International Standard 2848

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Building construction — Modular coordination — Principles and rules

Construction immobilière — Coordination modulaire — Principes et règles

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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 developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2848 was developed by Technical Committee ISO/TC 59, *Building construction*.

This second edition was submitted directly to the ISO Council, in accordance with clause 6.11.2 of part 1 of the Directives for the technical work of ISO. It cancels and replaces the first edition (i.e. ISO 2848-1974), which had been approved by the member bodies of the following countries :

Australia	India	South Africa, Rep. of
Austria	Ireland	Sweden
Canada	Israel	Switzerland
Denmark	Italy	Thailand
Egypt, Arab Rep. of	Japan	Turkey
Finland	Netherlands	United Kingdom
France	New Zealand	USSR
Germany, F.R.	Norway	
Hungary	Romania	

The member body of the following country had expressed disapproval of the document on technical grounds :

Belgium

Building construction — Modular coordination — Principles and rules

1 Scope

This International Standard specifies the aims of modular co-ordination and states the general principles and rules to be applied in determining the dimensions of buildings and the positioning and dimensioning of components, equipment and assemblies.[1)]

2 Field of application

Modular coordination applies to the design of buildings of all types, to the design and the production of building components of all types, and to the construction of buildings.

3 References

ISO 1006, *Building construction — Modular coordination — Basic module.*

ISO 1040, *Building construction — Modular coordination — Multimodules for horizontal coordinating dimensions.*

ISO 1791, *Building construction — Modular coordination — Vocabulary.*

ISO 1803, *Building construction — Tolerances for building — Vocabulary.*

ISO 6512, *Building construction — Modular coordination — Storey heights and room heights.*

ISO 6513, *Building construction — Modular coordination — Series of preferred multimodular sizes for horizontal dimensions.*

ISO 6514, *Building construction — Modular coordination — Sub-modular increments.*

4 Definitions

For the purpose of this International Standard, the definitions given in ISO 1791 and ISO 1803 apply.

5 Aims of modular coordination

The principal object of modular coordination is to assist the building industry and associated industries, by standardization in such a way that components fit with each other, with other components and with the building assembly on site, thereby improving the economics of building.

Modular coordination thus

a) facilitates cooperation between building designers, manufacturers, distributors, contractors and authorities;

b) in the design work, enables buildings to be so dimensioned that they can be erected with standard components without undue restriction on freedom of design;

c) permits a flexible type of standardization, which encourages the use of a limited number of standardized building components for the construction of different types of building;

d) optimizes the number of standard sizes of building components;

1) Modular coordination may also be applied to town planning.

e) encourages as far as possible the interchangeability of components, whatever their material, form or method of manufacture;

f) simplifies site operations by rationalizing setting out, positioning and assembly of building components;

g) ensures dimensional coordination between installations (equipment, storage units, other fitted furniture, etc.) as well as with the rest of the building.

6 Basis of modular coordination

Modular coordination is essentially based on

a) the basic module;

b) standardized multimodules;

c) a reference system to define coordinating spaces and zones for building elements and for the components which form them;

d) rules for locating building elements within the reference system;

e) rules for sizing building components in order to determine their work sizes;

f) rules for defining preferred sizes for building components and coordinating dimensions for buildings.

7 Modules

7.1 Basic module

The basic module (see ISO 1006) is the fundamental unit of size in modular coordination.

Multiples of the basic module form the modular sizes of building components, of the parts of buildings they form and of buildings themselves.

7.2 Multimodules

Multimodules are standardized selected whole multiples of the basic module. Different multimodules will suit particular applications. However, if modular coordination is to be achieved, the values of multimodules should not be chosen arbitrarily and only standardized multimodules (see ISO 1040) shall be used.

By using multimodules, it is possible to achieve a substantial reduction in the number of modular sizes, particularly for components having at least one dimension equal to one of the dimensions of the functional element of which they are a part.

A further reduction in the number of modular sizes may be achieved by means of a general series of multimodular sizes based on selected multimodules.

7.3 Sub-modular increments

Sub-modular increments (see ISO 6514) are selected fractions of the basic module and are used when there is a need for an increment smaller than the basic module.

By using sub-modular increments, it is possible to achieve modular coordination both for components needing smaller increments than 1 **M** and for components with one or more dimensions smaller than 1 **M**.

In order to produce a solution appropriate to a project as a whole, sub-modular increments may also be used for determining the displacement of different modular grids.

However, sub-modular increments should not be used for determining the distance between modular reference planes of a modular space-grid.

