Designation: F 699 – 00ε1

An American National Standard

Standard Practice for Accelerated Conditioning of Polybutylene Pipe and Tubing for Subsequent Quality Control Testing[1]

This standard is issued under the fixed designation F 699; 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.

ε[1] NOTE—Keywords were added editorially in November 2003.

1. Scope

1.1 This practice describes a procedure for accelerating the crystalline phase transformation of polybutylene from the metastable Form II to the stable Form I by application of hydrostatic pressure in a closed pressure vessel.

1.2 The technique can be used as an alternative to the 10-day conditioning procedure called for in Specification D 2581. The product obtained after pressure aging will be in a crystalline state, approximately that obtained by aging under Standard Laboratory Conditions.

1.3 This practice is not to be used for qualification of an extruded product for pressure rating of pipe or tubing.

1.4 The values given in parentheses are provided for information purposes only.

1.5 *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.* Specific precautionary statements are given in 5.2 and 6.2.

2. Referenced Documents

2.1 *ASTM Standards:*

D 2581 Specification for Polybutylene (PB) Plastics Molding and Extrusion Materials[2]

3. Summary of Practice

3.1 Accelerated transformation is achieved by subjecting extruded or molded polybutylene samples to 207 MPa (30 000 psi) for 10 min in a water-filled pressure vessel.

4. Significance and Use

4.1 After accelerated conditioning, physical testing may be performed in accordance with applicable ASTM test methods.

4.2 For quality control purposes, tensile, quick-burst, or dimensional tests may be run on the product immediately after pressure aging.

NOTE 1—Because shrinkage occurs during the conditioning process, cut and measure specimens after aging.

5. Apparatus

5.1 The procedure requires the use of a *Certified Pressure Vessel, Pump, Tubing, and Fittings*, rated for 345 MPa (50 000 psi) hydrostatic pressures.

NOTE 2—A schematic drawing and photograph of the test apparatus are provided to assist in the construction of the unit (see Fig. 1 and Fig. 2).

5.2 **Caution—**Carefully follow all manufacturer's instructions for installing and operating the components of this unit. All lines, connections, valves, etc., must be those recommended for high-pressure apparatus. Operators of this unit should be thoroughly instructed in the execution of this procedure. Apparatus should be provided with protective shield.

6. Procedure

6.1 Fill chamber with water at temperature of 68 to 86°F (20 to 30°C) and place specimens in vessel.

6.2 Close pressure vessel. **Caution:** Follow manufacturer's instructions carefully in this operation.

6.3 Completely fill system with water and bleed off any excess to remove entrapped air.

NOTE 3—Some pumping of water into system may be required to ensure an air-free system.

6.4 Build up the hydrostatic pressure to 207 MPa (30 000 psi) ± 13.8 MPa (2000 psi) and maintain for 10 ± 1 min.

6.5 Release pressure by venting and remove samples.

[1] This practice is under the jurisdiction of ASTM Committee F-17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.40 on Test Methods.

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[2] *Annual Book of ASTM Standards*, Vol 08.02.

6.6 Test samples less then 0.075 in. (1.9 mm) thick shall be maintained at room temperature for a minimum of one-half h before being subjected to any physical property tests. Samples prepared from extruded pipe shall be maintained at room temperature for a minimum of one h before testing. Testing on conditioned specimens shall be conducted within one h after completion of the conditioning period.

7. Keywords

7.1 accelerated conditioning; quality control testing; polybutylene pipe; polybutylene tubing

