

Anaesthetic and respiratory equipment — Conical connectors —

Part 1: Cones and sockets

The European Standard EN ISO 5356-1:2004 has the status of a
British Standard

ICS 11.040.10

National foreword

This British Standard is the official English language version of EN ISO 5356-1:2004. It is identical with ISO 5356-1:2004. It supersedes BS EN 1281-1:1997 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee CH/121, Anaesthetic and respiratory equipment, to Subcommittee CH/121/1, Breathing attachments and anaesthetic machines, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO title page, pages ii to v, a blank page, pages 1 to 16, the Annex ZA page and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 10 June 2004

© BSI 10 June 2004

ISBN 0 580 43872 4

English version

**Anaesthetic and respiratory equipment - Conical connectors -
Part 1: Cones and sockets (ISO 5356-1:2004)**

Matériel d'anesthésie et de réanimation respiratoire -
Raccords coniques - Partie 1: Raccords mâles et femelles
(ISO 5356-1:2004)

Anästhesie- und Beatmungsgeräte - Konische Konnektoren
- Teil 1: Männliche und weibliche Konen (ISO 5356-1:2004)

This European Standard was approved by CEN on 1 April 2004.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

This document (EN ISO 5356-1:2004) has been prepared by Technical Committee ISO/TC 121 "Anaesthetic and respiratory equipment" in collaboration with Technical Committee CEN/TC 215 "Respiratory and anaesthetic equipment", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2004, and conflicting national standards shall be withdrawn at the latest by November 2004.

This document supersedes EN 1281-1:1997.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 5356-1:2004 has been approved by CEN as EN ISO 5356-1:2004 without any modifications.

**INTERNATIONAL
STANDARD**

**ISO
5356-1**

Third edition
2004-05-15

**Anaesthetic and respiratory equipment —
Conical connectors —**

**Part 1:
Cones and sockets**

*Matériel d'anesthésie et de réanimation respiratoire — Raccords
coniques —*

Partie 1: Raccords mâles et femelles



Reference number
ISO 5356-1:2004(E)

Contents

Page

Foreword	iv
Introduction	v
1 Scope.....	1
2 Normative references	1
3 Terms and definitions	2
4 Conical connectors made of metal	2
4.1 General requirements	2
4.2 Additional requirements for male conical connectors of 22 mm size	2
4.3 Additional requirements for conical connectors of 8,5 mm size	4
5 Conical connectors made of materials other than metal.....	4
5.1 General requirements	4
5.2 Additional requirements for conical connectors of 22 mm size	4
5.3 Additional requirements for conical connectors of 8,5 mm size	4
6 22 mm latching connectors.....	4
Annex A (normative) Plug and ring test gauges for conical connectors made of materials other than metal	5
Annex B (normative) Test for security of engagement of 22 mm latching connector to male conical connector	7
Annex C (normative) Test for leakage from 22 mm latching connectors	8
Annex D (normative) Drop procedure for 22 mm latching connectors.....	9
Annex E (informative) Plug and ring test gauges for conical connectors made of metal	10
Annex F (informative) Suggested apparatus and methods for testing the security of engagement of 22 mm latching connectors	12
Bibliography	16

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 5356-1 was prepared by Technical Committee ISO/TC 121, *Anaesthetic and respiratory equipment*, Subcommittee SC 1, *Breathing attachments and anaesthetic machines*.

This third edition cancels and replaces the second edition (ISO 5356-1:1996), which has been technically revised. The major differences are the inclusion of 8,5 mm size connectors and some minor corrections to the figures and tables.

ISO 5356 consists of the following parts, under the general title *Anaesthetic and respiratory equipment* — *Conical connectors*:

- *Part 1: Cones and sockets*
- *Part 2: Screw-threaded weight-bearing connectors*

Introduction

In clinical practice, several breathing attachments used in anaesthetic and respiratory equipment may have to be joined together to provide a suitable breathing system. Items of medical equipment, such as a humidifier or a spirometer, are often incorporated into the breathing system which may also be connected to an anaesthetic-gas scavenging system. Connections for these purposes are usually cone and socket joints, and a lack of standardization of these connections has given rise to problems of interchangeability when connecting equipment made by different manufacturers. This part of ISO 5356 specifies the requirements and dimensions for conical connectors used in anaesthetic and respiratory equipment.

An important consideration is that conical connections need to be secure but nevertheless disconnectable by the operator. The use of connectors meeting the requirements of this part of ISO 5356 will not necessarily prevent them being disconnected accidentally. To minimize the risk of 22 mm connectors being accidentally disconnected, latching connectors can be used.

