PD ISO/TS 16976-8:2013

BSI Standards Publication

Respiratory protective devices — Human factors

Part 8: Ergonomic factors

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee PH/4, Respiratory protection.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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ISBN 978 0 580 78771 3

ICS 13.340.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 June 2013.

Amendments issued since publication

Date	Text affected

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TECHNICAL SPECIFICATION

ISO/TS 16976-8

First edition
2013-06-01

Respiratory protective devices — Human factors —

Part 8: Ergonomic factors

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

Reference number
ISO/TS 16976-8:2013(E)

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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. www.iso.org/directives

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The committee responsible for this document is ISO/TC 94, *Personal safety — Protective clothing and equipment*, SC15, *Respiratory protective devices*.

ISO/TS 16976 consists of the following parts:

— *Part 1: Metabolic rates and respiratory flow rates*

— *Part 2: Anthropometrics*

— *Part 3: Physiological responses and limitations of oxygen and limitations of carbon dioxide in the breathing environment*

— *Part 4: Work of breathing and breathing resistance: Physiologically based limits*

The following parts are under preparation:

— *Part 5: Thermal effects*

— *Part 6: Psycho-physiological effects*

— *Part 7: Hearing and speech*

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Introduction

This part of ISO/TS 16976 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 may 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 part of ISO/TS 16976 covers many aspects, the writers of performance standards should be aware that 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 part of ISO/TS 16976 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/TS 16976 Parts 1 to 7, this part of ISO/TS 16976 provides basic human factor data.

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Respiratory protective devices — Human factors —

Part 8: Ergonomic factors

1 Scope

ISO/TS 16976 provides information 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 part of ISO/TS 16976 gives guidance on the generic ergonomic factors related to RPD.

It specifies for the writers of RPD performance standards principles relating to:

— the biomechanical interaction between RPD and the human body;

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

This part of ISO/TS 16976 does not cover requirements related to specific hazards for which RPD are designed.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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*

3 Terms and definitions

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

4 Ergonomic factors

4.1 General

Harmonized 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.

4.2 Integration of performance and ergonomic requirements

The primary purpose of RPD is to provide protection against specific inhalation hazards that cannot be eliminated or adequately reduced by other means. Performance standards should therefore contain performance requirements and test methods to ensure that the products fulfilling the performance

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