APPENDIX G
MEDICAL FACILITIES PLUMBING SYSTEMS

(APPENDIX G IS A REQUIREMENT OF THIS CODE)

G101 GENERAL

G1011 Scope

G101.1.1 The provisions of this appendix are intended to set out those items of hospital plumbing systems which differ from plumbing systems in other buildings. Special care shall be accorded the hospital plumbing system because of its direct relationship to adequate medical care and the need for added protection for patients and hospital personnel from health hazards.

G101.1.2 It is understood that hospital plumbing systems shall conform not only to the requirements of this appendix, but also to the requirements contained in the other sections of the Louisiana State Plumbing Code.

G101.1.3 The provisions of this appendix shall apply to special plumbing installations in clinics, doctors offices, nursing homes, and other medical facilities, etc., as well as in hospital installations.

G101.2 Definitions

The following words and terms shall, for the purposes of this chapter and as stated elsewhere in this code, have the meanings shown herein. Refer to Chapter 2 for general definitions.

ASPIRATOR - a fitting or device supplied with water or other fluid under positive pressure which passes through an integral orifice or constriction causing a vacuum. Aspirators are often referred to as suction apparatus, and are similar in operation to an ejector.

AUTOPSY TABLE - a fixture or table used for post-mortem examination of a body.

BEDPAN HOPPER - see Clinical Sink.

BEDPAN STEAMER OR BOILER - a fixture used for scalding bedpans or urinals by direct application of steam or boiling water.

BEDPAN UNIT - a small workroom in the nursing area designed and equipped for emptying, cleaning, and sometimes for steaming bedpans, and for no other purpose.

BEDPAN WASHER AND STERILIZER - a fixture designed to wash bedpans and to flush the contents into the sanitary drainage system. It may also provide for emptying, cleaning, and sometimes for steaming bedpans, and for no other purpose.

BEDPAN WASHER HOSE - a device supplied with hot and cold water and located adjacent to a water closet or clinical sink to be used for cleansing bedpans.

CLINICAL SINK (BEDPAN HOPPER) - a fixture meeting the design requirements of G 102.1 for the rinsing of bedpans and soiled linen. Such fixtures shall have a trap size of not less than 3 inches.

EFFECTIVE OPENING - the minimum cross-sectional area at the point of water supply discharge, measured or expressed in terms of (1) diameter of a circle, or (2) if the opening is not circular, the diameter of a circle of equivalent cross-sectional area. Applicable to air gap.

NURSES' STATION - an area in the nursing unit separated from the corridor by counter or desk, designed to permit nurses to record and file each patient's history and progress, observation and control of corridor, preparation of medicines and maintain contact with patients, the hospital and the outside by local and public means of communication.

SCRUB SINK - a device usually located in the operating suite to enable operating personnel to scrub their hands prior to operating procedure. The hot and cold water supply is activated by a knee-action mixing valve or by wrist or pedal control.

STERILIZER, BOILING TYPE - a fixture (nonpressure type) used for boiling instruments, utensils, and other equipment (used for disinfection). Some devices are portable, others are connected to the plumbing system.

STERILIZER, INSTRUMENT - a device for the sterilization of various instruments.

STERILIZER, PRESSURE INSTRUMENT WASHER-STERILIZER - a fixture (pressure vessel) designed to both wash and sterilize instruments during the operating cycle of the fixture.

STERILIZER, PRESSURE (AUTOCLAVE) - a fixture (pressure vessel) designed to use steam under pressure for sterilizing. Also called an autoclave.

STERILIZER, UTENSIL - a device for sterilization of utensils as used in hospital services.

STERILIZER VENT - a separate pipe or stack, indirectly connected to the building drainage system at the lower terminal, which receives the vapors from nonpressure sterilizers, or the exhaust vapors from pressure sterilizers, and conducts the vapors directly to the outer air. Sometimes called vapor, steam, atmospheric, or exhaust vent.

STERILIZER, WATER - a device for sterilizing water and storing sterile water.

STILL - a device used in distilling liquids.

UTILITY ROOM - a workroom in the patient nursing area, designed and equipped to facilitate preparation, cleaning and incidental sterilization of the various supplies, instruments, utensils, etc. involved in nursing treatment and care, exclusive of medications handled in nurses' stations and bedpan cleaning and sterilizing.

G102 FIXTURES

G102.1 Bedpans
Acceptable flush rim bedpan hoppers (clinic sink), bedpan washers, and/or other acceptable fixtures and equipment shall be provided for the disposing of bedpan contents and the cleansing and disinfection of bedpans in soiled utility (hopper) rooms.

