



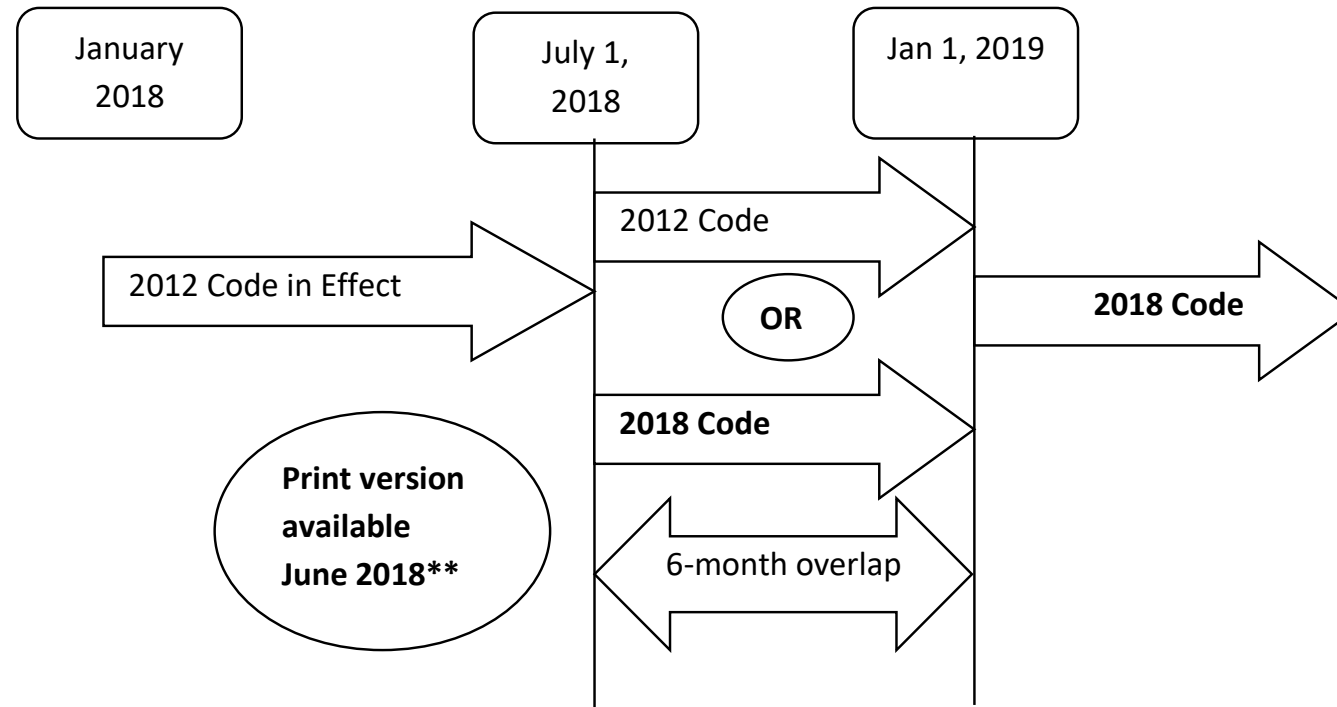
2018 Mechanical Code Overview

OVERVIEW OF COMMERCIAL AND 1 AND 2 FAMILY DWELLING
MECHANICAL CODE

Before we begin...

The 2018 NC Mechanical Code was Adopted by Building Code Council, it is through Rules Review, and is available in print and CD form. We are in the transition period right now. One can select to use either the 2018 or the 2012 code.

The following represents a time line that may aid in planning when to budget for new code training and materials.



Before
we
begin...

FIGURE 1: TENTATIVE ADOPTION AND EFFECTIVE DATES*

- *Dates of overlap and earliest adoption date (July 1, 2018) **are subject to variation** due to the direction of the Building Code Council.
- **The print availability is a best estimate, unfortunately it cannot be promised without caveats

Before we begin...

This link will go
away Dec 31, 2018

Limited time only, Free 2012 NC Code Downloads Available

The Building Code Council and the NC Department of Insurance have negotiated for and achieved funding from the NC General Assembly for the offering of a free (free to the user) downloads of the 2012, 2014 and 2015 NC Building Codes. These codes are fully downloadable and printable for a limited time courtesy of the Department of Insurance. The link to the codes is:

<https://codes.iccsafe.org/public/collections/nc>

The version has the following benefits:

- Fully Downloadable, searchable, printable
- Contains all of the Building Code Council approved amendments from 2012 – 2017 inserted directly into document
- Capable of using electronic sticky notes and highlights when downloaded.

Ok - Overview

The task of the ad hoc committees was to incorporate logical changes that the model code (IMC) offered in the 2012 and 2015 ICC cycle into the 2018 NCMC and 2018 NC Residential Code.

- The ad hoc committees were instructed to not accept changes simply because they were in the model code
- Each change that appeared in the 2012 and/or 2015 ICC language was to be vetted to make sure it was in the best interest of the North Carolina Code.

Overview

Ad hoc committee tasks continued...

- The 2018 NC Code is supposed to represent the 2012 NC Codes with:
 - Building Code Council approved amendments from 2012 – 2017
 - Items from the 2012 ICC Codes that are logical for inclusion in the NC Code
 - Items from the 2015 ICC Codes that are logical for inclusion in the NC Code.
- Attempted clean up of trouble-spots in existing 2012 NC Code.

Overview

No one ever brags about...

- We were in committee meetings for 2 solid weeks, and we did not do anything...
- More than likely, it is human nature to tout ***changes made*** as evidence of ***work accomplished***.
- Well, if we overemphasize the changes made there are of course contractors, legislators, and citizens that view “change” as bad and over-regulation, and not a good accomplishment

Overview

- Instead, I want to emphasize that...
 - Many of the changes are semantics that are not supposed to change anything, just make it easier to read or more technically correct.
 - Also, many, many changes are simply the updating of the referenced documents in the referenced standard chapter. Many of those changes make new product offerings available for use.
 - Manufacturers are constantly trying to have new products and methods added to the code so their product or method will become “off the shelf”, and readily installed
 - An example of this is the geothermal heat pump section
 - I want to emphasize that, in the Mechanical and Fuel Gas code, there was not even a need to file a substantial financial impact report

Overview

So to report on the ad hoc committee accomplishments, It may be more appropriate to say...