Annex A includes a figure and a table detailing plug and ring test gauges that are used to check conical connectors made of materials other than metal. Annexes B, C and D provide test methods for latching connectors, Annex E includes a figure and table detailing plug and ring test gauges that may be used to check metal conical connectors, and Annex F contains recommendations for testing security of latching connectors.

Figure 1, detailing the dimensions and tolerances of metal conical connectors, has been prepared in accordance with ISO 3040.

Anaesthetic and respiratory equipment — Conical connectors —

Part 1: Cones and sockets

1 Scope

This part of ISO 5356 specifies dimensional and gauging requirements for cones and sockets intended for connecting anaesthetic and respiratory equipment, e.g. in breathing systems, anaesthetic-gas scavenging systems and vaporizers.

This part of ISO 5356 gives requirements for the following conical connectors:

- 8,5 mm size intended for use in paediatric breathing systems;
- 15 mm and 22 mm sizes intended for general use in breathing systems;
- 22 mm latching connectors (including performance requirements);
- 23 mm size intended for use with vaporizers, but not for use in breathing systems;
- 30 mm size intended for the connection of a breathing system to an anaesthetic gas scavenging system.

This part of ISO 5356 does not specify the medical devices and accessories on which these connections are to be provided.

Requirements for the application of conical connectors are not included in this part of ISO 5356, but are or will be given in the relevant International Standards for specific medical devices and accessories.

NOTE Requirements for screw-threaded weight-bearing conical connectors are specified in ISO 5356-2.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4135, *Anaesthetic and respiratory equipment — Vocabulary*

ISO 5367, *Breathing tubes intended for use with anaesthetic apparatus and ventilators*

IEC 60601-1:1988, *Medical electrical equipment — Part 1: General requirements for safety*, including Amendment 1:1991 and Amendment 2:1995

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4135 and the following apply.

3.1
22 mm latching connector
 female connector for engagement with a male conical connector of 22 mm size complying with this part of ISO 5356, and which has a feature to reduce the possibility of accidental disconnection

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 Figures 1 and 2 and Table 1.

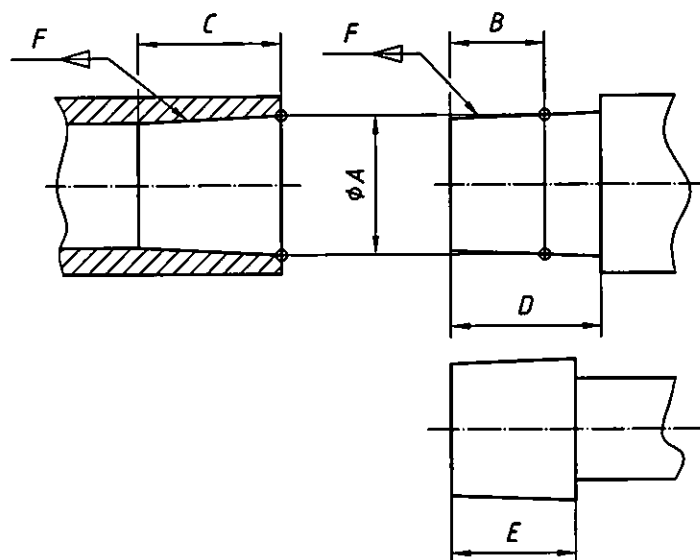
NOTE See Annex E for dimensions of plug and ring gauges for the connectors.

4.2 Additional requirements for male conical connectors of 22 mm size

4.2.1 Male conical connectors of 22 mm size, with the exception of those intended for connection to a face mask, shall incorporate the recess as shown in Figure 2 a).

4.2.2 Male conical connectors of 22 mm size to which it is intended to attach a face mask shall incorporate a shoulder or equivalent construction as shown in Figure 2 b).

4.2.3 If a circumferential groove or grooves are incorporated in the surface of a male conical connector of 22 mm size, the total width of the groove or grooves at the surface shall not exceed 8 mm.



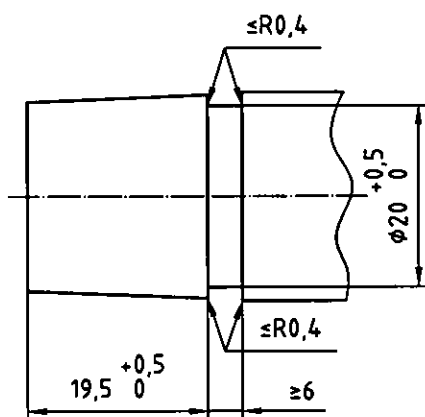
The radius on the entrance to the female connector and on the leading edge of the male cone should be not less than 0,5 mm and not more than 0,8 mm.

