SVENSK STANDARD
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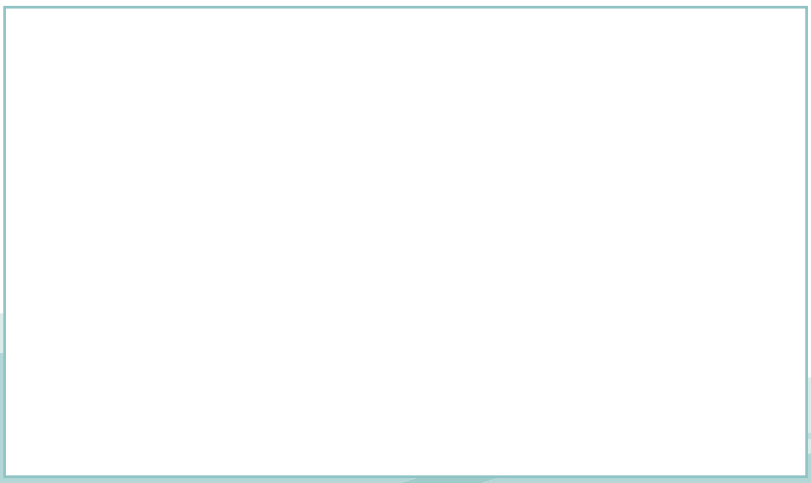
Byggnaders termiska egenskaper – Beräkning av inomhustemperatur på sommaren i ett rum utan mekanisk kylning – Förenklade metoder
(ISO 13792:2012)

Thermal performance of buildings – Calculation of internal temperatures of a room in summer without mechanical cooling – Simplified methods
(ISO 13792:2012)



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Europastandarden EN ISO 13792:2012 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 13792:2012.

Denna standard ersätter SS-EN ISO 13792:2005, utgåva 1.

The European Standard EN ISO 13792:2012 has the status of a Swedish Standard. This document contains the official version of EN ISO 13792:2012.

This standard supersedes the Swedish Standard SS-EN ISO 13792:2005, edition 1.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

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Denna standard är framtagen av kommittén för Beräkningsmetoder, SIS/TK 189/AG 2.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 13792

March 2012

ICS 91.120.10

Supersedes EN ISO 13792:2005

English Version

Thermal performance of buildings - Calculation of internal temperatures of a room in summer without mechanical cooling - Simplified methods (ISO 13792:2012)

Performance thermique des bâtiments - Calcul des températures intérieures en été d'un local sans dispositif de refroidissement mécanique - Méthodes simplifiées (ISO 13792:2012)

Wärmetechnisches Verhalten von Gebäuden - Berechnung von sommerlichen Raumtemperaturen bei Gebäuden ohne Anlagentechnik - Vereinfachtes Berechnungsverfahren (ISO 13792:2012)

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

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 CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN ISO 13792:2012: E

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Foreword

This document (EN ISO 13792:2012) has been prepared by Technical Committee ISO/TC 163 "Thermal performance and energy use in the built environment" in collaboration with Technical Committee CEN/TC 89 “Thermal performance of buildings and building components” the secretariat of which is held by SIS.

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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 13792:2005.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 13792:2012 has been approved by CEN as a EN ISO 13792:2012 without any modification.

Introduction

Knowledge of the internal temperature of a room in warm periods is needed for several purposes, such as:

a) defining the characteristics of a room at the design stage, in order to prevent or limit overheating in summer;

b) assessing the need for a cooling installation.

The internal temperature is influenced by many parameters such as climatic data, envelope characteristics, ventilation and internal gains. The internal temperature of a room in warm periods can be determined using detailed calculation methods. ISO 13791 lays down the assumptions and the criteria to be satisfied for assessment of internal conditions in the summer with no mechanical cooling. However, for a number of applications, the calculation methods based on ISO 13791 are too detailed. Simplified methods are derived from more or less the same description of the heat transfer processes in a building. Each calculation method has its own simplification, assumptions, fixed values, special boundary conditions and validity area. A simplified method can be implemented in many ways. In general, the maximum allowed simplification of the calculation method and the input data is determined by the required amount and accuracy of the output data.

This International Standard defines the level, the amount and the accuracy of the output data and the allowed simplification of the input data.

No particular calculation methods are included in the normative part of this International Standard. As examples, two calculation methods are given in Annex A. They are based on the simplification of the heat transfer processes that guarantees the amount and the accuracy of the output data and the simplification of the input data required by this International Standard.

The use of these simplified calculation methods does not imply that other calculation methods are excluded from standardization, nor does it hamper future developments. Clause 6 gives the criteria to be satisfied in order for a method to comply with this International Standard.

