

KINGDOM OF SAUDI ARABIA

SAUDI STANDARDS, METROLOGY AND QUALITY ORGANIZATION

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SAUDI STANDARD
DRAFT No.

Plastic Fittings for Connecting Water Closets to the Sanitary Drainage System

SAUDI STANDARDS, METROLOGY AND QUALITY
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Plastic Fittings for Connecting Water Closets to the Sanitary Drainage System

1 General

1.1 Scope

This Standard establishes physical, performance, and testing requirements applicable to the joint that connects a water closet to the sanitary drain piping of a plumbing system.

The use of alternate materials or methods is permitted, provided the proposed material and method complies with the performance requirements and intent of this Standard.

1.2 Units of Measurement

Values are stated in U.S. Customary units, followed in parentheses by values stated in the International System of Units (SI). The U.S. Customary units shall be considered as the standard.

1.3 References

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below, including all amendments published thereto.

SASO (Saudi Standards, Metrology and Quality Organization)

SASO 1473/2016

Ceramic Sanitary Applications – Western Water Closets

SASO 1257/2017

Sanitary Appliances - Flushing Water Tanks

ASTM International (American Society for Testing and Materials)

ASTM A53/A53M-24

Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM A888-21a

Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

ASTM B302-17

Standard Specification for Threadless Copper Pipe, Standard Sizes

ASTM D1784-08

Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

ASTM D1785-21a

Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

ASTM D2949-01a (2008)

Standard Specification for 3.25-in. Outside Diameter Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings

ASTM D3965

Standard Classification System and Basis for Specifications for Rigid Acrylonitrile-Butadiene-Styrene (ABS) Materials for Pipe and Fittings

ASTM D5926-15 (2020)

Standard Specification for Poly (Vinyl Chloride) (PVC) Gaskets for Drain, Waste, and Vent (DWV), Sewer, Sanitary, and Storm Plumbing Systems

CISPI (Cast Iron Soil Pipe Institute)**CISPI 301-21**

Standard Specification for hubless cast iron soil pipe and fittings for sanitary and storm drain, waste, and vent piping applications

CSA Group (Canadian Standards Association)**CSA B70:19**

Cast iron soil pipe, fittings, and means of joining

CSA B181.1

Acrylonitrile-butadiene-styrene (ABS) drain, waste, and vent pipe and pipe fittings

CSA B181.2

Polyvinylchloride (PVC) and chlorinated polyvinylchloride (CPVC) drain, waste and vent pipe and pipe fittings

CSA B602

Mechanical couplings for drain, waste, and vent pipe and sewer pipe

2 Physical Requirements

2.1 Size

The joint (connection method, device, or fitting) shall accommodate all water closets that comply with the dimensional requirements set forth in SASO 1473/2016 and SASO 1257/2017 and the applicable dimensional requirements and manufacturing tolerances of the following pipe materials in weight, grade, or schedules in 3- and 4-inch nominal pipe sizes:

- a) Extra heavy, service weight, and hubless cast iron soil pipe and fittings shall comply with CSA B70, ASTM A888, or CISPI 310.
- b) Schedule 40 PVC plastic pipe shall be in accordance with ASTM D1785 or CSA B181.2
- c) Schedule 40 ABS Plastic Pipe shall be in accordance with ASTM D3965 or CSA B181.1
- d) 3.25-inch outside diameter PVC plastic drainpipe waste and vent pipe shall comply with ASTM D2949
- e) Schedule 40 galvanized steel pipe shall comply with ASTM A53/A53M-24
- f) Copper tubing shall comply with ASTM B302.

2.2 Materials

2.2.1 General.

The materials used in manufacturing of the joint (connection method, device, or fitting) shall be compatible with the materials with which it physically contacts and shall demonstrate, by compliance with related recognized standards or tests, its ability to function in its installed environment.

2.2.2 Free From Defects.

The joint (connection method, device, or fitting) shall be free from defects or features that cause leaks or cause interference with fluid or solid flows.

2.2.3 Component Material.

Component material shall comply with one of the following materials.

