Revisions to Chapter 5 & 7 of the 2018 International Plumbing Code

CHAPTER 5 - WATER HEATERS

CHAPTER 7 - DRAINAGE

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Minimum Standard Construction Codes in Georgia

While you are reading and studying these classes on construction codes in Georgia it is important to understand how codes are regulated in our state. Codes are law and are to be enforced as such.

From the early 1960s until 1991 there were no statewide construction codes. It was entirely up to a local government to decide which codes they would enforce on construction projects in their jurisdiction. This caused a lot of confusion in the construction industry. The state decided to remedy the situation by adopting statewide Minimum Standard Construction Codes. This meant that no matter where you worked in the state you would be required to meet the same level of quality and standards on all construction projects. This bill passed and became law in 1991 known as "Uniform Codes Act". It set up eight mandatory codes that covered all phases of construction and set the minimum standards for all work performed. An additional six permissive codes were also adopted that cover existing buildings and other issues. The Georgia Department of Community Affairs is the state agency the manages the Code program.

While codes are state laws, the state delegated code enforcement to the local governments. It is required that they adopt administrative procedures on how they will enforce codes and declare which codes they will enforce. As with many state laws. If the local jurisdiction does not enforce codes, the person installing a plumbing, electrical or heating system or building a structure must still meet these minimum standards. If a person is found guilty of not complying with these requirements, they will be held responsible by the courts. The next slide shows the current Minimum Standard codes for Georgia.

2020 State Adopted Mandatory Construction Codes

- 2018 International Building Code (IBC)
- 2018 International Residential Building Code (IRC)
- 2018 International Plumbing Code (IPC)
- 2018 International Mechanical Code (IMC)
- 2018 International Fuel Gas Code IFGC)
- 2018 International Fire Code (IFC)
- 2015 International Energy Code (IECC)
- 2017 National Electrical Code. (NEC)
- 2018 International Swimming Pool and Spa Code (IPSC)

- Except for the National Electrical Code, all codes listed above have Georgia Amendments which change the requirements of the code. Amendments must be used in conjunction with the code to determine compliance of work performed.

- The Latest edition of the Code are adopted by the state every six years. Amendments can be adopted yearly

- Amendments can be found on the DCA: website dca.ga.gov

Revision to Chapter 5 of the 2018 International Plumbing Code

This class covers the changes that were made to the 2018 International Plumbing Code.

Chapter 5 of the IPC covers requirements for the installation of water heaters. While many of the requirements found in this chapter have been consistent for years many other are being revised due to the evolution of water heaters. Issues such as water heater efficiency and the use of solar thermal water heating systems have caused the industry to rethink some installation requirements.

One event that triggered the redesign of many of your storage type water heaters occurred in 2014. The US Department of Energy passed legislation requiring that water heaters become more energy-efficient. Water heaters have been an area of energy usage that had not greatly evolved to keep up with energy conservation efforts. The new law went into effect April 2015 and required that both gas and electric storage type water heaters and tankless meet new energy guidelines standards. The tank type water heaters were upgraded using more insulation and other steps to increase efficiency. While tankless already met most of the guidelines there were a few manufacturers who had to upgrade their equipment. The question was if tank type water heaters were becoming obsolete and should be restricted. The move by the government was to push tankless technology, heat pump assisted technology and solar thermal water heating systems. Due to the change in the administrations after Trump won the White House the push to limit the use of tank type water heaters has been reversed. As it stands now, they will remain a major part of the market.

Revision to Chapter 5 of the 2018 International Plumbing Code

Due to the Department of Energy's efforts on improving the energy efficiency of water heaters, the calculation of the First Hour Rating (FHR) on water heaters was revised and many of the heaters have lower ratings.

Water Heater Sizing

Heating water is the second biggest energy expense in a household. Knowing your family's first hour water usage will help you get the right size heater. Getting a heater that is too small will create havoc in your household but getting a heater that is too big will cause you to waste money on the initial purchase and costs to keep all of that water hot 24 hours a day 365 days a year. A water heater's first-hour rating (FHR) is the most important feature to consider when purchasing a new heater, since it tells you how much hot water the heater can deliver in an hour of use.

Take a minute to calculate the amount of hot water your household needs on the busiest one hour period of time of any average day. You can quickly calculate it using the following chart: Figure on roughly 2 gallons for shaving, 4 gallons for washing face and hands, 5 gallons for preparing food, 5 gallons for a dishwasher, and 10 gallons for each 10-minute shower and each load of laundry. To make the correct choice always check the FHR (first hour recovery) rating when considering a replacement heater.

To see how the FHR is calculated by the manufacturers see the next page.

Revision to Chapter 5 of the 2018 International Plumbing Code

Due to the Department of Energy's efforts to improve the energy efficiency, the First Hour Rating (FHR) on water heaters was revised and many of the heaters have lower ratings.

Water Heater Sizing

Heating water is the second largest energy expense in your household. If you know your family's first hour hot water usage it can help you get the right size heater. Getting a heater that is too small will mean you run out of hot water but getting a heater that is too big will cost you more both when you buy it and for the operating cost keeping the extra water hot 24 hours a day. A water heater's first-hour rating (FHR) is the most important factor to consider when buying a new heater, because it shows you how much hot water the heater can deliver in an hour of use.

How much hot water your household use in the busiest one-hour time period of an average day. In a normal household the highest usage of water occurs in the early morning. During this time you have more people taking showers (One of the largest use of hot water) and shaving, running dishwashers and washing clothes. You can quickly calculate the amount of hot water you need using the following chart: Add 2 gallons for shaving, 2 gallons for washing your face and hands, 3 gallons for preparing food, 5 gallons for a dishwasher, and 15 gallons for each 10-minute shower and 10 gallons for each load of laundry. Once you calculate the amount of hot water you use, the FHR (First Hour Rating) can help select the correct heater. A family of 4 normally uses 50 to 60 gallons of hot water during their busiest hour. To get this amount you would need a 40 gallon gas heater or a 50 gallon electric.

The formula that manufacturers used to determine first hour rating is shown on the next page.

Revision to Chapter 5 of the 2018 International Plumbing Code

Approximate first hour rating can be determined with the following formula:

Tank Capacity x ***.70*** + ***Recovery*** = ***First Hour Rating***.

Example: The water heater is 40 gallons; elements are 5500 watts (electric water heater) 40(gallons) x .7(70 percent of the tank capacity) + 22.5(GPH at 80 degree rise in temp) = 50.5 gallons first hour rating.

Why multiply by 0.70? The amount of water in the tank is multiplied by 70 percent because as water is being used, new cold water is entering the tank and diluting some of the heated water. The thermostat senses the cold water introduced into the tank and begins the heating process again. Use the following guide as a quick reference in determining 70% of the tank capacity:

If your tank capacity is:	70% of your tank capacity is:
30 gallons	21 gallons
40 gallons	28 gallons
50 gallons	35 gallons
65 gallons	45.5 gallons
75 gallons	52.5 gallons
80 gallons	56 gallons
100 gallons	70 gallons
120 gallons	84 gallons

Revisions to the 2018 International Plumbing Code

Chapter 5

Water Heaters

Revision to Chapter 5 of the 2018 International Plumbing Code

One of the issues for Georgia and many other states is the determination of what is classified as a water heater and what is a boiler. Under ASME standards in Georgia law there are three limits which determine whether a water heating device is simply a heater or a boiler.

Item 1 deals with the amount of heat generated by the burner on the unit. ASME in Georgia law put a limit of 200,000 BTUs allowed on the burner for the appliance to remain classified as a water heater. If the burner exceeds 200,000 the appliance, then falls under the classification of a boiler. For this reason many manufacturers will allow up to 199,000 BTUs on their water heaters to avoid the boiler classification.

Item 2 deals with the maximum operating temperature of the heater. Water heaters are allowed to have a maximum operating temperature of 210°F to remain classified as a heater. Once the operation temperature exceeds 210°F the appliance shifts into a boiler classification. Hot water supply boilers operate at temperatures of 250°F while many of your process boilers operate at even higher temperatures.

Item 3 deals with the maximum amount of water allowed to be stored in the unit during the heating operation. Water heaters are limited to a maximum of 120 gallons of water in the storage tank. In appliance that heats in excess of 120 gallons of water moved to the classification for boiler. Water expands as it is heated and to keep pressure down to an acceptable level the amount of water stored in the unit is limited.

Attention to plumbers! You must have a boiler certification issued by the State Insurance Commissioner's Office (State Fire Marshal) to install or repair boilers.

Revision to Chapter 5 of the 2018 International Plumbing Code

Chapter 5 section 502.1 states that water heaters shall be installed in accordance manufacturer's instructions. The plumbing code covers requirements of water heater installation but also references other codes that must be followed based off the fuel type used to heat the water. Oil fired water heaters are not common in Georgia. They are required to be installed per the IPC and meet the requirements of the International Mechanical Code (IMC). Electric water heaters conform to both requirements of the Plumbing Code (IPC) and provisions of NFPA 70 (NEC) better known as the National Electrical Code. Gas fired water heaters are required to meet both the IPC and requirements of the International Fuel Gas Code (IFGC).

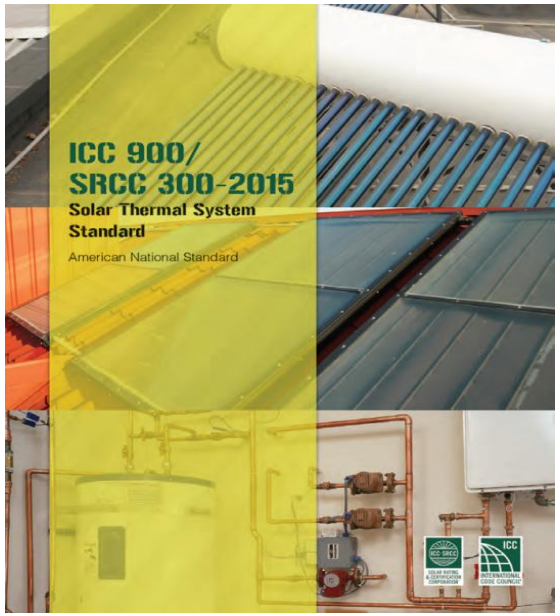
A revision to this section in a 2018 IPC covers the installation of solar thermal water heating systems. In the past the IPC has not covered these systems which caused confusion for installers. Solar systems are covered under the International Mechanical Code. This section now refers you to the IMC and has added two other codes covering the installations of these systems. One is **ICC 900** which include all the solar provisions of the International Code Council and **SRCC 300** which is the Solar Rating Councils Certification program and qualifies the solar panels, the installation of the system and its installers.

