of any portion of a grease duct system, a leakage test shall be performed in accordance with Section 506.3.2.5.1 or 506.3.2.5.2, or an approved equivalent test shall be performed. Ducts shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the ductwork from being visually inspected on all sides. The permit holder shall be responsible to provide the necessary *equipment* and perform the grease duct leakage test. ~~A water test shall be performed to determine that all welded and brazed joints are liquid tight.~~
~~A water test shall be performed by passing grease duct pressure washing equipment through the entire section of ductwork to be tested and visually inspecting for leakage of water. The pressure washing equipmnent shall be of a type used for professionally cleaning commercial kitchen grease ducts. A test shall be performed for the entire duct system, including the hood-to-duct connection. Where the duct work is tested in sections, no joint shall be excluded from testing. For *listed* factory-built grease ducts, this test shall be limited to duct joints assembled in the field and shall exclude factory welds.~~

506.3.2.5.1 Grease duct light test. The light test shall be performed by passing a lamp having a power rating of not less than 100 W through the entire section of ductwork to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls. Light from the duct interior shall not be visible through any exterior surface of the duct during the test.

506.3.2.5.2 Grease duct water pressure test. The water pressure test shall be performed by use of a pressure washer operating at a

pressure of not less than 1500 psi (10 342 kPa) and simulating cleaning operations. The water shall be applied directly to all areas to be tested. Water applied to the duct interior shall not be visible on any exterior surface of the duct during the test. For *listed* factory-built grease ducts, this test shall be limited to duct joints assembled in the field and shall exclude factory welds.

Commenter's Reason: A grease duct leakage test is important and the code mandates such tests. However, limiting the test to one method does not recognize the successful use of modified light and air pressure test methods that are being applied successfully in some code jurisdictions. In some installations such as exterior duct systems installed during freezing weather conditions the use of pressurized water may not be practical or safe. Delaying construction while waiting for changes in the weather may also not be practical. In these situations an alternate light test, pressure test or other test acceptable to the AHJ is needed.
For many grease duct installations that use short runs of accessible duct the inspector may find light or air pressure tests as effective as water but at a much lower cost. In some cases, especially those difficult to access for inspection a combination of test methods may be most practical using one for initial test and others to confirm successful repair of welds or other joints where leaks were found during the initial test. One may be a better actual test in the field. A water test shouldn't be the only viable option.

M50-15

M51-15

202 (New), 506.5.2 (New)

Proposed Change as Submitted

Proponent : Shawn Strausbaugh, Arlington County, VA representing the VA Plumbing and Mechanical Officials Association (VPMIA) and the VA Building Code Officials Association (VBCOA) Guy McMann, Jefferson County CO, representing the CO Association of Plumbing and Mechanical Officials (CA, representing Arlington County, VA representing the VA Plumbing and Mechanical Inspectors Association (VPMIA) and the VA Building Code Officials Association (VBCOA) (sstrausbaugh@arlingtonva.us)

2015 International Mechanical Code

Add new definition as follows:

SECTION 202 DEFINITIONS

POLLUTION CONTROL UNIT (PCU) Manufactured equipment that is installed in a grease exhaust duct system for the purpose of extracting smoke, grease particles, and odors from the exhaust flow by means of a series of filters.

Add new text as follows:

506.5.2 Pollution Control Units. Pollution control units shall be installed in accordance with the manufacturer's installation instructions and shall be in accordance with all of the following:

1. Pollution control units shall be listed and labeled in accordance with UL 1978.
2. Fans serving pollution control units shall be listed and labeled in accordance with with UL 762.
3. Pollution control units shall be mounted and secured in accordance with the manufacturer's installation instructions and the International Building Code.
4. Pollution control units located indoors shall be listed and labeled for such use. Where enclosed duct systems, as required by Section 506.3.11, are connected to a pollution control unit, such unit shall be located in a room or space having the same fire-resistance rating as the duct enclosure. Access shall be provided for servicing and cleaning of the unit. The space or enclosure shall be ventilated in accordance with the manufacturer's installation instructions.
5. A clearance of not less than 18 inches (457 mm) shall be maintained between the pollution control unit and combustible material.
6. Roof mounted pollution control units shall be listed for exterior installation and shall be mounted not less than 18 inches (457 mm) above the roof.

7. Exhaust outlets for pollution control units shall be in accordance with Section 506.3.13.
8. An airflow differential pressure control shall be provided to monitor the pressure drop across the filter sections of a pollution control unit. When the airflow is reduced below the design velocity, the airflow differential pressure control shall activate a visual alarm located in the area where cooking operations occur.
9. Pollution control units shall be provided with a factory installed fire suppression system.
10. Service space shall be provided in accordance with the manufacturer's instructions for the pollution control unit and the requirements of Section 306.
11. Wash down drains shall discharge through a grease interceptor and shall be sized for the flow. Drains, shall be sealed with a trap or other approved means to prevent air bypass. Where a trap is utilized it shall have a seal depth that accounts for the system pressurization and evaporation between cleanings.
12. Protection from freezing shall be provided for the water supply and fire suppression systems where such systems are subject to freezing.
13. Duct connections to pollution control units shall be in accordance with Section 506.3.2.3. Where water splash or carryover can occur in the transition duct as a result of a washing operation, the transition duct shall slope downward toward the cabinet drain pan for a length not less than 18 inches (457 mm). Ducts shall transition to the full size of the units inlet and outlet openings.
14. Extra heavy duty appliance exhaust systems shall not be connected to pollution control units except where such units are specifically designed and listed for use with solid fuels.
15. Pollution control units shall be maintained in accordance with the manufacturer's instructions.

Reason: Pollution Control Units have been manufactured by numerous companies for several years. The desire to limit the amount of smoke, grease, and other particulate at the exhaust outlets of commercial cooking appliances has driven the use of these units as numerous entities are requiring these types of units to be installed. These unit and there minimum construction and installation standards need to be addressed in the mechanical code.

Cost Impact: Will increase the cost of construction
The cost of construction of these specific units may be increased by manufacturers if their current unit did not meet the minimum requirements per this new section. As we do not represent manufacturers it is difficult to substantiate if this proposed change will have create such a cost increase or not

M51-15 : 506.5.2 (New)-STRAUSBAUGH3640

Public Hearing Results

Committee Action: Approved as Modified

Modification:

506.5.2 Pollution Control Units. Where provided, ~~Pollution~~ pollution control units shall be installed in accordance with the manufacturer's installation instructions and shall be in accordance with all of the following:

1. Pollution control units shall be listed and labeled in accordance with UL 1978.
2. Fans serving pollution control units shall be listed and labeled in accordance with with UL 762.
3. Pollution control units shall be mounted and secured in accordance with the manufacturer's installation instructions and the International Building Code.
4. Pollution control units located indoors shall be listed and labeled for such use. Where enclosed duct systems, as required by Section 506.3.11, are connected to a pollution control unit, such unit shall be located in a room or space having the same fire-resistance rating as the duct enclosure. Access shall be provided for servicing and cleaning of the unit. The space or enclosure shall be ventilated in accordance with the manufacturer's installation instructions.
5. A clearance of not less than 18 inches (457 mm) shall be maintained between the pollution control unit and combustible material.
6. Roof mounted pollution control units shall be listed for exterior installation and shall be mounted not less than 18 inches (457 mm) above the roof.
7. Exhaust outlets for pollution control units shall be in accordance with Section 506.3.13.
8. An airflow differential pressure control shall be provided to monitor the pressure drop across the filter sections of a pollution control unit. When the airflow is reduced below the design velocity, the airflow differential pressure control shall activate a visual alarm located in the area where cooking operations occur.
9. Pollution control units shall be provided with a factory installed fire suppression system.
10. Service space shall be provided in accordance with the manufacturer's instructions for the pollution control unit and the requirements of Section 306.
11. Wash down drains shall discharge through a grease interceptor and shall be sized for the flow. Drains, shall

be sealed with a trap or other approved means to prevent air bypass. Where a trap is utilized it shall have a seal depth that accounts for the system pressurization and evaporation between cleanings.

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

Committee Reason: Approval was based on the proponent's published reason statements. These units are being installed today and need coverage. The modification removes any ambiguity about whether these units are required to be installed.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Steven Ferguson, representing American Society of Heating Refrigerating and Air-Conditioning Engineers (sferguson@ashrae.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

506.5.2 Pollution Control Units. Where provided, pollution control units shall be installed in accordance with the manufacturer's installation instructions and shall be in accordance with all of the following:

1. Pollution control units shall be listed and labeled in accordance with applicable requirements of UL 1978 and UL710.
2. Fans serving pollution control units shall be listed and labeled in

accordance with with UL 762.

3. Pollution control units shall be mounted and secured in accordance with the manufacturer's installation instructions and the International Building Code.
4. Pollution control units located indoors shall be listed and labeled for such use. Where enclosed duct systems, as required by Section 506.3.11, are connected to a pollution control unit, such unit shall be located in a room or space having the same fire-resistance rating as the duct enclosure. Access shall be provided for servicing and cleaning of the unit. The space or enclosure shall be ventilated in accordance with the manufacturer's installation instructions.
5. A clearance of not less than 18 inches (457 mm) shall be maintained between the pollution control unit and combustible material except where otherwise listed for reduced clearance to combustible materials.
6. Roof mounted pollution control units shall be listed for exterior installation and shall be mounted not less than 18 inches (457 mm) above the roof except where otherwise listed for reduced clearance to combustible materials.
7. Exhaust outlets for pollution control units shall be in accordance with Section 506.3.13.
8. An airflow differential pressure control shall be provided to monitor the pressure drop across the filter sections of a pollution control unit. When the airflow is reduced below the design velocity, the airflow differential pressure control shall activate a visual alarm located in the area where cooking operations occur.
9. Pollution control units shall be provided with ~~a factory~~ an approved automatic fire extinguishing system installed in accordance with the fire ~~suppression~~ extinguishing system manufacturer's instructions.
10. Service space shall be provided in accordance with the manufacturer's instructions for the pollution control unit and the requirements of Section 306.
11. Wash down drains shall discharge through a grease interceptor and shall be sized for the flow. Drains, shall be sealed with a trap or other approved means to prevent air bypass. Where a trap is utilized it shall have a seal depth that accounts for the system pressurization and evaporation between cleanings.
12. Protection from freezing shall be provided for the water supply and fire suppression systems where such systems are subject to freezing.
13. Duct connections to pollution control units shall be in accordance with Section 506.3.2.3. Where water splash or carryover can occur in the transition duct as a result of a washing operation, the transition duct shall slope downward toward the cabinet drain pan for a length not less than 18 inches (457 mm). Ducts shall transition to the full size of the units inlet and outlet openings.
14. Extra heavy duty appliance exhaust systems shall not be connected to pollution control units except where such units are specifically designed and listed for use with solid fuels.
15. Pollution control units shall be maintained in accordance with the manufacturer's instructions.

Commenter's Reason: Addition of UL 710 in requirement 1 – UL 710 is a needed additional reference for this type of application
Addition to requirements 5 and 6- this is a new requirement in UL 710, so the addition would make the proposal consistent with UL710.

Addition to requirement 9 – this is to be consistent with NFPA 96 Section 9.3.3. The fire suppression system does not necessarily need to be factory supplied as several manufacturers will provide units that are pre-piped and provide a connection point for the fire suppression propellant and agents – some fire suppression chemicals require HAZMAT treatment and as a result are provided in the field rather than shipped from the manufacturer.

Public Comment 2:

Proponent : Shawn Strausbaugh, representing Arlington County, VA representing VA Plumbing and Mechanical Inspectors Association, VA Building Code Official Association (sstrausbaugh@arlingtonva.us) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

506.5.2 Pollution Control Units. ~~Where provided,~~ The installation of pollution control units shall be ~~installed~~ in accordance with the manufacturer's installation instructions and ~~shall be in accordance with~~ all of the following:

1. Pollution control units shall be listed and labeled in accordance with UL 1978.
2. Fans serving pollution control units shall be listed and labeled in accordance with with UL 762.
3. Pollution control units shall be mounted and secured in accordance with the manufacturer's installation instructions and the International Building Code.
4. Pollution control units located indoors shall be listed and labeled for such use. Where enclosed duct systems, as required by Section 506.3.11, are connected to a pollution control unit, such unit shall be located in a room or space having the same fire-resistance rating as the duct enclosure. Access shall be provided for servicing and cleaning of the unit. The space or enclosure shall be ventilated in accordance with the manufacturer's installation instructions.
5. A clearance of not less than 18 inches (457 mm) shall be maintained between the pollution control unit and combustible material.
6. Roof mounted pollution control units shall be listed for exterior installation and shall be mounted not less than 18 inches (457 mm) above the roof.
7. Exhaust outlets for pollution control units shall be in accordance with Section 506.3.13.
8. An airflow differential pressure control shall be provided to monitor the pressure drop across the filter sections of a pollution

control unit. When the airflow is reduced below the design velocity, the airflow differential pressure control shall activate a visual alarm located in the area where cooking operations occur.

9. Pollution control units shall be provided with a factory installed fire suppression system.
10. Service space shall be provided in accordance with the manufacturer's instructions for the pollution control unit and the requirements of Section 306.
11. Wash down drains shall discharge through a grease interceptor and shall be sized for the flow. Drains, shall be sealed with a trap or other approved means to prevent air bypass. Where a trap is utilized it shall have a seal depth that accounts for the system pressurization and evaporation between cleanings.
12. Protection from freezing shall be provided for the water supply and fire suppression systems where such systems are subject to freezing.
13. Duct connections to pollution control units shall be in accordance with Section 506.3.2.3. Where water splash or carryover can occur in the transition duct as a result of a washing operation, the transition duct shall slope downward toward the cabinet drain pan for a length not less than 18 inches (457 mm). Ducts shall transition to the full size of the units inlet and outlet openings.
14. Extra heavy duty appliance exhaust systems shall not be connected to pollution control units except where such units are specifically designed and listed for use with solid fuels.
15. Pollution control units shall be maintained in accordance with the manufacturer's instructions.

Commenter's Reason: The committee's modification of adding " Where provided" creates additional language that is not needed as there is not a charging section requiring the installation of PCU units. If the "where provided" language is needed in this new section then this language would need to be added to numerous code sections for equipment that is not required by the code to be installed. We have rewritten the first sentence in this new code section to make it clear that these pieces of equipment are not required however if they are installed they must conform to the manufactures installation instructions and the rest of the requirements under this new section.

M51-15

M56-15
507.6.1

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

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

Reason: The term "smoke generators" includes all forms of smoke producing products and cleans up the sectoin a little bit.

Cost Impact: Will not increase the cost of construction
There will be no addional cost as this in only an editorial modification and clarification.

M56-15 : 507.6.1-MCMANN3574

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: Approval was based on the proponent's published reason statements.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Steven Ferguson, representing American Society of Heating Refrigerating and Air-Conditioning Engineers (sferguson@ashrae.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

507.6.1 Capture and containment test. The permit holder shall verify

capture and containment performance of the exhaust system. This field test shall be conducted with all appliances under the hood at operating temperatures, with all sources of outdoor air providing *makeup air* for the hood operating and with all sources of recirculated air providing conditioning for the space in which the hood is located operating. Capture and containment shall be verified visually by observing smoke or steam produced by actual or simulated cooking, such as that provided by smoke ~~generators~~ candles and smoke puffers. Smoke bombs shall not be used.

Commenter's Reason: ASHRAE recommends disapproval and a clarification as a modification. The term generator is too generic. Generators do not differentiate between smoke candles and smoke bombs. The source of Section 507.6.1 is ASHRAE Standard 154, which prohibits smoke bombs because of the large volume it produces which does not represent an actual cooking process. We are ok with the concept of cleaning up of the language, however, we want to be clear that smoke bombs should not be used for this type of test, and the currnet proposal permits the use of smoke bombs.

M56-15

M58-15
510.8

Proposed Change as Submitted

Proponent : Peter Levitt, Sternvent, representing Sternvent (plevitt@sternvent.com)

2015 International Mechanical Code

Revise as follows:

510.8 Suppression required. Ducts shall be protected with an *approved* automatic fire suppression system installed in accordance with the *International Building Code*. Dust collection system ducts shall be protected by a spark detection and extinguishing system.

Exceptions:

1. An approved automatic fire suppression system shall not be required in ducts conveying materials, fumes, mists and vapors that are nonflammable and noncombustible under all conditions and at any concentrations.
2. Automatic fire suppression systems shall not be required in metallic and noncombustible, nonmetallic exhaust ducts in semiconductor fabrication facilities.
3. An *approved* automatic fire suppression system shall not be required in ducts where the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).
4. For laboratories, as defined in Section 510.1, automatic fire protection systems shall not be required in laboratory hoods or exhaust systems

Reason: Many designers of dust collection systems are not familiar with what type of fire supression system is suitable for a dust collection system duct and the asociated dust particle convening velocity of 3000-5000 feet per minute. If a source of ignition such as a spark enters a dust collection system, burning embers will travel towards the dust collector. Due to the small mass of the embers and high transport velocity in the duct, there will not be enough heat generated to activate a thermocouple sprinkler head. A photocell spark detection and extinguishing system is typically used. This technolgy is defined and recoginzed by NFPA in #69 and recognized in #664.

Bibliography:

NFPA 69

NFPA 664

and

NFPA Guide to Combustible Dusts

Authors; Walter Frank & Samuel Rodgers

Editor; Guy Colonna

2012

Pages 171-178

Cost Impact: Will increase the cost of construction

While a thermocuple sprinkler head has a cost of aprox $100 and the cost of the spark detection system is $5,000-$8,000, the spark detection system will prevent a fire or explosion in the dust collector and as a result prevent property loss, injury & loss of life, whereas a thermocouple head will be ineffective in this application.