- We reviewed thousands of lines of model code, and identified, reviewed, and, if appropriate, adopted changes.
- The impact to the state of NC is expected to be minimal as compared to the 2012 code.
- The desired reformatting of the code into residential and commercial by the Building code Council will necessitate a bit of a learning curve nonetheless.

Overview

Inevitably, when a model code (ICC) code section is rewritten to simply make it easier to understand, it sometimes has the opposite effect.

- We recognize this, but want to emphasize the goal was to not have change for the sake of change, and in most instances the wording was accepted because we hoped it would clarify the code section.

Overview – ad hoc Committee Members

Commercial Mechanical Code

Mechanical

Keith Rogers, PE, Chairman - NCBCC

Al Bass, Engineer

Dick Flowers - City of Raleigh

Paula Strickland, Contractor

Lee Littiken, Contractor

Dan Dittman, PE - NCDDOI Staff

Bill Moeller, PE – NCDDOI Staff

Training – Materials

- This is an introduction to the 2018 Codes, but not a complete review of all sections that were changed.
- This does not take the place of a Level I, II, or III standard course.
- We will not go in depth on any given section
- The responsibility for full knowledge lies with the contractors, design professionals and code officials and their management.

The training infinite loop

Give me a
Summary of the
2018 Code
Changes!



Here is a
summary
of the
changes



This is
insufficient, I
NEED ALL THE
CHANGES!



Here you go,
here are all
the changes!



Um, can you
summarize
that for me?



Is it a Major or Minor Change??

A recession is when your neighbor loses his job, a depression is when you lose your job...

A minor code change is one that you see and plan for, a major code change is one that causes you a change order...

In order to minimize any major code changes..

The provided spreadsheet should enable you to:

- Review the code changes
- Prepare additional training documents for yourself or your staff
- Allow you to research items more in-depth
- Use as you see fit for your office

Format of Excel Document

Color Coding

2012 Language	2012/2015/and/or NC-Specific language	Notes, observations, anticipated impact
	If this cell is light green, it means the language was first noted in the 2012 IMC.	
	If this cell is light blue, it means the language was first noted in the 2015 IMC.	
	If this cell is yellow, and/or text is underlined, then this is language that is NC-Specific.	
	If this cell is blue or green, and there <u>is underlined text</u> or yellow highlighted text , then there was a compound-change.	

Format of Excel Document

Color Coding – Example #1

2012 Language	2012/2015/and/or NC-Specific language	Notes, observations, anticipated impact
No current language in 2012 Code addressing this.	<p>[A] 102.3 Maintenance. The owner or the owner's authorized agent</p> <p>The inspection for maintenance of HVAC systems shall be performed in accordance with ASHRAE/ACCA/ANSI Standard 180.</p>	Deleted this section, did not appear to have a place in a building code, better suited for a maintenance code.

Individual Changes

NC always makes a number of changes to the model code that are changes to the model code, but are not changes to NC

- Chapter 1– 15 Sections were “affected” since the Model Code of 2009
- Chapter 2 - 33 Sections ...
- Chapter 3 – 42 Sections ...
- Chapter 4 – 24 sections ...
- Chapter 5 – 76 sections ...
- Chapter 6 – 37 sections ...

I used the term “affected” because the change or modification may be very slight, or is just NC-specific language that gets rolled forward so it really is not a change to NC.

Individual Changes

- Chapter 7– 1 Sections “affected “ from the Model Code
- Chapter 8 - 8 Sections ...
- Chapter 9 – 18 Sections ...
- Chapter 10 – 12 sections ...
- Chapter 11 – 14 sections ...
- Chapter 12 – 20 sections ...

Individual Changes

- Chapter 13 – 8 Sections “affected” from the Model Code
- Chapter 14 - 0 Sections ...
- Chapter 15 – Virtually every standard was updated, as is usual
- Appendix A – 0
- Appendix B - 0

Individual Changes

Slightly over 300 sections were amended in some way, shape or manner, not including the updates to the referenced standards.

The vast majority of changes were not significant, or represent things that NC traditionally changes anyway.

Chapter 1

[A] 105.2 Alternative materials, methods, equipment and appliances.

The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material or method of construction shall be *approved* where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons the alternative was not approved.

If you are turned down for an alternate method, reasons why need to be in writing

[A] 106.1 Where required.

An owner, owner's authorized agent or contractor who desires to erect, install, enlarge, alter, repair, remove, convert or replace a mechanical system, the installation of which is regulated by this code, or to cause such work to be performed, shall first make application to the code official and obtain the required permit for the work.

Exception: Where *equipment* and *appliance* replacements or repairs must be performed in an emergency situation, the permit application shall be submitted within the next working business day of the department of mechanical inspection

Remainder of Section 106 deleted

Deleted. See North Carolina Administrative Code and Policies.

Included in mechanical also. Just to clarify that no cooling could be considered an emergency also

Requested this stay in, so people know it is okay to changeout cooling equipment also. Might be abused, but do not want to discourage permitting, or have it be blamed for slow service. – DED

