ASHRAE® Northern Nevada Chapter

WELCOME!

The following presentation has been prepared for the Northern Nevada Chapter of ASHRAE

EVOLUTION OF THE UNIFORM MECHANICAL CODES

Presented by:

Rick Kabele, B.S., CBO, CFM, CFPS

Principal

Building Safety Associates, LLC

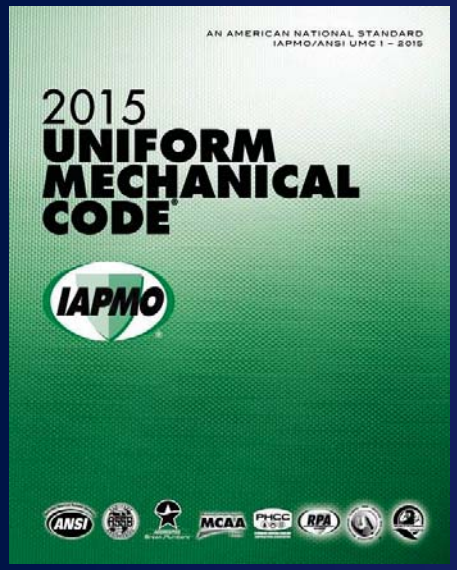
Rick@buildingsafetyassociates.com

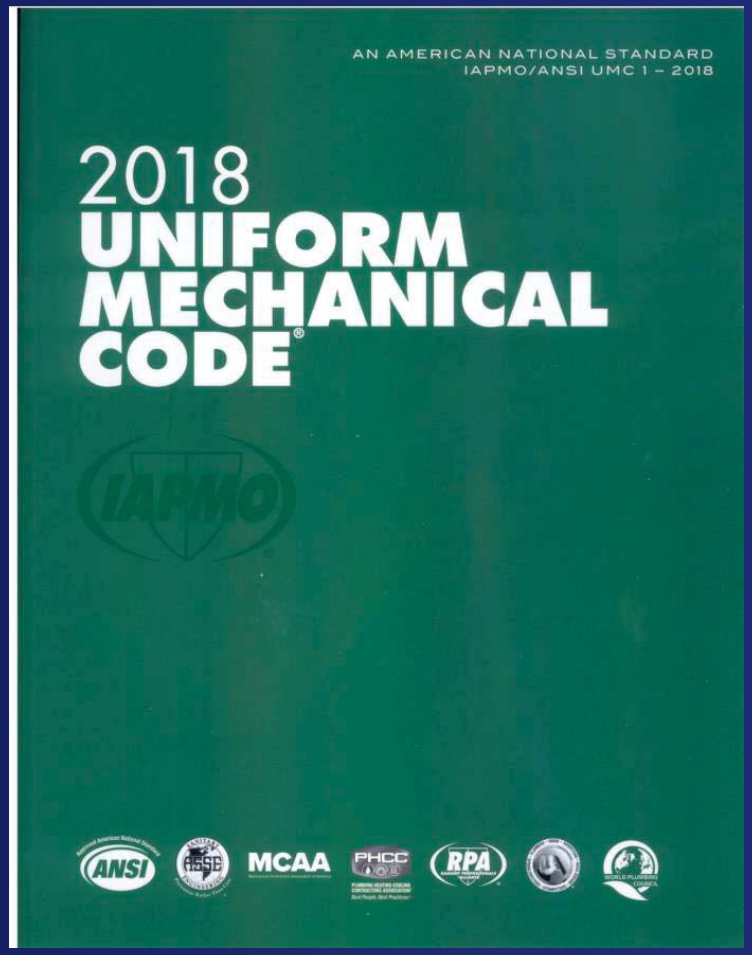
www.buildingsafetyassociates.com

(775) 342-8383

2012 TO 2018


2012
UNIFORM
MECHANICAL
CODE
IAPMO


AN AMERICAN NATIONAL STANDARD
IAPMO/ANSI UMC 1 – 2015
2015
UNIFORM
MECHANICAL
CODE
IAPMO
ANSI
MCAA
PHCC
RPA


AN AMERICAN NATIONAL STANDARD
IAPMO/ANSI UMC 1 – 2018
2018
UNIFORM
MECHANICAL
CODE
IAPMO
ANSI
MCAA
PHCC
RPA

TWO CODE CYCLES

- Moving from the 2012 Uniform Mechanical Code (UMC) to the 2018 means that we SKIPPED the 2015!