Thermal performance of buildings — Calculation of internal temperatures of a room in summer without mechanical cooling — Simplified methods

1 Scope

This International Standard specifies the required input data for simplified calculation methods for determining the maximum, average and minimum daily values of the operative temperature of a room in warm periods:

a) to define the characteristics of a room at the design stage in order to avoid overheating in summer;

b) to define whether the installation of a cooling system is necessary or not.

Clause 6 gives the criteria to be met by a calculation method in order to satisfy this International Standard.

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 6946, *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

ISO 7345, *Thermal insulation — Physical quantities and definitions*

ISO 9050, *Glass in building — Determination of light transmittance, solar direct transmittance, total solar energy transmittance, ultraviolet transmittance and related glazing factors*

ISO 10077-1, *Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Part 1: General*

ISO 10292, *Glass in building — Calculation of steady-state U values (thermal transmittance) of multiple glazing*

ISO 13370, *Thermal performance of buildings — Heat transfer via the ground — Calculation methods*

ISO 13791, *Thermal performance of buildings — Calculation of internal temperatures of a room in summer without mechanical cooling — General criteria and validation procedures*

ISO 15927-2, *Hygrothermal performance of buildings — Calculation and presentation of climatic data — Part 2: Hourly data for design cooling load*

EN 410, *Glass in building — Determination of luminous and solar characteristics of glazing*

EN 673, *Glass in building — Determination of thermal transmittance (U value) — Calculation method*

EN 13363-1, *Solar protection devices combined with glazing — Calculation of solar and light transmittance — Part 1: Simplified method*

3 Terms, definitions, symbols and units

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7345 and the following apply.

3.1.1
internal environment
closed space delimited from the external environment or adjacent spaces by the building fabric

3.1.2
room element
wall, ceiling, roof, floor, door or window that separates the internal environment from the external environment or an adjacent space

3.1.3
room air
air in the room

3.1.4
internal air temperature
temperature of the room air

3.1.5
internal surface temperature
temperature of the internal surface of a building element

3.1.6
mean radiant temperature
uniform surface temperature of an enclosure in which an occupant would exchange the same amount of radiant heat as in the actual non-uniform enclosure

3.1.7
operative temperature
uniform temperature of an enclosure in which an occupant would exchange the same amount of heat by radiation plus convection as in the actual non-uniform environment

NOTE For simplification, the mean value of the air temperature and the mean radiant temperature of the room can be used.

3.2 Symbols and units

For the purposes of this document, the following symbols and units apply.

Symbol	Definition	Unit
A	area	m^2
A_c	cavity area	m^2
A_m	thermal mass area	m^2
A_s	sunlit area	m^2
A_t	exposed area	m^2
A_w	wall area	m^2
C	heat capacity	J/K
C_i	internal heat capacity	J/K

C_m	heat capacity of the enclosure elements	J/K
c	specific heat capacity	J/(kg·K)
c_a	specific heat capacity of air at constant pressure	J/(kg·K)
d	thickness	m
F_a	decrement factor	—
F_s	surface factor	—
F_{sm}	surface factor of the envelope	—
f_c	correction factor for transmission thermal load	—
f_{ex}	exposure factor	—
f_r	correction factor for solar thermal load	—
f_s	sunlit factor	—
f_{sa}	solar-to-air factor	—
f_{sl}	solar loss factor	—
f_t	frame factor	—
f_v	ventilation factor	—
H_{ei}	heat transfer coefficient due to the air ventilation	W/K
H_{em}	conventional heat transfer coefficient between the external environment and the internal surface of the heavy components	W/K
H_{es}	global heat transfer coefficient between the internal and external environment	W/K
H_{is}	heat transfer coefficient due to internal exchanges by convection and radiation	W/K
H_{ms}	conventional internal heat transfer coefficient	W/K
H_T	heat transfer coefficient of the envelope	W/K
h	surface coefficient of heat transfer	W/(m^2·K)
h_c	convective heat transfer coefficient	W/(m^2·K)
h_r	radiative heat transfer coefficient	W/(m^2·K)
I	intensity of solar radiation	W/m^2
I_r	reflected component of the solar radiation reaching the surface	W/m^2
l	length	m
N_c	number of components facing the indoor environment	—
N_e	number of external components	—
N_h	number of heavy opaque components	—
N_l	number of light opaque components	—
Np	number of opaque components	—
N_s	number of internal sources	—
N_w	number of glazing components	—
n	air changes per hour	l/h
q	density of heat flow rate	W/m^2
R	thermal resistance	m^2·K/W