



Standard Specification for Socket Fusion Tools for Use in Socket Fusion Joining Polyethylene Pipe or Tubing and Fittings¹

This standard is issued under the fixed designation F1056; 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 specification covers socket fusion tools for use in making socket fusion joints between polyethylene pipe or tubing and fittings as specified by Specifications [D3035](#), [D2513](#), [D2447](#), and [D2683](#). This specification covers newly manufactured heater faces and used heater faces which have been recoated. Requirements for materials, workmanship, and dimensions are included. Where applicable on this specification, “pipe” shall mean “pipe” and “tubing.”

1.2 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.

2. Referenced Documents

2.1 ASTM Standards:²

D1248 [Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable](#)

[D1600 Terminology for Abbreviated Terms Relating to Plastics](#)

D2122 [Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings](#)

[D2447 Specification for Polyethylene \(PE\) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter \(Withdrawn 2010\)](#)³

[D2513 Specification for Polyethylene \(PE\) Gas Pressure Pipe, Tubing, and Fittings](#)

D2657 [Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings](#)

[D2683 Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing](#)

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.

[D3035 Specification for Polyethylene \(PE\) Plastic Pipe \(DR-PR\) Based on Controlled Outside Diameter](#)

[D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials](#)

[F412 Terminology Relating to Plastic Piping Systems](#)

3. Terminology

3.1 Definitions:

3.1.1 *General*—Definitions are in accordance with Terminology [F412](#) and abbreviations are in accordance with Terminology [D1600](#), unless otherwise specified.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *chamfer tool*—a device that is used to chamfer the outside edge of the pipe. The chamfer allows the pipe end to easily enter the pipe heater face and easily enter the heated fitting. Chamfering is optional for all sizes but commonly done for 1¼-in. IPS and larger sizes.

3.2.2 *depth gage*—a device that is used to locate the rounding clamp a prescribed distance from the end of the pipe.

3.2.3 *heating tool*—a device used to heat the heater faces.

3.2.4 *fitting heater face or adapter*—A block of heat conducting material that attaches to the heating tool and is dimensioned to melt the internal surface of the fitting socket.

3.2.5 *pipe heater face or adapter*— A block of heat conducting material that attaches to the heating tool and is dimensioned to melt the external surface of the pipe.

NOTE 1—The fitting heater face and pipe heater face can be in one block of heat conducting material.

3.2.6 *rounding clamp or cold ring*—a device that is clamped around the pipe to round the pipe and limit the distance the pipe end goes into the pipe heater face and the socket fitting.

4. Materials and Manufacture

4.1 Heater faces may be manufactured from aluminum, steel, or other suitable heat conducting material.

NOTE 2—Polyethylene may stick to hot metal heating surfaces. This sticking may be minimized by covering the heating surfaces with a stick-resistant coating such as polytetrafluoroethylene (PTFE) or polyphenylene sulfide (PPS). Copper or copper alloys are not suitable without coating because some polyolefins react with copper.

5. Dimensions, Mass, and Permissible Variations

5.1 Heater face dimensions and tolerances shall be as shown in **Table 1**. The dimensions in **Table 1** are for heater faces at the commonly used operating temperature of 500°F (260°C). **Annex A1** contains **Table A1.1** which gives dimensions to measure for coated aluminum faces at 73.4°F (23°C).

5.2 Depth gage dimensions and tolerances shall be as shown in **Table 2**.

5.3 Chamfer dimensions shall be limited to a maximum of 20 % of the ASTM depth gage depth along the pipe wall and 60 % of the wall thickness.

6. Workmanship, Finish, and Appearance

6.1 The manufacture of these socket fusion tools shall be in accordance with good commercial practice so as to produce socket fusion tools meeting the requirements of this specifica-

tion. Heater faces shall have surfaces free of cracks, voids, foreign inclusions, or injurious defects.

