



## Standard Guide for Squeeze-Off of Polyolefin Gas Pressure Pipe and Tubing<sup>1</sup>

This standard is issued under the fixed designation F1041; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope—Scope\*

1.1 This guide describes general procedures for squeeze-off of polyolefin gas pressure pipe and tubing. Pipe and squeeze tool manufacturers shall be requested to supply recommendations for squeeze-off with materials or products.

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

1.3 This guide covers squeeze-off of polyolefin pipe and tubing in accordance with Specification **D2513**.

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

1.5 *Units*—The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units, which are provided for information only and are not considered the standard.

1.6 *This standard does not purport to address all of the safety problems, concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* <https://standards.iteh.ai/>

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

### 2. Referenced Documents

#### 2.1 *ASTM Standards:*<sup>2</sup>

**D2513** Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings

**F1734** Practice for Qualification of a Combination of Squeeze Tool, Pipe, and Squeeze-Off Procedures to Avoid Long-Term Damage in Polyethylene (PE) Gas Pipe

#### 2.2 *Other Standards/ Documents:*

**GRI-92/0147.2** Volume 2: Technical Reference on Squeeze-off of Polyethylene Gas Pipes<sup>3</sup>

**OTD Project 2.14c / GTI Project 22245** “Assessment of Squeeze-off Location for Small Diameter Polyethylene Pipe and Tubing – Phase 2”<sup>4</sup>

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee **F17** on Plastic Piping Systems and is the direct responsibility of Subcommittee **F17.60** on Gas. Current edition approved ~~May 1, 2016~~ Aug. 1, 2020. Published ~~May 2016~~ August 2020. Originally approved in 1987. Last previous edition approved in ~~2008~~ 2016 as F1041 – 02(2008)(2016). DOI: ~~10.1520/F1041-02R16~~ 10.1520/F1041-20.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

<sup>3</sup> GRI Document Fulfillment Center, 1510 Hubbard Dr. Batavia, IL 60510.

<sup>4</sup> Available from GTI, 1700 S Mount Prospect Rd. Des Plaines, IL 60018 <https://www.gti.energy/>.

\*A Summary of Changes section appears at the end of this standard

### 3. Significance and Use

3.1 Squeeze-off is a technique used to control the flow of gas through a pipe by the compressing action of a mechanical or hydraulic device. Squeeze-off may be used to reduce the flow of gas to an acceptable rate.

3.2 Proper squeeze-off procedures result in significant time saving in the reduction of gas flow in an emergency and in the maintenance and operation, or both, of a gas distribution system. Improper squeeze-off can cause damage to the pipe or create a safety hazard, or both.

### 4. Operator Experience

4.1 Each squeeze-off shall be made in accordance with written procedures in accordance with Practice **F1734**, that have been proven to produce safe squeeze-off. The person actually responsible for the squeeze-off shall ensure that detailed procedures are developed in conjunction with the owner of the pipe system, the manufacturer of the pipe, and the manufacturer of the squeeze-off tools. These procedures shall include safety precautions to be followed and are to be issued before actual squeeze-off operations commence.

4.2 Skill and knowledge on the part of the operator are required to control the flow of gas to achieve a safe squeeze-off. This skill and knowledge shall be obtained by making squeeze-offs in accordance with written procedures in accordance with Practice **F1734**.

### 5. Pipe and Conditions

5.1 In order to obtain proper squeeze-off, it is necessary to consider the pipe diameter, wall thickness, pipe material, internal pressure, squeeze tool(s), squeeze-off procedure and environmental conditions. The user shall request the pipe manufacturer to supply specific recommendations for the squeeze-off of the manufacturer's product based upon the evaluation procedures outlined in Practice **F1734** with additional considerations for internal pressure and ambient temperature. The operator shall exercise caution during cold temperatures because the pipe may be more susceptible to squeeze off damage.

### 6. Apparatus

6.1 Tools to squeeze-off polyolefin gas pressure pipe and tubing shall conform to the requirements of F1563.

### 7. Procedure

[ASTM F1041-20  
https://standards.iteh.ai/catalog/standards/sist/7fbc49c1-43be-4103-a4b1-8ddab09971fb/astm-f1041-20](https://standards.iteh.ai/catalog/standards/sist/7fbc49c1-43be-4103-a4b1-8ddab09971fb/astm-f1041-20)

7.1 Proper squeeze-off procedures developed in accordance with Practice **F1734** shall address safety considerations, tool location, tool operation, tool removal, and post squeeze-off considerations.

