



SLOVENSKI STANDARD

SIST EN 15221-6:2011

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Upravljanje objektov in storitev - 6. del: Merjenje površin in prostorov pri upravljanju objektov in storitev

Facility Management - Part 6: Area and Space Measurement in Facility Management

Facility Management - Teil 6: Flächenbemessung im Facility Management

Facilities management - Partie 6: Mesure des surfaces et de l'espace en facilities management

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ICS:

03.080.99	Druge storitve	Other services
91.040.01	Stavbe na splošno	Buildings in general

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EUROPEAN STANDARD

EN 15221-6

NORME EUROPÉENNE

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ICS 03.080.99; 91.140.01

English Version

Facility Management - Part 6: Area and Space Measurement in Facility Management

Facilities management - Partie 6: Mesure des surfaces et de l'espace en facilities management

Facility Management - Teil 6: Flächenbemessung im Facility Management

This European Standard was approved by CEN on 8 July 2011.

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.

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Contents

Page

Foreword.....	3
Common Introduction for the European Standards EN 15221-3, EN 15221-4, EN 15221-5 and EN 15221-6.....	4
Introduction to Area and Space Measurement in Facility Management	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 Methods and units of measurement	8
4.1 Units	8
4.2 Distance	8
4.3 Area	13
4.4 Volume	13
5 Framework of area and space measurement of buildings	13
5.1 General	13
5.2 Level Area (LA)	16
5.3 Non-functional Level Area (NLA)	18
5.4 Gross Floor Area (GFA)	19
5.5 Exterior Construction Area (ECA)	21
5.6 Internal Floor Area (IFA)	22
5.7 Interior Construction Area (ICA)	24
5.8 Net Floor Area (NFA)	25
5.9 Partition Wall Area (PWA)	27
5.10 Net Room Area (NRA)	28
5.11 Technical Area (TA)	30
5.12 Circulation Area (CA)	32
5.13 Amenity Area (AA)	33
5.14 Primary Area (PA)	34
6 Area and space measurement outside of buildings	35
6.1 Additional terminology	35
6.2 Classification	37
Annex A (normative) Area Matrix	39
Annex B (normative) Further illustrations	41
B.1 Further illustrations for atria	41
B.2 Further illustrations for covered areas and uncovered areas	42
B.3 Vehicle parking area	43
B.4 Further illustrations for staircases and stairwells	43
B.5 Walls	44
Annex C (informative) Examples for subcategories to Technical Areas, Circulation Areas, Amenity Areas and Primary Areas	46
Bibliography	49

Foreword

This document (EN 15221-6:2011) has been prepared by Technical Committee CEN/TC 348 "Facility Management", the secretariat of which is held by NEN.

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 2012, and conflicting national standards shall be withdrawn at the latest by April 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 European Standard is one of the series EN 15221 "*Facility Management*" which consists of the following parts:

- *Part 1: Terms and definitions*
- *Part 2: Guidance on how to prepare Facility Management agreements*
- *Part 3: Guidance on quality in Facility Management*
- *Part 4: Taxonomy, Classification and Structures in Facility Management*
- *Part 5: Guidance on Facility Management processes*
- *Part 6: Area and Space Measurement in Facility Management*
- *Part 7: Performance Benchmarking*

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 and the United Kingdom.

