



# Building construction — Modular coordination — Application of horizontal multimodules

*Construction immobilière — Coordination modulaire — Application des multimodules horizontaux*

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The reasons which led to the decision to publish this document in the form of a technical report type 2 are explained in the Introduction.

## 0 Introduction

The need for rules for applying multimodules for horizontal dimensions in construction was recognized some years ago. However, in view of the fact that the application of multimodules is still under development in many countries, it was decided to publish these rules, in the first instance, as a technical report.

## 1 Scope and field of application

This technical report contains the rules for applying multimodules for horizontal dimensions in construction which are established in ISO 1040.

It is applicable to construction of buildings of all types which are designed in conformity with the principles and rules of modular coordination established in ISO 2848.

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## 2 Reference

ISO 2848, *Modular co-ordination — Principles and rules*.

## 3 Specifications

### 3.1 Principles of application of multimodules

Multimodules are used as modules, i.e. as units in multimodular grids, spacing the lines of grids and as common factors of multimodular sizes (dimensions) in buildings and of components. They are used to reduce the number of modular sizes in a plan solution or of series of components.

Multimodules of different values are used as the basis for selection of multimodular dimensions for longitudinal and transversal spacing of the structural parts of buildings as well as for other dimensions in the plan and for components (additive ones included), certain openings, etc.

### 3.2 Combination of various multimodules

In a project one or more multimodules applied to dimensions of different elements and components may be used; it may often be an advantage to use different multimodules in both directions of a plan [see figure 1 a)]. Such multimodules cannot be chosen freely. As a rule it will be advantageous if the larger multimodules are multiples of the smaller multimodules [see figure 1 b)], for example: **3M — 6M — 12M; 15M — 30M — 60M**.

### 3.3 Choice of multimodules for design of projects of particular type

**3.3.1** For reasons of economy it is normally advantageous to select the largest multimodule(s) which will not hinder the development of functional plan layouts.

The selection of multimodules for design of buildings of various types shall be carried out according to the specific features of the sizes of the main premises and structural systems of buildings.

**3.3.2** According to the functional specific features and dimensions of the main rooms, buildings are divided into the following three categories:

- a) Category I: Buildings with the main rooms of relatively small dimensions determined by the scale and demands of one person, for example residential buildings, rooms of hotels, boarding houses, rest houses, sanatoria, hospital wards.
- b) Category II: Buildings with the main rooms of medium dimensions conforming to the requirements of a strictly limited group of people according to a definite social activity, for example school buildings, nurseries, kindergartens, office buildings, club rooms.
- c) Category III: Buildings where the main rooms are halls of large dimensions intended for organization of social activities involving the participation of a great number of people, or production activities, for example sports and entertainment buildings, exhibition halls, shops, industrial buildings, storage, farm buildings.

**3.3.3** According to the degree of freedom of planning which is determined by the specific features of the structural systems, buildings are divided into three categories:

- a) Category 1: **Rigid plan**, i.e. which does not allow for varying the dimensions of the main rooms, for example in large-size panel structures with a small spacing between loadbearing cross walls [see figure 2 a)].
- b) Category 2: **Partly free plan**, i.e. with a limited possibility of varying the dimensions and layout of rooms, for example in the case of longitudinal loadbearing walls or a large spacing between loadbearing cross walls as well as in the case of combining large and small spacings [see figure 2 b)].
- c) Category 3: **Free plan**, i.e. where variation of the dimensions and layout of rooms is easy within the general dimensions of the buildings, for example in the case of structural systems without interior supports or with a column grid of the framework [see figure 2 c)] or with very large spacings between loadbearing walls.

**3.3.4** Categories I-III and 1-3 can be arranged in a matrix where multimodules of increasing size are used when going horizontally from I to III, vertically from 1 to 3 or diagonally from I.1 to III.3 (see the table).

An example is given in the annex of a matrix filled in as a function of experience of application of multimodular rule choice, as formulated in this technical report.