CODE REVISION TO THE 2018 IPC

502.1 Solar Water Heating System Standard

Solar thermal water heating systems must conform to the *International Mechanical Code and ICC 900/SRCC 300.*

CODE: 502.1 General. Water heaters shall be installed in accordance with the manufacturer's instructions. Oil-fired water heaters shall conform to the requirements of this code and the *International Mechanical Code*. *Electric water heaters shall conform to the requirements of this* code and provisions of NFPA 70. Gas-fired water heaters shall conform to the requirements of the *International Fuel Gas Code*. *Solar thermal water*
heating systems shall conform to the requirements of the *International Mechanical Code and ICC 900/SRCC 300*



Revision to Chapter 5 of the 2018 International Plumbing Code

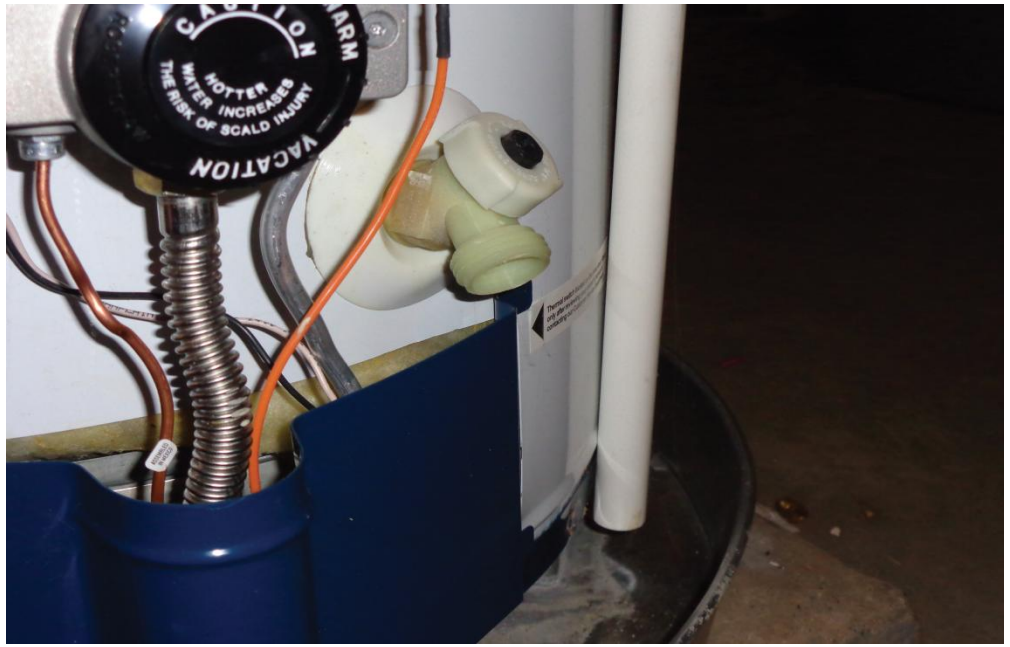
Section 501.3 drain valves. Drain valves on water heater storage tanks have been included in the code and were required to conform to ASSE 1005. The standard written by the American Society of sanitary engineers covered design of the valve and the hose connections. This requirement was removed from the IPC because the International code Council did not feel that it was necessary. There are many valve designs that will perform correctly to drain the tank and have a professionally designed hose connection.

CODE REVISION TO THE 2018 IPC

501.3 Water Heater Drain Valves

The standard covering water heater drain valves has been discontinued by the standard promulgator. Minimum criteria for drain size and the hose connection have been added to the code for these valves.

501.3 Drain Valves. Drain valves for emptying shall be installed at the bottom of each tank-type water heater and hot water storage tank. ~~Drain valves shall conform to ASSE 1005.~~ The drain valve inlet shall be not less than 3/4 inch nominal iron pipe size and the outlet shall be provided with male garden hose threads.



Revision to Chapter 5 of the 2018 International Plumbing Code

Section 504.6 Requirements for Discharge Piping. The requirements of this section deal with the discharge piping for the temperature and pressure relief valve on the water heater tank. There are 14 separate requirements that cover its installation. Item number nine added a requirement for correctly sized air gap between the end of the discharge piping and the floor or indirect waste receptor. The maximum distance the pipe can terminate above the floor or a waste receptor is 6 inches. The minimum distance is two pipe diameters. A three-quarter inch T&P discharge line can not terminate closer than 1 ½ inch above the floor or waste receptor.

CODE REVISION TO THE 2018 IPC

504.6 Temperature and Pressure Relief Discharge Piping

The temperature and pressure relief valve discharge pipe termination must have an air gap suitable to protect the potable water supply distribution system of the building.

504.6 Requirements for Discharge Piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

(Items 1-9 remain unchanged)

10. Terminate not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or waste receptor flood level rim.

Revision to Chapter 5 of the 2018 International Plumbing Code

Item 14 was added to the list of requirements for T & P discharge line. It covers plastic tubing being used as a discharge piping for the TMP valve on the water heater. While the code approves the use of various plastic tubing to be installed as the discharge piping of the T&P valve, there are certain issues it now addresses. In many cases plastic tubing is installed with fittings that are inserted into the piping and secured with a crimp ring. The insert fittings reduce the inside diameter of the piping making it noncompliant with the T&P valve manufacturers requirements. To resolve this issue if this piping is installed with the insert fittings the pipe size must be increased one pipe diameter. The second issue is caused because the tubing is not rigid and is subject to motion when water is discharged through it. For this reason, the code requires the end of the tubing be secured in place.

CODE REVISION TO THE 2018 IPC

504.6 Insert Fittings on T&P Valve Piping

Where insert fittings are used in T & P valve discharge piping, the piping must be of a larger size.

504.6 Requirements for discharge piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

(Items 1 through 13 are unchanged.)

14. *Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.*

Revision to Chapter 5 of the 2018 International Plumbing Code

504.7 Required Pans. This section requires a safety pan to be installed under a water heater storage tank when leakage of the heater could cause damage. It gives a description of the required pan both metal or plastic. This is like language that was in the 2012 IPC. The revision added to this section addresses the fact that the manufacturers of plastic pans did not approve of their use under a gas-fired water heater. Language was added prohibiting the use of plastic pan under a gas fired water heater.

CODE REVISION TO THE 2018 IPC

504.7 Water Heater Drain Pan Materials

Aluminum and plastic are approved drain pan materials. Plastic drain pans must not be used under gas-fired water heaters. (Section Revised)

504.7 Required pan. Where a storage tank-type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan constructed of one of the following:

1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.

2. Plastic not less than 0.036 inch (0.9 mm) in thickness.

3. Other *approved materials.* A plastic pan shall not be installed beneath a gas-fired water heater.

Revision to Chapter 5 of the 2018 International Plumbing Code

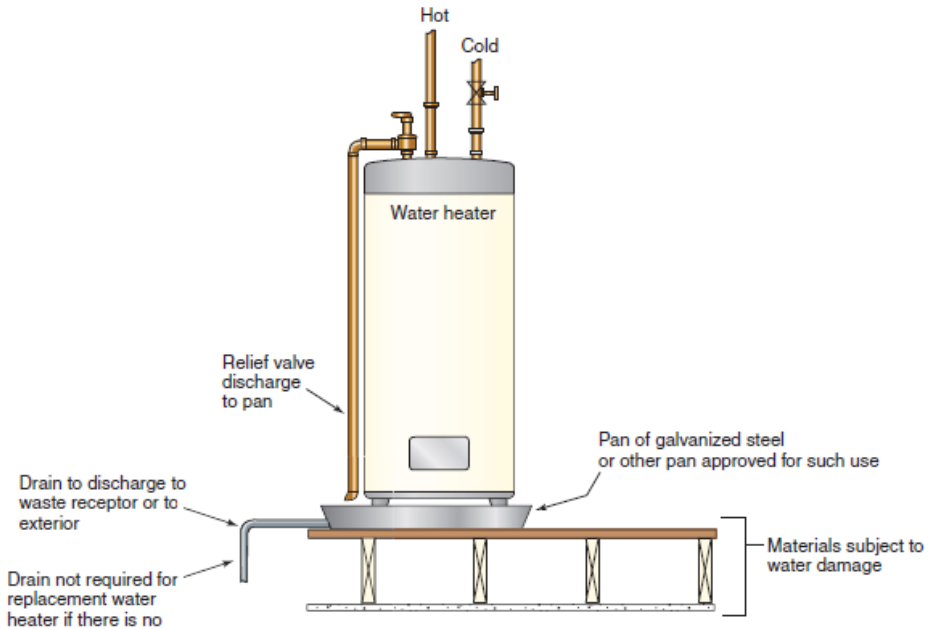
504.7.2 Pan Drain Termination. This section gives instructions for the drain line of the water heater safety pan to be installed to a safe drainage point. It dictates size and gives instructions for the termination of the pan drain to a waste receptor or to the outdoors. There was a revision added to this section to address the replacement of existing water heaters. As is the rule of code all work must meet the requirements of the code in effect when the installation is permitted and installed. In previous codes a water heater pan was not required in many of the locations where they are today. This causes a problem on replacements because there may be insufficient space to install a pan or it may be difficult to impossible to install the pan drain. The code addresses this by stating when replacing an existing water heater and a pan drain has not been installed you may simply install the pan and plug the drain.

CODE REVISION TO THE 2018 IPC

504.7.2 Water Heater Pan Drain Line

In a replacement water heater installation situation, there might not be a nearby drain point for a required pan for the water heater. This code modification allows a pan to not have a drain line if one is not present.