- Why is that IMPORTANT?

Material Lost in the Shuffle

- Simply because there were MORE changes between 2012 and 2015, than between 2015 and 2018 editions!
- And ALL of the changes are ADDITIVE!

Getting Started with Code Changes to the 2015 UMC

Beginning with the 2015 Edition, the UMC now incorporates definitions of Classes of Air from ASHRAE 62

(ASHRAE 62.1:5.16.1)

UMC: 203.0 Class of Air

- Air, Class 1. Air with low contaminant concentrations, low sensory-irritation intensity, and inoffensive odor.
- Air, Class 2. Air with moderate contaminant concentration, mild sensory-irritation intensity, or mildly offensive odor.

UMC: 203.0 Class of Air

- Air, Class 3. Air with significant contaminant concentration, significant sensory-irritation intensity, or offensive odor.

UMC: 203.0 Class of Air

- Air, Class 4. Air with highly objectionable fumes or gasses or with potentially dangerous particles, bio-aerosols, or gasses, at concentrations high enough to be considered harmful.

UMC: 303.9 Avoiding Strain on Gas Piping

- Correlation with NFPA 54:9.1.17

Appliances shall be supported and connected to the piping so as not to exert undue strain on the connections.

Flexible Connections

UMC: 304.2 Sloped Roof

- Where equipment or appliances that require service are installed on a roof having a slope of 4 units vertical in 12 units horizontal or more, a level platform of not less than 30-inches (W x D) shall be provided at the service side of the equipment or appliance.

UMC: 310.1.1 Condensate Pumps

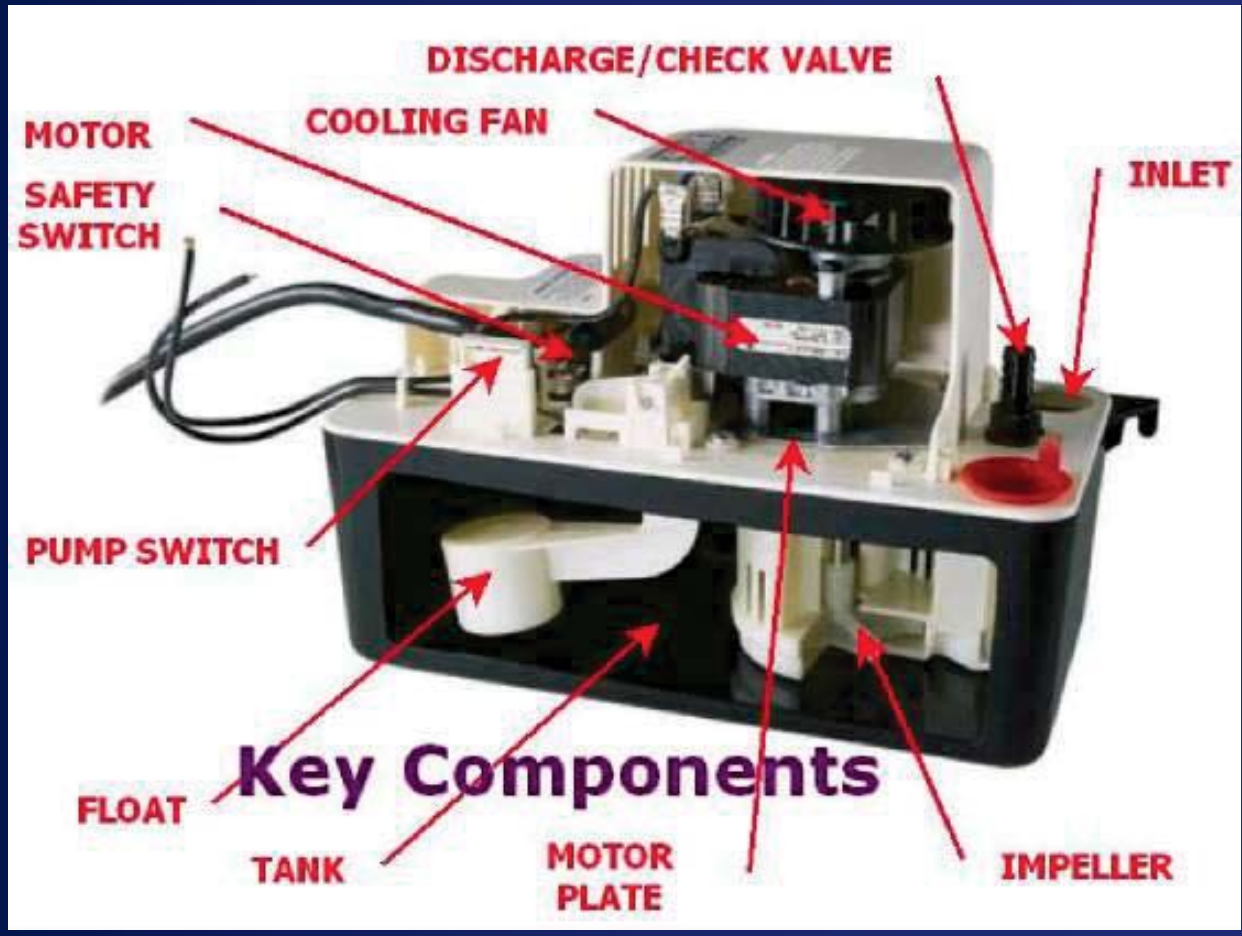
Where approved by the AHJ, condensate pumps shall be installed in accordance with the manufacturer's installation instructions. Pump discharge shall rise vertically to a point where it is possible to connect to a gravity condensate drain and discharged to an approved disposal point. (Indirect Waste Receptor)

