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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

Facility management - Partie 6 : Mesure des surfaces et de l'espace en facility management

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 15221-6

November 2018

ICS 03.080.10

Will supersede EN 15221-6:2011

English Version

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

Facility management - Partie 6 : Mesure des surfaces et
de l'espace en facility management

Facility Management - Teil 6: Flächenbemessung im
Facility Management

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 348.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 15221-6:2018) has been prepared by Technical Committee CEN/TC 348 “Facility Management”, the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 15221-6:2011.

This European Standard is one of the series ISO 41000 and EN 15221 “*Facility Management*” which consists of the following parts:

1. *ISO 41011:2017 Facility Management - Vocabulary*
2. *ISO 41012:Facility Management – Guidance on strategic sourcing and the development of agreements*
3. *ISO 41013 Facility Management – scope, key concepts and benefits*
4. *EN 15221 Part 3: Guidance on quality in Facility Management*
5. *EN 15221 Part 4: Taxonomy, Classification and Structures in Facility Management*
6. *EN 15221 Part 5: Guidance on Facility Management processes*
7. *EN 15221 Part 6: Area and Space measurement in Facility Management*
8. *EN 15221 Part 7: Performance Benchmarking*

Note With the addition of the ISO standards, Part 1 and Part 2 of EN 15221 are withdrawn.

Introduction

In 2013 the initiative was taken to interest parties at ISO level for the FM suite of standards of Europe, the EN 15221 parts 1 to 7. This resulted in the re-development of the standards for vocabulary, sourcing and agreements.

The result consists of the parts:

- ISO 41011 Facility Management – Vocabulary
- ISO 41012 Facility Management – Guidance on strategic sourcing and the development of agreements.
- ISO 41013 Facility Management – Scope. Key concepts and benefits.

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.

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 harmonized 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 harmonized European approach to “area and space measurement”.

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1 Scope

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

This document 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 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 41011 *Facility Management – Vocabulary*

ISO/TR 41013 *Facility Management – Scope. Key concepts and benefits*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 41011:2017 and the following 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>

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

[SOURCE: 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

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 1 to entry: 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

4 Methods and units of measurement**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.

prEN 15221-6:2018 (E)

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;

