
British Standard

Conical connectors for anaesthetic and respiratory equipment

Part 1. Specification for cones and sockets

Connecteurs coniques pour matériel d'anesthésie et de réanimation
Partie 1. Cônes et raccords femelles — Spécifications

Kegelverbindungen für Anästhesie- und Respirationsgeräte
Teil 1. Außen- und Innenanschlußstücke

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Conical connectors for anaesthetic and respiratory equipment
Part 1. Specification for cones and sockets

Revised text

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Front cover

Delete the title of Part 1 and substitute the following
'Specification for cones and sockets (excluding 8.5 mm size)'.

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June 1990

National foreword

Under cross-references insert the following under the headings 'International standard' and 'Corresponding British Standard' respectively.

'ISO 8185 : 1988

BS 5724 Medical electrical equipment
Part 2. Particular requirements for safety
Section 2.24 : 1989 Specification for humidifiers
(Identical)

In paragraph 10, line 1, delete the comma between 'ISO 5367' and 'ISO 5369' and substitute 'and'; delete 'and ISO 8185'.

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National foreword

This Part of BS 3849 has been prepared under the direction of the Health Care Standards Committee. It is identical with ISO 5356-1 : 1987 'Anaesthetic and respiratory equipment — Conical connectors — Part 1: Cones and sockets', which was published by the International Organization for Standardization (ISO) and prepared under the direction of Technical Committee ISO/TC 121, Anaesthetic and respiratory equipment. This Part of BS 3849, together with Part 2, which is a specification for screw-threaded weight-bearing connectors, is a revision of BS 3849 : 1965, which is withdrawn.

Whereas BS 3849 : 1965 covered only 15 mm and 22 mm size connectors made of metal or semi-rigid material, this revision covers 15 mm, 19 mm, 22 mm, 23 mm and 30 mm size connectors made of either metal or materials other than metal, for example polyamide, polyacetal, polycarbonate, polysulphone, etc. Also, whereas BS 3849 : 1965 included requirements for the sequence of conical connectors used when assembling breathing system components, no requirements for applications of connectors are given in this revision (see 0.3).

In 0.2, it is stated that 19 mm and 30 mm size connectors are intended for the connection of a breathing system to an anaesthetic gas scavenging system. In the UK, current practice is to use 30 mm size connectors for this purpose and only these connectors are specified in BS 6834 'Specification for active anaesthetic gas scavenging systems'.

Terminology and conventions. The text of the international standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

In British Standards it is current practice to use the spelling 'polysulphone' instead of 'polysulfone'.

Wherever the words 'ISO 5356' and 'part of ISO 5356' appear, referring to this standard, they should be read as 'BS 3849' and 'Part of BS 3849' respectively.

Cross-references

International standard	Corresponding British Standard
ISO 2882 : 1979	BS 2050 : 1978 Specification for electrical resistance of conducting and antistatic products made from flexible polymeric material (Technically equivalent)
ISO 4135 : 1979*	BS 6015 : 1980 Glossary of terms used in anaesthesiology (Identical)
ISO 5356-2 : 1987*	BS 3849 Conical connectors for anaesthetic and respiratory equipment Part 2 : 1988 Specification for screw-threaded weight-bearing connectors (Identical)
ISO 5366-1 : 1986*	BS 6149 Tracheostomy tubes Part 1 : 1987 Specification for connectors (Identical)

The Technical Committee has reviewed the provisions of ISO 2878 to which reference is made in the text and has decided that for the purposes of this standard, the method described in appendix A of BS 2050 : 1978 may be used (see clause 4).

There are at present no British Standards equivalent to ISO 3040, ISO 5358, ISO 5367, ISO 5369 and ISO 8185 to which informative references only are made in clause 9. BS 6546 'Specification for tracheal tube connectors' is related to ISO 7228, to which an informative reference only is made in clause 9.

NOTE. *Typographical errors.* In clause 3, lines 1 and 2, for 'defintions' read 'definitions'. In the heading of clause 6, for 'that' read 'than'.

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

*For information only.

British Standard

Conical connectors for anaesthetic and respiratory equipment

Part 1. Specification for cones and sockets

0 Introduction

0.1 ISO 5356 comprises the following two parts :

Part 1 : Cones and sockets.

Part 2 : Screw-threaded weight-bearing connectors.

0.2 In clinical practice several breathing attachments 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, though not invariably, 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 gives requirements for five sizes of conical connector of which only the 15 mm and 22 mm sizes are intended for general use in breathing systems. The 23 mm size is intended for use with vaporizers which are unsuitable for use in the breathing system (see ISO 5358); usually because they impose a high resistance to gas flow. The 19 mm and 30 mm sizes are intended for the connection of a breathing system to an anaesthetic gas scavenging system.¹⁾

An important consideration is that conical connections are secure but are nevertheless disconnectable by the user. The use of connectors meeting the requirements of this part of ISO 5356 will not necessarily prevent their being disconnected accidentally, although accessory devices for this purpose may be incorporated.

It should be noted that compliance with this part of ISO 5356 does not preclude the possibility that some flow direction sensitive components may be mis-connected and it is stressed that the avoidance of this hazard has to remain the responsibility of the user.

