

SVENSK STANDARD

SS-EN ISO 28803:2012



Fastställt/Approved: 2012-03-29
Publicerad/Published: 2012-04-02
Utgåva/Edition: 1
Språk/Language: engelska/English
ICS: 13.180

Ergonomi angående den fysiska miljön – Tillämpning av internationella normer för människor med speciella behov (ISO 28803:2012)

Ergonomics of the physical environment – Application of international standards to people with special requirements (ISO 28803:2012)

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EUROPEAN STANDARD

EN ISO 28803

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2012

ICS 13.180

English Version

**Ergonomics of the physical environment - Application of
international standards to people with special requirements (ISO
28803:2012)**

Ergonomie de l'environnement physique - Application des
Normes internationales aux personnes ayant des
exigences particulières (ISO 28803:2012)

Ergonomie der physikalischen Umgebung - Anwendung
Internationaler Normen für Personen mit besonderen
Bedürfnissen (ISO 28803:2012)

This European Standard was approved by CEN on 14 March 2012.

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Foreword

This document (EN ISO 28803:2012) has been prepared by Technical Committee ISO/TC 159 "Ergonomics" in collaboration with Technical Committee CEN/TC 122 "Ergonomics" the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by September 2012, and conflicting national standards shall be withdrawn at the latest by September 2012.

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Endorsement notice

The text of ISO 28803:2012 has been approved by CEN as a EN ISO 28803:2012 without any modification.

SS-EN ISO 28803:2012 (E)

Introduction

This is one of a series of International Standards concerned with the ergonomics of the physical environment. This International Standard complements others in the series concerned with specific components of the environment, such as thermal environments, acoustics, lighting or air quality, building upon them to allow an assessment of human response to the total environment. This International Standard is particularly concerned with extending the scopes of other International Standards — see 5.2.2, 5.3.2 to 5.3.5, 5.4.2, 5.5, 6.2 to 6.6, 7.3 and 9.2 — so that they can be applied to as wide a range of people as possible. The background information it provides on the responses and needs of groups of persons with special requirements will contribute to accessible environmental designs that will complement other activities in the field of ergonomics.

This International Standard includes a description of the range and variety of responses and adaptations to physical environments of people with special requirements, and the consequences for measuring and evaluating those environments. It considers the application of indices and methods for people with special requirements where health and safety, comfort and well-being are considerations. It provides a description of the nature of the particular characteristics of people with special requirements in the context of their responses to environments (e.g. restricted sensation, reduced perception or ability to respond). It is not a database of characteristics of people with special requirements, but uses data from ISO/TR 22411 to provide methods and criteria that will in turn provide accessible environments.

Ergonomics of the physical environment — Application of International Standards to people with special requirements

1 Scope

This International Standard describes how International Standards concerned with the ergonomics of the physical environment can be applied for people with special requirements, who would otherwise be considered to be beyond the scope of those standards. It has been produced according to the principles of accessible design provided in ISO/IEC Guide 71 and using the data provided in ISO/TR 22411.

It is not restricted to any specific environment but provides the general principles that allow assessment and evaluation, and can contribute to the development of standards concerned with specific environments. It is applicable to built environments as well as to other indoor, vehicle and outdoor environments. Nor is it restricted to specific environmental components; it includes assessment of acoustic environments, thermal environments, lighting, air quality and other environmental factors that could be considered to influence the health, comfort and performance of people with special requirements in an environment.

It is applicable to all occupants of such environments who can be considered to have special requirements.

NOTE This will depend upon context and can, for example, include babies, infants, men or women, people with disabilities, older or ill people. A person could have a special requirement in one type of environment but not in another.

2 Normative references

The following referenced documents are indispensable for the application 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 13731, *Ergonomics of the thermal environment — Vocabulary and symbols*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13731 and the following apply.

3.1

accessible design

design focussed on principles of extending standard design to people with some type of performance limitation to maximize the number of potential customers who can readily use a product, building or service which may be achieved by

- designing products, services and environments that are readily usable by most users without any modification,
- making products or services adaptable to different users (adapting user interfaces), and
- having standardized interfaces to be compatible with special products for persons with disabilities

NOTE 1 Terms such as design for all, barrier-free design, inclusive design and transgenerational design are used similarly but in different contexts.

