



# Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings<sup>1</sup>

This standard is issued under the fixed designation C564; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the U.S. Department of Defense.*

## 1. Scope

1.1 This specification covers preformed rubber gaskets used to seal joints in cast iron soil pipe and fittings.

1.2 The committee with jurisdiction over this standard is not aware of another comparable standard for materials covered in this standard.

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 following safety hazards caveat pertains only to the test methods section 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 and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

- A644 Terminology Relating to Iron Castings
- C1277 Specification for 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

<sup>1</sup> 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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<sup>2</sup> 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.

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

D1415 Test Method for Rubber Property—International Hardness

D2240 Test Method for Rubber Property—Durometer Hardness

D3677 Test Methods for Rubber—Identification by Infrared Spectrophotometry

### 2.2 Other Documents

RMA Class 3 Dimensional Tolerances, RMA Manual<sup>3</sup>

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<sup>4</sup>

## 3. Terminology

3.1 *Definitions*—For definitions of terms in this standard see Terminology A644.

### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *flash, n*—the excess material protruding from the surface of a molded article at the mold junction.

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

3.2.3 *virgin rubber, n*—a term that may be used interchangeably with raw rubber (raw thermoset elastomer). A rubber or thermoset elastomer that has not had any additional work, diluents incorporated, processes performed on it, or any combination thereof. A rubber that is in an unmodified state or one in which no attempt has been made to alter it in any fashion as received from the manufacturer or supplier.

## 4. Materials and Manufacture

4.1 Gaskets shall be made of a properly vulcanized virgin compound containing virgin rubber as the sole elastomer with no scrap or reclaim.

4.2 Gaskets manufactured for use in couplings complying with Specification C1277 or CISPI 310 shall be manufactured from a properly vulcanized virgin compound in which the

<sup>3</sup> Available from Association for Rubber Products Manufacturers (ARPM), 7321 Shadeland Station Way, Suite 285, Indianapolis, IN 46256, http://www.arpminc.org.

<sup>4</sup> Available from Cast Iron Soil Pipe Institute (CISPI), http://www.cispi.org.

primary elastomer is polychloroprene (neoprene). The gaskets shall be tested in accordance with Test Methods **D3677**.

## 5. Physical Requirements

5.1 Sample gaskets selected as specified in Section 8 shall conform to the requirements for physical properties listed in **Table 1** when tested in accordance with the methods specified in Section 9.

## 6. Dimensions and Permissible Variations

6.1 Gaskets shall conform to the dimensions specified by the manufacturer.

6.2 All cross-sectional dimensions shall have an RMA Class 3 tolerance as shown in **Annex A1**, and all diametral dimensions shall have a tolerance of  $\pm 1$  percent.

## 7. Workmanship

7.1 The surface of the gasket shall be smooth and free of pitting, cracks, blisters, air marks, and any other imperfections that will affect its behavior in service. The body of the gasket shall be free of porosity and air pockets.

7.2 Neither the flash thickness nor the flash extension shall exceed  $\frac{1}{32}$  in. (0.8 mm), at any point on the sealing ring.

7.3 The offset, or failure of the mold to register accurately, shall not exceed  $\frac{1}{64}$  in. (0.4 mm).

## 8. Sampling

8.1 For each of the tests, gaskets shall be selected at random and tests be performed by the method and frequency of the tests as specified in Section 9.

## 9. Test Methods

9.1 **Hardness**—The gasket material shall be tested for hardness in accordance with ASTM Test Method **D2240**. Test Method **D1415** shall be used as the referee method. Hardness measurements shall be made on specimens prepared in accordance with 9.2. However, hardness readings for guidance purposes shall be permitted to be taken directly on the gasket,

recognizing that these readings may vary slightly from those taken on the dumb-bell specimens. Tests shall be performed during the day of production not to exceed a 24-h period for each size and type gasket produced during that period.

9.2 **Elongation and Tensile Strength**—The gasket material shall be tested for elongation and tensile strength in accordance with Test Methods **D412**. Standard ASTM Type C dumb-bell specimens conforming to Fig. 1 (Apparatus for Tensile Set Test) of Test Methods **D412** shall be cut from a section of the gasket for this test. To obtain a uniform thickness, these gasket sections shall be permitted to be buffed prior to cutting into dumb-bell specimens, so as to produce a finely ground surface without cuts or burns. Tests shall be performed during the day of production not to exceed a 24-h period for each size and type gasket produced during that period.

9.3 **Tear Strength**—The gasket material shall be tested for tear strength in accordance with Test Method **D624** using Die C. Tests shall be performed during the day of production not to exceed a 24-h period for each size and type gasket produced during that period.

9.4 **Compression Set**—The gasket material shall be tested for compression set in accordance with Test Methods **D395** using Method B. Specimens shall be aged in an oven for 22 h at  $158 \pm 2^\circ\text{F}$  ( $70 \pm 1^\circ\text{C}$ ). Where plied specimens are necessary, the results shall comply with the requirements of **Table 1**. Tests shall be performed during the day of production not to exceed a 24-h period for each size and type gasket produced during that period.

9.4.1 When testing pipe gaskets, the prepared specimens shall be 1-in. disks cut from prepared samples .075 in. (1.905 mm) to .090-in. (2.286 mm) thick and not to exceed seven (7) plies. For hubless coupling gasket inserts a test specimen measuring .43 in. (10.922 mm)  $\times$  .75 in. (19.05 mm) may be cut directly from the part provided the sample is of consistent thickness. The thickness of the sample shall be measured in accordance with Test Methods **D395**, section 13.1. Since all specimens from hubless pipe gaskets are curved, not flat, it is important to measure the thickness in the center of the sample

**TABLE 1 Physical Requirements of Gaskets**

Property	Requirements			ASTM Test Method
	A	B	C	
Hardness (nominal durometer $\pm 5$ ) as specified by the pipe manufacturer	50	60	70	<b>D2240</b>
Elongation, min, %	350	300	250	<b>D412</b>
Tensile strength, min, psi	1500	1500	1500	<b>D412</b>
(MPa)	(10)	(10)	(10)	
Tear strength, min, lbf/in.	150	150	150	
(N/cm)	(268)	(268)	(268)	<b>D624</b>
Compression set, max, %	25	25	25	<b>D395</b>
Heat aging, 96 h at $158 \pm 2^\circ\text{F}$ ( $70 \pm 1^\circ\text{C}$ ):				<b>D573</b>
Hardness increase, max, durometer points	10	10	10	...
Loss in tensile strength, max,%	15	15	15	...
Loss in elongation, max, %	20	20	20	...
Water absorption:				<b>D471</b>
Weight increase, max, %	20	20	20	...
Ozone resistance	no cracks	no cracks	no cracks <sup>A</sup>	<b>D1149</b>
Oil immersion:				
Volume increase, max, %	80	80	80	<b>D471</b>

<sup>A</sup> Note—Ozone Resistance on 70 hardness Hubless Pipe Gaskets shall be tested at 1/1,000,000 (1PPM).