Ergonoomika. Soojuslike ainevahetusprodukti määramine

Ergonomics - Determination of metabolic heat production

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 28996:2000 sisaldab Euroopa standardi EN 28996:1993 ingliskeelset teksti.	This Estonian standard EVS-EN 28996:2000 consists of the English text of the European standard EN 28996:1993.
Standard on kinnitatud Eesti Standardikeskuse 11.01.2000 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 11.01.2000 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 13.180

ainevahetus, arvutamine, inimfaktori arvessevõtmine, klassifikatsioonid, mõõtmine, soojuslik mugavus, tabelid (andmed)

EUROPEAN STANDARD **EN 28996**

NORME EUROPÉENNE

EUROPÄISCHE NORM October 1993

UDC 331.101.;577.121:331.483.46:612.014.43

Descriptors: Human factors engineering, thermal comfort, measurements, metabolism, tables (data), computation, classifications

English version

Ergonomics - Determination of metabolic heat production (ISO 8996:1990)

Ergonomie - Détermination de la production de chaleur métabolique (ISO 8996:1990)

Ergonomie - Bestimmung der Wärmeerzeugung im menschlichen Körper (ISO 8996:1990)

This European Standard was approved by CEN on 1993-10-25. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Foreword

This European Standard is the endorsement of ISO 8996:1990. Endorsement of ISO 8996 was recommended by Technical Committee CEN/TC 122 "Ergonomics" under whose competence this European Standard will henceforth fall.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1994, and conflicting national standards shall be withdrawn at the latest by April 1994.

The standard was approved and in accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

Endorsement notice

The text of the International Standard ISO 8996:1990 was approved by CEN as a European Standard without any modification.

INTERNATIONAL STANDARD

ISO 8996

First edition
1990-12-15

Ergonomics — Determination of metabolic heat production

Ergonomie — Détermination de la production de chaleur métabolique

Reference number
ISO 8996 : 1990 (E)

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.

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.

International Standard ISO 8996 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Sub-Committee SC 5, *Ergonomics of the physical environment*.

Annexes A to G form an integral part of this International Standard.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Printed in Switzerland

Introduction

This International Standard is one of a series intended for use in the study of thermal environments. It covers the evaluation of metabolic heat production by determining the metabolic rate needed to evaluate comfort and thermal stress using the methods given in this series of International Standards.

This page intentionally left blank

Ergonomics — Determination of metabolic heat production

1 Scope

The metabolic rate, as a conversion of chemical into mechanical and thermal energy, measures the energetic cost of muscular load and gives a numerical index of activity. A knowledge of metabolic rate is necessary to measure metabolic heat production for the evaluation of human heat regulation. Specifying methods for determination metabolic rate, this International Standard can also be used for other applications — for example: the assessment of working practices, the cost of specific jobs or sport activities, the total cost of activity, etc.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7933 : 1989, *Hot environments — Analytical determination and interpretation of thermal stress using calculation of required sweat rate*.

ISO 9886 : — [1], *Ergonomics — Evaluation of thermal strain by physiological measurements*.

3 Principle and accuracy

Since most of the energy produced by an organism is converted into thermal energy, the mechanical fraction — called the "useful work" (W) — can normally be neglected and the metabolic heat production can be equated with the metabolic rate (see ISO 7933).

Table 1 gives three approaches for determining metabolic rate.

Table 1 — Levels for the determination of the metabolic rate

Level	Method	Accuracy	Inspection of the work place
I	A — Classification according to kind of activity	Rough information where the risk of error is very great	Not necessary
	B — Classification according to occupation		Information on technical equipment, work organization
II	A — Use of tables of group assessment	High error risk Accuracy: ± 15 %	Time study necessary
	B — Use of estimation tables for specific activities		
	C — Use of heart rate under defined conditions		Not necessary
III	Measurement	Risk of errors within the limits of the accuracy of the measurement and of the time study Accuracy: ± 5 %	Time study necessary

1) To be published.