INTERNATIONAL STANDARD

ISO 4463-3

First edition
1995-12-15

# Measurement methods for building — Setting-out and measurement —

## Part 3:
## Check-lists for the procurement of surveys and measurement services



ISO 4463-3:1995
https://standards.iteh.ai/catalog/standards/sist/74448f07-a4e9-420a-b33b-3920d8e7bafb/iso-4463-3-1995

*Méthodes de mesurage pour la construction — Piquetage et mesurage — Partie 3: Listes de contrôle pour la fourniture de levés topographiques et de prestations de mesurage*

Reference number
ISO 4463-3:1995(E)

# Contents





**Annex**





International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

# 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 4463-3 was prepared by Technical Committee ISO/TC 59, *Building construction*, Subcommittee SC 4, *Dimensional tolerances and measurement*.

This first edition of ISO 4463-3, together with ISO 4463-1 and ISO 4463-2, cancels and replaces ISO 4463:1979, which has been technically revised.



ISO 4463 consists of the following parts, under the general title *Measurement methods for building — Setting-out and measurement*:

— *Part 1: Planning and organization, measuring procedures, acceptance criteria*

— *Part 2: Measuring stations and targets*

— *Part 3: Check-lists for the procurement of surveys and measurement services*

Annex A of this part of ISO 4463 is for information only.

This page intentionally left blank

# Measurement methods for building — Setting-out and measurement —

# Part 3:
Check-lists for the procurement of surveys and measurement services

## 1 Scope

This part of ISO 4463 identifies and provides guidance in the form of check-lists for the surveying and setting-out services that may be required during the development and construction of buildings and ancillary works.

It will assist those involved in specifying the surveying and setting-out services required during the procurement of buildings by providing a check-list of the requirements from which selections can be made and to which further items can be added depending on the particular needs of the project.

The guidance is applicable to both new construction and refurbishment projects.



## 2 Stages of procurement of a building

In the development and construction of a project, survey, setting-out and measurement services may be required at any of the following stages.

Stage 1: Acquisition of the plot or of the existing building or buildings

Stage 2: Project planning

Stage 3: Prior to project construction

Stage 4: Project construction

Stage 5: Project completion

## 3 Associated measurement procedures

### 3.1 Stage 1: Acquisition of the plot or of the existing building or buildings

The legal boundaries of a plot shall be defined by either a cadastral survey or a local system survey.

#### 3.1.1 Check-list of instructions for the procurement of the appropriate specialist services

Specify that the surveyor shall:

a) identify the plot or the building, including its orientation, on a location drawing;

b) indicate on a site plan the main features on or adjacent to the site (e.g. roads, underground services, overhead power or telephone lines, major trees, fences, etc.); add or delete items as required for the particular project;

c) provide spot levels related to national or local benchmarks;

d) establish, if required, the relationship of the site plan to the national or other reference grids or coordinate systems.

#### 3.1.2 Presentation of information on the Stage 1 drawings

Specify that the surveyor shall:

a) select a scale for the survey drawing appropriate to the particular need (see clause 4) to show the required information;

b) show contour lines, as appropriate, at the required differences in height and/or spot levels.

## 3.2 Stage 2: Project planning

During the planning stage of a project, there is a need for both general and detailed information on the plot or on the existing buildings and ancillary works.

### 3.2.1 Check-list of instructions for the procurement of the appropriate specialist services

Specify that the surveyor shall:

a) carry out a topographical survey to define the location of the main natural and artificial features on the site and, if required, the level contour lines, and, when neccesary, indicate those features which are protected by law or other regulations;

b) carry out a detail survey to establish the position of those existing features required to be located on or adjacent to the site (e.g. buildings, walls, pylons, posts, trees, roads, kerbs, hedges, etc.) and the nature (e.g. grass, concrete, etc.) and level of the surfaces;

c) produce a separate external services coordination drawing;

d) produce an existing services drawing to define the type and location (position and depth or height) of the existing services immediately adjacent to and across the site including, where applicable, roads and road furniture;

e) for refurbishment projects, produce an existing building drawing to define in detail and to give dimensions (in plan and elevation) of the internal and external features of existing buildings;

f) establish a planning grid in terms of a common grid or a system of coordinates or reference lines to aid the development of the design and to coordinate the site surveys (cadastral, topographical and detail) with the project plans.

### 3.2.2 Presentation of information on the Stage 2 drawings

Specify that the surveyor shall:

a) select a scale for the survey drawing appropriate to the particular need (see clause 4) to show the required information;

b) show, as appropriate, contour lines at the required differences in height and/or spot levels to indicate specific changes in level.

The drawings may include

— a block plan,

— the identity and location on site of the outlines of the proposed construction and a table of coordinates for each of the measured features,

— details of the primary network survey including the main survey stations and witness marks,

— the orientation (north point),

— the relation to the national or other reference grid,

— the identity and location of existing features such as boundaries, existing buildings, posts, fences, hedges, features adjacent to the plot, etc.,

— the location of bore holes and trial pits carried out during the soil investigation,

— a grid of levels or contour lines, and

— the area of the site or a specified part of it.

