



Designation: **C1440–08 (Reapproved 2013)^{ε1} C1440 – 17**

Standard Specification for Thermoplastic Elastomeric (TPE) Gasket Materials for Drain, Waste, and Vent (DWV), Sewer, Sanitary, and Storm Plumbing Systems¹

This standard is issued under the fixed designation C1440; 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.

^{ε1} NOTE—Editorial changes were made throughout in October 2013.

1. Scope

1.1 This specification covers thermoplastic elastomeric (TPE) gasket materials for preformed elastomeric gaskets used in shielded and non-shielded mechanical couplings. These couplings are used in gravity flow drain, waste, and vent (DWV), sewer, sanitary, and storm plumbing systems. They include couplings to join similar and dissimilar piping sizes and material.

1.2 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.

1.3 *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.*

1.4 *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

A644 Terminology Relating to Iron Castings

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

D1415 Test Method for Rubber Property—International Hardness

D2240 Test Method for Rubber Property—Durometer Hardness

D5964 Practice for Rubber IRM 901, IRM 902, and IRM 903 Replacement Oils for ASTM No. 1, ASTM No. 2, ASTM No. 3 Oils, and IRM 905 formerly ASTM No. 5 Oil

3. Terminology

3.1 *Definitions*—Refer to Terminology A644 for definitions of the following terms used in this specification: *elastomer, elastomeric, elongation, gasket, hardness, preformed gasket*-(see *gasket*), *thermoplastic elastomer*.

4. Materials and Manufacture

4.1 Gaskets shall be made of virgin thermoplastic elastomeric compound containing only clean compound, where the primary elastomer is a thermoplastic vulcanizate containing only clean, reworked thermoplastic elastomer material from the manufacturer's own production of the same compound.

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.

4.2 Where splices are made in the gasket, the strength of the splice shall be such that the gasket will withstand the stretch test described in 8.9 with no visible separation or peeling.

4.3 Many thermoplastic elastomeric materials (TPE)(TPEs) are temperature sensitive. Designed operating temperature range for the 8790 Shore A TPE materials is 0° to 130° F (-18° to 55° C); 0 to 130° F (-18 to 55° C). These materials are not designed or intended for prolonged operation outside this range.

5. Physical Properties

5.1 Gaskets representative of the manufacturer's production shall be selected as specified in Section 7 and shall conform to the requirements for physical properties listed in Table 1 when tested in accordance with the methods specified in Section 8.

6. Workmanship, Finish, and Appearance

6.1 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.

6.2 Neither the flash thickness nor the flash extension shall exceed $\pm 32^{1/32}$ in. (0.8 mm), at any point on the ring.

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

7. Sampling

7.1 For the stretch test specified in 8.9, sample gaskets shall be selected at random from each shipment of gaskets. For each of the other tests, gaskets shall be selected at random as required by the method of test specified.

8. Test Methods

8.1 *Hardness*—Test the gasket material for hardness in accordance with Test Method D2240. As required, use Test Method D1415 as the referee method. Make hardness measurements on specimens prepared in accordance with 8.2. However, hardness readings for guidance purposes shall be taken directly on the gasket, recognizing that these shall be permitted to vary slightly from those taken on the dumbbell specimens.

TABLE 1 Physical Requirements of Gasket Materials

Properties Tested	ASTM Test Method	TPE ^A
Hardness, Shore A (± 5 pts)	D2240	87 (5 s Delay)
Hardness, Shore A (± 5 pts)	D2240	90 (5 s Delay)
Elongation, min, %	D412	250
Tensile Strength, min, psi (kPa)	D412	1500 (10 342)
Tensile Strength, min, psi (kPa)	D412	1500 (10 342)
Heat Aging	D573	
96 h at $158 \pm 4^{\circ}$ F ($70 \pm 2^{\circ}$ C)		
96 h at $158 \pm 4^{\circ}$ F ($70 \pm 2^{\circ}$ C)		
Hardness increase, max, pts, Shore A		10
Loss in tensile strength, max, %		15
Loss in elongation, max, %		20
Tear Strength, min, lbf/in (N/cm)	D624	150(268)
Tear Strength, min, lbf/in (N/cm)	D624	150 (268)
Water Absorption	D471	
7 days at $158 \pm 4^{\circ}$ F ($70 \pm 2^{\circ}$ C)		
7 days at $158 \pm 4^{\circ}$ F ($70 \pm 2^{\circ}$ C)		
Weight increase, max, %		20
Ozone Resistance	D1149	No cracks
100 h at $104 \pm 4^{\circ}$ F ($40 \pm 2^{\circ}$ C)		
100 h at $104 \pm 4^{\circ}$ F ($40 \pm 2^{\circ}$ C)		
Ozone Concentration 150 pphm		
20 % Extension		
Compression Set, max %	D395	12
Compression Set, max, %	D395	12
22 h at $158 \pm 2^{\circ}$ F ($70 \pm 1^{\circ}$ C)	Method A	
22 h at $158 \pm 2^{\circ}$ F ($70 \pm 1^{\circ}$ C)	Method A	
Oil Immersion in IRM 903 Oil	D471	
70 h at $212 \pm 4^{\circ}$ F ($100 \pm 2^{\circ}$ C)		
70 h at $212 \pm 4^{\circ}$ F ($100 \pm 2^{\circ}$ C)		
Max Volume Increase, %		80
Max Volume Decrease, %		15

^ADesigned operating temperature for Shore A TPE materials is 0° to 130° F (-18° to 55° C); 0 to 130° F (-18 to 55° C). These materials are not designed or intended for prolonged operation outside this range.