



**Summary of Substantive Changes
between the 2019 and the 2020 editions of
NSF 14 “Plastics Piping System Components
and Related Materials”**

Presented to the IAPMO Standards Review Committee on February 8, 2021

General: The changes to this standard should not have an impact on currently listed products. The substantive changes are:

- Revised rework material requirements to ensure the overall oxidative resistance classification is not affected (see Section 4.1.2)
- Removed inherent viscosity (IV) requirements for PVC resins (see Section 5.3)
- Revised dependent listing transfer requirements to verify that the change in color does not adversely impact the oxidative resistance of the originally classified material (see Section 5.7)

Section 2, Normative references: Referenced standards were added, updated, or deleted as follows:

ASTM D2513-~~18~~19. Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings

ASTM D2564-~~12~~ (2018). Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems

ASTM D2846/D2846M-~~17be~~19a. Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems

ASTM D2949-~~10~~18. Standard Specification for 3.25-in Outside Diameter Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings

ASTM D3517-~~14~~19. Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pressure Pipe

ASTM F439-~~13~~19. Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80

ASTM F442/F442M-~~13e~~19. Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)

ASTM F628-~~12~~^{e23}. Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe with a Cellular Core

ASTM F714-13 (2019). Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter

ASTM F876-~~17~~19A Standard Specification for Crosslinked Polyethylene (PEX) Tubing

ASTM F877-~~18~~20 Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold- Water Distribution Systems

ASTM F894-~~13~~19 Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe

ASTM F949-~~15~~20 Standard Specification for Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings

ASTM F1488-14e1 (2019) Standard Specification for Coextruded Composite Pipe



ASTM F1732-~~12~~-(2018) Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer and Drain Pipe Containing Recycled PVC Material

ASTM F1760-~~16~~-(2020) Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content

ASTM F1807-~~17~~19b. Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring, or Alternate Stainless Steel Clamps, for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

ASTM F1960-~~15~~19a. Standard Specifications for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing

ASTM F1970-~~12e~~119. Standard Specification for Special Engineered Fittings, Appurtenances or Valves for Use in Poly(Vinyl Chloride) (PVC) or Chlorinated Poly(Vinyl Chloride)(CPVC) Systems

ASTM F1974-09 (20152020). Standard Specification for Metal Insert Fittings for Polyethylene/Aluminum/ Polyethylene and Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene Composite Pressure Pipe

ASTM F2080-~~16~~18. Standard Specification for Cold-Expansion Fittings with Metal Compression Sleeves for Crosslinked Polyethylene (PEX) Pipe and SDR9 Polyethylene Raised Temperature (PE-RT) Pipe

ASTM F2098-~~15~~18. Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) to Metal Insert Fittings and Plastic Insert Fittings

ASTM F2159-~~18~~19a. Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring, or Alternate Stainless Steel Clamps for SDR9 Cross-Linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

ASTM F2306/F2306M-~~14e~~119. Standard Specification for 12 to 60 in. [300 to 1500 mm] Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications

ASTM F2389-~~17a~~19. Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems

ASTM F2434-~~14~~19. Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene (PEX-AL-PEX) Tubing

ASTM F2618-~~15~~19. Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Pipe Fittings for Chemical Waste Drainage Systems

ASTM F2623-~~14~~19. Standard Specification for Polyethylene of Raised Temperature (PE-RT) SDR Tubing Systems for Non-Potable Water Applications

ASTM F2648/F2648M (~~17~~)M-20. Standard Specification for 2 to 60 in [50 to 1500 mm] Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Land Drainage Applications

ASTM F2764/F2764M-~~17e~~119. Standard Specification for 6 to 60 in [150 to 1500 mm] Polypropylene (PP) Corrugated Double and Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications

ASTM F2769-~~16~~18. Standard Specification for Polyethylene of Raised Temperature (PE-RT) Plastic Hot and Cold-Water Tubing and Distribution Systems

ASTM F2788/F2788M-~~18~~20. Standard Specification for Metric and Inch-sized Crosslinked Polyethylene (PEX) Pipe

ASTM F2855-~~12~~19. Standard Specification for Chlorinated Poly(Vinyl Chloride)/Aluminum Chlorinated Poly(Vinyl Chloride) (CPVC-AL-CPVC) Composite Pressure Tubing

ASTM F2881 / F2881M-~~18~~19 Standard Specification for 12 to 60 in [300 to 1500 mm] Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications

Vent Pipe with a Cellular Core



ASTM F3253-~~17~~19. Standard Specification for Crosslinked Polyethylene (PEX) Tubing with Oxygen Barrier for Hot- and Cold-Water Hydronic Distribution Systems

[ASTM F3347-20. ~~Standard~~ Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene \(PEX\) Tubing](#)

[ASTM F3348-20. Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene \(PEX\) Tubing](#)

CAN/CSA B137.1-~~17~~20. Polyethylene (PE) Pipe, Tubing, and Fittings for Cold Water Pressure Services

CAN/CSA B137.3-~~17~~20. Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications

CAN/CSA B137.4-~~17~~20. Polyethylene (PE) Piping Systems for Gas Services

CAN/CSA B137.5-~~17~~20. Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications

CAN/CSA B137.6-~~17~~20. CPVC Pipe, Tubing, and Fittings for Hot and Cold Water Distribution Systems

CAN/CSA B137.8-~~17~~20. Polybutylene (PB) Piping for Pressure Applications

CAN/CSA B137.9-~~17~~20. Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure Pipe Systems

CAN/CSA B137.10-~~17~~20. Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene (PEX-AL-PEX) Composite Pressure Pipe Systems

CAN/CSA B137.11-~~17~~20. Polypropylene (PP-R) Pipe and Fittings for Pressure Applications

CAN/CSA B137.18-~~17~~20. Polyethylene of Raised Temperature Resistance (PE-RT) Tubing Systems for Pressure Applications

UL 1821 (~~3rd~~ 4th Edition). Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service

2.2 Normative references for compounds and other materials

ASTM D1784-~~11~~20. Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

ASTM D3222-18a. Standard Specification for Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials

ASTM D4066-13 ([2019](#)) Standard Classification System for Nylon Injection and Extrusion Materials (PA)

ASTM D4101-17^{e1}. Standard Specification for Polypropylene Injection and Extrusion Materials

ASTM D6778-~~14~~20. Standard Classification for Polyoxymethylene (POM, Acetal) Molding and Extrusion Materials

[IAPMO PS 51-2016. Expansion Joints and Flexible Expansion Joints for DWV Piping Systems](#)

21 CFR Parts 1-99. Food and Drugs (Rev 4/~~17~~19)

21 CFR Parts 100-169. Food and Drugs (Rev 4/~~17~~19)

21 CFR Parts 170-199. Food and Drugs (Rev 4/~~17~~19)

ASTM D543-14~~20~~. Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents

ASTM D3139-~~98~~ (~~2011~~)[19](#). Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

ASTM D3212-07 (~~2013~~[2020](#)) Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

DIN 8075. Polyethylene (PE) pipes – PE 80, PE 100, PE-HD – General quality requirements, testing (~~2011~~[2018](#))

PPI TR-3. Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe (~~2018~~)



PPI TR-4. PPI Listing of Hydrostatic Design Basis (HDB), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe (2018)

Section 4, Requirements for plastic piping system components and related materials: Revised rework material requirements to ensure the overall oxidative resistance classification is not affected as follows:

4.1.2 Rework materials

4.1.2.1 All materials excluding polyethylene

The use of clean rework material of the same formulation from the same [piping product](#) manufacturer shall be acceptable provided that the finished products meet the requirements of the applicable product standard(s). Plastic piping system components and related materials shall be manufactured in such a way as to prevent contamination.

4.1.2.2 Polyethylene

The use of clean, rework polyethylene material from the same material designation ([e.g. PE 4710](#)) and from the same [piping product](#) manufacturer shall be acceptable provided that the finished products meet the requirements of the applicable product standard(s). Plastic piping system components and related materials shall be manufactured in such a way as to prevent contamination.

[For potable water applications, when mixing rework materials at any ratio of a different ORC \(Oxidative Resistance Classification\) than the virgin compound, the resulting product receives the ORC of the lowest rated compound within the mixture.](#)

[NOTE - For example, rework of CC2 ORC can be mixed with CC3 ORC virgin compound and the resulting product would be classified as CC2 ORC.](#)

Section 5.3, Requirements for PVC resins: Removed inherent viscosity (IV) requirements for PVC resins as follows:

5.3 Requirements for PVC resins

~~Resins intended for use in PVC fitting compounds shall have an inherent viscosity of at least 0.65 when tested according to ASTM D1243.5~~ Resins intended for use in PVC pressure pipe compounds shall comply with the applicable requirements of PPI TR-3.⁹

NOTE — PPI TR-3 currently limits the inherent viscosity of PVC pressure pipe resin to a minimum of 0.88.

Section 5.7, Chlorine resistance – Dependent transfer listing requirements: Revised dependent listing transfer requirements to verify that the change in color does not adversely impact the oxidative resistance of the originally classified material as follows:

5.7 Chlorine resistance – ~~Dependent transfer listing~~ ~~Oxidative Equivalency~~ requirements

~~In order to qualify a pipe made from~~ [For](#) a material that already has a chlorine resistance classification ~~the following minimum requirements shall be met for each (denoted original material), oxidative equivalency is required on~~ pipe [or material](#) ~~which is~~ comprised of a different color [from the original material](#) ~~and shall be referred to as a Dependent Transfer Listing~~ [or when the production site differs from that of the original material. When the pipe or material production site differs from that of the original material, a minimum of one color shall be selected from the production site being assessed.](#)

~~NOTE—~~ This requirement does not apply to changes in color of an external, coextruded polymer layer which is separate and distinct from the pipe polymer matrix.



[Qualified pipe shall meet the minimum requirements of 5.7.1 and 5.7.2.](#)

5.7.2 Pipe with middle polymeric layer

— five data points at one hoop stress level at the highest temperature conditions as for the original data set;

— the 95% LPL shall be calculated for the original material data at these temperatures / stress conditions; and

— all five data points (failure times) shall meet or exceed the LPL for that condition.

NOTE— The hoop stress level shall be chosen so that there are no mixed mode failures. In the occurrence of such failures, the testing shall be repeated at a lower stress that would generate brittle failures.