Figure 1 — Conical connectors made of metal

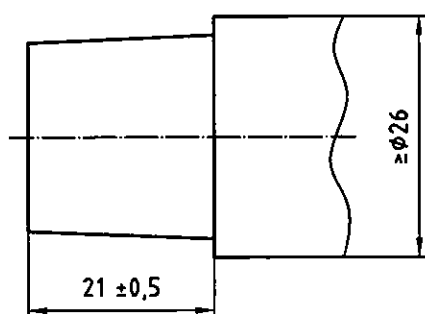
Table 1 — Conical connectors made of metal — Dimensions (see Figure 1)

Connector size mm	<i>A</i> mm	<i>B</i> mm	Taper length min. <i>C</i> mm	Clearance to shoulder (if present) <i>D</i> mm	Length to taper min. <i>E</i> mm	Taper ratio <i>F</i>
8,5	$8,45 \pm 0,04$	6	6,4	8,9 min.	8	1:19
15	$15,47 \pm 0,04$	10	16	16 min.	14,5	1:40
22	$22,37 \pm 0,04$	15	21	See Figure 2	See Figure 2	1:40
23	$23,175 \pm 0,02$	13	18	18 min.	15	1:36
30	$30,9 \pm 0,05$	14	18	18 min.	14	1:20

Dimensions in millimetres



a) Connector intended for breathing attachment (with recess)



b) Connector intended for face mask (with shoulder)

Circumferential grooves may be incorporated on the surface of the male cone, if required (see 4.2.3).

Figure 2 — Conical connectors of 22 mm size made of metal — Supplementary dimensions

4.3 Additional requirements for conical connectors of 8,5 mm size

The male conical connector shall have a minimum inside diameter of 6 mm extending inward for at least 6 mm from the end of the connector.

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 gauges having dimensions as shown in Figure A.1 and Table A.1.

- a) Conical connectors made of materials other than metal shall meet the dimensional requirements in Figure 1 and Table 1, with the exception that dimensions *A* and *B* and ratio *F* may vary from those shown.
- b) When the connector is engaged in the appropriate plug or ring test gauge shown in Figure A.1 and Table A.1, by applying an axial force of $(35 \pm 3,5)$ N for 8,5 mm and 15 mm connectors and (50 ± 5) N for 22 mm and 30 mm connectors and, while maintaining the same force, rotating the connector up to 20° , its leading edge shall lie between the minimum and maximum diameter steps of the gauge. The connectors and gauges shall be maintained at a temperature of (20 ± 3) °C during the test.

NOTE Because connectors made from plastics materials, for example polyamide, polyacetal, polycarbonate, polysulfone, etc., can vary greatly in their physical characteristics, it is not considered practicable to specify their dimensions; for this reason, gauging 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, contact with solvents, etc.

It is the responsibility of the manufacturer to ensure that adequate tests have been carried out to prove as far as possible that the particular materials chosen for the connectors are suitable.

5.2 Additional requirements for conical connectors of 22 mm size

The requirements given in 4.2 apply.

5.3 Additional requirements for conical connectors of 8,5 mm size

The requirements given in 4.3 apply.

6 22 mm latching connectors

6.1 22 mm latching connectors shall engage with the 22 mm male connector with a recess as specified in Figure 2 a).

6.2 When tested in accordance with Annex B, the engaged connection shall not become disconnected.

6.3 When tested in accordance with Annex C, the leakage rate from the engaged connectors shall not exceed 5 ml/min (corrected to 20 °C and 101,3 kPa).

6.4 After being subjected to the procedure described in Annex D, the 22 mm latching connector shall still meet the requirements in 6.1, 6.2 and 6.3.

