

भारतीय मानक

भवन निर्माण उद्योग में माड्यूलरी समन्वय हेतु सिफारिशें

भाग 1 पारिभाषिक शब्दावली

(पहला पुनरीक्षण)

Indian Standard

RECOMMENDATIONS FOR MODULAR
CO-ORDINATION IN BUILDING
INDUSTRY : TOLERANCES

PART 1 GLOSSARY OF TERMS

(*First Revision*)

UDC 621.753.1 : 721.013 [389.63]

© BIS 1990

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard (Part 1) (First Revision) was adopted by the Bureau of Indian Standards on 25 April 1990 after the draft finalized by the Planning Bye-Laws and Dimensional Co-ordination Sectional Committee had been approved by the Civil Engineering Division Council.

One of the aims of modular co-ordination is to provide compatibility and inter-changeability of components. In earlier days a practical system of tolerance was derived as clearance fit, prescribing minus tolerance on each component without any allowance to the space in which it is to be placed. The extensive use of prefabricated elements and components in building construction have provoked the concept of tolerances in recent years. The concept of tolerance is indeed a tool to be used for dimensional control of the component which can fit without any problem for size, squareness, bow, plumbness, posit on and appearance. In order to ensure clarity and unambiguous expression in tolerance principles, it is necessary to adopt the internationally agreed glossary of terms. This standard, therefore, has been prepared giving the definitions of these terms which are specially used in relation to principles and applications of tolerances.

This standard was originally published as IS 6408 : 1971 'Recommendations for modular co-ordination: Application of tolerances in building industry'. In the usage of this standard, a need was felt to cover the terminology in a comprehensive manner in addition to effecting the other technical changes deemed necessary on the basis of the experience gained over the years. As a result the standard is being bifurcated into two parts as follows:

- Part 1 Glossary of terms, and
- Part 2 Principles and applications.

This, the first part provides a glossary of terms applicable to principles and applications of tolerances for modular co-ordination in building industry. The definitions of general terms relating to modular co-ordination are covered in IS 4993 : 1983 'Glossary of terms relating to modular co-ordination (second revision)'.

In the preparation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. This has been met by deriving assistance from the following documents:

- a) Industrialised building and modular design. Henrik Nissen. Cement and Concrete Association, London 1972
- b) The principles of modular co-ordination in building (revised) CIB W24. The International Modular Group 1982.
- c) Modular co-ordination of low cost housing. United Nations Publication. 1972.
- d) Dimensional co-ordination for building. DC 12. HMSO Publication 1972.
- e) PCI Committee report on tolerances for precast and prestressed concrete. PCI Journal. Vol 30, No. 1, Jan/Feb 1985
- f) DS/R 1050-1982 Application of dimensional tolerances in building. Dansk Standardiseringsraad.
- g) ISO 4464-1980 Tolerances for building — Relationship between the different types of deviations and tolerances used for specification. International Organization for Standardization.

Indian Standard

RECOMMENDATIONS FOR MODULAR CO-ORDINATION IN BUILDING INDUSTRY : TOLERANCES

PART 1 GLOSSARY OF TERMS*(First Revision)***1 SCOPE**

1.1 This standard (Part 1) defines the terms used in the principles and applications of tolerances used in the study, planning, design and construction of buildings carried out in accordance with the principles of modular co-ordination.

2 TERMINOLOGY (See Also FIG. 1)**2.1 Actual Dimensions**

The measured dimensions of the elements or components after casting or fabrication. This dimension may differ from the working dimensions due to construction and material induced variation. This is also known as actual measurement.

2.2 Alignment Face

The face of precast element which is to be set in alignment with the face of adjacent elements or features.

2.3 Average Joint Width

The difference between the work size and modular size.

2.4 Basic Dimension

The dimension shown on the contract drawing or called for the specifications. The basic dimension shall apply to size, location and relative location. This shall also be called the normal or 'nominal' dimension.

2.5 Basic Line

An imaginary line with reference to which the actual location of component at site is determined.

2.6 Component Reference Plane

The alignment of component reference point, line or plane with the joint reference plane.

2.7 Deviation of Form

The difference between actual form and the corresponding basic form.