M58-15 : 510.8-LEVITT5228

Public Hearing Results

Committee Action: Disapproved

Committee Reason: No criteria is proposed for the spark detection system. The proposal could be interpreted that fire suppression is not required. Other methods of protection could be used besides that proposed. The exceptions might not apply if a spark detection system is required.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Peter Levitt, representing self (plevitt@sternvent.com) requests Approve as Submitted.

Commenter's Reason: M 58-15

Peter Levitt's reply to committee comments;

1. The criteria that spark detection & extinguishing system should be the method of fire suppression for dust collection system ducts 10" dia & larger is that many people reading section 510.8 believe that a traditional sprinkler head should be used. A sprinkler head is not suitable in a high velocity duct. A dust collection system duct velocity is 4000 feet per minute. The beginning of a fire in the duct is sparks & burning embers, which do not generate enough heat to trigger a traditional sprinkler head. This is not common knowledge. AHJ's are approving traditional sprinkler heads in dust collector ducts, because they are not aware that a sprinkler head, by itself is ineffective in certain applications, such as dust collection systems. NFPA 652, 654 & 664 require spark/ember detectors that activate a water spray.
2. The proposal states that there should be detection & extinguishing. The extinguishing is the fire suppression.
3. I am not aware of another effective method of fire suppression for a dust collection duct.
4. The proposed text is compatible with each of the four exceptions currently in the code. I do not see any conflict.

Peter Levitt is the product manager of Sternvent, a manufacturer of dust collectors. Sternvent does not manufacture spark detection & extinguishing systems. Peter is a committee member of NFPA 664 & 484

M58-15

M60-15
511.1.3

Proposed Change as Submitted

Proponent : Peter Levitt, Sternvent, representing Sternvent (plevitt@sternvent.com)

2015 International Mechanical Code

Revise as follows:

511.1.3 Conveying systems exhaust discharge. An exhaust system shall discharge to the outside of the building either directly by flue or indirectly through the bin or vault into which the system discharges, except where the contaminants have been removed. Exhaust system discharge shall be permitted to be recirculated provided that the solid particulate has been removed at a minimum efficiency of 99.9 percent at 10 microns (10.01 mm) and where flammable vapors are present in the exhaust flow, such vapor concentrations are less than 25 percent of the LFL, ~~and *approved equipment* is used to monitor~~ as determined by a hazard analysis. Where flammable vapor concentrations are greater than 25% of the ~~vapor concentration.~~ LFL, the exhaust system discharge shall not be recirculated.

Reason: The current wording of section 511.1.3 requires vapor monitoring equipment for all dust collection systems that recirculate the filtered air back to the bulding, *regardless* if vapors are *ever present*. Dust collection system air streams rarley include flamable or non-flamable vapors. Vapors are not a part of the process or created by cutting wood, grinding metals, conveying chemical or food products, etc. Vapors are more likely to be part of the air stream for refuse conveying.
The current requirement for vapor monitoring equipment for all dust collectors that recirculate the air seems to be *overly burdensome*. I beleve the current text first appeared in the 2009 edition.

Some code enforcers who are familar with section 511.1.3 have been requiring flamable vapor detection systems for woodworing shops in schools, maintenance and comercial facilities, that do not have flamable vapors, because of the IMC requirement.

Flammable vapor detection systems are typicaly used in industrial processes where there is the potential for flammable vapors to exist in the work area and there is also a potential ignition source. Some aplications include; printing, paint manufacturing, commercial painting and storage areas.

Cost Impact: Will not increase the cost of construction

A typical flammable vapor detection system cost $10,000-$15,000.

End users, who do not have flammable vapors in their air stream or have flammable vapors that have a concentration of less than 25% of the LFL and need to recirculate the filtered air from the dust collection system, will no longer need to purchase a flammable vapor detection system and therefore save $10,000-$15,000.

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The current code requirement is not overly burdensome and is needed for life safety. What is being conveyed in the system can change as operations change. Discharging the exhaust to the outdoors is an alternative to the current code requirements.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Peter Levitt, representing self (plevitt@sternvent.com) requests Approve as Submitted.

Commenter's Reason: M 60-15

Peter Levitt's reply to committee comments;

- Section 511 Dust, Stock and Refuse Conveying Systems is applicable to woodworking dust collection systems. Woodworking shops & school wood shops do not typically contain flammable vapors. The requirement for a flammable vapor detection (FVD) system to be included with all exhaust systems that recirculate the air back to the building (typically a dust collection system), was added to 511.1.3 two revision cycles back.

- During the past five years, Sternvent has received engineer's specifications for two high school wood shop dust collection systems that specified a flammable vapor detection system, because it is required by IMC511.1.3. There are rarely, if ever, flammable vapors in wood shops. However, the code requires FVD system if the air is to be recirculated, regardless if flamable vapors are or would likey ever be present.

- If flammable vapors were common in wood shops or other manufacturing facilities, then the room lighting & machine motors would have to be explosion proof NEMA 7 design for code compliance. Rarely is there a need for this, because there are rarely, if ever, flammable vapors present.

- The two FVD manufacturers I have contacted were not willing to provide their equipment unless it was an industrial setting & vapors were know to exist. They need to know what vapors will be present & in what concentration.

- A typical FVD system cost $15,000. This is greater than the cost of many dust collectors.

- Flammable vapor detection equipment is designed for use with industrial ovens & dryers, when flammable vapors are normally present. Requiring FVD systems for all dust collectors that recirculate the filtered air back to the building does not seem to have any practical or scientific basis.

- Requiring ALL ventilation systems for dust, stock & refuse to have a FVD system, would be similar to requiring that a carbon monoxide detection system always be included as well.

- I have been designing & selling dust collection systems for over thirty tears. I am not aware of any fire loss history due to a dust collector & flammable vapors.

- Although, discharging the filtered air exhaust to the outdoors is an alternative & does not require a FVD, as the code is currently written, this is not an acceptable alternative for most customers because of the energy loss of heated or cooled air. Our customers have mandates to be green.

- My recommendation is that IF flammable vapors are present or likely could be present, then the air should not be recirculated back to the building. There is no need to mandate that every time the air is recirculated to the building for a dust, stock or refuse conveying system, a flammable vapor detection system is required.

- Luckily, few AHJ's and fire protection engineers have been reading and requiring the FVD called for in 511.1.3. (We have only had two requests in five years.) It is not good for any of us to have a code requirement which appears to be too broad. Thank you for your time and consideration.

Peter Levitt is the product manager of Sternvent, a manufacturer of dust collectors. Sternvent does not manufacture spark detection & extinguishing systems. Peter is a committee member of NFPA 664 & 484

M60-15

M62-15
601.5

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

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

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.
2. Return air shall not be taken from a hazardous or insanitary location or a refrigeration room as defined in this code.
3. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
4. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturer's installation instructions, ACCA Manual D or the design of the registered design professional.
5. Return air taken from one dwelling unit shall not be discharged into another dwelling unit.
6. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
7. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic.

   Exceptions:

   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen and are located not less than 10 feet (3048 mm) from the cooking appliances.
   2. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage
8. <u>Return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where such spaces are dehumidified.</u>

Reason: It is not desirable to pull return air from swimming pool areas due to the affects it would have on the system from humidity and chemical odors associated with such spaces. A dedicated system would be required or a combination of supply and exhaust or the air should be dehumidified.

Cost Impact: Will not increase the cost of construction
No cost unless the air is treated.

M62-15 : 601.5-MCMANN3834

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed text would prohibit the installation of a dedicated HVAC system for the pool area.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Steven Ferguson, representing American Society of Heating Refirgerating and Air Conditioning Engineers (sferguson@ashrae.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

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

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.
2. Return air shall not be taken from a hazardous or insanitary location or a refrigeration room as defined in this code.
3. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
4. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturer's installation instructions, ACCA Manual D or the design of the registered design professional.
5. Return air taken from one dwelling unit shall not be discharged into another dwelling unit.
6. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
7. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room <u>, indoor swimming pool enclosure and associated deck area,</u> or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen and are located not less than 10 feet (3048 mm) from the cooking appliances.
2. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage
3. ~~Return air shall not be taken from~~ Dedicated HVAC systems serving indoor swimming pool enclosures and associated deck areas ~~except where~~ shall not be prohibited from obtaining return air from such ~~spaces are dehumidified.~~ swimming pool enclosures and associated deck areas

Commenter's Reason: Class 2 air, such as humid contaminated air in swimming pool enclosures, should not be transferred into class 1 air spaces for cross contamination and humidification control reasons. This proposes to clarify the requirement and making an exception to permit air from swimming pool enclosers to be recirculated from the same or similar spaces within the building.

Public Comment 2:

Proponent : Guy McMann, Jefferson County, Co., representing Colorado Associatoin of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

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

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.
2. Return air shall not be taken from a hazardous or insanitary location or a refrigeration room as defined in this code.
3. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
4. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturer's installation instructions, ACCA Manual D or the design of the registered design professional.
5. Return air taken from one dwelling unit shall not be discharged into another dwelling unit.
6. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
7. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic.

   Exceptions:

   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen

and are located not less than 10 feet (3048 mm) from the cooking appliances.

2. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage

8. Return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified in accordance with Section 403.2.1 item # 2, or where such spaces are ~~dehumidified~~ served by dedicated HVAC systems.

Commenter's Reason: The committees concern that the original language seemed to exclude dedicated systems was valid. This correction clearly excludes dedicated systems from the requirement of untreated recirculation to other spaces.

Public Comment 3:

Proponent : Brent Ursenbach, Salt Lake County, representing Utah Chapter ICC (bursenbach@slco.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

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

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.
2. Return air shall not be taken from a hazardous or insanitary location or a refrigeration room as defined in this code.
3. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
4. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturer's installation instructions, ACCA Manual D or the design of the registered design professional.
5. Return air taken from one dwelling unit shall not be discharged into another dwelling unit.
6. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
7. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic.

   Exceptions:

   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen and are located not less than 10 feet (3048 mm) from the cooking appliances.
   2. Dedicated forced air systems serving only the

garage shall not be prohibited from obtaining return air from the garage

8. Return air shall not be taken from indoor swimming pool enclosures and associated deck areas ~~except where~~ .

Exceptions:

1. Where the air from such spaces ~~are~~ is dehumidified in accordance with Sections 403.2.1 Item #2.
2. Dedicated HVAC systems serving only such spaces.

Commenter's Reason: The original proposal correctly identified it is generally not desirable to draw return air from a pool area, where the moisture and chemical odors may be distributed through other areas of a building. This public comment addresses concerns identified by both the IFGC and IMC committees.
A similiar proposal FG 38, was modified during the IFGC Hearings, but disapproved by the committee; however an Assembly Motion for As Modified was successful. The IMC committee disapproved this proposal, as it prohibited the installation of a dedicated HVAC system for a pool enclosure. This public comment includes the FG 38 modification, made during the development hearings, and an exception for dedicated system, which has also been added to FG 38 by Public Comment.

M62-15

M64-15
602.1

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

602.1 General. Supply, return, exhaust, relief and ventilation air plenums shall be limited to uninhabited crawl spaces, areas above a ceiling or below the floor, attic spaces ~~and~~ , mechanical equipment rooms and the framing cavities addressed in Section 602.3. Plenums shall be limited to one fire area. Air systems shall be ducted from the boundary of the fire area served directly to the air-handling equipment. Fuel-fired appliances shall not be installed within a plenum.

Reason: Section 602.3 is in the plenum Section 602 and covers stud and joist space plenums, however, Section 602.1 does not recognize such plenums. Section 602.1 limits plenums to a list of spaces that excludes stud and joist space plenums.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes.

Cost Impact: Will not increase 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 nor are the code requirements made more stringent.

M64-15 : 602.1-SNYDER3267

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: Approval was based on the proponent's published reason statements. Under this proposal, framing cavities will no longer be excluded.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Marcelo Hirschler, representing GBH International (gbhint@aol.com) requests Disapprove.

Commenter's Reason: Section 602.3 states that these spaces are "sort of" plenums but are not to be used as plenums for supply air. Therefore adding them into section 602.1 seems almost a contradiction, since section 602.1 is specifically intended for "supply, return, exhaust, relief and ventilation air plenums". At present the "stud cavity and joist space plenums" addressed in 602.3 are not specifically required to comply with the requirements of 602.1 and that is as it should be. Moreover, M65 proposes to exclude these "sort of" plenums from the materials of construction requirements for plenums. This is something that is necessary. It is something that was introduced in a recent code cycle but was implicit before, in that the materials of construction of plenums (when exposed to the air flow) clearly need to meet the same fire safety requirements as the materials contained in the plenum (when exposed to the air flow).

M64-15

M65-15
602.2

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

602.2 Construction. *Plenum* enclosure construction materials that are exposed to the airflow shall comply with the requirements of Section 703.5 of the *International Building Code* or such materials shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

The use of gypsum boards to form plenums shall be limited to systems where the air temperatures do not exceed 125°F (52°C) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature. Air plenums formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.

> **Exception:** The materials from which the stud and joist space plenums addressed in Section 602.3 are constructed shall not be required to comply with Section 703.5 of the International Building Code and shall not be required to have a maximum flame spread index of 25 and a maximum smoke-developed index of 50 when tested in accordance ASTM E 84 or UL723.

Reason: The significant change to Section 602.2 did not specifically address stud and joist space plenums. It is assumed that that Section 602.2 was intended to apply to spaces such as under-floor and above-ceiling spaces utilized as plenums. If Section 602.2 does apply to stud and joist space plenums, then such plenums would not be allowed to be constructed with wood studs, wood joists, wood trusses and wood floor decking. Section 602.2 should not have the effect of banning the common variety of stud and joist space plenums.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes.

Cost Impact: Will not increase 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 nor are the code requirements made more stringent.

M65-15 : 602.2-SNYDER3268

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The change to the 2015 IMC to require 25/50 flame/smoke indices for the materials that bound the plenum was significant, and this proposal would be a step backwards.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Janine Snyder, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

602.2 Construction. *Plenum* enclosure construction materials that are exposed to the airflow shall comply with the requirements of Section 703.5 of the *International Building Code* or such materials shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

The use of gypsum boards to form plenums shall be limited to systems where the air temperatures do not exceed 125°F (52°C) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature. Air plenums formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.

> **Exception:** ~~The~~ The construction materials ~~from which the~~ for stud ~~and joist space~~ cavity plenums ~~addressed~~ that are in compliance with Section 602.3 ~~are~~ and constructed with gypsum board on both membranes of the wall assembly shall not be required to comply with Section 703.5 of the International Building Code and shall not be required to have a maximum flame spread index of 25 and a maximum smoke-developed index of 50 when tested in accordance ASTM E 84 or UL723.

Commenter's Reason: Stud cavities constructed of wood or steel studs and gypsum board are used for return air in many occupancies and they should not be prohibited over the concern for wood studs not having a 25/50 flame/smoke index. It is unnecessarily restrictive to apply Section 602.2 to stud cavities in wall assemblies constructed of wood studs and gypsum board membranes. Note that Section 602.2 has already eliminated the use of joist cavities as plenums in wood framed construction, and this revised exception is only addressing stud cavities for return air in wood or steel framed construction.

M65-15

M71-15
602.2.1.7

Proposed Change as Submitted

Proponent : Michael Cudahy, representing Plastic Pipe and Fittings Association (mikec@cmservices.com)

2015 International Mechanical Code

Revise as follows:

602.2.1.7 Plastic plumbing pipe and tube. Plastic piping and tubing used in plumbing systems ~~shall be listed and~~ shall exhibit a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Reason: While some of the exceptions for products in this section of the mechanical code contain, "listed and labeled" language, some have no mention of "listing and labeling", section 602.2.1.7 oddly only says, "listed".

We propose to delete, "listed" from this section, as it is inconsistent with the other language.

Cost Impact: Will not increase the cost of construction
This proposal seeks to determine if the "listing / listing and labeling" language is correct compared with other sections, and seeks conformity in the language. Thus the code with this proposal added will not cause the cost of construction to increase.

M71-15 : 602.2.1.7-CUDAHY4606

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Disapproval was based on the action taken on M76-15.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : David Seiler, Arkema, Inc., representing Arkema (dave.seiler@arkema.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

602.2.1.7 Plastic plumbing pipe and tube. Plastic piping and tubing used in plumbing systems shall be listed and labeled and shall exhibit a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Commenter's Reason: The proposal identified an anomaly in the current code language for ASTM E84 testing for plastic piping. The reason statement reads: "While some of the exceptions for products in this section of the mechanical code contain, "listed and labeled" language, some have no mention of "listing and labeling", section 602.2.1.7 oddly only says, "listed"."
Because the parent section in 602.2.1 contains a requirement that materials installed in plenums be either noncombustible, or be listed and labeled to ASTM E84, the intent of the code is clear. Furthermore, Exception 5.3 in 602.2.1 includes "Materials listed and labeled for installation within a plenum."
The correct requirement for plastic plumbing pipe and tube is listing and labeling. This public comment modifies the proposal to correctly capture the intent of the code.

M71-15

M75-15
602.2.1.7

Proposed Change as Submitted

Proponent : Marcelo Hirschler, representing GBH International (gbhint@aol.com)

2015 International Mechanical Code

Revise as follows:

602.2.1.7 Plastic plumbing pipe and tube.
Plastic piping and tubing used in plumbing systems shall be listed and labeled and shall exhibit a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

Reason: This section was added at the last edition. When the language was developed the section was written stating that the plastic piping and tubing needs to be "listed" instead of "listed and labeled" as other products in plenums are.

