IRC — Mechanical

2015 GROUP A PUBLIC COMMENT AGENDA

SEPTEMBER 30 – OCTOBER 5, 2015
LONG BEACH CONVENTION CENTER
LONG BEACH, CA

ICC
INTERNATIONAL CODE COUNCIL®

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RM8-15
M1502.3 (New)

Proposed Change as Submitted

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

2015 International Residential Code

Add new text as follows:

M1502.3 Make-up air for tight construction. Make-up air shall be provided for clothes dryers where the air infiltration rate is known to be less than 0.4 air changes per hour (ACH). Make-up air shall be provided by a duct that communicates with the outdoors, a ventilated crawl space, or a ventilated attic space and such duct shall have a cross sectional area not less than that of a 4 inch round duct. The make-up air duct shall open into the room in which the clothes dryer is located. Make-up air duct inlets shall be provided with a screen having a mesh size not less than ¼ inch and not greater than ½ inch. The make-up air inlet shall be equipped with an air admitting damper that opens during the operation of the clothes dryer.

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

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

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

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

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

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

Cost Impact: Will increase the cost of construction
There will be an increase cost to install a make up air duct.

RM8-15 : M1502.3 (New)-BALLANCO3701

Public Hearing Results

Committee Action: Disapproved

Committee Reason: There are too many variables to apply such a requirement. Kitchen hoods don't need makeup air until they exceed an exhaust rate of 399 cfm. This is too restrictive and would apply to electric dryers.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

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

Modify as Follows:

2015 International Residential Code

M1502.3 Make-up air ~~for tight construction~~. Make-up air shall be provided for clothes dryers ~~where the air infiltration rate is known to be~~ located in rooms or spaces having a volume of less than ~~0.4 air changes per hour (ACH)~~ 15,000 cubic feet. Make-up air shall be provided ~~by a duct~~ through an opening that ~~communicates with the outdoors, a ventilated crawl space, or a ventilated attic space and such duct shall have a cross sectional area~~ is not less than 60 square inches in area and that ~~of a 4 inch round duct. The make-up air~~ communicates directly or through a duct ~~shall open into the room in which the clothes dryer is located. Make-up air duct inlets shall be provided~~ with ~~a screen~~ indoor spaces having a ~~mesh size not less than ¼ inch and not greater than ½ inch. The make-up air inlet shall be equipped~~ volume of 15,000 cubic feet or more, the outdoors or spaces that freely communicate with ~~an air admitting damper that opens during~~ the ~~operation of the clothes dryer~~ outdoors.

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

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

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

outdoors.

RM9-15
M1502.3

Proposed Change as Submitted

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

2015 International Residential Code

Revise as follows:

M1502.3 Duct termination. Exhaust ducts shall terminate on the outside of the building. Exhaust duct terminations shall be in accordance with the dryer manufacturer's installation instructions. If the manufacturer's instructions do not specify a termination location, the exhaust duct shall terminate not less than 3 feet (914 mm) in any direction from openings into buildings. Exhaust duct terminations shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. Exhaust duct penetrations of exterior wall and roof assemblies shall be sealed air-tight to prevent the dryer exhaust from re-entering the building.

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

Cost Impact: Will not increase the cost of construction
This change clarifies the intent of the code.

RM9-15 : M1502.3-BALLANCO4119

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This subject is already covered in the IECC. How does one interpret "air tight"? This is a workmanship issue, not a code issue. All wall and roof penetrations need to be sealed anyway.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

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

Modify as Follows:

2015 International Residential Code

M1502.3 Duct termination. Exhaust ducts shall terminate on the outside of the building. Exhaust duct terminations shall be in accordance with the dryer manufacturer's installation instructions. If the manufacturer's instructions do not specify a termination location, the exhaust duct shall terminate not less than 3 feet (914 mm) in any direction from openings into buildings. Exhaust duct terminations shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. ~~Exhaust duct penetrations of exterior wall and roof assemblies shall be sealed air-tight to prevent the dryer exhaust from re-entering the building.~~

M1502.3.1 Roof Penetrations. Where an exhaust termination penetrates a roof, a flashing shall be installed in accordance with Section R903.2.

M1502.3.2 Penetrations of exterior walls. Where an exhaust termination penetrates an exterior wall, a waterproof seal shall be made on the exterior of the wall by one of t he following methods:

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

Commenter's Reason: What this code change pointed out is that the code is remiss regarding penetrations of mechanical system. In the plumbing section, P2607 provides detailed requirements regarding pipe penetrations of roofs and exterior walls. However, no such section exists in the mechanical section of the code. This is highlighted in Section R905.2.8.4. This section has flashing requirements for plumbing piping systems and chimneys, but ignores duct and exhaust terminations. A proposed change will be submitted next cycle to add the requirements for duct and exhaust penetrations to R905.2.8.4.

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

RM9-15

RM10-15
M1502.3

Proposed Change as Submitted

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

2015 International Residential Code

Revise as follows:

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

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

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

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

Cost Impact: Will increase the cost of construction
The exhaust terminal may cost more.

RM10-15 : M1502.3-BALLANCO4122

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This is a maintenance issue that the homeowners need to address. Approved exhaust terminals will already allow access for cleaning.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

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

Modify as Follows:

2015 International Residential Code

M1502.3 Duct termination. Exhaust ducts shall terminate on the outside of the building. Exhaust duct terminations shall be in accordance with the dryer manufacturer's installation instructions. If the manufacturer's instructions do not specify a termination location, the exhaust duct shall terminate not less than 3 feet (914 mm) in any direction from openings into buildings. Exhaust duct terminations shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. Dryer exhaust ducts that are installed in enclosed wall or ceiling cavities or in attic areas shall have duct terminations ~~shall, by design,~~ that provide access for cleaning the ~~exhaust~~ duct.

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

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

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

RM10-15

RM13-15

M1502.4.2.1 (New)

Proposed Change as Submitted

Proponent : Rick Harpenau, In-O-Vate Technologies, representing In-O-Vate Technologies (rick@dryerbox.com)

2015 International Residential Code

Add new text as follows:

M1502.4.2.1 Exhaust termination pathways. . Dryer exhaust duct terminal pathways that cause a change in direction of air flow between 45 and 90 degrees shall have an area not less than 20 percent larger that the cross sectional area of the exhaust duct served. Dryer exhaust duct terminal pathways that cause a change in direction of air flow greater than 90 degrees shall have an area not less than 30 percent larger than the cross sectional area of the exhaust duct served. Exhaust duct terminal passageways shall maintain throughout an area of not less than 12.5 square inches (8,065 sq mm).

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

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

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

Cost Impact: Will increase the cost of construction
The increase size may result in a higher cost.

RM13-15 : M1502.4.2.1 (New)-HARPENAU4553

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal does not address ells. No one makes a 5 inch ell. The "terminal pathway" sounds like it describes the entire duct system. The code already contains a table for duct fittings. The percentage calculation is complicated.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

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

Modify as Follows:

2015 International Residential Code

~~**M1502.4.2.1 Exhaust termination pathways.** . Dryer exhaust duct terminal pathways that cause a change in direction of air flow between 45 and 90 degrees shall have an area not less than 20 percent larger that the cross sectional area of the exhaust duct served. Dryer exhaust duct terminal pathways that cause a change in direction of air flow greater than 90 degrees shall have an area not less than 30 percent larger than the cross sectional area of the exhaust duct served. Exhaust duct terminal passageways shall maintain throughout an area of not less than 12.5 square inches (8,065 sq mm).~~

M1502.3.1.1 Increase in exhaust termination outlet size. Where the passageway of a dryer exhaust duct terminal changes direction more than 90 degrees, the open area of the outlet of the terminal shall be not less than 15 square inches (9,677 sq mm).

Commenter's Reason: The Committee indicated that this language was too confusing. The modified language coordinates with the new section M1502.3.1. SMACNA lists the K factor for a 90 degree elbow as being 1 and a 130 degree elbow as being 1.2. To equal the pressure loss through the termination, the outlet open area would have to be increased by a factor of 1.2. This results in an open area of 15 square inches. This will result in the equivalent pressure loss through the exhaust termination.

RM13-15

RM14-15

M1503, M1503.1 (New), M1503.2 (New), M1503.2.1 (New), M1503.1, M1503.2, M1505, M1505.1

Proposed Change as Submitted

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

2015 International Residential Code

Revise as follows:

SECTION M1503
~~RANGE HOODS~~ DOMESTIC COOKING EXHAUST EQUIPMENT

Add new text as follows:

M1503.1 General. Domestic cooking exhaust equipment shall comply with the requirements of this section.

M1503.2 Domestic cooking exhaust. Where domestic cooking exhaust equipment is provided it shall comply with one of the following:

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

M1503.2.1 Open top broiler exhaust. Domestic open-top broiler units shall be provided with a metal exhaust hood, having a thickness of not less than 0.0157-inch (0.3950 mm) (No. 28 gage). Such hood shall be installed with a clearance of not less than 1 /4 inch (6.4 mm) between the hood and the underside of combustible material and cabinets. A clearance of not less than 24 inches (610 mm) shall be maintained between the cooking surface and combustible material and cabinets. The hood width shall be not less than the width of the broiler unit and shall extend over the entire unit.

Exception: Broiler units that incorporate an integral exhaust system, and that are listed and labeled for use without an exhaust hood, shall not be required to have an exhaust hood.

Revise as follows:

~~M1503.1~~ M1503.3 ~~General~~ Exhaust discharge. ~~Range hoods~~ Domestic cooking exhaust equipment shall discharge to the outdoors through a duct. The duct ~~serving the hood~~ shall have a smooth interior surface, shall be air tight, shall be equipped with a back-draft damper and shall be independent of all other exhaust systems. Ducts serving ~~range hoods~~ domestic cooking exhause equipment shall not terminate in an attic or crawl space or areas inside the building.

Exception: Where installed in accordance with the manufacturer's instructions, and where mechanical or natural *ventilation* is otherwise provided, *listed* and *labeled* ductless range hoods shall not be required to discharge to the outdoors.

~~M1503.2~~ M1503.4 Duct material. Ducts serving ~~range hoods~~ domestic cooking exhaust equipment 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 is installed under a concrete slab poured on grade.
2. The underfloor trench in which the duct is installed is completely backfilled with sand or gravel.
3. The PVC duct extends not more than 1 inch (25 mm) above the indoor concrete floor surface.
4. The PVC duct extends not more than 1 inch (25 mm) above grade *outside of the building.*
5. The PVC ducts are solvent cemented.

Delete without substitution:

~~SECTIONM1505 OVERHEAD EXHAUST HOODS~~

~~M1505.1 General.~~ ~~Domestic open-top broiler units shall have a metal exhaust hood, having a minimum thickness of 0.0157 inch (0.3950 mm) (No. 28 gage) with $^{1}/_{4}$ inch (6.4 mm) clearance between the hood and the underside of combustible material or cabinets. A clearance of not less than 24 inches (610 mm) shall be maintained between the cooking surface and the combustible material or cabinet. The hood shall be not less than the width of the broiler unit, extend over the entire unit, discharge to the outdoors and be equipped with a backdraft damper or other means to control infiltration/exfiltration when not in operation. Broiler units incorporating an integral exhaust system, and *listed* and *labeled* for use without an exhaust hood, need not have an exhaust hood.~~

Reason: This proposal accomplishes the following:

1. Changes the name of Section M1503 from Range Hoods to Domestic Cooking Exhaust Equipment, which more accurately reflects the duct, makeup air, and exhaust air requirements in the section.
2. Adds a charging paragraph for the Section to M1503.1.
3. Describes the listing standards used to investigate the various types of exhaust equipment in Section M1503.2.
4. Relocates Section M1505.1 for open top broilers to section M1503.2.1.
5. Makes editorial revisions for clarity.

Cost Impact: Will not increase the cost of construction
It is primarily editorial in nature.

Public Hearing Results

Committee Action: **Approved as Modified**

Modification:

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

> **Exception:** Where installed in accordance with the manufacturer's instructions, and where mechanical or natural ventilation is otherwise provided, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.

Committee Reason: Approval is based on the proponent's published reason statements. The proposal is a logical reorganization of text. The modification provides consistency within the proposal regarding terminology.

Assembly Action : **None**

Individual Consideration Agenda

Public Comment 1:

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

Further Modify as Follows:

2015 International Residential Code

M1503.2 Domestic cooking exhaust. Where domestic cooking exhaust equipment is provided it shall comply with one of the following:

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

with UL 923.