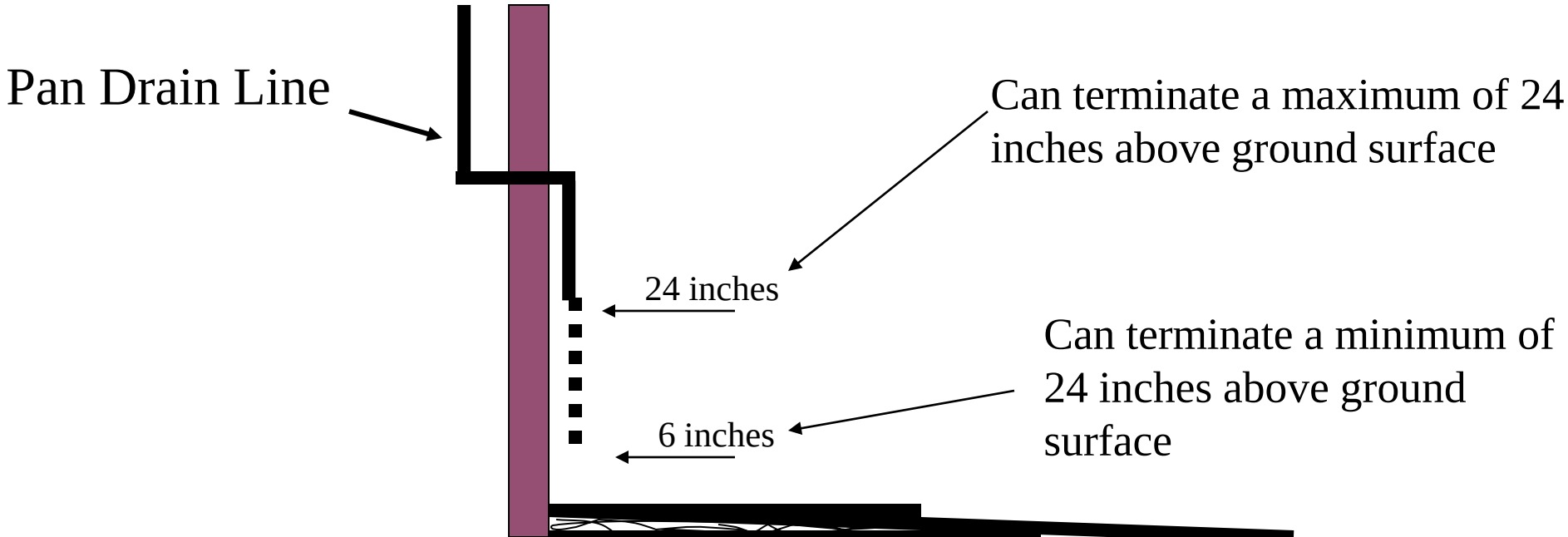
504.7.2 Pan Drain Termination. The pan drain shall extend full-size and terminate over a suitably located indirect waste receptor or floor drain or extend to the exterior of the building and terminate not less than 6 inches (152 mm) and not more than 24 inches (610 mm) above the adjacent ground surface. Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation.



Water heater pan installation

Water Heaters
Safety Devices

504.7.2 Pan drain termination. The pan drain shall extend full-size and terminate over a suitably located indirect waste receptor or floor drain or extend to the exterior of the building and terminate not less than 6 inches (152 mm) and not more than 24 inches (610 mm) above the adjacent ground surface.



Revisions to the 2018 International Plumbing Code

Chapter 7

Drainage

Revision to Chapter 7 of the 2018 International Plumbing Code

This class covers the changes that were made to the 2018 International Plumbing Code.

The purpose of **Chapter 7** is to regulate the materials, design and installation of sanitary drainage piping systems as well as the connections made to the system. The intent is to design and install sanitary drainage systems that will function reliably, are neither undersized nor oversized and are constructed from materials, fittings and connections whose quality is regulated by this section. In the 19th century, typhoid fever, cholera and dysentery were a threat to survival of humans living in large cities and in close quarters. The modern plumbing system, with proper drainage piping, has been one of the main reasons for the elimination of these diseases. Medical professionals give much of the credit to the plumbing profession for improvements in health and longevity. Medicine alone would have only a marginal effect without improved sanitation practices.

The conventional method of sizing a sanitary drainage system is by drainage fixture unit (dfu) load values. The drainage fixture unit approach takes into consideration the probability of a load on a drainage system. The probability method of sizing drainage systems was developed largely by Dr. Roy Hunter. Through his research, Dr. Hunter attempted to standardize and simplify design principles, while reducing the cost of plumbing systems.

Fixture unit values were determined based on the average rate of discharge by a fixture, the time of a single operation and the frequency of use or interval between operations. The theoretical approach considers a large group of fixtures being connected to the plumbing system with only a small fraction of the total number of fixtures in use simultaneously. The probability method has also been effective in the design of smaller plumbing systems because of the excessive design factors added by Dr. Hunter.

Revision to Chapter 5 of the 2018 International Plumbing Code

701.2 Connection to Sewer System Required. This section requires all fixtures in a building that produce waste to be connected to either a private sewage disposal system or septic tank or have a connection to the public sewer. This is to ensure that sewage it disposed of properly and to ensure sanitary conditions. An exception added to this section allows for fixtures connected to a graywater system can be connected to a collection tank per the requirements found in chapter 13 covering requirements for reclaimed water. The definition of reclaimed water was added to chapter 2 to support language in chapters 13 and 14 of the IPC.

The average four-person single family home uses over 20,000 gallons of water monthly. Over half of which is used for landscape irrigation; think about that, clean drinking water being sprayed on dirt! The same family uses nearly 3,000 gallons of water per month to flush toilets; talk about good water going after bad! Our recycling systems reduce families municipal water usage by 50% to 70% with a similar reduction in their water bill. Of greater importance is the fact the family is doing their utmost to preserve one of our most important natural resources!
By using our systems water becomes a reusable asset rather than a one-time commodity. Take long relaxing showers without feeling guilty, safe in the knowledge that the water you're using today will irrigate your lawn tomorrow!

Gray water recycling system

CODE REVISION TO THE 2018 IPC

701.2 Connection to Sewer

Gray water systems are not required to be connected to a public sewer or a private sewage disposal system provided that they discharge to systems in accordance with Chapter 13 or 14.

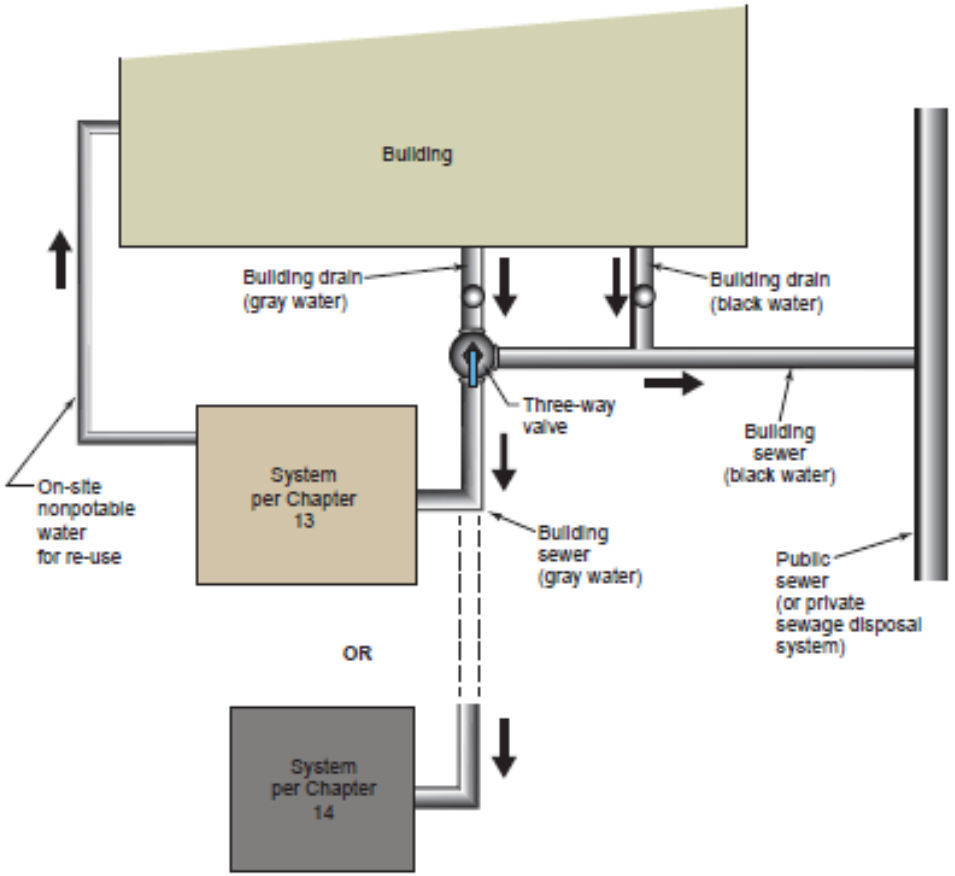
701.2 Connection to sewer required. Buildings in which Sanitary drainage piping from plumbing fixtures in buildings and sanitary drainage piping systems from premises shall be connected to a public *sewer. Where a public sewer is not available*, the sanitary drainage piping and systems shall be connected to a private sewage disposal system in compliance with state or local requirements. Where state or local requirements do not exist for private sewage disposal systems, the sanitary drainage piping and systems shall be connected to an approved private sewage disposal system that is in accordance with the *International Private Sewage Disposal Code.*

Exception: Sanitary drainage piping and systems that convey only the discharge from bathtubs, showers, lavatories, clothes washers and laundry trays shall not be required to connect to a public *sewer or to* a private sewage disposal system provided that the piping or systems are connected to a system in accordance with Chapter 13 or 14.

CODE REVISION TO THE 2018 IPC

701.2 Connection to Sewer

Gray water systems are not required to be connected to a public sewer or a private sewage disposal system provided that they discharge to systems in accordance with Chapter 13 or 14.



Diversion of gray water from public sewer

Revision to Chapter 5 of the 2018 International Plumbing Code

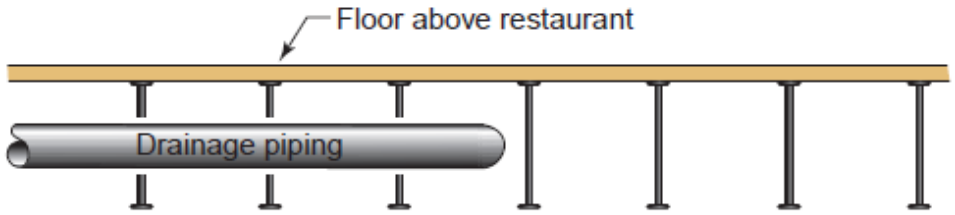
701.8 drainage Piping Above Food Areas. The 2012 IPC prohibited any drainage piping from fixtures being installed above areas in a building where food preparation or dining occurred. This was to protect the food and occupants from the possibility of a leakage of sewage that could contaminate the food or drink in the area below. Code required these piping to be installed elsewhere or install drip trays under the pipes that would catch any leakage. This section of the code has been deleted and thus has removed any restrictions on the piping location. Plumbing design professionals and food safety experts feel that the piping installed today is less likely to leak due to the improved piping materials and joining methods, so this restriction has been deleted from the code.

