

# State of North Carolina Plumbing Code



Adopted by the North Carolina  
Building Code Council  
January 10, 1961

RECOMMENDED MINIMUM PLUMBING CODE AND  
RECOMMENDED PROCEDURES FOR ITS ADMINISTRATION  
BY LOCAL GOVERNMENT UNITS  
APPROVED BY THE NORTH CAROLINA BUILDING CODE  
COUNCIL

JANUARY 10, 1961

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# **RECOMMENDED PROVISIONS FOR ADMINISTRATION OF THE NORTH CAROLINA PLUMBING CODE BY LOCAL GOVERNMENTAL UNITS**

## **(As Approved by the North Carolina Building Code Council)**

It is the intent and purpose of these recommendations to provide opportunity for the several political subdivisions of state to adopt standards, provisions, requirements and inspection of plumbing, on premises, or in all habitable buildings or structures.

The provisions of these recommendations shall be construed as minimum standards and requirements, and same may be amended by the governing authorities of municipalities, county boards of commissioners, county boards of health or other political subdivisions for the further protection of the public health, safety, and comfort.

In the interest of uniform standards and regulations, it is recommended by the Building Code Council that cities, towns, county commissioners, local boards of health and other political subdivisions do adopt the rules, regulations and standards, as prescribed in the North Carolina Plumbing Code, for the installation of plumbing in all types of habitable buildings or structures. Upon adoption of the aforesaid rules, regulations and standards, with approval of the Building Code Council, same shall be considered as conclusive evidence that such code supercedes the State Building Code in a particular subdivision.

### **ADMINISTRATIVE PROCEDURES**

#### **SECTION 2001 (f) - DUTIES OF PLUMBING INSPECTOR**

The plumbing inspector shall have the power, and it shall be his duty, to enforce the requirements and provisions of this code; to approve or disapprove plans and specifications pertinent to plumbing within a reasonable time after receipt of an application; to issue permits, notices and certificates; to witness tests and to perform such other duties that may be required by the local governing authority, in connection with the administration and enforcement of this code and other applicable plumbing regulations.

#### **SECTION 2001 (g) - RIGHT OF ACCESS FOR PURPOSES OF INSPECTION, POWER TO CONDEMN, EXCEPTION**

The plumbing inspector shall have the right to enter public or private property within the jurisdiction of this code at such reasonable time as may be necessary for the performance of his duties. The plumbing inspector is empowered to condemn any plumbing system, or segment thereof, fixtures, apparatus or appurtenances which are not installed, altered or restored in accordance with the provisions of this code. In the interest of public health, the administrative authority further shall have the right to condemn any plumbing system or part thereof which is a detriment to health and require that same be remedied immediately.

Buildings constructed by the State of North Carolina in accordance with plans and specifications approved by the North Carolina Department of Administration are not subject to inspection by the plumbing inspector of a county or municipality or the codes and requirements thereof. (See G. S. 143-135.1)



**SECTION 2001 (h) - DISCRETIONARY POWER, APPEAL**

In event plumbing cannot be reasonably installed, altered or restored in accordance with the provisions of this code, due to structural barrier, then in this event, the decision of the plumbing inspector shall prevail, based upon general accepted standards that will not jeopardize the public health or safety. Should any controversy arise relating to the interpretation of this code, the master plumber or installer may appeal to the local governing authority whose decision shall be final, provided, however, an appeal from the local governing authority may be taken to the N. C. Building Code Council or Superior Court, as provided for in G. S. 143-140.

**SECTION 2001 (i) - MASTER PLUMBER**

The words, "Master Plumber", when used in this code, shall be deemed and held to mean, a person who holds a current license issued by the State Board of Examiners of Plumbing and Heating Contractors, in accordance with the provisions of G. S. 87, Article 2, which authorizes the said person to engage in the business of plumbing contracting in cities or towns having a population of more than 3500, in accordance with the last official U. S. Census.

**SECTION 2001 (.1) - INSTALLER**

The word, "Installer", when used in this code, shall be deemed and held to mean, a person who installs plumbing, or who is responsible for the installation of plumbing, in accordance with the provisions of this code, in cities, towns or unincorporated areas in which a license is not required by the State Board of Examiners of Plumbing and Heating Contractors.

**SECTION 2001 (k) - JOURNEYMAN PLUMBER**

For the purpose of this code, the words, "Journeyman Plumber", shall be deemed and held to mean a person who is skilled in the art of installing plumbing, and who is employed by, and under the supervision and jurisdiction of, a Master Plumber or Installer, as defined herein.

**SECTION 2001 (l) - APPLICATIONS, PERMITS REQUIRED: EXCEPTIONS**

Applications shall be made to, and permits shall be obtained from, the plumbing inspector, for the installation of plumbing systems or the extensions, alterations or general repairs thereof, in accordance with the provisions of this code, however, the provisions of this code shall not apply to those who make minor repairs or replacements to an already installed system of plumbing, on the house side of a trap, provided such repairs or replacements in no way disrupt the original water supply, waste or ventilating systems. In event a fixture is replaced, a permit shall be secured and same shall be inspected by the plumbing inspector.

**SECTION 2001 (m) - APPLICATIONS, PERMITS ISSUED TO MASTER PLUMBERS AND INSTALLERS**

Applications to install plumbing in cities or towns of more than 3500 population, in accordance with the last, official United States Census, shall be received from, and permits issued only to, master plumbers, as defined herein. When applications and permits are required in cities or towns of less than 3500 population or any unincorporated area, same shall be made by, and issued to, the installer of plumbing or the person responsible for the installation of same.

**SECTION 2001 (n) - MASTER PLUMBER OR INSTALLER NOT TO SECURE PERMIT FOR OTHERS**

No master plumber or installer shall secure a permit from the plumbing inspector for others, not qualified in accordance with the provisions of this code, to install plumbing.

**SECTION 2001 (o) - APPLICATIONS, PERMITS REQUIRED BEFORE WORK BEGINS**

Applications must be approved by, and permits secured from the plumbing inspector before beginning the installation, alteration or restoration of plumbing, as provided in this code.

**SECTION 2001 (p) - PERMIT MAY BE REVOKED, DAMAGES**

The plumbing inspector, at any time during the progress of the installation of plumbing, may revoke a permit for reason of non-compliance with the provisions of this code, and, further, upon the condition that interested parties shall have no claim for damages that may result from such procedure.

**SECTION 2001 (q) - PERMIT MAY BE REFUSED**

Additional permits shall not be issued to any master plumber or installer during a period in which he refuses to correct previous defects in the installation of plumbing as required by the plumbing inspector.

**SECTION 2001 (r) - INSPECTION REQUIRED**

All plumbing installed in accordance with the provisions of this code shall be inspected by the plumbing inspector and no part of the plumbing system shall be covered until same has been so inspected and approved as herein prescribed.

**SECTION 2001 (s) - REQUEST FOR INSPECTION**

Requests for inspection of plumbing, as required in this code, shall be filed by the master plumber or the installer of same in the office of the plumbing inspector at such time as the local governing authority may determine,

**SECTION 2001 (t) - FINAL INSPECTION**

When the installation, alteration or restoration of plumbing has been completed in accordance with the provisions of this code, a request for final inspection shall be filed at the office of the plumbing inspector by the master plumber or installer.

**SECTION 2001 (u) - PLUMBING SYSTEM TO BE TESTED**

In order to prevent the use of defective materials and to provide for water tight or air tight joints, the piping of the entire drainage and venting system shall be tested in the presence of the plumbing inspector by application of the water test as follows. If such test is applied to the entire system, all openings in the piping shall be tightly closed, except the highest openings above the roof, and the entire system shall be filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged, except the highest opening of the section under test, and each section shall be completely filled with water. No section shall be tested with less than a ten (10) foot head of water. In testing successive sections, at least the upper ten (10) feet of the next succeeding section shall be tested so that no joint or pipe in the building shall have been submitted to a test of less than a ten (10) foot head of water. In lieu of the above water test, the plumbing inspector may require an air test, to consist of not less than five (5) pounds per square inch of pressure in the system. In either of the above tests, the plumbing system shall sustain a constant water level or air pressure per square inch for a period of not less than fifteen (15) minutes. If either of the above tests reveals defective materials or workmanship, same shall be replaced or corrected and tests, as provided in this section, shall be repeated. A roughing-in test shall be required before any piping of the plumbing system is concealed or fixtures set.

**SECTION 2001 (v) - TEST OF EXISTING PLUMBING**

In event the plumbing inspector has reason to believe that insanitary conditions exist, in habitable buildings or on premises, he may require the owner or agent thereof to provide for tests, as described in

paragraph (u) hereof, and in event defective materials or workmanship are revealed by such tests, the said owner or agent shall immediately repair the plumbing system in accordance with the directions of the plumbing inspector.

**SECTION 2001 (w) - MATERIALS AND LABOR FOR TESTS**

All equipment, material, power and labor necessary for inspection and tests shall be furnished by the master plumber or installer.