2.8 Feature Tolerance

The location or dimensional tolerance of feature, such as a corbel or a blockout with respect to the overall member dimensions.

2.9 Grid Reference Lines

These represent the co-ordinating planes between modular components.

2.10 Joint

Space between the adjacent component, irrespective use of jointing material, for filling up space.

2.11 Joint Reference Plane

The position of the joint represented co-ordinating reference plane.

2.12 Jointing Component Size

The dimension which ensures shape, size and position of the linkage components such that all joint widths from maximum to minimum are acceptable when the jointing components are in position.

2.13 Joint Width

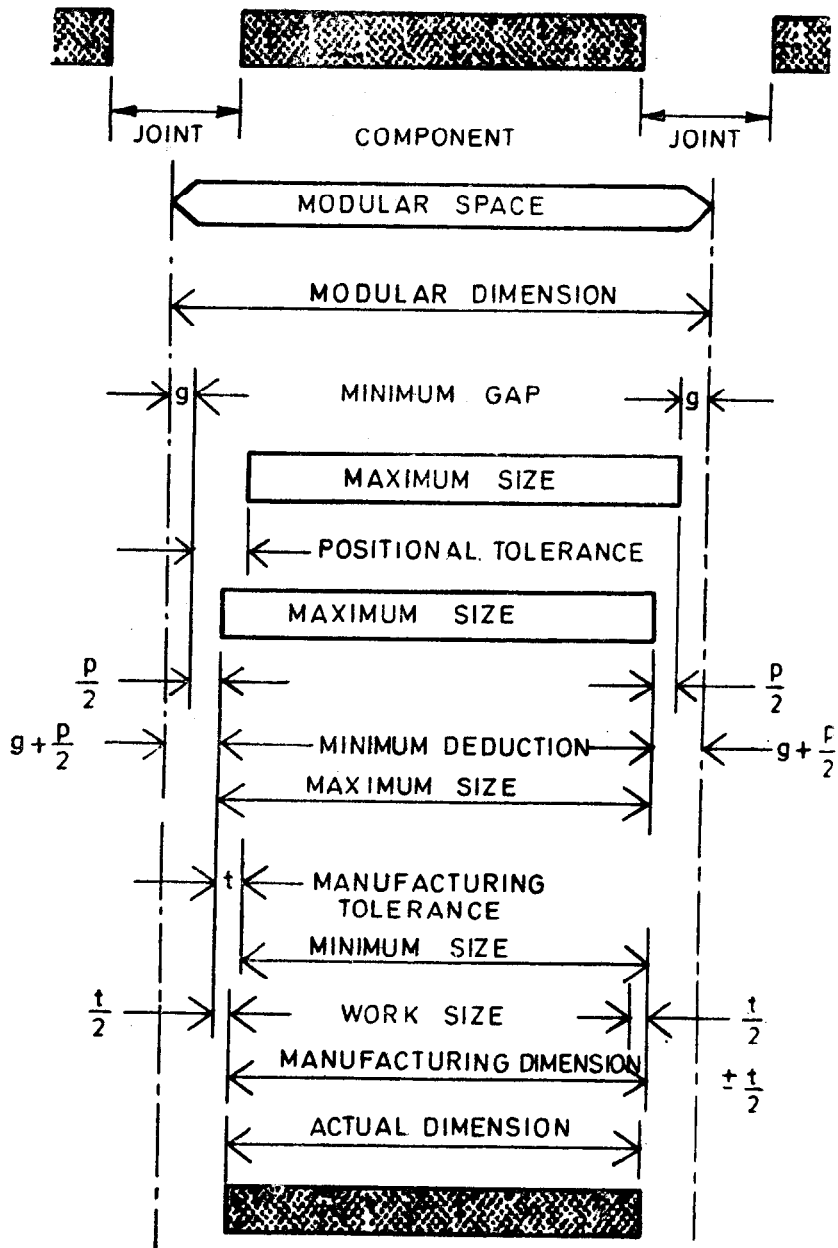
The maximum and minimum limits of joint dimension in width.

2.14 Linear Deviation

The difference between an actual line measurement and the corresponding basic size.