2.2.3.1 Rigid Acrylonitrile-Butadiene-Styrene (ABS) shall conform to the requirements of ASTM D3965 cell classifications 0-0-3-2-3, 2-1-2-1-2, or 1-0-2-2-3.

2.2.3.2 Polyvinyl Chloride (PVC) shall conform to the requirements of PVC 1-2-4-5-4-B, 1-2-4-5-4-C, 1-1-4-4-3-B, or 1-4-3-3-3-D, as described in ASTM D1784.

2.2.3.3 Elastomeric compounds shall conform to the chemical and physical requirements specified for elastomers in ASTM D5926 or CSA B602.

3 Performance Requirements

3.1 Test Setup and Preparation

3.1.1 New joints (connection method, device, or fitting) shall be used for each test.

3.1.2 Tests shall be conducted to demonstrate the ability of the connection device to seal against the intended sealing surface(s) and the dimensional tolerances of the piping material or fitting. A joint that is designed to seal against the inside diameter of the pipe shall be tested with pipe samples that reflect the smallest inside dimensional tolerance and the largest inside dimensional tolerance allowed in the relevant material standard(s). A joint that is designed to seal against the outside diameter of the pipe shall be tested with pipe samples that reflect the smallest outside dimensional tolerance and largest outside tolerance allowed in the relevant material standard(s).

3.1.3 Tests shall be performed with or without closet flanges.

3.1.4 Pipe shall be machined to obtain the dimensional requirements for testing in accordance with para. 2.1 within a ± 0.010 in. (0.25 mm) tolerance.

3.1.5 Figure 1 illustrates a test stand and Figs. 2 through 6 illustrate the test fixtures to be used in performance testing.

3.2 Joint Tightness

3.2.1 Pressure Test. The joint connections shall be hydrostatically tested at room temperature in accordance with paras. 3.2.1.1 through 3.2.5.

3.2.1.1 Test Method. The assembly shall be filled with water, expelling all air and pressurizing to 10psi (69 kPa). Pressure shall be maintained for 15 minutes, after which the assembly shall be checked for leaks.

3.2.1.2 Performance Requirement. No leakage shall be permitted during any pressure test.

3.2.2 Set Up #1. A connection shall be assembled according to manufacturer's instructions, with Test Fixture 1 (see Fig. 2) and pipe with the minimum dimensional tolerance of the applicable I.D. or O.D. in a test stand (see Fig. 1).

3.2.3 Set Up #2. A connection shall be assembled, according to manufacturer's instructions, with Test Fixture 2 (see Fig. 3) and pipe with the maximum dimensional tolerance of the applicable I.D. or O.D. in a test stand and pressure tested as specified in paras. 3.2.1.1 and 3.2.1.2.

3.2.4 Set Up #3. A connection shall be assembled, according to manufacturer's instructions, with Test Fixture 3 (see Fig. 4) and pipe with the minimum dimensional tolerance of the applicable I.D. or O.D. in a test stand and pressure tested as specified in paras. 3.2.1.1 and 3.2.1.2.

3.2.5 Set Up #4. A connection shall be assembled, according to manufacturer's instructions with Test Fixture 4 (see Fig. 5) and pipe with the maximum dimensional tolerance of the applicable I.O. or O.D. in a test stand and pressure tested as specified in paras. 3.2.1.1 and 3.2.1.2.

3.3 Perpendicular Misalignment (Variation)

3.3.1 Test Method. A connection shall be assembled according to manufacturer's instructions, with Test Fixture 5 (see Fig. 6) and a randomly selected pipe sample of appropriate size. The pipe sample shall be placed in a test stand in the normal installed position for a minimum of 15 minutes and then deflected to an angle of 5 deg from the horizontal plane.

3.3.2 The assembly shall be filled with water, expelling all air and pressure to 10 psi (69 kPa). Pressure shall be maintained for 15 minutes and checked for leaks.

3.3.3 Performance Requirement. The connection shall not leak when hydrostatically tested at room temperature in accordance with para. 3.3.2.

4 Marking and Identification

The following information shall be provided on the product:

- the manufacturer's name or trademark;
- the model number; and
- the standard designation number.

