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# INTERNATIONAL MECHANICAL CODE

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## M9-07/08, Part III IFGC 305.7

THIS CODE CHANGE WILL BE HEARD ON THE IFGC PORTION OF THE HEARING ORDER.

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

### *Proposed Change as Submitted:*

**Proponent:** Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

### **PART III – IFGC**

#### **Revise as follows:**

**305.7 Clearances from grade.** Equipment and appliances installed at grade level shall be supported on a level concrete slab or other approved material extending not less than 3-inches (76 mm) above adjoining grade or shall be suspended ~~a minimum of~~ not less than 6 inches (152 mm) above adjoining grade.

**Reason:** This change will make the IFGC consistent with the IRC and a proposed change to the IMC.

**Cost Impact:** The code change proposal will not increase the cost of construction.

### **PART III – IFGC**

#### **Committee Action:**

**Disapproved**

**Committee Reason:** The parallel code text in the IMC and IRC contains a requirement for compliance with the manufacturer's instructions which is not proposed for the IFGC text. There are pads being successfully used in the field that are less than 3 inches in height above grade.

#### **Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because public comments were submitted.**

#### *Public Comment 1:*

**Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.**

#### **Modify proposal as follows:**

**305.7 Clearances from grade.** Equipment and appliances installed at grade level shall be supported on a level concrete slab or other approved material extending not less than 3-inches (76 mm) above adjoining grade or shall be suspended not less than 6 inches (152 mm) above adjoining grade. Such supports shall be installed in accordance with the manufacturer's installation instructions.

**Commenter's Reason:** This text was mistakenly left out. This is now consistent with Part I and Part II which were approved as submitted.

#### *Public Comment 2:*

**Guy Tomberlin, Fairfax County, VA, representing himself, requests Approval as Modified by this Public Comment.**

#### **Modify proposal as follows:**

**305.7 Clearances from grade.** Equipment and appliances installed at grade level shall be supported on a level concrete slab or other approved material extending not less than 3-inches (76 mm) above adjoining grade or shall be suspended not less than 6 inches (152 mm) above adjoining grade. Such support shall be installed in accordance with the manufacturer's installation instructions.

**Commenter's Reason:** This proposal accomplishes many needed items. Two of which are merely fundamental corrections. First, in the last portion of the existing last sentence the rewording is to be consistent with I-code format. Second, these provisions are consistent with the IRC and IMC. Logically, it makes no sense to have different requirements for an outdoor gas appliance vs an outdoor electric appliance.

The committee was correct, as published the original proposal did not include the reference to manufacturer's installation instructions so the as modified version includes such allowance. However the committee comments were not quite correct on the next issue. It was stated that "this proposal would prohibit 1.5 inch thick concrete pads and no one presented any testimony that 1.5 inch thick pads were not adequate." This proposal does not prohibit 1.5 inch thick pads, it simply requires that they be installed and supported with at least 1.5 inches of other support material below them. In other words, the area below the pad could easily be built up with 1.5 inches of supporting fill above grade, compacted in place, and then set an 1.5 inch thick pad on top of that, on which the appliance would rest.

Final Action: AS AM AMPC\_\_\_\_\_ D

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**NOTE: PARTS I AND II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE**

**M9-07/08, PART I – IMC**

**Revise as follows:**

**304.9 Clearances from grade.** Equipment and appliances installed at grade level shall be supported on a level concrete slab or other approved material extending not less than 3 inches (76 mm) above adjoining grade or shall be suspended ~~a minimum of not less than~~ 6 inches (152 mm) above adjoining grade. Such support shall be in accordance with the manufacturer's installation instructions.

**Reason:** This change will make the IMC consistent with the IRC and a proposed change to the IFGC.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**PART I – IMC**

**Committee Action:**

**Approved as Submitted**

**Committee Reason:** A minimum height above grade is needed in the code and this change adds a 3 inch height which is consistent with the IRC requirement.

**Assembly Action:**

**None**

**M9-07/08, PART II – IRC**

**M1305.1.4.1 Ground clearance.** ~~Equipment and~~ appliances supported from the ground shall be level and firmly supported on a concrete slab or other approved material extending not less than 3 inches ( 76 mm ) above the adjoining ground. Such support shall be in accordance with the manufacturer's installation instructions. Appliances suspended from the floor shall have a clearance of not less than 6 inches (152 mm) from the ground.

**2. Delete without substitution:**

~~**M1308.3 Foundations and supports.** Foundations and supports for outdoor mechanical systems shall be raised at least 3 inches (76 mm) above the finished grade, and shall also conform to the manufacturer's installation instructions.~~

**Reason:** The two IRC Mechanical sections are addressing the same subject matter. It's more efficient to combine the two and have just one section covering the topic. The modification to IMC 304.9 and IFGC 305.7 are consistent language with that of M1305.1.4.1.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**PART II – IRC**

**Committee Action:**

**Approved as Submitted**

**Committee Reason:** This code change combines two sections to put all of the ground clearance requirements in one place.

**Assembly Action:**

**None**

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**M13-07/08**

**306.5 (IFGC [M] 306.5)**

*Proposed Change as Submitted:*

**Proponent:** Tim Manz, University of Minnesota, representing the Association of Minnesota Building Officials (AMBO)

**Revise as follows:**

**306.5 (IFGC [M] 306.5) (Supp) Equipment and appliances on roofs or elevated structures.** Where equipment and appliances requiring access are installed on roofs or elevated structures at a height exceeding 16 feet (4877 mm), such access shall be provided by a permanent approved means of access, the extent of which shall be from grade or floor level to the equipment and appliances' level service space. Such access shall not

require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than four units vertical in 12 units horizontal (33-percent slope). Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.

Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

1. The side railing shall extend above the parapet or roof edge not less than 30 inches (762 mm).
2. Ladders shall have rung spacing not to exceed 14 inches (356 mm) on center.
3. Ladders shall have a toe spacing not less than 6 inches (152 mm) deep.
4. There shall be a minimum of 18 inches (457 mm) between rails.
5. Rungs shall have a minimum 0.75-inch (19 mm) diameter and be capable of withstanding a 300-pound (136.1 kg) load.
6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding 100 pounds (488.2 kg/m<sup>2</sup>) per square foot. Landing dimensions shall be not less than 18 inches and not less than the width of the ladder served. A guard rail shall be provided on all open sides of the landing.
7. Ladders shall be protected against corrosion by approved means.

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

**Exception:** This section shall not apply to Group R-3 occupancies and dwellings. The replacement of equipment and appliances on existing buildings shall not require the addition of access means that do not already exist.

**Reason:** The exception needs to be rewritten to specify that dwellings built under the IMC and existing buildings do not need to have permanent means of access when existing equipment is being replaced with new equipment. It is unreasonable to expect building owners to install permanent ladders when they are simply updating the rooftop HVAC&R equipment.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Committee Action:**

**Disapproved**

**Committee Reason:** The new language would apply to dwellings in high-rise apartment buildings and equipment and appliances on the roofs of such buildings need to have access whether it was previously provided or not.

**Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**John Stelzenmueller, City of Tualatin, OR, representing the Oregon Mechanical Officials Association, requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**306.5 (IFGC [M] 306.5) (Supp) Equipment and appliances on roofs or elevated structures.** Where equipment and appliances requiring access are installed on roofs or elevated structures at a height exceeding 16 feet (4877 mm), such access shall be provided by a permanent approved means of access, the extent of which shall be from grade or floor level to the equipment and appliances' level service space. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than four units vertical in 12 units horizontal (33-percent slope). Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.

Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

1. The side railing shall extend above the parapet or roof edge not less than 30 inches (762 mm).
2. Ladders shall have rung spacing not to exceed 14 inches (356 mm) on center.
3. Ladders shall have a toe spacing not less than 6 inches (152 mm) deep.
4. There shall be a minimum of 18 inches (457 mm) between rails.
5. Rungs shall have a minimum 0.75-inch (19 mm) diameter and be capable of withstanding a 300-pound (136.1 kg) load.
6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding 100 pounds (488.2 kg/m<sup>2</sup>) per square foot. Landing dimensions shall be not less than 18 inches and not less than the width of the ladder served. A guard rail shall be provided on all open sides of the landing.
7. Ladders shall be protected against corrosion by approved means.

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

**Exception:** This section shall not apply to ~~Group R-3 occupancies and dwellings.~~ The replacement of equipment and appliances on existing buildings shall not require the addition of access means that do not already exist the replacement, repair or maintenance of an existing appliance or piece of equipment lawfully in existence at the time of the adoption of this code.

**Commenter's Reason:** No other modification is needed. It becomes cumbersome for a contractor to install additional means of access when all they are doing is providing a replacement of equipment or appliances. The additional expense of adding catwalks, ladders, guardrails, etc can become a financial hardship for the building owner as well. The initial installation may have been in place for 20 years and had been lawful until replacement. Why make a lawful installation unlawful by not allowing the contractor to up-grade the equipment or appliance.

Final Action:                    AS                    AM                    AMPC\_\_\_\_                    D

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## M17-07/08, Part I

### Table 308.6

*Proposed Change as Submitted:*

**Proponent:** Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

#### PART I – IMC

**Revise table as follows:**

**TABLE 308.6  
CLEARANCE REDUCTION METHODS<sup>b</sup>**

(No change to table)

For SI: 1 inch = 25.4 mm, °C = [(°F)-32]/1.8, 1 pound per cubic foot = 16.02 kg/m<sup>3</sup>, 1.0 Btu • in/ft<sup>2</sup> • h • °F = 0.144 W/m<sup>2</sup> • K.

a. (No change)

b. For limitations on clearance reduction for solid fuel-burning appliances, see Section 308.7

**Reason:** There have been cases where 308.7 is being overlooked, thus installers have been attempting to install solid fuel appliances with 6 and 9-inch clearances when 12 is the absolute minimum. This footnote will aid in the proper installation of solid fuel appliances.

**Cost Impact:** The code change proposal will not increase the cost of construction.

#### PART I – IMC

**Committee Action:**

**Disapproved**

**Committee Reason:** There are other items in Section 308, such as masonry chimneys and kitchen exhaust ducts, that have limitations on clearance reduction methods in Table 308.6. To only have a note for solid fuel-burning appliances might cause users to think they can use the table for those other items.

**Assembly Action:**

**None**

#### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO) requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**TABLE 308.6  
CLEARANCE REDUCTION METHODS<sup>b</sup>**  
(No change to table)

For SI: 1 inch = 25.4 mm, °C = [(°F)-32]/1.8, 1 pound per cubic foot = 16.02 kg/m<sup>3</sup>, 1.0 Btu • in/ft<sup>2</sup> • h • °F = 0.144 W/m<sup>2</sup> • K.

a. (No change)

b. For limitations on clearance reduction for solid fuel-burning appliances, masonry chimneys, connector pass-throughs, masonry fireplaces and kitchen exhaust ducts, see Sections 308.7 through 308.11.

**Commenter's Reason:** This change was originally intended for solid fuel-burning appliances only because that was where the most common infractions were occurring. The committee was concerned that not addressing the other limitations on masonry fireplaces, chimneys etc. might cause users to think they could use the table for those other items. All those other items were included now in the footnote. This will provide the user with even greater guidance thereby cutting cost and time making corrections. This was approved as submitted in the IRC.

Final Action: AS AM AMPC\_\_\_\_ D

**NOTE: PART II REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE**

**M17-07/08, PART II – IRC-M**

**Revise table as follows:**

**TABLE M1306.2  
REDUCTION OF CLEARANCES WITH SPECIFIED FORMS OF PROTECTION<sup>a,b,c,d,e,f,g,h,i,j,k,l</sup>**

(Portions of table not shown remain unchanged)

For SI: 1 inch = 25.4 mm, 1 pound per cubic foot = 16.019 kg/m<sup>3</sup>, °C = [(°F)-32/1.8], 1 Btu/(h • ft<sup>2</sup> • °F/in.) = 0.001442299 (W/cm<sup>2</sup> • °C/cm).

a. through k. (No change)

b. For limitations on clearance reduction for solid fuel-burning appliances see Section M1306.2.1.

**Reason:** There have been cases where M1306.2.1 is being overlooked, thus installers have been attempting to install solid fuel appliances with 6 and 9-inch clearances when 12 is the absolute minimum. This footnote will aid in the proper installation of solid fuel appliances.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**PART II – IRC-M**

**Committee Action:**

**Approved as Submitted**

**Committee Reason:** The added footnote will point users to Section M1306.2.1 to clarify that 12 inches is the absolute minimum clearance to combustibles for solid fuel-burning appliances and that the reduced clearances in the table are not allowed.

**Assembly Action:**

**None**

## M19-07/08

**313 (New), 313.1 (New), 313.2 (New), 313.2.1 (New), 313.2.2 (New)**

*Proposed Change as Submitted:*

**Proponent:** Tim Manz, University of Minnesota, representing the Association of Minnesota Building Officials (AMBO)

**Add new text as follows:**

### **SECTION 313 TESTING AND BALANCING**

**313.1 Mechanical ventilation and hydronic systems.** All mechanical ventilation and hydronic systems shall be balanced in accordance with this section.

**313.2 System balancing reports.** System balancing reports shall verify system performance specified in Sections 313.2.1 and 313.2.2 and shall specify that the minimum amount of outdoor air required in Chapter 4 is provided to the ventilation system. System balancing reports shall be submitted to the code official.

**313.2.1 Mechanical ventilation system balancing.** Mechanical ventilation systems shall provide airflow rates within 10 percent of design capacities. Fan speed shall be adjusted to meet design airflow.

Exception: Balancing shall not be required for fan motors rated at one horsepower (0.746 kW) or less.

**313.2.2 Hydronic system balancing.** Hydronic systems shall provide flow rates within 10 percent of design capacities. Pump impellers shall be trimmed or pump speed shall be adjusted to meet design flow.

Exception: Balancing shall not be required for pump motors rated at five horsepower (3.73 kW) or less.

**Reason:** Testing and balancing of HVAC&R systems is critical to ensure that they are installed and operate as designed. The above requirements are consistent with those established in the industry by various organizations and result in a clear and concise testing and balancing requirement that is easily enforced by the code official.

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

**Committee Action:** **Disapproved**

**Committee Reason:** The proposed testing and balancing requirements are too simplified; there are other methods available. There has been no evidence presented that there are currently problems because of the lack of balancing. Maintenance of the reports by the code official could be a major paperwork problem.

**Assembly Action:** **None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Tim Manz, University of Minnesota Building Code Division, representing the Association of Minnesota Building Officials (AMBO), requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

## **SECTION 313 TESTING AND BALANCING**

~~**313.1 Mechanical ventilation and hydronic systems.** All mechanical ventilation and hydronic systems shall be balanced in accordance with this section.~~

~~**313.2 System balancing reports.** System balancing reports shall verify system performance specified in Sections 313.2.1 and 313.2.2 and shall specify that the minimum amount of outdoor air required in Chapter 4 is provided to the ventilation system. System balancing reports shall be submitted to the code official.~~

~~**313.2.1 Mechanical ventilation system balancing.** Mechanical ventilation systems shall provide airflow rates within 10 percent of design capacities. Fan speed shall be adjusted to meet design airflow.~~

~~Exception: Balancing shall not be required for fan motors rated at one horsepower (0.746 kW) or less.~~

~~**313.2.2 Hydronic system balancing.** Hydronic systems shall provide flow rates within 10 percent of design capacities. Pump impellers shall be trimmed or pump speed shall be adjusted to meet design flow.~~

~~Exception: Balancing shall not be required for pump motors rated at five horsepower (3.73 kW) or less.~~

**Systems adjusting and balancing.** HVAC systems shall be balanced in accordance with generally accepted engineering standards. Air and water flow rates shall be measured and adjusted to deliver final flow rates within 10% of design rates. Test and balance activities shall include as a minimum the following items:

1. Air systems balancing: Each supply air outlet and zone terminal device shall be equipped with means for air balancing in accordance with the requirements of Chapter 6. Discharge dampers are prohibited on fans with motors of 10 hp (18.6 kW) and larger. Air systems shall be balanced in a manner to first minimize throttling losses then, for fans with system power of greater than 1 hp, fan speed shall be adjusted to meet design flow conditions.

Exception: Fan with fan motors of 1 hp or less.

2. Hydronic systems balancing: Individual hydronic heating and cooling coils shall be equipped with means for balancing and pressure test connections. Hydronic systems shall be proportionally balanced in a manner to first minimize throttling losses, then the pump impeller shall be trimmed or pump speed shall be adjusted to meet design flow conditions. Each hydronic system shall have either the ability to measure pressure across the pump, or test ports at each side of each pump.

**Exceptions:**

1. Pumps with pump motors of 5 hp or less.
2. When throttling results in no greater than 5% of the nameplate horsepower draw above that required if the impeller were trimmed.

**Commenter's Reason:** M19 (strikeout text above) was disapproved by the IMC committee because they felt that it was too simplified and that there was no evidence presented indicating the problems due to lack of balancing. The testing and balancing requirements from EC 134 (underlined text above) were approved by the IECC committee as part of requirements on commissioning. The two code changes are nearly identical in technical content, so the requirements from EC 134 are being proposed in lieu of the original M19 proposal.

The cost of testing and balancing is a small part of the overall project, yet can provide improved indoor air quality and higher productivity. A 2004 study by Lawrence Berkeley National Laboratory concluded that commissioning (which verifies the testing and balancing) is cost-effective for both new and existing buildings in a variety of uses and sizes, not only in energy savings but also in extended equipment life and lower maintenance costs.

**Bibliography:**

Lawrence Berkeley National Laboratory Report Number 56637, The Cost-Effectiveness of Commercial-Buildings Commissioning: A Meta-Analysis of Energy and Non-Energy Impacts in Existing Building and New Construction in the United States, December 2004, <http://eetd.lbl.gov/Emills/PUBS/Cx-Costs-Benefits.html>

Final Action:                    AS                    AM                    AMPC\_\_\_\_                    D

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## M22-07/08

**401.4, 401.4.1, 401.4.2, 401.4.3, 401.5, Table 401.5, 501.2.1, 501.2.2 (New)**

### *Proposed Change as Submitted:*

**Proponent:** Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

#### **1. Delete and substitute as follows:**

~~**401.4 Opening location.** Outdoor air exhaust and intake openings shall be located a minimum of 10 feet (3048 mm) from lot lines or buildings on the same lot. Where openings front on a street or public way, the distance shall be measured to the centerline of the street or public way.~~

~~**Exceptions:**~~

- ~~1. Group R-3.~~
- ~~2. Exhaust outlets for environmental air exhaust openings shall be located not less than 3 feet (914 mm) from property lines and not less than 3 feet (914 mm) from openings into the building.~~

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

1. Intake openings shall be located a minimum of 10-feet ( 3048 mm ) from lot lines or buildings on the same lot. Where openings front on a street or public way, the distance shall be measured to the centerline of the street or public way.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10-feet ( 3048 mm ) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.2.1.
3. Intake openings shall be located not less than 3-feet below or 25 feet above contaminant sources where such sources are located within 10-feet ( 3048 mm ) of the opening.

#### **2. Delete without substitution:**

~~**401.4.1 (Supp) Intake openings.** Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks, except as otherwise specified in this code. Where a source of contaminant is located within 10 feet (3048 mm) horizontally of an intake opening, such opening shall be located a minimum of 2 feet (610 mm) below the contaminant source.~~

~~Environmental air exhausted from a residential dwelling shall not be considered to be a hazardous or noxious contaminant.~~

~~**401.4.2 Exhaust openings.** Outdoor exhaust openings shall be located so as not to create a nuisance. Exhaust air shall not be directed onto walkways.~~

~~**[B] 401.4.3 Flood hazard.** For structures located in flood hazard areas, outdoor exhaust openings shall be at or above the design flood elevation.~~

**3. Revise as follows:**

**401.5 Outdoor Intake opening protection.** Air exhaust and intake openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles. Openings in louvers, grilles and screens shall be sized in accordance with Table 401.5, and shall be protected against local weather conditions. Outdoor air exhaust and intake openings located in exterior walls shall meet the provisions for exterior wall opening protectives in accordance with the *International Building Code*.

**TABLE 401.5  
OPENING SIZES IN LOUVERS, GRILLES AND  
SCREENS PROTECTING OUTDOOR EXHAUST AND AIR INTAKE OPENINGS**

OUTDOOR OPENING TYPE	MINIMUM AND MAXIMUM OPENING SIZES IN LOUVERS, GRILLES AND SCREENS MEASURED IN ANY DIRECTION
Exhaust openings	Not < ¼ inch and not > ½ inch
Intake openings in residential occupancies	Not < ¼ inch and not > ½ inch
Intake openings in other than residential occupancies	> ¼ inch and not > 1 inch

For SI: 1 inch = 25.4 mm.

**501.2.1 (Supp) 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. Environmental air duct exhaust terminations shall comply with Section 401.4.~~

~~**Exception:** Exhaust from bathrooms and kitchens in residential dwellings complying with Section 401.4.1.~~

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.
4. For specific systems see the following sections:
  - 4.1. Clothes dryer exhaust, Section 504.4
  - 4.2. Kitchen hoods and other kitchen exhaust equipment, Sections 506.3.12, 506.4 and 506.5
  - 4.3. Dust, stock and refuse conveying systems, Section 511.2
  - 4.4. Subslab soil exhaust systems, Section 512.4, and
  - 4.5. Smoke control systems, Section 513.10.3
  - 4.6. Refrigerant discharge, Section 1105.7
  - 4.7. Machinery room discharge, Section 1105.6.1

**4. Add new text as follows:**

**501.2.1.1 Exhaust discharge.** Exhaust air shall not be directed onto walkways. Exhaust outlets serving structures in hazardous locations shall be installed at or above the designed flood elevation

**501.2.2 Exhaust opening protection.** Exhaust openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles. Openings in screens, louvers and grilles shall be not less than ¼ inch and not greater than ½-inch in size, measured in any direction. Openings shall be protected against local weather conditions. Outdoor openings located in exterior walls shall meet the provisions for exterior wall opening protectives in accordance with the *International Building Code*.

**Reason:** This is an effort to bring order and consistency to these two sections. These sections are broken and in serious need of re-organization. First of all, to have exhaust openings mixed in with intake openings in a ventilation chapter doesn't make a whole lot of sense. All references to exhaust openings have been relocated to chapter 5 where they belong. All requirements for intake openings will remain in chapter 4 where they belong. Intake openings have been re-organized in an easy to read format with no current requirements omitted. Table 401.5 requirements for exhaust openings have been relocated to the new 501.2.2. Section 501.2.1 #3 has been stricken and the exceptions also as it excluded kitchen and bath from any requirements at all. Section 401.4 has been stricken in its entirety along with the exceptions because 501.2.1 #3 includes ALL environmental exhaust so there is no need for an exception. Also 401.3 has been relocated to 501.2.1 as

well. The 2-foot dimension has been changed to 3-feet as it is consistent with IMC-918.6; IRC-G2427.7; G2427.8 #1; and IFGC Sections 503.6.7 and 618.5. A new 25 feet dimension has been added so as not to prohibit an opening to be installed less than 10-feet from contaminants if the opening is positioned much higher than the contaminant source.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Committee Action:**

**Disapproved**

**Committee Reason:** The code change needs further work to correct some issues such as the apparent conflict between the 10 foot and 25 foot distances in Section 401.4, Item 3. The term “hazardous locations” in Section 501.2.1.1 should probably be “flood hazard areas”.

**Assembly Action:**

**None**

*Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

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

1. Intake openings shall be located a minimum of 10-feet (3048 mm) from lot lines or buildings on the same lot. Where openings front on a street or public way, the distance shall be measured to the centerline of the street or public way.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10-feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in item 3 or section 501.2.1.
3. Intake openings shall be located not less than 3-feet below ~~or 25 feet above~~ contaminant sources where such sources are located within 10-feet (3048 mm) of the opening.
4. Intake openings on structures in flood hazard areas shall be at or above the design flood level.

**401.5 Intake opening protection.** Air intake openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles. Openings in louvers, grilles and screens shall be sized in accordance with Table 401.5, and shall be protected against local weather conditions. Outdoor air intake openings located in exterior walls shall meet the provisions for exterior wall opening protectives in accordance with the International Building Code.

**TABLE 401.5  
OPENING SIZES IN LOUVERS, GRILLES AND  
SCREENS PROTECTING AIR INTAKE OPENINGS**

<b>OUTDOOR OPENING TYPE</b>	<b>MINIMUM AND MAXIMUM OPENING SIZES IN LOUVERS, GRILLES AND SCREENS MEASURED IN ANY DIRECTION</b>
Intake openings in residential occupancies	Not < ¼ inch and not > ½ inch
Intake openings in other than residential occupancies	> ¼ inch and not > 1 inch

**501.2.1 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.
4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the design flood level.
- 4-5. For specific systems see the following Sections:
  - 4-4-1 5.1. Clothes dryer exhaust, Section 504.4
  - 4-2 5.2. Kitchen hoods and other kitchen exhaust equipment, Sections 506.3.12; 506.4 and 506.5
  - 4-3 5.3. Dust stock and refuse conveying systems, Section 511.12
  - 4-4 5.4. Sub-slab soil exhaust systems, Section 512.4
  - 4-5 5.5. Smoke control systems, Section 513.10.3
  - 4-6 5.6. Refrigerant discharge, Section 1105.7
  - 4-7 5.7. Machinery room discharge, Section 1105.6.1

**501.2.1.1 Exhaust discharge.** Exhaust air shall not be directed onto walkways. ~~Exhaust outlets serving structures in hazardous locations shall be installed at or above the designed flood elevation.~~

**501.2.2 Exhaust opening protection.** Exhaust openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles. Openings in screens, louvers and grilles shall be sized not less than ¼ inch and not greater than ½-inch. ~~measured in any direction.~~ Openings shall be protected against local weather conditions. Outdoor openings located in exterior walls shall meet the provisions for exterior wall opening protectives in accordance with the *International Building Code*.

**Commenter's Reason:** The committee was receptive to this proposal but said it needed a little more work, to fix it and bring it back, which is what we did. This change accomplishes several things. First of all it removes conflicting language that would have otherwise gone to print as a result of several changes being approved last cycle all covering the same subject matter. Second, this proposal establishes where intake and exhaust openings really belong, that being exhaust openings in Chapter 5 and intakes in Chapter 4 where they should logically reside. This is an important cleanup that will eliminate any confusion as to the direction the code is taking with regard to these openings.

Final Action: AS AM AMPC\_\_\_\_ D

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## M30-07/08, Part I

**504.6, 504.6.1, 504.6.2, 504.6.3 (New), 504.6.4 (New), 504.6.4.1 (New), 504.6.4.2 (New), 504.6.4.3 (New), 504.6.5 (New), Table 504.6.5 (New), 504.6.6 (New), 504.6.7 (New) [IFGC [M] 614.6, [M] 614.6.1, [M] 614.6.2, [M] 614.6 through [M] 614.6.7 (New)]**

*Proposed Change as Submitted:*

**Proponent:** Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing In-O-Vate Technologies

### PART I – IMC

#### 1. Delete and substitute as follows:

~~**504.6 Domestic clothes dryer ducts.** Exhaust ducts for domestic clothes dryers shall be constructed of metal and shall have a smooth interior finish. The exhaust duct shall be a minimum nominal size of 4 inches (102 mm) in diameter. The entire exhaust system shall be supported and secured in place. The male end of the duct at overlapped duct joints shall extend in the direction of airflow. Clothes dryer transition ducts used to connect the appliance to the exhaust duct system shall be limited to single lengths not to exceed 8 feet (2438 mm) and shall be listed and labeled for the application. Transition ducts shall not be concealed within construction.~~

~~**504.6.1 (Supp) Maximum length.** The maximum length of a clothes dryer exhaust duct shall not exceed 25 feet (7620 mm) from the dryer location to the outlet terminal. The maximum length of the duct shall be reduced 2 1/2 feet (762 mm) for each 45 degree (0.79 rad) bend and 5 feet (1524 mm) for each 90 degree (1.6 rad) bend. The maximum length of the exhaust duct does not include the transition duct.~~

~~**Exception:** Where the make and model of the clothes dryer to be installed is known and the manufacturer's installation instructions for such dryer are provided to the code official, the maximum length of the exhaust duct, including any transition duct, shall be permitted to be in accordance with the dryer manufacturer's installation instructions. Where exhaust ducts are installed in concealed locations, the developed length of the exhaust duct system shall be indicated by permanent labels or tags installed in an observable location.~~

~~**504.6.2 Rough in required.** Where a compartment or space for a domestic clothes dryer is provided, an exhaust duct system shall be installed in accordance with Sections 504.6 and 504.6.1.~~

~~**504.6 (IFGC [M] 614.6) Domestic clothes dryer exhaust ducts.** Exhaust ducts for domestic clothes dryers shall conform to the requirements of Sections 504.6.1 through 504.6.7.~~

~~**504.6.1 (IFGC [M] 614.6.1) Material and size.** Exhaust ducts shall have a smooth interior finish and shall be constructed of metal a minimum 0.016-inch (0.4 mm) thick. The exhaust duct size shall be 4 inches nominal in diameter.~~

~~**504.6.2 (IFGC [M] 614.6.2) Duct installation.** Exhaust ducts shall be supported at 4 foot 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 into the inside of the duct.~~

~~**504.6.3 (IFGC [M] 614.6.3) Transition ducts.** Transition ducts used to connect the dryer to the exhaust duct system shall be a single length that is listed and labeled in accordance with UL 2158A. Transition ducts shall be a maximum of 8 feet in length. Transition ducts shall not be concealed within construction.~~

**504.6.4 (IFGC [M] 614.6.4) Duct length.** The maximum allowable exhaust duct length shall be determined by one of the methods specified in Sections 504.6.4.1 through 504.6.4.3.

**504.6.4.1 (IFGC [M] 614.6.4.1) Specified length.** The maximum length of the exhaust duct shall be 25 feet (7620mm) from the connection to the transition duct from the dryer to the outlet terminal.

**504.6.4.2 (IFGC [M] 614.6.4.2) Manufacturer’s instructions.** The maximum length of the exhaust duct shall be determined by the dryer manufacturer’s installation instructions. The code official shall be provided with a copy of the installation instructions for the make and model of the dryer.

**504.6.4.3 (IFGC [M] 614.6.4.3) Booster fan.** The maximum length of the exhaust duct shall be determined by the booster fan manufacturer’s installation instructions. Booster fans shall be listed and labeled for use in dryer exhaust duct systems. The booster fan shall be installed in accordance with the manufacturer’s installation instructions.

**504.6.5 (IFGC [M] 614.6.5) Exhaust duct length reduction.** The maximum length of the exhaust duct shall be reduced in accordance with Table 504.6.5.

**TABLE 504.6.5 (IFGC [M] TABLE 614.6.5)  
DRYER EXHAUST DUCT FITTING EQUIVALENT LENGTH**

<u>Dryer Exhaust Duct Fitting Type</u>	<u>Equivalent Length (feet)</u>
<u>4” radius mitered 45 degree elbow</u>	<u>2-1/2</u>
<u>4” radius mitered 90 degree elbow</u>	<u>5</u>
<u>6” radius smooth 45 degree elbow</u>	<u>1</u>
<u>6” radius smooth 90 degree elbow</u>	<u>1-3/4</u>
<u>8” radius smooth 45 degree elbow</u>	<u>1</u>
<u>8” radius smooth 90 degree elbow</u>	<u>1-7/12</u>
<u>10” radius smooth 45 degree elbow</u>	<u>3/4</u>
<u>10” radius smooth 90 degree elbow</u>	<u>1-1/2</u>

**504.6.6 (IFGC [M] 614.6.6) Length identification.** Where the exhaust duct is concealed within the building construction, the equivalent length of the exhaust duct shall be identified on a permanent label or tag. The label or tag shall be located within 6 feet of the exhaust duct connection.