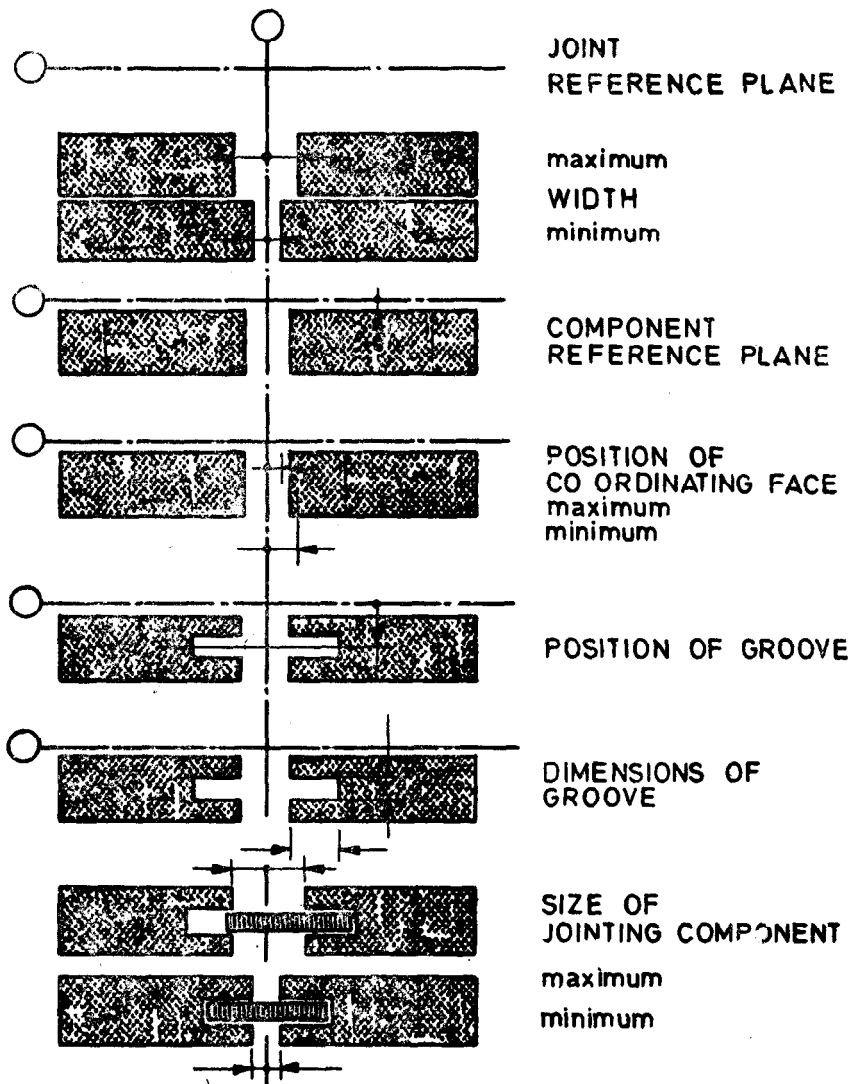
2.15 Maximum Joint Width

The largest size specified to take account of the minimum component size.



