they could be unduly subjected to damage during transit.

(4) *Freezing*. All piping and fixtures subject to freezing temperatures shall be insulated or protected to prevent freezing, under normal occupancy. The manufacturer shall provide:

(i) Written installation instructions for the method(s) required for compliance to this section;

(ii) A statement in his installation instructions that if heat tape is used it shall be listed for use with manufactured homes;

(iii) A receptacle outlet for the use of a heat tape located on the underside of the manufactured home within 2 feet of the water supply inlet. The receptacle outlet provided shall not be placed on a branch circuit which is protected by a ground fault circuit interrupter.

(5) All piping, except the fixture trap, shall be designed to allow drainage.

(6) *Rodent resistance*. All exterior openings around piping and equipment shall be sealed to resist the entrance of rodents.

(7) Piping and electrical wiring shall not pass through the same holes in walls, floors or roofs. Plastic piping shall not be exposed to heat in excess of manufacturers recommendation or radiation from heat producing appliances.

[40 FR 58752, Dec. 18, 1975, as amended at 42 FR 54383, Oct. 5, 1977. Redesignated at 44 FR 20679, Apr. 6, 1979, as amended at 58 FR 55012, Oct. 25, 1993]

§ 3280.604 Materials.

(a) *Minimum standards*. Materials, devices, fixtures, fittings, equipment, appliances, appurtenances and accessories shall conform to one of the standards in the following table and be free from defects. Where an appropriate standard is not indicated in the table or a standard not indicated in the table is preferred, the item may be used if it is listed. A listing is also required when so specified in other sections of this subpart.

(b) Where more than one standard is referenced for a particular material or component, compliance with only one of those standards is acceptable. Exceptions:

(1) When one of the reference standards requires evaluation of chemical, toxicity or odor properties which are not included in the other standard, then conformance to the applicable requirements of each standard shall be demonstrated;

(2) When a plastic material or component is not covered by the Standards in the following table, it shall be certified as non-toxic in accordance with NSF14–1990, ''Plastic Piping Components and Related Materials.''

FERROUS PIPE AND FITTINGS

Gray Iron Threaded Fittings—ANSI/ASME B16.4–1992.

Malleable Iron Threaded Fittings—ANSI/ASME B16.3–1992.

Material and Property Standard for Special Cast Iron Fittings—IAPMO PS 5–84.

Welding and Seamless Wrought Steel Pipe—ANSI/ASME B36.10–1979.

Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless—ASTM A53–93.

Pipe Threads, General Purpose (Inch)—ANSI/ASME B1.20.1–1983.

Standard Specification for Cast Iron Soil Pipe and Fittings—ASTM A74–92.

Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications—CISPI–301–90.

NONFERROUS PIPE AND FITTINGS

Standard Specification for Seamless Copper Pipe, Standard Sizes—ASTM B42–93.

Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube—ASTM B251–93.

Standard Specification for Seamless Copper Water Tube—ASTM B 88–93.

Standard Specification for Copper Drainage Tube (DWV)—ASTM B306–92.

Wrought Copper and Copper Alloy Solder-Joint Pressure Fitting—ASME/ANSI B16.22–1989.

Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings-DWV—ASME/ANSI B16.29–1986.

Cast Copper Alloy Solder-Joint Pressure Fittings—ANSI B16.18–1984.

Cast Copper Alloy Solder-Joint Drainage Fittings-DWV—ASME B16.23–1992.

Cast Copper Alloy Fittings for Flared Copper Tubes—ASME/ANSI B16.26–1988.

Standard Specification for Seamless Red Brass Pipe, Standard Sizes—ASTM B43–91.

Cast Bronze Threaded Fittings, Classes 125 and 250—ANSI/ASME B16.15–1985.

PLASTIC PIPE AND FITTINGS

Standard Specification Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic

Drain, Waste, and Vent Pipe and Fittings—ASTM D2661–91.

Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings—ASTM D2665–91b.

Standard Specification for Drain, Waste, and Vent (DWV) Plastic Fittings Patterns—ASTM D3311–92.

Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40, Plastic Drain, Waste, and Vent Pipe With a Cellular Core—ASTM F628–91.

Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems—ASTM D2846–92.

