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Designation: C1277 – 18

Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings[1]

This standard is issued under the fixed designation C1277; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the materials and testing of shielded hubless couplings to join hubless cast iron soil pipe and fittings.

1.2 Several different types of hubless couplings are available for use in hubless cast iron sanitary and storm drain, waste, and vent piping applications to connect hubless cast iron soil pipe and fittings by using a sleeve-type, or some other type coupling device. It is the purpose of this specification to furnish information as to the characteristics of one such sleeve-type couplings when applied to cast iron soil pipe and fittings manufactured in accordance with Specification A888, latest revision, and CISPI-301, latest revision.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 The committee with jurisdiction over this standard is aware of other comparable standard published by the Cast Iron Soil Pipe Institute, CISPI-310, FM 1680 published by Factory Mutual, and Specification C1540 published by ASTM.

1.5 The following precautionary caveat pertains only to the test method portion, Section 7, of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A240/A240M Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

A644 Terminology Relating to Iron Castings

A888 Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

C564 Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings

C1540 Specification for Heavy Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings

D395 Test Methods for Rubber Property—Compression Set

D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

D471 Test Method for Rubber Property—Effect of Liquids

D573 Test Method for Rubber—Deterioration in an Air Oven

D624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

D1149 Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment

D2240 Test Method for Rubber Property—Durometer Hardness

D3677 Test Methods for Rubber—Identification by Infrared Spectrophotometry

2.2 *CISPI Standards:*[3]

CISPI-301 Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications

CISPI-310 Specification for Couplings for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

[1] This specification is under the jurisdiction of ASTM Committee A04 on Iron Castings and is the direct responsibility of Subcommittee A04.75 on Gaskets and Coupling for Plumbing and Sewer Piping.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from Cast Iron Soil Pipe Institute (CISPI), 2401 Fieldcrest Dr., Mundelein, IL 60060, http://www.cispi.org.

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2.3 *Factory Mutual Standard:*[4]

FM 1680 Couplings Used in Hubless Cast Iron Systems for Drain, Waste or Vent, Sewer, Rainwater or Storm Water System, Above or Below Ground, Industrial, Commercial and Residential

3. Terminology

3.1 Definitions of the following terms used in this specification are found in Terminology A644: *elastomeric* and *durometer*.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *center stop, n*—an integral part of the gasket centered on the axial length of the gasket, intended to limit the insertion depth of the pipe to be coupled.

3.2.2 *clamp assembly, n*—that portion of the coupling excluding the gasket and shield.

3.2.3 *corrugated, n*—any method of embossing.

3.2.4 *coupling, n*—the complete assembly.

3.2.5 *fitting, n*—parts of a pipeline other than straight pipes, valves, or couplings.

3.2.6 *gasket, n*—the elastomeric portion of the coupling.

3.2.7 *joint, n*—the point of assembly consisting of the coupling and the joined pipes or fittings, or both.

3.2.8 *manufacturer clamp assembly and shield, n*—the entity that attaches the clamp assembly to the shield for the couplings covered by this standard specification.

3.2.9 *manufacturer gaskets, n*—the entity that molds the gaskets covered by this standard specification.

3.2.10 *shield, n*—an external metallic protective device designed to protect the sealing gasket from external elements that could cause failure of the sealing gasket.

4. Materials and Manufacture

4.1 Physical properties of gaskets shall comply with Specification C564 and the dimensions, material specifications, and physical and chemical properties as shown in Figs. 1-2 and Tables 1 and 2.

[4] Available from Factory Mutual Research, 1151 Boston-Providence Turnpike, Norwood, MA, 02062.