UMC: 310.1.1 Condensate Pumps cont.

Each condensing unit shall be provided with a separate sump and interlocked with the equipment to prevent the equipment from operating during a failure. Separate pumps shall be permitted to connect to a single gravity indirect waste.

UMC: 310.1.1 Condensate Pumps cont.

The safety switch is the interlock for the equipment shut down and must now be connected



UMC: 310.2 Condensate Control

The revisions to this section clarify the use of Primary and Secondary Condensate Drains.

The Section also gives installers options for the removal of condensate and protection of the structure through a option to shut down the equipment.

UMC: 310.3 Condensate Waste Pipe Material & Size

The material of the piping shall comply with the pressure and temperature rating of the appliance or equipment, and shall be approved (compatible) for use with the liquid being discharged.

UMC: 402.1.3 Ventilation in Healthcare Facilities

Mechanical ventilation for healthcare facilities shall be designed and installed in accordance with this code and ASHRAE 170.

The Facility Guidelines Institute has incorporated ASHRAE Standard 170 into the ventilation design standards for healthcare facilities. (ASHE)

UMC: 403.7.1 Parking Garages

The Exhaust Rate for (Enclosed) parking garages shall be in accordance with Table 403.7.

[0.75 cfm/ft^2]

This code change correlates with ASHRAE 62.1 and provides two options for energy conservation while protecting the public.

UMC: 403.7.1 Parking Garages cont.

Options:

- Ventilation modulation upon detection of vehicle operation or presence of occupants.
- Ventilation modulation incorporating automatic carbon monoxide sensing devices with specific CO concentration limits.

UMC: 504.4 Clothes Dryers

A clothes dryer exhaust duct shall not be connected to a vent connector, gas vent, or chimney, and shall not terminate into a crawl space, attic, or other concealed space.

UMC: 504.4 Clothes Dryers cont.

Additional new language in this Section provides specific details on assembly and installation of Dryer Ducts to avoid the entrapment of lint.

UMC: 504.4.2 Domestic Clothes Dryers.

