



## Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 40<sup>1</sup>

This standard is issued under the fixed designation D 2468; 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 Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.*

### 1. Scope

1.1 This specification covers acrylonitrile-butadienestyrene (ABS) Schedule 40 pipe fittings. Included are requirements for materials, workmanship, dimensions, and burst pressure.

1.2 The text of this specification references notes, footnotes, and appendixes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the specification.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 The following safety hazards caveat pertains only to the test method portion, Section 8, 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:

- D 618 Practice for Conditioning Plastics for Testing<sup>2</sup>
- D 1599 Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings<sup>3</sup>
- D 1600 Terminology for Abbreviated Terms Relating to Plastics<sup>2</sup>
- D 1788 Specification for Rigid Acrylonitrile-Butadiene-Styrene (ABS) Plastics<sup>4</sup>
- D 2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings<sup>3</sup>
- F 412 Terminology Relating to Plastic Piping Systems<sup>3</sup>
- F 1498 Specification for Taper Pipe Threads 60° for Thermoplastic Pipe and Fittings<sup>3</sup>

#### 2.2 NSF Standard:

Standard No. 14 for Plastic Piping Components and Related Materials<sup>5</sup>

### 3. Terminology

3.1 Definitions are in accordance with Terminology F 412 and abbreviations are in accordance with Terminology D 1600, unless otherwise specified. The abbreviation for acrylonitrile-butadiene-styrene plastics is ABS.

### 4. Classification

4.1 *General*—This specification covers Schedule 40 ABS pipe fittings, made from four ABS plastic compounds and intended for use with Iron Pipe Size (IPS) outside-diameter plastic pipe.

4.1.1 Fittings covered by this specification are normally molded. Inline fittings, such as couplings, unions, bushings, caps, nipples, etc., shall be molded or machined from extruded stock.

4.1.2 Fittings fabricated by welding are not included in this specification.

### 5. Materials

5.1 This specification covers ABS pipe fittings made from four ABS plastics as defined in Specification D 1788. These are Type I, Grade 1 (cell 322); Type I, Grade 2 (cell 522); Type I, Grade 3 (cell 355); and Type II, Grade 1 (cell 445).

5.2 *Compound*—The ABS plastic compound shall meet the requirements of Type I, Grade 1; Type I, Grade 2; Type I, Grade 3; or Type II, Grade 1, as described in Specification D 1788.

NOTE 1—Mechanical strength, heat resistance, impact strength, and chemical resistance requirements are covered in Specification D 1788.

5.3 *Rework Material*—The manufacturers shall use only their own clean rework fitting material and the fittings produced shall meet all the requirements of this specification.

### 6. Requirements

#### 6.1 Dimensions and Tolerances:

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee F-17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.10 on Fittings. Current edition approved Sept. 10, 1996. Published November 1996. Originally published as D 2468 – 65 T. Last previous edition D 2468 – 96.

<sup>2</sup> Annual Book of ASTM Standards, Vol 08.01.

<sup>3</sup> Annual Book of ASTM Standards, Vol 08.04.

<sup>4</sup> Annual Book of ASTM Standards, Vol 08.02.

<sup>5</sup> Available from the National Sanitation Foundation, P.O. Box 1468, Ann Arbor, MI 48106.

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6.1.1 Fitting sockets, inside diameters (waterways), minimum wall thicknesses, and dimensions shall be as shown in Tables 1-3 when measured in accordance with Test Method D 2122.

6.1.2 Multistep reducer bushings may be cored out. Where coring is used, the inner socket shall be reinforced from the outer wall by a minimum of three ribs extending from the top of the inner socket to the deepest extremity of the coring. The transition from D to DJ (Table 3) may be straight, tapered as shown, or radiused. A positive taper in the same direction of the taper in the socket on the outside diameter of the bushing is optional.

6.1.3 The maximum angular variation of any opening shall be not more than 1/2° off the true centerline axis.

6.1.4 The minimum wall thickness of fittings shall be 125 % of the minimum wall thickness of the corresponding size of Schedule 40 pipe for which they are designed to be used, except that for the socket, the wall thickness shall be at least equal to the minimum wall thickness of the corresponding size of Schedule 40 pipe. For any threaded fitting the minimum wall thickness of the threaded portion shall be at least equal to the thickness of material under the thread root of threaded Schedule 80 pipe of the same size.

6.1.5 The minimum inside diameter of the fittings shall be not less than the minimum specified inside diameter of the corresponding size of Schedule 40 pipe. Any fitting having a male thread shall have an internal diameter not larger than Schedule 80 pipe of the same size.

6.1.6 Minimum dimensions have zero negative tolerance.

Tolerances on other dimensions are shown in Table 1 and Table 3.

6.2 *Threads*—For all fittings having taper pipe threads, threads shall conform to Specification F 1498 and be gaged in accordance with 8.4.