**SECTION 2001 (x) - FINAL CERTIFICATE OF INSPECTION ISSUED BY PLUMBING INSPECTOR**

If, after the final inspection and tests of plumbing, as provided for in this code, the plumbing inspector approves of same, he shall issue a certificate of compliance to the master plumber or installer. A property owner or his agent shall be entitled to a copy of said certificate of compliance upon request to the plumbing inspector.

**SECTION 2001 (y) - INSPECTION FEES**

Prior to the issuance of a permit to install, alter or restore plumbing in accordance with the provisions of this code, the master plumber or installer shall pay the required inspection fees, as designated by the local governing authority.

**SECTION 2001 (z) - PROPERTY OWNER, AGENT TO REPAIR OR REPLACE CONDEMNED PLUMBING**

It shall be the duty of any owner, agent or person having control of property to immediately repair or replace any segment of the plumbing system which has been condemned by the plumbing inspector.

**SECTION 2001 (aa) - DISCONTINUANCE OF SEWER CONNECTION**

For persistent discharge into the city sewer of substances injurious thereto, the plumbing inspector shall have power to disconnect the sewer connection.

**SECTION 2001 (bb) - INDUSTRIAL WASTES**

Before the issuance of permits for the installation of plumbing systems in hospitals, chemical plants, laundries, abattoirs, or any other industrial plant, a statement shall be filed at the office of the plumbing inspector as to what substances, ingredients or matter, other than the usual wastes from the human body, will be discharged by the house sewer.

**SECTION 2001 (cc) - PLUMBING FOR TENEMENTS AND CERTAIN OTHER BUILDINGS**

Every owner of any tenement house, boarding and lodging house, workshop, store or manufactory shall provide adequate plumbing fixtures for such houses or tenements and for the lodgers or workers therein, where such building property line abuts a street or alley wherein is laid a public sewer. All water closets shall be located in well lighted and ventilated rooms, and shall be kept in a sanitary condition. There shall be provided one (1) water closet for every fifteen (15) men or women inhabitants or employees in such shops, factories or other buildings, these to be located as remotely from each other as is possible. Separate toilet rooms and at least one (1) for each family shall be provided for apartments and flats which are to be occupied by separate families.

#### **SECTION 2001 (dd) - LOCATION OF WINDOWS IN RELATION TO VENT STACKS**

In the event that a structure is built higher than an existing structure, the owner of the structure shall not locate windows within ten (10) feet of any existing vent stack on the lower structure, unless the owner of such higher structure shall defray the expenses of or shall himself make such alterations as are necessary to conform with the provisions of this code.

#### **SECTION 2001 (ee) - LOCATION OF WATER CLOSETS WITH REFERENCE TO WORKING AREA**

In the construction of commercial and industrial buildings, water closets shall be located not more than one floor above or below the regular working area of occupants; however, the above rule shall be waived when passenger elevators are provided.

#### **SECTION 2001 (ff) - INDIVIDUAL SEWAGE DISPOSAL SYSTEMS**

In those instances where the installation of a private residential sewage-disposal system cannot be avoided, the following requirements should be followed. For these requirements see the State Board of Health Bulletin No. 519, "Residential Sewage Disposal Plants."

#### **SECTION 2001 (gg) - INDIVIDUAL WATER SUPPLY**

Where connection to a municipal water supply or public water system is not possible, private water supplies shall be constructed in accordance with State Board of Health Bulletin No. 476, "Protection of Private Water Supplies."

#### **SECTION 2001 (hh) - AIR CONDITIONING EQUIPMENT: APPLICATION REQUIRED**

No installation of air conditioning equipment requiring the use of water for direct cooling, in the absence of evaporative condensers or cooling towers, shall be installed on any premises supplied from a municipal water system until a permit authorizing such installation has been issued by the local administrative authority. Applications for permits shall specify make, type and tonnage of installation, the minimum and maximum water requirements and such additional information regarding the proposed installation as may be required.

#### **SECTION 2002 - DEFINITIONS**

For the purpose of this article the following words and phrases are deemed and held to mean:

1. Administrative Authority - The Administrative Authority is the individual official, board, department or agency established and authorized by the State, county, city or other political subdivision to administer and enforce the provisions of this plumbing code as adopted or amended.
2. Air Gap - The air gap in a water supply system for plumbing fixtures is the unobstructed vertical distance between the supply- fitting outlet (spout) and the highest possible water level in the receptor when flooded, not considering any below rim overflow attachment, whether operative or not.
3. Approved - Approved means accepted or acceptable under an applicable specification stated or cited in this code or accepted as suitable for the proposed use by the Administrative Authority.
4. Area Drain - An area drain is a drain installed to collect surface or rain water from an area or open court on the ground level.
5. Backflow - Backflow means the flow of water or other liquids, mixtures or substances into a potable water supply system from any source not intended for its supply. Back-siphonage is one type of backflow.

6. Backflow Connection - A backflow connection is any arrangement whereby backflow can occur.
7. Backflow Preventer - A backflow preventer is a device or means to prevent backflow into the potable water system.
8. Back-Siphonage - Back-siphonage is the flowing back of used, contaminated or polluted water from a plumbing fixture or vessel into water supply pipes due to negative pressure in such pipes.
9. Back Vent Pipe - A back vent pipe is that part of a vent line which connects directly into an individual trap underneath or back of the fixture it serves and extended to the branch or main vent at any point higher than the fixture or fixture trap it serves.
10. Branch - The branch of any system of piping is that part of the system which extends horizontally at a slight grade, with or without lateral or vertical extensions or vertical arms, from the main to receive fixture soil or waste outlets not directly connected to the main.
11. Branch Interval - A branch interval is a length of soil, waste or water pipe corresponding in general to a story height, but in no case less than 8', within which the horizontal branches from plumbing fixtures on one floor or story are connected to the stack.
12. Building - A building is a structure built, erected, and framed of component structural parts designed for the housing, shelter, enclosure or support of persons, animals or property of any kind.
13. Building Drain - The building (house) drain is that part of the lowest piping of a drainage system which receives the discharge from soil, waste and other drainage pipes inside the walls of the building and conveys it to the building (house) sewer beginning 3' outside the building wall.
14. Building Sewer - The building (house) sewer is that part of the horizontal piping of a drainage system which extends from the end of the building drain and which receives, the discharge of the building drain and conveys it to a public sewer, private sewer, individual sewage disposal system, or other point of disposal.
15. Circuit Vent - A circuit vent is a branch vent that serves two or more traps and extends from in front of the last fixture connection of the horizontal branch to the vent stack.
16. Combination Fixture - A combination fixture is a fixture combining one sink and tray or a two-or-three-compartment sink or tray in one unit.
17. Combination Waste and Vent System - A combination waste and vent system is a specially designed system of waste piping, embodying the horizontal wet venting of one or more sinks or floor drains by means of a common waste and vent pipe adequately sized to provide free movement of air above the flow line of the drain.
18. Common Vent - A common vent is a vent connecting at the junction of two fixture drains and serving as a vent for both fixtures.
19. Continuous Vent - A continuous vent is a vertical vent that is a continuation of the drain to which it connects.
20. Continuous Waste - A continuous waste is a drain from two or three fixtures connected to a

single trap.

21. Cross Connection - A cross-connection is any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other water of unknown or questionable safety, whereby water may flow from one system to the other, the direction of flow depending on the pressure differential between the two systems. (See Backflow and Back-Siphonage).
22. Dead End - A dead end is a branch leading from a soil, waste, vent, building drain or building sewer, which is terminated at a developed distance of 2' or more by means of a cap, plug or other fitting not used for admitting water to the pipe.
23. Developed Length - The developed length of a pipe is its length along the center line of the pipe and fittings.
24. Drain - A drain or drain pipe is any pipe which carries waste water or water-borne waste in a building drainage system.
25. Drainage Piping - Drainage piping is all or any part of the piping of a plumbing system, which conveys sewage, drain water or other liquid wastes including the vents.
26. Durham System - Durham System is a term used to describe soil or waste systems where all piping is of threaded pipe, tubing or other such rigid construction, using recessed drainage fittings to correspond to the types of piping.
27. Fixture Unit - A fixture unit is a quantity in terms of which the load-producing effects of the plumbing system of different kinds of plumbing fixtures are expressed on some arbitrarily chosen scale. For the purpose of this Code, one fixture unit equals one cubic foot or 7 1/2 gallons per minute, which is practically the average discharge of one lavatory with a 1 1/4" plug and a 1 1/2" trap and waste.
28. Floor Drain - A floor drain is a drain installed to collect washings or surplus waste water from a floor surface.
29. Fire Line - A system of pipes and equipment used exclusively to supply water in an emergency for extinguishing fire.
30. Grease Interceptor - An interceptor is a device designed and installed so as to separate and retain deleterious, hazardous, or undesirable matter from normal waste and permit normal sewage or liquid wastes to discharge into the disposal terminal by gravity.
31. Horizontal Branch - A horizontal branch is a drain pipe extending laterally from a soil or waste stack or building drain, with or without vertical sections or branches, which receives the discharge from one or more fixture drains and conducts it to the soil or waste stack or to the building (house) drain.
32. House Drain - See Building Drain
33. House Sewer - See Building Sewer
34. Indirect Waste Pipe - An indirect waste pipe is a pipe that does not connect directly with the drainage system but conveys liquid waste by discharging into a plumbing fixture or receptacle which is directly connected to the drainage system.
35. Individual Vent - An individual vent is a pipe installed to vent a fixture trap, and which

connects with the vent system above the fixture served or terminates in the open air.

