

American  
National  
Standard



ANSI/AAMI/  
ISO 5356-1:  
2004

Anaesthetic and  
respiratory equipment—  
Conical connectors—  
Part 1: Cones and  
sockets

**This document was approved and published when the U.S. TAG for TC 121 was held by ASTM, but it is now an AAMI standard. The original formatting has been maintained, so there are some variations from the typical AAMI style.**

*Published by*

Association for the Advancement of Medical Instrumentation  
4301 N. Fairfax Drive, Suite 301  
Arlington, VA 22203-1633  
[www.aami.org](http://www.aami.org)

© 2014 by the Association for the Advancement of Medical Instrumentation

All Rights Reserved

This publication is subject to copyright claims of ISO, and AAMI. No part of this publication may be reproduced or distributed in any form, including an electronic retrieval system, without the prior written permission of AAMI. All requests pertaining to this document should be submitted to AAMI. It is illegal under federal law (17 U.S.C. § 101, *et seq.*) to make copies of all or any part of this document (whether internally or externally) without the prior written permission of the Association for the Advancement of Medical Instrumentation. Violators risk legal action, including civil and criminal penalties, and damages of \$100,000 per offense. For permission regarding the use of all or any part of this document, complete the reprint request form at [www.aami.org](http://www.aami.org) or contact AAMI, 4301 N. Fairfax Drive, Suite 301, Arlington, VA 22203-1633. Phone: 703-525-4890; Fax: 703-525-1067.

Printed in the United States of America

ISBN 1-57020-532-9

Approved as an American National Standard with deviations by ASTM International

**INTERNATIONAL      ANSI/ISO**  
**STANDARD            5356-1(MOD)**

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*

**ANSI/ISO 5356-1:2004(E)**

MOD in ANSI/ISO 5356-1 means that ASTM International has approved the standard as an American National Standard with deviations. The U.S. deviations are appended to the end of ANSI/ISO 5356-1.

<b>Contents</b>	Page
<b>Foreword</b> .....	iv
<b>Introduction</b> .....	v
<b>1 Scope</b> .....	1
<b>2 Normative references</b> .....	1
<b>3 Terms and definitions</b> .....	2
<b>4 Conical connectors made of metal</b> .....	2
<b>4.1 General requirements</b> .....	2
<b>4.2 Additional requirements for male conical connectors of 22 mm size</b> .....	2
<b>4.3 Additional requirements for conical connectors of 8,5 mm size</b> .....	4
<b>5 Conical connectors made of materials other than metal</b> .....	4
<b>5.1 General requirements</b> .....	4
<b>5.2 Additional requirements for conical connectors of 22 mm size</b> .....	4
<b>5.3 Additional requirements for conical connectors of 8,5 mm size</b> .....	4
<b>6 22 mm latching connectors</b> .....	4
<b>Annex A (normative) Plug and ring test gauges for conical connectors made of materials other than metal</b> .....	6
<b>Annex B (normative) Test for security of engagement of 22 mm latching connector to male conical connector</b> .....	8
<b>Annex C (normative) Test for leakage from 22 mm latching connectors</b> .....	9
<b>Annex D (normative) Drop procedure for 22 mm latching connectors</b> .....	10
<b>Annex E (informative) Plug and ring test gauges for conical connectors made of metal</b> .....	11
<b>Annex F (informative) Suggested apparatus and methods for testing the security of engagement of 22 mm latching connectors</b> .....	13
<b>Bibliography</b> .....	17

## ANSI/ISO 5356-1:2004(E)

### 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