Type of Fixture	Unit Value	Trap Minimum Size Inches	Soil or Waste Minimum Size Inches	Vent Minimum Size Inches
Bath Tub, all types*	3	1½	1½	1½
Bed Pan Washer	6	2	3	2
Bidet	4	2	2	1½
Cuspidor, fountain or dental	1	1¼	1¼	1¼
Dishwasher, residential	4	1½	1½	1½
Drinking Fountain	½	1¼	1¼	1¼
Floor Drain,				
2 inch	4	2	2	1½
3 inch or larger**	4	3	3	2
Laundry Tray	3	1½	1½	1½
Refrigerator, ice	½	1¼	1¼	1¼
Shower Stall, each head	4	2	2	1½
Sinks,				
combination	4	1½	1½	1½
factory wash-up	4	2	2	1½
fountain or bar	3	1½	1½	1½
glass or silver	3	1½	1½	1½
pack or plaster work	4	2	2	1½
residential	4	1½	1½	1½
restaurant, all types	4	2	2	1½
siphon jet	4	3	3	2
service sink, wall outlet	4	2	2	1½
service sink, floor outlet	4	3	3	2
surgeons wash-up	3	1½	1½	1½
Sterilizer,				
bed pan	4	2	2	1½
instrument or water	1	1¼	1¼	1¼
Urinal	4	2	2	1½
Wash basin	1	1¼	1½	1¼
Water Closet, any type	6	2	3	2

*Includes foot, Sitz and infant baths and regular bath tubs with or without shower
**Trap and waste pipe sizes to correspond to floor drain when 4 inches or larger.

(3) UNIT CAPACITY AND LENGTH OF SANITARY PIPING. The number of fixture units connected to any stack, branch or vent and the length of piping shall not exceed that shown in the following table for a given diameter of pipe. After maximum length, including vent, for any given pipe size is reached, the diameter of the pipe shall be increased to the next size.

Pipe Diameter (inches)	Fixture Unit Capacity Soil, Waste or Vent Pipe			Maximum Length (in feet)
	On Stack	On Branch	On Vent	
1¼	1	1	1	50
1½	8	4	12	65
2	18	9	24	85
2½	40	20	60	105
3	84*	42	126	212
4	252	126	252	300
5	680	340	680	390
6	1,380	690	1,380	510
8	3,600	1,800	3,600	750
10	7,600	3,800	7,600	
12	12,000	6,000	12,000	

*See H 62.06 (2) on water closet limitations.

H 62.04 House sewers. (1) PREMISES SERVED. The plumbing system of each new building, or a new plumbing system in an existing building, shall be entirely separate from and independent of that of any other building. Every building shall have an independent connection with a public or private sewer when available. Where a building stands in the rear of another on the same lot, the house drain from the front building may be extended to the rear building, private

garage or barn, and the whole will be considered as one house drain. See H 62.22 (1).

(2) MATERIALS. All house sewers shall be constructed of cast iron, vitrified clay or concrete pipe, or other approved materials.

Note: See H 63.01 and H 63.02 for tentative approval of bituminous fiber and asbestos cement pipe.

(3) GRADE. House sewers shall, where possible, have a grade of one-fourth inch per foot or more. In no case shall the grade be less than one-eighth inch per foot. Where the main sewer in the street has sufficient depth, or where a lot is 3 feet or more above the established street grade line, the house sewer between the curb line and lot line or building may receive greater inclination than one-half inch per foot as may be provided for by local ordinance, or as in the judgment of the authorized supervisor is permissible.

(4) SIZE. (a) *Sanitary sewer.* The size of the house sewer connecting with a sanitary sewer shall be determined by the total number of fixture units tributary to such house sewer using the following table. The diameter of the house sewer shall be equal to or greater than that of the house drain.

Diameter of pipe (inches)	Fixture Units		
	⅛" per ft. grade	¼" per ft. grade	½" per ft. grade
4	114	150	210
5	270	370	540
6	510	720	1,050
8	1,290	1,860	2,640
10	2,520	3,600	5,250
12	4,390	6,300	9,300

(b) *Combination sewer.* The minimum size of a combination house sewer or drain shall be the same as that required for a sanitary sewer. The size of a combination sewer or drain shall be determined in the same manner as for a sanitary sewer, using the table in subsection (a) and converting the drainage area to equivalent fixture unit loads. For the purposes of computing the equivalent fixture load, each 10 square feet of roof or drained area in horizontal projection shall count as one fixture unit. Maximum roof areas tributary to vertical leaders shall be governed by the following table:

Type of Roof	Allowable Roof Area in Square Feet for Given Size of Inside Leader					
	2½"	3"	4"	5"	6"	8"
Roof covered with gravel, slag or similar material with incline ¼" to 1' or less	1,646	1,646 to 2,120	2,120 to 3,780	3,780 to 5,886	5,886 to 8,490	8,490 to 15,128
Same with incline ½" to 1' or more and sawtoothed roofs	1,220	1,220 to 1,767	1,767 to 3,150	3,150 to 4,905	4,905 to 7,075	7,075 to 12,602
Metal, tile, brick, slate, or similar roofs of any incline	976	976 to 1,414	1,414 to 2,520	2,520 to 3,924	3,924 to 5,660	5,660 to 10,082

Note: In view of the storm water separation programs that are underway in many communities it is strongly recommended that separate sanitary and storm water drains and sewers be installed for all buildings even though a combination street sewer is the only outlet available at this time.

(c) *Storm sewer.* The required size of storm water house sewers, storm water house drains and other lateral storm drains shall be determined on the basis of total drained area in horizontal projections of roofs, yards and other areas tributary to same. The size of storm drains (horizontal) should be at least one size larger than required for the vertical leader. The size of the vertical leader should be determined from the table in subsection (b).

(5) ALIGNMENT. All house sewers shall be laid in alignment between fittings. Any changes in grade or direction shall be made with proper wyes and curves or wyes and one-eighth bends. Clipping of pipe is prohibited. All house sewers shall be installed on undisturbed stable ground. Where such ground conditions do not exist, adequate substantial supports of permanent material shall be provided at intervals of 3 feet or less to prevent settling of piping.

(6) CONNECTIONS TO MAIN SEWER. When in accordance with measurements furnished by the local governing body, or its authorized representatives, the house connection is not found within 3 feet of the designated point, a short slant connection and one-eighth bend shall be used, set upon a carefully cut opening in the main sewer, the connection secured to insure permanency by ample cementing or grouting; or a length of the main sewer pipe shall be removed, and a "Y" connection inserted in its place to serve as the connection of the house sewer to the main sewer. Such connection or insertion shall be made under the supervision of the authorized representative of the municipality. See H 62.22 (2).

(7) DRAIN ENDS AND CONNECTIONS GUARDED. The ends of all sewer and drain pipes not immediately connected shall be securely closed so as to prevent the introduction of sand or earth. Where the sewer or drain is to be used temporarily for draining foundations during the erection of any building or for other purposes a catch basin shall be provided.

(8) TRENCHING. (a) *Inspection.* When found necessary for inspection purposes, all excavations necessary for the installation of a house drainage system, or any part thereof, shall be open trench work. Trenches shall be trimmed to uniform grade.

(b) *Back filling.* Due care shall be exercised in back filling to prevent breakage or settling of the house sewer or drain.

(9) LIMITATION ON LOCATION. The following minimum distances shall be maintained between house sewers or drains and water wells:

(a) Sewers of cast iron pipe—leaded joints ..... 8 feet
(b) Sewer of other materials than cast iron ..... 25 feet
(c) Rain water drains or other clear water conductors .. 10 feet

Note: See H 62.11 (1), (6), H 62.20 (1) (c) and (2) (a) for permissible location of catch basins, sumps, septic tanks and sewage disposal units with respect to water wells. Also see Wisconsin well construction and pump installation code.

(10) LIMITATIONS ON USE. (a) *Drains discharging obnoxious liquids.* No person shall connect to a public sewer any drains or sewer through which is discharged any obnoxious or odorous liquids, gas, tar, grease, rags or any other substance likely to cause an obstruction, nuisance, explosion or tend to interfere with sewage treatment processes. See H 62.11 (5).

(b) *Storm and clear water connections prohibited.* Roof leaders, surface drains, ground water drains, foundation footing drains or other clear water drains shall be connected wherever possible with a storm sewer, but they shall not be connected to a building sewer which discharges into a sanitary sewer or private sewage treatment plant.

History: 1-2-56; (10) (b) am. Register, February, 1957, No. 14, eff. 3-1-57.

H 62.05 Building or house drains. (1) ELEVATION. All building drains wherever possible shall be brought into the building underground, below the level of the basement floor.

(2) MATERIALS. All building drains shall be constructed of vitrified clay, type M hard temper copper or cast iron pipe. The use of vitrified clay or copper pipe is permitted where there is a soil covering of 18 inches or more. Where the ground is surmountd by a substantial cement floor a 12 inch covering is permitted. Where a building drain leaves the building at a point above the basement floor, it shall be constructed of cast iron or type M hard temper copper pipe to a point 5 feet from the inside of the building foundation wall or to such additional distance as necessary to reach undisturbed stable ground. See section H 62.22 (3).

(3) SIZE. The size of building drains and building sub-drains shall be determined by the number of fixture units tributary thereto. The minimum size of a building drain shall be 4 inches. The minimum size of a building sub-drain shall be 2 inches. See sections H 62.04 (4) and 62.10 (1).

