



# SLOVENSKI STANDARD

## SIST ISO 9836:2000

01-april-2000

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### Standardi za lastnosti stavb - Definicija in računanje indikatorjev površine in prostornine

Performance standards in building -- Definition and calculation of area and space indicators

### iTeh STANDARD PREVIEW

Normes de performance dans le bâtiment -- Définition et calcul des indicateurs de surface et de volume

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Ta slovenski standard je istoveten z: **ISO 9836:1992**

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# INTERNATIONAL STANDARD

**ISO**  
**9836**

First edition  
1992-06-15

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## Performance standards in building — Definition and calculation of area and space indicators

**iTeh STANDARD PREVIEW**  
*Normes de performance dans le bâtiment — Définitions et calcul des  
indicateurs de surface et de volume*  
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Reference number  
ISO 9836:1992(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 9836 was prepared by Technical Committee ISO/TC 59, *Building construction*, Sub-Committee SC 3, *Functional/user requirements and performance in building construction*.

Annex A of this International Standard is for information only.

<https://standards.iteh.ai/catalog/standards/sist/c4cdae1f-8df9-47b8-a4f4-cdd5b1d7/cabc/sist-iso-9836-2000>

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## Introduction

The surface area and volume indicators derived from spaces in existing buildings can give their utilization values, such as the spatial proximity of connected functional uses. As approximate values for planning they can be a basis for further developments.

The same is true of those surface area and volume indicators which represent the use of materials. Such indicators enable an increase or reduction in the quantity of materials to be obtained when planning other constructions.

Reference to surface area and volume indicators when assessing buildings which either already exist or which are in the planning stage indirectly indicates the economic characteristics of the buildings. Thus the relationship between the area taken up by the building and the usable area shows whether the building costs and materials have been used to their best advantage.

In the same way the relationship between the area of the building envelope and the usable area shows the extent to which basic savings have been made on the envelope and the running costs of the heating and air-conditioning systems.

As far as the determination of the economic performance of whole buildings is concerned, surface area and volume indicators contain basic data for calculation of capital costs for running and maintenance. They give a basis for the minimization of running costs by limiting the amount of space and the cost of individual materials. For example, if the area of the external walls is small compared to the usable area, this would indicate not only relatively low energy costs but also relatively low cleaning and maintenance costs for façades.

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# Performance standards in building — Definition and calculation of area and space indicators

## 1 Scope

This International Standard deals with the definition and calculation of surface area and volume indicators.

In defining area measurement, this International Standard uses the intra-muros and extra-muros concept. The wall centre method of measurement used in many parts of the world, or for particular types of buildings, is not considered in this International Standard.

The surface area and volume indicators defined in this International Standard are intended for practical use, as a basis for measuring various aspects of the performance of buildings or as a planning aid. In other words, they should enable judgement to be made on functional, technical and economic aspects.

This International Standard is intended to be used when establishing:

- specifications for the geometric performance of a building and its spaces (e.g. in design, purchasing procedures, etc., or in building regulations where appropriate);
- technical documentation relating to the performance of whole buildings prepared by designers, contractors and manufacturers.
- evaluation, comparison or control of the properties of a building which are connected to its geometric performance.

## 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 6241:1984, *Performance standards in building — Principles for their preparation and factors to be considered*.

ISO 6707-1:1989, *Building and civil engineering — Vocabulary — Part 1: General terms*.

## 3 Definitions

For the purposes of this International Standard, the definitions given in ISO 6707-1 and the following definitions apply.

**3.1 surface area indicators:** These measure individual types of area (e.g. usable area) and the relationship between different types of area (e.g. area occupied by structure/usable area).

**3.2 volume indicators:** These measure individual types of volume (e.g. net volume) and the relationship between different types of volume (e.g. gross volume/net volume).

**3.3 mixed surface area and volume indicators:** These relate the types of volume to the types of area (e.g. gross volume/usable area) and the types of area to types of volume (e.g. area of building envelope/net volume).

NOTE 1 Clause 5 gives further definitions of the different surface areas, volumes and indicators, together with the appropriate calculation methods.