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

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

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

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

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

RM14-15

RM17-15
M1503.4

Proposed Change as Submitted

Proponent : Janine Snyder, City of Thornton, Colorado, representing Colorado Association of Plumbing & Mechanical Officials (CAPMO) (Janine.Snyder@cityofthornton.net)

2015 International Residential Code

Delete and substitute as follows:

M1503.4 Makeup air required. ~~Exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (0.19 m^3/s) shall be mechanically or naturally provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with not less than one damper. Each damper shall be a gravity damper or an electrically operated damper that automatically opens when the exhaust system operates. Dampers shall be accessible for inspection, service, repair and replacement without removing permanent construction or any other ducts not connected to the damper being inspected, serviced, repaired or replaced.~~

Exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (0.19 m^3/s) shall be mechanically or naturally provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with not less than one damper. Each damper shall be an electrically operated damper that automatically opens when the exhaust system operates. Dampers shall be accessible for inspection, service, repair and replacement without removing permanent construction or any other ducts not connected to the damper being inspected, serviced, repaired or replaced.

Reason: By practice they just don't work unless installed running downhill in the duct which can create a faulty seal within the duct allowing additional leakage. The whole intent is to have the electronic connection between the hood and damper. Volume dampers are subject to not fully closing when installed in the horizontal run due to wind and interior vs exterior pressure diffentials. Additionally, they can create an unintended opening in the building envelope which is a prohibition in the energy code.

Cost Impact: Will increase the cost of construction
This will slightly increase the cost of construction by returning to practices. However, the energy cost impact of having an opening into a conditioned structure from the exterior mitigates the increased construction cost.

RM17-15 : M1503.4-SNYDER5667

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed text is too restrictive in that it eliminates gravity dampers. An option is needed for both types of dampers, gravity and motorized.

Assembly Motion: **As Submitted**
Online Vote Results: **Failed**
Support: 29.57% (55) Oppose: 70.43% (131)
Assembly Action : **None**

Individual Consideration Agenda

Public Comment 1:

Proponent : Janine Snyder, City of Thornton, Colorado, representing Colorado Association of Plumbing & Mechanical Officials, CAPMO (Janine.Snyder@cityofthornton.net) requests Approve as Submitted.

Commenter's Reason: By practice they just don't work unless installed running downhill in the duct which can create a faulty seal within the duct allowing additional leakage. The whole intent is to have the electronic connection between the hood and damper. Volume dampers are subject to not fully closing when installed in the horizontalrun due to wind and interior vs exterior pressure diffentials. Additionally, they can create an unintended opening in the building envelope which is a prohibition in the energy code.

RM17-15

RM20-15

M1506.3, R303.5, R303.5.1, R303.5.2

Proposed Change as Submitted

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

2015 International Residential Code

Revise as follows:

M1506.3 Exhaust openings. ~~Air exhaust openings shall terminate not less than 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable and nonoperable openings into the building and 10 feet (3048 mm) from mechanical air intakes except where the opening is located 3 feet (914 mm) above the air intake.~~
Openings shall comply with Sections R303.5.2 and R303.6.

R303.5 Opening location. Outdoor intake and exhaust openings shall be located in accordance with Sections R303.5.1 and R303.5.2.

R303.5.1 Intake openings. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) from any hazardous or noxious contaminant source, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks.

For the purpose of this section, the exhaust from *dwelling* unit toilet rooms, bathrooms, kitchens, and ~~kitchens~~ other living space shall not be considered as hazardous or noxious.

~~**Exceptions:**~~

~~1. The 10-foot (3048 mm) separation is not required where the intake opening is located 3 feet (914 mm) or greater below the contaminant source.~~

~~2. Vents and chimneys serving fuel-burning appliances shall be terminated in accordance with the applicable provisions of Chapters 18 and 24.~~

~~3. Clothes dryer exhaust ducts shall be terminated in accordance with Section M1502.3.~~

R303.5.2 Exhaust openings. Exhaust air shall not be directed onto walkways. Air exhaust openings shall terminate not less than 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable and nonoperable openings into the building; and 10 feet (3048 mm) from mechanical air intakes.

Exceptions:

1. The 10-foot (3048 mm) separation between intake and exhaust openings is not required where the intake opening is located 3 feet (914 mm) or greater below the contaminant source.
2. Vents and chimneys serving fuel-burning appliances shall be terminated in accordance with the applicable provisions of Chapters 18 and 24.
3. Clothes dryer exhaust ducts shall be terminated in accordance with Section M1502.3.

4. Where a combined exhaust and intake terminal is used to separate intake air from exhaust air originating in living space other than kitchens, a minimum separation distance between these two openings is not required provided that the exhaust air concentration within the intake air flow does not exceed 10%, as established by the manufacturer of such terminal.

Reason:
Combined exhaust/supply terminations are regularly installed with heating and energy recovery ventilators (H/ERVs). Their use reduces building penetrations, labor, and associated system costs. By reducing the number of penetrations, air leakage can also be reduced, resulting in space conditioning energy savings. Further, the durability of the structure can be improved through reducing entry pathways for bulk water. Combined terminations are regularly approved and installed in single family and multifamily dwelling units across the country, and manufacturer tests have demonstrated that minimum cross-contamination of airflow results from these terminations. There is currently no industry standard by which to test these units, so we have simply proposed that their performance be verified by the manufacturer, as is the practice in other areas of the code (M2002.5, R502.7, R502.8.2, R703.11.1.1, R802.7.2, R905.2.6, R1003.15.1, R1003.15.2, G2405.3, etc.). The 10% cross contamination metric is based on language in ASHRAE 62.1 that limits cross contamination of exhaust and supply streams to 10% for "air with moderate contaminant concentration, mild sensory-irritation intensity, or mildly offensive odors"; a similar exception exists in the IMC, Section 514.4. In both the IMC and ASHRAE 62.1, no standard is cited for determining cross-contamination, presumably because none yet exists. All exceptions were moved to the exhaust openings section because two of the four exceptions address only exhaust openings; the other two exceptions apply to both intake and exhaust openings, so could feasibly be located in either section.

Cost Impact: Will not increase the cost of construction

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

RM20-15 : M1506.3-MOORE4871

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal would allow any two ducts to be combined under Exception # 4.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

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

Modify as Follows:

2015 International Residential Code

R303.5.2 Exhaust openings. Exhaust air shall not be directed onto walkways. Air exhaust openings shall terminate not less than 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable and nonoperable openings into the building; and 10 feet (3048 mm) from mechanical air intakes.

Exceptions:

1. The 10-foot (3048 mm) separation between intake and exhaust openings is not required where the intake opening is located 3 feet (914 mm) or greater below the contaminant source.
2. Vents and chimneys serving fuel-burning appliances shall be terminated in accordance with the applicable provisions of Chapters 18 and 24.
3. Clothes dryer exhaust ducts shall be terminated in accordance with Section M1502.3.
4. Where a factory-built combined exhaust and intake ~~terminal~~ termination is used to separate intake air from exhaust air originating in living space other than kitchens, a minimum separation distance between these two openings is not required provided that the exhaust air concentration within the intake air flow does not exceed 10%, as established by the manufacturer of ~~such terminal~~ the termination.

Commenter's Reason: It is important to note that the only substantive change to these sections is contained in R303.5.2 Exception #4. All other changes are essentially editorial/organizational. The same language in R303.5.2 Exception #4 was recently approved unanimously by the ASHRAE 62.2 committee as addendum h to ASHRAE 62.2-2013. In transferring the language to the IRC, the committee objected to Exception #4 because "the proposal would allow any two ducts to be combined under Exception #4". This was not our intention in submitting the proposal, so it has been corrected to clarify that the combined termination must be factory-built, tested, and verified by the manufacturer that it meets the requirements of this section.

Approval of this proposal will simplify the organization of the IRC, align the IRC with ASHRAE 62.2, *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*, reduce the cost of construction, reduce penetrations of the building envelope, and promote the durability of buildings.

RM20-15

RM24-15

M1507.3, M1507.3.1, M1507.3.2, M1507.3.3, Table M1507.3.3(1), Table M1507.3.3(2), M1507.3.4 (New), Table M1507.4.4, M1507.3.5 (New), M1507.4, Table M1507.4

Proposed Change as Submitted

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

2015 International Residential Code

Revise as follows:

M1507.3 Whole-house mechanical ventilation system. Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through ~~M1507.3.3~~ M1507.3.6.

M1507.3.1 System design. *No change to text.*

M1507.3.2 System controls. *No change to text.*

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at ~~a continuous~~ an average rate of not less than that determined ~~in accordance with~~ by Equation 15-1 or ~~TableM1507.3.3(1)~~ Table M1507.3.3.

$Q_r = (0.01 \times A_{floor}) + [7.5 \times (N_{br} + 1)]$ **(Equation 15-1)**

where:

Q_r = ventilation flow rate, cubic feet per minute (cfm)

A_{floor} = floor area in square feet (ft^2)

N_{br} = number of bedrooms, not less than one

~~Exception: The whole-house mechanical system is permitted to operate intermittently where the system has controls that enable operation for 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).~~

TABLE M1507.3.3 ~~(1)~~
~~CONTINUOUS~~ WHOLE-HOUSE MECHANICAL VENTILATION ~~SYSTEM~~ AIRFLOW RATE ~~REQUIREMENTS~~

DWELLING	NUMBER OF BEDROOMS				

UNIT FLOOR AREA (square feet)	0 – 1	2 – 3	4 – 5	6 – 7	> 7
	Airflow in CFM				
<1,500	30	45	60	75	90
1,501 – 3,000	45	60	75	90	105
3,001 – 4,500	60	75	90	105	120
4,501 – 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

Delete without substitution:

~~**TABLE M1507.3.3(2)**~~
~~**INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a, b]**~~

Portions of table not shown for clarity

~~a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.~~

~~b. Extrapolation beyond the table is prohibited.~~

Add new text as follows:

M1507.3.4 Ventilation quality adjustment The required whole house ventilation rate from Section M1507.3 shall be adjusted by the system coefficient in Table 1507.3.4 based on the system type using Equation 15-2.

$Q_v = Q_r \times C_{system}$ **(Equation 15-2)**

where:

Q_r = ventilation rate in cubic feet per minute from Equation 15-1 or Table 1507.3.3
C_{system} = system coefficient from Table M1507.3.4

TABLE M1507.3.4
SYSTEM COEFFICIENT

SYSTEM TYPE	DISTRIBUTED[a]		NOT DISTRIBUTED[a]	
	MIXED[b]	NOT MIXED[b]	MIXED[b]	NOT MIXED[b]
Balanced[c]	0.75	1.0	1.0	1.25
Not Balanced[c]	1.0	1.25	1.25	1.5

a. "Distributed" shall apply where outdoor ventilation air is supplied directly to each bedroom and the largest common area; otherwise "not distributed" shall apply.

b. " Mixed" shall apply where not less than 70% of the whole building air volume is recirculated each hour by one or more mechanical systems, otherwise "not mixed" shall apply. Where a central heating or cooling air handler fan is used to provide the mixing, the design heating or cooling airflow rate shall be used to determine the operation time setting required.

c. "Balanced" shall apply where two or more fans simultaneously supply outdoor air and exhaust air at approximately the same rate; otherwise "not balanced" shall apply. Where outdoor air is supplied by a central forced air system, "balanced" shall apply only where the fan for such system operates simultaneously with the exhaust fan(s) .

M1507.3.5 Intermittent operation Systems controlled to operate intermittently shall operate for not less thant one hour in each four hour period. The ventilation rate provided by systems controlled to operate intermittently shall be computed as the average ventilaton provided including both times of operation and non-operation.

Revise as follows:

~~**M1507.4**~~ **M1507.3.6 Local exhaust rates.** Local exhaust systems shall ~~be designed to~~ have the capacity to exhaust the minimum air flow rate ~~determined~~ in accordance with Table ~~M1507.4~~ M1507.3.6. Fans required by this section shall be provided with controls that enable manual override, such as an on and off switch. Fan controls shall be provided with ready access from the room served by the fan.

~~TABLE M1507.4~~ TABLE M1507.3.6
MINIMUM ~~REQUIRED~~ LOCAL EXHAUST RATES ~~FOR ONE- AND TWO-FAMILY DWELLINGS~~

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens	100 cfm ~~intermittent or 25 cfm continuous~~
Bathrooms-Toilet Rooms	~~Mechanical exhaust capacity of~~ 50 cfm ~~intermittent or 20 cfm~~

	~~continuous~~

Reason: This proposed change adds the equation to compute minimum ventilation rates, adjusts airflow rates based on the effectiveness of the ventilation system type, more clearly states that the occupants shall have controls to adjust the ventilation, and makes several changes to clarify the ventilation section.
The equation on which Table M1507.3.3 is based is added explicitly as Equation 15-1. The equation is an alternative to the ventilation rates in Table M1507.3.3. The rate computed by Equation 15-1 is often lower than the table because the rates in the table have been rounded up to the largest floor area and highest number of bedrooms for each cell in the table.

