ASME A112.4.3-1999

PLASTIC FITTINGS FOR CONNECTING WATER CLOSETS TO THE SANITARY DRAINAGE SYSTEM

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda or written interpretations of the requirements of this Standard issued to this edition.

The American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990

FOREWORD

The axiom "a chain is only as strong as its weakest link" can be applied to the sanitary drainage system. Modern manufacturing practices, along with material, dimensional, and performance standards, have resulted in sanitary drainage systems that safely convey sanitary waste to the collection system. While major improvements have been made in the systems, materials, and connections methods, however, a "weak link" still exists: the connection between the water closet and the sanitary drainage system.

Historically, the connection has been made with "plumbers putty" and, in more recent years, a pre-formed wax-type mastic. The joint connection is on the sewer side of the water closet trap where the material and performance standards of the soil, waste, and vent system apply. However, no existing standard addresses the water closet to drain connection. Since any leak in this connection would allow sewer gas and micro-organisms to enter a building, and any leaking waste would contaminate the surrounding area and damage floors and ceilings, there is a need for requirements to cover this joint connection.

This Standard establishes the performance criteria necessary to insure a safe water and air-tight connection between the water closet and sanitary drainage system, consistent with present day plumbing material and performance standards.

Suggestions for improvement of this Standard will be welcomed. They should be sent to The American Society of Mechanical Engineers; Secretary, A112 Main Committee; Three Park Avenue; New York, NY 10016-5990.

This revision was approved as an American National Standard on January 28, 1999.

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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 are 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

The following is a list of publications referenced in this Standard.

ASME A112.19.2M, Vitreous China Plumbing Fixtures

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300

ASTM A 53-97, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM A 888-96, Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

ASTM B 302-97, Specification for Threadless Copper Pipe

ASTM D 1784-97, Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

ASTM D 1785-96b, Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

ASTM D 2949-97, Specification for 3.25-in. Outside Diameter Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings

ASTM D 3965-94, Specification for Rigid Acrylonitrile-Butadiene-Styrene (ABS) Compounds for Pipe and Fittings

ASTM D 5926-96, Specification for Poly(Vinyl Chloride) (PVC) Gaskets for Drain, Waste, and Vent (DWV) Sewer, Sanitary, and Storm Plumbing Systems

Publisher: American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428

CISPI 310, Specification for Couplings Used to Connect Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

Publisher: Cast Iron Soil Pipe Institute (CISPI), 5959 Shallowford Road, Chattanooga, TN 37421

CSA B70, Cast Iron Soil Pipe, Fittings, and Means of Joining

CSA B181.1, ABS Drain, Waste, and Vent Pipe and Pipe Fittings

CSA B181.2, PVC Drain, Waste, and Vent Pipe and Pipe Fittings

CSA B602, Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe

Publisher: Canadian Standards Association (CSA), 178 Rexdale Boulevard, Etobicoke (Toronto), Ontario, Canada MW 1R3

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 ASME A112.19.2M 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 A 888, or CISPI 310.

(b) Schedule 40 PVC plastic pipe shall be in accordance with ASTM D 1785 or CSA B181.2.

(c) Schedule 40 ABS Plastic Pipe shall be in accordance with ASTM D 3965 or CSA B181.1.

(d) 3.25-inch outside diameter PVC plastic drain pipe waste and vent pipe shall comply with ASTM D 2949.

(e) Schedule 40 galvanized steel pipe shall comply with ASTM A 53.

(f) Copper tubing shall comply with ASTM B 302.

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 D 3965 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 D 1784.

2.2.3.3 Elastomeric compounds shall conform to the chemical and physical requirements specified for elastomers in ASTM D 5926 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 10 psi (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 dimen-

sional 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.D. or O.D. in a test stand and pressure tested as specified in paras. 3.2.1.1 and 3.2.1.2.

3.3 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:

(a) the manufacturer's name or trademark;
(b) the model number; and
(c) the standard designation number.

