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व्यापक परिचालन मसौदा

हमारा संदर्भ: सीईडी 51/टी-13 **19 जून 2024**

तकनीकी समिति: योजना एवं हाउसिंग विषय समिति, सीईडी 51

प्राप्तकर्ता:

1. **सिविल अभियांत्रिकी विभाग परिषद, सीईडीसी के सभी सदस्य**
2. **योजना एवं हाउसिंग विषय समिति, सीईडी 51 के सभी सदस्य**
3. **रुचि रखने वाले अन्य निकाय।**

महोदय/महोदया,

निम्नलिखित मानक का मसौदा संलग्न हैं:

प्रलेख संख्या	शीर्षक
सीईडी 51(25907)WC	**भवन निर्माण उद्योग में मॉड्यूलर कोआर्डिनेशन के लिए रेकमेन्डेशन: सहनशीलता: भाग 1 शब्दों की शब्दावली** (आई एस 6408: पार्ट - 1 का दूसरा पुनरीक्षण) (आई सी एस नंबर: 91.010.30)

कृपया इस मसौदे का अवलोकन करें और अपनी सम्मतियाँ यह बताते हुए भेजे कि यह मसौदा प्रकाशित हो तो इस पर अमल करने में आपको व्यवसाय अथवा कारोबार में क्या कठिनाइयां आ सकती हैं।

सम्मतियाँ भेजने की अंतिम तिथि: 20 जुलाई 2024

सम्मति यदि कोई हो तो कृपया अधोहस्ताक्षरी को ई-मेल द्वारा ced51@bis.gov.in पर या उपरलिखित पते पर, संलग्न फोर्मेट में भेजें। सम्मतियाँ बीआईएस ई-गवर्नेंस पोर्टल, www.manakonline.in के माध्यम से ऑनलाइन भी भेजी जा सकती हैं।

यदि कोई सम्मति प्राप्त नहीं होती है अथवा सम्मति में केवल भाषा संबंधी त्रुटि हुई तो उपरोक्त प्रलेख को यथावत अंतिम रूप दे दिया जाएगा। यदि सम्मति तकनीकी प्रकृति की हुई तो विषय समिति के अध्यक्ष के परामर्श से अथवा उनकी इच्छा पर आगे की कार्यवाही के लिए विषय समिति को भेजे जाने के बाद प्रलेख को अंतिम रूप दे दिया जाएगा।

यह प्रलेख भारतीय मानक ब्यूरो की वैबसाइट www.bis.gov.in पर भी उपलब्ध हैं।
धन्यवाद।

भवदीय
ह/-
द्वैपायन भद्र
वैज्ञानिक 'ई' एवं प्रमुख
सिविल अभियांत्रिकी विभाग

सलंग्न: ऊपरलिखित

भारतीय मानक ब्यूरो
(उपभोक्ता मामले, खाद्य एवं सार्वजनिक वितरण मंत्रालय, भारत सरकार)
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मानकः पथप्रदर्शकः

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WIDE CIRCULATION DRAFT

Our Reference: CED 51/T-13 **19 June 2024**

Planning and Housing Sectional Committee, CED 51

ADDRESSED TO:

1. All Members of Civil Engineering Division Council, CEDC
2. All Members of the Planning and Housing Sectional Committee, CED 51
3. All others interested

Dear Sir/Madam,

Please find enclosed the following draft:

Doc No.	Title
CED 51(25907)WC	**Recommendations for modular co-ordination in building industry: Tolerances: Part 1 Glossary of terms** *[Second Revision of IS 6408 (Part 1)]* (ICS No. 91.010.30)

Kindly examine the attached draft and forward your views stating any difficulties which you are likely to experience in your business or profession, if this is finally adopted as National Standard.

Last Date for comments: 20 July 2024

Comments if any, may please be made in the enclosed format and emailed at ced51@bis.gov.in or sent at the above address. Additionally, comments may be sent online through the BIS e-governance portal, www.manakonline.in.

In case no comments are received or comments received are of editorial nature, kindly permit us to presume your approval for the above document as finalized. However, in case comments, technical in nature are received, then it may be finalized either in consultation with the Chairman, Sectional Committee or referred to the Sectional Committee for further necessary action if so desired by the Chairman, Sectional Committee.