36. Industrial Waste - Industrial waste is liquid waste resulting from the processes employed in industrial establishments and is free of fecal matter.
37. Local Ventilating Pipe - A pipe provided to remove foul air from a room or fixture to the outer air. It is not to be connected to or with any pipe of a house drainage system.
38. Loop Vent - A loop vent is the same as a circuit vent, except that it loops back and connects with a stack vent instead of a vent stack.
39. Main - The main of any system of continuous piping is the principal artery of the system to which branches may be connected.
40. Main Sewer - A main sewer is a common sewer directly controlled by local public authority.
41. Main Vent - The main vent is the principal artery of the venting system to which vent branches may be connected.
42. Outbuilding or Accessory Building - A building or structure which is incidental and subordinate to the principal building and located on the same lot or premises as the principal building or structure.
43. Plumbing - Plumbing, in its broadest sense, is the art and science of creating and maintaining sanitary conditions in and about buildings where people live, work or assemble, by providing permanent means for a supply of safe, pure and wholesome water, ample in volume and of suitable temperatures for drinking, cooking, bathing, washing and cleaning, and to cleanse all waste receptacles and like means of reception and speedy and complete removal from the premises of all fluid or semi-fluid organic wastes and other impurities incident to human life and occupation. Plumbing, in a mechanical sense, is the art and science of installing the pipes to provide the water supply, with apparatus for its control and handling, fixtures and appliances to receive wastes or surplus water, the soil, waste, drain and sewer system for removing the waste or surplus water, traps to prevent sewer air from entering the occupied portion of the building, ventilating pipes to protect the trap seals and provide for a cleansing circulation of air throughout the plumbing system. It includes extensions of the water supply distributing system for fire-fighting or mechanical purposes, and where no street or private sewer exists, it includes the means of sewage disposal, and generally all work usually and customarily done by plumbers to the property line.
44. Plumbing Fixture - A plumbing fixture is any receptacle intended to receive and discharge water, liquid or water-carried wastes into a drainage system with which it is connected.
45. Plumbing System - The plumbing system includes the water supply and distribution pipes; plumbing fixtures and traps; soil, waste and vent pipes; building drains and building sewers including their respective connections, devices and appurtenances within a building or on the premises.
46. Premises - Premises shall be deemed and held to mean a lot or parcel of land, which may or may not contain a structure or building.
47. Pool - A pool is a water receptacle used for swimming or as a plunge or other bath, designed to accommodate more than one bather at a time. This shall include baptisteries or ornamental fountain basins, or similar construction. Pools are subject to all rules for trapping, venting and

water supply.

48. Potable Water - Potable water is water which is satisfactory for drinking, culinary and domestic purposes and meets the requirements of the health authority having jurisdiction.
49. Public or Public Use - In the classification of plumbing fixtures, public applies to fixtures in general toilet rooms of schools, gymnasiums, hotels, railroad stations, public buildings, bars, public comfort stations, and other installations where a number of fixtures are installed so that their use is similarly unrestricted.
50. Relief Vent - A relief vent is a vent the primary function of which is to provide circulation of air between drainage and vent systems.
51. Riser - A riser is a water supply pipe, which extends vertically one full story or more to convey water to branches or fixtures.
52. Sanitary Sewer - A sanitary sewer is a pipe which carries sewage and excludes storm, surface and ground water.
53. Septic Tank - A septic tank is a watertight receptacle which receives the discharge of a drainage system or part thereof, and is designed and constructed so as to separate solids from the liquid, digest organic matter through a period of detention, and allow the liquids to discharge into the soil outside of the tank through a system of open-joint or perforated piping or disposal pit.
54. Sewage - Sewage is any liquid waste containing animal or vegetable matter in suspension or solution, and may include liquids containing chemicals in solution.
55. Size and Length - The size of pipe is the nominal internal diameter, except that other than iron pipe size tubing is measured by its outside diameter. The developed length of a pipe is its length along the center line of pipe and fitting.
56. Soil Pipe - A soil pipe is any pipe which conveys the discharge of water closets or fixtures, having similar functions, with or without the discharge from other fixtures, to the building drain or building sewer.
57. Stack - Stack is a general term for any vertical line of soil, waste or vent piping.
58. Stack Vent - A stack vent is the extension of a soil or waste stack above the highest horizontal or fixture branch connected to the stack. (See Vent Stack).
59. Storm Water Drain - A storm water drain (or sewer) is a drain used for conveying rain water, surface water, sub-surface water, condensate, cooling water or other non-potable water, not discharged from any plumbing fixture waste.
60. Structure - A structure is a building, house, bridge, any variation of a house, such as an apartment, hotel, office building, church, store, shed, tent, or viewing stand.
61. Sub-House Drain - Sub-house drain is that portion of a drainage system which cannot drain by gravity into the sewer.
62. System - When the word "system" is used in this article, same shall refer to the "plumbing system" as defined herein.
63. Trap - A trap is a fitting or device constructed to prevent the passage of air or gas through a pipe without materially affecting the flow of sewage or waste water through it.



64. Trap Seal - The trap seal is the vertical distance between the crown weir and the dip of the trap.
65. Vent Pipe - A vent pipe is any pipe conveying air provided to ventilate a building drainage system and to prevent trap siphonage or other disturbance to trap seals.
66. Vent Stack - A vent stack, sometimes called a main vent, is a vertical vent pipe installed primarily for the purpose of providing circulation of air to or from any part of the house drainage system (See Stack Vent).
67. Waste Pipe and Special Wastes - A waste pipe is any pipe which receives the discharge of any fixture, except water closets or similar fixtures, and conveys the same to the house drain, soil or waste stack. When such pipe does not connect direct to the house drain or soil stack, it is termed a special waste.
68. Water Distribution Pipes - The water distribution pipes are those which convey water from the service pipe to the plumbing fixture or to any part of the premises.
69. Water Mains - A water main (street) is a general water supply pipe for public community use.
70. Water Service Pipe - The water service pipe is the pipe from the water main to the building served.
71. Water Supply System - A water supply system consists of the water service pipe, the water distributing pipes, and the necessary connecting pipes, fittings and control valves.
72. Wet Vent - A wet vent is a vent which receives the discharge from wastes other than water closets.

## **SECTION 2003 - GENERAL REGULATIONS**

### **2003 (a) - WORKMANSHIP**

Workmanship shall be of such character as to fully secure the results sought in all the sections of this Chapter.

In providing right-of-way for all plumbing waste vent, water or gas piping, care shall be taken to confine all holes or notching to the minimum required for the pipe size. Before approval can be made of the roughing-in, the building shall be rodent proofed around all plumbing piping. All plumbing work shall be installed in accordance with this Code.

### **2003 (b) - GRADES OF HORIZONTAL PIPING**

All horizontal piping shall be run in practical alignment and shall be supported or anchored to effectively prevent sagging at intervals not to exceed 5'. All stacks shall be supported at their bases, and all pipes shall be rigidly secured. The minimum grades for pipe 3" or less in diameter should be 1/4" per foot, and for sizes greater than 3", the minimum should be 1/8" per foot.

Piping shall be installed without undue stresses or strains and provisions made for expansion, contraction, and structural settlement. No structural member shall be weakened beyond a safe limit by cutting, notching or otherwise, unless provision is made for carrying the structural load.

### **2003 (c) - CHANGE IN DIRECTION**

All changes in direction shall be made by the appropriate use of 45 degree Y's, half Y's, long sweep quarter bends, sixth, eighth, or sixteenth bends, except that single sanitary T's may be used on vertical stacks, and short quarter bends may be used in soil and waste lines where the change in direction of flow is from the horizontal to the vertical. T's and crosses may be used in vent pipes and

on water distributing pipes.

**2003 (d) - PROHIBITED FITTINGS**

No low side or heel outlet quarter bend shall be used on horizontal waste lines except when used as wet vents. Double hub fittings shall not be used on waste lines. The drilling and tapping of house drains, waste or vent pipes, and the use of saddle hubs and bands are prohibited. Any fitting or connection which has an enlargement, chamber or recess with a ledge, shoulder or reduction of the pipe area, that offers an obstruction to flow through the drain is prohibited.

**2003 (e) - PROHIBITED CONNECTIONS**

No fixture, fitting, device or construction shall be installed which may provide a backflow connection between a distributing system of water for drinking and domestic purposes and a drainage system, soil or waste pipe, so as to permit or make possible the backflow of sewage or waste into the water supply system.

No interconnection or cross-connection shall be made between a water supply system carrying water meeting accepted standards of purity, and any other water supply system. No person shall directly or indirectly connect any open gutter, rain water leader, or cesspool into any sewer.

