
**Lasers and laser-related equipment —
Determination of laser resistance of
tracheal tubes —**

**Part 1:
Tracheal tube shaft**

*Lasers et équipements associés aux lasers — Détermination de la
résistance au laser des tubes trachéaux —*

Partie 1: Axe des tubes trachéaux



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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 11990-1 was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 9, *Electro-optical systems*.

This first edition of ISO 11990-1 cancels and replaces ISO 11990:2003, of which it constitutes a minor revision.

ISO 11990 consists of the following parts, under the general title *Lasers and laser-related equipment — Determination of laser resistance of tracheal tubes*:

- *Part 1: Tracheal tube shaft*
- *Part 2: Tracheal tube cuffs*

Introduction

A fire in the airway is always a serious matter. In addition to local damage in the larynx, injury can occur to the lower airway and the parenchymal tissue in the lung. The products of combustion can be blown into the lungs.

Procedures performed in the airway where a tracheal tube and a laser are used bring together an oxygen-enriched atmosphere, a fuel and high power, the three ingredients necessary to create a fire. The likelihood that a laser beam will contact the tracheal tube during airway procedures is high.

In the early to mid-1980s, the increasing use of such lasers was followed by airway fires and, subsequently, the development of tracheal tubes designed specifically to be resistant to laser ignition and damage. Unfortunately, some of these tubes were not sufficiently resistant under operating room conditions, and airway fires continued to occur. These events led to the development of the test method described in this part of ISO 11990, in order to assist the clinician in determining which tracheal tube shaft is most laser-resistant for a defined set of conditions.

Lasers and laser-related equipment — Determination of laser resistance of tracheal tubes —

Part 1: Tracheal tube shaft

1 Scope

This part of ISO 11990 specifies a method of testing the continuous wave (cw) resistance of the shaft of a tracheal tube designed to resist ignition by a laser. It is not applicable to other components of the system, such as the inflation system and cuff, which are defined in ISO 11990-2 (see Note 1).

NOTE 1 ISO 11990-2 specifies the method for testing the laser resistance of the tracheal tube cuff.

This part of ISO 11990 can be used to measure and describe the properties of materials, products or assemblies in response to heat and flame under controlled laboratory conditions. It does not describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual clinical use conditions. However, the results of this test can be used as one element of a fire risk assessment which takes into account all factors pertinent to an assessment of the hazard of a particular end use.

NOTE 2 The direct applicability of the result of this test method to the clinical situation has not been fully established.

CAUTION — This test method can involve hazardous materials, operations, and equipment. This part of ISO 11990 provides advice on minimizing some of the risks associated with its use but does not purport to address all such risks. It is the responsibility of the user of this part of ISO 11990 to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.

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 11146-1, *Lasers and laser-related equipment — Test methods for laser beam widths, divergence angles and beam propagation ratios — Part 1: Stigmatic and simple astigmatic beams*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

beam cross-sectional area

A_{95}

smallest area containing 95 % of the total beam power

[ISO 11990-2:2010]