**504.6.7 (IFGC [M] 614.6.7) Exhaust duct required.** Where facilities for a clothes dryer are provided, an exhaust duct system shall be installed.

**Reason:** Over the past few code change cycles, the requirements for dryer exhaust venting has been subject to extensive changes. As a result, the requirements are not properly coordinated. The only feasible means of correctly the text is to provide all new language that is coordinated and contains all of the technically correct requirements.

The initial section establishes that the following section apply to dryer exhaust ducts. The specific requirements are found in the remaining section.

Section 504.6.1 has the requirements for a metal duct as currently found in the code. The change is the requirements for the duct to be 4 inches nominal in diameter. A mm equivalent is not provided since it is a nominal dimension. The current code requires a 4 inch minimum. However, if the duct is increased to 5 inch, the velocity in the exhaust duct drops significantly. The larger duct will not provide the minimum velocity to remove the moisture and any lint that gets into the exhaust duct.

Section 504.6.2 identifies a new requirement for support. Other than having an arbitrary statement, the support is required every 4 feet. This is a typical spacing for supporting a 4 inch duct with insert joints. The other change is to the proper terminology. Male end is no longer used in the profession. It is either an insert end or in the case of threads an outside thread.

Section 504.6.3 simply isolates the requirements for a transition duct. The current text is often missed since it is located within a section of exhaust duct length. The UL standard is currently listed in the Residential Code, but not the Mechanical Code.

Section 504.6.4 provides the three options for maximum exhaust duct length. The first requirement is 25 feet with is the current requirement in the Mechanical Code and Fuel Gas Code. While the Residential Code has a 35 foot limitation, this distance is incorrect. Stack type washers and dryers stipulate a maximum length of 25 feet. Hence, the length cannot be listed as 35 feet.

When the dryer has been specified, the manufacturer’s instructions can be used to determine the dryer vent length. This is currently written as an exception; however, it is really an option. The requirements are the same as the current code.

The third viable method is power venting using a dryer booster fan. The new requirement stipulates that the dryer booster fan manufacturer determines the exhaust duct length. The requirements also state that the booster fan must be listed and label; and installed in accordance with the manufacturer’s installation instructions. Listed booster fans are a viable method of extending the length of the duct.

Section 504.6.5 lists the equivalent lengths of various fittings. The newer fittings were determined based on an analysis using the ASHRAE and SMACNA fitting tables. The equivalent length table assumes that the current requirement in the code is accurate.

The identification is listed in Section 504.6.6. The new requirement is that the label or tag must be located within 6 feet of the exhaust duct connection. The distance is based on the maximum distance the gas valve can be located from a gas dryer. Since this has been used to determine close proximity for a gas valve, it is appropriate to use the same distance for close proximity for a label.

The last section requires an exhaust duct when a dryer connection is present in a building. This is the intent of the current rough-in section.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**PART I – IMC**

**Committee Action:**

**Approved as Modified**

**Modify proposal as follows:**

**504.6.4 Duct length.** The maximum allowable exhaust duct length shall be determined by one of the methods specified in Sections 504.6.4.1 through ~~or~~ 504.6.4.3-2.

~~**504.6.4.3 Booster fan.** The maximum length of the exhaust duct shall be determined by the booster fan manufacturer's installation instructions. Booster fans shall be listed and labeled for use in dryer exhaust duct systems. The booster fan shall be installed in accordance with the manufacturer's installation instructions.~~

(Portions of proposal not shown remain unchanged.)

**Committee Reason:** This is a needed reorganization that breaks out specific requirements, such as transition ducts and maximum duct length, and adds a new table for duct fitting equivalent length. The modification deletes the booster fan section because the supporting standard is not yet approved.

**Assembly Action:**

**None**

*Individual Consideration Agenda*

**This item is on the agenda for individual consideration because public comments were submitted.**

*Public Comment 1:*

**Julius Ballanco, PE, CPD, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies, requests Approval as Modified by this Public Comment.**

**Further modify proposal as follows:**

~~**504.6.5**~~ **504.6.4.1.1 Exhaust duct length reduction.** The maximum length of the exhaust duct shall be reduced in accordance with Table 504.6.54.1.1.

**TABLE 504.6.5 504.6.4.1.1  
DRYER EXHAUST DUCT FITTING EQUIVALENT LENGTH**

Dryer Exhaust Duct Fitting Type	Equivalent Length (feet)
4" radius mitered 45 degree elbow	2-1/2
4" radius mitered 90 degree elbow	5
6" radius smooth 45 degree elbow	1
6" radius smooth 90 degree elbow	1-3/4
8" radius smooth 45 degree elbow	1
8" radius smooth 90 degree elbow	1-7/12
10" radius smooth 45 degree elbow	3/4
10" radius smooth 90 degree elbow	1-1/2

(Renumber subsequent sections)

(Portions of proposal not shown remain unchanged)

**Committer's Reason:** There was confusion regarding the applicability of the equivalent duct length for duct fittings. The equivalent duct length only applies to the specified dryer duct lengths. It would not apply to duct lengths specified by the manufacturer in their listing. The listing would identify the number of elbows permitted and the equivalent duct length. By changing the number of the section, this section would become a subsection of the specific length section.

*Public Comment 2:*

**Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.**

**Further modify proposal as follows:**

**504.6.1 (IFGC [M]614.6.1) Material and size.** Exhaust ducts shall have a smooth interior finish and shall be constructed of ~~metal~~ steel having a minimum thickness of ~~0.016-inch (0.4 mm)~~ 0.0157-inches (.3950 mm) (No. 28 Gage) thick. The exhaust duct size shall be 4-inches nominal in diameter.

**504.6.2 (IFGC [M] 614.6.2) Duct installation.** Exhaust ducts shall be supported at ~~4-12-foot~~ 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 into the inside of the duct~~

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The language in 504.6.1 is consistent with language in M-16 which was approved. Proposed 504.6.2 violates the SMACNA Standard for hanger spacing and the last sentence also violates 504.4 in that tape alone is not a means of connection for dryer vents. Duct cleaning firms are having fits because the ducts are coming apart requiring them to open up finished walls to repair them thereby creating added expense and unhappy customers.

*Public Comment 3:*

**Guy Tomberlin, Fairfax County, VA, representing the VA Plumbing and Mechanical Inspectors Association and VA Building and Code Officials Association, requests Approval as Modified by this Public Comment.**

**Further modify proposal as follows:**

**504.6 (IFGC [M] 614.6) Domestic clothes dryer exhaust ducts.** Exhaust ducts for domestic clothes dryers shall conform to the requirements of Sections 504.6.1 through ~~504.6.7~~ 504.6.6.

**504.6.4 Duct length.** The maximum allowable exhaust duct length shall be determined by one of the methods specified in Sections 504.6.4.1 or 504.6.4.2.

**504.6.4.1 (IFGC [M] 614.6.4.1) Specified length.** The maximum length of the exhaust duct shall be 25 feet (7620mm) from the connection to the transition duct from the dryer to the outlet terminal. Where fittings are utilized, the maximum length of the exhaust duct shall be reduced in accordance with Table 504.6.4.1.

**TABLE 504.6.4.1 (IFGC [M]TABLE 614.6.4.1)  
DRYER EXHAUST DUCT FITTING EQUIVALENT LENGTH**

**(No change to table contents)**

**504.6.4.2 (IFGC [M] 614.6.4.2) Manufacturer's instructions.** The maximum length of the exhaust duct shall be determined by the dryer manufacturer's installation instructions. The code official shall be provided with a copy of the installation instructions for the make and model of the dryer. Where the exhaust duct is to be concealed, the installation instructions shall be provided to the code official prior to the concealment inspection. In the absence of fitting equivalent length calculations from the clothes dryer manufacturer, Table 504.6.4.1 shall be utilized.

~~**504.6.5 (IFGC [M] 614.6.5) Exhaust duct length reduction.** The maximum length of the exhaust duct shall be reduced in accordance with Table 504.6.5.~~

**504.6.5 (IFGC [M] 614.6.5) Length identification.** Where the exhaust duct is concealed within the building construction, the equivalent length of the exhaust duct shall be identified on a permanent label or tag. The label or tag shall be located within 6 feet of the exhaust duct connection.

**504.6.7.6 (IFGC [M] 614.6.6) Exhaust duct required.** Where ~~facilities space~~ space for a clothes dryer ~~are is~~ provided, an exhaust duct system shall be installed. Where the clothes dryer is not installed at the time of occupancy, the exhaust duct shall be capped at the location of the future dryer.

Exception: Where a listed condensing clothes dryer is installed prior to occupancy of structure.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** Some of the proposed modification is formatting. For example the table as referenced in the original proposal appears to be a third option for exhaust duct lengths, but the reality is it is nothing more than a tool to be used with the other alternatives, it just can't be used alone. It has been relocated under the first option with a newly added reference for maximum distances, because it is mainly utilized in conjunction with the standard 25 foot measurement. The modified text includes added direction if a manufacturer fails to provide fitting allowances within their installation instructions, which makes the connection with option number two for using the installation instructions.

Another modification was to replace the term facilities with the term space. This is a clarification if a "space " is left next to a washer then it could easily be determined it would be for a dryer and exhaust duct must be installed. But the existing term would ask if the area next to a washer is left open is it a "facility?"

The next modification would require that if a future exhaust duct is required to be in place then it must be capped or plugged and identified. The reason for the cap or plug is to better comply with the energy code. Leaving a 4 inch duct in place that terminates to the outdoors and may not get used for several years simply goes against energy code philosophy. Yes a backdraft damper is required but a substantial amount of air can still travel through such a conduit directly to the outdoors. Also this makes it clear to cap off the duct at the inside origination point not the outside termination where someone might not know the cap is in place. And the third improvement for future exhaust duct requirements is if someone wants to utilize a listed condensing dryer, only in order to take advantage of this exception the dryer must be in place for occupancy. This will prevent not installing the duct and just saying that a condensing unit "will be" installed at some point.

Final Action:                    AS                    AM                    AMPC\_\_\_\_                    D

## M30-07/08, Part II

IRC M1502.3, M1502.3.1 (New), M1502.3.2 (New), M1502.3.3 (New), M1502.3.4 (New), M1502.3.4.1 (New), M1502.3.4.2 (New), M1502.3.4.3 (New), M1502.3.5 (New), Table M1502.3.5 (New), M1502.3.6 (New), M1502.3.7 (New), M1502.4, M1502.5, M1502.6, M1502.3 (New)

*Proposed Change as Submitted:*

**Proponent:** Julius Ballanco, PE, JB Engineering and Code Consulting, PC, representing In-O-Vate Technologies

### PART II – IRC-M

**Delete and substitute as follows:**

~~**M1502.3 Duct size.** The diameter of the exhaust duct shall be as required by the clothes dryer's listing and the manufacturer's installation instructions.~~

~~**M1502.4 Transition ducts.** Transition ducts shall not be concealed within construction. Flexible transition ducts used to connect the dryer to the exhaust duct system shall be limited to single lengths, not to exceed 8 feet (2438 mm) and shall be listed and labeled in accordance with UL 2158A.~~

~~**M1502.5 Duct construction.** Exhaust ducts shall be constructed of minimum 0.016-inch thick (0.4 mm) rigid metal ducts, having smooth interior surfaces with joints running in the direction of air flow. Exhaust ducts shall not be connected with sheet metal screws or fastening means which extend into the duct.~~

~~**M1502.6 (Supp) Duct length.** The maximum length of a clothes dryer exhaust duct shall not exceed 35 feet (10668 mm) from the dryer location to the wall or roof termination. The maximum length of the duct shall be reduced 2.5 feet (762 mm) for each 45-degree (0.8 rad) bend and 5 feet (1524 mm) for each 90-degree (1.6 rad) bend. The maximum length of the exhaust duct does not include the transition duct.~~

#### **Exceptions:**

- ~~1. Where the make and model of the clothes dryer to be installed is known and the manufacturer's installation instructions for the dryer are provided to the building official, the maximum length of the exhaust duct, including any transition duct, shall be permitted to be in accordance with the dryer manufacturer's installation instructions.~~
- ~~2. Where large radius 45-degree (0.8 rad) and 90-degree (1.6 rad) bends are installed, the equivalent length of the clothes dryer exhaust duct for each bend shall be as provided in the fitting manufacturer's installation instructions. The engineering calculation used by the manufacturer of such fittings shall be in accordance with the ASHRAE Fundamentals Handbook.~~

**M1502.3 Dryer exhaust ducts.** Dryer exhaust ducts shall conform to the requirements of Sections M1502.3.1 through M1502.3.7.

**M1502.3.1 Material and size.** Exhaust ducts shall have a smooth interior finish and shall be constructed of metal a minimum 0.016-inch (0.4 mm) thick. The exhaust duct size shall be 4 inches nominal in diameter.

**M1502.3.2 Duct installation.** Exhaust ducts shall be supported at 4 foot 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 into the inside of the duct.

**M1502.3.3 Transition duct.** Transition ducts used to connect the dryer to the exhaust duct system shall be a single length that is listed and labeled in accordance with UL 2158A. Transition ducts shall be a maximum of 8 feet in length. Transition ducts shall not be concealed within construction.

**M1502.3.4 Duct length.** The maximum allowable exhaust duct length shall be determined by one of the methods specified in Sections M1502.3.4.1 through M1502.3.4.3.

**M1502.3.4.1 Specified length.** The maximum length of the exhaust duct shall be 25 feet (7620mm) from the connection to the transition duct from the dryer to the outlet terminal.

**M1502.3.4.2 Manufacturer's instructions.** The maximum length of the exhaust duct shall be determined by the dryer manufacturer's installation instructions. The code official shall be provided with a copy of the installation instructions for the make and model of the dryer.

**M1502.3.4.3 Booster fan.** The maximum length of the exhaust duct shall be determined by the booster fan manufacturer's installation instructions. Booster fans shall be listed and labeled for use in dryer exhaust duct systems. The booster fan shall be installed in accordance with the manufacturer's installation instructions.

**M1502.3.5 Exhaust duct length reduction.** The maximum length of the exhaust duct shall be reduced in accordance with Table M1502.3.5.

**TABLE M1502.3.5  
DRYER EXHAUST DUCT FITTING EQUIVALENT LENGTH**

Dryer Exhaust Duct Fitting Type	Equivalent Length (feet)
4" radius mitered 45 degree elbow	2-1/2
4" radius mitered 90 degree elbow	5
6" radius smooth 45 degree elbow	1
6" radius smooth 90 degree elbow	1-3/4
8" radius smooth 45 degree elbow	1
8" radius smooth 90 degree elbow	1-7/12
10" radius smooth 45 degree elbow	3/4
10" radius smooth 90 degree elbow	1-1/2

**M1502.3.6 Length identification.** Where the exhaust duct is concealed within the building construction, the equivalent length of the exhaust duct shall be identified on a permanent label or tag. The label or tag shall be located within 6 feet of the exhaust duct connection.

**M1502.3.7 Exhaust duct required.** Where facilities for a clothes dryer are provided, an exhaust duct system shall be installed.

**Reason (Part II):** Over the past few code change cycles, the requirements for dryer exhaust venting has been subject to extensive changes. As a result, the requirements are not properly coordinated. The only feasible means of correctly the text is to provide all new language that is coordinated and contains all of the technically correct requirements.

The initial section establishes that the following section apply to dryer exhaust ducts. The specific requirements are found in the remaining section.

Section M1502.3.1 has the requirements for a metal duct as currently found in the code. The change is the requirements for the duct to be 4 inches nominal in diameter. A mm equivalent is not provided since it is a nominal dimension. The current code requires a 4 inch minimum. However, if the duct is increased to 5 inch, the velocity in the exhaust duct drops significantly. The larger duct will not provide the minimum velocity to remove the moisture and any lint that gets into the exhaust duct.

Section M1502.3.2 identifies a new requirement for support. Other than having an arbitrary statement, the support is required every 4 feet. This is a typical spacing for supporting a 4 inch duct with insert joints. The other change is to the proper terminology. Male end is no longer used in the profession. It is either an insert end or in the case of threads an outside thread.

Section M1502.3.3 simply isolates the requirements for a transition duct. The current text is often missed since it is located within a section of exhaust duct length. The UL standard is currently listed in the Residential Code, but not the Mechanical Code.

Section M1502.3.4 provides the three options for maximum exhaust duct length. The first requirement is 25 feet with is the current requirement in the Mechanical Code and Fuel Gas Code. While the Residential Code has a 35 foot limitation, this distance is incorrect. Stack type washers and dryers stipulate a maximum length of 25 feet. Hence, the length cannot be listed as 35 feet.

When the dryer has been specified, the manufacturer's instructions can be used to determine the dryer vent length. This is currently written as an exception; however, it is really an option. The requirements are the same as the current code.

The third viable method is power venting using a dryer booster fan. The new requirement stipulates that the dryer booster fan manufacturer determines the exhaust duct length. The requirements also state that the booster fan must be listed and label; and installed in accordance with the manufacturer's installation instructions. Listed booster fans are a viable method of extending the length of the duct.

Section M1502.3.5 lists the equivalent lengths of various fittings. The newer fittings were determined based on an analysis using the ASHRAE and SMACNA fitting tables. The equivalent length table assumes that the current requirement in the code is accurate.

The identification is listed in Section M1502.3.6. The new requirement is that the label or tag must be located within 6 feet of the exhaust duct connection. The distance is based on the maximum distance the gas valve can be located from a gas dryer. Since this has been used to determine close proximity for a gas valve, it is appropriate to use the same distance for close proximity for a label.

The last section requires an exhaust duct when a dryer connection is present in a building. This is the intent of the current rough-in section.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**PART II – IRC-M  
Committee Action:**

**Disapproved**

**Committee Reason:** The standard for dryer exhaust duct ventilators in proposed Section M1502.3.4.3 is not yet approved. There was no technical justification for reducing the maximum duct length from 35 feet to 25 feet.

**Assembly Action:**

**None**

*Individual Consideration Agenda*

**This item is on the agenda for individual consideration because public comments were submitted.**

Public Comment 1:

**Julius Ballanco, PE, CPD, JB Engineering and Code Consulting, P.C., representing In-O-Vate Technologies, requests Approval as Modified by this Public Comment.**

Modify proposal as follows:

~~M1502.3.4.3 Booster fan.~~ The maximum length of the exhaust duct shall be determined by the booster fan manufacturer's installation instructions. ~~Booster fans shall be listed and labeled for use in dryer exhaust duct systems. The booster fan shall be installed in accordance with the manufacturer's installation instructions.~~

~~M1502.3.5 M1502.4.1.1 Exhaust duct length reduction.~~ The maximum length of the exhaust duct shall be reduced in accordance with Table M1502.3.54.1.1.

**M1502.3.5 M1502.4.1.1 DRYER EXHAUST DUCT FITTING EQUIVALENT LENGTH**

Dryer Exhaust Duct Fitting Type	Equivalent Length (feet)
4" radius mitered 45 degree elbow	2-1/2
4" radius mitered 90 degree elbow	5
6" radius smooth 45 degree elbow	1
6" radius smooth 90 degree elbow	1-3/4
8" radius smooth 45 degree elbow	1
8" radius smooth 90 degree elbow	1-7/12
10" radius smooth 45 degree elbow	3/4
10" radius smooth 90 degree elbow	1-1/2

(Renumber subsequent sections)

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The standard on booster fans, now called dryer exhaust duct power ventilators, is not completed. Until this standard is completed it would be inappropriate to include the reference.

By adding this modification, the change becomes consistent with the language proposed for the IMC.

The change in the number of the dryer duct fitting system will clarify that this section applies to specific duct lengths, not listed lengths. That was never the intent of the section.

Public Comment 2:

**Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.**

Modify proposal as follows:

**M1502.3.1 Material and size.** Exhaust ducts shall have a smooth interior finish and shall be constructed of ~~metal steel~~ having a minimum thickness of ~~0.016-inch (0.4 mm)~~ 0.0157-inches (.3950 mm) (No. 28 Gage), thick. The exhaust duct size shall be 4-inches nominal in diameter.

**M1502.3.2 Duct installation.** Exhaust ducts shall be supported at ~~4-~~ 12-foot 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 into the inside of the duct~~

**M1502.3.4.1 (IFGC [M] 614.6.4.1) Specified length.** The maximum length of the exhaust duct shall be ~~25 feet (7620 mm)~~ 35-feet (10668 mm) from the connector to the transition duct from the dryer to the outlet terminal.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The language in M1502.3.1 is consistent with language in M-16 Part II which was approved. Proposed M1502.3.2 violates the SMACNA Standard for hanger spacing and the last sentence also violates M1502.5 in that tape alone is not a means of connection for dryer vents. Duct cleaning firms are having fits because the ducts are coming apart requiring them to open up finished walls to repair them thereby creating added expense and unhappy customers. The 35-foot dimension is consistent with what is already in the code.

Public Comment 3:

**Guy Tomberlin, Fairfax County, VA, representing the VA Plumbing and Mechanical Inspectors Association and VA Building and Code Officials Association, requests Approval as Modified by this Public Comment.**

Modify proposal as follows:

**M1502.3 Dryer exhaust ducts.** Dryer exhaust ducts shall conform to the requirements of Sections M1502.3.1 through M1502.3.76.

**M1502.3.4 Duct length.** The maximum allowable exhaust duct length shall be determined by one of the methods specified in Sections M1502.3.4.1 ~~through~~ or M1502.3.4.32.

**M1502.3.4.1 Specified length.** The maximum length of the exhaust duct shall be 25 feet (7620mm) from the connection to the transition duct from the dryer to the outlet terminal. Where fittings are utilized, the maximum length of the exhaust duct shall be reduced in accordance with Table M1502.3.4.1.

**TABLE M1502.3.4.51  
DRYER EXHAUST DUCT FITTING EQUIVALENT LENGTH**

(No change to table contents)

**M1502.3.4.2 Manufacturer's instructions.** The maximum length of the exhaust duct shall be determined by the dryer manufacturer's installation instructions. The code official shall be provided with a copy of the installation instructions for the make and model of the dryer at the concealment inspection. In the absence of fitting equivalent length calculations from the clothes dryer manufacturer, Table M1502.3.4.1 shall be utilized.

~~**M1502.3.4.3 Booster fan.** The maximum length of the exhaust duct shall be determined by the booster fan manufacturer's installation instructions. Booster fans shall be listed and labeled for use in dryer exhaust duct systems. The booster fan shall be installed in accordance with the manufacturer's installation instructions.~~

~~**M1502.3.5 Exhaust duct length reduction.** The maximum length of the exhaust duct shall be reduced in accordance with Table M1502.3.5.~~

**M1502.3.6 5 Length identification.** Where the exhaust duct is concealed within the building construction, the equivalent length of the exhaust duct shall be identified on a permanent label or tag. The label or tag shall be located within 6 feet of the exhaust duct connection.

**M1502.3.7 6 Exhaust duct required. Exhaust duct required.** Where ~~facilities~~ space for a clothes dryer ~~are~~ is provided, an exhaust duct system shall be installed. Where the clothes dryer is not installed at the time of occupancy, the exhaust duct shall be capped at the location of the future dryer.

**Exception:** Where a listed condensing clothes dryer is installed prior to occupancy of structure.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** Some of the proposed modification is formatting. For example the table as referenced in the original proposal appears to be a third option for exhaust duct lengths, but the reality is it is nothing more than a tool to be used with the other alternatives, it just can't be used alone. It has been relocated under the first option with a newly added reference for maximum distances, because it is mainly utilized in conjunction with the standard 25 foot measurement. The modified text includes added direction if a manufacturer fails to provide fitting allowances within their installation instructions, which makes the connection with option number two for using the installation instructions.

Another modification was to replace the term facilities with the term space. This is a clarification if a "space " is left next to a washer then it could easily be determined it would be for a dryer and exhaust duct must be installed. But the existing term would ask if the area next to a washer is left open is it a "facility?"

The next modification would require that if a future exhaust duct is required to be in place then it must be capped or plugged and identified. The reason for the cap or plug is to better comply with the energy code. Leaving a 4 inch duct in place that terminates to the outdoors and may not get used for several years simply goes against energy code philosophy. Yes a backdraft damper is required but a substantial amount of air can still travel through such a conduit directly to the outdoors. Also this makes it clear to cap off the duct at the inside origination point not the outside termination where someone might not know the cap is in place. And the third improvement for future exhaust duct requirements is if someone wants to utilize a listed condensing dryer, only in order to take advantage of this exception the dryer must be in place for occupancy. This will prevent not installing the duct and just saying that a condensing unit "will be" installed at some point.

Final Action:                    AS                    AM                    AMPC\_\_\_\_                    D

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## M31-07/08

### 504.6.1 (IFGC [M] 614.6.1)

*Proposed Change as Submitted:*

**Proponent:** Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

**Revise as follows:**

**504.6.1 (IFGC [M] 614.6.1) (Supp) Maximum length.** The maximum length of a clothes dryer exhaust duct shall not exceed ~~25 feet (7620 mm)~~ 35 feet (10668 mm) from the dryer location to the outlet terminal. The maximum length of the duct shall be reduced 2 1/2 feet (762 mm) for each 45 degree (0.79 rad) bend and 5 feet (1524 mm) for each 90 degree (1.6 rad) bend. The maximum length of the exhaust duct does not include the transition duct.

**Exception:** Where the make and model of the clothes dryer to be installed is known and the manufacturer's installation instructions for such dryer are provided to the code official, the maximum length of the exhaust duct, including any transition duct, shall be permitted to be in accordance with the dryer manufacturer's installation instructions. Where exhaust ducts are installed in concealed locations, the developed length of the exhaust duct system shall be indicated by permanent labels or tags installed in an observable location.

**Reason:** This section is outdated and overly restrictive when compared to the dryers being built today. The distances permitted by the manufacturers far exceed the distances permitted by the code. By permitting the longer lengths, greater flexibility is achieved in laundry-room placement with-in the building. This will also help in eliminating the use of booster fans which could affect drying cycles. Following are some examples of allowable dryer lengths by various manufacturers extracted from their instructions. Also included are some older unit lengths, all of which are at least 15 years old. The committee passed this last cycle overwhelmingly but was narrowly defeated by the membership for the fear that there may be a machine that would not comply with the longer length. These machines are being removed from service as time goes on in favor of more efficient machines. The analogy of (If keeping this dimension artificially low would save the life of just one dryer, wouldn't it be worth it?) The answer would be NO. The IRC committee approved this last cycle and it was not challenged. It is very important the two books read the same.

**Maytag dryers:**

- 65 feet with 0 elbows
- 54 feet with 1 elbow
  
- 44 feet with 2 elbows
- 36 feet with 3 elbows
- 28 feet with 4 elbows

**Amana/ Speed Queen dryers**

- 44 feet with 0 elbows
- 34 feet with 1 elbows
  
- 26 feet with 2 elbows
- 20 feet with 3 elbows

**OLDER MODELS:**

- Maytag, 1990**
- 50 feet with 0 elbows
  
- 42 feet with 1 elbow
- 34 feet with 2 elbows
- 26 feet with 3 elbows

**Whirlpool dryers**

- 64 feet with 0 elbows
- 54 feet with 1 elbow
- 44 feet with 2 elbows
- 34 feet with 3 elbows
- 27 feet with 4 elbows

**Fridgidare / Westinghouse / Tappen / Gibson**

- 60 feet with 0 elbows
- 52 feet with 1 elbow
- 44 feet with 2 elbows
- 32 feet with 3 elbows

**Whirlpool, 1991**

- 58 feet with 0 elbows
- 48 feet with 1 elbow
- 38 feet with 2 elbows
- 29 feet with 3 elbows
- 21 feet with 4 elbows

**Kenmore dryers**

- 64 feet with 0 elbows
- 54 feet with 1 elbow
- 44 feet with 2 elbows
- 34 feet with 3 elbows
- 27 feet with 4 elbows

**Magic Chef/Admiral/Norge**

- 45 feet with 0 elbows
- 35 with 1 elbows
- 25 with 2 elbows

**Kenmore, 1988**

- 22 feet with 3 elbows

**General Electric dryers:**

- 90 feet with 0 elbows
- 60 feet with 1 elbow
- 45 feet with 2 elbows
- 35 feet with 3 elbows

**Camco/Moffat/McClary**

- 45 feet with 0 elbows
- 35 feet with 1 elbow
- 25 feet with 2 elbows

**Throm**

- 55 feet with 0 elbows
- 47 feet with 1 elbow
- 41 feet with 2 elbows
- 30 feet with 3 elbows
- 22 feet with 4 elbows

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Committee Action:**

**Disapproved**

**Committee Reason:** There are many clothes dryers still on the market that are not designed for more than 25 feet of exhaust duct length, including stackable washer/dryer combinations that are prevalent in condominiums. The existing exception already allows for the longer duct lengths when allowed by the manufacturer's instructions.

**Assembly Action:**

**None**

*Individual Consideration Agenda*

**This item is on the agenda for individual consideration because public comments were submitted.**

*Public Comment 1:*

**Charles Gerber, Henrico County, VA, representing the VA Plumbing and Mechanical Inspectors Association and VA Building and Code Officials Association, requests Approval as submitted.**

**Commenter's Reason:** The committee's reason for disapproval was simply that there are existing dryers that are not designed to push air through the vent more than 25 feet. Even though this statement may be true, it is irrelevant because in today's housing market, the location of the dryer is designed to have a minimal impact on habitable space, not to be within any certain distance to an outside wall. The house built in 2008 is roughly two to three times bigger than the house built in 1970. The dryers are therefore much further from a point of discharge than 25 feet. This dryer vent length is a maximum, not minimum. It will not prohibit the use of dryers capable of pushing air only 25 feet as long as the vent does not exceed 25 feet from their discharge.

Please approve this change as submitted to change a distance that is outdated.

*Public Comment 2:*

**Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Submitted.**

**Commenter's Reason:** Provided that the 35 foot dimension is published in the IRC, it is of utmost importance that the IMC be consistent with that document. How will we answer the fact that two residences built side by side have two different requirements for dryer duct lengths? The building community will conclude that **we did not do our job**. Testimony in opposition stated that some stackable dryers could not meet the increased length requirement. Although this is true, it is an extremely low percentage that simply isn't justifiable. Ninety-nine percent of the units produced exceed this length by a great deal. Those units that cannot meet this requirement must be installed according to the manufacturer's instructions. The code already stipulates this. There was some testimony regarding stackables in apartments. There is plenty of time in the design stage to choose appliances that work with various duct lengths so that argument doesn't hold up. Booster fans are on there way back but that doesn't mean they are the answer to all of our problems, they cost money and present access issues. Some of the opposition revolved around the fact that less long radius stamped elbows would be sold if this proposal goes to print. This is a fact, but special interests should not be a factor for disapproval. Please consider this proposal, especially if the length remains in the IRC.

*Public Comment 3:*

**John Stelzenmueller, City of Tualatin, OR, representing the Oregon Mechanical Officials Association, requests Approval as Submitted.**

**Commenter's Reason:** The proposal to increase the dryer duct length from 25 feet to 35 feet was approved during the last code cycle because dryer manufacturers allow for such length. This length should be allowed to continue due to the fact that most modern dryer manufacturer's installation instructions indicate the 35-foot exhaust duct length is acceptable. House designers have for years designed their houses with laundry rooms placed in areas of the house that fits the aesthetic design. The 25-foot length was always a problem and required the exhaust ducts to be placed in many questionable locations with terminations that, many times, extended through foundation vents. If the dryer manufacturer doesn't allow the exhaust duct to extend to 35 then the installation instructions will prevail. The manufacturers should be allowed to market their product based on their design.