Cost Impact: Will increase the cost of construction
If jurisdictions approved plastic piping and plumbing items that were listed but not listed and labeled they will, in future, have to be both listed and labeled.

M75-15 : 602.2.1.7-HIRSCHLER3529

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Disapproval was based on the action taken on M76-15.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Marcelo Hirschler, representing GBH International (gbhint@aol.com) requests Approve as Submitted.

Commenter's Reason: Approve proposal as submitted. It is essential that plastic pipe and tubing be listed and labeled. This is being submitted in case concerns are raised about M76.

M75-15

M76-15
602.2.1.7

Proposed Change as Submitted

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

2015 International Mechanical Code

Revise as follows:

602.2.1.7 Plastic plumbing ~~pipe~~ piping and ~~tube~~ tubing. Plastic piping and tubing used in plumbing systems exposed within a plenum shall be listed and ~~shall exhibit~~ labeled as having a flame spread index ~~of~~ not ~~more~~ greater than 25 and a smoke-developed index ~~of~~ not ~~more~~ greater than 50 when tested in accordance with ASTM E 84 or UL 723.

> **Exception:** Plastic water distribution piping and tubing listed and labeled in accordance with UL 2846 as having a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm), and installed in accordance with its listing.

Add new standard(s) as follows:
UL 2846-14, Fire Test of Plastic Water Distribution Plumbing Pipe for Visible Flame and Smoke Characteristics

Reason: This proposal accomplishes the following:

1. Clarifies that this section is only applicable to plastic piping and tubing exposed within a plenum, using wording similar to Section 602.2.1.3.
2. Makes grammatical revisions for consistency.
3. Allows an option for water distribution piping and tubing to be listed to the UL 2846 criteria noted.

UL 2846 is an ANSI standard that includes a test method for determining values of flame propagation distance and optical smoke density for individual pairs of plastic plumbing pipes for distribution of potable water that can be installed in ducts, plenums, and other spaces used for environmental air. The scope of this standard can be viewed at http://ulstandards.ul.com/standard/?id=2846.

The acceptance criteria specified (peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet) is consistent with values in Sections 602.2.1.1, 602.2.1.2 and 602.2.1.3.

Cost Impact: Will not increase the cost of construction
This proposal provides an alternative method for evaluating plastic water distribution system piping and tubing.

Analysis:
A review of the standard proposed for inclusion in the code, UL 2846, 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, 2015.

Public Hearing Results

Committee Action: Approved as Modified

Modification:

602.2.1.7 Plastic plumbing piping and tubing. Plastic piping and tubing used in plumbing systems ~~exposed within a plenum~~ shall be listed and labeled as having a flame spread index not greater than 25 and a smoke-developed index not greater than 50 when tested in accordance with ASTM E 84 or UL 723.

> **Exception:** Plastic water distribution piping and tubing listed and labeled in accordance with UL 2846 as having a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm), and installed in accordance with its listing.

Committee Reason: Approval is based on the proponent's published reason statements. The modification eliminates redundant words because this section is about materials within plenums. The deleted words would allow materials to cover the pipes where such materials were not listed for the application of covering pipes.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Michael Cudahy, representing Plastic Pipe and Fittings Association (mikec@cmservices.com) requests Approve as Submitted.

Commenter's Reason: The floor modification to delete the langauage, "exposed within a plenum" was recommended in error, and PPFA recommends we approve the original submitted proposal from UL.

"Exposed within a plenum" and similar lanugage is repeated in section 602 at least seven times, and is very standard lanugage for multiple products, including;

wiring, optical fiber and communication raceways (602.2.1.1)
fire sprinkler piping (602.2.1.2)
pnumatic tubing (602.2.1.3)
electrical equipment (602.2.1.4)
and
discrete plumbing and mechanical products (602.2.1.5)

Pipe, like any other product, can be installed within a plenum if fully enclosed.
To omit this language would be in error, and inconsistant with the rest of that code section, would cause confusion, and we recommend the original proposal as it was submitted by UL.

Public Comment 2:

Proponent : David Seiler, Arkema, Inc., representing Arkema (dave.seiler@arkema.com) requests Approve as Modified by Committee.

Commenter's Reason: We support the modification by the committee, which ensures that a loophole contained in the proposal is not introduced into the mechanical code. As submitted, the proposal could allow the covering of piping with non-approved materials to avoid "exposure" within the plenum space as a means to negate the current test requirement for ASTM E84.
It is also important that the introduction of UL2846 be properly scoped; the committee modification ensures that.

M76-15

M77-15
602.2.1.7

Proposed Change as Submitted

Proponent: David Seiler, Arkema Inc, representing Arkema Inc. (dave.seiler@arkema.com)

2015 International Mechanical Code

Revise as follows:

602.2.1.7 Plastic plumbing pipe and tube. Plastic piping and tubing used in plumbing systems shall be listed and shall exhibit a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723 without any liquid in the pipe and utilizing the full width of the test apparatus tunnel during such tests.

Reason: This is a simple clarification to confirm the testing procedure of ASTM E84

Bibliography: NFPA 90A, ASTM E84, UL 723

Cost Impact: Will not increase the cost of construction
This clarification makes no change in the material types that currently meet the code, thus there is no cost impact.

M77-15 : 602.2.1.7-SEILER4331

Public Hearing Results

Committee Action: Disapproved

Committee Reason: It is not necessary for the code to clarify what is in the test standards, nor is it necessary to focus on a single aspect of such standards.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Marcelo Hirschler, representing GBH International (gbhint@aol.com) requests Approve as Submitted.

Commenter's Reason: This proposal works very well in conjunction with the approved text from M76 and it is consistent with the requirements of ASTM E84. The added language is needed because this requirement is often violated by

manufacturers of pipes or pipe materials who use test specimens that are less than full width and, in some cases, use plastic pipes filled with water to get better results.The code needs to be clear on critical aspects when abundant examples of violations exist.
UL 2846 (accepted for inclusion in the IMC by M76) provides a means for alternate testing (as an exception) for those "plastic water distribution piping and tubing" products that have been listed to UL 2846. In UL 2846 there is an explicit statement that liquids shall not be used during testing, which is why this added clause is not needed for the exception. There is no need for a double exception for these materials, as would be provided by the use of test specimens that don't **strictly** comply with ASTM E84.

ASTM E84 allows variations from the standard full width sheet testing **only** for (a) materials that have a standard mounting method developed (as a standard practice, described in section 6.8 of ASTM E84), (b) for adhesives and trim that have been listed and (c) for materials for which a specific test method exists (described in Appendix X5 of ASTM E84).

None of these methods include plastic piping.

Language in ASTM E84 (2015a) - sections 6.3, 6.8 and appendix X5:

6.3 The size of the test specimen shall be:
Width: between 20 and 24 in. (508 and 610 mm)
Length: 24 ft + 12 in. — 6 in.
Thickness: maximum 4 in. (101 mm).
NOTE 1 - The test apparatus is not designed for testing at thicknesses greater than 4 in. (101 mm), but has the ability to be modified if required. This is accomplished through (a) modifications to the test apparatus lid to maintain an airtight seal, and (b) the introduction, usually of additional sample/lid supports above the test apparatus ledges. Due to the composition of some materials, test results obtained at a thickness greater than 4 in. (101 mm) will potentially vary from results of a test on the same material tested at a thickness of 4 in. (101 mm) or less.
6.3.1 The test specimen shall not be required to conform to the test specimen length and width described in 6.3 when the material complies with 6.3.1.1-6.3.1.3.
NOTE 2 - When tests are conducted with materials installed at less than full width, representing the end-use width, any resulting flame spread and smoke developed indices will not relate to indices obtained with the calibration material, which is tested using the specimen width described in 6.3.
6.3.1.1 Materials for which there is a standard practice to address specimen preparation and mounting with this test method shall be tested as described in the appropriate standard practice (see 6.8).
6.3.1.2 Adhesives and trim shall be permitted to be tested in the width or length, or both, specified in their listings, or as part of their conditions for being labeled, by a nationally recognized testing laboratory.
6.3.1.3 Materials and products for which there is a specific test method or application standard requiring the use of the apparatus described in Section 5 shall be permitted to be tested in accordance with that specific test method or application standard (see Appendix X5).

6.8 In addition to the above provisions, the standard practices listed below shall be used for specimen preparation and mounting of the relevant test materials. For all other products, guidance on mounting methods is provided in Appendix X1.
E2231 for pipe and duct insulation materials.
E2404 for paper, polymeric (including vinyl and expanded vinyl) and textile wall and ceiling covering materials, facings or wood veneers intended to be applied on site over a wood substrate.
E2573 for site-fabricated stretch systems.
E2579 for the following wood products: solid board, lumber and timber products (including solid boards, lumber, timber, fingerjoined lumber, glulam, laminate wood, laminated veneer lumber and parallel strand lumber products), panel products (including fibreboard, hardboard, oriented strandboard, waferboard, and plywood panel products), decorative wood products (including fine woodwork, millwork and moulding) and shingles and shakes used as interior wall and ceiling finish and interior trim as well as to laminated products factory-produced with a wood

substrate.
E2599 for reflective insulation, radiant barrier and vinyl stretch ceiling materials for building applications.
E2688 for tapes up to and including 8 in. (203.2 mm) in width.
E2690 for caulks and sealants intended to be applied up to and including 8 in. (203.2 mm) in width.
E2988 for Flexible Fibrous Glass Insulation for Metal Buildings.

X5. SPECIFIC TEST METHODS AND APPLICATION STANDARDS
X5.1 The following standards address testing of materials in accordance with test methods that are applications or variations of this test method or apparatus.
X5.1.1 Wires and cables for use in air-handling spaces are covered by NFPA 262.
X5.1.2 Pneumatic tubing for control systems are covered by UL 1820.
X5.1.3 Combustible sprinkler piping is covered by UL 1887.
X5.1.4 Optical fiber and communications raceways are covered by UL 2024.
X5.1.5 Materials required to meet the extended Test Method E84 to a 30-min duration are covered by Test Method E2768.

Public Comment 2:

Proponent : David Seiler, Arkema, Inc., representing Arkema (dave.seiler@arkema.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

602.2.1.7 Plastic plumbing pipe and tube. Plastic piping and tubing used in plumbing systems shall be listed and labeled and shall exhibit a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723 . Test specimens shall have a width of not less than 20 inches (508mm) and not greater than 24 inches (610mm). Tests shall be conducted without any liquid in the ~~pipe and utilizing the full width of the test apparatus tunnel during such tests~~ specimens.

Commenter's Reason: The proposal was submitted to provide guidance to testing and certification agencies about a very important aspect of fire testing for plastic pipes located within plenum spaces.
The committee reason for disapproval states that it is unnecessay for the code to clarify what is in the standards, but when there is confusion and disagreement in the testing and certification industry, these types of clarifications become essential to safeguard public safety. The codes rely on test methods for evaluating building materials and products; in many cases the code references do contain specific provisions to clarify test parameters, modify certain provisions, or provide guidance to manufacturers and testing agencies on demonstrating code compliance.

This proposal covers such a test standard reference. ASTM E84 (also known as the Steiner Tunnel Test) is used for a broad variety of building materials and products, including plastics. The standard provides guidance on how to prepare material specimens in order to ensure consistently *comparative* and repeatable testing. Product evaluation entities, including ICC-ES, have issued product "approvals" based on testing conducted "in general accordance with" or using "modified versions" of ASTM E84; those product approvals are then used as evidence of code compliance.

ASTM E84 provides guidance on materials testing by establishing a minimum

specimen width of 20". Testing of material specimens with less than 20" width can provide a false sense of security (and an inaccurate flame spread and/or smode developed index) by reducing the fuel load during the test. There is no reason that arrays of plastic pipe specimen(s) cannot be appropriately mounted within the test tunnel.

Additionally, manufacturers have tested plastic pipes to ASTM E84 with water or other liquid present in the pipe specimen(s). Testing plastic condensate or drain pipes that are normally empty as installed in the intended end use by filling them with water violates a basic premise of the code: demonstration of code compliance *must* be based on representative specimens tested as they are intended to be used.

The modification in this comment includes three technical changes:

1. Adds "labeled" to the requirement for testing to be consistent with the committee action on M76-15.

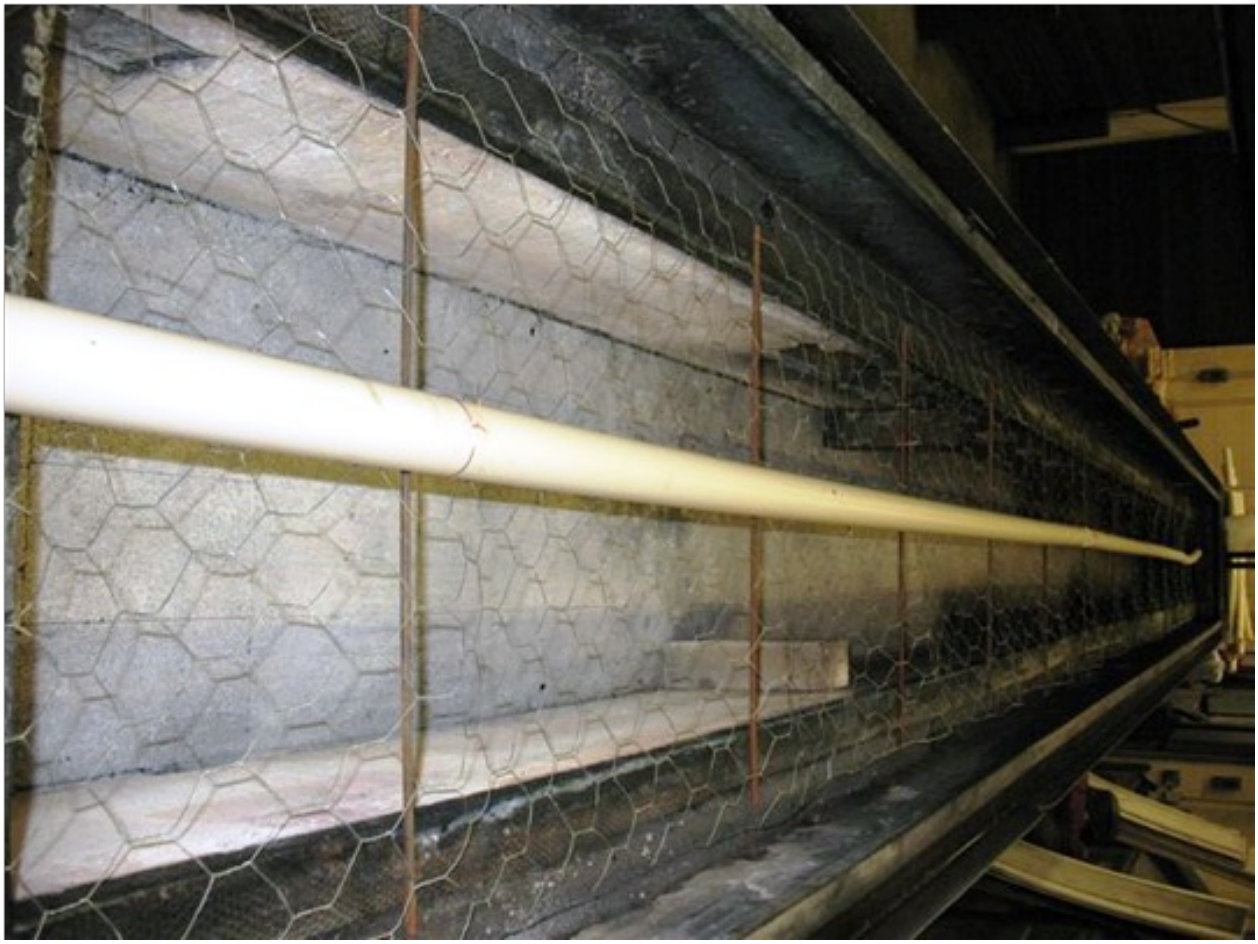
2. Specifies a minimum width for test specimens; the 20" width is included in ASTM E84.

3. Clarifies that plastic pipes for use in plenums must be tested without the addition of liquids in the test specimens.

Leading certification bodies agree with our stance on these test parameters. In correspondence on this matter, UL stated they would decline to test (let alone certify)plastic pipes with water in the specimen(s). UL further states that while they would conduct ASTM E84/UL723 tests with specimens at less than full width for the purposes of product development "for the applicant's use only", they would *not* provide product certification for products tested in that manner.

Approving this proposal as modified by this public comment will set the appropriate level of fire safety by requiring that plastic pipes manufactured for use in plenums be tested in *full* accordance with ASTM E84 and without adding water. Despite the committee reason statement to the contrary, these safeguards are essential.

Attached to this reason statement is a letter from UL to Arkema on the subject of plastic pipe testing, and several photographs showing installed pipe configurations and testing illustrations.



August 20, 2014

Arkema Inc.
Rosemary Heinze
Marketing Manager - Fluoropolymers
900 First Ave
King of Prussia, PA 19406

Subject: Clarification on Testing of Pipes

Dear Rosemary,

This letter clarifies our recent discussions. In your e-mail last month, you inquired:

If Arkema had materials that they would like to test to this standard (UL723 / ASTM E84) which seems to allow (1) water filled pipes, (2) pipes up to 6" in diameter, and (3) single pipes in the tunnel rather than full width testing; would UL agree to perform these tests and provide a flame and smoke value listing for use in compliance with ASTM E84/UL 723?

