INTERNATIONAL MECHANICAL CODE

M18-06/07, Part II
303.5; IFGC 303.5

Proposed Change as Submitted:

PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART I IS SHOWN HERE FOR INFORMATIONAL PURPOSES ONLY.

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

PART I – IMC

Revise as follows:

303.5 Indoor locations. Fuel-fired furnaces, water heaters and boilers installed in closets and alcoves shall be listed for such installation. For purposes of this section, a closet or alcove shall be defined as a room or space having a volume less than 12 times the total volume of fuel-fired appliances other than boilers and less than 16 times the total volume of boilers. Room volume shall be computed using the gross floor area and the actual ceiling height up to a maximum computation height of 8 feet (2438 mm).

PART II – IFGC

Revise as follows:

303.5 Indoor locations. Furnaces, water heaters and boilers installed in closets and alcoves shall be listed for such installation.

Reason: There is no reason to not include a water heater in this section. There are oil fired units that are designed to be installed in a closet and there are units that must have the space as required for a non-closet application as this section describes.

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

PART I — IMC
Committee Action: **Approved as Submitted**

Committee Reason: The installation in closets of water heaters not listed for such use is a common problem. This change will help to remind the inspector to check for the listing when water heaters are installed in closets.

Assembly Action: **None**

PART II — IFGC
Committee Action: **Disapproved**

Committee Reason: Disapproval is consistent with the action taken on FG15-06/07. There is no reason to add waters heaters to this section because the installation of such appliances in any space is already covered in the listing and manufacturer's installation instructions. The manufacturer's instructions always list the required clearances for the spaces in which the appliance is listed for installation.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This item is on the agenda for individual consideration because an assembly action was successful and a Public Comment was submitted.

Public Comment:

Guy Tomberlin, Fairfax County Virginia, representing the Virginia Plumbing and Mechanical Inspectors Association/Virginia Building and Code Officials Association, requests Approval as Submitted for Part II.

Commenter's Reason: Part I of this proposal was accepted by the IMC Committee. The published committee reason for disapproval action of this proposal was because the appliance listing already covers this topic. This statement is inaccurate. This section of the code is not provided to address listing and labeling. This section of code exists solely to define what is a "closet." Currently no other code section, or code for that matter, provides the definition or the parameters of what is a closet. Staying consistent for all appliances is important for uniform application of the code. Appliances such as water heaters, boilers, and furnaces are all listed two ways, one is for closet installation and the other is not for closet installation. Without this text how can any designer, installer, inspector or plan reviewer determine if a space is appropriate for a water heater installation that is not listed for "closet installation"? Therefore how can it be safely determined (and who determines) if the space is suitable (large enough) for a water heater that is not listed for closet installation. One committee member stated that clearances are included in the installation instructions. The clearances that are identified with appliances not listed for closet installation are intended to address working space and serviceability of the appliance not proper heat dissipation or air movement. This does not add any new or restrictive requirements for water heaters. What it does is provide missing guidance that the current code fails to provide. Common practice is that most people are using this criterion anyway for water heater installations. Another committee member stated at the Public Hearings that there was no data to show that a water heater is the same as a boiler. Isn't the Btu load of any appliance the same as the identical Btu load of another? In other words a 100,000 Btu burner does not know if it is in a boiler or a water heater or a furnace, does it? What this proposal provides is the minimum space permitted for a water heater that that is not listed and labeled for closet installation; that's it! Floor action to approve as submitted clearly indicates that the ICC membership agree that this is a much needed enhancement to the IFGC. This is a companion change to FG 15.

Final Action: AS AM AMPC____ D

M20-06/07, Part I
Table 305.4

Proposed Change as Submitted:

Proponent: Lawrence L. Suggars, South Salt Lake City, representing the Utah Chapter of ICC

PART I – IMC

Revise table as follows:

TABLE 305.4
PIPING SUPPORT SPACING[a]

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
Steel tubing	~~8~~	~~10~~
1/2 inch	4	4
5/8 or 3/4 inch	6	6
7/8 or 1 inch	8	every floor level
Steel pipe	~~12~~	~~15~~
1/2 inch	6	6
3/4 or 1 inch	8	8
1 1/4 inch or larger	10	every floor level

(Portions of table not shown do not change)
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
a. See Section 301.15.
b. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.
c. Mid-story guide.

Reason: Currently there is a conflict between the IMC, the IPC and the IFGC. This is an attempt to bring uniformity between the three codes in the supporting of steel pipe and steel tubing.

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

Committee Action: **Disapproved**

Committee Reason: This table should not be correlated with the IFGC, which is based on the NFGC, Z223.1, and not appropriate for this code. The support spacing for steel piping is much too short; steel is the strongest piping material and capable of spanning much longer distances.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Lawrence Suggars, South Salt Lake City, representing the Utah Chapter, requests Approval as Modified by this Public Comment for Part I.

Modify proposal as follows:

TABLE 305.4
PIPING SUPPORT SPACING[a]

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
Steel tubing	8 4	10 4
Steel tubing (gas) 1/2 inch 5/8 or 3/4 inch 7/8 or 1 inch	6 8	6 every floor level
Steel pipe	12 6	15 6
Steel pipe (gas) 1/2 inch 3/4 or 1 inch 1 1/4 inch or larger	8 10	8 every floor level

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
a. See Section 301.15.
b. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.
c. Mid-story guide.

Commenter's Reason: The intent of this proposal is to bring uniformity to all codes which address the supporting of pipe. By adding the word (gas) the other codes are aware that the IFGC has different requirements for supporting pipe when fuel gas is involved (see IMC's M20 06/07).

Analysis: Gas piping is not within the scope of the IMC. The labeling of pipe for gas does not belong in this table.

Public Comment 2:

Julius Ballanco, P.E., representing himself, requests Disapproval for Part I.

Commenter's Reason: The hanger spacing proposed for steel pipe in the IMC is wrong. The proponent has attempted to change the requirements for consistency, however, the wrong lengths were selected. The hanger spacing is clearly identified in the MSS standards. Steel pipe can be spaced 12 feet on the horizontal. Over 1-1/2 inch in diameter, the spacing can increase to 15 feet. These values are completely out of line and will add unnecessary cost for the installation of steel pipe.

Final Action: AS AM AMPC____ D

M20-06/07, Part II
IPC Table 308.5

Proposed Change as Submitted:

Proponent: Lawrence L. Suggars, South Salt Lake City, representing the Utah Chapter of ICC

PART II – IPC

TABLE 308.5
HANGER SPACING

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
Steel tubing		
1/2 inch	4	4
5/8 or 3/4 inch	6	6
7/8 or 1 inch	8	every floor level
Steel pipe	~~12~~	~~15~~
1/2 inch	6	6
3/4 or 1 inch	8	8
1 1/4 inch or larger	10	every floor level

(Portions of table not shown do not change)
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
a. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.
b. Mid-story guide.

Reason: Currently there is a conflict between the IMC, the IPC and the IFGC. This is an attempt to bring uniformity between the three codes in the supporting of steel pipe and steel tubing.

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

Committee Action: **Approved as Submitted**

Committee Reason: This code change attempts to make the IPC consistent with the IFGC. The IPC, IFGC and IMC should not conflict regarding the support of the same materials.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Larry Suggars, South Salt Lake City, representing the Utah Chapter of ICC, requests Approval as Modified by this Public Comment for Part II.

Modify proposal as follows:

TABLE 308.5
HANGER SPACING

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
Steel tubing (gas)		
1/2 inch	4	4
5/8 or 3/4 inch	6	6
7/8 or 1 inch	8	every floor level
Steel pipe	12	15
	6	6
Steel pipe (gas)	8	8
1/2 inch	10	every floor level
3/4 or 1 inch		
1 1/4 inch or larger		

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
a. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.
b. Mid-story guide.

Commenter's Reason: The word "gas" was left out of the original monograph but always intended to be there. This change is intended to bring uniformity to the other codes where pipe is addressed (see IPC M20).

Final Action: AS AM AMPC____ D

M31-06/07
306.5.1 (IFGC [M] 306.5.1)

Proposed Change as Submitted:

Proponent: Charlie Gerber, Henrico County, VA, representing the Virginia Plumbing and Mechanical Inspectors Association/Virginia Building and Code Officials Association

Revise as follows:

306.5.1 Sloped roofs. Where appliances, equipment, fans or other components that require service are installed on a roof having a slope of three units vertical in 12 units horizontal (25-percent slope) or greater and having an edge more than 30 inches (762 mm) above grade at such edge, a level platform shall be provided on each side of the appliance or equipment to which access is required for service, repair or maintenance. The platform shall be not less than 30 inches (762 mm) in any dimension and shall be provided with guards. The guards shall extend not less than 42 inches (1067 mm) above the platform, shall be constructed so as to prevent the passage of a 21-inch-diameter (533 mm) sphere and shall comply with the loading requirements for guards specified in the *International Building Code*. Access to appliances shall not require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope). Where access involves obstructions greater than 30 inches in height permanent ladders, or equivalent, shall be provided on all sides requiring access in accordance with the ladder requirements of Section 306.5.

Reason: The added language is from the existing proceeding section 306.5. It is not specifically stated in this section refereeing to sloped roofs and therefore some feel it is not applicable. The current section is provided to protect the health and welfare of service personnel. However it leaves a gap in safety coverage from where the appliance is actually located to where the roof accessed. If the roof is over 16 feet in height the code provides requirements for permanent access (Section 306.5) otherwise for lower installations a portable ladder is usually the method of choice to get to roof mounted appliances. But the appliance can be 10, 50 or 100 feet and further, (there's' currently no distance limit) from the roof access to the appliance, walking on a sloped roof! The service person has to not only carry the tools required for the task but what about the repair parts themselves? Compressors, motors etc.. This puts the serviceperson in a compromising position to get the job done safely. The proposed text provides a safe work environment for everyone, the installer and the service person and closes the gap for this important life-safety issue.

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

Committee Action: **Approved as Modified**

Modify proposal as follows:

306.5.1 Sloped roofs. Where appliances, equipment, fans or other components that require service are installed on a roof having a slope of three units vertical in 12 units horizontal (25-percent slope) or greater and having an edge more than 30 inches (762 mm) above grade at such edge, a level platform shall be provided on each side of the appliance or equipment to which access is required for service, repair or maintenance. The platform shall be not less than 30 inches (762 mm) in any dimension and shall be provided with guards. The guards shall extend not less than 42 inches (1067 mm) above the platform, shall be constructed so as to prevent the passage of a 21-inch-diameter (533 mm) sphere and shall comply with the loading requirements for guards specified in the *International Building Code*. Access to appliances shall not require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope). Where access involves obstructions greater than 30 inches in height on any side, permanent ladders, or equivalent, shall ~~be~~ provide~~d on all sides requiring~~ access in accordance with the ladder requirements of Section 306.5.

Committee Reason: This change will increase the safety of service personnel by providing permanent access means when a steep roof must be crossed or a 30 inch high obstruction must be climbed. Carrying tools and appliance components over such obstacles is very dangerous. This will require a ladder to be installed closer to the appliance or equipment. The modification revises some confusing language to clarify that the 30 inch measurement is to any side of the obstacle, not that ladders are required on all sides of the obstacle.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Charles Gerber, Henrico County Virginia, representing the Virginia Plumbing and Mechanical Inspectors Association/Virginia Building and Code Officials Association, requests Approval as Modified by this Public Comment.

Further modify proposal as follows:

306.5.1 Sloped roofs. Where appliances, equipment, fans or other components that require service are installed on a roof having a slope of three units vertical in 12 units horizontal (25-percent slope) or greater and having an edge more than 30 inches (762 mm) above grade at such edge, a level platform shall be provided on each side of the appliance or equipment to which access is required for service, repair or maintenance. The platform shall be not less than 30 inches (762 mm) in any dimension and shall be provided with guards. The guards shall extend not less than 42 inches (1067 mm) above the platform, shall be constructed so as to prevent the passage of a 21-inch-diameter (533 mm) sphere and shall comply with the loading requirements for guards specified in the *International Building Code*. Access ~~to appliances~~ shall not require ~~climbing over obstructions greater than 30 inches (762 mm) high or~~ walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope). Where access involves obstructions greater than 30 inches in height, ~~on any side, permanent ladders, or equivalent, shall provide access in accordance with the ladder requirements of Section 306.5~~ such obstructions shall be provided with ladders installed in accordance with Section 306.5 or stairs installed in accordance with the requirements specified in the *International Building Code* in the path of travel to and from appliances, fans or equipment requiring service.

Commenter's Reason: The modification that was approved in the public comment hearings did not provide the clarity that this new wording now provides. The changes to this section that are incorporated into this final action comment are as follows. It is prohibited to walk on roofs with a slope of 4 to 12 to access appliances or equipment. It is not reasonable to expect service personal to safely carry tools and typical repairs parts across a sloped roof. Where obstacles are located in the path of travel to or from appliances or equipment that are greater than 30 inches (such as a parapet) a means to navigate the obstacle such as a ladder or stairs shall be provided to permit safe access.

Final Action: AS AM AMPC____ D

M36-06/07, Part II
307.2.2 (IPC [M] 314.2.2) (IFGC [M] 307.3); IRC M1411.3.2

Proposed Change as Submitted:

PART I DID NOT RECEIVE A PUBLIC COMMENT AND HAS BEEN WITHDRAWN BY THE PROPONENT. PART I IS SHOWN HERE FOR INFORMATIONAL PURPOSES ONLY.

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

PART I – IMC

Revise as follows:

307.2.2 (IPC [M] 314.2.2, IFGC [M] 307.3) Drain pipe materials and sizes. Components of the condensate disposal system shall be cast iron, galvanized steel, copper, cross-linked polyethylene, polybutylene, polyethylene, ABS, CPVC or PVC pipe or tubing. All components shall be selected for the pressure and temperature rating of the installation. Condensate waste and drain line size shall be not less than 3/4-inch (19 mm) internal diameter and shall not decrease in size from the drain pan connection to the place of condensate disposal. Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method. ~~All horizontal sections of drain piping shall be installed in uniform alignment at a uniform slope.~~

PART II – IRC

Revise as follows:

M1411.3.2 Drain pipe materials and sizes. Components of the condensate disposal system shall be cast iron, galvanized steel, copper, polybutylene, polyethylene, ABS, CPVC or PVC pipe or tubing. All components shall be selected for the pressure and temperature rating of the installation. Condensate waste and drain line size shall be not less than 3/4-inch (19 mm) internal diameter and shall not decrease in size from the drain pan connection to the place of condensate disposal. Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method. ~~All horizontal sections of drain piping shall be installed in uniform alignment at a uniform slope.~~

Reason: Based on the outcome of language submitted to 307.2.1, this will not be needed. This subject is best addressed in 307.2.1.

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

Analysis: Similar action should be considered for M33-06/07.

PART I — IMC **Withdrawn by Proponent**

PART II – IRC
Committee Action: **Approved as Submitted**

Committee Reason: Uniform slope is not as critical for condensate lines as it is for sanitary drainage. There is no harm in increasing the slope as long as the minimum slope is maintained.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Jud Collins, Mannford, OK, requests Disapproval.

Commenter's Reason: The reason this language was initially inserted into the code was to prevent condensate drains from being installed with high and low areas in the drain. A continuous downward slope is required so that dips do not occur in the drain. Since this language was inserted into the code, the occurrence of dips in condensate drains has been greatly reduced.

Final Action: AS AM AMPC____ D

M40-06/07, Part I
307.2.3.2 (New) [IPC [M] 314.2.3.2 (New)]

Proposed Change as Submitted:

Proponent: Tony Longino, County of Greenville, SC, representing himself

PART I – IMC

Add new text as follows:

307.2.3.2 Appliance, equipment and insulation in pans. Where appliances, equipment or insulation are subject to water damage when auxiliary drain pans fill, such portions of the appliances, equipment and insulation shall be installed above the flood level rim of the pan. Supports located inside of the pan to support the appliance or equipment shall be water resistant and approved.

Reason: There are no current requirements in the code to prevent appliances, equipment or insulation from being installed inside of the auxiliary drain pan. It has been a long standing and bad practice for some contractors to install up flow furnaces and air handlers on top of plenum boxes resting in the bottom of the drain pan, Therefore [1] reducing the capacity of the drain pan and [2] Allowing the required insulation, interior or exterior, to wick and absorb water as the pan fills. Insulation is not approved for wet locations and will hold water for a long period of time, which can cause mold and bacteria to form or cause the metal to rust and deteriorate.

Cost Impact: Less than $10 for supports.

Committee Action: **Approved as Submitted**

Committee Reason: This change will require components of the appliance and integral insulation material to be installed above the flood rim level of the drain pan. This will prevent degradation of the components and the formation of mold and mildew in insulation that is wetted when the drain pan fills.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Michael A. Baker, City of Prescott, AZ, representing Arizona Building Officials, requests Disapproval for Part I.

Commenter's Reason: We should not penalize an entire industry for the bad practices of a few. The wording insulation as used in this code proposal leaves room for a lot of misinterpretation. Until reading the supporting statement I was under the impression the proponent was concerned with ceiling insulation and not ductwork insulation. This definitely needs to be clarified. As written the ceiling insulation would have to be installed above the drain pan. In addition, the proponent uses the phrase "it has been a long standing and bad practice for some contractors" indicating there are a few contractors that use this method. The requirements for submersion should be defined by the appliance manufacturer and enforced as such. If the manufacturer allows their product to be submerged then it should be allowed. This proposal would eliminate the manufacturer's design option to dry locations only.

Public Comment 2:

David C. Delaquila, GAMA-An Association of Appliance and Equipment Manufacturers, requests Disapproval for Part I.

Commenter's Reason: The purpose of a drain pan is to "drain" water away from the area and not allow it to accumulate it in the pan. This unnecessarily adds cost to the installation of the equipment.

Final Action: AS AM AMPC____ D

M40-06/07, Part II
IRC M1411.3.3 (New)

Proposed Change as Submitted:

Proponent: Tony Longino, County of Greenville, SC, representing himself

PART II – IRC

Add new text as follows:

M1411.3.3 Appliance, equipment and insulation in pans. Where appliances, equipment or insulation are subject to water damage when auxiliary drain pans fill, such portions of the appliances, equipment and insulation shall be installed above the flood level rim of the pan. Supports located inside of the pan to support the appliance or equipment shall be water resistant and approved.

Reason: There are no current requirements in the code to prevent appliances, equipment or insulation from being installed inside of the auxiliary drain pan. It has been a long standing and bad practice for some contractors to install up flow furnaces and air handlers on top of plenum boxes resting in the bottom of the drain pan, Therefore [1] reducing the capacity of the drain pan and [2] Allowing the required insulation, interior or exterior, to wick and absorb water as the pan fills. Insulation is not approved for wet locations and will hold water for a long period of time, which can cause mold and bacteria to form or cause the metal to rust and deteriorate.

Cost Impact: Less than $10 for supports.

Committee Action: **Approved as Submitted**

Committee Reason: This proposal will prevent installations where the insulation can be below the flood rim level of the pan, causing water to wick up in the insulation, resulting in the formation of mold and mildew.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Michael A. Baker, City of Prescott, AZ, representing Arizona Building Officials, requests Disapproval for Part II.

Commenter's Reason: We should not penalize an entire industry for the bad practices of a few. The wording insulation as used in this code proposal leaves room for a lot of misinterpretation. Until reading the supporting statement I was under the impression the proponent was concerned with ceiling insulation and not ductwork insulation. This definitely needs to be clarified. As written the ceiling insulation would have to be installed above the drain pan. In addition, the proponent uses the phrase "it has been a long standing and bad practice for some contractors" indicating there are a few contractors that use this method. The requirements for submersion should be defined by the appliance manufacturer and enforced as such. If the manufacturer allows their product to be submerged then it should be allowed. This proposal would eliminate the manufacturer's design option to dry locations only.

Public Comment 2:

David C. Delaquila, GAMA-An Association of Appliance and Equipment Manufacturers, requests Disapproval for Part II.

Commenter's Reason: The purpose of a drain pan is to "drain" water away from the area and not allow it to accumulate it in the pan. This unnecessarily adds cost to the installation of the equipment.

Final Action: AS AM AMPC____ D

M41-06/07, Part I
313 (New), Chapter 15

Proposed Change as Submitted:

Proponent: Mark Riley, City of Troy, MI Building Department, representing himself

PART I – IMC

1. Add new text as follows:

SECTION 313
CARBON MONOXIDE ALARMS

313.1 Where required-new construction dwellings. In new construction, dwelling units within which fuel-fired appliances are installed shall be provided with an approved carbon monoxide alarm installed outside of each separate sleeping area in the immediate vicinity of the bedroom(s).

313.2 Where required-existing dwellings. In existing dwellings, where interior alterations, repairs, fuel-fired appliance replacements or additions requiring a permit occur, or where one or more sleeping rooms are added or created, carbon monoxide alarms shall be provided in accordance with Section 313.1.

313.3 Alarm requirements. The required carbon monoxide alarms shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed. Carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.

313.4 Power source and interconnection. The required carbon monoxide alarms shall be powered by the building wiring where such wiring is supplied by a commercial power source and when such source is interrupted, the alarms shall be battery powered. The power supply wiring shall be permanent and without a disconnecting switch other than the branch circuit overcurrent device.

Where more than one carbon monoxide alarm is required within a dwelling unit, the alarms shall be interconnected in a manner such that the activation of one alarm will cause actuation of all of the alarms within the dwelling.

Exceptions:

1. Alarms installed in existing dwelling units shall not be required to be interconnected and powered by a commercial power source where the work described in Section 313.2 does not result in the removal of interior wall or ceiling finishes thereby exposing the structure and there is no attic, crawl space or basement which could provide access for wiring without the removal of interior finishes.
2. Alarms shall not be required to be interconnected and shall be permitted to be powered only by batteries where installed in buildings without commercial power.

2. Add standard to Chapter 15 as follows:

UL

UL 2034 Standard for Single and Multiple Station Carbon Monoxide Alarms. Edition 2 including revisions through March 8, 2005

Reason: Over 200 a deaths a year in the United States have been contributed to CO Poisoning, and over 10,000 cases where people were admitted to the hospital emergency rooms. Every major safety agency strongly recommends the use of CO detectors. GAMA recommends the use of CO detectors on their website.
C.S.P.C., U.L. and manufacturer's have spent many hours revising U.L. Standard 2034 to provide a more reliable device.
The location requirement is based on research of manufacturer's installation instructions and recommendations from NFPA 720, *Recommended Practice for the Installation of Household Carbon Monoxide (CO) Warning Equipment*

The U.S. Consumer Product Safety Commission (CPSC) recommends that consumers purchase and install carbon monoxide detectors with labels showing they meet the requirements of the new Underwriters Laboratories, Inc. (UL) voluntary standard (UL 2034). The UL standard, published in April 1992, requires detectors to sound an alarm when exposure to carbon monoxide reaches potentially hazardous levels over a period of time. Detectors that meet the requirements of UL 2034 provide a greater safety margin than previously-manufactured detectors.

Properly working carbon monoxide detectors can provide an early warning to consumers before the deadly gas builds up to a dangerous level. Exposure to a low concentration over several hours can be as dangerous as exposure to high carbon monoxide levels for a few minutes - the new detectors will detect both conditions. Most of the devices cost under $100. Each home should have at least one carbon monoxide detector in the area outside individual bedrooms. CPSC believes that carbon monoxide detectors are as important to home safety as smoke detectors are.

Bibliography: CPSC document #5010

Cost Impact: There is a slight impact of less than 100 dollars per dwelling.

Committee Action: **Disapproved**

Committee Reason: The ICC CTC committee currently does not recommend mandatory installation of CO alarms. The Consumer Product Safety Commission has not endorsed CO alarms as being reliable. There are liability issues within the industry that need to be resolved before they are made mandatory. NFPA 720 is the more appropriate standard for installation of CO alarms. The building owner or occupant can install them voluntarily. The current technology will not support the interconnection of multiple CO alarms as required by this change.

Assembly Action: **Approved as Modified**

Modify the proposal as follows:

~~**313.4 Power source and interconnection.** The required carbon monoxide alarms shall be powered by the building wiring where such wiring is supplied by a commercial power source and when such source is interrupted, the alarms shall be battery powered. The power supply wiring shall be permanent and without a disconnecting switch other than the branch circuit overcurrent device.~~

~~Where more than one carbon monoxide alarm is required within a dwelling unit, the alarms shall be interconnected in a manner such that the activation of one alarm will cause actuation of all of the alarms within the dwelling.~~

~~**Exceptions:**~~

1. ~~Alarms installed in existing dwelling units shall not be required to be interconnected and powered by a commercial power source where the work described in Section 313.2 does not result in the removal of Interior wall or ceiling finishes thereby exposing the structure and there is no attic, crawl space or basement which could provide access for wiring without the removal of interior finishes.~~
2. ~~Alarms shall not be required to be Interconnected and shall be permitted to be powered only by batteries where installed in buildings without commercial power.~~

(Portions of proposal not shown remain unchanged)

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:

David C. Delaquila, GAMA-An Association of Appliance and Equipment Manufacturers, requests Disapproval for Part I.

Commenter's Reason: GAMA believes this proposal should be disapproved on the basis that it unfairly identifies fuel-burning appliances as the only source of carbon monoxide. Carbon monoxide alarms should be installed in all residential occupancies, regardless of the type of fuel the appliances use. The recent rash of CO incidents in Washington State (predominantly electric heat pumps) and Texas during power outages as a result of inclement weather reinforces the need for theses devices to be installed in all residential buildings. A large majority of the recent CO incidents was attributed to the misuse of power generators. Had these homes had a working CO alarm with battery power backup many of these incidents might have been avoided. Carbon monoxide comes from a variety of sources unrelated to fuel-burning

appliances and this proposal does not go nearly far enough to provide safety to all occupancies. Code requirements that address life safety should not fall short of its goal. It should never be the intent of any life safety requirement to protect only a segment of the residential population when a large segment of the population is left unprotected.

Public Comment 2:

Paul K. Heilstedt, PE, Chair, Code Technology Committee (CTC), requests Disapproval for Part I.

Commenter's Reason: The CTC agrees with the action taken by the three code change committees. They correctly note that there are reliability concerns and there is still the question of how long such devices will last before they need replacement. As to the text approved by the assembly, this text will literally require all existing dwelling units to be provided with a carbon monoxide alarm when a permit is pulled for the conditions noted, even if the dwelling unit does not have a fuel fired appliance.