Final Action:                      AS                      AM                      AMPC \_\_\_\_                      D

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## **M33-07/08, Part I**

### **504.6.3 (New) [IFGC [M] 614.6.3 (New)]**

*Proposed Change as Submitted:*

**Proponent:** Proponent: John Neff, Washington State Building Code Council

#### **PART I – IMC**

**Add new text as follows:**

**504.6.3 (IFGC [M] 614.6.3) Protection required.** Protective shield plates shall be placed where nails or screws from finish or other work are likely to penetrate the clothes dryer exhaust duct. Shield plates shall be placed on the finished face of all framing members where there is less than 1-1/4 inches (32 mm) between the duct and the finished face of the framing member. The shield plate shall be steel not less than 1/16 inch (1.59 mm) in thickness. The shield plate shall extend to protect the entire width of the duct.

**Reason:** The purpose of this proposal is to ensure that combustible lint will not collect in the dryer duct, producing a risk of fire. If the duct is penetrated by a screw or nail, the "smooth interior finish" is compromised and a collection point is formed. Temperatures in the ducts can get high, especially when the duct is clogged and air flow is reduced.

**Cost Impact:** The code change proposal will not increase the cost of construction.

#### **PART I – IMC**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal goes beyond the protection requirements already in the code in Section 305.5 and would require protection in areas that do not normally require it. The proposal could add to construction costs beyond the value added by the plates.

**Assembly Action:**

**None**

#### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because public comments were submitted.**

*Public Comment 1:*

**Charles Gerber, Henrico County, VA, representing the VA Plumbing and Mechanical Inspectors Association and VA Building and Code Officials Association, requests Approval as Submitted.**

**Commenter's Reason:** The committee's reason for disapproval was not totally incorrect, but not sound enough to warrant disapproval. This added requirement gives the user better guidance for installation, which is what code changes should do. If the user has to go beyond the section being used for direction and code compliance, things may get overlooked or not installed correctly. Shouldn't the code be a document that is user friendly for everyone who uses it?

That is what this change does. Contrary to the committee's remarks, it is no more restrictive than section 305.5 in the IMC. It just puts the protection of dryer ducts in the section for dryer ducts. As far as the other remark about guidance for the maximum fastener lengths, this change does give guidance. In the last line of the change it requires the shield to extend the entire width of the duct for protection. Please support this harmless but necessary and useful change.

*Public Comment 2:*

**John Neff, Washington State Building Code Council, requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**504.6.3 (IFGC [M]614.6.3) Protection required.** Protective shield plates shall be placed where nails or screws from finish or other work are likely to penetrate the clothes dryer exhaust duct. Shield plates shall be placed on the finished face of all framing members where there is less than 1-1/4 inches (32 mm) between the duct and the finished face of the framing member. ~~The shield plate shall be steel not less than 1/16 inch (1.59 mm) in thickness. The shield plate shall extend to protect the entire width of the duct.~~ Protective shield plates shall be constructed of steel, shall have a thickness of 0.062-inch (1.6 mm) and shall extend a minimum of 2 inches above sole plates and below top plates.

**Commenter's Reason:** The purpose of this proposal is to ensure that combustible lint will not collect in the dryer duct, producing a risk of fire. If the duct is penetrated by a screw or nail, the "smooth interior finish" is compromised and a collection point is formed. Temperatures in the ducts can get high, especially when the duct is clogged and air flow is reduced. Section 305.5 addresses piping only and not ducts. This language is necessary to extend that same protection to dryer ducts.

Final Action:                      AS                      AM                      AMPC \_\_\_\_                      D

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**M33-07/08, Part II  
IRC M1502.7 (New)**

*Proposed Change as Submitted:*

**Proponent:** John Neff, Washington State Building Code Council

**PART II – IRC**

**Add new text as follows:**

**M1502.7 Protection required.** Protective shield plates shall be placed where nails or screws from finish or other work are likely to penetrate the clothes dryer exhaust duct. Shield plates shall be placed on the finished face of all framing members where there is less than 1-1/4 inches (32 mm) between the duct and the finished face of the framing member. The shield plate shall be steel not less than 1/16 inch (1.59 mm) in thickness. The shield plate shall extend to protect the entire width of the duct.

**Reason:** The purpose of this proposal is to ensure that combustible lint will not collect in the dryer duct, producing a risk of fire. If the duct is penetrated by a screw or nail, the "smooth interior finish" is compromised and a collection point is formed. Temperatures in the ducts can get high, especially when the duct is clogged and air flow is reduced.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**PART II – IRC-M**

**Committee Action:**

**Disapproved**

**Committee Reason:** Protection from fasteners penetrating walls is already covered in Section M1308.2. This proposal provided no prescriptive requirements to provide any guidance to the user such as maximum fastener lengths.

**Assembly Action:**

**None**

*Individual Consideration Agenda*

**This item is on the agenda for individual consideration because public comments were submitted.**

Public Comment 1:

**Charles Gerber, Henrico County, VA, representing the VA Plumbing and Mechanical Inspectors Association and VA Building and Code Officials Association, requests Approval as submitted.**

**Commenter's Reason:** The committee's reason for disapproval was not totally incorrect, but not sound enough to warrant disapproval. This added requirement gives the user better guidance for installation, which is what code changes should do. If the user has to go beyond the section being used for direction and code compliance, things may get overlooked or not installed correctly. Shouldn't the code be a document that is user friendly for everyone who uses it?

That is what this change does. Contrary to the committee's remarks, it is no more restrictive than section M1308.2 in the IRC. It just puts the protection of dryer ducts in the section for dryer ducts. As far as the other remark about guidance for the maximum fastener lengths, this change does give guidance. In the last line of the change it requires the shield to extend the entire width of the duct for protection. Please support this harmless but necessary and useful change.

Public Comment 2:

**John Neff, Washington State Building Code Council, requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**M1502.7 Protection required.** Protective shield plates shall be placed where nails or screws from finish or other work are likely to penetrate the clothes dryer exhaust duct. Shield plates shall be placed on the finished face of all framing members where there is less than 1-1/4 inches (32 mm) between the duct and the finished face of the framing member. ~~The shield plate shall be steel not less than 1/16 inch (1.59 mm) in thickness. The shield plate shall extend to protect the entire width of the duct.~~ Protective shield plates shall be constructed of steel, shall have a thickness of 0.062-inch thick (1.6 mm) and shall extend a minimum of 2 inches above sole plates and below top plates.

**Commenter's Reason:** The purpose of this proposal is to ensure that combustible lint will not collect in the dryer duct, producing a risk of fire. If the duct is penetrated by a screw or nail, the "smooth interior finish" is compromised and a collection point is formed. Temperatures in the ducts can get high, especially when the duct is clogged and air flow is reduced. Section M1308.2 addresses piping only and not ducts. This language is necessary to extend that same protection to dryer ducts.

Final Action:                    AS                    AM                    AMPC\_\_\_\_                    D

## M34-07/08

### 504.8 (New) [IFGC [M] 614.8 (New)]

*Proposed Change as Submitted:*

**Proponent:** Guy Tomberlin, Fairfax County, VA, representing the Virginia Plumbing & Mechanical Inspectors Association/the Virginia Building and Code Officials Association

**Add new text as follows:**

**504.8 (IFGC [M] 614.8) Common exhaust systems for clothes dryers located in multi-story structures.**  
Where a common multi-story duct system is designed and installed to convey exhaust from multiple clothes dryers, the construction of such system shall be in accordance with all of the following:

1. The shaft in which the duct is installed shall be constructed and fire-resistant-rated as required by the *International Building Code*.
2. Dampers shall be prohibited in the exhaust duct. Penetrations of the shaft and ductwork shall be protected in accordance with Section 607.5.5, Exception 2.
3. Rigid metal ductwork shall be installed within the shaft to convey the exhaust. The ductwork shall be constructed of not less than 24 gage sheet steel and in accordance with SMACNA Duct Construction Standards.
4. The ductwork within the shaft shall be designed and installed without offsets.
5. The exhaust fan motor design shall be in accordance with Section 503.2.
6. The exhaust fan motor shall be located outside of the airstream.
7. The exhaust fan shall run continuously, and shall be connected to a standby power source.
8. The exhaust fan operation shall be monitored in an approved location and shall initiate an audible or visual signal when the fan is not in operation.
9. Makeup air shall be provided for the exhaust system.
10. A cleanout opening shall be located at the base of the shaft to provide access to the duct to allow for cleaning and inspection. The finished opening shall be not less than 12 inches by 12 inches.
11. Screens shall not be installed at the termination.

**Reason:** This practice has been used successfully across the US for several decades. The use of a common shaft to exhaust multiple clothes dryers and the many variables associated with such construction has never been addressed by the model codes. In addition, there is no industry standard for this application or installation. Due to the incomplete model code guidance/ provisions and lack of any type industry standard lead to the development of this proposal to address the many details that are currently omitted by any recognized code/standard for this type installation.

1. This requirement assures the integrity of the structure is maintained.
2. This is consistent with current IBC Section 716.5.3.
3. There is no way to account for the many different variables that exist when this application is utilized. This restriction helps avoid the velocity reduction at any offsets due to friction. In addition any offsets create the possibility of unwanted lint accumulation.
4. This minimum requirement prohibits the potential for a design that may permit the use of the gypsum enclosure itself to serve as the exhaust passageway.
5. This requirement ensures that the proper fan will be utilized for this application. This will prohibit the use of a typical roof mounted dome type fan that are designed for typical bathroom exhaust.
6. This is a current requirement of 504 for commercial dryers.
7. Again this is the exact requirement from current IBC Section 716.5.3 and IMC Section 607.5.5.2.
8. This configuration relies on the fact that the fan located on the top of the vertical riser is actually working. Otherwise excessive lint accumulation will collect in the bottom of the riser and in any subducts that the lint happens to pass by on its way down.
9. The IMC requires this for exhaust systems the air exhausted must be replaced.
10. The duct cleaning industry has the technology to clean these systems from this one cleanout on the bottom of the riser and through the top where the fan is located.
11. This requirement is consistent with current IMC and the clothes dryer manufacturer's installation recommendations.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Committee Action:**

**Approved as Modified**

**Modify proposal as follows:**

**504.8 (IFGC [M]614.8) Common exhaust systems for clothes dryers located in multi-story structures.** Where a common multi-story duct system is designed and installed to convey exhaust from multiple clothes dryers, the construction of such system shall be in accordance with all of the following:

1. The shaft in which the duct is installed shall be constructed and fire resistant rated as required by the *International Building Code*.
2. Dampers shall be prohibited in the exhaust duct. Penetrations of the shaft and ductwork shall be protected in accordance with Section 607.5.5, Exception 2.
3. Rigid metal ductwork shall be installed within the shaft to convey the exhaust. The ductwork shall be constructed of ~~not less than 24-gage~~ sheet steel having a minimum thickness of (0.0187-inches) (0.4712 mm) (No. 26 gage) and in accordance with SMACNA Duct Construction Standards.
4. The ductwork within the shaft shall be designed and installed without offsets.
5. The exhaust fan motor design shall be in accordance with Section 503.2.
6. The exhaust fan motor shall be located outside of the airstream.
7. The exhaust fan shall run continuously, and shall be connected to a standby power source.
8. The exhaust fan operation shall be monitored in an approved location and shall initiate an audible or visual signal when the fan is not in operation.
9. Makeup air shall be provided for the exhaust system.
10. A cleanout opening shall be located at the base of the shaft to provide access to the duct to allow for cleaning and inspection. The finished opening shall be not less than 12 inches by 12 inches.
11. Screens shall not be installed at the termination.

**Committee Reason:** Common exhaust ducts for clothes dryers in multi-story buildings are frequently used and this code change adds some prescriptive requirements to allow the code official to ensure proper installation. The modification changes the gage of the duct material from 24 to 26 for consistency with the IBC fire safety requirements.

**Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Julius Ballanco, PE, CPD, JB Engineering and Code Consulting, P.C., representing HVI, requests Approval as Modified by this Public Comment.**

**Further modify proposal as follows:**

**504.8 Common exhaust systems for clothes dryers located in multi-story structures.** Where a common multi-story duct system is designed and installed to convey exhaust from multiple clothes dryers, the construction of such system shall be in accordance with all of the following:

1. The shaft in which the duct is installed shall be constructed and fire resistant rated as required by the shall conform to the International Building Code.

2. ~~Dampers, fire dampers and smoke dampers shall be prohibited in the exhaust duct. Penetrations of the shaft and ductwork shall be protected in accordance with Section 607.5.5, Exception 2.~~
3. ~~Rigid metal ductwork shall be installed within the shaft to convey the exhaust. The ductwork shall be constructed of sheet steel having a minimum thickness of (0.0187 inches) (0.471 mm) (No.26 gage) and in accordance with SMACNA Duct Construction Standards. The duct within the shaft shall be constructed of rigid metal and as specified in the SMACNA HVAC Duct Construction Standards-Metal and Flexible. The minimum duct thickness shall be 0.0187inches (0.471 mm) (No.26 gage). The duct shall be sized in accordance with accepted engineering practice.~~
4. ~~The ductwork within the shaft shall be designed and installed without offsets.~~
5. ~~4. The exhaust fan motor design shall be in accordance with Section 503.2 shall be specifically designed for the intended application and listed in accordance with UL 705. Motors located within the airstream shall be totally enclosed motors.~~
6. ~~The exhaust fan motor shall be located outside of the airstream.~~
7. ~~5. The exhaust fan shall run continuously, and shall be connected to a standby power source.~~
8. ~~6. The exhaust fan operation shall be monitored in an approved location and shall initiate an audible or visual signal when the fan is not in operation.~~
9. ~~7. Makeup air shall be provided in accordance with the requirements of Section 501.3 for the exhaust system.~~
10. ~~8. A cleanout opening shall be located at the base of the shaft to provide access to the duct to allow for cleaning and inspection. The finished opening shall be not less than 12 inches by 12 inches.~~
14. ~~9. Screens shall not be installed at the termination.~~

**Commenter's Reason:** HVI supports the addition of this section to the code. There are merely some editorial changes that clean up the section. This modification also eliminates some unnecessary requirements converting the section to performance oriented language.

Language is added regarding sizing. The proposed section had no sizing criteria. This could result in either the undersizing or oversizing of the duct.

An unnecessary section prohibits offsets for these systems. While that may sound nice, it is not always possible. If properly sized, there is no problem with having an offset in these systems.

The ventilators used for these systems are listed to UL 705. Therefore, it is appropriate to list this specific reference. Motors that are fully enclosed are considered to be outside the airstream. The modification clarify this.

Finally, there is clarification in Item #2 that dampers of any type are not permitted in this system.

Final Action:                    AS                    AM                    AMPC \_\_\_\_                    D

## M39-07/08

**506.3.6, 506.3.10, 506.3.10.1 (New), 506.3.10.2 (New), 506.3.10.3 (New), 506.3.10.4 (New)**

*Proposed Change as Submitted:*

**Proponent:** Tony Crimi, A.C. Consulting Solutions, inc., representing the International Firestop Council

### 1. Revise as follows:

~~**506.3.6**~~ **506.3.9 (Supp) Grease duct clearances.** Grease duct systems and exhaust equipment serving a Type I hood shall have a clearance to combustible construction of not less than 18 inches (457 mm), and shall have a clearance to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 3 inches (76 mm).

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

### 2. Delete and substitute as follows:

~~**506.3.10 (Supp) Grease duct enclosure.** A grease duct serving a Type I hood that penetrates a ceiling, wall or floor shall be enclosed from the point of penetration to the outlet terminal. A duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the *International Building Code*. Ducts shall be enclosed in accordance with the *International Building Code* requirements for shaft construction. The duct enclosure shall be sealed around the duct at the point of penetration and vented to the outside of the building through the use of weather protected openings. Clearance from the duct to the interior surface of enclosures of combustible construction shall be not less than 18 inches (457 mm). Clearance from the duct to the interior surface of enclosures of noncombustible construction or gypsum wall board attached to noncombustible structures shall be not less than 6 inches (152 mm). The duct enclosure shall serve a single grease exhaust duct system and shall not contain any other ducts, piping, wiring or systems.~~

#### **Exceptions:**

1. ~~The shaft enclosure provisions of this section shall not be required where a duct penetration is protected with a through-penetration firestop system tested and listed in accordance with ASTM E-814 or UL 1479 and having an "F" and "T" rating equal to the fire resistance rating of the assembly.~~

being penetrated. The surface of the duct shall be continuously covered on all sides from the point at which the duct originates to the outlet terminal. The duct shall be covered with a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose, in accordance with ASTM E2336. Such system shall be installed in accordance with the listing and the manufacturer's installation instructions. Exposed ductwrap systems shall be protected where subject to physical damage.

2. The shaft enclosure provisions of this section shall not be required where a duct penetration is protected with a through penetration firestop system tested in accordance with ASTM E 814 or UL 1479, having an "F" and "T" rating equal to the fire resistance rating of the assembly being penetrated and where a listed and labeled prefabricated duct system, listed for such purposes in accordance with UL 2221, is utilized. Such system shall be installed in accordance with the listing and the manufacturer's installation instructions.
3. A duct enclosure shall not be required for a grease duct that penetrates only a nonfire-resistance-rated roof/ceiling assembly.

**506.3.10 Grease Duct Enclosures.** A grease duct serving a Type I hood that penetrates a ceiling, wall or floor shall be enclosed from the point of penetration to the outlet terminal. A duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the *International Building Code*. Duct enclosures shall be either field-applied or prefabricated. Duct enclosures shall be as prescribed by Section 506.3.10.1, 506.3.10.2 or 506.3.10.3.

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

### 3. Add new text as follows:

**506.3.10.1 Shaft enclosure.** Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be permitted to be enclosed in accordance with the *International Building Code* requirements for shaft construction. Such grease duct systems and exhaust equipment shall have a clearance to combustible construction of not less than 18 inches (457 mm), and shall have a clearance to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 6 inches (76 mm). Duct enclosures shall be sealed around the duct at the point of penetration and vented to the outside of the building through the use of weather-protected openings.

**506.3.10.2 Field applied enclosure.** Field-applied grease duct enclosure assemblies shall consist of commercial kitchen grease ducts constructed in accordance with Section 506.3.1 enclosed by a field-applied grease duct enclosure that is a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose in accordance with ASTM E2336. The surface of the duct shall be continuously covered on all sides from the point at which the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-penetration firestop system classified in accordance with ASTM E 814 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer's installation instructions. Exposed duct wrap systems shall be protected where subject to physical damage.

**506.3.10.3 Prefabricated enclosure.** Prefabricated grease duct enclosure assemblies shall consist of listed commercial kitchen grease ducts constructed in accordance with Section 506.3.1. Such grease ducts shall be enclosed within a prefabricated grease duct enclosure assembly that is listed and labeled and specifically evaluated for such purpose in accordance with UL2221. Duct penetrations shall be protected with a through-penetration firestop system classified in accordance with ASTM E 814 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer's installation instructions.

**Reason:** The purpose of the proposed code change is to re-organize Section 506.3.10 to reflect changes made in the 2006 IMC cycle, and to consolidate and simplify the Grease duct clearances provisions with the grease duct enclosure provisions.

During the last several cycles, there has been a great deal of discussion regarding the appropriate reference to test methods for fire resistive grease duct enclosure systems. Both ASTM E 2336 and UL 2221 were added to the exceptions to clause 506.3.10. However, there continue to be confusion regarding the requirements relating to clearances versus the requirements regarding grease duct enclosure materials. This proposal seeks to consolidate and clarify the different approaches.

The purpose of submitting the proposed change is identified above. There is confusion in the application of the IMC requirements by designers and code users. Part of this confusion has been the fact that the grease duct clearance requirements were located in 506.3.6, while the grease duct enclosure provisions, which also talk about clearances from the duct to the interior surfaces of enclosures of combustible or non-combustible construction, are located in 506.3.10.

In addition, the reorganization separates the three options for construction of the grease duct enclosures into separate, stand-alone articles. Both ASTM E 2336 and UL 2221 were added to the exceptions to clause 506.3.10. In reality, the existing base requirement to use the shaft enclosure provisions should be treated as an independent option for construction of the grease duct enclosure rather than the base requirement, given that test methods now exist for testing fire-resistive grease duct enclosure systems specifically.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Committee Action:**

**Approved as Modified**

**Modify proposal as follows:**

**506.3.6.9 (Supp) Grease duct clearances.** Grease duct systems and exhaust equipment serving a Type I hood shall have a clearance to combustible construction of not less than 18 inches (457 mm), and shall have a clearance to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 3 inches (76 mm).

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

**506.3.10 Grease Duct Enclosures.** A grease duct serving a Type I hood that penetrates a ceiling, wall or floor shall be enclosed from the point of penetration to the outlet terminal. A duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the *International Building Code*. The duct enclosure shall serve a single grease duct and shall not contain other ducts, piping or wiring systems. Duct enclosures shall be sealed around the duct at the point of penetration and vented to the outside of the building through the use of weather-protected openings. Duct enclosures shall be either field-applied or prefabricated. Duct enclosures shall be as prescribed by Sections 506.3.10.1, 506.3.10.2 or 506.3.10.3.

**Exception:** ~~A duct enclosure shall not be required for a grease duct that penetrates only a non fire resistance rated roof/ceiling assembly.~~

**506.3.10.1 Shaft enclosure.** Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be permitted to be enclosed in accordance with the *International Building Code* requirements for shaft construction. Such grease duct systems and exhaust equipment shall have a clearance to combustible construction of not less than 18 inches (457 mm), and shall have a clearance to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 6 inches (76 mm).

**506.3.10.2 Field applied grease duct enclosure.** ~~Field applied grease duct enclosure assemblies shall consist of~~ Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be enclosed by a field-applied grease duct enclosure that is a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose in accordance with ASTM E2336. The surface of the duct shall be continuously covered on all sides from the point at which the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-penetration firestop system classified in accordance with ASTM E 814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer's installation instructions. Exposed duct wrap systems shall be protected where subject to physical damage.

**506.3.10.3 Prefabricated grease duct enclosure assemblies.** Prefabricated grease duct enclosure assemblies shall consist of listed commercial kitchen grease ducts constructed in accordance with Section 506.3.1. Such grease ducts shall be enclosed within a prefabricated grease duct enclosure assembly that is listed and labeled and specifically evaluated for such purpose in accordance with UL 2221. Duct penetrations shall be protected with a through-penetration firestop system classified in accordance with ASTM E 814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer's installation instructions.

**506.3.10.4 Duct enclosure not required.** A duct enclosure shall not be required for a grease duct that penetrates only a non fire-resistance-rated roof/ceiling assembly.

**Committee Reason:** This proposal appropriately reorganizes Section 506.3.10 to consolidate and clarify the various methods of enclosing grease ducts. Section 506.3.10 will now direct the user to one of three methods in the subsequent sections which each provide technical guidance for the particular method. The modification reverts Section 506.3.9 back to 506.3.6, adds back some language in Section 506.3.10 that was in the existing code language and inadvertently omitted, deletes the exception to Section 506.3.10 and moves it to a new Section 506.3.10.4, deletes redundant language in the first line of Section 506.3.10.2 and adds "shall be" for grammatical correctness and adds "or UL 1479" to follow ASTM E 814 which was in existing code language.

**Assembly Action:**

**Disapproved**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because an assembly action was successful and public comments were submitted.**

*Public Comment 1:*

**Tony Crimi, A.C. Consulting Solutions, Inc., representing International Firestop Council, requests Approval as Modified by this Public Comment.**

**Further modify proposal as follows:**

~~506.3.6~~ **506.3.9 (Supp) Grease duct clearances.** Grease duct systems and exhaust equipment serving a Type I hood shall have a clearance to combustible construction of not less than 18 inches (457 mm), and shall have a clearance to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 3 inches (76 mm).

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

**506.3.10.3 Prefabricated Factory-built grease duct enclosure assemblies.** ~~Prefabricated grease duct enclosure assemblies shall consist of listed commercial kitchen grease ducts constructed in accordance with Section 506.3.1. Such grease ducts shall be enclosed within a prefabricated grease duct enclosure assembly that is listed and labeled and specifically evaluated for such purpose in accordance with UL 2221. Factory-built grease duct assemblies incorporating integral enclosure materials shall be listed and labeled for use as commercial kitchen grease duct assemblies in accordance with UL 2221, and shall be installed from the point at which the duct originates to the outlet terminal.~~ Duct penetrations shall be protected with a through-penetration firestop system classified in accordance with ASTM E 814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such ~~systems assemblies~~ shall be installed in accordance with the listing and the manufacturer's installation instructions.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The purpose of the proposed code change is to re-locate 506.3.6 and re-organize Section 506.3.10 to reflect changes made in the 2006 IMC and 2007 Supplement cycle, in order to consolidate and simplify the Grease duct clearances provisions with the grease duct enclosure provisions. During the last several cycles, there has been a great deal of discussion regarding the appropriate reference to test methods for fire resistive grease duct enclosure systems. Both ASTM E 2336 and UL 2221 were added to the exceptions to clause 506.3.10. However, there continue to be confusion regarding the requirements relating to clearances versus the requirements regarding grease duct enclosure materials. This proposal seeks to consolidate and clarify the different approaches. In addition, some editorial changes have been incorporated to adapt the 2007 Supplement language into the format of M39-07/08.

**Substantiation:** The purpose of submitting the proposed change is identified above. There is confusion in the application of the IMC requirements by designers and code users. Part of this confusion has been the fact that the grease duct clearance requirements were located in 506.3.6, while the grease duct enclosure provisions, which also talk about clearances from the duct to the interior surfaces of enclosures of combustible or non-combustible construction, are located in 506.3.10.

In addition, the reorganization separates the three options for construction of the grease duct enclosures into separate, stand-alone articles. Both ASTM E 2336 and UL 2221 were added to the exceptions to clause 506.3.10. In reality, the existing base requirement to use the shaft enclosure provisions should be treated as an independent option for construction of the grease duct enclosure rather than the base requirement, given that test methods now exist for testing fire-resistive grease duct enclosure systems specifically.

*Public Comment 2:*

**Bob Eugene, Underwriters Laboratories, Inc., requests Approval as Modified by this Public Comment.**

**Further modify proposal as follows:**

**506.3.6 (Supp) Grease duct clearances.** ~~Where enclosures are not required, g~~Grease duct systems and exhaust equipment serving a Type I hood shall have a clearance to combustible construction of not less than 18 inches (457 mm), and shall have a clearance to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 3 inches (76 mm).

**Exception:** ~~Clearances for f~~Factory-built commercial kitchen grease ducts listed and labeled in accordance with UL 1978 and listed and labeled exhaust equipment installed in accordance with Section 304.1 ~~shall comply with their listings.~~

**506.3.10 Grease Duct Enclosures.** A grease duct serving a Type I hood that penetrates a ceiling, wall or floor shall be enclosed from the point of penetration to the outlet terminal. A duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the *International Building Code*. The duct enclosure shall serve a single grease duct and shall not contain other ducts, piping or wiring systems. Duct enclosures shall be sealed around the duct at the point of penetration and vented to the outside of the building through the use of weather-protected openings. Duct enclosures shall be either field-applied or ~~prefabricated factory-built~~. Duct enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours. Duct enclosures shall be as prescribed by Sections 506.3.10.1, 506.3.10.2 or 506.3.10.3.

**506.3.10.3 Prefabricated Factory-built grease duct enclosure assemblies.** ~~Prefabricated grease duct enclosure assemblies shall consist of listed commercial kitchen Factory-built grease ducts assemblies incorporating integral enclosure materials shall be constructed in accordance with Section 506.3.1. Such grease ducts shall be enclosed within a prefabricated grease duct enclosure assembly that is listed and labeled and specifically evaluated for such purpose for use as commercial kitchen grease duct assemblies in accordance with UL 2221.~~ Duct penetrations shall be protected with a through-penetration firestop system classified in accordance with ASTM E 814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such ~~systems assemblies~~ shall be installed in accordance with the listing and the manufacturer's installation instructions.

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The proposed language above is intended to clarify errors that were inadvertently incorporated into this proposal.

The 2006 *International Mechanical Code* (IMC) implies a prefabricated grease duct enclosure assembly should be protected with a listed and labeled prefabricated system evaluated to UL 2221. This wording is incorrect. Factory-built commercial kitchen grease ducts which are listed to UL 2221 incorporate integral enclosure materials and as such do not require additional field protection. This was clarified in the 2007 Supplement. Unfortunately wording similar to the 2006 IMC was inadvertently incorporated into M39-07/08. As such, this public comment proposes to reinstate language similar to that contained in the 2007 Supplement for these products. Slight editorial changes were necessary adapt the 2007 Supplement language into the format of M39-07/08, but the technical meaning is identical.

*Public Comment 3:*

**Vickie Lovell, InterCode Incorporated, representing 3M Company, requests Approval as Modified by this Public Comment.**

Further modify proposal as follows:

**506.3.6 (Supp) Grease duct clearances.** Where enclosures are not required, grease duct systems and exhaust equipment serving a Type I hood shall have a clearance to combustible construction of not less than 18 inches (457 mm), and shall have a clearance to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 3 inches (76 mm).

**Exception:** Factory-built commercial kitchen grease ducts listed and labeled in accordance with UL 1978, and listed and labeled exhaust equipment installed in accordance with Section 304.1, shall comply with their listings for clearances.

**506.3.10.1 Shaft enclosure.** Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be permitted to be enclosed in accordance with the *International Building Code* requirements for ~~fire-resistance-rated~~ shaft construction. Such grease duct systems and exhaust equipment shall have a clearance to combustible construction of not less than 18 inches (457 mm), and shall have a clearance to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 6 inches (76 mm).

**506.3.10.2 Field applied grease duct enclosure.** Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 ~~shall be that are~~ enclosed by a field-applied grease duct enclosure ~~that is shall be~~ a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose in accordance with ASTM E2336. The surface of the duct shall be continuously covered on all sides from the point at which the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-penetration firestop system classified in accordance with ASTM E 814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer's installation instructions. Exposed duct wrap systems shall be protected where subject to physical damage.

**506.3.10.3 Prefabricated Factory-built grease duct enclosure assemblies.** ~~Prefabricated grease duct enclosure assemblies shall consist of listed commercial kitchen grease ducts constructed in accordance with Section 506.3.1. Such grease ducts shall be enclosed within a prefabricated grease duct enclosure assembly that is listed and labeled and specifically evaluated for such purpose in accordance with UL 2221. Factory-built grease duct assemblies incorporating integral enclosure materials shall be listed and labeled for use as commercial kitchen grease ducts assemblies in accordance with UL 2221, and shall be installed from the point at which the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-penetration firestop system classified in accordance with ASTM E 814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such systems assemblies shall be installed in accordance with the listing and the manufacturer's installation instructions.~~

(Portions of proposal not shown remain unchanged)

**Commenter's Reason:** The proposed language above is intended to further modify a public comment submitted by the International Firestop Council and also Underwriters Laboratories on M39 -07/08. 3M Company completely agrees with and supports the changes submitted by these proponents, and encourages the ICC voting membership to support their public comment on M39. The public comment reflects the current state of the art in terms of products, terminology, testing methods and clarification to the clearances of both factory built and field fabricated grease duct enclosures. This change also reflects the changes that were identified in the 2008 version of NFPA 96, the "Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations".

We offer these further modifications (underlined) which have incorporated the proposed changes by IFC and UL to section 506.3.10 and are intended to further clarify their public comment, and to improve the public comment grammatically, but are not intended to change any of the technical provisions of the UL/IFC version.