G102.2 Clinic Sink
A clinic sink shall have an integral trap in which the upper portion of a visible trap seal provides a water surface. The fixture shall be so designed as to permit complete removal of the contents by siphonic or blowout action, or both, and to reseal the trap. A flushing rim shall provide water to cleanse the interior surface. The fixture shall have flushing and cleansing characteristics similar to a water closet.

G102.3 Prohibited Use of Clinic and Service Sinks
A clinic sink serving a soiled utility room shall not be considered as a substitute for, nor shall it be used as, a janitor's service sink. A janitor's service sink shall not be used for the disposal of urine, fecal matter, or other human waste.

G102.4 Ice Prohibited in Soiled Utility Room
Machines for manufacturing ice, or any device for the handling or storage of ice, shall not be located in a soiled utility room. Machines for manufacturing ice, or devices for handling or storage of ice intended for either human consumption or packs, may be located in a clean utility room, floor pantry, or diet kitchen.

G102.5 Sterilizer Equipment Requirements
G102.5.1 It shall be unlawful to descale or otherwise submit the interior of water sterilizers, stills, or similar equipment to acid or other chemical solutions while the equipment is connected to the water or drainage system.

G102.5.2 New pressure sterilizers and pressure instrument washer-sterilizers hereafter installed shall display, in a location clearly visible at all times, the ASME Standard symbol and data plate.

G102.5.3 All sterilizer piping and devices necessary for the operation of sterilizers shall be accessible for inspection and maintenance, and shall satisfy the following:

1. Steam supplies to sterilizers, including those connected by pipes from overhead mains or branches, shall be drained to prevent any excess moisture from reaching the sterilizer. The condensate drainage from the steam supply shall be discharged by gravity.
2. Steam condensate return from sterilizers shall not be connected to pressure or vacuum return systems; only gravity returns shall be acceptable. Steam condensate returns from sterilizers shall not be connected to overhead mains or branches.
3. Pressure sterilizers should be equipped with an acceptable means of condensing and cooling the exhaust steam vapors. Nonpressure sterilizers should be equipped with an acceptable device which will automatically control the vapors in a manner so as to confine them within the vessel, or equipped with an acceptable means of condensing and cooling the vapors.
4. Gas fired equipment or apparatus, requiring either water or drainage connections or both, shall meet the standards of the American National Standards Institute.

G102.6 Special Elevations
Control valves, vacuum outlets, and devices which protrude from a wall of an opening, emergency, recovery, examining, or delivery room, or in a corridor or other locations where patients may be transported on a wheeled stretcher, shall be so located at an elevation which will preclude bumping the patient or stretcher against the device. When necessary to install at a low elevation, safety precautions should be taken to protect the personnel.

G102.7 Plumbing in Mental Hospitals
In mental hospitals, special consideration should be given to piping, controls and fittings of plumbing fixtures as required by the types of mental patients being treated. Pipes or traps should not be exposed, and fixtures should be substantially bolted through walls.

G103 DRAINAGE AND VENTING

G103.1 Ice Storage Chest Drains
Any drain serving an ice storage chest or box shall discharge over an indirect waste receptor separate from all other fixture wastes. Each terminal shall discharge through an air gap above the receptor. The end shall be covered with a removable screen of not less than 10 mesh per square inch (15.5 mesh per 1000 sq mm), and if discharging vertically, the terminal shall be cut at an angle of 45° (0.785 rad).

G103.2 Bedpan Washers and Clinic Sinks
Bedpan washers and clinic sinks shall be connected to the soil pipe system and vented following the requirements as applied to water closets, except that bedpan washers require additional local vents.

G103.3 Sterilizer Wastes
G103.3.1 Indirect Wastes Required. All sterilizers shall be provided with individual and separate indirect wastes, with air gaps of not less than two diameters of the waste tailpiece. The upper rim of the receptor, funnel, or basket type waste fitting shall be not less than 2 inches (51 mm) below the vessel or piping, whichever is lower. Except as provided in G103.3.2 and G103.3.4, a "P" trap shall be

installed on the discharge side of, and immediately below, the indirect waste connection serving each sterilizer.

G103.3.2 Recess Room Floor Drain.

G103.3.2.1 In all recess rooms containing the recessed or concealed portions of sterilizers, not less than one acceptable floor drain, connecting to the drainage system, shall be installed in a manner to drain the entire floor area.

G103.3.2.2 The recess room floor drain waste and trap shall be a minimum diameter of 3 in (76 mm). It shall receive the drainage from at least one sterilizer within the recess room to assure maintenance of the floor drain trap seal. The sterilizer drain shall be installed on a branch taken off between the floor drain trap and the drain head. An individual waste trap shall not be required on this type of installation.

