



Designation: F 1054 – 01

Standard Specification for Conical Fittings¹

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1. Scope

1.1 This specification specifies dimensions and gaging requirements for cones and sockets intended for connecting anesthetic and respiratory care equipment including, but not limited to, breathing systems (resuscitators, ventilators, and anesthesia gas machines), anesthetic gas scavenging systems, and vaporizers. This specification gives requirements for the following cones and sockets:

1.1.1 15- and 22-mm sizes intended for general use in breathing systems;

1.1.2 22-mm size latching connectors (including performance requirements) intended for general use in breathing systems;

1.1.3 23-mm size intended for use with vaporizers intended for use outside the breathing system; and

1.1.4 30-mm size intended for the connection of a breathing system to an anesthetic gas scavenging system.

1.2 It is expected that standards for particular medical devices will provide details on the application and implementation of these conical connectors.

2. Referenced Documents

2.1 ASTM Standards:

F 1205 Specification for Anesthesia Breathing Tubes²

2.2 ISO Standards:³

ISO R129 Engineering Drawings—Dimensioning

ISO 1302 Technical Drawings—Methods of Indicating Surface Texture on Drawings

ISO 3040: 1990, Technical Drawings—Dimensioning and Tolerancing—Cones

ISO 4135: 1995, Vocabulary

3. Terminology

3.1 Definitions:

¹ This specification is under the jurisdiction of ASTM Committee F29 on Anesthetic and Respiratory Equipment and is the direct responsibility of Subcommittee F29.10 on Anesthesia Workstations.

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² *Annual Book of ASTM Standards*, Vol 13.01.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

3.1.1 *22-mm latching connector*—female connector for engagement with a male connector of 22-mm size complying with this specification, and that has a feature to reduce the possibility of accidental disconnection.

3.1.2 Additional terms used in this specification are defined in accordance with ISO 4135.

4. Conical Connectors Made of Metal

4.1 *General Requirements*—The dimensions of conical connectors made of metal including those made of composite materials in which the mating surfaces are metal, shall be as shown in Figs. 1-3 and Table 1.

NOTE 1—See Annex A5 for dimensions of plug and ring gages for the connectors.

4.2 Additional Requirements for Conical Connectors of 22-mm Size:

4.2.1 If a 22-mm male conical connector incorporates a circumferential groove or grooves, the total width of the groove or grooves at the surface shall not exceed 8 mm.

4.2.2 If a 22-mm male conical connector incorporates a recess, the recess shall be as shown in Fig. 2.

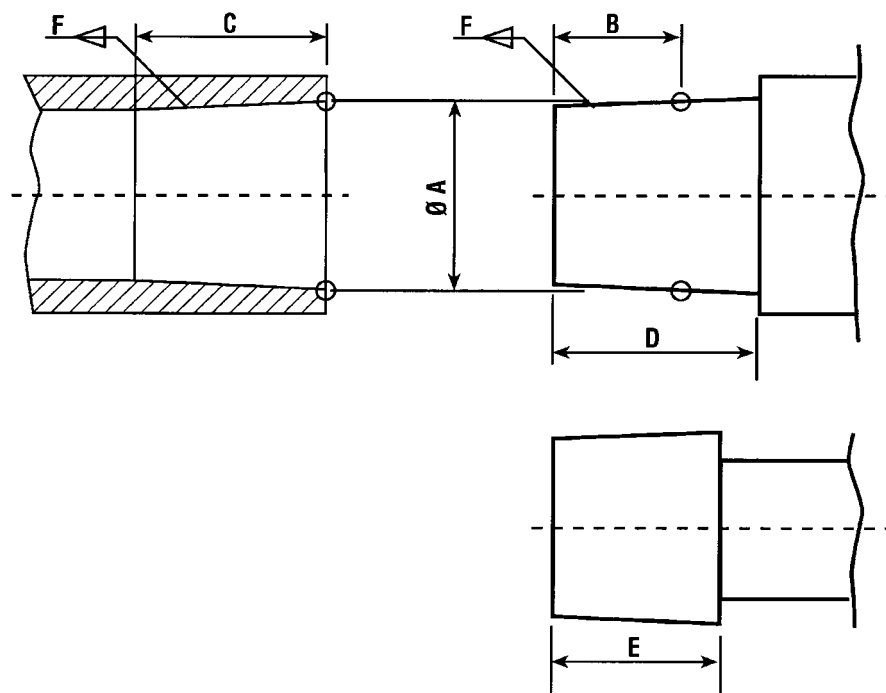
4.2.3 If a 22-mm male conical connector incorporates a shoulder, the shoulder or equivalent construction shall be as shown in Fig. 3.

5. Conical Connectors Made of Materials Other Than Metal

5.1 *General Requirements*—Conical connectors made of materials other than metal shall meet the following requirements when they are type tested with gages having dimensions as shown in Fig. A1.1 and Table A1.1.

5.1.1 Conical connectors made of materials other than metal shall meet the dimensional requirements in Fig. 1 and Table 1, with the exception that the Dimensions A and B and Ratio F may vary from those shown.