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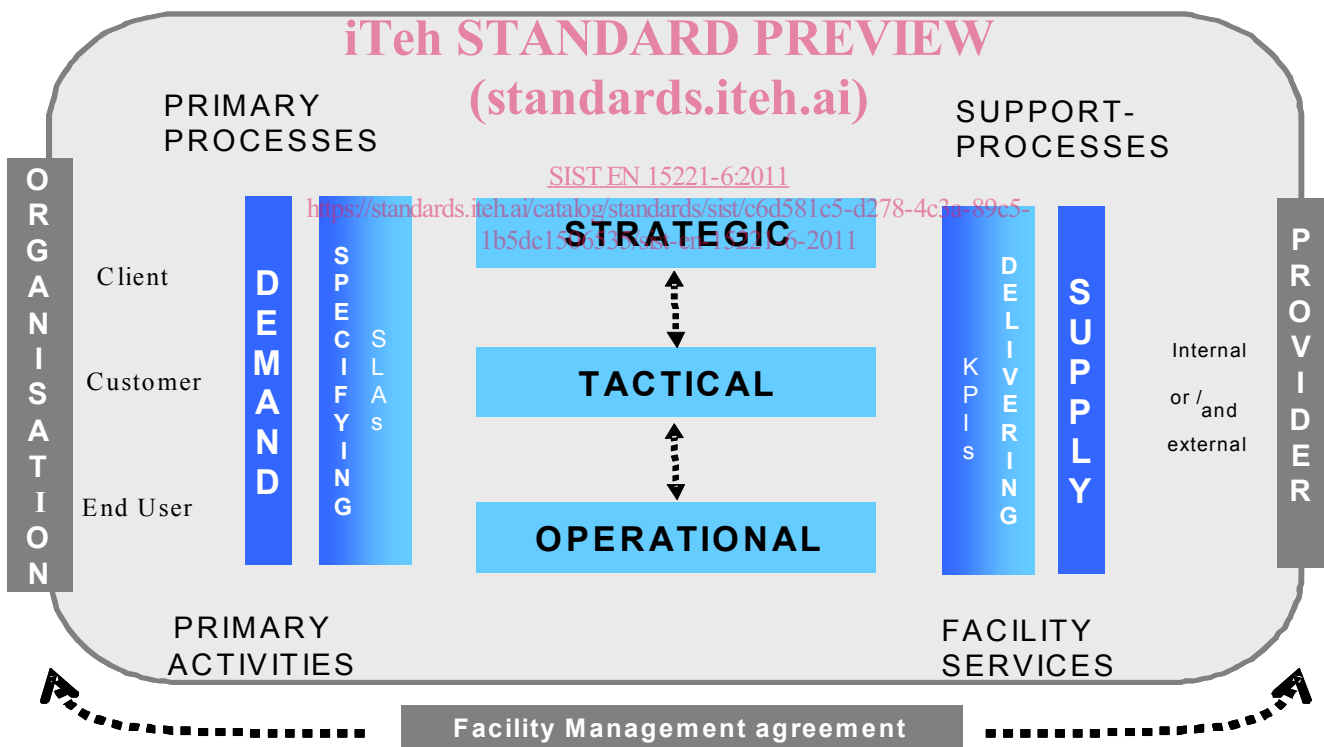
Common Introduction for the European Standards EN 15221-3, EN 15221-4, EN 15221-5 and EN 15221-6

In 2002 the initiative was taken to establish a European Standard for Facility Management benchmarking purposes. It was soon recognized that to reach this objective, preliminary standards had to be elaborated and published. The first result of that process was the standards EN 15221-1:2006 and EN 15221-2:2006. Based on the discussions in the development of those two standards the decision was made to develop four new European Standards for Quality, Taxonomy, Processes and Measurement.

After the realization of those six standards it was possible to pursue developing a European Standard for Benchmarking prEN 15221-7.

The standards, EN 15221-3, EN 15221-4, EN 15221-5 and EN 15221-6 have been developed, adopted and agreed as a set of principles, underlying the Facility Management approach on EN 15221-1, to ensure consistency. These are incorporated in the basic principles of a process-based management system, upon which these standards are founded.

The FM-model of EN 15221-1 is shown below.



Model EN 15221-1:2006

These standards also build on widely accepted management principles, in particular value chain (Porter, M E, (1985), "Competitive Advantage: creating and sustaining superior performance", Free Press, New York) and quality control (PDCA (Plan, Do, Check, Act). Deming, W E (1986), "Out of the Crisis", MIT, Cambridge). Reference to ISO 10014:2006, *Quality management – Guidelines for realizing financial and economic benefits*.