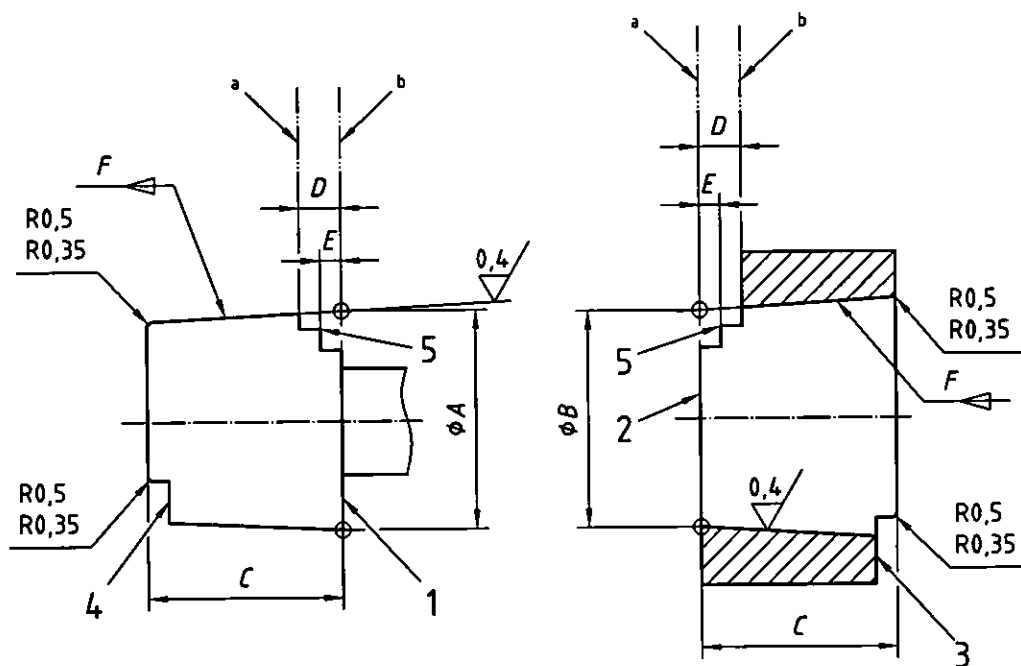
6.5 22 mm latching connectors intended for re-use shall meet the requirements in 6.1, 6.2, 6.3 and 6.4 after being subjected to the cleaning, disinfection or sterilization procedures specified in IEC 60601-1:1998, 44.7.

Annex A (normative)

Plug and ring test gauges for conical connectors made of materials other than metal

Figure A.1 and Table A.1 give details of plug and ring gauges for use in checking conical connectors made of materials other than metals.

Dimensions in millimetres
Surface roughness values in micrometres



Key

- 1 face A
- 2 face B
- 3 step to check mating gauges ground flush to face A
- 4 step to check mating gauges ground flush to face B
- 5 basic steps
- a Position max.
- b Position min.

NOTE Basic and mating gauge steps are optional.

Figure A.1 — Plug and ring test gauges for conical connectors made of materials other than metal

Table A.1 — Plug and ring test gauges for conical connectors made of materials other than metal — Dimensions (see Figure A.1)

Dimensions in millimetres

Connector size	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	Tolerance on taper per unit of length on diameter
8,5	$8,50 \pm 0,005$	$8,09 \pm 0,005$	$8,4 \pm 0,005$	$1,31 \pm 0,005$	See NOTE	1:19	$0,053 \pm 0,000\ 2$
15	$15,525 \pm 0,005$	$15,165 \pm 0,005$	$14,5 \pm 0,005$	$4,3 \pm 0,005$	$2,2 \pm 0,005$	1:40	$0,025 \pm 0,000\ 2$
22	$22,425 \pm 0,005$	$21,94 \pm 0,005$	$19,5 \pm 0,005$	$5,2 \pm 0,005$	$2,2 \pm 0,005$	1:40	$0,025 \pm 0,000\ 2$
30	$30,98 \pm 0,005$	$30,12 \pm 0,005$	$17,2 \pm 0,005$	$3,1 \pm 0,005$	$1,6 \pm 0,005$	1:20	$0,050 \pm 0,000\ 2$
NOTE Gauge for 8,5 mm connector has only one mating step.							

Annex B **(normative)**

Test for security of engagement of 22 mm latching connector to male conical connector

B.1 Condition the male 22 mm conical connector complying with Figure 2 a) and the 22 mm latching connector for 1 h at a temperature of $(35 \pm 3) ^\circ\text{C}$ and relative humidity of at least 80 %, and carry out the test under the same conditions.

B.2 Engage the 22 mm latching connector with the male connector in accordance with the manufacturer's instructions.

B.3 After 1 min of engagement without activation of any disengagement mechanism, apply for 10 s an axial separation force of $(50 \pm 5) \text{ N}$ and, unless the 22 mm latching connector permits free radial rotation, also apply a torque of $(25 \pm 5) \text{ N}\cdot\text{cm}$ at a rate not exceeding $20 \text{ N}\cdot\text{s}^{-1}$.

B.4 Observe whether the assembled connectors become disconnected.

NOTE Examples of suitable apparatus that can be used to test security of engagement, together with a more detailed test procedure, are given for information in Annex F.

Annex C
(normative)

Test for leakage from 22 mm latching connectors

C.1 Take the engaged male conical connector and 22 mm latching connector that have been tested as described in Annex B and condition them at $(35 \pm 3) ^\circ\text{C}$.

C.2 Using air, apply an internal static pressure of $(8 \pm 0,5)$ kPa above ambient to the assembly and determine the leakage rate from the assembly, e.g. by pressure drop or volumetric method.