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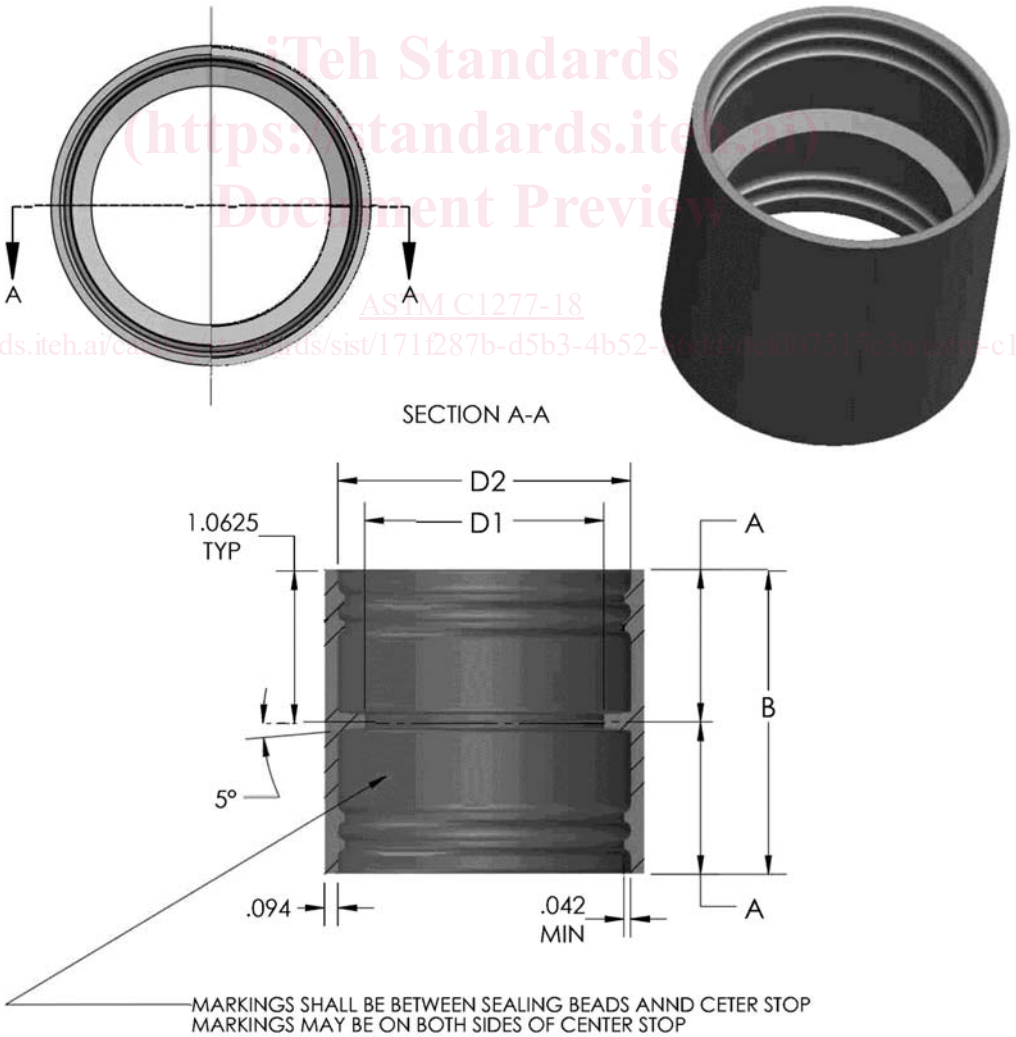
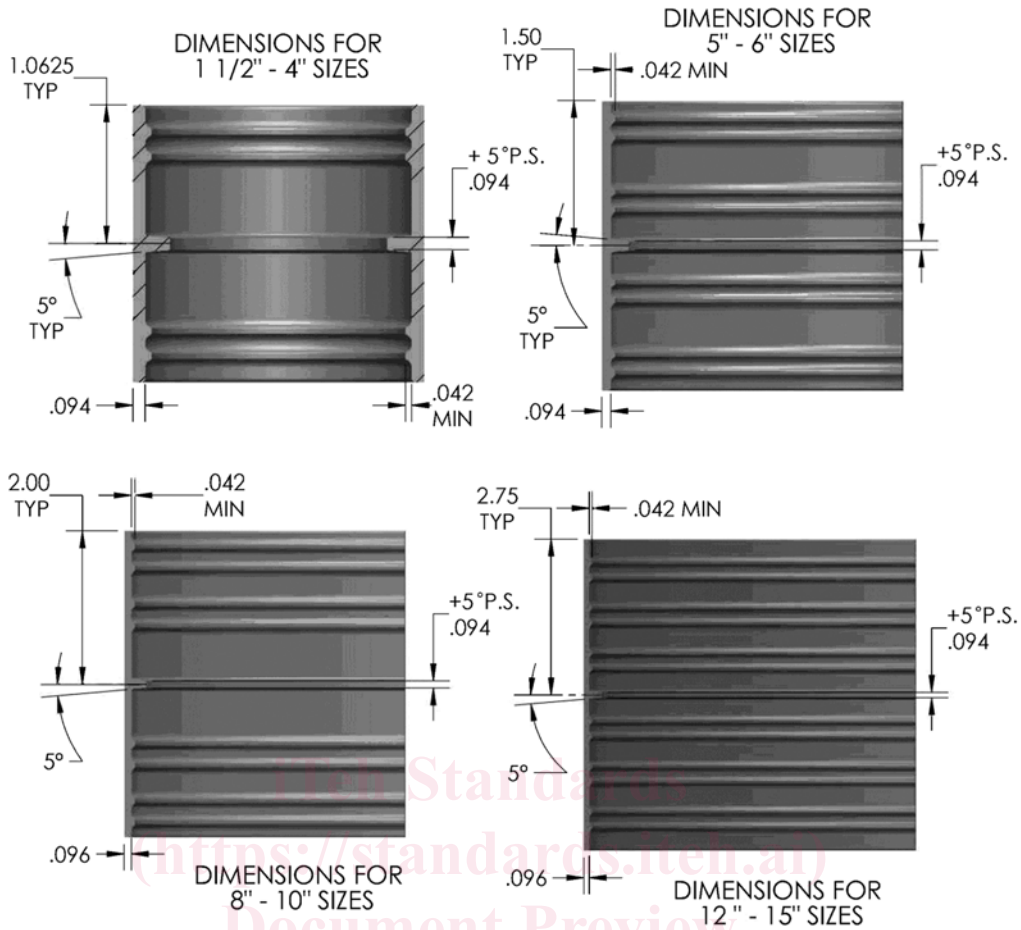