The CTC notes the importance of and the need for compliance with the applicable code provisions for equipment maintenance and compliance with equipment installation instructions to control the hazards associated with CO emissions. This is consistent with the position of the Environmental Protection Agency in their report entitled "Protect your family and yourself from carbon monoxide poisoning", EPA-402-F-96-005, October 1996.The report can be downloaded at: http://www.epa.gov/iaq/pubs/coftsht.html

The EPA notes the following:

"So what's a consumer to do?

First, don't let buying a CO detector lull you into a false sense of security. Preventing CO from becoming a problem in your home is better than relying on an alarm. Follow the checklist of DO's and DON'TS above." [The checklist focuses on appliance use, maintenance and care as well as directives to not idle your car in the garage or use gas powered engines in enclosed spaces].

As far as CO detectors, the EPA report states the following:

"A few words about CO detectors

"Carbon Monoxide Detectors are widely available in stores and you may want to consider buying one as a back-up --BUT NOT AS A REPLACEMENT for proper use and maintenance of your fuel-burning appliances. However, it is important for you to know that the technology of CO detectors is still developing, that there are several types on the market, and that they are not generally considered to be as reliable as the smoke alarms found in homes today. Some CO detectors have been laboratory-tested, and their performance varied. Some performed well, others failed to alarm even at very high CO levels, and still others alarmed even at very low levels that don't pose any immediate health risk. And unlike a smoke alarm, where you can easily confirm the cause of the alarm, CO is invisible and odorless, so it's harder to tell if an alarm is false or a real emergency."

The code change is well intentioned, and there is indeed a health concern due to carbon monoxide poisoning, but a code mandate for carbon monoxide detectors is not the solution.

Public Comment 3:

Ted A. Williams, American Gas Association, requests Disapproval for Part I.

Commenter's Reason: ICC should disapprove this proposal. The ICC Code Technology Committee has published on the ICC website its recommendation from its Area of Study - Carbon Monoxide Alarms. Its recommendation is as follows:

> "Recommendation: The CTC recommendation is:
>
> There has not been sufficient justification presented to the CTC to mandate carbon monoxide alarms in new and existing residential type occupancies.
>
> In making this recommendation, the CTC notes the importance of and the need for compliance with the applicable code provisions for equipment maintenance and compliance with equipment installation instructions to control the hazards associated with CO emissions.[1]

This recommendation follows many hours of testimony and presentation of documentation (recorded on the ICC website) on CO alarm issues from a wide variety of stakeholders at CTC meetings in Schiller Park, IL and Detroit, MI. ICC committees should address this recommendation in its deliberations and explain alternative actions to the CTC recommendation.

In addition, the following issues of the ICC proposals support disapproval:

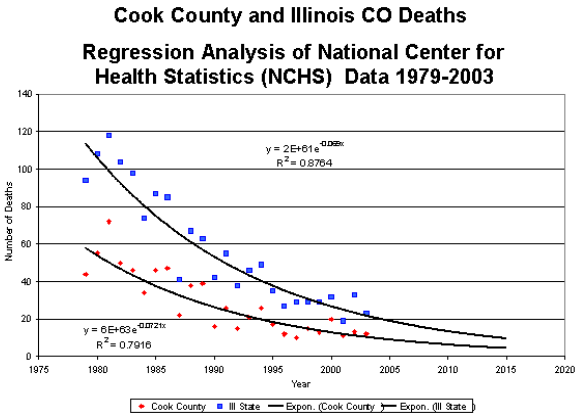
- The U. S. Consumer Product Safety Commission (CPSC), in response to separate letter from the NEMA and Gas Appliance Manufacturers Association (GAMA) requesting CPSC support of CO alarm mandates, has stated that it would not support CO alarm mandates until issues of long term reliability of CO alarms were addressed.
- Issues of alarm reliability have not been addressed in published information on alarm performance. As a result, information to date demonstrates poor performance in the field (including data from first responders documented in the National Fire Investigation Response Data System – NFIRS) and in controlled laboratory tests for mitigating false positive and FALSE NEGATIVE activation. The information provided to the CTC and in the public record documents this information in detail.[2]
- The CO alarm proposal is in conflict with NFPA 720, the ANSI-recognized consensus standard for installation and location of CO alarms. In the case of M41, specifically, occupancies with attached garages are excluded, whereas under NFPA 720, these occupancies are included. Other conflicts with NFPA 720 exist as well.
- M41, through its conflicts with NFPA 720 and focus on new and renovated housing, would not have a demonstrable impact on CO fatalities nationally. Even with 100% COMPLIANCE, PERFECT ALARM RELIABILITY, and PERFECT CONSUMER RESPONSE,

these proposals might address only about 20% of CO fatalities since current national residential poisoning incidents involve automobiles in attached garages and older housing without renovation or appliance replacement.

- This proposal does not address THE ONLY GROWING CAUSE OF CO FATALITIES -- PORTABLE EQUIPMENT, INCLUDING GENERATORS.
- CO alarms are not currently a stable product since UL through its Standards Technical Panel 2034 is addressing fundamental issues of alarm life and even activation points. At its upcoming meeting in October, UL will consider proposals to the UL 2034 standard to address deficiencies documented by CPSC and others. The changes proposed would fundamentally alter the design and performance of CO alarms.
- Experience from the City of Chicago, the first major metropolitan jurisdiction in the U. S. to promulgate mandatory CO alarm installation requirements, illustrates in the plot of CO fatalities below THE INEFFECTIVENESS OF MANDATES:

    - Though promulgated in 1994, Chicago and its collar communities in Cook County (many of which have similar mandates) continue to have CO fatalities. Continuing frequency of CO fatalities around ten per year appears to be stable over time and may be expected to continue in the future.
    - The annual number of deaths in this community is consistent with historical trends of declining CO fatalities over time, but no impact or change in this rate of decline can be attributed to the Chicago mandate.
    - For the mandate to have been effective, either CO fatalities would have had to decrease to zero or near zero, or at a minimum, the rate of CO fatalities would have had to show a discontinuous change that could be associated with the promulgation of the mandate.

Reasons for the ineffectiveness of the Chicago mandate are the subject of speculation and may be attributed to lack of compliance, lack of enforcement, lack of appropriate response, failure of alarms to perform as designed, or these and other factors in combination and discussed in AGA's presentation to the CTC.[2] Nevertheless, the societal cost of the mandate has been significant with no discernable societal benefit.



[1] "Report of the CTC, Area of Study – Carbon Monoxide Alarms," International Code Council Code Technology Committee, September 22, 2005, Detroit Marriott Renaissance Center, Detroit, Michigan [Available on the ICC website: http://iccsafe.org/cs/cc/ctc/Carbon.html].

[2] Williams, Ted A. "CO Alarm Mandates in Model Codes as Public Policy," presented at ICC Code Technology Committee on CO Alarms, July 26, 2005, Schiller Park, Illinois [Available on the ICC website: http://iccsafe.org/cs/cc/ctc/Carbon.html].

Final Action: AS AM AMPC____ D

M41-06/07, Part II
IRC M1309 (New), Chapter 43

Proposed Change as Submitted:

Proponent: Mark Riley, City of Troy, MI Building Department, representing himself

PART II – IRC

1. Add new text as follows:

SECTION M1309
CARBON MONOXIDE ALARMS

M1309.1 Where required new construction dwellings. In new construction, dwelling units within which fuel-fired appliances are installed shall be provided with an approved carbon monoxide alarm installed outside of each separate sleeping area in the immediate vicinity of the bedroom(s).

M1309.2 Where required existing dwellings. In existing dwellings where interior alterations, repairs, fuel-fired appliance replacements or additions requiring a permit occur, or where one or more sleeping rooms are added or created, carbon monoxide alarms shall be provided in accordance with Section M1309.1.

M1309.3 Alarm requirements. The required carbon monoxide alarms shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed. Carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.

M1309.4 Power source and interconnection. The required carbon monoxide alarms shall be powered by the building wiring where such wiring is supplied by a commercial power source and when such source is interrupted, the alarms shall be battery powered. The power supply wiring shall be permanent and without a disconnecting switch other than the branch circuit overcurrent device.

Where more than one carbon monoxide alarm is required within a dwelling unit, the alarms shall be interconnected in a manner such that the activation of one alarm will cause actuation of all of the alarms within the dwelling.

Exceptions:

1. Alarms installed in existing dwelling units shall not be required to be interconnected and powered by a commercial power source where the work described in Section M1309.2 does not result in the removal of interior wall or ceiling finishes thereby exposing the structure and there is no attic, crawl space or basement which could provide access for wiring without the removal of interior finishes.
2. Alarms shall not be required to be interconnected and shall be permitted to be powered only by batteries where installed in buildings without commercial power.

2. Add standard to Chapter 43 as follows:

UL

UL 2034 Standard for Single and Multiple Station Carbon Monoxide Alarms. Edition 2 including revisions through March 8, 2005

Reason: Over 200 a deaths a year in the United States have been contributed to CO Poisoning, and over 10,000 cases where people were admitted to the hospital emergency rooms. Every major safety agency strongly recommends the use of CO detectors. GAMA recommends the use of CO detectors on their website.
C.S.P.C., U.L. and manufacturer's have spent many hours revising U.L. Standard 2034 to provide a more reliable device.
The location requirement is based on research of manufacturer's installation instructions and recommendations from NFPA 720, *Recommended Practice for the Installation of Household Carbon Monoxide (CO) Warning Equipment*

The U.S. Consumer Product Safety Commission (CPSC) recommends that consumers purchase and install carbon monoxide detectors with labels showing they meet the requirements of the new Underwriters Laboratories, Inc. (UL) voluntary standard (UL 2034). The UL standard, published in April 1992, requires detectors to sound an alarm when exposure to carbon monoxide reaches potentially hazardous levels over a period of time. Detectors that meet the requirements of UL 2034 provide a greater safety margin than previously-manufactured detectors.

Properly working carbon monoxide detectors can provide an early warning to consumers before the deadly gas builds up to a dangerous level. Exposure to a low concentration over several hours can be as dangerous as exposure to high carbon monoxide levels for a few minutes - the new detectors will detect both conditions. Most of the devices cost under $100. Each home should have at least one carbon monoxide detector in the area outside individual bedrooms. CPSC believes that carbon monoxide detectors are as important to home safety as smoke detectors are.

Bibliography: CPSC document #5010

Cost Impact: There is a slight impact of less than 100 dollars per dwelling.

Committee Action: **Disapproved**

Committee Reason: There are reliability issues with the technology resulting in unnecessary fire department calls. There is no federal mandate for CO detectors and the ICC CTC committee does not recommend making them mandatory. The committee believed this issue belongs in Chapter 3 of the IRC rather than in the mechanical section. There were questions about the proper location of the detectors that need to be resolved.

Assembly Action: **Approved as Modified**

Modify proposal as follows:

~~**M1309.4 Power source and interconnection.** The required carbon monoxide alarms shall be powered by the building wiring where such wiring is supplied by a commercial power source and when such source is interrupted, the alarms shall be battery powered. The power supply wiring shall be permanent and without a disconnecting switch other than the branch circuit overcurrent device.~~

~~Where more than one carbon monoxide alarm is required within a dwelling unit, the alarms shall be interconnected in a manner such that the activation of one alarm will cause actuation of all of the alarms within the dwelling.~~

~~**Exceptions:**~~

1. ~~Alarms installed in existing dwelling units shall not be required to be interconnected and powered by a commercial power source where the work described in Section M1309.2 does not result in the removal of Interior wall or ceiling finishes thereby exposing the structure and there is no attic, crawl space or basement which could provide access for wiring without the removal of interior finishes.~~
2. ~~Alarms shall not be required to be Interconnected and shall be permitted to be powered only by batteries where installed in buildings without commercial power.~~

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:

David C. Delaquila, GAMA-An Association of Appliance and Equipment Manufacturers, Disapproval for Part II.

Commenter's Reason: GAMA believes this proposal should be disapproved on the basis that it unfairly identifies fuel-burning appliances as the only source of carbon monoxide. Carbon monoxide alarms should be installed in all residential occupancies, regardless of the type of fuel the appliances use. The recent rash of CO incidents in Washington State (predominantly electric heat pumps) and Texas during power outages as a result of inclement weather reinforces the need for theses devices to be installed in all residential buildings. A large majority of the recent CO incidents was attributed to the misuse of power generators. Had these homes had a working CO alarm with battery power backup many of these incidents might have been avoided. Carbon monoxide comes from a variety of sources unrelated to fuel-burning appliances and this proposal does not go nearly far enough to provide safety to all occupancies. Code requirements that address life safety should not fall short of its goal. It should never be the intent of any life safety requirement to protect only a segment of the residential population when a large segment of the population is left unprotected.

Public Comment 2:

Paul K. Heilstedt, Chair, Code Technology Committee (CTC), requests Disapproval for Part II.

Commenter's Reason: The CTC agrees with the action taken by the three code change committees. They correctly note that there are reliability concerns and there is still the question of how long such devices will last before they need replacement. As to the text approved by the assembly, this text will literally require all existing dwelling units to be provided with a carbon monoxide alarm when a permit is pulled for the conditions noted, even if the dwelling unit does not have a fuel fired appliance. The CTC notes the importance of and the need for compliance with the applicable code provisions for equipment maintenance and compliance with equipment installation instructions to control the hazards associated with CO emissions. This is consistent with the position of the Environmental Protection Agency in their report entitled "Protect your family and yourself from carbon monoxide poisoning", EPA-402-F-96-005, October 1996.The report can be downloaded at: http://www.epa.gov/iaq/pubs/coftsht.html

The EPA notes the following:

"So what's a consumer to do?

First, don't let buying a CO detector lull you into a false sense of security. Preventing CO from becoming a problem in your home is better than relying on an alarm. Follow the checklist of DO's and DON'TS above." [The checklist focuses on appliance use, maintenance and care as well as directives to not idle your car in the garage or use gas powered engines in enclosed spaces].

As far as CO detectors, the EPA report states the following:

"A few words about CO detectors

"Carbon Monoxide Detectors are widely available in stores and you may want to consider buying one as a back-up --BUT NOT AS A REPLACEMENT for proper use and maintenance of your fuel-burning appliances. However, it is important for you to know that the technology of CO detectors is still developing, that there are several types on the market, and that they are not generally considered to be as reliable as the smoke alarms found in homes today. Some CO detectors have been laboratory-tested, and their performance varied. Some performed well, others failed to alarm even at very high CO levels, and still others alarmed even at very low levels that don't pose any immediate health risk. And unlike a smoke alarm, where you can easily confirm the cause of the alarm, CO is invisible and odorless, so it's harder to tell if an alarm is false or a real emergency."

The code change is well intentioned, and there is indeed a health concern due to carbon monoxide poisoning, but a code mandate for carbon monoxide detectors is not the solution.

Public Comment 3:

Ted A. Williams, American Gas Association, requests Disapproval for Part II.

Commenter's Reason: ICC should disapprove this proposal. The ICC Code Technology Committee has published on the ICC website its recommendation from its Area of Study - Carbon Monoxide Alarms. Its recommendation is as follows:

> "Recommendation: The CTC recommendation is:
>
> There has not been sufficient justification presented to the CTC to mandate carbon monoxide alarms in new and existing residential type occupancies.
>
> In making this recommendation, the CTC notes the importance of and the need for compliance with the applicable code provisions for equipment maintenance and compliance with equipment installation instructions to control the hazards associated with CO emissions.[1]

This recommendation follows many hours of testimony and presentation of documentation (recorded on the ICC website) on CO alarm issues from a wide variety of stakeholders at CTC meetings in Schiller Park, IL and Detroit, MI. ICC committees should address this recommendation in its deliberations and explain alternative actions to the CTC recommendation.

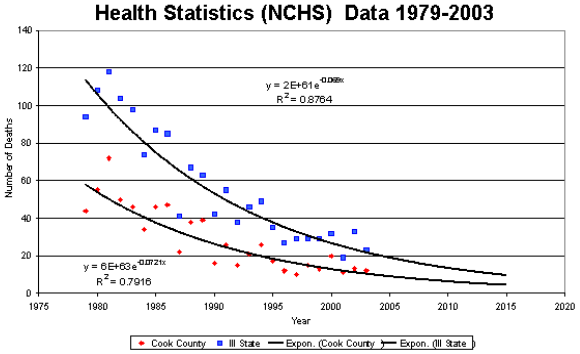
In addition, the following issues of the ICC proposals support disapproval:

- The U. S. Consumer Product Safety Commission (CPSC), in response to separate letter from the NEMA and Gas Appliance Manufacturers Association (GAMA) requesting CPSC support of CO alarm mandates, has stated that it would not support CO alarm mandates until issues of long term reliability of CO alarms were addressed.
- Issues of alarm reliability have not been addressed in published information on alarm performance. As a result, information to date demonstrates poor performance in the field (including data from first responders documented in the National Fire Investigation Response Data System – NFIRS) and in controlled laboratory tests for mitigating false positive and FALSE NEGATIVE activation. The information provided to the CTC and in the public record documents this information in detail.[2]
- The CO alarm proposal is in conflict with NFPA 720, the ANSI-recognized consensus standard for installation and location of CO alarms. In the case of M41, specifically, occupancies with attached garages are excluded, whereas under NFPA 720, these occupancies are included. Other conflicts with NFPA 720 exist as well.
- M41, through its conflicts with NFPA 720 and focus on new and renovated housing, would not have a demonstrable impact on CO fatalities nationally. Even with 100% COMPLIANCE, PERFECT ALARM RELIABILITY, and PERFECT CONSUMER RESPONSE, these proposals might address only about 20% of CO fatalities since current national residential poisoning incidents involve automobiles in attached garages and older housing without renovation or appliance replacement.
- This proposal does not address THE ONLY GROWING CAUSE OF CO FATALITIES -- PORTABLE EQUIPMENT, INCLUDING GENERATORS.
- CO alarms are not currently a stable product since UL through its Standards Technical Panel 2034 is addressing fundamental issues of alarm life and even activation points. At its upcoming meeting in October, UL will consider proposals to the UL 2034 standard to address deficiencies documented by CPSC and others. The changes proposed would fundamentally alter the design and performance of CO alarms.
- Experience from the City of Chicago, the first major metropolitan jurisdiction in the U. S. to promulgate mandatory CO alarm installation requirements, illustrates in the plot of CO fatalities below THE INEFFECTIVENESS OF MANDATES:
  - Though promulgated in 1994, Chicago and its collar communities in Cook County (many of which have similar mandates) continue to have CO fatalities. Continuing frequency of CO fatalities around ten per year appears to be stable over time and may be expected to continue in the future.
  - The annual number of deaths in this community is consistent with historical trends of declining CO fatalities over time, but no impact or change in this rate of decline can be attributed to the Chicago mandate.
  - For the mandate to have been effective, either CO fatalities would have had to decrease to zero or near zero, or at a minimum, the rate of CO fatalities would have had to show a discontinuous change that could be associated with the promulgation of the mandate.

Reasons for the ineffectiveness of the Chicago mandate are the subject of speculation and may be attributed to lack of compliance, lack of enforcement, lack of appropriate response, failure of alarms to perform as designed, or these and other factors in combination and discussed in AGA's presentation to the CTC.[2] Nevertheless, the societal cost of the mandate has been significant with no discernable societal benefit.

Cook County and Illinois CO Deaths

Regression Analysis of National Center for Health Statistics (NCHS) Data 1979-2003



[1] "Report of the CTC, Area of Study – Carbon Monoxide Alarms," International Code Council Code Technology Committee, September 22, 2005, Detroit Marriott Renaissance Center, Detroit, Michigan [Available on the ICC website: http://iccsafe.org/cs/cc/ctc/Carbon.html].

[2] Williams, Ted A. "CO Alarm Mandates in Model Codes as Public Policy," presented at ICC Code Technology Committee on CO Alarms, July 26, 2005, Schiller Park, Illinois [Available on the ICC website: http://iccsafe.org/cs/cc/ctc/Carbon.html].

Final Action: AS AM AMPC____ D

M41-06/07, Part III
IFGC 311 (New), Chapter 8

Proposed Change as Submitted:

Proponent: Mark Riley, City of Troy, MI Building Department, representing himself

PART III – IFGC

1. Add new text as follows:

SECTION 311
CARBON MONOXIDE ALARMS

311.1 Where required-new construction dwellings. In new construction, dwelling units within which fuel-fired appliances are installed shall be provided with an approved carbon monoxide alarm installed outside of each separate sleeping area in the immediate vicinity of the bedroom(s).

311.2 Where required-existing dwellings. In existing dwellings where interior alterations, repairs, fuel-fired appliance replacements or additions requiring a permit occur, or where one or more sleeping rooms are added or created, carbon monoxide alarms shall be provided in accordance with Section 311.1.

311.3 Alarm requirements. The required carbon monoxide alarms shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed. Carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.

311.4 Power source and interconnection. The required carbon monoxide alarms shall be powered by the building wiring where such wiring is supplied by a commercial power source and when such source is interrupted, the alarms shall be battery powered. The power supply wiring shall be permanent and without a disconnecting switch other than the branch circuit overcurrent device.

Where more than one carbon monoxide alarm is required within a dwelling unit, the alarms shall be interconnected in a manner such that the activation of one alarm will cause actuation of all of the alarms within the dwelling.

Exceptions:

1. Alarms installed in existing dwelling units shall not be required to be interconnected and powered by a commercial power source where the work described in Section 311.2 does not result in the removal of interior wall or ceiling finishes thereby exposing the structure and there is no attic, crawl space or basement which could provide access for wiring without the removal of interior finishes.
2. Alarms shall not be required to be interconnected and shall be permitted to be powered only by batteries where installed in buildings without commercial power.

2. Add standard to Chapter 8 as follows:

UL

UL 2034 Standard for Single and Multiple Station Carbon Monoxide Alarms. Edition 2 including revisions through March 8, 2005

Reason: Over 200 a deaths a year in the United States have been contributed to CO Poisoning, and over 10,000 cases where people were admitted to the hospital emergency rooms. Every major safety agency strongly recommends the use of CO detectors. GAMA recommends the use of CO detectors on their website.
C.S.P.C., U.L. and manufacturer's have spent many hours revising U.L. Standard 2034 to provide a more reliable device.
The location requirement is based on research of manufacturer's installation instructions and recommendations from NFPA 720, *Recommended Practice for the Installation of Household Carbon Monoxide (CO) Warning Equipment*

The U.S. Consumer Product Safety Commission (CPSC) recommends that consumers purchase and install carbon monoxide detectors with labels showing they meet the requirements of the new Underwriters Laboratories, Inc. (UL) voluntary standard (UL 2034). The UL standard, published in April 1992, requires detectors to sound an alarm when exposure to carbon monoxide reaches potentially hazardous levels over a period of time. Detectors that meet the requirements of UL 2034 provide a greater safety margin than previously-manufactured detectors.

Properly working carbon monoxide detectors can provide an early warning to consumers before the deadly gas builds up to a dangerous level. Exposure to a low concentration over several hours can be as dangerous as exposure to high carbon monoxide levels for a few minutes - the new detectors will detect both conditions. Most of the devices cost under $100. Each home should have at least one carbon monoxide detector in the area outside individual bedrooms. CPSC believes that carbon monoxide detectors are as important to home safety as smoke detectors are.

Bibliography: CPSC document #5010

Cost Impact: There is a slight impact of less than 100 dollars per dwelling.

Committee Action: Disapproved

Committee Reason: CO alarms are not within the scope of the IFGC. The ICC CTC committee has not recommended that CO alarms be made mandatory as required by this proposal. It is not clear why the bedroom location was chosen. The alarm may not be audible when the bedroom doors are closed. The Consumer Product Safety Commission has not endorsed CO alarms as being reliable. The dwelling occupants can install CO alarms if they desire them.

Assembly Action: Approved as Modified

Modify proposal as follows:

~~**311.4 Power source and interconnection.** The required carbon monoxide alarms shall be powered by the building wiring where such wiring is supplied by a commercial power source and when such source is interrupted, the alarms shall be battery powered. The power supply wiring shall be permanent and without a disconnecting switch other than the branch circuit overcurrent device.~~

~~Where more than one carbon monoxide alarm is required within a dwelling unit, the alarms shall be interconnected in a manner such that the activation of one alarm will cause actuation of all of the alarms within the dwelling.~~

~~**Exceptions:**~~

1. ~~Alarms installed in existing dwelling units shall not be required to be interconnected and powered by a commercial power source where the work described in Section 311.2 does not result in the removal of Interior wall or ceiling finishes thereby exposing the structure and there is no attic, crawl space or basement which could provide access for wiring without the removal of interior finishes.~~
2. ~~Alarms shall not be required to be Interconnected and shall be permitted to be powered only by batteries where installed in buildings without commercial power.~~

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:

David C. Delaquila, GAMA-An Association of Appliance and Equipment Manufacturers, requests Disapproval for Part III.

Commenter's Reason: GAMA believes this proposal should be disapproved on the basis that it unfairly identifies fuel-burning appliances as the only source of carbon monoxide. Carbon monoxide alarms should be installed in all residential occupancies, regardless of the type of fuel the appliances use. The recent rash of CO incidents in Washington State (predominantly electric heat pumps) and Texas during power outages as a result of inclement weather reinforces the need for theses devices to be installed in all residential buildings. A large majority of the recent CO incidents was attributed to the misuse of power generators. Had these homes had a working CO alarm with battery power backup many of these incidents might have been avoided. Carbon monoxide comes from a variety of sources unrelated to fuel-burning appliances and this proposal does not go nearly far enough to provide safety to all occupancies. Code requirements that address life safety should not fall short of its goal. It should never be the intent of any life safety requirement to protect only a segment of the residential population when a large segment of the population is left unprotected.

Public Comment 2:

Paul K. Heilstedt, Chair, Code Technology Committee (CTC), requests Disapproval for Part III.

Commenter's Reason: The CTC agrees with the action taken by the three code change committees. They correctly note that there are reliability concerns and there is still the question of how long such devices will last before they need replacement. As to the text approved by the assembly, this text will literally require all existing dwelling units to be provided with a carbon monoxide alarm when a permit is pulled for the conditions noted, even if the dwelling unit does not have a fuel fired appliance.

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The EPA notes the following:

“So what’s a consumer to do?
First, don’t let buying a CO detector lull you into a false sense of security. Preventing CO from becoming a problem in your home is better than relying on an alarm. Follow the checklist of DO’s and DON’TS above.” [The checklist focuses on appliance use, maintenance and care as well as directives to not idle your car in the garage or use gas powered engines in enclosed spaces].