## 3.3 Stage 3: Prior to project construction

Prior to the construction of the project there is a need to provide detailed information on the plot and the proposed construction.

### 3.3.1 Check-list of actions for the procurement of the appropriate services

a) Confirm the legal boundaries and that the existing features and the planning grid have been defined and the proposed building has been located.

b) Verify that the proposed building(s) given on the drawings is/are of a size able to fit on the site.

c) Obtain the architect's or the local authority's final approval on the agreed dimensions and position.



### 3.3.2 Check-list of instructions for the procurement of the appropriate specialist services

Specify that the surveyor shall:

a) produce a site plan to locate the position of the proposed construction in relation to the setting-out points;

b) produce a site setting-out plan to establish the primary points and key secondary lines, stations, targets and benchmarks;

c) verify all the given dimensions of the project by computing them into coordinates of the site reference system to achieve a consistent accuracy of setting-out across the site;

d) confirm that the location plan correctly coordinates with the actual on-site;

e) establish, where necessary, monitoring stations to check the ground movement and the movement of existing buildings and other important features around the site (e.g. those protected by law or other regulations).

### 3.3.3 Presentation of information on the Stage 3 drawings

Specify that the surveyor shall:

a) select a scale for the survey drawings appropriate to the particular need (see clause 4) to show the required information;

b) where possible, relate the levels shown on the construction drawings to the site levels.

### 3.3.4 Agreement on measurement accuracy

For the setting-out and construction tasks to be undertaken, indicate the permitted deviations and, when needed, the relationship between the standard deviation and the permitted deviation in the contract specification.

## 3.4 Stage 4: Project construction

During the construction of the project, there is a need to carry out and verify the setting-out, and to measure the construction as it proceeds to ensure it complies with the specification.

### 3.4.1 Check-list of instructions for the procurement of appropriate specialist services

Specify that the surveyor shall:

a) check the initial setting-out to confirm that the location drawings correctly coordinate with the actual site dimensions and records;

b) establish, for the duration of the construction, a setting-out plan indicating the primary net major and secondary baselines, grid intersections, targets and benchmarks;

c) establish, for each building, a detailed secondary setting-out plan including elevational control to ensure the correct positioning of all the elements of the construction; each plan should include the grid intersections or offset grid intersections including targets, temporary benchmarks and datum lines, and plumbing stations and targets;

d) establish a detailed external works setting-out plan to ensure the correct positioning of the roads, any retaining walls, the drainage and landscaping, etc.;

e) carry out progressive monitoring throughout the construction of the project to verify compliance of the actual construction with the specified tolerance requirements; in particular, compliance checks are required for the structural frame, floors, lift shafts, drainage, roads and external works.

### 3.4.2 Monitoring of movements or deformations

Monitoring of movements or deformations may be required for both existing and new constructions, for adjacent buildings, for ground movements or the ground water level (water table).

Where the monitoring of movements or deformations is required, there is a need to reach agreement with the surveyor on the following:

— the method and the equipment to be used to record the movements;

— the frequency and accuracy of the measurements;

— the method of presentation of the data;

— the appropriate observation stations (in plan and elevation);

— the frequency with which the reliability of stations and targets shall be checked during the construction.

### 3.4.3 Presentation of information on Stage 4 drawings

Specify that the surveyor shall:

a) select a scale for the survey drawings appropriate to the particular need (see clause 4) to show the required information;

b) where possible, relate the levels shown on the construction drawings to the site levels.

## 3.5 Stage 5: Project completion

On completion of the project there is a need to provide as-built records of the construction, including drawings.

### 3.5.1 Check-list of instructions for the procurement of appropriate specialist services

Specify that the surveyor shall:

a) carry out as-built surveys to record for final records the position in plan and elevation of the buildings, the external works and the services;

b) prepare a separate coordinated drawing indicating the location and depth of all external services.

### 3.5.2 Presentation of information on Stage 5 drawings

Specify that the surveyor shall select a scale for the survey drawings appropriate to the particular need (see clause 4) to show the required information.

## 4 Recommended drawing scales

Table 1 gives the principal scales recommended for use for each of the defined types of surveys and drawings.

**Table 1 — Recommended drawing scales for different types of drawings**

| Use | Scale |
|---|---|
| Surveys and layouts | 1:2000<br>1:1000<br>1:500 |
| Site and key plans | 1:1000<br>1:500<br>1:200 |
| Location drawings, block plans and general arrangement drawings | 1:200<br>1:100<br>1:50 |
| Component and assembly drawings | 1:20<br>1:10<br>1:5<br>1:1 |

## 5 Accuracy of sizes from survey drawings

The features of primary significance (e.g. building corners, boundaries), the main survey lines and the objects for which dimensions must be accurately known should always be dimensioned from the survey or from the measuring records and not by scaling from drawings irrespective of their scale.

In those cases where numerical values are not available and dimensional information has to be taken from the drawing, the accuracy limits of the plotted locations have to be taken into account.