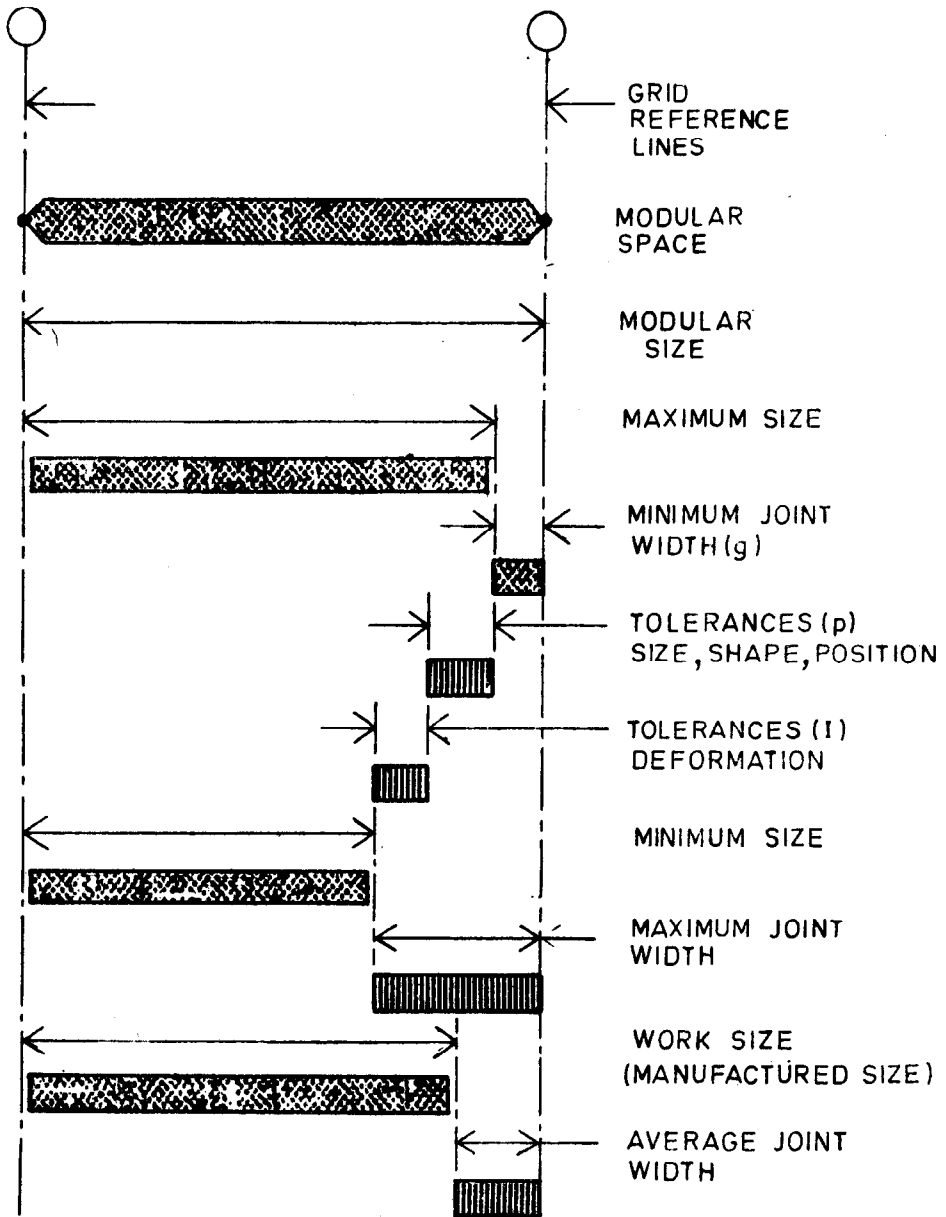
1A Terms Relating to Size and Dimension

FIG. 1 TERMS RELATING TO TOLERANCES IN MODULAR CO-ORDINATION — *Contd*



1B Terms Relating to Joint

FIG. 1 TERMS RELATING TO TOLERANCES IN MODULAR CO-ORDINATION — *Contd*



1C. Terms Relating to Tolerances with Respect to Sizes and Dimensions

FIG. 1 TERMS RELATING TO TOLERANCES IN MODULAR CO-ORDINATION

2.16 Minimum Joint Width

The minimum size specified to take account of the maximum size of component.

2.17 Minimum Gap

The minimum distance between the co-ordinating face of a component and a modular plane, it is equal to half the minimum joint thickness.

2.18 Modular Size

The basic size of the component which is the same size as the modular space.

2.19 Modular Space

The basic space allocated to a component and sized in accordance with the rules of modular co-ordination.

2.20 Part Tolerance

Tolerance applicable to part dimension of an element or component.

2.21 Position of Co-ordinating Face

The space for the co-ordinating face of a component to lie between the maximum and minimum gap.

2.22 Position of Groove

The position of the groove in the co-ordinating face of a component.

2.23 Positional Variation

The distance between the basic line, point or plane and a reference line, point or plane on the component.

2.24 Primary Control Surface

A surface on a precast element, the dimensional location of which is specifically set and controlled in the erection process. Clearance is generally allowed to vary so that the primary control surface can be set within tolerance.

