Designation: C 564 – 97

Endorsed by the
Cast Iron Soil Pipe Institute

Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings[1]

This standard is issued under the fixed designation C 564; 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.

This standard has been approved for use by agencies of the 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 values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 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:*

C 717 Terminology of Building Seals and Sealants[2]

D 395 Test Methods for Rubber Property—Compression Set[3]

D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension[3]

D 471 Test Method for Rubber Property—Effect of Liquids[3]

D 573 Test Method for Rubber—Deterioration in an Air Oven[3]

D 624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers[3]

D 1149 Test Method for Rubber Deterioration—Surface Ozone Cracking in a Chamber[3]

D 1415 Test Method for Rubber Property—International Hardness[3]

D 2240 Test Method for Rubber Property—Durometer Hardness[3]

2.2 *Other Documents*

RMA *Class 3 Dimensional Tolerances, RMA Manual*[4]

3. Terminology

3.1 *Definitions*—For definitions of terms in this standard see Terminology C 717.

3.2 *Definitions of Terms Specific to This Standard:*

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

3.2.2 *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.

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 ± 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 0.8 mm (1⁄32 in.), at any point on the sealing ring.

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[1] This specification is under the jurisdiction of ASTM Committee C24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.75 on Gaskets and Couplings for Plumbing and Sewer Piping.

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[2] *Annual Book of ASTM Standards*, Vol 04.07.

[3] *Annual Book of ASTM Standards*, Vol 09.01.

[4] Rubber Manufacturer's Association, 1400 K Street NW, No. 900, Washington, DC 20005 – 2455.

TABLE 1 Physical Requirements of Gaskets

Property	Requirements			ASTM Test Method
Hardness (nominal durometer ±5) as specified by the pipe manufacturer	50	60	70	D 2240
Elongation, min, %	350	300	250	D 412
Tensile strength, min, MPa	10	10	10	D 412
(psi)	(1500)	(1500)	(1500)	
Tear strength, min, N/cm	268	268	268	D 624
(lbf/in.)	(150)	(150)	(150)	
Compression set, max, %	25	25	25	D 395
Heat aging, 96 h at 70 ± 1°C (158 ± 2°F):				D 573
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:				D 471
Weight increase, max, %	20	20	20	...
Ozone resistance	no cracks	no cracks	no cracks	D 1149
Oil immersion:				
Volume increase, max, %	80	80	80	D 471

7.3 The offset, or failure of the mold to register accurately, shall not exceed 0.4 mm (1⁄64 in.).

8. Sampling

8.1 For each of the tests, gaskets shall be selected at random as required by the method of test specified.

9. Test Methods

9.1 *Hardness*—The gasket material shall be tested for hardness in accordance with ASTM Test Method D 2240. Test Method D 1415 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.

9.2 *Elongation and Tensile Strength*—The gasket material shall be tested for elongation and tensile strength in accordance with Test Methods D 412. Standard ASTM Type C dumb-bell specimens conforming to Fig. 1 (Apparatus for Tensile Set Test) of Test Methods D 412 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.

9.3 *Tear Strength*— The gasket material shall be tested for tear strength in accordance with Test Method D 624 using Die C.

9.4 *Compression Set*— The gasket material shall be tested for compression set in accordance with Test Methods D 395 using Method B. Specimens shall be aged in an oven for 22 h at 70 ± 1°C (158 ± 2°F). Where plied specimens are necessary, the results shall comply with the requirements of Table 1.

9.5 *Heat Aging*—The gasket material shall be tested for effects of heat aging in accordance with 9.2, and shall be aged for 96 h at 70 ± 1°C (158 ± 2°F). Hardness measurements shall be made as specified in 9.1.

9.6 *Water Absorption*—The gasket material shall be tested for weight increase due to water absorption in accordance with Test Method D 471. If a 25.4-mm (1-in.) specimen cannot be cut from the sample gasket, the greatest width obtainable shall be used. The test specimen shall be immersed in distilled water at 70 ± 1°C (158 ± 2°F) for 7 days.

9.7 *Ozone Resistance*—The gasket material shall be tested for ozone resistance in accordance with Test Method D 1149, using specimens and procedure specified under Method B. The ozone concentration shall be 150 parts/100 000 000 of air by volume. Specimens shall be aged 100 ± 1h at 40 ± 1°C (104 ± 2°F). A two-power hand magnifying glass shall be used to examine the gasket for cracks.

9.8 *Oil Immersion*— The gasket material shall be tested for volume decrease due to oil absorption in accordance with Test Method D 471. If a 25.4 mm (1-in.) specimen cannot be cut from the sample gasket, the greatest width obtainable shall be used. The test specimen shall be immersed in IRM 903 for 70 ± 0.7 h at 100 ± 1°C (212 ± 2°F).

10. Certification

10.1 When requested, the manufacturer shall certify that the product conforms to the requirements of this specification.

11. Marking

11.1 Mark each gasket with clearly legible letters not exceeding 6.35 mm (¼ in.) in height. These markings shall include the gasket manufacturer's name or symbol, the pipe size and class (such as NH for no hub, SV for service, XH for extra heavy), the year of manufacture, country of origin and the ASTM specification designation.

12. Keywords

12.1 cast iron; fittings; gaskets; pipe; rubber

ANNEX

(Mandatory Information)

A1. RUBBER MANUFACTURERS ASSOCIATION, INC. TOLERANCES

See Table A1.1.

TABLE A1.1 RMA Class 3 Dimensional Tolerances (Commercial Tolerances)

Size, mm, (in.)	Fixed[A]	Closure[B,C]
0 to 12.67 (0 to 0.499)	±0.254 (±0.010)	±0.381 (±0.015)
12.7 to 25.37 (0.500 to 0.999)	±0.254 (±0.010)	±0.457 (±0.018)
24.4 to 50.77 (1.000 to 1.999)	±0.381 (±0.015)	±0.508 (±0.020)
50.8 to 76.17 (2.000 to 2.999)	±0.508 (±0.020)	±0.635 (±0.025)
76.2 to 101.57 (3.000 to 3.999)	±0.635 (±0.025)	±0.762 (±0.030)
101.6 to 126.97 (4.000 to 4.999)	±0.762 (±0.030)	±0.889 (±0.035)
127.0 to 203.17 (5.000 to 7.999)	±0.889 (±0.035)	±1.27 (±0.050)
Greater than 203.2 (Greater than 8.000)	multiply by	1.27 (0.0050)

[A] Fixed dimensions are those that are parallel to the mold parting line or major mold sections and that are not affected by flash thickness variations. Tolerances apply individually to each fixed dimension according to its own size.
[B] Closure dimensions are those vertical to the mold parting line or parting lines of major sections and are affected by flash thickness variation.
[C] The tolerance on closure dimensions is that tolerance for the largest closure dimension. This tolerance is then applied to all other closure dimensions.