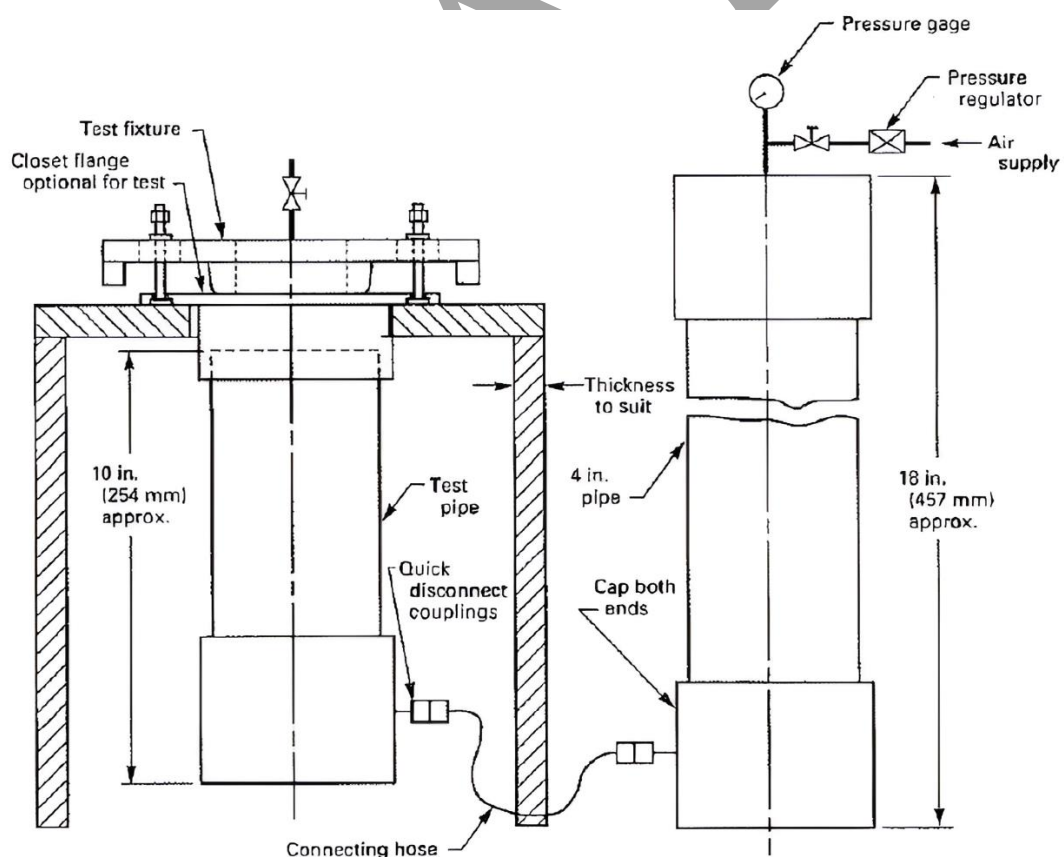


Figure 1 Test Stand

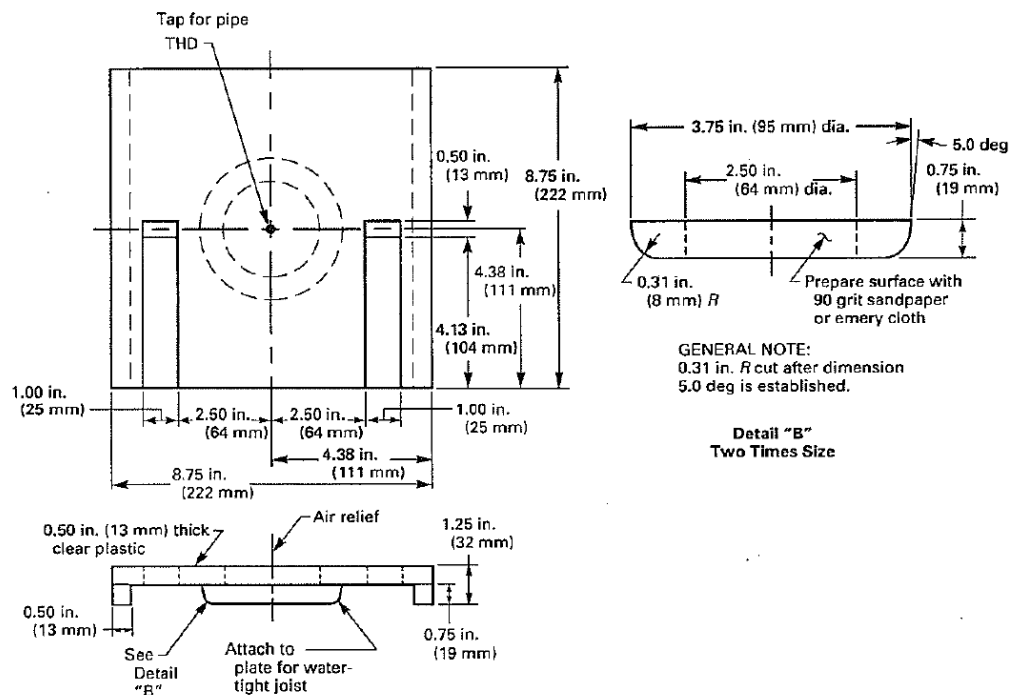


