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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Specification for PVC and ABS Injected Solvent Cemented Plastic Pipe Joints[1]

This standard is issued under the fixed designation F 545; 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 requirements for materials, dimensions, and test methods for PVC and ABS plastic pipe joints in which an annular sealed space between pipe and socket surfaces is injected with solvent cement.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 The following precautionary caveat pertains only to the test methods portion, Section 7, 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 and health practices and determine the applicability of regulatory limitations prior to use.*

1.4 For safe handling, see Practice F 402.

2. Referenced Documents

2.1 *ASTM Standards:*

D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing[2]

D 1084 Test Methods for Viscosity of Adhesives[3]

D 1527 Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80[4]

D 1599 Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings[4]

D 1600 Terminology for Abbreviated Terms Relating to Plastics[2]

D 1784 Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds[2]

D 1785 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120[4]

D 1788 Specification for Rigid Acrylonitrile-Butadiene-Styrene (ABS) Plastics[5]

D 2235 Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings[4]

D 2564 Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems[4]

F 402 Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings[4]

F 412 Terminology Relating to Plastic Piping Systems[4]

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology F 412, and abbreviations are in accordance with Terminology D 1600, unless otherwise specified.

4. General Description

4.1 The injected type of solvent cemented joint is one in which an annular cavity formed between a pipe and a socket is sealed at socket bottom and socket entrance and is injected with suitable cements to form a rigid bonded joint.

5. Materials and Manufacture

5.1 Pipes, fittings, and belled pipes shall meet the requirements of applicable ASTM specifications.

5.2 The injected cement shall meet the requirements of 6.2 for PVC or 6.2.3 for ABS components.

6. Requirements

6.1 *General*—The internal diameter of the socket shall be uniform for the minimum socket length, "C'', with a locking taper in its base and an outer seal ring attached to the socket entrance (see Fig. 1), or reduced diameter at the socket entrance to provide a seal. The locking taper angle and the outer seal ring shall be designed to center the pipe during assembly and effectively seal both ends of the annular cavity. The socket shall have an injection port to inject the solvent cement and an exhaust port diametrically opposite, or in another suitable location, so that the injected cement will completely fill the cavity and also allow air to escape from the annular cavity.

6.2 *PVC Solvent Cement*—The solvent cement for PVC injected joints shall meet the requirements set forth in 6.2.1 through 6.2.5.

6.2.1 *Materials*—The solvent cement shall be a solution of Class 12454-B unplasticized poly(vinyl chloride) molding or extrusion compound as specified in Specification D 1784, or

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[2] *Annual Book of ASTM Standards*, Vol 08.01.

[3] *Annual Book of ASTM Standards*, Vol 15.06.

[4] *Annual Book of ASTM Standards*, Vol 08.04.

[5] *Discontinued*—See *1990 Annual Book of ASTM Standards*, Vol 08.02.