Chapter 2

Air, Outdoor

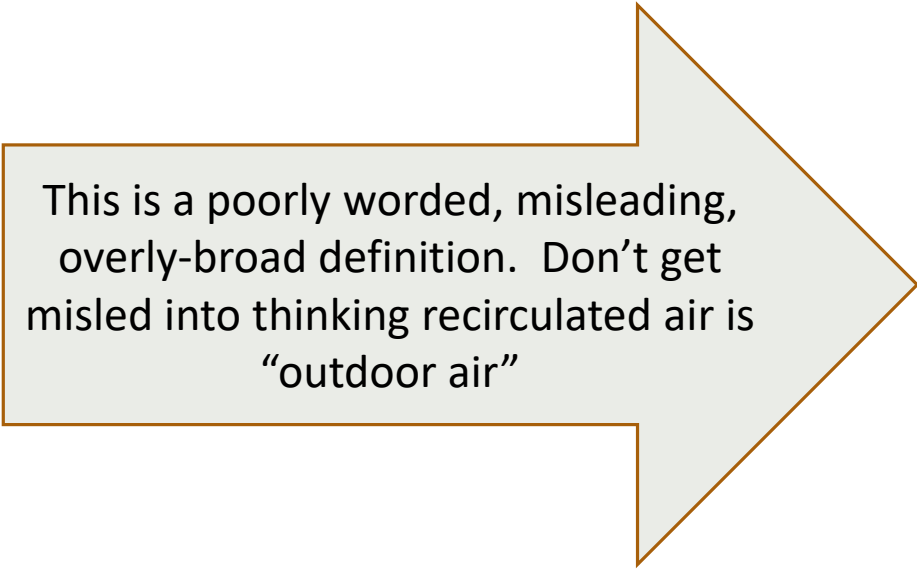
AIR, OUTDOOR. Ambient air that enters a building through a ventilation system, through intentional openings for natural ventilation, or by infiltration.

VENTILATION. The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, any space.

VENTILATION AIR. That portion of supply air that comes from the outside (outdoors), plus any recirculated air that has been treated to maintain the desired quality of air within a designated space.

403.2 Outdoor air required.

The minimum outdoor airflow rate shall be determined in accordance with Section 403.3.



This is a poorly worded, misleading, overly-broad definition. Don't get misled into thinking recirculated air is "outdoor air"

This is meant to address items in
plenums.

Discrete Product

DISCRETE PRODUCT. Products that are noncontinuous, individual, distinct pieces such as, but not limited to, electrical, plumbing and mechanical products and duct straps, duct fittings, duct registers and pipe hangers.

Simply added the
definition of a
mini-split.

Ductless Mini-Split System

DUCTLESS MINI-SPLIT SYSTEM. A heating and cooling system that is comprised of one or multiple indoor evaporator/air-handling units and an outdoor condensing unit that is connected by refrigerant piping and electrical wiring. A ductless mini-split system is capable of cooling or heating one or more rooms without the use of a traditional ductwork system.

Mini-splits are not exempt from permitting requirements. The code does regulate them, even if they are plug-in.

Added parking
garage exhaust to
the definition

Environmental Air

ENVIRONMENTAL AIR. Air that is conveyed to or from occupied areas through ducts which are not part of the heating or air-conditioning system, such as ventilation for human use, domestic kitchen range exhaust, bathroom exhaust, domestic clothes dryer exhaust and parking garage exhaust.

Extra-Heavy-Duty Cooking Appliance

EXTRA-HEAVY-DUTY COOKING APPLIANCE. Extra-heavy-duty cooking appliances are those utilizing open flame combustion of solid fuel at any time.

Shall not use solid fuel to provide source of heat for cooking. Pellets and chips if used as flavoring shall not be in a state of open flame combustion at any time. Smoldering chambers shall not introduce embers into the flue at any time.

Realize the NC language should be an exception or put in the Heavy Duty Cooking Appliance – Need to Fix - Sorry

Heavy-Duty Cooking Appliance

HEAVY-DUTY COOKING APPLIANCE. Heavy-duty cooking *appliances* include electric under-fired broilers, electric chain (conveyor) broilers, gas under-fired broilers, gas chain (conveyor) broilers, gas open-burner ranges (with or without oven), electric and gas wok ranges, **smokers, smoker ovens**, and electric and gas over-fired (upright) broilers and salamanders.

Smokers are, by definition,
heavy duty appliances at a
minimum

Chapter 3

301.3 Identification

301.3 Identification.

Each length of pipe and tubing and each pipe fitting utilized in a mechanical system shall bear the identification of the manufacturer as required by the listing or standard for the piping or tubing.

The listing companies have varying ways that their products are allowed to be identified. Makes it real difficult for the contractor and code official to verify a products origin

301.4 Plastic pipe, fitting and components

301.4 Plastic pipe, fittings and components. - deleted

~~Plastic pipe, fittings and components shall be *third party certified* as conforming to NSF 14. –~~

304.11 Guards

[BE] 304.11 Guards.

Guards shall be provided where ~~various components~~ **appliances, equipment, fans** or other components that require service and roof hatch openings are located within **40 feet 6 feet** (1829 mm)(~~3048 mm~~) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof, or grade below. The guard shall extend not less than 30 inches (762 mm) beyond each end of **appliances, equipment, fans** ~~components~~ and roof hatch openings. ~~that require service~~. The top of the guard shall be located not less than 42 inches (1067 mm) above the elevated surface adjacent to the guard. The guard shall be constructed so as to prevent the passage of a 21-inch-diameter (533 mm) sphere and shall comply with the loading requirements for guards specified in the *International Building Code*.

Exceptions:

Exception: **Exception 1:** Guards are not required where permanent fall arrest/restraint anchorage connector devices that comply with ANSI/ASSE Z 359.1 are affixed for use during the entire lifetime of the roof covering. The devices shall be re-evaluated for possible replacement when the entire roof covering is replaced. The devices shall be placed not more than 10 feet (3048 mm) on center along hip and ridge lines and placed not less than 10 feet (3048 mm) from roof edges and the open sides of walking surfaces.

Exception 2: Guards not required at the time of original installation are not required by this section for equipment repaired or replaced.

Guards have been required since 1971

New

306.3 Appliances in attics and above hard ceilings

306.3 Appliances in attics and above hard ceilings.

Attics containing appliances shall be provided with an opening and unobstructed passageway large enough to allow removal of the largest **component of the appliance**. The passageway shall be not less than 30 inches (762 mm) high and 22 inches (559 mm) wide and not more than 20 feet (6096 mm) in length measured along the centerline of the passageway from the opening to the *appliance*. The passageway shall have continuous solid flooring not less than 24 inches (610 mm) wide. A level service space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the *appliance*. The clear access opening dimensions shall be not less than 20 inches by 30 inches (508 mm by 762 mm), and large enough to allow removal of the largest **component of the appliance**.

