

CHAPTER 1 ADMINISTRATION

SECTION 101 GENERAL

101.1 Title.

These regulations shall be known as the North Carolina Plumbing Code as approved by the North Carolina Building Code Council on September 13, 2005, to be effective July 1, 2006. References to the International Codes shall mean the North Carolina Codes. The North Carolina amendments to the International Codes are underlined.

101.2 Scope.

The provisions of this code shall apply to the erection, installation, alteration, repairs, relocation, replacement, addition to, use or maintenance of plumbing systems within this jurisdiction. This code shall also regulate nonflammable medical gas, inhalation anesthetic, vacuum piping, nonmedical oxygen systems and sanitary and condensate vacuum collection systems. The installation of fuel gas distribution piping and equipment, fuel gas-fired water heaters and water heater venting systems shall be regulated by the International Fuel Gas Code. Provisions in the appendices shall not apply unless specifically adopted.

Exceptions:

1. Deleted.
2. Plumbing systems in existing buildings undergoing re-pair, alteration, or additions, and change of occupancy shall be permitted to comply with the International Existing Building Code.

101.5 Appendices.

Provisions in the appendices shall not apply unless specifically adopted or referenced in this Code.

101.6 Requirements of other State agencies, occupational licensing boards, or commissions.

The North Carolina State Building Codes do not include all additional requirements for buildings and structures that may be imposed by other State agencies, occupational licensing boards, and commissions. It shall be the responsibility of a permit holder, design professional, contractor, or occupational license holder to determine whether any additional requirements exist.

SECTION 103 DEPARTMENT OF PLUMBING INSPECTION

Deleted. See the North Carolina Administrative Rules and Policies.

SECTION 104 DUTIES AND POWERS OF THE CODE OFFICIAL

Deleted. See the North Carolina Administrative Rules and Policies.

**SECTION 106
PERMITS**

Deleted. See the North Carolina Administrative Rules and Policies.

**SECTION 107
INSPECTIONS AND TESTING**

Deleted. See the North Carolina Administrative Rules and Policies.

**SECTION 108
VIOLATIONS**

Deleted. See the North Carolina Administrative Rules and Policies.

**SECTION 109
MEANS OF APPEAL**

Deleted. See the North Carolina Administrative Rules and Policies.

CHAPTER 2 DEFINITIONS

SECTION 202 GENERAL DEFINITIONS

BATTERY OF FIXTURES. Any group of two or more similar adjacent fixtures which discharge into a common horizontal waste or soil branch.

BUILDING DRAIN. That part of the lowest piping of a drainage system that receives the discharge from soil, waste and other drainage pipes inside and that extends 10 feet (3048 mm) in developed length of pipe beyond the exterior walls of the building and conveys the drainage to the building sewer.

Combined. A building drain that conveys both sewage and storm water or other drainage.

Sanitary. A building drain that conveys sewage only.

Storm. A building drain that conveys storm water or other drainage, but not sewage.

DRAINAGE SYSTEM. Piping within a public or private premise that conveys sewage, rainwater or other liquid wastes to a point of disposal. A drainage system does not include the mains of a public sewer system or a private or public sewage treatment or disposal plant.

Building gravity. A drainage system that drains by gravity into the building sewer.

Sanitary. A drainage system that carries sewage and excludes storm, surface and ground water.

Storm. A drainage system that carries rainwater, surface water, condensate, cooling water or similar liquid wastes.

INDIRECT WASTE RECEPTOR. A plumbing fixture designed specifically to collect and dispose of liquid waste from other plumbing fixtures, plumbing equipment or appliances which are required to discharge to the drainage system through an air gap. The following type fixtures fall within the classification of indirect liquid waste receptors: floor sinks, mop receptors, service sinks, and standpipe drains with integral air gaps.

LABELED. Equipment, devices, fixtures or materials bearing the label of an approved agency.

PIPE SIZES. For the purposes of determining the minimum size of pipe required, cross sectional areas is the essential characteristic, not the pipe diameter. Therefore, when in the code, it is instructed to “increase by one pipe size.” We should presume the availability of pipe sizes that are not readily available. Presume the commercial availability of pipe sizes ½, ¾, 1, 1 ¼, 1 ½, 2, 2 ½, 3, 3 ½, 4, 4 ½, 5, 6, 7, 8, 9, 10.

SCUPPER. An opening in a wall or parapet that allows water to drain from a roof.

TOILET. Water closet and frequently, a lavatory, but not a bathtub, shower, spa or similar bathing fixture.

TOILET ROOM. A room containing a water closet, and frequently, a lavatory, but not a bathtub, shower, spa or similar bathing fixture.

TYPE A DWELLING UNIT. A dwelling unit that is designed and constructed for accessibility in accordance with the provisions of the North Carolina Accessibility Code.

TYPE B DWELLING UNIT. A dwelling unit that is designed and constructed for accessibility in accordance with the provisions of the North Carolina Accessibility Code.

Water service pipe. The pipe from the water main or other source of potable water supply, or from the meter when the meter is at the public right of way, to the water distribution system of the building served. Water service pipe shall terminate 5 feet outside the foundation wall.

CHAPTER 3 GENERAL REGULATIONS

301.3 Connections to the sanitary drainage system.

All plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid wastes or sewage shall be directly connected to the sanitary drainage system of the building or premises, in accordance with the requirements of this code. This section shall not be construed to prevent the indirect waste systems required by Chapter 8. All drain, waste and vent piping associated with gray water recycling systems shall be installed in full compliance with this code.

301.5 Pipe, tube and fitting sizes. See Chapter 2 – Definitions.

302.1 Detrimental or dangerous materials.

Ashes, cinders or rags; flammable, poisonous or explosive liquids or gases; oil, grease or any other insoluble material capable of obstructing, damaging or overloading the building drainage or sewer system, or capable of interfering with the normal operation of the sewage treatment processes or private disposal system, shall not be deposited, by any means, into such systems.

302.2 Industrial wastes.

Waste products from manufacturing or industrial operations shall not be introduced into the public sewer or private sewage disposal system until it has been determined by the code official or other authority having jurisdiction that the introduction thereof will not damage the public sewer system or interfere with the functioning of the sewage treatment plant.

303.1 Identification.

Each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system shall bear the identification of the manufacturer, and the applicable standard to which it was manufactured.

304.1 General.

Plumbing systems shall be designed and installed in accordance with Sections 304.2 through 304.4 and the North Carolina Building Code to prevent rodents from entering structures.

304.3 Meter boxes.

Deleted.

304.4 Openings for pipes.

In or on structures where openings have been made in walls, floors or ceilings for the passage of pipes, such openings shall be closed and protected by the installation of approved metal collars, or other approved materials that are securely fastened to the adjoining structure.

305.5 Pipes through or under footings or foundation walls.

Any pipe that passes within 12 inches (305 mm) under a footing or through a foundation wall shall be provided with a relieving arch, or a pipe sleeve pipe shall be built into the foundation wall. The sleeve shall be two pipe sizes greater than the pipe passing through the wall. Piping shall not be run under pier footing (refer to 307).

305.6 Freezing.

The top of water pipes, installed below grade outside the building, shall be below the frost line or a minimum of 12 inches below finished grade whichever is greater. Water pipes installed in a wall exposed to the exterior shall be located on the heated side of the wall insulation. Water piping installed in an unconditioned attic or unconditioned utility room shall be insulated with an insulation having a minimum R factor of 6.5 determined at 75oF in accordance with ASTM C-177.

NOTE: These provisions are minimum requirements which have been found suitable for normal weather conditions. Abnormally low temperatures for extended periods may require additional provisions to prevent freezing.

305.6.1 Frost protection.

No traps of soil or waste pipe shall be installed or permitted outside of a building, or concealed in outside walls or in any place where they may be subjected to freezing temperatures, unless adequate provision is made to protect them from freezing. Waste and soil piping leaving the building shall have a minimum cover of 3 inches.

305.9 Protection of components of plumbing system.

Components of a plumbing system installed along alleyways, driveways, parking garages or other locations exposed to damage shall be recessed into the wall or otherwise protected in an approved manner.

Exception: One-and two-family dwellings and townhouses.

307.2 Cutting, notching or bored holes.

A framing member shall not be cut, notched or bored in excess of limitations specified in the International Building Code or the North Carolina Residential Code.

308.5 Interval of support.

Pipe shall be supported in accordance with Table 308.5, or the manufacturers' installation instructions.

Exception: The interval of support for piping systems designed to provide for expansion/contraction shall conform to the engineered design in accordance with Section 105.4.

308.7.1 Location.

For plastic pipe sizes greater than 6 inches (152 mm), and other pipe sizes greater than 4 inches (102 mm), restraints shall be provided for drain pipes at all changes in direction and at all changes in diameter greater than two pipe sizes. Braces, blocks, rodding,

backfill and other suitable methods as specified by the coupling manufacturer shall be utilized.