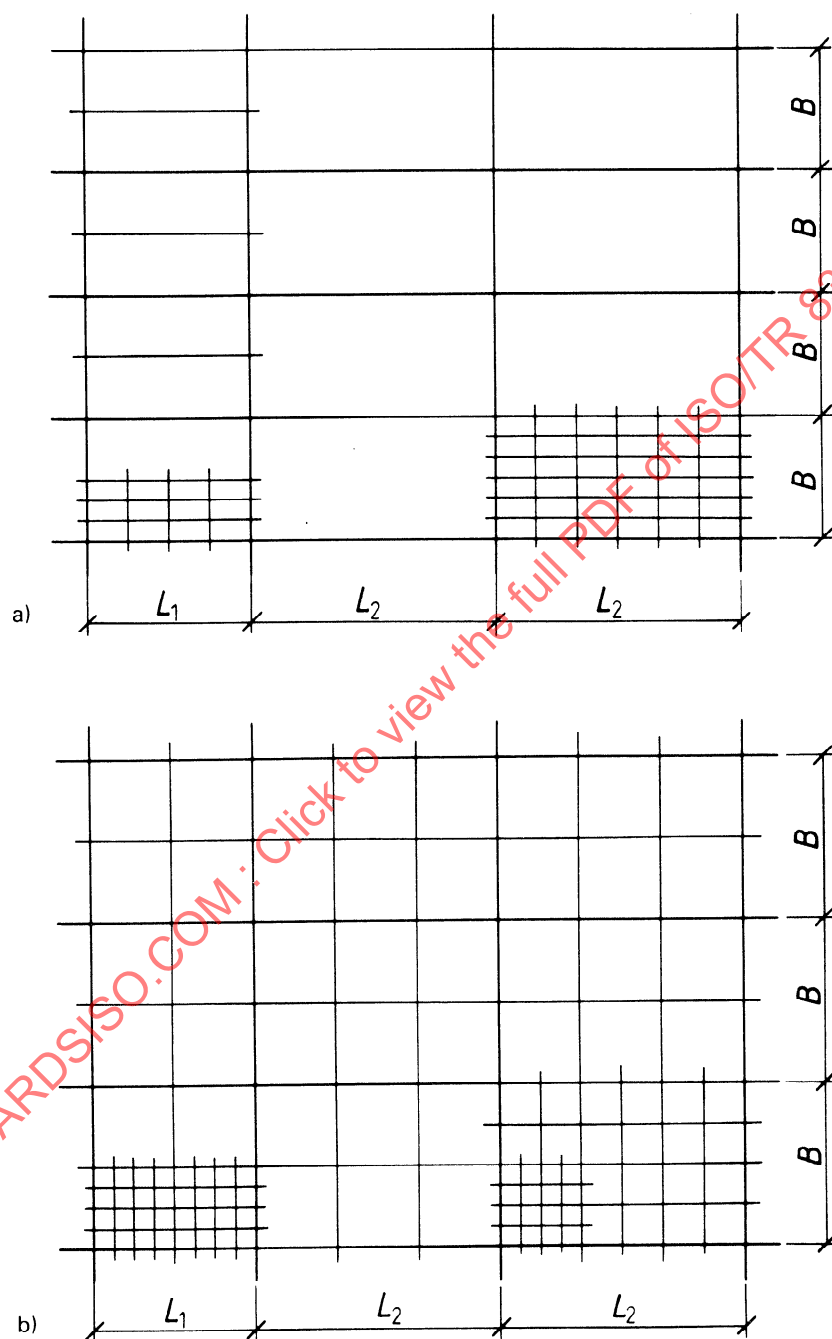
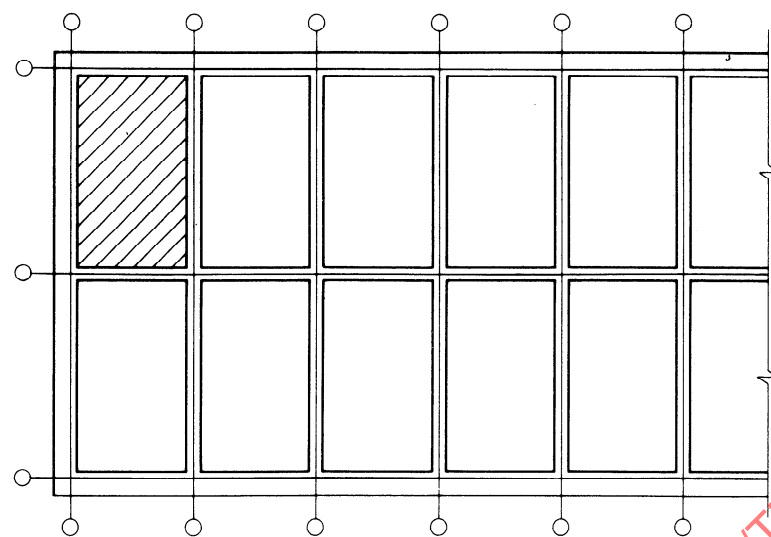
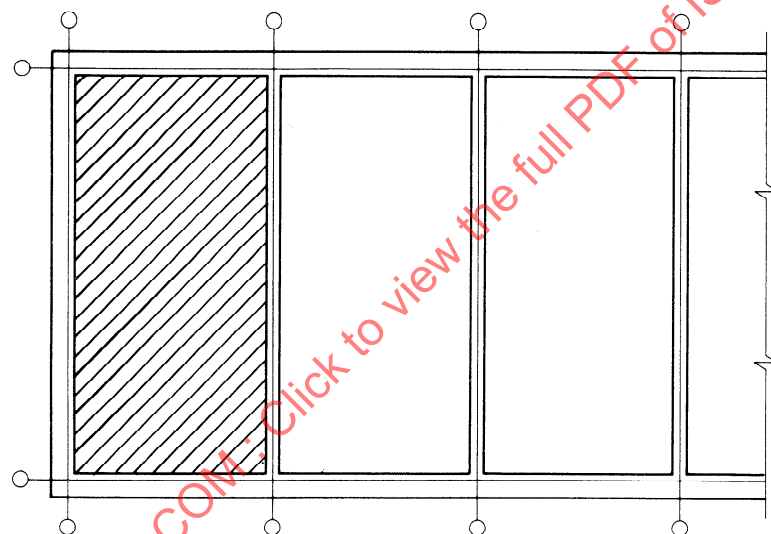