**2003 (f) - DEAD ENDS**

In the installation of any drainage system, dead ends shall be prohibited. Cleanouts shall not be considered dead ends, but unwashed and unvented connections to cleanouts shall be kept as short as possible.

**2003 (g) - PROTECTION OF MATERIAL**

All pipes passing under or through walls shall be protected from breakage with a sleeve one inch larger than the pipe used. All pipes through or under concrete or other corrosive materials shall be protected against external corrosion.

**2003 (h) - PROTECTION OF ELECTRICAL MACHINERY**

Any drain, line leader or water line likely to sweat and located over electrical machines, pumps, control or switch boards shall be covered with anti-sweat covering.

**2003 (i) - PROTECTION OF WATER TANKS**

Drainage piping shall not pass directly over water supply tanks or reservoirs unless such tanks or reservoirs are covered and amply protected.

**SECTION 2004 - QUALITY AND WEIGHTS OF MATERIALS**

**2004 (a) - QUALITY**

All materials used in any drainage or plumbing system, or part thereof, shall be free from defects. Drainage and vent piping within structures shall be of cast iron, lead, galvanized steel, galvanized wrought iron, brass or copper of required size and wall thickness, singly or in combination. The maximum unsupported developed length in which lead pipe may be used shall be 1 1/2' but underground water service may be of lead. All cast iron soil pipe installed below grade shall be coated and when installed above grade may be coated or uncoated. The use of galvanized drainage pipe below grade is prohibited.

All copper tube or fittings below grade shall be type "K" or "L" copper tube and fittings.

**2004 (b) - LABEL: WEIGHT OF SOIL PIPE**

Each length of pipe, fitting, trap, fixture and device used in a plumbing or drainage system shall be stamped or indelibly marked with the weight or quality thereof and the maker's mark or name. The weight of cast iron soil pipe shall not be more than 5% less, for a regular single-hub laying length of 5' (plus hub) than the following table, and fittings shall correspond thereto in wall thickness:

INCHES	POUNDS	INCHES	POUNDS
2	20	5	52
3	30	6	65
4	40	8	100

All cast iron soil pipe and fittings shall conform to Commercial Standard CS 188-59.

**2004 (c) — WROUGHT-IRON PIPE**

All wrought-iron pipe shall conform to the A.S.T.M. "Standard Specifications for Welded Wrought-Iron Pipe" (A72-59T), and shall be galvanized.

**2004 (d) - MILD STEEL PIPE**

All steel pipe shall conform to the A.S.T.M. "Standard Specifications for Black and Hot-dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses" (A120-57T), and shall be galvanized.

**2004 (e) - BRASS AND COPPER PIPE**

Brass and copper pipe shall conform respectively to the standard specifications of A.S.T.M. for "Seamless Red Brass Pipe, Standard Sizes," and for "Seamless Copper Pipe, Standard Sizes" (Numbers B43-58 and B42-58, respectively).

**2004 (f) - COPPER TUBING**

Copper tubing for water supply distribution systems shall conform to the A.S.T.M. "Standard Specification for Seamless Copper Water Tube" (B88-58). Copper tubing used for underground water supply or service shall be type K or L. Type M copper is permitted to be used above ground only.

**2004 (g) - LEAD PIPE, DIAMETER, WEIGHTS (WHEN PERMITTED)**

All lead pipe shall be of best quality of drawn pipe, of not less weight per linear foot than shown below and in accordance with

**Commercial Standards CS95-41 or Lead Industries Association Standards: Lead, Soil, Waste, Vent or Flush Pipes:**

INTERNAL DIAMETER (inches)	WEIGHTS PER FOOT	
	(pounds)	(ounces)
1	2	---
1 1/4	2	8
1 1/2	3	8
2	4	12
3	6	---
4	8	---

Lead traps and bends shall be in accordance with Commercial Standards CS96-41 or Lead Industries Association Standards, and shall have a wall thickness of not less than 1/8". Calking lead shall be in accordance with Commercial Standards CS94-41 or Lead Industries Association Standards.

**2004 (h) - CLAY SEWER PIPE**

Shall conform to A.S.T.M. Standards C278 or C200-59T for extra strength. Resilient joints shall be used and shall conform to A.S.T.M. Standard C425-58T.

**2004 (i) - CONCRETE SEWER PIPE**

If reinforced, shall meet A.S.T.M. Standard No, C76-59T and if non-reinforced, shall meet A.S.T.M. Standard No. C14-59.

**2004 (j) - BITUMINIZED FIBER SEWER PIPE AND FITTINGS**

Shall conform to Commercial Standard No. CS116-54 or CS226-59.

**2004 (k) - COPPER SEWER PIPE AND FITTINGS**

As a minimum requirement, copper sewer pipe and fittings shall be at least type "L".

**2004 (l) - ASBESTOS CEMENT SEWER PIPE**

Shall conform to A.S.T.M. Standard C428-59T, or Federal Specifications SS-P331-(a) with amendments.

**2004 (m) - ACID WASTES AND VENTS**

Wastes, vent pipe and fittings shall be of an acid proof material or as approved by the Administrative Authority. In no case shall corrosive liquids, spent acids or other harmful chemicals which might destroy or injure a drain, sewer, soil or waste pipe, or which might create noxious or toxic fumes, discharge into the plumbing system without being thoroughly diluted or neutralized by passing through a properly constructed and acceptable dilution or neutralizing device. Such device shall be automatically provided with a sufficient intake of diluting water or a neutralizing medium, so as to make its contents non-injurious before being discharged into the soil or sewerage system.

**2004 (n) - SHEET LEAD**

Sheet lead shall weigh not less than four (4) pounds per square foot.

**2004 (o) - SHEET COPPER OR BRASS**

Sheet copper or brass shall be not lighter than No. 17 B. and S. gauge, except that for local and interior ventilating pipe it shall be not lighter than No. 23 B. and S. gauge.

**2004 (p) - GALVANIZED SHEET IRON**

Galvanized sheet iron shall be not lighter than the following B. and S. gauges:

No. 26 for 2 to 12" pipe

No. 24 for 13 to 20" pipe

No. 22 for 21 to 26" pipe

**2004 (q) - THREADED FITTINGS**

Plain screwed fittings for use with wrought-iron or steel pipe vents may be of cast iron, or of malleable iron, of standard weights and dimensions.

Screwed drainage fittings for use on soil, waste or leaders shall be of the recessed drainage type, with smooth interior waterway, and with threads tapped out of solid metal.

Screwed fittings for brass or copper pipe shall be cast red brass, steam pattern, for water supply or vents, and recessed drainage pattern for soil or waste.

All screwed fittings on water supply pipes shall be either brass or malleable and beaded.

All malleable iron fittings shall be galvanized.

American standard tapered pipe thread shall be used on all threaded fittings.

**2004 (r) - FITTINGS**

Fittings for copper tubing, if sweated type or flared joint type, shall conform to all of the patterns of good practice. They shall be without defects.

**2004 (s) - CALKING FERRULES WHEN PERMITTED**

Calking ferrules shall be of the best quality red cast brass, with weights and dimensions in accordance with the following table:

Pipe Size	Actual Inside Diameter	Length	Weight	
			(pounds)	(ounces)
(inches)	(inches)	(inches)		
2	2 1/4	4 1/2	1	0
3	3 1/4	4 1/2	1	12
4	4 1/4	4 1/2	2	8

**2004 (t) – SOLDERING NIPPLES AND BUSHINGS WHEN PERMITTED**

Soldering nipples shall be of red brass or copper pipe, iron pipe size, or of heavy, cast red brass not less than the following weights:

Diameter	Weights	Diameter	Weight	
(inches)	(ounces)	(inches)	(pounds)	(ounces)
1-1/4	6	2-1/2	1	6
1-1/2	8	3	2	0
2	14	4	3	8

Soldering bushings shall be of heavy, cast red brass, with iron pipe threads.

**2004 (u) - FLOOR FLANGES FOR WATER CLOSETS**

Brass floor flanges for water closets shall be not less 3/16 of an inch thick. Cast iron floor flanges shall be full 3/8" thick.

**SECTION 2005 - JOINTS AND CONNECTIONS**

**2005 (a) - TIGHTNESS OF PLUMBING JOINTS AND CONNECTIONS**

Joints and connections shall be made permanently gas and water tight.

**2005 (b) - CALKED JOINTS**

Joints for cast iron bell and spigot soil pipe for drainage and vent pipe shall be firmly packed with picked oakum or hemp and secured with molten lead, at least 1" deep. Lead shall be run in one pouring and calked tight. Lead joints for water supply piping shall conform to the regulations of Section 9a of the American Water Works Association's Specifications No. C600-54T.

**2005 (c) - SCREWED JOINTS**

Screw joints shall be tapered, with threads sharp and true, and the burrs formed in cutting shall be completely removed by reaming before installation.

**2005 (d) - WIPED SOLDER JOINTS WHEN PERMITTED**

Joints in lead pipes or between lead pipe and brass or copper pipes, ferrules, soldering nipples, bushings or traps, in all cases, shall be full wiped joints, with an exposed surface of the solder on each side of the joint of at least 3/4", and a minimum thickness at the thickest part of the joint of 3/8". Overcast or cup joints are prohibited.