Some types of ventilation work better than others. The proposal adds a ventilation quality adjustment (new M1507.3.4) based on the type of ventilation system.

This change improves on the code language; for example, although Section M1507.3.3 says the requirement is for a continuous rate, it is clear the section also allows intermittent ventilation. Unneeded words are eliminated. For example the existing Table M1507.3.3(2) and the discussion on "intermittent" in the exception is a long-winded ways of saying rates that are averaged over 4 hour periods also work.

This change makes it clear that occupants can control kitchen and bath fans, allowing them to increase the ventilation when needed. For example, increasing the ventilation if food is burned in the kitchen, or odors in the bathroom suggest higher levels of ventilation.

Some argue ventilation rates need to be substantially increased, but they do not provide evidence that existing rates are inadequate. The existing ventilation rates in the IRC have been used in many programs over the past two decades: Environments for Living program, Engineered for Life program, Energy and Environmental Building Association (EEBA) building recommendations, DOE Building America program experience, Canada's R-2000 program and Canada's Energy Star program.

Excess ventilation causes problems. Excess ventilation causes part load humidity problems in humid climates, which can lead to mold. Excess ventilation causes buildings to get overly dry during the winter leading to problems with wood finishes and furniture. Excess ventilation can cause discomfort to occupants leading to the installation of humidifiers which can be sources of indoor pollutants, leading the occupants to turn off the ventilation system which defeats the purpose of providing ventilation. Finally excessive ventilation leads to big energy costs.

Cost Impact: Will not increase the cost of construction
Overall costs should not increase. The required ventilation airflow rates are based on the same equation as the existing code. Ventilation rates required by the Equation 15-1 option are the same or slightly less than in the existing Table M1507.3.3(1). There will be some increases or decreases in cost depending on the system type, with the code change encouraging the use of the more effective systems. Some options, such as providing ventilation air through a central forced air system, are an inexpensive way to provide ventilation that is both "distributed" and "mixed". Most builders are already using the larger fans in Table M1507.3.6. Operating costs should go down due to encouraging the use of more effective ventilation system types and letting the occupant control ventilation to use it when most needed.

RM24-15 : M1507.3-CONNER5337

Public Hearing Results

Committee Action: Approved as Modified

Modification:

M1507.3.4 Ventilation quality adjustment. The required whole house ventilation rate from Section M1507.3.3 shall be adjusted by the system coefficient in Table 1507.3.4 based on the system type using Equation 15-2.

$Q_v = Q_r \times C_{system}$ (Equation 15-2)

where:

Q_r = ventilation rate in cubic feet per minute from Equation 15-1 or Table 1507.3.3

C_{system} = system coefficient from Table 1507.3.4

Committee Reason: Approval is based on the proponent's published reason statements. The modification adds the option for the table calculation.

Assembly Action : None

Individual Consideration Agenda

Public Comment 2:

Proponent : Craig Drumheller, representing National Association of Home Builders (CDrumheller@nahb.org); Craig Conner, representing self (craig.conner@mac.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Residential Code

TABLE M1507.3.4

SYSTEM TYPE	DISTRIBUTED[a]		NOT DISTRIBUTED[a]	
	~~MIXED~~[b]	~~NOT MIXED~~[b]	~~MIXED~~[b]	~~NOT MIXED~~[b]
Mixed[b] or Balanced[c]	0.75	~~1.0~~	1.0	~~1.25~~
Not Mixed[b] and Not Balanced[c]	1.0	~~1.25~~	1.25	~~1.5~~

a. "Distributed" shall apply where ~~outdoor~~ a ducted system serving heating, cooling or ventilation equipment supplies air ~~is supplied~~ directly to each bedroom and the largest common area; otherwise "not distributed" shall apply.

b. " Mixed" shall apply where not less than 70% of the whole building air volume is recirculated each hour by one or more mechanical systems, otherwise "not mixed" shall apply. Where a central heating or cooling air

handler fan is used to provide the mixing, the design heating or cooling airflow rate shall be used to determine the operation time setting required.
c. "Balanced" shall apply where two or more fans simultaneously supply outdoor air and exhaust air at approximately the same rate; otherwise "not balanced" shall apply. Where outdoor air is supplied by a central forced air system, "balanced" shall apply only where the fan for such system operates simultaneously with the exhaust fan(s) .

Commenter's Reason: The original proposal adds a ventilation quality adjustment factor to the whole-house mechanical ventilation system rates based on the effectiveness of the listed ventilation systems. Based on how homes are currently constructed, this proposal drastically increases the amount of ventilation required for most homes- this contradicts the original reason statement from the proponent. Very few homes have balanced ventilation, according to the Home Innovation Builder Practices Survey- only 7% of the homes built in 2014 used balanced ventilation with HRVs or ERVs. As originally proposed, a balanced system is necessary to reduce the required ventilation rate.
This leaves 93% of homes that will either have the same or an increased ventilation rate. In order to maintain the same rate as currently required without using a balanced system two conditions must apply, 1) there must be a supply ventilation system that brings air directly into the house and 2) a central fan is required that will recirculate 70% of the air on an hourly basis. In order to achieve the 70% re-circulation in a 2,400 square foot house, a central fan will need to run continually at 224 cfm. Neither one of these system types are common. All other systems will require a 25-50% increase in flow.
The proposed change provides a simpler table that still provides incentives for the more effective ventilation strategies and deterrents for less effective systems without penalizing typical ventilation systems that are currently acceptable in the majority of homes.

Changes include:

- Homes with forced air systems shall be considered "Distributed"
- "Mixed" and "Balanced" systems shall both get the same consideration.

Homes without a central type forced air system, balanced ventilation or other re-circulation control will have a higher ventilation rate, but as a whole, the ventilation rates should remain the same for most homes with forced air HVAC systems. If additional ventilation strategies are installed, the ventilation rate can be decreased while providing a similar indoor air quality.

Public Comment 3:

Proponent : Alisa McMahon, representing self (mcmahon.gbac@cox.net) requests Approve as Modified by this Public Comment.

Replace Proposal as Follows:

2015 International Residential Code

M1507.3 Whole-house mechanical ventilation system. Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through ~~M1507.3.6~~ M1507.3.5.

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate of not less than that determined in accordance with Equation 15-1 or Table ~~M1507.3.3(1)~~ M1507.3.3.

Exception: The whole-house mechanical ventilation system is permitted to operate intermittently where the system complies with Section M1507.3.5~~has controls that enable operation for 25-percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).one~~.

$Q_r = (0.01 \times A_{floor}) + [7.5 \times (N_{br} + 1)]$ (Equation 15-1)

where:

Q_r = continuous ventilation flow rate, cubic feet per minute (cfm)

A_{floor} = floor area in square feet (ft^2)

N_{br} = number of bedrooms, not less than

TABLE M1507.3.3
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION FLOW RATE

DWELLING UNIT FLOOR AREA (square feet)	**NUMBER OF BEDROOMS**				
	1	**2**	**3**	**4**	**5**
	Airflow in CFM				
<500	20	28	35	43	50
501-1,000	25	33	40	48	55
1,001-1,500	30	38	45	53	60
1,501-2,000	35	43	50	58	65
2,001-2,500	40	48	55	63	70
2,501-3,000	45	53	60	68	75
3,001-3,500	50	58	65	73	80

3,501-4,000	55	63	70	78	85
4,001-4,500	60	68	75	83	90
4,501-5,000	65	73	80	88	95

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

~~**M1507.3.3**~~
~~**CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS**~~

~~**DWELLING UNIT FLOOR AREA (square feet)**~~	~~**NUMBER OF BEDROOMS**~~				
	~~**0 – 1**~~	~~**2 – 3**~~	~~**4 – 5**~~	~~**6 – 7**~~	~~**> 7**~~
	~~**Airflow in CFM**~~				
~~–~~	~~30~~	~~45~~	~~60~~	~~75~~	~~90~~
~~1,501 – 3,000~~	~~45~~	~~60~~	~~75~~	~~90~~	~~105~~
~~3,001 – 4,500~~	~~60~~	~~75~~	~~90~~	~~105~~	~~120~~
~~4,501 – 6,000~~	~~75~~	~~90~~	~~105~~	~~120~~	~~135~~
~~6,001 – 7,500~~	~~90~~	~~105~~	~~120~~	~~135~~	~~150~~
~~> 7,500~~	~~105~~	~~120~~	~~135~~	~~150~~	~~165~~

~~For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.~~

M1507.3.4 Ventilation quality adjustment The required whole house ventilation rate from Section M1507.3.3 shall be adjusted by the system coefficient in Table 1507.3.4 based on the system type using Equation 15-2.

$Q_v = Q_r \times C_{system}$ (Equation 15-2)

where:

Q_v = quality-adjusted ventilation flow rate, cubic feet per minute (cfm)
Q_r = continous ventilation flow rate in cubic feet per minute from Equation 15-1 or Table 1507.3.3
C_{system} = system coefficient from Table 1507.3.4

TABLE M1507.3.4
SYSTEM COEFFICIENT

SYSTEM TYPE	DISTRIBUTED[a]		NOT DISTRBUTED[a]	
	MIXED[b]	NOT MIXED[b]	MIXED[b]	NOT MIXED[b]
Balanced[c]	0.75	1.0	1.0	1.25
Not Balanced[c]	1.0	1.25	1.25	1.5

a. "Distributed" shall apply where outdoor ventilation air is supplied directly to each bedroom and the largest common area; otherwise "not distributed" shall apply.
b. "Mixed" shall apply where not less than 70% of the whole building air volume is recirculated each hour by one or more mechanical systems; otherwise "not mixed" shall apply. Where a central heating or cooling air handler fan is used to provide the mixing, the design heating or cooling airflow rate shall be used to determine the operation time setting required.
c. "Balanced" shall apply where two or more fans simultaneously supply outdoor air and exhaust air at approximately the same rate; otherwise "not balanced" shall apply. Where outdoor air is supplied by a central forced air system, "balanced" shall apply only where the fan for such system operates simultaneously with the exhaust fan(s).

M1507.3.5 Intermittent Operation. The whole-house mechanical ventilation system is permitted to operate intermittently where the system is controlled to operate for not less than 25-percent of each 4-hour segment. The intermittent ventilation rate shall be the quality-adjusted ventilation flow rate prescribed in Section M1507.3.4 multiplied by the factor determined in accordance with Table M1507.3.5.

TABLE ~~M1507.3.3~~ M1507.3.5
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a, b]

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor[a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.

b. Extrapolation beyond the table is prohibited.

M1507.4 Local exhaust rates. Local exhaust systems shall ~~be designed to~~ have the capacity to exhaust the minimum air flow rate ~~determined~~ in accordance with Table M1507.4.

TABLE M1507.4
MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens	100 cfm ~~intermittent or 25 cfm continuous~~
Bathrooms-Toilet Rooms	~~Mechanical exhaust capacity of~~ 50 cfm ~~intermittent or 20 cfm continuous~~

Commenter's Reason: Note: Text changes are shown in relation to original code. However, "Commenter's Reasons" address the differences between "RM 24-15 as modified by committee" and commenter's proposed replacement.

1. TABLE M1507.3.3 in "RM 24-15 as modified by committee" is identical to TABLE M1507.3.3(1) in the original code. Problems with the table include:

Increments are too large (1500 square feet & 2 bedrooms).

Airflows are calculated using the maximum floor area and largest number of bedrooms in each range.

Both conditions result in higher ventilation air requirements than those calculated with Equation 15-1.

Commenter's proposed TABLE M1507.3.3:

Increments are reduced to 500 square feet and 1 bedroom.

This modification yields results more similar to Equation 15-1 and overall lower ventilation air requirements.

Equation 15-1 can be used for buildings over 5,000 square feet and/or with more than 5 bedrooms.

Examples:

Please see dashed line boxes in the tables below. In the original TABLE M1507.3.3(1), the ventilation air requirement is 90 CFM for buildings from 3,001 to 4,500 square feet with four to five bedrooms. In the commenter's proposed TABLE M1507.3.3, the ventilation air requirement for the same buildings ranges from 73 CFM to 90 CFM.

In a 3001 sq ft / 4 bedroom home, the required ventilation air requirement (CFM) is:

original code Table M1507.3.3(1)	90
proposed Table M1507.3.3	73
Equation 15-1	68

In a 3500 sq ft / 4 bedroom home, the required ventilation air requirement (CFM) is:

original code Table M1507.3.3(1)	90
proposed Table M1507.3.3	73
Equation 15-1	73

[insert image 1 here]

In a 4500 sq ft / 5 bedroom home, the required CFM is:

original code Table M1507.3.3(1)	90
proposed Table M1507.3.3	90
Equation 15-1	90

[insert image 2 here]

2. Commenter added a definition of Q_V in Section M1507.3.4 (not defined in "RM 24-15 as modified by committee").

3. Cost – Mixing and distribution are good. However, the "ventilation quality adjustment" will likely encourage central forced air integrated ventilation systems. Such systems are inexpensive to install, but very expensive to operate in all climate zones. (See operating cost data and comparison in LBNL-40378.) Neither version of this code proposal ("as modified by committee" or commenter's) includes requirements to mitigate the high operating costs and energy consumption associated with central forced air integrated ventilation systems. One example of such a measure would be ECM motors in air handler fans.