FIG. 1 Rubber Gasket



NOTE 1—Dimensions found in these drawings are for informational purposes only. The dimensions A and B found in the table are mandatory. Dimensions D1 and D2 found in the table are reference for mold design. Tolerances are found in Fig. 2. The center stop width is (3/32) .094 plus the 5° draft angle. Sealing ring shape and dimensions are to manufacturer's design.

	Dimensions									
	1½ in.	2 in.	3 in.	4 in.	5 in.	6 in.	8 in.	10 in.	12 in.	15 in.
A	1.062	1.062	1.062	1.062	1.500	1.500	2.000	2.000	2.750	2.750
B	2.125	2.125	2.125	2.125	3.000	3.000	4.000	4.000	5.500	5.500
D1	1.531	1.968	2.968	4.000	4.968	5.968	7.968	9.975	12.000	15.200
D2	1.937	2.343	3.343	4.406	5.343	6.343	8.343	10.350	12.430	15.650

NOTE 2—Dimensional tolerances to be RMA Class 3 (see Table 1).

FIG. 1 Rubber Gasket *(continued)*

4.2 Clamp assembly screws or bolts shall not have screwdriver slots.

5. Elastomeric Gasket Requirements

5.1 The gaskets shall be tested in accordance with Test Methods D3677 and be manufactured from a properly vulcanized virgin compound where the primary elastomer is polychloroprene (neoprene).

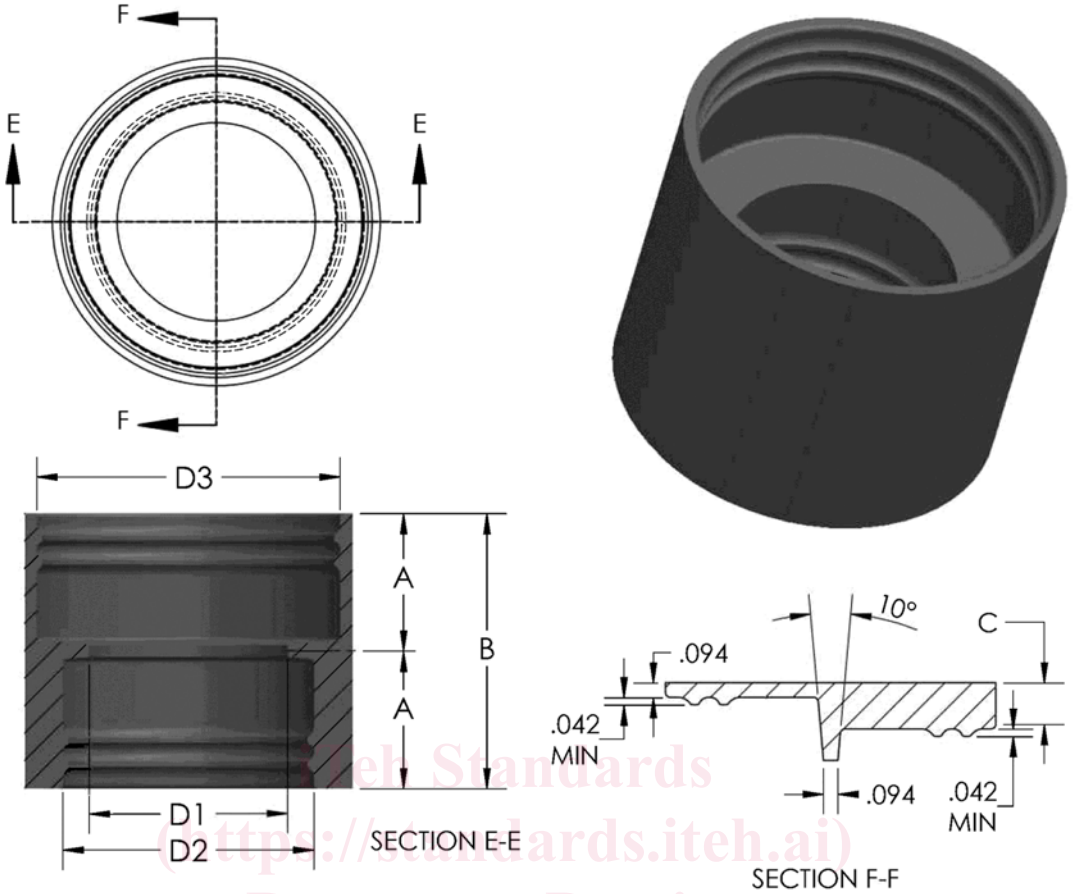
5.2 The elastomeric gasket shall consist of one piece conforming to the physical requirements of Specification C564. The gaskets shall be tested by the gasket manufacturer for compliance to Specification C564 during each day of production not to exceed 24 h for each size of gasket being produced. These tests shall be performed at the manufacturer's location during the time of production. These tests shall include hardness, elongation and tensile strength, tear strength, and compression set. Heat aging, water absorption, ozone resistance, and oil immersion tests shall be performed annually or when the formulation changes or sources of supply change, whichever occurs first.