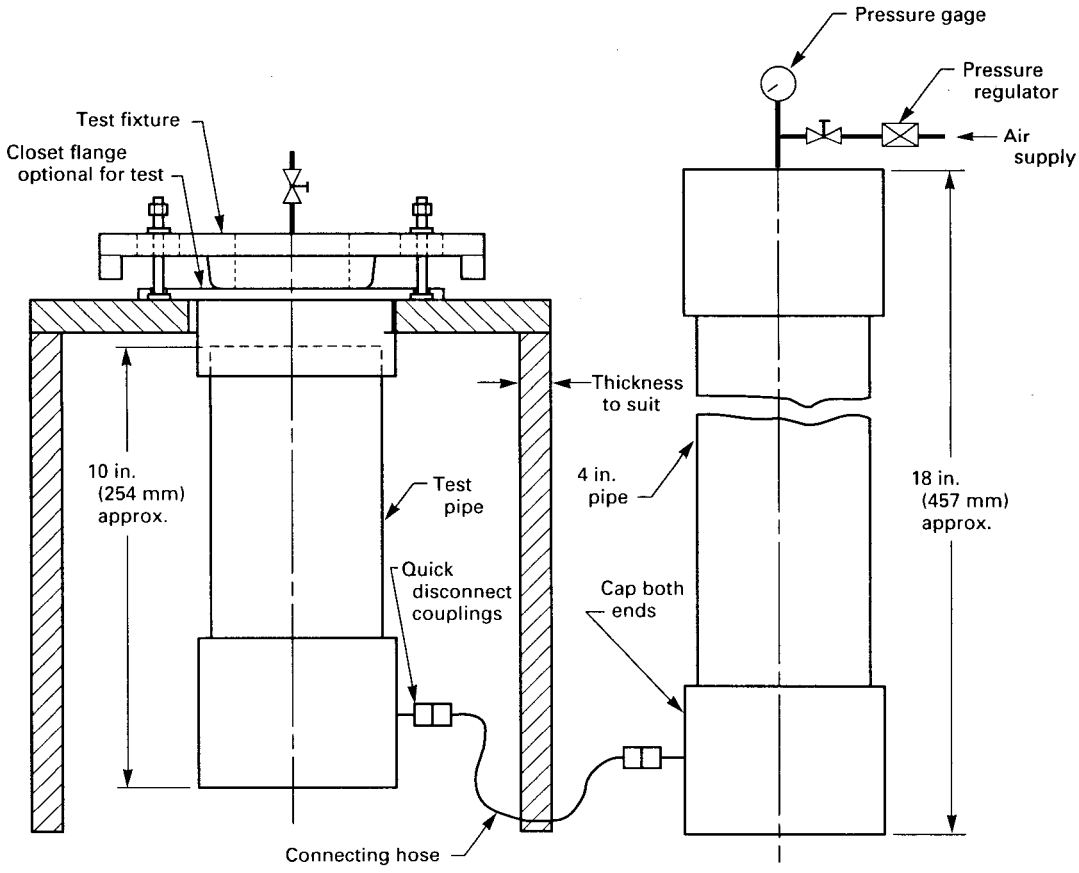

FIG. 1 TEST STAND

