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Respiratory protective devices — Methods of test and test equipment —

Part 7: Practical performance test methods

Appareils de protection respiratoire — Méthodes d'essai et équipement d'essai —

Partie 7: Essai de performance pratique

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 15, *Respiratory protective devices*.

This second edition cancels and replaces the first edition (ISO 16900-7:2015), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Eliminated the annex, “Application of uncertainty of measurement — Determination of compliance” because there are no measurements in this standard to which the deleted method would apply.

— Modified activity 8 in Annex A regarding maximum noise output when the activity is conducted.

— Eliminate walking requirement when adjusting the RPD during activities in Annex B.

A list of all parts in the ISO 16900 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document is intended as a supplement to the respiratory protective devices (RPD) performance standards. Test methods are specified for complete devices or parts of devices. If deviations from the test method given in this document are necessary, these deviations will be specified in the performance standards.

Respiratory protective devices — Methods of test and test equipment —

Part 7: Practical performance test methods

1 Scope

This document specifies practical performance tests for respiratory protective devices. The purpose of these tests is to subjectively assess certain properties, characteristics and functions of the RPD, when worn by test subjects in simulated practical use, which cannot be assessed by tests described in other standards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 16972, *Respiratory protective devices — Terms, definitions, graphical symbols and units of measurement*

ISO/TS 16976-2:2015, *Respiratory protective devices — Human factors — Part 2: Anthropometrics*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16972 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Prerequisites

The performance standards shall indicate the conditions of the test. This includes the following:

— any exclusions to the activites in Table A.1;

— any activities from Annex B in addition to those specified in Table A.1;

— any pre-conditioning;

— temperature and humidity for the test;

— number of test subjects;

— number of samples to be tested.

5 General test requirements

Unless otherwise specified, the values stated in this document are expressed as nominal values. Except for temperature limits, values which are not stated as maxima or minima shall be subject to a tolerance of ±5 %. Unless otherwise specified, the ambient conditions for testing shall be between 16 °C and 32 °C and (50 ± 30) % relative humidity. Any temperature limits specified shall be subject to an accuracy of ±1 °C.

6 Procedure

6.1 Principle

Test subjects donning and wearing the RPD in accordance with the information supplied by the manufacturer perform activities in simulation of practical use. They are then asked to assess the RPD subjectively and comment accordingly.

6.2 Test subjects

Before performing any tests involving human subjects, account shall be taken of any national regulations concerning the medical history, medical examination, or supervision of the test subjects. Test subjects who have been trained in the correct use and fitting of the type of RPD being tested and who satisfy the target population as specified by the manufacturer shall be selected. The medical and physical condition of the subjects shall be satisfactory for the tasks involved. The test subjects shall be able to demonstrate that they are able to complete all the activities when not wearing RPD. This includes the ability to see and hear even when using individual eye correction and/or hearing aids (specifically activities 7 and 8 in Table A.1). The necessity for a medical examination before the tests and for medical supervision during them is at the discretion of the appropriate responsible person of the test house.

Candidates for the test panel shall be measured for face length and face width in accordance with ISO/TS 16976-2:2015, Annex B. The face length and face width measurements of the candidates shall be used to allocate the candidates to the cells of the bivariate panel in accordance with ISO/TS 16976-2:2015, 8.2. The face length and face width of any candidate for whom the bivariate measurements for face width and length fall outside of the limits of the panel (see ISO/TS 16976-2:2015, Figure C.1) shall be recorded, but it does not preclude the candidate from being a test subject.

Prior to the tests the following data shall be recorded for each test subject, but not reported:

- identification;
- age;
- gender;
- height;
- weight;
- whether or not the individual used eye correction and/or hearing aids during the tests;
- neck circumference, where applicable,
- The bivariate cell number allocated to the subject, or the face width and length if they fall outside of the limits of the bivariate cells

The information recorded shall comply with any national regulations on the storage of personal data.

6.3 Inspection of test samples

Practical performance tests shall only be performed following satisfactory RPD performance during laboratory tests specified in relevant clauses of the performance standards.

Before testing, examine the RPD to ensure that it is in good working condition and that it can be used without hazard.

6.4 Test conditions

The actual conditions of temperature, humidity and where relevant the illuminance level and the background noise level under which the tests are performed shall be measured and recorded.

6.5 Activities

A minimum of two test subjects shall be used.

Each subject shall wear clothing for use with the RPD under test as specified by the manufacturer. If not specified, clothing appropriate to the test conditions and the activities to be performed shall be worn.

If the manufacturer specifies that other items of PPE shall be worn in conjunction with the RPD, these items shall be worn during the activities.

For respiratory interface classes c, d and e, where corrective eyewear is specified by the manufacturer and where multiple sizes of RI are offered, each size of RI shall be assessed with the specified corrective eyewear. Uncorrected lenses may be used, provided the test subject does not require vision correction. In addition, one test of an RI of any size shall be conducted without the use of a corrective eyewear kit.

Ask the test subjects to read and follow the information supplied by the manufacturer and then choose the correct size (if applicable) and don the RPD. The test subject shall comment on whether the information supplied by the manufacturer was understandable and could be followed.

If it was not possible for the test subject to choose the correct size (where applicable) and to don the RPD correctly by following the information supplied by the manufacturer, the test subject can be shown how to select the correct size and to don the RPD correctly in accordance with the information supplied. This observation shall be reported.

The test subject shall perform all the pre-use checks specified in the information supplied by the manufacturer.

Before starting the test, check that the RPD has been donned correctly. Re-adjust if necessary and record this finding. Finally, confirm that the test subject is ready to start the test. If that confirmation cannot be given by the test subject, then take the test subject off the panel and report the fact.

Inform the test subjects that if they wish to adjust the RPD during the test they may do so.

The sequence of activities shall be as specified in Table A.1. The activities shall be continuous, without removal of the RPD, unless otherwise specified in the performance standards.

Additional tests related to optional features shall be performed as indicated in Annex B or after the sequence of activities in Table A.1, as appropriate.

During the tests the RPD shall be subjectively assessed by each wearer. After completing the test activities the subject shall be asked for comments. If the comments received indicate that there might be issues that affect the safe use of the RPD, these shall be confirmed by further observations and testing. It is permitted for the observer to add their own comments.

7 Test report

Report the following.

— The actual conditions of temperature, humidity, and where relevant illuminance level and background noise level under which the tests were performed.

— Whether all test subjects completed all the assigned sequence of tasks.