(4) BACK FLOW VALVES. The house drain when subject to back flow or back water at the time of installation shall be provided with adequate back water valves, installed to prevent interference with the flow of discharge of any conductor, rain water leader or other fixture, and be readily accessible for cleaning. Provisions for a free circulation of air shall be made.

(5) OTHER REQUIREMENTS. Installation of house drains shall also conform to H 62.04 (3), (5), (7), (8) and (9).

History: 1-2-56; (1) (2) (3) am. Register, February, 1957, No. 14, eff. 3-1-57.

H 62.06 Stacks and branches. (1) SOIL AND WASTE STACKS. Every building in which plumbing fixtures are installed shall have a soil, waste or vent stack at least 3 inches in diameter extending through the roof with an increaser or frost proof housing. See H 62.07 (12), H 62.22 (4), (5), (6), (7).

(2) SIZE. The size of the stacks and branches shall be determined by the number of fixture units connected thereto. If pitch or grade of a soil or waste branch is 45 degrees or more, the same unit capacities as for vertical stacks will be permissible. Any underground branch shall be at least 2 inches in diameter. A water closet may connect to a 3 inch stack through a 4 x 3 inch bend. Not more than two water closets shall be connected to a 3 inch soil stack. Not more than one water closet shall be connected to a 3 inch branch. Two water closets located back to back shall be connected to a 3 inch soil stack with a 3 x 3 inch double wye and one-eighth bends or similar

fittings or fitting. A sanitary cross will not be permitted. All waste openings provided for future use shall be properly vented and sealed. See H 62.03 (1), (3).

(3) STACK CONNECTION AT BASE. A long sweep one-fourth bend, two one-eighth bends, or a "Y" and one-eighth or one-sixth bend or its equivalent shall be used at the base of all soil and waste stacks. When such bend or fittings constitute the connection between a soil or waste stack and an underground house drain or branch of larger size than the soil or waste stack served, the increase shall be made above the floor unless a special approved fitting is used. See H 62.22 (8), (9).

(4) MULTIPLE BUILDING STACKS. Where more than one unit in a motel, cabin court or mobile home park are connected to the same sewer or drain, a minimum vent stack of 2 inches may be permitted in each unit when the total number of fixture units does not exceed the capacity of such 2-inch pipe, provided that a full sized 3-inch stack is installed in the uppermost unit or at the upper end of the sewer. In the latter case the stack shall have frost protection. See H 62.07 (12) (a).

(5) BRANCHES. (a) *Soil and waste extensions.* Any branch extending from a soil or waste pipe, running vertically, horizontally, or both, shall be carried full size to fixture connections and shall be vented or revented to conform with the provisions of H 62.03 (1) and (3). See H 62.22 (11), (12).

(b) GRADE OF HORIZONTAL PIPES. All horizontal drain, soil and waste pipes shall be run in practical alignment, and where possible at a uniform grade of one-fourth inch per foot or more. In no case shall the grade be less than one-eighth inch per foot.

(c) *Change in direction.* All changes in direction shall be made by the proper use of 45 degree "Y"s, half-"Y"s, long sweep one-fourth bends, one-sixth, one-eighth or one-sixteenth bends, or with fittings producing a like radius, except that single or double sanitary "T"s may be used on vertical stack or on horizontal runs where it is impracticable to install a 45 degree "Y" with a one-eighth bend. Short one-fourth bends may be used in soil and waste lines where the change in direction of flow is from the horizontal to the vertical and for closet discharge connections. No common pattern double sanitary "T", "Y" or straight through fitting shall be used on either a vertical or horizontal stack or branch, serving wall-

hung closet bowls installed back to back. See H 62.06 (2), H 62.14 (10), H 62.15 (5) (a).

(6) HANGERS AND SUPPORTS. Stacks shall be substantially supported at 10 foot or floor intervals. Horizontal piping shall be supported at intervals not to exceed 10 feet. Cast iron soil pipe shall be supported at intervals of not more than 5 feet. All pipe supports shall be heavy iron posts, wall hangers or bracket, or concrete or masonry piers. Supports secured in or against masonry shall be attached with expansion bolts or other approved methods without the use of wood plugs. All drainage and plumbing pipes shall be rigidly secured and supported so that proper alignment will be retained. See H 62.22 (9).

(7) INCREASERS AND REDUCERS. Where different sizes of pipes or pipes and fittings are to be connected, proper size increasers or reducers shall be used.