2.25 Secondary Control Surface

A surface on a precast element, the dimensional location of which is dependent on the location tolerance of the member primary control surfaces in addition to the member feature tolerances.

Example

The elevation of a second storey corbel on a multistoreyed column whose first storey corbel is selected as the primary elevational control surface.

2.26 Shape of Groove

The shape and size of groove in the co-ordinating face of a component.

2.27 Sum Tolerance (Total Tolerance)

Tolerance applicable to the sum (total) dimension of elements or components.

2.28 Tolerance

The definition shall include the following:

- a) The permitted variation from a basic dimension or quantity as in the length or width of a member.
- b) The range of variation permitted in maintaining a basic dimension as in an alignment tolerance.
- c) A permitted variation from location or alignment.
- d) The difference between the permissible limits of size or between the permissible limits of position.

2.29 Tolerance 'T'

Tolerance for deformation, thermal movement, etc. and these are combined algebraically.

2.30 Tolerance 'P'

Tolerance allocated for size, shape and position and these are combined statistically.

2.31 Manufacturing Tolerance

An allowance for the lack of accuracy permitted for the production of a component.

2.32 Variation

The difference between the actual and the basic dimension. Variation may be either negative (lesser) or positive (greater).

2.33 Working Dimension

The planned dimension of the member obtained from both its basic dimension and joint or clearance dimensions. It is to this planned dimension that the product tolerance is applied.

Example

If a nominal 2 400 mm wide component is designed to have nominal 20 mm joint width on either side, the working dimension for component would be 2 380 mm.

2.34 Work Size

The definition shall include:

- a) A size which is specified for the manufactured component. This shall also be called a manufacturing size.

- b) The size given with its permissible deviations, specified for manufacturing a component the actual size of which would be within these deviations under reference condition.

2.35 Construction Tolerance

The width of the space on the site, related to reference points or lines, within the limits of which a point, a line or a surface of a component shall be situated.

NOTE — Manufacturing tolerance, setting-out tolerance and erection tolerance together shall comprise the construction tolerance. Construction tolerances are determined by the requirements of the construction for satisfactory performance.

2.36 Manufacturing Tolerance

The width of the space related to the reference form, within the limits of which a point, a line or a surface of a component shall be situated after manufacture.

NOTE — Dimensional tolerance, orientation tolerance and form tolerance together shall comprise the manufacturing tolerance. The latter is not related to any reference object on the site.

2.37 Setting Out Tolerance

The width of the space on the site within the limits of which a setting-out point or line shall be situated.

NOTE — The positional and orientation tolerance for setting out together shall compose the setting-out tolerance.

2.38 Erection Tolerance

The width of the space on the site, related to the actual form of a component and the actual

position for reference points or lines, within the limits of which a point, a line or a surface of a component shall be situated.

NOTE — For each component there shall be a reference position determined by reference points or lines set-out on the site and by the actual form of the component. This position also gives the reference position for each point, line or surface of the component. From these positions, the erection tolerance determines the width of the space within the limits of which a given point, line or surface of the component shall be situated. The positional and orientation tolerances for erection together shall compose the erection tolerance

2.39 Dimensional Tolerances

The tolerance width governing the size of a dimension in a given direction of the component concerned; that is length, width, thickness, height, depth or diameter.

2.40 Orientation Tolerance (Angularity Manufacture)

The tolerance width governing the relative orientation of straight lines or planes of a component.

2.41 Form Tolerance

The tolerance width governing the form of a line or a surface (such as of a component) relative to a reference form.

2.42 Positional Tolerance

The tolerance width governing the position of a point, a line, a plane or a surface relative to a reference position.

2.43 Orientation Tolerance (Erection Setting-out)

The tolerance width after setting-out or erection, governing the orientation of a straight line or plane surface relative to a reference orientation.

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Revision of Indian Standards

Indian Standards are reviewed periodically and revised, when necessary and amendments, if any, are issued from time to time. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No. CED 10 (4296)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices :

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

Telephone

{ 331 01 31
{ 331 13 75

Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola
CALCUTTA 700054

37 86 62

Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036

2 18 43

Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113

41 29 16

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
BOMBAY 400093

6 32 92 95

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE.
FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR.
PATNA. THIRUVANANTHAPURAM