308.9 Stacks.

Bases of stacks shall be supported by the building structure, virgin or compacted earth, or other suitable material to adequately support the weight of the piping.

309.2 Flood Hazard.

(delete exception #3)

310.1 Light and ventilation.

Washrooms and toilet rooms shall be illuminated and ventilated in accordance with the International Building Code and International Mechanical Code. Toilet rooms shall not open directly into a room used for the preparation of food for service to the public.

310.4 Water closet compartment.

Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy.

Exceptions:

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. In toilet rooms in child care facilities in areas used exclusively by children five years of age and under the following is permitted:
 - a. Toilet stall enclosures, toilet stall doors and partitions between toilets may be omitted.
 - b. Doors into toilet rooms may be omitted.
 - c. Walls enclosing toilet rooms may be full height with vision panels, or may be partial height at least 42" high in areas for children four and five years of age and 36" high in areas for children under four years of age.

The toilet rooms shall meet applicable ventilation requirements for toilet areas in the North Carolina Building Code and the North Carolina Mechanical Code.

311.1 Temporary Toilet Facilities at Construction Sites.

Suitable toilet facilities shall be provided and maintained in a sanitary condition during construction. An adequate number of facilities must be provided for the number of employees at the construction site according to the following:

<u>Number of Employees</u>	<u>Minimum Number of Facilities</u>
<u>Less than 20</u>	<u>1 toilet</u>
<u>20 to 200</u>	<u>1 toilet & 1 urinal per 40 workers</u>
<u>More than 200</u>	<u>1 toilet & 1 urinal per 50 workers</u>

There shall be at least one facility for every two contiguous construction sites. Such facilities may be portable, enclosed, chemically treated, tank-tight units. Portable toilets shall be enclosed, screened, and weatherproofed with internal latches. Temporary toilet

facilities need not be provided on site for crews on a job site for no more than one working day and having transportation readily available to nearby toilet facilities.

312.2 Drainage and vent water test.

A water test shall be applied to the drainage system within the building either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the 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 openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, at least the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. This pressure shall be held for at least 15 minutes. The system shall then be tight at all points.

Exception:

Rough plumbing testing for one and two family dwellings shall be as specified above except the water level shall be a minimum of 3 feet above the highest drainage fitting.

312.5 Water distribution system.

Upon completion of a section, or the entire water distribution system, or any portion completed shall be tested and proved tight under a water pressure not less than 100 psi or for piping systems other than plastic, by an air test of not less than 100 psi (344 kPa). The water utilized for tests shall be obtained from a potable source of supply. The required tests shall be performed in accordance with this section.

312.6 Gravity sewer test. Deleted.

312.7 Forced sewer test. Deleted.

312.9 Inspection and testing of backflow prevention assemblies. Deleted.

314.1 Approved location.

Approved location shall be in accordance with the North Carolina Mechanical Code.

314.2 Evaporators and cooling coils. Deleted.

CHAPTER 4 FIXTURES, FAUCETS AND FIXTURE FITTINGS

403.1 Minimum number of fixtures.

In new construction or building additions and in changes of occupancy as defined in the North Carolina Building Code, plumbing fixtures shall be provided for the type of occupancy and in the minimum number shown in Table 403.1. Types of occupancies not shown in Table 403.1 shall be considered individually by the code official. The number of occupants shall be determined by the International Building Code. Occupancy classification shall be determined in accordance with the International Building Code.

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES *(see attached Table)*

403.2 Separate facilities.

Where plumbing fixtures are required, separate facilities shall be provided for each sex.

Exceptions:

1. Separate facilities shall not be required for private facilities.
2. Separate employee facilities shall not be required in occupancies in which 25 or less people are employed.
3. Separate facilities shall not be required in structures or tenant spaces with a total occupant load, including both employees and customers, of 25 or less.
4. Separate facilities shall not be required in mercantile occupancies in which the maximum occupant load is 100 or less.

403.3.1 Adjustments in occupant content.

If an owner or tenant requests, the Plumbing Official shall make adjustments in the occupant content established by Table 403.1 for manufacturing, workshops, loft building, foundries, storage, aircraft hangars, garages, and similar establishments. The owner or occupant shall provide satisfactory written data accompanied by plans which substantiates a claim that the occupant content of a particular building or tenancy will, at all times, be less than provided for in the above table. Approval of such data and accompanying claims shall not prevent the Plumbing Official from requiring additional facilities based on the above table, should changes be made affecting the floor plan upon which the original approval was based whether such changes be made by the original or ultimate owner or building occupant or occupants. The remainder of the facilities requirements of 403.2 are not affected by this paragraph.

403.8 Multiplex Theaters. Plumbing fixtures for multiple adjoining motion picture theaters with a common lobby shall be based upon the seating capacity of the largest single auditorium plus 50% of the seats in the remaining auditoriums.

403.9 Plumbing fixtures for public schools.

403.9.1 Occupant content. Occupant content of public schools for the purpose of determining the number of required facilities shall be the maximum legal class size multiplied by the number of classrooms. A public school classroom is a room or space 500 square feet or larger normally used for instructional purposes. Maximum class sizes are 29 students for grades K-9 and 33 students for grades 10-12. (GS 115C-301). The occupant load for private schools shall be as listed in Table 1004.1.2 in the North Carolina Building Code.

403.9.2 Occupant load and distance. The total student occupant load shall be the sum of the occupant loads for all classrooms, labs, shops and vocational spaces. The total occupant load for all buildings on a campus may be utilized when calculating the total number of fixtures required. Toilet facilities for students and teachers may be located in an adjacent building but shall be located so that no person will have more than 200 feet of accessible, covered horizontal travel distance from any classroom lab, shop or vocational space closest door for access to the required number of fixtures. The occupant content of kindergarten and first grade classrooms with internal toilet facilities is not required to be used in determining the number of group facilities for the entire school.

403.9.3 Occupant load for teachers and staff. Fixtures provided for teachers and staff shall be determined by multiplying the number of Classrooms by 1.75. Staffing ratio for grades K-8 is 80% F and 20% M.

403.9.4 Gymnasiums, Cafeterias, Auditoriums and Stadiums for Schools. Fixtures in group toilet facilities provided for classroom areas may be used toward satisfying the total number of required fixtures for gymnasiums, cafeterias and auditoriums provided that such facilities are located within 200 feet from the space and cannot be locked-off from access during after-school-hours use of the gymnasium, cafeteria, or auditorium. Simultaneous use of classrooms, gymnasium, cafeteria, or auditoriums shall not be considered for calculation of occupant loads for toilet fixtures. Stadium facilities shall be located within 400 feet of the closest bleacher exit from each set of bleachers that the facility serves.

403.9.5 Miscellaneous Provisions.

403.9.5.1 Unisex facilities. A single unisex facility may be used when the classroom area served is 1200 square feet or less and is used either for kindergarten through grade 2 or is a modular classroom used for any grade level. Unisex facilities may be provided for teacher/staff if their total occupant load within 200 feet is 15 or less.

403.9.5.2 Student group facilities. Every public school group facility shall have a minimum of 4 flushing type fixtures. Four flushing male group toilets shall have a minimum of two water closets.

403.9.5.3 Substitutions. Water closets may be substituted for urinals for grades K through 2. Urinals may be substituted for water closets in male group toilet rooms for teachers/staff and gyms, auditoriums, cafeterias or stadiums. The number of water

closets shall not be reduced to less than 1/3 of the required total number of flushing fixtures.

403.9.5.4 Modular classroom buildings. Toilet rooms may be omitted in a modular classroom building when facilities of sufficient capacity for the additional occupants are provided in an adjacent building and located within 200 feet of horizontal travel distance from the modular classroom.

403.9.5.5 Temporary modular classroom buildings. Toilet rooms may be omitted in modular classroom buildings grades 9 through 12 when these temporary buildings are to be replaced by permanent facilities which are under contract. Facilities of sufficient capacity for the additional occupants shall be provided within 450 feet of horizontal travel distance from the modular classroom.

405.3.1 Water closets, urinals, lavatories and bidets.

A water closet, urinal, lavatory or bidet shall not be set closer than 15 inches (381 mm) from its center to any side wall, partition, vanity or other obstruction, and not closer than 30 inches (762 mm) center-to-center between water closets, urinals or adjacent fixtures. There shall be at least a 21-inch (533 mm) clearance in front of the water closet, urinal or bidet to any wall, fixture or door. Water closet compartments shall not be less than 30 inches (762 mm) wide and not less than 60 inches (1524 mm) deep. There shall be at least a 21-inch (533 mm) clearance in front of a lavatory to any wall, fixture or door (see Figure 405.3.1).

