



भारतीय मानक ब्यूरो

(उपभोक्ता मामले, खाद्य एवं सार्वजनिक वितरण मंत्रालय, भारत सरकार)

BUREAU OF INDIAN STANDARDS

(Ministry of Consumer Affairs, Food & Public Distribution, Govt. of India)

मानक भवन, 9, बहादुर शाह ज़फ़र मार्ग, नई दिल्ली - 110002
Manak Bhawan, 9, Bahadur Shah Zafar Marg, New Delhi - 110002

Phones: 23230131 / 2323375 / 23239402

Website: www.bis.org.in , www.bis.gov.in

व्यापक परिचालन मसौदा

हमारा संदर्भ : सीईडी 44/टी-25

06 जनवरी 2025

तकनीकी समिति: सिविल इंजीनियरिंग के कार्यों के मापन की पद्धतियाँ

(जल संसाधन विकास को छोड़कर) विषय समिति, सीईडी - 44

प्राप्तकर्ता :

1. सिविल इंजीनियरी विभाग परिषद, सीईडीसी के सभी सदस्य
2. सीईडी 44 के सभी सदसी
3. रूचि रखने वाले अन्य निकाय

य महोदय/महोदया,

निम्नलिखित भारतीय मानक का मसौदा संलग्न है:

प्रलेख संख्या	शीर्षक
सीईडी 44 (26855)WC	भवन की माप की विधि एवं सिविल इंजीनियरिंग कार्य भाग 25 सुरंग- निर्माण [IS 1200 (भाग 22) का पहला पुनरीक्षण] ICS 17.020; 91.040.01; 93.010

कृपया इस मानक के मसौदे का अवलोकन करें और अपनी सम्मतियाँ यह बताते हुए भेजे कि यदि यह मानक के रूप में प्रकाशित हो तो इस पर अमल करने में आपके व्यवसाय अथवा कारोबार में क्या कठिनाइयाँ आ सकती हैं।

सम्मतियाँ भेजने की अंतिम तिथि: 06/02/2025

टिप्पणियाँ, यदि कोई हों, बीआईएस ई-गवर्नेंस पोर्टल

https://www.services.bis.gov.in/php/BIS_2.0/dgdashboard/draft/darftdetail/63/3/CED के माध्यम से ऑनलाइन भेजी जा सकती हैं।

वैकल्पिक रूप से, टिप्पणियाँ संलग्न प्रारूप में भी दर्ज की जा सकती हैं और ced44@bis.gov.in या divya.s@bis.gov.in पर ईमेल की जा सकती हैं।

आपको अपनी टिप्पणियाँ प्रस्तुत करने के लिए लॉगिन करना पड़ सकता है, कृपया लॉगिन बनाएं।

यदि कोई सम्मति प्राप्त नहीं होती है अथवा सम्मति में केवल भाषा सम्बन्धी त्रुटि हुई तो उपरोक्त प्रलेख को यथावत अंतिम रूप दिया जाएगा। यदि सम्मित तकनीकी प्रकृति की हुई 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 वेबसाइट www.bis.gov.in पर भी उपलब्ध है।

धन्यवाद।

भवदीय

ह/-

(दिव्या एस.)

सदस्य सचिव सीईडी 44
वैज्ञानिक 'डी'(सिविल इंजीनियरिंग)
ई-मेल: divya.s@bis.gov.in

संलग्न: उपरलिखित

**भारतीय मानक ब्यूरो**

(उपभोक्ता मामले, खाद्य एवं सार्वजनिक वितरण मंत्रालय, भारत सरकार)

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Website: www.bis.org.in , www.bis.gov.in**WIDE CIRCULATION DRAFT**

Our Reference: CED 44/T-25

06 January 2025

**Technical Committee: Method of Measurement of Works of Civil Engineering
(Excluding Water Resources Development) Sectional Committee, CED 44,****Addressed To:**

- All Members of Civil Engineering Division Council, CEDC
- All Members of CED 44
- All others interested

Dear Sir/Madam,

Please find enclosed the following document:

Doc No.	Title
CED 44 (26855) WC	Method of Measurement of Building and Civil Engineering Works Part 25 Tunnelling [(Third Revision) of IS 1200 (Part 25)] ICS 17.020; 91.040.01; 93.010

Kindly examine the draft standard 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: 06 February 2025

Comments if any, may be sent online through the BIS e-governance portal at https://www.services.bis.gov.in/php/BIS_2.0/dgdashboard/draft/darftdetail/63/3/CED.

Alternatively, comments may also be recorded in the enclosed format and emailed at ced44@bis.gov.in or at divya.s@bis.gov.in.

You may be required to login to submit your comments, kindly create a login.

In case no comments are received or comments received are of editorial nature, you will kindly permit us to presume your approval for the above document as finalized. However, in case of comments of 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,

Sd/-

(Divya S.)