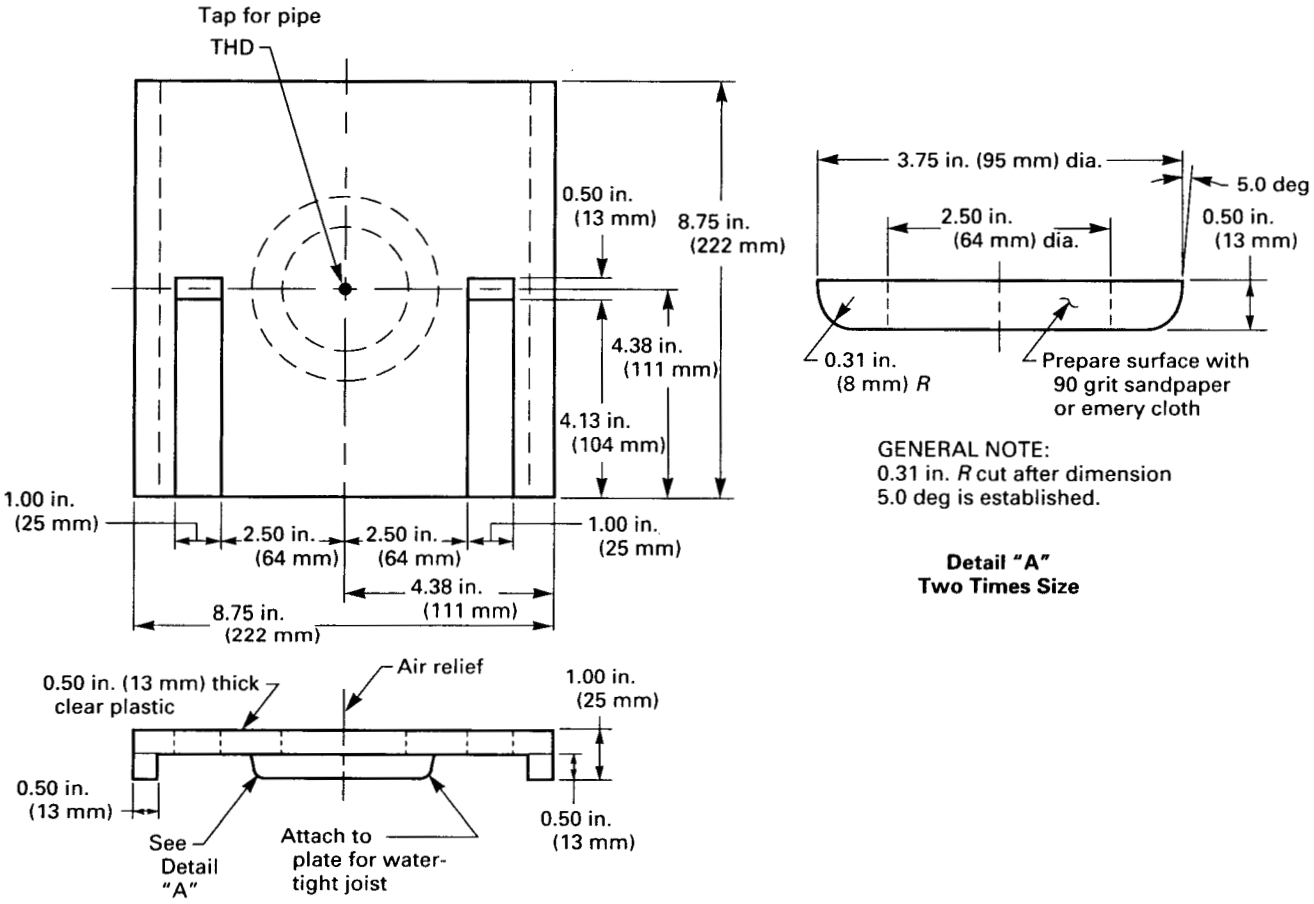

FIG. 2 TEST FIXTURE 1

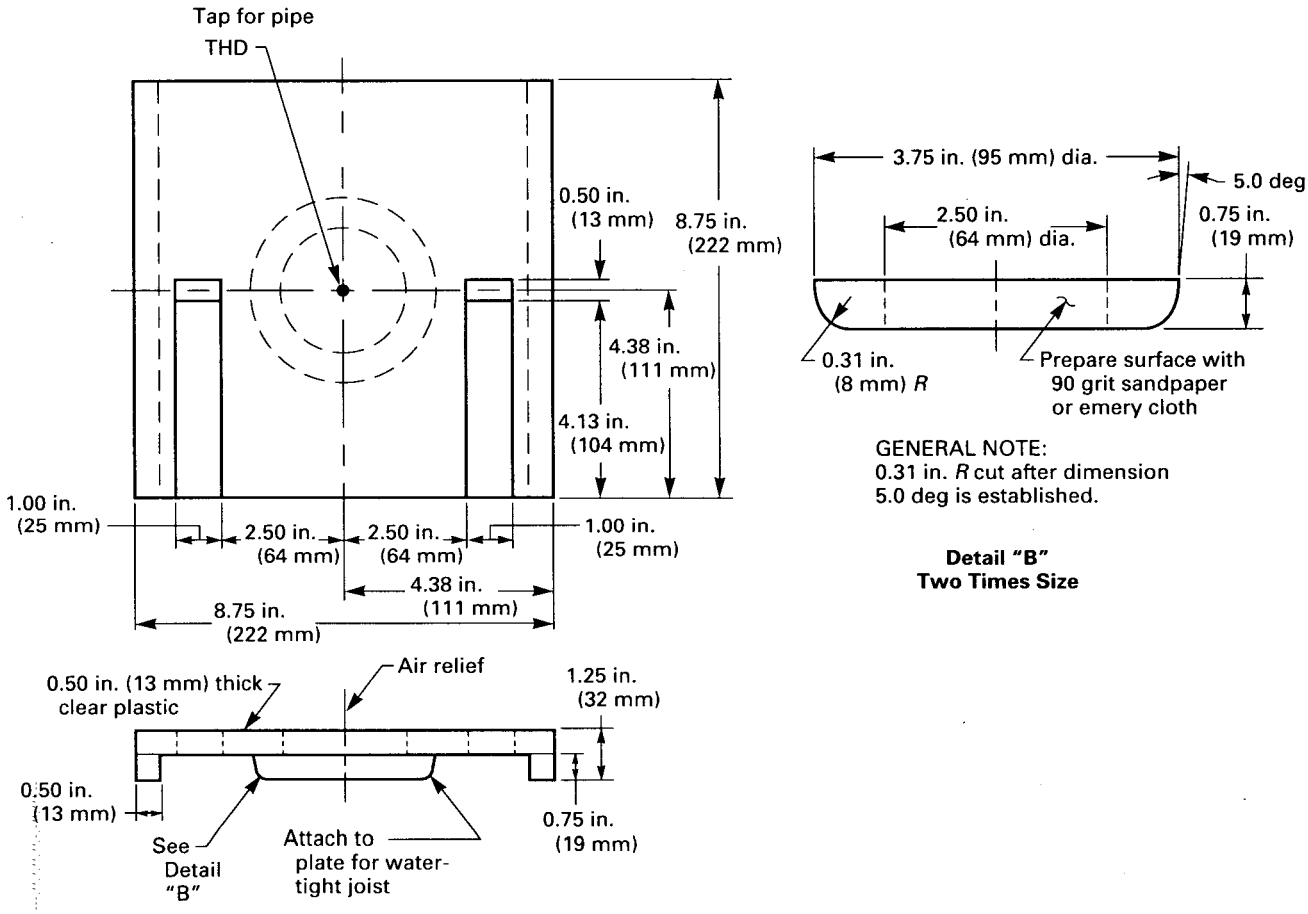