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Public Comment 3:

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Commenter’s Reason: ICC should disapprove this proposal. The ICC Code Technology Committee has published on the ICC website its recommendation from its Area of Study - Carbon Monoxide Alarms. Its recommendation is as follows:

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This recommendation follows many hours of testimony and presentation of documentation (recorded on the ICC website) on CO alarm issues from a wide variety of stakeholders at CTC meetings in Schiller Park, IL and Detroit, MI. ICC committees should address this recommendation in its deliberations and explain alternative actions to the CTC recommendation.

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- M41, through its conflicts with NFPA 720 and focus on new and renovated housing, would not have a demonstrable impact on CO fatalities nationally. Even with 100% COMPLIANCE, PERFECT ALARM RELIABILITY, and PERFECT CONSUMER RESPONSE, these proposals might address only about 20% of CO fatalities since current national residential poisoning incidents involve automobiles in attached garages and older housing without renovation or appliance replacement.
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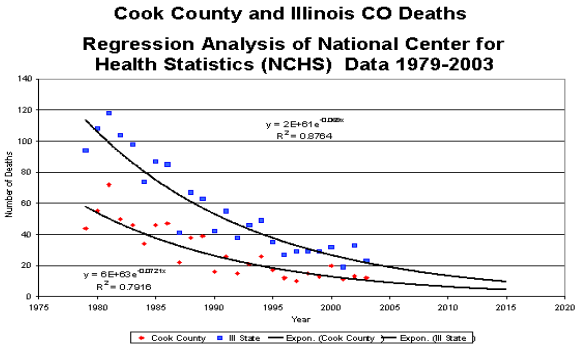
    - Though promulgated in 1994, Chicago and its collar communities in Cook County (many of which have similar mandates) continue to have CO fatalities. Continuing frequency of CO fatalities around ten per year appears to be stable over time and may be expected to continue in the future.
    - The annual number of deaths in this community is consistent with historical trends of declining CO fatalities over time, but no impact or change in this rate of decline can be attributed to the Chicago mandate.
    - For the mandate to have been effective, either CO fatalities would have had to decrease to zero or near zero, or at a minimum, the rate of CO fatalities would have had to show a discontinuous change that could be associated with the promulgation of the mandate.

Reasons for the ineffectiveness of the Chicago mandate are the subject of speculation and may be attributed to lack of compliance, lack of enforcement, lack of appropriate response, failure of alarms to perform as designed, or these and other factors in combination and discussed in AGA’s presentation to the CTC.[2] Nevertheless, the societal cost of the mandate has been significant with no discernable societal benefit.



[1] "Report of the CTC, Area of Study – Carbon Monoxide Alarms," International Code Council Code Technology Committee, September 22, 2005, Detroit Marriott Renaissance Center, Detroit, Michigan [Available on the ICC website: http://iccsafe.org/cs/cc/ctc/Carbon.html].

[2] Williams, Ted A. "CO Alarm Mandates in Model Codes as Public Policy," presented at ICC Code Technology Committee on CO Alarms, July 26, 2005, Schiller Park, Illinois [Available on the ICC website: http://iccsafe.org/cs/cc/ctc/Carbon.html].

Final Action: AS AM AMPC____ D

M44-06/07

403.1, 403.2, 403.2.1, 403.2.2, 403.3, 403.3.1, 403.3.1.1 (New), 403.3.2.3.1 (New), 403.3.2.3.2 (New), 403.3.2.3.3 (New), 403.3.2.3.4 (New) 403.3.1.2 (New), Table 403.1 (New), 403.3.1.3 (New), 403.3.2.1 (New), 403.3.2.2 (New), 403.3.2.3 (New), 403.3.3, Table 403.3, 403.3.4, 403.4 (New), 403.5 (New), 403.6 (New), 403.7 (New), 404.2, 202 (New)

Proposed Change as Submitted:

Proponent: Steven Ferguson, ASHRAE

1. Revise as follows:

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or exhaust air. The amount of supply air shall be approximately equal to the amount of return and exhaust air. The amount of supply air shall be approximately equal to the amount of return and exhaust air. The system shall not be prohibited from producing negative or positive pressure. The system to convey ventilation air shall be designed and installed in accordance with Chapter 6.

~~Ventilation supply systems shall be designed to deliver the required rate of supply air to the occupied zone within an occupied space. The occupied zone shall have boundaries measured at 3 inches (76 mm) and 72 inches (1829 mm) above the floor and 24 inches (610 mm) from the enclosing walls.~~

403.2 Outdoor air required. The minimum ~~ventilation rate of required~~ outdoor airflow rate shall be determined in accordance with Section 403.3. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the breathing zone within each occupiable space.

Exception: Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

403.2.1 Recirculation of air. The outdoor air required by Section 403.3 shall not be recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from being recirculated as a component of supply air to building spaces, except that:

1. Ventilation air shall not be recirculated from one dwelling unit to another or to dissimilar occupancies.

2. Supply air to a swimming pool and associated deck areas shall not be recirculated unless such air is dehumidified to maintain the relative humidity of the area at 60 percent or less. Air from this area shall not be recirculated to other spaces where 10 percent or more of the resulting supply air stream consists of air recirculated from these spaces.
3. Where mechanical exhaust is required by Note b in Table 403.3, recirculation of air from such spaces shall be prohibited. All air supplied to such spaces shall be exhausted, including any air in excess of that required by Table 403.3.
4. Where mechanical exhaust is required by Note h in Table 403.3, mechanical exhaust is required and recirculation is prohibited where 10% or more of the resulting supply air stream consists of air recirculated from these spaces.

403.2.2 Transfer air. Except where recirculation from such spaces is prohibited by Table 403.3, air transferred from occupiable ~~occupied~~ spaces is not prohibited from serving as makeup air for required exhaust systems in such spaces as kitchens, baths, toilet rooms, elevators and smoking lounges. The amount of transfer air and exhaust air shall be sufficient to provide the flow rates as specified in Section~~s~~ 403.3 ~~and 403.3.1~~. The required outdoor airflow rates specified in Table 403.3 shall be introduced directly into such spaces or into the occupied spaces from which air is transferred or a combination of both.

403.3 ~~Ventilation~~ Outdoor airflow rate. Ventilation systems shall be designed to have the capacity to supply the minimum outdoor airflow rate determined in accordance with this section. ~~Table 403.3 based on the occupancy of the space and the occupant load or other parameter as stated therein.~~ The occupant load utilized for design of the ventilation system shall not be less than the number determined from the estimated maximum occupant load rate

indicated in Table 403.3 Ventilation rates for occupancies not represented in Table 403.3 shall be those for a listed occupancy classification that is most similar in terms of occupant density, activities and building construction; or, shall be determined by an approved engineering analysis. The ventilation system shall be designed to supply the required rate of ventilation air continuously during the period the building is occupied, except as otherwise stated in other provisions of the code.

With the exception of smoking lounges, the ventilation rates in Table 403.3 are based on the absence of smoking in occupiable spaces. When smoking is anticipated in a space other than a smoking lounge, the ventilation system serving the space shall be designed to provide ventilation over and above that required by Table 403.3 in accordance with accepted engineering practice.

Exception: The occupant load is not required to be determined, based on the estimated maximum occupant load rate indicated in Table 403.3 where approved statistical data document the accuracy of an alternate anticipated occupant density.

2. Delete and substitute as follows:

~~**403.3.1 System operation.** The minimum flow rate of outdoor air that the ventilation system must be capable of supplying during its operation shall be permitted to be based on the rate per person indicated in Table 403.3 and the actual number of occupants present.~~

403.3.1 Zone outdoor airflow. The minimum outdoor airflow required to be supplied to each zone shall be determined as function of occupancy classification and space air distribution effectiveness in accordance with Section 403.3.1.1 through 403.3.1.3

3. Add new text as follows:

403.3.1.1 Breathing zone outdoor airflow. The outdoor airflow rate required in the breathing zone (Vbz) of the occupiable space or spaces in a zone shall be determined in accordance with Equation 4-1.

$$Vbz = RpPz + RaAz \qquad \text{(Equation 4-1)}$$

Where:

Az = zone floor area: the net occupiable floor area of the space or spaces in the zone.
Pz = zone population: the number of people in the space or spaces in the zone.
Rp = people outdoor air rate: the outdoor airflow rate required per person from Table 403.3
Ra = area outdoor air rate: the outdoor airflow rate required per unit area from Table 403.3

403.3.1.2 Zone air distribution effectiveness. The *zone air distribution effectiveness* (*Ez*) shall be determined using Table 403.1.

TABLE 403.1
ZONE AIR DISTRIBUTION EFFECTIVENESS

Air Distribution Configuration	*Ez*
Ceiling or floor supply of *cool air*	1.0[f]
Ceiling or floor supply of *warm air* and floor return	1.0
Ceiling supply of *warm air* and ceiling return.	0.8[g]
Floor supply of *warm air* and ceiling return	0.7
Makeup air drawn in on the opposite side of the room from the exhaust and/or return	0.8
Makeup air drawn in near to the exhaust and/or return location	0.5

a. "*Cool air*" is air cooler than space temperature.
b. "*Warm air*" is air warmer than space temperature.
c. "Ceiling" includes any point above the *breathing zone.*
d. "Floor" includes any point below the *breathing zone.*
e.*"Makeup air"* is air supplied or transferred. to a zone to replace air removed from the zone by exhaust or return systems..
f. *Zone air distribution effectiveness* of 1.2 shall be permitted for systems with floor supply of *cool air* and ceiling return, provided low-velocity displacement ventilation achieves unidirectional flow and thermal stratification.
g. *Zone air distribution effectiveness* of 1.0 shall be permitted for systems with ceiling supply of *warm air*, provided supply air is less than 15°F (8°C) above space temperature and provided that the 150 fpm (0.8 m/s) supply air jet reaches to within 4.5 ft (1.4 m) of floor level.

403.3.1.3 Zone outdoor airflow. The *zone outdoor airflow* rate (*Voz*), shall be determined in accordance with Equation 4-2.

$$Voz = Vbz/Ez \qquad \text{(Equation 4-2)}$$

4. Delete and substitute as follows:

~~**403.3.2 Common ventilation system.** Where spaces having different ventilation rate requirements are served by a common ventilation system, the ratio of outdoor air to total supply air for the system shall be determined based on the space having the largest outdoor air requirement or shall be determined in accordance with the following formula:~~

~~$Y = X/(1 + X – Z)$ (Equation 4-1)~~

~~Where~~
~~*Y = Vot/Vst* = Corrected fraction of outdoor air in system supply.~~
~~*X = Von/Vst* = Uncorrected fraction of outdoor air in system supply~~
~~*Z = Voc/Vsc* = Fraction of outdoor air in critical space. The critical space is that space with the greatest required fraction of outdoor air in the supply to this space.~~
~~*Vot*= Corrected total outdoor airflow rate.~~
~~*Vst*= Total supply flow rate, i.e., the sum of all supply for all branches of the system.~~
~~*Von*= Sum of outdoor airflow rates for all branches on system.~~
~~*Voc*= Outdoor airflow rate required in critical spaces.~~
~~*Vsc*= Supply flow rate in critical space.~~

403.3.2 System outdoor airflow. The outdoor air required to be supplied by each ventilation system shall be determined in accordance with Section 403.3.2.1 through 403.2.3 as a function of system type and zone outdoor airflow rates.

5. Add new text as follows:

403.3.2.1 Single zone systems. When one air handler supplies a mixture of outdoor air and recirculated return air to only one zone, the system *outdoor air intake flow rate* (*Vot*) shall be determined in accordance with Equation 4-3.

Vot = Voz (Equation 4-3)

403.3.2.2 100% outdoor air systems. When one air handler supplies only outdoor air to one or more zones, the system *outdoor air intake flow* rate (*Vot*) shall be determined using Equation 4-4.

$Vot = \sum_{all\ zones} Voz$ (Equation 4-4)

403.3.2.3 Multiple zone recirculating systems. When one air handler supplies a mixture of outdoor air and recirculated return air to more than one zone, the system *outdoor air intake flow* rate (*Vot*) shall be determined in accordance with Sections 403.3.2.3.1 through 403.3.2.3.5.

403.3.2.3.1 Primary outdoor air fraction. The *primary outdoor air fraction* (*Zp*) shall be determined for each zone in accordance with Equation 4-5.

$Zp = Voz/Vpz$ (Equation 4-5)

Where:

Vpz = primary airflow: The airflow rate supplied to the zone from the air-handling unit at which the outdoor air intake is located. It includes outdoor intake air and recirculated air from that air-handling unit but does not include air transferred or air recirculated to the zone by other means. For design purposes, *Vpz* shall be the zone design primary airflow rate, except for zones with variable air volume supply *Vpz* shall be the lowest expected primary airflow rate to the zone when it is fully occupied.

403.3.2.3.2 System ventilation efficiency. The *system ventilation efficiency* (*Ev*) shall be determined using Table 403-2 or Appendix A of ASHRAE Standard 62.1.

TABLE 403.2
SYSTEM VENTILATION EFFICIENCY

***Max*(*Zp*)**	***Ev***
≤ 0.15	1.0
≤ 0.25	0.9
≤ 0.35	0.8
≤ 0.45	0.7
≤ 0.55	0.6
≤ 0.65	0.5
≤ 0.75	0.4
> 0.75	0.3

Notes for Table 8
1. *Max*(*Zp*) is the largest value of *Zp* calculated using Equation 4-5 among all the zones served by the system.
2. Interpolating between table values shall be permitted.

403.3.2.3.3 Uncorrected outdoor air intake. The *uncorrected outdoor air intake* flow rate (*Vou*) shall be determined in accordance with Equation 4-7.

$Vou = D \sum_{all\ zones} RpPz + \sum_{all\ zones} RaAz$ (Equation 4-7)

Where:

D = occupant diversity: the ratio of the *system population* to the sum of the *zone populations*, determined in accordance with Equation 4-8.

$D = Ps/\sum_{all\ zones} Pz$ (Equation 4-8)

Where:

Ps = system population: The total number of occupants in the area served by the system. For design purposes, *Ps* shall be the maximum number of occupants expected to be concurrently in all zones served by the system.

403.3.2.3.4 Outdoor air intake flow rate. The *outdoor air intake flow rate* (*Vot*) shall be determined in accordance with Equation 4-9.

$Vot = Vou/Ev$ (Equation 4-9)

6. Revise table as follows:

TABLE 403.3
~~REQUIRED OUTDOOR VENTILATION AIR~~
MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	~~ESTIMATED MAXIMUM OCCUPANT LOAD, PERSONS PER 1,000 SQUARE FEET a~~	~~OUTDOOR AIR (Cubic feet per Minute (cfm) Per person) UNLESS NOTED e~~	People Outdoor Airflow Rate in Breathing Zone Rp cfm/person	Area Outdoor Airflow Rate in Breathing Zone Ra cfm/ft2[a]	Default Occupant Density #/1000 ft2[a]	Exhaust Airflow Rate cfm/ft2[a]
Correctional facilities						
Cells						
without plumbing fixtures	~~20~~	~~20~~	5	0.12	25	–
with plumbing fixtures[g,hg]	~~20~~	~~20~~	5	0.12	25	1.00
Dining halls (See Food and Beverage Service)	~~100~~	~~15~~	–	–	–	–
Guard stations	~~40~~	~~15~~	5	0.06	15	–
Day room	~~=~~	~~=~~	5	0.06	30	–
Booking/waiting	~~=~~	~~=~~	7.5	0.06	50	–
Dry Cleaners, laundries						
Coin-operated dry cleaner	~~20~~		15	–	20	–
Coin-operated laundries	~~20~~	~~15~~	7.5	0.06	20	–
Commercial dry cleaner	~~30~~	~~30~~	30	–	30	–
Commercial laundry	~~10~~	~~25~~	25	–	10	–
Storage, pick up	~~30~~	~~35~~	7.5	.12	30	–
Education						
Auditoriums	~~150~~	~~15~~	5	0.06	150	–
~~Classrooms~~	~~50~~	~~15~~	below	below	below	–
Corridors (See Public Spaces)	~~—~~	~~0.10 /ft2~~	–	–	–	–
~~Laboratories~~	~~30~~	~~20~~	below	below	below	–
~~Libraries~~ Media center	~~20~~	~~15~~	10	0.12	25	–
Sports locker rooms[hg]	~~—~~	~~0.50 /ft2~~	–	–	–	0.50
~~Music rooms~~Music/theater/dance	~~50~~	~~15~~	10	0.06	35	–
Smoking lounges[b,g]	~~70~~	~~60~~	60		70	–
~~Training shops~~	~~30~~	~~20~~				–
Daycare (through age 4)			10	0.18	25	–
Classrooms (ages 5-8)			10	0.12	25	–
Classrooms (age 9 plus)			10	0.12	35	–
Lecture classroom			7.5	0.06	65	–
Lecture hall (fixed seats)			7.5	0.06	150	–
Art classroom[hg]			10	0.18	20	0.70
Science laboratories[hg]			10	0.18	25	1.00
Wood/metal shops[hg]			10	0.18	20	0.50
Computer lab			10	0.12	25	–
Multi-use assembly			7.5	0.06	100	–
Locker/dressing rooms[hg]			–	–	–	0.25
Food and beverage service						
Bars, cocktail lounges	~~100~~	~~30~~	7.5	0.18	100	–
Cafeteria, fast food	~~100~~	~~20~~	7.5	0.18	100	–
Dining rooms	~~70~~	~~20~~	7.5	0.18	70	–
Kitchens (cooking)[f,gb]	~~20~~	~~15~~	–	–	–	0.70
Hospitals, nursing and convalescent homes						
Autopsy rooms[b]	~~—~~	~~0.50 /ft2~~		–	–	0.50
Medical procedure rooms	~~20~~	~~15~~	15	–	20	–
Operating rooms	~~20~~	~~30~~	30	–	20	–
Patient rooms	~~10~~	~~25~~	25	–	10	–
Physical therapy	~~20~~	~~15~~	15	–	20	–
Recovery and ICU	~~20~~	~~15~~	15	–	20	–
Hotels, motels, resorts and dormitories						
~~Assembly rooms~~ Multi-purpose assembly	~~120~~ ~~—~~	~~15~~ ~~35 /room~~	5 –	0.06 –	5 –	– 25/50[f]
Bathrooms/Toilet – private[g,hg]	~~—~~	~~30 /room~~	5	0.06	10	–
Bedroom/living room	~~50~~	~~20~~	5	0.06	50	–
Conference/meeting ~~rooms~~	~~20~~	~~15~~	5	0.06	20	–
Dormitory sleeping areas	~~120~~	~~30~~	7.5	0.18	120	–
Gambling casinos	~~—~~	~~30 /room~~	–	–	–	–
~~Living rooms~~ Lobbies/pre-function	~~30~~	~~15~~	7.5	0.06	30	–
Offices						

OCCUPANCY CLASSIFICATION	~~ESTIMATED MAXIMUM OCCUPANT LOAD, PERSONS PER 1,000 SQUARE FEET a~~	~~OUTDOOR AIR (Cubic feet per Minute (cfm) Per person) UNLESS NOTED e~~	People Outdoor Airflow Rate in Breathing Zone Rp cfm/person	Area Outdoor Airflow Rate in Breathing Zone Ra cfm/ft2[a]	Default Occupant Density #/1000 ft2[a]	Exhaust Airflow Rate cfm/ft2[a]
Conference rooms	~~50~~	~~20~~	5	0.06	50	–
Office spaces	~~7~~	~~20~~	5	0.06	5	–
Reception areas	~~60~~	~~15~~	5	0.06	30	–
~~Telecommunication centers and data entry~~	~~60~~	~~20~~	–	–	–	–
Telephone/data entry	~~=~~	~~=~~	5	0.06	60	–
Main entry lobbies	~~=~~	~~=~~	5	0.06	10	–
Private dwellings, single and Multiple						
Garages, common for multiple units[b]	~~—~~	~~1.5 cfm/ft2~~	–	–	–	0.75
Garages, separate for each dwelling[b]	~~—~~	~~100 cfm per car~~	–	–	–	100 cfm per car
Kitchens[~~gb~~]	~~—~~	~~100 cfm intermit. or 25 cfm contin.~~	–	–	–	25/100[f]
Living areas[c]	~~Based upon number of bedrooms. first bedrm 2; each additional bedrm: 1~~	~~0.35 air changes per houra or 15 cfm per person, whichever is greater~~	0.35 ACH but not less than 15 cfm/p	–	Based upon number of bedrooms. first bedrm 2; each additional bedrm: 1	–
Toilet rooms and bathrooms[~~g,hg~~]	~~—~~	~~mech. exhaust capacity of 50 cfm interittent or 20 cfm contin.~~	–	–	–	20/50[f]
Public spaces						
Corridors ~~and utilities~~	~~—~~	~~0.05 /ft2~~	–	0.06	–	–
Elevator car[~~g~~]	~~—~~	~~1.00 /ft2~~	–			1.0
~~Locker rooms~~[~~hg~~]	~~—~~	~~0.5 /ft2~~	–	–	–	–
Shower room (per shower head)[~~g,hg~~]		~~50 cfm intermediate or 20 cfm contin.~~	–	–	–	50/20[f]
Smoking lounges[b,~~g~~]	~~70~~	~~60~~	60	–	70	–
Toilet rooms – public[~~g,hg~~]	~~—~~	~~75 /w.c. or urinal~~	–	–	–	50/70[e]
Places of religious worship			5	0.06	120	
Courtrooms			5	0.06	70	
Legislative chambers			5	0.06	50	
Libraries			5	0.12	10	
Museums (children's)			7.5	0.12	40	
Museums/galleries			7.5	0.06	40	
Retail stores, sales floors and Showroom floors						
~~Basement and street~~ Sales (except as below)	~~—~~	~~0.30 /ft2~~	7.5	0.12	15	–
Dressing rooms	~~—~~	~~0.20 /ft2~~	–	–	–	0.25
~~Malls and arcades~~ Mall common areas	~~—~~	~~0.20 /ft2~~	7.5	0.06	40	–
Shipping and receiving	~~70~~	~~0.15 /ft2~~	–	0.12	–	–
Smoking lounges[b,~~g~~]	~~—~~	~~60~~	60	–	70	–
Storage rooms	~~—~~	~~0.15 /ft2~~	–	0.12	–	–
		~~0.20 /ft2~~				

OCCUPANCY CLASSIFICATION	~~ESTIMATED MAXIMUM OCCUPANT LOAD, PERSONS PER 1,000 SQUARE FEET a~~	~~OUTDOOR AIR (Cubic feet per Minute (cfm) Per person) UNLESS NOTED e~~	People Outdoor Airflow Rate in Breathing Zone Rp cfm/person	Area Outdoor Airflow Rate in Breathing Zone Ra cfm/ft2[a]	Default Occupant Density #/1000 ft2[a]	Exhaust Airflow Rate cfm/ft2[a]
~~Upper floors~~	~~—~~	~~0.05 /ft2~~				
Warehouses (See Storage)						
Specialty shops						
Automotive motor-fuel dispensing	~~—~~	~~1.5 /ft2~~	–	–	–	1.50
stations[b]	~~25~~	~~15~~	7.5	0.06	25	0.50
Barber	~~25~~	~~25~~	20	0.12	25	0.60
Beauty and nail salons[b, i]	~~—~~	~~0.30 /ft2~~				
~~Clothiers, furniture~~	~~—~~	~~2.0 /ft2~~				2.0
Embalming room[b]	~~8~~	~~15~~				
~~Florists~~	~~8~~	~~15~~				
~~Hardware, drugs, fabrics~~	~~—~~	~~50 cfm intermediate or 20 cfm contin. per station~~				
~~Nail salon[b,i]~~	~~—~~	~~1.0 /ft2~~				
		~~15~~				
		~~15~~	7.5	0.18	10	0.90
Pet shops (animal areas)[b]	~~20~~					
~~Reducing salons~~	~~8~~		7.5	0.06	8	–
Supermarkets						
Sports and amusement						
~~Ballrooms and discos~~Disco/dance	~~100~~	~~25~~	20	0.06	100	–
floors	~~70~~	~~25~~	10	0.12	40	–
Bowling alleys (seating areas)	~~70~~	~~25~~	7.5	0.18	20	–
Game ~~rooms~~arcades	~~—~~	~~0.50 /ft2~~	–	0.30	–	0.50
Ice arenas without combustion engines						
~~Playing floors (gymnasiums)~~ Gym,	~~30~~	~~20~~	–	0.30	–	–
stadium, arena (play area)	~~150~~	~~15~~	7.5	0.06	150	–
Spectator areas	~~—~~	~~0.50 /ft2~~	–	0.48	–	–
Swimming pools (pool and deck area)			20	0.06	40	–
Health club/aerobics room			20	0.06	10	–
Health club/weight room						
Storage						
Repair garages, enclosed parking	~~—~~	~~1.5 /ft2~~	–	–	–	0.75
garages[b,d]	~~—~~	~~0.05 /ft2~~	–	0.06	–	–
Warehouses						
Theaters						
Auditoriums (See Education)	~~150~~	~~15~~				
Lobbies	~~150~~	~~20~~	5	0.06	150	–
Stages, studios	~~70~~	~~15~~	10	0.06	70	–
Ticket booths	~~60~~	~~20~~	5	0.06	60	–
Transportation						
Platforms	~~100~~	~~15~~	7.5	0.06	100	–
~~Vehicles~~	~~150~~	~~15~~				
~~Waiting rooms~~ Transportation waiting	~~100~~	~~15~~	7.5	0.06	100	–
Workrooms						
Bank vaults/safe deposit	~~5~~	~~15~~	5	0.06	5	
Darkrooms	~~—~~	~~0.50 /ft2~~	–	–	–	1.00
~~Duplicating~~Copy, printing rooms	~~—~~	~~0.50 /ft2~~	5	0.06	4	0.50
Meat processing[c]	~~10~~	~~15~~	15	–	10	–
Pharmacy (prep. area)	~~20~~	~~15~~	5	0.18	10	–
Photo studios	~~10~~	~~15~~	5	0.12	10	–
Computer (without printing)	~~=~~	~~=~~	5	0.06	4	–

For SI: 1 cubic foot per minute = 0.0004719 m3/s, 1 ton = 908 kg,
1 cubic foot per minute per square foot = 0.00508 m3/(s □m2),
□C = [(□F) -32]/1.8, 1 square foot = 0.0929 m2.

a. Based upon net occupiable floor area

b. Mechanical exhaust required and the recirculation of air from such spaces ~~as permitted by Section 403.2.1~~ is prohibited (see Section 403.2.1, Item~~s 1 and~~ 3).

c. Spaces unheated or maintained below50□F are not covered by these requirements unless the occupancy is continuous.