CODE REVISION TO THE 2018 IPC

701.8 Drainage Piping above Food Areas

The installation of drainage piping above **“food areas**” is no longer prohibited.

~~**701.8 Drainage piping in food service areas.** Exposed soil or waste piping shall not be installed above any working, storage or eating surfaces in food service establishments.~~



Ceiling or “drip tray”
not required

RESTAURANT

Ceiling or “drip trays” under piping above food areas not required

Revision to Chapter 5 of the 2018 International Plumbing Code

702.3 Polypropylene Piping for Building Sewer. Polypropylene plastic was added to table 702.3 as an approved material to be used for building DWV and sewer pipe. This piping has already been approved for water piping. It must be installed per manufacturer's instructions. There are a number of new piping systems being introduced to the plumbing industry as new plastics are being developed. Polypropylene was added into the Plumbing Code (IPC) recently, It has been used in other countries since the early 2000's.

Polypropylene piping is an ideal material for potable water because it doesn't affect the water it carries. The heat fusion connections keep the system free of hazardous chemicals. And Green Pipe's distinct coloring blocks sunlight from passing through the pipe wall and promoting biofilm formation, ensuring that drinking water is kept pure from the source to the destination. When using Polypropylene in a domestic hot water recirculating system, please refer to our manufacturer's instructions before installing.

Heat fusion is the process used to join thermoplastics such as Polypropylene together. Rather than using glue, solder, or a mechanical connection and gasket, heat fusion physically turns the two pieces of plastic into one piece. The process is similar to welding but doesn't require a filler material and heat fusion does not weaken the material at the point of connection. The heat fusion connections use a large joining area, making the connection at least as strong as the pipe itself, and often stronger. Heat fusion works by returning the connection point to a melted state, the way it was during production. This allows the polypropylene chains to join together as the connection cools for a permanent bond, as if they were manufactured as one piece. This prevents any sort of chemical or physical weakness at the point of connection and results in a much lower instance of leaks or failures.

CODE REVISION TO THE 2018 IPC

702.3 Polypropylene Piping for Building Sewer

Standards for polypropylene (PP) plastic pipe are added to Table 702.3 for code approved building sewer piping.

TABLE 702.3 Building Sewer Pipe

Material	Standard
Polypropylene (PP) Plastic Pipe	ASTM F2736; ASTM F2764; CSA B182.13

Revision to Chapter 5 of the 2018 International Plumbing Code

702.5 Temperature Rating of Drainage Piping. This section was revised as to the temperature of wastewater allowed to enter the drainage system of a building. The code has long required that the maximum temperature of waste entering to the drainage system not exceed 140°F. This was because of the impact waste of a higher temperature could have on the drainage system. This caused a problem in cases where the application in which the hot water was used required a temperature in excess of 140 many healthcare, cleaning, and cooking appliances often used water in excess of 140°F. This required the installation of a system to cool the waste before it could enter the drainage. The wording of the 2018 IPC has been revised and states that if waste hotter than 140°F is introduced into the drainage system the piping material of the system must be rated for temperature greater than the temperature of the waste. Along with some of the existing piping such as cast-iron there are some new plastics that are rated for temperatures in excess of 200°F. **Note to plumbers!** Whatever piping material you use must be located at the point where the waste is introduced and be continued until the waste is disposed of in a private septic tank or sewer

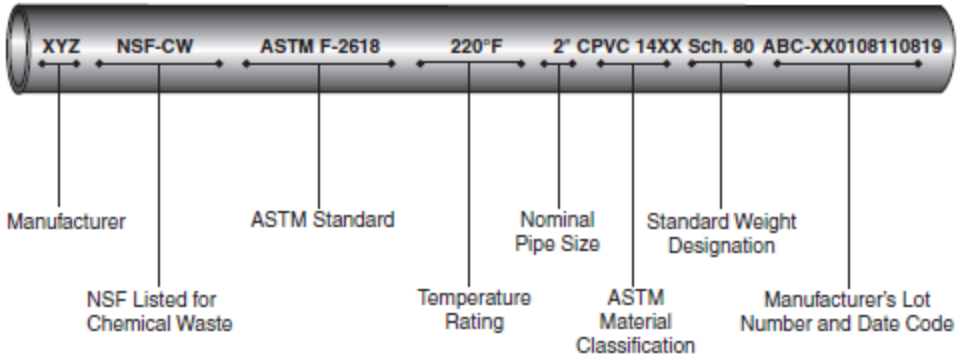
CODE REVISION TO THE 2018 IPC

702.5 Temperature Rating of Drainage Piping

Wastewater having a temperature greater than 140°F (60°C) does not need to be cooled before it enters the drainage system if the drainage system piping is rated for the higher temperature.

702.5 Temperature Rating. Where the wastewater temperature will be greater than 140°F (60°C), the sanitary drainage piping material shall be rated for the highest temperature of the wastewater.

~~**803.1 Wastewater Temperature.** Steam pipes shall not connect to any part of a drainage or plumbing system and water above 140°F (60°C) shall not be discharged into any part of a drainage system. Such pipes shall discharge into an indirect waste receptor connected to the drainage system.~~



Sample identification markings on CPVC drainage pipe for high-temperature and chemical wastes

Revision to Chapter 5 of the 2018 International Plumbing Code

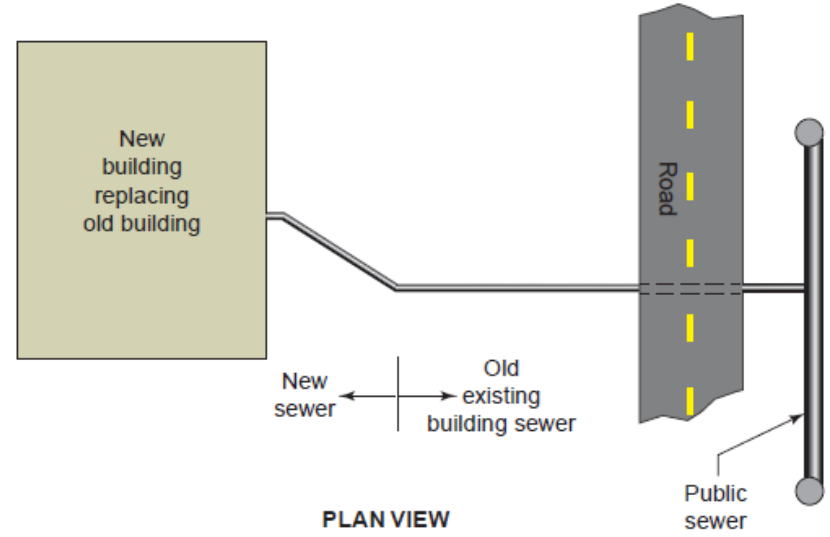
703.4 Existing Building Sewers and Building Drains. This section deals with the reuse of existing drainage piping. This often occurs when a building is being remodeled or renovated and the existing drainage system will be reused. The 2012 code addressed this by stating that the existing piping must be inspected to verify that the piping is in good condition, has the correct slope and is the correct size. The word inspection was left open to the interpretation of the installer or the inspector. Inspection to some meant that you verify the size run some water through it to ensure there is no blockage and making sure that the pipe is in good condition so it can be connected to the new piping system inside the building. In many cases this caused problems for the new occupants who found once they had moved into the building that the old drainage system was not in good condition. The 2018 IPC revised this section by **replacing the term inspection with the words internally examined.** This left little option to the plumber who wanted to reuse the old piping other than to use a camera system to internally examined the piping.

CODE REVISION TO THE 2018 IPC

703.4 Reuse of Buried Drain and Sewer Piping

The use of existing building sewers and existing building drains for new building plumbing system is clarified.

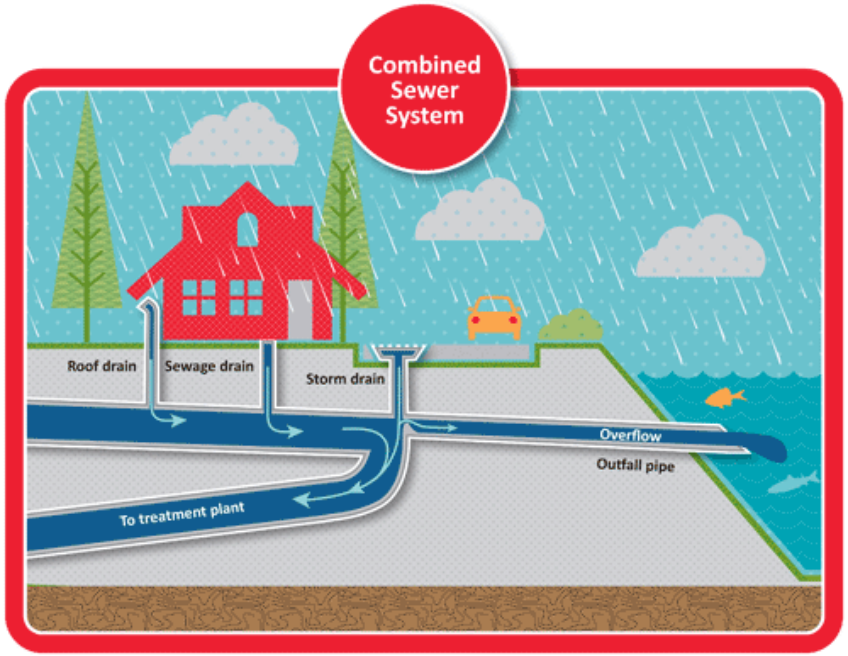
703.4 Existing building sewers and building drains. Where the entire sanitary drainage system of an existing building is replaced, existing *building drains under concrete slabs and existing* building sewers that will serve the new system shall be **internally** examined to verify that the piping is sloping in the correct direction, is not broken, is not obstructed and is sized for the drainage load of the new plumbing drainage system to be installed.



Old existing building sewer need not be replaced

Revision to Chapter 5 of the 2018 International Plumbing Code

706.3 Combined Sanitary and Storm Water Connection to Public Sewer. On public systems that handle both the sanitary sewer and stormwater collection on one system the sanitary sewer is now required by the 2018 IPC to be independently connected to the public sewer system. You can no longer tie the sanitary drainage and stormwater drainage piping together before they tie into the public sewer. A combined stormwater and sewer system are commonly found in your older cities such as Atlanta, Miami, Chicago and New York. These systems are no longer allowed to be installed. The Environmental Protection Agency outlawed them years ago because of federal health regulations which deal with treating wastewater. **Note to Plumber!** While the plumbing code does apply to installation of these drains, the local water and sewer utility has jurisdiction on the connection of the drain to their system. Check with them to see how the connection should be made.