4. Intermittent Operation – Commenter's Proposed Section M1507.3.5 is essentially the original code M1507.3.3 Exception modified to include the quality-adjusted ventilation rate. Commenter's proposed TABLE M1507.3.5 is identical to TABLE M1507.3.3(2) in the original code.

The Table is a relatively foolproof approach to intermittent ventilation rate calculation. Conversely, section M1507.3.5 in "RM 24-15 as modified by committee" is not clear: "The ventilation rate provided by systems controlled to operate intermittently shall be computed as the average ventilaton [sic] provided including both times of operation and non-operation."

5.

Bibliography: The airflow requirements in proposed TABLE M1507.3.3 are calculated in accordance with ASHRAE 62.2-2010. However, the increments (500 square feet and 1 bedroom) follow ASHRAE 62.2-2013 (TABLE 4.1a). As in ASHRAE 62.2-2013 (TABLE 4.1a), proposed TABLE M1507.3.3 tops out at 5,000 square feet and 5 bedrooms.

ASHRAE 62.2-2010 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

ASHRAE 62.2-2013 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

LBNL-40378 – Recommended Ventilation Strategies For Energy-Efficient Production Homes – Energy Analysis Department, Environmental Energy Technologies Division,

Public Comment 4:

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

Modify as Follows:

2015 International Residential Code

M1507.3 Whole-house mechanical ventilation system. Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through ~~M1507.3.6~~ M1507.3.3.

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall be installed to provide outdoor air continuously at ~~an average~~ a rate ~~of not less~~ greater than or equal to that determined by Equation 15-1 or~~–~~ , alternatively, Table M1507.3.3.

$Q_r = (0.01 \times A_{floor}) + [7.5 \times (N_{br} + 1)]$ **(Equation 15-1)**

where:

Q_r = ventilation flow rate, cubic feet per minute (cfm)

A_{floor} = floor area in square feet (ft^2)

N_{br} = number of bedrooms, not less than one

> **Exception:** The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than one hour in each four hour period. The average ventilation rate provided by the system over each 4 hour period shall be greater than or equal to the rate calculated in accordance with this Section.

TABLE M1507.3.3
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION AIRFLOW RATE

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

~~M1507.3.6~~ M1507.4 Local exhaust rates. Local exhaust systems shall have the capacity to exhaust the minimum air flow rate in accordance with Table ~~M1507.3.6~~ M1507.4. Fans required by this section shall be provided with controls that enable manual override, such as an on and off switch. Fan controls shall be provided with ready access from the room served by the fan.

TABLE ~~M1507.3.6~~ M1507.4
MINIMUM LOCAL EXHAUST RATES

~~**M1507.3.4 Ventilation quality adjustment** The required whole house ventilation rate from Section M1507.3.3 shall be adjusted by the system coefficient in Table 1507.3.4 based on the system type using Equation 15-2.~~

~~$Q_v = Q_r \times C_{system}$ (Equation 15-2)~~

~~where:~~

~~Q_r = ventilation rate in cubic feet per minute from Equation 15-1 or Table 1507.3.3~~

~~C_{system} = system coefficient from Table 1507.3.4~~

~~M1507.3.5 Intermittent operation~~ ~~Systems controlled to operate intermittently shall operate for not less than one hour in each four hour period. The ventilation rate provided by systems controlled to operate intermittently shall be computed as the average ventilaton provided including both times of operation and non-operation.~~

~~M1507.3.4~~

~~SYSTEM TYPE~~	**~~DISTRIBUTED~~**[a]		**~~NOT DISTRIBUTED~~**[a]	
	~~MIXED~~[b]	**~~NOT MIXED~~**[b]	**~~MIXED~~**[b]	**~~NOT MIXED~~**[b]
~~Balanced~~[c]	~~0.75~~	~~1.0~~	~~1.0~~	~~1.25~~
~~Not Balanced~~[c]	~~1.0~~	~~1.25~~	~~1.25~~	~~1.5~~

~~a. "Distributed" shall apply where outdoor ventilation air is supplied directly to each bedroom and the largest common area; otherwise "not distributed" shall apply.~~

~~b. " Mixed" shall apply where not less than 70% of the whole building air volume is recirculated each hour by one or more mechanical systems, otherwise "not mixed" shall apply. Where a central heating or cooling air handler fan is used to provide the mixing, the design heating or cooling airflow rate shall be used to determine the operation time setting required.~~

~~c. "Balanced" shall apply where two or more fans simultaneously supply outdoor air and exhaust air at approximately the same rate; otherwise "not balanced" shall apply. Where outdoor air is supplied by a central forced air system, "balanced" shall apply only where the fan for such system operates simultaneously with the exhaust fan(s) .~~

Commenter's Reason: If approved as submitted, RM-24 will have the effect of radically affecting the ventilation rates and systems specified for whole-house mechanical ventilation and introducing requirements that go beyond ANSI/ASHRAE 62.2, *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*. The most contentious components of this proposal are in Section M1507.3.4. Approval of this comment would remove the contentious sections of RM-24, which were recently disapproved by the ANSI/ASHRAE 62.2 committee. This comment would retain the elements of the original proposal that serve as beneficial clean-up of the language in M1507, would clarify that local exhaust systems are not required to be a of component whole-house mechanical ventilation systems, and would also reword some confusing language that the proposal introduced regarding calculation of continuous and intermittent ventilation rates.

Earlier this year, ASHRAE 62.2 deliberated multiple proposals to differentiate between the ventilation rates of distributed and nondistributed, balanced and non-balanced, and mixed versus non-mixed ventilation systems. In June, the committee voted unanimously to approve a proposal that would differentiate between balanced and non-balanced ventilation, as there is wide consensus that this makes a difference in overall ventilation effectiveness. However, the committee rejected a proposal to differentiate between distributed and nondistributed as well as mixed

versus non-mixed - largely because the research has come to very different conclusions on these topics.

RM-24 should not be approved without modification for the following reasons:

1. Approval of the original proposal would reclassify local exhaust systems as part of the whole-house mechanical ventilation system. This is not how these systems are classified by industry or within ANSI/ASHRAE 62.2 and could cause great confusion for specifiers, installers, and inspectors related to requirements.
2. ANSI/ASHRAE 62.2 deliberated and ultimately disapproved a similar proposal earlier this summer. Approval of RM-24 as submitted would result in a significant departure from the consensus standard.
3. RM-24 requires the most common ventilation systems, which are non-distributed and non-balanced, to increase their ventilation rate by 50%. This will result in a cost and energy penalty, potentially requiring higher cfm fans and increasing the energy use required to condition the ventilation air. It can also increase the risk of depressurization in dwelling units that continue to be built tighter. And, increasing ventilation rates can be expected to increase the humidity load in most dwelling units during shoulder season and summer months, which could impact occupant comfort, building durability, and indoor air quality.
4. This proposal's rationale notes that increasing ventilation rates can greatly increase humidity loads with negative consequences such as mold; however, it goes on to increase ventilation rates by as much as 50% for the most common systems.
5. This proposal heavily favors central fan integrated systems versus exhaust systems. Besides the fact that CFI systems typically use much more energy than exhaust-only systems, CFI systems can actually introduce more pollutants into a space during their operation than alternative systems, depending on duct leakage levels, duct location (i.e., attics, crawlspaces, garages), and infiltration pathways.
6. Research is split on whether or not it makes sense to mix the air within a house. The answer is, "it depends". Factors like the location of pollutants, the location of occupants, and the type of ventilation system all play a significant role in whether distribution is helpful or harmful. For example, studies have shown that kitchens can contain the most concentrated source of harmful pollutants within a house. The best response is NOT to mix air from kitchens, but to instead exhaust from the kitchen and avoid mixing.
7. Distribution of ventilation air is not always the most beneficial configuration. Benefits of distribution depend on occupancy patterns. For example, a professional couple that works during the day and is home for 10 hours, 8 of which are spent in the master bedroom, may want their ventilation air concentrated in the bedroom to get the maximum benefit out of their system.

RM24-15

RM25-15
M1507.3.2

Proposed Change as Submitted

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

2015 International Residential Code

Revise as follows:

M1507.3.2 System controls. The whole-house mechanical ventilation system shall be provided with controls that enable manual override. Such controls shall be provided with text or a symbol that indicates the control's function.

Reason:
Tight homes are being outfitted with code-mandated whole-house mechanical ventilation systems. These systems are often simply a bathroom exhaust fan expected to run continuously. The problem is that without a label indicating the system's function, homeowners have no idea of the purpose of these systems and are likely to turn them off – thereby increasing the rate of accumulation of harmful indoor pollutants without their knowledge. At a minimum, these systems should be labeled to indicate that they are different than a typical bath fan.

Cost Impact: Will increase the cost of construction
This proposal is expected to have minimal cost impacts, as it simply involves labeling equipment for its intended purpose. This label could either be supplied from manufacturers (incremental cost would probably be <$0.10) or field-applied.

RM25-15 : M1507.3.2-MOORE4894

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposal won't stop homeowners from shutting off the systems. It is not clear what is required to indicate control function.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

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

Modify as Follows:

2015 International Residential Code

M1507.3.2 System controls. The whole-house mechanical ventilation system shall be provided with controls that enable manual override. Such controls shall be ~~provided~~ labeled with text or a symbol that indicates the ~~control~~ system's function.

Commenter's Reason: Without requiring a label of some sort for the whole house mechanical system, there may be no way for a code official, contractor, or homeowner to know what system in the dwelling unit is supposed to serve this function, especially in the case of an exhaust-only system that otherwise might be mistaken for a typical bath fan. Requiring a label is crucial to facilitate a code official's inspection and approval of the system. Additionally, the homeowner needs this information at a minimum to ensure that they do not unintentionally disable their whole-house ventilation system.

A similar proposal was overwhelmingly approved by the IMC committee in Memphis.

RM25-15

RM26-15

M1507.3.3, Chapter 44

Proposed Change as Submitted

Proponent : Robby Schwarz, EnergyLogic, Inc., representing EnergyLogic, Inc. (robby@nrglogic.com)

2015 International Residential Code

Revise as follows:

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate ~~of not less than that~~ as determined in accordance with Table M1507.3.3(1) or in accordance with Equation 15-1.

Equation 15-1

Ventilation rate =(0.01 CFM x total square foot area of house) + [(number of bedrooms +1) x 7.5 CFM]

> **Exception:** The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25-percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

Add new standard(s) as follows:

ASHRAE 62.2 - 2010 Ventilation and Acceptable Indoor Air Quaility in Low-Rise Residential Buildings

Reason: Many Builders and Designers would like to be more precise in the specification of the air that is utilized to ventilate a home. The table is good to ensure that ventilation is occurring in a home and for a quick guide for the quantity of air that is needed for whole house mechanical ventilation, but the formula is more precise especially for homes that are on the small side in the floor area chart.

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate of not less than that determined in accordance with Table M1507.3.3(1).

Exception: The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25-percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

TABLE M1507.3.3(1)
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 – 1	2 – 3	4 – 5	6 – 7	> 7
	Airflow in CFM				
< 1,500	30	45	60	75	90
1,501 – 3,000	45	60	75	90	105
3,001 – 4,500	60	75	90	105	120
4,501 – 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

TABLE M1507.3.3(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a, b]

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor[a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
b. Extrapolation beyond the table is prohibited.

M1507.3.3 Mechanical ventilation rate. The whole house mechanical ventilation system shall provide outdoor air at a continuous ~~rate of not less than that~~as determined in accordance with Table M1507.3.3(1) or the ASHRAE 62.2 formula (0.01 CFM x total sqft of house) + ((number of bedrooms +1) x 7.5CFM) .

Rational Statement:

Many Builders and Designers would like to be more precise in the specification of the air that is utilized to ventilate a home. The table is good to ensure that ventilation is occurring in a home and for a quick guide for the quantity of air that is needed for whole house mechanical ventilation, but the formula is more precise especially for homes that are on the small side in the floor area chart.