Figure 2 Test Fixture 1

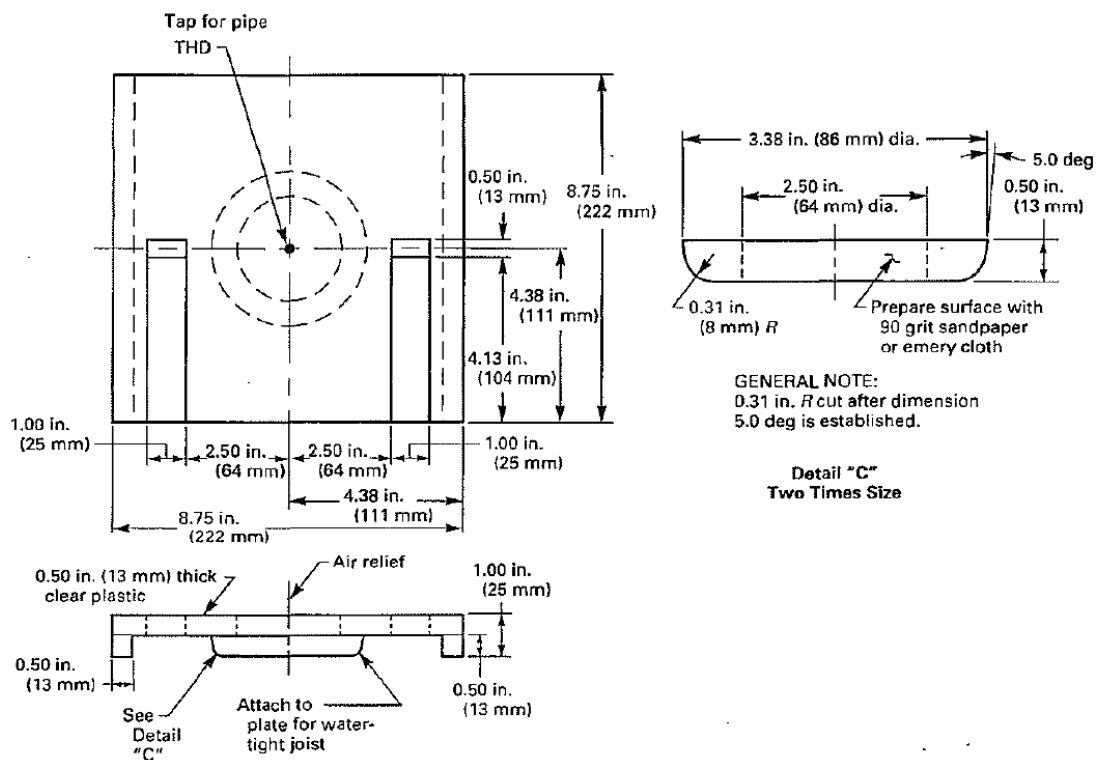


Figure 3 Test Fixture 2