405.6 Plumbing in mental health centers. Deleted.

405.8 Slip joint connections.

Slip joints shall be made with an approved elastomeric gasket and shall only be installed on the trap outlet, trap inlet and within the trap seal. Fixtures with concealed slip-joint connections shall be provided with an access panel or utility space at least 12 inches (305 mm) in its smallest dimension or other approved arrangement so as to provide access to the slip joint connections for inspection and repair. Where such access cannot be provided, access doors shall not be required provided that all joints are soldered, solvent cemented or screwed to form a solid connection.

406.3 Waste connection.

The waste from an automatic clothes washer shall connect to a vertical branch drain of not less than 2" in diameter, or a horizontal branch drain of not less than 3" in diameter. The 2" trap in the waste connection may be used as a cleanout for both the 2" and the 3" branch.

412.5 Location.

Floor drains shall be located to readily drain the entire floor area.

412.6 Trap primers.

The water seal of floor drain traps shall be maintained by an automatic trap primer, drainage from a clear water fixture or other method acceptable to the authority having jurisdiction.

Exception: Hose bibbs located in rooms with nonabsorbent floors may be used in lieu of an automatic trap primer.

417.3 Shower waste outlet.

Waste outlets serving showers shall be at least 2 inches (51 mm) in diameter and, for other than waste outlets in bathtubs, shall have removable strainers not less than 3 inches (76 mm) in diameter with strainer openings not less than 0.25 inch (6.4 mm) in minimum dimension. Where each shower space is not provided with an individual waste outlet, the waste outlet shall be located and the floor pitched so that waste from one shower does not flow over the floor area serving another shower. Waste outlets shall be fastened to the waste pipe in an approved manner.

417.4 Shower compartments.

Shower compartment shall conform to Table 417.4 and shall have approved shower pan material or the equivalent thereof as determined by the plumbing official. The pan shall turn up on three sides at least 2 inches (51 mm) above the finished curb level. The remaining side shall wrap over the curb. Shower drains shall be constructed with a clamping device so that the pan may be securely fastened to the shower drain thereby making a watertight joint. Shower drains shall have an approved weephole device system to insure constant drainage of water from the shower pan to the sanitary drainage system. There shall be a watertight joint between the shower and drain and trap. Shower receptacle waste outlets shall be not less than 2 inches and shall have a removable strainer.

Exception: Shower compartments with prefabricated receptors conforming to the standards listed in Table 417.4.

Table 417.4

Prefabricated shower receptor standards

<u>Materials</u>	<u>Standards</u>
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<u>Plastic shower receptors and</u>	
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<u>shower stalls</u>	<u>ANSI Z124.2</u>
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<u>Shower pans nonmetallic</u>	<u>ASTM D 4551, See 303.8</u>
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419.1 Approval. Urinals shall conform to ASME 112.19.2, CSA B45.1 or CSA B45.5. Urinals shall conform to the water consumption requirements of Section 604.4. Urinals shall conform to the hydraulic performance requirements of ASME 112.19.6, CSA B45.1 or CSA B45.5.

Urinals that do not use water shall be permitted provided the urinals:

1. provide a barrier liquid sealant contained in a removable trap to maintain the trap seal;
2. permit the uninhibited flow of water through the trap to the sanitary drainage system;
3. comply with ANSI Z124.9 and ASME 112.19.2, as applicable.

424.3 Shower valves.

Shower and tub-shower combination valves shall be balanced pressure, thermostatic or combination balanced-pressure/thermostatic valves that conform to the requirements of ASSE 1016 or CSA B125. Multiple (gang) showers supplied with a single tempered water supply pipe shall have the water supply for such showers controlled by a master thermostatic mixing valve complying with ASSE 1017. Shower and tub-shower combination valves and master thermostatic mixing valves required by this section shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions. Scald preventative valves are not required in dwelling units with individual water heaters set at 120°F.

425.1 Flushing devices required. Each water closet, urinal, clinical sink, and any plumbing fixture that depends on trap siphonage to discharge the fixture contents to the drainage system shall be provided with a flushometer valve, flushometer tank or a flush tank designed and installed to supply water in quantity and rate of flow to flush the contents of the fixture, cleanse the fixture, and refill the fixture trap.

A flushometer valve, flush tank, or similar device shall not be required for urinal fixtures that comply with the waterless test requirements of ANSI Z124.9 and which:

1. provide a barrier liquid sealant contained in a removable trap to maintain the trap seal;
2. permit the uninhibited flow of water through the trap to the sanitary drainage system;
3. comply with ANSI Z124.9 and ASME 112.19.2 as applicable.

(retain subsection 425.1.1)

**TABLE 403.1
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES
(See Sections 403.2 and 403.3)**

NO.	CLASSIFICATION	USE GROUP	DESCRIPTION	WATERCLOSETS (URINALS SEE SECTION 419.2) ^j		LAVATORIES ^j		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410.1) ^j	OTHER ^g
				Male	Female	Male	Female			
1	Assembly (see Sections 403.2, 403.5 and 403.6)	A-1	Theaters usually with fixed seats and other buildings for the performing arts and motion pictures	1 per 125	1 per 65	1 per 200		-	1 per 500	1 service sink
			<u>Theaters in K-12 Schoolsⁱ</u>	<u>1 per 125</u>	<u>1 per 100</u>	<u>1 per 200</u>		-	<u>1 per 500</u>	<u>1</u> service sink
		A-2	Nightclubs, bars, taverns, dance halls and buildings for similar purposes	1 per 40	1 per 40	1 per 75		-	1 per 500	1 service sink
			Restaurants, banquet halls and food courts	1 per 75	1 per 75	1 per 200		-	1 per 500	1 service sink ^h
			<u>Cafeterias in K-12 Schoolsⁱ</u>	<u>1 per 125</u>	<u>1 per 100</u>	<u>1 per 200</u>		-	<u>1 per 500</u>	<u>1</u> service sink
		A-3	Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums	1 per 125	1 per 65	1 per 200		-	1 per 500	1 service sink
			<u>Gymnasiums in K-12 Schoolsⁱ</u>	<u>1 per 125</u>	<u>1 per 100</u>	<u>1 per 200</u>		-	<u>1 per 500</u>	<u>1</u> service sink
			Passenger terminals and transportation facilities	1 per 500	1 per 500	1 per 750		-	1 per 1,000	1 service sink
		A-3	Places of Worship and other religious services. Churches without assembly halls ^b	1 per 150	1 per 75	1 per 200		-	1 per 1,000	1 service sink
		A-4	Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities	1 per 75 for the first 1500 and 1 per 120 for the remainder	1 per 40 for the first 1500 and 1 per 60 for the remainder	1 per 200	1 per 150	-	1 per 1,000	1 service sink
		A-5	Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities ^k	1 per 75 for the first 1500 and 1 per 120 for the remainder	1 per 40 for the first 1500 and 1 per 60 for the remainder	1 per 200	1 per 150	-	1 per 1,000	1 service sink
			<u>K-12 Stadiums, bleachers and grandstands for outdoor sporting events and activities^{ik}</u>	<u>1 per 125</u>	<u>1 per 100</u>	<u>1 per 250</u>	<u>1 per 200</u>	-	<u>1 per 1,000</u>	1 service sink
2	Business (see Sections 403.2, 403.4 and 403.6)	B	Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses	1 per 25 for first 50 occupants and 1 per 50 for remaining occupants exceeding 50		1 per 40 for first 80 occupants and 1 per 80 for remaining occupants exceeding 80		-	15-100 <u>1</u> 101-250 <u>2</u> 251-500 <u>3</u> add 1 per 500 exceeding 500	-