Exceptions:

1. The passageway and level service space are not required where the *appliance* is capable of being serviced and removed through the required opening.
- ~~1. Where the passageway is unobstructed and not less than 6 feet (1829 mm) high and 22 inches (559 mm) wide for its entire length, the passageway shall be not greater than 50 feet (15 250 mm) in length.~~
- 2. Where the passageway is not less than 6 feet (1829 mm) high for its entire length, the passageway shall not be limited in length.**

306.3.1 Electrical requirements

306.3.1 Electrical requirements. Lighting outlet and receptacle.

~~A luminaire controlled by a switch located at the required passageway opening and a receptacle outlet shall be provided at or near the *appliance* location in accordance with NFPA 70.~~ For reference and coordination purposes only, refer to North Carolina Electrical Code article 210.63 for receptacle, and Article 210.70 (3) for lighting outlet and switch location.

306.5 Equipment and appliances on roofs or elevated structures

306.5 Equipment and appliances on roofs or elevated structures.

Where *equipment* and appliances requiring periodic maintenance are installed on access or appliances are located on , or suspended from, an elevated structure or the roof of a building such that personnel will have to climb higher than 16 feet (4877 mm) above grade or finished floor to access such equipment or appliances, an interior or exterior means of access shall be provided. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) in height or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope). Such access shall not require the use of portable ladders. Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.

Clears up the case where you had roofs that are multiple heights. You are not expected to carry a ladder up a 16-ft height to then scale obstacles greater than 30 inches.

#8 requires a landing area

8. Landing required. The ladder shall be provided with a clear and unobstructed bottom landing area having a minimum dimension of 30 inches (762 mm) by 30 inches (762 mm) centered in front of the ladder.
9. Ladders shall be protected against corrosion. ~~by approved means.~~
10. Access to ladders shall be provided at all times. This requirement does not preclude the owner from securing the ladder from unauthorized access.

#10 requires access, but NC
stated it can be secured

Condensate pumps are the installer's choice. The phrase "where unable to drain by gravity..." statement has been removed.

307.2.1 Condensate disposal

307.2.1 Condensate disposal.

Condensate from all condensing furnaces, cooling coils and evaporators shall be conveyed from the drain pan outlet to an *approved* place of disposal. Such piping shall maintain a minimum horizontal slope in the direction of discharge of not less than one-eighth unit vertical in 12 units horizontal (1-percent slope). Where pumps are used, they shall be installed with a factory-equipped auxiliary high-level switch and shall shut off equipment served upon activation of the auxiliary high-level switch. Where damage to any building components will occur as a result of overflow from the pump, the pump shall also be located in the auxiliary drain pan or in a separate drain pan equipped with a separate drain line or water-level detection device.

Added requirement for insulation.
Was an interpretation before, led to
inconsistent enforcement.

307.2.2 Drain pipe materials and sizes

307.2.2 Drain pipe materials and sizes.

Components of the condensate disposal system shall be cast iron, galvanized steel, copper, cross-linked polyethylene, polyethylene, ABS, CPVC, PVC, or polypropylene pipe or tubing. Components shall be selected for the pressure and temperature rating of the installation.

Joints and connections shall be made in accordance with the applicable provisions of Chapter 7 of the *International Plumbing Code* relative to the material type. Condensate

waste and drain line size shall be not less than $\frac{3}{4}$ -inch (19.1 mm) internal diameter and

shall not decrease in size from the drain pan connection to the place of condensate disposal. ~~Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with Table 307.2.2.~~

Provisions shall be made to prevent the formation of condensation on the exterior of primary condensate drain piping if condensate dripping off the pipe could cause damage to any building component.

307.2.3 Auxiliary and secondary drain systems

307.2.3 Auxiliary and secondary drain systems.

In addition to the requirements of Section 307.2.1, where damage to any building components could occur as a result of overflow from the *equipment* primary condensate removal system one of the following auxiliary protection methods shall be provided for each cooling coil or fuel-fired *appliance* that produces condensate:

1. An auxiliary drain pan with a separate drain shall be provided under the coils on which condensation will occur. The auxiliary pan drain shall discharge to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drain. The pan shall have a minimum depth of $1\frac{1}{2}$ inches (38 mm), shall be not less than 3 inches (76 mm) larger than the unit, or the coil dimensions in width and length and shall be constructed of corrosion-resistant material. Galvanized sheet steel pans shall have a minimum thickness of not less than 0.0236 inch (0.6010 mm) (No. 24 gage). Nonmetallic pans shall have a minimum thickness of not less than 0.0625 inch (1.6 mm).

a. Appliances with primary condensate pans above appliance components.

Cooling coils mounted above the air handler or furnace shall have a secondary drain piped to auxiliary pan under air handler to avoid condensate migrating through appliance components before reaching the auxiliary drain pan.

307.2.4.1 Ductless mini-split system traps

307.2.4.1 Ductless mini-split system traps.

Ductless mini-split equipment that produces condensate shall be provided with an inline check valve located in the drain line, or a trap.

307.2.5 Drain line maintenance.

Condensate drain lines shall be configured to permit the clearing of blockages and performance of maintenance without requiring the drain line to be cut.