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

~~e. Where the ventilation rate is expressed in cfm/ft2, such rate is based upon cubic feet per minute per square foot of the floor area being ventilated.~~

~~f. The sum of the outdoor and transfer air from adjacent spaces shall be sufficient to provide an exhaust rate of not less than 1.5 cfm/ft2.~~

~~g. Transfer air permitted in accordance with Section 403.2.2.~~

e. Rates are per water closet or urinal. The higher rate shall be provided where periods of heavy use are expected to occur, e.g., toilets in theaters, schools, and sports facilities. The lower rate shall be permitted where periods of heavy use are not expected.
f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted where the exhaust system is designed to operate continuously during normal hours of use.
~~h~~g. Mechanical exhaust is required and recirculation is prohibited except that recirculation shall be permitted where the resulting supply air stream consists of not more than 10 percent air recirculated from these spaces (see Section 403.2.1, Items 2 and 4).
i. For nail salons, ~~T~~the required exhaust shall include ventilation tables or other systems that ~~shall~~ capture the contaminants and odors at their source and are capable of exhausting a minimum of 50 cfm per station.

7. Add new text as follows:

403.4 Exhaust Ventilation. Exhaust airflow rate shall be provided in accordance with the requirements in Table 403.3. Exhaust makeup air shall be permitted to be any combination of outdoor air, recirculated air, and transfer air, except as limited in accordance with Section 403.2.

8. Revise as follows:

~~403.3.1~~ 403.5 System operation. The minimum flow rate of outdoor air that the ventilation system must be capable of supplying during its operation shall be permitted to be based on the rate per person indicated in Table 403.3 and the actual number of occupants present.

~~403.3.3~~403.6 Variable air volume system control. Variable air volume air distribution systems, other than those designed to supply only 100-percent outdoor air, shall be provided with controls to regulate the flow of outdoor air. Such control system shall be designed to maintain the flow rate of outdoor air at a rate of not less than that required by Section 403.3 over the entire range of supply air operating rates.

~~403.3.4~~403.7 Balancing. The ventilation air distribution system shall be provided with means to adjust the system to achieve at least the minimum ventilation airflow rate as required by Sections 403.3 and 403.4. Ventilation systems shall be balanced by an approved method. Such balancing shall verify that the ventilation system is capable of supplying and exhausting the airflow rates required by Sections 403.3 and 403.4.

404.2 Minimum ventilation. Automatic operation of the system shall not reduce the ventilation airflow rate below 0.05 cfm per square foot (0.00025m3/s •m2) of the floor area and the system shall be capable of producing a ventilation airflow rate of ~~1.5~~ 0.75 cfm per square foot (0.0076m3/s • m2) of floor area.

9. Add new text as follows:

SECTION 202
GENERAL DEFINITIONS

BREATHING ZONE. The region within an occupied space between planes 3 and 72 in. (75 and 1800 mm) above the floor and more than 2 ft (600 mm) from the walls of the space or from fixed air-conditioning equipment.

NET OCCUPIABLE FLOOR AREA. The floor area of an occupiable space defined by the inside surfaces of its walls but excluding shafts, column enclosures, and other permanently enclosed, inaccessible, and unoccupiable areas. Obstructions in the space such as furnishings, display or storage racks, and other obstructions, whether temporary or permanent, are not deducted from the space area.

OCCUPIABLE SPACE. An enclosed space intended for human activities, excluding those spaces intended primarily for other purposes, such as storage rooms and equipment rooms, that are only intended to be occupied occasionally and for short periods of time.

ZONE. One occupiable space or several occupiable spaces with similar occupancy classification (see Table 403.3), occupant density, zone air distribution effectiveness, and zone primary airflow rate per unit area.

Reason: To bring the IMC more in line with contemporary ventilation and air quality criteria that are based on research conducted since the ventilation provisions of the IMC were revised and the consensus achieved under the ANSI Standards process.

The current ventilation criteria in the IMC are essentially based on ASHRAE Standard 62-1989. Research has been conducted since then our knowledge of indoor air quality and ventilation has evolved. In response to these actions ASHRAE has enhanced Standard 62, upon which the IMC is based. This code change would make the IMC consistent with ventilation rate procedures defined in ANSI/ASHRAE Standard 62.1-2004 and consistent with the 2006 Uniform Mechanical Code.

ANSI/ASHRAE Standard 62.1-2004 is a consensus national standard. Standard 62.1 ventilation rate calculation procedure has been substantially updated in the 2004 version to reflect the latest research on building indoor air quality. The procedure now requires designers to account for pollutant sources other than occupants, such as building materials and furnishings, and to account for the efficiency of the

ventilation system to deliver outdoor air to the breathing zone. Ventilation systems designed using the new procedures will result in slightly lower outdoor rates for most occupancies compared to the current code, reducing first costs and energy costs.

Bibliography:
ANSI/ASHRAE Standard 62.1-2004 Ventilation for Acceptable Indoor Air Quality, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA

Cost Impact: The code change proposal will not increase the cost of construction, and in some instances will reduce the first cost of construction. Engineering design effort and jurisdictional plan review processes will not be materially affected due to the availability and greater specificity of compliance tools.

Committee Action: **Approved as Submitted**

Committee Reason: The proposal updates the outdoor air ventilation requirements to reflect the latest technology and to be consistent with the requirements of ASHRAE 62.1-2004. It updates the ventilation rates in Table 403.3, adds a table for system efficiency and replaces the previous common ventilation system requirements with single zone and multiple zone recirculation system requirements.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Lawrence Brown, CBO, National Association of Home Builders (NAHB), requests Disapproval.

Commenter's Reason: The proposed approach to achieve ventilation is incredibly and unnecessarily complicated. There is no justification for the changes other than it would be "consistent with ventilation rate procedures defined in ANSI/ASHRAE Standard 62.1-2004." But, there are no study references or evidence that a 3 year old standard is usable or improves air quality. Also, some of the ventilation rates in the proposal are different than ASHRAE 62.1 (e.g. Garages, common for multiple units – 0.75 cfm/ft^2 - proposed vs. 1.5 in 62.1). In addition, some of the definitions (i.e., net occupiable floor area and occupiable floor space) are completely non conventional, difficult to calculate and different than other standard area calculations that are better understood. The claim that the cost impact of this proposal will "not increase and in some instances … reduce the first cost" is completely unfounded. All this considered, there is absolutely no basis nor need to support exchanging the current IMC provisions with the proposed text.

Public Comment 2:

Ken Schoonover, P.E., KMS Associates, Inc., representing Airxchange, Inc., requests Disapproval.

Commenter's Reason: This proposal is premature. While ASHRAE 62-2004 may have evolved to this point based on recent research, it is not ready to be mandated as the required design criteria across the board for all buildings. The standard is heavy on the theoretical side and short on the practical realities and limitations of the construction industry today. There are enforceability problems with the proposal and the standard. There is a gaping hole in the standard wherever smoking is permitted in buildings. There are other minor problems with the language and format. ASHRAE 62-2004 needs to evolve further before it is suitable for use as the code-mandated basis for design of ALL buildings and structures.

ENFORCEMENT OFFICIALS – ARE YOUR PERMIT APPLICANTS EQUIPPED FOR THIS? Many buildings go up without the services of a design engineer. Will everyone who has to design and build be familiar enough with the calculation procedure to get it right? The proponent says engineering design effort will not be materially affected because of the availability of compliance tools. Are design-build contractors ready for this? Are these tools sufficiently available, well known and understood? If the answer is no, and I believe it is no, then this is premature.

NO DESIGN CRITERIA FOR SMOKING. The proposed ventilation rates are based on no smoking (proposed Section 403.3). Smoking rates in the U.S. are down and smoking bans may be growing, but indoor smoking is not universally prohibited and is not likely to be any time soon. The code will then require design by "accepted engineering practice". What is that? All that ASHRAE 62-2004 provides (Section 6.2.9 of the standard) is "Smoking areas shall have more ventilation and/or air cleaning than comparable no-smoking areas." How much is more? Section 6.2.9 goes on to say "Specific ventilation rate requirements cannot be determined until cognizant authorities determine the concentration of smoke that achieves an acceptable level of risk." There is no criteria.

ENFORCEMENT OFFICIALS – HOW WILL YOU ENFORCE VENTILATION FOR SMOKING AREAS? The term "accepted engineering practice" is widely recognized as vague, subjective and just plain poor code language. However, even if it is generally understood to mean ASHRAE 62-2004, there still is no meaningful, enforceable criteria. If the rate is increased by ANY amount over the rate from Table 403.3, or if air cleaners are used, regardless of how insufficient it might actually be, the design complies. Is this reasonable and appropriate standard? Can this be relied upon to ensure that the health and safety objective of the code and the standard will be achieved? More likely what you will do is trust the designer. That may work for structural design, but I'd refer you back to the first question above, is the industry equipped to deal with this standard across the board?

ENFORCEMENT WILL BE MORE DIFFICULT – Currently, the occupancy, the occupant load and the required ventilation rate for the space is specified. Relatively easy to determine if the design complies. The basic requirement proposed here, per 403.2, is airflow to the breathing zone. You will either have to assume that all of the required outdoor air delivered will actually reach the breathing zone, or relate the actual measured airflow rate to the engineers calculations, which factors in ventilation efficiency, system efficiency and calculation of net square footage. You cannot directly relate the measured rate to the required rate without these design variables and assumptions. Will you verify the validity of the designer's assumptions? What extent of review will be necessary when there is no design engineer involved? Have you seen the available compliance tools? Are you comfortable with them and do they meet your needs?

Other problems:

THE OCCUPANT LOAD RATES WILL NOT BE CONSISTENT WITH THE BUILDING CODE – The occupants/1,000 sq. ft. currently in Table 403.3 are consistent with the occupant load that the IBC uses for means of egress design. The proposal in many cases reduces the number (e.g. offices from 7 to 5; Classrooms from 50 to 25 or 35; library reading rooms from 20 to 10). The system can be designed for substantially fewer people than are allowed by the building code. This does not make sense.

BUILDING CONSTRUCTION NOW A FACTOR FOR SPACES NOT SPECIFICALLY LISTED IN TABLE 403.3 – When you have an occupancy not represented in Table 403.3, Section 403.3 would say that you use the listed occupancy classification that is most similar in terms of density, activity and "building construction". What is meant by "building construction"? This is either an unknown factor that cannot be determined or enforced, or it is completely meaningless, since nothing in the occupancy listings relates to building construction. At best, this adds unnecessary confusion.

REFERENCES TO TABLE 403.3 NOTES ARE WRONG – Section 403.2.1(4) refers to note h. As proposed, there would no longer be a note h. If existing note i is to be relabeled note h to maintain alphabetical consistency, the text would be wrong. This is likely an unintended error, but are there other errors?

I ask you to disapprove this change for these reasons.

Final Action: AS AM AMPC____ D

M46-06/07

403.2, Chapter 15

Proposed Change as Submitted:

Proponent: Michael Burnetter, P.E., New York State Department of State Codes Division, representing himself

1. Revise as follows:

403.2 Outdoor air required. The minimum ventilation rate of outdoor air shall be determined in accordance with Section 403.3.

Exceptions:

1. Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.
2. Where the ventilation system is designed in accordance with ANSI/ASHRAE 62.1

2. Add standard to Chapter 15 as follows:

ASHRAE

Standard 62.1-2004 Ventilation for Acceptable Air Quality

Reason: The purpose of this proposal is to allow the use of ANSI/ASHRAE 62.1 as an acceptable alternative to section 403.2. The ANSI/ASHRAE 62.1-2004 is a reference standard already found in the IEBC. Adding this reference standard to the IMC will create a set of uniform codes. Currently, the exception allows for an engineered system but provides no further guidance. Should a code official or design engineer be looking for a detailed standard which may be relied upon as an acceptable compliance path for ventilation rates in addition to the prescriptive tables of the IMC or the broad brush "engineered system" exception, then incorporating this reference standard into the IMC would provide for that flexibility while having a detailed standard as a point of reference. As ASHRAE is the expert organization in the filed of HVAC design, this standard can be viewed as a fully vetted and debated standard, the purpose of which is to guide the design and control of ventilation systems.

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

Analysis: Results of review of the proposed standard will be posted on the ICC website by August 20, 2006.

Note: The following analysis was not in the Code Change Proposal book but was published in the "Errata to the 2006/2007 Proposed Changes to the International Codes and Analysis of Proposed Reference Standards" provided at the code development hearings:

Analysis: Review of proposed new standard indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: **Approved as Submitted**

Committee Reason: This change allows the designer of ventilation systems to use the latest version of ASHRAE 62.1 as an alternate to the requirements of Section 403.3 rather than having to have the design approved as an alternate means in accordance with Section 105.2.

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 Virginia Plumbing and Mechanical Inspectors Association/Virginia Building and Code Officials Association, requests Disapproval.

Commenter's Reason: The approval of M 44 appropriately and adequately addresses this topic fully. The inclusion of the reference to the ASHRAE 62.1 Standard creates confusion and conflict with the supply of outdoor air requirements. This leads to non-uniform application of the IMC. The well known industry problems associated with outdoor air at this time (2006 IMC) are the perceived excessive quantities required in A (Assembly) and E (Education) occupancies. The extracted text from ASHRAE 62.1 contained in M 44 contains the fix for these occupancies along with the current method of assuring outdoor air is provided to the intended space. The new text approved in M 44 contains a reduction in outside air for these occupancies of almost 50% less than the current 2006 IMC Section 403 requires. The industry problem is solved! M 46 contains many problems that are sure to lead to mass confusion by the use of the direct reference to 62.1.

The 62.1 document is not written in mandatory language. This is one of the primary reasons the direct reference has never been included in the IMC before. Mandatory prescriptive language is the primary difference of a "Code "and a "Standard". Typically standards contain information that is non-mandatory, subjective, and performance based. The current IMC format that has been used successfully is that the pertinent text from the 62.1 document, relevant to minimum outdoor air provisions, has been extracted and inserted into the Mechanical Code. This way enhancement may occur at anytime through the ICC code development process. If you look at the 2006 IMC Section 403 you will notice several examples of how this has worked effectively, added nail salon entry in the table, recirculation of air prohibition, locker and changing room distinction, correctional cells distinction with plumbing fixtures and without., embalming room criteria, the list goes on and on. The point is we have the pertinent information already covered in the IMC and the ability to maintain it and keep it current through the 18 month cycle of code changes using the ICC process. History has proven this is the best method to keep up with the ever changing outdoor air technology. A few examples of the non-mandatory language are Section 5.15.1 "convenient access", Section 5.14.1 "sufficient working space", Section 6.2.2 "judged to be unacceptable level". What is sufficient, what is convenient and who judges level of acceptability? These are just a few illustrations of many subjective terms utilized in typical 62.1 text.

Next there are far too many direct conflicts contained in 62.1 with the IMC and even with the IECC. A few examples are Section 5.11 contains condensate provisions that are different than the IMC, Section 5.6.1 contains different requirements for intakes, Section 5.1 contains different allowances in relation to the use of Natural Ventilation than the IMC permits, Section 516 contains different provisions for parking garages than the IMC, Section 5.17.2.1 has allowances for air cleaning processes, Section 5.17.3 has different provisions for recirculated air, Section 5.15.1 has different provisions for building envelope requirements than the IECC, again the list goes on and on. How are these differences going to be settled? The scope and foundation that the ICC promotes is the minimum set of requirements to protect health, safety and welfare of the public. How can we endorse two sets of requirements that are different? Logically, there can only be one minimum.

Then there are multiple references to other standards several of which do not comply with ICC review standards. Just a few examples of this are air balancing requirements located in Section 7.2.2 references to ASHRAE 111 and SMACNA's HVAC Systems-Testing, Adjusting, and Balancing (see M 50- 06/07 this standard does not comply with ICC requirements) Section 7.1.5 references NFPA 90A and 90B, Section 5.5.1 references surfaces resistant to mold growth in accordance with ASTM C 1338, Section 5.6.3 references using rain test apparatus as described in Section 58 of UL 1995., Sections 5.9 and 6.2.1.1 references filter efficiency complying with ASHRAE 52.2, Section 9 references NFPA 45 and AIHA Z9.5 both of which were identified as not complying with ICC review requirements (see M 55- 03/04). One can only guess how the ICC review process has determined and published the ASHRAE 62.1 2004 edition complies with Section 3.6 of the ICC policy? Clearly there are many references contained in the document to other documents that have been published as not complying with ICC review provisions. However this is really not the main issue. The main issue is all of this might be good reference material for a designer to utilize when designing a building ventilation system but not as code mandated requirements. The unfavorable scenario this creates is code officials across the US are going to require compliance with one or all the other reference standards that 62.1 contains. Look at the current 06 IMC it contains none of these references and ventilation design and installation would seem to be successfully occurring everyday without these cumbersome overly restrictive standard references.

Another huge problem with the formatting of the 62.1 document is that it makes references to Appendixes throughout the text. Yet when you go to the Appendixes they are clearly identified as "not part of the standard", merely informative and not requirements necessary for conformance with the Standard. Sections 5.6.1, 6.2.1.2, 6.2.2, 6.3.1.2, and 6.3.1.4 all reference Appendixes. How is this type of information applied uniformly? Do you use the appendixes or not?

Lastly, the 62.1 document goes well beyond of the basic minimum requirements for outside air. It covers many more topics. The conflict between the IMC minimum requirements and the ASHRAE 62.1 "recommendations" will wreak havoc on the industry. There will be more inconsistency related to outdoor air than ever. Many people have worked very hard within the ICC process to attempt to make code requirements easy to understand, enforce and apply while keeping a goal of uniform application across the country. The incorporation of this stand alone reference to ASHRAE 62.1 goes against all of that philosophy. M 44 achieves this concept! The IMC gets all the pertinent information extracted from 62.1 that is needed to design and install ventilation systems safely, effectively to maintain health safety and welfare of the public. I urge membership vote of disapproval of M-46 06/07.

Final Action: AS AM AMPC____ D

M49-06/07
403.3.4

Proposed Change as Submitted:

Proponent: Cecil F. Hardee, Jr., County of Fairfax, VA, representing the Virginia Plumbing and Mechanical Inspectors Association/Virginia Building and Code Officials Association

Delete without substitution:

~~**403.3.4 Balancing.** Ventilation systems shall be balanced by an approved method. Such balancing shall verify that the ventilation system is capable of supplying the airflow rate required by Section 403.~~

Reason: The purpose is to delete current requirements of this section. This section gives no guidance or reference as to a standard to follow when balancing a duct system. The code never describes what is an "approved" method. Therefore any unqualified company or individual could be verifying these systems. Most states do not even have a license requirement for the "air balance" type tradesperson.

Some localities will not perform a final inspection or allow occupancy unless the report is completed. Even after the report is submitted the rates change. There are many factors that affect the outcome of air balancing; some include the condition of the duct system, the static pressure, the condition of the equipment and the general maintenance of the system. When occupant comfort levels vary dampers are closed and the system becomes unbalanced from the original balancing process. To require balancing of systems there needs to be more criteria to follow for the air flow balance within the duct system and not focus on the outlet where air flow rates are typically measured. What if the building is a "shell" only with no occupancy? Is a balance report required to gain the final mechanical inspection and then perform another balance again when the space actually becomes occupied for the intended use? The code official won't even see the second report and that's the one that counts! Isn't the initial balance to gain inspection useless? It has to be preformed again under the actual occupant circumstances. This is an unnecessary duplication of efforts and more importantly a huge waste of time and money. On a new building with multiple tenants, do you require a balance report initially and then each time a tenant moves in require a balance report again and again? What if the scope of work is to relocate some ductwork? Is a balance report required for this type of activity? While the balance report is an extremely important issue it is not the code official who needs this information, it is the building owner, the designer, the occupants, or building management. Why is there no such verification for a naturally ventilated structure? Why make the code more difficult to comply with because a designer chooses to provide a more adequate ventilation system?

Lastly this section requires that the system be "capable" of supplying airflow rates required by Section 403. This can easily be achieved by doing the outdoor air calculation of the space, verifying the units specifications, and then assuring the proper equipment is installed that supplies the outdoor air.

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

Analysis: The definition of "APPROVED" in Section 202 makes the code official responsible for approving the balancing method.

Committee Action: **Disapproved**

Committee Reason: Removal of this section would leave the code with no requirement for balancing. The code official would have more difficulty verifying that the ventilation system was balanced for proper operation.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Cecil F. Hardee, Jr., County of Fairfax Virginia, representing the Virginia Plumbing and Mechanical Inspectors Association/Virginia Building and Code Officials Association requests Approval as Modified by this Public Comment.

Replace proposal as follows:

403.3.4 Balancing. The ventilation system appliances shall be adjusted to supply the amount of air as required by Section 403.

Commenter's Reason: There is no ICC consensus standard for air balancing. Proposal M99 was denied during the Public Hearings in Florida because it was not in ICC language. The current text gives no guidance as to an approved reference standard to be used in balancing the system. The code never describes what an "approved" method is. What are the qualifications of the company or persons performing the test and what is the licensing or certification requirements? Most states don't have a licensing requirement for the "air balance" type person, therefore any unqualified company or person could be performing these tests. Some localities will not perform a final inspection or allow occupancy unless the report is completed. When comfort levels change the dampers are opened or closed and the air balance is affected.

Why require balancing when the occupant is most likely to change it after taking possession. By requiring the appliances to supply the amount of air as required by Section 403 it will ensure that the system is capable of delivering the required air as stated in Section 403.3 even though the dampers are adjusted to the comfort levels of the occupants. Typical job specification requires a balance report for the designer and owner. This is a contractual issue not a code regulated function.

Final Action: AS AM AMPC____ D

M51-06/07
406.1

Proposed Change as Submitted:

Proponent: Tom Rubottom, City of Lakewood, CO, representing the Colorado Chapter of ICC

Revise as follows:

406.1 General. Uninhabited spaces, such as crawl spaces and attics, shall be provided with natural ventilation openings as required by the *International Building Code* or shall be provided with a mechanical exhaust and supply air system. The mechanical exhaust rate shall be not less than 0.02 cfm per square foot (0.00001 m3/s • m2) of horizontal area and the system shall ~~be automatically controlled to operate when the relative humidity in the space served exceeds 60 percent~~ operate continuously.

Reason: Currently IMC Section 406.1 does not correlate with Section 1203.3.2, Item 3 of the IBC. IMC Section 406.1 permits an automatically controlled ventilation system by means of a humidistat. Section 1203.3.2, Item 3 of the IBC requires that if a mechanical ventilation system is to be utilized in lieu of natural openings, the system is to be continuous.

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

Committee Action: **Approved as Submitted**

Committee Reason: This change makes the mechanical exhaust requirements for uninhabited crawl spaces consistent with IBC Section 1203.3.2 by requiring the exhaust to be continuous rather than intermittent.

Assembly Action: **Disapproved**

Individual Consideration Agenda

This item is on the agenda for individual consideration because an assembly action was successful.

Final Action: AS AM AMPC____ D

M56-06/07
502.4 through 502.5.2, 407 (New)

Proposed Change as Submitted:

Proponent: Ronald Marts, Telcordia, representing AT&T, SBC, Ameritech, PacBell, Cincinnati Bell, BellSouth, Qwest and Southern New England Tele

Delete and relocate as follows:

~~**[F] 502.4 Stationary storage battery systems.** Stationary storage battery systems, as regulated by Section 608 of the *International Fire Code*, shall be provided with ventilation in accordance with this chapter and Section 502.4.1 or 502.4.2.~~

~~**Exception:** Lithiumion batteries shall not require ventilation.~~

~~**[F] 502.4.1 Hydrogen limit in rooms.** For flooded lead acid, flooded nickel cadmium and VRLA batteries, the ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room.~~

~~**[F] 502.4.2 Ventilation rate in rooms.** Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (cfm/ft2) [0.00508 m3/(s •m2)] of floor area of the room.~~

~~**[F] 502.5 Valve-regulated lead-acid batteries in cabinets.** Valve-regulated lead-acid (VRLA) batteries installed in cabinets, as regulated by Section 608.6.2 of the *International Fire Code*, shall be provided with ventilation in accordance with Section 502.5.1 or 502.5.2.~~

~~**[F] 502.5.1 Hydrogen limit in cabinets.** The cabinet ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the cabinet during the worst-case event of simultaneous boost charging of all batteries in the cabinet.~~

~~**[F] 502.5.2 Ventilation rate in cabinets.** Continuous cabinet ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (cfm/ft.2) [0.00508 m3/(s • m2)] of the floor area covered by the cabinet. The room in which the cabinet is installed shall also be ventilated as required by Section 502.4.1 or 502.4.2.~~

SECTION 407
VENTILATION OF STATIONARY STORAGE BATTERY SYSTEMS

[F] 407.1 Stationary storage battery systems. Stationary storage battery systems, as regulated by Section 608 of the *International Fire Code*, shall be provided with ventilation in accordance with this chapter and Section 502.4.1 or 502.4.2.

Exception: Lithiumion batteries shall not require ventilation.

[F] 407.1.1 Hydrogen limit in rooms. For flooded lead acid, flooded nickel cadmium and VRLA batteries, the ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room.

[F] 407.1.2 Ventilation rate in rooms. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (cfm/ft2) [0.00508 m3/(s •m2)] of floor area of the room.

[F] 407.2 Valve-regulated lead-acid batteries in cabinets. Valve-regulated lead-acid (VRLA) batteries installed in cabinets, as regulated by Section 608.6.2 of the *International Fire Code*, shall be provided with ventilation in accordance with Section 502.5.1 or 502.5.2.

[F] 407.2.1 Hydrogen limit in cabinets. The cabinet ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the cabinet during the worst-case event of simultaneous boost charging of all batteries in the cabinet.

[F] 407.2.2 Ventilation rate in cabinets. Continuous cabinet ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (cfm/ft.2) [0.00508 m3/(s • m2)] of the floor area covered by the cabinet. The room in which the cabinet is installed shall also be ventilated as required by Section 502.4.1 or 502.4.2.

Reason: The ventilation requirement for stationary storage battery systems was inadvertently put in the "exhaust" chapter of the IMC instead of the ventilation chapter. Section 608 of the IFC was recently renamed from "Lead Acid Battery Systems" to "Stationary Storage Battery Systems." The section has always required ventilation, but never exhaust. Battery requirements were originally developed in the UFC as Article 64, which also required ventilation, but not exhaust. The earlier BOCA and Standard Codes also required ventilation, but not exhaust.