(8) MATERIALS. All main branch, soil and waste pipes shall be made of cast iron, coated with tar or asphaltum, galvanized wrought iron or galvanized steel pipe, or lead, brass, or type M hard temper copper. All piping, other than cast iron pipe, when installed so as to be embedded through concrete, shall be protected by thoroughly applying one or more coats of asphaltum paint or adequate tar paper wrapping or both, or by other equivalent means of insulation. No galvanized steel or wrought iron waste pipes shall be laid underground.

(9) PROTECTION FROM FROST. All drain, soil, or waste pipes shall, unless entirely impracticable, be placed within the walls of buildings and shall be as direct as possible and shall together with all fixture traps and other appliances be protected from frost. Wherever soil and waste pipes are placed in outside walls, protection from frost shall be provided by adequate insulation which may consist of proper air spacing, approved insulating materials, warm air circulation or any effective combination of the same. The underfloor work of bath rooms located on outside walls, shall be protected from frost by the placing of cold air draft stops between joists or studdings, or by the use of approved insulating materials.

History: 1-2-56; (2) am. Register, February, 1957, No. 14, eff. 3-1-57.

H 62.07 Vents. (1) MAIN VENT. All soil or waste stacks, 3 inches or more in diameter with fixtures on three or more floor levels, shall have the main vent connect full size to the main soil or waste pipe, below the lowest fixture branch.

(2) CIRCUIT VENTS. (a) *Water closets.* Circuit vents for water closets shall have a diameter of 2 inches for a battery of two closets, 3 inches for a battery of three to six closets and 4 inches for a battery of seven or eight closets.

(b) *Other fixtures.* The size of circuit vents shall be determined from the number of fixture units connected thereto. The size of the soil or waste branch shall be carried full diameter to the last fixture connection. A branch soil or waste pipe, to which two and not more than eight fixtures are connected may be vented by a circuit vent which shall be taken off ahead of the last fixture. See H 62.03 (1), (3), H 62.22 (10), (11), (12), (24).

basin shall be sufficient to hold at least one gauge of the boiler. All cooling devices when receiving the blowoff from such boilers shall be provided with a relief pipe, extended independently to the outer air. The size of the relief pipe shall be equal to the threaded opening provided in the cover of the basin.

(10) PIPE BENDING PROHIBITED. Bending of brass, galvanized steel or galvanized wrought iron pipe is prohibited. See H 63.04.

H 62.15 Materials. (1) QUALITY. All material used in any drainage or plumbing system, or part thereof, shall be free from defects that impair service.

(2) LABELING. Each length of pipe, fitting, trap, fixture, and device used in a plumbing or drainage system, shall be stamped or indelibly marked with the weight, or quality thereof, and the maker's mark or name.

(3) VITRIFIED CLAY PIPE shall conform to the A.S.T.M. "Standard Specifications for Clay Sewer Pipe," serial designation C-13, latest revision.

(4) CONCRETE PIPE shall conform to A.S.T.M. "Standard Specifications for Concrete Sewer Pipe," serial designation C-14, latest revision. See H 63.01, H 63.02.

(5) CAST IRON PIPE AND FITTINGS. (a) *Specifications.* Cast iron pipe and fittings shall conform to the A.S.T.M. "Standard Specifications for Cast Iron Soil Pipe and Fittings," serial designation A-74, and federal specification WW-P-401, latest revisions.

(b) *Quality.* Soil pipe and fittings shall be made of close grained gray iron and shall be ductile and smooth on the inside, free from flaws, sand holes or other defects and of a uniform thickness.

(c) *Weights.* The weight of cast iron pipe and fittings shall conform to that shown in the accompanying table. Use of standard weight pipe shall be limited to buildings 2 stories or less in height, and service weight pipe to buildings 5 stories or less in height. Extra heavy weight pipe shall be used in buildings 6 stories or more in height. Wall thickness of fittings and the hubs shall correspond with that of the pipe of the same size and kind.

Diameter	Standard pounds per foot	Service pounds per foot	Extra Heavy pounds per foot
2-inch	3½	4	5
3-inch	4½	6	9
4-inch	6½	8	12
5-inch	8-2/5	10-4/5	15
6-inch	10-1/5	13	19
8-inch		20	30

Note: Most manufacturers have discontinued production of "standard" weight soil pipe. Use of "service" weight pipe is recommended because of its greater strength.

(d) *Screw thread pipe.* All cast iron screw thread pipe used for soil, waste or vent pipe shall be smooth on the inside and outside, free from flaws, sand holes, or other defects and of uniform wall thickness. The outside shall be sufficiently circular and the iron shall

be such as to permit cutting of a satisfactory standard sharp thread conforming to the specifications for wrought iron or steel pipe.

(e) *Coating.* All pipe and fittings shall be coated with asphaltum or coal tar pitch.