**TABLE 403.1
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES
(See Sections 403.2 and 403.3)**

NO.	CLASSIFICATION	USE GROUP	DESCRIPTION	WATERCLOSETS (URINALS SEE SECTION 419.2) ^j		LAVATORIES ^j		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410.1) ^j	OTHER ^g
				Male	Female	Male	Female			
3	Educational	E	Educational facilities ⁱ K-8 9 thru 12 Teacher/Staff	1 per 50 <u>1 per 25</u> <u>1 per 30</u> <u>1 per 30</u>	1 per 50 <u>1 per 25</u> <u>1 per 25</u> <u>1 per 25</u>	1 per 50 <u>1 per 60</u> <u>1 per 100</u> <u>1 per 100</u>	-	1 per 100	4 service sink	
4	Factory and Industrial	F-1 and F-2	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials (See Section 403.3.1 for adjustments in occupant content)	1 per 100		1 per 100	(see Section 411)	1 per 400	4 service sink	
5	Institutional	I-1	Residential care	1 per 10		1 per 10	1 per 8	4 per 100	4 service sink ^l	
		I-2	Hospitals and other health care facilities ^c	<u>Fixture requirements are regulated and enforced by state licensing and certification jurisdictions only.</u>						
			Employees	1 per 25	1 per 35	-	1 per 100	-		
			Visitors	1 per 75	1 per 100	-	1 per 500	-		
		I-3	Prisons ^e	<u>Fixture requirements are regulated and enforced by state licensing and certification jurisdictions only.</u>						
			Reformatories, detention centers, and correctional centers ^e	<u>Fixture requirements are regulated and enforced by state licensing and certification jurisdictions only.</u>						
			Employees	<u>1 per 25</u>	<u>1 per 35</u>	-	<u>1 per 100</u>	-		
			Visitors	<u>1 per 75</u>	<u>1 per 100</u>	-	<u>1 per 500</u>	-		
		I-4	Adult daycare and childcare ^e	<u>Fixture requirements are regulated and enforced by state licensing and certification jurisdictions only.</u>						
			Employees	<u>1 per 25</u>	<u>1 per 35</u>	-	<u>1 per 100</u>	-		
Visitors	<u>1 per 75</u>		<u>1 per 100</u>	-	<u>1 per 500</u>	-				
6	Mercantile (see Sections 403.2, 403.5 and 403.6)	M	Retail stores, service stations, shops, salesrooms, markets and shopping centers	1 per 500		1 per 750	-	1 per 1,000	4 service sink	
7	Residential	R-1	Hotels, motels, boarding houses (transient)	1 per guestroom		1 per guestroom	1 per guestroom	-	-	

TABLE 403.1
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES
(See Sections 403.2 and 403.3)

NO.	CLASSIFICATION	USE GROUP	DESCRIPTION	WATERCLOSETS (URINALS SEE SECTION 419.2) ^f		LAVATORIES ^j		BATHTUBS/SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410.1) ^j	OTHER ^g
				Male	Female	Male	Female			
		R-2	Dormitories, fraternities, sororities and boarding houses (non-transient)	1 per 10		1 per 10		1 per 8	1 per 100	-
		R-2	Apartment house	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	-	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		R-3	One-and-two family dwellings	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	-	1 kitchen sink per dwelling unit; ^e
		R-4	Residential care/ <u>unlicensed</u> assisted living facilities	1 per 10		1 per 10		1 per 8	-	-
8	Storage (see Sections 403.2 and 403.4)	S-1 S-2	Structures for the storage of goods, warehouses, storehouses and freight depots, low and moderate hazard ^{m,n}	1 per 100		1 per 100		See Section 411	-	-

^a The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

^b The number of fixtures provided shall be based on either the capacity of the church sanctuary or the church educational building, whichever is larger.

^c Toilet facilities for employees shall be separate from facilities for inmates or patients.

^d A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient rooms shall be permitted where such room is provided with direct access from each patient room and with provisions for privacy.

^e For day nurseries, a maximum of one bathtub shall be required.

^f For attached one- and two-family dwellings, one automatic clothes washer connection shall be required per 20 dwelling units.

^g A mop receptacle with a water supply, or a hose bib and floor drain, may be used in lieu of a service sink.

^h A can wash may be used in lieu of a service sink.

ⁱ See 403.9 for additional information on plumbing fixtures for schools.

^l When the rearrangement of an area or space increases the occupant content, the plumbing facilities shall be increased in accordance with this code.

^k For baseball stadiums, the number of fixtures shall be reduced by 50%.

^l May be omitted when located within a single family dwelling.

^m Self-service mini-storage facilities without an office area are exempt.

ⁿ Unheated storage buildings which are used periodically are not required to have toilet rooms.

CHAPTER 5 WATER HEATERS

501.8 Temperature controls.

All hot water supply systems shall be equipped with automatic temperature controls capable of adjustments from the lowest to the highest acceptable temperature settings for the intended temperature operating range. In a water heating system where temperatures exceed 140 degrees F (60 degrees C) a means such as a mixing valve shall be installed to temper the water for domestic uses.

501.9 Installation by manufacturer.

The following is a reprint of GS 66-27.1. All automatic water heaters or tanks (120 gallons or less) which utilize nonmetallic dip tubes, supply and hot water nipples, supply baffles or heat traps shall be tested and so labeled by the manufacturer to withstand a temperature of 400 degrees F without deteriorating in any manner. All such heaters or tanks shall have installed thereon by the manufacturer an American Society of Mechanical Engineers and National Board of Boiler and Pressure Vessel Inspectors Approved Type Pressure-Temperature Relief Valve set at or below the safe working pressure of the tank as indicated and labeled upon the tank or heater or a plate secured to it. All replacement components for an automatic water heater or tank (120 gallons or less) shall meet these provisions.

The following is a reprint of GS 66-27.1A. Water heater thermostat settings.

(a) The thermostat of any new residential water heater offered for sale or lease for use in a single-family or multifamily dwelling in the State shall be preset by the manufacturer or installer no higher than approximately 120 degrees Fahrenheit (or 49 degrees Celsius). A water heater reservoir temperature may be set higher if it is supplying space heaters that require higher temperatures. For purposes of this section, a water heater shall mean the primary source of hot water for any single-family or multifamily residential dwelling including, but not limited to any solar or other hot water heating systems.

(b) Nothing in this section shall prohibit the occupant of a single-family or multiunit residential dwelling with an individual water heater from resetting or having reset the thermostat on the water heater. Any such resetting shall relieve the manufacturer or installer of the water heater and, in the case of a residential dwelling that is leased or rented, also the unit's owner, from liability for damages attributed to the resetting.

(c) A warning tag or sticker shall be placed on or near the operating thermostat control of any residential water heater. This tag or sticker shall state that the thermostat settings above the preset temperature may cause severe burns. This tag or sticker may carry such other appropriate warnings as may be agreed upon by manufacturers, installers, and other interested parties.

501.10 Fossil fuel equipment installation.

The installation of the following equipment and systems shall comply with the North Carolina Fuel Gas Code:

1. Fuel piping for any fossil fuel burning equipment.

2. Venting systems for fossil fuel burning equipment which is part of the plumbing system.

502.1 General.

Water heaters shall be installed in accordance with the manufacturer's installation 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 the ICC Electrical Code ~~listed in Chapter 13~~. Gas-fired water heaters shall conform to the requirements of the International Fuel Gas Code.

502.3 Water heaters installed in attics.

Attics containing a water heater shall be provided with an opening and unobstructed passageway large enough to allow removal of the water heater. The passageway shall not be less than 30 inches (762 mm) high and 22 inches (559 mm) wide and not more than 20 feet (6096 mm) in length when measured along the centerline of the passageway from the opening to the water heater. If 6 feet of headroom is provided along the centerline of the passageway from the opening to the water heater, the length of the passageway is permitted to exceed 20 feet in length. The passageway shall have continuous solid flooring not less than 24 inches (610 mm) wide. A level service space at least 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the water heater. The clear access opening dimensions shall be a minimum of 20 inches by 30 inches (508 mm by 762 mm) where such dimensions are large enough to allow removal of the water heater.

502.5 Water heaters installed in garages.

Water heaters having an ignition source shall be elevated such that the source of ignition is not less than 18 inches (457 mm) above the garage floor. Appliances shall be located or reasonably protected, so that they are not subject to physical damage by a moving vehicle.

Exception: Elevation of the ignition source is not required for appliances that are listed as flammable vapor ignition resistant.

502.6 Installation in crawl spaces.

Under-floor spaces containing appliances requiring access shall be provided with an access opening and unobstructed passageway large enough to remove the largest component of the appliance. The passageway shall not be less than 22 inches (559 mm) high and 36 inches (914 mm) wide, nor more than 20 feet (6096 mm) in length when measured along the centerline of the passageway from the opening to the equipment. A level service space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the appliance. If the depth of the passageway or the service space exceeds 12 inches (305 mm) below the adjoining grade, the walls of the passageway shall be lined with concrete or masonry extending 4 inches (102 mm) above the adjoining grade and having sufficient lateral-bearing capacity to resist collapse.

The clear access opening dimensions shall be a minimum of 22 inches by 30 inches (559 mm by 762 mm), where such dimensions are large enough to allow removal of the largest component of the appliance.

Exceptions:

1. The passageway is not required where the level service space is present when the access is open and the appliance is capable of being serviced and removed through the required opening.
2. Where the passageway is not less than 6 feet high (1829 mm) for its entire length, the passageway shall not be limited in length.

502.7 Under floor and exterior grade installation.

502.7.1 Exterior Grade Installations. Equipment and appliances installed above grade level shall be supported on a solid base or approved material a minimum of 2 inches thick.

