



**Designation: F412–20a F412 – 21**

## Standard Terminology Relating to Plastic Piping Systems<sup>1</sup>

This standard is issued under the fixed designation F412; 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 terminology is a compilation of definitions of technical terms used in the plastic piping industry. Terms that are generally understood or adequately defined in other readily available sources are not included.

1.2 When a term is used in an ASTM document for which Committee F17 is responsible it is included only when judged, after review, by Subcommittee F17.91 to be a generally usable term.

1.3 Definitions that are identical to those published by other ASTM committees or other standards organizations are identified with the committee number (for example, D20) or with the abbreviation of the name of the organization (for example, IUPAC International Union of Pure and Applied Chemistry).

1.4 A definition is a single sentence with additional information included in notes.

1.5 Definitions are followed by the committee responsible for the standard(s) (for example, [F17.26]) and standard numbers(s) in which they are used (for example, F714).

1.6 *Abbreviated Terminology:* <https://standards.iteh.ai/standards/astm/a637c652-6e15-402c-a7fc-527a20563880/astm-f412-21>

1.6.1 Abbreviated terminology is intended to provide uniform contractions of terms relating to plastic piping that have evolved through widespread common usage. The compilation in this standard has been prepared to avoid the occurrence of more than one abbreviated term for a given plastics piping term and to avoid multiple meanings for abbreviated terms.

1.6.2 The abbreviated terminology and descriptions in this standard are intended to be consistent with usage in plastics piping and the standards under F17 jurisdiction. Other ASTM Committees may assign a different word-phrase description to the same abbreviated terminology. In such cases, the abbreviated terms in this standard shall apply to usage in F17 standards, or if widespread misunderstanding could result from conflicting abbreviated terminology descriptions, the abbreviated terminology for the word-phrase shall not be used in F17 standards.

1.6.3 *Acronyms and Initialisms*—A word formed from the letters or parts of words of a longer word-phrase, usually from the initial letters or parts of the words. An Acronym is pronounced as a word, for example radar, for radio detection and ranging. An Initialism is pronounced as a series of letters, for example DOT for Department of Transportation.

1.6.4 The Acronym or Initialism description is the origin word-phrase for the Acronym or Initialism, not a definition.

<sup>1</sup> This terminology is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.91 on Editorial and Terminology.

Current edition approved June 1, 2020/Dec. 1, 2021. Published July 2020/January 2022. Originally approved in 1975. Last previous edition approved in 2020 as F412–20; F412 – 20a. DOI: 10.1520/F0412-20A; 10.1520/F0412-21.