7. Sampling

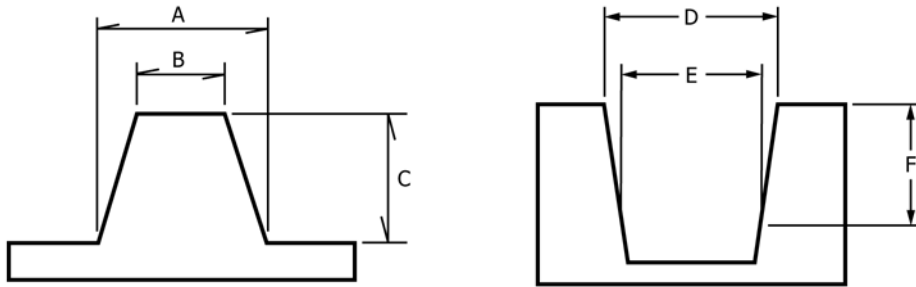
7.1 Select at random a sufficient quantity of socket fusion tools from each lot to be tested to determine that the basic properties and dimensions are in conformance with this specification.

8. Inspection

8.1 Inspection of socket fusion tools shall be agreed upon between the purchaser and the supplier as part of the purchase contract.

8.2 Inspection for dimensional accuracy shall be done with dial calipers, micrometers, or similar devices that have an accuracy within 0.001 in. (0.025 mm).

TABLE 1 Socket Fusion Heater Faces^{A,B,C,D}



Size in.	Fitting Heater Face						Pipe Heater Face					
	A Diameter, in. (mm)		B Diameter, in. (mm)		C Depth, in. (mm)		D Diameter, in. (mm)		E Diameter, in. (mm)		F Depth, in. (mm)	
	max	Tolerance	max	Tolerance	max	Tolerance	min	Tolerance	min	Tolerance	min	Tolerance
½ IPS	0.837	-0.007	0.793	-0.007	0.625	-0.010	0.851	+0.007	0.807	+0.007	0.625	+0.010
	(21.26)	(-0.18)	(20.14)	(-0.18)	(15.88)	(-0.25)	(21.62)	(+0.18)	(20.50)	(+0.18)	(15.88)	(+0.25)
¾ IPS	1.046	-0.008	1.004	-0.008	0.625	-0.010	1.062	+0.008	1.020	+0.008	0.625	+0.010
	(26.57)	(-0.20)	(25.50)	(-0.20)	(15.88)	(-0.25)	(26.97)	(+0.20)	(25.91)	(+0.20)	(15.88)	(+0.25)
1 IPS	1.312	-0.008	1.259	-0.008	0.687	-0.010	1.328	+0.008	1.275	+0.008	0.687	+0.010
	(33.32)	(-0.20)	(31.98)	(-0.20)	(17.45)	(-0.25)	(33.73)	(+0.20)	(32.39)	(+0.20)	(17.45)	(+0.25)
1¼ IPS	1.657	-0.008	1.604	-0.008	0.875	-0.010	1.673	+0.008	1.620	+0.008	0.875	+0.010
	(42.09)	(-0.20)	(40.74)	(-0.20)	(22.23)	(-0.25)	(42.49)	(+0.20)	(41.15)	(+0.20)	(22.23)	(+0.25)
1½ IPS	1.896	-0.010	1.840	-0.010	0.875	-0.010	1.916	+0.010	1.860	+0.010	0.875	+0.010
	(48.16)	(-0.25)	(46.74)	(-0.25)	(22.23)	(-0.25)	(48.67)	(+0.25)	(47.24)	(+0.25)	(22.23)	(+0.25)
2 IPS	2.371	-0.010	2.315	-0.010	0.875	-0.010	2.391	+0.010	2.335	+0.010	0.875	+0.010
	(60.22)	(-0.25)	(58.80)	(-0.25)	(22.23)	(-0.25)	(60.22)	(+0.25)	(59.31)	(+0.25)	(22.23)	(+0.25)
3 IPS	3.494	-0.014	3.426	-0.014	1.000	-0.010	3.522	+0.014	3.454	+0.014	1.000	+0.010
	(88.75)	(-0.36)	(87.02)	(-0.36)	(25.40)	(-0.25)	(89.46)	(+0.36)	(87.73)	(+0.36)	(25.40)	(+0.25)
4 IPS	4.495	-0.014	4.421	-0.014	1.125	-0.010	4.523	+0.014	4.449	+0.014	1.125	+0.010
	(114.17)	(-0.36)	(112.29)	(-0.36)	(28.58)	(-0.25)	(114.88)	(+0.36)	(113.00)	(+0.36)	(28.58)	(+0.25)
½ CTS	0.622	-0.007	0.571	-0.007	0.625	-0.010	0.636	+0.007	0.585	+0.007	0.625	+0.010
	(15.80)	(-0.18)	(14.50)	(-0.18)	(15.88)	(-0.25)	(16.15)	(+0.18)	(14.86)	(+0.18)	(15.88)	(+0.25)
¾ CTS	0.871	-0.008	0.817	-0.008	0.625	-0.010	0.887	+0.008	0.833	+0.008	0.625	+0.010
	(22.12)	(-0.20)	(20.75)	(-0.20)	(15.88)	(-0.25)	(22.53)	(+0.20)	(21.16)	(+0.20)	(15.88)	(+0.25)
1 CTS	1.122	-0.008	1.059	-0.008	0.625	-0.010	1.138	+0.008	1.075	+0.008	0.625	+0.010
	(28.50)	(-0.20)	(26.85)	(-0.20)	(15.88)	(-0.25)	(28.91)	(+0.20)	(27.31)	(+0.20)	(15.88)	(+0.25)
1¼ CTS	1.372	-0.008	1.314	-0.008	0.687	-0.010	1.388	+0.008	1.330	+0.008	0.687	+0.010
	(34.85)	(-0.20)	(33.38)	(-0.20)	(17.45)	(-0.25)	(35.26)	(+0.20)	(33.78)	(+0.20)	(17.45)	(+0.25)