6.3 *Burst Pressure*:

6.3.1 The minimum burst strength of the fittings shall be not less than that calculated for the size and wall thickness of the pipe with which it is to be used, when calculated from the following equation:

$$S = P(D_o - t)2t \quad (1)$$

where:

*S* = hoop stress, psi (MPa),

*P* = internal pressure, psi (MPa),

*D* = average outside diameter, in. (mm), and

*t* = minimum wall thickness, in. (mm).

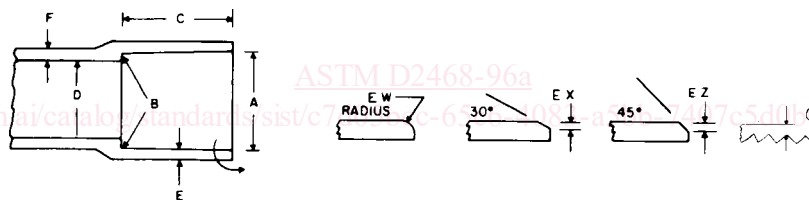
Fittings tested in accordance with 8.5 shall withstand the minimum burst pressure shown in Table 4.

6.3.2 Pressures shown are minimum burst pressures and do not imply rated working pressures. The burst pressure shall be used only as an indication of quality.

### 7. Workmanship, Finish, and Appearance

7.1 The fittings shall be homogeneous throughout and free of cracks, holes, foreign inclusions, or other defects. The fittings shall be as uniform as commercially practicable in color, opacity, density, and other physical properties.

**TABLE 1 Tapered Sockets for ABS Pipe Fittings, Schedule 40, in.<sup>A</sup>**



Nominal Pipe Size	A Socket Entrance Diameter			B Socket Bottom Diameter			C Socket Length, min	D <sup>B</sup> Inside Diameter, min	Wall Thickness, min			Entrance, min		
	Diameter	Tolerance on Diameter	Maximum Out-of-Round	Diameter	Tolerance on Diameter	Maximum Out-of-Round			E	F	G	EW	EX	EZ
1/8	0.417	±0.004	±0.008	0.401	±0.004	±0.008	0.500	0.265	0.068	0.085	0.056	1/64	1/64	1/64
1/4	0.552	±0.004	±0.008	0.536	±0.004	±0.008	0.500	0.360	0.088	0.110	0.063	1/64	1/64	1/64
3/8	0.687	±0.004	±0.008	0.671	±0.004	±0.008	0.594	0.489	0.091	0.114	0.068	1/32	1/32	1/32
1/2	0.848	±0.004	±0.008	0.836	±0.004	±0.008	0.688	0.618	0.109	0.136	0.072	1/32	1/32	1/32
3/4	1.058	±0.004	±0.010	1.046	±0.004	±0.010	0.719	0.820	0.113	0.141	0.079	1/32	1/32	1/32
1	1.325	±0.005	±0.010	1.310	±0.005	±0.010	0.875	1.044	0.133	0.166	0.087	1/16	1/16	1/16
1 1/4	1.670	±0.005	±0.012	1.655	±0.005	±0.012	0.938	1.375	0.140	0.175	0.098	1/16	1/16	1/16
1 1/2	1.912	±0.006	±0.012	1.894	±0.006	±0.012	1.094	1.604	0.145	0.181	0.106	1/16	1/16	1/16
2	2.387	±0.006	±0.012	2.369	±0.006	±0.012	1.156	2.061	0.154	0.193	0.123	1/16	1/16	1/16
2 1/2	2.889	±0.007	±0.015	2.868	±0.007	±0.015	1.750	2.462	0.203	0.254	0.139	3/32	1/8	1/8
3	3.516	±0.008	±0.015	3.492	±0.008	±0.015	1.875	3.060	0.216	0.270	0.160	3/32	1/8	1/8
3 1/2	4.016	±0.008	±0.015	3.992	±0.008	±0.015	2.000	3.540	0.226	0.283	0.183	3/32	1/8	1/8
4	4.518	±0.009	±0.015	4.491	±0.009	±0.015	2.000	4.017	0.237	0.296	0.194	3/32	1/8	1/8
5	5.583	±0.010	±0.030	5.553	±0.010	±0.030	3.000	5.037	0.258	0.323	0.228	3/32	1/8	1/8
6	6.647	±0.011	±0.030	6.614	±0.011	±0.030	3.000	6.054	0.280	0.350	0.281	1/8	3/16	3/16
8	8.655	±0.015	±0.045	8.610	±0.015	±0.045	4.000	7.966	0.322	0.403	0.341	1/8	3/16	3/16

<sup>A</sup> The sketches and designs of fittings are illustrative only.

<sup>B</sup> See 6.1.5.