Annex D

(normative)

Drop procedure for 22 mm latching connectors

- D.1** Condition a male conical connector complying with Figure 2 a) and the 22 mm latching connector for 1 h at a temperature of $(20 \pm 3) ^\circ\text{C}$ and relative humidity of at least 80 %, and carry out the test under the same conditions.
- D.2** Engage the 22 mm latching connector with the male conical connector in accordance with the manufacturer's instructions. Attach the male conical connector to a breathing tube complying with ISO 5367 and having a length of 2 m.
- D.3** Attach the opposite end of the breathing tube to a point 1 m above a 50 mm thick hardwood board (e.g. hardwood having a density greater than 700 kg/m^3) standing on a rigid base (e.g. a concrete block).
- D.4** Raise the engaged connectors to a point 1 m above the board and 2 m distant from the other end of the breathing tube and release them so that they fall onto the hardwood board. Repeat this five times.
- D.5** Proceed with desired test.

Annex E (informative)

Plug and ring test gauges for conical connectors made of metal

Figure E.1 and Table E.1 give, for information, details of plug and ring test gauges that may be used to check metal conical connectors.

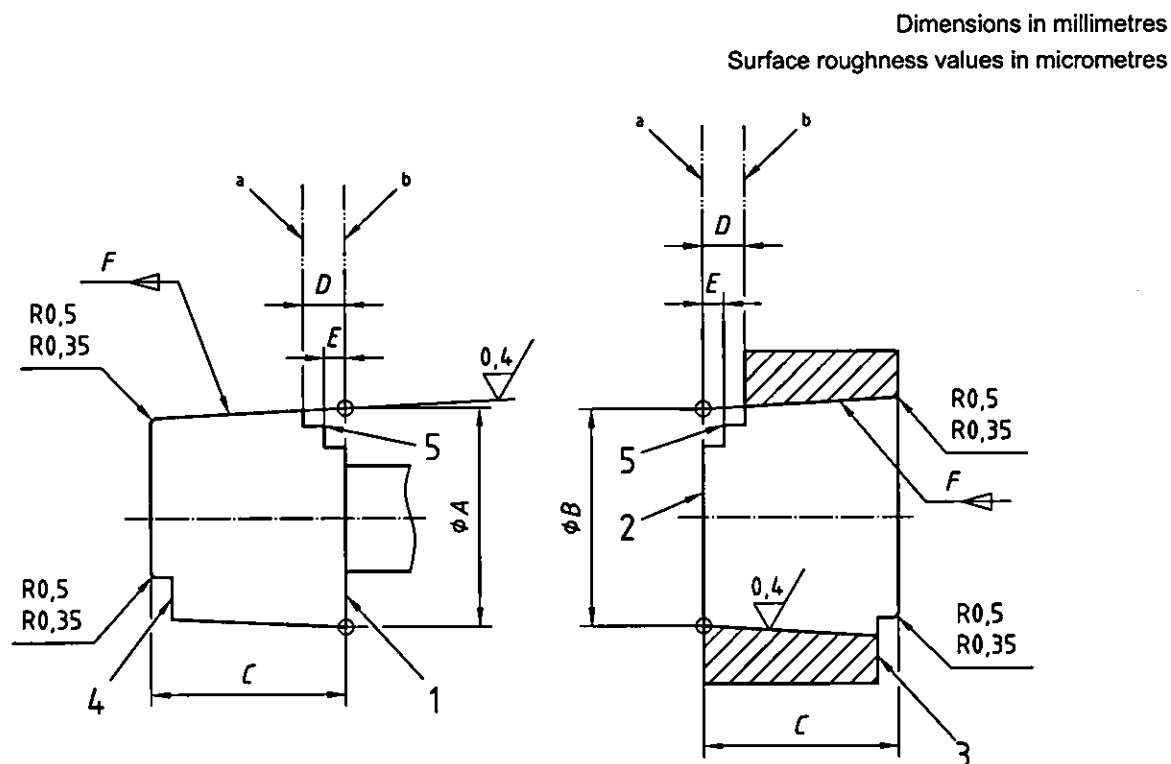


Figure E.1 — Plug and ring test gauges for conical connectors made of metal

**Table E.1 — Plug and ring test gauges for conical connectors made of metal —
Dimensions (see Figure E.1)**

Dimensions in millimetres

Connector size	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	Taper ratio <i>F</i>	Tolerance on taper per unit of length on diameter
8,5	$8,49 \pm 0,005$	$8,094 \pm 0,005$	$8,4 \pm 0,005$	$1,52 \pm 0,005$	See NOTE	1:19	$0,053 \pm 0,000\ 2$
15	$15,51 \pm 0,005$	$15,18 \pm 0,005$	$14,5 \pm 0,005$	$3 \pm 0,005$	$1,6 \pm 0,005$	1:40	$0,025 \pm 0,000\ 2$
22	$22,41 \pm 0,005$	$21,955 \pm 0,005$	$19,5 \pm 0,005$	$3 \pm 0,005$	$1,6 \pm 0,005$	1:40	$0,025 \pm 0,000\ 2$
23	$23,195 \pm 0,003$	$22,794 \pm 0,003$	$16 \pm 0,005$	$1,33 \pm 0,005$	$0,72 \pm 0,005$	1:36	$0,0278 \pm 0,000\ 2$
30	$30,95 \pm 0,005$	$30,15 \pm 0,005$	$17 \pm 0,005$	$1,9 \pm 0,005$	$1 \pm 0,005$	1:20	$0,050 \pm 0,000\ 2$
NOTE Gauge for 8,5 mm connector has only one mating step.							

Annex F (informative)

Suggested apparatus and methods for testing the security of engagement of 22 mm latching connectors

F.1 Method 1 — Bench-mounted test equipment

F.1.1 Apparatus