The principles of the Deming cycle (PDCA) underpin all of the standards but are applied to a different extent and depth in each. In fact, there are different types of PDCA cycles depending of the term (e.g. long-term, short-term).

These standards align to EN ISO 9000 family of standards for Quality Management Systems and applies specific guidance on the concepts and use of a process-based approach to management systems to the field of Facility Management.

The term "facility services" is used as a generic description in the standards. The term "standardized facility products" refers to the "standardized facility services" defined and described in EN 15221-4, *Facility Management – Part 4: Taxonomy, Classification and Structures in Facility Management*.

Countries can decide to substitute the term "product" into "service", when they consider that it is important for a good acceptance and use of the standards in their own country.

The aim of all the standards is to provide guidance to Facility Management (FM) organizations on the development and improvement of their FM processes to support the primary activities. This will support organizational development, innovation and improvement and will form a foundation for the further professional development of FM and its advancement in Europe. Therefore, generic examples are provided in the standard to assist organizations.

These standards lay the foundation of the work that has to be done further more in developing Facility Management, for e.g. benchmark standards prEN 15221-7.

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Introduction to Area and Space Measurement in Facility Management

In order to support a consistent European approach to Facility Management, this document provides a constructive framework with clear terms, definitions and principles for measuring floor areas and spaces in buildings, not least a common language amongst all stakeholders in the entire construction industry.

The need for a harmonised European approach to "area and space measurement" is evidenced by the fact that many European countries currently use different rules and definitions for assessing building floor areas. Subsequently, space measurement data from different countries is difficult to interpret and data comparisons are most likely to be inaccurate. It is this comparability of data which is eminently important for a wide range of decision-makers, such as planners and architects, economists and investors, owners and tenants, politicians and administrators, etc.

Recent research by the European Committee of Construction Economists (CEEC) highlighted the fact that all European countries use similar elements for measuring floor areas in buildings. The way these components are grouped and coded, however, differs vastly between various countries. Subsequently, comparisons between the Net Internal Area of an UK building as measured by RICS with the Net Enclosed Area (Netto-Grundfläche) of a German building as measured by DIN or the Net Floor Area (Netto Vloeroppervlakte) of a Dutch building as measured by NEN are highly misleading as the floor areas are measured differently.

In short, the fact that measuring specific floor areas in one and the same building using different national standards result in variations up to 30 % clearly highlights the need for a harmonised European approach to "area and space measurement".

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1 Scope

This European Standard establishes a common basis for planning and design, area and space management, financial assessment, as well as a tool for benchmarking in the field of Facility Management.

This standard covers area and space measurement for existing owned or leased buildings as well as buildings in state of planning or development.

This standard presents a framework for measuring floor areas within buildings and areas outside of buildings. In addition, it contains clear terms and definitions as well as methods for measuring horizontal areas and volumes in buildings and/or parts of buildings, independent of their function.

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.

EN 15221-1:2006, *Facility Management — Part 1: Terms and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15221-1:2006 and the following apply.

3.1

distance

numerical expression of a one-dimensional figure, measured along the shortest line linking two points

3.2

area

numerical expression of a two-dimensional surface, calculated mostly as the product of two distance measures

3.3

volume

numerical expression of a three-dimensional concept, calculated mostly as the product of all three distance measures

3.4

space

area or volume bounded actually or theoretically

[see ISO 6707-1]

3.5

floor

generally the lower horizontal structure of a room which constitutes the bounding element of a building or part thereof

3.6

ceiling

generally the upper horizontal surface of a room

EN 15221-6:2011 (E)**3.7****roof**

covering structure which constitutes the top level of a building or part thereof

3.8**wall**

generally vertical structure which constitutes the bounding elements of a building or part thereof

NOTE It is distinguished between both structural walls and non-structural walls as well as exterior and interior walls (see B.5):

- | | |
|---|---|
| A | Structural walls support floors or roofs and/or ensure structural integrity |
| B | Non-structural walls are intended to divide/separate space only |
| 1 | Exterior walls divide/separate inside rooms from the outside |
| 2 | Interior walls divide/separate inside rooms only |

Combinations of the above are possible (e.g. interior walls can be structural and exterior walls can be non-structural).