Member Secretary CED 44
Scientist 'D' (Civil Engineering)E-mail: divya.s@bis.gov.in

Encl: As above

FORMAT FOR SENDING COMMENTS ON THE DOCUMENT

(Please use A-4 size sheet of paper only and type within fields indicated. Comments on each clause/sub-clause/table/fig etc. be started on a fresh box. Information in column 3 should include reasons for the comments and suggestions for modified working of the clauses when the existing text is found not acceptable. Adherence to this format facilitates Secretariat's work) {Please e-mail your comments to divya.s@bis.gov.in

Doc. No.: CED 44(26855) WC **BIS Letter Ref:** CED 44/T-25

Title: Wide Circulation Draft of Method of Measurement of Building and Civil Engineering Works Part 25 Tunnelling [(*Third Revision*) of IS 1200 (Part 25)]

Last date of comments: **06 February 2025**

Name of the Commentator/ Organization: _____

SI No.	Clause/ Para/ Table/ Figure No. commented	Comments/ Modified Wordings	Justification of Proposed Change
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NOTE- Kindly insert more rows as necessary for each clause/table, etc

BUREAU OF INDIAN STANDARDS**DRAFT FOR COMMENTS ONLY**

(Not to be reproduced without the permission of BIS or used as an Indian Standard)

Draft Indian Standard

**METHOD OF MEASUREMENT OF BUILDING
AND CIVIL ENGINEERING WORKS
PART 25 TUNNELING**

(Third Revision of IS 1200 Part 25)

ICS 17.020; 91.040.01; 93.010

Method of Measurement of Works of Civil Engineering
(Excluding Water Resources Development) Sectional
Committee, CED 44

Last date of comments

06 February 2025

FOREWORD

(formal clauses will be added later)

Measurement occupies a very important place in the planning and execution of any civil engineering work from the time of first estimates to the final completion and settlement of payments for a project. Methods followed for measurement are not uniform and considerable differences exist between practices followed by different construction agencies and also between various Central and State Government Departments, While it is recognized that each system of measurement has to be specifically related to administrative and financial organizations within a department responsible for the work, a unification of various systems at technical level has been accepted as very desirable specially as it permits a wider range of operation for civil engineering contractors and eliminates ambiguities and misunderstandings of various systems followed.

Since various trades are not related to one another, the Sectional Committee decided that each type of trade as given in IS 1200:1964 'Method of measurement of building works (*first revision*)' be issued separately as different parts which will be helpful to specific users in various trades. This standard having provisions relating to tunnelling work was first published in 1958, revised in 1964 and in 1971.

This third revision of the standard has been brought out to incorporate the changes found necessary in light of usage of this standard and suggestions made by various implementing bodies. The significant modifications in this revision are:

- a) The provision to measure work done in highway/railway tunnels and using tunnel boring machines, separately have been included in the standard.
- b) Further provisions regarding the use of tunnel boring machines, and calculation of rates have been specified.

For standards on method of measurement of river valley projects, the Indian Standards formulated by the Measurement and Cost Analysis of Works for River Valley Projects Sectional Committee, WRD 23 under the Water Resources Division Council of BIS may be referred.

This standard contributes to the Sustainable Development Goal 9 'Build resilient infrastructure, promote sustainable industrialization and foster innovation'.

In the course of usage of this standard by various construction agencies in the country, several clarifications and suggestions for modifications were received and as a result of study, the technical committee responsible for this standard decided that its scope beside being applicable to buildings should be expanded to cover method of measurement for civil engineering works like industrial and river valley projects.

Wherever necessary, more information than is demanded by adherence to this standard may be given, provided the principles of measurements laid down in this standard are observed and it is in the interest of accuracy and practical estimating to do so.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a measurement shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (second revision)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Draft Indian Standard

**METHODS OF MEASUREMENT OF BUILDING AND
CIVIL ENGINEERING WORKS
PART 25 TUNNELLING**

[Third Revision IS 1200 (PART 25)]

1 SCOPE

This standard (Part 25) covers the method of measurement of tunnelling.

2 REFERENCE

The standards listed below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
IS 1200	Methods of measurement of building and civil engineering works
Part 1 : 1992	Part 1 earthwork
Part 2 : 1974	Part 2 concrete works
Part 11 : 2024	Part 11 paving, floor finishes, dado and skirting (<i>Fifth Revision</i>)
IS 4880 (Part 2) : 1976	Code of practice for design of tunnels conveying water: Part 2 geometric design (<i>First Revision</i>)

2 GENERAL RULES

2.1 Bills of Quantities – The bills of quantities shall fully describe the materials and workmanship, and accurately represent the work to be executed.

2.2 Booking of Dimensions – In booking dimensions, the order shall be consistent and generally in the sequence of length, width and height or depth or thickness.

2.3 Clubbing of Items – Items may be clubbed together and that the break-up of the clubbed items is agreed to be on the basis of the detailed description of the items stated in this standard.

2.4 Measurements – All work shall be measured net in decimal system as fixed in its place as given below

- Linear dimensions shall be measured to the nearest 0.01 metre,
- Areas shall be worked out to the nearest 0.01 square metre,
- Cubic contents shall be worked to the nearest 0.01 cubic metre, and
- The weight shall be measured to the nearest 0.1 kilogram.

2.5 Work to be Measured Separately – Work executed in the following conditions shall be measured separately:

- a) Work in or under water, and
- b) Work in compressed air.
- c) Highway / Railway Tunnels.
- d) Tunnel Boring Machines.