The document is also hosted on BIS website www.bis.gov.in.

Thanking you,

Yours faithfully,
Sd/-

(Dwaipayan Bhadra)
Scientist 'E' / Director & Head
(Civil Engineering Department)

Encl: As above

FORMAT FOR SENDING COMMENTS ON THE DOCUMENT

[Please use A4 size sheet of paper only and type within fields indicated. Comments on each clause/sub-clause/ table/figure, etc, be stated on a fresh row. Information/comments should include reasons for comments, technical references and suggestions for modified wordings of the clause. **Comments through e-mail to ced51@bis.gov.in shall be appreciated**.

Doc. No.: CED 51(25907)WC **BIS Letter Ref**: CED 51/T-13

Title: Recommendations for modular co-ordination in building industry: Tolerances: Part 1 Glossary of terms [Second Revision of IS 6408 (Part 1)] (ICS No. 91.010.30)

Last date of comments: **20 July 2024**

Name of the Commentator/ Organization: _____

Clause/ Para/ Table/ Figure No. commented	Comments/Modified Wordings	Justification of Proposed Change

NOTE- Kindly insert more rows as necessary for each clause/table, etc

BUREAU OF INDIAN STANDARDS

DRAFT FOR COMMENTS ONLY

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Draft Indian Standard

RECOMMENDATIONS FOR MODULAR CO-ORDINATION IN BUILDING INDUSTRY: TOLERANCES: PART 1 GLOSSARY OF TERMS

[*Second Revision of IS 6408 (Part 1)*]

(ICS NO. 91.010.30)

Planning and Housing Sectional Committee, CED 51	**Last Date for Comments: 20 July 2024**

FOREWORD

(Formal Clauses to be added later)

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 uses 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, plumpness, 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 and further revised in 1990 to divide into two parts as follows:

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

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.

This revision is brought out as the Committee responsible for this standard felt the need to cover the terminology in a comprehensive manner and add further definitions on the basis of experience gained over the years and also to bring it in line with the National Building Code of India 2016 (SP 7 : 2016). In this revision, besides the modification of the existing definitions, a number of new terms have also been included with a view to bringing about uniformity in the expression of various

terms applicable to modular coordination. In the formulation of this standard due weightage has been given to international co-ordination among standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

The composition of the Committee responsible for formulation of this standard is given at Annex A.

This standard contributes to the following United Nations Sustainable Development Goal: Goal 9 ‘Industry, Innovation and Infrastructure’ towards building resilient infrastructure; promote inclusive and sustainable industrialization and faster innovation; and Goal 11 ‘Sustainable Cities and Communities’ towards making cities and human settlements inclusive, safe, resilient and sustainable.

DRAFT FOR COMMENTS ONLY

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Draft Indian Standard

RECOMMENDATIONS FOR MODULAR CO-ORDINATION IN BUILDING INDUSTRY: TOLERANCES: PART 1 GLOSSARY OF TERMS

[Second Revision of IS 6408 (Part 1)]

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 TERMINOLOGIES

For the purpose of this standard, the following definitions shall apply (*see* Fig. 1).

2.1 Actual Dimensions/ Actual Size — 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 Angular Deviation — Difference between an actual angle and the corresponding target angle.

NOTES —

1. Deviations can be expressed in gons, degrees, or as perpendicular offsets over a given length.
2. A special case of angular deviation is the deviation of a direction, where a straight line is given and where its direction is the angle between this actual line and a given reference line; such as the meridian, the X-axis or N-axis, the horizontal or the vertical (plumb line).

2.4 Average Joint Width — The difference between the work size and modular size.

2.5 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/ nominal/ target dimension.

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

2.7 Component Reference Plane — The alignment of component reference point, line or plane with the joint reference plane.

2.8 Constructions 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.

2.9 Deviation — The difference between actual size and the corresponding basic size.

NOTE — In some cases there is a need to distinguish deviations caused by physical circumstances, such as temperature, shrinkage, creep or load (inherent deviations), and those due to variability in manufacturing, setting out or erection (induced deviations).

2.10 Dimension — Extent in a given direction or along a given line, or a given angle.

NOTE — Extent in this context is unquantified.

2.11 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.

2.12 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.

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

2.14 Flatness deviation of a surface — Plot of the differences between the actual positions of a set of specified points on a surface and those on the corresponding flat surface.