5.2.1 The elastomeric gasket shall have an inside center stop that does not create an enlargement chamber or recess with a ledge, shoulder, or reduction of pipe area or offer an obstruction to flow.

5.2.2 The elastomeric gasket shall be free of defects that affect the use and serviceability.

6. Clamp Assembly Requirements

6.1 The shield and clamp assembly shall be made of material conforming to the requirements as outlined in Section 6, Table 3, and Fig. 3.



NOTE 1—Dimensions found in these drawings are for informational purposes only. The dimensions found in the table are mandatory. Tolerances are found in Fig. 2. Sealing ring shape and dimensions are to manufacturer's design.

	Dimensions for Reducing Sleeves		
	2 × 1½	3 × 2	4 × 3
A	1.062	1.062	1.062
B	2.125	2.125	2.125
C	0.297	0.594	0.625
D1	1.531	1.968	2.968
D2	1.937	2.343	3.343
D3	2.343	3.343	4.406

NOTE 2—Dimensional tolerances to be RMA Class 3 (see Table 1).

FIG. 2 Reducing Rubber Gasket

TABLE 1 Dimensional Tolerances for Rubber – Standard Dimensional Tolerances RMA CLASS 3

Size, in.	Fixed, ±	Closure, ±
0 to 0.499	0.010	0.015
0.500 to 0.999	0.010	0.018
1.000 to 1.999	0.015	0.020
2.000 to 2.999	0.020	0.025
3.000 to 3.999	0.025	0.030
4.000 to 4.999	0.030	0.035
5.000 to 7.999	0.035	0.050

NOTE 1—8.000 and over—multiplied by 0.0050. These are commercial tolerances. All diametral dimensions shall have a tolerance of ±1 %.

6.1.1 All parts shall be of 300 series stainless steel. All parts made from round stock shall be of 300 series stainless steel (excluding copper-bearing alloys). The shield shall be corrugated or otherwise provided with a mechanism to accommodate maximum and minimum ODs of pipe and fittings and include two stainless steel bands for sizes 1½ to 4 in., four bands for 5 to 10 in., and six bands for 12 and 15 in. Each tightening device housing shall interlock with a band at the unslotted end. The bands are to be fastened to the shield by riveting or such other method that will ensure that the bands will not become separated from the shield. The shield and clamp assembly shall comply with dimensions and material specifications as given in Table 3 and Figs. 3 and 4.

6.1.2 Clamp assemblies shall be tested to withstand no less than 125 % of the manufacturer's stated installation torque or a minimum of 60 lbf·in. (6.78 N·m) of applied torque, whichever is greater, without visible signs of failure. The clamp assembly shall be tested over a steel mandrel of the appropriate diameter and torqued as required. These tests shall be performed randomly on selected samples during the course

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