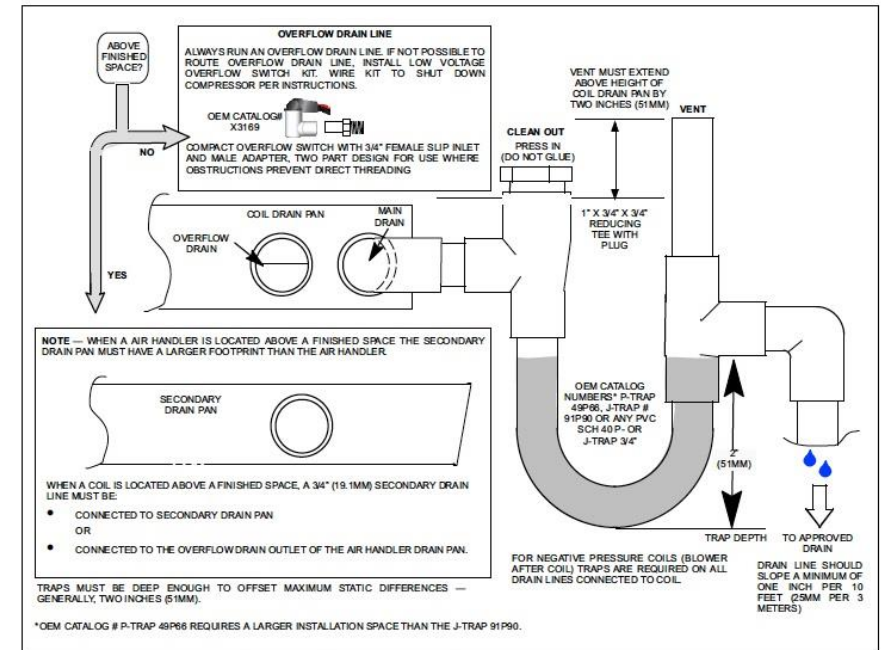


Figure 15. Typical Main and Overflow Drain Installations

307.3 Condensate pumps.

Condensate pumps located in uninhabitable spaces, such as attics and crawl spaces, shall be connected to the appliance or equipment served such that when the pump fails, the appliance or equipment will be prevented from operating. Pumps shall be installed in accordance with the manufacturers' instructions.



Note that the phrase “where damage could occur” is not here; it applies to all condensate pumps in attics and crawl spaces.

Code section that allows
for zero-clearance hoods
for labeled assemblies.

308.4.1 Labeled assemblies

308.4.1 Labeled assemblies.

~~The allowable clearance reduction shall be based on an approved reduced clearance protective assembly that is listed and labeled in accordance with UL 1618.~~

The allowable clearance reduction shall be based on an approved reduced clearance protective assembly that has been tested and bears the label of an approved agency.

And no, human comfort does not mean “comfy” it means some heat for people versus product.

309.1 Space-heating systems

[BG] 309.1 Space-heating systems.

Interior spaces intended for human occupancy shall be provided with active or passive space-heating systems capable of maintaining an indoor temperature of not less than 68°F (20°C) at a point 3 feet (914 mm) above floor on the design heating day. The installation of portable space heaters shall not be used to achieve compliance with this section.

Exceptions:

1. Interior spaces where the primary purpose is not associated with human comfort.

2. Group F, H, S and U occupancies

Removed prescriptive section
for groups F, H, S, and U

Section 313 Carbon Monoxide alarms - residential

SECTION 313 CARBON MONOXIDE ALARMS

The two carbon monoxide requirements that were passed by amendments to the 2012 code are incorporated into the 2018 code.

The commercial one doesn't come right out and say it is commercial.

313.4 Carbon Monoxide detection - commercial

313.4 Carbon monoxide detection.

313.4.1 General. Carbon monoxide detection shall be installed in accordance with Sections 313.4.1 through 313.4.6.

313.4.1.1 Where required. Carbon monoxide detection shall be provided in Group I-1, I-2, I-4 and R occupancies (Except R-3) and in classrooms in Group E occupancies in the locations specified in Section 313.4.2 where any of the conditions in Sections 313.4.1.2 through 313.4.1.6 exist.

Chapter 4



401.2 Ventilation required

401.2 Ventilation required.

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

NC eliminates model code requirement
for mechanical ventilation in dwellings

Hospitals are not in Table
403.3 anymore.

Two changes made to item #2

401.4 Intake opening location

401.4 Intake opening location.

Air intake openings shall comply with all of the following:

1. Intake openings shall be located not less than 10 feet (3048 mm) from lot lines or buildings on the same lot.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.3.1. Outdoor air intake openings shall be permitted to be located less than 10 feet (3048 mm) horizontally from streets, alleys, parking lots and loading docks provided that the openings are located not less than 25 feet (7620 mm) vertically above such locations. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way.



403.1 Ventilation system

403.1 Ventilation system.

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

Does not mean they have to have a mechanical means of ventilation if they can meet the natural means, it just adds a prescriptive path to do so.

- h. For nail salons, each manicure and pedicure station shall be provided with a *source capture system* capable of exhausting not less than 50 cfm per station. Exhaust inlets shall be located in accordance with Section 502.20. Where one or more required source capture systems operate continuously during occupancy, the exhaust rate from such systems shall be permitted to be applied to the exhaust flow rate required by Table 403.3.1.1 for the nail salon.

Clearly includes pedicure stations also

No real change, just hammers it home. Capture the pollution at the source.

502.20 Manicure and pedicure stations

502.20 Manicure and pedicure stations.

Manicure and pedicure stations shall be provided with an exhaust system in accordance with Table 403.3.1.1, Note h. Manicure tables and pedicure stations not provided with factory-installed exhaust inlets shall be provided with exhaust inlets located not more than 12 inches (305 mm) horizontally and vertically from the point of chemical application.

Chapter 5

No screens, no fixed louvers

504.4 Exhaust installation – dryer exhaust duct

504.4 Exhaust installation.

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



504.5 Dryer exhaust duct power ventilators.

504.5 Dryer exhaust duct power ventilators.

Domestic dryer exhaust duct power ventilators shall be listed and labeled to UL 705 for use in dryer exhaust duct systems. The dryer exhaust duct power ventilator shall be installed in accordance with the manufacturer's instructions

Just wanted to let people know tape is not the only method. Some manufacturer's require steel straps.

504.8.2 Duct installation

504.8.2 Duct installation.

Exhaust ducts shall be supported at 4-foot (1219 mm) intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. ~~Ducts shall not be joined with screws or similar fasteners that protrude more than $\frac{4}{8}$ inch (3.2 mm) into the inside of the duct.~~ Ducts shall not be joined with screws or similar fasteners that protrude into the inside of the duct. Ducts shall be sealed in accordance with 603.9.

- a. Nonmetallic mechanical fasteners (tie-straps) shall be listed to UL 181B
- b. Metal band duct clamps are not required to be listed.