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

Committee Action: **Disapproved**

Committee Reason: The proposal was not considered to be comprehensive enough; there are other sections in the exhaust section that also address ventilation.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Ronald Marts, Telcordia Technologies, representing AT&T, BellSouth, SBC, PacBell, Ameritech, SNET, Qwest, Cincinnati Bell, requests Approval as Submitted.

Commenter's Reason: The Committee denied this proposed change and commented that it was not comprehensive enough as it did not address other sections in the exhaust chapter where the term "ventilation" is used. I am a telecommunications consultant and co-author of Section 608 of the IFC (Stationary Storage Battery Systems). As such, I am not familiar with dry cleaning, flammable finishes, and other hazardous materials mentioned in Chapter 5 of the IMC and would not feel comfortable addressing changes in those areas.

My proposal cleans up a small section of Chapter 5 where ventilation requirements for battery rooms were inadvertently placed in Chapter 5 instead of Chapter 4. I would ask the membership's support in this small clean up.

In the meantime, I would suggest the committee create a task group to address other sections in the chapter where only ventilation is required. I would be happy to help in that endeavor.

Final Action: AS AM AMPC____ D

M60-06/07, Part I

504.6.1 (IFGC [M] 614.6.1), Table 504.6.1 (New) [IFGC Table 614.6.1 (New)]

Proposed Change as Submitted:

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing In-O-Vate Technology

PART I – IMC

1. Revise as follows:

504.6.1 (IFGC 614.6.1) ~~Maximum~~ Dryer exhaust duct length. The ~~maximum~~ equivalent length of a clothes dryer exhaust duct ~~shall not exceed 25 ft (7620 mm)~~ from the dryer location to the outlet terminal shall be posted by the exhaust duct connection to the dryer. The ~~maximum~~ equivalent length of duct shall ~~be reduced 2-1/2 feet for each 45-degree (0.79 rad) bend and 5 feet (1524 mm) for each 90-degree (1.6 rad) bend~~ include the equivalent length of each fitting used in accordance with the equivalent pipe lengths shown in Table 504.6.1. ~~The maximum length of the exhaust duct does not include the transition duct.~~ The maximum allowable exhaust duct length stated in the clothes dryer's installation instructions shall be equal to or greater than the posted equivalent length.

~~**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.~~

2. Add new table as follows:

TABLE 504.6.1 (IFGC TABLE 614.6.1
EQUIVALENT LENGTH FOR FITTINGS

DRYER EXHAUST DUCT FITTING	EQUIVALENT LENGTH	
	feet	mm
45 degree, 4 sectioned bend, 4 inch radius	7-1/2	2286
90 degree, 4 sectioned bend, 4 inch radius	15	4572
45 degree, smooth bend, 10 inch radius	1-1/4	381
90 degree, smooth bend, 10 inch radius	2-1/2	762

Reason: Testing on the impact of elbows in a dryer exhaust system was conducted at UL. The testing was sponsored by JB Engineering and Code Consulting, P.C., with financing from In-O-Vate Technologies. A copy of the results from this study have been submitted to the Mechanical Code Change Committee. I have asked In-O-Vate Technologies to make the report available to everyone on their website, www.dryerbox.com. Anyone interested in reviewing the UL report should download the report.

The testing had interesting results that showed the impact of a standard 4 section 4 inch radius elbow was more severe than the code specifies. Placing a 4 section 4 radius inch elbow in the exhaust pipe results in an equivalent pipe length of 15 feet, not 5 feet. When a smooth 10 inch radius elbow was installed, the equivalent length of the elbow was only 2-1/2 feet. The smooth radius was 6 times more efficient than the 4 section 4 inch radius elbow in flow movement through the fitting.

Rather than specify a maximum length, this change would require the equivalent length of the dryer vent to be posted. The dryer vent length would be based on the length of the straight vent pipes and the fittings used in the dryer vent. Since each dryer has a slightly different requirement for vent length, the dryer would have to match up with the posted equivalent dryer length.

When connecting the dryer to the vent, the manufacturer's installation instructions would have to be followed for the dryer vent length.

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

Analysis: What is meant by the term “smooth bend”?

Committee Action: **Disapproved**

Committee Reason: There needs to be a prescriptive maximum length in the code that reflects the majority of the dryers available in the market. The 10 inch radius elbows cannot be installed in a standard wall assembly. According to the new table in the proposal, an installation with more than two 4 inch radius elbows would not be possible because of the excessive 15 foot equivalent length. The make and model of the dryer to be installed needs to be known before using the 10 inch radius elbows.

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, P.E., JB Engineering and Code Consulting, P.C., representing In-O-Vate Technology, requests Approval as Submitted for Part I.

Commenter's Reason: I proposed both M59 and M60 with the idea of providing an option for regulating the length of a dryer exhaust duct. The code officials in attendance at the Orlando hearings asked that I pursue M60. One of the concerns with this code change was that the posting of the length of the dryer exhaust duct was not clear. However, with the approval of M62-06/07, Part I, the posting on the length is clear. This change will allow the full allowable length of the dryer exhaust duct to be used. Currently, dryer manufacturers are penalized by not allowing the full use of their capabilities when the dryer manufacturer is not known during construction.

Final Action: AS AM AMPC____ D

M60-06/07, Part II

IRC M1502.6, Table M1502.6 (New)

Proposed Change as Submitted:

Proponent: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., representing In-O-Vate Technology

PART II – IRC

1. Revise as follows:

M1502.6 ~~Maximum~~ Dryer exhaust duct length. The ~~maximum~~ equivalent length of a clothes dryer exhaust duct ~~shall not exceed 25 ft (7620 mm)~~ from the dryer location to the wall or roof termination shall be posted by the exhaust duct connection to the dryer. The ~~maximum~~ equivalent length of duct shall ~~be reduced 2-1/2 feet for each 45-degree (0.79 rad) bend and 5 feet (1524 mm) for each 90-degree (1.6 rad) bend~~ include the equivalent length of each fitting used in accordance with the equivalent pipe lengths shown in Table M1502.6. ~~The maximum length of the exhaust duct does not include the transition duct.~~ The maximum allowable exhaust duct length stated in the clothes dryer’s installation instructions shall be equal to or greater than the posted equivalent length.

~~**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, determination of the equivalent length of clothes dryer exhaust duct for each bend by engineering calculation in accordance with the ASHRAE Fundamentals Handbook shall be permitted.~~

2. Add new table as follows:

TABLE M1502.6
EQUIVALENT LENGTH FOR FITTINGS

DRYER EXHAUST DUCT FITTING	EQUIVALENT LENGTH	
	feet	mm
45 degree, 4 sectioned bend, 4 inch radius	7-1/2	2286
90 degree, 4 sectioned bend, 4 inch radius	15	4572
45 degree, smooth bend, 10 inch radius	1-1/4	381
90 degree, smooth bend, 10 inch radius	2-1/2	762

Reason: Testing on the impact of elbows in a dryer exhaust system was conducted at UL. The testing was sponsored by JB Engineering and Code Consulting, P.C., with financing from In-O-Vate Technologies. A copy of the results from this study have been submitted to the Mechanical Code Change Committee. I have asked In-O-Vate Technologies to make the report available to everyone on their website, www.dryerbox.com. Anyone interested in reviewing the UL report should download the report.

The testing had interesting results that showed the impact of a standard 4 section 4 inch radius elbow was more severe than the code specifies. Placing a 4 section 4 radius inch elbow in the exhaust pipe results in an equivalent pipe length of 15 feet, not 5 feet. When a smooth 10 inch radius elbow was installed, the equivalent length of the elbow was only 2-1/2 feet. The smooth radius was 6 times more efficient than the 4 section 4 inch radius elbow in flow movement through the fitting.

Rather than specify a maximum length, this change would require the equivalent length of the dryer vent to be posted. The dryer vent length would be based on the length of the straight vent pipes and the fittings used in the dryer vent. Since each dryer has a slightly different requirement for vent length, the dryer would have to match up with the posted equivalent dryer length.

When connecting the dryer to the vent, the manufacturer's installation instructions would have to be followed for the dryer vent length.

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

Analysis: What is meant by the term "smooth bend"?

Committee Action: **Disapproved**

Committee Reason: The proposed new table would make 4 inch radius elbows unusable for most home installations with 3 elbows. It would be difficult if not impossible to install the 10 inch radius elbows in conventional wall construction.

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, P.E., JB Engineering and Code Consulting, P.C., representing In-O-Vate Technology, requests Approval as Submitted for Part II.

Commenter's Reason: I proposed both M59 and M60 with the idea of providing an option for regulating the length of a dryer exhaust duct. The code officials in attendance at the Orlando hearings asked that I pursue M60. One of the concerns with this code change was that the posting of the length of the dryer exhaust duct was not clear. However, with the approval of M62-06/07, Part I, the posting on the length is clear. This change will allow the full allowable length of the dryer exhaust duct to be used. Currently, dryer manufacturers are penalized by not allowing the full use of their capabilities when the dryer manufacturer is not known during construction.

Final Action: AS AM AMPC____ D

M61-06/07, Part I
504.6.1 (IFGC [M] 614.6.1); IRC M1502.6

Proposed Change as Submitted:

PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED HERE FOR INFORMATIONAL PURPOSES ONLY.

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

PART I – IMC

Revise as follows:

504.6.1 (IFGC [M] 614.6.1) 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 21/2 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.

PART II – IRC

Revise as follows:

M1502.6 Duct length. The maximum length of a clothes dryer exhaust duct shall not exceed 25 feet (7620 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. 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.
2. Where large-radius 45-degree (0.8 rad) and 90-degree (1.6 rad) bends are installed, determination of the equivalent length of clothes dryer exhaust duct for each bend by engineering calculation in accordance with the ASHRAE Fundamentals Handbook shall be permitted.

Reason: 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 within 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.

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Maytag dryers:	**Amana/ Speed Queen dryers**	**OLDER MODELS**:
65 feet with 0 elbows	44 feet with 0 elbows	**Maytag, 1990**
54 feet with 1 elbow	34 feet with 1 elbows	50 feet with 0 elbows
44 feet with 2 elbows	26 feet with 2 elbows	42 feet with 1 elbow
36 feet with 3 elbows	20 feet with 3 elbows	34 feet with 2 elbows
28 feet with 4 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

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

PART I – IMC
Committee Action: **Disapproved**

Committee Reason: There is no way to control what type of dryer will be connected to the 35 foot exhaust duct. Many older model dryers and some of the newer stackable washer/dryer combination units will not be able to exhaust properly when connected to a 35 foot long exhaust duct.

Assembly Action: **None**

PART II — IRC
Committee Action: **Approved as Submitted**

Committee Reason: The proposed 35 foot exhaust duct length will support all new dryers and most older dryers that are currently installed. The 25 foot length is too restrictive for today's technology. This will provide the designers more flexibility in locating dryers in homes.

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, CBO, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO) requests Approval as Submitted for Part I.

Commenter's Reason: This was approved by the Residential Committee. Everyone agrees that 25-feet is too restrictive for today's technology and equipment of the past. In any case, in the rare occasion where there is a conflict, the manufacturer's installation instructions always prevail.

Final Action: AS AM AMPC____ D

M62-06/07 Part I
504.6.1 (IFGC [M] 614.6.1)

Proposed Change as Submitted:

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

PART I – IMC

Revise as follows:

504.6.1 (IFGC [M] 614.6.1) 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 21/2 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 exception creates a problem when dryers are moved from one location to another. The length of concealed ductwork cannot be verified. Without knowing the developed length of the exhaust duct, a different dryer installed may not work properly and as a result, may possibly cause a fire. If the system is properly identified, the right dryer can be matched to the correct exhaust system.

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

Committee Action: **Approved as Submitted**

Committee Reason: This change is needed to require a warning sign for new occupants that the existing dryers exhaust duct may be of such length that their clothes dryer will not operate properly when connected to the duct.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Michael A. Baker, City of Prescott, AZ, representing Arizona Building Officials, requests Disapproval for Part I.

Commenter's Reason: Labeling the duct length is not needed. From the proponents findings in his previous proposal M 61 all of the dryers indicated can clearly meet the maximum duct distance of 25'. In fact until 2-3 elbows are installed the units will meet the 25' maximum. In addition there is no direction as to what type of sign should be installed, paper, plastic, or metal. What size should the label be 2" x 3", Index card size, 5" x 8"? Or the location where the tag/label should be placed such as near the appliance location, adjoining the duct opening… For these reasons we need to take another look at the proposals text to see if it clearly identifies the proponent's intentions.

Public Comment 2:

Lawrence Brown, CBO, National Association of Home Builders (NAHB), requests Disapproval for Part I.

Commenter's Reason: As noted in the IRC Building-Energy Code Committee's Reason for Disapproval, "The term "observable location" is vague and unenforceable. The homeowner can remove or obscure the labels after the certificate of occupancy is issued." In addition, as to what constitutes a "permanent" label or tag falls under this same concern. This provision would also apply to low-rise residential where the developed length can be accessed just by measuring the length to the termination point. And, on the rough-in inspection is the inspector going to measure the duct length to verify the sign states the exact length? What if the duct is fished after the walls or ceilings have been installed? How will the inspector then verify the accuracy of the sign? If the manufacturer's instructions are followed, and the installer can easily verify the duct length by using the dimensions measured along the wall path, the installation will be in compliance.

Final Action: AS AM AMPC____ D

M62-06/07, Part II
IRC M1502.6

Proposed Change as Submitted:

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

PART II – IRC

Revise as follows:

M1502.6 Duct length. The maximum length of a clothes dryer exhaust duct shall not exceed 25 feet (7620 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. 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.
2. Where large-radius 45-degree (0.8 rad) and 90-degree (1.6 rad) bends are installed, determination of the equivalent length of clothes dryer exhaust duct for each bend by engineering calculation in accordance with the ASHRAE Fundamentals Handbook shall be permitted.

Reason: This exception creates a problem when dryers are moved from one location to another. The length of concealed ductwork cannot be verified. Without knowing the developed length of the exhaust duct, a different dryer installed may not work properly and as a result, may possibly cause a fire. If the system is properly identified, the right dryer can be matched to the correct exhaust system.

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

Committee Action: **Disapproved**

Committee Reason: The term "observable location" is vague and unenforceable. The homeowner can remove or obscure the labels after the certificate of occupancy is issued.

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, CBO, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO) requests Approval as Submitted for Part II.

Commenter's Reason: This was approved as submitted by the Mechanical code committee. When this exception is employed and the exhaust duct is concealed, it is impossible to match the correct dryer to the correct venting system if it is not identified as to its' developed length. What's more important, giving the installation half a chance of working correctly or painting over the sign after it's installed? The term observable location is not vague at all. It does provide flexibility as to its location. The mechanical inspector cannot legislate ignorance, stupidity or bad intent. If someone paints over the sign so be it, they have been informed and that is all the code official is required to do. Besides, signs are not the only way to identify the duct. Tags or bands work just as well.

Final Action: AS AM AMPC____ D

M64-06/07, Part I
505.1; IRC M1503.2

Proposed Change as Submitted:

PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED HERE FOR INFORMATIONAL PURPOSES ONLY.

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

PART I – IMC

Revise as follows:

505.1 Domestic systems. Where domestic range hoods and domestic appliances equipped with downdraft exhaust are located within dwelling units, such hoods and appliances shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls and shall be air tight and equipped with a backdraft damper.

Exceptions:

1. Where installed in accordance with the manufacturer's installation instructions and where mechanical or natural ventilation is otherwise provided in accordance with Chapter 4, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.
2. Ducts for domestic kitchen cooking appliances equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
   2.1. The duct shall be installed under a concrete slab poured on grade.
   2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.
   2.3. The PVC duct shall extend not greater than 1 inch (25 mm) above the indoor concrete floor surface.
   2.4. The PVC duct shall extend not greater than 1 inch (25 mm) above grade outside of the building.
   2.5. The PVC ducts shall be solvent cemented.
   2.6. The PVC ducts and fittings comply with Section 603.8.3.

PART II – IRC

Revise as follows:

M1503.2 Duct material. Single-wall ducts serving range hoods shall be constructed of galvanized steel, stainless steel or copper.

Exception: Ducts for domestic kitchen cooking appliances equipped with down-draft exhaust systems shall be permitted to be constructed of schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:

1. The duct shall be installed under a concrete slab poured on grade; and
2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel; and
3. The PVC duct shall extend not more than 1 inch (25mm) above the indoor concrete floor surface; and
4. The PVC duct shall extend not more than 1 inch (25mm) above grade outside of the building; and
5. The PVC ducts shall be solvent cemented.
6. The PVC ducts and fittings comply with Section M1601.1.2.

Reason: Current text is lacking the appropriate standards PVC duct must conform with. Currently the only standard criterion the IMC provides is the external loading requirements of ASTM D 2412. This application is just as important as plumbing piping if not more so. It is not permissible to mix and match pipe and fittings without the appropriate transition fittings. The IMC currently contains no such criteria.

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

PART I – IMC
Committee Action: **Approved as Submitted**

Committee Reason: This change adds guidance to the section containing requirements for PVC materials and joints for domestic downdraft exhaust systems.

Assembly Action: **None**

PART II — IRC
Committee Action: **Approved as Modified**

Modify the proposal as follows:

M1503.2 Duct material. Single-wall ducts serving range hoods shall be constructed of galvanized steel, stainless steel or copper.

Exception: Ducts for domestic kitchen cooking appliances equipped with down-draft exhaust systems shall be permitted to be constructed of schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:

1. The duct shall be installed under a concrete slab poured on grade; and
2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel; and
3. The PVC duct shall extend not more than 1 inch (25mm) above the indoor concrete floor surface; and

4. The PVC duct shall extend not more than 1 inch (25mm) above grade outside of the building; and
5. The PVC ducts shall be solvent cemented.
6. ~~The PVC ducts and fittings comply with Section M1601.1.2.~~

Committee Reason: The proposal adds fittings to the section to insure the same materials are used for both pipe and fittings. The modification deletes the reference Section M1601.1.2 because that section is for underground air ducts and not appropriate for kitchen exhaust ducts..

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, P.E., JB Engineering and Code Consulting, P.C., representing General Plastics, requests Approval as Modified by this Public Comment for Part I.

Modify proposal as follows:

505.1 Domestic systems. Where domestic range hoods and domestic appliances equipped with downdraft exhaust are located within dwelling units, such hoods and appliances shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls and shall be air tight and equipped with a backdraft damper.

Exceptions:

1. Where installed in accordance with the manufacturer's installation instructions and where mechanical or natural ventilation is otherwise provided in accordance with Chapter 4, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.
2. Ducts for domestic kitchen cooking appliances equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
   2.1. The duct shall be installed under a concrete slab poured on grade.
   2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.
   2.3. The PVC duct shall extend not greater than 1 inch (25 mm) above the indoor concrete floor surface.
   2.4. The PVC duct shall extend not greater than 1 inch (25 mm) above grade outside of the building.
   2.5. The PVC ducts shall be solvent cemented.
   ~~2.6 . The PVC ducts and fittings comply with Section 603.8.3.~~

Commenter's Reason: The ducts for kitchen exhaust are different than the underground ducts. Typically, a kitchen exhaust duct is a greater thickness than an HVAC plastic duct. The IRC Committee recommended deletion of this additional wording in Part II of the code change.

Final Action: AS AM AMPC____ D

M65-06/07, Part I
505.2 (New)

Proposed Change as Submitted:

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

PART I – IMC

Add new text as follows:

505.2 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cfm shall be provided with makeup air at a rate approximately equal to the exhaust air rate. Such make-up air systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system

Reason: Kitchens in homes are becoming larger and larger, resembling commercial kitchen environments with heavy-duty ranges and so forth. Currently there are no specific requirements for make-up air in a residence except for that in Section G2407. That section states in general that exhaust systems must be taken into account but provides no guidelines in doing so. Some hood systems exhaust 1800 cfm and more. That much air being removed can adversely affect the operation of other appliances in the residence. This language would require the

installation of a motorized damper in the duct to prevent air from entering the building when the hood is not in operation. There are many hood systems with high velocity fans. For example; Sirius- 350 –600 cfm; Braun-340-1300 cfm; Allure, 300-1300 cfm, Range Master, 600-1500; Imperial, 660-1330 and so on. The 400-cfm figure is a reasonable threshold to start at. There are many hoods on the market that would fit under this benchmark and would allow for many installations that would NOT require additional makeup air. This proposal would not apply to whole-house fans, the theory being that someone will open windows and doors in order to evacuate the entire building. Although this proposal does not require tempered air, the cooking operations would offset the makeup air temperature especially when the outlet is located behind the range or cooktop. It will be up to the designer to require tempered air. Considering the tightness of the thermal envelope, and the effects of negative pressure on other systems, make-up air should be provided in these higher cfm exhaust systems.

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

Committee Action: **Approved as Submitted**

Committee Reason: The larger kitchen exhaust systems need to have requirements for makeup air to prevent problems with other appliances caused by negative pressure.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Michael A. Baker, City of Prescott, AZ, representing Arizona Building Officials, requests Disapproval.

Commenter's Reason: Large residential homes with large residential kitchens also have large volumes of make up air. Residential kitchens do not necessitate the need for make up air as they are in use for a very small fraction of time that the dwelling is occupied. Even during a party or holiday dinner the kitchen may be in continuous use for a couple of hours. And this is generally not all of the appliances at the same time. Commercial kitchens are predicated on the fact that they will be in continuous operation for the entire time the building is open to the public. Commercial appliances are larger and operate on a much higher heat level than residential appliances causing commercial kitchens to become very warm very quick. For these reasons make up air is introduced to provide for the exhausted air. And even if commercial type appliances are installed in a residential kitchen the frequency of use and the frequency of all appliances used at the same time is very slim. It doesn't make sense to add separate mechanical units to cool residential kitchens when we need to conserve our energy resources.

Final Action: AS AM AMPC____ D

M65-06/07, Part II
IRC M1503.4 (New)

Proposed Change as Submitted:

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

PART II – IRC

Add new text as follows:

M1503.4 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cfm shall be provided with makeup air at a rate approximately equal to the exhaust air rate. Such make-up air systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.

Reason: Kitchens in homes are becoming larger and larger, resembling commercial kitchen environments with heavy-duty ranges and so forth. Currently there are no specific requirements for make-up air in a residence except for that in Section G2407. That section states in general that exhaust systems must be taken into account but provides no guidelines in doing so. Some hood systems exhaust 1800 cfm and more. That much air being removed can adversely affect the operation of other appliances in the residence. This language would require the installation of a motorized damper in the duct to prevent air from entering the building when the hood is not in operation. There are many hood systems with high velocity fans. For example; Sirius- 350 –600 cfm; Braun-340-1300 cfm; Allure, 300-1300 cfm, Range Master, 600-1500; Imperial, 660-1330 and so on. The 400-cfm figure is a reasonable threshold to start at. There are many hoods on the market that would fit under this benchmark and would allow for many installations that would NOT require additional makeup air. This proposal would not apply to whole-house fans, the theory being that someone will open windows and doors in order to evacuate the entire building. Although this proposal does not require tempered air, the cooking operations would offset the makeup air temperature especially when the outlet is located behind the range or cooktop. It will be up to the designer to require tempered air. Considering the tightness of the thermal envelope, and the effects of negative pressure on other systems, make-up air should be provided in these higher cfm exhaust systems.

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

Committee Action: **Approved as Submitted**

Committee Reason: Large homes with high volume kitchen exhaust fans are becoming more prevalent. This code change will insure that adequate makeup air is provided to prevent problems with venting and combustion air related to negative pressure.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Michael A. Baker, City of Prescott, AZ, representing Arizona Building Officials, requests Disapproval for Part II.

Commenter's Reason: Large residential homes with large residential kitchens also have large volumes of make up air. Residential kitchens do not necessitate the need for make up air as they are in use for a very small fraction of time that the dwelling is occupied. Even during a party or holiday dinner the kitchen may be in continuous use for a couple of hours. And this is generally not all of the appliances at the same time. Commercial kitchens are predicated on the fact that they will be in continuous operation for the entire time the building is open to the public. Commercial appliances are larger and operate on a much higher heat level than residential appliances causing commercial kitchens to become very warm very quick. For these reasons make up air is introduced to provide for the exhausted air. And even if commercial type appliances are installed in a residential kitchen the frequency of use and the frequency of all appliances used at the same time is very slim. It doesn't make sense to add separate mechanical units to cool residential kitchens when we need to conserve our energy resources.

Public Comment 2:

Lawrence Brown, CBO, National Association of Home Builders (NAHB), requests Disapproval for Part II.

Commenter's Reason: NO documentation was provided that shows residential range hoods installed per the current provisions are causing a problem, and no documentation to show that the residential cooking equipment would "offset" the temperature difference in the make-up air. As cooking equipment of this type would probably be installed in a very large single family dwelling, no consideration is given to the volume of air within the whole dwelling. The passive methods currently used work fine and should be acceptable. Other problems with this Proposal are: An "Automatic controller" is not defined and would not be a necessity for residential; and the term "Approximately equal" is poor code language and not defined. Also, part of the Proponent's "Reason" goes to the heart for Disapproval. A whole hose fan would certainly exhaust more than 400 cfm. So why not mandate "make-up air for this exhaust fan? It should also be noted that the Declaration of Cost Increase is not accurate this will increase the cost of construction.

Final Action: AS AM AMPC____ D

M68-06/07
506.3.2.5

Proposed Change as Submitted:

Proponent: Maureen Traxler, City of Seattle, WA, representing the Washington Association of Building Officials Technical Code Development Committee

Revise as follows:

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

A light test shall be performed by passing a lamp having a power rating of not less than 100 watts through the entire section of duct work to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls. A test shall be performed for the entire duct system, including the hood-to-duct connection. The ductwork shall be permitted to be tested in sections, provided that every joint is tested.

Reason: The purpose of this proposed code change is to delete a burdensome and unnecessary requirement.

Code officials should be given the discretion to determine whether to be present during grease duct tests. The current language does not regulate installers of grease ducts; it regulates code officials. It mandates that code officials perform a task that many believe is not necessary. Some code officials feel strongly that they want to witness each grease duct test, and the proposed modification allows them to do that. Code officials in other jurisdictions also feel strongly that witnessing each test is not an efficient use of resources, but this code section prohibits them from that making that choice. It is possible to ensure that adequate testing is done by establishing test protocols and requiring test reports. The city of Seattle does not witness grease duct tests, with no apparent negative consequences. The IMC allows other potentially dangerous systems to be installed without the building official witnessing a test, for example hazardous exhaust systems (section 510) and dust collecting systems (section 511).

