



Standard Practice for Qualification of a Combination of Squeeze Tool, Pipe, and Squeeze-Off Procedures to Avoid Long-Term Damage in Polyethylene (PE) Gas Pipe¹

This standard is issued under the fixed designation F 1734; 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 the qualification of a squeeze process consisting of a combination of a squeeze tool, pipe, and squeeze-off procedures to avoid long-term damage in polyethylene gas pipe. This practice examines the inside and outside surfaces of the pipe near the squeeze to determine the existence of features indicative of long-term cracking. The occurrence of these features depends on the squeeze tool design, the pipe being squeezed, and the squeeze procedures being used. This practice is particularly appropriate for pre-1975 Polyethylene (PE) pipe, and for pipe with diameter greater than or equal to 8 in., because of the greater possibility of long-term damage.

1.2 After the visual screening identifies a viable squeeze process, a sustained pressure test in accordance with Specification D 2513 should be used to confirm the viability.

1.3 This practice is for use by squeeze-tool manufacturers and gas utilities for all squeeze tools made in accordance with Specification F 1563; pipe manufactured in accordance with Specification D 2513, up to and including pipe diameters of 12 in.; and squeeze procedures in accordance with Guide F 1041.

1.4 Governing codes and project specifications should be consulted. Nothing in this practice should be construed as recommending practices or systems at variance with governing codes and project specifications.

1.5 Where applicable in this guide, “pipe” shall mean “pipe and tubing.”

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

1.7 *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.*

2. Referenced Documents

2.1 ASTM Standards:

D 2513 Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings²

¹ This practice is under the jurisdiction of ASTM Committee F-17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.60 on Gas. Current edition approved Sept. 10, 1996. Published November 1996.

² *Annual Book of ASTM Standards*, Vol 08.04.

D 3350 Specification for Polyethylene Plastics Pipe and Fittings Materials²

F 1041 Guide for Squeeze-Off of Polyolefin Gas Pressure Pipe and Fittings²

F 1563 Specification for Tools to Squeeze-Off Polyethylene (PE) Gas Pipe or Tubing²

3. Terminology

3.1 Definitions:

3.1.1 *squeeze-off*, *n*—a technique to control the flow of gas in a pipe by compressing the pipe with a mechanical or hydraulic device.

3.1.2 *squeeze process*, *n*—the combination of the squeeze tool, the pipe being squeezed, and the squeeze procedures being used.

3.1.3 *wall compression (WC)*, *n*—a measure of the extent to which the pipe is squeezed. (See Fig. 1.) It is defined as

$$WC, \% = \left(1 - \frac{L}{2t}\right) [m]P5 100 \quad (1)$$

where:

L = distance between the squeeze bars as shown in Fig. 1, and

t = average pipe wall thickness, expressed in the same units as *L*.

4. Summary of Practice

4.1 Pipe of the size and material of interest is cut into samples at least 1 ft long or 5 diameters long, whichever is greater. The samples are squeezed in the tool of interest, using the procedure of interest, until the desired level of flow control is achieved. Let this level of wall compression be called *S*_{min}. Then, four other samples are squeezed to obtain squeeze levels of (*S*_{min}−5) %, (*S*_{min}+5) %, (*S*_{min}+10) %, and (*S*_{min}+15) %. This squeeze range brackets unacceptable through acceptable levels of wall compression for flow control, with the (*S*_{min}+15) % value selected to allow an adequate operational range.

4.2 The squeezed samples are split along their length at 90 degrees to the squeeze “ears.” The area containing the ears is inspected visually. Features such as crazing, small voids, or cracks indicate potential permanent damage for that combination of pipe, tool, and squeeze procedure.