3.9**room**

part of a building, entirely or partially bounded by dividing elements and whose floor and/or ceiling forms part of the construction of the building, accessible to people

3.10**building**

undivided shelter comprising a space entirely or partially bounded by enclosing structures, intended for specific purposes for its occupants

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4 Methods and units of measurement

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4.1 Units

The units of measurement differ according to the type of calculation:

- distances are measures of one dimension and should be expressed in metres (m);
- areas are measures of two dimensions and should be expressed in square metres (m²);
- volumes are measures of three dimensions and should be expressed in cubic metres (m³).

NOTE Where other measurements are used, this can be transformed by using existing formulas e.g. square feet vs. square metre.

4.2 Distance

For distances, it is necessary to distinguish between length, width and height. The length is measured as linear extent from end to end (measurement of a horizontal distance). The width is measured as linear extent from side to side (measurement of a horizontal distance). The height is measured as linear extent from top to bottom (measurement of vertical distance).

NOTE 1 Width is equal to or smaller than length.

For lengths, widths and heights it is distinguished between gross and net distance:

- the gross length / width is measured as horizontal distance between the outer limiting faces of exterior walls or the horizontal distance between the centres of interior walls;

- the net length / width is measured as horizontal distance between the inner limiting faces of walls, whereby incidental structural components are not taken into consideration;
- the gross height is measured as vertical distance between the top of a finished floor or the adjoining land and the top of the finished floor of a room situated above it or the top of the roof structure;

NOTE 2 For the lowest storey in the building, gross height has to be measured to the bottom of the floor (up to the maximum of an ordinary floor).

- the net height is measured as vertical distance between the top of a finished floor or the adjoining land and the bottom of a ceiling or roof situated above it, whereby incidental structural components are not taken into consideration;
- the free height is measured as vertical distance between the top of a finished floor or ground level and the underside of the suspended ceiling that is situated above it, whereby incidental structural components are not taken into consideration.

NOTE 3 The minimum passage height can be less than the free height.

- The construction height is the difference between gross height and net height.