(f) *Bends.* When direction of flow changes from horizontal to vertical the radius of bends shall be as follows:

Size of pipe	2"	3"	4"	5"	6"
Minimum radius	3"	3½"	4"	4½"	5"

When direction of flow changes from vertical to horizontal or when it is at right angles and changes in the same horizontal plane the radius of bends shall be as follows:

S'ze of pipe	2"	3"	4"	5"	6"
Minimum radius	5"	5½"	6"	6½"	7"

Note: For method of determining radius see H 62.22 (37). A combination Y and 1/8 bend fitting or a Y and 1/8 bend are recommended. When a pipe of smaller diameter enters a pipe of greater diameter, a fitting with a minimum radius as shown may be used. When sanitary tees are used in change of direction they shall be so arranged that the flow from other fixtures will serve as a wash.

(6) WROUGHT IRON PIPE (GENUINE). All wrought iron pipe shall be galvanized and shall conform to the A.S.T.M. "Standard Specifications for Welded Wrought Iron Pipe," serial designation A-72, latest revision.

(7) MILD STEEL PIPE. All mild steel, welded or seamless, shall be galvanized, and shall conform to the A.S.T.M. "Standard Specifications for Welded and Seamless Steel Pipe," serial designation A-53, latest revision.

(8) SCREW THREAD FITTINGS. Threaded fittings for vents, back vents, soil and waste pipes shall be of cast iron, galvanized malleable iron or brass. Waste fittings shall be of recessed, drainage pattern, and shall be galvanized or asphaltum coated. Drainage fittings shall have a minimum length from face to center as follows:

Pipe size, inches	1¼	1½	2	2½	3	4	5	6
Length, inches	2¼	2½	3⅛	3⅝	4¼	5⅜	6⅛	7⅛

Note: Long turn Y branches or Y and 1/8 bend are recommended. See H 62.14 (10) and H 62.22 (38).

(9) LEAD MATERIALS. (a) *Waste and vents.* Lead waste and vent pipes shall be the best quality of drawn lead pipe, having a minimum weight per foot as follows:

Inside diameter, inches	1¼	1½	2	3	4
Weight per foot, pounds	2½	3½	4¾	6	8

(b) *Traps.* All lead traps and bends shall have a minimum wall thickness of one-eighth inch.

(c) *Water supply piping.* Lead water supply piping should have minimum weights shown in the following table:

Inside diameter, inches	Weight lbs. per foot	Wall thickness inches	Classification	
			East	West
⅜	2		AA	XS
½	2		AA	XS
⅝	3		AA	XS
¾	3½	.231	AA	XS
1	4¾	.246	AA	XS
1¼	7¾	.320	AAA	XXS
1½	11¼	.386	AAA	XXS
2	19½	.504	AAA	XXS

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

(10) BRASS PIPE AND FITTINGS. (a) *Specifications.* All brass pipe used for soil, waste, vent and water pipes, except fixture traps and overflows, shall be of commercial standard pipe size and conform to A.S.T.M. "Standard Specifications for Brass Pipe," serial number B-43, latest revision.

(b) *Fittings for soil and waste pipes.* Brass screw thread fittings used for soil and waste pipes, shall be of the recessed, drainage fitting pattern.

(c) *Fittings for water pipe.* Fittings and couplings for brass water pipe shall be of unfinished red brass, with flat band, guaranteed for 175 pounds water-working pressure and shall conform to A.S.A. "American Standard Brass or Bronze Screwed Fittings," serial number B-16.15, latest revision. In erecting brass pipe, friction wrenches and friction vises shall be used exclusively except on pipe larger than 3 inches in diameter.

(d) *Brass tubing.* All brass tubing used for fixtures, traps and overflows between wall or floor and fixtures shall be made of seamless brass tube with a thickness of at least 0.0453 inch (No. 17 Brown & Sharp Gauge) and shall conform to A.S.T.M. "Standard Specifications for Seamless Brass Tubes," serial number B-135, latest revision.

(e) *Traps and overflows.* All brass fittings used for fixtures, traps and overflows shall be of a good quality of brass, free from sand holes, flaws or other defects, and of a uniform thickness equal to twice the thickness of the brass tubing. The thickness of the threaded ends shall be equal to the thickness of the fitting at the root of the thread.

(f) *Soldering nipples* shall be of heavy cast brass, or of brass pipe of weight, thickness and size conforming to standard pipe sizes. (SPS). When cast they shall be of full bore and of not less than the weights given in the following table:

Inside diameter	Weight
1¼ inch	0 lb. 6 oz.
1½ inch	0 lb. 8 oz.
2 inch	0 lb. 14 oz.
2½ inch	1 lb. 6 oz.
3 inch	2 lb. 6 oz.
4 inch	3 lb. 8 oz.