FIG. 3 TEST FIXTURE 2

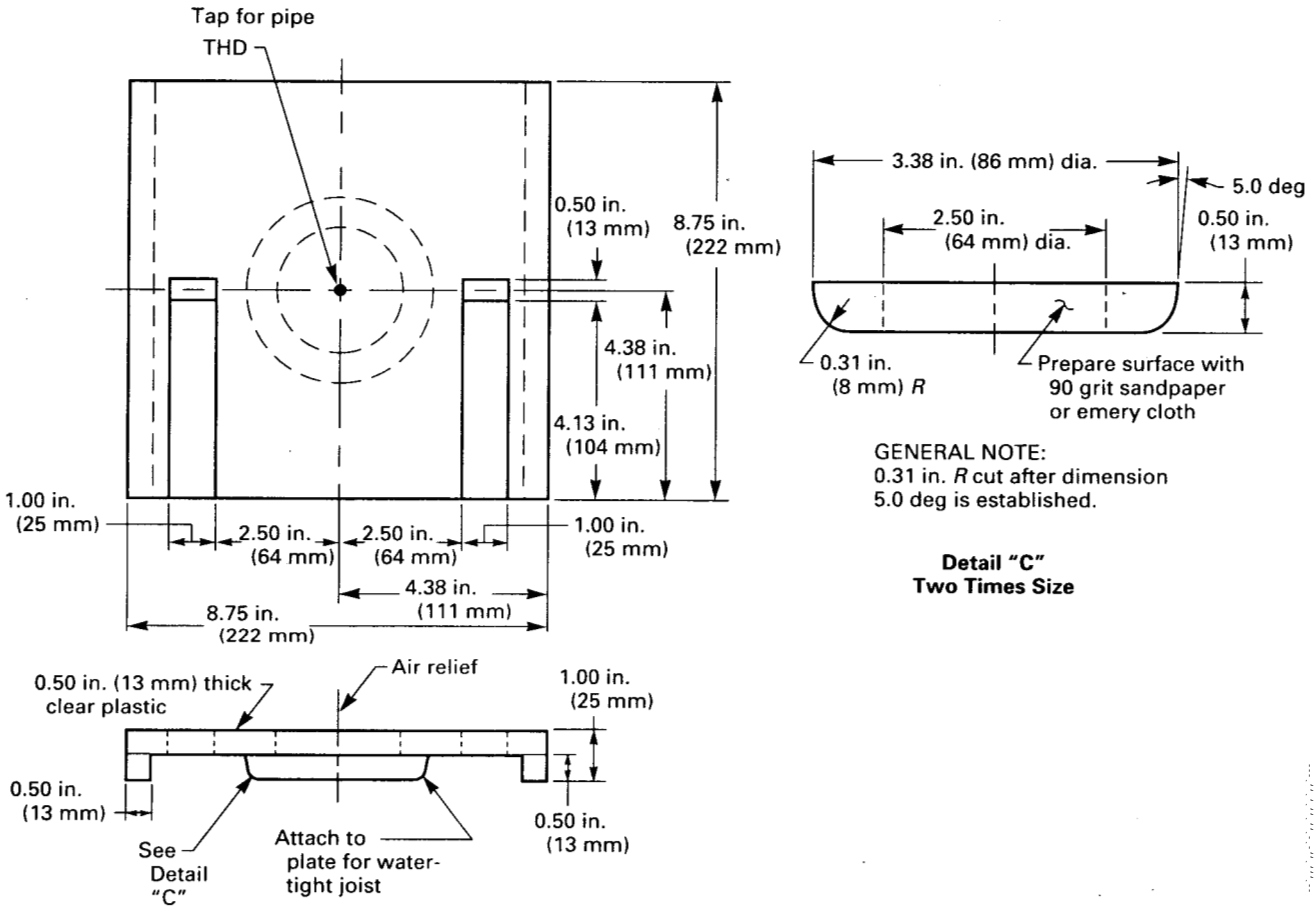