8 Coordination of non-modular sizes

It will not always be possible or economical to use modular coordination totally, and the use of non-modular sizes will sometimes have to be envisaged. In particular, the thicknesses of many building components and assemblies may still have to be non-modular. Such thicknesses are strongly determined by economic and functional considerations. In some cases, such sizes could be coordinated by the use of simple fractions of the basic module.

9 Reference system

The reference system is a system of points, lines and planes to which the sizes and positions of building components or assemblies relate.

A reference system should mainly be used during the design stage, and may also form the basis of the system of lines from which measurements on site are set out.

9.1 Modular space-grid

A modular space-grid is a three-dimensional reference system within which a building and its components are located. Thus, the planes form free modular spaces which, according to the design, may be filled out by modular components. The distance between the planes in such a system is equal to the basic module (basic module grid) or to a multimodule (multimodular grid). (An example is shown in figure 1.) The reference planes in the modular space-grid are termed modular planes.

NOTE — The multimodule may differ for each of the three directions of the modular space-grid.

9.2 Modular grids

Designs have to be expressed in two dimensions. To this end, horizontal and vertical projections of the modular space-grid, which are known as modular grids, are used.

Different modular grids may be superimposed on the same plan or elevation for different purposes. (Examples are shown in figure 2.)

The advantage of using grids is that they provide a continuous reference system in a project, provided that the basic module grid is kept uninterrupted all over the building. The position of components and their corresponding modular dimensions can thus be recognized both by those preparing drawings and, as far as they appear in the final drawings, also by those reading them.

9.2.1 Basic module grid

The fundamental modular grid is that in which the spacing of consecutive parallel lines is equal to the basic module. (See ISO 1006.)

9.2.2 Multimodular grids

In addition to the basic module grid, multimodular grids, in which the spacing of the lines is a multimodule, may be used. This multimodule may differ for each of the two directions of the grid.

Lines in a multimodular grid normally coincide with lines in the basic module grid. In practice, however, it may be advantageous to displace modular grids used for different purposes in relation to each other. One example may be the displacement of the horizontal grid determining the position of floor components from the horizontal grid determining the position of wall components with a dimension equal to the support of the floor components.

9.2.3 Zones of interruptions of modular grids

In some cases it may be necessary to interrupt a modular grid (for example, in order to accommodate dividing elements). The width of the zone of interruption of the modular grid may be modular or non-modular. (See figure 3.)

9.2.4 Displacement of modular grids

When several modular grids are used in designing the same plan, it may be advantageous to displace the grids with reference to each other in one or both directions. The displacement between the grids shall be chosen so as to produce a solution appropriate to the project as a whole. (An example is shown in figure 4.)

10 Location and dimensioning

For the purposes of design, each building component and assembly is assumed to be located in a space within the reference system defined by reference planes or lines, i.e. its allotted modular space. This space includes the space required for joints and permitted dimensional deviations (see figure 5). Thus, in modular planning, the modular plane or grid line defining the location of a component does so by boundary reference (see figure 6). In some cases it may be practical, however, to define the location of, for example, the centre line of a component in relation to the modular grid (see figure 7). The latter can, however, be considered as a special case of boundary reference.

In practice, work-sizes of components and assemblies are derived from modular sizes. Allowances have to be made in particular for manufacturing, site setting-out and erection deviations. In modular coordination, free spaces (rooms, openings in walls and floors, etc.) should be larger than their modular dimensions, while components which are intended to fit into such spaces shall be smaller than the modular dimensions.

11 Preferred modular sizes

A further reduction in the ranges of sizes, as well as greater facility for addition and division can be achieved by the use of a general series of preferred modular sizes. (See ISO 6513.)

Preferred modular sizes for various components and assemblies as well as for various building dimensions will be specified in future International Standards. (See ISO 6512.)