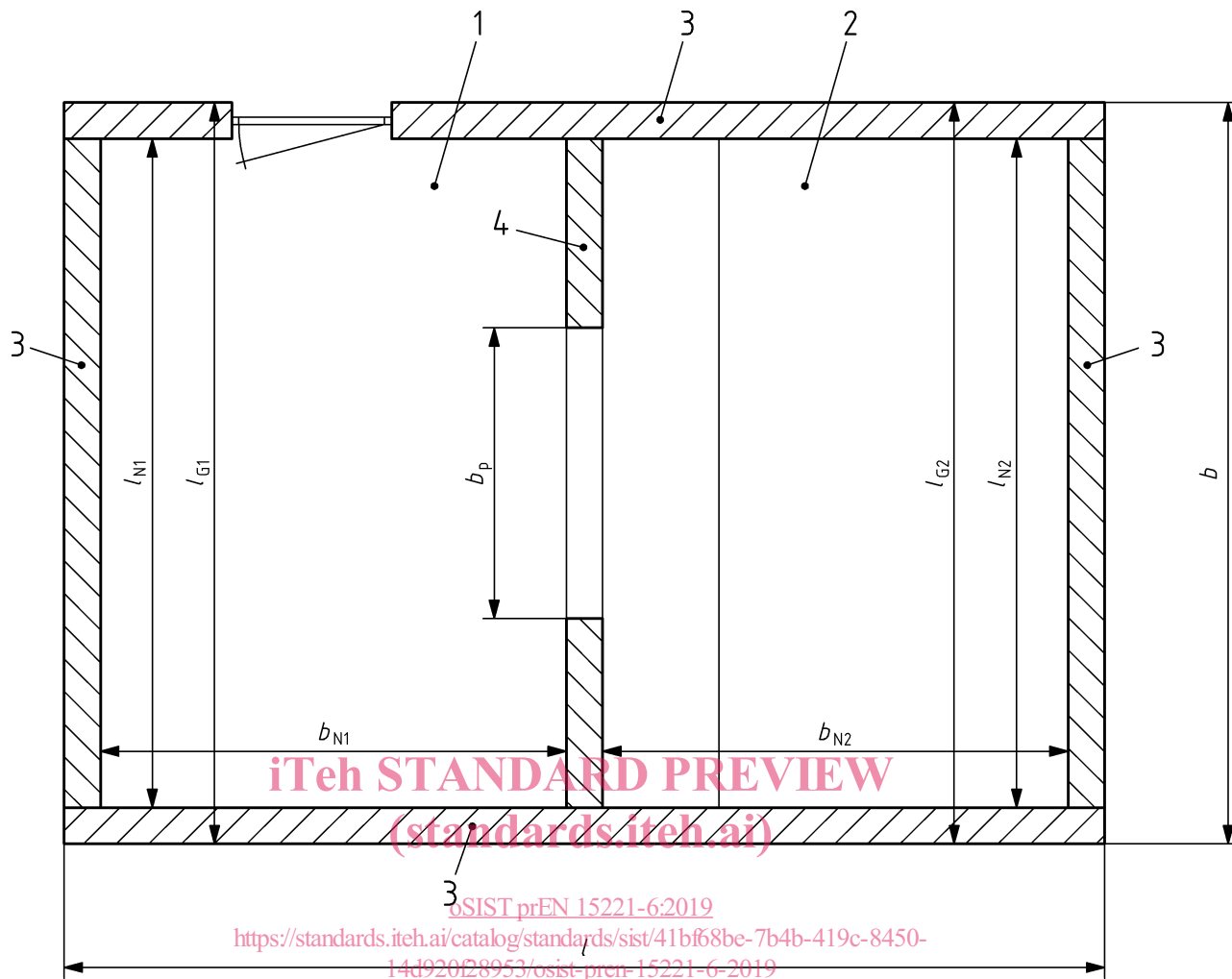
For the lowest storey in the building, gross height has to be measured to the bottom of the floor (up to the maximum of an ordinary floor).

- 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.