G103.3.3 Prohibited Connections. Branch funnel and branch basket type fittings, except as provided in G103.3.4, are prohibited on any new installation or when relocating existing equipment. Existing branch funnel or branch basket type installations shall be provided with an acceptable indirect waste below the branch connections.

G103.3.4 Battery Assemblies. A battery assembly of not more than three sterilizer wastes may drain to one trap, provided the trap and waste are sized according to the combined fixture unit rating, the trap is located immediately below one of the indirect waste connections, the developed distance of a branch does not exceed 8 ft (2438 mm), and the branches change direction through a tee-wye or wye pattern fitting.

G103.3.5 Bedpan Steamers, Additional Trap Required. A trap with a minimum seal of 3 inches (76 mm) shall be provided in a bedpan steamer drain located between the fixture and the indirect waste connection.

G103.3.6 Pressure Sterilizer. Except when an exhaust condenser is used, a pressure sterilizer chamber drain may be connected to the exhaust drip tube before terminating at the indirect waste connection. If a vapor trap is used, it shall be designed and installed to prevent moisture being aspirated into the sterilizer chamber. The jacket steam condensate return, if not connected to a gravity steam condensate return, shall be separately and indirectly wasted. If necessary to cool a high temperature discharge, a cooling receiver, trapped on its discharge side, may serve as the fixture trap.

G103.3.7 Pressure Sterilizer Exhaust Condensers. The drain from the condenser shall be installed with an indirect waste as prescribed in this code. If condensers are used on pressure sterilizers, the chamber drain shall have a separate indirect waste connection.

G103.3.8 Water Sterilizer. All water sterilizer drains, including tank, valve leakage, condenser, filter and cooling, shall be installed with indirect waste or according to G103.3.2.1.

G103.3.9 Pressure Instrument Washer-Sterilizer. The pressure instrument washer-sterilizer chamber drain and overflow may be interconnected. Also, they may be interconnected with the condensers. The indirect waste shall follow the provision set forth in this code.

G103.4 Aspirators

In operating rooms, emergency rooms, recovery rooms, delivery rooms, examining rooms, autopsy rooms, and other locations except laboratories, where aspirators are installed for removing blood, pus, or other fluids, the discharge from any aspirator shall be indirectly connected to the drainage system. The suction line shall be provided with a bottle or similar trap to protect the water supply.

G103.5 Vacuum System Stations

Vacuum system station locations shall be considered from the standpoint of convenience and practical use. The receptacles should be built into cabinets or recesses but shall be visible and readily accessible.

G103.6 Bottle System

Vacuum (fluid suction) systems intended for collecting, removing or disposing of blood, pus or other fluids by the so-called bottle system shall be provided with receptacles, which are equipped with an overflow preventative device, at each vacuum outlet station. Each vacuum outlet station should be equipped with a secondary safety receptacle as an additional safeguard against fluids, other than air entering the vacuum piping systems.

G103.7 Central Disposal System Equipment

All central vacuum (fluid suction) systems shall assure continuous service. Systems equipped with collecting or control tanks shall provide for draining and cleaning of the tanks while the system is in operation. In hospitals or institutions having emergency power provisions, the system shall be capable of remaining in service during the use of emergency power. The exhausts from a vacuum pump used in connection with a vacuum (fluid suction) system shall discharge separately to the outer atmosphere. The exhaust discharge shall not create a nuisance or hazard within, without, around or about the premises. Termination of the exhaust to the atmosphere shall be the same as required for sanitary sewer vents.

G103.8 Central Vacuum and Disposal Systems

G103.8.1 The waste from a central vacuum (fluid suction) system of the disposal type which is connected to the drainage system, whether the disposal be by barometric lag, collection tanks, or bottles, shall be directly connected to the sanitary drainage system through a trapped waste.

G103.8.2 The piping of a central vacuum (fluid suction) system shall be of corrosion resistant material having a smooth interior surface. A branch shall not be less than $1/_2$

inch for one outlet and sized according to the number of vacuum outlets, and a main shall not be less than 1 inch. The pipe sizing shall be increased according to acceptable engineering practices. All piping shall be provided with adequate, and accessible cleanout facilities on mains, and branches, and shall be accessible for inspection, maintenance, and replacements.

G103.9 Water Systems for Space Cooling and Heating Condensate Drains

The lowest point of a condensate riser or risers shall be trapped and discharged over an indirect waste sink. The trap may be either "P" or a "running trap" with a cleanout. A branch shall be installed upstream from the condensate drain trap for flushing and resealing purposes. The condensate drain and trap shall be located above the lowest floor level of the building.