*Public Comment 4:*

**Jason Thompson, PE, National Concrete Masonry Association (NCMA), representing the Masonry Alliance for Codes and Standards (MACS), requests Disapproval.**

**Commenter's Reason:** We are submitting this Public Comment to request disapproval of Code Change Proposal M39-07/08, which was approved as modified by the Committee, because we believe it is flawed. Our main concern is that this code change proposal has completely reorganized the provisions for grease duct enclosures so that the previous Exceptions 1 and 2 to the basic requirement for a shaft enclosure for such commercial kitchen grease duct protection have been relegated as equivalent to or better than the basic requirement for a shaft enclosure in accordance with the International Building Code (IBC). Shaft enclosures are the tried, tested, and proven primary method for the protection of grease ducts in buildings, especially where those ducts penetrate multiple floors. However, new Section 506.3.10.1 Shaft Enclosure implies that the shaft enclosure may be inferior to the other types of protection since the section states that commercial kitchen grease ducts "shall be permitted to be enclosed in accordance with the International Building Code requirements for shaft construction." Then Section 506.3.10.2 states that such grease ducts "shall be" enclosed by a field-applied grease duct enclosure. Similarly, new Section 506.3.10.3 also states that such grease ducts "shall be" enclosed with a prefabricated grease duct enclosure assembly. Thus, the shaft enclosure becomes subservient to the other types of fabricated enclosures that are not a basic part of the building construction. We strongly believe that the primary means for protecting commercial grease ducts must be by a shaft enclosure based on the provisions in Section 707 of the IBC with the other methods of field-applied and prefabricated grease duct enclosures being exceptions to that basic requirement since they are not equivalent. In fact, this code change proposal implies that they are actually superior to shaft enclosures required by the IBC.

The language in Section 506.3.10 is also flawed. The next to the last sentence states: "Duct enclosures shall be either field-applied or prefabricated." However, a shaft enclosure is neither. It is field constructed but it is certainly not field-applied, nor is it prefabricated.

Section 506.3.10.1 Shaft Enclosure also has some flawed language in that the first sentence refers to to "shaft construction" in the IBC. The appropriate term should be "shaft enclosures." Shafts are defined in Section 702.1 of the IBC as "an enclosed space extending through one or more stories of a building, connecting vertical openings in successive floors, or floors and roof." Whereas a "shaft enclosure" is defined as: "the walls or construction forming the boundaries of a shaft." Also, the changing language of Section 506.3.10.2 Field-Applied Grease Duct Enclosures is inconsistent with that in Section 506.3.10.3 Prefabricated Grease Duct Enclosure Assemblies which may cause confusion in interpretation as to how these systems and assemblies are to be applied to meet the requirements of the IMC. And there is no requirement that the prefabricated grease duct enclosure assemblies be protected where subject to physical damage as is required for the field-applied grease duct enclosures.

In summary, this code change proposal as modified is sufficiently flawed that it should not be approved at this time for inclusion in the 2009 edition of the IMC. If approved, it will result in misinterpretation and misapplication of the code requirements and subsequent lack of consistent and correct application of these very important requirements for the protective enclosures of kitchen grease ducts for Type I hoods.

Final Action:                    AS                    AM                    AMPC\_\_\_\_\_                    D

# M50-07/08

## 507.2.1, 507.2.2

### *Proposed Change as Submitted:*

**Proponent:** Antwone J. Ross, Chesterfield County, VA, representing the Virginia Plumbing & Mechanical Inspectors Association

### **Revise as follows:**

**507.2.1 Type I hoods.** Type I hoods shall be installed where cooking appliances produce grease or smoke, ~~such as occurs with griddles, fryers, broilers, ovens, ranges and wok ranges.~~ Type I hoods shall be installed over medium-duty, heavy-duty, and extra-heavy-duty cooking appliances.

**507.2.2 (Supp) Type II hoods.** Type II hoods shall be installed where cooking or dishwashing appliances produce heat, steam, or products of combustion and do not produce grease or smoke, ~~such as steamers, kettles, pasta cookers and dishwashing machines.~~ Type II hoods shall be installed over light-duty appliances.

### **Exceptions:**

1. Under-counter-type commercial dishwashing machines.
2. A Type II hood is not required for dishwashers and potwashers that are provided with heat and water vapor exhaust systems that are supplied by the appliance manufacturer and are installed in accordance with the manufacturer's instructions.
3. A single light-duty electric convection, bread, retherm or microwave oven. The additional heat and moisture loads generated by such appliances shall be accounted for in the design of the HVAC system.
4. A Type II hood is not required for the following electrically heated appliances: toasters, steam tables, popcorn poppers, hot dog cookers, coffee makers, rice cookers, egg cookers, holding/warming ovens. The Additional heat and moisture loads generated by such appliances shall be accounted for in the design of the HVAC system.
5. Any appliance having an engineered exhaust system incorporated as part of the appliance's design.

**Reason:** The purpose of the proposed change is to clarify the code requirements and allow more consistent enforcement.

The code does not explicitly state that medium duty, heavy-duty, and extra-heavy-duty appliances are required to be under type I hoods. This requirement is only implied by section 507.13. Section 507.13 is used to determine exhaust rates and is not the appropriate section to determine the type of hood required. Section 507.2 is the section that provides guidance on hood type requirements. Current code requirements for a type I hood are based on whether the cooking appliance generates grease or smoke and only includes a few examples. It is common practice for the AHJ to evaluate some cooking appliances on a case-by-case basis taking into consideration type and frequency of cooking as it relates to grease and smoke production. Based on this line of reasoning, it is not uncommon for the AHJ to determine a medium-duty appliance (such as conveyor style pizza ovens or rotisserie ovens) does not produce significant amounts of grease or smoke and therefore belongs under a type II hood. When this occurs the code does not offer any guidance on the minimum required exhaust rate. Section 507.13 only specifies exhaust rates for medium-duty appliances under type I hoods or light duty appliances under type II hoods. There is no category for medium-duty appliances under type II hoods. In summary, since there is no guidance for medium-duty appliances under type II hoods, one can only assume the code does not intend to allow this situation. The code needs to be changed to clearly required type I hoods for anything other than a light-duty appliance. Proposed change to Section 507.2.2 is to keep the format consistent with 507.2.1.

**Cost Impact:** The code change proposal will increase the cost of construction for those jurisdictions that may have allowed the installation of medium duty appliances under type II hoods.

### **Committee Action:**

**Approved as Submitted**

**Committee Reason:** This code change clarifies which appliances require Type I or Type II hoods. Previously, the user could only infer from Section 507.13 that medium-duty, heavy-duty and extra-heavy-duty cooking appliances required Type I hoods and light-duty appliances required Type II hoods.

### **Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

### *Public Comment:*

**Bob Eugene, Underwriters Laboratories, Inc., requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**507.2.1 Type I Hoods.** Type I hoods shall be installed where cooking appliances produce grease or smoke. Type I hoods shall be installed over medium-duty, heavy-duty, and extra-heavy-duty cooking appliances. Type I hoods shall be installed over light-duty cooking appliances that produce grease or smoke.

**507.2.2. (Supp) Type II hoods.** Type II hoods shall be installed where cooking or dishwashing appliances produce heat, steam, or products of combustion and do not produce grease or smoke. Type II hoods shall be installed over light-duty appliances that do not produce grease or smoke.

**Exceptions:**

1. Under-counter-type commercial dishwashing machines.
2. A Type II hood is not required for dishwashers and potwashers that are provided with heat and water vapor exhaust systems that are supplied by the appliance manufacturer and are installed in accordance with the manufacturer's instructions.
3. A single light-duty electric convection, bread, retherm or microwave oven. The additional heat and moisture loads generated by such appliances shall be accounted for in the design of the HVAC system.
4. A Type II hood is not required for the following electrically heated appliances: toasters, steam tables, popcorn poppers, hot dog cookers, coffee makers, rice cookers, egg cookers, holding/warming ovens. The additional heat and moisture loads generated by such appliances shall be accounted for in the design of the HVAC system.
5. Any appliance having an engineered exhaust system incorporated as part of the appliance's design.

**Commenter's Reason:** Clarifying the code to specify what types of appliances are required under Type I and Type II hoods will help the users of the code. However, the proposed additional sentence to Section 507.2.2 conflicts with the first sentence of the same section. There are some light duty appliances, such as pizza ovens and cheesemelters, that produce grease. Regardless of the amount produced, a Type I hood should be installed over a cooking appliance that produces grease or smoke.

Final Action:                      AS                      AM                      AMPC \_\_\_\_                      D

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## **M65-07/08**

### **510.8.2**

#### *Proposed Change as Submitted:*

**Proponent:** Tony Crimi, A.C. Consulting Solutions, Inc., representing the International Firestop Council

#### **Revise as follows:**

**510.8.2 Clearance to combustibles.** Ducts shall have a clearance to combustibles in accordance with Table 510.8.2. Exhaust gases having temperatures in excess of 600°F (316°C) shall be exhausted to a chimney in accordance with Section 511.2.

**Exception:** Where the surface of the duct is continuously covered on all sides from the point at which the duct originates to the outlet terminal with a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose in accordance with ASTM E2336, the required clearance shall be in accordance with the listing of such material, system, product or method. Such material, system, product or method shall be installed in accordance with the listing and the manufacturer's installation instructions.

**Reason:** To introduce an alternative method for establishing clearances to combustibles for ducts used to convey hazardous exhaust as required in 5.10.8 of the IMC. The protection of these ducts can be accomplished using enclosures tested to the ASTM E2336 test Standard for fire resistive grease duct enclosures.

There are alternative methods available for providing protection for hazardous exhaust duct enclosures beyond the existing clearance provisions. ASTM E 2336 is entitled *Standard Test Methods For Fire Resistive Grease Duct Enclosure Systems*, and is currently referenced in the IMC. The Standard is based on the methodology that has been widely used throughout the United States for the evaluation of Grease Duct enclosures for over 10 years.

There are parallels between the level of performance required for hazardous exhaust ducts as compared to Grease ducts and grease duct enclosures. The ASTM E2336 standard evaluates these enclosure materials and the duct enclosure systems using the following test methods: noncombustibility, full scale fire resistance, durability, internal fire, and fire-engulfment with a through-penetration fire stop.

The test method prescribes an ASTM E119 fire exposure for both a fire engulfment and a fire resistance wall test. The fire resistance test illustrates the ability of the enclosure material to resist the effects of fire when applied in a vertical application (i.e. as a wall assembly tested in accordance with ASTM E119).

A durability test is included for the materials, which is intended to simulate the effects of long-term exposure of typical in-service conditions on the thermal transmission qualities of the enclosure materials when subjected to a modified version of Test Method C 518.

In addition, an internal fire test uses two standardized fire exposures occurring inside the protected duct itself. Both tests illustrate the enclosure material's ability to resist thermal transmission of heat to the unexposed side in a horizontal application. The first standardized fire exposure is intended to simulate long term exposure of the enclosure material to a standardized service condition. The test simulates an internal fire within the duct by maintaining a minimum 500°F (260°C) average interior temperature for at least 4 h. The second standardized fire exposure is intended to simulate a sudden rise in the exposure conditions within the duct. Within 15 min after the end of the 4-h period, increase the average interior temperature in the duct is increased to 2000°F (1093°C). This exposure is then maintained for 30 minutes.

While the 500°F used to simulate typical operating temperatures in ASTM E2336 is lower than the 600°F stipulated by 510.8.2, it does represent a tested level of performance, and is supplemented by the additional test at 2000°F for 30 minutes, which simulates a large fire event within the duct. The current provisions of 5.10.8.2 do not explicitly take this into account.

A fire-engulfment test uses a standardized fire exposure, the time temperature curve of Test Methods E 119, to simulate a fire occurring on the outside of the grease duct, and demonstrates the ability of the grease duct enclosure system to remain intact without a through opening. The fire-engulfment test also tests the fastening methods used to secure the enclosure material to the grease duct and the supporting system. The fire-engulfment test also provides a means to test a through-penetration fire stop to determine its compatibility with the duct enclosure system. The fire-engulfment and vertical fire resistance tests are followed by the application of a standardized hose stream test.

Enclosure systems which meet the ASTM E2336 criteria demonstrate the ability to resist the passage of flames and hot gases during a standardized fire resistance test and a standardized internal fire test, as well as an ability to resist transmission of heat through the duct and the enclosure material(s). The ability of a fire stop to meet the requirements of Test Method E 814 when used with the duct enclosure system is also evaluated.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee did not believe the standard, which is specific to grease ducts, was appropriate for hazardous exhausts. The proponent's reason discussed tests conducted at 500° F for short durations, but this section is for systems with normal operating temperatures in excess of 600° F.

**Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Tony Crimi, A.C. Consulting Solutions, Inc., representing the International Firestop Council, requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**510.8.2 Clearance to combustibles.** Ducts shall have a clearance to combustibles in accordance with Table 510.8.2. Exhaust gases having temperatures in excess of 600°F (316°C) shall be exhausted to a chimney in accordance with Section 511.2.

~~**Exception:** Where the surface of the duct is continuously covered on all sides from the point at which the duct originates to the outlet terminal with a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose in accordance with ASTM E2336, the required clearance shall be in accordance with the listing of such material, system, product or method. Such material, system, product or method shall be installed in accordance with the listing and the manufacturer's installation instructions.~~

**Exception:** For ducts carrying exhaust gases not exceeding 500°F, the clearance to combustibles is permitted to be reduced to zero where the surface of the duct is continuously covered on all sides from the point at which the duct originates to the outlet terminal with a listed and labeled material, system, product, or method of construction specifically evaluated for such purpose, in accordance with ASTM E2336. Such system shall be installed in accordance with the listing and the manufacturer's installation instructions.

**Commenter's Reason:** To introduce an alternative method for establishing clearances to combustibles for ducts used to convey hazardous exhaust as required in 5.10.8 of the IMC. The protection of these ducts can be accomplished using enclosures tested to the ASTM E2336 test Standard for fire resistive grease duct enclosures. There are alternative methods available for providing protection for hazardous exhaust duct enclosures beyond the existing clearance provisions. ASTM E 2336 is entitled *Standard Test Methods For Fire Resistive Grease Duct Enclosure Systems*, and is currently referenced in the IMC. The Standard is based on the methodology that has been widely used throughout the United States for the evaluation of Grease Duct enclosures for over 10 years.

**Substantiation:** There are parallels between the level of performance required for hazardous exhaust ducts as compared to Grease ducts and grease duct enclosures. The ASTM E2336 standard evaluates these enclosure materials and the duct enclosure systems using the following test methods: non-combustibility, full scale fire resistance, durability, internal fire, and fire-engulfment with a through-penetration fire stop.

Enclosure systems which meet the ASTM E2336 criteria demonstrate the ability to resist the passage of flames and hot gases during a standardized fire resistance test and a standardized internal fire test, as well as an ability to resist transmission of heat through the duct and the enclosure material(s). The ability of a fire stop to meet the requirements of Test Method E 814 when used with the duct enclosure system is also evaluated. The test method prescribes an ASTM E119 fire exposure for both a fire engulfment and a fire resistance wall test.

The fire resistance test illustrates the ability of the enclosure material to resist the effects of fire when applied in a vertical application (i.e. as a wall assembly tested in accordance with ASTM E119).

In addition, an internal fire test uses two standardized fire exposures occurring inside the protected duct itself. Both tests illustrate the enclosure material's ability to resist thermal transmission of heat to the unexposed side in a horizontal application. The first standardized fire exposure is intended to simulate long term exposure of the enclosure material to a standardized service condition. The test simulates an internal fire within the duct by maintaining a minimum 500°F (260°C) average interior temperature for at least 4 h. The second standardized fire exposure is intended to simulate a sudden rise in the exposure conditions within the duct. Within 15 min after the end of the 4-h period, increase the average interior temperature in the duct is increased to 2000°F (1093°C). This exposure is then maintained for 30 minutes, which simulates a large fire event within the duct. The current provisions of 5.10.8.2 do not explicitly take this into account. A durability test is included for the materials, which is intended to simulate the effects of long-term exposure of typical in-service conditions on the thermal transmission qualities of the enclosure materials when subjected to a modified version of Test Method C 518.

A fire-engulfment test uses a standardized fire exposure, the time temperature curve of Test Methods E 119, to simulate a fire occurring on the outside of the grease duct, and demonstrates the ability of the duct enclosure system to remain intact without a through opening. The fire-engulfment test also tests the fastening methods used to secure the enclosure material to the grease duct and the supporting system. The fire-engulfment test also provides a means to test a through-penetration fire stop to determine its compatibility with the duct enclosure system. The fire-engulfment and vertical fire resistance tests are followed by the application of a standardized hose stream test.

Final Action: AS AM AMPC\_\_\_\_\_ D

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## M68-07/08

### 602.2.1

#### *Proposed Change as Submitted:*

**Proponent:** Guy Tomberlin, Fairfax County, VA, representing the Virginia Plumbing & Mechanical Inspectors Association/the Virginia Building and Code Officials Association

#### **Revise as follows:**

**602.2.1 (Supp) Materials within plenums.** Except as required by Sections 602.2.1.1 through 602.2.1.5, materials within plenums shall be noncombustible or 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.

#### **Exceptions:**

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in ~~one- and two-family dwelling units~~ located in R2 and R3 occupancies.
4. This section shall not apply to smoke detectors.
5. Combustible materials fully enclosed within continuous noncombustible raceways or enclosures, approved gypsum board assemblies or within materials listed and labeled for such application.

**Reason:** The design of return plenums is being utilized within apartments and condominiums (R2 and R3). Current text requires that in this application the regulations for plenums that are typically found in commercial structures be adhered to. The characteristics of plenums located in the single units of apartments and condos more closely resemble that of a residential application than that of an office building environment. One and two family dwelling text is more appropriately located in the IRC.

**Cost Impact:** Cost savings.

#### **Committee Action:**

**Disapproved**

**Committee Reason:** This proposal would allow combustibles to be in plenums in R-2 occupancies, many of which are built of noncombustible construction. There was no compelling reason to reduce the requirements to allow combustibles in plenums in such construction.

#### **Assembly Action:**

**None**

#### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

#### *Public Comment:*

**Guy Tomberlin, Fairfax County, VA, representing the VA Plumbing and Mechanical Inspectors Association and VA Building and Code Officials Association, requests Approval as Submitted.**

**Robert F. Loeper, Jr., President, representing Region VII Chapter of ICC requests Approval as Submitted.**

**Commenter's Reason:** The reason for disapproval in Palm Springs was no compelling testimony was provided to allow combustible materials in a plenum in R-2 type construction. An apartment unit does not know if it is located within a Type I or Type V constructed building. The occupant usually does not know either. Combustible plenums are utilized successfully in residential construction everyday. Where is the logic that because the shell of a structure is built with non combustible materials that plenums located within the dwelling units must follow the same rigorous construction methods? Non-combustible material is allowed to be utilized in each of the units such as PVC. These type products are separated from the common areas by nothing more than the apartment unit or dwelling unit construction itself. But if a designer wants to utilize a ceiling space as a plenum they now have to switch over to non combustible piping materials. This makes no

sense. The hazard has not been increased based on the fact that within each individual apartment unit the ceiling space is utilized as a plenum instead of using ductwork for the return air. In the unlikely event of fire the same smoke from the same materials is all that could possibly be moved throughout the individual unit regardless if it has a plenum or not, no increased hazard is created for the other occupants of the structure.

Final Action: AS AM AMPC\_\_\_\_ D

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## M72-07/08 602.2.1.5 (New)

### *Proposed Change as Submitted:*

**Proponent:** Bob Eugene, Underwriters Laboratories, Inc.

### **Add new text as follows:**

**602.2.1.5 Plumbing and mechanical equipment in plenums.** Discrete plumbing and mechanical equipment, appurtenances and appliances with combustibile material exposed within a plenum shall be listed and labeled for such use in accordance with UL 2043.

(Renumber subsequent sections)

**Reason:** UL 2043 was developed to test products and materials that are not able to be tested in accordance with ASTM E84 or UL 723. These discrete products include air duct supports, registers, air diffusers, and control dampers.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Committee Action:** **Disapproved**

**Committee Reason:** The UL 2043 standard has been revised to cover not only electrical equipment but also discrete plumbing and mechanical equipment. However, the committee had not seen the revised standard and did not know what might be covered. The word "discrete" was considered to be subjective and could lead to uneven enforcement in the field.

**Assembly Action:** **None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

### *Public Comment:*

### **Bob Eugene, Underwriters Laboratories, Inc., requests Approval as Submitted.**

**Commenter's Reason:** UL 2043 standard is referenced in the 2006 Edition of the IMC in Section 602.2.1.4. There was no required change in the edition and revision of the standard previously reviewed by the committee. Because the standard is already referenced, the ICC Rules do not require another copy of the same standard to be furnished to the Committee for further review.

IMC Section **201.4 Terms not defined**, states '*Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies.*' Therefore, if the term is not listed in Section 202, the ordinarily accepted meanings (Webster Dictionary) will apply. Webster defines 'discrete' as '*1: constituting a separate entity: individually distinct <several discrete sections>2 a: consisting of distinct or unconnected elements*'. Because these products are small and separate entities and cannot be put into the Steiner Tunnel for testing under UL 723, the products are tested under UL 2043.

Although the scope of the currently referenced edition of UL 2043 does not exclude plumbing and mechanical products from being tested to the standard, the Scope of ANSI/UL 2043-2008 as currently drafted clarifies that products proposed for inclusion in 602.2.1.4 may be tested to this standard:

#### **1. Scope**

- 1.1. This is a fire test method for determining the fire performance response of discrete products (including, but not limited to electrical equipment) intended to be installed in air handling spaces, such as above suspended ceilings or below floors. These products are subjected to an open flame ignition source and evaluated using a product calorimeter.
  - 1.1A This test may be used to determine fire performance and smoke characteristics of discrete, non-continuous building materials where the Test for Surface Burning Characteristics of Building Materials, UL 723, is not applicable.
- 1.2. The purpose of this test is to determine the rate of heat release and the rate of smoke release of the burning product samples as they relate to the requirements for fire-resistant and low-smoke-producing characteristics in accordance with the provisions of the following codes: National Electric Code, NFPA 70, International Mechanical Code, NFPA 5000, Standard for the Installation of Air Conditioning and Ventilating Systems, NFPA 90A.
- 1.3. This test method does not provide information on the performance of products in other fire or test conditions. This test does not investigate the toxicity of the products of combustion.
- 1.4. This test does not cover the constructional, electrical, or other performance requirements of the product.

Final Action: AS AM AMPC\_\_\_\_ D

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# M73-07/08

## 602.2.1.6 (New)

### *Proposed Change as Submitted:*

**Proponent:** Marcelo M. Hirschler, GBH international, representing the American Fire Safety Council

#### **Add new text as follows:**

**602.2.1.6 Plastic piping.** Plastic piping exposed within a plenum shall be used only in wet pipe systems and 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. Piping shall be listed and labeled for plenum use. The listing shall state that the pipe did not contain water during the fire test.

(Renumber subsequent sections)

**Reason:** Plastic piping is often used exposed in plenums. This is perfectly appropriate when the pipe has been properly listed and labeled as a result of a valid fire test in the ASTM E 84 test with the pipe itself. Unfortunately it has become the custom of some pipe manufacturers to test the pipe when it is full of water. Such a test would clearly not be appropriate, but the practice of filling pipes with water during a fire test is not prohibited explicitly in the fire test standard, ASTM E 84. We can now find pipes that have been listed as a result of fire testing conducted with the pipe full of water. The standards committee (ASTM E05.22) says that this is a code issue and not an issue for the test method. The proposed new IMC code section has been drafted to parallel the section on fire sprinkler piping, 602.2.1.2.

**Cost Impact:** The code change proposal will not increase the cost of construction.

#### **Committee Action:**

**Approved as Modified**

#### **Modify proposal as follows:**

**602.2.1.6 Plastic piping.** Materials used for plastic piping exposed within a plenum shall be used only in wet pipe systems for the purpose of transporting liquids and 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. Piping shall be listed and labeled for plenum use. The listing shall state that the pipe be based on an ASTM E 84 or UL 723 test specimen that did not contain water during the fire test.

(Renumber subsequent sections)

**Committee Reason:** It has become a common practice for manufacturers to test plastic pipe to ASTM E 84 with the pipe full of water. This is not the intent of the code and this code change clarifies the intent. The modification further clarifies that this is a material test and the plastic piping is not necessarily "wet pipe" but may only be used to transport liquids, such as waste drainage piping. The modification also adds the equivalent UL 723 Standard in addition to the ASTM E 84 Standard.

#### **Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because public comments were submitted.**

#### *Public Comment 1:*

**Michael W. Cudahy, Plastic Pipe and Fittings Association (PPFA), requests Approval as Modified by this Public Comment.**

#### **Further modify proposal as follows:**

**602.2.1.6 Plastic piping.** ~~Materials used for Plastic plumbing piping and tubing exposed within a plenum used for the purpose of transporting liquids 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, UL 1887 or UL 723. Piping shall be listed and labeled for plenum use. The listing shall be based on an ASTM E84 or UL 723 test specimen that did not contain water.~~

**Commenter's Reason:** PPFA is opposed to this proposed change and can offer a modification. The code should not modify a test standard. ASTM E 84 is not an appropriate test method for many products, pipe and tubing included, as some piping systems contain water during use and the amount of surface exposure in a plenum is limited. There is currently no provision in ASTM E84 or UL 723 that provides guidance on how to test pipe. ASTM E84 addresses flat sheet products. Water distribution pipe or tubing should be tested containing water, DWV and vent pipe should not. Testing in this manner is representative of how the product is used. Other products which are evaluated for use in plenums are tested in the same form as which they are used. These systems deserve to be tested in a manner similar to how they

are used. UL 1887, *Fire Test of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics*, requires testing of a single 24-foot length of plastic sprinkler pipe, which is a method of testing that is more appropriate for plumbing pipe and tube. Plumbing pipe and tube seems to be better language than “used for the purpose of transporting liquids”.

*Public Comment 2:*

**David W. Ash, Lubrizol Advanced Materials, Inc., requests Disapproval.**

**Commenter’s Reason:** ASTM E-84 was written to evaluate products that are used in flat sheets, such as flooring and wall coverings. There is no direction in E-84 that addresses the evaluation of piping systems. Testing a product in the manner in which it is used is a logical approach. In the case of wall coverings or flooring testing flat sheet is an appropriate method. In the case of pipe used to transport water a consistent testing approach would be to conduct the evaluation in this same manner, i.e. water filled pipe. This proposal would not permit test data that was generated from testing water filled pipe to be used justify the use of that pipe to transport water in plenums.

*Public Comment 3:*

**Sid Cavanaugh, Cavanaugh Consulting, representing Lubrizol, requests Disapproval.**

**Commenter’s Reason:** First and foremost, there was no concrete technical reason given for this code change other than the proponent was concerned about PEX piping penetrating plenums. If PEX or any other material is a problem then that material should be addressed but not in a manner that disallows piping materials currently used and approved for that installation. There was no technical information provided to the committee that proved there is a safety concern or any evidence of failure due to current code language. In addition the committee did not address the following while making their decision.

- a) There is no provision in ASTM E84 or UL 723 that provides guidance on how to test pipe. ASTM E84 addresses flat sheet products such as wall or floor coverings.
- b) The statement in the proposal that states that the sample must not contain water is not appropriate code language. The code should not modify a test standard. This should be addressed by an appropriate testing organization.
- c) The listing and labeling of pipe will increase the cost to the manufacturer which will ultimately increase the cost to the consumer.
- d) The pipe is filled with water when it is in service in the plenum. Testing in this manner is representative of how the product is used. Other products which are evaluated for use in plenums are tested in the same form as which they are used.
- e) Not all materials used to manufacture plastic pipe can be readily formed into a sheet so that they can be tested in accordance with ASTM E84.

*Public Comment 4:*

**Michael W. Cudahy, Plastic Pipe and Fittings Association (PPFA), requests Disapproval.**

**Commenter’s Reason:** PPFA is opposed to this proposed change and ask that it be rejected as the code should not modify a test standard. ASTM E 84 is not an appropriate test method for many products, pipe and tubing included, as some piping systems contain water during use and the amount of surface exposure in a plenum is limited. There is currently no provision in ASTM E84 or UL 723 that provides guidance on how to test pipe. ASTM E84 addresses flat sheet products. Water distribution pipe or tubing should be tested containing water, DWV and vent pipe should not. Testing in this manner is representative of how the product is used. Other products which are evaluated for use in plenums are tested in the same form as which they are used. These systems deserve to be tested in a manner similar to how they are used. UL 1887, *Fire Test of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics*, requires testing of a single 24-foot length of plastic sprinkler pipe, which is a method of testing that is more appropriate for plumbing pipe and tube.

*Public Comment 5:*

**William B. Morris, Charlotte Pipe and Foundry, requests Disapproval.**

**Commenter’s Reason:** This code change effectively rewrites ASTM E 84 and UL 723 by modifying these standards within the code. These standards are designed to test flat sheet products such as flooring and do not specifically address a methodology for testing piping systems. Therefore, testing of any piping system to these standards requires a modified test. For that reason the standards permit testing in a manner representative of how the product is to be used which logically would include testing in a water filled condition for piping used in domestic water service. Additionally, the listing and labeling requirements in this change will impose additional costs upon manufacturers increasing the cost of construction. I urge that this code change be disapproved.

*Public Comment 6:*

**Guy Tomberlin, Fairfax County, VA, representing the VA Plumbing and Mechanical Inspectors Association and VA Building and Code Officials Association, requests Disapproval.**

**Robert F. Loeper, Jr., President, representing Region VII Chapter of ICC requests Disapproval.**

**Commenter’s Reason:** This proposal will eliminate a common practice. There are plastic piping systems today that are specifically tested when full of water to achieve a 25/50 flame spread, smoke developed rating. This only makes sense because that is the application in which they are utilized within buildings. They do not pose any increased hazard to the occupants in the event of fire. In fact, quite the opposite. If the pipe were to be exposed to a high heat situation, such as fire, then the resulting condition is water that will escape from the pipe. Applying water to an area that is on fire is typically not an unfavorable situation.

Final Action:                    AS                    AM                    AMPC\_\_\_\_                    D

# M74-07/08

## 603.2 (New)

### *Proposed Change as Submitted:*

**Proponent:** Tony Crimi, A.C. Consulting Solutions, Inc., representing the International Firestop Council

### **Add new text as follows:**

**603.2 Air duct enclosures.** Where ducts are used as part of an approved smoke control system conforming to Section 513, the ducts shall be located within enclosures constructed in accordance with the *International Building Code* requirements for shaft construction.

### **Exceptions:**

1. The shaft enclosure provisions of the *International Building Code* shall not be required where a duct penetration is protected with a through-penetration fire stop system classified in accordance with ASTM E 814 and having an “F” and “T” rating equal to the fire-resistance rating of the assembly being penetrated and where the surface of the duct is continuously covered on all sides from a point at which the duct penetrates a ceiling, wall or floor to the outlet terminal with a classified, listed and labeled material, system, method of construction or product specifically evaluated for such purpose, in accordance with nationally recognized standards for such enclosure materials.
2. Where fire dampers have been approved for use in the smoke control system, and their operation will not interfere with the operation of the smoke control system installed and approved in accordance with Section 909 of the *International Building Code*.

(Renumber subsequent sections)

**Reason:** The purpose of this code change proposal is to introduce provisional language into the IMC to address systems used for covering and protection of HVAC air ducts used as part of an approved smoke control system.

The covering of duct systems for fire protection is becoming more and more popular. The current code text fails to address this application for HVAC air ducts. When Ducts are used as part of an approved smoke control system in accordance with Section 909 of the IBC, fire dampers are only permitted where their use would not interfere with the operation of a smoke control system.

