Designation: F1057 – 87 (Reapproved 2005)

An American National Standard

Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique[1]

This standard is issued under the fixed designation F1057; 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 practice covers a procedure for estimating the quality of extruded poly (vinyl chloride) (PVC) plastic pipes by observing the reaction of pipe specimens after exposure to heat.

1.2 *This standard does not purport to address all of the safety problems, 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.*

2. Significance and Use

2.1 This practice is applicable to distinguish between properly and improperly extruded PVC plastic pipe. It can be used to:

2.1.1 Reveal incomplete exsiccation of compound before or during extrusion (Note 1),

2.1.2 Determine the presence of stress in the pipe wall produced by the extrusion process (Note 2),

2.1.3 Determine whether infused areas are present, and

2.1.4 Reveal contamination.

NOTE 1—Residual moisture in the compound vaporizes at extrusion temperatures and is normally evacuated as it forms vapor. Pockets of moisture trapped in the pipe wall result from incomplete exsiccation of the compound, and may reduce the physical properties of the pipe.

NOTE 2—Minor residual stress in the pipe will not impair field performance and handleability. High-residual stress has no proven effect on performance, but may impair handleability during installation.

3. Apparatus

3.1 *Air Oven*, thermostatically controlled, capable of operating at 180 ± 5°C (356 ± 9°F) such that after insertion of the specimen to be tested the test temperature is regained within 15 min or less.

NOTE 3—The oven should be vented to the outside of the building.

4. Procedure

4.1 Prepare specimens of pipe 150 mm (6 in.) long or longer with ends cut square so that they stand perpendicular on end when placed in the oven.

4.1.1 Cut staves from pipes whose size prevents insertion of full round specimens in the oven. Prepare large-diameter pipe staves so that their lengths parallel to the pipe axis are 150 mm (6 in.) or longer.

4.2 Examine the specimens and note any unusual features such as discoloration, inclusions, or pinholes in the cut edge.

4.3 Place the specimens of whole pipe in the preheated oven so that each specimen stands on end with sufficient separation between them so that hot air can flow freely between the pipes. Place specimens of pipe staves on the floor of the preheated oven so that they rest on their longitudinal edges and so that hot air can flow freely around them. Record the time when the air in the oven recovers to 180°C (356°F). After an additional 30 min at this temperature, remove the specimens, taking care not to alter any heat effects.

4.4 Examine the specimens within 3 min after removal from the oven, while still hot. With a sharp knife, cut whole pipe specimens lengthwise at approximately 60° circumferential intervals, resulting in six pipe staves of approximately equal widths. Cut specimens being tested in the form of staves into three roughly equal segments. Note the following for the report:

4.4.1 The shape of the pipe ends and the pipe barrel,

4.4.2 The condition and appearance of both the inner and outer surfaces of the material, and

4.4.3 The condition and appearance of the cut edges of the material.

5. Interpretation

5.1 A suggested interpretation of the results observed is given in Appendix X1.

6. Report

6.1 Report the following information, where applicable:

6.1.1 Information given by the pipe marking, including the nominal size of pipe, the type of pipe, and the date code;

6.1.2 Form in which the pipe was tested;

[1] This practice is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F 17.40 on Test Methods.

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6.1.3 Date of the test;

6.1.4 Extent and nature of any distortion at the ends or in the barrel of the specimen;

6.1.5 Condition and appearance of the outer surface;

6.1.6 Condition and appearance of the inner surface;

6.1.7 Appearance of the cut edges, and

6.1.8 Any other changes attributable to the test.

7. Precision and Bias

7.1 No statement is made about either the precision or bias of Practice F1057 for estimating the quality of PVC pipe, since the result merely states whether there is conformance to the criteria for acceptability suggested by the interpretation.

