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Energy performance of buildings — Schedule and condition of building, zone and space usage for energy calculation —

Part 2: Residential buildings

Performance énergétique des bâtiments — Plan et conditions d'utilisation des espaces, zones et bâtiments pour le calcul d'énergie —

Partie 2: Bâtiments résidentiels

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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.

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 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 163, *Thermal performance and energy use in the built environment*.

A list of all parts in the ISO 18523 series can be found on the ISO website.

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Introduction

There is a strong need to improve the environment to make the evaluation of energy performance of buildings more reliable and practical, so that energy efficiency of buildings is improved by referring to the evaluation results. There have been no international standards prescribing building use in this area. This document prescribes the indispensable information on the conditions for zone and space usage in energy calculations for residential buildings.

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Energy performance of buildings — Schedule and condition of building, zone and space usage for energy calculation —

Part 2: Residential buildings

1 Scope

This document specifies the formats to present the schedule and conditions of zone and space usage (referred to as input data of energy calculations) for residential buildings.

The schedule and conditions include schedules of occupancy, operation of technical building systems, ventilation rates, hot water usage, usage of appliances and internal heat gains due to occupancy, lighting and appliances. The schedule and conditions for lighting are applicable to fixed installed lighting fixtures.

This document also gives categories of residential building, zone and space according to differentiating schedule and condition. For residential buildings or its housing units which contain any category of space or zone of non-residential buildings, ISO 18523-1 applies.

Depending on necessary minuteness of the energy calculation, different levels of schedule and condition from the view point of time and space averaging are specified.

The values and categories for the schedule and condition are included informatively.

NOTE The schedule and condition in this document is basically different from assumptions in order to determine the size of technical building systems in the process of design, where possible largest or smallest values are assumed. Instead, most usual and average values, which are assumed for the building energy calculation, are dealt with in this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 18523-1, *Energy performance of buildings — Schedule and condition of building, zone and space usage for energy calculation — Part 1: Non-residential buildings*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

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3.1 Space

3.1.1
apartment block
building (3.1.2), which contains multiple *housing units* (3.1.8)

3.1.2
building
construction as a whole, including its envelope and all *technical building systems* (3.3.13), where energy is used to condition the indoor environment, to provide domestic hot water and illumination and other services related to the use of the building

3.1.3
building zone
zone
part of a building consisting of (part of) one or more spaces with assumed uniform properties related to a specific service or service component, or (in absence of a service) assumed uniform indoor environmental conditions

3.1.4
common space
<apartment block>indoor or outdoor space, which is commonly used by residents

3.1.5
thermally conditioned space
thermally conditioned zone
heated and/or cooled space (zone)

3.1.6
elementary space
space
part of a room, a room or group of adjacent rooms with assumed uniform properties for all considered types of zones

3.1.7
habitable room
room that is continuously used for living, working, meeting, amusement and other purposes similar thereto

Note 1 to entry: Spaces such as bathroom, washroom, toilet, entrance hall or corridor are excluded.

3.1.8
housing unit
single-family house (3.1.9) or apartment (flat or maisonette) of *apartment blocks* (3.1.1)

3.1.9
single-family house
detached house
independent residential building, where a family lives

3.1.10
thermally unconditioned space
thermally unconditioned zone
space (zone) that is not heated nor cooled

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3.2 Schedule

3.2.1
annual operation hours
operation hours
total length of hours in a *standard year* (3.2.11) when a *technical building system* (3.3.13) can be operated depending on necessity

3.2.2
annual schedule
allocation of *daily schedule(s)* (3.2.4) for one year

Note 1 to entry: Division of the year can be selected from 365 days, 53 weeks, 12 months, seasons or no division (a set of daily schedules is uniformly applied throughout the year).

3.2.3
daily operating hours
hours when a service system is operated, or the length of the hours

3.2.4
daily schedule
conditions of occupancy, service system operations, requirement for the functions of the service systems and internal heat gains at each time of a day

3.2.5
daily schedule with hourly conditions
set of hourly conditions of occupancy, service system operations, requirement for the functions of the service systems and internal heat gains in a day

3.2.6
monthly schedule
allocation of *daily schedule(s)* (3.2.4) for each month of the year

3.2.7
seasonal schedule
allocation of *daily schedule(s)* (3.2.4) to each season of the year

3.2.8
schedule
information on condition(s) of building, zone or space usage throughout a cycle of period, such as day, week, month, season and year

3.2.9
set of daily schedules
complete set of daily schedules representing usage of a category of building, zone or space in one year

3.2.10
standard year
selected year, of which the number of days has to be 365 and arrangement of weekdays, weekends and holidays are referred in weekly, monthly, seasonal and annual schedules

3.2.11
weekly schedule
allocation of *daily schedule(s)* (3.2.4) to each week of the year

3.2.12
whole set of annual schedules
complete set of *annual schedules* (3.2.2) representing usage of all types of building, zone and space, as objects of energy calculation

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3.2.13
whole set of seasonal schedules
complete set of *seasonal schedules* (3.2.7) representing usage of all types of building, zone and space, as objects of energy calculation

3.2.14
whole set of monthly schedules
complete set of *monthly schedules* (3.2.6) representing usage of all types of building, zone and space, as objects of energy calculation

3.3 Parameters for conditions of building, zone and space usage

3.3.1
appliances
consumer electronics and machines for housekeeping

3.3.2
condition
status of *occupancy* (3.3.9), operation of service systems, requirement for the functions of the *technical building systems* (3.3.13) and internal heat gains

3.3.3
demand control ventilation
ventilation with a rate controlled according to the necessity of the ventilation, such as the emission rate of target pollutant

3.3.4
local exhaust ventilation
mechanical exhaust ventilation for eliminating contaminants, such as odour, combustion gases, water vapour and oil mist, from nearby sources

3.3.5
height of the working plane
height of the plane on which the assumed visual task is carried out, from the floor

Note 1 to entry: Height of the working plane is expressed in metres, m.