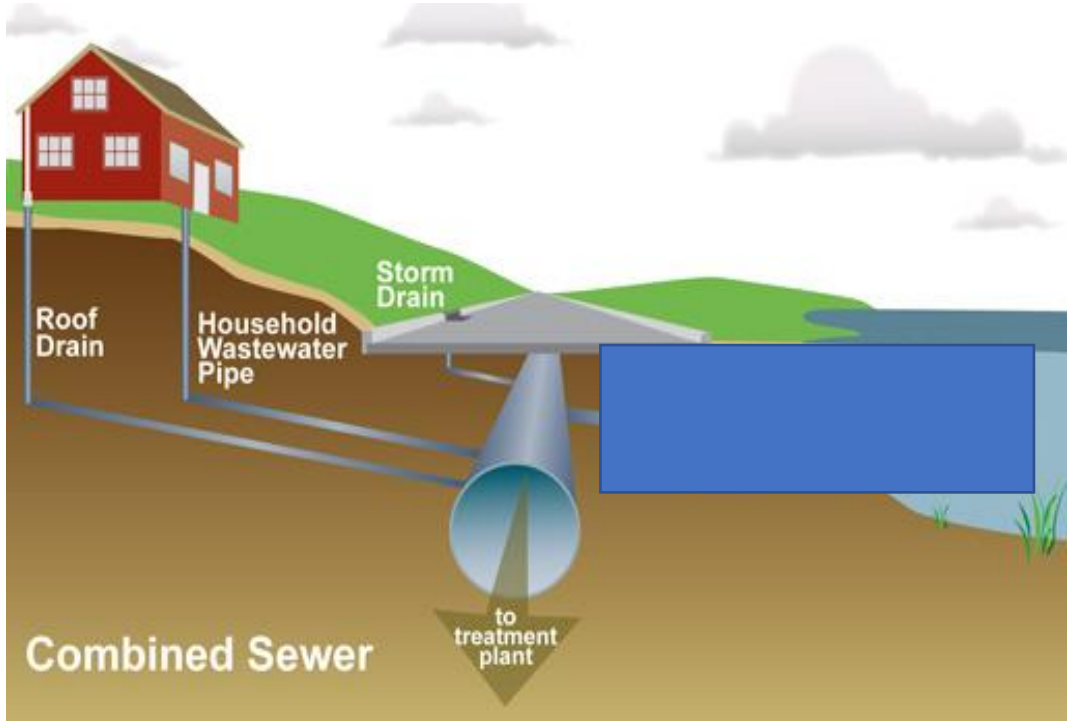


CODE REVISION TO THE 2018 IPC

703.6 Connection to Combined Sanitary and Storm Public Sewer

Building sanitary sewers and building storm sewers must be independent even though connecting to a combined sanitary/storm public sewer.

703.6 Combined Sanitary and Storm Public Sewer. Where the public sewer is a combined system for both sanitary and storm water, the sanitary sewer shall be connected independently to the public Sewer.



Revision to Chapter 5 of the 2018 International Plumbing Code

704.2 Change Reduction in Pipe Size and Direction of Flow. The IPC does not allow for the reduction of drainage pipe size in the direction of flow. This is to ensure that the flow is not backed up due to having to go into a smaller pipe. There are fittings which appear to violate this restriction by starting off with a large opening and then reducing to a smaller one. A 4” x 3” water closet flange, a 4” x 3” closet bend and a offset closet flange are examples of these type of fittings. The 2018 IPC clarifies that these fittings can be installed on drainage systems. These are acceptable because the transition in pipe size is made at the connection to the fixture and do not retard the flow of waste.

CODE REVISION TO THE 2018 IPC

704.2 Reduction of Pipe Size

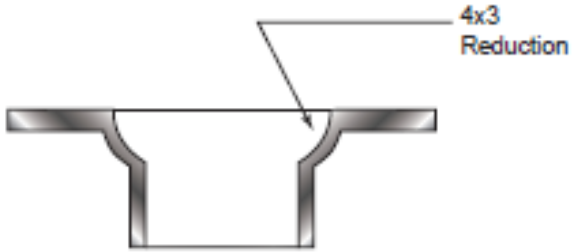
Allowable reductions of pipe size are clarified and expanded.

704.2 Change Reduction in pipe size in the direction of flow. The size of the drainage piping shall not be reduced in size in the direction of the flow. The following shall not be considered as a reduction in size in the direction of flow:

1. A 4-inch by 3-inch (102 mm by 76 mm) water closet flange.

2. A water closet bend fitting having a 4-inch (102 mm) inlet and a 3-inch (76 mm) outlet provided that the 4-inch leg of the fitting is upright and below, but not necessarily directly connected to, the water closet flange.

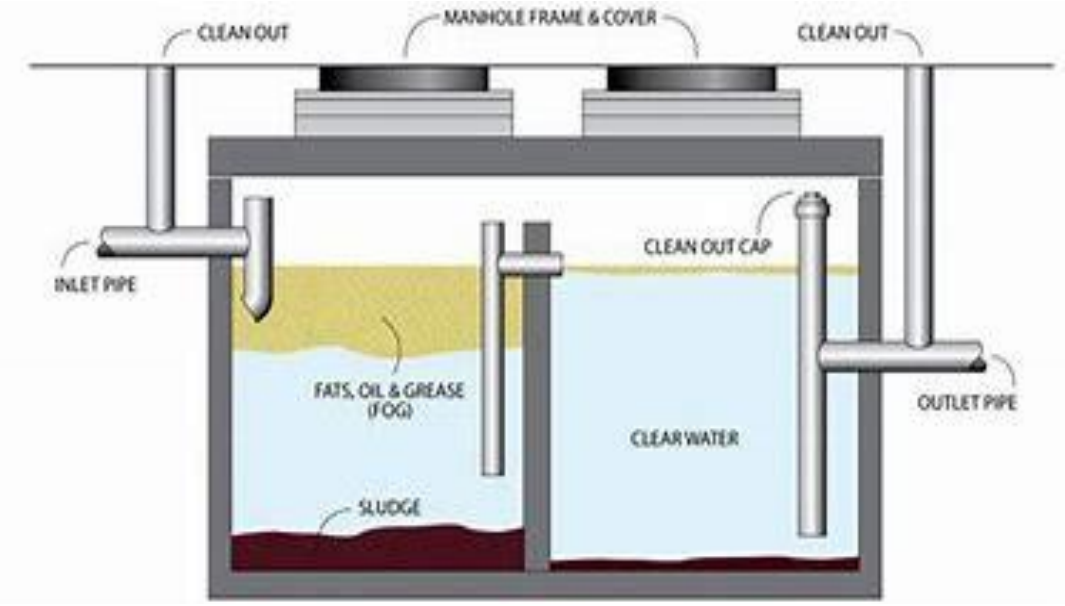
3. An offset closet flange.



Water closet flange

Revision to Chapter 5 of the 2018 International Plumbing Code

704.1 Slope of Horizontal Drainage Piping. This section was revised concerning the minimum slope of horizontal drainage piping in a plumbing system. Normally minimum slope is dictated based off the size of the drainpipe. The revision in the 2018 IPC required any drainage piping upstream of a grease interceptor and carrying grease laden waste to be installed with a minimum slope of not less than ¼ inch per foot regardless of pipe size. This ensures that the grease laden waste will get to the grease interceptor with a steady flow and not allow the grease to separate from the water in the piping. This requirement may cause an issue with the grease interceptor when the unit is located a long distance from the food prep area such as the parking lot. It will require the interceptor to be installed deeper in the ground to adjust for the fall of the piping.

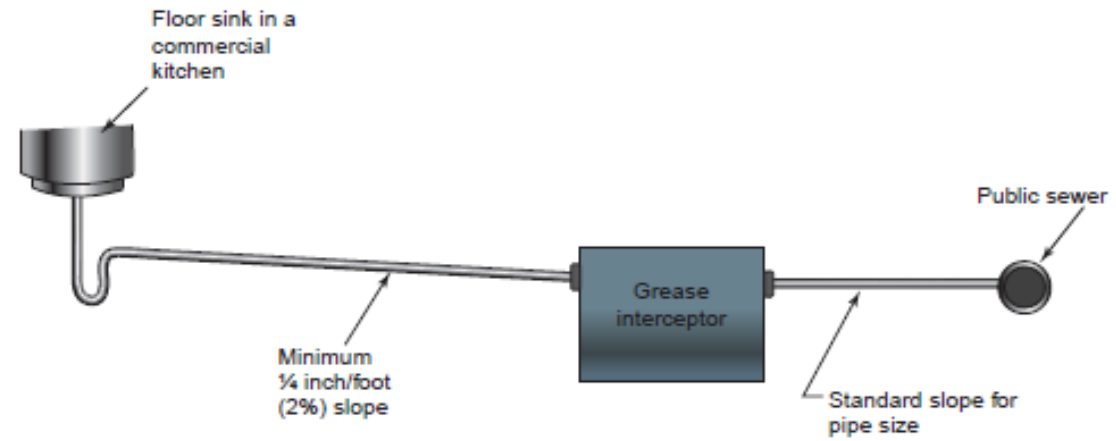


CODE REVISION TO THE 2018 IPC

704.1 Grease-laden Waste Piping Slope

Piping conveying grease-laden waste must have a slope of not less than 1/4 inch per foot (2-percent).

2018 CODE: 704.1 Slope of horizontal drainage piping. Horizontal drainage piping shall be installed in uniform alignment at uniform slopes. The slope of a horizontal drainage pipe shall be not less than that indicated in Table 704.1 except that where the drainage piping is upstream of a grease interceptor, the slope of the piping shall be not less than 1/4 inch per foot (2-percent slope).



Drainage piping slope to grease interceptor

Revision to Chapter 5 of the 2018 International Plumbing Code

705.11.2 Solvent Cementing. The revision in this chapter removed the requirement for a purple primer to be used when making a solvent cement joints on PVC piping. There are two conditions that must be met before the primer could be deleted. The first was that the solvent cement used to make the joint is third-party certified and conforms to ASTM D 2564. The second was that the solvent cement joints can only be in a PVC drain waste and vent system of a non-pressure application and on pipes no more than 4 inches in diameter. This revision caused a conflict due to the fact the instructions for most PVC solvent cements require a purple primer be used when making a joint. The IPC states when the code and the manufacturer's instructions do not agree you go with the most restrictive. In this case the manufacturer's instructions are more restrictive than the code. <u>This means a primer would still be required. For this reason Georgia has amended this section by stating if the glue manufacture does not require primer on a solvent cement joints then a primer is not required.</u>

CODE REVISION TO THE 2018 IPC

705.11.2 Exception for Solvent Cementing PVC Piping 4 Inches and Smaller

The application of a primer to drain, waste and vent PVC pipe and fittings prior to solvent cementing is not required for 4-inch pipe size and smaller.