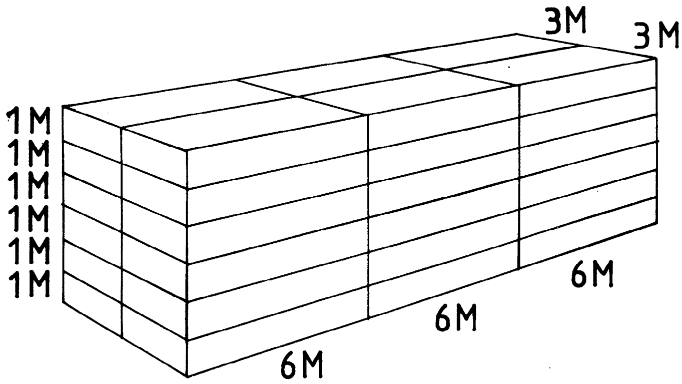
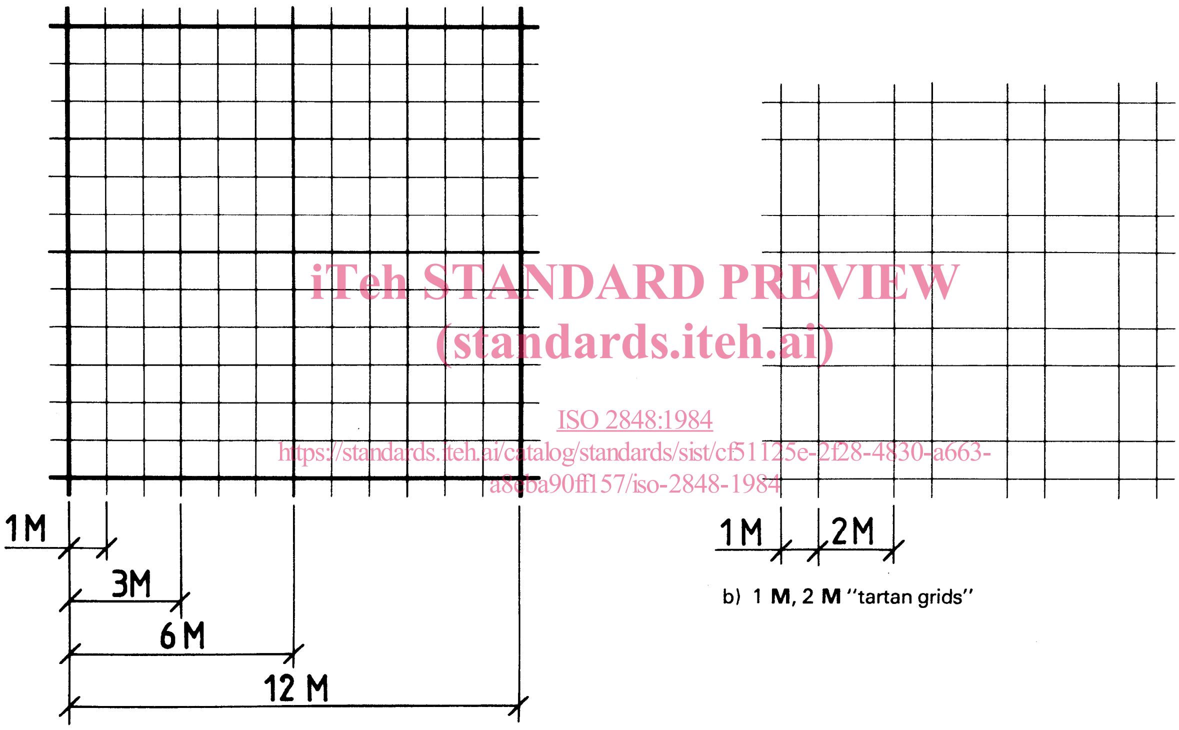


Figure 1 — Example of a modular space-grid



a) 1 **M**, 3 **M**, 6 **M**, 12 **M**-grids

b) 1 **M**, 2 **M** "tartan grids"