502.7.2 Underfloor installation. Suspended equipment shall be a minimum of 6 inches (152 mm) above the adjoining grade.

502.7.3 Crawlspace supports. In a crawl space, a minimum of 4x8x16 inch block or brick supports shall be held in place with mortar. Formed concrete or approved prefabricated steel units are acceptable.

502.7.4 Drainage. Below grade installations shall be provided with a natural drain or an automatic lift or sump pump.

502.8 Prohibited installations.

Water heaters (using solid, liquid, or gas fuel) with the exception of those having direct vent systems, shall not be installed in bathrooms and bedrooms or in a closet with access only through a bedroom or bathroom. However, water heaters of the automatic storage type may be installed as replacement in a bathroom, when specifically authorized by the plumbing official, provided they are properly vented and supplied with adequate combustion air.

Exception: When a closet, having a weather-stripped solid door with an approved closing device, has been designed exclusively for the water heater and where all air for combustion and ventilation is supplied from outdoors.

503.1 Cold water line valve.

The cold water branch line from the main water supply line to each hot water storage tank or water heater shall be provided with a valve, located near the equipment and serving only the hot water storage tank or water heater. The valve shall not interfere or cause a disruption of the cold water supply to the remainder of the cold water system. The valve shall be provided with access on the same floor level as within 3 feet of the water heater served.

503.2 Water circulation.

The method of connecting a circulating water heater to the tank shall provide proper circulation of water through the water heater. The pipe or tubes required for the installation of appliances that will draw from the water heater or storage tank shall

comply with the provisions of this code for material and installation. Installation shall comply with the manufacturer's instructions.

504.6 Relief outlet waste.

The outlet of a pressure, temperature or other relief valve shall not be directly connected to the drainage system.

504.6.1 Discharge.

The relief valve shall discharge full size to a safe place of disposal such as within 6 inches of the floor, outside the building, or an indirect waste receptor. The discharge pipe shall not have any trapped sections and shall have a visible air gap or air gap fitting located in the same room as the water heater. The outlet end of the discharge pipe shall not be threaded and such discharge pipe shall not have a valve or tee installed. Relief valve piping shall be piped independent of other equipment drains or relief valve discharge piping to the disposal point. Such pipe shall be installed in a manner that does not cause personal injury to occupants in the immediate area or structural damage to the building.

504.6.2 Materials.

Relief valve discharge piping shall be of those materials listed in Table 605.5 or shall be tested, rated and approved for such use in accordance with ASME A112.4.1. Piping from safety pan drains shall be of those materials listed in Table 605.4 and Table 702.1.

504.7 Required pan.

Where water heaters or hot water storage tanks are installed in: (a) remote locations such as a suspended ceiling, (b) attics, (c) above occupied spaces, or (d) unventilated crawl spaces, the tank or water heater shall be installed in a galvanized steel pan having a minimum thickness of 24 gage, or other pans approved for such use.

Exception: Electric water heaters may rest in a high impact plastic pan of at least 1/16 inch (1.6 mm) thickness.

504.7.1 Pan size and drain.

The pan shall be not less than 1.5 inches (38 mm) deep and shall be of sufficient size and shape to receive all dripping or condensate from the tank or water heater. The pan shall be drained by an indirect waste pipe having a minimum diameter of 1 inch (19 mm).

[E] 505.1 Unfired vessel insulation. Deleted.

CHAPTER 6 WATER SUPPLY AND DISTRIBUTION

602.2 Potable water required.

Only potable water shall be supplied to plumbing fixtures that provide water for drinking, bathing or culinary purposes, or for the processing of food, medical or pharmaceutical products. ~~Unless otherwise provided in this code, potable water shall be supplied to all plumbing fixtures.~~

602.3 Individual water supply.

Where a potable public water supply is not available, individual sources of potable water supply shall be utilized.

602.3.1 Sources. ~~Deleted.~~

602.3.2 Minimum quantity. ~~Deleted.~~

602.3.3 Water quality. ~~Deleted.~~

602.3.4 Purging of system.

After construction or major repair, the individual water supply system shall be purged of deleterious matter ~~and disinfected in accordance with Section 610.~~

602.3.5 Pumps. ~~Deleted.~~

602.3.5.1 Pump enclosure. ~~Deleted.~~

604.4.1 Lavatory faucets.

Lavatory faucets shall be of the metering type when located in the following public restrooms:

- a. in all occupancies in restrooms which have six or more lavatories.
- b. in school occupancies in student-use restrooms.
- c. in assembly occupancies in all customer or public-use restrooms.

604.5 Size of fixture supply.

The minimum size of a fixture supply pipe shall be as shown in Table 604.5. The fixture supply pipe shall not terminate more than 72 inches (1828 mm) from the point of connection to the fixture. A reduced-size flexible water connector installed between the supply pipe and the fixture shall be of an approved type. The supply pipe shall extend to the floor or wall adjacent to the fixture. The minimum size of individual distribution lines utilized in parallel water distribution systems shall be as shown in Table 604.5.

Exception: This shall not apply to residential dishwashers or ice makers.

604.9 Water hammer.

The flow velocity of the water distribution system shall be controlled to reduce the possibility of water-hammer. A water-hammer arrestor shall be installed where quick-closing valves (clothes washers and dishwashers) and copper, metallic piping is used. The water-hammer arrestor shall not be required on any valves where plastic pipe is used for water distribution piping. Water-hammer arrestors shall be installed in accordance with the manufacturer's specifications. Water-hammer arrestors shall conform to ASSE 1010.

605.3 Water service pipe.

Water service pipe shall conform to NSF61 and shall conform to one of the standards listed in Table 605.3. All water service pipe or tubing, installed underground and outside of the structure, shall have a minimum working pressure rating of 160 psi (1100 kPa) at 73.4 E F (23 E C). Where the water pressure exceeds 160 psi (1100 kPa), piping material shall have a minimum rated working pressure equal to the highest available pressure. ~~Plastic water service piping shall terminate within 5 feet (1524 mm) inside of the point where the pipe penetrates an exterior wall or slab on grade.~~ All ductile iron water pipe shall be cement mortar lined in accordance with AWWA C104.

605.4 Water distribution pipe.

Water distribution pipe shall conform to NSF 61 and shall conform to one of the standards listed in Table 605.4. All ~~hot~~ water distribution pipe and tubing shall have a minimum pressure rating of 100 psi (690 kPa) at 180 E F (82 E C).

605.6 Flexible water connectors. Deleted.

606.1 Location of full-open valves.

Full-open valves shall be installed in the following locations:

1. Deleted.
2. A full-open valve shall be located either outside the building within 5 feet of the foundation wall in a readily accessible valve box, in the crawlspace within 3 feet of the crawlspace access door or within the building in a location where it may be accessed without the use of a ladder or a tool.
3. Deleted.
4. On the base of every water riser pipe in occupancies other than multiple-family residential occupancies that are two stories or less in height and in one- and two-family residential occupancies.
5. On the top of every water down-feed pipe in occupancies other than one- and two-family residential occupancies.
6. On the entrance to every water supply pipe to a dwelling unit, except where supplying a single fixture equipped with individual stops.
7. On the water supply pipe to a gravity or pressurized water tank.
8. On the water supply pipe to every water heater.

606.2 Location of shutoff valves.

Shutoff valves shall be installed within 3 feet on the same floor in the following locations:

1. On the fixture supply to each plumbing fixture other than bathtubs and showers in one- and two-family residential occupancies, and other than in individual guestrooms that are provided with unit shutoff valves in hotels, motels, boarding houses and similar occupancies.
2. Deleted.
3. On the water supply pipe to each appliance or mechanical equipment.

606.2.1 Buildings other than dwellings or dwelling units.

Each supply branch line serving more than one fixture shall have a shut-off valve installed so as to isolate all fixtures and all pieces of equipment supplied by the branch line. The shut-off valve shall be labeled and located as close to the connection to the supply main and riser as practical.

606.4 Valve identification.

Service ~~and hose bibb~~ valves shall be identified. All other valves installed in locations that are not adjacent to the fixture or appliance shall be identified, indicating the fixture or appliance served.

607.1 Where required.

Each dwelling unit shall be provided with an adequate source of hot water for each family unit to meet minimum basic requirements for health, sanitation and personal hygiene. Central water heating facilities shall be accessible for emergency maintenance without entering any individual apartment or living unit when supplying hot water to that unit. In other occupied structures hot water may be supplied to all plumbing fixtures and equipment utilized for bathing, washing, culinary purposes, cleansing, laundry or building maintenance.

607.2 Hot water supply temperature maintenance. Deleted.

607.2.1 Piping insulation.

In other than one-and two-family dwellings, circulating hot water system piping shall be insulated in accordance with the International Energy Conservation Code.

607.2.3 Recirculating pump. Deleted.

608.8.2 Color.

The color of the pipe identification shall be discernable and consistent throughout the building. See Table 608.8.2 for color identification.