Standard Specification for Polybutylene (PB) Plastic Hot- and Cold-Water Distribution Systems—ASTM D3309–92a.

Plastic Piping Components and Related Materials—ANSI/NSF 14–1990.

MISCELLANEOUS

Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings—ASTM C564–88.

Backflow Valves—ANSI A112.14.1–1975.

Plumbing Fixture Setting Compound—TTP 1536A–1975.

Material and Property Standard for Cast Brass and Tubing P-Traps—IAPMO PS 2–89.

Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems—*ANSI Z21.22–1986, With Addendum Z21.22a–1990.

Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings—ASTM D2235–88.

Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems—ASTM D2564–91a.

Specification for Neoprene Rubber Gaskets for HUB and Spigot Cast Iron Soil Pipe and Fittings—CISPI–HSN–85.

Plumbing System Components for Manufactured Homes and Recreational Vehicles—ANSI/NSF 24–1988.

Material and Property Standard for Diversion Tees and Twin Waste Elbow—IAPMO PS 9–84.

Material and Property Standard for Flexible Metallic Water Connectors—IAPMO PS 14–89.

Material and Property Standard for Dishwasher Drain Airgaps—IAPMO PS 23–89.

Material and Property Standards for Backflow Prevention Assemblies—IAPMO PS 31–91.

PLUMBING FIXTURES

Plumbing Fixtures (General Specifications)—FS WW–P–541E/GEN–1980.

Vitreous China Plumbing Fixtures—ANSI/ASME A112.19.2(M)–1990.

Enameled Cast Iron Plumbing Fixtures—ANSI/ASME A112.19.1M–1987.

Porcelain Enameled Formed Steel Plumbing Fixtures—ANSI/ASME A112.19.4(M)–1984.

Plastic Bathtub Units With Addenda Z124.1a–1990 and Z124.16–1991—ANSI Z124.1–1987.

Standard for Porcelain Enameled Formed Steel Plumbing Fixtures—IAPMO TSC 22–85.

Plastic Shower Receptors and Shower Stalls With Addendum Z124.2a–1990—ANSI Z124.2–1987.

Stainless Steel Plumbing Fixtures (Designed for Residential Use)—ANSI/ASME A112.19.3M–1987.

Material and Property Standard for Drains for Prefabricated and Precast Showers—IAPMO PS 4–90.

Plastic Lavatories with addendum Z124.3a–1990—ANSI Z124.3–1986.

Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used in Building—ANSI Z97.1–1984.

Plumbing Fixture Fittings—ANSI/ASME A112.18.1M–1989.

Trim for Water Closet, Bowls, Tanks, and Urinals—ANSI A112.19.5–1979.

Plastic Water Closets, Bowls and Tanks with Addenda Z124.4a–1990—ANSI Z124.4–1986.

Whirlpool Bathtub Appliances—ASME/ANSI A112.19.7M–1987.

Performance Requirements for Individual Thermostatic Pressure Balancing and Combination Control for Bathing Facilities—ASSE 1016–1988, (ANSI 1990).

Performance Requirements for Pressurized Flushing Devices (Flushometers) For Plumbing Fixtures—ASSE 1037–1990 (ANSI–1990).

Performance Requirements for Water Closet Flush Tank Fill Valves (Ballcocks)—ASSE 1002 Revision 5–1986, (ANSI/ASSE–1979).

Performance Requirements for Hand-held Showers—ASSE 1014–1989 (ANSI–1990).

Hydrants for Utility and Maintenance Use—ANSI/ASME A112.21.3M–1985.

Performance Requirements for Home Laundry Equipment—ASSE 1007–1986.

Performance Requirements for Hot Water Dispensers, Household Storage Type Electrical—ASSE 1023–ANSI/ASSE–1979.

Plumbing Requirements for Residential Use (Household) Dishwashers—ASSE 1006, ASSE/ANSI–1986.

Performance Requirements for Household Food Waste Disposer Units—ASSE 1008–1986.

Performance Requirements for Temperature Activated Mixing Valves for Primary Domestic Use—ASSE 1017–1986.

Water Hammer Arresters—ANSI A112.26.1–1969 (R 1975).

Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, Hot Tubs and Whirlpool Bathtub Appliances—ASME/ANSI A112.19.8M–1989.

Air Gaps in Plumbing Systems—ASME A112.1.2–1991.

Performance Requirements for Diverters for Plumbing Faucets with Hose Spray, Anti-Siphon Type, Residential Applications—ASSE 1025–ANSI/ASSE–1978.

Performance Requirements for Pipe Applied Atmospheric Type Vacuum Breakers—ASSE 1001 ASSE/ASNI–1990.

Performance Requirements for Hose Connection Vacuum Breakers—ASSE 1011–1981 (ANSI–1982).

Performance Requirements for Wall Hydrants, Frost Proof Automatic Draining, Anti-Backflow Types—ANSI/ASSE 1019–1978.

[58 FR 55013, Oct. 25, 1993]

§ 3280.605 Joints and connections.

(a) *Tightness.* Joints and connections in the plumbing system shall be gas-tight and watertight for the pressures required under testing procedures.

(1) *Assembling of pipe.* All joints and connections shall be correctly assembled for tightness. Pipe threads shall be fully engaged with the threads of the fitting. Plastic pipe and copper tubing shall be inserted to the full depth of the solder cup or welding sockets of each fitting. Pipe threads and slip joints shall not be wrapped with string, paper, putty, or similar fillers.

(2) *Threaded joints.* Threads for screw pipe and fittings shall conform to the approved or listed standard. Pipe ends shall be reamed out to size of bore. All burrs, chips, cutting oil and foreign matter shall be removed. Pipe joint cement or thread lubricant shall be of approved type and applied to male threads only.

(3) *Solder joints.* Solder joints for tubing shall be made with approved or listed solder type fittings. Surfaces to be soldered shall be cleaned bright. The joints shall be properly fluxed with noncorrosive paste type flux and, for manufactured homes to be connected to a public water system, made with solder having not more than 0.2 percent lead.

(4) *Plastic pipe, fittings and joints.* Plastic pipe and fittings shall be joined by installation methods recommended by the manufacturer or in accordance with the provisions of a recognized, approved, or listed standard.

(5) *Union joints.* Metal unions in water piping shall have metal-to-metal ground seats.

(6) *Flared joints.* Flared joints for soft-copper water tubing shall be made with approved or listed fittings. The tubing shall be expanded with a proper flaring tool.

(7) *Cast iron soil pipe joints.* Approved or listed cast iron pipe may be joined as follows:

(i) Approved or listed hubless pipe as per the manufacturer's recommendation.

(ii) Hub and plain-end soil pipe may be joined by compression fittings per the manufacturer's recommendation.

[40 FR 58752, Dec. 18, 1975. Redesignated at 44 FR 20679, Apr. 6, 1979, as amended at 53 FR 23611, June 23, 1988]

§ 3280.606 Traps and cleanouts.

(a) *Traps*—(1) *Traps required.* Each plumbing fixture, except listed toilets, shall be separately trapped by approved water seal ''P'' traps. All traps shall be effectively vented.

(2) *Dual fixtures.* A two-compartment sink, two single sinks, two lavatories, or a single sink and a single lavatory with waste outlets not more than 30 inches apart and in the same room and flood level rims at the same level may be connected to one ''P'' trap and may be considered as a single fixture for the purpose of drainage and vent requirements.

(3) *Prohibited traps.* A trap which depends for its seal upon concealed interior partitions shall not be used. Full ''S'' traps, bell traps, drum traps, crown-vented traps, and running traps are prohibited. Fixtures shall not be double-trapped.

(4) *Material and design.* Each trap shall be self-cleaning with a smooth and uniform interior waterway. Traps shall be manufactured of cast iron, cast brass, or drawn brass tubing of not less than No. 20 Brown and Sharpe gage, or approved or listed plastic, or other approved or listed material. Union joints for a trap shall be beaded to provide a shoulder for the union nut. Each trap shall have the manufacturer's name stamped or cast in the body of the trap, and each tubing trap shall show the gage of the tubing.

(5) *Trap seal.* Each ''P'' trap shall have a water seal of not less than 2 inches and not more than 4 inches and shall be set true to its seal.