- Revises the definition to “Type 1” Clothes Dryer.
- Specifies that duct material is to be “rigid” metal, have a diameter of not less that 4-inches, and have a thickness of not less than 0.016-inch.
- LISTED transition ducts used to connect the Type 1 dryer to an exhaust duct are to be no more than 6-feet in length.

UMC: 505.10 Makeup Air

Exhaust hood systems capable of exhausting in excess of 600 cfm shall be provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.

UMC: 511.3 Makeup Air

NOTE: This amendment was incorrectly applied to Section 508.3.5.4. And should be noted as follows:

511.3.1 Evaporative coolers shall not be used for makeup air units on commercial kitchen hoods and kitchen ventilation systems. (Exception for listed equipment.)

UMC: 604.1 Insulation of Ducts

Amended to correlate with Energy Code.

Supply air ducts, return air ducts, and plenums of a heating or cooling system shall be insulated to achieve the minimum thermal (R) value in accordance with the 2018 International Energy Conservation Code, Sections R403.3.1 and R403.3.6 for residential installations, and Section C403.11.1 for commercial installations.

Duct Insulation

UMC: 608.1 Air-Moving Systems & Smoke Detectors

Requirement revised by amendment.

Automatic shutoff shall be accomplished by interrupting the power source of the air-moving equipment upon detection of smoke in the main ~~supply~~ return-air duct or plenum upstream of any filters, exhaust air connections, outdoor air connections, or decontamination equipment and appliances served by such equipment.

UMC: 609.0 Performance Test for Automatic Shutoffs

New language added by amendment:

Upon completion and before final approval of the air-moving system, a performance test shall be conducted to verify compliance of the smoke detector installation to the manufacturer's specifications. The permittee shall furnish the necessary test equipment and devices required to perform the tests . . .

UMC: 609.0 Performance Test for Automatic Shutoffs cont.

. . . and shall provide the jurisdiction with an accurate, completed and signed test report. At the discretion of the AHJ, the test may be required to be witnessed by the AHJ or be performed by an approved third-party testing agency.

UMC: 939.0 Sauna Heaters

New language added by amendment:

939.1 General. Sauna heaters shall be listed and installed in accordance with the manufacturer's installation instructions. Approved guards or barriers shall be installed to prevent accidental contact with the heater. Ventilation shall be provided in accordance with the heater listing and combustion air for gas fueled heaters shall comply with Chapter 7 of this code.

UMC: Chapter 13, Fuel Gas Piping

1301.1 Applicability. Whenever there is a conflict between this code and NFPA 54 or NFPA 58 as adopted by the Nevada LP Gas Board for LP Gas installations, the adopted codes of the Nevada LP Gas Board shall govern.

UMC: 1313.5.1 Turning Gas On

2018 Amendments add important modifications to this section.

1313.5.1.1 During the process of turning gas on into a system of new gas piping or into a system or portions of a gas system that has been restored after an interruption of service, a manometer test shall be made.

UMC: 1313.5.1 Turning Gas On cont.

1313.5.1.2 For medium pressure gas

1313.5.1.3 For appliances or equipment required pounds of gas pressure

1313.5.1.4 Manometer testing. Manometer testing. Testing shall be performed by a person holding a valid Washoe County manometer tester card. Such test does not need to be reported when conducted by the serving gas utility.

End of 2015 Significant Changes to the UMC

This concludes the extent of those code changes that occurred during the publication of the 2015 Edition of the Uniform Mechanical Code

PART 2

Continuation of the presentation of the 2018 Significant Changes to the Uniform Mechancial Code (UMC) follows:

2018 Significant Changes to the UMC

The following slides will present the most recent changes incorporated into the 2018 Edition of the Uniform Mechanical Code

UMC: 203.0 Appliance

203.0 Appliance. A device that utilizes an energy source to produce light, heat, power, refrigeration, air conditioning or compressed fuel gas.

This was changed to include a device that uses power or fuel to compress fuel gas.