The IBC and IMC currently do not have specific provisions for protection of air ducts which are used as part of an approved smoke control systems or for stairwell pressurization to be protected from fire exposure. This text is similar to the language which had previously been used for grease duct enclosures assemblies in Section 506.3.10. At that time, the most widely used alternative to the general shaft enclosures provisions was ICBO-ES AC 101 Acceptance Criteria for Grease Duct Enclosure Materials. Similarly, in November of 2005, ICC-ES approved the publication of AC 179, Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies, which can be used to evaluate products used for these applications. The purpose of the acceptance criteria is to establish requirements for fire protection enclosure systems applied to metallic HVAC ducts, as alternatives to shaft enclosures for vertical ducts with required fire-resistance-rated shafts under specified conditions, with limitations on their application. The criteria also provides an alternate to fire dampers in horizontal ducts (penetrating fire barriers, fire partitions, and or smoke barriers) and vertical ducts connecting not more than two stories.

AC 179 evaluates the enclosure materials and the HVAC duct enclosure systems using the following test methods: Flame spread, smolder resistance, a fire engulfment test based on ISO 6944 with a through-penetration fire stop, durability tests, and thermal conductivity.

Work is currently underway on the development of an ASTM Consensus Standard for this application, but until such time as that process is complete, the proposed language incorporated here will provide a means of evaluating the performance of these products and systems, which are becoming more widespread in their use, while not restricting the choice of acceptable solutions available to designers.

### **Bibliography:**

ICC-ES AC179, Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies.

**Cost Impact:** The code change proposal will not increase the cost of construction.

### **Committee Action:**

**Disapproved**

**Committee Reason:** The proposal is too vague as to when or where the through-penetration fire stop system can be used. There was some dispute among proponents and opponents as to which standards apply. There is no standard similar to the grease duct standard for the designer and code official to rely on.

### **Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

Public Comment:

**Tony Crimi, A.C. Consulting Solutions, Inc., representing the International Firestop Council, requests Approval as Modified by this Public Comment.**

Modify proposal as follows:

**603.2 Air duct enclosures.** Where ducts are used as part of an approved smoke control system conforming to Section 513, the ducts shall be located within enclosures constructed in accordance with the *International Building Code* requirements for shaft construction.

**Exceptions:**

1. The shaft enclosure provisions of the *International Building Code* shall not be required where a duct penetration is protected with a through-penetration fire stop system classified in accordance with ASTM E 814 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated and where the surface of the duct is continuously covered on all sides from a point at which the duct penetrates a ceiling, wall or floor to the outlet terminal with a classified, listed and labeled material, system, method of construction or product specifically evaluated for such purpose, ~~in accordance with nationally recognized standards for such enclosure materials.~~ Such enclosure materials or systems shall comply with section 604.3 and shall be securely installed and capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste where subjected to a fire engulfment test under ASTM E 119 time-temperature fire conditions for the time period at least equal to the fire-resistance rating of the floor assembly.
2. ~~Where fire dampers have been approved for use in the smoke control system, and their operation will not interfere with the operation of the smoke control system installed and approved in accordance with Section 909 of the *International Building Code*.~~

**Commenter's Reason:** The purpose of this Code change proposal is to introduce provisional language into the IMC to address systems used for covering and protection of HVAC air ducts used as part of a required and approved smoke control system. The covering of duct systems for fire protection is becoming more popular due to realized design and installation benefits. The current code text fails to address this application for HVAC air ducts.

**Substantiation:** The IBC and IMC currently do not have specific provisions for protection of air ducts which are used as part of an approved smoke control systems or for stairwell pressurization to be protected from fire exposure. The most widely used alternative to the general shaft enclosures provisions is AC 179, Acceptance Criteria for Metallic HVAC Duct Enclosure Assemblies, which can be used to evaluate products used for these applications. The purpose of the acceptance criteria is to establish requirements for fire protection enclosure systems applied to metallic HVAC ducts, as alternatives to shaft enclosures for vertical ducts with required fire-resistance-rated shafts under specified conditions, with limitations on their application. AC 179 evaluates the enclosure materials and the HVAC duct enclosure systems using the following test methods: Flame spread, smolder resistance, a fire engulfment test based on ISO 6944 with a through-penetration fire stop, durability tests, and thermal conductivity.

The language contained here would require enclosure materials and the HVAC duct enclosure systems to be either enclosed within a shaft conforming to the IBC section 706 or be tested in a fire engulfment test based on a time-temperature fire exposure which can simulate both ISO 6944 or ASTM E119, and include through-penetration fire stop requirements and flame spread and smoke developed indexes of 25 and 50 respectively.

Work is currently underway on the development of an ASTM Consensus Standard for this application, but until such time as that process is complete, the proposed language incorporated here will provide a means of evaluating the performance of these products and systems, which are becoming more widespread in their use, while not restricting the choice of acceptable solutions available to designers.

Final Action:                    AS                    AM                    AMPC\_\_\_\_                    D

**M75-07/08**  
**603.7**

*Proposed Change as Submitted:*

**Proponent:** Tim Manz, University of Minnesota, representing the Association of Minnesota Building Officials (AMBO)

**Revise as follows:**

**603.7 Rigid duct penetrations.** Duct system penetrations of walls, floors, ceilings and roofs and air transfer openings in such building components shall be protected as required by Section 607. Ducts in a private garage and ducts penetrating the walls or ceilings separating a dwelling from a private garage shall be continuous and constructed of a minimum 26 gage (0.48 mm) galvanized sheet metal and shall not have openings into the garage. Fire and smoke dampers are not required in such ducts passing through the wall or ceiling separating a dwelling from a private garage except where required by Chapter 7 of the *International Building Code*.

**Reason:** The IMC and IBC do not clearly address duct penetrations of private garages in condominiums and townhouses that are built to the IMC and IBC, so this section clarifies that fire and smoke dampers are typically not required if the duct is continuous and constructed of minimum 26 gage sheet metal. This clarification is necessary due to the numerous misinterpretations of IBC Chapter 7 that have resulted in fire or smoke dampers being installed at these locations when it is not the intent of the code for them to be installed.

**Cost Impact:** The code change proposal will not increase the cost of construction.

Modify proposal as follows:

**603.7 Rigid duct penetrations.** Duct system penetrations of walls, floors, ceilings and roofs and air transfer openings in such building components shall be protected as required by Section 607. ~~Ducts in a private garage and ducts penetrating the walls or ceilings separating a dwelling from a private garage shall be continuous and constructed of a minimum 26 gage (0.48 mm) galvanized sheet metal and shall have no openings into the garage. Fire and smoke dampers are not required in such ducts passing through the wall or ceiling separating a dwelling from a private garage except where required by Chapter 7 of the International Building Code. Except where required by Chapter 7 of the International Building Code, fire and smoke dampers shall not be required in ducts passing through the walls or ceilings separating private garages from dwellings where all of the following conditions are met:~~

1. The ducts are continuous.
2. The ducts are constructed of a minimum of 26 gage (0.0187 inches) (0.048 mm) galvanized sheet metal.
3. The ducts do not have openings into the garage.

**Committee Reason:** The purpose of this code change is to clarify that ducts penetrating a wall or ceiling separating a garage from a dwelling unit are not required to have fire or smoke dampers if the ducts meet certain construction requirements. The modification further clarifies the requirements by breaking the new language into listed items.

Assembly Action:

None

*Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Tim Manz, University of Minnesota Building Code Division, representing the Association of Minnesota Building Officials (AMBO), requests Approval as Submitted.**

**Commenter's Reason:** The IMC committee approved a modified version of the original code change proposal that actually changed the intent to make it less restrictive. As a result, it actually allows ducts passing through a private garage to have openings into the garage if protected with combination fire/smoke dampers. This is not the intent of the original code change proposal and would conflict with Section 309.1.1 of the IRC, which is what the proposed code change is based on. Condominiums and townhomes built to the IMC and IBC deserve the same level of protection that a similar structure built to the IRC is provided.

Final Action:            AS                    AM                    AMPC\_\_\_\_            D

**M76-07/08**  
**603.7 (New)**

*Proposed Change as Submitted:*

**Proponent:** James Karnes, Dura-Tite Systems LLC

**Add new text as follows:**

**603.7 Duct fittings.** Metallic duct fittings shall be constructed in accordance with the requirements of Section 603.4. Plastic and nonmetallic duct fittings shall have a peak rate of heat release not greater than 100 kilowatts, a peak optical density not greater than 0.50 and an average optical density not greater than 0.15 when tested in accordance with UL 2043. Such fittings shall be listed and labeled.

(Renumber subsequent sections)

**Reason:** The purpose of this code change is to allow products that are not capable of being tested under UL 723 *Test for Surface Burning Characteristics of Building Materials* to be tested under the expanded scope of UL 2043 *Standard for Safety Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces*. The scope of UL 2043 has been expanded to include 'other discrete products' beyond electrical components and speaker enclosures. The purpose of the UL 2043 test is to determine the rate of heat release and the rate of smoke release of the burning product samples as they relate to the requirements for fire-resistant and low-smoke-producing characteristics in accordance with the provisions of the following codes: *National Electric Code, NFPA 70, International Mechanical Code, NFPA 5000, Standard for the Installation of Air Conditioning and Ventilating Systems, NFPA 90A.*

**Revisions to the UL 2043 Standard effective Fall 2007 relate to the inclusion of "other discrete products" in the plenum space. This has been expanded due to product submissions that are not able to be tested under UL723** *Test for Surface Burning Characteristics of Building Materials*. UL 2043 –This is a fire test method for determining the fire performance response of discrete products (including, but not limited to electrical equipment) intended to be installed in air handling spaces, such as above suspended ceilings or

below floors. These products are subjected to an open flame ignition source and evaluated using a product calorimeter. This test may be used to determine fire performance and smoke characteristics of discrete, non-continuous building materials where the Test for Surface Burning Characteristics of Building Materials, UL 723, is not applicable.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Committee Action:**

**Disapproved**

**Committee Reason:** There was some confusion about whether these fittings would be in conflict with Section 603.8.3 which allows plastic fittings only underground. UL 2043 has been revised to cover not only electrical equipment but also discrete plumbing and mechanical equipment. However, the committee had not seen the revised standard and did not know what might be covered.

**Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**James Karnes, Dura-Tite Systems, LLC, requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**603.7 Duct fittings.** ~~Metallic duct fittings shall be constructed in accordance with the requirements of Section 603.4. Plastic and nonmetallic duct fittings for above ground installations shall be tested and comply with the requirements of have a peak rate of heat release not greater than 100 kilowatts, a peak optical density not greater than 0.50 and an average optical density not greater than 0.15 when tested in accordance with UL 2043 and—Such fittings shall be listed and labeled.~~

(Renumber subsequent sections)

**Commenter's Reason:** Due to renumbering of the initial proposal at the February hearings, there was confusion between this proposal and section 603.8 which allows plastic duct only underground or slab. This is for above grade duct fittings for forced air HVAC systems.

UL2043 has been expanded to cover this type of product due to the inability to test this type of product in a UL181 ASTM E-84 testing method. UL2043 is used as the alternative test method for this approval, as this type of product is considered discrete as described as 'a non-continuous building material'. This testing standard has been used and accepted by the ICC since 1992 for discrete electrical products used in air handling spaces. The re-writing of the UL 2043 Standard includes the term "other discrete products" which allows inclusion of additional plumbing and mechanical products into the testing procedure.

This proposal was also disapproved due to the committee not having reviewed the revised standard. The amended scope of the standard document will be available for review at the hearings in September. The word "discrete" was questioned as being subjective, yet it has been used for electrical equipment since the early 1990s in the codes. As stated above, it refers to non-continuous building materials. The products labeled for UL 2043 must pass the testing, and therefore enforcement in the field will not depend on the local code officials' definition of the term "discrete", but on the passing of the test and the product being listed and labeled as such.

This is not a new standard or testing method, as it has been used in the ICC codes for other products used in the plenum that are not able to be tested under UL723 (ASTM E-84).

Per Dwayne Sloan of UL, Regarding UL 2043-

While UL2043 does not provide a direct technical correlation to UL723 (or ASTM E84) flame spread of 25, smoke developed of 50, the intent of this Standard is to demonstrate that a discrete product, non-continuous building material, has fire resistant and low smoke-producing characteristics.

UL2043 is referenced for this purpose in the IMC, will be specifically referenced in NFPA 90A, and has been used to satisfy the NEC. Below, please find the language has been proposed in UL2043 and has already passed ballot with 100% consensus.

- 1.1 This is a fire test method for determining the fire performance response of discrete products (including, but not limited to electrical equipment) intended to be installed in air handling spaces, such as above suspended ceilings or below floors. These products are subjected to an open flame ignition source and evaluated using a product calorimeter.
- 1.1 A This test may be used to determine fire performance and smoke characteristics of discrete, non-continuous building materials where the Test for Surface Burning Characteristics of Building Materials, UL 723, is not applicable.
- 1.2 The purpose of this test is to determine the rate of heat release and the rate of smoke release of the burning product samples as they relate to the requirements for fire-resistant and low-smoke-producing characteristics in accordance with the provisions of the following codes: National Electric Code, NFPA 70, International Mechanical Code, NFPA 5000, Standard for the Installation of Air Conditioning and Ventilating Systems, NFPA 90A.

Final Action:

AS

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AMPC \_\_\_\_\_

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# M81-07/08

## 603.17.3

### *Proposed Change as Submitted:*

**Proponent:** Guy Tomberlin, Fairfax County, VA, representing the Virginia Plumbing & Mechanical Inspectors Association/the Virginia Building and Code Officials Association

#### **Delete without substitution:**

~~**603.17.3 (Supp) Air dispersion systems.** Air dispersion systems shall be exposed in the space that is being conditioned by the system and shall be operated under positive pressure. Air dispersion systems shall not pass through fire resistance rated assemblies. Air dispersion systems shall be listed and labeled.~~

**Reason:** This was M-98 last code change cycle. The original proposal included a standard for these systems. However the standard did not comply with ICC criteria. So the proponent deleted the standard reference instead of going back and adjusting the standard. Now we have a system in the code text with no reference standard to verify compliance. Chapter 3 requires listing and labeling and so does this text. What does this system have to be listed to? This is totally out of concept the I-Codes attempt to stay within, the text can not require something to be listed and labeled but never reference listed to what.

**Cost Impact:** The code change proposal will not increase the cost of construction.

#### **Committee Action:**

**Disapproved**

**Committee Reason:** Air dispersion systems are useful products that need to be recognized in the code. Not all listed items in the code have standards that meet ICC criteria for standards.

#### **Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

#### *Public Comment:*

**Guy Tomberlin, Fairfax County, VA, representing the VA Plumbing and Mechanical Inspectors Association and VA Building and Code Officials Association, requests Approval as Submitted.**

**Commenter's Reason:** This section permits the installation of products that have absolutely no standardized installation or manufacturing criteria. This text was approved last code cycle, M-98 but it actually contained a reference standard as originally proposed. Only the standard did not comply with ICC policy so instead of disapproving the text the standard was deleted. This would have seemed reasonable only the proponent never made any attempt to make the adjustments to the standard and resubmit for ICC acceptance. Now we have code language that requires listing and labeling but never provides the guidance as to be listed and labeled to what? This has caused an undesirable situation when it comes to the actual installation. There is no way to achieve uniform application and enforcement of something that has no recognized methods, procedures and practices such as those typically found in a reference standard.

Lastly the text is flawed even if it contained a reference standard. The first sentence appears to require this type product to remain exposed however it really doesn't say that. This material could be installed in an under floor situation that has "lift out" floor tiles and comply with this code section. The intent of this product was that it would always be installed in a visible location but that is not what the text states.

The under floor system would be installed and probably never looked at again, just as other duct material that is required to meet certain standard and installation criteria. This text, simply put, has created an unfair advantage over the other duct material/systems currently referenced in the IMC that do have to meet some minimum standard and do have installation criteria. The insertion of this section goes against all principals that the I-codes have worked so hard to incorporate over the past several years. The I-code process welcomes and embraces new products and materials, only they must have some minimum level of standardization in order to accomplish uniformity.

Final Action:            AS                    AM                    AMPC\_\_\_\_            D

# M82-07/08

## 604.2 (New)

### *Proposed Change as Submitted:*

**Proponent:** Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

#### **Add new text as follows:**

**604.2 Duct and plenum insulation, where required.** Supply and return air ducts and plenums shall be insulated with insulation having an R-value of not less than R-5 where located in unconditioned spaces and an R-value of not less than R-8 where located outside of the building. Where located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by insulation having an R-value of not less than R-8.

#### **Exceptions:**

1. Where located within equipment and appliances.
2. Where the design temperature difference between the interior and exterior of the duct or plenum does not exceed 15°F (8°C).

(Renumber subsequent sections)

**Reason:** This is extracted from IECC Section 503.2.7 and needs to be included here in the IMC. Section 604 tells us everything except where insulation is required. It would be appropriate for inspectors and installers to have this information readily available in this document and not have to locate a second code to come up with the answer. There is no new language here and this added text would make 604 a little more complete.

**Cost Impact:** The code change proposal will not increase the cost of construction.

#### **Committee Action:**

**Disapproved**

**Committee Reason:** The committee considered this proposal to be incomplete because it only addresses the commercial requirements of the IECC and does not address the residential requirements which would also apply to some IMC applications. There was concern that copying the IECC requirements into the IMC could cause problems if one committee revised this section and the other did not.

#### **Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

#### *Public Comment:*

**Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.**

#### **Modify proposal as follows:**

**604.2 Duct and plenum insulation, where required in non-residential occupancies.** Supply and return air ducts and plenums in non-residential occupancies shall be insulated with insulation having an R-value of not less than R-5 where located in unconditioned spaces and an R-value of not less than R-8 where located outside of the building thermal envelope. Where located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by insulation having an R-value of not less than R-8.

#### **Exceptions:**

1. Where located within equipment and appliances.
2. Where the design temperature difference between the interior and exterior of the duct or plenum does not exceed 15°F (8°C).

**604.3 Duct and plenum insulation, where required in residential occupancies.** Supply and return air ducts and plenums in residential occupancies shall be insulated with insulation having an R-value of not less than R-6 where located in unconditioned spaces and an R-value of not less than R-8 where located outside of the building thermal envelope. Where located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by insulation having an R-value of not less than R-8.

**Exception:** Ducts or portions thereof located inside the building thermal envelope and not in an unconditioned space.

(Renumber subsequent sections)

**Commenter's Reason:** The committee felt that residential requirements were left out of this proposal so they are now included to provide total guidance in determining where insulation is required. It would be helpful to have these requirements all located in 604. Inspectors need to know where insulation is required in order to apply the requirements of 604. Section 604 tells us everything we need to know about insulation EXCEPT where it's required. This will aid the user in properly identifying what insulation belongs where. All this text is based on data from the IECC Sections 503.2.7 and 403.2.1.

Final Action: AS AM AMPC\_\_\_ D

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## M86-07/08 801.2

### *Proposed Change as Submitted:*

**Proponent:** Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

#### **Revise as follows:**

**801.2 General.** Every fuel-burning appliance shall discharge the products of combustion to a vent, factory-built chimney or masonry chimney, except for appliances vented in accordance with Section 804. The chimney or vent shall be designed for the type of appliance being vented.

**Exception:** Appliances vented by a Type I hood installed in accordance with Section 507.

**Reason:** Type I hoods when installed in accordance with this code are quite capable of exhausting products of combustion from a variety of fuel sources such as wood burning char-broilers. Some appliances do not necessarily need a factory built chimney. This section currently doesn't recognize this practice.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Committee Action:** Disapproved

**Committee Reason:** The action was based on the proponent's request for disapproval.

**Assembly Action:** None

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

#### *Public Comment:*

**Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.**

#### **Modify proposal as follows:**

**801.2 General.** Every fuel-burning appliance shall discharge the products of combustion to a vent, factory-built chimney or masonry chimney, except for appliances vented in accordance with Section 804. The chimney or vent shall be designed for the type of appliance being vented.

**Exception:** Commercial cooking appliances vented by a Type I hood installed in accordance with Section 507.

**Commenter's Reason:** We asked the committee to disapprove this in error. This section leads one to believe that appliances must be directly attached to a vent. Indirect venting is permissible if done correctly. As long as hoods are installed according to 507 indirect venting is permissible. This exception legitimizes this practice.

Final Action: AS AM AMPC\_\_\_ D

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# M88-07/08, Part I

## 918.6

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

*Proposed Change as Submitted:*

**Proponent:** Jim Weiler, Pueblo County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO); Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

### PART I – IMC

**Revise as follows:**

**918.6 Prohibited sources.** Outdoor or return air for a forced-air heating system shall not be taken from the following locations:

1. Closer than 10 feet (3048 mm) from an appliance vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outdoor air inlet.
2. Where there is the presence of objectionable odors, fumes or flammable vapors; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A hazardous or insanitary location or a refrigeration machinery room as defined in this code.
4. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with Sections 918.2 and 918.3, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

**Exception:** The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

5. A closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, ~~or~~ furnace room, attic or crawl space.
6. A room or space containing a fuel-burning appliance where such room or space serves as the sole source of return air.

**Exceptions:**

1. This shall not apply where the fuel-burning appliance is a direct-vent appliance.
2. This shall not apply where the room or space complies with the following requirements:
  - 2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning appliances therein.
  - 2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
  - 2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of any appliance firebox or draft hood in the same room or space.
3. This shall not apply to rooms or spaces containing solid fuel-burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.

**Reason:** There are times when it is required to heat a crawl space for various reasons but installing a return air duct doesn't mean it is fully conditioned. There are good reasons not to do this. Mold, odors and insects just to name a few. The IMC doesn't specifically prohibit this situation although implied. This language will clarify that this should not occur.

**Cost Impact:** The code change proposal will not increase the cost of construction.

### PART I – IMC

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee thought that the last sentence in the proposed modification was confusing and needed to be deleted. Without the modification that added the term "unconditioned" to attics and crawl spaces, the proposed language is incomplete because it is appropriate to take return air from conditioned attics and crawl spaces.

**Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**918.6 Prohibited sources.** Outdoor or return air for a forced-air heating system shall not be taken from the following locations:

1. Closer than 10 feet (3048 mm) from an appliance vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outdoor air inlet.
2. Where there is the presence of objectionable odors, fumes or flammable vapors; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A hazardous or insanitary location or a refrigeration machinery room as defined in this code.
4. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with Sections 918.2 and 918.3, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

**Exception:** The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

5. A closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic or crawl space.
6. An unconditioned crawl space by means of direct connection to the return side of a forced air system. Transfer openings in the crawl space enclosure shall not be prohibited.
7. A room or space containing a fuel-burning appliance where such room or space serves as the sole source of return air.

**Exceptions:**

1. This shall not apply where the fuel-burning appliance is a direct-vent appliance.
2. This shall not apply where the room or space complies with the following requirements:
  - 2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning appliances therein.
  - 2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
  - 2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of any appliance firebox or draft hood in the same room or space.
3. This shall not apply to rooms or spaces containing solid fuel-burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.

**Commenter's Reason:** This proposal was approved as originally modified in the IRC and IFGC. We are requesting this be Approved as Modified by this Public Comment in order to be consistent with the other two documents. The last sentence in Item #5 was the concern, the committee believing it wasn't needed. This sentence actually will eliminate any confusion as to the intent. A direct connection to an unconditioned crawl space is undesirable therefore the only way to pull air out would be through transfer openings which are ok. This sentence will aid the user as to the real intent of this section. **It is very important that the codes are consistent in language.**

Final Action:                      AS                      AM                      AMPC \_\_\_\_                      D

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**NOTE: PART II AND III REPRODUCED FOR INFORMATIONAL PURPOSES ONLY – SEE ABOVE**

**M88-07/08, PART II – IRC-M**

**Revise as follows:**

**M1602.2 Prohibited sources.** Outdoor and return air for a forced-air heating or cooling system shall not be taken from the following locations:

1. Closer than 10 feet (3048 mm) to an appliance vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.

2. Where flammable vapors are present; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with ACCA Manual D, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

**Exception:** The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

4. A closet, bathroom, toilet room, kitchen, garage, mechanical room, furnace room, attic, crawl space, or other dwelling unit.
5. A room or space containing a fuel-burning appliance where such room or space serves as the sole source of return air.

**Exceptions:**

1. The fuel-burning appliance is a direct-vent appliance or an appliance not requiring a vent in accordance with Section M1801.1 or Chapter 24.
2. The room or space complies with the following requirements:
  - 2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning appliances therein.
  - 2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
  - 2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of any appliance firebox or draft hood in the same room or space.
3. Rooms or spaces containing solid-fuel burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.

**Reason:** There are times when it is required to heat a crawl space for various reasons but installing a return air duct doesn't mean it is fully conditioned. There are good reasons not to do this. Mold, odors and insects just to name a few. The IRC doesn't specifically prohibit this situation although implied. This language would clarify that this should not occur

**Cost Impact:** The code change proposal will not increase the cost of construction.

**PART II – IRC-M  
Committee Action:**

**Approved as Modified**

**Modify proposal as follows:**

**M1602.2 Prohibited sources.** Outdoor and return air for a forced-air heating or cooling system shall not be taken from the following locations:

1. Closer than 10 feet (3048 mm) to an appliance vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.
2. Where flammable vapors are present; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with ACCA Manual D, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

**Exception:** The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

4. A closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room, unconditioned attic, crawl space, or other dwelling unit.
5. A room or space containing a fuel-burning appliance where such room or space serves as the sole source of return air.
6. An unconditioned crawl space by means of direct connection to the return side of a forced air system. Transfer openings in the crawl space enclosure shall not be prohibited.

**Exceptions:**

1. The fuel-burning appliance is a direct-vent appliance or an appliance not requiring a vent in accordance with Section M1801.1 or Chapter 24.
2. The room or space complies with the following requirements:
  - 2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning appliances therein.
  - 2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
  - 2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of any appliance firebox or draft hood in the same room or space.
3. Rooms or spaces containing solid-fuel burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.

**Committee Reason:** This proposal adds attics and crawl spaces to the list of spaces from which return air must not be taken. Mold and odors from unconditioned attics and crawl spaces could be introduced into the conditioned space without this prohibition. The modification creates a new item for crawl spaces and adds the term "unconditioned" to both attics and crawl spaces to clarify that taking return air from conditioned attics and crawl spaces would be acceptable.

**Assembly Action:**

**None**

### **PART III – IFGC**

**Revise as follows:**

**618.5 Prohibited sources.** Outside or return air for a forced-air heating system shall not be taken from the following locations:

1. Closer than 10 feet (3048 mm) from an appliance vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.
2. Where there is the presence of objectionable odors, fumes or flammable vapors; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A hazardous or insanitary location or a refrigeration machinery room as defined in the *International Mechanical Code*.
4. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with Section 618.2, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

**Exception:** The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

5. A room or space containing an appliance where such a room or space serves as the sole source of return air.

**Exception:** This shall not apply where:

1. The appliance is a direct-vent appliance or an appliance not requiring a vent in accordance with Section 501.8.
  2. The room or space complies with the following requirements:
    - 2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning appliances therein.
    - 2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
    - 2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of any appliance firebox or draft hood in the same room or space.
  3. Rooms or spaces containing solid fuel-burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.
6. A closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room ~~or furnace room~~, attic, or crawl space.

**Reason:** There are times when it is required to heat a crawl space for various reasons but installing a return air duct doesn't mean it is fully conditioned. There are good reasons not to do this. Mold, odors and insects just to name a few. The IFGC doesn't specifically prohibit this situation although implied. This language would clarify that this should not occur.

**Cost Impact:** The code change proposal will not increase the cost of construction.

### **PART III - IFGC**

**Committee Action:**

**Approved as Modified**

**Modify proposal as follows:**

**618.5 Prohibited sources.** Outside or return air for a forced-air heating system shall not be taken from the following locations:

1. Closer than 10 feet (3048 mm) from an appliance vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.
2. Where there is the presence of objectionable odors, fumes or flammable vapors; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A hazardous or insanitary location or a refrigeration machinery room as defined in the *International Mechanical Code*.
4. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with Section 618.2, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

**Exception:** The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

5. A room or space containing an appliance where such a room or space serves as the sole source of return air.

**Exception:** This shall not apply where:

1. The appliance is a direct-vent appliance or an appliance not requiring a vent in accordance with Section 501.8.
2. The room or space complies with the following requirements:
  - 2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning appliances therein.
  - 2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
  - 2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of any appliance firebox or draft hood in the same room or space.
3. Rooms or spaces containing solid fuel-burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.
6. A closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, ~~or furnace room, or attic-or-crawl space.~~
7. A crawl space by means of direct connection to the return side of a forced air system. Transfer openings in the crawl space enclosure shall not be prohibited.

**Committee Reason:** Return air should not be taken from attics and crawl spaces because of contaminants that could be present in such spaces. The modification creates a separate item for crawl spaces recognizing that although direct connection between the return air duct system and the crawl space is undesirable, air taken from the crawl space through transfer openings should not pose a problem.

**Assembly Action:**

**None**

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## M91-07/08, Part I

### 1101.10 (New)

*Proposed Change as Submitted:*

**Proponent:** Mona Casey, Naples, FL

#### **PART I – IMC**

**Add new text as follows:**

**1101.10 Locking access port caps.** Refrigerant circuit access ports located outdoors shall be fitted with locking-type tamper-resistant caps.

**Reason:** The purpose of this code modification is to add new requirements to the Code. The existing code does not address the issue of accessibility to the lethal chemical Chlorofluorocarbons (CFCs/Freon) by untrained and unlicensed individuals, including children.

Because the lethal chemical Freon is easily accessible, "huffing", which refers to the inhalation of Freon and other dangerous chemicals, has been on the rise over the past few years not only among pre-teens and teenagers but among adults as well. Freon is highly addictive and is considered a gateway drug because users often progress from inhalants to illegal drugs and alcohol.

#### *National Statistics*

- The National Institute on Drug Abuse reports that one in five American teens have used Inhalants to get high.
- According to Stephen J. Pasierb, President and CEO of The Partnership for Drug-Free America, 22% of 6th and 8th graders admitted abusing inhalants and only 3% of parents think their child has ever abused inhalants.
- An analysis of 144 Texas death certificates by the Texas Commission on Alcohol and Drug Abuse involving misuse of inhalants found that the most frequently mentioned inhalant (35%) was Freon (51 deaths). Of the Freon deaths, 42 percent were students or youth with a mean age of 16.4 years.
- Suffocation, inhaling fluid or vomit into the lungs, and accidents each cause about 15% of deaths linked to inhalant abuse.
- National Institute on Drug Abuse's 'Monitoring the Future' study reveals that inhalant abuse among 8<sup>th</sup> graders is up 7.7% since 2002.

55% of deaths linked to inhalant abuse are caused by "Sudden Sniffing Death Syndrome." SSDS can occur on the first use or any use. The Inhalant causes the heart to beat rapidly and erratically, resulting in cardiac arrest.

22% of inhalant abusers who died of SSDS had no history of previous inhalant abuse. In other words, they were first-time users.

- The use of inhalants in middle schools has doubled in two years
- The average age a child starts using drugs or alcohol is just 12½
- Every third day a child is taken to the hospital because of a drug overdose
- 85 percent of all juvenile criminal cases are substance related
- Deaths due solely to drug toxicity increased 76% between 1998 and 2005

The modification of this code will have an immense positive impact on the safety and health of our citizens, especially our youth. It will reduce the number of deaths associated with Inhalant abuse and the number of injuries associated with Freon accidents and leaks.

The modification of this code will:

- Seal service valve to prevent leaks
- Prevent excessive energy usage due to refrigerant loss
- Help prevent illegal venting of refrigerant
- Support every EPA management program
- Help prevent accidental mixing of refrigerant
- Deter refrigerant theft at unsecured sites
- Help prevent access by unauthorized persons
- Help prevent loss from cylinders and recovery tanks
- Reduce potential liability for inhalation induced injury or death

**Cost Impact:** The code change proposal will increase the cost of construction. The current cost of this locking refrigerant cap based on the companies I contacted ranges from \$20-\$30 per pair (installation not included).