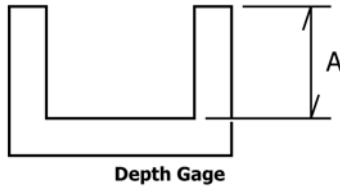
^A Dimensions are for heater faces at the commonly used operating temperature of 500°F (260°C) (see **Annex A1** for dimensions for coated, aluminum heater faces at 73.4°F (23°C)).

^B Recommended heater faces should be manufactured close to maximum diameter for fitting heater faces and close to minimum diameter for pipe heater faces to allow for wear and recoating.

^C Minimum dimensions have zero negative tolerance. Maximum dimensions have zero positive tolerance. The sketches and designs of the heater faces are illustrative only. Entrance and base chamfer or radius is optional. The maximum entrance and base chamfer or radius is 0.03 in. (0.7 mm).

^D "F" Depth Tolerances are intended as a point of measurement of "E" diameter only and not as a limit of actual socket tool depth. The depth of the pipe heater face socket may be of any dimension greater than "F".

TABLE 2 Depth Gages^A



Size in.	Depth Gage Depth ^A in. (mm)	
	Depth	Tolerance
½ IPS	0.625	±0.005
	(15.88)	(±0.13)
¾ IPS	0.625	±0.005
	(15.88)	(±0.13)
1 IPS	0.687	±0.005
	(17.45)	(±0.13)
1¼ IPS	0.875	±0.005
	(22.23)	(±0.13)
1½ IPS	0.875	±0.005
	(22.23)	(±0.13)
2 IPS	0.875	±0.005
	(22.23)	(±0.13)
3 IPS	1.000	0.005
	(25.40)	(±0.13)
4 IPS	1.125	0.005
	(28.58)	(±0.13)
½ CTS	0.625	0.005
	(15.88)	(±0.13)
¾ CTS	0.625	0.005
	(15.88)	(±0.13)
1 CTS	0.625	0.005
	(15.88)	(±0.13)
1¼ CTS	0.687	0.005
	(17.45)	(±0.13)

^A The sketch of the depth gage is illustrative only.