**2005 (e) - COPPER TUBING JOINTS**

Copper tubing joints shall be made by cleaning tubing and fitting, fitting sleeve, applying any suitable flux, and bringing to a heat that will produce a full and complete capillary sweated joint on the application of the proper grade of solder, or flanged fittings where permitted.

**2005 (f) - JOINTS OF LEAD TO CAST IRON, STEEL OR WROUGHT IRON**

Joints of lead to cast iron, steel or wrought iron shall be made by means of calking ferrule, soldering nipple or bushing.

#### **2005 (g) - HOT-POURED JOINTS**

Hot-poured compound for concrete sewer pipe shall not be water absorbent, and when poured against a dry surface shall have a bond of not less than 100 pounds per square inch. All surfaces of the joint shall be cleaned and dried before pouring. If wet surfaces are unavoidable, a suitable primer shall be applied. Compound shall not soften sufficiently to destroy the effectiveness of the joint when subjected to a temperature of 160° F nor be soluble in any of the waste carried by the drainage system. Approximately 25 per cent of the joint space at the base of the socket shall be filled with jute or hemp. A pouring collar, rope or other device shall be used to hold the hot compound during pouring. Each joint shall be poured in one operation until the joint is filled. Joints shall not be tested until one hour after pouring.

#### **2005 (h) - PRECAST JOINTS**

Precast collars shall be formed in both the spigot and bell of the pipe in advance of use. Collar surfaces shall be conical with side slopes of 3° with the axis of the pipe, and the length shall be equal to the depth of the socket. Prior to making joint contact, surfaces shall be cleaned and coated with solvents and adhesives as recommended in the standard. When the spigot end is inserted in the collar, it shall bind before contacting the base of the socket. Material shall be inert and resistant to both acids and alkalies.

#### **2005 (i) - CEMENT MORTAR JOINTS**

Cement joints shall be used only when specifically permitted in other chapters of this Code or when approved by the Administrative Authority, as sufficient to accomplish the purpose of the Code. A layer of jute or hemp shall be inserted into the base of the joint space and rammed to prevent mortar from entering the interior of the pipe. Jute or hemp shall be dipped into a slurry suspension of Portland cement in water prior to insertion in the bell. Not more than 25 per cent of the joint space shall be used for jute or hemp. The remaining space shall be filled in one continuous operation with a thoroughly mixed mortar composed of one part cement and two parts sand, with only sufficient water to make the mixture workable by hand. After one-half hour of setting, the joint shall be rammed around entire periphery with a blunt tool to force the partially stiffened mortar into the joint and to repair any cracks formed during the initial setting period. Pipe interior shall be swabbed to remove any material that might have fallen into the interior. Additional mortar of the same composition shall be troweled so as to form a 45° taper with the barrel of the pipe.

#### **2005 (j) - ASBESTOS CEMENT SEWER PIPE JOINTS**

Joints in asbestos cement pipe shall be made with sleeve couplings of the same composition as the pipe, sealed with rubber rings. Joints between asbestos cement pipe and metal pipe shall be made by means of an adapter coupling calked as required.

#### **2005 (k) - BITUMINIZED FIBER PIPE JOINTS**

Joints in bituminized fiber pipe shall be made with tapered type couplings of the same material as the pipe. Joints between bituminized fiber pipe and metal pipe shall be made by means of an adapter coupling calked as required.

#### **2005 (l) - CLOSET AND PEDESTAL URINAL FLOOR CONNECTIONS**

In setting closet bowls and pedestal urinals, a 3/8" thick, cast iron floor flange or a brass floor flange, an approved setting compound, wax or graphite gasket shall be used to make a tight joint.

#### **2005 (m) - SLIP JOINTS AND UNIONS**

Slip joints or unions shall be permitted in drainage piping only in trap seals or on the inlet side of the trap, and must not be used in vent piping. They may be used in exposed water piping, in a plumbing fixture supply.

**2005 (n) - INCREASERS AND REDUCERS**

Where different sizes of drainage pipe, or pipes and fittings, are to be connected, proper sizes of increasers and reducers shall be employed. Reduction of size of drain pipes in the direction of flow is prohibited.

Where different sizes of water pipes, or pipes and fittings, are to be connected, proper sizes of fittings shall be used. The use of bushings is not acceptable.

**2005 (o) - ROOF FLASHINGS**

Joints where pipes pass through roofs shall be made water-tight by use of copper flashing, sheet lead, cast-iron plates or other approved materials.

**2005 (p) - EXPANSION AND CONTRACTION IN VERTICAL PLUMBING PIPES**

In structures exceeding 50' in height, adequate means shall be provided for taking care of the expansion and contraction of all vertical lines of pipe, at intervals of 50' or less.

**2005 (q) - BURNED JOINTS**

Joints in lead pipe, or between lead pipes and fittings, may be lead burned with a bond of at least  $\frac{3}{4}$ ".

**2005 (r) - WELDED JOINTS**

All welded joints shall be made in accordance with the provisions of Section 5 or the B31 Code for pressure piping of the American Standards Association. (1955)

**SECTION 2006 - TRAPS AND CLEANOUTS**

**2006 (a) - TRAPS REQUIRED FOR EACH FIXTURE**

Every fixture shall be trapped by a water-sealed trap placed as near to the fixture as possible. No fixture shall be double trapped.

**2006 (b) - PROTECTION FROM SIPHONAGE AND BACK PRESSURE**

Traps shall be protected from siphonage and back pressure and for this purpose the waste line leading from them shall be vented if it is farther than 3 ½' from the waste and vent pipe to which it connects, except that floor drains, showers, bathtubs, dishwashers, and washing machines shall be wasted into a 2" minimum size soil pipe with a 2" P trap not to exceed 5' from the trap to the vent. On a 3" or 4" vent serving a double bathroom on the same floor, but below any branch vent, four minor fixtures may be connected if within the required distance. Approved deep seal welded sand trap shall be permitted unvented if within 10' of the house drain. Vertical waste pipes shall be directly behind the sink trap where possible. Special installations shall be as approved by the plumbing inspector. All washing machine waste connections shall be threaded and capped until placed in use.



**2006 (c) – ANTI-SIPHONAGE TRAPS**

What is known as an anti-siphon trap shall only be permitted in isolated cases and shall be a type approved by Administrative Authority.

**2006 (d) - TRAPS AND CLEANOUTS**

Traps shall be self-cleaning and water-sealed and shall have a scouring action. Traps for bathtubs, lavatories, sinks and other similar fixtures, shall either be integral or shall be of lead, brass, cast iron or galvanized malleable iron. Traps shall have a full size bore, smooth interior waterway, such that a solid ball 1/4" smaller in diameter than the specified diameter of the trap will pass freely from the outlet and entirely through the seal of the trap. The minimum diameter of traps for fixtures shall be that given for the soil or waste branches (except that in the case of water closets the required minimum shall be 2 1/8"). In cases other than fixtures, the size of the trap shall be the same as the discharge pipe connection thereto. Running traps and "S" traps are prohibited.

**2006 (e) - WATER SEAL**

All traps shall have a water seal of at least 2".

**2006 (f) - SETTING AND PROTECTION OF TRAPS**

Traps shall be set true with respect to their water seals and protected from frost and evaporation and other loss of seal.

**2006 (g) - BACK-WATER VALVES**

Connection of a building drainage system to the public sewer is at the owner's risk. Where plumbing fixtures are set at a level only slightly higher than the public sewer, or for any other reason, there is a possibility of a backflow of sewage, the owner may, at his discretion install a back-water valve as probable protection.

**2006 (h) - GREASE INTERCEPTORS.OR TRAPS**

In commercial buildings, a grease interceptor shall be installed in waste lines leading from sinks, drains or other fixtures in the following establishments when, in the opinion of the Administrative Authority, a hazard exists: restaurants, hotel kitchens or bars, factory cafeterias or restaurants, clubs, or other establishments where grease can be introduced into the drainage system in quantities that can affect line stoppage or hinder sewage disposal.

**2006 (i) - CLEANOUTS FOR WASTE STACKS AND SEWERS**

At the foot of every vertical waste stack exceeding 12' in height, at changes in direction of flow that would not permit free passage of sewer tape, and in straight runs of sewer at not more than 70' intervals for 3" and larger, and 30' for 2" and smaller, approved cleanouts shall be installed. Y fittings shall be used for insertion of cleanout connections into sewers. The plumber is required to provide and install a cleanout within 10' of the property line. Cleanouts on all drainage waste lines shall be a brass plug or a nipple and cap.

**2006 (j) - CLEANOUT FERRULES**

The body of cleanout ferrules shall be made so as to permit the insertion of a test plug through the ferrule, and shall be made gas and water tight without the aid of any flux or compound.

**2006 (k) - ACCESSIBILITY REQUIRED**

All traps, cleanouts and back-water valves shall be accessible. There shall be a minimum of 3' clearance between cleanout and any obstruction that would interfere with proper cleaning.

