



Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80¹

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1. Scope*

1.1 This specification covers water well casing pipe and couplings made from thermoplastic materials in standard dimension ratios (SDR), SCH 40 and SCH 80.

1.2 Specifications are provided for the application of these materials to water well and ground water monitoring applications. Flush threaded joint systems are included for screen and casing used primarily in the construction of ground water monitoring wells (see Practice D5092/D5092M).

1.3 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. (See IEEE/ASTM SI 10.)

NOTE 1—Certain field conditions may require alternative materials to ensure safe long-term use. The user should consult federal, state, and local codes governing the use of thermoplastic materials for well casing or monitor pipe.

NOTE 2—This standard specifies dimensional, performance and test requirements for plumbing and fluid handling applications, but does not address venting of combustion gases.

1.4 Although the pipe sizes and SDR values listed in this specification are generally available, numerous other plastic pipes in Schedule 40 and 80 wall, other SDR values and various outside diameters have been used for well casing. Such products are often selected because they fulfill certain needs and Annex A1 includes a list of these Plastic Pipe Well Casing Specials.

1.5 The following safety hazards caveat pertains only to the test method portion, Section 6, 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 This international standard was developed in accordance with internationally recognized principles on standard-

ization 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
- D638 Test Method for Tensile Properties of Plastics
- D653 Terminology Relating to Soil, Rock, and Contained Fluids
- D1527 Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80 (Withdrawn 2013)³
- D1600 Terminology for Abbreviated Terms Relating to Plastics
- D1784 Classification System and Basis for Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
- D1785 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- D1892 Specification for Styrene-Butadiene Molding and Extrusion Materials (Withdrawn 1987)³
- 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
- D2241 Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
- D2282 Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (Withdrawn 2006)³
- 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)

¹ This specification is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.61 on Water.

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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



D2564 Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
D2855 Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets
D3122 Specification for Solvent Cements for Styrene-Rubber (SR) Plastic Pipe and Fittings
D3965 Classification System and Basis for Specifications for Rigid Acrylonitrile-Butadiene-Styrene (ABS) Materials for Pipe and Fittings
D5092/D5092M Practice for Design and Installation of Groundwater Monitoring Wells
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
IEEE/ASTM SI 10 American National Standard for Use of the International System of Units (SI): The Modern Metric System

2.2 ANSI Standards:⁴

B1.5 ACME Screw Threads

B1.8 Stub ACME Screw Threads

B1.9 Buttress Inch Screw Threads

2.3 Federal Standard:⁵

FED-STD-123 Marking for Shipment (Civil Agencies)

2.4 Military Standard:⁵

MIL-STD-129 Marking for Shipment and Storage

2.5 Other Standards:

Screw-Threads Standards for Federal Services 1957, Handbook H28, Part III⁶

NSF 14 Plastic Piping System Components and Related Materials

NSF 61 Drinking Water System Components⁷

3. Terminology

3.1 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. The abbreviation for poly(vinyl chloride) is PVC. The abbreviation for styrene-rubber is SR.

3.2 Ground water investigation terms are in accordance with Terminology **D653**.

4. Classification

4.1 Well casing is produced in either plain end, belled end, or threaded, and is used for water wells, ground water monitoring, leak detection, recovery systems, dewatering systems, and waste disposal.

5. Materials and Manufacture

5.1 *Specification*—The material described shall meet or exceed the requirements of (1) Specification **D3965** for ABS with a cell classification of 44322 or 33333, (2) Specification **D1784** for PVC with a cell classification of 12454 or 14333, or (3) Specification **D1892** for SR with a cell classification of 4434A. The material so described shall be approved for potable water.

NOTE 3—Caution should be exercised to control heat of hydration during grouting as thermoplastic materials are heat sensitive. Accelerators tend to increase the heat of hydration and are not recommended.

5.2 Acrylonitrile-butadiene-styrene (ABS) well casing pipe and couplings plastic shall be virgin plastic produced by the original compounder (see Specification **D1527**). The minimum butadiene content is 6 %; the minimum acrylonitrile content is 15 %; the minimum styrene or substituted styrene content, or both, is 15 %; and the maximum content of other monomers is 5 % and lubricants, stabilizers, and colorants.

5.3 Poly(vinyl chloride) (PVC) well casing pipe and couplings plastic shall be made of virgin plastic produced by the original compounder. It shall contain poly(vinyl chloride) homopolymer, and such additives—stabilizers, lubricants, processing aids, impact improvers, and colorants—as needed to provide the required processing and toughness characteristics (see Test Method **D638**).

5.4 The SR plastics compound shall contain at least 50 % styrene plastics, combined with rubbers to a minimum rubber content of 5 %, and compounding materials such as antioxidants and lubricants, and may contain up to 15 % acrylonitrile combined in the styrene plastics or rubbers, or both. The rubbers shall be of the poly-butadiene or butadiene-styrene type, or both, with a maximum styrene content of 25 % or nitrile type, or both. The combined styrene plastics and rubber content shall be not less than 90 %.

5.5 *Rework Material*—Clean rework material generated from the manufacturer's own well casing pipe and couplings production may be used by the same manufacturer, provided the well casing pipe and couplings produced meet all the requirements of this specification.

5.6 Solvent Cement:

5.6.1 *Specification*—The solvent cement shall meet the requirements of Specification **D2235** for ABS, Specification **D2564** for PVC, or Specification **D3122** for SR (see Supplementary Requirements S3).

6. Requirements

6.1 *Workmanship*—The pipe shall be homogeneous throughout and essentially uniform in color, opacity, density, and other properties. The inside and outside surfaces shall be semi-matte or glossy in appearance (depending on the type of plastic) and free of chalking, sticky, or tacky material. The surfaces shall be free of excessive bloom, that is, slight bloom is acceptable. The pipe walls shall be free of cracks, holes, blisters, voids, foreign inclusion, or other defects that are visible to the naked eye and that may affect the wall integrity.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁵ DLA Document Services Building 4/D 700 Robbins Avenue Philadelphia, PA 19111-5094 <http://quicksearch.dla.mil/>.

⁶ U.S. Government Bookstore 710 North Capitol Street N.W. Washington, DC <http://bookstore.gpo.gov/>.

⁷ Available from NSF International, P.O. Box 130140, 789 N. Dixboro Rd., Ann Arbor, MI 48113-0140, <http://www.nsf.org>.