705.11.2 Solvent Cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D 2564, CSA B137.3, CSA B181.2 or CSA B182.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be permitted above or below ground.

Exception: A primer is not required where both of the following conditions apply:

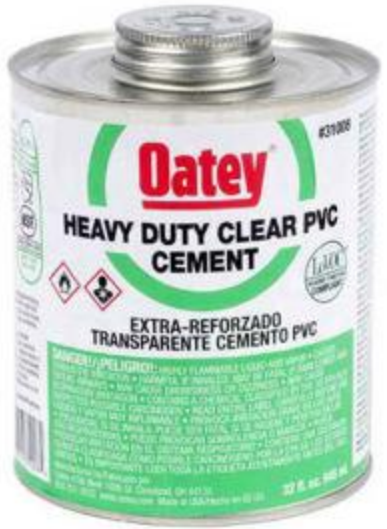
1. The solvent cement used is third-party certified as conforming to ASTM D 2564.

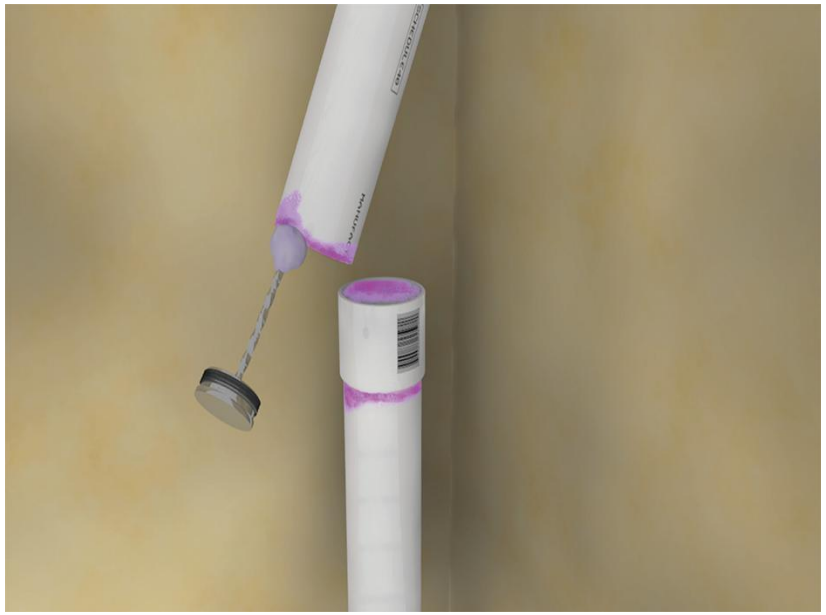
2. The solvent cement is used only for joining PVC drain, waste and vent pipe and fittings in non-pressure applications in sizes up to and including 4 inches (102 mm) in diameter.

GEORGIA AMENDED THIS SECTION

CODE REVISION TO THE 2018 IPC

705.11.2 Exception for Solvent Cementing PVC Piping 4 Inches and Smaller





- Recommended for potable water, pressure pipe, conduit and DWV applications
- Meets ASTM Standard D2564

Revision to Chapter 5 of the 2018 International Plumbing Code

705 16.4 Plastic Pipe or Tubing to Other Piping Material. In passcode editions it was a violation to make a solvent cement joints when joining ABS plastic and PVC piping. This type of connection was listed as a prohibited joint. The 2018 IPC was revised to allow these connections on one location of the drainage system. The joint could be used where the building drainage system was connected to the building sewer. The solvent cement used to make the joint must comply with ASTM D 3138.

ABS piping is rarely been used in Georgia. Most of this type of pipe that was installed in the 1950's and 60's. Because of the strength of the pipe it was used primarily for sewer laterals from a building to the public sewer. Most of this pipe has ben replaced due to it had met or exceeded its expected life span. While this piping has limited use in our state, it is widely used in the Western part of our country.

CODE REVISION TO THE 2018 IPC

705.16.4 PVC to ABS Solvent Cement Joint

One joint between ABS plastic building drain piping and PVC plastic building sewer drain piping can be solvent cemented with special cement.

705.16.4 Plastic pipe or tubing to other piping material. Joints between different types of plastic pipe shall be made with an *approved* adapter fitting, or by a solvent cement joint only where a single joint is made between ABS and PVC pipes at the end of a building drainage pipe and the beginning of a *building sewer pipe using a solvent cement complying with* ASTM D3138. Joints between plastic pipe and other piping material shall be made with an approved adapter fitting. Joints between plastic pipe and cast iron hub pipe shall be made by a caulked joint or a mechanical compression joint.

Revision to Chapter 5 of the 2018 International Plumbing Code

708 Cleanouts for Drainage and Waste Systems. This section was reorganized and reworded for clarity. While there was very little revision in the wording there was one change regarding cleanouts that are located at the base of the stack. Former code editions required a cleanout to be installed at the base of the stack to ensure easier maintenance of the drain system. These cleanouts were rarely used because of the potential for waste buildup in the stack so the code deleted its requirement. **Note to plumbers.** Georgia amendments have completely rewritten this section and have added several options what can be used in place of a cleanout. While the code will not allow you to use the opening under a toilet is a cleanout, Georgia's amendment allows you to do so. Georgia's amendment allows the use of the opening of a P-trap's, tub and shower drains or the opening of a washing machine standpipe to be used as an acceptable cleanout. This means there are fewer cleanouts installed on our systems.

Many architects and engineers are by passing the Georgia amendment and are requiring cleanouts be installed on a system per code. They do not feel it is beneficial having to remove a toilet or urinal to clean the drain line. While this mainly on commercial projects, some or your larger national home building companies are requiring the same on their homes. They agree with the code and don't feel it is right for the homeowner to have to pay for removing and reinstalling the toilet.

CODE REVISION TO THE 2018 IPC

708 Cleanouts for Drainage and Waste Systems

The section on cleanouts has been completely reorganized and reworded for clarity. Brass cleanout plugs are permitted for metallic piping only. Where located at a finished wall, the cleanout must be within 11/2 inches of the finished surface. A cleanout is no longer required at the base of each waste or soil stack.

708.1.3 Building Drain and Building Sewer Junction. The junction of the building drain and the building sewer shall be served by a cleanout that is located at the junction or within 10 feet (3048 mm) developed length of piping upstream of the junction. For the requirements of this section, the removal of water closet shall not be required to provide cleanout access.

708.1.6 Cleanout Plugs. Cleanout plugs shall be brass, plastic or other approved materials. Cleanout plugs for borosilicate glass piping systems shall be of borosilicate glass. Brass cleanout plugs shall conform to ASTM A74 and shall be limited for use only on metallic piping systems. Plastic cleanout plugs shall conform to the referenced standards for plastic pipe fittings as indicated in Table 702.4. Cleanout plugs shall have a raised square head, a countersunk square head or a countersunk slot head. Where a cleanout plug will have a trim cover screw installed into the plug, the plug shall be manufactured with a blind end threaded hole for such purpose.

CODE REVISION TO THE 2018 IPC

708 Cleanouts for Drainage and Waste Systems

708.1.10 Cleanout Access. Required cleanouts shall not be installed in concealed locations. For the purposes of this section, concealed locations include, but are not limited to, the inside of plenums, within walls, within floor/ceiling assemblies, below grade and in crawl spaces where the height from the crawl space floor to the nearest obstruction along the path from the crawl space opening to the cleanout location is less than 24 inches (610 mm). Cleanouts with openings at a finished wall shall have the face of the opening located within 1-1/2 inches (38 mm) of the finished wall surface. Cleanouts located below grade shall be extended to grade level so that the top of the cleanout plug is at or above grade. A cleanout installed in a floor or walkway that will not have a trim cover installed shall have a countersunk plug installed, so the top surface of the plug is flush with the finished surface of the floor or walkway.

708.1.10.1 Cleanout Plug Trim Covers. Trim covers and access doors for cleanout plugs shall be designed for such purposes and shall be approved. Trim cover fasteners that thread into cleanout plugs shall be corrosion resistant. Cleanout plugs shall not be covered with mortar, plaster or any other permanent material.

708.1.10.2 Floor Cleanout Assemblies. Where it is necessary to protect a cleanout plug from the loads of vehicular traffic, cleanout assemblies in accordance with ASME A112.36.2M shall be installed.

~~**708.3.4 Base of Stack.** A cleanout shall be provided at the base of each waste or soil *stack*.~~

Revision to Chapter 5 of the 2018 International Plumbing Code

712.3 .2 Sump Pit. The code change in the 2018 IPC revised this section regarding the elevation of the lid on a sewage ejectors sump. In the past code required that the sump lid be flush with the floor in which it was installed. The 2018 IPC has revised this to say that the lid can recess into the floor as much as 2 inches. The code change was made due to the fact that in some cases when the sump is opened there can be a small buildup of waste that will run out onto the floor. By recessing the lid below the floor level a small reservoirs is created to catch such waste.

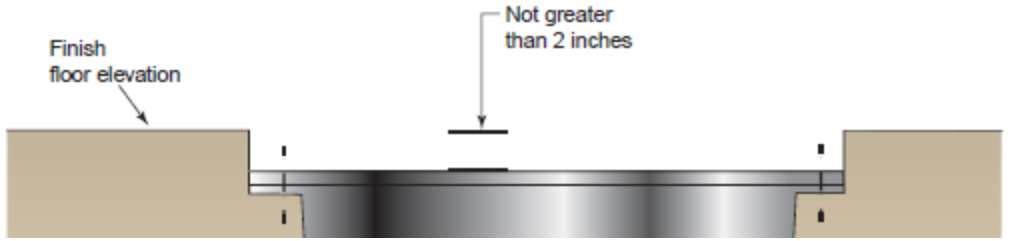
Sewage ejection systems are the answer to installing a complete bathroom or laundry room or maybe just a shower in your basement, cellar or anywhere the drain will be located below your main sewer or septic lines. The basin (Sump), with the pump in the bottom of it, is recessed into the floor. Your fixtures are plumbed to drain into the basin through the side inlet set up for 4" drainpipe. The side inlet can be bushed down to 3" if needed. When the fluid level rises high enough it triggers the float switch to turn on the pump. The sewage is pumped out of the pump, through the 2" discharge outlet, through the check valve, and into your regular drain line. The discharge pipe passing through the lid is sealed with a 2" non-threaded rubber grommet.
The vent outlet through the lid has a 3" opening and can be sealed with a 3" or 3" x 2" non-threaded rubber grommet.