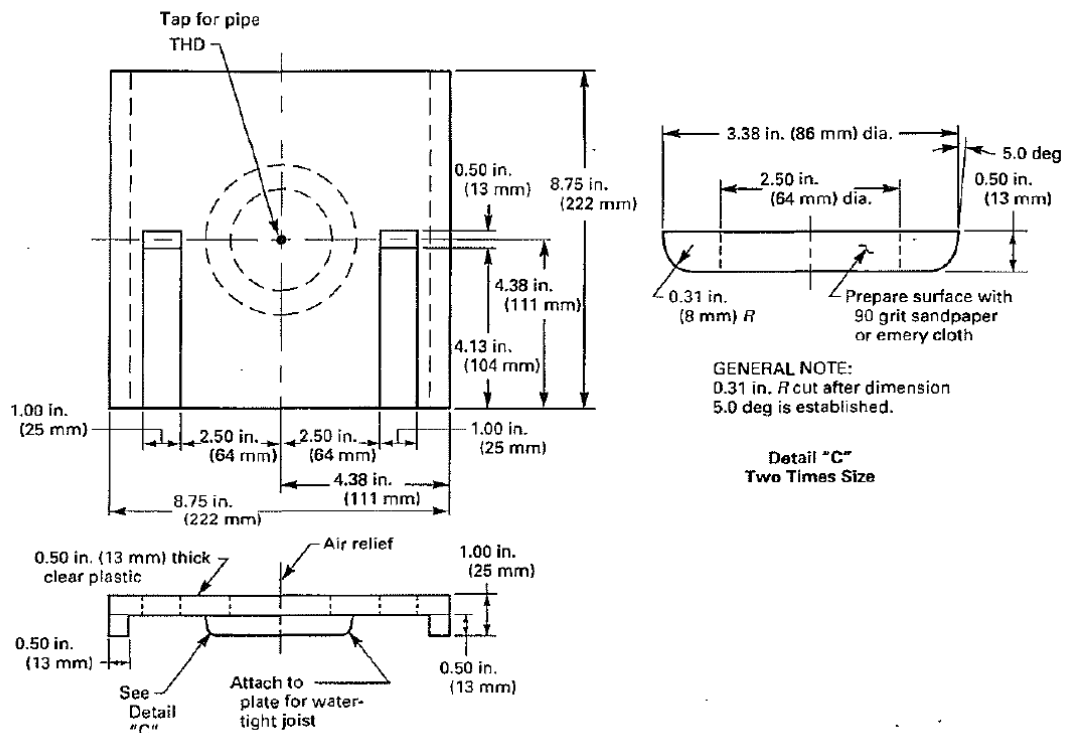


Figure 4 Test Fixture 3

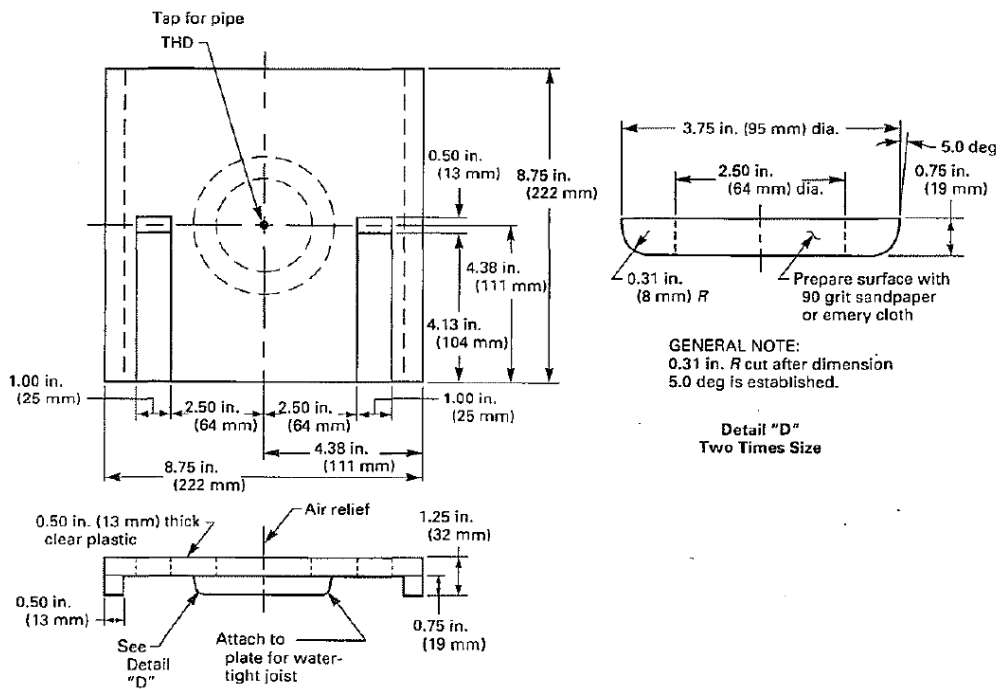