FIG. 4 TEST FIXTURE 3

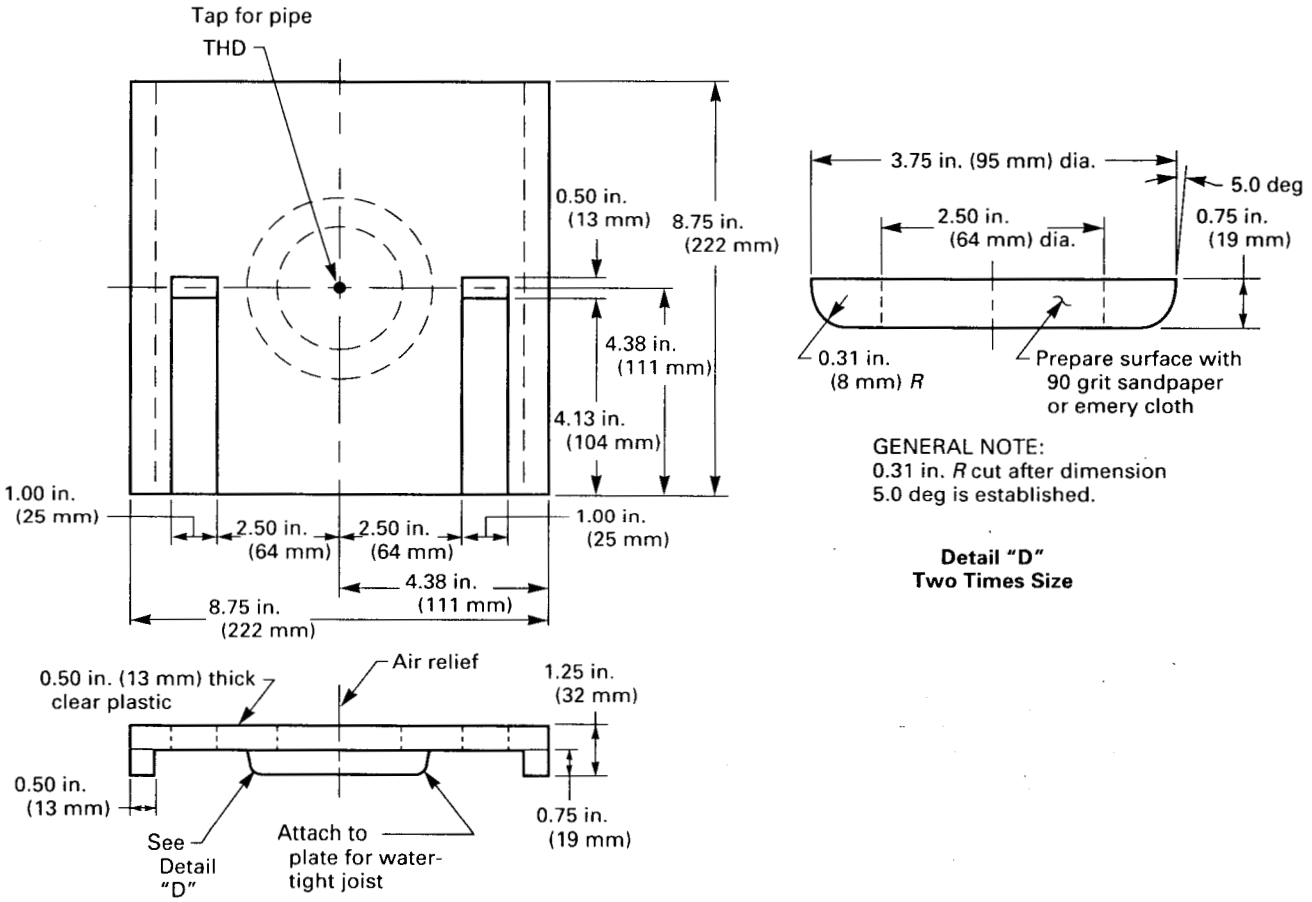