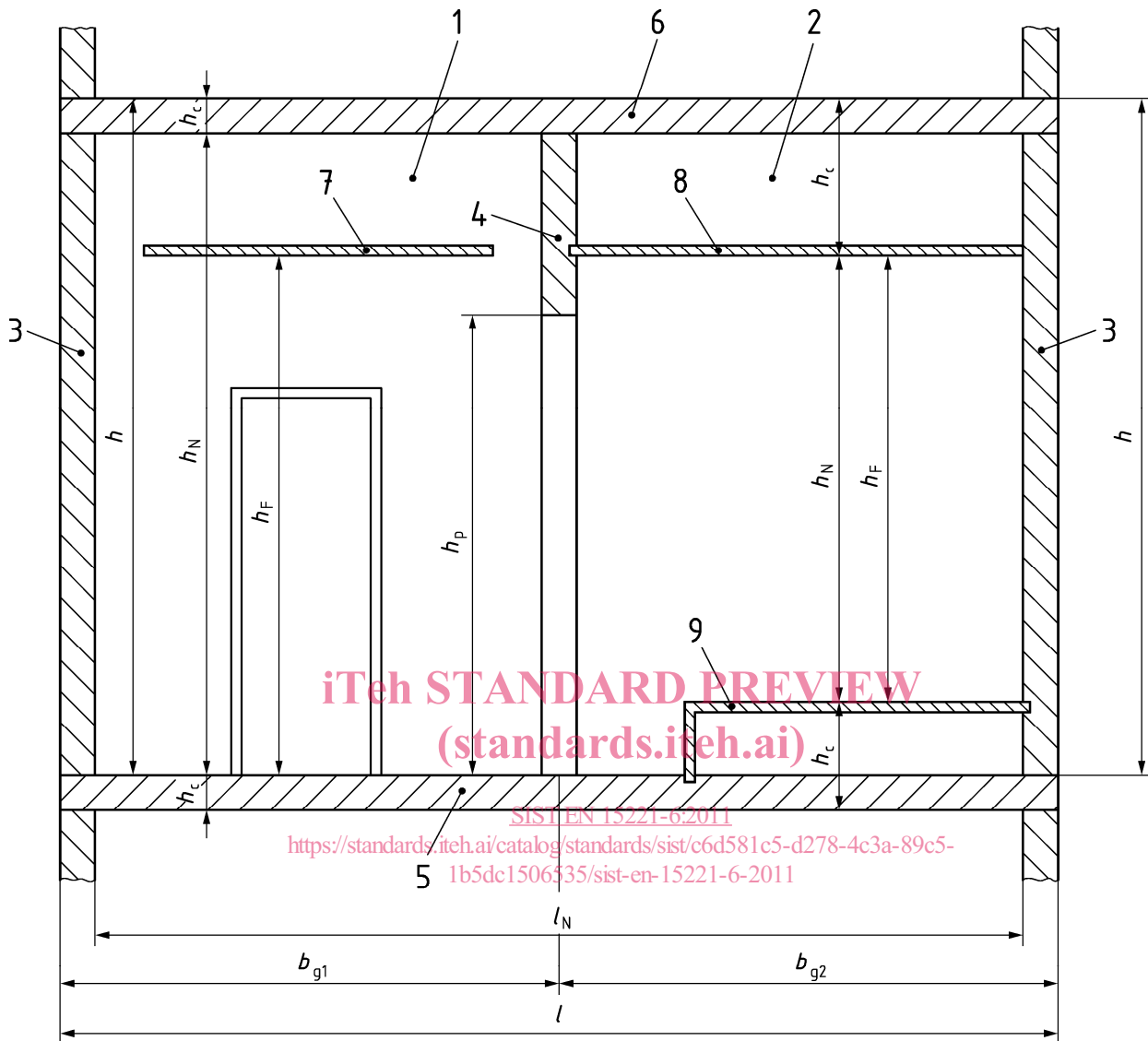
Examples are given in Figures 1 and 2.