(g) *Weight of brass ferrules.* Brass ferrules shall be of a good quality of brass, composed of a mixture that will fuse readily with plumbers' solder, free from sand holes, flaws or other defects uniform in thickness, and at least four and one-half inches long, of a size and weight as shown in the following table:

Inside diameter, inches	Weight
1½	1 lb. 1 oz.
2	1 lb. 4 oz.
3	1 lb. 14 oz.
4	2 lb. 8 oz.
5	3 lb. 0 oz.
6	3 lb. 8 oz.

(11) COPPER TUBE AND FITTINGS. (a) *Copper tube* used for water, soil, waste and vent piping shall conform to A.S.T.M. "Standard Specifications for Seamless Copper Water Tube," serial number B-88, latest revision. Copper water tube used for underground water lines shall be type "K," either soft or hard temper. Copper tube used for interior water lines shall have a wall thickness equal to or better than type "L" and shall be hard temper, except that concealed vertical tube may be of soft temper for repair and replacement lines only. Copper tube used for soil, waste and vent piping shall have a wall thickness equal to or better than type "M" and shall be of hard temper.

(b) *Fittings* used with copper water tube shall be of the sleeve type, of such size that the solder will completely fill the joints by capillary action. Cast red brass fittings shall conform to A.S.A. "American Standard Cast-Brass-Solder-Joint Fittings," serial number B-16.18, latest revision. Wrought copper fittings may be used for water piping only and shall have a wall thickness at least equal to that of the tube with which it is to be used. All waste fittings shall be cast red brass recessed drainage fittings and shall be soldered. Sleeve branches (saddle tees) will not be allowed. Fittings on water pipe may be soldered, flared or flanged provided that all above-ground tube which will be concealed shall be soldered. The solder used shall be 50–50 lead-tin (new metals) or tin-antimony containing 90 to 96% tin and 4 to 10% antimony.

(12) SHEET COPPER OR BRASS. All sheet copper or brass shall be of sufficient weight to serve the purpose for which it is used. Sheet used for local and interior ventilating pipe shall have a thickness of at least 0.0159 inch (No. 26, B. & S. gauge).

(13) GALVANIZED SHEET IRON. Galvanized sheet iron for local room vents shall be not lighter than the following B. & S. gauge:

No. 26 for 2 to 12 inch pipe.
No. 24 for 13 to 20 inch pipe.
No. 22 for 21 to 26 inch pipe.

(14) ASBESTOS CEMENT PIPE AND FITTINGS. Asbestos cement pipe and fittings and other equal piping materials with approved fittings and methods of jointing may be used for local vent pipes. See H 62.14 (8) (b), H 63.02.

Note: The addresses of the organizations preparing standards referred to in this section are as follows:

A.S.A. (American Standards Association), 70 East 45th St., New York 17, N. Y.; A.S.T.M. (American Society for Testing Materials), 1916 Race St., Philadelphia 3, Pa.; A.S.M.E. (American Society of Mechanical Engineers), 29 W. 39th St., New York, N. Y.

H 62.16 Joints and connections. (1) VITRIFIED PIPE. Joints in vitrified pipe shall be made of either a mortar or a jointing compound. In joining vitrified clay pipe the spigot of one pipe must be carefully centered into the bell of the next pipe. Joints shall be firmly packed with hemp, oakum or jute in such a manner as not to disturb the alignment of the pipes. When mortar is used it shall be composed of equal parts of Louisville or Portland cement with clean sharp sand thoroughly mixed with enough water added to give the proper consistency. The joints must be pointed carefully on the outside and the

pipe left clean and smooth on the inside by drawing through a swab or scraper. Jointing compound shall be used in such a way as to permit the jointing compound to have the greatest unobstructed surface for pouring and adhesion. Care shall be exercised in placing the runner or snake to insure non-leakage during pouring and it shall not be removed until the compound is permanently set. The compound shall be poured continuously and as rapidly as possible until the joint is completely filled. Pipes shall be clean. All jointing compounds shall be approved by the board.

Note: The use of copper rings in cement joints is recommended. See H 62.22 (39).

(2) VITRIFIED TO IRON PIPE. Underground joints between vitrified and iron pipe shall be made the same as above required for vitrified pipe.

(3) CAST IRON PIPE. All joints in cast iron pipe and fittings shall be made by first inserting a roll of hemp, oakum or jute and thoroughly calking it in place, and then following with pure molten lead well calked, not less than one inch deep, lead to be brought to top of hub and faced. No paint, varnish or putty will be allowed on the joints until they have been tested.

(4) GALVANIZED WROUGHT IRON AND STEEL PIPE. Joints in galvanized iron pipe shall be standard screw joints, and all burrs or cuttings shall be removed. All screw joints shall be made with white or red lead, mineral paint, or other approved compounds, applied on outside thread. Not more than three threads of made-up joints shall be exposed, and they shall be protected by a coating of mineral or asphaltum paint or other approved compound, applied before the work is tested or inspected.