FIG. 5 TEST FIXTURE 4

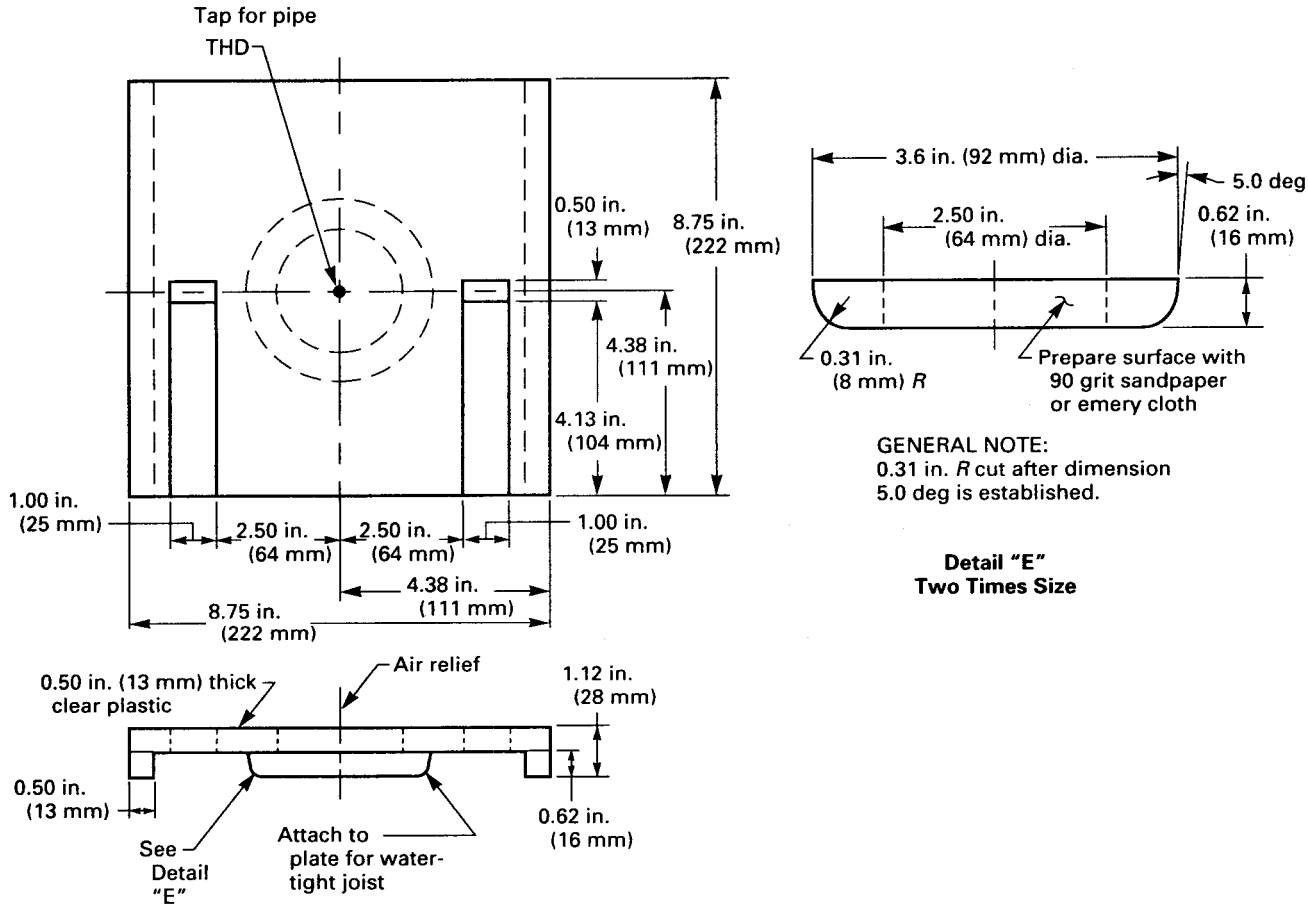

FIG. 6 TEST FIXTURE 5