**SECTION 2007 - -WATER SUPPLY AND DISTRIBUTION AND QUALITY OF WATER SUPPLY**

**2007 (a) - POTABLE WATER**

The quality of the water supply for all premises intended for human occupancy shall conform to the accepted standards of purity for potable water, as established by the United States Public Health Service.

**2007 (b) - BACKFLOW**

Every supply outlet or connection to fixtures or appliances shall be protected from backflow by means of an approved air gap, or backflow preventer between the control valve of the outlet and the fixture or appliance. Backflow preventers and vacuum breaker devices shall be of approved design.

No plumbing fixture, device or construction shall be installed which will provide a cross-connection between a distributing system or water for drinking and domestic purposes and a drainage system, soil, air or waste pipe so as to permit or make possible the backflow of sewage or waste into the water supply system.

Approved backflow preventers or vacuum breakers must be used with any supply fixture, the outlet end of which may at times be submerged, such as hose and spray, direct flush valve and under-rim water supply connections to a plumbing fixture or receptacle in which the surface of the water is exposed at any time to atmospheric pressure. Every flushometer valve shall be equipped with an approved vacuum breaker.

**2007 (c) - WATER PIPES: MINIMUM SIZE OF WATER SERVICE PIPES**

The minimum size of water service pipes from the curb to the building shall be of sufficient size to furnish an adequate flow of water to meet the requirements of the building at peak demand and in no case shall be less than 3/4", and must extend full size to each residential bathroom and water heater with 1/2" branches to fixtures. Where copper pipe is used, pipe may be reduced one pipe size within the building. If flushometers or other devices requiring a high rate of water flow are used, the water-service pipe shall be designed to supply this flow. Where galvanized lines pass through concrete floors or walls, protective sleeves or covering must be used.

**2007 (d) - HOT WATER SUPPLY**

Hot water supply to one (1) bath shall be a minimum size of 1/2". All water pipe must be reamed. Boiler tubes shall not be less than 3/4" and shall be brass or copper. All hot water heaters shall have a separate control valve on the cold water supply.

**2007 (e) - SCHEDULE OF MINIMUM WATER PIPE SIZES**

Schedule of minimum water pipe sizes in new work, where flush valves are not used:

	<u>Galvanized</u>	
One to eight fixtures	¾	inch
Nine to fourteen fixtures	1	inch
Fifteen to twenty-five fixtures	1-1/4	inch
Twenty-six to thirty-five fixtures	1-1/2	inches
Thirty-six to fifty-five fixtures	2	inches

  

	<u>Copper</u>	
One to three fixtures	1/2	inch
Four to twelve fixtures	3/4	inch
Twelve to twenty fixtures	1	inch
Twenty to thirty fixtures	1 1/4	inches
Thirty to fifty fixtures	1 1/2	inches
Over fifty fixtures	2	inches

**2007 (f) - VALVE ON INSIDE**

On the inside of the building at an approved location, there shall be installed a valve of approved design, which shall be of the same size as the main supply pipe and shall be equipped with a drain cock. Combination stop and waste valves and cocks shall not be installed in an underground service pipe.

**2007 (g) - COMPRESSION STOP AND WASTE VALVES IN BUILDING**

The main cut-off valve on the water supply must be accessible inside of the house when there is no basement. There shall be a separate cut-off for each house, apartment or building.

**2007 (h) - FIXTURES, STOPS AND SUPPLIES**

All fixtures, except bathtubs and showers, shall be provided with stops on supplies to same. Floor supplies are prohibited on all new work and shall be avoided where possible on renovations.

**2007 (i) - HOT WATER PIPES BETWEEN HEATER AND STORAGE TANK**

Hot water pipes between heater and storage tank should preferably be of copper or brass.

**2007 (j) - OVER RIM TRIMMINGS**

Water shall be supplied to fixtures by over rim trimmings, and closet flush valves shall be equipped with vacuum breaker.

**2007 (k) - HEATER AND STORAGE TANK**

The diameter of the top of a heater shall not be larger than the body of the heater and the heater shall be connected to not less than a thirty (30) gallon extra heavy storage tank, and shall be equipped with automatic reseating type pressure relief valve. The above relief valve shall be installed in accordance with manufacturer's recommendation and the discharge shall be piped to a safe point of disposal.

**2007 (l) - RETURN PIPES FROM BOILER TO HEATER**

Return pipes from boiler to heater shall be connected to the lower side tapping on the boiler.

**2007 (m) - GAS OR OIL HEATERS**

Gas heaters shall be installed in accordance with the regulations suggested by the American Gas Association. All oil water heaters shall be vented. Automatic reseating type pressure relief valves are required on all oil, electric, gas heaters, storage or pressure heating vessels. Where required by the State Boiler Inspection Law, Rules and Regulations, temperature and/or pressure relief valves of a type approved by the American Society of Mechanical Engineers shall be used.

**2007 (n) - AIR CHAMBERS**

Water supply piping systems shall be provided with air chambers or shock absorbers when necessary.

**SECTION 2008 - PLUMBING FIXTURES**

**2008 (a) - SECONDHAND FIXTURES**

Secondhand fixtures, and fixtures previously used in another building or location may not be installed unless they have been thoroughly cleansed and approved by the Administrative Authority.

**2008 (b) - HOW INSTALLED**

All plumbing fixtures shall be installed free and open in a manner to afford access for cleaning. Where practical, all pipes from fixtures shall be run to the wall.

**2008 (c) - BUILT-IN BATHTUBS**

Built-in bathtubs and other built-in fixtures which have concealed union, slip, or gasket water or waste connections should be so located that a suitable access door can be provided in the construction to permit repairs and replacements.

**2008 (d) - WATER CLOSETS**

All water closet bowls shall be of wash down, siphon jet or siphon action type and shall be of vitreous china and shall be supplied with water from tanks or other approved flushing devices. The use of frost proof, wash out, range and hopper closets is prohibited. All seats of water closets provided for public use shall be of the open-front type.

**2008 (e) - BATHTUBS**

All bathtubs, places or replaced, shall be of approved material and design.

**2008 (f) - LAVATORIES**

Lavatories shall be of non-absorbent material such as vitreous china, enameled steel, stainless steel or enameled iron.

**2008-(g) - URINALS**

Urinals shall be of vitreous china only and shall be either of the pedestal or blow out, wall hung types with suitable flushing devices. Wherever urinals are installed in public toilets, a 2" non-corrosive type floor drain shall be installed in the local area of same. Through urinals may be used only on such premises as stadiums, parks, prisons, or buildings of temporary or occasional occupancy.

**2008 (h) - WOODEN SINKS**

Wooden sinks or wash trays shall not be connected to the plumbing system, except that wooden

sinks, or vats, may be used by photographers or engravers for their work wherein strong acids are used.

**2008 (i) - FLOOR DRAINS**

The floor drain lateral shall not exceed 10' in length from a vented main branch, except that deep seal traps may be 20' away.

**2008 (j) - SHOWER BATHS**

All shower baths shall have a membrane pan made water tight at trap and turned up on the wall not less than 9" above the strainer, or shall have such other adequate waterproofing method or device as may be approved by the Administrative Authority.

**2008 (k) - FIXTURE STRAINERS**

All fixtures other than water closets and urinals shall be provided with fixed strong metallic strainers with outlet areas not less than that of the interior of the trap and waste pipe.

**2008 (l) FIXTURE OVERFLOW**

The overflow pipe from a fixture shall be connected on the house or inlet side of the trap and be so arranged that it may be readily and effectively cleaned.

**2008 (m) - NUMBER OF TOILET FIXTURES REQUIRED.**

Every office building, school, store, warehouse, manufacturing establishment, or other structure, where workman or workwomen are or will be employed, shall be provided with at least one (1) water closet, and if both sexes are employed, at least two (2) water closets.

Water closets shall be provided for each sex according to the following table:

Minimum Facilities		
No. of Persons	Closets	Ratio
1-15	1	1 for 15
16-35	2	1 for 17 1/2
36-55	3	1 for 18 1/3
56-80	4	1 for 20
81-110	5	1 for 22
111-150	6	1 for 25
151-190	7	1 for 27 1/7

and thereafter at the rate of one closet for every thirty (30) persons (except that in schools designed for minimum occupancy of 400 pupils, at least one (1) toilet fixture shall be provided for each forty (40) pupils and in toilets for boys at least 1/3 of the fixtures shall be water closets.)

The number of water closets to be provided for each sex shall in every case be based upon the maximum number of persons of that sex employed at any one time on the given floor, or floors, or in the structure for which such closets are provided.

Whenever a urinal is supplied, one closet less than the required number may be provided for males when more than thirty-five (35) are employed (except that the number of closets in such cases shall be at least 2/3 of the number given in the above table).

When a dwelling or other building is divided into separate family apartments, a separate water closet shall be provided for each such unit. Hotels and rooming houses shall be provided with at least

one (l) water closet for each four (b) sleeping rooms, and dormitory rooms shall have at least one (l) water closet to each 1,000 square feet of area thereof. Where there are water closets for the two sexes, access thereto must be suitably separated.