2.5.1 Where springs are likely to be encountered the work shall be measured against a separate specific provision made for the purpose (see **2.5**).

2.6 Pumping where resorted to including bore well/well point dewatering shall each be measured separately for all stages of pumping, including intermediate stages unless otherwise stated, in kW hours or hp hours. Whenever pneumatic pumping is resorted to, it shall be measured in rated capacity of the compressor, in cubic metre of air delivered per hour.

3 METHOD OF MEASUREMENT OF EXCAVATION

3.1 The item of tunnel excavation may be classified as follows:

- a) Excavation in tunnel in hard rock not requiring supports.
- b) Excavation in tunnel in all classes of soil, soft and hard rock [see IS 1200 (Part 1)] requiring temporary or permanent supports during excavation.

NOTE — Supports shall be measured separately (see **4**).

3.2 The description of item shall unless otherwise stated to be held to include drilling, blasting, ventilation, lighting, scaling and hauling of excavated material and depositing in the area earmarked and finally clearing the surface.

3.3 The quantity of excavation shall be measured in -cubic metres and shall be the volume of the tunnel measured in solid contained within hypothetical line as decided by engineer-in-charge (also known as 'B' line or pay line) irrespective of whether or not the actual excavation falls within or beyond the said line, subject to excavation up to the minimum excavation line ('A' line), 'A' line and 'B' line shall be as defined in IS 4880 (Part 2).

3.3.1 In case as determined by the engineer-in-charge the minimum excavation line is increased necessitating enlargement of the already excavated tunnel, separate measurement of the quantity of the excavation shall be made. The measurement shall be between the original 'B' line and the revised 'B' line that is established.

3.4 The layers of soft or disintegrated rock bedded with hard rocks or seams or faults required to be excavated beyond the pay line being removed by hand or pneumatic or other implements without requiring continuous and systematic blasting, shall be measured separately.

3.5 Cement consumed at the point of mixing for guniting/ shotcreting required for protection of weak rock shall be measured separately on weight basis.

3.6 While using Tunnel Boring Machines, length of the finished diameter of the tunnel inclusive of lining if specified is measured in metres.

4 METHOD OF MEASUREMENT OF SUPPORTS

4.1 Permanent Supports - The item of permanent supports shall consist of furnishing and installing the supports, complete with all bolts, nuts, butt plates, feather plates, dowels, wedges, tie rods, spikes, drift pins, temporary timber spreaders and concrete pedestals if any, logging, blocking and back packing with excavated material. All structural steel including riveted and welded, and nuts and bolts shall be measured in kilograms

4.2 Temporary Supports – The item of temporary supports, when erected, shall include furnishing, installing, maintenance and removing temporary supports including other connected materials, labour and equipment. The measurement of the temporary support shall be done on the basis of area supported by such support (peripheral length multiplied by linear dimension of tunnel).

4.3 Grouting behind the supports and concrete lining shall be measured separately in terms of weight of cement consumed stating the material used.

4.4 In case precast concrete blocks as lagging are provided, so as to form the part of concrete lining, the same shall be measured separately [see IS 1200 (Part 2)]. The volume of such blocks shall be deducted from the volume of the concrete lining if these are placed within the 'B' line.

4.5 Space between the 'B' line and precast concrete or structural steel lining filled by concrete shall be measured separately as below on the basis of weight of cement consumed:

- a) Cement concrete placed manually for ledge beams, curbs, etc.
- b) Cement concrete placed with mechanical aids such as pumps, placers, etc.

4.6 Rock bolt shall be measured on weight basis which shall be including wedges, nuts and butt plates.

4.7 Pipes provided for drainage purposes in lining shall be measured separately in running metres

5. CONCRETE LINING

5.1 Measurement for the concrete lining shall be made of the quantity of concrete placed between the formwork or the outside surface of the steel shell when used and the pay line, which shall be 'B' line or pay line adopted for excavation at the place. The item of

concrete lining shall be inclusive of formwork. No deduction shall be made for the volume of the reinforcement, but the volume of permanent steel supports (see 4.2) where provided shall be deducted from the total volume of concrete lining [see also IS 1200 (Part 11)].

5.1.1 The rate of tunnel lining in case of TBM is generally inclusive in the overall rate.

6. PRESSURE GROUTING OVER CONCRETE LINING

6.1 Grouting – Measurement for grouting shall be made on the basis of the weight of cement in the grout actually forced into the holes. Stone dust and/or other additions, if used, shall be measured separately in the loose dry state before mixing and shall be measured by boxes of approved size and design.

6.2 Grout Holes – The length of the grout holes drilled either for pack grouting or pressure grouting through concrete and also rock shall be measured in running metres. Grout holes drilled through plate steel liners shall, however, be measured in numbers separately.

6.3 Grout Pipe and Fittings – Grout pipes and fittings provided for grouting shall be measured in kilograms and the weight of all pipes and fittings shall be derived either by actual weighment or from known weights and lengths.

6.4 Water Pressure Testing – Measurement for water pressure testing shall, where necessary, be made separately for each hole and enumerated.