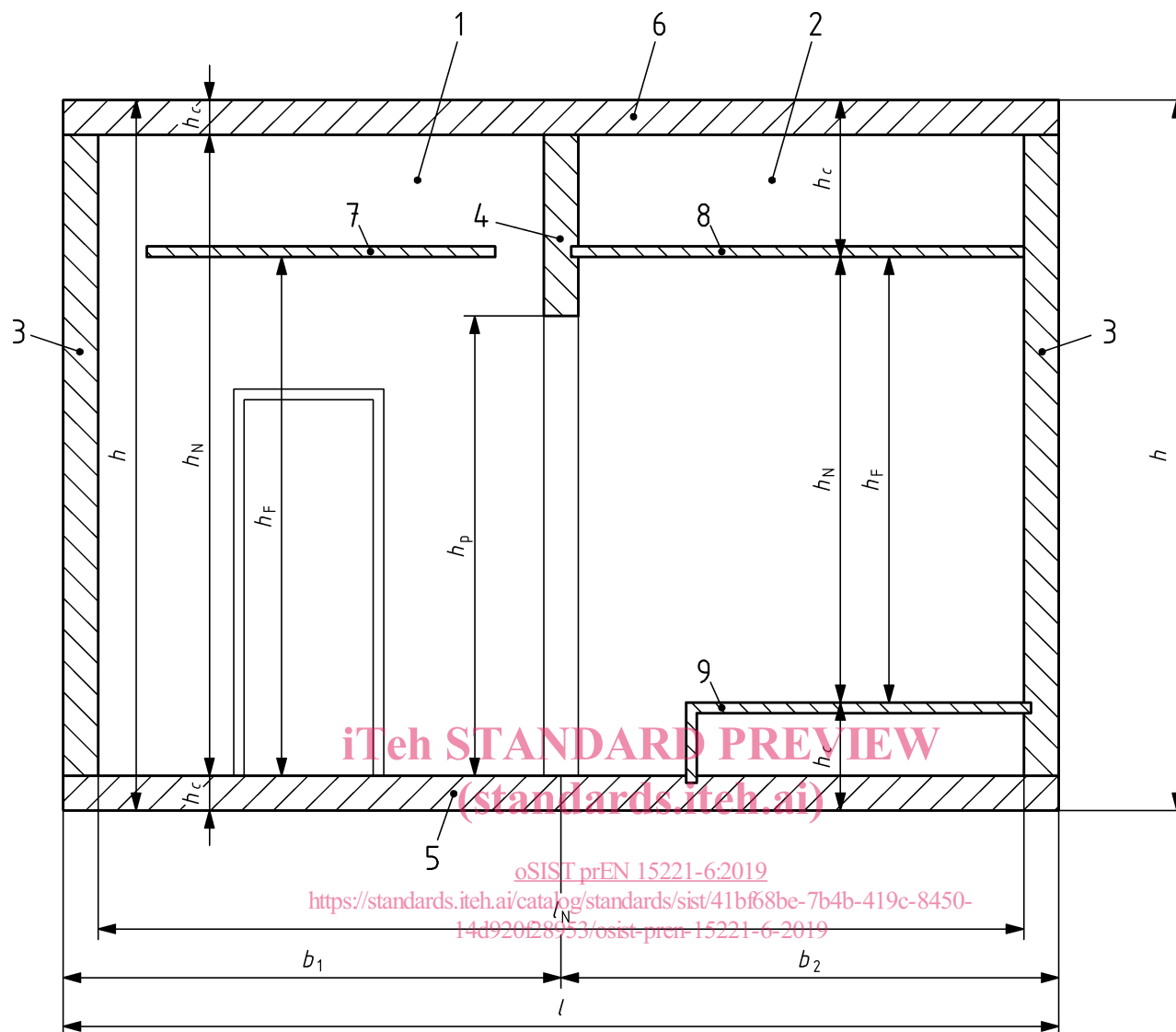
NOTE 2 The minimum passage height can be less than the free height.

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

Examples are given in Figures 1 and 2.