Thanks for your inquiry Rosemary. The basic answer to your questions is that at this time, UL would decline to provide certification for the pipe products in the manner described. We expounded on this discussion through various calls and e-mails. This letter intends to confirm those discussions.

1. UL would decline testing and certification of water filled pipes because:

   a. When the flame breaches the pipe wall, water could disperse throughout the tunnel. The water interferes with the test results, and UL does not believe this is within the intent of the comparative test method UL723 / ASTM E84. At ASTM and at NFPA 90A, UL has continually supported that pipes, when tested, should not be filled with water.

   b. UL believes that even pipes that are “intended” to be filled with water, may for various reasons be found empty in the field, and become subject to fire exposure without water in them.

   c. In committee discussions, there have been misunderstandings expressed about testing thermoplastic sprinkler pipe in accordance with UL1887. This confirms that in accordance with UL1887, pipes are not intended to be tested filled with water.

2. UL will test pipes up to 6 in. diameter under our Preliminary Investigation or Verification Service for the Applicant’s use only, but not provide certification:

   a. Experience shows that in most instances single or double lengths of large diameter pipes significantly increase the volume in the tunnel apparatus during the test. This disrupts the normal air flow through the tunnel which can result in a reduction in the 4 ½ ft. flame front and a reduction in the normal interior furnace temperature. This could have a significant effect on the flame spread index and smoke developed index. The Report accompanying such test results would clearly state these observations.

   b. Because of these test performance dynamics that alter the results, UL would decline to provide certification when these dynamics occur.

UL LLC
12 Laboratory Drive, Research Triangle Park, NC 27709-3995 USA
T: 919.549.1400 / F: 919.547.6000 / W: UL.com

3. Lastly, UL would test small diameter, single pipes in the tunnel rather than full width testing under our Preliminary Investigation or Verification Service for the Applicant's use only, but would not provide certification. The reason is that testing less than full width in this method has not been clearly defined or permitted within UL723 or ASTM E84. As you are aware, this continues to be heavily debated within the ASTM committees. In addition, testing less than full width conflicts with NFPA 90A. We do not know if the results from a single pipe length would satisfy the needs of the other Codes.

As an outgrowth of the need for an alternate test method for testing pipe, recently UL Standards received a ballot for a proposal to develop a new UL Standard for Plastic Pipe. The scope of this Standard UL2846 is limited to plumbing pipes for distribution of potable water that can be installed in ducts, plenums, and other spaces used for environmental air. The method determines flame propagation distance and optical smoke density for individual pairs of plastic. The intended pass / fail criteria are flame travel of < 5 feet, peak optical density < 0.5, and average optical density < 0.15. This method addresses pipe sizes 4 in. and less in diameter and uses the UL1887 tray to mount two pipes side-by-side. This test method does not cover plastic pipes when installed adjacent (side to side) in quantities greater than two.

Should you or anyone have any questions, please do not hesitate to contact me.

Very truly yours,

Randall Laymon
Senior Staff Engineer
Building Materials & Systems

Reviewed by:

Dwayne Sloan
Principal Engineer
Building Materials & Systems

M77-15

M78-15
602.2.1.8 (New)

Proposed Change as Submitted

Proponent : Marcelo Hirschler, representing GBH International (gbhint@aol.com)

2015 International Mechanical Code

Add new text as follows:

602.2.1.8 Pipe insulation. Pipe insulation in plenums shall comply with the requirements of Section 604.

Reason: Section 602 contains the requirements for materials in plenums. However, pipe insulation in plenums, which is supposed to comply with the same requirements as duct insulation (shown in section 604) is not specifically included. The default requirements in section 602 are simply a flame spread index of 25 and a smoke developed index of 50, when tested in accordance with ASTM E84. However, section 604 contains further details, including the requirements to meet testing in accordance with ASTM C411, the temperature requirements and the details of the mounting method for ASTM E84 (which should be in accordance with ASTM E2231). Some people may consider this as implicit but it is always better to be explicit rather than implicit. ASTM E2231 is entitled Standard Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics and it deals with both pipe and duct insulation and it is already referenced in section 604 of the IMC.

Cost Impact: Will increase the cost of construction
This provides a pointer to clarify a missing requirement and should not affect requirements. However, if some juridisctions now handle pipe insulation in plenums different from duct insulation then the requirements would change for those jurisdictions.

M78-15 : 602.2.1.8 (New)-HIRSCHLER3525

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Disapproval was based on the action taken on M79-15

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Marcelo Hirschler, representing GBH International (gbhint@aol.com) requests Approve as Submitted.

Commenter's Reason: I support the committee action on proposal M79. This public comment is being presented simply in case the approval of M79 is challenged. The code is silent about pipe insulation at present.

M80-15
602.2.2 (New)

Proposed Change as Submitted

Proponent : Brian Helms, Charlotte Plastics, representing Charlotte Pipe and Foundry (brian.helms@charlottepipe.com)

2015 International Mechanical Code

Add new text as follows:

602.2.2 Plastic piping in plenums. Plastic piping installed in plenums shall be tested in strict accordance with the requirements of ASTM E84 and UL723 including the mounting method used and the size of the sample tested. Modified tests that use mounting methods or sample sizes different than those required by the E84 and UL723 shall not be accepted as proof of compliance.

Reason: The requirements found in STM E84 and UL723 are the requirements. Changing the sample size or mounting methods to enable a plastic pipe manufacturer to achieve a passing grade ignore the basis by which the existing requirements exist. That reason is the protection of the health and safety of the occupants of the building. Allowing the use of modified tests exposes all plastic pipe manufacturers to liability which some might not wish to accept.

Cost Impact: Will not increase the cost of construction
This change merely highlights that the requirement of the standards regarding a product's acceptability for use in a plenum be followed without alteration. The practice of modifying or altering the requirements of ASTM E84 and UL 723 has been gaining momentum in the industry and diluting results that are intended to provide safety to the industry by measuring flame spread and smoke development of material used in a plenum. This change does not add to the cost of construction.

M80-15 : 602.2.2 (New)-HELMS5401

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This proposal would bring the code into the business of writng test standards. Who determines if the test methods were modified. The adjective "strict" before the word accordance implies that there is some other level of compliance with the standard requirements and that AHJ approval may be involved.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Brian Helms, representing Charlotte Pipe and Foundry (brian.helms@charlottepipe.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

602.2.2 Plastic piping in plenums. Plastic piping installed in plenums shall be tested in ~~strict~~ accordance with the requirements of ASTM E84 and UL723 ~~including the mounting method used and the size of the sample tested~~. _Modified tests that use mounting methods or sample sizes different than those required by ~~the~~ ASTM E84 and UL723 shall not be accepted as proof of compliance.

Commenter's Reason: ASTM E84 has long been the benchmark for the use of combustible piping materials in plenum applications. This proposal does not request the code body to rewrite the standard. Instead, this proposal empowers officials to reject products that have supposedly passed the requirements of ASTM E84 via questionable methods and enables them to ask for detailed test reports. Currently, the IMC does not include any recourse for code officials or specifying design professionals to combat the growing problem of some manufacturers intentionally altering some methods in these standards for the purpose of getting a passing 25/50 flame spread/smoke developed result. This proposal is a step in the right direction to keep manufacturers honest and to reduce safety liability for code officials, engineers, contractors and manufacturers.

M80-15

M93-15
603.8, 603.8.3

Proposed Change as Submitted

Proponent : Charles Stock, Spunstrand Inc., representing Spunstrand Inc.

2015 International Mechanical Code

Revise as follows:

603.8 Underground ducts. Ducts shall be *approved* for underground installation. Metallic ducts not having an *approved* protective coating shall be completely encased in not less than 2 inches (51 mm) of concrete. Nonmetallic and plastic ducts shall comply with UL 181.

603.8.3 Plastic ducts and fittings. Plastic ducts shall be constructed only of PVC having a minimum pipe stiffness of 8 psi (55 kPa) at 5-percent deflection when tested in accordance with ASTM D 2412. Plastic duct fittings shall be constructed of either PVC or high-density polyethylene. Plastic duct and fittings shall be utilized in underground installations only and all exposed surfaces shall have a Class 0 or Class 1 flame and smoke rating in accordance with UL 181. The maximum design temperature for systems utilizing plastic duct and fittings shall be 150°F (66°C).

Reason: The further clarification in section 603.8 and the addition of section 603.8.3 are mainly intended to insure that the use of improper materials does not slip through the code cracks. This should eliminate the use of highly flammable and excessive smoke-generating materials in an HVAC duct system regardless of its installation location above or below ground. All duct and fittings used for HVAC systems in the Uniform Mechanical Code and the International Mechanical Code call for the interior of the duct and plenums to be rated Class 0 or Class 1 per UL 181, which is a flame spread of 25 and a smoke development of 50 or less. These standards are used for ducts and plenums for both safety and liability concerns which should apply to underground duct and fittings as well. The indication that PVC or HDPE, which do not meet Class 1 or Class 0 per UL 181, can be used solely because it is buried seems to drastically contradict the other code sections. Duct systems, both above and below ground, should comply with applicable UL 181 standards. It should also be noted that the maximum temperature rating for PVC and HDPE is usually 140deg F. Limit switches on residential and commercial air handlers are normally set at 160deg F and air temperatures in the ductwork can often run up to 140deg F. If a $25 limit switch fails, the temperatures can then easily exceed 140deg F. It is inappropriate to install a material in a duct system in which the air exceeds the ducts maximum temperature rating with no safety factor.

Cost Impact: Will not increase the cost of construction
Any products that are not completely code compliant, meeting UL 181 and ASTM C-518, were not and should not be considered in determining the cost impact of these proposed changes. With that said, there would be no cost impact as there are currently three U.S. manufacturers providing code approved product with numerous others who could if they are willing to enter the market.

M93-15 : 603.8-STOCK5654

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The code should refer to just ducts as opposed to nonmetallic and plastic. UL181 is not the appropriate standard. There is no rationale for limiting plastic underground ducts to PVC only.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Charles Stock, representing Spunstrand Inc requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

603.8 Underground ducts. Ducts shall be *approved* for underground installation and shall achieve a class 0 or 1 rating when tested in accordance with ASTM E-84 or UL 723. Metallic ducts not having an *approved* protective coating shall be completely encased in not less than 2 inches (51 mm) of concrete. ~~Nonmetallic and plastic ducts shall comply with UL 181.~~

603.8.3 Plastic ducts and fittings. Plastic ducts shall be constructed only of PVC ~~having~~ or FRP and shall have a minimum pipe stiffness of 8 psi (55 kPa) at 5-percent deflection when tested in accordance with ASTM D 2412. Plastic duct fittings shall be constructed only of ~~either PVC~~ PVC, FRP, or high-density polyethylene. Plastic duct and fittings shall be utilized in underground installations only ~~and all exposed surfaces shall have a Class 0 or Class 1 flame and smoke rating in accordance with UL 181~~. The maximum design temperature for systems utilizing plastic duct and fittings shall be 150°F (66°C).

Commenter's Reason:
Spunstrands goal in requesting approval of the proposed code changes is simply to clarify and strengthen the code for underground ductwork. We desire to stop the use of potentially unsafe products which continue to be accepted and installed through some of the current interpretations of code verbiage. As product offerings change and new products enter the market it is important that the code evolves accordingly to maintain the desired level of clarity and direction for all manufacturers, designers, installers, and inspectors.

Leaving IMC 603.8 and 603.8.3 as is will do nothing but create a race to the bottom when it comes to underground duct materials. Since Spunstrand started making ductwork for underground applications, we have had the desire to manufacture a safe, code-compliant product. However, without the proposed type of modifications and additions, Spunstrand and other manufacturers, in order to compete with new products, will be forced by ICC and its voters to offer and supply less-safe non-class 1 products. In the end, the failure to act by the voters and subsequent shift to accepting poorer-performing products would contradict what ICC and its members claim their codes are intended to accomplish.

Throughout the mechanical codes, all aboveground ducts are to comply with the strict standards of achieving class 0 or 1 per ASTM E-84 or UL 723. Knowing that with fuel, oxygen, and heat/flame there is fire, it is only logical that an underground HVAC duct system intended to convey air/oxygen would have the potential to see all three if, and only if, the ductwork itself is a fuel. So why not limit the use of duct materials that contribute to fire whether it be above or below ground by requiring

underground duct to show compliance with the flame and smoke requirements of ASTM E-84 or UL 723? There are some that believe a duct being non-toxic, non-caustic, and installed underground should be enough of a justification for overlooking this point. However, this doesn't change the fact that non-class 0/1 duct material may spread or contribute to the spread of flame throughout a building more and faster than a class 0/1 material; it may also generate or contribute to the generation of more smoke than a class 0/1 material. If flame propagation and smoke generation are not important, just because the materials are non-toxic, non-caustic, and underground, then no change to the code is needed here. However, if there is value in showing that flame and smoke performance characteristics are important regardless of where in the building envelope they are, then I urge you to vote for the approval of the changes proposed here.

The additions to 603.8.3 will clarify the use of FRP duct/fittings along with continued use of PVC duct and PVC/HDPE fittings. They will also insure that modified versions of these recognized materials are not installed. The additional "only" disclaimers are intended to prohibit PVC, FRP, or HDPE "like" products from being acceptable for underground installations. While, despite their performance characteristics, the addition of PVC duct and PVC/HDPE fittings were allowed into the IMC decades ago these additions will allow code-compliant FRP duct, which has been used for decades as well, to be acknowledged while limiting non-compliant products from being utilized.

In the end, it is our belief that ICC and its members can either wait until there is an issue or catastrophe caused by, or contributed to by, non-compliant or under-performing products that are using the "open" verbiage currently in 603.8 and 603.8.3 or they can be proactive and clarify now that ICC, its members, and its inspectors do desire "...to protect the health, safety, and welfare of people by creating safe buildings..."

M93-15

M95-15
603.8.3

Proposed Change as Submitted

Proponent : Terrence Cahill, Crawford Company, representing Crawford Company (tcahill@crawford-company.com)

2015 International Mechanical Code

Revise as follows:

603.8.3 Plastic ducts and fittings. Plastic ducts shall be constructed of ~~PVC~~ a Class 0 or Class 1 duct material having a flame spread index of 25 or less and a smoke developement index of 50 or less, when tested in accordance with ASTM E-84 or UL 723. Ducts shall have a minimum pipe stiffness of 8 psi (55 kPa) at 5-percent deflection when tested in accordance with ASTM D 2412. ~~Plastic duct fittings shall be constructed of either PVC or high-density polyethylene.~~ _ Plastic duct and fittings shall be ~~utilized in~~ listed and labeled for underground installations ~~only~~. The maximum design temperature for systems utilizing plastic duct and fittings shall be 150°F (66°C).

Reason: Section 603.8.3 should be updated to include all listed and labeled plastic duct options. Of primary concern is the lack of requirement for a NFPA Class 1 duct material (less than 25 Flame spread, and less than 50 Smoke development) for underground HVAC duct. For Health and Safety reasons we feel that this should be a minimum requirement for all HVAC duct.
Throughout the IMC there is a uniformity that requires Class 0 or Class1, listed and labeled material for nonmetallic duct components. Underground nonmetallic duct, Section 603.8.3 should not be an exception. The following sections are examples of the Class 0 or Class1 requirements:

-510.8 Hazardous Exhaust - Duct construction *1 (see attachment File A)

-602.2.1 Materials within plenums *2

-603.5 Nonmetallic ducts *3

-603.6.2 Flexible air connectors *4

-604.3 Coverings and Linings *5

The Uniform Mechanical Code (UMC) -2012 is also clear on requirements for Class 0 or Class 1 Duct Materials. Reference the following sections:

- 506.1 Product Conveying Ducts - Materials *6

-602.2 Combustibles within Ducts or Plenums *7.

The current IMC code section 603.8.3 limits underground HVAC duct materials to PVC or HDPE, neither of which are a Class 0 or Class 1 duct material. When this code section was written these materials may have been the best choice for corrosion resistant underground duct. There are new duct products that are ICC-ES tested and listed with a PMG listing for underground duct. One of the principle ICC-ES requirements for underground nonmetallic duct is that it be ASTM E84 Class 0 or Class1 material. This code change will acknowledge these new approved materials and set standards that are consistent and uniform as new duct materials are introduced.

After the 9/11disaster FEMA, AWWA, NYPD and others put out independent reports on what improvements could be to the building codes in order to reduce the number of casualties in future disasters. These organizations independently concurred that in the event of catastrophic episode, all ductwork within a building should have the capability of being used for exhaust duct. By requiring Class 0 or Class 1 duct

material in section 603.8.3 this recommendation is ensured as these types of duct materials will not readily melt and collapse in fire situations. Both PVC and HDPE will readily melt and HDPE specifically has been shown to easily burn, even in underground applications.

This proposed Code change will ensure reliability, safety and uniformity with all nonmetallic duct applications.

Cost Impact: Will not increase the cost of construction
The proposed code change will have little if any effect on the cost of an installed underground duct systems. Even though the raw material cost of the called out PVC and HDPE are less than the resins used for fiberglass reinforced plastic, the installation requirements tend to even out the installed finished project cost. As an example, corrosion resistant high strength filament wound fiberglass duct does not require concrete encasement as metallic and some nonmetallic duct materials do. As HVAC design engineers are trending more and more towards designing buildings utilizing Displacement Ventilation systems, larger diameter underground ducts are required. Nonmetallic, code approved duct material options already exist that are more cost effective for large diameter duct than the section 603.8.3 mentioned PVC or HDPE. The proposed code change to Class 0 or Class1 duct material will encourage the development of even more cost effective duct materials that also incorporate this life saving requirement. The real issue is health and safety and that is hard to put a price on.