NOTE 2 Accessible design is a subset of universal design where products and environments are usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

[ISO/IEC Guide 71:2001, definition 3.2]

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3.2

assistive technology

technology that is used to increase, maintain or improve functional capabilities of individuals with disabilities

3.3

assistive device

piece of equipment, product system, hardware, software or service that is used to increase, maintain or improve functional capabilities of individuals with disabilities

3.4

user

person who interacts with the product, service or environment

3.5

alternative format

different realization or presentation which may make products and services accessible by the use of another modality or sensory ability

3.6

impairment

limitation in body function or structure, such as a significant deviation or loss of capability, which can be temporary (for example, due to injury) or permanent (slight or severe and can fluctuate over time)

EXAMPLE Deterioration due to aging.

3.7

standard

document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context

NOTE Standards should be based on the consolidated results of science, technology and experience, and aimed at the promotion of optimum community benefits.

[ISO/IEC Guide 2:2004, definition 3.2]

3.8

international standard

standard that is adopted by an international standardizing/standards organization and made available to the public

[ISO/IEC Guide 2:2004, definition 3.2.1.1]

3.9

International Standard

international standard where the International Standards organization is ISO or IEC

3.10

adaptive opportunity

opportunity for a person to alter the environment to which he or she is exposed by behavioural (move away, adjust posture, adjust clothing, etc.) or other means (open window, close door, adjust environmental controls etc.)

4 General factors requiring consideration when designing or evaluating environments for people with special requirements

People with special requirements are people who generally fall outside the scope of most International Standards. Standards for environmental design and assessment are often valid only for people with specific characteristics who are frequently referred to as "normal" or "typical". Environmental design for a wider

population can require different conditions from those given in a standard, in order to provide comfort or avoid unacceptable stress on the body.

NOTE Existing thermal International Standards cover a range of conditions, types of people and so on, which are identified in the scope of those documents, thereby providing information for people who fall outside the scope and who should be treated as people with special requirements.

One reason for standards to have a restricted scope in terms of user population, is that knowledge is incomplete for people who might have special requirements in environmental design. These people often include children, people with disabilities and older people. Although knowledge about such populations is incomplete, advice can still be provided to ensure accessible design of environments.

Clauses 5 to 9 describe the assessment of the thermal, acoustic, visual, lighting, air quality and other environments. For each environmental component, guidance is provided on how to apply the relevant International Standards for people with special requirements.

General considerations include factors which affect a person's response to the particular environmental component. For example, body size and shape or the ability to move around can be important. The relevant International Standards are then considered in terms of these general considerations. For example, if someone with a spinal injury cannot sweat below the lesion, then a heat stress standard based upon sweat rate will require appropriate modification. General advice can then be provided in terms of modifications to the relevant International Standard in order to make it more valid for a wider range of people.

A characteristic of people who are not "normal" or "typical" is the wide variation in response across the population; often, individual characteristics would have to be considered. In such cases, or where unacceptable strain or threat to health are involved, then medical advice needs to be sought. In such cases, the information provided in Clauses 5 to 9 should be brought to the attention of the medical advisor.

One particular consideration is the degree to which a person can modify exposure to environments by behavioural measures. People with special requirements could have restricted behavioural opportunities (to move around, change clothing, control the environment, etc.) and this will be important for all environmental components.

5 Considerations related to design and evaluation of the thermal environment

5.1 Factors requiring special consideration for design and evaluation

The following factors shall be considered when assessing the thermal environment.

a) Sensory impairment and paralysis

Some physical disabilities and methods of treatment (e.g. drugs) affect thermal sensation and requirements for thermal comfort and health. Examples of drugs that can affect body temperature regulation are beta blockers, diuretics, laxatives, anticholinergics, antihistamines, neuroleptics, methyldopa, MAO inhibitors, tricyclic antidepressants, serotonergic agonists, phenothiazines and vasoconstrictors.

Additional issues include methods for collecting valid and reliable data on the responses of people with special requirements, e.g. pregnant women, older people or babies.

b) Difference in the shape of the body

The loss or atrophying of a limb makes the application of the Dubois' surface area formula difficult and prone to error. Consequently, it will have some influence on the concept of mean skin temperature. Infants and babies will have somewhat different body proportions compared to average adults. This influences the projected surface area available for heat exchange from different parts of the body and hence the impact of thermal radiation, convection and evaporation.

c) Impairment of sweat secretion

It is not uncommon for more than 80 % of the sweat-secreting skin area to be impaired in quadriplegic persons (high-level spinal cord injured persons) and some other paralytic diseases. This will affect the