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

Committee Action: **Approved as Modified**

Modify proposal as follows:

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

A light test shall be performed by passing a lamp having a power rating of not less than 100 watts through the entire section of duct work to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls. A test shall be performed for the entire duct system, including the hood-to-duct connection. The ductwork shall be permitted to be tested in sections, provided that every joint is tested.

Exception: Subject to the approval of the code official, the leakage test need not be performed in the presence of the code official provided that an approved agency submits a report of the results of the test.

Committee Reason: The proposed change, with the modification, will still require the tests to be witnessed, but will allow the code official some flexibility to a accept a report from an approved agency rather than having to observe each test himself.

Assembly Action: **Disapproved**

Individual Consideration Agenda

This item is on the agenda for individual consideration because an assembly action was successful and a Public Comment was submitted.

Public Comment:

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

Commenter's Reason: Two fundamental problems exist with this proposal. First the current IMC Section 107.1.1 already permits the code official to accept reports from approved inspection agencies and requires all the criteria for the inspection reports and the inspection agency. Second the proposed text never requires the grease duct be proven liquid tight. It is only proposing that the code official accept the report. What if the test failed miserably and that's what the report indicated. The proposed text states "provided that an approved agency submits a report of the results of the test". It never requires a successful or satisfactory completion of the test.

In addition, if this proposal is accepted it would be setting up a new format. That is, wherever tests are required throughout the IMC the same text would need to be added. That's not reasonable when Section 107.1.1 already is written to require successful test results prior to approval and it is already applicable to all IMC inspections.

Final Action: AS AM AMPC____ D

M70-06/07

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. Delete and substitute as follows:

~~**506.3.10 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 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 the point at which the duct penetrates a ceiling, wall or floor to the outlet terminal with a classified and labeled material, system, method of construction or product specifically evaluated for such purpose, in accordance with ASTM E 2336. 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 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 a prefabricated grease duct enclosure assembly is protected on all sides from the point at which the duct penetrates a ceiling, wall or floor to the outlet terminal with a classified and labeled prefabricated system specifically evaluated for such purposes in accordance with UL 2221.~~
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 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*. The duct enclosure shall serve a single grease exhaust duct system and shall not contain any other ducts, piping, wiring or systems.

2. Add new text as follows:

506.3.10.1 Grease Duct Protection. Where the surface of the duct is continuously covered on all sides with a grease duct protection system from the point at which the duct penetrates a ceiling, wall or floor to the outlet terminal, such grease duct protection systems shall be a classified and labeled material, system, method of construction, or product specifically evaluated in accordance with ASTM E2336 for such purpose.

Exceptions:

1. Prefabricated grease duct enclosure assemblies, which incorporate protection on all sides from the point at which the duct penetrates a ceiling, wall or floor to the outlet terminal with a classified and labeled prefabricated system specifically evaluated for such purposes in accordance with UL 2221.
2. Ducts enclosed in accordance with the *International Building Code* requirements for shaft construction, provided such duct enclosures are 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 wallboard attached to noncombustible structures shall be not less than 6 inches (152 mm).

506.3.10.2 Grease duct penetrations. 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.

506.3.10.3 Protection of duct wrap systems. Exposed duct wrap systems shall be protected where subject to physical damage.

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

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 new test methods available. This change is not intended to make any technical changes to the existing Code requirements.

During the last cycle, there was 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 Section 506.3.10. In reality, the existing base requirement to use the shaft enclosure provisions in this section should be treated as the Exception, rather than the requirement, given that test methods now exist for testing fire-resistive grease duct enclosure systems specifically. ASTM E2336 is currently an ANSI approved Standard for testing these systems, and is based on the methodology that has been widely used throughout the United States for more than 10 years with thousands of successful in-service installations.

In May 2004 ASTM published a new Standard E2336 entitled "Standard Test Methods For Fire Resistive Grease Duct Enclosure Systems". This Standard closely parallels the requirements of the AC 101 Acceptance Criteria for Grease Duct Enclosure Materials that have been in effect since April 1994 under the auspices of ICBO-ES, and more recently ICC-ES. ASTM E2336 is a performance based test method which evaluates the enclosure materials and the grease duct enclosure systems using the non-combustibility, fire resistance, durability, an internal fire, and fire-engulfment test with a through-penetration fire stop. The test method also prescribes a standardized fire exposure based on ASTM E119. As part of the engulfment test, the grease duct and its' protection system are evaluated in the configuration in which they are used and installed in the field.

Conversely, the existing shaft provision use test results from a wall assembly tested in accordance with ASTM E119 to simulate a four sided or round protected grease duct assembly. While this may be an acceptable solution based on historical information, the Code should utilize test methods that are specifically designed for the application in question as preferred methods to the historical "best-available-fit" approach to testing.

The ASTM Standard has widespread support from the manufacturers of field-applied duct enclosure systems. The majority of the ASTM E2336 standard is based on the Model Building Code Evaluation Service Acceptance Criteria titled AC 101, Acceptance Criteria for Grease Duct Enclosure Materials. In fact, the AC 101 Standard has been the most "nationally recognized standard" for the evaluation of such enclosure materials since its inception. UL 2221 has also been accepted as an alternate test method for prefabricated grease duct enclosure assemblies protected on all sides.

ASTM E2336 is the only ANSI approved, nationally recognized standard for grease duct fire resistive enclosures, and is supported by a decade of testing and product certification from manufacturers of grease duct protection materials and systems.

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

Committee Action: Disapproved

Committee Reason: Nothing technical is being added by this proposal. Some committee members felt that the reorganization resulted in the perception that one method of grease duct protection is favored over the others by the code.

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:

~~**506.3.10 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*. The duct enclosure shall serve a single grease exhaust duct system and shall not contain any other ducts, piping, wiring or systems.~~

~~**2. Add new text as follows:**~~

~~**506.3.10.1 Grease Duct Protection.** Where the surface of the duct is continuously covered on all sides with a grease duct protection system from the point at which the duct penetrates a ceiling, wall or floor to the outlet terminal, such grease duct protection systems shall be a classified and labeled material, system, method of construction, or product specifically evaluated in accordance with ASTM E2336 for such purpose.~~

~~**Exceptions:**~~

1. ~~Prefabricated grease duct enclosure assemblies, which incorporate protection on all sides from the point at which the duct penetrates a ceiling, wall or floor to the outlet terminal with a classified and labeled prefabricated system specifically evaluated for such purposes in accordance with UL 2221.~~
2. ~~Ducts enclosed in accordance with the *International Building Code* requirements for shaft construction, provided such duct enclosures are 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 wallboard attached to noncombustible structures shall be not less than 6 inches (152 mm).~~

~~**506.3.10.2 Grease duct penetrations.** 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.~~

~~**506.3.10.3 Protection of duct wrap systems.** Exposed duct wrap systems shall be protected where subject to physical damage.~~

~~**506.3.10.4. Penetrations of non fire-resistance-rated assemblies.** 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 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 exhaust duct system and shall not contain any other ducts, piping, wiring or systems.

Exception: Listed and labeled factory-built commercial kitchen grease ducts and exhaust equipment installed in accordance with Section 304.1.

506.3.10.1 Penetrations of nonfire-resistance-rated assemblies. A duct enclosure shall not be required for a grease duct that penetrates only a nonfire-resistance-rated roof/ceiling assembly.

506.3.10.2 Grease Duct Enclosures Assemblies. 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 sealed around the duct at the point of penetration and shall be either field applied or prefabricated in accordance with Sections 506.3.10.2.1 through 506.3.10.2.3. 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.

506.3.10.2.1. Commercial kitchen grease ducts. Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be enclosed in accordance with the *International Building Code* requirements for shaft construction, provided such duct enclosures are sealed around the duct at the point of penetration and vented to the outside of the building through the use of weather-protected openings. 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 6 inches (76 mm).

506.3.10.2 2. Field-applied grease duct enclosure assemblies. Field-applied grease duct enclosure assemblies shall consist of commercial kitchen grease ducts constructed in accordance with 506.3.1 that shall be enclosed with 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. 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.

506.3.10.2.3 Prefabricated grease duct enclosure assemblies. Prefabricated grease duct enclosure assemblies shall consist of listed commercial kitchen grease ducts constructed in accordance with Section 506.3.1.1. They 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. Such systems shall be installed in accordance with the listing and the manufacturer's installation instructions.

Commenter's Reason: The purpose of the proposed code change is to clarify the IMC requirements regarding the Grease Duct enclosures and the materials and systems used for grease duct enclosure assemblies. During the last three sets of hearings, 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. Confusion continues to exist around the structure of 506.3.10 in that the approved test methods are contained within the exceptions rather than the body of the requirement. The proper application of the test methods regarding the reduction of clearances also complicates the issue.

The existing structure of the requirements in 506.3.10 adds confusion by not differentiating between the duct construction, the duct enclosure construction, and the duct clearances. It also appears to discriminate against test methods that are specifically designed for the application in question in favor of the existing shaft provision using test results from a wall assembly tested in accordance with ASTM E119 as a historical "best-available-fit" approach to testing. By separating the three approaches for providing protection, this proposal clarifies issues surrounding the when specific clearances are required prescriptively, and differentiates between the duct construction requirements and the duct enclosure construction and performance requirements.

With the development and addition to the IMC of ASTM E 2336 and UL 2221, this section needs to be re-organized for clarification. Both ASTM E2336 and UL2221 are more performance based methods for evaluating grease duct enclosures and grease duct enclosure materials, and should be recognized as such. For example, ASTM E2336 is a performance based test method which evaluates the enclosure materials and the grease duct enclosure systems using the non-combustibility, fire resistance, durability, an internal fire, and fire-engulfment test with a through-penetration fire stop. The test method also prescribes a standardized fire exposure based on ASTM E119. As part of the engulfment test, the grease duct and its' protection system are evaluated in the configuration in which they are used and installed in the field.

Final Action: AS AM AMPC____ D

M74-06/07
506.3.10

Proposed Change as Submitted:

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

Revise as follows:

506.3.10 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 out let 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 out side 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 ~~classified~~ tested and listed 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~~ ~~t~~The surface of the duct ~~is~~ shall be continuously covered on all sides from the point at which the duct originates ~~penetrates a ceiling, wall or floor~~ to the outlet terminal. The duct shall be covered with a ~~classified~~ listed and labeled material, system, product, or method of construction ~~or product~~ 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 classified in accordance with ASTM E814 and having an "F" and "T" rating equal to the fire resistance rating of the assembly being penetrated and where a prefabricated grease duct enclosure assembly is protected on all sides from the point at which the duct penetrates a ceiling, wall or floor to the outlet terminal with a classified~~ The shaft enclosure provisions of this section shall not be required where a listed and labeled prefabricated duct system, specifically evaluated 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.

Reason: Current text is confusing and may be misinterpreted to allow products that are unlisted or not listed for the intended application to be used for this purpose. The proposed revisions clarify the intent of the existing requirements for the user. The one difference is that the current requirements for a shaft shall be provided for duct systems where they originate not where they penetrate. This new language will require that ductwrap systems be installed to the same requirements as a shaft since this is an alternative to a shaft.

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

Committee Action: **Disapproved**

Committee Reason: Deleting the "F" and "T" rating from the second exception will leave nothing to tell the user that the "F" and "T" rating of the system must be at least equal to the assembly being penetrated.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because 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.

Modify proposal as follows:

506.3.10 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 r*equirements 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 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 E 2336. 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 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 a prefabricated grease duct enclosure assembly is protected on all sides from the point at which the duct originates to the outlet terminal with a ~~the shaft enclosure provisions of this section shall not be required where a~~ listed and labeled prefabricated duct system specifically evaluated 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.

Commenter's Reason: The revised proposal improves the existing code requirement by more precisely clarifying the intent of the existing requirements for the user. Current text is could be misinterpreted to allow products that are unlisted or not listed for the intended application to be used for this purpose. Further, referencing the point at which the ducts originate rather than where they penetrate a ceiling, wall, or floor simplifies the use of the Code.

These changes are largely editorial in nature, but do help to clarify the code for the user by using more precise language in applying the existing code requirements. The one additional technical difference is that the protection shall be provided for duct systems starting from where they originate rather than where they penetrate. This new language will require that both UL2221 and ASTM E2336 systems be installed to the same requirements as a shaft since these are alternatives to a shaft. The addition of the reference to the manufacturers' installation instructions gives additional information to code officials so that installation can be done correctly.

Public Comment 2:

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

Modify proposal as follows:

506.3.10 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 out let 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 out side 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 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 E814, having an "F" and "T" rating equal to the fire resistance rating of the assembly being penetrated and ~~The shaft enclosure provisions of this section shall not be required~~ where a listed and labeled prefabricated duct system, ~~specifically evaluated~~ 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.

Commenter's Reason: As stated in the published Report of the Public Hearings, as this change was originally proposed it inadvertently removed a much needed reference to ASTM 814 in the second exception. As you can see the As Modified currently proposed includes this criteria. This proposal removes the outdated term "classified". Products are listed not classified. The newly worded second exception is important. As currently written it appears to require a shaft around prefabricated ductwork listed to UL 2221. It is not the intent to require a shaft installation for this type of listed ductwork. It is written as an exception to a shaft not in addition to a shaft.

Final Action: AS AM AMPC____ D

M75-06/07
506.3.12.3

Proposed Change as Submitted:

Proponent: Cecil F. Hardee, Jr., County of Fairfax, VA, representing the Virginia Plumbing and Mechanical Inspectors Association/Virginia Building and Code Officials Association

Revise as follows:

506.3.12.3 Termination location. Exhaust outlets shall be located not less than 10 feet (3048 mm) horizontally from parts of the same or contiguous buildings, adjacent buildings and adjacent property lines ~~and air intake openings into any building~~ and shall be located not less than10 feet (3048 mm) above the adjoining grade level. Exhaust outlets shall be located not less than 10 feet (3048 mm) horizontally from or not less than 2 feet (607 mm) above air intake openings into any building. Exhaust outlet terminations shall not be directed towards nor impinge on any structure.

Reason: The purpose of this change is to clarify the code for the termination of exhaust systems to contiguous or adjacent buildings. By adding a clearance requirement for contiguous or adjacent buildings it will ensure that adequate clearance above buildings is maintained and is consistent with other sections. Adequate air flow is needed to have an exhaust system operate properly. Not having a requirement only allows for problems. This section's provisions fail to allow the long time proven acceptable arrangement to be 2 feet above intake openings.

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

Committee Action: **Approved as Submitted**

Committee Reason: The change modifies the requirement for exhaust terminations in relationship to air intake openings by adding an allowance for terminations at least 2 feet above the air intake opening. This arrangement has proven effective in the field and was missing from this section.

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, CBO, 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:

506.3.12.3 Termination location. Exhaust outlets shall be located not less than 10 feet (3048 mm) horizontally from parts of the same or contiguous buildings, adjacent buildings and adjacent property lines and shall be located not less than10 feet (3048 mm) above the adjoining grade level. Exhaust outlets shall be located not less than 10 feet (3048 mm) horizontally from or not less than ~~2~~ 3 feet (~~607~~ 914 mm) above air intake openings into any building. ~~Exhaust outlet terminations shall not be directed towards nor impinge on any structure.~~

Commenter's Reason: 3- feet is consistent with NFPA-96 Section 7.8.2 and needs to be maintained especially when the lower velocity of 500 FPM is taken into consideration as opposed to the previous 1500 FPM minimum velocity. The ability to pull contaminants into the building will be greater. The last sentence is redundant language. 506.5.2 already covers impingement and "termination shall not discharge towards any structure" is not qualified by a number. If left in, a fan discharge could not be pointed toward a building 50-feet away.

Public Comment 2:

Lawrence Suggars, South Salt Lake City, representing the Utah Chapter of ICC, requests Disapproval.

Commenter's Reason: M75 addresses the termination of the grease duct for Type 1 hoods. The proponent states that a 2' clearance was a common installation in previous codes. The research I did in my office with earlier codes back to the mid 1960's has the same language as found in both the 2003 & 2006 codes. In addition, I consulted with two local engineers and a long time installer with the logic of the installation as noted with this code change. We all feel that this change should be disapproved. The 2' above an air intake is a long standing practice for the venting of category 1 appliances like furnaces and water heaters.

Final Action: AS AM AMPC____ D

M78-06/07
507.2.2

Proposed Change as Submitted:

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

Revise as follows:

507.2.2. 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.

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 <u>designed for counter top Installation</u>. 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<u>/retherm</u> ovens. The additional heat and moisture loads generated by such appliances shall be accounted for in the design of the HVAC system.

Reason: This is a cleanup because items 3 and 4 are similar in nature. This change removes bread ovens from the list of exceptions to type II hood requirements. The existing item number 3 was added a few years back with the intent to only cover counter mounted equipment. However the committee deleted the language "counter mounted" because of the lack of a clear definition as to what exactly is counter mounted. Designers and installers are abusing this section to promote the installation of large cabinet floor mounted bread ovens without a type II hood. That was never the intent of item number three. The intent is exactly what the new number 4 reflects. You will notice all of the items listed are typically small in size and low heat producing equipment. A five feet tall bread oven is not anywhere near the same application as a toaster or a hot dog cooker.

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

Committee Action: **Disapproved**

Committee Reason: The size of the appliance should not be the issue when considering an installation without a Type II hood. The issue should be to insure that the HVAC system is properly designed to handle the extra latent heat and moisture from the appliance being proposed for installation.

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 Virginia Plumbing and Mechanical Inspectors Association/Virginia Building and Code Officials Association, requests Approval as Submitted.

Commenter's Reason: In the ROH the committee stated that appliance size need not be an issue. We couldn't disagree more; the code must determine when hoods are needed and when they are not. This proposal answers the basic fundamental question, are type II hoods needed or not? The reality of this situation is that the exception is being utilized and the rule is not. If the HVAC system can always be sized to eliminate the Type II hood requirements than the code should say so. It's just not the case, Type II hoods are necessary. Since the inception of the 1996 IMC, Type II hoods have been required for heat, steam, and vapor producing appliances. VA submitted this original code text more than two cycles ago to add the exception number 2. The proposal was and is intended to give some reasonable relief from Type II hood requirements when a small adjustment is preformed on the HVAC calculation for low heat producing appliances. The original proposal included the descriptive term "counter" before the list of appliances to be exempted. Unfortunately the committee removed the term "counter" due to the lack of a definition and now this section is being abused and used as justification for huge heat and steam producing equipment to not require hoods.

The unfortunate reality is HVAC systems are not being adjusted and small food establishments are not being designed to provide suitable employee or customer comfort. Excessive heat, steam, and particulate matter are being recirculated throughout these spaces and creating the potential for an unhealthy condition for anyone who occupies the space.

If this proposal is not approved this entire section needs an overhaul to only require Type II hoods over dishwashers because that is the only appliance that is not being exempted in the industry today.

Final Action: AS AM AMPC____ D

M79-06/07
507.9

Proposed Change as Submitted:

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

Revise as follows:

507.9 Clearances for Type I hood. A Type I hood shall be installed with a clearance to combustibles of not less than 18 inches (457 mm).

Exception: Clearance shall not be required from gypsum <u>wallboard or 1/2-inch or thicker cementitious</u> wallboard attached to noncombustible structures provided that a smooth, cleanable, nonabsorbent and noncombustible material is installed between the hood and the gypsum wallboard over an area extending not less than 18 inches (457 mm) in all directions from the hood.

Reason: As written, this exception does not allow cementitious type wallboard (Durorock) to be utilized in reducing clearances for the hood. Why not? It's a great material for the application and will probably hold up to prolonged heat exposure better than gypsum. This will also provide a little flexibility in the choice of materials.

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

Committee Action: **Disapproved**

Committee Reason: The proposal needs further work to include the cementitious wallboard throughout this section. In the next-to-last line of the proposal, it only mentions gypsum wallboard, but it should also address the cementitious product.

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, CBO, 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:

507.9 Clearances for Type I hood. A Type I hood shall be installed with a clearance to combustibles of not less than 18 inches (457 mm).

Exception: Clearance shall not be required from gypsum wallboard or 1/2-inch or thicker cementitious wallboard attached to noncombustible structures provided that a smooth, cleanable, nonabsorbent and noncombustible material is installed between the hood and the gypsum or cementitious wallboard over an area extending not less than 18 inches (457 mm) in all directions from the hood.

Commenter's Reason: There was support for this change except the last part of the change "or cementitious" was accidentally left out.

Final Action: AS AM AMPC____ D

M87-06/07
602.1

Proposed Change as Submitted:

Proponent: Richard Grace, Fairfax County Government, VA, representing the Virginia Plumbing and Mechanical Inspectors Association

Revise as follows:

602.1 General. Supply, return, exhaust, relief and ventilation air plenums shall be limited to uninhabited crawl spaces, areas above a ceiling or below the floor, attic spaces and ~~mechanical equipment rooms~~ and spaces dedicated to house one or more air handling units. Plenums shall be limited to one fire area. Fuel-fired appliances shall not be installed within a plenum.

Reason: This change will clarify that spaces such as a penthouse, where other non-related equipment and materials may be stored, cannot be utilized as a plenum simply because the penthouse has mechanical equipment installed in the room.

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

Committee Action: **Disapproved**

Committee Reason: The proposed language is overly broad and could be misinterpreted to disallow an electric water heater to be installed in a space used as a plenum for an air handling unit.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Richard Grace, Fairfax County Virginia, representing Virginia Plumbing and Mechanical Inspectors Association (VPMIA), requests Approval as Submitted.

Commenter's Reason: The published committee reason for disapproval action of this proposal was because the language may be misinterpreted to disallow electric water heater installation in a plenum space. Electric water heaters, or any other appliance installation, must comply with current IMC requirements. "301.4 Listed and labeled. Appliances regulated by this code shall be listed and labeled for the application in which they are installed and used, unless otherwise approved in accordance with Section 105." If the electric water heater has been listed and labeled for plenum use, how will this be misinterpreted? The term "mechanical equipment room" invites occupancy and storage of material and equipment not necessarily listed and labeled for plenum use. "Spaces dedicated to house one or more air handling units" promotes and clarifies that this space is part of the air distribution system and must be treated as a plenum space in regards to the appliances, equipment, and materials exposed within this space.

Final Action: AS AM AMPC____ D

M90-06/07
603.2 (New)

Proposed Change as Submitted:

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

Add new text as follows:

603.2 Air duct enclosures. Where ducts are required to be enclosed by the *International Building Code*, such enclosures shall be constructed in accordance with the *International Building Code* for shaft construction.

> **Exception:** 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.

(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.

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.

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.

Analysis: Is the proposed exception for the IMC affecting a requirement in the IBC?

Committee Action: **Disapproved**

Committee Reason: There is no consensus standard available for approval of air duct enclosure systems to support this proposal.

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 required to be enclosed by the *International Building Code*, such enclosures shall be constructed in accordance with the *International Building Code* for shaft construction.

Exception: 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~~ it originates 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.

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. 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. The language in this proposal has been editorially improved to reflect comments received by the Committee at the Orlando hearings.

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.

Final Action: AS AM AMPC____ D

M95-06/07, Part I
603.9

Proposed Change as Submitted:

Proponent: John R. Addario, P.E., New York State Department of State Codes Division

PART I – IMC

Revise as follows:

603.9 Joints, seams and connections. All longitudal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC *Duct Construction Standards- Metal and Flexible* and NAIMA *Fibrous Glass Duct Construction Standards.* All joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants, or tapes. Tapes and mastics used to seal ductwork listed and labeled in accordance with UL 181A shall be marked "181A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. Tapes and mastics used to seal flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181B-FX" for pressure-sensitive tape or "181B-M" for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL181B and shall be marked 181B-C. Unlisted duct tape is not permitted as a sealant on any metal ducts.

Reason: The purpose of this proposal is to clarify the use of the materials that can be used for sealing ducts, specifically metal ducts. UL181 only applies to factory made rigid fibrous ducts and flexible air ducts and connectors. UL181A and B only applies to these types of ducts and does not apply to metal ducts, therefore tapes and mastics meeting these listings are not tested on metal ducts.

The SMACNA HVAC *Duct Construction Standards- Metal and Flexible (referenced in IMC section 603.4)* standard specifically distinguishes between a liquid sealant and mastic. The SMACNA standard also recognizes the use of a liquid sealant as an adequate product for sealing ducts. Liquid sealants are widely available from several different manufacturers and used with some two part systems. Pliable "duct sealants" would be considered either a "Liquid Sealant" or a "Mastic".

SMACNA DCS distinguishes and describes a liquid sealant and mastic as follows:

"**1.7.2 Liquids.** Many manufacturers produce liquid sealants specifically for ducts. They have the consistency of heavy syrup and can be applied either by brush or with a cartridge gun or powered pump. . . "

"**1.7.3 Mastics**. Heavy mastic sealants are more suitable as fillets, in grooves or between flanges. . . "

Several different manufacturer's installation instructions for fire dampers and fire and smoke dampers specifically list approved sealants to be used to seal the duct connection to the fire damper. Most of these installation manuals list up to three different manufacturers of sealants; in some cases all or at least two of the three are considered a "liquid sealant." These types of sealants are used on breakaway joints.

Some duct connections (mostly to serviceable equipment, filter racks, coils, etc.) are preferred to be sealed with RTV type sealant, which provides excellent durability, remains flexible and can be separated in the future if service needs require the removal of the duct or for clearances. Several installation manuals, in fact, recommend this type of duct connection.

The code allows 'gypsum ducts' (on return air) and requires all ducts to be "sealed", but you would be more apt to use what is considered a liquid sealant in this particular application than a mastic.

This proposal would clarify the use of liquid sealants, which would also include aerosol systems, provided they are listed and labeled for the intended application. Specifically adding the text "liquid sealant" and not relying on "Alternate Materials and Methods" will provide uniform enforcement of the code.

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

Committee Action: **Approved as Submitted**

Committee Reason: Liquid sealants have been used successfully in the field for sealing ducts. It is appropriate to add them to the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Charles E. Gerber, County of Henrico, representing the Virginia Plumbing and Mechanical Inspectors Association/Virginia Building and Code Officials Association, requests Disapproval.

Commenter's Reason: In the proponent's justification statement, he refers to these liquid sealants as referred to in SMACNA DCS. Does this mean that all of these liquid sealants have the approval of SMACNA and are on the label? If not, how are we as code enforcers able to tell the difference between which liquid sealants are acceptable? The way this change is written, could we accept wood glue, interior/exterior caulk, plumber's paste/dope or even roofing tar? My common sense says "no", but I can only imagine the arguments and interpretations this would create. The term "liquid sealants" is way too ambiguous and unenforceable to be code language.