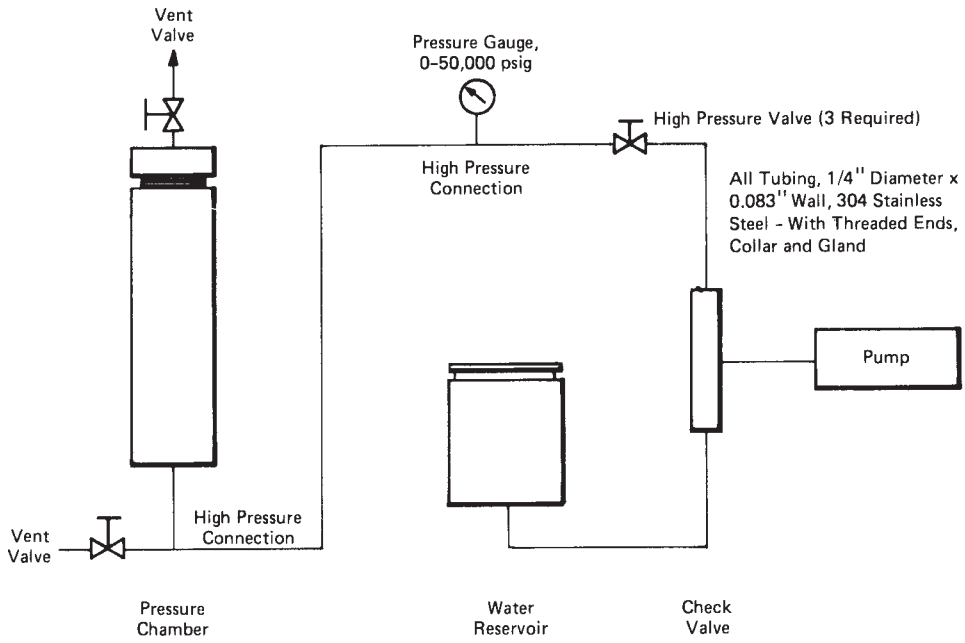

FIG. 1 Schematic of Accelerated Aging Unit

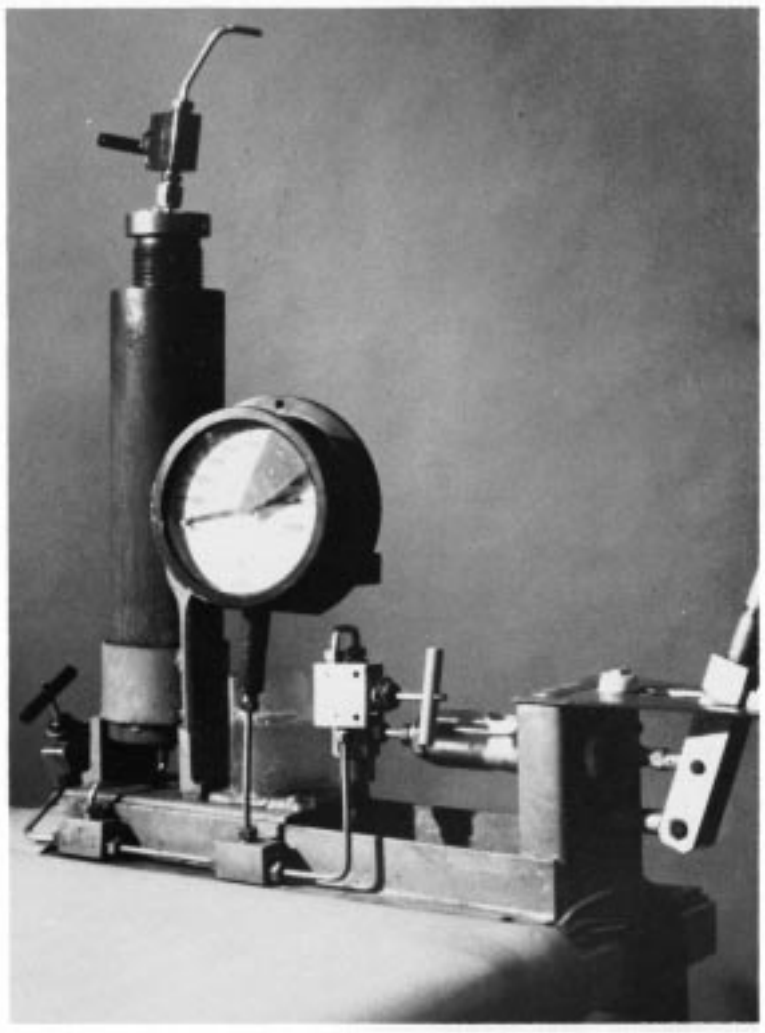

FIG. 2 Accelerated Aging Unit