



BSI Standards Publication

Respiratory protective devices — Human factors

Part 6: Psycho-physiological effects

National foreword

This British Standard is the UK implementation of ISO 16976-6:2023. It supersedes PD ISO/TS 16976-6:2014, which is withdrawn.

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 committee manager.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2023
Published by BSI Standards Limited 2023

ISBN 978 0 539 15368 2

ICS 13.340.30

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

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 28 February 2023.

Amendments/corrigenda issued since publication

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

INTERNATIONAL
STANDARD

ISO
16976-6

First edition
2023-02-07

**Respiratory protective devices —
Human factors —**

Part 6:
Psycho-physiological effects

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



Reference number
ISO 16976-6:2023(E)

© ISO 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023, Published in Switzerland

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
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	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
5.2.1 General.....	4
5.2.2 Oxygen (O ₂) and carbon dioxide (CO ₂) in the breathing space.....	4
5.2.3 Metabolic rate during RPD use.....	5
5.3 Subjective feelings of discomfort.....	5
5.3.1 General.....	5
5.3.2 Subjective feelings of dyspnoea (air hunger) due to increased breathing resistance and work of breathing.....	6
5.3.3 Subjective feelings of dry respiratory passages.....	7
5.3.4 Subjective feelings of heat stress.....	7
5.4 Psychological responses to RPD wear.....	8
5.4.1 General.....	8
5.4.2 Subjective feelings of claustrophobia.....	8
5.4.3 RPD phobia.....	8
5.5 Objective measures of psycho-physiological effects.....	9
5.5.1 General.....	9
5.5.2 Use of screening tool to predict the psycho-physiological effect on the RPD wearer.....	9
5.5.3 Anxiety.....	9
5.6 Selection criteria for potential RPD wearer.....	10
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 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 — Protective clothing and equipment, Subcommittee SC 15, Respiratory protective devices.

This first edition of ISO 16976-6 cancels and replaces the second edition of the Technical Specification ISO/TS 16976-6:2014, which has been technically revised.

The main changes are as follows:

- the document has been editorially revised.

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.

Introduction

This document addresses the psychological factors that can trigger physiological effects (psychophysiology effects) that contribute to user acceptance, or the ability to tolerate wearing respiratory protective devices (RPD) for the duration needed. This document 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 clauses focus on a separate psychophysiological 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 psychophysiological responses and how these measurements are used to predict whether an individual will have difficulty wearing an RPD. Finally, this document addresses the selection criteria that can be used to determine who is best suited to engage in an occupation requiring the use of RPD.

Respiratory protective devices — Human factors —

Part 6: Psycho-physiological effects

1 Scope

This document 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 document does not cover requirements related to the specific hazard for which the RPD is 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 and the following 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/>

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

blood pressure

BP

pressure in the large arteries of the body, typically measured in the brachial artery

3.4

cardiac arrhythmia

variation from the normal rhythm of the heart beat