NOTE — Flatness deviation is usually determined along straight lines of specified lengths, placed in specified positions or at random.

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

2.16 Grid Reference Lines — These represent the co-ordination planes between modular components.

2.17 Horizontality Deviation — Vertical difference between a specified point on a line or plane intended to be horizontal and the corresponding target point on a horizontal reference line or plane.

2.18 Joint — Space between the adjacent components, irrespective use of jointing material, for filling up space.

2.19 Joint Reference Plane — The position of the joint represented co-ordinating reference plane.

2.20 Joint Alignment Deviation — Difference in relative level or position at the joint of adjacent components intended to be coincident.

2.21 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.

2.22 Joint Width — The maximum and minimum limits of joint dimension in width.

2.23 Length Deviation — Difference between an actual length and the corresponding target length.

2.24 Linear Deviation — The difference between an actual line measurement and the corresponding basic size.

2.25 Lower Permitted Deviation — Difference between the lower limit of size and the corresponding target size.

2.26 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.

2.27 Maximum Joint Width — The largest size specified to take account of the minimum component size.

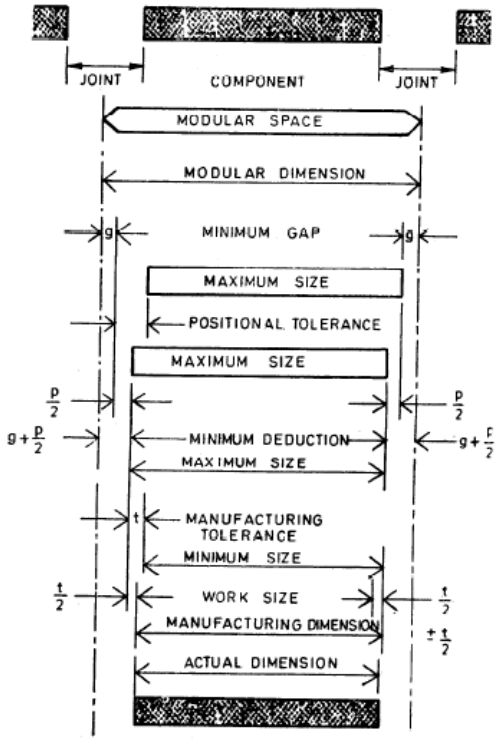
2.28 Minimum Joint Width — The minimum size specified to take account of the maximum size of component.

2.29 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.

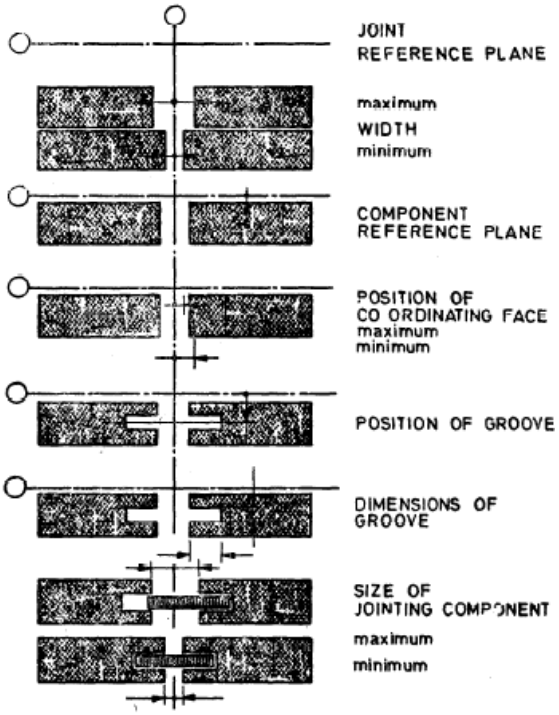
2.30 Modular Size — The basic size of the component which is the same size as the modular space.

2.31 Modular Space — The basic space allocated to a component and sized in accordance with the rules of modular coordination.