TABLE M1507.3.3(1)

CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 – 1	2 – 3	4 – 5	6 – 7	> 7
	Airflow in CFM				
< 1,500	30	45	60	75	90
1,501 – 3,000	45	60	75	90	105
3,001 – 4,500	60	75	90	105	120
4,501 – 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

- Ventilation can't be greater than what is calculated by formula

Fan flow (CFM) = 0.01 CFM x your floor area + 7.5 x (your number of bedrooms + 1)

- For a 1,510 square foot 4-bedroom home,

(0.01 X 1510) + (7.5 times 5)

(15.1) + (37.5)

Formula Result: 52.6 CFM

Chart Result: 75 CFM

Cost Impact: Will not increase the cost of construction
No cost increase. Possible cost reductions by using more accurate ventilation requirements

Analysis: A review of the standard proposed for inclusion in the code, ASHRAE 62.2, with regard to the ICC criteria for referenced
standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2015.

RM26-15 : M1507.3.3-SCHWARZ4944

Public Hearing Results

Committee Action: Approved as Submitted

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

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Alisa McMahon, self, representing self (mcmahon.gbac@cox.net) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Residential Code

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate as determined in accordance with Table M1507.3.3(1) or in accordance with Equation 15-1.

Equation 15-1
Ventilation rate =(0.01 CFM x total square foot area of house) + [(number of bedrooms +1) x 7.5 CFM]

> **Exception:** The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that ~~enable operation~~ operate the system for not less than 25-percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

TABLE M1507.3.3
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

~~DWELLING UNIT FLOOR AREA (square feet)~~	~~NUMBER OF BEDROOMS~~				
	~~0 – 1~~	~~2 – 3~~	~~4 – 5~~	~~6 – 7~~	~~> 7~~
	~~Airflow in CFM~~				
~~–~~	~~30~~	~~45~~	~~60~~	~~75~~	~~90~~
~~1,501 – 3,000~~	~~45~~	~~60~~	~~75~~	~~90~~	~~105~~
~~3,001 – 4,500~~	~~60~~	~~75~~	~~90~~	~~105~~	~~120~~
~~4,501 – 6,000~~	~~75~~	~~90~~	~~105~~	~~120~~	~~135~~
~~6,001 – 7,500~~	~~90~~	~~105~~	~~120~~	~~135~~	~~150~~
~~> 7,500~~	~~105~~	~~120~~	~~135~~	~~150~~	~~165~~

~~For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.~~

TABLE M1507.3.3(1)
CONTINOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	1	2	3	4	5
	Airflow in CFM				
<500	20	28	35	43	50
501-1,000	25	33	40	48	55
1,001-1,500	30	38	45	53	60
1,501-2,000	35	43	50	58	65
2,001-2,500	40	48	55	63	70
2,501-3,000	45	53	60	68	75
3,001-3,500	50	58	65	73	80
3,501-4,000	55	63	70	78	85
4,001-4,500	60	68	75	83	90
4,501-5,000	65	73	80	88	95

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

Commenter's Reason: Problems with original TABLE M1507.3.3(1):
Increments are too large (1500 square feet & 2 bedrooms).

Airflows are calculated using the maximum floor area and largest number of bedrooms in each range.

Both conditions result in higher ventilation air requirements than those calculated with Equation 15-1.

Proposed TABLE M1507.3.3(1):

Increments are reduced to 500 square feet and 1 bedroom.

This modification yields results more similar to Equation 15-1 and overall lower

ventilation air requirements.

Equation 15-1 can be used for buildings over 5,000 square feet and/or with more than 5 bedrooms.

In addition, the commenter's language clarifies the intent of the original code with respect to intermittent operation. The system must operate one hour out of four as opposed to being enabled to operate.

Examples:

Please see dashed line boxes in the tables below. In the original Table M1507.3.3(1), the ventilation air requirement is 90 CFM for buildings from 3,001 to 4,500 square feet with four to five bedrooms. In the proposed Table M1507.3.3(1), the ventilation air requirement for the same buildings ranges from 73 CFM to 90 CFM.

In a 3001 sq ft / 4 bedroom home, the required ventilation air requirement (CFM) is:

original Table M1507.3.3(1)	90
proposed Table M1507.3.3(1)	73
Equation 15-1	68

In a 3500 sq ft / 4 bedroom home, the required ventilation air requirement (CFM) is:

original Table M1507.3.3(1)	90
proposed Table M1507.3.3(1)	73
Equation 15-1	73

Example: 3001 sq ft - 4 bedroom

TABLE M1507.3.3(1) ORIGINAL					
floor area	bedrooms				
sq ft	0-1	2-3	4-5	6-7	>7
<1500	30	45	60	75	90
1501-3000	45	60	75	90	105
3001-4500	60	75	90	105	120
4501-6000	75	90	105	120	135
6001-7500	90	105	120	135	150
>7500	105	120	135	150	165

TABLE M1507.3.3(1) PROPOSED					
floor area	bedrooms				
sq ft	1	2	3	4	5
<500	20	28	35	43	50
501-1000	25	33	40	48	55
1001-1500	30	38	45	53	60
1501-2000	35	43	50	58	65
2001-2500	40	48	55	63	70
2501-3000	45	53	60	68	75
3001-3500	50	58	65	73	80
3501-4000	55	63	70	78	85
4001-4500	60	68	75	83	90
4501-5000	65	73	80	88	95

Equation 15-1
Ventilation rate = (0.01 CFM x total square foot area of house) + [(number of bedrooms +1) x 7.5 CFM]

Ventilation rate = 0.01 x 3001 + 7.5 x (4 + 1) = 68 CFM

In a 4500 sq ft / 5 bedroom home, the required CFM is:

original Table M1507.3.3(1) 90

proposed Table M1507.3.3(1) 90

Equation 15-1 90

Example: 3500 sq ft - 4 bedroom

TABLE M1507.3.3(1) ORIGINAL					
floor area	bedrooms				
sq ft	0-1	2-3	4-5	6-7	>7
<1500	30	45	60	75	90
1501-3000	45	60	75	90	105
3001-4500	60	75	90	105	120
4501-6000	75	90	105	120	135
6001-7500	90	105	120	135	150
>7500	105	120	135	150	165

TABLE M1507.3.3(1) PROPOSED					
floor area	bedrooms				
sq ft	1	2	3	4	5
<500	20	28	35	43	50
501-1000	25	33	40	48	55
1001-1500	30	38	45	53	60
1501-2000	35	43	50	58	65
2001-2500	40	48	55	63	70
2501-3000	45	53	60	68	75
3001-3500	50	58	65	73	80
3501-4000	55	63	70	78	85
4001-4500	60	68	75	83	90
4501-5000	65	73	80	88	95

Equation 15-1

Ventilation rate = (0.01 CFM x total square foot area of house) + [(number of bedrooms +1) x 7.5 CFM]

Ventilation rate = 0.01 x 3500 + 7.5 x (4 + 1) = 73 CFM

Bibliography: The airflow requirements in proposed TABLE M1507.3.3(1) are calculated in accordance with ASHRAE 62.2-2010. However, the increments (500 square feet and 1 bedroom) follow ASHRAE 62.2-2013 (TABLE 4.1a). As in ASHRAE 62.2-2013 (TABLE 4.1a), proposed TABLE M1507.3.3(1) tops out at 5,000 square feet and 5 bedrooms.

ASHRAE 62.2-2010 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

ASHRAE 62.2-2013 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

RM27-15
M1507.4 (New)
Proposed Change as Submitted

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

2015 International Residential Code

Add new text as follows:

M1507.4 Venting and depressurization. Each fuel-fired furnace, boiler and water heater shall comply one or more of the following:

1. It shall be a direct-vent, fan-assisted or power-vented type.
2. Where of the natural draft type, it shall be located in a dwelling unit that has only supply or balanced ventilation systems.
3. It shall be located outside of the dwelling unit's air barrier.
4. It shall be located in a mechanical room and provided with combustion air that is supplied entirely from ducts to the outdoors or from direct openings to the outdoors.

Exceptions:

1. This section shall not apply to dwelling units having a tested air tightness of greater than 3 ACH50.
2. This section shall not apply to dwelling units having depressurization test results that are within the limits specified by an approved depressurization standard.

Reason: This proposal provides clear and practical requirements which limit the types of whole house mechanical ventilation systems which can be installed with naturally vented appliances in order to minimize the potential for back drafting. This proposal addresses the most likely scenarios where back drafting could occur and allows the whole house mechanical ventilation to assist in preventing back drafting rather than becoming a contributing factor. The requirements are consistent with Table RA301.1(1) in informative Appendix RA in the 2015 IECC where recommended depressurization limits in houses are defined. All configurations in the table with depressurization limits less than -5 Pa will no longer be able to use exhaust only whole house ventilation.

Bibliography: (1) Russell, Marion, Max Sherman and Armin Rudd (2005). "Review of Residential Ventilation Technologies." LBNL Report 57730, Ernest Orlando Lawrence Berkeley National Laboratory, Berkeley. California. http://www.buildingscience.com/documents/guides-and-manuals/gm-review-residential-ventilation-technologies

Cost Impact: Will increase the cost of construction
This code change proposal will increase the cost of construction for certain construction configurations. In a house with a naturally vented combustion appliances where exhaust-only ventilation was the preferred method of whole house ventilation, there will be an increase in cost to change to a supply type system. According to a 2005 study(1) the additional cost to go from a single-point exhaust system to a central-fan integrated supply system (without exhaust) will be roughly

$155.

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The intent of the proposal is unclear. Would the proposal allow natural draft appliances?

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Craig Conner, representing self (craig.conner@mac.com); Shaunna Mozingo, representing self (smozingo@coloradocode.net) requests Approve as Modified by this Public Comment.

Replace Proposal as Follows:

2015 International Residential Code

M1507.4 Venting and depressurizatoin Dwelling units that contain fuel-fired furnaces, fuel-fired boilers, or fuel-fired water heaters shall meet one or more of the following:

1. The dwelling unit shall not have a whole house mechanical ventilation system that is of an exhaust-only type.
2. The tested airtightness of the dwelling unit shall be greater than three ACH50.
3. Natural draft appliances serving the dwelling unit shall be located outside of the conditioned space.

Commenter's Reason: Backdrafting generally requires three things: exhaust ventilation, a tight house, and naturally drafted combustion devices. If one of these is absent, backdrafting is less likely to occur. This proposed change requires that one of the three be absent. It gives the code user the option of deciding which of the three requirements to apply in order to make backdrafting much less likely.
The committee commented that the original code language was too complex. The new version is simpler and clearer.

The committee also questioned if naturally drafted appliances were allowed. As reworded it is clear that naturally drafted appliaces would be allowed if one of the other options for surpressing backdrafting was used.

RM28-15
M1507.4

Proposed Change as Submitted

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

2015 International Residential Code

Revise as follows:

M1507.4 Local exhaust ~~rates~~ system. Local exhaust systems shall be designed to have the capacity to exhaust the minimum air flow rate determined in accordance with Table M1507.4. Except where functioning as a component of a whole house ventilation system, exhaust fans shall be controlled by a humidity control. Humidity controls shall be capable of adjustment between a relative humidity range of 50 to 80 percent. A humidity control shall utilize manual or automatic means of adjustment and shall be a separate component or an integral component of the exhaust fan.

Reason: Bathroom exhaust fans are often underutilized by occupants. Properly operated exhaust fans removes moisture and odors thereby improving the functionality of the space and contributing to a healthy and sanitary environment. Unless functioning as a component of a whole house ventilation system, effective moisture and odor removal is achieved by humidity sensor controls. Humidity controls ensure the exhaust system operates when the bathroom is in use and for a period of time after the occupant has left the room.
During a bath or shower, the humidity level in a bathroom can be a perfect breeding ground for mold, mildew and microorganisms that can impact your health. Excess moisture has tremendous potential for damaging a home. It cracks and peels paint, ruins gypsum wallboard, causes exterior paint failure, warps doors and rusts cabinets and fixtures. Without control, it can even cause deterioration of joists and framing. As it condenses on windows, walls, ceilings and cabinets, it attracts dirt. It encourages mildew on tile grout and generally provides an environment for increased bacterial growth.

Depending on the size of the bathroom, an intermittent exhaust fan needs to run at least 20 minutes after each shower to ensure that moisture levels are reduced. Both intermittent and continuous bathroom exhaust systems reduce the risk of mold growth which is a significant health concern in homes. Moisture sensor controlled exhaust fans are far more effective than a timed or manually operated fan or an operable window that is usually left closed during the winter and summer months of the year.

Bibliography: Home Ventilating Institute
- http://www.hvi.org/publications/HowMuchVent.cfm
GreenCodePro/CALGreen - http://greencodepro.com/code-summaries/california-green-building-standards-code/4-506-1-bathroom-exhaust-fans

LEED for Homes Reference Guide, 2008. p. 301-302.

Cost Impact: Will increase the cost of construction
Exhaust fan costs range from $106 for an 80 cfm with humidity sensor control to $251 for an 80 cfm with humidity sensor control, motion sensor, and quiet sound rating. The minimum cost for a roof vent kit with flex duct is $23. Moisture controlled bathroom exhaust fans minimizes the potential for building damage, saving the cost

of making repairs to correct problems that could have been easily avoided.