Places of public or semi-public assembly accommodating large numbers of persons shall be provided with a sufficient number of water closets and urinals and lavatories described as minimum facilities in Table 7.21.2 of the National Plumbing Code, in 1955 published by the American Society of Mechanical Engineers. Such water closets shall be in an accessible location and provided with signs plainly indicating their purpose.

There shall be at least one (l) lavatory wherever water closets are required.

#### **2008 (n) - LOCATION OF TOILET FIXTURES**

Water closets shall be readily accessible to the persons using them.

#### **SECTION 2009 - HANGERS AND SUPPORTS FOR PLUMBING PIPING**

##### **2009 (a) - PIPE AND FIXTURE SUPPORTERS**

All horizontal and vertical piping shall be secured or supported at sufficiently close intervals to keep it in alignment and prevent sagging.

Cast-iron soil and waste pipes shall be supported when above ground on strong brick piers not over 5' apart, or held in place by strap iron hangers not over 5' apart, or over 30" long, and vertical pipes shall be supported at base and at every story height, and not to exceed every 20'. Connections of wall hangers, pipe supports, or fixture settings with brick, stone or concrete backing, shall be made with expansion bolts or through bolts without the use of wooden plugs. In hollow terra cotta block partitions, toggle or through bolts shall be used, and in solid plaster or gypsum block partitions through bolts with large washers shall be used. In wood stud partitions blocking shall be built in before the plastering is done for fastening the fixture supports. All water pipe shall be securely fastened by straps or hangers placed not over 10' apart.

##### **2009 (b) - LOCATION OF FIXTURES**

No plumbing fixtures shall be located in any room or apartment which is not provided with adequate ventilation, either natural or artificial.

##### **2009 (c) - VENTILATION PIPE, HOW CONNECTED**

Ventilation pipes from toilet rooms shall be installed in compliance with Section 501 of the North Carolina Building Code.

#### **SECTION 2010 - DRAINAGE AND VENTING OF PLUMBING SYSTEMS**

##### **2010 (a) - PROTECTION OF PIPES AGAINST BREAKAGE AND CORROSION**

Pipes passing under or through walls shall be protected from breakage. Pipes passing through or under cinder concrete or other corrosive material shall be protected against external corrosion.

#### **2010 (b) - PROHIBITED PLUMBING CONNECTIONS**

The use of wastes or vents for rain leaders, or the use of rain leaders as vents or waste pipes is forbidden.

#### **2010 (c) - BUILDING DRAINS AND SEWERS**

(1) ABOVE-GROUND PIPING WITHIN BUILDING: Piping for a drainage system within a building or structure shall be of cast iron, galvanized; wrought iron, galvanized steel, lead, brass or copper pipe or copper tube type K, L, M, or D.W.V. (A.S.T.M. Standard B306-59) except D.W.V. is not approved for urinal wastes and vents. All copper pipe or copper tube offered for sale or installed within the jurisdiction of this Code shall have standard colors for identification marked thereon in accordance with the Standard Colors as promulgated by the Copper and Brass Research Association Data - 76.

(2) UNDERGROUND PIPING WITHIN BUILDING. All drains within buildings, when underground, shall be cast iron soil pipe, lead pipe, brass pipe, or Type "K" or "L" copper tube and fittings. In buildings exceeding three (3) stories in height, all underground cast iron soil pipe and fittings shall be what is known as "extra heavy" cast iron soil pipe.

#### **2010 (d) - BUILDING DRAINS FOR REAR BUILDINGS**

When a structure stands in the rear of another on the same interior lot, and a private sewer is unavailable or cannot be constructed, the building drain of the front structure may be extended to the rear, and the whole considered as one building drain.

Building sewers generally should be of the same material and laid, graded and tested the same as building drains.

#### **2010 (e) - FIXTURE UNITS**

The following table shall be employed to determine the minimum diameters of fixture traps, the minimum diameters of waste pipes from single fixtures, and the total fixture unit values to be assigned to fixtures.

In the classification of plumbing installations, Class I (private) shall apply to fixtures in residences and apartments and to fixtures in private bathrooms of hotels and similar installations where the fixtures are intended for the use of a family or an individual.

Class 2 (semi-private) shall apply to fixtures in office buildings, factories, dormitories and similar installations where the fixtures are intended for the use of the occupants of the building.

Class 3 (public) shall apply to fixtures in general toilet rooms of schools, gymnasiums, hotels, railroad stations, public comfort stations and other installations (whether paid or free) where a number of fixtures are installed so that their use is similarly unrestricted.

Fixture unit ratings for all fixtures given a single rating shall apply to those fixtures in all classes of installations.

FIXTURE UNITS PER FIXTURE OR GROUP

Fixtures & class in installation	Minimum Nominal Trap Diameter (inches)	Minimum Nominal Diameter Individual Drain (inches)	Fixture Units
1 lavatory or washbasin, class 1	1 1/4	1 1/2	1
1 lavatory or washbasin, class 2 or 3	1 1/2	1 1/2	2
1 water closet, class 1	3	3	3
same with flush valve			8
1 water closet, class 2	3	3	5
same with flush valve			8
1 water closet, class 3	3	3	6
same with flush valve			8
1 bathtub, class 1	1 1/2	1 1/2	2
1 bathtub, class 2 or 3	2	2	4
1 shower stall, shower head only, class 1	2	2	4
1 shower stall, multiple spray, class 1	2	2	4
1 shower stall, shower head only, class 2 or 3	2	2	4
1 shower stall, multiple spray, class 2 or 3	3	3	6
Gang shower for each shower head			5
1 urinal, pedestal or blow out	3	3	6
1 bathroom group consisting of 1 lavatory, 1 water closet, and 1 bathtub with or without overhead shower head or consisting of 1 lavatory, 1 water closet, 1 shower stall, class 1 (tank type water closet)			6
Above with flush valve water closet			8
1 bathroom group consisting of 1 lavatory, 1 water closet, 1 bathtub and 1 shower stall in the same bathroom, class 1 (tank type water closet)			8
Above with flush valve water closet			10
1 sink, residence or apartment kitchen	1-1/2	2	2
1 sink, butler's or pantry, class 1	1-1/4	1-1/2	1
1 sink, hotel or restaurant, pot sink	2	3	8
1 sink, hotel or restaurant, vegetable sink	2	2	6
1 sink, hotel or restaurant, glass sink	2	2	3
1 sink, hotel or restaurant, silver sink	2	2	3



1 sink, lunch counter bar sink	2	2	5
1 sink, soda fountain bar sink	2	2	1.5
1 sink, siphon jet service sink, flush rim or mop	3	3	6
1 sink, ordinary service sink	2	2	3
1 sink, bed pan sink or bed pan washer	3	3	6
1 sink, lavatory, surgeon's or medical sink	2	2	1.5
1 sterilizer, instrument, utensil or water	1-1/2	1-1/2	0.5
1 sterilizer, bed pan	3	3	6
1 laundry tray	1-1/2	2	2
1 combination fixture	2	2	3
1 foot bath or sitz bath	2	2	2
1 infant's or baby's slab bath	2	2	0.5
1 bidet	1-1/2	2	3
1 drinking fountain	1-1/4	1-1/4	0.5
1 cuspidor, fountain or dental	1-1/4	1-1/4	0.5
1 individual refrigerator drain	1	1	0.25
1 floor drain, ordinary	2	2	1
1 floor drain, receiving regular or intermittent discharges from fixtures shall be counted as the total of the fixtures drained in it.			
1 floor drain, receiving overflow from tanks or discharges from unrated fixtures shall be rated on the estimated maximum flow, for each gallon per minute.			3
1 sewage ejector, for each 25 gallons per minute discharge capacity			50

**2010 (f) - SOIL AND WASTE STACKS**

Soil and waste stacks shall be as direct as possible and free from sharp angles and turns. The required size of soil and waste stacks shall be independently determined by the fixture units connected to the stack, and the total length in accordance with the table at the end of the next section.

**2010 (g) - COMMON SOIL OR WASTE AND VENTS**

Where bathrooms or water closets or other fixtures are located on opposite sides of a wall or partition, or directly adjacent to each other within the prescribed distance, such fixtures may have a common soil or waste pipe and a common vent. All closet back vents shall be taken from the branch between the fixture and the soil stack.

**SOIL AND WASTE STACKS**

Diameter of stacks (inches)	Maximum number of fixture units permitted	Maximum number of water closets. Permitted	Maximum developed length
1 1/2	4	---	50 feet
2	14	---	75 feet
2 1/2	36	---	100 feet
3	90	2	150 feet
4	300	33	300 feet
5	700	80	500 feet
6	1,050	120	Unlimited
8	2,000	225	Unlimited
10	3,500	400	Unlimited

**2010 (h) - CLEANOUTS AND TEST T'S**

Test T's are required at a suitable location on the sink waste pipe. Where sink line is 10' or less in length, test T's only will be required.

**2010 (i) - SINK WASTE PIPES SEPARATELY CONNECTED**

Sink waste pipes shall be separately connected to the soil stack or drain. A dishwasher, washing machine or disposal may be added thereto.

