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Respiratory protective devices — Human factors —

Part 8: Ergonomic factors

Appareils de protection respiratoire — Facteurs humains — Partie 8: Facteurs ergonomiques

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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 of 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 www.iso.org/iso/foreword.html.

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

This first edition of ISO 16976-8 cancels and replaces the first edition of ISO/TS 16976-8:2013, which has been technically revised.

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

— Requirements more specified.

A list of all parts in the ISO 16976 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.

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Introduction

This document provides guidance for the writers of respiratory protective devices (RPD) performance standards on the specification of ergonomic factors.

Ergonomics involves the application of scientific methods and appropriate data to the design and specification of machines, equipment, environments, systems and the interface with the people using it. The successful use of ergonomics in designing RPD will enhance the acceptability of the RPD and through this will improve the safety, health, performance and effectiveness of the wearer.

RPD is used in situations where a risk to health or safety has been identified. The preferred solution is to reduce the risk to zero and thereby to remove the need for RPD. If this is not possible, the threat should be reduced so that practical RPD can minimize the risk to wearer exposed to that hazard. In some working conditions some RPD can be more comfortable than none and not to be considered as an additional discomfort. Side effects of using RPD can range from discomfort to severe constraint and physical load. The application of ergonomic principles to RPD allows optimization of the balance between protection and usability.

Some aspects of the design and specification of RPD require specialist knowledge of the particular job the RPD is used for and of the particular hazard against which the RPD is to be effective or particular ergonomics issues. Although this document covers many aspects, it cannot be expected to identify all the existing and possible future problem points for which ergonomic factors and test methods will be required in performance standards. It will remain the responsibility of the relevant experts to identify and quantify the hazards in the work place and to foresee the potential ergonomic problems, and thus to ensure that the RPD specified and manufactured is fit for the purposes intended in all respects.

For practical reasons, this document presents ergonomics factors separately. However, it should be recognized that the overall acceptability of a RPD will be determined by a combination of these and other factors by the individual wearer.

Together with ISO 16976-1 to ISO 16976-7, this document provides basic human factor data.

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1 Scope

This document describes requirements on factors related to human physiology, ergonomics and performance for the preparation of standards for performance requirements, testing and use of respiratory protective devices (RPD).

This document gives guidance on the generic ergonomic factors related to RPD.

It specifies principles relating to

— the biomechanical interaction between RPD and the human body, and

— the interaction between RPD and the human senses: vision, hearing, smell, taste and skin contact.

This document does not cover requirements related to specific hazards for which RPD are designed.

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 — Vocabulary and graphical symbols*

3 Terms and definitions

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

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

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

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

4 Ergonomic factors

4.1 General

Performance standards for RPD should contain ergonomic requirements and test methods, or should make normative reference to other standards to be applied.

Usually, ergonomic assessments of RPD have to be made while people are wearing them or are connected to the external component of the system. Wherever possible, the assessments should be objective, although some aspects can only be assessed subjectively.

Examples of how to make assessments are given in Annex A.

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