Some guidance on the label and its contents

504.8.5 Length identification

504.8.5 Length identification.

Where the exhaust duct equivalent length exceeds 35 feet (10 668 mm), the equivalent length of the exhaust duct shall be identified on a permanent label or tag. The label or tag shall be located within 6 feet (1829 mm) of the exhaust duct connection.

- Label shall be permanently stenciled, laminated, or commercially available plastic or metal tags.
- Labels shall state, at a minimum (fill in the blank):
 - Caution: Equivalent length ft. Any installed dryer must be equipped with exhaust system that meets or exceeds this equivalent length requirement.
- Labels can be attached to wall or vent receptor.

Independent

505.1 Domestic systems

505.1 Domestic systems.

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

506.3.9 Grease duct horizontal cleanouts

506.3.9 Grease duct horizontal cleanouts.

Cleanouts serving horizontal sections of grease ducts shall:

1. Be spaced not more than 20 feet (6096 mm) apart.
2. Be located not more than 10 feet (3048 mm) from changes in direction that are greater than 45 degrees (0.79 rad).
3. Be located on the bottom only where other locations are not available and shall be provided with internal damming of the opening such that grease will flow past the opening without pooling. Bottom cleanouts and openings shall be approved for the application and installed liquid-tight.
4. Not be closer than 1 inch (25 mm) from the edges of the duct.
5. Have opening dimensions of not less than 12 inches by 12 inches (305 mm by 305 mm). Where such dimensions preclude installation, the opening shall be not less than 12 inches (305 mm) on one side and shall be large enough to provide access for cleaning and maintenance.
6. Shall be located at grease reservoirs.

Changed the layout,
not necessarily the
content

506.3.10 Underground grease duct installations

506.3.10 Underground grease duct installation.

Underground grease duct installations shall comply with all of the following:

1. Underground grease ducts shall be constructed of steel having a minimum thickness of 0.0575 inch (1.463 mm)(No. 16 gage) and shall be coated to provide protection from corrosion or shall be constructed of stainless steel having a minimum thickness of 0.0450 inch (1.140 mm)(No. 18 gage).
2. The underground duct system shall be tested and approved in accordance with Section 506.3.2.5 prior to coating or placement in the ground.
3. The underground duct system shall be completely encased in concrete with a minimum thickness of 4 inches (102 mm).
4. Ducts shall slope toward grease reservoirs.
5. A grease reservoir with a cleanout to allow cleaning of the reservoir shall be provided at the base of each vertical duct riser.
6. Cleanouts shall be provided with access to permit cleaning and inspection of the duct in accordance with Section 506.3.
7. Cleanouts in horizontal ducts shall be installed on the topside of the duct.
8. Cleanout locations shall be legibly identified at the point of access from the interior space.

Prescriptive
underground
grease duct
method
added

506.5.1 Exhaust Fans

506.5.1 Exhaust fans.

Exhaust fan housings serving a Type I hood shall be constructed as required for grease ducts in accordance with Section 506.3.1.1.

Exception: Fans *listed* and *labeled* in accordance with UL 762.

506.5.1.1 Fan motor.

Exhaust fan motors shall be located outside of the exhaust airstream.

506.5.1.2 In-line fan location.

Where enclosed duct systems are connected to in-line fans not protected by fire-rated enclosures or field applied grease duct enclosure, and not located outdoors, ~~the~~ then the fan shall be located in a room or space having the same fire-resistance rating as the duct enclosure. Access shall be provided for servicing and cleaning of fan components. Such rooms or spaces shall be ventilated in accordance with the fan manufacturer's installation instructions.

Prescriptive hibachi style down draft section added

507.1 General-Kitchen hoods

507.1 General.

Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues.

A Type I or Type II hood shall be installed at or above all *commercial cooking appliances* in accordance with Sections 507.2 and 507.3. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. Where a Type I hood is installed, the installation of the entire system, including the hood, ducts, exhaust equipment and makeup air system shall comply with the requirements of Sections 506, 507, 508 and 509.

Exceptions:

1. Factory-built commercial exhaust hoods that are listed and labeled in accordance with UL 710, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5.
3. Where cooking appliances are equipped with integral down-draft exhaust systems and such appliances and exhaust systems are listed and labeled for the application in accordance with NFPA 96, a hood shall not be required at or above them.

(did not pick up Item 3 during ad hoc meetings, becoming sort of common with Hibachi-style cooking surfaces)

Very problematic when manufacturers don't follow same set of rules. These are not UL710B appliances – they may be something else

507.2 Type I hoods

507.2 Type I hoods.

Type I hoods shall be installed where cooking *appliances* produce grease or smoke. ~~as a result of the cooking process.~~ Type I hoods shall be installed over ~~medium-duty, heavy-duty and extra-heavy-duty cooking appliances.~~ Type I hoods shall be installed over *light-duty cooking appliances* and *medium-duty cooking appliances* that produce grease or smoke

Exception: A Type I hood shall not be required for an electric cooking appliance where an approved testing agency provides documentation that the appliance effluent contains 5 mg/m^3 or less of grease when tested at an exhaust flow rate of 500 cfm ($0.236 \text{ m}^3/\text{s}$) in accordance with UL 710B.

507.2.1 Type I exhaust flow rate label.

Type I hoods shall bear a label indicating the minimum exhaust flow rate in cfm per linear foot (1.55 L/s per linear meter) of hood that provides for capture and containment of the exhaust effluent for the cooking appliances served by the hood, based on the cooking appliance duty classifications defined in this code.

Chapter 6

2018 Mechanical Code

602.2 Construction.

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

2012 Mechanical Code

602.2 Construction. *Plenum* enclosures shall be constructed of materials permitted for the type of construction classification of the building.

703.5 Noncombustibility tests. The tests indicated in Sections 703.5.1 and 703.5.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Type I, II, III and IV construction. The term “noncombustible” does not apply to the flame spread characteristics of *interior finish* or *trim* materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

703.4.1 Elementary materials. Materials required to be noncombustible shall be tested in accordance with ASTM E 136

602.2.1.5 Discrete plumbing and mechanical products in plenums

602.2.1.5 Discrete plumbing and mechanical products in plenums.

Where discrete plumbing and mechanical products and appurtenances are located in a plenum and have exposed combustible material, they shall be listed and labeled for such use in accordance with UL 2043.