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

1.7 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:<sup>2</sup>

[C114 Test Methods for Chemical Analysis of Hydraulic Cement](#)  
[D256 Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics](#)  
[D638 Test Method for Tensile Properties of Plastics](#)  
[D648 Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position](#)  
[D747 Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam \(Withdrawn 2019\)<sup>3</sup>](#)  
[D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials](#)  
[D882 Test Method for Tensile Properties of Thin Plastic Sheet](#)  
[D883 Terminology Relating to Plastics](#)  
[D907 Terminology of Adhesives](#)  
[D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics](#)  
[D1079 Terminology Relating to Roofing and Waterproofing](#)  
[D1238 Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer](#)  
[D1488 Test Method for Amylaceous Matter in Adhesives](#)  
[D1505 Test Method for Density of Plastics by the Density-Gradient Technique](#)  
[D1527 Specification for Acrylonitrile-Butadiene-Styrene \(ABS\) Plastic Pipe, Schedules 40 and 80 \(Withdrawn 2013\)<sup>3</sup>](#)  
[D1600 Terminology for Abbreviated Terms Relating to Plastics](#)  
[D1785 Specification for Poly\(Vinyl Chloride\) \(PVC\) Plastic Pipe, Schedules 40, 80, and 120](#)  
[D2104 Specification for Polyethylene \(PE\) Plastic Pipe, Schedule 40 \(Withdrawn 2010\)<sup>3</sup>](#)  
[D2239 Specification for Polyethylene \(PE\) Plastic Pipe \(SDR-PR\) Based on Controlled Inside Diameter](#)  
[D2241 Specification for Poly\(Vinyl Chloride\) \(PVC\) Pressure-Rated Pipe \(SDR Series\)](#)  
[D2282 Specification for Acrylonitrile-Butadiene-Styrene \(ABS\) Plastic Pipe \(Withdrawn 2006\)<sup>3</sup>](#)  
[D2444 Practice for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup \(Falling Weight\)](#)  
[D2447 Specification for Polyethylene \(PE\) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter \(Withdrawn 2010\)<sup>3</sup>](#)  
[D2513 Specification for Polyethylene \(PE\) Gas Pressure Pipe, Tubing, and Fittings](#)  
[D2661 Specification for Acrylonitrile-Butadiene-Styrene \(ABS\) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings](#)  
[D2666 Specification for Polybutylene \(PB\) Plastic Tubing \(Withdrawn 2003\)<sup>3</sup>](#)  
[D2680 Specification for Acrylonitrile-Butadiene-Styrene \(ABS\) and Poly\(Vinyl Chloride\) \(PVC\) Composite Sewer Piping](#)  
[D2683 Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing](#)  
[D2737 Specification for Polyethylene \(PE\) Plastic Tubing](#)  
[D2751 Specification for Acrylonitrile-Butadiene-Styrene \(ABS\) Sewer Pipe and Fittings \(Withdrawn 2014\)<sup>3</sup>](#)  
[D2837 Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products](#)  
[D2846/D2846M Specification for Chlorinated Poly\(Vinyl Chloride\) \(CPVC\) Plastic Hot- and Cold-Water Distribution Systems](#)  
[D3035 Specification for Polyethylene \(PE\) Plastic Pipe \(DR-PR\) Based on Controlled Outside Diameter](#)  
[D3139 Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals](#)  
[D3212 Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals](#)  
[D3261 Specification for Butt Heat Fusion Polyethylene \(PE\) Plastic Fittings for Polyethylene \(PE\) Plastic Pipe and Tubing](#)  
[D3309 Specification for Polybutylene \(PB\) Plastic Hot- and Cold-Water Distribution Systems](#)  
[D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials](#)  
[F402 Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings](#)  
[F405 Specification for Corrugated Polyethylene \(PE\) Pipe and Fittings \(Withdrawn 2015\)<sup>3</sup>](#)  
[F441/F441M Specification for Chlorinated Poly\(Vinyl Chloride\) \(CPVC\) Plastic Pipe, Schedules 40 and 80](#)  
[F442/F442M Specification for Chlorinated Poly\(Vinyl Chloride\) \(CPVC\) Plastic Pipe \(SDR-PR\)](#)  
[F449 Practice for Subsurface Installation of Corrugated Polyethylene Pipe for Agricultural Drainage or Water Table Control](#)  
[F628 Specification for Acrylonitrile-Butadiene-Styrene \(ABS\) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core \(Withdrawn 2021\)<sup>3</sup>](#)

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

- F645 Guide for Selection, Design, and Installation of Thermoplastic Water- Pressure Piping Systems
- F714 Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter
- F771 Specification for Polyethylene (PE) Thermoplastic High-Pressure Irrigation Pipeline Systems (Withdrawn 2013)<sup>3</sup>
- F876 Specification for Crosslinked Polyethylene (PEX) Tubing
- F877 Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems
- F891 Specification for Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe With a Cellular Core
- F948 Test Method for Time-to-Failure of Plastic Piping Systems and Components Under Constant Internal Pressure With Flow (Withdrawn 2018)<sup>3</sup>
- F1025 Guide for Selection and Use of Full-Encirclement-Type Band Clamps for Reinforcement or Repair of Punctures or Holes in Polyethylene Gas Pressure Pipe
- F1281 Specification for Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe
- F1335 Specification for Pressure-Rated Composite Pipe and Fittings for Elevated Temperature Service (Withdrawn 2011)<sup>3</sup>
- F1417 Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air
- F1473 Test Method for Notch Tensile Test to Measure the Resistance to Slow Crack Growth of Polyethylene Pipes and Resins
- F1488 Specification for Coextruded Composite Pipe
- F1499 Specification for Coextruded Composite Drain, Waste, and Vent Pipe (DWV)
- F1545 Specification for Plastic-Lined Ferrous Metal Pipe, Fittings, and Flanges
- F1668 Guide for Construction Procedures for Buried Plastic Pipe
- F1733 Specification for Butt Heat Fusion Polyamide(PA) Plastic Fitting for Polyamide(PA) Plastic Pipe and Tubing
- F1760 Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content
- F1924 Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing
- F1948 Specification for Metallic Mechanical Fittings for Use on Outside Diameter Controlled Thermoplastic Gas Distribution Pipe and Tubing
- F1970 Specification for Special Engineered Fittings, Appurtenances or Valves for use in Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Systems
- F1973 Specification for Factory Assembled Anodeless Risers and Transition Fittings in Polyethylene (PE) and Polyamide 11 (PA11) and Polyamide 12 (PA12) Fuel Gas Distribution Systems
- F1986 Specification for Multilayer Pipe Type 2, Compression Fittings, and Compression Joints for Hot and Cold Drinking-Water Systems (Withdrawn 2020)<sup>3</sup>
- F1987 Specification for Multilayer Pipe Type 2, Compression Fittings, and Compression Joints for Hydronic Heating Systems (Withdrawn 2020)<sup>3</sup>
- F2145 Specification for Polyamide 11 (PA 11) and Polyamide 12 (PA12) Mechanical Fittings for Use on Outside Diameter Controlled Polyamide 11 and Polyamide 12 Pipe and Tubing
- F2158 Specification for Residential Central-Vacuum Tube and Fittings
- F2160 Specification for Solid Wall High Density Polyethylene (HDPE) Conduit Based on Controlled Outside Diameter (OD)
- F2176 Specification for Mechanical Couplings Used on Polyethylene Conduit, Duct and Innerduct
- F2206 Specification for Fabricated Fittings of Butt-Fused Polyethylene (PE)
- F2389 Specification for Pressure-rated Polypropylene (PP) Piping Systems
- F2623 Specification for Polyethylene of Raised Temperature (PE-RT) Systems for Non-Potable Water Applications
- F2769 Specification for Polyethylene of Raised Temperature (PE-RT) Plastic Hot and Cold-Water Tubing and Distribution Systems
- ~~F2788~~/F2788M Specification for Metric and Inch-sized Crosslinked Polyethylene (PEX) Pipe
- F2818 Specification for Specification for Crosslinked Polyethylene (PEX) Material Gas Pressure Pipe and Tubing
- ~~F2829~~/F2829M Specification for Metric- and Inch-Sized Fittings for Crosslinked Polyethylene (PEX) Pipe
- ~~F2905~~/F2905M Specification for Crosslinked Polyethylene (PEX) Line Pipe For Oil and Gas Producing Applications
- F2929 Specification for Crosslinked Polyethylene (PEX) Tubing of 0.070 in. Wall and Fittings for Radiant Heating Systems up to 75 psig
- ~~F2968~~/F2968M Specification for Crosslinked Polyethylene (PEX) Pipe for Gas Distribution Applications