## **PART I – IMC**

### **Committee Action:**

**Disapproved**

**Committee Reason:** This is not an enforcement issue for the mechanical inspector. This should be addressed at the manufacturer's level rather than in the code. There are other ways to address this issue.

### **Assembly Action:**

**Approved as Submitted**

## *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because an assembly action was successful and public comments were submitted.**

### *Public Comment 1:*

**Julius Ballanco, PE, JB Engineering and Code Consulting, P.C., representing himself, requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

~~4101.10 Locking access port caps. Refrigerant circuit access ports located outdoors shall be fitted with locking type tamper resistant caps.~~

**1101.3 Protection.** Any portion of a refrigeration system that is subject to physical damage shall be protected in an approved manner.  
Outdoor connections for filling the system with refrigerant shall be protected from unauthorized access in an approved manner.

**Commenter's Reason:** The proponent has compelling justification for requiring protection of the fill connection for refrigerants. Rather than specifying a specific method, it would be more appropriate to have performance language which requires protection from unauthorized access. The proposed modification will add the necessary performance language to the section.

In the Mechanical Code, a section on "Protection" already exists in Section 1101. Therefore, it would seem most appropriate to add the requirement to that section.

### *Public Comment 2:*

**The following list of individuals request Approval as Modified by this Public Comment.**

**Sharyl Adams, Chesterfield County Youth Planning and Development**  
**Terri Brown, Camden Children's Alliance & Resources, Inc.**  
**Mona Casey, representing the United Parents to Restrict Open Access to Refrigerant**  
**G. Wayne Frith, Substance Abuse Free Environment Inc.**  
**John Gladness, City of Sylacauga, AL**  
**Gregorio Deleon Guerrero, Mobile, AL**  
**Jessica Landreth, Camden Children's Alliance & Resources, Inc.**  
**Paola Merkins, West Vancouver, BC**  
**Celenda Perry, Camden Children's Alliance & Resources, Inc.**  
**Diana Lynne Prothro**  
**Harvey Weiss, SYNERGIES/National Inhalant Prevention Coalition**

**Modify proposal as follows:**

**1101.10 Locking access port caps.** ~~Refrigerant circuit access ports located outdoors shall be fitted with locking type tamper resistant caps.~~  
**Protection.** Outdoor connections for filling the system with refrigerant shall be protected from unauthorized access in an approved manner.

**Commenter's Reason-Adams:** SAFE is a substance abuse prevention coalition in Chesterfield County, Virginia. In 2005, SAFE discovered that inhalant abuse was a significant problem in our community. In fact, use by eighth graders was double the national average. SAFE has been aggressively educating the public about this issue since that time. However, education is only one approach to the problem. Decreasing accessibility to abusable products is important as well.

Abuse of refrigerant in air conditioners is one of the ways our youth get intoxicated from inhalants. The proposed modification listed above would prevent unauthorized access to refrigerant. Unfortunately, some young people have lost their lives from siphoning off and huffing refrigerant from an air conditioning unit.

SAFE strongly supports the proposed modification be included in ICC codes.

**Commenter's Reason-Brown, Landreth, Perry:** Refrigerant thefts by youth for recreational purposes do lead to fatalities and can be thwarted.

**Commenter's Reason-Casey:** The National Institute on Drug Abuse reports that one in five American teens have used Inhalants to get high.

According to Stephen J. Pasierb, President and CEO of The Partnership for Drug-Free America, 22% of 6th and 8th graders admitted abusing inhalants and only 3% of parents think their child has ever abused inhalants.

An analysis of 144 Texas death certificates by the Texas Commission on Alcohol and Drug Abuse involving misuse of inhalants found that the most frequently mentioned inhalant (35%) was Freon (51 deaths). Of the Freon deaths, 42 percent were students or youth with a mean age of 16.4 years.

National Institute on Drug Abuse's 'Monitoring the Future' study reveals that inhalant abuse among 8th graders is up 7.7% since 2002.

"Huffing," or inhaling volatile substances, is becoming increasingly popular among children, especially among 12- to 14-year-olds (*Archives of Pediatric and Adolescent Medicine*, 1998;152(8):781--786).

Although huffing peaks between the ages of 12 and 15 years, it often starts "innocently" in children only 6 to 8 years old (*Pediatrics*, 1996;97:3).

Inhalants are unique because each and every use holds a potential to be fatal, even the first; this is known as "sudden sniffing death syndrome," or SSDS, and results from an irregular heart rate. SSDS can occur without an "overdose." (Indiana Prevention Research Center, Indiana University, Bloomington)

Inhalants were the most frequently reported class of illicit drugs used in the past year among adolescents aged 12 or 13 (3.4 and 4.8 percent, respectively) according to the NSDUH Report March 13, 2008: Inhalant Use across the Adolescent Years by the Us Department of Health and Human Services and SAMHSA's National Clearing House for Alcohol and Drug Information.

According to the Montana Office of Public Instructions 2007 Youth Behavior Risk Survey, the highest inhalant rates were among students at alternative schools (32.2%), urban Native Americans (26.3%) and students with disabilities (25.3%); Female use bested male use in 2005; and at grades 7-8 inhalant use exceeded marijuana use for the first time in 10 years.

According the National Inhalant Prevention Coalition Inhalant Prevention Update: 19 May 2008, in Tennessee, between 2003 and 2007, inhalant use for females under 15 jumped from 13.3% to 17.2% while male cohorts went from 11.3% to 11.0%; at the 9th grade level female use rose from 12.7% in 2003 to 18.3% in 2007 while male cohorts were steady at 11.8%; among 11th grade males the 2005 inhalant use rate of 9.1% soared to 19.0% in 2007; and for 16 or 17 year old males inhalant use when from 11.5% in 2005 to 18.0% in 2007. In New York, between 2005 and 2007, male inhalant use when from 7.6% to 10.8% while female use grow from 9.6% to 10.8%; Black inhalant rates almost doubled from 5.6% to 10.6% while Hispanic rates rose from 9.3% to 16.2%.

**Commenter's Reason-Frith:** The Virginia Inhalant Abuse Prevention Coalition was formed in 2007 to address a significant problem with inhalant abuse among young people in the Commonwealth of Virginia. Its membership includes representatives from local substance abuse prevention coalitions from across the state as well as from state agencies and other local, regional and statewide organizations such as poison control centers. I serve as chairman of the legislative/policy committee for the organization.

Decreasing the accessibility to the public of refrigerants in air conditioners is an important component in preventing inhalant abuse. Teens find it easy to break into and siphon off the refrigerant in air conditioning units for huffing. Since even one use can be lethal, eliminating this source of refrigerant will help protect the safety of our young people.

The Virginia Inhalant Abuse Prevention Coalition strongly supports the above modification for air conditioner units.

**Commenter's Reason-Gladness:** This proposal is vitally important in limiting access to potentially lethal refrigerant by unlicensed, untrained individuals, specifically for the purpose of getting intoxicated.

Because the potentially lethal refrigerant is currently easily and readily accessible, "huffing", which refers to the inhalation of refrigerant and other dangerous chemicals has been on the rise over the past few years. As a result, the number of deaths due to "huffing" is increasing accordingly. Refrigerant and other inhalants are highly addictive and are considered a gateway drug because users often progress from inhalants to illegal drug and alcohol abuse.

**Commenter's Reason-Guerrero:** Due to the easy access of these filling systems and lack of education, a deep loss of an immediate family member can occur.

**Commenter's Reason-Merkins:** As a parent and former School Trustee I have been continuously involved in establishing and promoting Substance Abuse Prevention initiatives in my community. As an Architect I had never consider the possibility that air conditioning refrigerant could be siphoned through unsecured access and used as inhalant. While many might think that inhaling substances is the problem of the inhaler or addict, I believe it's an issue that should be addressed by the community in general. This is a great way to introduce regulations that might help save a life, usually a young life, in what might be a one time experiment gone lethal. Securing access is relatively easy and inexpensive compared to the devastating effects, social, economical and personal, that unregulated access and misuse of refrigerants have.

**Commenter's Reason-Prothro:** I am asking for this modification to be made to protect all outside refrigerant fill connections from unauthorized access in an approved manner, so that no other person will lose their life.

I came home from work on November 28, 2007 to find my beautiful 19 year old daughter, Erica Rain Prothro, who had just come home for the Thanksgiving holiday from college in New York, sitting in my living room chair with a plastic bag over her head – Dead. She had been

introduced by a friend of hers just a few days prior, to huffing Freon. Erica had no idea what she was messing with. The one breath death killed my daughter with refrigerant from our very own air conditioner unit outside our home. We found the cap off the unit the next day. Erica was only home alone for approximately 40 minutes at most. Although Erica had been revived, she was completely brain dead. Please protect our young by protecting these units from access by untrained, unlicensed individuals.

**Commenter's Reason-Weiss:** As the executive director of the National Inhalant Prevention Coalition, I can state very simply the importance of this modification. It will save lives!

Final Action: AS AM AMPC\_\_\_\_\_ D

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## M91-07/08, Part II

### M1411.6 (New)

#### *Proposed Change as Submitted:*

**Proponent:** Mona Casey, Naples, FL

#### **PART II – IRC**

#### **Add new text as follows:**

**M1411.6 Locking access port caps.** Refrigerant circuit access ports located outdoors shall be fitted with locking-type tamper-resistant caps.

**Reason:** The purpose of this code modification is to add new requirements to the Code. The existing code does not address the issue of accessibility to the lethal chemical Chlorofluorocarbons (CFCs/Freon) by untrained and unlicensed individuals, including children.

Because the lethal chemical Freon is easily accessible, "huffing", which refers to the inhalation of Freon and other dangerous chemicals, has been on the rise over the past few years not only among pre-teens and teenagers but among adults as well. Freon is highly addictive and is considered a gateway drug because users often progress from inhalants to illegal drugs and alcohol.

#### *National Statistics*

- The National Institute on Drug Abuse reports that one in five American teens have used Inhalants to get high.
- According to Stephen J. Pasierb, President and CEO of The Partnership for Drug-Free America, 22% of 6th and 8th graders admitted abusing inhalants and only 3% of parents think their child has ever abused inhalants.
- An analysis of 144 Texas death certificates by the Texas Commission on Alcohol and Drug Abuse involving misuse of inhalants found that the most frequently mentioned inhalant (35%) was Freon (51 deaths). Of the Freon deaths, 42 percent were students or youth with a mean age of 16.4 years.
- Suffocation, inhaling fluid or vomit into the lungs, and accidents each cause about 15% of deaths linked to inhalant abuse.
- National Institute on Drug Abuse's 'Monitoring the Future' study reveals that inhalant abuse among 8<sup>th</sup> graders is up 7.7% since 2002.

55% of deaths linked to inhalant abuse are caused by "Sudden Sniffing Death Syndrome." SSDS can occur on the first use or any use. The Inhalant causes the heart to beat rapidly and erratically, resulting in cardiac arrest.

22% of inhalant abusers who died of SSDS had no history of previous inhalant abuse. In other words, they were first-time users.

#### *Collier County, FL Statistics*

- The use of inhalants in middle schools has doubled in two years
- The average age a child starts using drugs or alcohol is just 12½
- Every third day a child is taken to the hospital because of a drug overdose
- 85 percent of all juvenile criminal cases are substance related
- Deaths due solely to drug toxicity increased 76% between 1998 and 2005

The modification of this code will have an immense positive impact on the safety and health of our citizens, especially our youth. It will reduce the number of deaths associated with Inhalant abuse and the number of injuries associated with Freon accidents and leaks.

The modification of this code will:

- Seal service valve to prevent leaks
- Prevent excessive energy usage due to refrigerant loss
- Help prevent illegal venting of refrigerant
- Support every EPA management program
- Help prevent accidental mixing of refrigerant
- Deter refrigerant theft at unsecured sites
- Help prevent access by unauthorized persons
- Help prevent loss from cylinders and recovery tanks
- Reduce potential liability for inhalation induced injury or death

**Cost Impact:** The code change proposal will increase the cost of construction. The current cost of this locking refrigerant cap based on the companies I contacted ranges from \$20-\$30 per pair (installation not included).

**PART II — IRC-M  
Committee Action:**

**Disapproved**

**Committee Reason:** The installation of locking access port caps would be better addressed with the HVAC manufacturers rather than in the code. Having them installed during the manufacturing process would insure wider usage and would probably have less cost impact to the homeowner.

**Assembly Action:**

**None**

*Individual Consideration Agenda*

**This item is on the agenda for individual consideration because public comments were submitted.**

**The following list of individuals request Approval as Modified by this Public Comment.**

**Sharyl Adams, Chesterfield County Youth Planning and Development  
Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C.  
Terri Brown, Camden Children’s Alliance & Resources, Inc.  
Mona Casey, representing the United Parents to Restrict Open Access to Refrigerant  
John Gladness, City of Sylacauga, AL  
Gregorio Deleon Guerrero, Mobile, AL  
Jessica Landreth, Camden Children’s Alliance & Resources, Inc.  
Paola Merkins, West Vancouver, BC  
Celenda Perry, Camden Children’s Alliance & Resources, Inc.  
Diana Lynne Prothro  
Harvey Weiss, SYNERGIES/National Inhalant Prevention Coalition**

**Modify proposal as follows:**

**M1411.6 Locking access port caps.** ~~Refrigerant circuit access ports located outdoors shall be fitted with locking type tamper resistant caps.~~  
**Protection.** Outdoor connections for filling the system with refrigerant shall be protected from unauthorized access in an approved manner.

**Commenter’s Reason-Adams:** SAFE is a substance abuse prevention coalition in Chesterfield County, Virginia. In 2005, SAFE discovered that inhalant abuse was a significant problem in our community. In fact, use by eighth graders was double the national average. SAFE has been aggressively educating the public about this issue since that time. However, education is only one approach to the problem. Decreasing accessibility to abusable products is important as well.

Abuse of refrigerant in air conditioners is one of the ways our youth get intoxicated from inhalants. The proposed modification listed above would prevent unauthorized access to refrigerant. Unfortunately, some young people have lost their lives from siphoning off and huffing refrigerant from an air conditioning unit.

SAFE strongly supports the proposed modification be included in ICC codes.

**Commenter’s Reason-Ballanco:** The proponent has compelling justification for requiring protection of the fill connection for refrigerants. Rather than specifying a specific method, it would be more appropriate to have performance language which requires protection from unauthorized access. The proposed modification will add the necessary performance language to the section.

It would seem most appropriate to retitle the section, "Protection".

**Commenter’s Reason-Brown, Landreth, Perry:** Refrigerant thefts by youth for recreational purposes do lead to fatalities and can be thwarted.

**Commenter’s Reason-Casey:** The National Institute on Drug Abuse reports that one in five American teens have used Inhalants to get high.

According to Stephen J. Pasierb, President and CEO of The Partnership for Drug-Free America, 22% of 6th and 8th graders admitted abusing inhalants and only 3% of parents think their child has ever abused inhalants.

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National Institute on Drug Abuse’s ‘Monitoring the Future’ study reveals that inhalant abuse among 8th graders is up 7.7% since 2002.

"Huffing," or inhaling volatile substances, is becoming increasingly popular among children, especially among 12- to 14-year-olds (*Archives of Pediatric and Adolescent Medicine*, 1998;152(8):781--786).

Although huffing peaks between the ages of 12 and 15 years, it often starts "innocently" in children only 6 to 8 years old (*Pediatrics*, 1996;97:3).

Inhalants are unique because each and every use holds a potential to be fatal, even the first; this is known as "sudden sniffing death syndrome," or SSSD, and results from an irregular heart rate. SSSD can occur without an "overdose." (Indiana Prevention Research Center, Indiana University, Bloomington)

Inhalants were the most frequently reported class of illicit drugs used in the past year among adolescents aged 12 or 13 (3.4 and 4.8 percent, respectively) according to the NSDUH Report March 13, 2008: Inhalant Use across the Adolescent Years by the Us Department of Health and Human Services and SAMHSA's National Clearing House for Alcohol and Drug Information.

According to the Montana Office of Public Instructions 2007 Youth Behavior Risk Survey, the highest inhalant rates were among students at alternative schools (32.2%), urban Native Americans (26.3%) and students with disabilities (25.3%); Female use bested male use in 2005; and at grades 7-8 inhalant use exceeded marijuana use for the first time in 10 years.

According the National Inhalant Prevention Coalition Inhalant Prevention Update: 19 May 2008, in Tennessee, between 2003 and 2007, inhalant use for females under 15 jumped from 13.3% to 17.2% while male cohorts went from 11.3% to 11.0%; at the 9th grade level female use rose from 12.7% in 2003 to 18.3% in 2007 while male cohorts were steady at 11.8%; among 11th grade males the 2005 inhalant use rate of 9.1% soared to 19.0% in 2007; and for 16 or 17 year old males inhalant use when from 11.5% in 2005 to 18.0% in 2007. In New York, between 2005 and 2007, male inhalant use when from 7.6% to 10.8% while female use grow from 9.6% to 10.8%; Black inhalant rates almost doubled from 5.6% to 10.6% while Hispanic rates rose from 9.3% to 16.2%.

**Commenter's Reason-Gladness:** This proposal is vitally important in limiting access to potentially lethal refrigerant by unlicensed, untrained individuals, specifically for the purpose of getting intoxicated.

Because the potentially lethal refrigerant is currently easily and readily accessible, "huffing", which refers to the inhalation of refrigerant and other dangerous chemicals has been on the rise over the past few years. As a result, the number of deaths due to "huffing" is increasing accordingly. Refrigerant and other inhalants are highly addictive and are considered a gateway drug because users often progress from inhalants to illegal drug and alcohol abuse.

**Commenter's Reason-Guerrero:** Due to the easy access of these filling systems and lack of education, a deep loss of an immediate family member can occur.

**Commenter's Reason-Merkins:** As a parent and former School Trustee I have been continuously involved in establishing and promoting Substance Abuse Prevention initiatives in my community. As an Architect I had never consider the possibility that air conditioning refrigerant could be siphoned through unsecured access and used as inhalant. While many might think that inhaling substances is the problem of the inhaler or addict, I believe it's an issue that should be addressed by the community in general. This is a great way to introduce regulations that might help save a life, usually a young life, in what might be a one time experiment gone lethal. Securing access is relatively easy and inexpensive compared to the devastating effects, social, economical and personal, that unregulated access and misuse of refrigerants have.

**Commenter's Reason-Prothro:** I am asking for this modification to be made to protect all outside refrigerant fill connections from unauthorized access in an approved manner, so that no other person will lose their life.

I came home from work on November 28, 2007 to find my beautiful 19 year old daughter, Erica Rain Prothro, who had just come home for the Thanksgiving holiday from college in New York, sitting in my living room chair with a plastic bag over her head – Dead. She had been introduced by a friend of hers just a few days prior, to huffing Freon. Erica had no idea what she was messing with. The one breath death killed my daughter with refrigerant from our very own air conditioner unit outside our home. We found the cap off the unit the next day. Erica was only home alone for approximately 40 minutes at most. Although Erica had been revived, she was completely brain dead.

Please protect our young by protecting these units from access by untrained, unlicensed individuals.

**Commenter's Reason-Weiss:** As the executive director of the National Inhalant Prevention Coalition, I can state very simply the importance of this modification. It will save lives!

Final Action:                      AS                      AM                      AMPC\_\_\_\_                      D

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# M93-07/08

## Table 1103.1

Proposed Change as Submitted:

Proponent: Steve Ferguson, American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

Revise as follows:

**[F]Table 1103.1 (Supp)**  
**REFRIGERANT CLASSIFICATION, AMOUNT AND TLV-TWA**  
**as approved by the American Society of Heating Refrigerating and**  
**Air-Conditioning Engineers and Revised 2004**

Chemical Refrigerant	Formula	Chemical Name of Blend	Hazard Categories <sup>a</sup>	Refrigerant Classification	Degrees of Hazard <sup>b</sup>	[[M]] Amount Of Refrigerant Per Occupied Space			
						Pound per 1,000 cubic feet	ppm	g/m3	OEL <sup>f</sup> TLV-TWA <sup>f</sup> (ppm)
R-11 <sup>e</sup>	CCl <sub>3</sub> F	trichlorofluoromethane	OHH	A1	2-0-0 <sup>c</sup>	0.39	1,100	6.2	C1,000
R-12 <sup>e</sup>	CCl <sub>2</sub> F <sub>2</sub>	dichlorodifluoromethane	CG,OHH	A1	2-0-0 <sup>c</sup>	5.6	18,000	90	1,000
R-13 <sup>e</sup>	CClF <sub>3</sub>	chlorotrifluoromethane	CG,OHH	A1	2-0-0 <sup>c</sup>	18	<del>67,000</del>	<del>290</del>	1,000
R-13B1 <sup>e</sup>	CBrF <sub>3</sub>	bromotrifluoromethane	CG,OHH	A1	2-0-0 <sup>c</sup>	22	<del>67,000</del>	<del>350</del>	1,000
R-14	CF <sub>4</sub>	tetrafluoromethane (carbon tetrafluoride)	CG,OHH	A1	2-0-0 <sup>c</sup>	<u>25</u>	<u>110,000</u>	<u>400</u>	1,000
R-22	CHClF <sub>2</sub>	chlorodifluoromethane	CG,OHH	A1	2-0-0 <sup>c</sup>	<u>13</u>	<u>59,000</u>	<u>210</u>	1,000
R-23	CHF <sub>3</sub>	trifluoromethane (fluoroform)	CG,OHH	A1	2-0-0 <sup>c</sup>	7.3	41,000	120	1,000
R-32	CH <sub>2</sub> F <sub>2</sub>	difluoromethane (methylene fluoride)	CG,F,OHH	A2	—	<u>4.8</u>	<u>36,000</u>	<u>77</u>	<u>1,000</u>
R-113 <sup>e</sup>	CCl <sub>2</sub> FCClF <sub>2</sub>	1, 1,2-trichloro-1,2,2-trifluoroethane	OHH	A1	2-0-0 <sup>c</sup>	1.2	2,600	20	1,000
R-114 <sup>e</sup>	CClF <sub>2</sub> CClF <sub>2</sub>	1,2-dichloro-1,2,2-tetrafluoroethane	CG,OHH	A1	2-0-0 <sup>c</sup>	8.7	20,000	140	1,000
R-115	CClF <sub>2</sub> CF <sub>3</sub>	chloropentafluoroethane	CG,OHH	A1		<u>47</u>	<u>120,000</u>	<u>760</u>	<u>1,000</u>
R-116	CF <sub>3</sub> CF <sub>3</sub>	hexafluoroethane	CH,OHH	A1	1-0-0	<u>34</u>	<u>97,000</u>	<u>550</u>	<u>1,000</u>
R-123	CHCl <sub>2</sub> CF <sub>3</sub>	2,2-dichloro-1,1,1-trifluoroethane	OHH	B1	2-0-0 <sup>c</sup>	3.5	9,100	57	50
R-124	CHClFCF <sub>3</sub>	2-chloro-1,1,1,2-tetrafluoroethane	CG,OHH	A1	2-0-0 <sup>c</sup>	3.5	10,000	56	1,000
R-125	CHF <sub>2</sub> CF <sub>3</sub>	pentafluoroethane	CG,OHH	A1	2-0-0 <sup>c</sup>	<u>23</u>	<u>75,000</u>	<u>370</u>	<u>1,000</u>
R-134a	CH <sub>2</sub> FCF <sub>3</sub>	1,1,1,2-tetrafluoroethane	CG,OHH	A1	2-0-0 <sup>c</sup>	13	50,000	210	1,000
R-141b	<u>CH<sub>3</sub>CCl<sub>2</sub>F</u>	<u>1,1-dichloro-1-fluoroethane</u>	<u>CG,OHH</u>			<u>0.78</u>	<u>2,600</u>	<u>12</u>	
R-142b	<u>CH<sub>3</sub>CClF<sub>2</sub></u>	<u>1-chloro-1,1-difluoroethane</u>	<u>CG,OHH</u>	<u>A2</u>		<u>5.1</u>	<u>20,000</u>	<u>83</u>	<u>1,000</u>
R-143a	CH <sub>3</sub> CF <sub>3</sub>	1,1,1-trifluoroethane	CG,F,OHH	A2	2-0-0 <sup>c</sup>	4.5	21,000	70	1,000
R-152a	CH <sub>3</sub> CHF <sub>2</sub>	1,1-difluoroethane	CG,F,OHH	A2	1-4-0	2.0	12,000	32	1,000
R-170	CH <sub>3</sub> CH <sub>3</sub>	ethane	CG,F,OHH	A3	2-4-0	0.54	7,000	8.7	1,000
R-E170	CH <sub>3</sub> OCH <sub>3</sub>	dimethyl ether	CG,F,OHH	A3		<u>1.0</u>	<u>8,500</u>	<u>16</u>	<u>1,000</u>
R-218	CF <sub>3</sub> CF <sub>2</sub> CF <sub>3</sub>	octafluoropropane	CG,OHH	A1	2-0-0 <sup>c</sup>	43	90,000	690	1,000
R-227ea	CF <sub>3</sub> CHFCF <sub>3</sub>	1,1,1,2,3,3,3-heptafluoropropane	CG,OHH	A1		<u>36</u>	<u>84,000</u>	<u>580</u>	<u>1,000</u>
R-236fa	CF <sub>3</sub> CH <sub>2</sub> CF <sub>3</sub>	1,1,1,3,3,3-hexafluoropropane	CG,OHH	A1	2-0-0 <sup>c</sup>	21	55,000	<u>340</u>	1,000
R-245fa	CHF <sub>2</sub> CH <sub>2</sub> CF <sub>3</sub>	1,1,1,3,3-pentafluoropropane	CG,OHH	B1	2-0-0 <sup>c</sup>	12	34,000	<u>190</u>	300
R-290	CH <sub>3</sub> CH <sub>2</sub> CH <sub>3</sub>	propane	CG,F,OHH	A3	2-4-0	0.56	5,300	<u>9.5</u>	2,500
R-C318	<u>-(CF<sub>2</sub>)<sub>2</sub>-</u>	<u>octafluorocyclobutane</u>	<u>CG,OHH</u>	<u>A1</u>		<u>41</u>	<u>80,000</u>	<u>660</u>	<u>1,000</u>
R400 <sup>e</sup>	zeotrope	R-12/114 (50/50)	CG,OHH	A1	2-0-0 <sup>c</sup>	10	28,000	160	—
R-400 <sup>e</sup>	zeotrope	R-12/114 (60/40)	CG,OHH	A1		<u>11</u>	<u>30,000</u>	<u>170</u>	
R-401A	zeotrope	R-22/152a/124 (53/13/34)	CG,OHH	A1	2-0-0 <sup>c</sup>	<u>6.6</u>	<u>27,000</u>	<u>110</u>	<u>1,000</u>
R-401B	zeotrope	R-22/152a/124 (61/11/28)	CG,OHH	A1	2-0-0 <sup>c</sup>	<u>7.2</u>	<u>30,000</u>	<u>120</u>	<u>1,000</u>
R-401C	zeotrope	R-22/152a/124 (33/15/52)	CG,OHH	A1	2-0-0 <sup>c</sup>	<u>5.2</u>	<u>20,000</u>	<u>84</u>	—
R-402A	zeotrope	R-125/290/22 (60/2/38)	CG,OHH	A1	2-0-0 <sup>c</sup>	8.5	33,000	140	1,000
R-402B	zeotrope	R-125/290/22 (38/2/60)	CG,OHH	A1	2-0-0 <sup>c</sup>	15	63,000	240	1,000
R-403A	zeotrope	R-290/22/218 (5/75/20)	CG,OHH	A1	2-0-0 <sup>c</sup>	<u>7.6</u>	<u>33,000</u>	<u>120</u>	<u>1,000</u>
R-403B	zeotrope	R-290/22/218 (5/56/39)	CG,OHH	A1	2-0-0 <sup>c</sup>	18	70,000	290	1,000
R-404A	zeotrope	R-125/143a/134a (44/52/4)	CG,OHH	A1	2-0-0 <sup>c</sup>	<u>31</u>	<u>130,000</u>	<u>500</u>	<u>1,000</u>
R-405A	zeotrope	R-22/152a/142b/C318	CG,OHH			16	57,000	260	1,000