A typical bench-mounted apparatus for testing the security of engagement of 22 mm latching connectors is shown in Figure F.1. The male test piece should be a 22 mm male conical connector dimensioned as shown in Figure 2 a) but with all the tolerances reduced to $\pm 0,005$ mm and a surface finish of $0,4 \mu\text{m}$.

NOTE There are a number of methods for applying the test forces, and Figure F.1 is illustrative of only one approach. Other methods include the use of gravity loading by weights or liquid containers.

The essential features of the apparatus should ensure that the tensile force can be applied in a truly axial direction and that torque can be applied without changing the tensile force. To minimize the effects of friction of the apparatus, the tensile force should be measured directly between the 22 mm latching connector and the male test piece.

F.1.2 Procedure

F.1.2.1 Secure the 22 mm latching connector to be tested in the self-centring holder of the apparatus (F.1.1), ensuring that the method of securing the 22 mm latching connector does not deform the section(s) that are intended to engage with the male test piece.

F.1.2.2 Condition the 22 mm latching connector and the apparatus at a temperature of $(35 \pm 3) ^\circ\text{C}$ and a relative humidity of at least 80 % for 1 h.

If a number of 22 mm latching connectors are to be tested, some may be conditioned at the required temperature and relative humidity without being secured to the apparatus, provided that they are conditioned again for at least 5 min after being secured to the apparatus.

F.1.2.3 Engage the 22 mm latching connector with the male test piece in accordance with the manufacturer's instructions.

F.1.2.4 After 1 min, attach the force-measuring device and apply an axial separation force at a rate not exceeding $20 \text{ N}\cdot\text{s}^{-1}$ until a force of $(50 \pm 5) \text{ N}$ is being applied. Maintain this force for 10 s without activating any disengagement mechanism, and observe whether the engaged 22 mm latching connector and male test piece become disconnected.

F.1.2.5 Without reducing the tensile load and without activation of any disengagement mechanism, apply a torque of $(25 \pm 5) \text{ N}\cdot\text{cm}$ or rotate the male test piece through an angle of 20° , whichever occurs first. Maintain this torque or position for 10 s and observe whether the engaged 22 mm latching connector and male test piece become disconnected.

F.2 Method 2 — Hand-held test equipment

F.2.1 Apparatus

A typical hand-held apparatus for testing the security of engagement of 22 mm latching connectors is shown in Figure F.2.

