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Respiratory protective devices — Human factors —

Part 1: Metabolic rates and respiratory flow rates

Appareils de protection respiratoire — Facteurs humains —

Partie 1: Régimes métaboliques et régimes des débits respiratoires



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 16976-1 was prepared by Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 15, *Respiratory protective devices*.

ISO 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]

The following parts are under preparation:

- *Part 2: Anthropometrics*
- *Part 3: Physiological responses and limitations of oxygen and limitations of carbon dioxide in the breathing environment*

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Introduction

For an appropriate design, selection and use of respiratory protective devices, it is important to consider the basic physiological demands of the user. The type and intensity of work affect the metabolic rate (energy expenditure) of the wearer. The weight and weight distribution of the device on the human body also may influence metabolic rate. Metabolic rate is directly correlated with oxygen consumption, which determines the respiratory demands and flow rates. The work of breathing is influenced by the air flow resistances of the device and the lung airways. The work (or energy cost) of a breath is related to the pressure gradient created by the breathing muscles and the volume that is moved in and out of the lung during the breath. Anthropometric and biomechanical data are required for the appropriate design of various components of a respiratory protective device, as well as for the design of relevant test methods.

This Technical Specification is the first part of a series of documents providing basic physiological and anthropometric data on humans. It contains information about metabolic rates and respiratory flow rates for various types of physical activity.