## 4 Units

Surface area and volume indicators are obtained by measuring the plan and elevation of the building, and their units of measurement differ according to

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the type of calculation ( $m^2$ ;  $m^3$ ;  $m^2/m^2$ ;  $m^3/m^3$ ;  $m^2/m^3$ ;  $m^3/m^2$ ).

## 5 Calculation methods and list of indicators for geometric performance

Surface area and volume indicators of existing or projected buildings can be used to advantage only when uniform indicators are used and compared. The method of determination should be identical for all indicators.

### 5.1 Surface areas

See figure 1.

#### 5.1.1 Calculation principles

**5.1.1.1** Horizontal and vertical surface areas are measured by their actual dimensions. Inclined planes are measured by their vertical projection onto an (imaginary) horizontal plane (but for heat loss calculations the true area must always be used).

**5.1.1.2** The surface areas are expressed in square metres, to two decimal places.

#### 5.1.2 Covered area

**5.1.2.1** The covered area is the area of ground covered by buildings in their finished state.

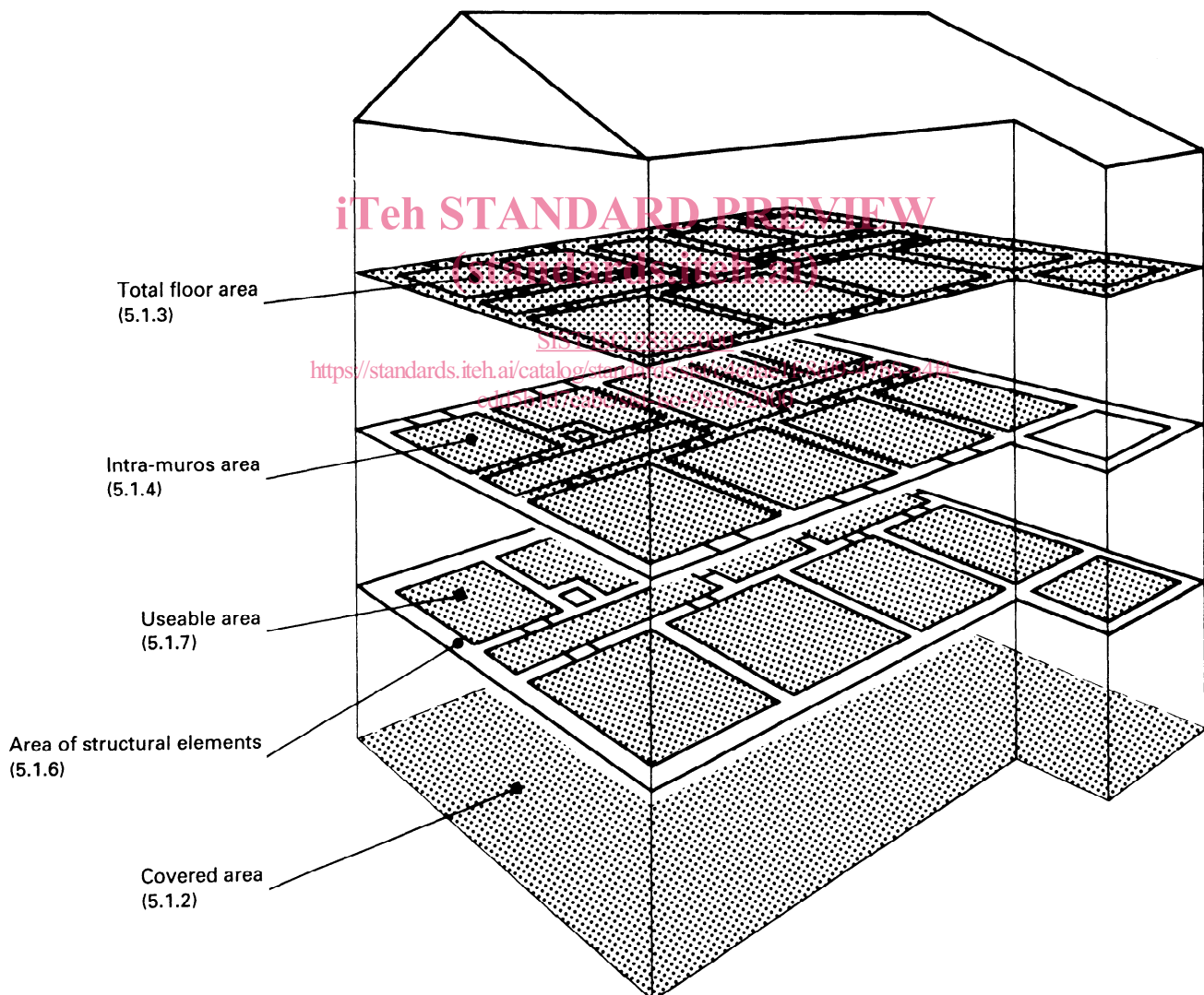


Figure 1 — Presentation of principal areas



**5.1.2.2** The covered area is determined by the vertical projection of the external dimensions of the building onto the ground.

The following are not included:

- constructions or parts of constructions not projecting above the surface of the ground;
- secondary components, e.g. external staircases, external ramps, canopies, horizontal sun-shields, roof overhangs, street lighting;
- the areas of outdoor facilities, e.g. greenhouses, outhouses and conservatories.

### 5.1.3 Total floor area

**5.1.3.1** The total floor area of a building is the total area of all floor levels. Floor levels may be storeys which are either completely or partially under the ground, storeys above ground, attics, terraces, roof terraces, service floors or storage floors (see figure 1).

It is necessary to distinguish between

- a) floor areas which are enclosed and covered on all sides;
- b) floor areas which are not enclosed on all sides up to their full height, but which are covered such as recessed balconies;
- c) floor areas which are contained within components (e.g. parapets, fascias, hand-rails), but which are not covered, such as open balconies.