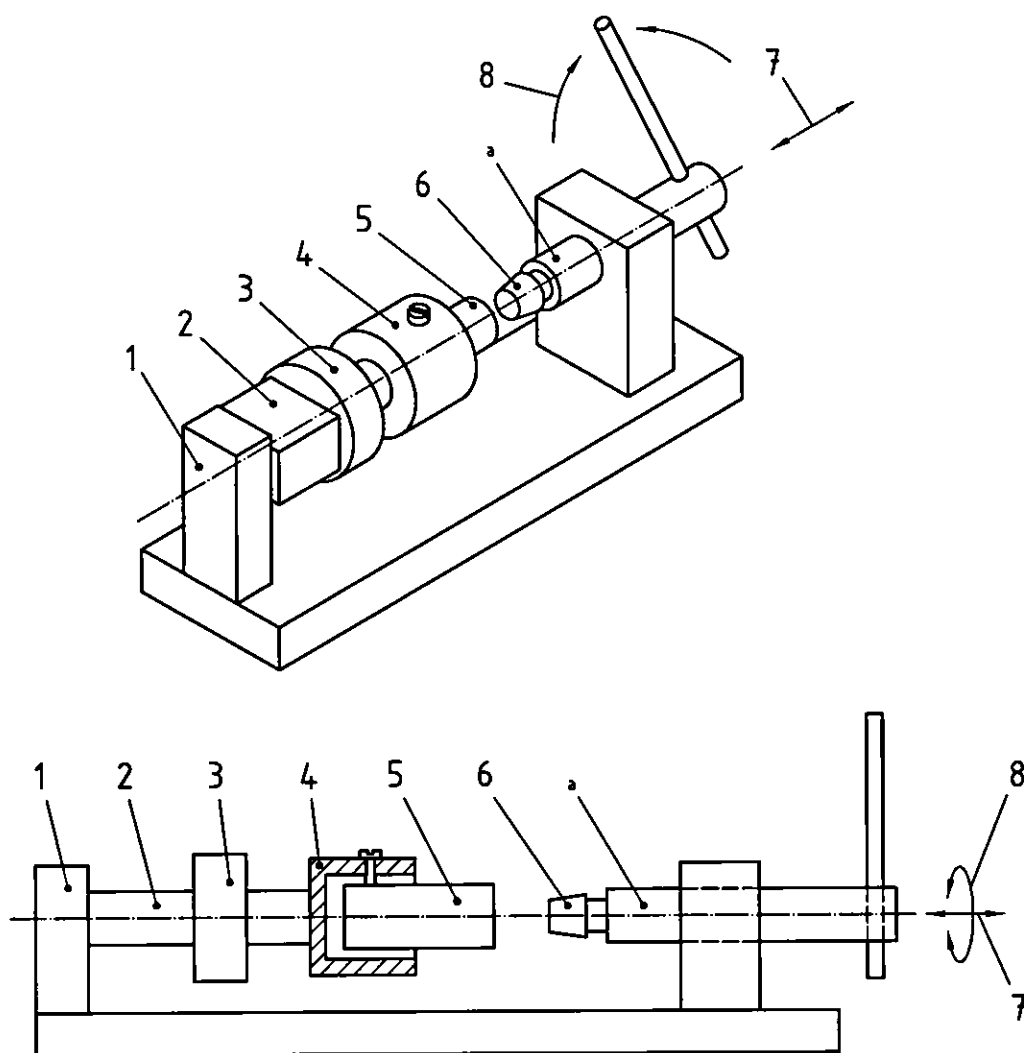
F.2.2 Procedure

F.2.2.1 Condition the 22 mm latching connector and the apparatus (F.2.1) at a temperature of $(35 \pm 3) ^\circ\text{C}$ and a relative humidity of at least 80 % for 1 h.

F.2.2.2 Engage the 22 mm latching connector with the male test piece on the apparatus.

F.2.2.3 After 1 min, manually apply an axial separation force at a rate not exceeding $20 \text{ N}\cdot\text{s}^{-1}$ until a force of $(50 \pm 5) \text{ N}$ is applied. Maintain this force for 10 s without activation of any disengagement mechanism, and observe whether the engaged 22 mm latching connector and male test piece become disconnected.