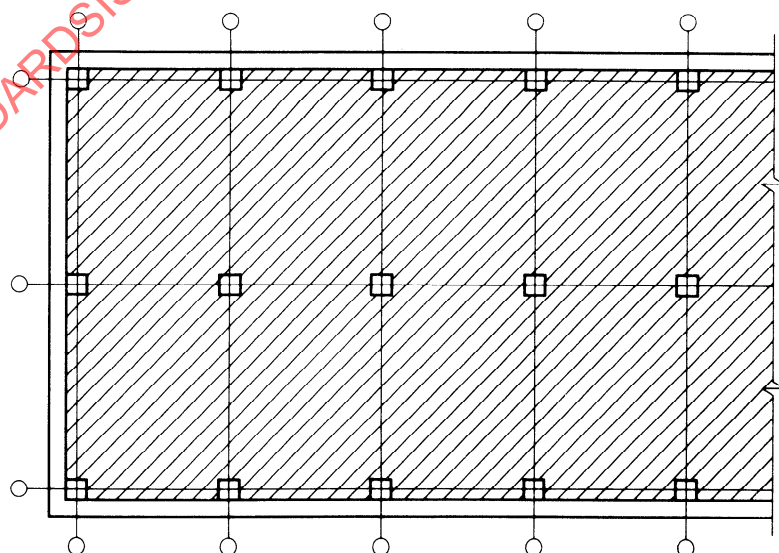
Figure 1 — Combination of various multimodules



a) Rigid plan



b) Partly free plan



c) Free plan

Figure 2 — Degree of freedom of planning which is determined by the structural systems

Table — Possibility of increasing the sizes of multimodules

| Building category         |                  | Main rooms            |                               |                                            |
|---------------------------|------------------|-----------------------|-------------------------------|--------------------------------------------|
|                           |                  | Small, for one person | Medium, for a group of people | Large, for social or production activities |
|                           |                  | I                     | II                            | III                                        |
| Degree of freedom of plan | Rigid plan       | I.1                   | II.1                          | III.1                                      |
|                           | Partly free plan | I.2                   | II.2                          | III.2                                      |
|                           | Free plan        | I.3                   | II.3                          | III.3                                      |

## Annex

An example of a practical application of the rules of the selection of multimodules formulated in this technical report for choice of multimodules for design of projects.

| Building category         |                  | Main rooms            |                                                   |                                            |
|---------------------------|------------------|-----------------------|---------------------------------------------------|--------------------------------------------|
|                           |                  | Small, for one person | Medium, for a group of people                     | Large, for social or production activities |
|                           |                  | I                     | II                                                | III                                        |
| Degree of freedom of plan | Rigid plan       | 1                     | 3M, <u>6M</u> , 12M                               |                                            |
|                           | Partly free plan | 2                     | 3M, 6M, <u>12M</u><br>or<br><u>15M</u> , 30M, 60M |                                            |
|                           | Free plan        | 3                     | 3M, 6M, <u>12M</u><br>or<br><u>15M</u> , 30M, 60M | 15M, 30M, <u>60M</u>                       |

### NOTES

- Multimodules which are preferable for multimodular dimensions used for spacings of the main loadbearing structures for the given combination of categories of buildings are underlined.
- A multimodule of **60M** can be added to a group of multimodules of **3M**, **6M**, **12M**, if necessary, to determine the dimensions of large halls combined with rooms of relatively small areas.
- A multimodule of **3M** can be added to a group of multimodules of **15M**, **30M**, **60M** for arrangement of partitions, dimensions of components, opening widths of windows, etc.
- A group of multimodules of **3M**, **6M**, **30M**, **60M** can be applicable for design of buildings with a complex combination of rooms of different sizes.
- In buildings comprising relatively independent parts, differing in structural systems and categories of main rooms, various groups of multimodules can be combined.