8. Keywords

8.1 heat reversion; PVC pipe

APPENDIX

(Nonmandatory Information)

X1. SUGGESTED INTERPRETATION OF RESULTS

X1.1 The specimens should be deemed to be satisfactory if none of the following effects are reported:

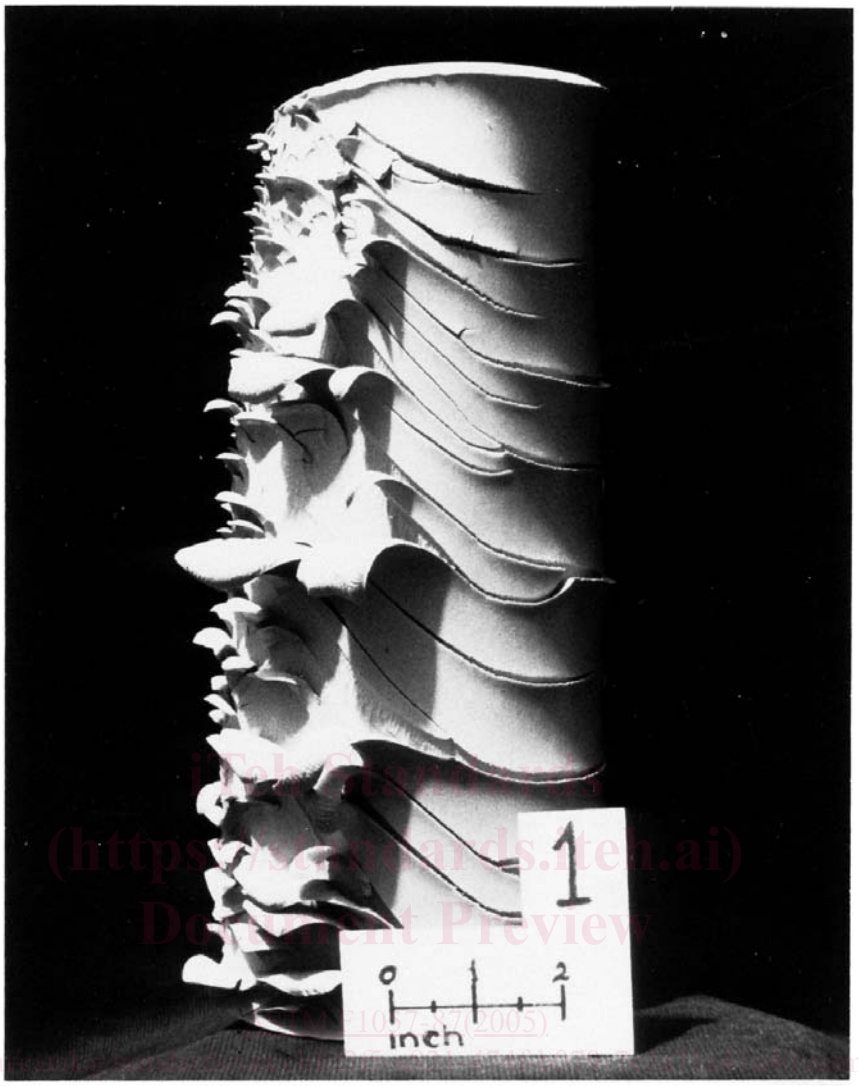
X1.1.1 Fish-scaling of any severity (see Fig. X1.1) for an illustration of fish-scaling);

X1.1.2 Wall separation (see Fig. X1.2 and Fig. X1.3 for illustrations of wall separation);

X1.1.3 Blisters on the outer or inner surface (see Fig. X1.4 and Fig. X1.5 for illustrations of blistering);

X1.1.4 Contamination made evident by the test (see Fig. X1.4 for an illustration of contamination); and

X1.1.5 Wall separation caused by pockets of granular material composed of unfused compound or foreign material. (Fig. X1.3 illustrates the general appearance, except that the voids will be filled with a granular material and may appear at any point in the wall.)



NOTE 1—Severe fish-scaling indicates uneven cooling in the sizing sleeve during extrusion. Resulting wall stresses are released by the heat reversion test. Note the flared end, another indication of this effect.

FIG. X1.1 Severe Fish Scaling