5.1.2 When the connector is engaged in the appropriate plug or ring test gage shown in Fig. A1.1 and Table A1.1, its leading edge shall lie between the minimum and maximum diameter steps of the gage when an axial force of 35 ± 3.5 N for 15-mm connectors, and 50 ± 5 N for 22- and 30-mm connectors, is applied and while maintaining the same axial force the

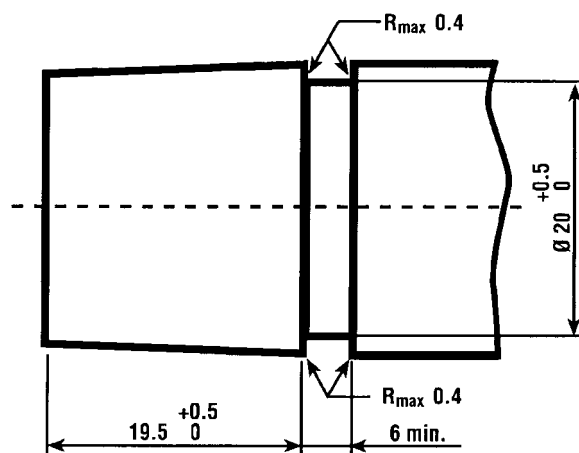


$\varnothing$ = Diameter (per ISO R129).

∇ = Taper [per unit of length on diameter (ISO 3040)]. Note: Symbol is turned 90° to the left in diagram above.

Note: Maximum radius on the entrance to the female connector and on the leading edge of the male cone should be not less than 0.5 mm and not more than 0.8 mm.

FIG. 1 Conical Connectors Made of Metal (All dimensions in millimetres)



Note: Circumferential grooves may be incorporated on the surface of the male cone if required (see 4.2.1).

FIG. 2 Conical Connector of 22-mm Size Made of Metal—Supplementary Dimensions (All dimensions in millimetres)

connector is rotated up to 20°. The connectors and gages shall be maintained at a temperature of $20 \pm 3^\circ\text{C}$ during the test.

NOTE 2—Because connectors made from plastic materials, for example, polyamide, polyacetal, polycarbonate, polysulfone, and so forth, may vary greatly in their physical characteristics, it is not considered practicable to specify their dimensions; for this reason, gaging requirements have been included. It is also considered impracticable to generalize on matters, such as cold flow and thermal instability, as well as possible changes in physical characteristics with solvents, and so forth.

5.1.3 It is the responsibility of the manufacturer to make certain that adequate tests have been carried out to ensure that a suitable material is chosen for the connectors.

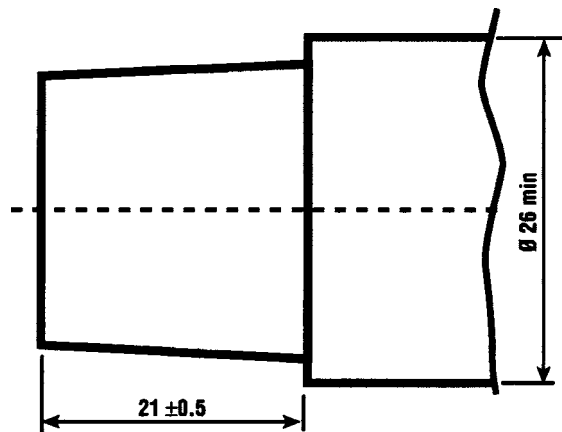
5.2 Additional Requirements for Conical Connectors of 22-mm Size—The requirements given in 4.2 apply.

6. 22-mm Latching Connectors

6.1 22-mm latching connectors shall not become disconnected when tested in accordance with Annex A2.

6.2 22-mm latching connectors shall have a leakage rate of less than 5 mL/min (corrected to 20°C and 101.3 kPa) when tested in accordance with Annex A3.

6.3 22-mm latching connectors shall meet the requirements specified in 6.1 and 6.2 after being subjected to the drop procedure described in Annex A4.



Note: Circumferential grooves may be incorporated on the surface of the male cone, if required (see 4.2.1).

FIG. 3 Connector Intended for Face Mask (with Shoulder) (All dimensions in millimetres)

TABLE 1 Conical Connectors Made of Metal—Dimensions (see Fig. 1)

Connector Size, mm	A Diameter, mm	B Gage Point, mm	C Length of Taper, mm	D Clearance to Shoulder (if Present), mm	E Length to Taper, mm	F Taper per Unit of Length on Diameter
15	15.47 ± 0.04	10	≥ 16	≥ 16	≥ 14.5	1:40
22	22.37 ± 0.04	15	≥ 21	see Fig. 2	see Fig. 2	1:40
23	23.175 ± 0.02	13	≥ 18	≥ 18	≥ 15	1:36
30	30.9 ± 0.05	14	≥ 18	≥ 18	≥ 14	1:20

6.4 22-mm latching connectors which are intended for reuse shall meet the requirements specified in 6.1-6.3 after being subjected to the cleaning, disinfection, or sterilization procedures recommended by the manufacturer.

7. Keywords

7.1 anesthetic equipment; cones; sockets

ANNEXES

(Mandatory Information)

A1. PLUG AND RING TEST GAGES FOR CONICAL CONNECTORS MADE OF MATERIALS OTHER THAN METAL

A1.1 *General*—Fig. A1.1 and Table A1.1 give details of plug and ring gages for use in checking conical connectors

made of materials other than metals.