7.2 *Safety Considerations*—Pressure control situations requiring squeeze-off may involve working in the vicinity of escaping gas. Consider the possibility and potential hazard of static electricity and observe safety precautions. Safety precautions regarding static electricity generally include performing the squeeze-off in operation in separate bellhole isolated from the blowing gas, grounding the squeeze-off tool and applying a soapy water solution and wet nonsynthetic cloth (such as cotton or burlap material) or commercially available electrostatic discharge fluid and polyethylene tape wrap to the pipe surface to provide for dissipation of static charge to the ground. Check the squeeze-off tool prior to use to ensure it is the correct size, is properly functioning, and is properly adjusted for the squeeze-off to be done.

7.3 *Tool Location*—Center the squeeze-off tool on and square to the pipe. This will allow the pipe to flatten freely without jamming against the tool frame or abutments. Locate the squeeze-off tool at least three pipe diameters or 12 in. (305 mm), whichever is greater, from any fusion joint (1.5 diameters for butt fusion joint)(butt, socket, saddle or electrofusion) or mechanical fitting. Measure the distance from the inside edge of the joint/fitting to the inside edge of the squeeze-off tool to determine the appropriate distance.

NOTE 1— Measuring the distance between the inside edge of the squeeze-off tool and the inside edge of the joint/fitting, as shown in Table 1, will ensure that the strain in the pipe wall will be minimized.

NOTE 2—Some mechanical couplings may have internal stiffeners that extend more than a 1/2 xOD beyond the external shell; in such cases the distance of the squeeze-off should be determined from the end of the internal stiffener, not the external shell. If operators are uncertain if the stiffener extends beyond the shell, they should locate the squeeze tool farther away, such as four pipe diameters.

**TABLE 1 Examples of Minimum Tool Location for Various Pipe Outside Diameters**

Nominal Pipe Size (NPS)	Outside Diameter, in	Minimum Tool Location, in.
		Distance From Inside Edge of Joint To Inside Edge of Squeeze-off Tool
1/2	0.840	2.52
3/4	1.050	3.15
1	1.315	3.95
1 1/4	1.660	4.98
2	2.375	7.12
3	3.500	10.50
4	4.500	13.50
Copper Tubing Size (CTS)		
1/2	0.625	1.87
3/4	0.875	2.62
1	1.125	3.36
1 1/4	1.600	4.80

NOTE 3—For additional information on the research conducted on squeeze tool location, see Gas Technology Institute Project Number 22245, “Assessment of Squeeze-off Location for Small Diameter Polyethylene Pipe and Tubing – Phase 2”.

7.4 *Tool Operation*—Operate the squeeze-off tool at a rate slow enough to allow stress relaxation in the pipe to occur. Experience indicates that compression rates of 2 in. per min. or less are appropriate. This is particularly helpful when pipe becomes stiff in cold weather. Squeeze the pipe until the flow of gas ceases or the mechanical stop is contacted, whichever comes first. Continuing to operate the squeeze-off tool beyond this point can cause pipe or tool damage. When the squeezed-off position is reached, on some tools, a mechanical lock-off device must be manually engaged.

7.5 *Tool Removal*—Remove the squeeze-off tool in a controlled manner. If the tool has a mechanical lock-off device, disengage it. Avoid sudden release of mechanical or hydraulic pressure. Controlled release is necessary so flow control may be quickly reestablished if required. A release rate of 0.5 in./min or less should be maintained to prevent pipe material damage. Rerounding the pipe is an option which should be exercised on the basis of improvement in gas flow or other concerns, rather than damage mitigation. If rerounding is preformed, rround the pipe by rotating the squeeze-off tool 90° and applying enough force to round the pipe or by using a special tool designed for this purpose.

7.6 *Post Squeeze-off Considerations*— After the squeeze-off tool has been removed, inspect the squeezed section for any damage. Procedures should include actions to be taken if damage is found. Procedures should not allow the same area to be squeezed off more than once. When an emergency condition requires squeeze-off without regard for possible pipe damage, the procedure should include actions to be taken based on the likelihood the pipe has been damaged.

## 8. Keywords

8.1 damage; pipe; polyolefin; squeeze-off