RM28-15 : M1507.4-FLOYD3605

Public Hearing Results

Committee Action: Approved as Modified

Modification:

M1507.4 Local exhaust system. Local exhaust systems shall be designed to have the capacity to exhaust the minimum air flow rate determined in accordance with Table M1507.4. Except where functioning as a component of a whole house ventilation system, exhaust fans in bathrooms with a shower or bathtub shall be ~~controlled by~~provided with a delay timer or humidity sensor control. ~~Humidity controls shall be capable of adjustment between a relative humidity range of 50 to 80 percent. A humidity control shall utilize manual or automatic means of adjustment and shall be a separate component or an integral component of the exhaust fan.~~

Committee Reason: Approval was based on the proponent's published reason statements. The modification adds a timer option to the humidity controller.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Anthony Floyd, City of Scottsdale, representing City of Scottsdale (afloyd@scottsdaleaz.gov) requests Approve as Modified by Committee.

Commenter's Reason: When provided, bathroom exhaust systems reduce the risk of mold growth which is a significant health concern in homes. They are far more effective at removing moisture and odor than an operable window which is usually left closed during the winter and summer months. During a bath or shower, the humidity level in a bathroom can be a perfect breeding ground for mold, mildew and microorganisms that can impact health. Excess moisture also has tremendous potential for damaging a home. Besides peeling paint, damaging gypsum wallboard, and deteriorating framing, it encourages mildew on tile grout and provides an environment for increased bacterial growth.
Unless operating as a component of a whole house ventilation system, an exhaust fan with a delay timer or humidity sensor is an effective means to remove excessive moisture or odor. Besides saving energy with an automatic shut-off, the exhaust fan continues to run after the occupant leaves the room until the moisture is significantly reduced. Depending on the size of the bathroom, an intermittent exhaust fan needs to run at least 20 minutes after each shower to ensure that moisture levels are reduced. Both intermittent and continuous bathroom exhaust systems reduce the risk of mildew and mold growth which is a sanitary and durability concern in all homes, regardless of climate zone.

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

Bibliography: Home Ventilating Institute - http://www.hvi.org/publications/HowMuchVent.cfm

Public Comment 2:

Proponent : Alisa McMahon, representing self (mcmahon.gbac@cox.net) requests Approve as Modified by Committee.

Commenter's Reason: see proponent's published reason statement

Public Comment 3:

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

Further Modify as Follows:

2015 International Residential Code

M1507.4 Local exhaust system. Local exhaust systems shall be designed to have the capacity to exhaust the minimum air flow rate determined in accordance with Table M1507.4. Except where functioning as a component of a whole house ventilation system, exhaust fans in bathrooms with a shower or bathtub shall be provided with a delay timer or humidity sensor control.

> **Exception:** Delay timers and humidity sensor controls are not required in Climate Zones 1B through 6B.

Commenter's Reason: Section 303.4 Mechanical Ventilation requires whole-house mechanical ventilation in accordance with Section M1507.3 if a *dwelling unit* is 5 air changes per hour or less. The energy code does not permit air changes higher than 5, consequently all dwelling units will have whole-house ventilation systems. In dry climate zones the moisture from a bathroom will be distributed throughout the whole house. Dryer climates do not have the same problems that may arise in humid climates. A mandate to install added equipment in all circumstances is not necessary.

Cost Impact: This will reduce the cost of construction.

RM28-15

RM29-15
M1601.1.1

Proposed Change as Submitted

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing Self (JBENGINEER@aol.com)

2015 International Residential Code

Revise as follows:

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

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. ~~Factory-made~~ Listed factory-made ducts shall ~~be listed and labeled in accordance~~ comply with UL 181~~ and installed in accordance with the manufacturer's instructions~~.
3. Fibrous glass duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*.
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC *Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A 653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a flame spread index of not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
    7.1. These cavities or spaces shall not be used as a plenum for supply air.
8. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
9. Stud wall cavities shall not convey air from more than one floor level.
10. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting fireblocking in accordance with Section R602.8.
11. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.

Reason: As currently written, Item 2 mandated UL 181. However, many sheet metal manufacturers make duct in their shop. A contractors shop would in essence qualify as a factory. However, contractors do not have listing and labeling of their duct. This section is also in conflict with other items, spectifically Item 3, 4, and 6. This section should simply allow the use of UL 181 duct as opposed to appearing to require compliance.

Cost Impact: Will not increase the cost of construction

This will lower the cost of construction by allowing any viable duct to be used in a dwelling unit.

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The current code text is preferred because it refers to the manufacturer's instructions.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

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

Modify as Follows:

2015 International Residential Code

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

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. ~~Listed factory made~~ Factory-made ducts shall be installed in accordance with the manufacturer's instructions. Factory-made ducts that are listed shall comply with UL 181.
3. Fibrous glass duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*.
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC *Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A 653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a flame spread index of not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
    7.1. These cavities or spaces shall not be used as a plenum for supply air.
8. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
9. Stud wall cavities shall not convey air from more than one floor

level.

10. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting fireblocking in accordance with Section R602.8.
11. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.

Commenter's Reason: The Committee was correct to state that installed in accordance with the manufacturer's installation instructions should remain in the section. This modification corrects that oversight. The other corrections is to identify the ducts as those listed as complying with UL 181. Plastic factory made ducts do not comply with UL 181 since these ducts are not within the scope of UL 181.

RM29-15

RM30-15
M1601.1.1

Proposed Change as Submitted

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C. (JBENGINEER@aol.com)

2015 International Residential Code

Revise as follows:

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

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be listed and labeled in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Fibrous glass duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*.
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC *Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A 653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a flame spread index of not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
    - 7.1. These cavities or spaces shall not be used as a plenum for supply air.
    - 7.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
    - 7.3. Stud wall cavities shall not convey air from more than one floor level.
    - 7.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting fireblocking in accordance with Section R602.8.
    - 7.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.
8. <u>PVC plastic duct and fitting material shall conform to cell classification 12454-B of ASTM D1248 or ASTM D1784 and the external loading properties of ASTM D2412. The duct temperature for plastic ducts shall not exceed 150° F (66° C).</u>

Reason: The PMGCAC raised a concern last cycle regarding the requirements for plastic duct above ground. The plastic duct being used above ground is the same

duct that is used for underground installations. This change will add the plastic duct requirements to the list of above ground duct systems using the language in Section M1601.1.2 to regulate the material requirement.
Item 6 in this section was originally added to the code during the initial hearings for the IRC when I proposed the inclusion of plastic ducts above ground. The Committee, at that time, thought the text would be more clear by referencing a flame spread of 200 rather than the language proposed for plastic duct. As such, plastic ducts have always been permitted by the IRC for above ground installations. This will simply add more specific requirements for the duct material.

Cost Impact: Will not increase the cost of construction
This change clarifies the requirement for PVC plastic duct and fittings. These are optional materials that may be used for duct construction.

RM30-15 : M1601.1.1-BALLANCO5109

Public Hearing Results

Committee Action: Approved as Submitted

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

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Michael Blaszkiewicz, SABIC, representing SABIC (michael.blaszkiewicz@sabic-ip.com) requests Disapprove.

Commenter's Reason: Proposal RM30-15 should be disapproved for the following reasons:

1. PVC plastic ducts are "factory-made" using the extrusion process and are not manufactured in the field; therefore, condition #2 (UL 181), already in the code, is applicable.
2. This code change contradicts the ICC Committee formal interpretation (2005) of requirements for above-ground plastic ducts: If the plastic duct meets condition #2 (Class 0 or Class 1) it is allowed; and they note that condition #6 (flame spread index not greater than 200) applies to other components of the duct system, but not to the duct itself.
3. This code change introduces ambiguity into the code. Using requirements for underground PVC plastic ducts and applying them to above-ground ducts will cause confusion. The underground duct flammability requirements are appropriately less stringent than those for above-ground and do not require the duct to meet Class 0 or Class 1. Instead, ASTM D1248 for underground PVC plastic ducts calls for ASTM D635, a small-scale horizontal burn test that is used to screen small parts used in appliances. ASTM D635 in no way compares to the applicable above ground duct large-scale flammability test requirements of condition #2, or even to the duct component requirements of condition #6.
4. Contrary to the proponent's claim that condition #6 originated "to allow plastic ducts above-ground," this less stringent flame spread was originally to address return ducts: "Return ducts, except those portions directly above the heating surface or closer than 2 feet (610 mm) to the heating unit casing,

shall be constructed of materials having a flame-spread rating not greater than 200." (1998 International One- and Two-Family Dwelling Code).

5. This code change specifies PVC as the only plastic material allowed for use in above-ground ducts while meeting less stringent requirements. No evidence was provided for this material-specific exception for PVC plastic in above-ground ducts. Any plastic that meets the appropriate code requirements should be allowed.

Public Comment 2:

Proponent : Jonathan Roberts, representing Underwriters Laboratories (jonathan.roberts@ul.com) requests Disapprove.

Commenter's Reason: The suitability of a plastic air duct should be determined based on the conditions of its use. The standards being proposed are not designed to evaluate all of the conditions that are likely to be encountered in above ground applications.

1. The scope of ASTM D 1248 it indicates "This specification provides for the identification of polyethylene plastics extrusion materials for wire and cable in such a manner that the seller and the purchaser can agree on the acceptability of different commercial lots or shipments.". In other words this is a standard that can be used to determine if shipments or lots of plastic parts meets the buyer's specifications, not whether the products are suitable for use in air duct systems. In addition we cannot determine the significance of the "cell classification 12454-B" referenced in the proposal. We could not find such a reference in the standard, and there is no requirement for a rating to be marked on the product. We have no idea how compliance with this rating will be determined at the job site.
2. Similarly the scope of ASTM D 2412 indicates "This test method covers the determination of load deflection characteristics of plastic pipe under parallel-plate loading." This standard is also not specifically designed to evaluate the conditions that air ducts will see in aboveground installations. It basically evaluates the load deflection and stiffness properties of pipe, but doesn't seem to have pass-fail acceptance criteria for the test, which is confusing. Finally neither standard appears to evaluate the pipes in elevated temperatures, so we are unsure of the technical basis for the claim that they are suitable for use in 150 degree F air ducts.

Requirements are already well established for all above ground factory-made ducts, including plastic, as specified in Item 2 of Section M1601.1.1.

The requirements of UL 181 apply to materials for the fabrication of air duct and air connector systems for use in accordance with the IRC. These systems include preformed lengths of flexible or rigid ducts, materials in the form of boards for field fabrication of lengths of rigid ducts, and preformed flexible air connectors. Tests required by UL 181 include flame penetration, mold growth and humidity, temperature, static load, impact, collapse, leakage, and surface burning characteristics.

RM30-15

RM32-15
M1601.1.1

Proposed Change as Submitted

Proponent : Robby Schwarz, representing EnergyLogic, Inc. (robby@nrglogic.com)

2015 International Residential Code

Revise as follows:

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

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be listed and labeled in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Fibrous glass duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*.
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC *Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A 653.
5. ~~The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.~~
5. *Duct systems* shall be constructed of materials having a flame spread index of not greater than 200.
6. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
    - 6.1. These cavities or spaces shall not be used as a plenum for supply or return air.
    - 6.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
    - 6.3. Stud wall cavities shall not convey air from more than one floor level.
    - 6.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting fireblocking in accordance with Section R602.8.
    - 6.5. Stud wall cavities in the outside walls of building envelope assemblies and the spaces between solid floor joists in any portion of the building shall not be utilized as supply or return air plenums.

Reason: Rational Statement:
Air is a fluid like water is a fluid. Code will not stand for a plumbing system that leaks but allows a minimum level of duct leakage even though the air that is carried through the duct system carries heat, moisture, and pollutants that can be detrimental to the building occupant and the structure. Many have read the language in the last two cycles of the code to mean that both the supply side and the return

side of an HVAC system need to be fully ducted. However the commentary has left a window of opportunity for contractors to continue to utilize building cavities for return air plenums. To be crystal clear, this code change proposal is largely in response to that and is designed to ensure that all HVAC duct systems are fully ducted to ensure life safety, long term durability, cost effectiveness, comfort and efficiency as they are all impacted by air under pressure being forced through un-ducted building cavities. A number of papers have been written about the decrease in efficiency and comfort as well as the increase in building durability issues and cost of ownership associated with air traveling through and out of un-ducted building cavities. Much of this air also is pulled into and out of the building due to the connection of the cavity to the outside. Negative pressure are a significant issue for combustion safety is a home and are more likely to impact atmospherically vented appliances through the leakage associated with building cavities used as returns. For all of these reasons and more all air pushed our pulled by an HVAC blower motor should be contained inside a duct system.