Figure 2 — Examples of superimposed modular grids

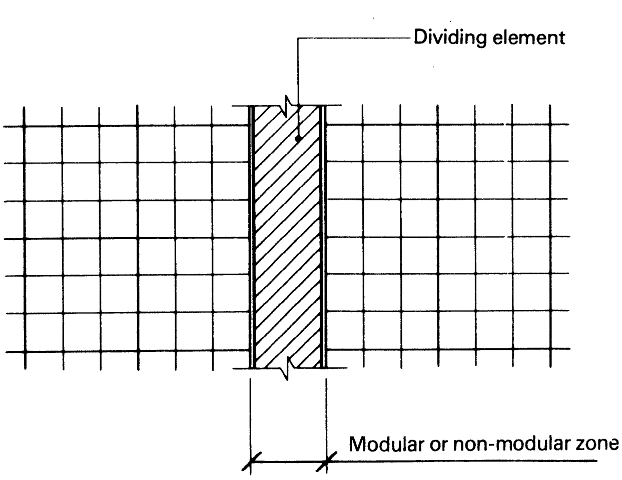


Figure 3 — Interruption of modular grids

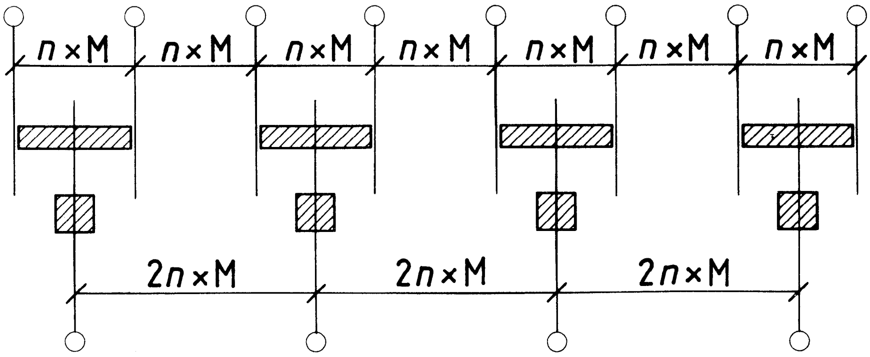


Figure 4 — Example of displacement of modular grids

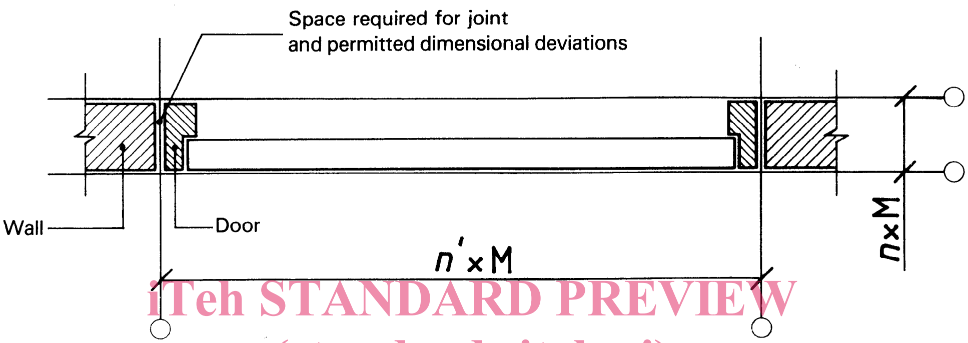


Figure 5 — Example of a building component located in its allotted modular space

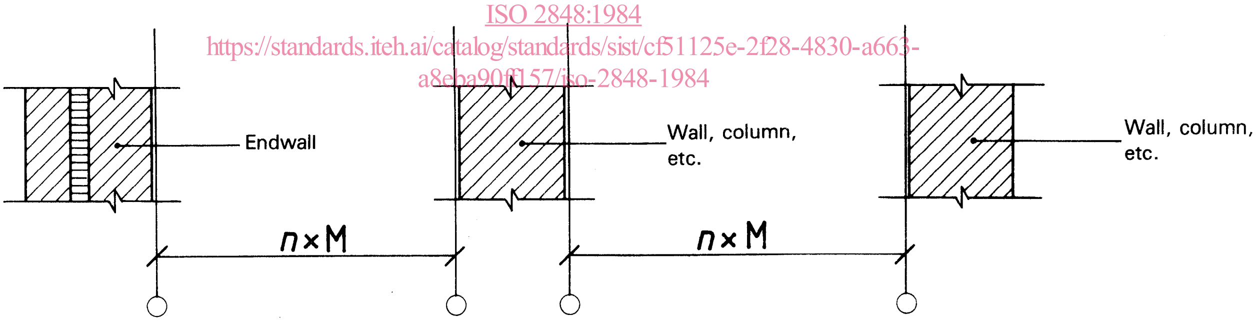
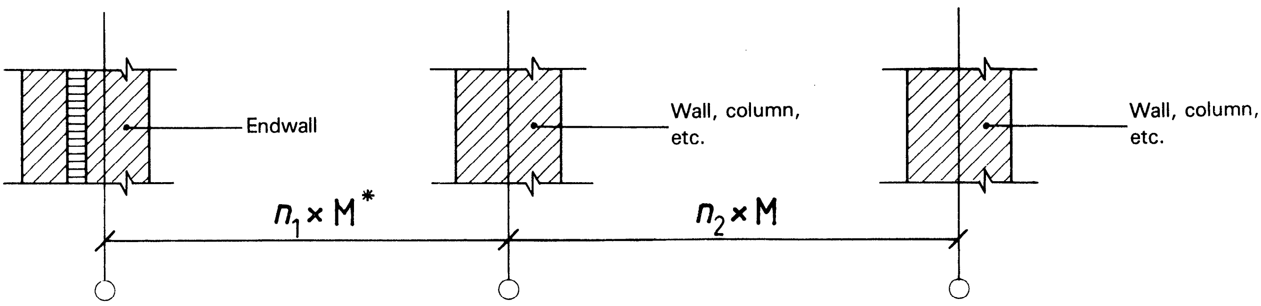


Figure 6 — Example of modular planes in boundary position



* In the case of asymmetric elements (for example endwalls), the modular plane may not coincide with the centre plane.

Figure 7 — Example of modular planes in axial position

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