UMC: Table 403.7 Minimum Exhaust Rates

This Table has been correlated with ASHRAE 62.1-2016 to clarify Exhaust Rates for:

- Locker rooms for athletic, industrial and healthcare facilities
- Other locker rooms, and
- Shower rooms

UMC: 504.4.2.1 (Duct) Length Limitation

Unless otherwise permitted and approved by the AHJ, dryer exhaust ducts shall not exceed a total combined horizontal and vertical length of 14-feet, including two 90-degree elbows.

Modified by the following 2018 Northern Nevada Amendment:

UMC: 504.4.2.1 (Duct) Length Limitation cont.

The maximum length of a clothes dryer exhaust duct shall not exceed 35-feet from the dryer location to the wall or roof termination.

The maximum length shall be reduced by 2.5-feet for each 45° bend and by 5-feet for each 90° bend.

UMC: 504.4.2.1 (Duct) Length Limitation cont.

Additional new language was inserted for Exhaust Duct Power Ventilators.

In which application the Power Ventilator is required to be listed in accordance with UL 705 and duct lengths are to be limited only by the ventilator manufacturer's specific instructions.

UMC: 505.0 Product-Conveying Systems

This section has been revised to correlate with NFPA 91-2015.

505.1 Mechanical Ventilation. A mechanical ventilation system shall be interlocked to operate with the equipment used to produce vapors, fumes, or dusts that are flammable or hazardous.

UMC: 511.2.2 Exhaust Air Volumes

Sections 511.2.2.1 Performance Test and 511.2.2.2 Capture and Containment Test have been revised to correlate with ASHRAE 154-2016.

Please refer to these specific code sections for testing parameters.

UMC: 511.2.2.2 Capture & Containment Test

New Exception added by amendment:

Exception: Capture and containment test not required if hood is UL listed and manufacturer's data lists the individual (specific) equipment below hood.

UMC: 519.0 Type II Hood Exhaust Systems

These requirements have been relocated to a separate section to avoid conflict with Type I Hood requirements.

519.1 Where Required. Type II hoods shall be installed above equipment and dishwashers that generate steam, heat, and products of combustion, and where grease or smoke is not present.

UMC: 601.2 Duct Sizing Requirements

601.2 Sizing Requirements. Duct systems shall be sized in accordance with ACCA Manual D or by other approved methods.

The 2016 Edition of Manual D is a consensus based standard with an ANSI standards designation.

UMC: 602.2.4 Discrete Products in Plenums

602.2.4 Discrete Products in Plenums.

Discrete plumbing, mechanical, and electrical products that are located in a plenum and have exposed combustible material shall be listed and labeled in accordance with UL 2043.

UMC: 602.4 Phenolic

602.4 Phenolic.

Ducts, plenums, or fittings of phenolic shall be constructed in accordance with SMACNA Phenolic Duct Construction Standards.

UMC: 602.5 Gypsum

602.5 Gypsum.

Where gypsum products are exposed in ducts or plenums, all gypsum products shall have a mold or mildew resistant surface.

UMC: 603.4 Factory-Made Air Ducts

603.4.1 Length Limitation.

Factory-made flexible air ducts and connectors shall be not more than 5-feet in length and shall not be used in lieu of rigid elbows or fittings. Flexible air ducts shall be permitted to be used as an elbow at a terminal device.

UMC: 603.5 Flexible Air Ducts

This revised section lists 13 installation criteria for the use of Flexible Air Ducts.

The section requires that Flexible Air Ducts comply with UL 181 and be installed in accordance with SMACNA HVAC Duct Construction Standards.

UMC: 603.10.1 Duct Leakage Tests

This entirely new section lays out specific requirements for the Leakage Testing of duct systems. (10%, 40%, 100%)

The section also provides a formula for determining the maximum allowable leakage in a single duct system.

Site-Built Duct

UMC: 802.3.6 Above-Ceiling Air Handling System

802.3.6 Above-Ceiling or Non-ducted Air Handling System. Where a venting system passes through an above-ceiling air space of an air-handling system, it shall conform to one of three specified requirements.

