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.

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An American National Standard

Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core[1]

This standard is issued under the fixed designation F628; 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.

1. Scope*

1.1 This specification covers coextruded acrylonitrile-butadiene-styrene (ABS) plastic drain, waste, and vent pipe made to Schedule 40 iron pipe sizes (IPS) and produced by the coextrusion process with concentric inner and outer solid ABS layers and the core consisting of closed-cell cellular ABS. Plastic which does not meet the material requirements specified in Section 5 is excluded from single layer and all coextruded layers.

1.2 Fittings suitable for use with pipe meeting the requirements of this specification are given in Annex A1. Fittings meeting the requirement of Specification D2661 are also acceptable.

1.3 Acrylonitrile-butadiene-styrene plastic which does not meet the definitions of virgin ABS plastic as given in 3.2.4 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 the standard. The values given in parentheses are for information only.

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 Recommendations 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)

D2661 Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings

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

E1508 Guide for Quantitative Analysis by Energy-Dispersive Spectroscopy

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,

[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**

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Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings
F412 Terminology Relating to Plastic Piping Systems
F1498 Specification for Taper Pipe Threads 60° for Thermoplastic Pipe and 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 Storage[4]

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 plastic is ABS.

3.1.2 *cellular plastic*—a plastic containing numerous cells, intentionally introduced, interconnecting or not, distributed throughout the mass.

3.1.3 *closed-cell cellular plastic*—cellular plastic in which almost all the cells are noninterconnecting.

3.1.4 *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.

3.1.5 *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.

3.1.6 *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 produced, of one size, 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 prepared from usually 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 Pipe produced in accordance with this specification is intended to provide pipe suitable for the drainage and venting of sewage and certain other non-hazardous liquid wastes.

NOTE 1—Before installing pipe for waste disposal use, the approval of the cognizant building code authority should be obtained as conditions not commonly found in normal use may be encountered and temperatures in excess of 180 °F (82 °C) may be encountered.

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

5. Materials

5.1 *Material Specification*—Virgin ABS plastic shall conform to the requirements prescribed in Specification D3965 with a cell classification of 4-2-2-2-2. The color and 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 shall contain a minimum of 15 % acrylonitrile, 6 % butadiene, and 15 % styrene or substituted styrene, or both, of polymers or blends of polymers.

5.2.2 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 rework pipe material conforming with these cell class requirements. Use it only in the core layer. The pipe produced shall meet all the requirements of this specification.

6. Requirements

6.1 *General*—The pipe and fittings should 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 *Dimension and Tolerance:*

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 tolerances for out-of-roundness shall apply to pipe prior to shipment.

6.2.2 *Wall Thickness*—The wall thickness and tolerances shall meet the requirements of Table 2 when measured in accordance with Test Method D2122.

6.2.3 *Length*—The pipe shall be in either 10 ft or 20 ft (3.05 m or 6.1 m) lengths, unless otherwise specified. The allowable tolerance on length shall be +½, −0 in. (+12, −0 mm).

6.3 *Performance Requirements:*

6.3.1 *Pipe Stiffness*—The minimum pipe stiffness values at 5 % deflection when measured in accordance with Test Method D2412, shall equal or exceed the values in Table 3. The rate of crosshead motion shall be 0.20 in./min to 0.25 in./min (5.1 mm/min to 6.3 mm/min). Three specimens shall be tested. If all three meet this requirement, the sample meets this requirement. If one or two fail, additional testing shall be conducted in accordance with 6.3.1.1. If all three fail, the sample does not meet the requirement.

6.3.1.1 *Pipe Stiffness and Lower Confidence Limit*—In the event that one or two of the specimens tested in 6.3.1 fail to meet the minimum requirement, the average pipe stiffness of eleven specimens shall meet or exceed the minimum requirement given in Table 3. The 99 % lower confidence limit (LCL)

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