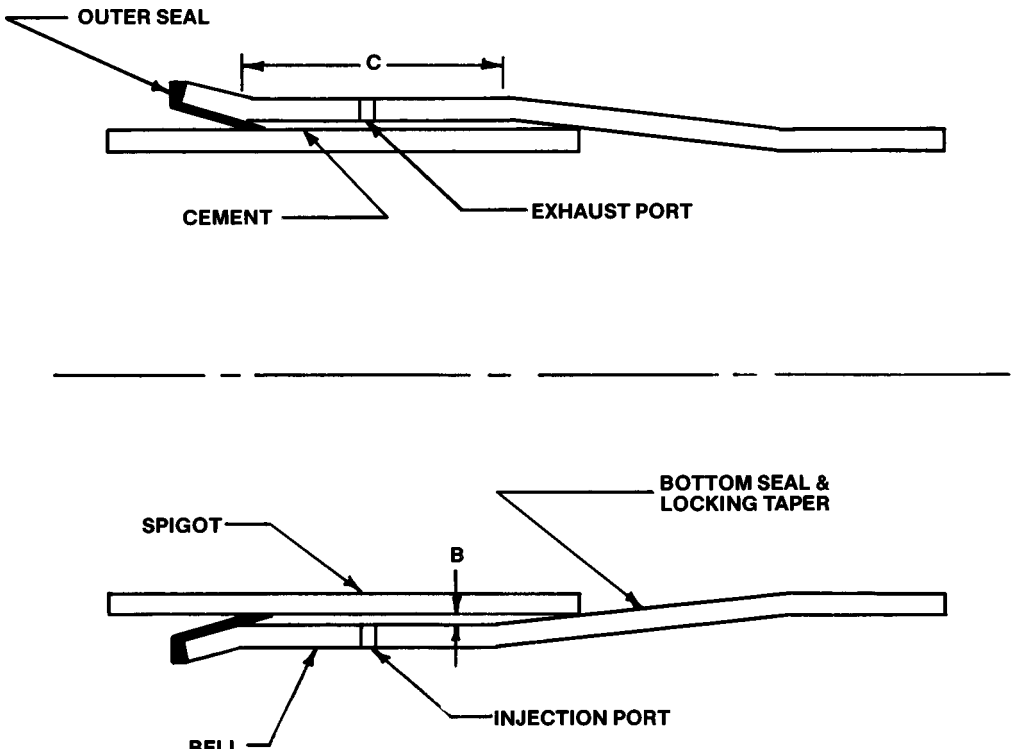

FIG. 1 Injection Joint

the base PVC resin used to make such a compound. Either virgin compound or resin or clean rework materials may be used, provided that the rework material is generated from the solvent cement manufacturer's own production, is compatible with virgin material, and will produce a cement that meets the requirements of this specification.

6.2.1.1 *Fillers, Thickeners, and Colorants*—Inert fillers, thickeners, or colorants may be added, provided the resulting cement meets the requirements of this specification.

6.2.2 *Homogeneity*—The cement shall not contain lumps or any foreign matter that could adversely affect the ultimate joint strength.

6.2.3 *Resin Content*—The PVC resin content of the PVC solvent cement shall be 14 % minimum when tested in accordance with Specification D 2564.

6.2.4 *Viscosity*—The minimum viscosity of the PVC solvent cement at 23°C shall be 50 000 cP (50 Pa·s) when tested in accordance with 7.5.

6.2.5 *Hydrostatic Burst Strength*—The minimum hydrostatic burst strength of a 4-in. (100-mm) Schedule 40 PVC injected joint made from pipe meeting Specification D 1785 shall be 710 psi (4.90 MPa) after a 24-h curing time, when tested in accordance with Test Method D 1599, using five specimens.

6.3 *ABS Solvent Cement*—The solvent cement for ABS injected joints shall meet the requirements set forth in 6.3.1 through 6.3.5.

6.3.1 *Materials*—The ABS cement for injection joints shall be a solution of acrylonitrile-butadiene-styrene plastic, as specified in Specification D 1527, in methyl ethyl ketone. Virgin or clean rework compound may be used, provided that the rework material is generated from the solvent cement manufacturer's own production, is compatible with virgin material, and will produce a cement that meets the requirements of this specification.

6.3.1.1 *Fillers, Thickeners, and Colorants*—Inert fillers or thickeners and colorants may be added, provided that the resulting cement meets the requirement of this specification.

6.3.2 *Homogeneity*—The cement shall not contain lumps or any foreign matter that could adversely affect the ultimate joint strength.

6.3.3 *Resin Content*—The ABS resin content shall be 25 % minimum when tested in accordance with Specification D 2235.

6.3.4 *Viscosity*—The minimum viscosity of the ABS solvent cement at 23°C shall be 50 000 cP (50 Pa·s) when tested in accordance with 7.5.

6.3.5 The minimum hydrostatic burst strength of a 4-in. (100-mm) Schedule 40 ABS injected joint made from Cell Class 522 material meeting Specification D 1788 shall be 580 psi (4.00 MPa) after a 48-h curing time, when tested in accordance with Test Method D 1599 using five specimens.

6.4 *Dimensions and Tolerances*:

6.4.1 *Pipe Dimensions*—The pipe shall meet dimensional requirements of the applicable ASTM specification.

6.4.2 *Fitting and Bell Socket Dimensions*:

6.4.2.1 *Socket Length*—The socket length *C*, straight section (Fig. 1), shall meet the minimum socket length requirements of Table 1.

6.4.2.2 *Wall Thickness*—For belled pipe and fittings fabricated from pipe sections, the thickness of the belled section shall be considered satisfactory if the bell was formed from pipe meeting the applicable ASTM specification. For molded fittings, the wall thickness shall be no less than the minimum