TABLE 608.8.2

IDENTIFICATION COLOR

(insert commentary Figure 608.8(2))

608.15.4.3 Fittings with hose-connected outlets.

Plumbing fixture fittings with hose-connected outlets shall have backflow protection in compliance with ASME A112.18.3.

608.17 Protection of individual water supplies. Deleted.

TABLE 608.17.1

DISTANCE FROM CONTAMINATION TO PRIVATE WATER SUPPLIES AND PUMP SUCTION LINES

Deleted.

SECTION 610

PURGING OF POTABLE WATER SYSTEM

610.1 General.

Permitted new or repaired potable water systems shall be purged of deleterious matter prior to utilization.

613.1 Temperature-actuated mixing valves.

Temperature-actuated mixing valves, which are installed to reduce water temperatures to defined limits, shall comply with ASSE 1016 or ASSE1017.

CHAPTER 7 SANITARY DRAINAGE

701.2 Sewer required.

Every building in which plumbing fixtures are installed and all premises having drainage piping shall be connected to a public sewer, where available, or an approved private sewage disposal system ~~in accordance with the International Private Sewage Disposal Code.~~

701.4 Sewage treatment.

Sewage or other waste from a plumbing system that is deleterious to surface or subsurface waters shall not be discharged into the ground or into any waterway unless it has first been rendered innocuous through proper treatment approved by the authority having jurisdiction.

701.5 Damage to drainage system or public sewer.

Wastes detrimental to the public sewer system or detrimental to the functioning of the private sewage system shall be treated and disposed of in accordance with Section 1003.

701.8 Engineered systems. Deleted.

(insert approved amendment to Tables 702.4 and 1102.7)

703.2 Drainage pipe in filled ground.

A building sewer or building drain is installed in unstable fill or unstable ground shall be of cast iron pipe, except that nonmetallic drains may be laid upon an approved continuous supporting system if installed in accordance with the manufacturer's installation instructions.

706.3 Installation of fittings.

Fittings shall be installed to guide sewage and waste in the direction of flow. Change in direction shall be made by fittings installed in accordance with Table 706.3. Change in direction by combination fittings, side inlets or increasers shall be installed in accordance with Table 706.3 based on the pattern of flow created by the fitting. Double sanitary tee patterns shall not receive the discharge of back-to-back ~~water closets and fixtures or~~ appliances with pumping action discharge.

Exception: Deleted.

TABLE 706.3

FITTINGS FOR CHANGE IN DIRECTION

(quarter bend/vert to horiz, delete "a", insert "d, f")

(quarter bend/horiz to horiz, delete "a", insert "e")

(short sweep/vert to horiz, delete "a")

- a. The fittings shall only be permitted for a 2-inch or smaller sink or lavatory fixture drain.
- b. Three inches or larger.

- c. For a limitation on double sanitary tees, see Section 706.3.
- d. May be used only within 12" below water closet flange measured to centerline of the quarter bend.
- e. This fitting shall only be permitted to be used as the first fitting directly behind the fixture for drains 2-inch and smaller.
- f. The heel inlet connection of a quarter bend may be used as a wet or dry vent if the heel inlet connection of the quarter bend is located in the vertical position. The heel or side inlet connection may be used as a wet vent if the quarter bend is located directly below a water closet or other fixture with one integral trap.

708.3.3 Changes of direction.

One cleanout shall be required for every four 45 degree changes located in series (a long sweep is equivalent to two 45 degree bends).

708.3.5 Building drain and building sewer junction.

There shall be a cleanout near the junction of the building drain and the building sewer. The cleanout shall be ~~either inside or outside the building wall~~ and shall be brought up to the finished ground level ~~or to the basement floor level~~. An approved two-way cleanout is allowed to be used at this location to serve as a required cleanout for both the building drain and building sewer. The cleanout at the junction of the building drain and building sewer shall not be required if the cleanout on a 3-inch (76 mm) or larger diameter soil stack is located within a developed length of not more than 10 feet (3048 mm) of from the building drain and building sewer connection and is extended to the outside of the building. The minimum size of the cleanout at the junction of the building drain and building sewer shall comply with Section 708.7.

708.7 Minimum size.

Cleanouts shall be the same nominal size as the pipe they serve up to 4 inches (102 mm). For pipes larger than 4 inches (102 mm) nominal size, the minimum size of the cleanout shall be 4 inches (102 mm).

Exceptions:

1. "P" trap connections with slip joints or ground joint connections, or stack cleanouts that are not more than one pipe diameter smaller than the drain served, shall be permitted. A water closet may be used as the cleanout for the water closet branch only.
2. Cast-iron cleanout sizing shall be in accordance with referenced standards in Table 702.4, ASTM A 74 for hub and spigot fittings or ASTM A 888 or CISPI 301 for hubless fittings.

TABLE 709.1

DRAINAGE FIXTURE UNITS FOR FIXTURES AND GROUPS

(Kitchen sink, domestic with food grinder..., insert "h")

(Bathroom group as defined in Section 202 (1.6 gpf WC), insert "i")

- a. For traps larger than 3 inches, use Table 709.2.
- b. A showerhead over a bathtub or whirlpool bathtub attachment does not increase the drainage fixture unit value.

- c. See Sections 709.2 through 709.4 for methods of computing unit value of fixtures not listed in this table or for rating of devices with intermittent flows.
- d. Trap size shall be consistent with the fixture outlet size.
- e. For the purpose of computing loads on building drains and sewers, water closets and urinals shall not be rated at a lower drainage fixture unit unless the lower values are confirmed by testing.
- f. For fixtures added to a dwelling unit bathroom group, add the DFU value of those additional fixtures to the bathroom group fixture count.
- g. See Section 406.3 for sizing requirements for fixture drain, branch drain, and drainage stack for an automatic clothes washer standpipe.
- h. Fixture arm and trap shall be 1-1/2" minimum; vertical drain shall be 2" minimum.
- i. For one and two family dwelling units, add 2 DFU for each additional full bath.

TABLE 710.1(1)
BUILDING DRAINS AND SEWERS
(in Table heading, insert "b, d")
(Diameter of pipe, 3 inch, insert "c")

- a. The minimum size of any building drain serving a water closet shall be 3 inches.
- b. No building sewer shall be less than 4 inch in size.
- c. No more than 3 water closets.
- d. Minimum 2 inch diameter underground.

TABLE 710.1(2)
HORIZONTAL FIXTURE BRANCHES AND STACKS
(in Table heading, insert "f")
(in Total for a horizontal branch heading, insert "e")
(Diameter of pipe, 3 inch, insert "g")
(Diameter of pipe, 3 inch/ Total for a horizontal branch, insert "d")
(Diameter of pipe, 3 inch/ Total discharge into one branch interval, insert "d")

- a. Does not include branches of the building drain. Refer to Table 710.1(1).
- b. Stacks shall be sized based on the total accumulated connected load at each story or branch interval. As the total accumulated connected load decreases, stacks are permitted to be reduced in size. Stack diameters shall not be reduced to less than one-half of the diameter of the largest stack size required.
- c. Sizing load based on design criteria.
- d. No more than 3 water closets.
- e. 50% less for circuit vented fixture branches.
- f. Minimum of 2" diameter underground.
- g. The minimum size of any building drain serving a water closet shall be 3 inches.

712.2 Valves required.

A check valve and full open valve, located on the discharge side of the check valve, shall be installed in the pump or ejector discharge piping between the pump or ejector and the gravity drainage system. Access shall be provided to such valves. Such valves will be

located above the sump cover required by Section 712.1 or, where the discharge pipe from the ejector is below grade, the valves shall be accessibly located outside the sump below grade in an access pit with a removable access cover.

Exception: Deleted.

712.3.4.1 Sump alarms.

Sumps that discharge by means of automatic pumping equipment shall be provided with an approved, electrically operated high water indicating alarm. A remote sensor shall activate the alarm when the fluid level exceeds a preset level that is less than the maximum capacity of the sump. The alarm shall function to provide an audiovisual signal to occupants within the dwelling. Electrical power for the alarm shall be supplied through a branch circuit separate from that supplying the pump motor.

712.4 Sewage pumps and sewage ejectors.

A sewage pump or ejector pump discharge pipe shall not discharge directly into a septic tank. The pumped line shall discharge laterally into a 4" gravity line not less than 10 feet from the connection to the tank through a lateral wye branch.

TABLE 712.4.2

**MINIMUM CAPACITY OF SEWAGE PUMP
OR SEWAGE EJECTOR**

(add footnote "a")

a. Minimum velocity shall be 2-fps. Diameter shall not be less than 2-inches.

SECTION 714

COMPUTERIZED DRAINAGE DESIGN

Deleted.