3.3.6
height of the specified surface
height of the plane on which the requirement for the ambient lighting is assumed, from the floor

Note 1 to entry: Height of the specified surface is expressed in metres, m.

3.3.7
luminaire
apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply

3.3.8
maintained average illuminance
value below which the average illuminance over the specified surface is not allowed to fall

Note 1 to entry: Maintained average illuminance is expressed in lux.

3.3.9
occupancy
presence of users in building, zone or space

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3.3.10
occupancy density
number of present users in building, zone or room per unit floor area of the space

Note 1 to entry: Occupancy density is used mainly for the calculations for space heating/cooling and ventilation.

3.3.11
overall ventilation
ventilation for supplying outdoor air into indoor spaces to dilute general contaminants, such as formaldehyde, CO_2 and water vapour

3.3.12
simultaneous usage ratio
<set of spaces>ratio of the number of zones or spaces which belong to a group of zones and spaces and are occupied or used at the time, to the total number of zones or spaces in the group

Note 1 to entry: This concept is applied to a group of zones or spaces of the same category, such as a group of guest rooms in hotels, a series of personal office rooms in office buildings, etc.

3.3.13
technical building system
all energy-using or -distributing components in a building that are operated to support the occupant or process functions housed therein (including HVAC, domestic hot water, illumination, transportation, laundering or similar functions)

3.3.14
movable fitting
movable part of openings, which is used for the purposes of, for example, solar shading, adding insulation, ventilation and security

3.4 Descriptions for daily schedule

3.4.1
hourly ratio
ratio of hourly value of parameters to their reference value

Note 1 to entry: Multiplying hourly ratios by the reference value, hourly values of the parameter is calculated. This shall be calculated in accordance with ISO 18523-1.

3.4.2
reference domestic hot water usage
maximum hourly service hot water usage by users of the space or zone

Note 1 to entry: Measured in volume flow rate per person, in volume flow rate per unit floor area or in volume flow rate per bed.

Note 2 to entry: The volume flow rate is calculated with the assumption on hot water temperature.

3.4.3
reference heat gain due to appliances
maximum hourly total (sensible and latent) heat gain due to appliances inside the room or zone

Note 1 to entry: Measured in watt per unit floor area.

Note 2 to entry: To be multiplied by hourly ratios, heat gain due to appliances at the time can be calculated.

3.4.4
reference heat gain due to person
maximum hourly total (sensible and latent) heat gain due to person inside the room or zone

Note 1 to entry: Measured in watt per unit floor area.

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Note 2 to entry: To be multiplied by hourly ratio, heat gain due to person at the time can be calculated.

3.4.5
reference heat gain due to lighting
maximum hourly sensible heat gain due to lighting inside the room or zone

Note 1 to entry: Measured in watt per unit floor area.

Note 2 to entry: To be multiplied by hourly ratios, heat gain due to lighting at the time can be calculated.

3.4.6
reference latent heat gain due to appliances
maximum hourly latent heat gain due to appliances inside the room or zone

Note 1 to entry: Measured in watt per unit floor area.

Note 2 to entry: To be multiplied by hourly ratios, latent heat gain due to appliances at the time can be calculated.

3.4.7
reference latent heat gain due to person
maximum hourly latent heat gain due to person inside the room or zone

Note 1 to entry: Measured in watt per unit floor area.

Note 2 to entry: To be multiplied by hourly ratios, latent heat gain due to person at the time can be calculated.

3.4.8
reference occupancy density
maximum hourly occupancy density of the space or zone

Note 1 to entry: Measured in person per unit floor area.

Note 2 to entry: To be multiplied by hourly ratios, occupancy density at the time can be calculated.

3.4.9
reference sensible heat gain due to appliances
maximum hourly sensible heat gain due to appliances inside the room or zone

Note 1 to entry: Measured in watt per unit floor area.

Note 2 to entry: To be multiplied by hourly ratios, sensible heat gain due to appliances at the time can be calculated.

3.4.10
reference sensible heat gain due to person
maximum hourly sensible heat gain due to person inside the room or zone

Note 1 to entry: Measured in watt per unit floor area.

Note 2 to entry: To be multiplied by hourly ratio, sensible heat gain due to person at the time can be calculated.

3.4.11
reference ventilation requirement
most probable estimation of outdoor air supply (in volume flow rate per unit floor area or in air change per hour) to the space or zone

3.4.12
total daily usage of domestic hot water
total volume of service hot water usage in one day

Note 1 to entry: Measured in volume per person, in volume per unit floor area, in volume per bed or in volume per household (housing unit).

Note 2 to entry: The volume is calculated with the assumption of hot water temperature.

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