**2010 (j) - SIZE OF BUILDING SEWERS, BUILDING DRAINS AND HORIZONTAL BRANCHES**

The required size of a sanitary building sewer, sanitary building drain or branch of the sanitary building drain, not receiving the discharge from fixtures on the same floor or level as the branch, shall be determined in accordance with the table following this section. No water closet shall discharge into a drain less than 3" in diameter and no main building drain or building sewer receiving discharges from water closets shall be less than 4" in diameter. The required size of a sloping sanitary drain receiving the discharge from fixtures on the same floor or level as the drain (termed a horizontal branch) shall be determined in accordance with the table following this section. When 3" waste lines are used for closet discharge, a 4" stub will be required with 4" closet flanges.

**BUILDING DRAINS AND BUILDING SEWERS**

Diameter of Pipe (inches)	Maximum Number of Fixture Units	
	¼ inch fall per foot	1/2 inch fall per foot
1 1/4	1	1
1 1/2	2.5	3.5
(a) 2	9	12
(a) 2 1/2	21	27
(a) 3 No. W.C.'s	45	72
4	150	210
5	370	540
6	720	1,050
8	1,860	2,640
10	3,600	5,250
12	6,300	9,300
15	11,600	16,800

**Horizontal Branches**

Diameter of Pipe (inches)	Minimum Number of Fixture Units	
	1/4 Inch fall per ft.	1/2 inch fall per ft.
1 1/4	1	1
1 1/2	2	3
(a) 2	6	8
(a) 2 1/2	15	18
(a) 3 No. W.C.'s	32	36
3 Not more than 2 W.C.'s	18	21
4	96	114
5	234	280
6	440	580
8	1,150	1,680
10	2,500	3,600
12	4,200	6,500
15	8,500	13,500

**2010 (k) - VENT PIPE GRADES**

Vent and branch vent pipes shall be free from drops or sags or so graded and connected as to drip back to a soil or waste pipe by gravity. Where vent pipes cannot be a horizontal soil or waste pipe, the vent branch shall be taken off above the center line of the pipe and the vent pipe rise vertically or at an angle of 45° to the vertical before offsetting horizontally or connecting to the branch. Vent pipes of all types when installed horizontally shall be at least 6" above the flood level rim of the highest fixture

served by the vent, so as to prevent the use of vent pipes as waste pipes.

**2010 (1) - REQUIRED SIZE OF VENTS**

The required size of vents shall be determined on the basis of the size of the soil or waste stack, the number of fixture units connected to the vent and the developed length of the pipe in accordance with the table in Section 2010 (n). Vents shall be at least 1 1/2" in diameter. The diameter of every vent stack shall be at least one half that of the soil or waste stack served. In determining the developed length of the vent pipes, the vent stack and branches shall be considered continuous.

**2010 (m) - CIRCUIT AND LOOP VENTS**

A branch soil pipe which extends not more than 30', serving not more than 10 water closets or urinals, and having the branches for the fixtures laid flat and taken from Y fittings, may be vented by a circuit or loop vent. Laterals shall not be more than 3 1/2' in length. The vent shall be taken off in front of the last fixture. If more than 8 fixtures discharge into the soil pipe, a full size vent shall be taken off in the center of the battery, and connected to the horizontal vent or run through the roof. Vents shall be the same size as the soil pipe.

**2010 (n) - WET VENTS**

The vent from a bathtub may be used as a waste pipe for one lavatory. The 2" vent from a water closet may be used as a waste pipe for one (1) sink, lavatory, tub or shower provided these fixtures serve the same family. Where main stacks are grouped together at the top of a structure into one (1) pipe extended through the roof this combined vent shall be at least equal in area to 75 per cent of the sum of the areas of the stack connecting into it. There shall be not less than a 2" vent for each water closet.

**VENT STACKS AND BRANCHES**

Diameter of Pipe		Max. No. Fixture Units Permitted	Max. Developed Length (ft.) for Each Size
1-1/2	inches	3	25
2	inches	20	50
2-1/2	inches	60	100
3	inches	120	150
4	inches	250	250
5	inches	500	300
6	inches	1250	Unlimited
8	inches	2400	Unlimited
10	inches	3000	Unlimited
12	inches	5000	Unlimited

**2010 (0) - ROOF VENT EXTENSION AND TERMINALS**

Roof extensions of soil and waste stacks, or roof vents, shall be run at full size at least 1' above roofs and at least 7' where the roof is used for any other purpose than weather protection.

The roof terminal of any vent, soil or waste pipe, if within 10' of any door, window, scuttle or airshaft, shall extend at least 3' above such openings.

### **2010 (p) - OFFSETS IN SOILS, WASTE AND VENT STACKS**

When offsets in soil and waste stacks above the highest fixture connection and offsets in vent stacks and connections to such vent stacks to a soil or waste pipe at the bottom, or to the building drain, should be made at an angle of at least 45° to the horizontal, at the discretion of the Administrative Authority.

### **SECTION 2011 - REFRIGERATOR, INDUSTRIAL, SAFE AND SPECIAL WASTES**

#### **2011 (a) - INDIRECT WASTES**

The waste pipes from all refrigerators, ice boxes, rinse sinks, cooling or refrigerating coils, laundry washers, extractors, steam tables, egg boilers, coffee urns or similar equipment shall be indirectly connected to a water-supplied sink or receptor and the waste outlet shall terminate at least 2" above the flood rim of such sink or receptor.

The waste pipe from a refrigerator safe or receptor shall be at least 1" in diameter and, when installed as a stack with branches on separate floors, it shall have a minimum diameter of 1 1/4". Such piping shall be of brass, copper or galvanized steel or wrought iron.

#### **2011 (b) - INDUSTRIAL WASTES**

Wastes from hospitals, chemical plants, laundries, abattoirs or any other industrial wastes, which in the opinion of the Administrative Authority or other agency having legal jurisdiction are detrimental to the public sewers or public health, shall first be treated inside of the structure as necessary before discharging into the sewer.

#### **2011 (c) - OVERFLOW AND EMERGENCY DRAINS**

Overflow and drain pipes from expansion tanks, filters, drip pans, cooling jackets, sprinkler systems and similar equipment and from the exhaust of a water lift shall discharge upon the roof, into an open fixture, or discharge as provided for refrigerator wastes. With the express permission of the Administrative Authority such pipes, if provided with a check valve, may be connected to a leader, if above any possible pressure line. Direct connection between water supply pipes and the sanitary sewer system are prohibited.

#### **2011 (d) - DRINKING WATER SYSTEMS**

Drinking water systems, vacuum cleaning systems and fire stand-by pipe lines are to be installed in accordance with these regulations.

### **SECTION 2012 - SPECIAL CONDITIONS**

#### **2012 (a) - DRAINAGE BELOW SEWER LEVEL**

When the whole or part of the drainage system lies below the crown level of the main sewer, such parts as cannot drain by gravity into the sewer shall be disposed of through a system of sub-building drains and lifted by approved means into the sewer.

The piping for such systems shall be known as a "sub-building drainage system". Piping for the sub-building drainage system shall be installed in accordance with the requirements for gravity systems. The lifting equipment shall be considered the equivalent of the building sewer.

Sub-building drains shall discharge into an airtight sump or receiving tank so located as to receive the sewage by gravity. From the sump or receiving tank, the sewage shall be lifted and discharged by pumps, pneumatic ejectors or equally efficient methods automatically operated. Hydraulic ejectors are prohibited. When the lifting device forms a trap, an additional trap on the drain may be omitted, but all

fixtures and equivalent devices shall be trapped. When sub-drains do not receive the discharge of plumbing fixtures other than cellar floor drains or drips from machinery, the sump or receiving tank need not be airtight or vented.

**2012 (b) - RECEIVING TANKS**

Receiving tanks (except in pneumatic systems) shall be provided with vent pipes at least 3" in diameter which may be connected to the gravity vent system. Pneumatic receiving tanks shall be provided with relief pipes at least 2" in size, the relief pipe extending independently to the roof and terminating as required for vent pipes in Section 2010 (n).

**2012 (c) - CONDENSERS AND BLOW-OFF TANKS**

The connection of a steam exhaust, boiler blow-off or drip pipe with the building drain is forbidden. Such pipes shall discharge directly into a condensing tank properly connected to the building sewer. In low pressure steam systems the condensing tank may be omitted but the waste connection must otherwise be as required above. Waste water when discharged into the sewer shall be at a temperature, of not higher than 140° F. Where higher temperatures exist, proper cooling methods shall be provided.

**SECTION 2013 - MISCELLANEOUS**

**2013 (a) - DEAD ENDS**

In the installation of any drainage system, dead ends longer than 5' shall be prohibited.

**References:**

**NOTE:**

Copies of standards referred to in this Code may be obtained from the following sources:

ASA---American Standards approved by the American Standards Association, 70 East Forty-fifth Street, New York 17, New York.

ASTM---Standards and Tentative Standards published by the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pennsylvania.

AWWA---Standards and Tentative Standards published by the American Water Works Association, 2 Park Avenue, New York 16, New York.

CS---Commercial Standards representing recorded voluntary recommendations of the trade, issued by the United States Department of Commerce and obtainable from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. November, 1960