This section was revised entirely to correlate with NFPA 54-2015.

UMC: 1106.2.3 Machinery Room Mechanical Ventilation

1106.2.3 Machinery Room Mechanical Ventilation. Machinery rooms shall be vented to the outdoors, utilizing mechanical ventilation in accordance with Sections 1106.2.4 and 1106.2.5.

The ventilation to be provided is to meet the requirements for Emergency Ventilation Air-Flows specified by Equation 1106.2.5.1 or by Table 1106.2.5.2 for Group A2L refrigerants.

UMC: 1205.2 Pressure Testing

1205.2 Pressure Testing.

Exception: For PEX, PP-R, PEX-AL-PEX, PE-RT, PE-AL-PE piping systems, testing with air shall be permitted where authorized by the manufacturer's instructions for the product.

The Plastic Pipe and Fittings Association (PPFA) position on air testing was revised in 2013 pending manufacturer approval.

The 2018 International Energy Conservation Code

Please note that the **IECC** has **significant** impacts on the design and function of building HVAC systems in BOTH commercial and residential construction.

The following slides will provide a brief overview of these requirements.

Air Curtains

Northern Nevada Amendments add this:

C402.5.9 Air Curtains. Where doorway, passageway, or pass-through openings in the building thermal envelope are intended to be normally open to the exterior environment, an approved air curtain, tested in accordance with ANSI/AMCA shall be used to separate conditioned air from the exterior.

Calculation of Heating and Cooling Loads

Design loads associated with heating, ventilating and air conditioning of the building shall be determined in accordance with ANSI/ASHRAE/ACCA Standard 183 or by an approved equivalent computational procedure.

Equipment Sizing

C403.3.1 Equipment sizing.

The output capacity of heating and cooling equipment shall be not greater than that of the smallest available equipment size that exceeds the loads calculated.

Vestibules for Building Entrances

C402.5.7 Vestibules. Although this requirement has been in the IECC for several code cycles, it seems to have been overlooked in many building designs.

Two important EXCEPTIONS:

1. Doors into spaces <3,000 sq.ft.
2. Doors that have an Air Curtain.

Economizers

C403.5 Economizers (Prescriptive).

Please be aware that this section has been substantially revised since the 2012 Edition of the Energy Code.

Demand Control Ventilation (Mandatory)

C403.7.1 Demand Control Ventilation.

Demand control ventilation (DCV) shall be provided for spaces larger than 500 sq. ft. and with an average occupant load of 25 people or greater per 1,000 sq. ft. of floor area.

Energy Recovery Ventilation Systems

C403.7.4 Energy Recovery Ventilation.

Specific design parameters are laid out in this section and in IECC Tables 403.7.4(1) and 403.7.4(2). Please be aware of these requirements and the EXCEPTIONS allowed.

Kitchen Exhaust Systems

C403.7.5. Kitchen Exhaust Systems.

Where total kitchen hood exhaust airflow rate is greater than 5,000 cfm, each hood shall be a factory-built commercial exhaust hood listed by a nationally recognized testing laboratory in compliance with UL 710.

Automatic Control of Guestroom HVAC

C403.7.6 Automatic Control of HVAC serving guestrooms (R-1, >50 Rooms)

This section specifies the requirements for automatic set-back and set-up with occupant activity and system set-back when room is NOT continuously occupied.

Shutoff Dampers

C403.7.7 Shutoff Dampers

Outdoor air intake and exhaust openings and stairway and shaft vents shall be provided with Class I motorized dampers.

EXCEPTIONS:

1. Buildings ≤ 3-Stories in height
2. Where the exhaust capacity is ≤ 300 cfm.

Walk-In Coolers

C403.10 Walk-in coolers & freezers.

This entire section, including its sub-sections setout the requirements for automatic closing doors and cooler/freezer insulation values for walls, ceilings and floors.

Residential Duct Leakage

By NNICC Amendments:

Post-construction Test: Total leakage shall be less than or equal to 5 CFM or total leakage to the outside shall be less than or equal to 3.5 cfm per 100 sq. ft. of conditioned floor area.