CODE REVISION TO THE 2018 IPC

712.3.2 Ejector Sump Cover Elevation

Gas-tight removable covers for sumps having ejectors and sewage pumps cannot be located more than 2 inches below grade or floor level.

712.3.2 Sump pit. The sump pit shall be not less than 18 inches (457 mm) in diameter and not less than 24 inches (610 mm) in depth, unless otherwise *approved. The pit shall be provided with access* and shall be located such that all drainage flows into the pit by gravity. The sump pit shall be constructed of tile, concrete, steel, plastic or other approved materials. The pit bottom shall be solid and provide permanent support for the pump. The sump pit shall be fitted with a gastight removable cover that is installed not more than 2 inches (51 mm) below grade or floor level. The cover shall be adequate to support anticipated loads in the area of use. The sump pit shall be vented in accordance with Chapter 9.



Revision to Chapter 5 of the 2018 International Plumbing Code

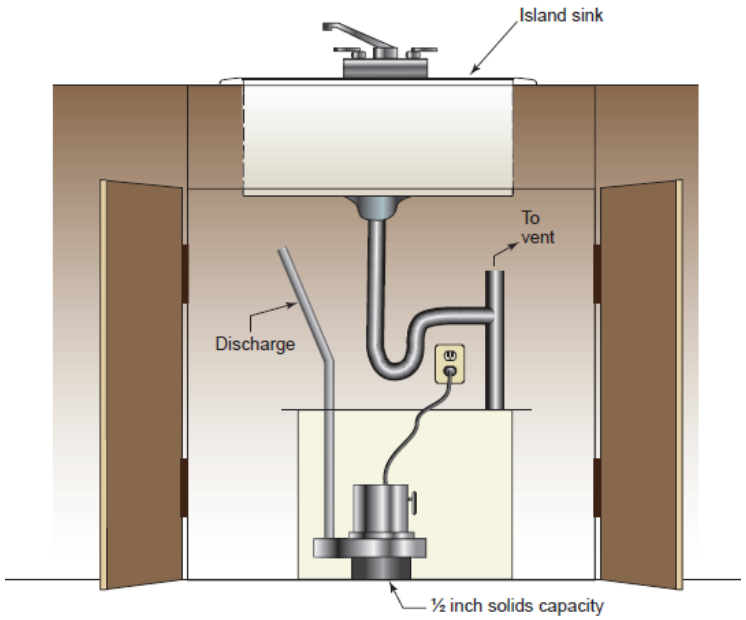
712.4 .2 Capacity. This change covered requirements on the smaller ejector pump systems installed on fixtures such as sinks. The revision requires these pumps to be able to handle any kind of spherical solids ½ inch in diameter. As these sinks normally handled mainly liquid waste or small solids this should not be a problem. Even when a food waste disposer is installed on the sink the solids discharged never exceed ½ inch in diameter.

CODE REVISION TO THE 2018 IPC

712.4.2 Waste Ejector Solids Size Reduced

CHANGE SUMMARY: The maximum solids diameter capacity for waste pumps and waste ejectors has been reduced from 1-inch diameter to 1/2-inch diameter.

712.4.2 Capacity. A sewage pump or sewage ejector shall have the capacity and head for the application requirements. Pumps or ejectors that receive the discharge of water closets shall be capable of handling spherical solids with a diameter of up to and including 2 inches (51 mm). Other pumps or ejectors shall be capable of handling spherical solids with a diameter of up to and including **1/2** inch (25 13 mm). The capacity of a pump or ejector based on the diameter of the discharge pipe shall be not less than that indicated in Table 712.4.2. 9.



Revision to Chapter 5 of the 2018 International Plumbing Code

713 Healthcare Plumbing. In the 2012 IPC the section covered fixtures primarily located in hospitals and clinics. The venting and drainage requirements for bedpan washers, clinical sinks and sterilizers were including along with other installation instructions. As we have seen in other parts of the 2018 IPC the code has deleted almost all sections that cover healthcare plumbing. These fixtures will now be regulated under federal government regulations, approved standards and manufacturer's instructions.

Some of approved regulations covering health care systems include OSHA, ADA, ASHRAE and NFPA 99. There are many more,

CODE REVISION TO THE 2018 IPC

713 Health Care Plumbing

CHANGE SUMMARY: Section 713 covering sanitary drainage systems in health care facilities has been deleted in its entirety.

~~**SECTION 713**~~
~~**HEALTH CARE PLUMBING**~~

Revision to Chapter 5 of the 2018 International Plumbing Code

715.1 Sewage Backflow. This section gives conditions under which a backwater valve is required on the sewer of a building. The conditions are the height of and opening for a manhole in the public sewer system as compared to the height of a flood rim opening of a fixture inside the structure. If it is possible for the sewage in the public system to reach a height greater than the openings of the fixtures in a building, then the sewage can flow into the building. A backwater valve protects those fixture openings against the back surge of the sewage. To restrict the amount of waste and debris passing through the valve the code prohibits any fixtures in the building that does not need protection from being discharged through the backwater valve.

In the case of a two-story house or a ranch with fixtures in a basement it would be necessary to stub out two building drains. The one for the fixtures needing protection would connect to the backwater valve and the second drain would be connected directly to the sewer.

The 2018 IPC added an exception for situation where a backwater valve is installed on an existing building. In many cases the separation of fixture drains is not possible. The exception allows all fixtures in the building drain through the backwater valve with her they need to be protected against the sewage back surge or not.

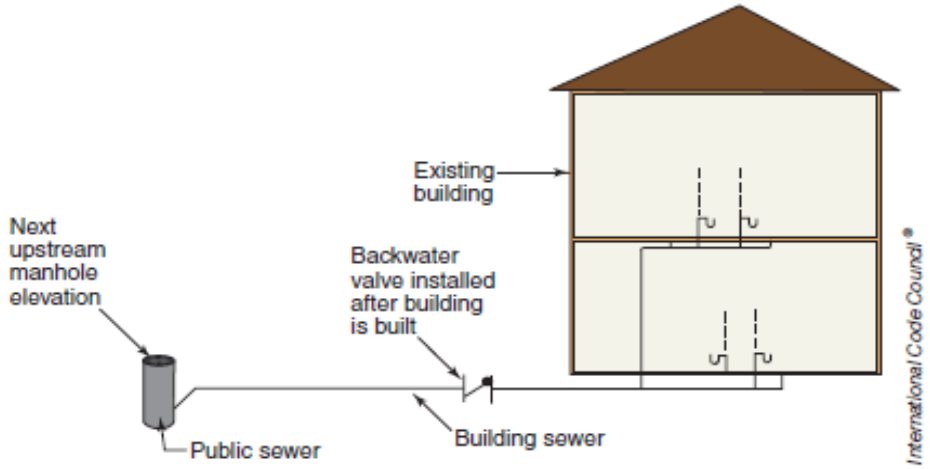
CODE REVISION TO THE 2018 IPC

715.1 Exception for Backwater Valve

Retrofit of a backwater valve in accordance with the code in an existing building is nearly impossible without the new exception.

715.1 Sewage Backflow. Where plumbing fixtures are installed on a floor with a finished floor elevation below the elevation of the manhole cover of the next upstream manhole in the public sewer, such fixtures shall be protected by a backwater valve installed in the building drain, or horizontal branch serving such fixtures. Plumbing fixtures installed on a floor with a finished floor elevation above the elevation of the manhole cover of the next upstream manhole in the public sewer shall not discharge through a backwater valve.

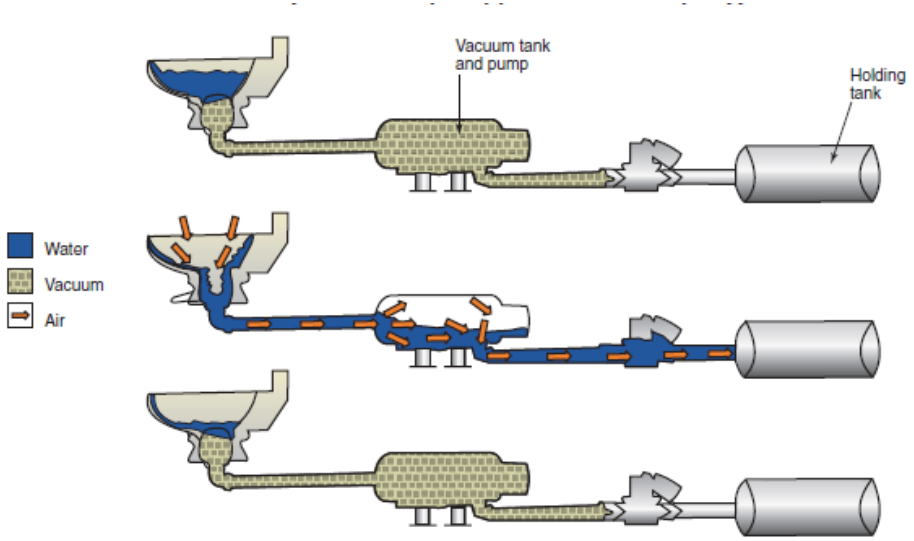
Exception: In existing buildings, fixtures above the elevation of the manhole cover of the next upstream manhole in the public sewer shall not be prohibited from discharging through a backwater valve.



Exception allows this backwater valve arrangement for existing buildings only.

Revision to Chapter 5 of the 2018 International Plumbing Code

715 Vacuum Drainage Systems. This section was added to the body of the code in the 2018 IPC to cover the requirements for vacuum drainage systems. In past editions requirements for these systems was an appendix in the back of the book which can only be used if the local jurisdiction adopted it into their enforcement ordinance. These systems are becoming more common in hospitals, clinics and other health care facilities. The code added the requirements for these fixtures to chapter 7 so local adoption is not necessary. Two requirements are the main focus of this section. One being the system must be installed per manufacturer's instructions. The other is that prior to installation of these fixtures, the local jurisdiction must approve their use.