Chemical Refrigerant	Formula	Chemical Name of Blend	Hazard Categories <sup>a</sup>	Refrigerant Classification	Degrees of Hazard <sup>b</sup>	[[M]] Amount Of Refrigerant Per Occupied Space				
						Pound per 1,000 cubic feet	ppm	g/m3	OEL <sup>f</sup> TLV-TWA <sup>f</sup> (ppm)	
		(45.0/7.0/5.5/2.5)								
R-406A	zeotrope	R-22/600a/142b (55/4/41)	CG,F,OHH	A2	—	4.7	21,000	25	1,000	
R-407A	zeotrope	R-32/125/134a (20/40/40)	CG,OHH	A1	2-0-0 <sup>c</sup>	18	78,000	290	1,000	
R-407B	zeotrope	R-32/125/134a (10/70/20)	CG,OHH	A1	2-0-0 <sup>c</sup>	20	77,000	320	1,000	
R-407C	zeotrope	R-32/125/134a (23/25/52)	CG,OHH	A1	2-0-0 <sup>c</sup>	17	76,000	270	1,000	
R-407D	zeotrope	R-32/125/134a (15/15/70)	CG,OHH	A1	2-0-0 <sup>c</sup>	15	65,000	240	1,000	
R-407E	zeotrope	R-32/125/134a (25/15/60)	CG,OHH	A1	2-0-0 <sup>c</sup>	16	75,000	260	1,000	
R-408A	zeotrope	R-125/143a/22 (7/46/47)	CG,OHH	A1	2-0-0 <sup>c</sup>	21	95,000	340	1,000	
R-409A	zeotrope	R-22/124/142b (60/25/15)	CG,OHH	A1	2-0-0 <sup>c</sup>	7.1	29,000	110	1,000	
R-409B	zeotrope	R-22/124/142b (65/25/10)	CG,OHH	A1	2-0-0 <sup>c</sup>	7.3	30,000	120	—	
R-410A	zeotrope	R-32/125 (50/50)	CG,OHH	A1	2-0-0 <sup>c</sup>	25	130,000	390	1,000	
R-410B	zeotrope	R-32/125 (45/55)	CG,OHH	A1	2-0-0 <sup>c</sup>	24	130,000	390	—	
R-411A	zeotrope	R-127/22/152a (1.5/87.5/11.0)	CG,F,OHH	A2	—	2.9	14,000	46	1,000	
R-411B	zeotrope	R-1270/22/152a (3/94/3)	CG,F,OHH	A2	—	2.8	13,000	45	1,000	
R-412A	zeotrope	R-22/318/142b (70/5/25)	CG,F,OHH	A2	—	5.1	22,000	82	1,000	
R-413A	zeotrope	R-218/134a/600a (9/88/3)	CG,F,OHH	A2	—	5.8	22,000	94	—	
R-414A	zeotrope	R-22/124/600a/142b (51/28.5/4/16.5)	CG,OHH	A1	—	6.4	26,000	100	1,000	
R-414B	zeotrope	R-22/124/600a/142b (50/39/1.5/9.5)	CG,OHH	A1	—	6.0	23,000	95	—	
R-415A	zeotrope	R-22/152a (82.0/18.0)	CG,F,OHH	A2		12	57,000	190		
R-415B	zeotrope	R-22/152a (25.0/75.0)	CG,F,OHH	A2		9.3	52,000	120	1,000	
R-416A	zeotrope	R-134a/124/600 (59/39.5/1.5)	CG,OHH	A1	2-0-0 <sup>c</sup>	3.9	14,000	62	—	
R-417A	zeotrope	R-125/134a/600 (45.5/50/3.5)	CG,OHH	A1	2-0-0 <sup>c</sup>	3.5	13,000	56	1,000	
R-418A	zeotrope	R-290/22/152a (1.5/96.0/2.5)	CG,F,OHH	A2	—	13	59,000	200		
R-419A	zeotrope	R-125/134a/E170 (77.0/19.0/4.0)	CG,F,OHH	A2	—	19	70,000	310		
R-420A	zeotrope	R-134a/142b (88.0/12.0)	CG,OHH	A1	2-0-0 <sup>c</sup>	12	45,000	190	1,000	
R-421A	zeotrope	R-125/134a(58.0/42.0)	CG,OHH	A1	2-0-0 <sup>c</sup>	17	61,000	280	1,000	
R-421B	zeotrope	R-125/134a (85.0/15.0)	CG,OHH	A1	2-0-0 <sup>c</sup>	21	69,000	330	1,000	
R-422A	zeotrope	R-125/134a/600a (85.1/11.5/3.4)	CG,OHH	A1	2-0-0 <sup>c</sup>	18	63,000	290	1,000	
R-422B	zeotrope	R-125/134a/600a (55.0/42.0/3.0)	CG,OHH	A1	2-0-0 <sup>c</sup>	16	26,000	250	1,000	
R-422C	zeotrope	R-125/134a/600a (82.0/15.0/3.0)	CG,OHH	A1	2-0-0 <sup>c</sup>	18	62,000	290	1,000	
R-422D	zeotrope	R-125/134a/600a (65.1/31.5/3.4)	CG,OHH	A1	2-0-0 <sup>c</sup>	16	58,000	260	1,000	
R-423A	zeotrope	R-134a227ea (52.5/47.5)	CC,OHH				2-0-0 <sup>c</sup>	19	59,000	310
R-424A	zeotrope	R-125/134a/600a/600/601a (50.5/47.0/1.0/0.6)	CG,OHH	A1	2-0-0 <sup>c</sup>	6.2	23,000	100	1,000	
R-425A	zoetrope	R-32/134a/227ea (18.5/69.5/12.0)	CG,OHH	A1	2-0-0 <sup>c</sup>	16	67,000	250	1,000	
R-426A	zeotrope	R-125/134a/600a/601a (5.1/93.0/1.3/0.6)	CG,OHH	A1		5.2	20,000	83	990	
R-427A	zeotrope	R-32/125/143a/134a (15.0/25.0/10.0/50.0)	CG,OHH	A1		18	76,000	280	1,000	
R-428A	zeotrope	R-125/143a/290/600a (77.5/20.0/0.6/1.9)	CG,OHH	A1		23	83,000	370	1,000	
R-429A	zeotrope	R-E170/152a/600a (60.0/10.0/30.0)	CG,F,OHH	A3		0.81	6,300	13		
R-430A	zeotrope	R-152a/600a76.0/24.0)	CG,F,OHH	A3		1.3	8,000	21		
R-431A	zeotrope	R-290/152a (71.0/29.0)	CG,F,OHH	A3		0.69	5,500	11		
R-432A	zeotrope	R-1270/E170 (80.0/20.0)	CG,F,OHH	A3		0.13	1,200	2.1		
R-433A	zeotrope	R-1270/290 (30.0/70.0)	CG,F,OHH	A3		0.34	3,100	5.5		
R-500e	azeotrope	R-12/152a (73.8/26.2)	CG,OHH	A1	2-0-0c	7.6	30,000	120	1,000	
R-501 <sup>e</sup>	azeotrope	R-22/12 (75.0/25.0)	CG,OHH	A1		13	54,000	210		
R-502e	azeotrope	R-22/115 (48.8/51.2)	CG,OHH	A1	2-0-0c	21	73,000	330	1,000	
R-503e	azeotrope	R-23/13 (40.1/59.9)	CG,OHH	A1	2-0-0c	15	67,000	240	1,000	
R-504 <sup>e</sup>	azeotrope	R-32/115 (48.2/51.8)	CG,OHH				29	140,000	460	

Chemical Refrigerant	Formula	Chemical Name of Blend	Hazard Categories <sup>a</sup>	Refrigerant Classification	Degrees of Hazard <sup>b</sup>	[[M]] Amount Of Refrigerant Per Occupied Space			
						Pound per 1,000 cubic feet	ppm	g/m <sup>3</sup>	OEL <sup>f</sup> TLV-TWA <sup>f</sup> (ppm)
R-507A	azeotrope	R-125/143a (50/50)	CG,OHH	A1	2-0-0c	32	130,000	520	1,000
R-508A	azeotrope	R-23/116 (39/61)	CG,OHH	A1	2-0-0c	14	55,000	220	1,000
R-508B	azeotrope	R-23/116 (46/54)	CG,OHH	A1	2-0-0c	13	52,000	200	1,000
R-509A	zeotrope	R-22/218 (44/56)	CG,OHH	A1	2-0-0c	24	75,000	390	1,000
R-600	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>	butane	CG,F,OHH	A3	1-4-0	—	—	—	800
R-600a	CH(CH <sub>3</sub> ) <sub>2</sub> -CH <sub>3</sub>	isobutane (2-methyl propane)	CG,F,OHH	A3	2-4-0	0.6	4000	9.6	800
R-601a	(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> CH <sub>3</sub>	isopentane	CG,F,OHH	A3		0.2	1000	2.9	600
R-717	NH <sub>3</sub>	ammonia	CG,C,F,OHH	B2	3-3-0 <sup>d</sup>	0.014	320	0.22	25
R-718	H <sub>2</sub> O	water	—	A1	0-0-0	—	—	—	
R-744	CO <sub>2</sub>	carbon dioxide	CG,OHH	A1	2-0-0 <sup>c</sup>	4.5	40,000	72	5,000
R-1150	CH <sub>2</sub> =CH <sub>2</sub>	ethene (ethylene)	CG,F,OHH	A3	1-4-2	0.38	5,200	6.0	1,000
R-1270	CH <sub>3</sub> CH=CH <sub>2</sub>	Propene (propylene)	CG,F,OHH	A3	1-4-1	0.1	1,000	1.7	660

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.0283 m<sup>3</sup>.

- CG = Compressed gas; C = Corrosive; F = Flammable; OHH = Other Health Hazard.
- Degrees of hazard are for health, fire, and reactivity, respectively, in accordance with NFPA 704.
- Reduction to 1-0-0 is allowed if analysis satisfactory to the code official shows that the maximum concentration for a rupture or full loss of refrigerant charge would not exceed the IDLH, considering both the refrigerant quantity and room volume.
- For installations that are entirely outdoors, use 3-1-0.
- Class I ozone depleting substance; prohibited for new installations.
- Occupational Exposure Limit based on the OSHA PEL, ACGIH TLV-TWA, the AIHA WEEL or consistent value on a time-weighted average (TWA) basis (unless noted C for ceiling) for an 8 hr/d and 40 hr/wk.

**Reason:** This proposal will update Table 1103.1 to be consistent with ASHRAE Standard 34-2007, and add new refrigerants for which ASHRAE Standard 34-2007 has given a designation and safety classification.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Analysis:** The new language added to the title of the table appears to be an attribution statement. This is normally found in the commentary.

**Committee Action:**

**Approved as Modified**

**Modify proposal as follows:**

[F]Table 1103.1 (Supp)  
**REFRIGERANT CLASSIFICATION, AMOUNT AND TLV-TWA-OEL**  
~~as approved by the American Society of Heating Refrigerating and  
Air Conditioning Engineers and Revised 2004~~

(No change to proposed table or footnotes.)

**Committee Reason:** This code change updates Table 1103.1 to be consistent with ASHRAE 34 and to add new refrigerants. The modification revises the title of the table to reflect the change from TLV-TWA to OEL and deletes the ASHRAE approval statement below the title because the language is more appropriate for the Commentary rather than in the code. The term "as approved" has connotations that could cause conflicts with the code official's authority of approval.

**Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Steve Ferguson, representing ASHRAE, requests Approval as Modified by this Public Comment.**

Further modify proposal as follows:

[F]TABLE 1103.1  
REFRIGERANT CLASSIFICATION, Amount and OEL

Chemical Refrigerant	Formula	Chemical Name of Blend	Refrigerant Classification	Degrees of Hazard <sup>a</sup>	[[M]] Amount Of Refrigerant Per Occupied Space			
					Pound per 1,000 cubic feet	ppm	g/m <sup>3</sup>	OEL <sup>e</sup>
R-11 <sup>d</sup>	CCl <sub>3</sub> F	trichlorofluoromethane	A1	2-0-0 <sup>b</sup>	0.39	1,100	6.2	C1,000
R-12 <sup>d</sup>	CCl <sub>2</sub> F <sub>2</sub>	dichlorodifluoromethane	A1	2-0-0 <sup>b</sup>	5.6	18,000	90	1,000
R-13 <sup>d</sup>	CClF <sub>3</sub>	chlorotrifluoromethane	A1	2-0-0 <sup>b</sup>				1,000
R-13B1 <sup>d</sup>	CBrF <sub>3</sub>	bromotrifluoromethane	A1	2-0-0 <sup>b</sup>				1,000
R-14	CF <sub>4</sub>	tetrafluoromethane (carbon tetrafluoride)	A1	2-0-0 <sup>b</sup>	25	110,000	400	1,000
R-22	CHClF <sub>2</sub>	chlorodifluoromethane	A1	2-0-0 <sup>b</sup>	13	59,000	210	1,000
R-23	CHF <sub>3</sub>	trifluoromethane (fluoroform)	A1	2-0-0 <sup>b</sup>	7.3	41,000	120	1,000
R-32	CH <sub>2</sub> F <sub>2</sub>	difluoromethane (methylene fluoride)	A2		4.8	36,000	77	1,000
R-113 <sup>d</sup>	CCl <sub>2</sub> FCClF <sub>2</sub>	1, 1,2-trichloro-1,2,2-trifluoroethane	A1	2-0-0 <sup>b</sup>	1.2	2,600	20	1,000
R-114 <sup>d</sup>	CClF <sub>2</sub> CClF <sub>2</sub>	1,2-dichloro-1,2,2-tetrafluoroethane	A1	2-0-0 <sup>b</sup>	8.7	20,000	140	1,000
R-115	CClF <sub>2</sub> CF <sub>3</sub>	chloropentafluoroethane	A1		47	120,000	760	1,000
R-116	CF <sub>3</sub> CF <sub>3</sub>	hexafluoroethane	A1	1-0-0	34	97,000	550	1,000
R-123	CHCl <sub>2</sub> CF <sub>3</sub>	2,2-dichloro-1,1,1-trifluoroethane	B1	2-0-0 <sup>b</sup>	3.5	9,100	57	50
R-124	CHClFCF <sub>3</sub>	2-chloro-1,1,1,2-tetrafluoroethane	A1	2-0-0 <sup>b</sup>	3.5	10,000	56	1,000
R-125	CHF <sub>2</sub> CF <sub>3</sub>	pentafluoroethane	A1	2-0-0 <sup>b</sup>	23	75,000	370	1,000
R-134a	CH <sub>2</sub> FCF <sub>3</sub>	1,1,1,2-tetrafluoroethane	A1	2-0-0 <sup>b</sup>	13	50,000	210	1,000
R-141b	CH <sub>2</sub> CCl <sub>2</sub> F	1,1-dichloro-1-fluoroethane			0.78	2,600	12	<u>500</u>
R-142b	CH <sub>3</sub> CClF <sub>2</sub>	1-chloro-1,1-difluoroethane	A2		5.1	20,000	83	1,000
R-143a	CH <sub>3</sub> CF <sub>3</sub>	1,1,1-trifluoroethane	A2	2-0-0 <sup>b</sup>	4.5	21,000	70	1,000
R-152a	CH <sub>3</sub> CHF <sub>2</sub>	1,1-difluoroethane	A2	1-4-0	2	12,000	32	1,000
R-170	CH <sub>3</sub> CH <sub>3</sub>	ethane	A3	2-4-0	0.54	7,000	8.7	1,000
R-E170	CH <sub>3</sub> OCH <sub>3</sub>	dimethyl ether	A3		1	8,500	16	1,000
R-218	CF <sub>3</sub> CF <sub>2</sub> CF <sub>3</sub>	octafluoropropane	A1	2-0-0 <sup>b</sup>	43	90,000	690	1,000
R-227ea	CF <sub>3</sub> CHFCF <sub>3</sub>	1,1,1,2,3,3,3-heptafluoropropane	A1		36	84,000	580	1,000
R-236fa	CF <sub>3</sub> CH <sub>2</sub> CF <sub>3</sub>	1,1,1,3,3,3-hexafluoropropane	A1	2-0-0 <sup>b</sup>	21	55,000	340	1,000
R-245fa	CHF <sub>2</sub> CH <sub>2</sub> CF <sub>3</sub>	1,1,1,3,3-pentafluoropropane	B1	2-0-0 <sup>b</sup>	12	34,000	190	300
R-290	CH <sub>3</sub> CH <sub>2</sub> CH <sub>3</sub>	propane	A3	2-4-0	0.56	5,300	9.5	<del>2,500</del> 1,000
R-C318	-(CF <sub>2</sub> ) <sub>4</sub> -	octafluorocyclobutane	A1		41	80,000	660	1,000
R-400 <sup>d</sup>	zeotrope	R-12/114 (50/50)	A1	2-0-0 <sup>b</sup>	10	28,000	160	1,000
R-400 <sup>d</sup>	zeotrope	R-12/114 (60/40)	A1		11	30,000	170	1,000
R-401A	zeotrope	R-22/152a/124 (53/13/34)	A1	2-0-0 <sup>b</sup>	6.6	27,000	110	1,000
R-401B	zeotrope	R-22/152a/124 (61/11/28)	A1	2-0-0 <sup>b</sup>	7.2	30,000	120	1,000
R-401C	zeotrope	R-22/152a/124 (33/15/52)	A1	2-0-0 <sup>b</sup>	5.2	20,000	84	1,000
R-402A	zeotrope	R-125/290/22 (60/2/38)	A1	2-0-0 <sup>b</sup>	8.5	33,000	140	1,000
R-402B	zeotrope	R-125/290/22 (38/2/60)	A1	2-0-0 <sup>b</sup>	15	63,000	240	1,000
R-403A	zeotrope	R-290/22/218 (5/75/20)	A1	2-0-0 <sup>b</sup>	7.6	33,000	120	1,000
R-403B	zeotrope	R-290/22/218 (5/56/39)	A1	2-0-0 <sup>b</sup>	18	70,000	290	1,000
R-404A	zeotrope	R-125/143a/134a (44/52/4)	A1	2-0-0 <sup>b</sup>	31	130,000	500	1,000
R-405A	zeotrope	R-22/152a/142b/C318 (45.0/7.0/5.5/2.5)			16	57,000	260	1,000
R-406A	zeotrope	R-22/600a/142b (55/4/41)	A2		4.7	21,000	25	1,000
R-407A	zeotrope	R-32/125/134a (20/40/40)	A1	2-0-0 <sup>b</sup>	18	78,000	290	1,000
R-407B	zeotrope	R-32/125/134a (10/70/20)	A1	2-0-0 <sup>b</sup>	20	77,000	320	1,000
R-407C	zeotrope	R-32/125/134a (23/25/52)	A1	2-0-0 <sup>b</sup>	17	76,000	270	1,000
R-407D	zeotrope	R-32/125/134a (15/15/70)	A1	2-0-0 <sup>b</sup>	15	65,000	240	1,000
R-407E	zeotrope	R-32/125/134a (25/15/60)	A1	2-0-0 <sup>b</sup>	16	75,000	260	1,000
R-408A	zeotrope	R-125/143a/22 (7/46/47)	A1	2-0-0 <sup>b</sup>	21	95,000	340	1,000
R-409A	zeotrope	R-22/124/142b (60/25/15)	A1	2-0-0 <sup>b</sup>	7.1	29,000	110	1,000
R-409B	zeotrope	R-22/124/142b (65/25/10)	A1	2-0-0 <sup>b</sup>	7.3	30,000	120	1,000
R-410A	zeotrope	R-32/125 (50/50)	A1	2-0-0 <sup>b</sup>	25	130,000	390	1,000
R-410B	zeotrope	R-32/125 (45/55)	A1	2-0-0 <sup>b</sup>	24	130,000	390	1,000
R-411A	zeotrope	R-127/22/152a (1.5/87.5/11.0)	A2		2.9	14,000	46	<del>1,000</del> 990
R-411B	zeotrope	R-1270/22/152a (3/94/3)	A2		2.8	13,000	45	<del>1,000</del> 980
R-412A	zeotrope	R-22/318/142b (70/5/25)	A2		5.1	22,000	82	1,000

R-413A	zeotrope	R-218/134a/600a (9/88/3)	A2		5.8	22,000	94	1,000
R-414A	zeotrope	R-22/124/600a/142b (51/28.5/4/16.5)	A1		6.4	26,000	100	1,000
R-414B	zeotrope	R-22/124/600a/142b (50/39/1.5/9.5)	A1		6	23,000	95	1,000
R-415A	zeotrope	R-22/152a (82.0/18.0)	A2		12	57,000	190	1,000
R-415B	zeotrope	R-22/152a (25.0/75.0)	A2		9.3	52,000	120	1,000
R-416A	zeotrope	R-134a/124/600 (59/39.5/1.5)	A1	2-0-0 <sup>b</sup>	3.9	14,000	62	1,000
R-417A	zeotrope	R-125/134a/600	A1	2-0-0 <sup>b</sup>	3.5	13,000	56	1,000
R-418A	zeotrope	R-290/22/152a (1.5/96.0/2.5)	A2		13	59,000	200	1,000
R-419A	zeotrope	R-125/134a/E170 (77.0/19.0/4.0)	A2		19	70,000	310	1,000
R-420A	zeotrope	R-134a/142b (88.0/12.0)	A1	2-0-0 <sup>b</sup>	12	45,000	190	1,000
R-421A	zeotrope	R-125/134a(58.0/42.0)	A1	2-0-0 <sup>b</sup>	17	61,000	280	1,000
R-421B	zeotrope	R-125/134a (85.0/15.0)	A1	2-0-0 <sup>b</sup>	21	69,000	330	1,000
R-422A	zeotrope	R-125/134a/600a (85.1/11.5/3.4)	A1	2-0-0 <sup>b</sup>	18	63,000	290	1,000
R-422B	zeotrope	R-125/134a/600a (55.0/42.0/3.0)	A1	2-0-0 <sup>b</sup>	16	26,000	250	1,000
R-422C	zeotrope	R-125/134a/600a (82.0/15.0/3.0)	A1	2-0-0 <sup>b</sup>	18	62,000	290	1,000
R-422D	zeotrope	R-125/134a/600a (65.1/31.5/3.4)	A1	2-0-0 <sup>b</sup>	16	58,000	260	1,000
R-423A	zeotrope	R-134a227ea (52.5/47.5)	A1	2-0-0 <sup>c</sup>	19	59,000	310	1,000
R-424A	zeotrope	R-125/134a/600a/601a (50.5/47.0/1.0/0.6)	A1	2-0-0 <sup>b</sup>	6.2	23,000	100	<del>4,999</del> 970
R-425A	zeotrope	R-32/134a/227ea (18.5/69.5/12.0)	A1	2-0-0 <sup>b</sup>	16	67,000	250	1,000
R-426A	zeotrope	R-125/134a/600a/601a (5.1/93.0/1.3/0.6)	A1		5.2	20,000	83	990
R-427A	zeotrope	R-32/125/143a/134a (15.0/25.0/10.0/50.0)	A1		18	76,000	280	1,000
R-428A	zeotrope	R-125/143a/290/600a (77.5/20.0/0.6/1.9)	A1		23	83,000	370	1,000
R-429A	zeotrope	R-E170/152a/600a (60.0/10.0/30.0)	A3		0.81	6,300	13	1,000
R-430A	zeotrope	R-152a/600a/76.0/24.0)	A3		1.3	8,000	21	1,000
R-431A	zeotrope	R-290/152a (71.0/29.0)	A3		0.69	5,500	11	1,000
R-432A	zeotrope	R-1270/E170 (80.0/20.0)	A3		0.13	1,200	2.1	710
R-433A	zeotrope	R-1270/290 (30.0/70.0)	A3		0.34	3,100	5.5	880
<u>R-434A</u>	<u>zeotrope</u>	<u>R-125/143a/600a (63.2/18.0/16.0/2.8)</u>	<u>A1</u>		<u>20</u>	<u>73,000</u>	<u>320</u>	<u>1,000</u>
<u>R-435A</u>	<u>zeotrope</u>	<u>R-E170/152a (80.0/20.0)</u>	<u>A3</u>		<u>1.1</u>	<u>8,500</u>	<u>17</u>	<u>1,000</u>
<u>R-436A</u>	<u>zeotrope</u>	<u>R-290/600a (56.0/44.0)</u>	<u>A3</u>		<u>0.5</u>	<u>4,000</u>	<u>8</u>	<u>1,000</u>
<u>R-436B</u>	<u>zeotrope</u>	<u>R-290/600a (52.0/48.0)</u>	<u>A3</u>		<u>0.5</u>	<u>4,000</u>	<u>8</u>	<u>1,000</u>
<u>R-437A</u>	<u>zeotrope</u>	<u>R-125/134a/600/601 (19.5/78.5/1.4/0.6)</u>	<u>A1</u>		<u>5</u>	<u>19,000</u>	<u>81</u>	<u>990</u>
R-500 <sup>e</sup>	azeotrope	R-12/152a (73.8/26.2)	A1	2-0-0 <sup>b</sup>	7.6	30,000	120	1,000
R-501 <sup>d</sup>	azeotrope	R-22/12 (75.0/25.0)	A1		13	54,000	210	1,000
R-502 <sup>e</sup>	azeotrope	R-22/115 (48.8/51.2)	A1	2-0-0 <sup>b</sup>	21	73,000	330	1,000
R-503 <sup>e</sup>	azeotrope	R-23/13 (40.1/59.9)		2-0-0 <sup>b</sup>	<del>15</del>	<del>67,000</del>	240	1,000
R-504 <sup>d</sup>	azeotrope	R-32/115 (48.2/51.8)			29	140,000	460	1,000
R-507A	azeotrope	R-125/143a (50/50)	A1	2-0-0 <sup>b</sup>	32	130,000	520	1,000
R-508A	azeotrope	R-23/116 (39/61)	A1	2-0-0 <sup>b</sup>	14	55,000	220	1,000
R-508B	azeotrope	R-23/116 (46/54)	A1	2-0-0 <sup>b</sup>	13	52,000	200	1,000
R-509A	azeotrope	R-22/218 (44/56)	A1	2-0-0 <sup>b</sup>	24	75,000	390	1,000
<u>R-510A</u>	<u>azeotrope</u>	<u>R-E170/600a (88.0/12.0)</u>	<u>A3</u>		<u>0.87</u>	<u>7,300</u>	<u>14</u>	<u>1,000</u>
R-600	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>	butane	A3	1-4-0	<u>0.1</u>	<u>1,000</u>	<u>2.4</u>	<del>800</del> <u>1,000</u>
R-600a	CH(CH <sub>3</sub> ) <sub>2</sub> -CH <sub>3</sub>	isobutane (2-methyl propane)	A3	2-4-0	0.6	4,000	9.6	800
R-601a	(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> CH <sub>3</sub>	isopentane	A3		0.2	1,000	2.9	600
R-717	NH <sub>3</sub>	ammonia	B2	3-3-0 <sup>c</sup>	0.014	320	0.22	25
R-718	H <sub>2</sub> O	water	A1	0-0-0				
R-744	CO <sub>2</sub>	carbon dioxide	A1	2-0-0 <sup>b</sup>	4.5	40,000	72	5,000
R-1150	CH <sub>2</sub> =CH <sub>2</sub>	ethene (ethylene)	A3	1-4-2				<del>1,000</del> <u>200</u>
R-1270	CH <sub>3</sub> CH=CH <sub>2</sub>	Propene (propylene)	A3	1-4-1	0.1	1,000	1.7	<del>660</del> <u>500</u>

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.0283 m<sup>3</sup>.

- Degrees of hazard are for health, fire, and reactivity, respectively, in accordance with NFPA 704.
- Reduction to 1-0-0 is allowed if analysis satisfactory to the code official shows that the maximum concentration for a rupture or full loss of refrigerant charge would not exceed the IDLH, considering both the refrigerant quantity and room volume.
- For installations that are entirely outdoors, use 3-1-0.

- d. Class I ozone depleting substance; prohibited for new installations.
- e. Occupational Exposure Limit based on the OSHA PEL, ACGIH TLV-TWA, the AIHA WEEL or consistent value on a time-weighted average (TWA) basis (unless noted C for ceiling) for an 8 hr/d and 40 hr/wk.

**Commenter's Reason:** ASHRAE continually tries to keep the refrigerant information in Table 1103.1 consistent with the requirements in ASHRAE Standard 34. Since we submitted our proposal last fall, 8 new refrigerants have been approved and published as part of Standard 34. In addition, the classifications for four other refrigerants have changed. The proposed changes in this table reflect these updates to Standard 34, and would bring the IMC in line with the Standard.

Final Action:                    AS                    AM                    AMPC\_\_\_\_\_                    D

## M96-07/08

### 1105.7.1 (New), 1105.7.2 (New), 1105.8

#### *Proposed Change as Submitted:*

**Proponent:** Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

#### 1. Add new text as follows:

**1105.7.1 Flammable refrigerants.** Systems containing flammable refrigerants having a density equal to or greater than the density of air shall discharge vapor to the atmosphere only by means of treatment systems that reduce the allowable discharge concentration of the refrigerant gas to not more than 50 percent of the IDHL at the point of exhaust.

**1105.7.2 Toxic and highly toxic refrigerants.** Systems containing toxic or highly toxic refrigerants shall discharge vapor to the atmosphere only through an approved treatment system in accordance with Section 1105.7.1 or an approved flaring system designed to incinerate the entire charge in accordance with Section 606.12.5 of the *International Fire Code*.

#### 2. Revise as follows:

**1105.8 Ammonia discharge.** ~~Pressure relief valves for ammonia systems shall discharge in accordance with ASHRAE-15~~ to one or more of the following locations:

1. To the atmosphere in accordance with Section 1105.7
2. In a tank containing 1gallon of water for each pound of ammonia ( 8.3 liters per kg. of ammonia ) that will be released in 1 hour from the largest relief device connected to the discharge piping. Provisions shall be made to keep the water from freezing during discharge. Discharge piping from the pressure relief device shall distribute ammonia into the bottom of the tank but not lower than 33 feet ( 10 m ) below the maximum liquid level. The tank shall be large enough to hold the required water plus the volume of ammonia discharged.
3. Other approved treatment systems

**Reason:** This is an effort to make Chapter 11 a little more complete. This language is extracted from ASHRAE-15 and none of the requirements differ from the standard. There have been complaints that the I-codes in general refer to too many standards requiring many different documents to accomplish one thing. Some of the complaints have merit. Why not just say what is required for ammonia discharge rather than referring to the standard. This will aid in plan review as well as field inspection because the requirements will be right there in the chapter.

The IMC also lacks complete guidance as it relates to termination of refrigerant relief devices. It doesn't make sense to travel to three documents to find the complete picture of what is required. This language further builds and completes chapter 11 as it will be more convenient to have all the regulations in one place for inspectors and plan reviewers to utilize.

**Cost Impact:** The code change proposal will not increase the cost of construction.

#### Committee Action:

**Approved as Modified**

#### Modify proposal as follows:

**1105.8 Ammonia discharge.** Pressure relief valves for ammonia systems shall discharge in accordance with ASHRAE-15 and to one or more of the following locations:

1. To the atmosphere in accordance with Section 1105.7

2. In a tank containing 1gallon of water for each pound of ammonia ( 8.3 liters per kg. of ammonia ) that will be released in 1 hour from the largest relief device connected to the discharge piping. Provisions shall be made to keep the water from freezing during discharge. Discharge piping from the pressure relief device shall distribute ammonia into the bottom of the tank but not lower than 33 feet (10 m) below the maximum liquid level. The tank shall be large enough to hold the required water plus the volume of ammonia discharged
3. Other approved treatment systems.

(Portions of proposal not shown remain unchanged.)

**Committee Reason:** This code change adds needed guidance on the discharge of flammable, toxic and highly toxic refrigerants and ammonia. This language was extracted from ASHRAE 15 and added to make the code more user friendly. The modification adds "in accordance with ASHRAE 15" because ASHRAE 15 provides other needed guidance besides the three items added by this code change.

**Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Jeffrey Shapiro, P.E., International Code Consultants, representing the International Institute of Ammonia Refrigeration, requests Disapproval.**

**Commenter's Reason:** The proponent's reason statement justifying the proposal states "This language is extracted from ASHRAE-15 and none of the requirements differ from the standard." However, this statement is incorrect. Most of the proposal originates from IFC text, but the proponent has not provided a thorough or accurate transcription, which results in technical problems and code conflicts. For example, the proposal only permits "treatment systems" for flammable refrigerant release, while the IFC also allows flaring systems. The proposal also bases the release threshold for flammable gases on IDLH, but IDLH implies toxicity properties, which may or may not be present with a flammable gas. The limit should have been based on the lower flammable limit (LFL) instead of IDLH. Other deficiencies also exist, and it would be better to disapprove this proposal and make an accurate transcription in a future code change rather than creating a conflict among the applicable codes and standards, which the proponent says that he is seeking to avoid.

Final Action:

AS

AM

AMPC\_\_\_\_\_

D

## **M97-07/08**

### **1106.5**

**THIS CODE CHANGE WILL BE HEARD ON THE IFC PORTION OF THE HEARING ORDER.**

*Proposed Change as Submitted:*

**Proponent:** Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO)

**Revise as follows:**

**[F] 1106.5 Remote controls.** Remote control of the mechanical equipment and appliances located in the machinery room shall be provided as required by Section 606.9 of the International Fire Code at an approved location immediately outside of the machinery room and adjacent to its principle entrance.

**Reason:** The IMC is unclear where exactly to place remote controls. This is extracted from the Fire Code and also completes 1106.5. There is no reason to reference the Fire Code as this section mirrors the Fire Code. This language further completes 1106.5.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Committee Action:**

**Disapproved**

**Committee Reason:** Duplicating the subject IFC text in the IMC could create tension between the two codes by establishing conflicting lines of authority between the fire code official and the mechanical code official.

**Assembly Action:**

**None**

### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Guy McMann, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO), requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**[F] 1106.5 Remote controls.** Remote control of the mechanical equipment and appliances located in the machinery room shall be provided as required by Section 606.9 of the *International Fire Code* and shall be installed at an approved location immediately outside of the machinery room and adjacent to its principle entrance.

**Commenter's Reason:** The committee felt there would be a conflict in the line of authority. This is solved by leaving the reference to the Fire Code in tact and simply adding some of the language into the Mechanical Code. The Mechanical Inspector needs to know where remote controls are to be installed.

Final Action:                    AS                    AM                    AMPC \_\_\_\_                    D

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**M101-07/08**

**1201.2 (New), 1202.1, 1202.2, 1202.3, 1202.4, Table 1202.4, 1202.5, Table 1202.5, 1202.6, 1203.3, 1203.3.1, 1203.3.2, 1203.3.3, 1203.3.4, 1203.3.5, 1203.3.6, 1203.3.7, 1203.3.8, 1203.3.8.1, 1203.3.8.2, 1203.4, 1203.5, 1203.6, 1203.7, 1203.8, 1203.8.1, 1203.8.2, 1203.9, 1203.10, 1203.10.1, 1203.11, 1203.11.1, 1203.11.2, 1203.12, 1203.13, 1203.14, Chapter 15**

*Proposed Change as Submitted:*

**Proponent:** Walter J. Sperko, PE, Sperko Engineering, representing himself

**1. Add new text as follows:**

**1201.2 Standards.** Piping in this chapter shall be designed, installed, inspected and tested in accordance with ASME B31.9 except as otherwise specified.