CHAPTER 8

INDIRECT/SPECIAL WASTE

801.1 Scope.

This chapter shall govern matters concerning indirect waste piping and special wastes. This chapter shall further control matters concerning food-handling establishments, sterilizers, clear-water wastes, swimming pools, methods of providing air breaks or air gaps, and neutralizing devices for corrosive wastes. Condensate piping between the air conditioning unit and the point of discharge shall be installed in accordance with the requirements of the North Carolina Mechanical Code.

802.1.1 Food handling.

Equipment and fixtures utilized for the storage, preparation and handling of food shall discharge through an indirect waste pipe by means of an air gap.

Exception: This requirement shall not apply to residential type dishwashing machines and residential type dishwashing sinks.

802.1.2 Floor drains in food storage areas.

Floor drains located within walk-in refrigerators or freezers in food service and food establishments shall be indirectly connected to the sanitary drainage system by means of an air gap. Where a floor drain is located within an area subject to freezing, the waste line serving the floor drain shall not be trapped and shall indirectly discharge into a waste receptor located out-side of the area subject to freezing.

Exception: Deleted.

802.1.3 Potable clear-water waste.

Where devices and equipment, such as sterilizers and relief valves, discharge potable water to the building drainage system, the discharge shall be through an indirect waste pipe by means of an air gap. Drinking fountains may be connected directly or indirectly.

802.4 Standpipes.

Standpipes shall be 2" in diameter and not be less than 18 inches (762 mm) or more than 48 inches (1219 mm) in height as measured from the crown weir. The standpipe shall extend 34 inches minimum above the base of the clothes washer unless recommended otherwise by the manufacturer. The connection of a laundry tray waste line may be made into a standpipe for the automatic clothes-washer drain. The outlet of the laundry tray shall be a maximum horizontal distance of 30 inches (762 mm) from the standpipe trap.

803.3 System design.

Deleted.

803.4 Piscina drain.

The drain from a wash basin (piscina) located in a sacristy may be connected directly to a dry well.

803.5 Acid soil and waste piping.

For engineered acid soil and waste drainage systems, the type of pipe shall be selected by a Professional Engineer registered in North Carolina. For nonengineered acid soil and waste drainage systems, the piping shall be of a material which is designed and recommended by the manufacturer as suitable for the type of waste drained. Piping shall be installed in accordance with the manufacturer's installation instructions. When installed within buildings, piping of combustible materials shall be of a flame retardant type rated at least V-2 per UL-94. Concentrations of acid waste which are sufficient to adversely affect the conventional drainage system shall be suitably diluted or neutralized before interconnection. Fittings shall conform to the type of piping used.

CHAPTER 9 VENTS

901.2.1 Venting required.

Every trap and trapped fixture shall be vented in accordance with one of the venting methods specified in this chapter. All fixtures discharging downstream from a water closet shall be individually vented except as provided in Section 911.

901.6 Engineered systems.

Deleted.

903.1 Stack required.

Every building in which plumbing is installed shall have at least one stack the size of which is not less than one-half of the required size of the building drain, and not less than 2-inches in diameter. Such stack shall run undiminished in size and as directly as possible from the building drain through to the open air or to a vent header that extends to the open air.

903.1.1 Connection to drainage system.

A vent stack shall connect to the building drain or to the base of a drainage stack in accordance with Section 903.4. A stack vent shall be an extension of the drainage stack. For townhouses and one- and two- family dwellings, the main vent shall connect to the building drain, building stack or branch there of not less than three inches in size.

904.1 Roof extension.

All open vent pipes that extend through a roof shall be terminated at least 6 inches (mm) above the roof, except where the roof is accessible by the public or the building tenants, the vent extensions shall be run at least 7 feet (2134 mm) above the roof.

904.6 Extension through the wall.

Vent terminals extending through the wall shall terminate a minimum of 10 feet (3048 mm) from the lot line and 10 feet (3048 mm) above average ground level. Vent terminals shall not terminate under the overhang of a structure with soffit vents. Side wall vent terminals shall not terminate horizontally to prevent birds or rodents from entering or blocking the vent opening.

905.4 Vertical rise of vent.

Every dry vent shall rise vertically to a minimum of 6 inches (152 mm) above the flood level rim of the highest trap or trapped fixture being vented.

Exception: When vents for interceptors and isolated floor drains are not located near an adjacent wall, the vent must rise 6 inches vertically before turning horizontally and continuing to the nearest wall. For cleaning purposes, a clean-out the same size as the vent shall be installed.

906.2 Venting of fixture drains.

The total fall in a fixture drain due to pipe slope shall not exceed the diameter of the fixture drain, nor shall the vent connection to a fixture drain, except for water closets, be below the weir of the trap.

909.1 Wet vent permitted.

Any combination of fixtures ~~within two bathroom groups~~ located on the same floor level are permitted to be vented by a wet vent. The wet vent shall be considered the vent for the fixtures and shall extend from the connection of the dry vent along the direction of the flow in the drain pipe to the most downstream fixture drain connection to the horizontal branch drain. ~~Only the fixtures within the bathroom groups shall connect to the wet-vented horizontal branch drain. Any additional fixtures shall discharge downstream of the wet vent.~~ A residential clothes washer drain line shall not be used as a wet vent.

909.1.1 Vertical wet vent.

Any combination of fixtures ~~within two bathroom groups~~ located on the same floor level is permitted to be vented by a vertical wet vent. The vertical wet vent shall extend from the connection to the dry vent down to the lowest fixture drain connection. Each fixture shall connect independently to the vertical wet vent. Water closet drains shall connect at the same elevation. Other fixture drains shall connect above or at the same elevation as the water closet fixture drains. The dry vent connection to the vertical wet vent shall be an individual or common vent serving one or two fixtures.

909.2 Vent connection.

The dry vent connection to the wet vent shall be an individual vent or common vent ~~to the lavatory, bidet, shower or bathtub~~. The dry vent shall be sized based on the largest required diameter of pipe within the wet vent system served by the dry vent.

909.4 Multistory bathroom groups.

On the lower floors of a multistory building, the waste pipe from one or two lavatories may be used as a wet vent for one or two bathtubs or showers provided that:

1. The wet vent and its extension to the vent stack is not less than 2-inch (51 mm) diameter, and,
2. Each water closet below the top floor is individually back vented and,
3. The vent stack is sized in accordance with Table 909.4.

Exception: In multistory bathroom groups (does not apply to one- and two-family dwellings), wet vented in accordance with 911.3, the water closets below the top floor need not be individually vented if a 2-inch (51 mm) wet vent connects downstream of the water closet.

TABLE 909.4
SIZE OF VENT STACK

<u>Number of Wet Vented Fixtures</u>	<u>Diameter of Vent Stacks (In.)</u>
<u>1 or 2 bathtubs or showers</u>	<u>2</u>
<u>3 to 5 bathtubs or showers</u>	<u>2-1/2</u>
<u>6 to 9 bathtubs or showers</u>	<u>3</u>
<u>10 to 16 bathtubs or showers</u>	<u>4</u>

SECTION 912

COMBINATION WASTE AND VENT SYSTEM

912.1 Approval.

Plans and specifications for each combination waste and vent system shall be submitted to the plumbing official, and approval shall be obtained before any installation is started.

912.2 Limits.

912.2.1 A combination waste and vent system is limited to sinks, dishwashers, floor sinks, indirect waste receptors, floor drains or similar applications where the fixtures are not adjacent to walls or partitions. It consists of the installation of waste piping in which the trap of the fixture is not individually vented.

912.2.2 Caution must be exercised to exclude appurtenances delivering large quantities of water or sewage such as pumps, etc., in a combination waste and vent system in order that adequate venting will be maintained.

912.3 Dishwashers.

Dishwashers and scullery sinks in commercial buildings shall drain through a grease interceptor sized in accordance with this code and they shall discharge into a floor sink through a minimum air gap.

912.4 General Design.

912.4.1 Every waste pipe and trap in this system shall be at least two pipe sizes larger than the size required in Chapter 7, and at least two pipe sizes larger than any fixture tail piece or connection, except that when "P" traps are installed above the floor, the "P" trap and horizontal fixture drain need not meet this requirement. The vertical waste pipe two sizes larger than the fixture outlet connection shall be extended above the floor to normal roughing height, and a cleanout shall be installed in top of the connecting waste tee. The fixture drain length shall be limited by Table 906.1. Floor sinks shall be connected through a running trap two pipe sizes larger than the sink outlet. Floor sink and waste piping from the floor sink to the trap shall be sized for the total fixture units draining thereto, based on Table 709.1, but in no case shall the line be less than 2-inch (51 mm) soil pipe when piping is underground.

