

This is a preview of "ISO/TS 16976-5:2013". [Click here to purchase the full version from the ANSI store.](#)

First edition
2013-11-01

Respiratory protective devices — Human factors —

Part 5: Thermal effects

*Dispositifs de protection respiratoire — Facteurs humains —
Partie 5: Effets thermiques*



Reference number
ISO/TS 16976-5:2013(E)

© ISO 2013



COPYRIGHT PROTECTED DOCUMENT

© ISO 2013

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

This is a preview of "ISO/TS 16976-5:2013". [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms, definitions, symbols and abbreviated terms	2
3.1 Terms and definitions	2
3.2 Symbols and abbreviated terms	2
4 Local thermal effects	2
4.1 General	2
4.2 Effects on skin contact by the RPD	2
4.3 Hot surfaces	3
4.4 Cold surfaces	4
4.5 Effects of inhaled breathable gas to airways and lung tissues	8
5 Effects on whole body heat balance	10
5.1 Respiratory heat exchange	10
5.2 Skin surface heat exchange	11
5.3 Increased metabolic rate	12
5.4 Thermoneutral conditions	12
5.5 Heat stress	12
5.6 Cold stress	13
Bibliography	15

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

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. 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* [Technical Specification]
- *Part 2: Anthropometrics* [Technical Specification]
- *Part 3: Physiological responses and limitations of oxygen and limitations of carbon dioxide in the breathing environment* [Technical Specification]
- *Part 4: Work of breathing and breathing resistance: Physiologically based limits* [Technical Specification]
- *Part 5: Thermal effects* [Technical Specification]
- *Part 7: Hearing and speech* [Technical Specification]
- *Part 8: Ergonomic factors* [Technical Specification]

The following parts are under preparation:

- *Part 6: Psycho-physiological effects* [Technical Specification]

This is a preview of "ISO/TS 16976-5:2013". [Click here to purchase the full version from the ANSI store.](#)

Introduction

For an appropriate design, selection and use of respiratory protective devices, basic physiological demands of the user must be considered. The function of a respiratory protective device, the way it is designed and used and the properties of its material may have a thermal effect on the human body.

This part of ISO/TS 16976 belongs to a series of documents providing basic physiological and anthropometric data on humans. It contains information about thermal effects associated with wearing respiratory protective devices