Final Action: AS AM AMPC____ D

M95-06/07, Part II
IRC M1601.3.1

Proposed Change as Submitted:

Proponent: John R. Addario, P.E., New York State Department of State Codes Division

PART II – IRC

Revise as follows:

M1601.3.1 Joints and seams. Joints of duct systems shall be made substantially airtight by means of tapes, mastics, <u>liquid sealants,</u> or gasketing or other approved closure systems. Closure systems used with rigid fibrous glass ducts shall comply with UL 181A and shall be marked "181A-P" for pressure-sensitive tape, "181A-M" for mastic or "181 A-H" for heat-sensitive tape. Closure systems used with flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181B-FX" for pressure-sensitive tape or "181B-M" for mastic. Duct connections to flanges of air distribution system equipment or sheet metal fittings shall be mechanically fastened. Crimp joints for round ducts shall have a contact lap of at least 1.5 inches (38 mm) and shall be mechanically fastened by means of at least three sheet metal screws or rivets equally spaced around the joint.

Reason: The purpose of this proposal is to clarify the use of the materials that can be used for sealing ducts, specifically metal ducts. UL181 only applies to factory made rigid fibrous ducts and flexible air ducts and connectors. UL181A and B only applies to these types of ducts and does not apply to metal ducts, therefore tapes and mastics meeting these listings are not tested on metal ducts.

The SMACNA HVAC *Duct Construction Standards- Metal and Flexible (referenced in IMC section 603.4)* standard specifically distinguishes between a liquid sealant and mastic. The SMACNA standard also recognizes the use of a liquid sealant as an adequate product for sealing ducts. Liquid sealants are widely available from several different manufacturers and used with some two part systems. Pliable "duct sealants" would be considered either a "Liquid Sealant" or a "Mastic".

SMACNA DCS distinguishes and describes a liquid sealant and mastic as follows:

"**1.7.2 Liquids.** Many manufacturers produce liquid sealants specifically for ducts. They have the consistency of heavy syrup and can be applied either by brush or with a cartridge gun or powered pump. . . "
"**1.7.3 Mastics**. Heavy mastic sealants are more suitable as fillets, in grooves or between flanges. . . "

Several different manufacturer's installation instructions for fire dampers and fire and smoke dampers specifically list approved sealants to be used to seal the duct connection to the fire damper. Most of these installation manuals list up to three different manufacturers of sealants; in some cases all or at least two of the three are considered a "liquid sealant." These types of sealants are used on breakaway joints.

Some duct connections (mostly to serviceable equipment, filter racks, coils, etc.) are preferred to be sealed with RTV type sealant, which provides excellent durability, remains flexible and can be separated in the future if service needs require the removal of the duct or for clearances. Several installation manuals, in fact, recommend this type of duct connection.

The code allows 'gypsum ducts' (on return air) and requires all ducts to be "sealed", but you would be more apt to use what is considered a liquid sealant in this particular application than a mastic.

This proposal would clarify the use of liquid sealants, which would also include aerosol systems, provided they are listed and labeled for the intended application. Specifically adding the text "liquid sealant" and not relying on "Alternate Materials and Methods" will provide uniform enforcement of the code.

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

Committee Action: **Approved as Submitted**

Committee Reason: This change adds liquid sealants as another method of sealing ducts. This action is consistent with the action taken on M95-06/07, Part I by the IMC committee.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Charles E. Gerber, County of Henrico, representing the Virginia Plumbing and Mechanical Inspectors Association/Virginia Building and Code Officials Association, requests Disapproval for Part II.

Commenter's Reason: In the proponent's justification statement, he refers to these liquid sealants as referred to in SMACNA DCS. Does this mean that all of these liquid sealants have the approval of SMACNA and are on the label? If not, how are we as code enforcers able to tell the difference between which liquid sealants are acceptable? The way this change is written, could we accept wood glue, interior/exterior caulk, plumber's paste/dope or even roofing tar? My common sense says "no", but I can only imagine the arguments and interpretations this would create. The term "liquid sealants" is way too ambiguous and unenforceable to be code language.

Final Action: AS AM AMPC____ D

M98-06/07
202 (New), 603.17.3 (New), Chapter 15

Proposed Change as Submitted:

Proponent: Kevin Gebke, DuctSox Corporation

1. Add new text as follows:

SECTION 202
GENERAL DEFINITIONS

AIR DISPERSION SYSTEM. Any diffuser system designed to, both, convey air within a room, space or area and diffuse air into that space while operating under positive pressure. Systems are commonly constructed of, but not limited to, fabric or plastic film.

603.17.3 Air dispersion systems. Air dispersion systems shall be located 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 in accordance with UL 2518.

2. Add new standard to Chapter 15 as follows:

UL
2518-05 Air Dispersion System Materials

Reason: Recognize and provide requirements for new technology. Current Code provisions do not address this technology. This Code addition would ensure that systems installed and used would meet requirements that set a level of safety. These requirements include testing for surface burning characteristics (flame spread and smoke developed), mold growth, humidity, temperature, and pressure.

These systems in the United States can be traced back to greenhouses where a plastic tube with holes in it was connected to a wall panel fan. This tube with holes helped establish a uniform environment within the greenhouse as compared to the wall fan blowing the air wildly into the building. The concept was simple; use the physical size of the component along with diffusion air velocity to create a uniform room environment.

Most connections, where the Air Dispersion System connects to the supplying air duct, are made at a sidewall. The supplying air duct has done its job; it has conveyed air from the air handling unit to the destination room, space, or area. At this point a sidewall grille or other type of diffuser could be used to diffuse the air into the space. This diffuser would rely on the velocity of the exiting air and its direction to meet requirements of the
space. An Air Dispersion System uses a physical and a velocity means to meet room requirements. The Air Dispersion System would be mounted in place of, for this example, the sidewall grille. The System, by physically being longer, the velocity exiting the system is more uniformly distributed throughout the space.

This technology has been used for over fifty years in the United States, and longer in Europe. The concept, here in the US, originated in the agricultural industry, and through innovative fabric technology and proven performance, has evolved into an attractive means to diffuse air within open ceiling spaces. These applications include food processing (refrigeration), industrial, warehousing, retail, convention centers, offices, athletic, and laboratory environments. Initially, these systems were subjected to ASTM E84. Subsequently, it was recognized that additional requirements were necessary to determine the suitability of the systems in these applications. These requirements were developed through ICBO ES into an acceptance criteria (AC 167), and those requirements have been incorporated into UL 2518.

Bibliography:
UL 2518
ICC ES AC167

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

Analysis: Results of review of the proposed standard will be posted on the ICC website by August 20, 2006.

Note: The following analysis was not in the Code Change Proposal book but was published in the "Errata to the 2006/2007 Proposed Changes to the International Codes and Analysis of Proposed Reference Standards" provided at the code development hearings:

Analysis: Review of proposed new standard indicated that, in the opinion of ICC Staff, the standard did not comply with ICC standards criteria, Section 3.6.2.11.

Committee Action: **Approved as Modified**

Modify proposal as follows:

603.17.3 Air dispersion systems. Air dispersion systems shall be ~~located~~ 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.

Committee Reason: The proposal adds a new technology for air dispersion systems with guidance for proper installation and operation. The modification changed the term "located' to "exposed" to emphasize that the diffuser must be completely exposed to the room and not concealed in the building construction. The modification also deleted the reference to UL 2518 because it was not a consensus standard.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment 1:

Charles Cottrell, North American Insulation Manufacturers Association, requests Disapproval.

Commenter's Reason: The proposal adds a new definition, section and UL standard on regulating the use of air dispersion systems. But the UL standard that was added is not available and is not on the UL list of ANSI approved standards. This proposal should be disapproved until there are material and installation standards that can be used to regulate their use.

Public Comment 2:

Charles Gerber, Henrico County Virginia, representing the Virginia Plumbing and Mechanical Inspectors Association/Virginia Building and Code Officials Association, requests Disapproval.

Commenter's Reason: This technology was approved with the new text wording that says it shall be listed and labeled but fails to say what it shall be listed and labeled too! Can this material be listed as a tent material and then used as a duct system? Actually it could according to the new text, as long as it is listed to something it is ok to serve in lieu of ductwork. The proponents need to get the listing standard, as reflected in the original proposal, within ICC guidelines and bring this back as soon as that is achieved.

Final Action: AS AM AMPC____ D

M100-06/07, Part I
604.4, [EC] 604.7, 604.11; IRC M1601.2.1, M1601.3.1, M1601.3.4

Proposed Change as Submitted:

PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS ON THE CONSENT AGENDA. PART II IS REPRODUCED HERE FOR INFORMATIONAL PURPOSES ONLY.

Proponent: Robert Braun, The Dow Chemical Company, representing the Spray Polyurethane Foam Alliance

PART I – IMC

Revise as follows:

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

Exception: Spray polyurethane foam shall be permitted to be spray-applied to the exterior of ducts in attics and crawl spaces subject to all of the following:

1. The flame–spread index is not greater than 25, and the smoke-developed index is not greater than 450 at the specified installed thickness.
2. The foam plastic is protected in accordance with the ignition barrier requirements of Section 2603.4.1.6 of the *International Building Code*.

604.11 Vapor retarders. Where Ducts used for cooling are externally insulated, the insulation shall be covered with a vapor retarder having a maximum permeance of 0.05 perm [(2.87 ng/(s · m2 · Pa)] or aluminum foil having a minimum thickness of 2 mils (0.051) mm). Insulations having a permenace of 0.05 perm [(2.87 ng/(s · m2 · Pa)] or less shall not be required to be covered. Spray polyurethane foam with a maximum permeance of 3 perm [(1722 ng/(s · m2 Pa)] at the installed thickness shall not be required to be covered. All joints and seams shall be sealed to maintain the continuity of the vapor retarder except where the insulation is spray polyurethane foam or other insulation with joint sealing capability.

PART II – IECC

Revise IMC as follows:

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

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

Reason: Add new material for current provision of the Code. Spray Polyurethane foam is currently not Code recognized for HVAC duct insulation but is currently recognized for attic floor insulation application when protected by an ignition barrier.

Spraying over the attic or crawl space ducts is an addition that will simultaneously produce continuous insulation, improve energy efficiency, and provide air leakage control to the duct system from the duct exterior. Section 719.7 of the 2006 IBC has permitted the use of exposed insulation and covering on pipe and tubing when the flame spread index is not more than 25 and the smoke developed index is not more than 450. The vapor permeability of Spray Polyurethane foam has proven sufficient in numerous applications where it has been successfully sprayed within cavity walls onto exterior wall sheathing and over hidden cavity wall ducts without vapor retarders. The application of Spray Polyurethane foam on ducts will improve energy efficiency and reduce duct air leakage.

Bibliography: IRC Section R314.5.11 permits Spray Polyurethane Foam plastic to be applied to the sill plate and header in crawl spaces and basements. Section 9.25.6.3 of the 1990 National Building Code of Canada and Section A-9.25.4.2.(2) of the 1995 Code recognizes low permeance foam plastic insulation without vapor barrier protection (see attachments)

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

PART I – IMC
Committee Action: **Disapproved**

Committee Reason: There are other ignition barrier requirements in the building code not addressed in the proposal. There were concerns about the permeability of the product when the thickness of the insulation is reduced..

Assembly Action: **None**

PART II — IECC
Committee Action: **Approved as Modified**

Modify the proposal as follows:

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

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

Committee Reason: Spray polyurethane foam is a material that is permitted to be used, but labeling of the material as described is impractical. This proposed text would give direction on how to identify the insulation values for spray polyurethane foam. The modification was made because providing an exception for spray polyurethane foam in the second sentence of Section 604.7 would have the unintended effect of eliminating spray polyurethane from the requirements for R-values completely.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Mason Knowles, Spray Polyurethane Foam Alliance, requests Approval as Modified by this Public Comment for Part I.

Modify proposal as follows:

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

Exception: Spray polyurethane foam shall be permitted to be spray-applied to the exterior of ducts in attics and crawl spaces subject to all of the following:

1. The flame-spread index is not greater than 25, and the smoke-developed index is not greater than 450 at the specified installed thickness.
2. The foam plastic is protected in accordance with the ignition barrier requirements of Section 2603~~.4.1.6~~ of the *International Building Code*.

604.11 Vapor retarders. Where ducts used for cooling are externally insulated, the insulation shall be covered with a vapor retarder having a maximum permeance of 0.05 perm [(2.87 ng/(s · m2 · Pa)] or aluminum foil having a minimum thickness of 2 mils (0.051 mm). Insulation having a permeance of 0.05 perm [(2.87 ng/(s · m2 · Pa)] or less shall not be required to be covered with a vapor retarder. Spray polyurethane foam with a maximum permeance of 3 perm [(1722 ng/(s · m2 Pa)] at the installed thickness shall not be required to be covered with a vapor retarder. All joints and seams shall be sealed to maintain the continuity of the vapor retarder except where the insulation is spray polyurethane foam or other insulation with joint sealing and vapor retarder capability.

Commenter's Reason: Part 1 allowing SPF to be installed to the exterior of ducts in attics and crawl spaces in the IMC code was disapproved because ignition barrier requirements were not properly addressed in the proposed code change and there were concerns about the permeability of the product. After the vote was taken, the proponents of the code change proposal met with opponents of the code change and developed a compromise language to modify the proposal. The modified proposal was approved in the IRC and IECC.

SPFA proposes the modification to part 1 to address the concerns that led to disapproval in the IMC code and asks the code body to vote for the modified code change proposal and vote against disapproval of part 1.

Final Action: AS AM AMPC____ D

M100-06/07, Part III
IRC M1601.2.1, M1601.3.1, M1601.3.4

Proposed Change as Submitted:

Proponent: Robert Braun, The Dow Chemical Company, representing the Spray Polyurethane Foam Alliance

PART III – IRC

Revise as follows:

M1601.2.1 Duct insulation materials. Duct insulation materials shall conform to the following requirements:

1. Duct coverings and linings, including adhesives where used, shall have a flame spread index not higher than 25, and a smoke-developed index not over 50 when tested in accordance with ASTME 84, using the specimen preparation and mounting procedures of ASTME 2231.

   Exception: Spray polyurethane foam shall be permitted to be spray-applied to the exterior of ducts in attics and crawl spaces subject to all of the following:

   1. The flame–spread index is not greater than 25, and the smoke-developed index is not greater than 450 at the specified installed thickness.
   2. The foam plastic is protected in accordance with the ignition barrier requirements of Sections R314.5.3 and R314.5.4.

2. Duct coverings and linings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C 411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C).
3. External duct insulation and factory-insulated flexible ducts shall be legibly printed or identified at intervals not longer than 36 inches (914 mm) with the name of the manufacturer; the thermal resistance *R*-value at the specified installed thickness; and the flame spread and smoke-developed indexes of the composite materials. Spray polyurethane foam manufacturers shall provide the same product information and properties, at the nominal installed thickness, to the customer in writing, at the time of foam application. All duct insulation product *R*-values shall be based on insulation only, excluding air films, vapor retarders or other duct components, and shall be based on tested C-values at 75° F (24° C) mean temperature at the installed thickness, in accordance with recognized industry procedures. The installed thickness of duct insulation used to determine its *R*-value shall be determined as follows:
   3.1. For duct board, duct liner and factory-made rigid ducts not normally subjected to compression, the nominal insulation thickness shall be used.
   3.2. For ductwrap, the installed thickness shall be assumed to be 75 percent (25-percent compression) of nominal thickness.
   3.3. For factory-made flexible air ducts, The installed thickness shall be determined by dividing the difference between the actual outside diameter and nominal inside diameter by two.
   3.4 For Spray polyurethane foam, the aged R-value per inch measured in accordance with recognized industry standards shall be provided to the customer in writing at the time of foam application. In addition, the total R-value for the nominal application thickness shall be provided.

M1601.3.1 Joints and seams. Joints of duct systems shall be made substantially airtight by means of tapes, mastics, gasketing or other approved closure systems. Closure systems used with rigid fibrous glass ducts shall comply with UL 181A and shall be marked "181A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat-sensitive tape. Closure systems used with flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "11B-FX" for pressure-sensitive tape or "181B-M" formastic. Duct connections

to flanges of air distribution system equipment or sheet metal fittings shall be mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C. Crimp joints for round metal ducts shall have a contact lap of at least 11/2 inches (38 mm) and shall be mechanically fastened by means of at least three sheet-metal screws or rivets equally spaced around the joint.

Exception: Spray polyurethane foam shall be permitted to be applied without additional joint seals.

M1601.3.4 Duct insulation. Duct insulation shall be installed in accordance with the following requirements:

1. A vapor retarder having a maximum permeance of 0.05 perm [(2.87 ng/(s m2 Pa)] in accordance with ASTM E 96, or aluminum foil with a minimum thickness of 2 mils (0.05 mm), shall be installed on the exterior of insulation on cooling supply ducts that pass through nonconditioned spaces conducive to condensation except where the insulation is spray polyurethane foam with a maximum water vapor permeance of 3 perm [(1722 ng/(s ▪ m^2 ▪ Pa)] at the installed thickness.
2. Exterior duct systems shall be protected against the elements.
3. Duct coverings shall not penetrate a fireblocked wall or floor.

Reason: Add new material for current provision of the Code. Spray Polyurethane foam is currently not Code recognized for HVAC duct insulation but is currently recognized for attic floor insulation application when protected by an ignition barrier.

Spraying over the attic or crawl space ducts is an addition that will simultaneously produce continuous insulation, improve energy efficiency, and provide air leakage control to the duct system from the duct exterior. Section 719.7 of the 2006 IBC has permitted the use of exposed insulation and covering on pipe and tubing when the flame spread index is not more than 25 and the smoke developed index is not more than 450. The vapor permeability of Spray Polyurethane foam has proven sufficient in numerous applications where it has been successfully sprayed within cavity walls onto exterior wall sheathing and over hidden cavity wall ducts without vapor retarders. The application of Spray Polyurethane foam on ducts will improve energy efficiency and reduce duct air leakage.

Bibliography: IRC Section R314.5.11 permits Spray Polyurethane Foam plastic to be applied to the sill plate and header in crawl spaces and basements. Section 9.25.6.3 of the 1990 National Building Code of Canada and Section A-9.25.4.2.(2) of the 1995 Code recognizes low permeance foam plastic insulation without vapor barrier protection.

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

Committee Action: **Approved as Modified**

Modify proposal as follows:

M1601.2.1 Duct insulation materials. Duct insulation materials shall conform to the following requirements:

1. Duct coverings and linings, including adhesives where used, shall have a flame spread index not higher than25, and a smoke-developed index not over 50 when tested in accordance with ASTM E84, using the specimen preparation and mounting procedures of ASTM E2231.

   Exception: Spray polyurethane foam shall be permitted to be spray applied to the exterior of ducts in attics and crawl spaces subject to all of the following:

   1. The flame–spread index is not greater than 25, and the smoke-developed index is not greater than 450 at the specified installed thickness.
   2. The foam plastic is protected in accordance with the ignition barrier requirements of Sections R314.5.3 and R314.5.4.
   3. The foam plastic complies with the requirements of Section R314.

2. Duct coverings and linings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C 411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C).
3. External duct insulation and factory-insulated flexible ducts shall be legibly printed or identified at intervals not longer than 36 inches (914 mm) with the name of the manufacturer; the thermal resistance *R*-value at the specified installed thickness; and the flame spread and smoke-developed indexes of the composite materials. Spray polyurethane foam manufacturers shall provide the same product information and properties, at the nominal installed thickness, to the customer in writing, at the time of foam application. All duct insulation product *R*-values shall be based on insulation only, excluding air films, vapor retarders or other duct components, and shall be based on tested C-values at 75°F (24°C) mean temperature at the installed thickness, in accordance with recognized industry procedures. The installed thickness of duct insulation used to determine its *R*-value shall be determined as follows:

   3.1. For duct board, duct liner and factory-made rigid ducts not normally subjected to compression, the nominal insulation thickness shall be used.
   3.2. For ductwrap, the installed thickness shall be assumed to be 75 percent (25-percent compression) of nominal thickness.
   3.3. For factory-made flexible air ducts, The installed thickness shall be determined by dividing the difference between the actual outside diameter and nominal inside diameter by two.
   3.4 For Spray polyurethane foam, the aged R-value per inch measured in accordance with recognized industry standards shall be provided to the customer in writing at the time of foam application. In addition, the total R-value for the nominal application thickness shall be provided.

M1601.3.4 Duct insulation. Duct insulation shall be installed in accordance with the following requirements:

1. A vapor retarder having a maximum permeance of 0.05 perm [(2.87 ng/(s m2 Pa)] in accordance with ASTM E 96, or aluminum foil with a minimum thickness of 2 mils (0.05 mm), shall be installed on the exterior of insulation on cooling supply ducts that pass through nonconditioned spaces conducive to condensation except where the insulation is spray polyurethane foam with a maximum water vapor permeance of 3 perm per inch [(1722 ng/(s ▪ m^2 ▪ Pa)] at the installed thickness.
2. Exterior duct systems shall be protected against the elements.
3. Duct coverings shall not penetrate a fireblocked wall or floor.

(Portions of proposal not shown remain unchanged)

Committee Reason: This code change adds another material for insulating ducts in attics and crawl spaces only. It also provides additional sealing of the duct joints due to the density of the foam material. The modification adds a reference to Section R314 for the foam plastic requirements and changes the units in Section M1601.3.4 from "perm" to "perm per inch".

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Charles Cottrell, North American Insulation Manufacturers Association, requests Disapproval for Part III.

Commenter's Reason: This proposal, which adds an exception for using spray polyurethane foam (SPUF) on ducts in crawlspaces and attics, should be disapproved for the following 3 reasons:
1. The proponent did not submit any fire test information showing why the smoke-developed index for this material should be increased from the base requirement of 50 for duct coverings to 450 for SPUF.
2. The proponent did not submit any test information to support increasing the maximum allowable vapor permeability for SPUF from 0.05 perms for duct insulation to 3 perms. This is a factor of 60 and will allow more vapor to penetrate the system.
3. The IMC Committee disapproved part I of this proposal – therefore approving it in the IRC would be inconsistent with the provisions of the IMC.

Final Action: AS AM AMPC____ D

M109-06/07
801.18.4, 801.18.4.1 (New)

Proposed Change as Submitted:

Proponent: Bob Eugene, Underwriters Laboratories Inc.

1. Revise as follows:

801.18.4 Clearances. Chimneys and vents shall have air-space clearance to combustibles in accordance with the International Building Code and the chimney or vent manufacturer's installation instructions.

Exception: Masonry chimneys equipped with a chimney lining system tested and listed ~~for installation in chimneys in contact with combustibles~~ in accordance with UL1777~~, and installed in accordance with the manufacturer's instructions, shall not be required to have clearance between combustible materials and exterior surfaces of the masonry chimney.~~

2. Add new text as follows:

801.18.4.1 Fireblocking. Noncombustible fireblocking shall be provided in accordance with the *International Building Code*.

Reason: Re-formatting this section allows deletion of duplicative words that are included only because 801.18.4 covers both clearances and firestopping. By dividing this into two sections, clarity is added.

Bibliography: IFGC 501.15.4

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

Committee Action: **Approved as Modified**

Modify the proposal as follows:

801.18.4 Clearances. Chimneys and vents shall have air-space clearance to combustibles in accordance with the International Building Code and the chimney or vent manufacturer's installation instructions.

Exception: ~~Masonry chimneys equipped with a chimney lining system tested and listed in accordance with UL1777~~. Existing masonry chimneys without the required air-space clearances shall be permitted to be used if lined or relined with a chimney lining system listed for use in chimneys with reduced clearances in accordance with UL 1777. The chimney clearance shall be not less than permitted by the terms of the chimney liner listing and the manufacturer's instructions.

(Portions of proposal not shown remain unchanged)

Committee Reason: This code change clarifies the code language by separating the clearance requirements from the fireblocking requirements in a separate section and deleting some duplicated language. The modification makes it clear that the reduced clearances achieved by installing the chimney liner must not be less than stated in the listing for the liner and the manufacturer's installation instructions.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Note: The following individuals separately submitted public comments with the same proposed modification. Their separate reason statements are provided below the proposed modification.

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

Jonathan C. Siu, City of Seattle, WA, representing WABO Technical Code Development Committee, requests Approval as Modified by this Public Comment.

Further modify proposal as follows:

801.18.4 Clearances. Chimneys and vents shall have air-space clearance to combustibles in accordance with the International Building Code and the chimney or vent manufacturer's installation instructions.

Exception: ~~Existing~~ Masonry chimneys without the required air-space clearances shall be permitted to be used if lined or relined with a chimney lining system listed for use in chimneys with reduced clearances in accordance with UL 1777. The chimney clearance shall be not less than permitted by the terms of the chimney liner listing and the manufacturer's instructions.

(Portions of proposal not shown remain unchanged)

Commenter's Reason (Eugene and Siu): The word "Existing" is deleted in the exception to be consistent with the committee action on FG46-06/07. UL 1777 is applicable to both new and existing chimneys.

Final Action: AS AM AMPC____ D

M111-06/07
802.7.1 (New)

Proposed Change as Submitted:

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

Add new text as follows:

802.7.1 Horizontal support of vents. Vent systems passing through roofs having a pitch greater than 12 units vertical in 12 units horizontal shall be provided with a minimum of 3 guy wires or other approved fastening devices, spaced in approximately even intervals around the vent and securely attached to the structure. Vent systems in excess of 5 feet of free standing height, measured from the top of the flashing, and passing through flat roofs shall be secured in place with a minimum of 3 guy wires or other approved fastening devices, spaced in

approximately even intervals around the vent and securely attached to the structure. All horizontal supports shall be in accordance with the manufacturer's installation instructions where applicable.

Reason: Venting systems, whether gas or other types of exhaust terminals, are susceptible to wind damage when the vents become too tall through the roof. At a point over 5-feet there will be an exposed joint and unless the vent is secured in place to prevent horizontal movement, the joint could become weakened to the point of failure, causing the pipe to become dislodged or loosened. Many locations are in high wind areas and type B-vent joints will not hold up to the punishment from high or severe winds. Manufacturers such as Metalbestos use the 5-foot free standing height as the point where horizontal supports are required. In the case of a flat roof, a B-vent could quite possibly have to be installed higher than 5-feet to clear an intake, parapet, or other obstruction. In this case, 3 wires or other approved means of bracing would be appropriate. Section 802.7 addresses the hangers for weight, and is generic in nature. This proposal is specifically addressing horizontal movement. It is important that venting systems stay in place during periods of high or severe winds. Instructions are rarely left for inspectors and a code reference would be most helpful in this situation.