**5.1.3.2** The total floor area of each level is obtained from the external dimensions of the enclosing elements, at floor height. These elements include finishes, claddings and parapets.

Recesses and projections for structural or aesthetic purposes and profiling are not included if they do not alter the net floor area (5.1.5). Covered floor areas which are not enclosed or are partially enclosed and have no enclosing elements [e.g. areas in accordance with 5.1.3.1 b)] are calculated according to the vertical projection of the outer limit of the covering components.

Net floor area is not determined for the following spaces (see 5.1.5.4):

- voids between the ground and the underside of the building, e.g. crawlways;
- space inside ventilated roofs;
- roofs not subjected to foot traffic other than for maintenance purposes.

**5.1.3.3** The total floor area is calculated separately for each floor level. Areas with varying storey height within one floor level (e.g. large halls, auditoria) are also calculated separately.

**5.1.3.4** If the floor areas are added together, the proportions of the different areas (according to 5.1.3) shall be distinguishable in order to enable the evaluation, comparison and separate calculation of the volumes.

**5.1.3.5** The total floor area is made up of the net floor area (5.1.5) and the area taken up by the structure (see 5.1.6).

### 5.1.4 Intra-muros area

**5.1.4.1** The intra-muros area is the total floor area (5.1.3) less the area taken up by the external walls.

**5.1.4.2** The intra-muros area is determined separately for each floor level. The calculation principles established for the total floor area (5.1.3) and for the area taken up by the external walls (5.1.6) apply equally. The intra-muros area is obtained by subtracting the area taken up by the external walls from the total floor area.

**5.1.4.3** The intra-muros area includes the net floor area (5.1.5) and the area taken up by the internal walls.

### 5.1.5 Net floor area

**5.1.5.1** The net floor area is the area between enclosing elements (see also 5.1.3.2).

**5.1.5.2** The net floor area is determined separately for each floor level and is sub-divided according to 5.1.3.1. It is calculated from the clear dimensions of the finished building at floor height, excluding skirtings, thresholds, etc.

Covered floor areas which are not enclosed, or only partially enclosed and have no enclosing elements [areas 5.1.3.1 b)] are determined by the vertical projection of the outer limit of the covering components. Areas with varying storey height within one floor level (e.g. large halls, auditoria) are calculated separately.

**5.1.5.3** Also included in the net floor area are demountable components such as partitions, pipes and ducts.

**5.1.5.4** The floor areas of structural elements, door and window recesses, and niches to recesses in the elements enclosing the spaces are not included in the net floor area.