9. Product Marking

9.1 Each heater face or depth gage shall, space permitting, be permanently marked with the following on a portion of the heater face or depth gage which will not interfere with use or performance:

- 9.1.1 Nominal size of pipe for which the heater face or depth gage is designed; including IPS or CTS designation,
- 9.1.2 Manufacturer’s name or trademark,
- 9.1.3 ASTM designation number, and
- 9.1.4 Where the size of the heater face or depth gage does not allow complete identification marking may be omitted in the following sequence: ASTM designation number, and manufacturer’s name or trademark.

10. Packaging and Package Marking

10.1 The heater faces or depth gages shall be packaged in accordance with the supplier’s standard practice in a manner ensuring arrival at destination in satisfactory condition.

10.2 Individual heater face packages, heater face set (that is pipe heater face and fitting heater face of the same size) packages, or depth gage packages shall be labeled with the following:

- 10.2.1 Nominal size of pipe for which the heater face or depth gage is designed; including IPS or CTS designation;
- 10.2.2 Manufacturer’s name or trademark, and
- 10.2.3 ASTM designation number.

11. Quality Assurance

11.1 When the product is marked with this designation, F1056, the manufacturer affirms that the product was manufactured, inspected, sampled, and tested in accordance with this specification and has been found to meet the requirements of this specification.

12. Keywords

12.1 depth gage; heater faces; polyethylene pipe ; socket; socket fusion; socket tools

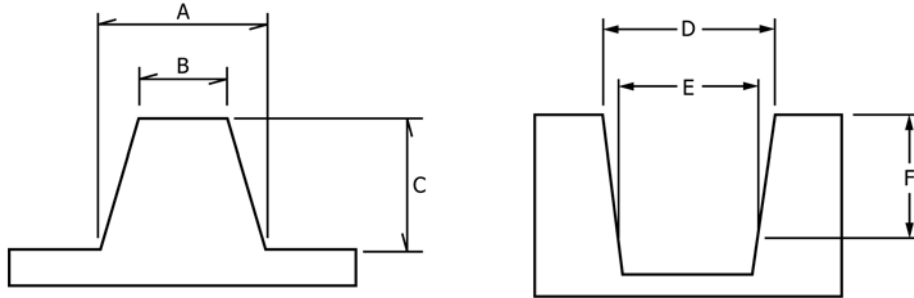
ANNEX

(Mandatory Information)

A1. CONVENIENT MEASURING DIMENSIONS FOR SOCKET HEATER FACES OF PREFERRED DESIGN

A1.1 This specification F1056, indicates the specified dimensions for socket heater faces at the commonly used operating temperature of 500°F (260°C) and allows for heater faces to be manufactured from aluminum, steel, or other heat

conducting materials. There is a practical need to have this specification converted to dimensions for faces at 74.3°F (23°C). Therefore, Table A1.1 is provided. Table A1.1 gives dimensions on coated aluminum faces at 74.3°F (23°C).

TABLE A1.1 Measurement Dimensions For Coated Aluminum Socket Fusion Heater Faces at 73.4°F (23°C)^{A,B,C}