Figure 5 Test Fixture 4

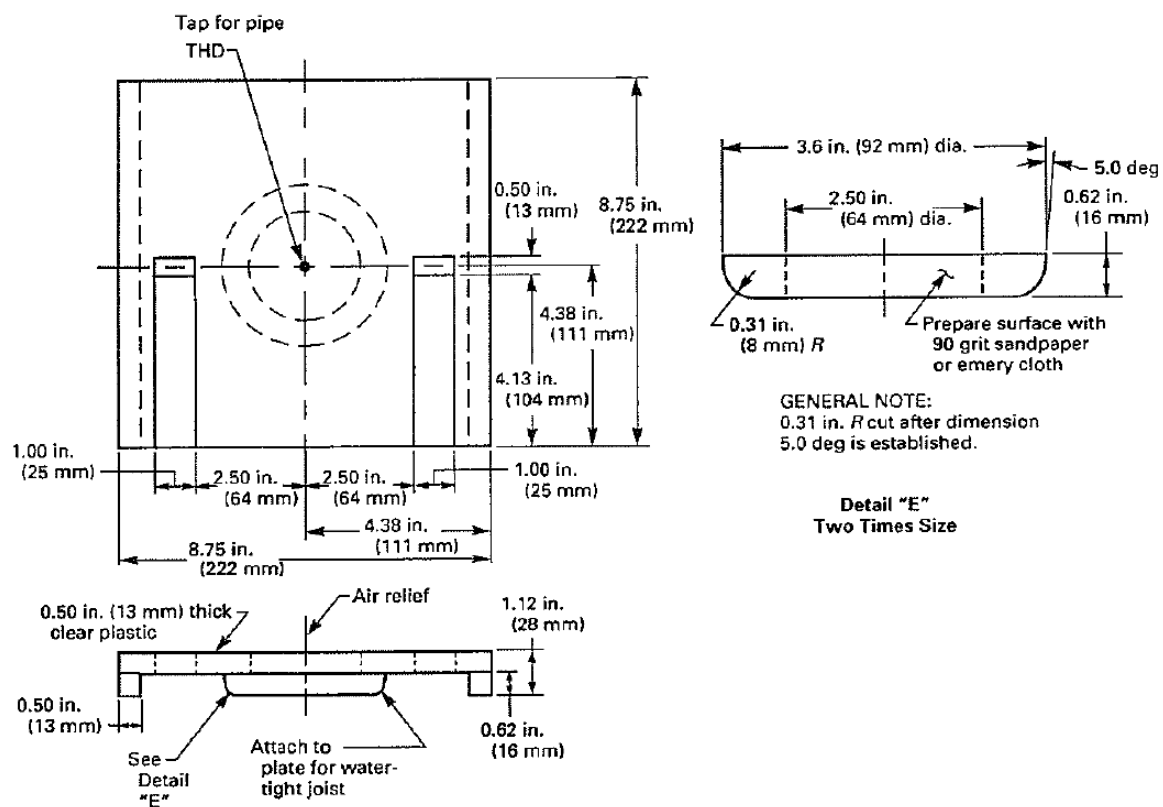


Figure 6 Test Fixture 5