Residential Building Test

R402.4.1.2 Testing.

The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding 5 air changes per hour.

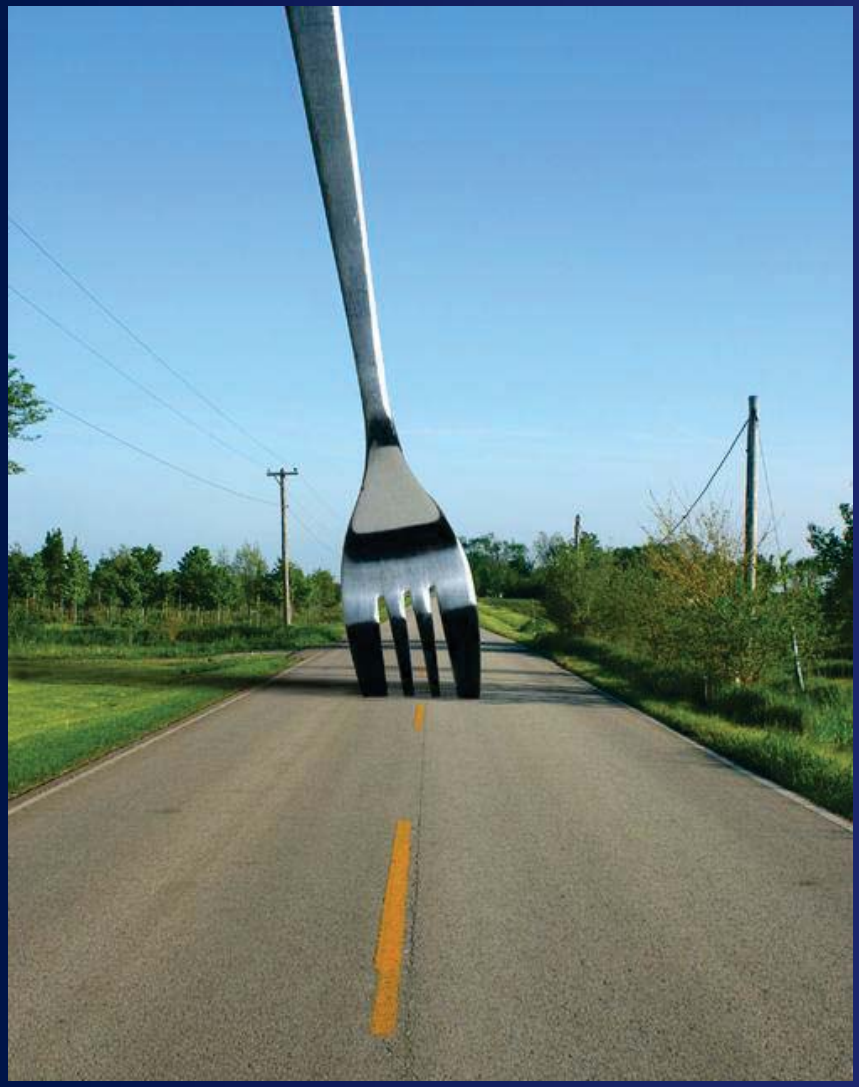
Mechanical Ventilation

R403.6 Mechanical ventilation.

The mechanical system shall have a readily accessible On-Off control switch allowing control of the mechanical system. Other automatic controls are permitted.

Proceed with *CAUTION!*

You may find yourself at "A Fork in the Road"



Which way will you go?

Call us!

For expert code consulting and simple advice, call our office. We stand ready to assist you with appropriate code applications and interpretations. We can review your projects or consult on your designs.

(775) 342-8383

RESOURCES

To purchase a copy of the 2018 Uniform Mechanical Code, contact IAPMO at:

https://iapmomembership.org/index.php?option=com_virtuemart&Itemid

RESOURCES

To purchase a copy of the 2018 International Mechanical Code and International Energy Conservation Code, contact ICC at:

https://shop.iccsafe.org/

THANK YOU!

Questions or Comments?