Cost Impact: Will increase the cost of construction
Cost implications are small with this proposal as building cavities need to be enclosed any way so air can flow through them. However this proposal is requiring that return air be enclosed in duct work and there will be a cost associated with that. However, this requirement, as well and the enhanced duct sealing requirements of the IECC, leads builders to the utilization of centralized returns which diminishes the amount of return duct work in the house drastically, maintains comfort and performance of the HVAC system, and is very cost affective.

RM32-15 : M1601.1.1-SCHWARZ4948

Public Hearing Results

Committee Action: Disapproved

Committee Reason: Floor joist cavities should be allowed for conveying return air.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Robby Schwarz, representing EnergyLogic, Inc. (robby@nrglogic.com) requests Approve as Submitted.

Commenter's Reason: The ROCAH indicates that this code change was disapproved because it was the opinion of the committee that floor joist plenums should be allowed to convey return air. Plenums/building cavities should be allowed to convey return air only if the return air is being conveyed inside of a hard duct which is located within the plenum or building cavity.
Right now there is a conflict between codes as the IECC clearly says in section R403.3.5 Building Cavities (Mandatory) "Building framing cavities shall not be used as ducts or plenums.

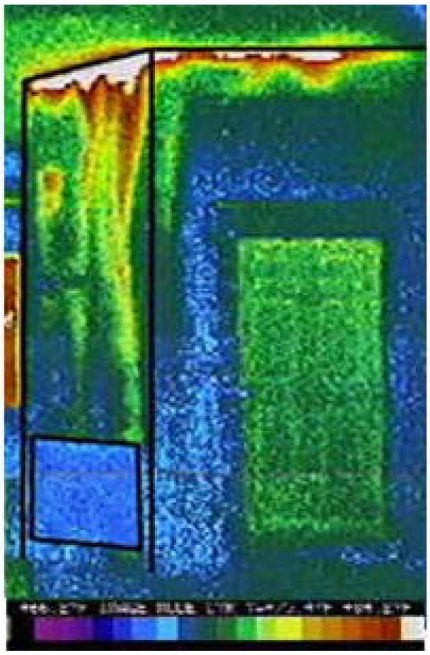
"Besides the Building Science rational spelled out in the original reason statement demonstrating building durability, efficiency, and life safety issues associated with pressure imbalances associated with building framing plenums being used as duct work, the current code language addressed by this proposals ensures that the intent of the code will be met."...to provide a reasonable level of safety, health, property protection and public welfare..."

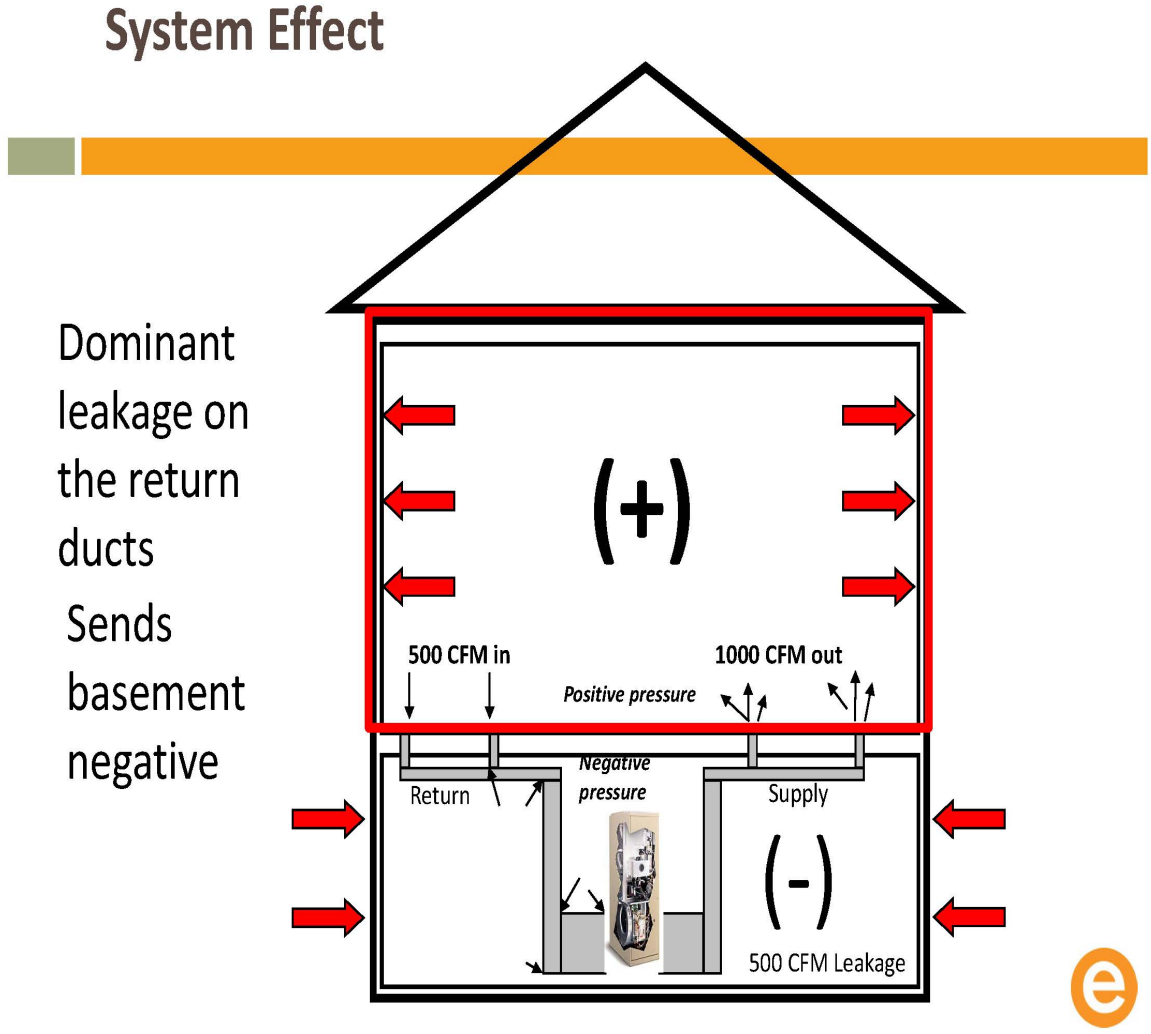
Combustion safety caused by uninhibited negative pressures, building durability

caused by returning warm moist air through random building cavities, indoor air quality concerns caused by pulling air from attics, crawl spaces, and other areas unknown, clearly demonstrate that both the supply side and the return side of an HVAC system should be fully ducted when placed in a plenum/building cavity, so that we can gain control and predictability of the air flowing through our buildings.

R403.2.3 Building cavities (Mandatory)

Building framing cavities shall not be used as ducts or plenums





Bibliography:
https://www.energycodes.gov/sites/default/files/documents/cn_open_spaces_as_return-air_options.pdf

- Building Energy Resource Center "Open Spaces as Return-Air Options - Code Notes" Building cavities are leaky

http://www.nachi.org/building-cavities-supply-return-ducts.htm

- **Building Cavities Used as Supply or Return Ducts by Nick Gromicko and Ben Gromicko**

http://search.proquest.com/openview/f7f3b637f577d99e7addbb96947394a8/1?pq-origsite=gscholar

- **Building cavities used as ducts: Air leakage characteristics and impacts in light commercial**

buildings

Cummings, James B; Withers, Charles R, Jr. **ASHRAE Transactions** 104 (1998): 743.

http://www.fsec.ucf.edu/en/publications/html/FSEC-CR-1668-98/

- **Building Cavities Used as Ducts: Air Leakage Characteristics and Impacts in Light Commercial Buildings by James B. Cummings and Charles R. Withers** *Florida Solar Energy Center (FSEC)*

Built Wrong from the Start By Joe Lstiburek page 3

RM32-15

RM36-15
M1601.4.1

Proposed Change as Submitted

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

2015 International Residential Code

Revise as follows:

M1601.4.1 Joints, seams and connections. Longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC *Duct Construction Standards—Metal and Flexible* and NAIMA *Fibrous Glass Duct Construction Standards*. Joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants or tapes. Tapes and mastics used to seal fibrous glass ductwork shall be *listed* and *labeled* in accordance with UL 181A and shall be marked "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 metallic and flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181 B-FX" for pressure-sensitive tape or "181 BM" for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C. Crimp joints for round metallic ducts shall have a contact lap of not less than 1 inch (25 mm) and shall be mechanically fastened by means of not less than three sheet-metal screws or rivets equally spaced around the joint.

Closure systems used to seal all ductwork shall be installed in accordance with the manufacturers' instructions.

Exceptions:

1. Spray polyurethane foam shall be permitted to be applied without additional joint seals.
2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.
3. For ducts having a static pressure classification of less than 2 inches of water column (500 Pa), additional closure systems shall not be required for continuously welded joints and seams and locking-type joints and seams of other than the snap-lock and button-lock types <u>that are located outside of conditioned spaces</u>.

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

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

RM36-15 : M1601.4.1-SURRENA5018

Public Hearing Results

Committee Action: Approved as Submitted

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

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

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

Modify as Follows:

2015 International Residential Code

M1601.4.1 Joints, seams and connections. Longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC *Duct Construction Standards—Metal and Flexible* and NAIMA *Fibrous Glass Duct Construction Standards*. Joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants or tapes. Tapes and mastics used to seal fibrous glass ductwork shall be *listed* and *labeled* in accordance with UL 181A and shall be marked "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 metallic and flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181 B-FX" for pressure-sensitive tape or "181 BM" for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C. Crimp joints for round metallic ducts shall have a contact lap of not less than 1 inch (25 mm) and shall be mechanically fastened by means of not less than three sheet-metal screws or rivets equally spaced around the joint.

Closure systems used to seal all ductwork shall be installed in accordance with the manufacturers' instructions.

Exceptions:

1. Spray polyurethane foam shall be permitted to be applied without additional joint seals.
2. Where a duct connection is made that is partially

inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.

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

Commenter's Reason: This proposal was approved at the Committee Action Hearings. The committee recognized that the cost to seal the longitudinal joints in conditioned space outweighed the benefit for this requirement; however, there was a concern that the modification contributed to the confusion of an already unclear exception.

The public comment modification does not change the meaning or intent of the original proposal. The change improves the language by removing exceptions to exceptions and also removing a redundant reference to "welded seams".

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

RM36-15

RM37-15
M1602.2

Proposed Change as Submitted

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

2015 International Residential Code

Revise as follows:

M1602.2 Return air openings. Return air openings for heating, ventilation and air conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturers' installation instructions, Manual D or the design of the registered design professional.
4. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

    Exceptions:

    1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking appliances.
    2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.
5. Taking return air from an unconditioned crawl space shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
6. Return air from one dwelling unit shall not be discharged into another dwelling unit.
7. <u>Return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where such space is dehumidified,</u>

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

Cost Impact: Will not increase the cost of construction
Generally speaking this proposal is will not cause an increase is cost. If

dehumidificaton is chosen then there could be an increase in cost.

Public Hearing Results

Committee Action: **Approved as Submitted**

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

Assembly Motion: **Disapprove**
Online Vote Results: **Failed**
Support: 34.59% (55) Oppose: 65.41% (104)
Assembly Action : **None**

Individual Consideration Agenda

Public Comment 1:

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

Modify as Follows:

2015 International Residential Code

M1602.2 Return air openings. Return air openings for heating, ventilation and air conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturers' installation instructions, Manual D or the design of the registered design professional.
4. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

    Exceptions:

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

5. Taking return air from an unconditioned crawl space shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
6. Return air from one dwelling unit shall not be discharged into another dwelling unit.
7. ~~Return~~ For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such ~~space~~ spaces is dehumidified,

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

RM37-15

RM38-15

M2005.1, M2005.2, M2005.2.1

Proposed Change as Submitted

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

2015 International Residential Code

Revise as follows:

M2005.1 General. Water heaters shall be installed in accordance with Chapter 28, the manufacturer's instructions and the requirements of this code. ~~Water heaters installed in an attic shall comply with the requirements of Section M1305.1.3.~~ Gas-fired water heaters shall comply with the requirements in Chapter 24. Domestic electric water heaters shall comply with UL 174. Oiled-fired water heaters shall comply with UL 732. Thermal solar water heaters shall comply with Chapter 23 and UL 174. Solid fuel-fired water heaters shall comply with UL 2523.

M2005.2 Prohibited locations. Fuel-fired water heaters shall not be located in sleeping rooms, bathrooms, toilet rooms, storage closets or a space that opens only to such room or spaces.