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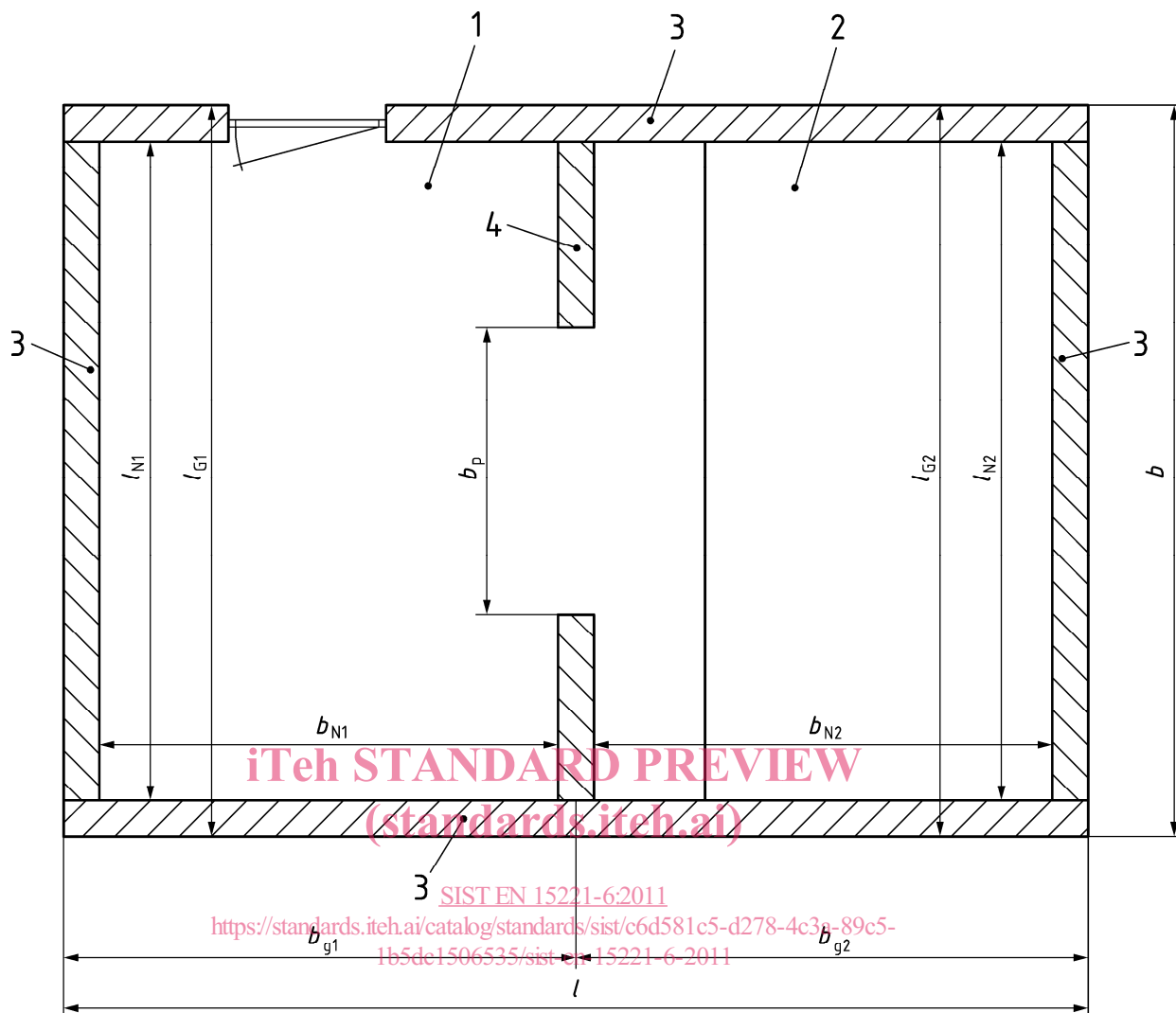
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Key

- 1 room 1
- 2 room 2
- 3 exterior wall
- 4 interior wall
- 5 floor
- 6 floor or roof
- 7 suspended ceiling
- 8 ceiling
- 9 raised floor
- b_{g1} gross width room 1
- b_{g2} gross width room 2
- l gross length
- l_N net length
- h gross height
- h_c construction height
- h_p passage height
- h_N net height
- h_F free height