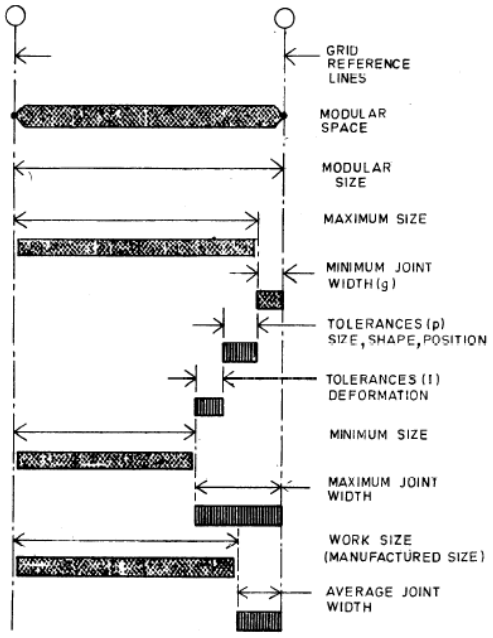
2.32 Manufacturing Tolerance — An allowance for the lack of accuracy, permitted for the production of a component.



1A Terms Relation to Size Dimension



1B Terms Relation to Joint



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

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

2.33 Orientation Tolerance (Angularity Manufacture) — The tolerance width governing the relative orientation of straight lines or planes of a component.

2.34 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.

2.35 Part Tolerance — Tolerance applicable to part dimension of an element or component.

2.36 Position of Co-ordination Face — The space for the co-ordination face of a component to Lie between the maximum and minimum gap.

2.37 Position of Groove — The position of the groove in the co-ordinating face of a component.

2.38 Position Deviation of a Point — Difference between the actual position of a point and the corresponding target position in relation to a specified datum.

NOTE — Position deviations are generally measured separately in both the horizontal plane and the vertical plane.

2.39 Position Deviation of a Line — Difference in the actual position of specified points on a line and the corresponding target position points in relation to a specified datum.

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

2.41 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.

2.42 Profile Deviation of a Line — Plot of the differences between the actual positions of a set of specified points on a line and those on the corresponding target line.

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

2.44 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.

2.45 Shape Deviation — Difference between the actual shape of a body and the corresponding target shape.

NOTE — The actual shape of the body should lie between two envelopes representing the smallest and largest permitted bodies.

2.46 Shape deviation of a surface — Plot of the differences between the actual positions of a set of specified points on a surface and those on the corresponding target surface.

2.47 Shape of Groove — The shape and size of groove in the co-ordinating face of a component.

2.48 Size — Magnitude of a dimension quantified in terms of a defined unit.

2.49 Skewness — Difference between the actual position of a corner point or a point on an edge of a surface and its corresponding target position on the plane through three other corner points or points on the edge of that surface.

2.50 Straightness Deviation of a Line — Plot of the differences between the actual positions of a set of specified points on a line and those on a straight line between two given points on that line.

2.51 Sum Tolerance (Total Tolerance) — Tolerance applicable to the sum (total) dimension of elements or components.

2.52 Target Size — A reference size used in design and in practice in order to indicate the size desired and to which the deviations, which would ideally be zero, are to be related.

NOTES

1. The term "work size" is a target size used in production to achieve the target specified size on the project drawing, and takes into account systematic deviations which can arise due to the production processes used and/or inherent deviations of the materials used.
2. If it is not necessary to specify a target size; any size can be taken as a reference size to which to relate the deviations.

2.53 Target Angle — A reference angle used in design and in practice in order to indicate the angle desired and to which the deviations, which would ideally be zero, are to be related.

2.54 Tolerance — The definition shall include the following:

a) The permitted variation from a target dimension or quantity as in the length or width of a member.
b) The range of variation permitted in maintaining a target 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.

NOTES

1. Tolerance is an absolute value without sign.
2. In building construction, tolerance is commonly expressed by "± permitted deviation" so that the value of the tolerance is implicit (*see* Fig 3).
3. An example of the relationship between the key basic terms is given in Fig 3.

2.55 Tolerance 'T' — Tolerance for deformation, thermal movement, etc. and these are combined algebraically.

2.56 Tolerance 'P' — Tolerance allocated for size, shape-and position and these are combined statistically.

2.57 Upper Permitted Deviation — Difference between the upper limit of size and the corresponding target size.

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

2.59 Verticality Deviation — Horizontal difference between a specified point on a line or plane intended to be vertical and the corresponding target point on a vertical reference line or plane.

2.60 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. For 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.

2.61 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.

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ANNEX A

(Committee Composition will be added after finalization)

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