(Re-number subsequent sections)

**2. Revise as follows:**

**1202.1 Piping.** Piping material shall conform to the standards ~~cited in this section~~ listed in ASME B31.9 .

**Exception:** Embedded piping regulated by Section 1209.

**1202.2 Used materials.** Reused pipe, fittings, valves or other materials shall be clean and free of foreign materials ~~and shall be approved by the code official for reuse.~~ Reused piping components shall be identified to a specification, grade or manufacturer's identification suitable for use in the system into which it will be installed as approved by the code official.

**1202.3 Material rating suitability.** ~~Materials shall be rated for the operating temperature and pressure of the hydronic system.~~ Materials shall be suitable for the type of fluid in the hydronic system. The exterior of the pipe shall be protected from corrosion and degradation.

**1202.4 Piping materials standards.** Hydronic pipe shall conform to the standards listed in ASME B31.9 or Table 1202.4. ~~The exterior of the pipe shall be protected from corrosion and degradation.~~

**TABLE 1202.4 (Supp)  
HYDRONIC PIPE**

<b>MATERIAL</b>	<b>STANDARD (see Chapter 15)</b>
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D 1527; ASTM D 2282
Brass pipe	ASTM B 43
Brass tubing	ASTM B 135
Copper or copper alloy pipe	ASTM B 42; ASTM B 302
Copper or copper alloy tube (Type K, L or M)	ASTM B 75; ASTM B 88; ASTM B 251
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D 2846; ASTM F 441; ASTM F 442
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pressure pipe	ASTM F 1281; CSA CAN/CSA-B-137.10
Cross-linked polyethylene (PEX) tubing	ASTM F 876; ASTM F 877
Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges	AWWA C115/A21.5-05
Ductile iron pipe	AWWA C151/A21.51; AWWA-C115/A21.15
Lead pipe	FS WW-P-325B
Polybutylene (PB) plastic pipe and tubing	ASTM D 3309
Polyethylene (PE) pipe, tubing and fittings (for ground source heat pump loop systems)	ASTM D 2513; ASTM D 3035; ASTM D 2447; ASTM D 2683; ASTM F 1056; ASTM D 2837; ASTM D 3350; ASTM D 1693
Polypropylene (PP) plastic pipe	ASTM F 2389
Polyvinyl chloride (PVC) plastic pipe	ASTM D 1785; ASTM D 2241
Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems	ASTM F 2389
Steel pipe	ASTM A 53; ASTM A 106
Steel tubing	ASTM A 254

**1202.5 Pipe fittings.** Hydronic pipe fittings shall be approved for installation with the piping materials to be installed, and shall conform to the respective pipe standards listed in ASME B31.9 or to the standards listed in Table 1202.5.

**TABLE 1202.5 (Supp)  
HYDRONIC PIPE FITTINGS**

<b>MATERIAL</b>	<b>STANDARD (see Chapter 15)</b>
Brass	ASTM F 1974
Bronze	ASME B16.24
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29
Ductile iron and gray iron	AWWA C110/A21.10
Ductile iron	AWWA C153/A21.53
Gray iron	ASTM A 126
Malleable iron	ASME B16.3
Plastic	ASTM D 2466; ASTM D 2467; ASTM D 2468; ASTM F 438; ASTM F 439; ASTM F 877; ASTM F 2389
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28; ASTM A 420

**3. Delete without substitution:**

**1202.6 Valves.** Valves shall be constructed of materials that are compatible with the type of piping material and fluids in the system. Valves shall be rated for the temperatures and pressures of the systems in which the valves are installed.

**1203.3 Joint preparation and installation.** When required by Sections 1203.4 through 1203.14, the preparation and installation of brazed, mechanical, soldered, solvent cemented, threaded and welded joints shall comply with Sections 1203.3.1 through 1203.3.7.

**1203.3.1 Brazed joints.** Joint surfaces shall be cleaned. An approved flux shall be applied where required. The joint shall be brazed with a filler metal conforming to AWS A5.8.

**1203.3.2 Mechanical joints.** Mechanical joints shall be installed in accordance with the manufacturer's instructions.

~~**1203.3.3 Soldered joints.** Joint surfaces shall be cleaned. A flux conforming to ASTM B 813 shall be applied. The joint shall be soldered with a solder conforming to ASTM B32.~~

~~**1203.3.4 Solvent cemented joints.** Joint surfaces shall be clean and free of moisture. An approved primer shall be applied to CPVC and PVC pipe joint surfaces. Joints shall be made while the cement is wet. Solvent cement conforming to the following standards shall be applied to all joint surfaces:~~

- ~~1. ASTM D 2235 for ABS joints.~~
- ~~2. ASTM F 493 for CPVC joints.~~
- ~~3. ASTM D 2564 for PVC joints.~~

~~CPVC joints shall be made in accordance with ASTM D 2846.~~

~~**1203.3.5 Threaded joints.** Threads shall conform to ASME B1.20.1. Schedule 80 or heavier plastic pipe shall be threaded with dies specifically designed for plastic pipe. Thread lubricant, pipe joint compound or tape shall be applied on the male threads only and shall be approved for application on the piping material.~~

~~**1203.3.6 Welded joints.** Joint surfaces shall be cleaned by an approved procedure. Joints shall be welded with an approved filler metal.~~

~~**1203.3.7 Grooved and shouldered mechanical joints.** Grooved and shouldered mechanical joints shall conform to the requirements of ASTM F 1476 and shall be installed in accordance with the manufacturer's installation instructions.~~

~~**1203.3.8 Mechanically formed tee fittings.** Mechanically extracted outlets shall have a height not less than three times the thickness of the branch tube wall.~~

~~**1203.3.8.1 Full flow assurance.** Branch tubes shall not restrict the flow in the run tube. A dimple/depth stop shall be formed in the branch tube to ensure that penetration into the outlet is of the correct depth. For inspection purposes, a second dimple shall be placed 0.25 inch (6.4 mm) above the first dimple. Dimples shall be aligned with the tube run.~~

~~**1203.3.8.2 Brazed joints.** Mechanically formed tee fittings shall be brazed in accordance with Section 1203.3.1.~~

~~**1203.4 ABS plastic pipe.** Joints between ABS plastic pipe or fittings shall be solvent cemented or threaded joints conforming to Section 1203.3.~~

~~**1203.5 Brass pipe.** Joints between brass pipe or fittings shall be brazed, mechanical, threaded or welded joints conforming to Section 1203.3.~~

~~**1203.6 Brass tubing.** Joints between brass tubing or fittings shall be brazed, mechanical or soldered joints conforming to Section 1203.3.~~

~~**1203.7 Copper or copper alloy pipe.** Joints between copper or copper alloy pipe or fittings shall be brazed, mechanical, soldered, threaded or welded joints conforming to Section 1203.3.~~

~~**1203.8 Copper or copper alloy tubing.** Joints between copper or copper alloy tubing or fittings shall be brazed, mechanical or soldered joints conforming to Section 1203.3 or flared joints conforming to Section 1203.8.1.~~

~~**1203.8.1 Flared joints.** Flared joints shall be made by a tool designed for that operation.~~

~~**1203.8.2 (Supp) Push-fit joints.** Push-fit joints shall be installed in accordance with the manufacturer's instructions.~~

~~**1203.9 CPVC plastic pipe.** Joints between CPVC plastic pipe or fittings shall be solvent cemented or threaded joints conforming to Section 1203.3.~~

~~**1203.10 Polybutylene plastic pipe and tubing.** Joints between polybutylene plastic pipe and tubing or fittings shall be mechanical joints conforming to Section 1203.3 or heat fusion joints conforming to Section 1203.10.1.~~

~~**1203.10.1 Heat fusion joints.** Joints shall be of the socket fusion or butt fusion type. Joint surfaces shall be clean and free of moisture. Joint surfaces shall be heated to melt temperatures and joined. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM D3309.~~

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

~~**1203.11.1 Compression-type fittings.** When 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 at least 18 inches (457 mm) from a plastic-to-metal adapter in the same water line.~~

~~**1203.12 PVC plastic pipe.** Joints between PVC plastic pipe and fittings shall be solvent cemented or threaded joints conforming to Section 1203.3.~~

~~**1203.13 Steel pipe.** Joints between steel pipe or fittings shall be mechanical joints that are made with an approved elastomeric seal, or shall be threaded or welded joints conforming to Section 1203.3.~~

~~**1203.14 Steel tubing.** Joints between steel tubing or fittings shall be mechanical or welded joints conforming to Section 1203.3.~~

(Renumber subsequent sections)

#### **4. Add standard to Chapter 15 as follows:**

##### **ASME**

##### B31.9-04 Building Services Piping

**Reason:** To incorporate ASME B31.9, *Building Services Piping*, into the IMC for hydronic piping.

ASME B31.9 is a recognized international standard for hydronic piping that was written specifically to provide a simplified piping code for use in design and installation of safe building services piping.

ASME B31.9 was first published in 1982 for the purpose of providing a thorough and comprehensive Code covering materials, design, installation, examination and testing for heating and air conditioning piping typically found in industrial, institutional, commercial, and public buildings, and in multi-unit residences. It was written because other long-established piping codes such as ASME B31.1, *Power Piping*, and B31.3, *Process Piping*, were too complex and expensive to follow for the lower temperatures and pressures and comparatively benign fluids used in buildings. B31.9 is intended to be applied to piping for water and anti-freeze solutions for heating and cooling, steam and steam condensate, air, liquids and other nontoxic, nonflammable fluids contained in piping not exceeding the following:

-Dimensional limits

- Carbon steel: NPS 30 (DN 750) and 0.500 inches (12.7 mm) wall
  - Stainless steel: NPS 12 (DN 300) and 0.500 inches (12.7 mm) wall
  - Aluminum: NPS 12 (DN 300)
  - Brass and copper NPS 12 (DN 300), 12.125 in (308 mm) for copper tube.
  - Thermoplastics: NPS 24 (DN 600)
  - Ductile Iron: NPS 18 (DN 450)
  - Reinforced Thermosetting Resin: NPS 24 (DN 600)
- Pressure and temperature limits
- Compressed air, steam and steam condensate to 1035 kPa (150 psi) gage
  - Steam and steam condensate from ambient to 186°C (366°F)
  - Other gases from ambient to -18 to 93°C (0 to 200°F)
  - Liquids to 2415 kPa (350 psi) gage and from -18 to 121°C (0 to 250°F)
  - Vacuum to 1 Bar (14.7 psi).

**Cost Impact:** Reduced. Most designers of larger facilities specify ASME B31.1, *Power Piping*, rather than B31.9, *Building Services Piping* making the cost of piping unnecessarily expensive.

**Analysis:** Review of proposed new standard ASME B31.9-04 indicated that, in the opinion of ICC staff, the standard did comply with ICC standards criteria.

**Committee Action:**

**Disapproved**

**Committee Reason:** Deleting the technical content of Chapter 12 and referring to ASME B31.9 would be a step backward for the IMC. This chapter has worked adequately for some time and no evidence was presented to indicate that there was a problem with the current language. The committee preferred code change M100-07/08.

**Assembly Action:**

**None**

#### *Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

Public Comment:

**Walter Sperko, Sperko Engineering Services, Inc., requests Approval as Submitted.**

**Commenter's Reason:** The proposal as submitted was rejected by the committee because the writer failed to adequately address two comments:

- 1) the perception that many materials, particularly plastics, were being deleted from the IMC. This is incorrect; all of the pipe and fittings listed in Tables 1202.4 and 1202.5 marked as deleted are included in ASME B31.9; the only material not included in B31.9 that is in IMC are CSA CAN/CSA B-137.10 for PEX-AL-PEX pipe, FS-WW-P-325B for lead pipe, AWWA C110/A21.10 and C153/A21.53 for Ductile and grey iron pipe and ASTM F2389 - 07 Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems. (**NOTE:** the version presented to the committee in Palm Springs mistakenly failed to show in Table 1202.5 under "plastic" that ASTM D2466, D2467, D2468, F438, F439 and F877 as deleted; they should be since they are contained in B31.9 and were deleted in the submittal presented by the writer). in addition, B31.9 contains other materials commonly found in hydronic piping system that are not included in IMC. See Appendix 1.
- 2) It was perceived that the current IMC is adequate. The current IMC does not provide for many aspects of piping that engineers should be required to consider. See Appendix 2.

**Appendix 1**  
**List of Materials permitted by in B31.9 and not in IMC Chapter 12**

**The American Society of Mechanical Engineers (ASME)**

Cast Iron Pipe Flanges and Flanged Fittings.....	B16.1
Cl Thd Fittings, Classes 125 and 250.....	B16.4
Face-to-Face and End-to-End Dimensions of Ferrous Valves .....	B16.10
Ferrous Pipe Plugs, Bushings, and Locknuts With Pipe Threads .....	B16.14
Manually Operated Metallic Gas Valves for Use in Gas Piping Systems	
Up to 125 psig (Sizes 1/2 Through 2) .....	B16.33
Valves, Flanged, Threaded, and Welding End .....	B16.34
Orifice Flange .....	B16.36
Malleable Iron Threaded Pipe Unions, Classes 150, 250, and 300.....	B16.39
Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300 .....	B16.42
Welded and Seamless Wrought Steel Pipe.....	B36.10M
Stainless Steel Pipe.....	B36.19M

**American Society for Testing and Materials (ASTM)**

Ferritic Malleable Iron Castings .....	A 47
Gray Iron Castings.....	A 48
Forgings, Carbon Steel, for Piping Components .....	A 105
Electric-Resistance-Welded Steel Pipe .....	A 135
Forgings, Carbon Steel for General Purpose Piping .....	A 181/A 181M
Cupola Malleable Iron .....	A 197
Spiral-Welded Steel or Iron Pipe .....	A 211
Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures .....	A 234/A 234M
Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650°F (345°C).....	A 278/A 278M
Seamless and Welded Austenitic Stainless Steel Pipes .....	A 312/A 312M
Ductile Iron Pressure Pipe.....	A 377
Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.....	A 395/A 395M
Wrought Austenitic SS Piping Fittings .....	A 403/A 403M
Ductile Iron Castings.....	A 536
Electric-Resistance-Welded Coiled Steel Tubing for Gas and Fuel Oil Lines .....	A 539
Aluminum-Alloy Sand Castings .....	B 26/B 26M
Steam or Valve Bronze Castings.....	B 61
Composition Bronze or Ounce Metal Castings.....	B 62
Seamless Copper Tube, Bright Annealed .....	B 68/B 68M
Aluminum-Alloy Drawn Seamless Tubes.....	B 210/B 210M
Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube .....	B 241/B 241M
Aluminum and Aluminum-Alloy Die, Hand, and Rolled Ring Forgings .....	B 247/B 247M
Seamless Copper Tube for Air Conditioning and Refrigeration Field Service .....	B 280
Copper and Copper-Alloy Die Forgings (Hot-Pressed) .....	B 283
Factory-Made Wrought Aluminum and Aluminum-Alloy Welding Fittings .....	B 361
Aluminum-Alloy Formed and Arc Welded Round Tube .....	B 547

**American Water Works Association (AWWA or ANSI/AWWA)**

Ductile Iron Pipe Centrifugally Cast in Metal Molds or Sand-Lines Molds, for Water and Other Liquids.....	C151/A21.51
Steel Pipe Flanges for Waterworks Service — Sizes 4 in. Through 144 in .....	C207
Dimensions for Fabricated Steel Water Pipe Fittings .....	C208
Gate Valves for Water and Sewage Systems.....	C500
Grooved and Shouldered Type Joints .....	C606

**Federal Government**

Pipe, Cast Iron and Ductile Iron (Pressure, for Water and Other Liquids) .....	FS WW-P-421
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**Manufacturers Standardization Society of the Valve and Fittings Industry (MSS)**

Class 150 Corrosion Resistant Gate, Globe, Angle, and Check Valves With Flanged and Butt Weld Ends .....	SP-42
Wrought Stainless Steel Butt Weld Fittings .....	SP-43
By-Pass and Drain Connection Standard .....	SP-45

Class 150 LW Corrosion Resistant Cast Flanges and Flanged Fittings.....	SP-51
Butterfly Valves .....	SP-67
Cast Iron Gate Valves, Flanged and Threaded Ends .....	SP-70
Cast Iron Swing Check Valves, Flanged and Threaded Ends .....	SP-71
Ball Valves With Flanged or Butt Weld Ends for General Service.....	SP-72
Cast Iron Plug Valves, Flanged and Threaded Ends.....	SP-78
SW Reducer Inserts.....	SP-79
Bronze Gate, Angle, and Check Valves .....	SP-80
Carbon Steel Pipe Unions — SW and Thd.....	SP-83
Steel Valves — SW and Thd Ends.....	SP-84
Cast Iron Globe and Angle Valves, Flanged and Thd Ends.....	SP-85
Diaphragm Type Valves.....	SP-88
Pipe Hangers and Supports — Selection and Application.....	SP-69
Pipe Hangers and Supports — Fabrication and Installation Practices.....	SP-89
Guidelines on Terminology for Pipe Hangers and Supports.....	SP-90
<b>American Society for Testing and Materials (ASTM) Nonferrous Materials</b>	
Reinforced Concrete Low-Head Pressure Pipe .....	C 361/C 361M
Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminants for Corrosion Resistant Equipment .....	C 582
PE Plastic Pipe, Schedule 40 .....	D 2104
PE Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter .....	D 2239
Classification for Machine-Made RTR Pipe .....	D 2310
Threaded PVC Plastic Pipe Fittings, Schedule 80.....	D 2464
Reinforced Epoxy Resin Piping Gas Pressure Pipe and Fittings.....	D 2517
Plastic Insert Fittings for PE Plastic Pipe.....	D 2609
PB Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter .....	D 2662
PB Plastic Tubing.....	D 2666
Joints for IPS PVC Using Solvent Cement .....	D 2672
PE Plastic Tubing.....	D 2737
Filament-Wound RTR Pipe.....	D 2996
Centrifugally Cast Glass Fiber RTR Pipe .....	D 2997
PB Plastic Pipe (SDR-PR), Based on Outside Diameter .....	D 3000
Butt Heat Fusion PE Plastic Fittings for PE Plastic Pipe and Tubing .....	D 3261
Biaxially Oriented PE (PEO) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.....	D 3287
Specification for “Fiberglass” (Glass-Fiber-Reinforced-Thermosetting Resin) Pressure Pipe.....	D 3517
Specification for Fiberglass Sewer and Industries Pressure Pipe .....	D 3754
Specification for Reinforced Plastic Mortar Pipe Fittings for Non-Pressure Applications .....	D 3840
Threaded CPVC Plastic Pipe Fittings, Schedule 80 .....	F 437
Standard Specification for Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure Pipe .....	F 1282
Standard Specification for Pressure-Rated Composite Pipe for Elevated Temperature Service .....	F 1335
<b>American Water Works Association (AWWA or ANSI/AWWA)</b>	
Reinforced Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids .....	C300
Prestressed Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids .....	C301
Reinforced Concrete Pressure Pipe, Noncylinder Type, for Water and Other Liquids .....	C302
PVC Pressure Pipe, 4 in. Through 12 in., for Water .....	C900
<b>Miscellaneous Components</b>	
<b>The American Society of Mechanical Engineers (ASME)</b>	
Unified Screw Threads.....	B 1.1
Pipe Threads (Except Dryseal) .....	B1.20.1
Dryseal Pipe Threads .....	B 1.20.3
Hose Coupling Screw Threads .....	B1.20.7
Nonmetallic Flat Gaskets for Pipe Flange.....	B16.21
BW Ends for Pipe, Valves, Flanges, and Fittings .....	B16.25
Square and Hex Bolts and Screws .....	B18.2.1
Square and Hex Nuts.....	B18.2.2
<b>American Society for Testing and Materials (ASTM)</b>	
Structural Steel .....	A 36/A 36M
Carbon Steel Track Bolts and Nuts.....	A 183
Alloy-Steel and SS Bolting Materials for HT Service .....	A 193/A 193M
Carbon and Alloy Steel Nuts for Bolts for High Pressure and HT Service A 194/A 194M .....	
Carbon Steel Bolts and Studs, 60,000 PSI Tensile .....	A 307
Solder Metal .....	B 32
Threads (60-Deg. Stud) for Glass RTR Pipe .....	D 1694
Solvent Cement for ABS Plastic Pipe and Fittings .....	D 2235
Solvent Cements for PVC Plastic Pipe and Fittings.....	D 2564
Solvent Cements for Transition Joints Between ABS and PVC Non-Pressure Piping Components.....	D 3138
Joints for Plastic Pressure Pipes Using Flexible Elastometric Seals.....	D 3139
Solvent Cements for CPVC Plastic Pipe and Fittings.....	F 493
Test Methods for Flash Point by Pensky-Martens Closed Tester .....	D 93
Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.....	D 1598
Test Method for Cyclic Pressure Strength of RTP Pipe.....	D 2143
Practice for Heat Joining of Polyolefin Pipe and Fittings .....	D 2657
Practice for Underground Installation of Thermoplastic Pressure Piping .....	D 2774
Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.....	D 2837
Practice for Making Solvent-Cemented Joints With PVC Pipe and Fittings .....	D 2855
Method for Obtaining Hydrostatic Design Basis for RTR Pipe and Fittings.....	D 2992
Practice for Flaring Polyolefin Pipe and Tubing .....	D 3140

Test Method for Strength of Anchors in Concrete and Masonary Elements.....	E 488
Practice for Safe Handling of Solvent Cements Used for Joining Thermoplastic Pipe and Fittings .....	F 402
Definition of Terms Relating to Plastic Piping Systems .....	F 412
Standard Specification for Non-Reinforced Extruded Tee Connections for Piping Applications. ....	F 2014
<b>American Water Works Association (AWWA or ANSI/AWWA)</b>	
Thickness Design of DI Pipe.....	C150/A21.50
Installation of DI Water Mains and Other Appurtenances .....	C600
Rubber-Gasket Joints for DI and Gray-Iron Pressure Pipe and Fittings.....	C 111/A21.11
<b>Society of Automotive Engineers (SAE)</b>	
Refrigeration Tube Fittings .....	J513
Hydraulic Tube Fittings.....	J514

**Appendix 2**  
**Technical Aspects of Piping that are**  
**Covered by ASME B31.9 but not by IMC Chapter 12**

The IMC Chapter 12 covers many things, but some aspects of piping that are crucial to a safe and functional piping system are not covered, whereas they are covered by ASME B31.9. The following is a list of those shortcomings.

IMC permits the use of ASTM A53 and A106 pipe, but does not provide for establishing the minimum wall thickness; B31.9 provides allowable stresses and design formulas for pressure design for not only for carbon steel pipe, but for stainless steel, aluminum and copper piping. It also provides design pressure limits for plastic, FRP and concrete piping. B31.9 provides a joint efficiency factor that derates welded pipe unless it is nondestructively examined.

The IMC does not require that the piping be designed for thermal expansion. B31.9 has a simplified formula that allows the engineer to evaluate thermal expansion or contraction effects, and when a design fails to satisfy that simplified approach, it requires that the system be analyzed in accordance with ASME B31.1, *Power Piping*.

IMC does not require that branch connections be evaluated for pressure design; when a hole is cut in one pipe to create an outlet, that hole is a weak spot that must be evaluated. B31.9, paragraph 904.3.2 provides a simple formula for such evaluation, and paragraph 930.2 provides for similar extruded outlets in copper.

IMC does not specify spacing between pipe supports for any materials; B31.9 provides nomographs that allow one to easily determine maximum spacing between supports for steel, copper and thermoplastic piping for a ranges of sizes and internal pressures.

IMC does not address loading of piping on supports. B31.9 provides limits on stress on rods that are used for pipe supports and refers engineers to MSS SP-69 for standard support selection. B31.9 also addresses anchor loading and provides means for evaluating compression effects that could result in buckling of pipe.

IMC does not specify that piping systems be provided with pressure relief; B31.9 requires such provisions where pressure reducing valves are part of the system, and it requires that relief valves be appropriately sized.

IMC does not require pressure testing of piping systems. B31.9 requires either hydrostatic or pneumatic testing and provides precautionary provisions.

It is the writer's experience that engineers follow ASME B31.9 or B31.1 when designing, installing, inspecting and testing piping, particularly for larger buildings such as low and highrise office buildings, shopping centers, education establishments, etc. The IMC should acknowledge that the ASME B31 Codes contain a complete and proven set of requirements for the design, analysis, support, fabrication, inspection and testing of piping systems by defaulting to B31.9 for hydronic piping covered by Chapter 12.

Final Action:                    AS                    AM                    AMPC\_\_\_\_                    D

## M106-07/08

### Chapter 15

*Proposed Change as Submitted:*

**Proponent:** Standards Writing Organization

**Revise standards as follows:**

## ASME

American Society of Mechanical Engineers  
Three Park Avenue  
New York, NY 10016-5990

Standard  
reference  
number

Title

B16.5—2003 1996

Pipe Flanges and Flanged Fittings NPS ½ through NPS 24—With B16.5a-1998 Addenda

CSD-1— 2004 2002

Controls and Safety Devices for Automatically Fired Boilers

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## ASTM

ASTM International  
100 Barr Harbor Drive  
West Conshohocken, PA 19428-2959

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Standard reference number	Title
A 106/A 106M- <u>06a</u> <del>04b</del>	Specification for Seamless Carbon Steel Pipe for High-Temperature Service
A 420/A 420M- <u>07</u> <del>05</del>	Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-Temperature Service
D 1693- <u>07</u> <del>05</del>	Test Method for Environmental Stress-Cracking of Ethylene Plastics
D 2837— <u>04e01</u>	Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials <u>or Pressure Design Basis for Thermoplastic Pipe Products</u>
D 2996— 01( <u>2007</u> ) <u>e01</u>	Specification for Filament-wound Fiberglass (Glass Fiber Reinforced Thermosetting Resin) Pipe
D 3035— <u>06</u> <del>03a</del>	Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
D 3350— <u>06</u> <del>02a</del>	Specification for Polyethylene Plastics Pipe and Fittings Materials
F 1055— <u>98</u> ( <u>2006</u> ) <u>e04</u>	Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and <u>Tubing Fittings</u>
F 1476-( <u>2006</u> ) <u>04</u>	Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications

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## IAR

International Institute of Ammonia Refrigeration  
1110 N. Glebe Road, Suite 250  
Arlington, VA 22201

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Standard reference number	Title
<u>2—99 (with Addendum A-2005)</u>	<u>Addendum A to Equipment, Design, and Installation of Ammonia Mechanical Refrigerating Systems</u>

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## NFPA

National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA 02269-9101

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Standard reference number	Title
31— <u>06</u> <del>04</del>	Installation of Oil-burning Equipment
37— <u>06</u> <del>02</del>	Stationary Combustion Engines and Gas Turbines
91— <u>04</u> <del>99</del>	Exhaust Systems for Air Conveying of Vapors, Gases, <del>Mists</del> and Noncombustible Particulate Solids
262— <u>07</u> <del>02</del>	Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-handling Spaces
853— <u>07</u> <del>03</del>	Installation of Stationary Fuel Power Plants

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## SMACNA

Sheet Metal and Air Conditioning Contractors National Association, Inc.  
4021 Lafayette Center Drive  
Chantilly, VA 20151-1209

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Standard reference number	Title
SMACNA/ANSI ( <u>2005</u> ) <del>95</del>	HVAC Duct Construction Standards-Metal and Flexible ( <u>2005</u> )

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Underwriters Laboratories, Inc.  
333 Pfingsten Road  
Northbrook, IL 60062

Standard reference number	Title
174-04	Household Electric Storage Tank Water Heaters—with Revisions through <del>November 2005</del> <u>May 2006</u>
181A-2005	Closure Systems for Use with Rigid Air Ducts and Air Connectors
268A-98	Smoke Detectors for Duct Application—with Revisions through <del>April 2003</del> <u>2006</u>
343-97	Pumps for Oil-Burning Appliances—with Revisions through <del>May 2002</del> <u>2006</u>
391— <del>2006</del> <u>95</u>	Solid-fuel and Combination-fuel Central and Supplementary Furnaces—with Revisions through <del>May 1999</del>
412-2004	Refrigeration Unit Coolers <u>with Revisions through February 2007</u>
471-1995 <u>2006</u>	Commercial Refrigerators and Freezers—with Revisions through <del>February</del> <u>March</u> 2006
<b>508—99</b>	<b>Industrial Control Equipment <u>with Revisions through July 2005</u></b>
710— 95	Exhaust Hoods for Commercial Cooking Equipment—with Revisions through <del>April 1999</del> <u>February 2007</u>
726-95	Oil-Fired Boiler Assemblies —with Revisions through <del>February</del> <u>March</u> 2006
727— <u>2006</u> 98	Oil-fired Central Furnaces—with Revisions through <del>January 1999</del>
791— <u>2006</u> 93	Residential Incinerators—with Revisions through <del>May 1998</del>
834-04	Heating, Water Supply, and Power Boilers-Electric- <u>with Revisions through March 2006</u>
858—05	Household Electric Ranges- <u>with Revisions through April 2006</u>
875—04	Electric Day Bath Heaters- <u>with Revisions through March 2006</u>
959—01	Medium Heat Appliance Factory-built Chimneys- <u>with Revisions through September 2006</u>
1453—04	Electric Booster and Commercial Storage Tank Water Heaters – <u>with Revisions through May 2006</u>
1482— <del>96</del> 98	Solid-fuel Type Room Heaters—with Revisions through <del>January 2000</del> <u>November 2006</u>
2158-1997	For Electric Clothes Dryers – with Revisions through May 2004
2221—01	Tests of Fire Resistive Grease Duct Enclosure <del>Systems</del> <u>Assemblies</u>

**Reason:** The *ICC Code Development Process for the International Codes* (Procedures) Section 4.5\* requires the updating of referenced standards to be accomplished administratively, and be processed as a Code Proposal. In May 2005, a letter was sent to each developer of standards that are referenced in the I-Codes, asking them to provide ICC with a list of their standards in order to update to the current edition. Above is the list received of the referenced standards under the maintenance responsibility of the IRC Committee.

**\*4.5 Updating Standards:** The updating of standards referenced by the Codes shall be accomplished administratively by the appropriate code development committee in accordance with these full procedures except that multiple standards to be updated may be included in a single proposal.

**Cost Impact:** The code change proposal will not increase the cost of construction.

**Committee Action:** **Approved as Submitted**

**Committee Reason:** Updating the editions of the referenced standards as proposed is consistent with the intent of the standards promulgators and the ICC policy for referenced standards.

**Assembly Action:** **None**

*Individual Consideration Agenda*

**This item is on the agenda for individual consideration because a public comment was submitted.**

*Public Comment:*

**Bob Eugene, Underwriters Laboratories, Inc., requests Approval as Modified by this Public Comment.**

**Modify proposal as follows:**

**UL**

2043—~~96~~ 2008 Fire Test for Heat and Visible Smoke Release for Discrete Products and their Accessories Installed in Air-handling Spaces—~~with Revisions through June 2004~~

**Commenter's Reason:** UL 2043 will complete its ANSI approval prior to the hearings in Minnesota. The 2008 edition provides additional clarity within the scope statement. This update further supports a final action of approval as submitted for M72-07/08.

Final Action:                   AS                   AM                   AMPC \_\_\_\_\_                   D

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