

PD ISO/TS 16976-6:2014



BSI Standards Publication

Respiratory protective devices — Human factors

Part 6: Psycho-physiological effects

bsi.

...making excellence a habit.™

National foreword

This Published Document is the UK implementation of ISO/TS 16976-6:2014.

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.

© The British Standards Institution 2014.
Published by BSI Standards Limited 2014

ISBN 978 0 580 82285 8
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 31 July 2014.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

TECHNICAL
SPECIFICATION

ISO/TS
16976-6

First edition
2014-06-01

**Respiratory protective devices —
Human factors —**

**Part 6:
Psycho-physiological effects**

*Appareils de protection respiratoire — Facteurs humains —
Partie 6: Effets psycho-physiologiques*



Reference number
ISO/TS 16976-6:2014(E)

© ISO 2014



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions, symbols and abbreviated terms	1
4 Symbols and abbreviated terms	3
5 Psycho-physiological effects influencing user acceptance of RPD	4
5.1 General	4
5.2 Physiological responses to wearing RPD and impact on performance of work	4
5.3 Subjective feelings of discomfort	5
5.4 Psychological responses to RPD wear	7
5.5 Objective measures of psycho-physiological effects	8
5.6 Selection criteria for potential RPD wearer	9
5.7 Impact of the psychological and physiological responses	10
Bibliography	11

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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 15, *Respiratory protective devices*.

ISO/TS 16976 consists of the following parts, under the general title *Respiratory protective devices — Human factors*:

- *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*
- *Part 5: Thermal effects*
- *Part 6: Psycho-physiological effects*
- *Part 7: Hearing and speech*
- *Part 8: Ergonomic factors*

Introduction

This part of ISO/TS 16976 addresses the psychological factors that can trigger physiological effects (psycho-physiology effects) that contribute to user acceptance, or the ability to tolerate wearing respiratory protective devices (RPD) for the duration needed. This part of ISO/TS 16976 takes the position that the psychological state has a physiological correlate (e.g. anxiety is accompanied by an increase in heart rate) and that the physiological responses to wearing an RPD have an impact on the psychology of the wearer (e.g. difficulty in breathing will result in anxiety). The following section focuses on a separate psycho-physiological situation that can impact user acceptance or contribute to the likelihood of the wearer removing the RPD prematurely and, thus, being exposed to a respiratory hazard. The physiological responses to wearing an RPD is addressed first followed by a discussion on the psychological responses to wearing RPD. The discussion then turns to the methodologies used to measure the psycho-physiological responses and how these measurements are used to predict whether an individual will have difficulty wearing an RPD. Finally, this part of ISO/TS 16976 addresses the selection criteria that can be used to determine who is best suited to engage in an occupation requiring the use of RPD.

The following definitions apply in understanding how to implement an ISO International Standard and other normative ISO deliverables (TS, PAS, IWA).

- “shall” indicates a requirement.
- “should” indicates a recommendation.
- “may” is used to indicate that something is permitted.
- “can” is used to indicate that something is possible, for example, that an organization or individual is able to do something.

3.3.1 of the ISO/IEC Directives, Part 2 (sixth edition, 2011) defines a requirement as an “expression in the content of a document conveying criteria to be fulfilled if compliance with the document is to be claimed and from which no deviation is permitted.”

3.3.2 of the ISO/IEC Directives, Part 2 (sixth edition, 2011) defines a recommendation as an “expression in the content of a document conveying that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.”

Respiratory protective devices — Human factors —

Part 6: Psycho-physiological effects

1 Scope

This part of ISO/TS 16976 provides information on the psycho-physiological effects related to the wearing of respiratory protective devices (RPD) and it is intended for the preparation of standards for selection and use of RPD.

It specifies for the writers of RPD standards, principles relating to

- the interaction between RPD and the human physiological and psychological perception,
- the acceptance by the wearer, and
- the need for training to improve acceptance of the RPD by the wearer.

This part of ISO/TS 16976 does not cover requirements related to the specific hazard for which the RPD is 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, symbols and abbreviated terms

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

3.1

aetiopathology

cause of the pathological state or disorder, pathogenesis

3.2

anxiety

state of being uneasy, apprehensive, or worried about what might happen, misgiving

3.3

BP

arterial blood pressure (mmHg)

3.4

cardiac arrhythmia

variation from the normal rhythm of the heart beat

3.5

claustrophobia

abnormal fear or dread of being in an enclosed or confined space