The expected limits of accuracy, represented by any undimensioned line or feature on a drawing, associated with the principal scales of plotted drawings are as follows.

| Scale | Limit of accuracy |
|---|---|
| 1:2000 | ± 0,5 m |
| 1:1000 | ± 0,2 m |
| 1:500 | ± 0,1 m |
| 1:200 | ± 50 mm |
| 1:100 | ± 25 mm |
| 1:50 | ± 12 mm |

NOTE 1 The limits above are only examples since they can fluctate subject to environmental conditions in the course of time (such as moisture) and their values do not include the accuracy of the achieved measurement.



## 6 Documentation

Identify and record the location where records of all the important dates are to be kept.

# Annex A
(informative)

## Dimensioning and setting-out from the same secondary setting-out lines

To achieve the required coordination, all parties involved in dimensioning and measuring should start from the same reference lines both during the design stage (when indicating dimensions and positions on a drawing) and on the construction site (when setting-out and carrying out compliance measurements).

An example of dimensioning and setting-out from the same secondary setting-out lines is given in figure A.1.

Dimensions in millimetres

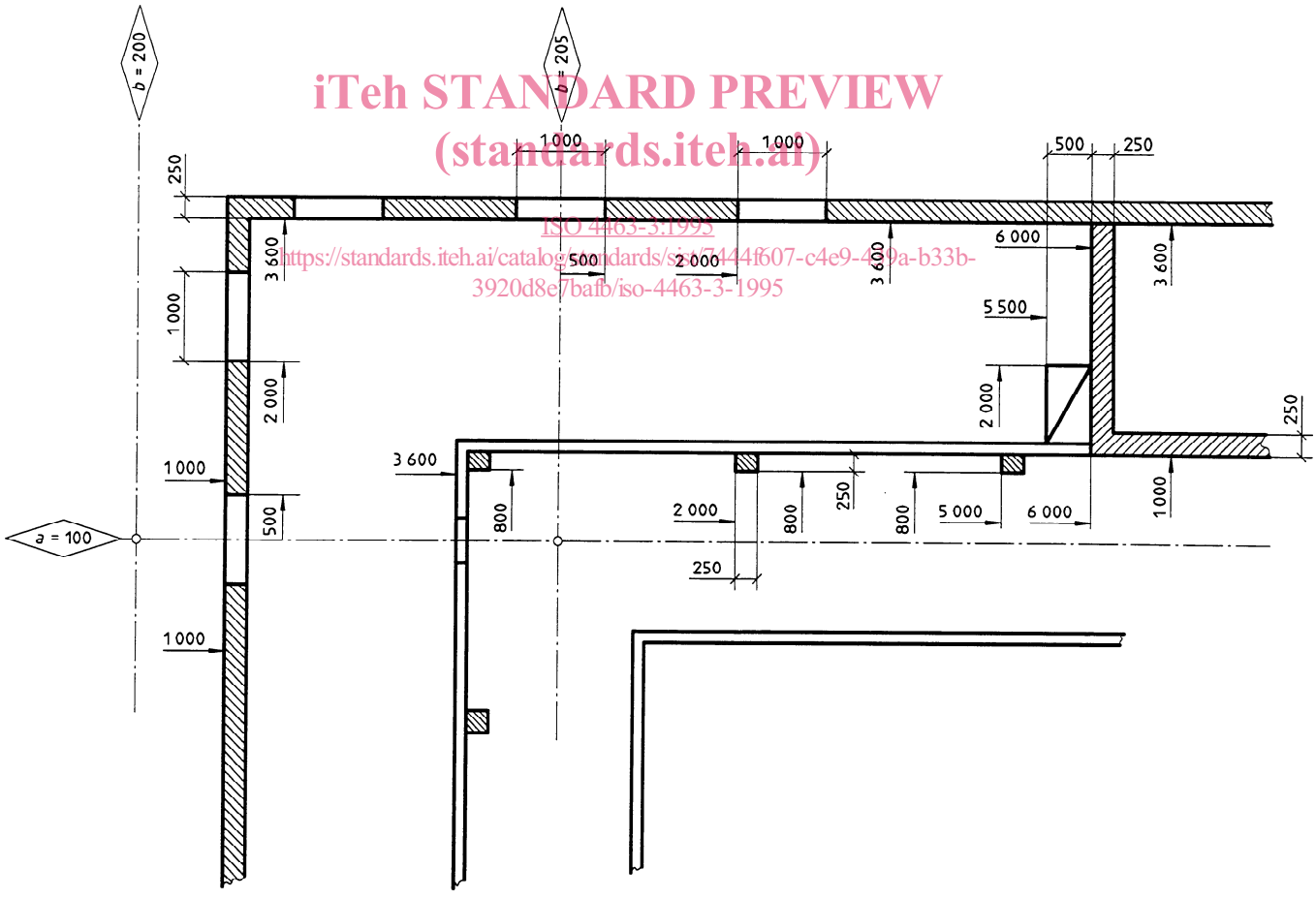




**Figure A.1**