Standard added – UL 2043

602.2.1.5 Discrete plumbing and mechanical products in plenums

602.2.1.5 Discrete plumbing and mechanical products in plenums.

Where discrete plumbing and mechanical products and appurtenances are located in a plenum and have exposed combustible material, they shall be listed and labeled for such use in accordance with UL 2043.

602.2.1.7 Plastic plumbing pipe and tube

602.2.1.7 Plastic plumbing pipe and tube.

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

602.3 Stud cavity and joist space plenums

602.3 Stud cavity and joist space plenums.

Stud wall cavities and the spaces between solid floor joists to be utilized as air plenums shall comply with the following conditions:

1. Such cavities or spaces shall not be utilized as a *plenum* for supply air.
2. Such cavities or spaces shall not be part of a required fire-resistance-rated assembly.
3. Stud wall cavities shall not convey air from more than one floor level.
4. Stud wall cavities and joist space plenums shall comply with the floor penetration protection requirements of the *International Building Code*.
5. Stud wall cavities and joist space plenums shall be isolated from adjacent concealed spaces by *approved* fireblocking as required in the *International Building Code*.
6. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.

This was in Residential Code in 2012. Made it consistent with that.
May need to protect ductboard from physical damage.

603.7 Rigid duct penetrations

603.7 Rigid duct penetrations.

Duct system penetrations of walls, floors, ceilings and roofs and air transfer openings in such building components shall be protected as required by Section 607. Ducts in a private garage that penetrate a wall or ceiling that separates a dwelling unit from a private garage shall be continuous, shall be constructed of sheet steel having a thickness of not less than 0.0187 inch (0.4712 mm) (No. 26 gage) or other approved noncombustible material of equivalent durability and shall not have openings into the garage. Fire and smoke dampers are not required in such ducts passing through the wall or ceiling separating a dwelling unit from a private garage except where required by Chapter 7 of the *International Building Code*

603.18 Return-air intake (nonengineered systems)

603.18 Return-air intake (nonengineered systems). If only one central return-air grille is installed, it shall be of a size sufficient to return a volume of air compatible with the CFM requirements and the temperature rise limitations specified by the equipment manufacturer. The face velocity of return air grilles shall not exceed 450 feet per minute (fpm) (2.3 m/s). At least one separate return shall be installed on each level of a multi-level structure. For split-level and split-foyer structures, one return may serve more than one level if located within the split area and the total area of the levels does not exceed 1,600 square feet (148.6 m²). Return-air grilles shall not be located in bathrooms. The return air from one residential living unit shall not be mixed with the return air from other living units. In dwellings with 1,600 square feet (148.6 m²) or less of conditioned area, a central return is permitted. When the dwelling contains more than 1,600 square feet (148.6 m²) of conditioned area, additional returns shall be provided. Each return shall serve not more than 1,600 square feet (148.6 m²) of area and shall be located in the area it serves. Return air may travel through the living space to the return-air intake if there are no restrictions, such as solid doors, to the air movement. Undercut doors are allowed. When panned joists are used for return air, the structural integrity shall be maintained. Air capacity for joists 16 inches (406 mm) on center shall be a maximum of 375 cubic feet per minute (0.177 m³/s) for 8-inch (203 mm) joists and 525 cubic feet per minute (0.248 m³/s) for 10-inch (254 mm) joists. Wiring located in spaces used for return-air ducts shall comply with the *North Carolina Electrical Code*.

Directly addresses basements now. In the past it was not addressed, led to inconsistent enforcement

604.1 General (duct insulation)

604.1 General.

Duct insulation shall conform to the requirements of Sections 604.2 through 604.13 and the *International Energy Conservation Code*. Replacement or addition of cooling equipment to existing ductwork located in an attic shall require the ductwork to be insulated. Replacement of heating or the addition of cooling equipment in a crawl space or conditioned basements shall not require the existing ductwork to be insulated. Unconditioned basement ductwork shall require insulation with the addition of cooling.

604.4 Foam Plastic insulation

604.4 Foam plastic insulation.

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

Exception: Spray application of polyurethane foam to the exterior of ducts in *attics* and crawl spaces shall be permitted in one-and-two family dwellings subject to all of the following:

1. The flame spread index is not greater than 25 and the smoke-developed index is not greater than 450 at the specified installed thickness.
2. The foam plastic is protected in accordance with the ignition barrier requirements of Sections R316.5.3 and R316.5.4.
3. The foam plastic complies with the requirements of Section R316.

Language from IRC - , except added “in one and two-family dwellings because that language is not in the IRC, because it only resides in the IRC to begin with.-DED

606.4.1 Supervision

[F] 606.4.1 Supervision.

The duct smoke detectors shall be connected to a fire alarm system where a fire alarm system is required by Section 907.2 of the *International Fire Code*. The actuation of a duct smoke detector shall activate a visible and audible supervisory signal at a constantly attended location. In facilities that are required to be monitored by a supervising station, duct smoke detectors shall report only as a supervisory signal, not as a fire alarm.

Clarifies it is a supervisory
signal

607.3.2.4 Corridor damper ratings

[BF] 607.3.2.4 Corridor damper ratings.

Corridor dampers shall have the following minimum ratings.

1. One hour fire-resistance rating.
2. Class I or II leakage rating as specified in Section 607.3.2.2.

Such walls are penetrated by ducted HVAC systems, have a required fire-resistance rating of 1 hour or less, and are in areas of other than Group H and are in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 of the *International Building Code*. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than 26 gage in thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals

607.6.3 Nonfire-resistance-rated floor assemblies

[BF] 607.6.3 Nonfire-resistance-rated floor assemblies.

Duct systems constructed of approved materials in accordance with Section 603 that penetrate nonfire-resistance-rated floor assemblies shall be protected by any of the following methods:

1. A shaft enclosure in accordance with Section 713 of the *International Building Code*.
2. The duct connects not more than two stories, and the annular space around the penetrating duct is protected with an *approved* noncombustible material that resists the free passage of flame and the products of *combustion*.
3. In floor assemblies composed of noncombustible materials, a shaft shall not be required where the duct connects not more than three stories, and the annular space around the penetrating duct is protected with an approved noncombustible material that resists the free passage of flame and the products of combustion and a fire damper is installed at each floor line.

