



Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings¹

This standard is issued under the fixed designation D2657; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This practice describes general procedures for making joints with polyolefin pipe and fittings (excluding polyethylene pipe and fittings) by means of heat fusion joining techniques in either a shop or field environment. These procedures are general ones. Specific instructions for heat fusion joining are obtained from product manufacturers. See Practice [F2620](#) for heat fusion joining of polyethylene pipe and fittings.

1.2 The techniques covered are applicable only to joining polyolefin pipe and fittings of related polymer chemistry, for example, polypropylenes to polypropylenes, or polybutylenes to polybutylenes. Material, density, and flow rate shall be taken into consideration in order to develop uniform melt viscosities and formation of a good fusion bond when joining the same material to itself or to other materials of related polymer chemistry.

1.3 Parts that are within the dimensional tolerances given in present ASTM specifications are required to produce sound joints between polyolefin pipe and fittings when using the joining techniques described in this practice.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 The text of this practice references notes, footnotes, and appendixes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the practice.

1.6 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use. See specific safety precautions in [3.1.1](#), [5.2](#), [8.2.3.1](#), [Note 8](#) and [Note 9](#), and [A1.1](#).*

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:*²

[F1056](#) Specification for Socket Fusion Tools for Use in Socket Fusion Joining Polyethylene Pipe or Tubing and Fittings

[F2620](#) Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings

3. Summary of Practice

3.1 Heat-fusion joining uses a combination of heat and force resulting in two melted surfaces flowing together to produce a joint. Fusion bonding occurs when the joint cools below the melt temperature of the material. There is a temperature range within which any particular material is satisfactorily joined. The specific temperature used requires consideration of the properties of the specific material, and the joining environment. With Techniques II or III ([3.3.2](#) or [3.3.3](#)), there is also an appropriate force to be applied which depends upon the material, the fusion equipment being used, and fusion temperature. See Practice [F2620](#) for heat fusion procedure for polyethylene pipe and fittings.

3.1.1 Electrically powered heat fusion tools and equipment are usually not explosion proof. When performing heat fusion in a potentially combustible atmosphere such as in an excavation where gas is present, all electrically powered tools and equipment that will be used in the combustible atmosphere shall be disconnected from the electrical power source and operated manually to prevent explosion and fire. For the heating tool, this requires bringing the heating tool up to or slightly above temperature in a safe area, then disconnecting it from electrical power immediately before use. This procedure

¹ This practice is under the jurisdiction of ASTM Committee [F17](#) on Plastic Piping Systems and is the direct responsibility of Subcommittee [F17.20](#) on Joining.

Current edition approved Feb. 1, 2023. Published February 2023. Originally approved in 1967. Last previous edition approved in 2015 as D2657 – 07(2015). DOI: 10.1520/D2657-07R23.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.