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

Committee Action: **Disapproved**

Committee Reason: Section 802.7 already requires vents to be properly supported. This new language is too excessive because it would require all vents over five feet in length to be supported with guy wires, even if they were listed for installation without additional support.

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

Modify the proposal as follows:

802.7.1 Horizontal support of vents. ~~Vent systems passing through roofs having a pitch greater than 12 units vertical in 12 units horizontal shall be provided with a minimum of 3 guy wires or other approved fastening devices, spaced in approximately even intervals around the vent and securely attached to the structure. Vent systems in excess of 5 feet of free standing height, measured from the top of the flashing, and passing through flat roofs shall be secured in place with a minimum of 3 guy wires or other approved fastening devices, spaced in approximately even intervals around the vent and securely attached to the structure. All horizontal supports shall be in accordance with the manufacturer's installation instructions where applicable.~~ Vent systems exceeding 5-feet in height above the roof surface shall be supported to limit horizontal movement In accordance with the manufacturer's instructions or by other approved means.

Commenter's Reason: This is not redundant language as it relates to 802.7. The important factor here is the 5-foot benchmark the manufacturers use to require support for horizontal movement from wind effects. The previous section addresses vertical loads but leaves it up to total interpretation which leads to inconsistent enforcement.

Final Action: AS AM AMPC____ D

M116-06/07
1007.1

Proposed Change as Submitted:

Proponent: David C. Bixby, Gas Appliance Manufacturers Association

Revise as follows:

1007.1 General. All steam and hot water boilers installed above radiation level shall be protected with ~~a~~ an automatic low-water fuel cutoff control. A watertube boiler requiring forced circulation to prevent overheating of the tubes shall have a flow-sensing device installed in lieu of the low-water fuel cutoff control.

Exception: Gas-fired hot water boilers that are listed to ANSI Z21.13 and installed below radiation level shall not be required to have a low-water fuel cutoff or flow-sensing control.

1007.2 Operation. The low-water cutoff shall automatically stop the combustion operation of the ~~appliance~~ boiler when the water level drops below the lowest safe water level as established by the manufacturer. The flow-sensing device, where used in lieu of a low-water cutoff, shall automatically stop the combustion operation of the boiler when the circulating flow is interrupted.

Reason: The purpose for requiring a low water cutoff control or flow sensing device in a hot water boiler is to cut off the fuel supply to the boiler where there is a possibility that a leak in the radiation/piping system could result in a low water situation in the boiler. Where the boiler is installed below the radiation/piping level, the possibility that the boiler would be drained due to a radiation distribution system leak is greatly reduced.

The proposed exception eliminates the need for a low water cutoff control or flow-sensing device on a listed hot water boiler when the boiler is installed below radiation level. ANSI Z21.13 is the standard for gas fired low-pressure steam and hot water boilers and it does not require hot water boilers to be equipped with such a control. Moreover, paragraph 10.3.5 in the 2006 Edition of the National Fuel Gas Code, ANSI Z223.1/NFPA 54, permits hot water boilers to be installed without low water cutoff controls when the boiler is installed below radiation level and therefore is consistent with the above proposed exception. The addition of requiring a flow-sensing device in lieu of a low-water cutoff control is consistent with the ASME Boiler and Pressure Vessel Code, Section IV, *Rules for Construction of Heating Boilers*.

It should be noted that the International Fuel Gas Code refers to the IMC for coverage regarding low-water fuel cutoff devices.

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

Analysis: What is required where radiation elements exist both above and below the boiler?

Committee Action: **Disapproved**

Committee Reason: The term “radiation level” is an undefined term in the code and not widely understood by most inspectors. The high temperature cutoff has been evaluated for use in water and has not been evaluated for use in air. The exemption of low-water cutoff devices is in conflict with the requirements of the ASMECSD-1.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David C. Delaquila, GAMA-An Association of Appliance and Equipment Manufacturers, requests Approval as Submitted.

Commenter’s Reason: GAMA believes this proposal should be approved as submitted and supports the proponent’s original reason for approval.

Final Action: AS AM AMPC____ D

M117-06/07
1007.1

Proposed Change as Submitted:

Proponent: James Ranfone, American Gas Association

Revise as follows:

1007.1 General. All steam and hot water boilers shall be protected with a low-water cutoff control.

Exception. Fuel gas-fired hot water boilers listed to ANSI Z21.13 and installed below the radiation level shall not be required to have low water cutoff controls.

Reason: The proposed revision eliminates the need for a low water cutoff control on a fuel gas fired hot water boiler listed to ANSI Z21.13 when the boiler is installed below the radiation level. ANSI Z21.13 is the standard for gas fired low-pressure steam and hot water boilers and it does not require hot water boilers to be equipped with low-water cutoff controls. Boilers listed to this standard are residential type boilers. The 2006 National Fuel Gas Code, ANSI Z223.1/NFPA 54, in section 10.3.5 permits hot water boilers to be installed without low water cutoff controls when the boiler is installed below the radiation level and therefore is consistent with the above revision.

The purpose for requiring a low water cutoff control in a hot water boiler is to shut down the boiler where there is a possibility that a leak in the radiation/piping system could result in a low water situation in the boiler. Where the boiler is installed below the radiation/piping level the possibility that the boiler would be drained due to a radiation distribution system leak is greatly reduced. Should a leak occur near or at the

boiler level, other boiler safety controls required by ANSI Z21.13, such as the high temperature safety shutoff control would be activated to shut down the boiler. ANSI Z21.13 hot water boilers do not operate at elevated pressures.

The IFGC in section 631 requires fuel gas boilers meet the installation requirements in the IMC. Since the IFGC does not cover low water cutoff controls our proposed IMC revision that for fuel gas hot water boilers is appropriate for the IMC committee to consider.

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

Committee Action: **Disapproved**

Committee Reason: The term "radiation level" is an undefined term in the code and not widely understood by most inspectors. The proponent's reason states that the high temperature safety shutoff control would shut down the boiler if a leak occurs at the boiler, but there was no substantiation that testing had been performed to prove this.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David C. Delaquila, GAMA-An Association of Appliance and Equipment Manufacturers, requests Approval as Submitted.

Commenter's Reason: GAMA believes this proposal should be approved as submitted and supports the proponent's original reason for approval.

Final Action: AS AM AMPC____ D

M127-06/07
1206.2

Proposed Change as Submitted:

Proponent: Edward L. Andrews, II, Andrews Mechanical, Inc., representing himself

Delete without substitution:

~~**1206.2 System drain down.** Hydronic piping systems shall be designed and installed to permit the system to be drained. Where the system drains to the plumbing drainage system, the installation shall conform to the requirements of the *International Plumbing Code*.~~

Reason: It is impractical to do this in a radiant floor and no one follows it anyway. This is way out of line and practice. There's not one radiant company who supplies a product that has a way to do this. There is no safety reason to do this. If people are concerned about freezing then put glycol in the system.

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

Committee Action: **Disapproved**

Committee Reason: The committee preferred the provisions of code change M129-06/07 that adds an exception for not draining underground hydronic systems rather than deleting the provision.

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, P.E., JB Engineering and Code Consulting, P.C., representing himself, requests Approval as Submitted.

Commenter's Reason: It is impossible to drain a radiant floor system as the proponent indicates. There is no need to have a drain down system for a hydronic piping system. We are often faced with running the piping around beams, which would result in trapped sections of pipe. This section requires the trapped sections to have a drain.

Final Action: AS AM AMPC____ D

M128-06/07, Part I
1206.2 (New)

Proposed Change as Submitted:

Proponent: John Certuse, P.E., Industrial Services & Engineering Inc.

PART I – IMC

Add new text as follows:

M1206.12 Freezing. Heating system piping, including discharge and supply piping to radiators, baseboards and hot water heat exchanger coils within air handlers that are located in areas outside of the heated building envelope and in a location susceptible to freezing temperatures, shall be protected from freezing. Such protection shall be by the addition of an industry acceptable antifreeze/glycol solution to the heating system water where possible, the application of heat or the use of a pumping arrangement that will periodically cycle water flow to prevent freezing.

All exposed pipes shall be insulated to retard heat loss. Insulation alone shall not be relied on as the sole means of protecting this piping.

Reason: As a Professional Engineer investigating freeze damage to buildings in Northern Climates, improper installation of heating systems and heating system piping is common due to the poor code direction in these systems.

Unlike plumbing systems that are addressed in the International Plumbing Code, heating system piping is not accounted for regarding this failure.

Cost Impact: Each case is unique. In some the installation modification and/pr antifreeze would increase the cost in some, it would not. For the most part, if this was planned for up front (if it were in the ICC Code), it would not.

Committee Action: **Disapproved**

Committee Reason: The protection methods proposed are too restrictive; there are other methods of freeze protection available and the designer should have the option of choosing one of the other methods.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David C. Delaquila, GAMA-An Association of Appliance and Equipment Manufacturers, requests Approval as Submitted.

Commenter's Reason: GAMA believes this proposal should be approved as submitted and supports the proponent's original reason for approval.

Final Action: AS AM AMPC____ D

M128-06/07, Part II
IRC M2101.11 (New)

Proposed Change as Submitted:

Proponent: John Certuse, P.E., Industrial Services & Engineering Inc.

PART II – IRC

Add new text as follows:

M2101.11 Freezing. Heating system piping, including discharge and supply piping to radiators, baseboards and hot water heat exchanger coils within air handlers that are located in areas outside of the heated building envelope and in a location susceptible to freezing temperatures, shall be protected from freezing. Such protection shall be by the addition of an industry acceptable antifreeze/glycol solution to the heating system water where possible, the application of heat or the use of a pumping arrangement that will periodically cycle water flow to prevent freezing.

All exposed pipes shall be insulated to retard heat loss. Insulation alone shall not be relied on as the sole means of protecting this piping.

Reason: As a Professional Engineer investigating freeze damage to buildings in Northern Climates, improper installation of heating systems and heating system piping is common due to the poor code direction in these systems.

Unlike plumbing systems that are addressed in the International Plumbing Code, heating system piping is not accounted for regarding this failure.

Cost Impact: Each case is unique. In some the installation modification and/pr antifreeze would increase the cost in some, it would not. For the most part, if this was planned for up front (if it were in the ICC Code), it would not.

Committee Action: **Disapproved**

Committee Reason: There are other methods of freeze protection available and the designer should have the option of choosing one of the other methods. The use of the term "industry acceptable" is ambiguous and could be open to interpretation as to which industry deems the anti-freeze to be acceptable.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

David C. Delaquila, GAMA-An Association of Appliance and Equipment Manufacturers, requests Approval as Submitted.

Commenter's Reason: GAMA believes this proposal should be approved as submitted and supports the proponent's original reason for approval.

Final Action: AS AM AMPC____ D

M130-06/07, Part I
1209.5 (New)

Proposed Change as Submitted:

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

PART I – IMC

Add new text as follows:

1209.5 Thermal barrier required. Radiant floor heating systems shall be provided with a thermal barrier in accordance with Sections 1209.5.1 through 1209.5.4

1209.5.1 Slab on grade installation. Radiant piping utilized in slab on grade applications shall be provided with insulating materials installed beneath the piping having a minimum R-value of 5.

1209.5.2 Suspended floor installation, In suspended floor applications, insulation shall be installed in the joist bay cavity serving the heating space above and shall consist of materials having a minimum R-value of 19.

1209.5.3 A Thermal break required. Thermal breaks shall be provided consisting of asphalt expansion joint materials or similar insulating materials at a point where a heated slab meets a stem wall or other conductive slab.

1209.5.4 Thermal barrier material marking. Insulating materials utilized in thermal barriers shall be identified in accordance with Section 102.1.1 of the *International Energy Conservation Code*.

Reason: Many tens of thousands of dollars can be spent on radiant heat systems that do not work properly due to the lack of thermal barriers. There's not much inspectors can do when they see piping lying in the dirt with no insulation beneath it. Radiant systems cannot operate as intended without a thermal barrier.

In the case of a slab on grade application, the ground will require a substantial charging of energy in order to hit a point of equilibrium where the thermal energy starts coming upwards instead of going downwards. Thermal energy flows from hot to cold, always and continuously. It substantially effects the over-all energy requirements and can seriously affect the performance of the system negatively and waste precious resources.

In the case of a suspended floor application, if the insulation is not properly applied, the lower floor (basement) will have a tendency to overheat and the floor that is trying to be heated will be under-heated. Once the system is installed without insulation its' too late and balancing is virtually impossible. The end result is that energy bills are high, comfort levels are low due to the lack of insulation, which in most cases can not be retrofitted to appease the situation. The lack of insulation can drive the operating costs as high as 25% depending upon the application and exposure. The paybacks for the consumer are huge considering the minimal cost of insulating materials such as 1-inch foam, which costs approximately .48/sq. ft. The energy code does not provide guidance in this situation. It is appropriate for this text to be included in this document as this is what is used by installers for the installation.

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

Committee Action: **Disapproved**

Committee Reason: The proposed method of providing a thermal break could violate the manufacturer's installation instructions. The insulation values proposed are probably too high; what was the technical justification for those values? The term "stem wall" is not a defined term in the code.

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, CBO, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO) requests Approval as Modified by this Public Comment for Part I.

Modify proposal as follows:

1209.5 Thermal barrier required. Radiant floor heating systems shall be provided with a thermal barrier in accordance with Sections 1209.5.1, through 1209.5.4

1209.5.1 Slab on grade installation. Radiant piping utilized in slab on grade applications shall be provided with insulating materials installed beneath the piping having a minimum R-value of 5.

1209.5.2 Suspended floor installation. In suspended floor applications, insulation shall be installed in the joist bay cavity serving the heating space above and shall consist of materials having a minimum R-value of ~~19~~ 11.

1209.5.3 Thermal break required. A thermal break shall be provided consisting of asphalt expansion joint materials or similar insulating materials at a point where a heated slab meets a ~~stem wall~~ foundation wall or other conductive slab.

1209.5.4 Thermal barrier material marking. Insulating materials utilized in thermal barriers shall be ~~identified in accordance with Section 102.1.1 of the *International Energy Conservation Code*~~ installed such that the manufacturer's R-value mark is readily observable upon inspection.

Exception: Insulation shall not be required in engineered systems where it can be demonstrated that the insulation will decrease the efficiency or have a negative effect on the installation.

Commenter's Reason: Asserting that installing insulation will violate manufacturers installation instructions is baseless because boiler manufacturers instructions don't dictate distribution systems. They have no idea what's going to be employed. Some manufacturers such as KITEC for example, indicate that insulation is IMPERATIVE in all systems. Tubing manufacturers operating temperatures are not affected by the presence of or lack of insulation, but are a direct result of the boilers operating temperatures. In fact, the opposite case could be made, If the contractor does NOT insulate below the radiant panel, the only way to deliver human comfort is to RAISE the operating temperature of the fluid, thereby exposing the tubing to higher than normal temperatures than would be required had the insulation been in place. The end result is wasted energy and a system that cannot be balanced correctly.

It was felt that R-19 was too restrictive so it was lowered to R-11 in compliance with chapter 11 and the word "stem" had a regional description so it was changed to "foundation". The committee had concerns with referencing the IECC so language was extracted from chapter 11 to cover the intent. Also concerns were brought up about engineered systems that might not need or want insulation for various reasons. The exception addresses this concern for both documents.

Final Action: AS AM AMPC____ D

M130-06/07, Part II
IRC M2103.2 (New)

Proposed Change as Submitted:

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

PART II – IRC

Add new text as follows:

M2103.2 Thermal barrier required. Radiant floor heating systems shall be provided with a thermal barrier in accordance with Sections M2103.2.1 through M2103.2.4

M2103.2.1 Slab on grade installation. Radiant piping utilized in slab on grade applications shall be provided with insulating materials installed beneath the piping having a minimum R-value of 5.

M2103.2.2 Suspended floor installation, In suspended floor applications, insulation shall be installed in the joist bay cavity serving the heating space above and shall consist of materials having a minimum R-value of 19.

M2103.2.3 A Thermal break required. Thermal breaks shall be provided consisting of asphalt expansion joint materials or similar insulating materials at a point where a heated slab meets a stem wall or other conductive slab.

M2103.2.4 Thermal barrier material marking. Insulating materials utilized in thermal barriers shall be identified in accordance with Section 102.1.1 of the *International Energy Conservation Code*.

Reason: Many tens of thousands of dollars can be spent on radiant heat systems that do not work properly due to the lack of thermal barriers. There's not much inspectors can do when they see piping lying in the dirt with no insulation beneath it. Radiant systems cannot operate as intended without a thermal barrier.

In the case of a slab on grade application, the ground will require a substantial charging of energy in order to hit a point of equilibrium where the thermal energy starts coming upwards instead of going downwards. Thermal energy flows from hot to cold, always and continuously. It substantially effects the over-all energy requirements and can seriously affect the performance of the system negatively and waste precious resources.

In the case of a suspended floor application, if the insulation is not properly applied, the lower floor (basement) will have a tendency to overheat and the floor that is trying to be heated will be under-heated. Once the system is installed without insulation its' too late and balancing is virtually impossible. The end result is that energy bills are high, comfort levels are low due to the lack of insulation, which in most cases can not be retrofitted to appease the situation. The lack of insulation can drive the operating costs as high as 25% depending upon the application and exposure. The paybacks for the consumer are huge considering the minimal cost of insulating materials such as 1-inch foam, which costs approximately .48/sq. ft. The energy code does not provide guidance in this situation. It is appropriate for this text to be included in this document as this is what is used by installers for the installation.

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

Committee Action: **Disapproved**

Committee Reason: This proposal will conflict with the manufacturer's installation instructions and the energy requirements of Chapter 11.

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, CBO, Jefferson County, CO, representing the Colorado Association of Plumbing and Mechanical Officials (CAPMO) requests Approval as Modified by this Public Comment for Part II.

Modify proposal as follows:

M2103.2 Thermal barrier required. Radiant floor heating systems shall be provided with a thermal barrier in accordance with Sections M2103.2.1 through M2103.2.34.

M2103.2.1 Slab on grade installation. Radiant piping utilized in slab on grade applications shall be provided with insulating materials installed beneath the piping having a minimum R-value of 5.

M2103.2.2 Suspended floor installation. In suspended floor applications, insulation shall be installed in the joist bay cavity serving the heating space above and shall consist of materials having a minimum R-value of ~~19~~ 11.

M2103.2.3 Thermal break required. A thermal break shall be provided consisting of asphalt expansion joint materials or similar insulating materials at a point where a heated slab meets a ~~stem wall~~ foundation wall or other conductive slab.

M2103.2.4 Thermal barrier material marking. Insulating materials utilized in thermal barriers shall be ~~identified in accordance with Section 102.1.1 of the *International Energy Conservation Code*~~ installed such that the manufacturer's R-value mark is readily observable upon inspection.

Exception: Insulation shall not be required in engineered systems where it can be demonstrated that the insulation will decrease the efficiency or have a negative effect on the installation.

Commenter's Reason: Asserting that installing insulation will violate manufacturers installation instructions is baseless because boiler manufacturers instructions don't dictate distribution systems. They have no idea what's going to be employed. Some manufacturers such as KITEC for example, indicate that insulation is IMPERATIVE in all systems. Tubing manufacturers operating temperatures are not affected by the presence of or lack of insulation, but are a direct result of the boilers operating temperatures. In fact, the opposite case could be made, If the contractor does NOT insulate below the radiant panel, the only way to deliver human comfort is to RAISE the operating temperature of the fluid, thereby exposing the tubing to higher than normal temperatures than would be required had the insulation been in place. The end result is wasted energy and a system that cannot be balanced correctly.

It was felt that R-19 was too restrictive so it was lowered to R-11 in compliance with chapter 11 and the word "stem" had a regional description so it was changed to "foundation". The committee had concerns with referencing the IECC so language was extracted from chapter 11 to cover the intent. Also concerns were brought up about engineered systems that might not need or want insulation for various reasons. The exception addresses this concern for both documents.

Final Action: AS AM AMPC____ D

M132-06/07
Chapter 15

Proposed Change as Submitted:

Proponent: Standards writing organizations as listed below.

Revise standards as follows:

ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. 1791 Tullie Circle, NE Atlanta, GA 30329-2305
Standard reference number	Title
15-2004 ~~2001~~	Safety Standard for Refrigeration Systems
ASHRAE- 2005 ~~2001~~	ASHRAE Fundamentals Handbook –2005 ~~2001~~

ASSE	American Society of Sanitary Engineering 901 Canterbury Road, Suite A Westlake, OH 44145
Standard reference number	Title
1017-2003 ~~1999~~	Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems

ASTM

ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

Standard reference number	Title
A 53/A 53M-05 ~~02~~	Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
A 106/A 106M-04b	Specification for Seamless Carbon Steel Pipe for High-Temperature Service
A 420/A 420M-05 ~~04~~	Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-Temperature Service
B 32-04 ~~03~~	Specification for Solder Metal
C 411-05 ~~97~~	Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation
D 56-05 ~~02a~~	Test Method for Flash Point by Tag Closed Tester
D 1527-99(2005) ~~e01~~	Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80
D 1693-05 ~~01~~	Test Method for Environmental Stress-Cracking of Ethylene Plastics
D 2235-04 ~~01~~	Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings
D 1785-05 ~~04~~	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120
D 2241-05 ~~04a~~	Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series)
D 2282-99(2005) ~~e01~~	Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR)
D 2466-05 ~~02~~	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
D 2467-05 ~~04~~	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D 2513-05 ~~04a~~	Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings
D 2564-04 ~~02~~	Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems
D 2683-04 ~~98~~	Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
D 2846/D 2846M-99e01	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems
D 3278-96(2004)e01	Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus
E 84-05e01 ~~04~~	Test Method for Surface Burning Characteristics of Building Materials
E 119-05a ~~00e~~	Test Methods for Fire Tests of Building Construction and Materials
E 136-04 ~~99e01~~	Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C
E 2231-02e01 ~~02~~	Standard Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess to Surface Burning Characteristics
F 439-05 ~~02e01~~	Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
F 442/F 442M-99(2005)	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)
F 876-05 ~~04~~	Specification for Crosslinked Polyethylene (PEX) Tubing
F 877-05 ~~02ae01~~	Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems
F 1281-05 ~~03~~	Specification for Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe
F 1476-01 ~~95a~~	Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02269-9101

Standard reference number	Title
91-04 ~~99~~	Exhaust Systems for Air Conveying, of Vapors, Gases, Mists, and Noncombustible Particulate Solids
211-~~03~~ 06	Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances

SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc. 4021 Lafayette Center Drive Chantilly, VA 20151-1209
Standard reference number	Title
SMACNA/ANSI (2005) ~~95~~	HVAC Duct Construction Standards-Metal and Flexible (2005)

UL	Underwriters Laboratories, Inc. 333 Pfingsten Road Northbrook, IL 60062
Standard reference number	Title
103-01	Factory-Built Chimneys for Residential Type and Building Heating Appliances-with Revisions through December ~~2003~~ 2005
174-04	Household Electric Storage Tank Water Heaters—with Revisions through ~~October 1999~~ November 2005
181-~~96~~ 05	Factory-Made Air Ducts and Air Connectors~~—with Revisions through May 2003~~
181A- ~~98~~ 2005	Closure Systems for Use with Rigid Air Ducts and Air Connectors ~~-with Revisions through December 1998~~
181B- ~~95~~ 2005	Closure Systems for Use with Flexible Air Ducts and Air Connectors ~~-with Revisions through August 2003~~
207-2001	Refrigerant-Containing Components and Accessories, Nonelectrical—with Revisions through November 2004
268-96	Smoke Detectors for Fire Protective Signaling Systems—with Revision through ~~January 1999~~ October 2003
268A-98	Smoke Detectors for Duct Application—with Revisions through ~~September 2001~~ April 2003
412-2004	Refrigeration Unit Coolers~~-with Revisions through November 2001~~
471-~~1995~~ 2006	Commercial Refrigerators and Freezers—with Revisions through ~~November 2001~~ February 2006
641-95	Type L Low-Temperature Venting Systems— with Revisions through ~~April 1999~~ August 2005
726-95 ~~98~~	Oil-Fired Boiler Assemblies —with Revisions through ~~January 2001~~ February 2006
731-1995	Oil-Fired Unit Heaters with Revisions through February 2006
732-1995	Oil-Fired Storage Tank Water Heaters - with Revisions through ~~January 1999~~ February 2005
834-04	Heating, Water Supply, and Power Boilers-Electric~~-with Revisions through November 1998~~
867-00	Electrostatic Air Cleaners – with Revisions through ~~May~~ February 2004
900-94	Air Filter Units — ~~with Revisions through October 1999~~
1240-2005 ~~1994~~	Electric Commercial Clothes~~-with Revisions through May 2000~~
1820-2004 ~~1997~~	Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics~~-with Revisions through March 1999~~
1887-2004 ~~1996~~	Fire Test of Plastic Sprinkler Pipe and Visible Flame and Smoke Characteristics~~-with Revisions through June 1999~~
1995-2005 ~~1998~~	Heating and Cooling Equipment ~~with Revisions through August 1999~~
2158-1997	~~Outline of Investigation~~ for Electric Clothes Dryer – with Revisions through May 2004

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 IMC 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.

Committee Action: **Approved as Submitted**

Committee Reason: The proposal updates the existing standards referenced in the code.

Assembly Action: **None**

Individual Consideration Agenda

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

Public Comment:

Note: The following individuals separately submitted public comments with the same proposed modification. Their separate reason statements are provided below the proposed modification.

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

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

Modify proposal as follows:

UL
1978 ~~95~~ 05 Grease Ducts

(Portion of proposal not shown remains unchanged)

Commenter's Reason (Crimi): To further modify this proposal by updating to the most current edition of UL1978. No other changes have been made to the "As submitted" proposal.

When this proposed change was submitted, the proponents seem to have omitted to update the reference in Chapter 15 to the most current edition of the UL 1978 standard, which is dated January 2005. The edition currently referenced in the IMC is the 1995 edition. The UL Standards Technical Panel responsible for UL1978 has been fairly active over the past few years in updating this Standard, and this work should be included in the Code change proposal.

Commenter's Reason (Eugene): Through an oversight, UL 1978 was not included in the Standards Writing Organizations proposal to update referenced standards. The most recent designation of ANSI/UL 1978 as an American National Standard (ANSI) occurred on January 4, 2005.

Final Action: AS AM AMPC____ D