Vacuum drainage system schematic

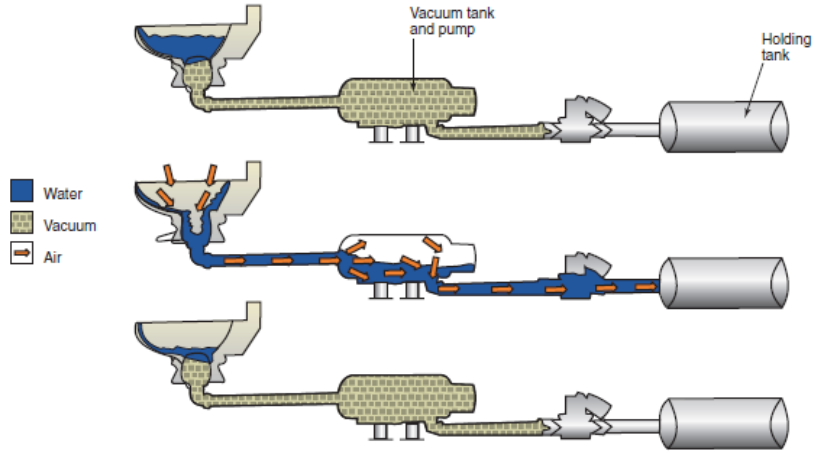
CODE REVISION TO THE 2018 IPC

715 Vacuum Drainage Systems

Vacuum drainage system provisions (as opposed to gravity drainage system provisions) have been moved from the appendix to the code.

715.1 Scope. Vacuum drainage systems shall be in accordance with Sections 716.2 through 716.4.

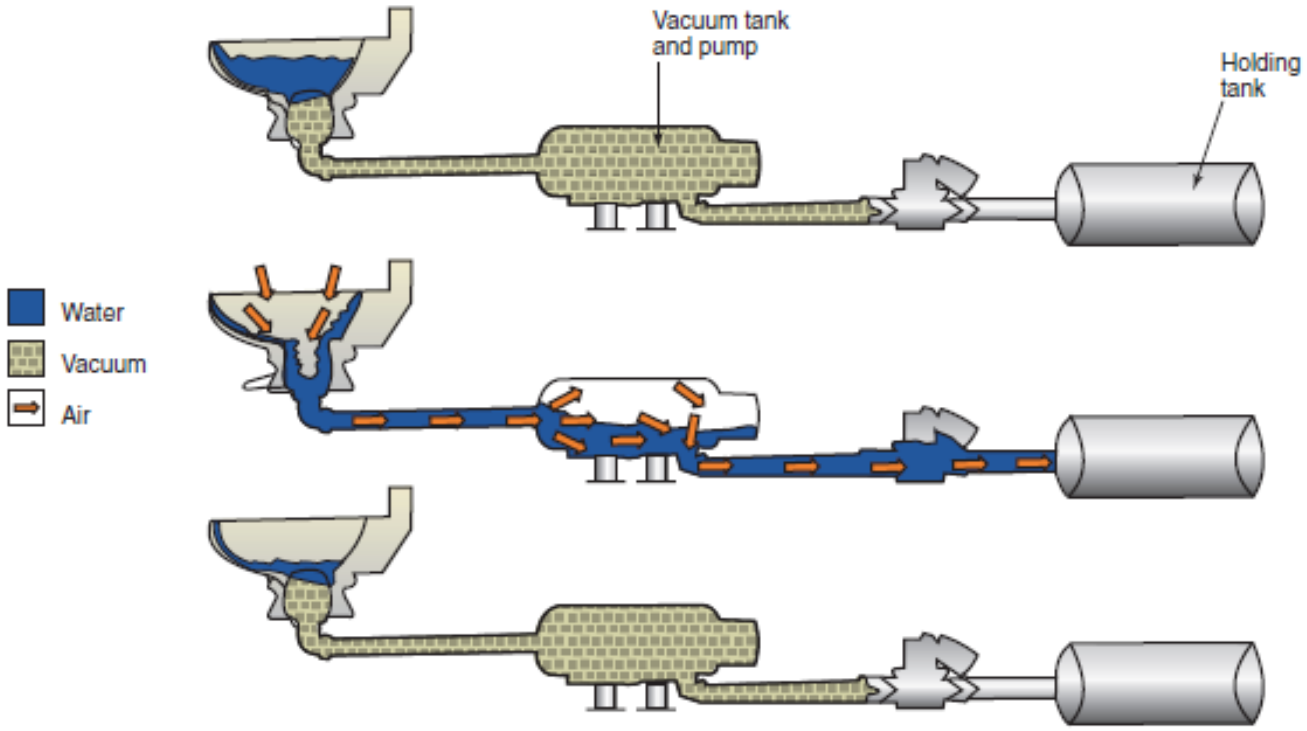
715.2 System Design. Vacuum drainage systems shall be designed in accordance with the vacuum drainage system manufacturer's instructions. The system layout, including piping layout, tank assemblies, vacuum pump assembly and other components necessary for proper function of the system, shall be in accordance with the manufacturer's instructions. Plans, specifications and other data for such systems shall be submitted to the code official for review and approval prior to installation.



Vacuum drainage system schematic

CODE REVISION TO THE 2018 IPC

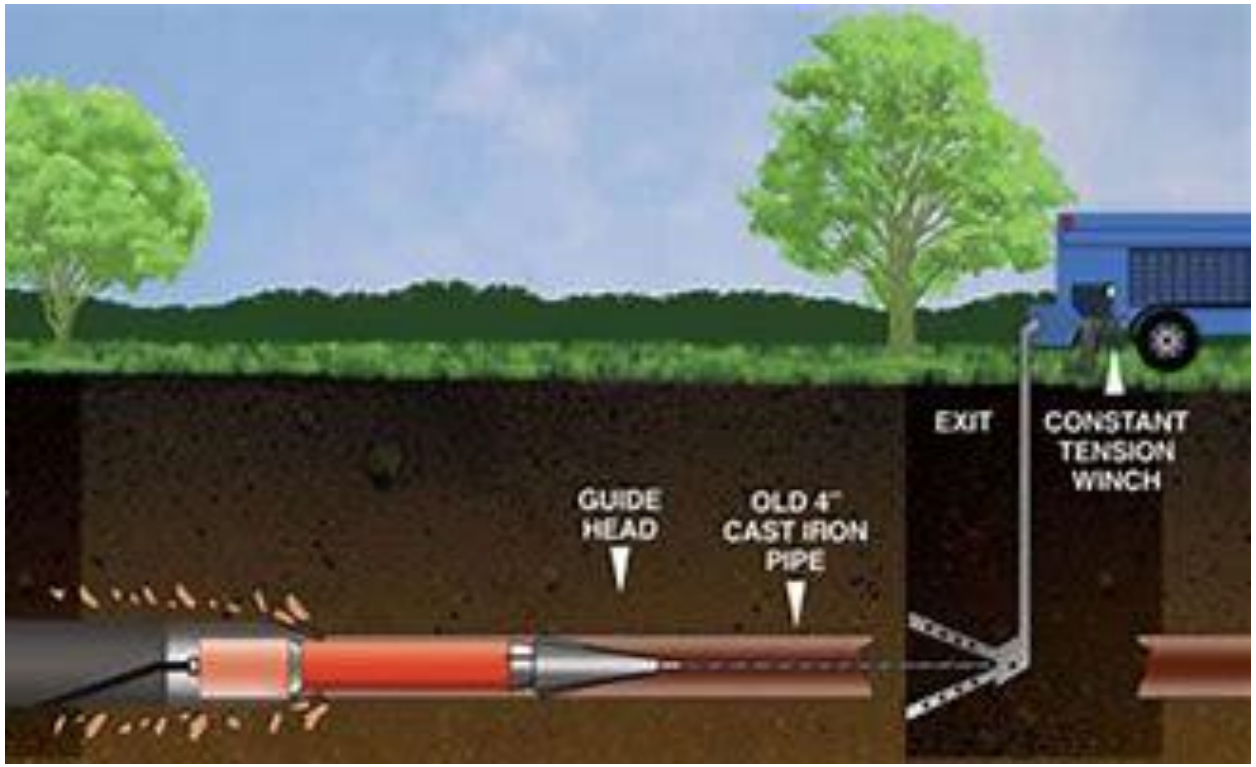
715 Vacuum Drainage Systems



Vacuum drainage system schematic

Revision to Chapter 5 of the 2018 International Plumbing Code

716 pipe Bursting Replacement of Building Drains. The 2018 IPC added this procedure for replacing existing building drains and sewers. While this is not new the code has never recognized it as an approved method for pipe replacement. The system simply pulls a metal head through an existing drain with a cable. The head is cone-shaped and is of a slightly larger diameter than the pipe through which it is being pulled. This causes the existing piping to split and allows a new pipe to be pulled through the opening as the head moves forward. The code puts two restrictions on this procedure, One is that this procedure is limited to gravity type drains. The other states the pipe can be no larger than 6 inches in diameter.



CODE REVISION TO THE 2018 IPC

716 Pipe Bursting Replacement of Building Drains

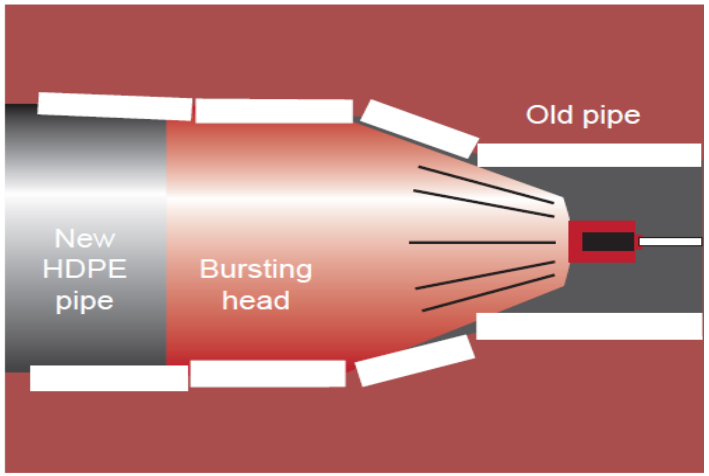
The section on replacement of building sewers by pipe-bursting methods has been expanded to include replacement of underground building drains.

716 REPLACEMENT OF UNDERGROUND BUILDING SEWERS AND BUILDING DRAINS BY PIPE-BURSTING METHODS

716.1 General. This section shall govern the replacement of existing *building sewer and building drain piping by pipe-bursting methods.*

716.2 Applicability. The replacement of *building sewer and building drain piping by pipe-bursting methods shall be limited to gravity* drainage piping of sizes 6 inches (152 mm) and smaller. The replacement piping shall be of the same nominal size as the existing piping.

Completed



Pipe bursting building drainage piping