Changes the situation where historically you were putting a fire damper in an unrated floor, and it was an undefined safety means. Effectively, you will need a shaft now for three stories if the floors are wood. - ded

Chapter 7

701.2 Dampered openings

701.2 Dampered openings.

Where combustion air openings are provided with volume, smoke or fire dampers, the dampers shall be interlocked with the firing cycle of the appliances served, so as to prevent operation of any appliance that draws combustion air from the room or space when any of the dampers are closed. Manual dampers shall not be installed in combustion air ducts. Ducts not provided with dampers and that pass through rated construction shall be enclosed in a shaft in accordance with the *International Building Code*.

Chapter 8

New section in mechanical and fuel gas code. Probably more common issue in Fuel Gas Code

802.9 Door swing

802.9 Door swing.

Appliance and equipment vent terminals shall be located such that doors cannot swing within 12 inches (305 mm) horizontally of the vent terminals. Doorstops or closers shall not be installed to obtain this clearance.

Chapter 9

903.4 Gasketed fireplace doors

903.4 Gasketed fireplace doors.

A gasketed fireplace door shall not be installed on a factory-built fireplace except where the fireplace system has been specifically tested, listed and labeled for such use in accordance with UL 127.

Section added in 2015 - ded

908.5 Water supply

908.5 Water supply.

Cooling towers, evaporative coolers and fluid coolers shall be provided with an approved water supply, sized for peak demand. The quality of water shall be provided in accordance with the equipment manufacturer's recommendations. The piping system and protection of the potable water supply system shall be installed as required by the *International Plumbing Code*.

Section added in 2015 – mostly advisory language – for the design professional - ded

908.8 Cooling Towers

908.8 Cooling towers.

Cooling towers, both open circuit and closed circuit type, and evaporative condensers shall comply with Sections 908.8.1 and 908.8.2.

908.8.1 Conductivity or flow-based control of cycles of concentration.

Cooling towers and evaporative condensers shall include controls that automate system bleed based on conductivity, fraction of metered makeup volume, metered bleed volume, recirculating pump run time or bleed time.

908.8.2 Drift eliminators.

Cooling towers and evaporative condensers shall be equipped with drift eliminators that have a maximum drift rate of 0.005 percent of the circulated water flow rate as established in the equipment's design specifications.

Basically industry standards - ded

SECTION 927 RADIANT HEATING SYSTEMS

927.1 General.

Electric radiant heating systems shall be installed in accordance with the manufacturer's instructions and shall be listed for the application.

Chapter 10

1007.1 General

1007.1 General.

Steam and hot water boilers shall be protected with a low-water cutoff control.

Exception: A low-water cutoff is not required for coil-type and water-tube-type boilers that require forced circulation of water through the boiler and that are protected with a flow sensing control.

Added in 2015 – ded

1007.2 Operation

1007.2 Operation.

Low-water cutoff controls and flow sensing controls required by Section 1007.1 shall automatically stop the *combustion* operation of the *appliance* when the water level drops below the lowest safe water level as established by the manufacturer or when water circulation stops, respectively.

Phrase added in 2015 - ded

Chapter 11

1107.2 Piping location

1107.2 Piping location.

Refrigerant piping that crosses an open space that affords passageway in any building shall be not less than 7 feet 3 inches (2210 mm) above the floor unless the piping is located against the ceiling of such space. Refrigerant piping shall not be placed in any elevator, dumbwaiter or other shaft containing a moving object or in any shaft that has openings to living quarters or to means of egress. Refrigerant piping shall not be installed in an enclosed ~~public stairway, stairway landing or means of egress.~~ vertical or horizontal exit enclosure.

Attempted to reconcile the differences between two standards, ASHRAE and NFPA with respect to means of egress.

Chapter 12

1208.1 General-testing

1208.1 General.

Hydronic piping systems shall be tested hydrostatically at one and one-half times the maximum system design pressure, but not less than 100 psi (689 kPa). The duration of each test shall be not less than 15 minutes.

Moved the ground source piping loop test requirements - ded

1210 – Ground-source heat pump loop system

About 5 pages of requirements were added in the 2015 IMC cycle specific to ground source heat pump systems. They are not all reproduced here for brevity. See code for all additions

SECTION 1210 PLASTIC PIPE GROUND-SOURCE HEAT PUMP LOOP SYSTEMS

1210.1 Ground-source heat pump-loop water piping.

Ground-source heat pump ground-loop piping and tubing material for water-based systems shall conform to the standards cited in this section.

Chapter 13

1305.2 Protection of pipe, equipment and appliances

1305.2 Protection of pipe, equipment and appliances.

Fuel oil pipe, *equipment* and appliances shall be protected from physical damage.

1305.2.1 Flood hazard.

Fuel oil pipe, equipment and appliances located in flood hazard areas shall be located above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment or shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding up to such elevation.

1308.1.1 Test Gauges

1308.1 Testing required.

Fuel oil piping shall be tested in accordance with NFPA 31.

1308.1.1 Test gauges.

Gauges used for testing shall be as follows:

1. Tests requiring a pressure of 10 pounds per square inch (psi) (69 kPa) or less shall utilize a testing gauge having increments of 0.10 psi (0.69 kPa) or less. 2. Tests requiring a pressure of greater than 10 psi (69 kPa) but less than or equal to 100 psi (689 kPa) shall utilize a testing gauge having increments of 1 psi (6.9 kPa) or less. 3. Tests requiring a pressure of greater than 100 psi (689 kPa) shall utilize a testing gauge having increments of 2 psi (14 kPa) or less

Added requirements for gauges. Most important for the fuel gas code. Put it in plumbing, fuel gas, and mechanical.

Chapter 14

1401 – No changes in chapter 14

Chapter 15

Many standards were updated, that is normal.

Appendix A

No changes

Appendix B

No changes



Questions?

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