(5) BRASS PIPE. Joints on brass pipe shall conform to provisions of subsection (4) except that exposed threads require no coating.

(6) COPPER TUBE. All joints in copper water tube shall be made in a manner to insure a permanent water-tight joint. The joints shall be properly fluxed and made with approved solder. The joints shall be wiped clean to remove excess flux after the soldering operation has been completed. See H 62.15 (11).

(7) DISSIMILAR METALS. Connections between wrought iron or brass and cast iron shall be either a calked joint or a screw thread joint. Connections between lead and cast or wrought iron pipes shall be made with a calked joint, a soldering nipple or threaded joint. Wrought iron pipe connections shall be made with a right and left coupling, flanged union with durable gasket, a ground faced union or a running thread with lock nut made tight with wicking and red or white lead. Joints in lead pipe or between lead, brass or copper pipes shall be wiped joints except solder brazed or sweated joints on reamed, concave brass bushings in connection with exposed brass or lead traps. See H 62.22 (20).

(8) WASTE PIPE. (a) *Lead.* All lead under-floor waste pipes so far as practicable should be free from short bends. All branch joints in connection with water-carrying waste pipes should be of the sanitary "Y" pattern and all such joints should be so prepared and

joined as to leave a clean interior, free from solder, obstructions or reductions of the respective pipe diameter. All lead waste pipes should be properly graded and substantially supported to guard against sagging or displacement and so installed that stoppages may be removed from any portion. To accomplish this, sink and basin traps should be so joined or connected to the waste pipes that they may be readily removed for wiring or rodding of the pipe throughout its entire length including waste branches thereof. Where lead closet bends are used, no water carrying waste pipe or branch shall be connected thereto. Where solder nipples are used in connecting to iron bends they should be straight bore of a size corresponding with the inside diameter of the waste pipe, but no such nipple should be less than 2 inches inside diameter. All lead bends should be so made as not to weaken the lead at the heel of the bend and all joints shall have a wall thickness of solder not less than three-sixteenths of an inch measured at the center of the pipe joint.

(b) *Screw thread.* All under-floor and concealed threaded waste pipes and fittings should be designed and constructed by the plumber to conform with the following minimum specifications: The waste piping for baths, sinks, basins and other similar fixtures shall be properly graded, free from short or unnecessary offsets, and all fittings shall be of the long radius sanitary pattern. Ends of all piping shall be cut straight and reamed on the inside. The thread should be cut to the required length and depth and so made up that the end of the pipe extends to the recess receiving shoulder of the fitting. Where avoidable no 90 degree universal swing joints or any offset connection should be made. All changes in direction should be made by means of "Y"s or 5⅝, 11¼, 22½, 30, 45, 60, or 90 degree long radius pattern elbows. All ells and other fittings should be full bore and all such pipes and fittings should have a smooth interior.

(9) ROOF TERMINALS, FLASHING. The joint at the roof shall be made water tight by the use of copper, lead, galvanized sheet metal or iron plates or flashings. The flashing shall extend not less than 6 inches from the pipe. All flashings shall be substantially made and so placed as to insure a permanent tight joint. Roof flashings designed and constructed to provide an air space between the pipe and flashing to prevent freezing of soil and vent pipe terminals are recommended. See H 62.15 (9) (d), (12), H 62.22 (18).

(10) EARTHENWARE. The connections between soil pipe and fixtures of earthenware, vitreous china or enameled iron shall be made by means of a brass floor plate, not less than three-sixteenths inch in thickness, soldered or wiped to lead pipe, or an iron floor flange connection calked to iron pipe, or an iron or brass connection calked or screwed to wrought iron or steel pipe, with the fixture floor flange bolted to the floor connection with solid brass closet bolts. Floor joints shall be made air-tight with an asbestos graphite ring, asbestos or rubber gasket, or washer, or metal to earthenware, or metal to metal union. A paste of red or white lead or other equal compound may be used.

(11) OTHER TYPES. Any type of joint other than those specified in this code which the board approves may be used.

(12) PROHIBITED FITTINGS. Sanitary tees of short radius shall not be used except in connecting horizontal to vertical soil or waste pipes in which the flow is toward the vertical line. The use of one-fourth bends or elbows in soil or waste pipes is governed by H 62.15 (5), (8), H 62.22 (37), and (38). One-fourth bends with side or heel outlets except when they are made with "Y" or sanitary "T" branches, and all double hub fittings, double tees and double sanitary tees when used horizontally are prohibited, except when smaller pipes discharge into a larger pipe. Double hubs and double hub fittings may be used on rain water leader and vent lines. Offsets having less than one-fifth pitch will not be permitted. The use of a drive ferrule is prohibited and the use of combination lead ferrules will be permitted only when the calk joint can be made in the upright position. All waste and vent pipes must enter soil pipe by means of properly inserted fittings. The drilling and tapping of soil, vent and waste pipes and house drains to receive waste and vent pipes of any description is strictly prohibited, and in no case will the use of saddles or bands be permitted. No double hub or inverted calk joint shall be permitted in soil and waste lines. Whenever wrought or galvanized iron pipe connects with cast iron, soil waste or vent lines, tapped fittings or tap extension pieces shall be used except where pipe and hub are the same diameter.