December 2014 Quoted List Pricing

Size	Price / Foot	90dg Elbow
24''PVC	89.95	1,077.00
24'' HDPE	83.88	617.00
24'' FRP	35.00	398.00
30'' PVC	150.00	1,280.00
30'' HDPE	105.62	842.00
30'' FRP	45.00	573.00
36'' PVC	198.00	1,4130
36''HDPE	135.75	1,083.00
36'' FRP	52.00	687.00

PVC pricing from Harrison Machine and Plastic Corporation -see attachment file * B-1 though B-5

HDPE pricing from Blue Duct - see attachment *B -6

FRP pricing from UnderDuct - see attachment * B -7

M95-15 : 603.8.3-CAHILL3564

Public Hearing Results

Committee Action: Disapproved

Committee Reason: There was no justification for deleting HDPE plastic materials. There was no justification for requiring 25/50 flame/smoke indices. Disapproval was based on the action taken on M93-15.

Individual Consideration Agenda

Public Comment 1:

Proponent : Terrence Cahill, Crawford Company, representing Crawford Company (tcahill@crawford-company.com) requests Approve as Modified by this Public Comment.

Replace Proposal as Follows:

2015 International Mechanical Code

603.8.3 Plastic ducts and fittings. Plastic ducts and fittings shall be constructed of PVC ~~having~~ , fiberglass reinforced plastic (FRP) or high density polyethylene (HDPE) and shall have a minimum pipe stiffness of 8 psi (55 kPa) at 5-percent deflection when tested in accordance with ASTM D 2412. ~~Plastic duct fittings shall be constructed of either PVC or high-density polyethylene.~~ _Plastic duct and fittings shall be utilized in underground installations only. The maximum design temperature for systems utilizing plastic duct and fittings shall be 150°F (66°C).

Commenter's Reason: This is in response to having code change proposal M95-15 rejected at the Code Hearings in April.
Realizing that underground PVC or HDPE duct does not have to be a class 0 or class1 duct material as required by ICC-ES LC1014, we propose this alternate change to code section 603.8.3 through the Public Comment process.

Reasons:

1. IMC code section 603.8.3 should acknowledge all LC1014 tested, PMG listed nonmetallic duct. Currently it reads "...shall be PVC... Plastic duct fittings constructed of either PVC or high density polyethylene". There are at least two manufactures of fiberglass reinforced plastic (FRP) that have a PMG listing for underground HVAC duct.

2. ICC-ES has accepted our fees and all of our expensive test data, and in turn we have been granted a PMG listing (see attachment) for underground duct. Without having FRP mentioned along with other materials in the IMC code section 603.8.3, it seems our time, money and effort have been for naught.

3 Customers, Architects, Engineers Code Officials and Contractors should know that fiberglass reinforced plastic duct is a code approved option for underground HVAC duct. It should be acknowledged in IMC code section 603.8.3.

M95-15

M96-15
603.9

Proposed Change as Submitted

Proponent : Donald Surrena, National Association of Home Builders, representing National Association of Home Builders (dsurrena@nahb.org)

2015 International Mechanical Code

Revise as follows:

603.9 Joints, seams and connections. All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA *HVAC Duct Construction Standards—Metal and Flexible* and NAIMA *Fibrous Glass Duct Construction Standards*. All joints, longitudinal and transverse seams and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants or tapes. Tapes and mastics used to seal fibrous glass ductwork shall be listed and labeled in accordance with UL 181A and shall be marked "181 A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. Tapes and mastics used to seal metallic and flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181 B-FX" for pressure-sensitive tape or "181 B-M" for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked "181 B-C." Closure systems used to seal all ductwork shall be installed in accordance with the manufacturer's instructions.

> **Exception:** For ducts having a static pressure classification of less than 2 inches of water column (500 Pa), additional closure systems shall not be required for continuously welded joints and seams and locking-type joints and seams of other than the snap-lock and buttonlock types for ducts that are located outside of conditioned spaces.

Reason: This proposal will reduce construction cost and still reduce energy loss that would occur due to duct leakage outside conditioned space. Low pressure longitudinal seam duct leakage is very limited and the small amount of leakage within conditioned space is still useful energy.

Bibliography: Estimated Costs of the 2015 IRC Codes Changes, Home Innovation Research Labs, Upper Marlboro, MD, December 2014,Report Reference No: MAT 1, Page 33

Cost Impact: Will not increase the cost of construction
Cost decrease of up to $314 for an average house according to research conducted by Home Innovation Research Labs.

M96-15 : 603.9-SURRENA5017

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The leakage rate for snap-lock and button-lock joints is insignificant and acceptable within conditioned spaces.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Craig Drumheller, representing National Association of Home Builders (CDrumheller@nahb.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

603.9 Joints, seams and connections. All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA *HVAC Duct Construction Standards—Metal and Flexible* and NAIMA *Fibrous Glass Duct Construction Standards*. All joints, longitudinal and transverse seams and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants or tapes. Tapes and mastics used to seal fibrous glass ductwork shall be listed and labeled in accordance with UL 181A and shall be marked "181 A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. Tapes and mastics used to seal metallic and flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181 B-FX" for pressure-sensitive tape or "181 B-M" for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked "181 B-C." Closure systems used to seal all ductwork shall be installed in accordance with the manufacturer's instructions.

> **Exception:** For ducts having a static pressure classification of less than 2 inches of water column (500 Pa), additional closure systems shall not be required for locking type longitudinal joints and seams located within conditioned space. ~~continuously welded joints and seams and locking-type joints and seams of other than the snap-lock and buttonlock types for ducts that are located outside of conditioned spaces.~~

Commenter's Reason: This proposal was approved at the Committee Action Hearings. The committee recognized that the cost to seal the longitudinal joints in conditioned space outweighed the benefit for this requirement; however, there was a concern that the modification contributed to the confusion of an already unclear exception.
The public comment modification does not change the meaning or intent of the original proposal. The change improves the language by removing exceptions to exceptions and also removing a redundant reference to "welded seams".

As modified, this proposal will still reduce the cost of construction up to $314 for an

average house.

M96-15

M98-15
604.3

Proposed Change as Submitted

Proponent : Mike Fischer, Kellen Company, representing The Center for the Polyurethanes Industry of the American Chemistry Council (mfischer@kellencompany.com)

2015 International Mechanical Code

Revise as follows:

604.3 Coverings and linings. Coverings and linings, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than 50, when tested in accordance with ASTM E 84 or UL 723, using the specimen preparation and mounting procedures of ASTM E 2231. Duct coverings and linings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C 411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Coverings and linings shall be listed and labeled.

Exception: Polyurethane foam insulation that is spray applied to the exterior of ducts in attics and crawlspaces shall have a smoke-developed index not greater than 450, subject to all of the following requirements:

1. The foam plastic insulation complies with the requirements of Section 2603 of the *International Building Code.*
2. The foam plastic insulation is protected against ignition in accordance with the requirements of Section 2603.4.1.6 of the *International Building Code.*

Delete without substitution:

~~**604.4 Foam plastic insulation.** Foam plastic used as duct coverings and linings shall conform to the requirements of Section 604.~~

Reason: The proposal adds an exception allowing a greater smoke-developed index for some applications of foam plastic insulation on the exterior surfaces of ducts in attics or crawlspaces under certain specified conditions. The exception applies only to foam insulation meeting the requirements of IBC Section 2603 and the ignition barrier requirements in IBC Section 2603.4.1.6. This additional option is consistent with the options in Section M1601.3 of the IRC.
Additionally the proposal removes a circular reference in Section 604.4.

Cost Impact: Will not increase the cost of construction
the proposal clarifies existing requirements and adds an option consistent with the IRC; it adds no additional mandatory provisions.

M98-15 : 604.3-FISCHER5593

Public Hearing Results

Committee Action: Approved as Modified

Modification:

604.3 Coverings and linings. Coverings and linings, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than 50, when tested in accordance with ASTM E 84 or UL 723, using the specimen preparation and mounting procedures of ASTM E 2231. Duct coverings and linings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C 411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Coverings and linings shall be listed and labeled.

> **Exception:** Polyurethane foam insulation that is spray applied to the exterior of ducts in attics and crawlspaces shall have a flame spread index not greater than 75 and a smoke-developed index not greater than 450, subject to all of the following requirements:

1. The foam plastic insulation complies with the requirements of Section 2603 of the *International Building Code*.
2. The foam plastic insulation is protected against ignition in accordance with the requirements of Section 2603.4.1.6 of the *International Building Code*.

604.4 Foam plastic insulation. Foam plastic used as duct coverings and linings shall conform to the requirements of Section 604.

Committee Reason: Approval was based on the proponent's published reason statements. The use of spray foam insulation is growing and the code needs to address it. The modifications restore Section 604.4 to ensure proper code enforcement and provide both flame and smoke idices to fully assess the material.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Mike Fischer, Kellen, representing The Center for the Polyurethanes Industry of the (mfischer@kellencompany.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

604.3 Coverings and linings. ~~Coverings~~ Duct coverings and linings, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than 50, when tested in accordance with ASTM E 84 or UL 723, using the specimen preparation and mounting procedures of ASTM E 2231. Duct coverings and linings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C 411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Coverings and linings shall be listed and labeled.

Exception: Polyurethane foam insulation that is spray applied to the exterior of ducts in attics and crawlspaces shall ~~have a flame spread index not more than 75 and a smoke-developed index not greater than 450,~~ be subject to all of the following requirements:

1. The foam plastic insulation shall have a flame spread index not greater than 75 and a smoke developed index not greater than 450, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231.
2. The foam plastic insulation shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which the foam plastic insulation is exposed in service. The test temperature shall not fall below 250 degrees F (121 degrees C).
3. The foam plastic insulation complies with the requirements of Section 2603 of the *International Building Code.*
~~2~~ 4. The foam plastic insulation is protected against ignition in accordance with the requirements of Section 2603.4.1.6 of the *International Building Code.*

Commenter's Reason: The code proposal was intended to provide for the use of foam plastic insulation for duct coverings in a manner consistent with the provisions for foam plastics in crawlspaces using surface burning characteristics in IBC Section 2603, and the ignition barrier requirements of IBC 2603.4.1.6. The proposal as modified by the committee creates some ambiguity regarding the requirements for testing to ASTM C411 and the provisions for appropriate mounting methods of ASTM E2231.
This modified proposal retains the intent of the proposal and the committee but clarifies that the appropriate requirements for hot surface performance testing remain in effect.

Public Comment 2:

Proponent : Marcelo Hirschler, representing GBH International (gbhint@aol.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

604.3 Coverings and linings. ~~Coverings~~ Duct coverings and linings, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than 50, when tested in accordance with ASTM E 84 or UL 723, using the specimen preparation and mounting procedures of ASTM E 2231. Duct coverings and linings shall not

flame, glow, smolder or smoke when tested in accordance with ASTM C 411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Coverings and linings shall be listed and labeled.

Exception: Polyurethane foam insulation that is spray applied to the exterior of ducts in attics and crawlspaces shall ~~have a flame spread index not more than 75 and a smoke-developed index not greater than 450,~~ be subject to all of the following requirements:

1. The foam plastic insulation shall have a flame spread index not greater than 75 and a smoke developed index not greater than 450, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231.
2. The foam plastic insulation shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which the foam plastic insulation is exposed in service. The test temperature shall not fall below 250 degrees F (121 degrees C).
3. The foam plastic insulation complies with the requirements of Section 2603 of the *International Building Code.*
~~2~~ 4. The foam plastic insulation is protected against ignition in accordance with the requirements of Section 2603.4.1.6 of the *International Building Code.*

Commenter's Reason: There were two inadvertent omissions when this proposal was accepted by the technical committee. The ducts can be quite hot and, therefore, the foam plastic insulation must meet the requirements of ASTM C411, to avoid it degrading too fast in use. The other omission is that the mounting method for testing to ASTM E84 needs to be added, just like in the charging paragraph. In summary, the exception is for the foam plastic used on the outside of ducts to be tested to ASTM E84 with a flame spread index of 75 and a smoke developed index of 450 (instead of 25/50 when it is inside) and it must be covered by an ignition barrier.

The change to add the word "duct" at the beginning of the sentence is for consistency only.

Public Comment 3:

Proponent : Tony Crimi, representing North American Insulation Manufacturers Association (tcrimi@sympatico.ca) requests Disapprove.

Commenter's Reason: The proposal adds an exception allowing a greater smoke-developed index for some applications of foam plastic insulation on the exterior surfaces of ducts in attics or crawlspaces, but does not offer any substantiation to justify this relaxation for all building types. A plenum is a highly sensitive space, used for handling environmental air distribution to a building. The codes are justifiably very restrictive with regards to all materials which are permitted within air ducts and air-handling systems, yet this proposal would permit foamed palstics with up to 450 smoke developed to be installed without any limitation on the quantities of these materials.

As Approved, this proposal eliminates the requirement for both the 25/50 flame spread and smoke developed requirements, and the need to test for in-service temperature performance using ASTM C411. The ASTM C411 testing applies to the determination of the performance of commercial pipe forms of thermal insulating

materials when exposed to simulated hot-surface application conditions. The term "hot-surface performance" has reference to testing in a simulated end-use temperature. This test method refers primarily to high-temperature insulations that are applicable to hot-side temperatures in excess of 200°F (93°C). By exempting foamed plastic pipe insulations from this testing, they are permitted to be used in any application without a proper evaluation of this hazard. An ignition barrier installed on the outer surface of the foamed plastic will not protect the material from ignition, or from flaming, glowing, smoldering or smoke emission as the Code currently requires for other pipe insulation materials.

While the exception applies to foam insulation meeting the requirements of IBC Section 2603 and the ignition barrier requirements in IBC Section 2603.4.1.6, Ignition barriers are not tested, are not required to prevent smouldering combustion, and do not prevent large quantities of smoke from being emmitted. The IBC and IMC recognize that ignition barriers are not always sufficient to protect foamed plastics. As a result, thermal barriers, which are tested to NFPA 275 and do provide some limitation on the volume of smoke permitted to be emmitted, are often required in critical locations. For example, 1407.10.2 requires MCM's and HPL's to be separated from the interior of a building (not just the plenum) by an approved, tested thermal barrier. Similarly, 2603.4 requires foam plastic shall be separated from the interior of a building by an approved and tested thermal barrier, with some exceptions provided based on performance testing. IBC 2603.5.2 also requires any foam plastic insulation to be separated from the building interior by a thermal barrier, unless special approval is obtained on the basis of Section 2603.9. At a minimum, thermal barrier protection should be required.

We support the comment in the Committee reason which identifies the fact that spray applied foam plastics are becoming more common, and the Codes needs to address those materials. However, the Codes need to do that by identifying appropriate solutions, rather than by relaxing existing fire safety measures in plenums to match the minimum level of protection permitted for interior finishes. There has been no research and insufficient substantiation provided to justify this significant relaxation in fire safety.

Public Comment 4:

Proponent : Tim Earl, representing GBH International (tearl@gbhinternational.com) requests Disapprove.

Commenter's Reason: This proposal as passed referenced flame spread requirements without specifying the proper mounting method. It also failed to reference the requirements of ASTM C411. If this is not corrected with a Public Comment, request disapproval.

M98-15

M99-15

604.7, 202 (New), Chapter 15

Proposed Change as Submitted

Proponent : Lamont Millspaugh, Reflectix, Inc., representing Reflective Insulation Manufacturers Association International (monty.millspaugh@reflectixinc.com)

2015 International Mechanical Code

Revise as follows:

604.7 Identification. External duct insulation, except spray polyurethane foam, and factory-insulated flexible duct shall be legibly printed or identified at intervals not greater than 36 inches (914 mm) with the name of the manufacturer, the thermal resistance *R*-value at the specified installed thickness and the flame spread and smoke-developed indexes of the composite materials. ~~Duct~~ For other than reflective duct insulation, duct insulation product *R*-values shall be based on insulation only, excluding air films, vapor retarders or other duct components, and shall be based on tested *C*-values at 75°F (24°C) mean temperature at the installed thickness, in accordance with recognized industry procedures. The R-value for external reflective duct insulation shall be determined in accordance with ASTM C1668 and the installed thickness shall include the enclosed air spaces.The installed thickness of duct insulation used to determine its *R*-value shall be determined as follows:

1. For duct board, duct liner and factory-made rigid ducts not normally subjected to compression, the nominal insulation thickness shall be used.
2. For duct wrap, the installed thickness shall be assumed to be 75 percent (25 percent compression) of nominal thickness.
3. For factory-made flexible air ducts, the installed thickness shall be determined by dividing the difference between the actual outside diameter and nominal inside diameter by two.
4. For spray polyurethane foam, the aged *R*-value per inch, measured in accordance with recognized industry standards, shall be provided to the customer in writing at the time of foam application.

Add new definition as follows:

SECTION 202 DEFINITIONS

REFLECTIVE DUCT INSULATION A thermal insulation assembly consisting of one or more surfaces that have an emittance of 0.1 or less and that bound an enclosed air space or spaces.

Add new standard(s) as follows:

ASTM C1668-12 Standard Specification for Externally Applied Reflective Insulation Systems on Rigid Duct in Heating, Ventilation, and Air Conditioning (HVAC) Systems

Reason: The purpose of this proposal is to provide clear and specific requirements for reflective duct insulation. This language improves the code by providing installers and building officials with a clear path on the specifications that pertain to this product, as well as adding the appropriate definition and an ASTM standard. The same definition and similar language for reflective duct insulation was approved into the 2015 IRC Section M 1601.3.
Reflective duct insulation is a well-established type of material/system and it has an ASTM standard specification, namely ASTM C 1668 Standard Specification for Externally Applied Reflective Insulation Systems on Rigid Duct in Heating, Ventilation, and Air Conditioning (HVAC) Systems. It has been in the market for over 10 years and has nationwide distribution and installation.

Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction. The proposal only clarifies the requirements for a type of insulation material that is currenly not properly regulated by the code. It incorporates standard industry practice not presently reflected in the code, but does not make this type of insulation mandatory.

Analysis: A review of the standard proposed for inclusion in the code, ASTM C1668, 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, 2015.

M99-15 : 604.7-MILLSPAUGH4868

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This product needs to be stamped with the product R-value for both the insulation alone and the insulation with an air space. The product installation would be better understood if the product-only R-value was indicated. This product is commonly installed without an air space between it and the duct. There is a significant difference in performance between installing the product with an air space and without an air space.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Amanda Hickman, InterCode Incorporated, representing Reflective Insulation Manufacturer's Association International (amanda@intercodeinc.com) requests Approve as Submitted.

Commenter's Reason: Unfortunately, during the hearing, there was some confusion on the part of the Committee regarding reflective duct insulation labeling. These products ARE labeled with the R-values. There are two installation methods. The product can be installed directly around the duct or it can be installed using spacers. There is one R-value for each method.

There is nothing in the code that prohibits the use of reflective duct insulation and, in fact, this product is commonly and widely used throughout the country. To the Committee's point sited in the Report on the Committee Action Hearing, this is exactly why the proposed language is absolutely needed. This language will ensure that proper installation of this product occurs.

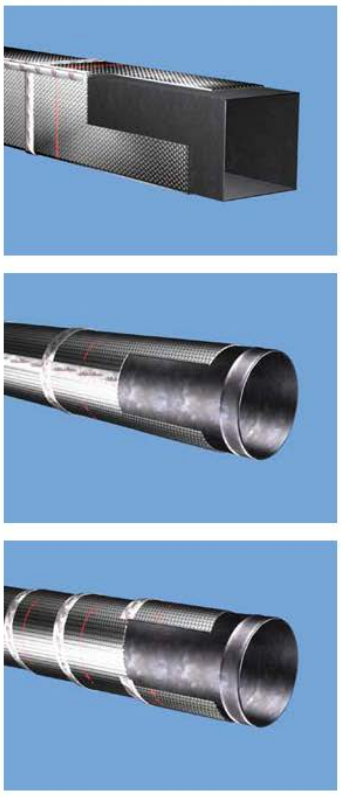
Document to Address Committee "Reason" Issue: Issue pertained to labeling the product with and without an air space incorporated into the assembly.

Industry Standard Labeling Practice: Products that require spacers (to provide stated R-value) are labeled with the product installed directly to the duct (no spacer) and the product installed utilizing a spacer (typically 0.75 inches).

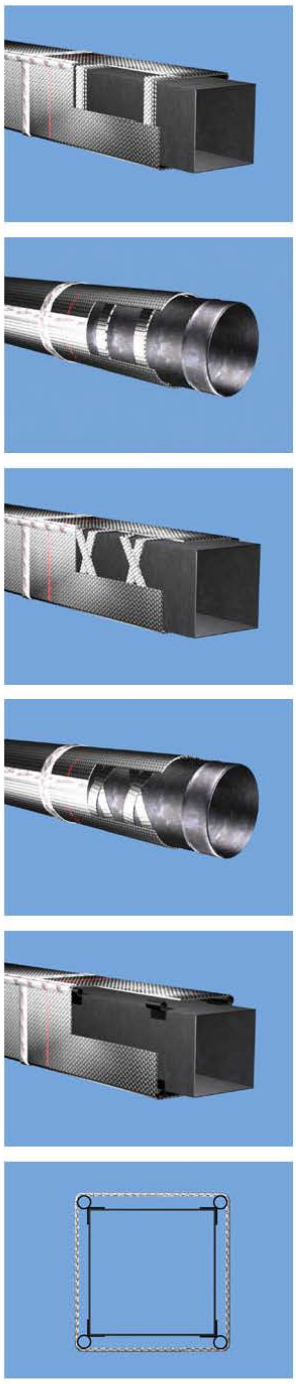
Code Official Verification of Proper Installation: It is a very straight forward exercise to determine if a product is installed with or without a spacer. Simply push on the underside of the product at 5 inch intervals, parallel to the duct, for 25 inches. This will provide verification if the product was installed with or without the spacers.

Graphics Depicting Product Installed With and Without Spacers:

Without Spacers – R-4.2:



With 0.75" Spacers – R-6.0:



M99-15

M101-15
605.4 (New)

Proposed Change as Submitted

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

2015 International Mechanical Code

Add new text as follows:

605.4 Bypass pathways Air handling equipment and HVAC equipment shall be designed and installed to limit the amount of airflow that bypasses the air filters and shall comply with the following:

1. Channels, racks and other filter retaining constructions that do not seal tightly to the filter frame by means of a friction fit shall be provided with a means to seal the filter frame to the filter retaining construction.
2. Where standard size filters are installed in banks of multiple filters, gaskets shall seal the gap between the frames of adjacent filters. As an alternative to gaskets, the frames of adjacent filters shall be compressed by means of spring elements that are built into the filter retaining construction.
3. Channels, racks and other filter retaining constructions shall be sealed to the duct or housing of the HVAC equipment served by the filters.
4. Filter access doors in ducts and HVAC equipment shall be designed to limit the amount of airflow that bypasses the filters.
5. Field or shop fabricated spacers shall not be installed for the purpose of replacing the intended size filter with a smaller size filter.
6. Gaskets and seals shall be provided with access for repair, maintenance and replacement.

Reason: The proposed text is taken from the 2015 IGCC.
This important fundamental requirement to prevent airflow from bypassing air filters should be a basic requirement in the IMC, not just in a high performance green building code.

This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes.

Cost Impact: Will increase the cost of construction
This proposal will increase the cost of construction because sealing and/or gaskets will be required beyond that which is normally provided in air handling systems.

M101-15 : 802.2-SNYDER3269

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed text is difficult to enforce and is appropriate for the IGCC, but overkill for the IMC. The equipment manufacturer's instructions already cover this.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Janine Snyder, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

605.4 Bypass pathways Air handling equipment and HVAC equipment shall be designed and installed to limit the amount of airflow that bypasses the air filters. Filter access doors in ducts and ~~shall comply with the following:~~

1. ~~Channels, racks and other filter retaining constructions that do not seal tightly to the filter frame by means of a friction fit~~HVAC equipment shall be~~provided with a means~~designed to~~seal~~limit the~~filter frame to~~amount of airflow that bypasses the~~filter retaining construction.~~
2. ~~Where standard size filters are installed in banks of multiple filters, gaskets shall seal the gap between the frames of adjacent~~ filters~~. As an alternative to gaskets, the frames of adjacent filters shall be compressed by means of spring elements that are built into the filter retaining construction.~~
3. Channels, racks and other filter retaining constructions shall be sealed to the duct or housing of the HVAC equipment served by the filters.
4. ~~Filter access doors in ducts and HVAC equipment shall be designed to limit the amount of airflow that bypasses the filters.~~
5. Field or shop fabricated spacers shall not be installed for the purpose of replacing the intended size filter with a smaller size filter.
6. ~~Gaskets and seals shall be provided with access for repair, maintenance and replacement.~~

Commenter's Reason: The committee felt that the proposed text was overkill and difficult to enforce, so the text was simplfied to capture the basic intent. This text is more detailed in the IGCC and a simple basic version is proposed for the IMC. This text will curtail leakage but will not require absolutely airtight equipment and ducts.

M101-15

M104-15
916.1, CHAPTER 15

Proposed Change as Submitted

Proponent : Jennifer Hatfield, J. Hatfield & Associates, PL, representing Association of Pool & Spa Professionals (jhatfield@apsp.org)

2015 International Mechanical Code

Revise as follows:

916.1 General. Pool and spa heaters shall be installed in accordance with the manufacturer's instructions. Oil-fired pool and spa heaters shall be tested in accordance with UL 726. Electric pool and spa heaters shall be tested in accordance with UL 1261, UL 1563 or CSA C22.2 No. 218.1. Gas-fired pool heaters shall comply with ANSI Z21.56/CSA 4.7. Pool and spa heat pump water heaters shall comply with UL 1995, AHRI 1160, or CSA C22.2 No. 236.

Add new standard(s) as follows:

AHRI 1160 (I-P) -09 Performance rating of Heat Pump Pool Heaters

ANSI Z21.56a/CSA 4.7 -2013 Gas Fired Pool Heaters

CSA C22.2 No. 236-11 Cooling Equipment

CSA C22.2 No. 218.1-M89(R2011) Spas, Hot Tubs and Associated Equipment

UL 1563-2009 Standard for Electric Spas, Hot Tubs and Associated Equipment-with revisions through July 2012

Reason: This proposal is needed to ensure consistency with what standards are required for the various pool heaters in Section 316.2 and Table 316.2 of the International Swimming Pool & Spa Code. This same proposal has been submitted to Section M2006.1 of the IRC.

Bibliography: International Swimming Pool & Spa Code, Section 316.2 & Table 316.2

Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction and ensures the applicable standards for the various pool heaters are provided within all the I-codes that address pool heaters.

Analysis: A review of the standard proposed for inclusion in the code, AHRI 1160 (I-P), ANSI Z21.56a/CSA 4.7, CSA C22.2 No. 236, CSA C22.2 No. 218.1, UL 1563, 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, 2015.

Public Hearing Results

Committee Action: Approved as Modified

Modification:

916.1 General. Pool and spa heaters shall be installed in accordance with the manufacturer's instructions. Oil-fired pool and spa heaters shall be tested in accordance with UL 726. Electric pool and spa heaters shall be tested in accordance with UL 1261~~, UL 1563 or CSA C22.2 No. 218.1. Gas-fired pool heaters shall comply with ANSI Z21.56/CSA 4.7~~. Pool and spa heat pump water heaters shall comply with UL 1995~~, AHRI 1160,~~ or CSA C22.2 No. 236.

> **Exception:** Portable residential spas and portable residential exercise spas shall comply with UL 1563 or CSA C22.2 No. 218.1.

Committee Reason: Approval was based on the proponent's published reason statements. The modification deletes AHRI 1160 which is already referenced in the IECC. Gas heaters are covered by the IFGC and the new exception recognizes integral heaters in spas listed to UL1563.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing Self (JBENGINEER@aol.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

916.1 General. Pool and spa heaters shall be installed in accordance with the manufacturer's instructions. Oil-fired pool and spa heaters shall be tested in accordance with UL 726. Electric pool and spa heaters shall be tested in accordance with UL 1261. Pool and spa heat pump water heaters shall comply with UL 1995 or CSA C22.2 No. 236.

> ~~**Exception:**~~ Portable residential spas and portable residential exercise spas shall comply with UL 1563 or CSA C22.2 No. 218.1.

Commenter's Reason: The proposed new exception is not an exception. It is a requirement consistent with the general requirements of the section.

M104-15

M106-15

929 (New), 929.1 (New), 929.2 (New), 929.3 (New), 929.4 (New), 929.5 (New), 929.6 (New), 929.7 (New), CHAPTER 15

Proposed Change as Submitted

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

2015 International Mechanical Code

Add new text as follows:

SECTION 929
UNVENTED ALCOHOL FUEL-BURNING DECORATIVE APPLIANCES

929.1 General Unvented alcohol fuel-burning decorative appliances shall be listed and labeled in accordance with UL 1370 and shall be installed in accordance Section 304.1.

929.2 Prohibited use Unvented alcohol fuel-burning decorative appliances shall not be used as the sole source of comfort heating in a dwelling unit.

929.3 Input rating Unvented alcohol fuel-burning decorative appliances shall not have an input rating in excess of 0.25 gallons of fuel per hour (0.95 liters per hour).

929.4 Prohibited locations Unvented alcohol fuel-burning decorative appliances shall not be installed within occupancies in Groups E and I. The location of unvented alcohol fuel-burning decorative appliances shall comply with Section 303.

929.5 Fuel Unvented alcohol fuel-burning decorative appliances shall be used only with the specific fuel marked on the appliance nameplate.

929.6 Ventilation Fresh air infiltration into the room in which the unvented alcohol fuel-burning decorative appliance is installed shall be provided in accordance with the markings on the appliance and the manufacturer's instructions.

929.7 Installation in fireplaces An unvented alcohol fuel-burning decorative appliance shall not be installed in a factory-built fireplace or masonry fireplace except where specifically identified for such use in accordance with the appliance manufacturer's installation instructions.

Add new standard(s) as follows:
UL 1370-11, Unvented Alcohol Fuel Burning Decorative Appliances, with revisions through January, 2014

Reason: This proposal provides requirements for the installation of unvented, self-contained alcohol-fuel-burning appliances. These appliances are intended for decorative purposes, though there may be limited radiant and convection-air comfort

heating. They are not intended to be utilized as a primary heat source. They are not provided with means for duct connection nor is there electrical/mechanical assist of heated air movement, such as a fan-blower assembly. The basic standard used to test and list these products is UL 1370, "Unvented Alcohol Fuel Burning Decorative Appliances", which is an ANSI consensus standard. There are five manufacturers of these appliances.

Denatured alcohol is formulated for the application. As part of the requirements of UL 1370, the appliances are tested for use only with the specific fuel marked on the appliance nameplate. These appliances are limited to a maximum input rate of 0.25 gallons of fuel per hour (0.95 liters per hour). Installation is intended to be in accordance with local codes, the manufacturer's installation instructions and any markings on the appliance. These appliances may be floor mounted or wall mounted. They may be installed in a solid-fuel-burning fireplace adapted for the purpose and, when so marked, in a factory-built solid-fuel-burning fireplace in accordance with the manufacturer's instructions. They are not intended for use in bathrooms or bedrooms nor for institutional use.

Cost Impact: Will not increase the cost of construction
This would permit the use of a new type of equipment to be installed.

Analysis: A review of the standard proposed for inclusion in the code, UL 1370, 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, 2015.

M106-15 : 929 (New)-ROBERTS4108

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The quantity of fuel allowed in such units is excessive. The allowable NOx emissions are above the EPA limits for such. These units should be prohibited in other occupancies besides Group E and I.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Bo Manalo, representing EcoSmart Fire (bo@ecosmartfire.com) requests Approve as Submitted.

Commenter's Reason:

I strongly support and urge you to accept Proposal M 106-15. This is long overdue and will minimize the mis-classification of this product category, Unvented Alcohol-fuel Burning Decorative Appliances. Every year, there are approximately 15,000-20,000 installations and this category should be provisioned in the code to ensure that only products listed under the appropriate standard is allowed. It will help eliminate installation of unsafe products.

The current category in the code is too generalized and applies only to Unvented Gas

Appliances. The safety standards used between the two categories are totally different and therefore should be separated to avoid mis-classification. The proposal is covered by the safety standard ANSI/UL 1370 for Unvented Alcohol Fuel-burning Decorative Appliances. The construction, performance, and products of combustion requirements are identical to both categories but listed under different standards. Frequently, the AHJ requires a product listing according to UL127, as provisioned in the IMC. This provision is specifically for gas-fired appliances and added in the code long before Unvented Alcohol Fuel burning appliances were developed.

Agan, I urge you to accept Proposal M 106-15. This will help ensure that this new and popular product category is listed to the appropriate standard and installed safely, properly, and fully provisioned in the IMC.

Public Comment 2:

Proponent : Jonathan Roberts, representing Underwriters Laboratories (jonathan.roberts@ul.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

929.4 Prohibited locations Unvented alcohol fuel-burning decorative appliances shall not be installed within occupancies in Groups E, F, H, I, M, S, and ~~I~~ U. The location of unvented alcohol fuel-burning decorative appliances shall comply with Section 303.

Commenter's Reason: This public comment addresses the committee comments as follows:
"***The quantity of fuel allowed in such units is excessive.***" The quantity of the fuel allowed in these appliances is limited in Section 929.3 to a quart of fuel per hour. The fuel is denatured alcohol, specifically formulated for use in these appliances. The fire code regulates the quantity and storage of flammable liquids used to refill the appliance.

"***The allowable NOx emissions are above the EPA limits for such.***" The established emission levels in ANSI/UL 1370 are the same as required by ANSI Z21.11.2 for unvented room heaters, which is already permitted in Section G2445 of the International Residential Code and Section 621 of the International Fuel Gas Code. The method used in these ANSI standards to measure the emissions is different than the method used by EPA. In ANSI/UL 1370 and ANSI Z21.11.2, the nitrogen dioxide concentration of the combustion products is required to not exceed 0.002 percent in an air free sample, which means any dilution air is factored out, whereas the EPA requirement is an ambient reading.

"***These units should be prohibited in other occupancies besides Group E and I.***" Agree that these units should not be installed in several other occupancies. The proposal now includes those additional occupancies in Section 929.4. These units are intended for installation only in A, B, and R occupancies, as further limited by Section 303.3 of the IMC. These units are intended for decorative purposes, though there may be limited radiant and convection-air comfort heating.

Public Comment 3:

Proponent : Craig Conner, representing self

(craig.conner@mac.com) requests Disapprove.

Commenter's Reason: The IMC committee correctly disapproved M106-15, stating "*The allowable NOx emissions are above the EPA limits for such.*" Unvented alcohol-burning appliances rely on diluting their exhaust pollutants in indoor air, the same air the occupants' breath. Using indoor air to dilute pollutant levels is a very poor way to manage pollutants

Unvented alcohol-burning appliances should not be installed in indoor living or working spaces. These devices exhaust all combustion bi-products, including nitrogen dioxide, into the indoor air. The pollutants can accumulate to unsafe levels; levels that exceed the Environmental Protection Agency's (EPA's) air quality standards. Controls on these devices allow them to burn until the fuel is exhausted, unless manually extinguished. Provisions for combustion and ventilation air are inadequate.