G103.10 Vent Material

Material for local vents serving bedpan washers and sterilizer vents serving sterilizers shall be sufficiently rust proof, erosion and corrosion resistant to withstand intermittent wetting and drying from steam vapors, to withstand the distilled water solvent action of the steam vapors and to withstand frequent and immediate changes of temperatures.

G103.ll Vent Connections Prohibited

Connections between local vents serving bedpan washers, sterilizer vents serving sterilizing apparatus and normal sanitary plumbing systems are prohibited. Furthermore, only one type of apparatus shall be served by a given vent.

G103.12 Local Vents and Stacks

G103.12.1 Bedpan washers shall be vented to the outer atmosphere by means of one or more local vents. Termination of the vent to the atmosphere shall be the same as required for sanitary sewer vents. The local vent for a bedpan washer shall not be less than a 2-inch diameter pipe. A local vent serving a single bedpan washer may drain to the fixture served.

G103.12.2 Where bedpan washers are located above each other on more than one floor, a local vent stack may be installed to receive the local vent on the various floors. More than three bedpan washers shall not be connected to a 2-inch local vent stack, six to a 3-inch local vent stack, and 12 to a 4-inch local vent stack. In multiple installations, the connections between a bedpan washer local vent and a local vent stack shall be made by use of the tee or tee-wye sanitary pattern drainage fittings, installed in an upright position.

G103.12.3 The bottom of the local vent stack, except when serving only one bedpan washer, shall be drained by means of a trapped and vented waste connection to the plumbing sanitary drainage system. The trap and waste shall be the same as the local vent stack.

G103.12.4 A water supply of not less than 1/4 inch minimum tubing shall be taken from the flush supply of each bedpan washer on the discharge or fixture side of the vacuum breaker, trapped to form not less than a 3-inch (76 mm) seal, and connected to the local vent stack on each floor. The water supply shall be so installed as to provide a supply of water to the local vent stack for cleansing and drain trap seal maintenance each time a bedpan washer is flushed.

G103.13 Sterilizer Vents and Stacks

G103.13.1 Multiple installations of pressure and nonpressure sterilizers shall have their vent connections to the sterilizer vent stack made by means of inverted wye fittings. Such vent connections shall be accessible for inspection and maintenance.

G103.13.2 The connection between sterilizer vent or exhaust openings and the sterilizer vent stack shall be designed and installed to drain to the funnel or basket type waste fitting. In multiple installations, the sterilizer vent stack shall be drained separately to the lowest sterilizer funnel or basket type waste fitting or receptor.

G103.14 Sterilizer Vent Stack Sizes

G103.14.1 The minimum diameter of a sterilizer vent serving a bedpan steamer shall be 1 1/2 inches. Multiple installations shall be sized according to Table G103.14A.

G103.14.2 The minimum diameter of a sterilizer vent stack shall be 2 inches when serving a utensil sterilizer, and 1 1/2 inches when serving an instrument sterilizer. Combinations of boiling type sterilizer vent connections shall be based on Table G103.14A.

G103.14.3 Sterilizer vent stacks shall be 2 1/2 inches minimum; those serving combinations of pressure sterilizer exhaust connections shall be sized according to Table G103.14B.

G103.14.4 The minimum diameter of a sterilizer vent stack serving an instrument washer-sterilizer shall be 2-inch diameter. Not more than two sterilizers shall be installed on a 2-inch stack, and not more than four on a 3-inch stack.

Table G103.14A Stack Sizes For Bedpan Steamers and Boiling Type Sterilizers (in) (Number of connections of various sizes permitted to various sized sterilizer vent stacks)

Stack size (in)	Connection size (in)		
	1 1/2		2
1 1/2 (Note 1)	1	or	0
2	2	or	1
2 (Note 2)	1	and	1
3 (Note 1)	4	or	2
3 (Note 2)	2	and	2
4 (Note 1)	8	or	4
4 (Note 2)	4	and	4

1 in = 25.4 mm
Notes:
1. Total of each size.
2. Combination of sizes.

Table G103.14B Stack Sizes for Pressure Sterilizers (in) (Number of connections of various sizes permitted to various sized vent stacks)

Stack size (in)	Connection size (in)			
	3/4	1	1 1/4	1 1/2
1 1/2 (Note 1)	3 or	2 or	1 or	1
1 1/2 (Note 2)	2 and	1		
2 (Note 1)	6 or	3 or	2 or	1
2 (Note 2)	3 and	2		
2 (Note 2)	2 and	1 and	1	
2 (Note 2)	1 and	1 and	1	
3 (Note 1)	15 or	7 or	5 or	3
3 (Note 2)		1 and	2 and	2
	1 and	5 and		1

1 in = 25.4 mm
Notes:
1. Total of each size.
2. Combination of sizes.