912.4.2 A vent shall be provided at the upstream end of each branch, washed over or under by the last fixture on the branch. No vent shall take off from the horizontal waste branch at an angle of less than 45 degrees (0.785 rad) from the horizontal unless washed by a fixture. A minimum size vent shall be located at all points where branches intersect. A vent shall be located downstream from all fixtures in the system, in addition to the upstream vent, separating this system from all other systems in the building. No fixtures other than those permitted in 912.2 shall discharge into any branch or portion of this system.

912.4.3 Caution shall be used in the design of the system to assure that the vertical distance from fixture or drain outlet to trap weir does not exceed 24 inches (610 mm). Long runs shall be provided with additional relief vents located at intervals of not more than 100 ft (30.5 m) to equalize pressure in the system.

912.5 Size of vents.

The size of vents shall be in accordance with requirements of 916.1 and Table 916.1, but the diameter shall be not less than one-half of the diameter of the waste pipe served.

912.6 Receptor drain size.

Indirect waste receptors shall be sized for the fixture units draining thereto, regardless of other requirements of this code.

913.1 Limitation.

Island fixture venting shall not be permitted for fixtures other than sinks and lavatories. Residential type kitchen sinks with a dishwasher waste connection, a food waste grinder, or both, in combination with the kitchen sink waste, shall be permitted to be vented in accordance with this section.

913.2 Vent connection.

The island fixture vent shall connect to the fixture drain as required for an individual or common vent. The vent shall rise vertically to above the drainage outlet of the fixture being vented before offsetting horizontally or vertically downward. For multiple island fixture vents, the vent or branch vent shall extend to a minimum of 6 inches (152 mm) above the highest island fixture being vented before connecting to the outside vent terminal.

**SECTION 918
ENGINEERED VENT SYSTEMS**

Deleted.

**SECTION 919
COMPUTERIZED VENT DESIGN**

Deleted.

**SECTION 920
SINGLE STACK PLUMBING SYSTEMS (SOVENT)**

Design and installation shall be in accordance with design criteria contained in the Copper Development Association (CDA) Handbook No. 802. Materials shall meet standards and specifications listed in Tables 702.1 and 702.4 for drain, waste and vent pipe and fittings.

CHAPTER 10 TRAPS, INTERCEPTORS AND SEPARATORS

1002.1 Fixture traps.

Each plumbing fixture shall be separately trapped by a water-seal trap, except as otherwise permitted by this code. The trap shall be placed as close as possible to the fixture outlet. The vertical distance from the fixture outlet to the trap weir shall not exceed 24 inches (610 mm). The distance of a clothes washer standpipe above a trap shall conform to Section 802.4. A fixture shall not be double trapped.

Exceptions:

1. This section shall not apply to fixtures with integral traps.
2. A combination plumbing fixture or up to three similar fixtures is permitted to be installed on one trap provided that one compartment is not more than 6 inches (152 mm) deeper than the other compartment and the waste outlets are not more than 30 inches (762 mm) apart.
3. A grease trap intended to serve as a fixture trap in accordance with the manufacturer's installation instructions shall be permitted to serve as the trap for a single fixture or a combination sink of not more than three compartments where the vertical distance from the fixture outlet to the inlet of the interceptor does not exceed 30 inches (762 mm), and the developed length of the waste pipe from the most upstream fixture outlet to the inlet of the interceptor does not exceed 60 inches (1524 mm).
4. The connection of a laundry tray complying with Section 802.4.

1002.6 Building traps. Deleted.

1002.8 Recess for trap connection. Deleted.

1002.9 Acid-resisting traps. Deleted.

1002.10 Plumbing in mental health centers. Deleted.

1003.2 Approval.

The size, type and location of each interceptor and of each separator shall be designed and installed in accordance with the manufacturer's instructions, the requirement of the local utilities department or health department, and the requirements of this section based on the anticipated conditions of use. Wastes that do not require treatment or separation shall not be discharged into any interceptor or separator.

1003.3 Grease traps and grease interceptors.

Grease traps and grease interceptors shall comply with the requirements of Sections 1003.3.1 through 1003.3.4.2 or with the requirement of the local utility department or health department.

1003.6 Laundries.

Commercial laundries shall be equipped with an interceptor, ~~with~~ a wire basket or similar device, removable for cleaning, that prevents passage into the drainage system of solids 0.5 inch (12.7 mm) or larger in size, string, rags, buttons or other materials detrimental to the public sewage system.

CHAPTER 11 STORM DRAINAGE

1101.1 Scope.

The provisions of this chapter shall govern the materials, design, construction and installation of storm drainage, except in one- and two-family dwellings.

1101.2 Where required.

All roofs, paved areas, yards, courts and courtyards shall drain into a separate storm sewer system, or a combined sewer system, or to an approved place of disposal. ~~For one- and two-family dwellings, and where approved, storm water is permitted to discharge onto flat areas, such as streets or lawns, provided that the storm water flows away from the building.~~

**FIGURE 1106.1
100-YEAR, 60-MINUTE RAINFALL (INCHES) NORTH CAROLINA
FOR PRIMARY ROOF DRAINS**
(insert map from 2002 NC, page 79)

**FIGURE 1106.1(a)
100-YEAR, 15-MINUTE RAINFALL (INCHES) NORTH CAROLINA
FOR SECONDARY ROOF DRAINS**
(insert map from 2002 NC, page 80)

**FIGURE 1106.1
100-YEAR, 1-HOUR RAINFALL (INCHES) EASTERN UNITED STATES**
Deleted.

**FIGURE 1106.1—continued 100-YEAR, 1-HOUR RAINFALL (INCHES)
CENTRAL UNITED STATES**
Deleted.

**FIGURE 1106.1—continued 100-YEAR, 1-HOUR RAINFALL (INCHES)
WESTERN UNITED STATES**
Deleted.

**FIGURE 1106.1—continued 100-YEAR, 1-HOUR RAINFALL (INCHES)
ALASKA**
Deleted.

**FIGURE 1106.1—continued 100-YEAR, 1-HOUR RAINFALL (INCHES)
HAWAII**
Deleted.

1106.5 Parapet wall scupper location.

Parapet wall roof drainage scupper and overflow scupper location shall comply with the requirements of Figure 1107.3 from the International Plumbing Code Commentary.

TABLE 1106.6

SIZE OF SEMICIRCULAR ROOF GUTTERS

(in Table heading, insert "a")

a. For Table 1106.3 and Table 1106.6, when rainfall rates exceed 6 inches per hour, then the figures for roof area shall be adjusted proportionally by multiplying the figure by six and dividing by the maximum rate of rainfall in inches per hour (Figure 1106.1(a)).

1107.3 Sizing of secondary drains.

Secondary (emergency) roof drain systems shall be sized in accordance with Section 1106 based on the rainfall rate indicated in Figure 1106.1(a). Scuppers shall be sized to prevent the depth of ponding water from exceeding that for which the roof was designed as determined by Section 1101.7. Scuppers shall not have an opening dimension of less than 4 inches (102 mm). The flow through the primary system shall not be considered when sizing the secondary roof drain system.

Appendix A:

Plumbing Permit Fee Schedule

The provisions contained in this appendix are deleted.

Appendix B:

Rates of Rainfall for Various Cities

The provisions contained in this appendix are adopted as part of this code.

Appendix C:

Gray Water Recycling Systems

The provisions contained in this appendix are adopted as part of this code.

Appendix D:

Degree Day and Design Temperatures

The provisions contained in this appendix are deleted.

Appendix E:

Sizing of Water Piping System

The provisions contained in this appendix are adopted as part of this code.

Appendix F:

Structural Safety

The provisions contained in this appendix are adopted as part of this code.

Appendix G:

Vacuum Drainage System

The provisions contained in this appendix are adopted as part of this code.

Appendix H:

Rodentproofing

The provisions contained in this appendix are adopted as part of this code.

APPENDIX H
RODENT PROOFING

The provisions contained in this appendix are adopted as part of this code.

H304.1 General. Buildings or structures and the walls enclosing habitable or occupiable rooms and spaces in which persons live, sleep or work, or in which feed, food or foodstuffs are stored, prepared, processed, served or sold, shall be constructed in accordance with the provisions of this section.

H304.2 Foundation wall ventilation openings. Foundation wall ventilator openings shall be covered for their height and width with perforated sheet metal plates no less than 0.070 inch (1.8 mm) thick, expanded sheet metal plates not less than 0.047 inch (1.2 mm) thick, cast iron grills or grating, extruded aluminum load-bearing vents or with hardware cloth of 0.035 inch (0.89 mm) wire or heavier. The openings therein shall not exceed 1/4 inch (6.4 mm).

H304.3 Foundation and exterior wall sealing. Annular spaces around pipes, electric cables, conduits, or other openings in the walls shall be protected against the passage of rodents by closing such openings with cement mortar, concrete masonry or noncorrosive metal.