The EPA identifies nitrogen dioxide as one of "six principal pollutants" (1). The nitrogen dioxide levels allowed in exhaust by the unvented alcohol-burning appliance "safety standard" greatly exceed EPA's ambient air quality standard (more below). Pollutants allowed in the exhaust can rapidly raise the pollutant levels in small areas to well above the EPA air quality standards.

Again, the proposed unvented alcohol-burning appliance safety standard, UL 1370, allows exhaust to greatly exceed the EPA's National Ambient Air Quality Standards. But, by how much? UL 1370 limits nitrogen dioxide in exhaust gases to 20,000 ppb (parts per billion) (2). EPA's "primary" air quality standard, an ambient air quality standard, for nitrogen dioxide is 100 ppb (3). Therefore, the exhaust flue gas pollutants, which vent directly into the room air, can be 200 TIMES that of EPA's air quality standard.

How does the flue gas exhaust volume from one hour of unvented alcohol-burning appliance use compare to the volume of the "small" room in UL 1370? UL 1370 small room is 200 cubic feet of room for each 1000 btu/hr of appliance (4). The flue gas volume from one hour of use is about 4% of that minimum room volume (5). If these gases from one hour of use stayed in the room they would be about 8 TIMES the EPA air quality standard in that one hour(6).

One measure of chemical toxicity is the IDLH level (Immediately Dangerous to Life and Health). The National Institute for Occupational Safety and Health value for IDLH for nitrogen dioxide is the same level that the "safety standard" allows unvented alcohol-burning appliances to exhaust(7).

Some nitrogen dioxide does leave the room or is otherwise dissipated. It reacts with surfaces of the room, moves into other rooms or is indirectly exhausted outside after being vented into the indoor air. Sometimes called a "decay rate", this might cut the nitrogen dioxide by half, which still puts a small room well above the EPA's air quality standard. In the second hour of use, the room starts with the nitrogen dioxide from the previous hour at a level already above the EPA standard. Subsequent hours are worse as pollutant levels build.

What are the health effects of increased nitrogen dioxide? According to the American Lung Association(8): inflamed airways, cough and wheezing, reduced lung function, increased asthma attacks, more emergency room and hospital admissions, increased respiratory infection, such as influenza. The ALA notes unvented heaters as one source for nitrogen dioxide. A required warning label from UL 1370 suggests more health issues: "People with breathing problems should consult a physician

before using the unvented decorative appliance."(9) Really? It is wholly unrealistic to expect people to check with their doctor before they go into a building with an appliance.

Homes and buildings can also have other sources of nitrogen dioxide. This can compound the issue further. Gas stoves or ovens usually start with low, but safe, levels of nitrogen dioxide. Buildings near busy roads, freeways, or airports often start with higher levels. Large urban areas tend to be worse; for example Chicago, Detroit, Atlanta, Los Angles, and the northeast corridor are worse. (8) Assuming a higher level is already present, unvented alcohol-burning appliances will further increase that level and more quickly exceed safe levels.

Experience with these devices in Europe is instructive. A European safety study reported: "*Such fireplaces have become increasingly popular in the recent years and simultaneously a number of severe accidents have been recorded. Therefore such appliances are seen to present an emerging safety issue.*" (10) "*... the most common accidents are related to users refilling hot appliances, where the fuel self-ignites spontaneously and burns the user or causes property damage, and accidents related to wall-mounted fireplaces that fall down from the wall and burn nearby users or property. Spilling of fuel is also a common accident, when the fuel gets into closed compartments in the fireplace where it evaporates and causes explosions or deflagration when the fireplace is ignited or when it get hot enough.*" (11)

These devices are sold as simple to install and DIY, which seems likely to add risk of poor installation, and/or falling out and dumping burning fuel.

The same European study did measurements of emissions for four unvented alcohol-burning appliances. It reported "*All four fireplaces exceed the threshold values laid down by WHO* [World Health Organization]. *The excess is from 7 to 30 times higher than allowed and it occurs within the first hour of operation.*" (12)

Combustion air is an issue. UL 1370 requires instruction to the users that "*In a house of typical construction, that is, one that is not of unusually tight construction due to heavy insulation and tight seals against air infiltration, an adequate supply of air for combustion and ventilation is provided through infiltration.*" (13) The terms "*unusually tight construction*", "*heavy insulation*", and "tight seals against air infiltration" are not specifically defined in UL 1370 or the I-codes. Given the greater air tightness required by the current IECC, relying on new building infiltration as ventilation is a poor assumption.

The directions on room size are unreasonable. UL 1307 directs that instructions to the user state "*... if used in a small room where less than 200 cubic feet ... of air space is provided for each 1000 Btu per hour of unvented decorative appliance rating ... the door(s) to adjacent room(s) should be kept open or a window to the outside should be opened at least 1 inch ....*" (13). Unvented alcohol-burning appliances should not rely on the user to open doors or windows for combustion and ventilation air.

The unvented alcohol-burning appliances don't have a thermostat or timer. They burn until manually shut off, or until the fuel is exhausted. Most don't have a device to sense bad air quality. What happens if someone falls asleep in a small room? Given the maximum fuel volume (1.3 gallon) and maximum burn rate (0.25 gallon/h, about 18000 Btu/h) these devices could burn 5 hours, or more at lower rates. Barring the occupants shutting them off, they would burn until the fuel is exhausted no mater what the impact on the occupants, temperature, or air quality.

The IMC committee stated "*The quantity of fuel allowed in such units is excessive*"*;* which is a comment on the volume of fuel in the device, and/or the volume of fuel stored at the home. UL 1370 allows 1.3 gallons of fuel in the devices (14); enough fuel to start a fire or endanger occupants should the device fall. The devices falling off the wall is one scenario the European study warned has occurred. In addition the volume of fuel stored on site presents a risk. The mandatory warning label states (15) "*Always Store (Intended Fuel) Outdoors and Away From Other Fuel Containers.*" This seems likely to be ignored sometimes, as it is much more convenient to store the fuel inside and closer to the use. The fuel is easy to order in quantity on line (16). Up to 32 gallon orders are an option. Again, it would seems likely some of the fuel will be stored near its use, which would also potentially create a fire hazard.

In summary, unvented alcohol-burning appliances pollute the living and working space, and create health and fire hazards. The code should not allow permanently installed unvented alcohol-burning appliances in the living and working space.

Notes:

(1) From the EPA web site:

"*The Clean Air Act … requires EPA to set National Ambient Air Quality Standards … for pollutants considered harmful to public health and the environment.*" "*EPA has set National Ambient Air Quality Standards for six principal pollutants…*"http://www.epa.gov/air/criteria.html

(2) Section 13.10 of UL 1370 limits nitrogen dioxide in the exhaust (called "air free sample") to "0.002 %" or in the units of the EPA air quality standard, this is 20,000 ppb.

(3) From the EPA website:

The 100 ppb is a "*primary standard*" intended to "*provide public health protection, including protecting the health of 'sensitive' populations such as asthmatics, children, and the elderly*". http://www.epa.gov/air/criteria.html

(4) UL 1370 Section 22.2.3 (s)

(5) The calculation of exhaust volume compared to room volume:

Natural gas has 1028 btu/cf. http://www.eia.gov/tools/faqs/faq.cfm?id=45&t=8

Each cf of natural gas vents 8.5 cf of air http://www.engineeringtoolbox.com/fuels-air-flue-gas-d_170.html (Air is only 21% oxygen, other gases are not part of combustion, but are vented also.)

1000 Btu / 200 cf of room volume is the suggested minimum room, or 5 Btu / cf

5 Btu / (1028 Btu/cf) * 8.5 = 0.04, or 4% of the small room volume

(6) Exhaust is 200 times EPA air quality standard. It fills 4% of the room volume.

200 x 0.04 = 8 times EPA air quality standard.

(7) National Institute for Occupational Safety and Health guide to chemical hazards for nitrogen dioxide. http://www.cdc.gov/niosh/npg/npgd0454.html

(8) From the American Lung Association:

http://www.lung.org/healthy-air/outdoor/resources/nitrogen-dioxide.html

(9) UL 1370, Section 22.2.3, subsection "r" #4.

(10) Study of Safety Requirements for Open Stoves or Fireplaces Using Alcohol Fuels. Revision 5.3, May 2010

Hans-Georg Niedermeyer, Bayerisches Staatsministerium für Arbeit und Sozialordnung, Germany: Henrik Persson, SP Technical Research Institute of Sweden, Sweden; Steinar Tegneby, Direktoratet for Samfunnssikkerhet og Beredskap, Norway; Yann Peter, DGCCRF, Bureau E2 – Biens d'équipement, France

Alex Jensen, Sikkerhedsstyrelsen, Denmark; Torben Rahbek, consultant

http://www.sik.dk/content/download/5561/77087/version/1/file/Report+-+Bio+fireplaces+-+v-3+%282%29.pdf

(11) Same study as above. Page 7

(12) Same study as above. Page 11

(13) UL 1370, Section 22.2.3, subsection "s"

(14) UL 1370, Section 7.5.3

(15) UL 1370, Table 20.1

(16) For example- see

http://www.woodlanddirect.com/Fireplace-Accessories/Ethanol-Gel-Fuel-Accessories

M106-15

M109-15 Part I

929.1 (New)

Proposed Change as Submitted

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

2015 International Mechanical Code

Add new text as follows:

929.1 Air-handler enclosures. Where an air-handler, electric furnace or heat pump unit is installed in an enclosure with a fuel-fired appliance, the circulating air for the air-handler, furnace and heat pump shall be conveyed to the blower housing from outside of the enclosure by continuous air-tight ducts.

Reason: Section 918.4 of the IMC, Section 618.7 of the IFGC and Section G2442.7 of the IRC all address this issue well for fuel-fired warm-air furnaces, but, are silent on other appliances such as fuel-fired water heaters and boilers that are likely to be in the same enclosure. Heat pump units, cooling air-handlers and electric furnaces would have the same effect on appliance vents if the return air was not ducted back to the blower housing. It is not just warm-air furnaces that the code should be concerned about. Any blower can create strong negative pressures in the enclosure where the return is pulled through louvered doors or grilles instead of ducts connected to the blower. A fuel-fired water heater or boiler in the enclosure should be addressed as well as the warm-air furnace in the same enclosure.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes.

Cost Impact: Will increase the cost of construction
This proposal will increase the cost of construction in those cases where the return air for an air handler, heat pump or electric furnace would have been pulled through a louvered door or grille and through the enclosure, instead of through ductwork connected directly to the unit.

M109-15 Part I : 929.1 (New)-SNYDER5976

Public Hearing Results

Part I

Committee Action: Disapproved

Committee Reason: Disapproval is consistent with, and was based on the issues raised for, Parts II and III

Assembly Action : None

Public Comment 1:

Proponent : Janine Snyder, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

929.1 Air-handler enclosures. Where ~~an air handler, electric furnace or heat pump unit~~ a gas-fired appliance is installed in a space that also contains an ~~enclosure with a fuel-fired appliance,~~ air handler and the ~~circulating~~ supply air ~~for~~ from the ~~air-handler~~ air handler is conveyed by ducts to spaces outside of the space containing the air handler, ~~furnace and heat pump~~ the return air shall be conveyed ~~to the blower housing~~ from outside of the ~~enclosure~~ space containing the air handler to the air handler by ~~continuous air-tight~~ ducts.

Commenter's Reason: The IFGC, IRC and IMC committees were concerned that the term "enclosure" is not defined and could include an entire floor level. This public comment replaces the term enclosure with a "space containing the appliance' to address that concern and to imitate the current text of Section 618.7 of the IFGC and Section 918.4 of the IMC. The committees also expressed concern that the proposed text would impact direct-vent appliances, however, the IFGC Section 618.7 and IMC Section 918.4 make no special allowance for direct-vent appliances. Direct-vent appliances are not exempt from Sections 618.7 and 918.4 currently nor should they be exempt from this new proposed code section.

M109-15 Part I

M109-15 Part II

305.13 (New)

Proposed Change as Submitted

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

2015 International Fuel Gas Code

Add new text as follows:

305.13 Air handler enclosures. Where an air-handler, electric furnace or heat pump unit is installed in an enclosure with a fuel-fired appliance, the circulating air for the air-handler, furnace and heat pump shall be conveyed to the blower housing from outside of the enclosure by continuous air-tight ducts.

Reason: Section 918.4 of the IMC, Section 618.7 of the IFGC and Section G2442.7 of the IRC all address this issue well for fuel-fired warm-air furnaces, but, are silent on other appliances such as fuel-fired water heaters and boilers that are likely to be in the same enclosure. Heat pump units, cooling air-handlers and electric furnaces would have the same effect on appliance vents if the return air was not ducted back to the blower housing. It is not just warm-air furnaces that the code should be concerned about. Any blower can create strong negative pressures in the enclosure where the return is pulled through louvered doors or grilles instead of ducts connected to the blower. A fuel-fired water heater or boiler in the enclosure should be addressed as well as the warm-air furnace in the same enclosure.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes.

Cost Impact: Will increase the cost of construction
This proposal will increase the cost of construction in those cases where the return air for an air handler, heat pump or electric furnace would have been pulled through a louvered door or grille and through the enclosure, instead of through ductwork connected directly to the unit.

M109-15 Part II : 305.13 (New)-SNYDER5977

Public Hearing Results

Part II

Committee Action: Disapproved

Committee Reason: The proposal is not enforceable and does not account for direct-vent appliances. The term "enclosure" is not defined and could be interpreted as an entire basement.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Janine Snyder, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Fuel Gas Code

305.13 Air handler enclosures. Where ~~an air-handler, electric furnace or heat pump unit~~ a gas-fired appliance is installed in a space that also contains an ~~enclosure with a fuel-fired appliance,~~ air handler and the ~~circulating~~ supply air ~~for~~ from the ~~air-handler~~ air handler is conveyed by ducts to spaces outside of the space containing the air handler, ~~furnace and heat pump~~ the return air shall be conveyed ~~to the blower housing~~ from outside of the ~~enclosure~~ space containing the air handler to the air handler by ~~continuous air-tight~~ ducts.

Commenter's Reason: The IFGC, IRC and IMC committees were concerned that the term "enclosure" is not defined and could include an entire floor level. This public comment replaces the term enclosure with a "space containing the appliance' to address that concern and to imitate the current text of Section 618.7 of the IFGC and Section 918.4 of the IMC. The committees also expressed concern that the proposed text would impact direct-vent appliances, however, the IFGC Section 618.7 and IMC Section 918.4 make no special allowance for direct-vent appliances. Direct-vent appliances are not exempt from Sections 618.7 and 918.4 currently nor should they be exempt from this new proposed code section.

M109-15 Part II

M109-15 Part III

M1602.3 (New)

Proposed Change as Submitted

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

2015 International Residential Code

Add new text as follows:

M1602.3 Air-handler enclosures. Where an air-handler, electric furnace or heat pump unit is installed in an enclosure with a fuel-fired appliance, the circulating air for the air-handler, furnace and heat pump shall be conveyed to the blower housing from outside of the enclosure by continuous air-tight ducts.

Reason: Section 918.4 of the IMC, Section 618.7 of the IFGC and Section G2442.7 of the IRC all address this issue well for fuel-fired warm-air furnaces, but, are silent on other appliances such as fuel-fired water heaters and boilers that are likely to be in the same enclosure. Heat pump units, cooling air-handlers and electric furnaces would have the same effect on appliance vents if the return air was not ducted back to the blower housing. It is not just warm-air furnaces that the code should be concerned about. Any blower can create strong negative pressures in the enclosure where the return is pulled through louvered doors or grilles instead of ducts connected to the blower. A fuel-fired water heater or boiler in the enclosure should be addressed as well as the warm-air furnace in the same enclosure.
This proposal is submitted by the ICC Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC) The PMGCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. This includes both the technical aspects of the codes and the code content in terms of scope and application of referenced standards. The PMGCAC has held one open meeting and multiple conference calls which included members of the PMGCAC. Interested parties also participated in all conference calls to discuss and debate the proposed changes.

Cost Impact: Will increase the cost of construction
This proposal will increase the cost of construction in those cases where the return air for an air handler, heat pump or electric furnace would have been pulled through a louvered door or grille and through the enclosure, instead of through ductwork connected directly to the unit.

M109-15 Part III : M1602.3 (New)-SNYDER5978

Public Hearing Results

Part III

Committee Action: Disapproved

Committee Reason: The term "enclosure" is not defined. The proposal limits the use of some appliances.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Janine Snyder, representing Plumbing, Mechanical and Fuel Gas Code Action Committee requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Residential Code

M1602.3 Air-handler enclosures. Where ~~an air-handler, electric furnace or heat pump unit~~ a gas-fired appliance is installed in a space that also contains an ~~enclosure with a fuel-fired appliance,~~ air handler and the ~~circulating~~ supply air ~~for~~ from the ~~air-handler~~ air handler is conveyed by ducts to spaces outside of the space containing the air handler, ~~furnace and heat pump~~ the return air shall be conveyed ~~to the blower housing~~ from outside of the ~~enclosure~~ space containing the air handler to the air handler by ~~continuous air-tight~~ ducts.