H 62.17 Repairs and reconstruction. (1) DEFECTIVE PLUMBING. Whenever it shall appear upon inspection that any part of an existing plumbing system is defective, or fails to conform to the requirements of this code and by reason of such failure tends to create a nuisance, it shall be repaired, renovated, replaced or removed within 30 days, upon written notice from the state or local health officer.

(2) FIXTURES REPLACED. When an old or defective fixture is removed, to be replaced by a new one, and no other fixture or piping is to be added or remodeled, it will not be necessary to reconstruct the soil, waste or vent piping to make it conform to this code, unless the same is in a defective condition. In such cases, if found necessary, the fixtures shall be provided with efficient deep seal traps or deep seal resealing traps of the self-scouring centrifugal type.

(3) RECONSTRUCTION. When old or defective plumbing is to be remodeled, additional fixtures installed or the whole plumbing system moved to another part of the building the remodeled system shall be made to conform to this code.

(4) OLD MATERIALS RE-USED. All fixtures, soil, waste, and vent pipes removed from an old building, if found to be in good condition, may be used in the same building or may be used in another building, provided they are approved by the board or local plumbing inspector and the owner of the building in which they are installed gives his written consent.

(5) OLD HOUSE DRAINS. Old house drains may be used in connection with new buildings or new plumbing only when they are found on examination or test to conform to the requirements of this code governing new sewers and drains. If the old work is found defective, the local or state inspector shall notify the owner of the changes necessary to make it conform to the requirements of this code.

(6) REPAIRS. All repairs to fixtures or piping shall be done in a substantial, sanitary and workmanlike manner.

H 62.18 Water supply systems. (1) WATER SERVICE. (a) *Size.* The water service pipe to any building shall be of sufficient size to permit a continuous ample flow of water under maximum simultaneous use to all fixtures and points of service. The minimum diameter of the service pipe shall be five-eighths inch.

(b) *Materials.* The service pipe from a main or from the pump of a privately owned supply to any building shall be copper water tube, lead, brass, cast iron or galvanized steel or wrought iron pipe.

(c) *Valve controls.* Service controls shall include a valve or shut-off at the main, a curb stop or valve at the curb or privately owned pump, and a valve or stop inside the foundation wall of each building.

(2) BUILDING DISTRIBUTION SYSTEM. (a) *Size.* The water supply piping shall be three-fourths inch in diameter for iron or brass pipe. The diameter of any riser or branch serving more than one plumbing fixture or appliance shall not be less than three-fourths inch for iron or brass pipe. The diameters of branches to single fixtures shall not be less than one-half inch except that three-eighths inch pipe not to exceed 5 feet in length may be used to supply water closet tanks, lavatories or similar fixtures. If copper water tube is used the minimum pipe diameters given above may be decreased one standard copper water tube size, except the minimum pipe diameter shall be three-eighths inch.

(b) *Materials.* All water supply pipes within a building shall be of lead, galvanized wrought iron or steel, brass, or cast iron, with brass or galvanized malleable iron fittings, or copper water tube and fittings. No pipe or fittings that have been used for other purposes shall be used for distributing water for drinking or domestic supply purposes. See H 62.16.

(c) *Supports.* All piping shall be supported to prevent undue strains upon connections or fixtures, and shall be so aligned and graded that the entire system or parts thereof can be controlled and drained. The formation of traps or sags in water piping shall be avoided where possible. When unavoidable such sags, traps or inverts shall have provisions for properly draining same.

(d) *Valve controls.* Controls within a building shall include a valve or compression stop for each lawn sprinkler, hot water tank, water closet, urinal and point of entrance of the water service. In a multiple dwelling or public building a valve shall also be provided at the base of each riser and for each dwelling unit or public toilet room unless served by an independent riser, and for each branch serving fixtures in the basement.

(e) *Water supply to fixtures.* All plumbing fixtures shall be provided with a sufficient supply of water for flushing to keep them in a sanitary condition. Every water closet shall be flushed by means of an approved tank or flush valve, of at least 4-gallon flushing capacity and at least one gallon for each urinal. The water from flush tanks shall be used for no other purpose than to reseal drain traps. See H 62.12 (8), (9).