a) Measuring distances on a vertical plane

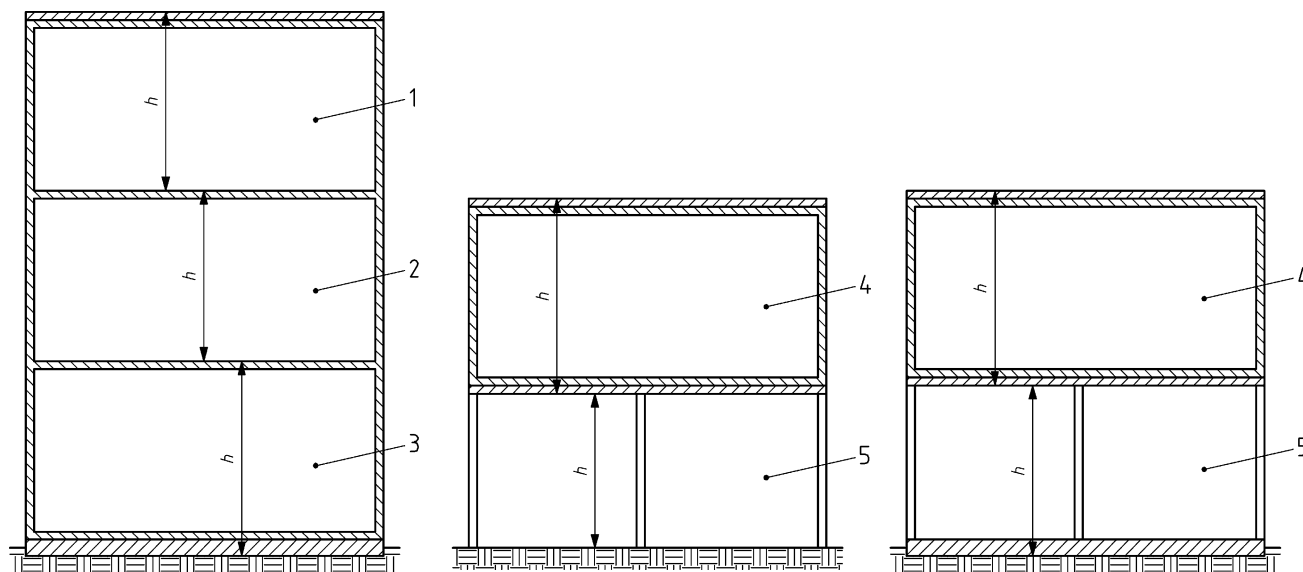


b) — Measuring distances on a horizontal plane seen from above

Key

1	room 1	b	gross width	l_{G2}	gross length 2
2	room 2	b_{g1}	gross width room 1	l_{N1}	net length 1
3	exterior wall	b_{g2}	gross width room 2	l_{N2}	net length 2
4	interior wall	b_p	passage width	h	gross height
5	floor	b_{N1}	net width 1	h_c	construction height
6	floor or roof	b_{N2}	net width 2	h_p	passage height
7	suspended ceiling	l	gross length	h_N	net height
8	ceiling	l_N	net length	h_F	free height
9	raised floor	l_{G1}	gross length 1		

Figure 1 — Measuring Distances



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

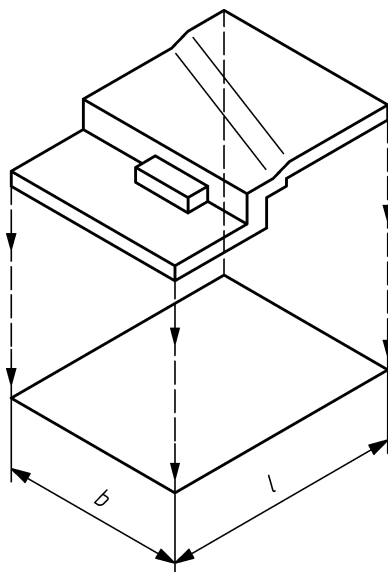
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Figure 2 — Examples of measuring gross distances in different buildings with multiple levels

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**Figure 3 — Vertical projection**

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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.

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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.

See Annex B for further information.

For all categories of areas it is distinguished between:

- A spaces which are entirely covered and enclosed on all sides up to their full height;
- B spaces which are entirely covered, but not enclosed on all sides up to their full height (e.g. recessed balconies);

C spaces which are not covered, but contained within components (e.g. open balconies).

Table 1 — Hierarchy of floor areas in the building

Level Area (LA)											
Gross Floor Area (GFA)											
Internal Floor Area (IFA)											
Net Floor Area (NFA)											
Net Room Area (NRA)											
		Technical Area (TA)		Circulation Area (CA)		Amenity Area (AA)		Primary Area (PA)			
		examples of subdivisions see Annex C		examples of subdivisions see Annex C		examples of subdivisions see Annex C		examples of subdivisions see Annex C			
Non-functional Level Area (NLA)	Exterior Construction Area (ECA)	Interior Construction Area (ICA)	Partition Wall Area (PWA)	Unrestricted Technical Area (UTA)		Unrestricted Circulation Area (UCA)		Unrestricted Amenity Area (UAA)		Unrestricted Primary Area (UPA)	
				Restricted Technical Area (RTA)		Restricted Circulation Area (RCA)		Restricted Amenity Area (RAA)		Restricted Primary Area (RPA)	

see 5.15

When defining the Rentable Floor Area it is strongly recommended to use one of the defined measurements of the table above.

The application of the framework given in Table 1 is illustrated in the following example.

A section of this building is being given in Figure 4. In the following figures, the grey coloured areas are showing in each case the area described in the subclause.