## 2.2 ISO Standards:<sup>4</sup>

ISO 3 Preferred Numbers

ISO 497 Preferred Numbers

ISO 12162 Thermoplastic materials for pipes and fittings for pressure applications – Classification, designation and design coefficient

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

ISO R 161 Pipes of Plastics Materials for the Transport of Fluids (Outside Diameters and Nominal Pressures) Part I, Metric Series

ISO 9080 Thermoplastics Pipes for the Transport of Fluids-Methods of Extrapolation of Hydrostatic Stress Rupture Data to Determine the Long-Term Hydrostatic Strength of Thermoplastic Pipe Materials

2.3 ANSI Standard:<sup>4</sup>

Z17.1 ANSI Preferred Numbers

2.4 PPI Standard:<sup>5</sup>

PPI TR-4

### 3. Terminology

**acceptance testing**—testing performed on a product to determine whether or not an individual lot of the product conforms with specified requirements. [F17]

DISCUSSION—

The number of requirements are usually fewer than for **qualification testing** (see definition).

**acetal plastics, n**—highly crystalline linear thermoplastic homopolymers or copolymers characterized by repeating oxymethylene units. [F17]

**acrylonitrile-butadiene-styrene (ABS) pipe and fitting plastics** —plastics containing polymers or blends of polymers, or both, in which 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 all other monomers is not more than 5 %; plus lubricants, stabilizers, and colorants. [F17.61] D1527, D2282 [17.62] D2680, D2751

**adhesive**—a substance capable of holding materials together by surface attachment. [F17]

*adhesive bonded joint*—see **joint, adhesive bonded**.

*adhesive, solvent*—see **solvent cement**.

**adiabatic extrusion**—a method of extrusion in which, after the extrusion apparatus has been heated sufficiently by conventional means to plastify the material, the extrusion process can be continued with the sole source of heat being the conversion of the drive energy, through viscous resistance of the plastic mass in the extruder. [D20] D883

**aging, n**—

(1) the effect on materials of exposure to an environment for an interval of time.

(2) the process of exposing materials to an environment for an interval of time.

[D20] D883

**alloy, n**—*in plastics*, two or more immiscible polymers united, usually by another component, to form a plastic resin having enhanced performance properties. [D20] D883

**allowable stress**—The maximum force per unit area that may be safely applied to a pipe.

DISCUSSION—

In Guide F645, the *allowable stress* is determined by multiplying the *hydrostatic design stress* (HDS) at 73°F by the *temperature correction factor*. [F17.61] F645

**antioxidant, n**—compounding ingredient used to retard deterioration caused by oxidation. [F17]

**apparent density**—the weight per unit volume of a material including voids inherent in the material as tested. [F17]

DISCUSSION—

The term bulk density is commonly used for material such as molding powder.

<sup>5</sup> Available from Plastics Pipe Institute (PPI), 105 Decker Court, Suite 825, Irving, TX 75062, <http://www.plasticpipe.org>.