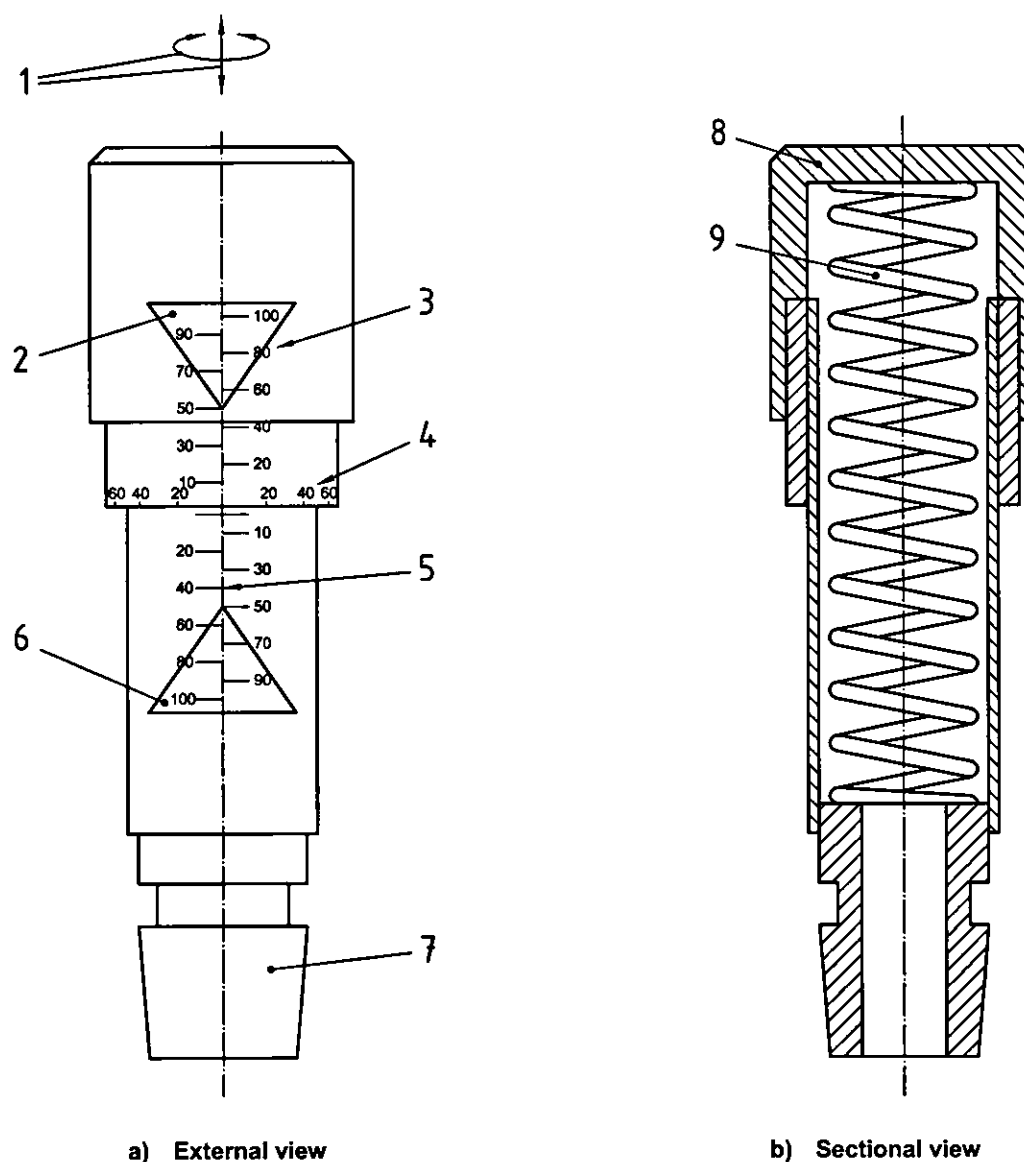
F.2.2.4 Without reducing the tensile load and without activation of any disengagement mechanism, apply a torque of $(25 \pm 5) \text{ N}\cdot\text{cm}$ or rotate the male test piece through an angle of 20° , whichever occurs first. Maintain this torque or position for 10 s, and observe whether the engaged 22 mm latching connector and male test piece become disconnected.



Key

- 1 rigid support
- 2 axial load meter
- 3 torque meter
- 4 holder
- 5 22 mm latching connector under test
- 6 22 mm male test piece
- 7 application of adjustable axial force
- 8 application of adjustable torque
- ^a Free to slide and rotate.

**Figure F.1 — Apparatus for testing the security of engagement of 22 mm latching connectors
(Method 1 — Bench-mounted)**



Key

- | | |
|---|----------------------------------|
| 1 application of torque or push or pull by hand | 8 knob |
| 2 area of scale indicating acceptable pull and twist forces | 9 coil spring fixed at both ends |
| 3 pull-force scale | |
| 4 torque scale | |
| 5 push-force scale | |
| 6 area of scale indicating acceptable push and twist forces | |
| 7 22 mm male test piece | |

Torque and force scales should be precalibrated using apparatus in Figure F.1.

Figure F.2 — Apparatus for testing the security of engagement of 22 mm latching connectors (Method 2 — Hand-held)

Bibliography

- [1] ISO 3040:1990, *Technical drawings — Dimensioning and tolerancing — Cones*

ANNEX ZA

(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 93/42 EEC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 93/42 EEC.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

WARNING: Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Table ZA.1 – Correspondence between this European Standard and EU Directives

Clause/subclause of this European Standard	Corresponding essential requirements of Directive 93/42/EEC	Comments
4	1, 2, 7.5, 7.6, 9.1	
5	1, 2, 7.5, 7.6, 9.1	
6	1, 2, 4, 7.5, 7.6, 9.1	

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover.
Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001.
Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at <http://www.bsi-global.com>.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre.
Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration.
Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001.
Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at <http://www.bsi-global.com/bsonline>.

Further information about BSI is available on the BSI website at <http://www.bsi-global.com>.

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

Details and advice can be obtained from the Copyright & Licensing Manager.
Tel: +44 (0)20 8996 7070. Fax: +44 (0)20 8996 7553.
Email: copyright@bsi-global.com.