Commenter's Reason: The IFGC, IRC and IMC committees were concerned that the term "enclosure" is not defined and could include an entire floor level. This public comment replaces the term enclosure with a "space containing the appliance' to address that concern and to imitate the current text of Section 618.7 of the IFGC and Section 918.4 of the IMC. The committees also expressed concern that the proposed text would impact direct-vent appliances, however, the IFGC Section 618.7 and IMC Section 918.4 make no special allowance for direct-vent appliances. Direct-vent appliances are not exempt from Sections 618.7 and 918.4 currently nor should they be exempt from this new proposed code section.

M109-15 Part III

M119-15

202 (New), 1104.2.2

Proposed Change as Submitted

Proponent : Jeffrey Shapiro, International Institute of Ammonia Refrigeration, representing International Institute of Ammonia Refrigeration (jeff.shapiro@intlcodeconsultants.com)

2015 International Mechanical Code

Add new definition as follows:

SECTION 202 DEFINITIONS

LOW-PROBABILITY PUMP. A pump that does not rely on a dynamic shaft seal as a singular means of containment to prevent atmospheric release of the pumped fluid.

Revise as follows:

1104.2.2 Industrial occupancies and refrigerated rooms. This section applies only to industrial occupancies and refrigerated rooms for manufacturing, food and beverage preparation, meat cutting, other processes and storage. Machinery rooms are not required where all of the following conditions are met:

1. The space containing the machinery is separated from other occupancies by tight construction with tight-fitting doors.
2. Access is restricted to authorized personnel.
3. The floor area per occupant is not less than 100 square feet (9.3 m^2) where machinery is located on floor levels with exits more than 6.6 feet (2012 mm) above the ground. Where provided with egress directly to the outdoors or into *approved* building exits, the minimum floor area shall not apply.
4. Refrigerant detectors are installed as required for machinery rooms in accordance with Section 1105.3.
5. Surfaces having temperatures exceeding 800°F (427°C) and open flames are not present where any Group A2, B2, A3 or B3 refrigerant is used (see Section 1104.3.4).
6. All electrical *equipment* and appliances conform to Class 1, Division 2, *hazardous location* classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant, other than ammonia, in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
7. All refrigerant-containing parts in systems with a total connected compressor power exceeding 100 horsepower (hp) (74.6 kW) ~~drive power~~, except evaporators used for refrigeration or dehumidification; condensers used for heating; control and pressure relief valves for either; low-probability pumps; and connecting piping, shall be located either outdoors or in a *machinery room*.

Reason: The modification of the 100 HP power threshold in Item 7 clarifies that this is compressor drive power, which is the terminology used in IIAR 2 Section 4.2.3 and ASHRAE 15 Section 7.2.2(g). The change ensures that the drive power for liquid pumps and other motorized equipment attached to the system is not improperly added.
Recognition of low-probability pumps acknowledges the superior leak resistance of these pumps and encourages their use to increase safety. The approach is modeled after the current IMC approach for low-probability systems, as defined in Chapter 2. Because low-probability systems are inherently more resistant to atmospheric releases than high-probability systems, the IMC permits more widespread use of low-probability systems. With respect to pumps, experience has shown that pump leaks are typically associated with failed seals on rotating (dynamic) parts, which can result in events ranging from a simple nuisance release to a hazardous condition requiring an emergency response. This proposal will encourage the use of pumps that are hermetically sealed or similar in lieu of pumps that rely on dynamic seals to contain refrigerant.

Cost Impact: Will not increase the cost of construction
The proposal will not increase the cost of construction because the first portion of the change is a clarification of current provisions, and the second portion of the change is an optional path to compliance. Standard pumps will continue to be permitted when they are located in refrigerant machinery rooms.

M119-15 : 1104.2.2-SHAPIRO4766

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: Approval was based on the proponent's published reason statements.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Jeffrey Shapiro, representing International Institute of Ammonia Refrigeration (jeff.shapiro@intlcodeconsultants.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

SECTION 202 DEFINITIONS

LOW-PROBABILITY PUMP. A pump that ~~does not rely on a dynamic shaft seal as a singular means of containment~~ is designed to prevent atmospheric release of the pumped fluid by one of the following methods: 1. The pump is permanently sealed. 2. The pump incorporates a static seal. 3. The pump incorporates not less than two sequential dynamic shaft seals to isolate the pumped fluid from atmosphere at shaft penetrations and automatically shuts down upon failure of any seal.

Commenter's Reason: The definition of low-probability pump is based on correlation with IIAR 2, and the definition in IIAR 2 was updated following approval of M119 in Memphis. This proposal updates the proposed IMC text to maintain correlation between the IMC and IIAR 2.

M119-15

M128-15
1107.2

Proposed Change as Submitted

Proponent : Maureen Traxler, Seattle Dept of Planning & Development, representing Washington Association of Building Officials Technical Code Development Committee (maureen.traxler@seattle.gov)

2015 International Mechanical Code

Revise as follows:

1107.2 Piping location. Refrigerant piping that crosses an open space that affords passageway in any building shall be not less than 7 feet 3 inches (2210 mm) above the floor unless the piping is located against the ceiling of such space. Refrigerant piping shall not be placed in any of the following:

1. a fire-resistance-rated exit access corridor.
2. an interior exit stairway.
3. an interior exit ramp.
4. an exit passageway.
5. an elevator, dumbwaiter or other shaft containing a moving object ~~or in any~~ .
6. a shaft that has ~~openings to living quarters~~ one or ~~to means of egress. Refrigerant piping shall not be installed in an enclosed public stairway,~~ more openings into a dwelling unit or sleeping unit.
7. a shaft that has one or more openings into a fire-resistance-rated exit access corridor, interior exit stairway ~~landing~~ or ramp, or ~~means of egress.~~ exit passageway.

Reason: The current code prohibits refrigerant piping in "means of egress" and in shafts with openings into "means of egress." The IBC definition is "A continuous and unobstructed path of vertical and horizontal egress travel from any occupied portion of a building or structure to a public way...." In other words, the means of egress includes all occupied spaces in a building, so prohibiting refrigerant piping in the means of egress means it's prohibited almost everywhere. Section 1107.2 is copied from ASHRAE 15 but this proposal gives it a reasonable interpretation that identifies specific locations where refrigerant piping is prohibited, and allows it to be installed in occupied buildings. This proposal is meant as an interpretation of the term "means of egress" as used in the ASHRAE language, without changing the intended meaning of the term.

Cost Impact: Will not increase the cost of construction
This proposal does not increase the cost of construction because it merely interprets an ambiguous term that is in the current code.

M128-15 : 1107.2-TRAXLER4752

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal does not address living quarters. The term "exit" could condense items 1 through 4 into a single item. The terminology is

inconsistent with the IBC.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Jeffrey Shapiro, representing International Institute of Ammonia Refrigeration (jeff.shapiro@intlcodeconsultants.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

1107.2 Piping location. Refrigerant piping that crosses an open space that affords passageway in any building shall be not less than 7 feet 3 inches (2210 mm) above the floor unless the piping is located against the ceiling of such space. Refrigerant piping shall not be placed in any of the following:

1. a fire-resistance-rated exit access corridor.
2. an interior exit stairway.
3. an interior exit ramp.
4. an exit passageway.
5. an elevator, dumbwaiter or other shaft containing a moving object.
6. a shaft that has one or more openings into a ~~dwelling unit or sleeping unit.~~
~~7. a shaft that has one or more openings into a~~ fire-resistance-rated exit access corridor, interior exit stairway or ramp, or exit passageway.

Commenter's Reason: The intent of this proposal is primarily to correct an error in the code. When the provisions in Section 1107.2 were first included in the code, the term "means of egress" was used differently. When the code changed to use a 3-part means of egress (exit access, exit and exit discharge), this section should have been updated to correlate, but it was not. The proposal, as modified by this public comment, provides the necessary update and clarifies that regulations for locating refrigerant piping are only intended to apply to the exit portion of the 3-part means of egress (not the exit access or exit discharge).
When this item was discussed by the committee, it was suggested that Items 1-4 of the proposal could be replaced by the term "exit" to simplify the text, but this is not correct because there are some exit components that are not intended to be captured by Items 1-4, such as exterior exits. Although consolidation is nice when possible, the separate items listed in the public comment are necessary to accurately reflect how the code should be applied.

With respect to committee's comments regarding the exclusion of "living quarters" and terminology issues, there was no intent in the original proposal to fix anything other than the "means of egress" concern. Nevertheless, we attempted to deal with this during the discussion, and things became confused, which led to the disapproval recommendation. Upon further consideration, it is clear that the current provisions that prohibit installation of refrigerant piping in shafts serving dwelling or sleeping areas, living quarters, etc. are unnecessary. Refrigerant concentration limits in ASHRAE 15 already limit refrigerant quantities such that a release into the smallest occupied space will not create an acute health risk for occupants. So, such a release into a shaft connecting to an occupied space, which is an even lesser risk than a release directly into a sleeping area, is likewise not a health risk. Thereby this comments recommends a revision to delete the unnecessary text.

Public Comment 2:

Proponent : Maureen Traxler, representing Washington Assn of Building Officials Technical Code Committee (maureen.traxler@seattle.gov); Julius Ballanco, JB Engineering and Code Consulting, P.C., representing Self (JBENGINEER@aol.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Mechanical Code

1107.2 Piping location. Refrigerant piping that crosses an open space that affords passageway in any building shall be not less than 7 feet 3 inches (2210 mm) above the floor unless the piping is located against the ceiling of such space. Refrigerant piping shall not be placed in any of the following:

1. a fire-resistance-rated exit access corridor.
2. an interior exit stairway.
3. an interior exit ramp.
4. an exit passageway.
5. an elevator, dumbwaiter or other shaft containing a moving object.
6. ~~a shaft that has one or more openings into a dwelling unit or sleeping unit.~~
~~7.~~ a shaft that has one or more openings into a fire-resistance-rated exit access corridor, interior exit stairway or ramp, or exit passageway.

Commenter's Reason: The primary purpose of this code change proposal was to clarify what is meant by "means of egress." Items 1-4 in the proposal clearly specify which elements of a means of egress are prohibited as locations for refrigerant piping. The Committee suggested that items 1-4 could be collapsed under the term "exit." However, since item
Most of the discussion before the Code Development Committee, however, was about "living quarters" and "dwelling units." Some people said the proposed change in terminology would broaden the restrictions on location of refrigerant piping, while others said the change added clarity. On further consideration, we believe the limitation on location of refrigerant piping in shafts with openings into either living quarters or dwelling and sleeping units is onerous and antiquated.

Ballanco: ASHRAE 15 is currently undergoing revisions to correlate with the Building and Mechanical Code. It was recognized that the text used to describe where refrigerant piping cannot be installed was confusing and inconsistent with Building Code language. This proposed change will clarify where refrigerant piping cannot be installed. The modification cleans up the proposal such that it is consistent with ASHRAE 15.

M128-15

M137-15

Table1202.5, CHAPTER 15

Proposed Change as Submitted

Proponent : William Chapin, Professional Code Consulting, LLC, representing Professional Code Consulting, LLC (bill@profcc.us)

2015 International Mechanical Code

Revise as follows:

TABLE 1202.5
HYDRONIC PIPE FITTINGS

MATERIAL	**STANDARD (see Chapter 15)**
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASTM F 1974; ASTM B16.24; ASME B16.51; ASSE 1061
Ductile iron and gray iron	ANSI/AWWA C110/A21.10; AWWA C153/A21.53; ASTM A 395; ASTM A 536; ASTM F 1476; ASTM F 1548
Ductile iron	ANSI/AWWA C153/A21.53
Gray iron	ASTM A 126
Malleable iron	ASME B16.3
PE-RT fittings	ASTM F 1807; ASTM F 2098; ASTM F 2159; ASTM F 2735; ASTM F 2769; ASSE 1061
PEX fittings	ASTM F 877; ASTM F 1807; ASTM F 2159; ASSE 1061
Plastic	ASTM D 2466; ASTM D 2467; ASTM F 438; ASTM F 439; ASTM F 877; ASTM F 2389;

	ASTM F 2735
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28; ASTM A 53; ASTM A 106; ASTM A 234; ASTM A 420; ASTM A 536; ASTM A 395; ASTM F 1476; ASTM F 1548

Add new standard(s) as follows:
ASSE 1061-2011 Performance Requirements for Push Fit Fittings.

Reason: ASSE 1061 Performance Requirements for Push Fit Fittings was originally published in 2006 and referenced in the 2009 IPC. These fittings have been used in the industry for over 15 years.

Cost Impact: Will not increase the cost of construction
Proposal addresses fittings and methods already used in the industry.

Analysis: A review of the standard proposed for inclusion in the code, ASSE-1061, 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, 2015.

M137-15 : T1202.5-CHAPIN5250

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: Approval was based on the proponent's published reason statements.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Gary Morgan, representing Viega LLC (gary.morgan@viega.us) requests Approve as Modified by this Public Comment.

Further Modify as Follows:

2015 International Mechanical Code

1203.11 Cross-linked polyethylene (PEX) plastic tubing. Joints between cross-linked polyethylene plastic tubing and fittings shall conform to Sections 1203.11.1 , 1203.11.2 and ~~1203.11.2~~ 1203.11.3. Mechanical joints shall conform to Section 1203.3.

1203.11.1 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.

1203.11.2 Plastic-to-metal connections. Soldering on the metal portion of the system shall be performed not less than 18 inches (457 mm) from a plastic-to-metal adapter in the same water line.

1203.11.3 Push-fit Joints. Push-fit joints that create a seal on the outside diameter of the tubing shall not be used with tubing that has an EVOH oxygen barrier layer.

1203.16 Raised temperature polyethylene (PE-RT) plastic tubing. Joints between raised temperature polyethylene tubing and fittings shall conform to Sections 1203.16.1 , 1203.16.2 and ~~1203.16.2~~ 1203.16.3. Mechanical joints shall conform to Section 1203.3.

1203.16.1 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.

1203.16.2 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.

1203.16.3 Push-fit Joints. Push-fit joints that create a seal on the outside diameter of the tubing shall not be used with tubing that has an EVOH oxygen barrier layer.

Commenter's Reason: The proponent of this proposal also proposed a floor ammendment to address a concern which exists for using push-to-connect type fittings on hydronic oxygen barrier type PEX and PE-RT tubing containing an EVOH (Ethlene Vinyl Alcohol) layer as the oxygen barrier. The floor modification was a very good one however the technical committee felt that the floor language did not do a good job describing the word "layer" as it pertained specifically to the material of concern in this case the EVOH layer material.
First of all it is widely known and accepted in the hydronics industry that one should never use an OD sealing push-to-connect type fitting on PEX or PE-RT tubing which contains an EVOH layer as the EVOH layer should not be directly exposed to the pressurized water or water/glycol mixture as the EVOH will eventually be dissolved and a potential leak path could allow water to escape between the tube outer wall and the O-Ring seal. All fittings used with EVOH layered PEX or PE-RT hydronic tubing use a fitting design which seals on the ID of the pipe and does not allow the fluid media to come into contact with the EVOH barrier layer.

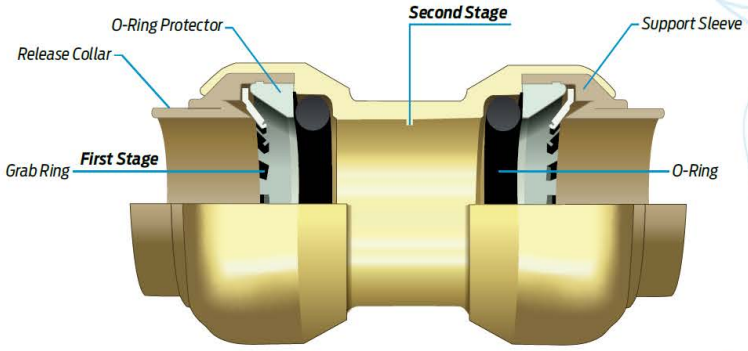
However it is completely appropriate for ASSE 1061 to be included in the hydronics fittings table as there are other pipe types which do not contain an outer EVOH layer (Copper and CPVC) and also there are PEX and PE-RT tubes used without an EVOH layer in systems where no ferrous materials are used. It is for that reason that I am proposing to include the propent's original floor modifications with slight additions describing the layer as one of EVOH material in the sections of the code specific to PEX and PE-RT fittings which would then contain the prohibition from using a OD sealing type push-fitting type joint IF an EVOH layer is present. The original floor modification did not define specfically the EVOH as the layer material which could be problematic and therefore the technical committee rejected the ammendment because of the unclarity of what it means by "layer". My proposal addresses this concern and that of the original proponent.

Please review the attached illustration document which helps explain exactly the details of what is being discussed here. The first drawing illustration shows what a somewhat typical push-to-connect fitting looks like that uses an O-ring to seal against the outermost surface of the tubing. The second photo illustration shows

what PEX looks like with a typical EVOH outer layer. I appreciate your approval of these proposed ammendments to M137.

Public Comment: Supporting information
M137-15 : Adding ASSE 1061 Push-fit fittings to TABLE 1202.5
HYDRONIC PIPE FITTINGS

The SharkBite® connection system uses an advanced push-fit design that works in two stages. When the tube is inserted into the fitting it passes the first stage through a release collar and then through a stainless steel grab ring. The grab ring has teeth that open out and grip onto the tube. At the second stage the tube is pushed through an o-ring protector which aligns the tube. A specially formulated o-ring is then compressed between the wall of the fitting and the tube before the end of the tube reaches the tube stop.



Drawing Illustration courtesy of Reliance Worldwide - SharkBite® Installation Instructions

Photo Illustration courtesy of Watts Radiant – A Watts Water Technologies Company

M137-15