Exceptions:

1. The water heater is a direct- vent appliance installed in accordance with the terms of its listing and the manufacturer's installation instructions.
2. Where the water heater is installed in a room ~~used as a storage closet. Water heaters located in~~ or space that opens only into a bedroom or bathroom, the room or space shall be ~~installed in~~ provided with a ~~sealed enclosure so that~~ *solid weather stripped door equipped with an approved self-closing device. All combustion air* ~~will not~~ shall be taken directly from the ~~living space~~ outdoors. ~~Installation of direct-vent water heaters within an enclosure is not required.~~

M2005.2.1 Water heater access. Access to water heaters that are located in an *attic* or underfloor crawl space ~~is permitted to~~ shall be ~~through a closet located in a sleeping room or bathroom where *ventilation* of those spaces is~~ in accordance with ~~this code.~~ Section M1305.

Reason: This section lacks some general informatoin and is incomplete. It is also in need of a little cleanup. There are no new requirements.

Cost Impact: Will not increase the cost of construction
This proposal is strictly editorial in nature and will not cause an increase is cost.

RM38-15 : M2005.1-MCMANN3692

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The "space" referred to in the proposal could be very large.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

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

Modify as Follows:

2015 International Residential Code

M2005.2 Prohibited locations. Fuel-fired water heaters shall not be located in ~~sleeping rooms, bathrooms, toilet rooms, storage closets~~ or ~~a space that opens only to such room~~ obtain combustion air from any of the following rooms or spaces:

1. Sleeping rooms.
2. Bathrooms.
3. Toilet rooms.
4. Storage closets.

Exceptions:

1. ~~The~~ Direct-vent water ~~heater~~ heaters that obtain all combustion air directly from the outdoors
2. Solid fuel-fired water heaters, provided that combuston air is ~~a direct- vent appliance installed~~ provided in accordance with the ~~terms of its listing and the manufacturer's~~ manufacturer'-s installation instructions and this section..
3. ~~Where the water heater is~~ Water heaters installed in a ~~room or space that opens only into a bedroom or bathroom,~~ dedicated enclosure in which all combustion air is taken directly from the ~~room or space~~ outdoors. Access to such enclosure shall be ~~provided with~~ through a weather-stripped solid ~~weather stripped~~ door that is equipped with an approved self-closing device. ~~All combustion air shall be taken directly from the outdoors.~~

M2005.2.1 Water heater access. Access to water heaters that are located in an *attic* or underfloor crawl space shall be in accordance with Section M1305.

Commenter's Reason: The committees consern that a space may be very large is unclear. The proposal has been modified to reflect the same language used in the IMC for water heater installations and prohibited locations. This will complete this section in an easy to read format. There are no new requirements. # 2 was left in place to cover any oil fired water heaters that may exsist.

RM38-15

RM40-15

Table M2101.1, M2103.3

Proposed Change as Submitted

Proponent : Curtis Dady, Viega, LLC, representing Viega, LLC (curtis.dady@viega.us)

2015 International Residential Code

Revise as follows:

TABLE M2101.1
HYDRONIC PIPING AND FITTING MATERIALS

MATERIAL	USE CODE[a]	STANDARD[b]	JOINTS	NOTES
Copper tubing (type K, L or M)	1, 2	ASTM B 75, B 88, B 251, B 306, ASME B16.51	Brazed, soldered, press-connected and flared mechanical fittings	Joints embedded in concrete

(Portions of table not shown remain unchanged)

For SI: °C = [(°F)-32]/1.8.

a. Use code:

1. Above ground.
2. Embedded in radiant systems.
3. Temperatures below 180°F only.
4. Low temperature (below 130°F) applications only.
5. Temperatures below 160°F only.

b. Standards as listed in Chapter 44.

M2103.3 Piping joints. Copper and copper alloy systems shall be soldered , brazed, or press-connected. Soldering shall be in accordance with ASTM B 828. Fluxes for soldering shall be in accordance with ASTM B 813. Brazing fluxes shall be in accordance with AWS A5.31. Press-connect shall be in accordance with ASME B16.51. Piping joints that are embedded shall be installed in accordance with the following requirements:

1. Steel pipe joints shall be welded.
2. Copper tubing shall be joined by brazing complying with Section P3003.6.1.
3. Polybutylene pipe and tubing joints shall be installed with socket-type heat-fused polybutylene fittings.

4. CPVC tubing shall be joined using solvent cement joints.
5. Polypropylene pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings.
6. Cross-linked polyethylene (PEX) tubing shall be joined using cold expansion, insert or compression fittings.
7. Raised temperature polyethylene (PE-RT) tubing shall be joined using insert or compression fittings.

Reason: ASME B16.51 "Copper and Copper Alloy Press-Connect Pressure Fittings" is included in IMC table 1202.5 HYDRONIC PIPE FITTINGS and these joints are included in sections 1203.8 and 1203.8.3.

Cost Impact: Will not increase the cost of construction
Addition of option, not requirement.

RM40-15 : M2101.1-DADY3675

Public Hearing Results

Committee Action: Approved as Modified

Modification:

TABLE M2101.1
HYDRONIC PIPING AND FITTING MATERIALS

(No change to Table)

Committee Reason: Approval is based on the proponent's published reason statements. The modification corrects the the table title.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

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

Modify as Follows:

2015 International Residential Code

M2103.3 Piping joints. Copper and copper alloy systems shall be soldered, brazed, or press-connected. Soldering shall be in accordance with ASTM B 828. Fluxes for soldering shall be in accordance with ASTM B 813. Brazing fluxes shall be in accordance with AWS A5.31. Press-connect joints shall be made in accordance with ~~ASME B16.51~~ the manufacturer's installation instructions. Piping joints that are embedded shall be installed in accordance with the following requirements:

1. Steel pipe joints shall be welded.
2. Copper tubing shall be joined by brazing complying with Section P3003.6.1.
3. Polybutylene pipe and tubing joints shall be installed with socket-type heat-fused polybutylene fittings.
4. CPVC tubing shall be joined using solvent cement joints.
5. Polypropylene pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings.
6. Cross-linked polyethylene (PEX) tubing shall be joined using cold expansion, insert or compression fittings.
7. Raised temperature polyethylene (PE-RT) tubing shall be joined using insert or compression fittings.

Commenter's Reason: ASME B16.51 contains no requirements for the installation of press-connect fittings. This section regulates installation, not fitting standards. The fitting manufacturer is required to provide the installation instructions for press connect fittings. It is inappropriate to reference the standard when no installation requirements are found in the standard.

RM40-15

RM53-15

M2301.3.3 (New)

Proposed Change as Submitted

Proponent : Robby Schwarz, EnergyLogic, Inc., representing EnergyLogic, Inc. (robby@nrglogic.com)

2015 International Residential Code

Add new text as follows:

M2301.3.3 Labeling of solar energy systems The solar energy installer shall provide a certificate or label that lists the following information relative to the installed solar system: Such certificate or label shall be posted near the inverter, electrical distribution panel, or other conspicuous location.

1. The date that the system was installed.
2. The name of the installation company.
3. The system type.
4. The orientation of the arrays and collectors.
5. The tilt in degrees of the arrays and collectors.
6. The square foot area of the arrays and collectors.
7. The number of panels in the arrays.
8. The peak power production of the arrays and collectors stated in watts.
9. The inverter efficiency of the arrays and collectors.
10. The loop type of the arrays and collectors.
11. The type of the arrays and collectors.
12. The storage volume of the system in cubic feet or gallons.

Reason: Rational Statement:
Just like the requirement to provide an insulation certificate to fully document the R-values of the insulation in each assembly of the home ensures that the code official and home owner knows and understand what has been installed in the home, this proposal ensures that everyone involved knows and understands the PV or solar thermal system that has been installed. In addition, since the requirement is in label form it is hoped that this Permanente label will live with the house and will provide meaning full information that can be used for repairs and upgrades, as well as, appraisals and sales transactions when the house is turned over.

Cost Impact: Will not increase the cost of construction
The cost of a label is so minimal that it should not be considered increasing the cost of construction.

RM53-15 : M2301.3.3 (New)-SCHWARZ4982

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The proposed text belongs in the IECC. The proposal addresses electrical components not within the scope of the code. The proposed labeling is unnecessary.

Assembly Action : **None**

Individual Consideration Agenda

Public Comment 1:

Proponent : Robby Schwarz, EnergyLogic, Inc., representing EnergyLogic, Inc. (robby@nrglogic.com) requests Approve as Submitted.

Commenter's Reason: The Committees Reason for disapproval was as follows. "The proposed text belongs in the IECC. The proposal addresses electrical components not within the scope of the code. The proposed labeling is unnecessary. Let's address all three of these concerns.

1. The proposed text belongs in the IECC

    • This proposal should also be adopted in the IECC but in order to have consistency between the codes it should be adopted here. The items requested on the label are not only energy related and are important to understand for any contractor that may interact with the system that has been installed. Electrician, Plumber, Rater, Appraiser, etc.

2. The proposal addresses electrical components not within the scope of the code

    • Chapter 23 of the IRC addresses Solar Thermal Energy Systems, Appendix U addresses Solar Electric, and Part VIII addresses Electrical issue. All of these section are associated with Solar systems which this proposal is addressing. Having a consolidated label that is permanent to the house ensure that all parties are certain of the system that has been installed.

3. The proposed labeling is unnecessary

    • Many components of the building are required to be labeled. From bypass values to gas vents and insulation as noted in section N1101.14. The code has addressed the need for permanent certificates or labels to be installed in the home for specific features where a record needs to be maintained of the specifics of the installation. Solar systems are a component of the building where a permanent record would be valuable to install. Just a certificate enables other professions to quickly assess what has been installed and how their services on the house need to be performed in relation to what is installed.

RM53-15

RM54-15

R202 (New), M2301.4.1.1 (New), M2301.4.1.2 (New)

Proposed Change as Submitted

Proponent : Rex Gillespie (rex.gillespie@caleffi.com)

2015 International Residential Code

Add new definition as follows:

SECTION 202 DEFINITIONS

FOOD GRADE FLUID. Potable water or a fluid containing additives listed in accordance with the Code of Federal Regulations, Title 21, Food and Drugs, Chapter 1, Food and Drug Administration, Parts 174-186

SECTION 202 DEFINITIONS

NON-FOOD GRADE FLUID. Any fluid that is not designated as a food grade fluid.

Add new text as follows:

M2301.4.1.1 Double-wall heat exchangers. Heat exchangers utilizing a *non-food grade fluid* shall separate the non-food grade fluid from the potable water by means of double-wall construction. An air gap open to the atmosphere shall be provided between the two walls. The point of discharge from the air gap between the two walls of the double-wall heat exchanger shall be visible.

M2301.4.1.2 Single-wall heat exchangers. Where single-wall heat exchangers are used, the heat transfer fluid shall be food grade fluid..

Reason: This proposal seeks to align with the language that appears in the IMC Chapter 1402.8 regarding heat exchangers and add definitions of FOOD GRADE and NON-FOOD GRADE heat transfer fluids as stated in SRCC Standard 300

Bibliography: SRCC Standard 300, Minimum Standard for Solar Thermal Water Heating Systems, January 3, 2013.

Cost Impact: Will not increase the cost of construction
The proposed changes are not anticipated to impact the cost of installation. No new equipment or features are required, and no new requirements are placed on manufacturers impacting certification or manufacturing costs. Proposed provisions provide additional clarity and direction for installers and code officials at inspection.

Analysis: A review of the standard proposed for inclusion in the code, CFR Title 21, Chapter 1, Parts 174-186, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2015.

Public Hearing Results

Committee Action: **Approved as Modified**

Modification:

SECTION 202 DEFINITIONS

~~FOOD GRADE FLUID. Potable water or a fluid containing additives listed in accordance with the Code of Federal Regulations, Title 21, Food and Drugs, Chapter 1, Food and Drug Administration, Parts 174-186~~

SECTION 202 DEFINITIONS

~~NON-FOOD GRADE FLUID. Any fluid that is not designated as a food grade fluid.~~

Committee Reason: It is important to inform mechanical contractors about cross contamination prevention, as they are informed by the IPC and IMC. The modification deletes the proposed definitions because there is no need to reference federal law regarding food safety which is not within the scope of the code.

Assembly Action : **None**

Individual Consideration Agenda

Public Comment 1:

Proponent : Julius Ballanco, JB Engineering and Code Consulting, P.C., representing Self (JBENGINEER@aol.com) requests Disapprove.

Commenter's Reason: The proposed new sections will conflict with the previous section M2301.4. This section references P2902.5.2 in the plumbing section. It also references SRCC 300. The proposed text uses the term food grade. Section P2902.5.2 and Section M2301.4 use the terms essentially toxic and essentially non-toxic. This would result in a conflict and confusion to the code official. While the reason states it attempts to align with Section 1402.8 of the Mechanical Code it would conflict with the Plumbing Code and the plumbing section of the IRC. Furthermore, there is no Section 1402.8 in the Mechanical Code.

RM54-15