



Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings¹

This standard is issued under the fixed designation D2661; 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 U.S. Department of Defense.

1. Scope*

1.1 This specification covers fittings and single and coextruded acrylonitrile-butadiene-styrene (ABS) plastic drain, waste, and vent pipe (DWV) made to Schedule 40 iron pipe sizes (IPS). Plastic which does not meet the material requirements specified in Section 5 is excluded from single layer and all coextruded layers.

1.2 Specification for fittings for use with pipe meeting the requirements of this specification are given in **Annex A1**.

1.3 Acrylonitrile-butadiene-styrene plastic, which does not meet the definition of virgin ABS plastic as given in **3.2.2**, is excluded, as performance of plastic other than those defined as virgin was not determined. ABS rework plastic, which meets the requirements of rework plastic as given in **5.3**, is acceptable.

1.4 Reprocessed plastic or recycled plastic as defined in Terminology **D883** is excluded.

1.5 Recommendations for storage, joining, and installation are provided in **Appendix X1**, **Appendix X2**, and **Appendix X3**, respectively.

1.6 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.

1.7 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.

1.8 *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 Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

- D618** Practice for Conditioning Plastics for Testing
- D883** Terminology Relating to Plastics
- D1600** Terminology for Abbreviated Terms Relating to Plastics
- D1898** Practice for Sampling of Plastics (Withdrawn 1998)³
- D2122** Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
- D2235** Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings
- D2321** Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
- D2412** Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
- D2444** Practice for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
- D3311** Specification for Drain, Waste, and Vent (DWV) Plastic Fittings Patterns
- D3965** Classification System and Basis for Specifications for Rigid Acrylonitrile-Butadiene-Styrene (ABS) Materials for Pipe and Fittings
- E105** Guide for Probability Sampling of Materials
- E122** Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process
- F402** Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings
- F412** Terminology Relating to Plastic Piping Systems

¹ This specification is under the jurisdiction of ASTM Committee **F17** on Plastic Piping Systems and is the direct responsibility of Subcommittee **F17.63** on DWV.

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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 The last approved version of this historical standard is referenced on www.astm.org.

*A Summary of Changes section appears at the end of this standard

F1498 Specification for Taper Pipe Threads 60° for Thermo-plastic Pipe and Fittings

F2135 Specification for Molded Drain, Waste, and Vent (DWV) Short-Pattern Plastic Fittings

2.2 *Federal Standard:*

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)⁴

2.3 *Military Standard:*

MIL-STD-129 Marking for Shipment and Storage⁴

3. Terminology

3.1 Definitions:

3.1.1 Definitions are in accordance with Terminology **F412**, and abbreviations are in accordance with Terminology **D1600**, unless otherwise specified. The abbreviation for acrylonitrile-butadiene-styrene is ABS.

3.1.2 *coextruded pipe*—pipe consisting of two or more concentric layers of material bonded together in processing by any combination of temperature, pressure, grafting, crosslinking, or adhesion.

3.1.3 *coextrusion*—a process whereby two or more heated or unheated plastic material streams forced through one or more shaping orifice(s) become one continuously formed piece.

3.1.4 *room temperature*—a temperature in the range from 68 °F to 85 °F ± 3.6 °F (20 °C to 30 °C ± 2 °C).

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *lot*—a lot shall consist of all pipe of the same size produced from one extrusion line during one designated 24 h period.

3.2.2 *recycled plastic*—a plastic prepared from discarded articles that have been cleaned and reground.

3.2.3 *reprocessed plastic*—a thermoplastic usually prepared from melt processed scrap or reject parts by a plastics processor, or from nonstandard or nonuniform virgin material.

3.2.4 *virgin ABS plastic*—plastic in the form of pellets, granules, powder, floc, or liquid that has not been subjected to use or processing other than that required for its initial manufacture.

4. Classification

4.1 The requirements of this specification are intended to provide pipe suitable for the drainage and venting of sewage and certain other liquid wastes.

NOTE 1—Industrial waste disposal lines should be installed only with the specific approval of the cognizant building code authority since chemicals not commonly found in drains and sewers and temperatures in excess of 180°F (82°C) may be encountered.

NOTE 2—This specification does not include requirements for pipe and fittings intended to be used to vent combustion gases.

5. Materials

5.1 *Material Specification*—Virgin black ABS plastic shall conform to the requirements prescribed in Specification **D3965** with a cell classification of 4-2-2-2. The form of the material shall be as agreed upon between the seller and the purchaser in accordance with Specification **D3965**.

5.2 The ABS plastic shall conform to the following requirements:

5.2.1 *Acrylonitrile-Butadiene-Styrene (ABS) Plastic*—Plastic containing polymers or blends of polymers shall contain a minimum of 15 % acrylonitrile, 6 % butadiene, and 15 % styrene or substituted styrene, or both. ABS plastic shall contain no more than 10 % of other monomeric or polymeric components plus other necessary compounding ingredients.

5.3 *Rework Material*—The manufacturer shall use only his own clean pipe or fitting rework material conforming with these cell class requirements. The pipe or fittings produced shall meet all the requirements of this specification.

6. Requirements

6.1 *General*—The pipe and fittings shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, or other injurious defects. The pipe shall be as uniform as commercially practicable in color, opacity, density, and other physical properties.

6.1.1 The requirements in this section are intended only for use as quality control tests, not as simulated service tests.

6.2 Dimensions and Tolerances:

6.2.1 *Outside Diameter*—The outside diameter and tolerances shall meet the requirements of **Table 1** when measured in accordance with Test Method **D2122**. The tolerance for out-of-roundness shall apply to pipe prior to shipment.

⁴ Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, <http://quicksearch.dla.mil>.

TABLE 1 Outside Diameters and Tolerances for ABS Schedule 40 Plastic Drain, Waste, and Vent Pipe

Nominal Pipe Size, in.	Outside Diameter		
	Average, in. (mm)	Tolerance on Average, in. (mm)	Out-of-Roundness Maximum Diameter Minus Minimum Diameter, in. (mm) ⁴
1¼	1.660 (42.16)	+0.010, -0.000 (+0.25, -0.00)	0.024 (0.60)
1½	1.900 (48.26)	+0.010, -0.000 (+0.25, -0.00)	0.024 (0.60)
2	2.375 (60.32)	+0.010, -0.000 (+0.25, -0.00)	0.024 (0.60)
3	3.500 (88.90)	+0.015, -0.000 (+0.38, -0.00)	0.030 (0.76)
4	4.500 (114.30)	+0.015, -0.000 (+0.38, -0.00)	0.030 (0.76)
6	6.625 (168.28)	+0.011, -0.011 (+0.28, -0.28)	0.050 (1.27)

⁴ Measured at time of manufacturing.