Size in.	Fitting Heater Face						Pipe Heater Face					
	A Diameter, in. (mm)		B Diameter, in. (mm)		C Depth, in. (mm)		D Diameter, in. (mm)		E Diameter, in. (mm)		F Depth, in. (mm)	
	max	Tolerance	max	Tolerance	max	Tolerance	min	Tolerance	min	Tolerance	min	Tolerance
½ IPS	0.832 (21.13)	0.007 (-0.18)	0.788 (20.02)	-0.007 (-0.18)	0.621 (15.77)	-0.010 (-0.25)	0.846 (21.49)	+0.007 (+0.18)	0.802 (20.37)	+0.007 (+0.18)	0.621 (15.77)	+0.010 (+0.25)
¾ IPS	1.040 (26.42)	-0.008 (-0.20)	0.998 (25.35)	-0.008 (-0.20)	0.621 (15.77)	-0.010 (-0.25)	1.056 (26.82)	+0.008 (+0.20)	1.014 (25.76)	+0.008 (+0.20)	0.621 (15.77)	+0.010 (+0.25)
1 IPS	1.305 (33.15)	-0.008 (-0.20)	1.252 (31.80)	-0.008 (-0.20)	0.683 (17.35)	-0.010 (-0.25)	1.321 (33.55)	+0.008 (+0.20)	1.268 (32.21)	+0.008 (+0.20)	0.683 (17.35)	+0.010 (+0.25)
1¼ IPS	1.648 (41.86)	-0.008 (-0.20)	1.595 (40.51)	-0.008 (-0.20)	0.870 (22.10)	-0.010 (-0.25)	1.664 (42.27)	+0.008 (+0.20)	1.611 (40.92)	+0.008 (+0.20)	0.870 (22.10)	+0.010 (+0.25)
1½ IPS	1.885 (47.88)	-0.010 (-0.25)	1.829 (46.46)	-0.010 (-0.25)	0.870 (22.10)	-0.010 (-0.25)	1.905 (48.39)	+0.010 (+0.25)	1.849 (46.69)	+0.010 (+0.25)	0.870 (22.10)	+0.010 (+0.25)
2 IPS	2.357 (59.87)	-0.010 (-0.25)	2.301 (58.45)	-0.010 (-0.25)	0.870 (22.10)	-0.010 (-0.25)	2.377 (60.38)	+0.010 (+0.25)	2.321 (58.95)	+0.010 (+0.25)	0.870 (22.10)	+0.010 (+0.25)
3 IPS	3.474 (88.24)	-0.014 (-0.36)	3.406 (86.51)	-0.014 (-0.36)	0.994 (25.25)	-0.010 (-0.25)	3.502 (88.95)	+0.014 (+0.36)	3.434 (87.22)	+0.014 (+0.36)	0.994 (25.25)	+0.010 (+0.25)
4 IPS	4.469 (113.51)	-0.014 (-0.36)	4.395 (111.63)	-0.014 (-0.36)	1.119 (28.42)	-0.010 (-0.25)	4.497 (114.22)	+0.014 (+0.36)	4.423 (112.34)	+0.014 (+0.36)	1.119 (28.42)	+0.010 (+0.25)
½ CTS	0.619 (15.72)	-0.007 (-0.18)	0.568 (14.43)	-0.007 (-0.18)	0.621 (15.77)	-0.010 (-0.25)	0.633 (16.08)	+0.007 (+0.18)	0.582 (14.78)	+0.007 (+0.18)	0.621 (15.77)	+0.010 (+0.25)
¾ CTS	.866 (22.00)	-0.008 (-0.20)	0.812 (20.62)	-0.008 (-0.20)	0.621 (15.77)	-0.010 (-0.25)	0.882 (22.40)	+0.008 (+0.20)	0.828 (21.03)	+0.008 (+0.20)	0.621 (15.77)	+0.010 (+0.25)
1 CTS	1.116 (28.35)	-0.008 (-0.20)	1.053 (26.75)	-0.008 (-0.20)	0.621 (15.77)	-0.010 (-0.25)	1.132 (28.75)	+0.008 (+0.20)	1.069 (27.15)	+0.008 (+0.20)	0.621 (15.77)	+0.010 (+0.25)
1¼ CTS	1.364 (34.65)	-0.008 (-0.20)	1.306 (33.17)	-0.008 (-0.20)	0.683 (17.35)	-0.010 (-0.25)	1.380 (35.05)	+0.008 (+0.20)	1.322 (33.58)	+0.008 (+0.20)	0.683 (17.35)	+0.010 (+0.25)

^A Recommended heater faces should be manufactured close to maximum diameter for fitting heater faces and close to minimum diameter for pipe heater faces to allow for wear and recoating.

^B Minimum dimensions have zero negative tolerance. Maximum dimensions have zero positive tolerance. The sketches and designs of the heater faces are illustrative only. Entrance and base chamfer or radius is optional. The maximum entrance and base chamfer or radius is 0.03 in (0.7 mm).

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