a) – Measuring distances on a vertical plane

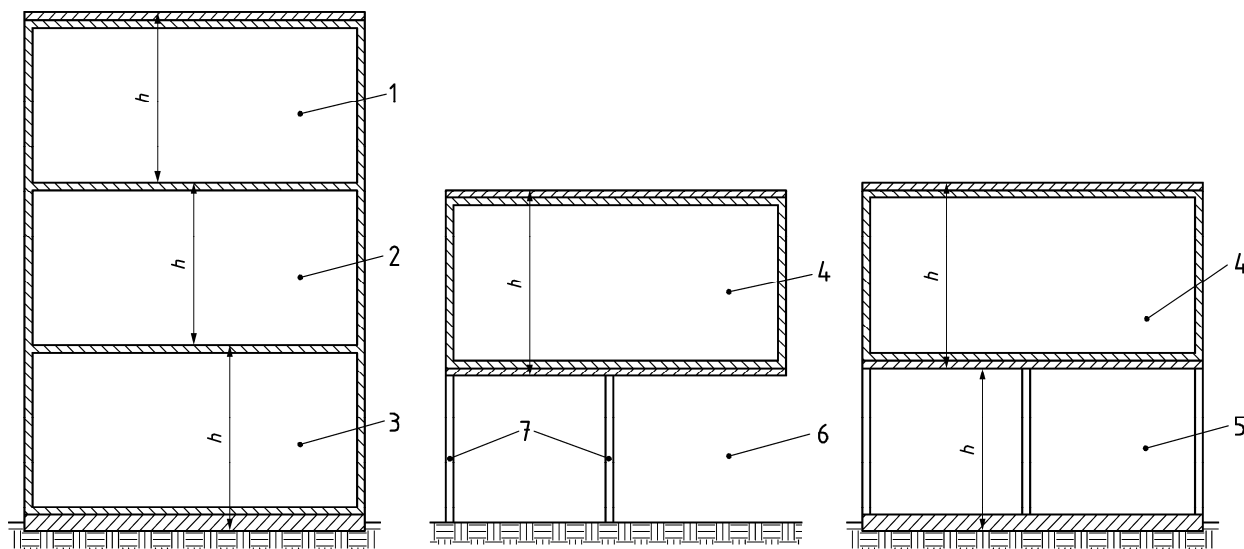
**Key**

- 1 room 1
- 2 room 2
- 3 exterior wall
- 4 interior wall
- b gross width
- b_{g1} gross width room 1
- b_{g2} gross width room 2
- b_p passage width
- b_{N1} net width 1
- b_{N2} net width 2
- l gross length
- l_{G1} gross length 1
- l_{G2} gross length 2
- l_{N1} net length 1
- l_{N2} net length 2

b) — Measuring distances on a horizontal plane seen from above

Figure 1 — Measuring Distances

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**Key**

- 1 highest floor level
- 2 intermediate floor level
- 3 lowest floor level
- 4 enclosed area
- 5 covered area
- 6 building area above ground
- 7 column
- h gross height

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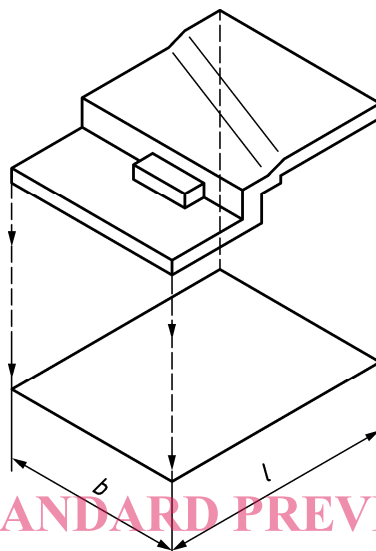
Figure 2 — Examples of measuring gross distances in different buildings with multiple levels

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4.3 Area

Both horizontal and vertical areas are measured by their actual dimensions. Inclined planes such as ramps are measured by their vertical projection onto an (imaginary) horizontal plane illustrated. Stair flights with a height difference $< 1,50$ m are illustrated at the plane where they start, stair flights with a height difference $\geq 1,50$ m are illustrated at the plane where they end (projected upward to the next plane).



Key

b width
 l length

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Figure 3 — Vertical projection

Gross areas are determined by the gross distances, net areas are determined by the net distances.

Areas which are solely needed for maintenance and emergency exits are not taken into account in this standard.

4.4 Volume

Volumes are measured by their actual dimensions. Inclined planes, whether floors or walls, define inclined bounds to the volume. Gross volumes are determined by the gross distances, net volumes are determined by the net distances. Note that Non-functional Level Area concepts such as voids do not apply here. When measuring volumes, a multi-level space is measured as a single volume.

5 Framework of area and space measurement of buildings

5.1 General

Buildings, rooms and floors shall be measured at the floor level (at the height level to the top of a finished floor). Every floor level shall be measured separately. Areas with varying net heights within one floor level may be calculated separately.

The area of a floor shall be determined as the area of the vertical projection onto the horizontal plane. Wall openings in interior and exterior walls are also measured by the vertical projection of their outer limits at floor level onto the horizontal plane and belong to the volume and area of exterior and interior walls.