G103.15 All radioactive materials shall be disposed of in a manner so as not to create a hazard to operation and maintenance personnel of the institution or to the public. Specific permission shall be secured from the proper authority to dispose of any radioactive material to the drainage system.

G104 WATER SUPPLY

G104.1 Water Service
It is recommended that all hospitals have dual services installed in a manner to provide an uninterrupted supply of water in case of a water main break.

G104.3 Hot Water Supply System
Hot water circulating mains and risers should be run from the hot water storage tank to a point directly below the highest fixture at the end of each branch main. Where the building is higher than three stories, each riser shall be circulated. Each main, branch main, riser and branch to a group of fixtures of the water system shall be valved.

G104.4 Vacuum Breaker Installations
G104.4.1 For ordinary hose connections, the maximum height at which any hose is to be used shall be treated as its flood level.

G104.4.2 Where low volume flows might cause leaking or spitting at the vacuum breaker parts, back pressure may be developed by installing an acceptable minimum orifice valve on the discharge side of the vacuum breaker. This shall be in addition to the regular control valve. This type of installation shall be subject to review and acceptance by the plumbing official before installation.

G104.5 Prohibited Water Closet and Clinic Sink Supply
Jet or water supplied orifices, except those supplied by the flush connections, shall not be located in or connected with a water closet bowl or clinic sink. This section shall not prohibit an acceptable bidet installation.

G104.6 Special Equipment, Water Supply Protection
Table G104.6 sets forth the requirements which shall be followed in protecting the water supply for hospital fixtures against backflow or back-siphonage.

G104.7 Clinical, Hydrotherapeutic and Radiological Equipment
All clinical, hydrotherapeutic, radiological, or any equipment, whether mentioned or not, which is water supplied or discharges to the waste system, shall meet the requirements of this section and the code covering cross connectors, air gaps, vacuum breakers, and check valves. Special equipment and devices found under these classes include those listed in Table G104.7.

Tabled 04.6 Fixtures and Their Water Supply Protection

Fixtures	Type of protection[1]	Remarks
Aspirators:		
Laboratory	Vacuum breaker	
Portable	Vacuum breaker	
Vacuum system	Vacuum breaker	
Bedpan:		
Washers	Vacuum breaker	
Washer hose	Vacuum breaker	Locate 5 ft above floor
Boiling type sterilizer	Air gap	Not less than twice the effective opening of the water supply
Exhaust condenser	Vacuum breaker	
Flush floor drain	Vacuum breaker	Locate 6 ft above floor
Hose connection	Vacuum breaker	
Pressure instrument washer-sterilizer	Vacuum breaker	
Pressure sterilizer	Vacuum breaker	
Vacuum systems:		
Cleaning	Air gap or vacuum breaker	
Fluid suction	Air gap or vacuum breaker	

1 ft a 304.8 mm

Note:

1. Where atmospheric vacuum breakers are used, they shall be installed after the last control valve.

G104.8 Condensate Drain Trap Seal

A water supply shall be provided for cleaning, flushing, and resealing the condensate trap. The source of the water supply shall be a refrigerator condenser discharge, a drinking fountain waste, or other acceptable method of flushing and releasing the trap. The water supply shall be not less than one-half inch diameter pipe and shall discharge through an air gap not less than twice the diameter of the supply pipe.

G104.9 Valve Leakage Diverter

Each water sterilizer which may be filled with water through directly connected piping shall be equipped with an acceptable leakage diverter and/or bleed-line on the water supply control valve to indicate and conduct any leakage of unsterile water away from the sterile zone.

Table G104.7
Classes of Clinical, Hydrotherapeutic and Radiological Equipment

Clinical	Hydrotherapeutic	Radiological	Other
Dental cuspidors	Control units	Diagnostic x-ray	Violet ray
Surgical cuspidors	Arm bath	Therapy x-ray	Photographic
Dental (flush rim)	Leg bath	X-ray transformers	developing
lavatories	Tub bath	X-ray oil tank	Film
Sitz bath	Immersion bath	Diffraction	developing
Emergency bath	Shower bath	X-ray developing	Microscopic
Receiving bath	Needle bath		
Prenatal bath	Tank		
Infant bath	Pool		
Prophylaxis	Hose		
Shampoo	Syringe douche		
Massage			

G105 MEDICAL GASES

Where medical gases are installed, the gas piping, outlets, manifold rooms and storage rooms shall be installed in accordance with the requirements of the NFiPA 99.