0.3 Requirements for the application of conical connectors are not included in this part of ISO 5356 but are given in the

relevant International Standards for devices and items of equipment (see clause 9).

0.4 Figures 1 to 5 detailing the dimensions and tolerances of metal conical connectors have been prepared in accordance with the principles given in ISO 3040.

Annex A gives recommendations for materials and is not an integral part of the standard.

Annex B includes figures detailing plug and ring gauges that may be used to check the sizes of metal conical connectors and is not an integral part of the standard.

1 Scope and field of application

This part of ISO 5356 specifies basic dimensional and gauging requirements for cones and sockets intended for use in breathing systems, anaesthetic gas scavenging systems and vaporizers.

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

2 References

ISO 2878, *Rubber, vulcanized — Antistatic and conductive products — Determination of electrical resistance.*

ISO 2882, *Rubber, vulcanized — Antistatic and conductive products for hospital use — Electrical resistance limits.*

3 Definitions

For the purposes of this part of ISO 5356, the following definitions apply.

NOTE — Definitions have been taken from ISO 4135.

3.1 breathing attachments : Components intended to make up or complete a breathing system.

¹⁾ An International Standard on anaesthetic gas scavenging systems is currently being prepared.

3.2 breathing system : Those gas pathways continuously or intermittently in communication with the patient's respiratory tract during any form of ventilation.

NOTES

- 1 In practice a breathing system usually extends from
 - a) the point of supply¹⁾ of a controlled gas mixture, for example the common gas outlet of an anaesthetic machine, or
 - b) the fresh-gas inlet of a circle system, lung ventilator, T-piece, etc., or
 - c) the fresh-gas inlet of a manually-operated resuscitator.
- 2 It usually extends to the point at which gas mixture escapes to atmosphere or a gas scavenging system, for example from an APL valve, the open end of a T-piece, etc.
- 3 Gas pathways exclusively concerned with gas scavenging systems are not regarded as a part of the breathing system.

4 Materials

If components are made of anti-static materials, they shall comply with the requirements given in ISO 2882 when tested by the methods described in ISO 2878.

5 Conical connectors made of metal

NOTES

- 1 Metal connectors include those of composite materials where the mating surfaces are metal.
- 2 Conical connectors of 19 mm, 23 mm and 30 mm size are not breathing system components.
- 3 See annex B for dimensions of plug and ring gauges.

5.1 Conical connectors of 15 mm size

The dimensions of conical connectors of 15 mm size made of metal shall be as shown in figure 1.

5.2 Conical connectors of 19 mm size

The dimensions of conical connectors of 19 mm size made of metal shall be as shown in figure 2.

5.3 Conical connectors of 22 mm size

5.3.1 The dimensions of conical connectors of 22 mm size made of metal, with or without a recess in the male component, shall be as shown in figure 3a) or 3b), as appropriate.

5.3.2 Male conical connectors of 22 mm size, with the exception of those intended for connection with a face mask, shall incorporate the recess as shown in figure 3a).

NOTE — The recess is to accommodate the end of a female connector made of elastomeric material²⁾ or to permit the fitting of other devices

to improve the security of the attachment of the socket to the male conical connector.

5.3.3 All male conical connectors to which it is intended to attach a face mask shall incorporate a shoulder or equivalent construction as shown in figure 3b).

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

NOTE — The design may permit the fitting of a device to ensure the secure attachment of tracheal (or tracheostomy) tube connectors.

5.4 Conical connectors of 23 mm size

The dimensions of conical connectors of 23 mm size made of metal shall be as shown in figure 4.

5.5 Conical connectors of 30 mm size

The dimensions of conical connectors of 30 mm size made of metal shall be as shown in figure 5.

6 Conical connectors made of materials other than metal

6.1 The axial length of conical connectors of 15 mm and 22 mm sizes made of materials other than metal, for example of polyamide, polyacetal, polycarbonate, polysulfone, etc., shall be as shown in figures 1 and 3, respectively. Other dimensions may be varied from those shown in figures 1 and 3 provided that both 15 mm and 22 mm connectors comply with the requirement laid down in 6.2 and that 22 mm connectors comply with the requirement laid down in 5.3.2.

6.2 Conical connectors of 15 mm and 22 mm sizes made of materials other than metal shall comply with the requirements laid down in 6.3 when they are type tested with gauges having dimensions as shown in figures 6 and 7, respectively.

NOTE — Since connectors made from plastics materials may vary enormously 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, therefore, the responsibility of the manufacturer to ensure that adequate tests have been carried out to prove as far as possible that the particular materials are suitable. Attention is drawn to the fact that some connectors will be used at elevated temperatures, for example those on heated humidifiers, and extra care will be required when selecting suitable materials.

1) In some situations, particularly in lung ventilators, this point may be inside a piece of equipment and should not be confused with a connection port fitted elsewhere, for example on the casing of a ventilator.

2) The term "elastomeric material" includes soft rubber (natural or synthetic) and some soft plastics materials, for example polyvinyl chloride and low-density polyethylene.