



भारतीय मानक ब्यूरो BUREAU OF INDIAN STANDARDS

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व्यापक परिचालन मसौदा

हमारा संदर्भ : सीईडी 43/टी-88

17 अक्टूबर 2022

तकनीकी समिति : मृदा एवं नींव इंजीनियरी विषय समिति, सीईडी 43

प्राप्तकर्ता :

- 1 सिविल इंजीनियरी विभाग परिषद, सीईडीसी के सभी सदस्य
- 2 मृदा एवं नींव इंजीनियरी विषय समिति, सीईडी 43 के सभी सदस्य
- 3 रूचि रखने वाले अन्य निकाय।

महोदया/महोदय,

निम्नलिखित मसौदा संलग्न है:

प्रलेख संख्या	शीर्षक
सीईडी 43 (20812)WC	संघट्ट विधि द्वारा मृदा की तरल सीमा के निर्धारण के लिए कासाग्रांडे उपकरण – विशिष्ट का भारतीय मानक मसौदा (IS 9259 का पहला पुनरीक्षण) (ICS No. 93.020; 13.080.20)

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 कठिनाइयाँ आ सकती हैं।

सम्मतियाँ भेजने की अंतिम तिथि: 17 नवंबर 2022

सम्मति यदि कोई हो तो कृपया अधोहस्ताक्षरी को ई मेल द्वारा madhurima@bis.gov.in पर या उपरलिखित पते पर, संलग्न फॉर्मेट में भेजें।

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 वेबसाइट www.bis.gov.in पर भी उपलब्ध हैं।

धन्यवाद।

भवदीय

ह/-

(अरुण कुमार एस.)

वै. 'ई'/निर्देशक और प्रमुख (सिविल इंजीनियरी)

संलग्न: उपरलिखित



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**DRAFT IN
WIDE CIRCULATION**

DOCUMENT DESPATCH ADVICE

Reference	Date
CED 43/T-88	17 October 2022

TECHNICAL COMMITTEE:

SOIL AND FOUNDATION ENGINEERING SECTIONAL COMMITTEE, CED 43

ADDRESSED TO:

1. All Members of Civil Engineering Division Council, CEDC
2. All Members of Soil and Foundation Engineering Sectional Committee, CED 43
3. All other interests

Dear Madam/Sir,

Please find enclosed the following draft:

Doc. No.	Title
CED 43 (20812)WC	Draft Indian Standard Casagrande Apparatus for Determination of Liquid Limit of Soils by Impact Method — Specification (<i>First Revision of IS 9259</i>) (ICS No. 93.020; 13.080.20)

Kindly examine the 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: 17 November 2022

Comments if any, may please be made in the enclosed format and emailed at madhurima@bis.gov.in or sent at the above address.

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 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/-

(Arun Kumar S.)

Sc. 'E'/Director and Head (Civil Engg.)

Encl: As above

BUREAU OF INDIAN STANDARDS

DRAFT FOR COMMENTS ONLY

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

Draft Indian Standard

**CASAGRANDE APPARATUS FOR DETERMINATION OF LIQUID LIMIT OF SOILS
BY IMPACT METHOD — SPECIFICATION**

(First Revision of IS 9259)

Soil and Foundation Engineering
Sectional Committee, CED 43

Last date of Comments:
17 November 2022

Soil and Foundation Engineering Sectional Committee, CED 43

FOREWORD

(Formal clauses will be added later)

There is a series of standards on methods of testing of soils. It has been recognized that reliable and inter-comparable test results can be obtained only with the standard testing equipment capable of giving that desired level of accuracy. With this objective, a series of specifications covering the requirements of equipment used for testing soils have been published to encourage their development and manufacture in the country.

The equipment covered in this standard is used for determination of liquid limit of soils by impact method as covered in IS 2720 (Part 5) : 1985 'Methods of test for soils: Part 5 Determination of liquid and plastic limit (*second revision*)'.

This standard covers the minimum requirements for the apparatus. The apparatus may also be manufactured with a revolution counter to indicate the number of falls of cup automatically and/or a motorized driving arrangement to give approximately 120 rev/min.

This standard was first published in 1980. The present revision has been taken up with a view to incorporating the modifications found necessary as a result of experience gained in the use of this standard. Also, in this revision, the standard has been brought into latest style and format of Indian Standards, and references to Indian Standards, wherever applicable have been updated. The other major modifications incorporated in this revision of the standard are given below:

- a) The title of the standard has been modified from 'Specification for liquid limit apparatus for soils' to 'Casagrande apparatus for determination of liquid limit of soils by impact method — Specification' considering that the apparatus for determination of liquid limit by cone penetration method is separately covered in IS 11196 : XXXX 'Equipment for determination of liquid limit of soils by cone penetration method — Specification (*first revision*)' (*under revision*).

- b) Relevant grade of vulcanized rubber for making base feet and base of the apparatus as per the revised IS 5192 (Part 1) : 1994 'Natural rubber compounds — Specification: Part 1 For moulded products (*second revision*)' has been specified.
- c) BIS certification marking clause has been modified to align with the revised *Bureau of Indian Standards Act, 2016*.

This standard contributes to the Sustainable Development Goal 9 - Industry, Innovation and Infrastructure: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

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 test or analysis, 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.

BUREAU OF INDIAN STANDARDS

DRAFT FOR COMMENTS ONLY

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Draft Indian Standard

**CASAGRANDE APPARATUS FOR DETERMINATION OF LIQUID LIMIT OF SOILS
BY IMPACT METHOD — SPECIFICATION**

(First Revision of IS 9259)

Soil and Foundation Engineering
Sectional Committee, CED 43

Last date of Comments:
17 November 2022

1 SCOPE

This standard covers the requirements of Casagrande apparatus used for the determination of liquid limit of soils by impact method.

2 REFERENCES

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

<i>IS No.</i>	<i>Title</i>
292 : 1983	Specification for leaded brass ingots and casting (<i>second revision</i>)
410 : 1977	Specification for rolled brass plate, strip and foil (<i>third revision</i>)
2102 (Part 1) : 1993	General tolerances: Part 1 Tolerances for linear and angular dimensions without individual tolerance indications (<i>third revision</i>)
3400 (Part 11) : 2021	Methods of test for vulcanized rubbers : Determination of rebound resilience (<i>second revision</i>)
4170 : 1967	Specification for brass rods for general engineering purposes
4413 : 1981	Specification for brass wires for general engineering purposes (<i>first revision</i>)
5192 (Part 1) : 1994	Natural rubber compounds — Specification: Part 1 For moulded products (<i>second revision</i>)

3 DIMENSIONS

The dimensions, with tolerances, of different component parts of Casagrande apparatus, that is, liquid limit device, grooving tool and gauge block shall be as detailed in Fig. 1 to 3. The dimensions against which tolerances are not specifically mentioned shall be taken as nominal dimensions and tolerances thereon shall be as given in IS 2102 (Part 1) shall apply.

4 LIQUID LIMIT DEVICE

4.1 Materials

The materials of construction of different component parts of the liquid limit device shall be given in Table 1. All parts made of brass shall be chrome-plated.

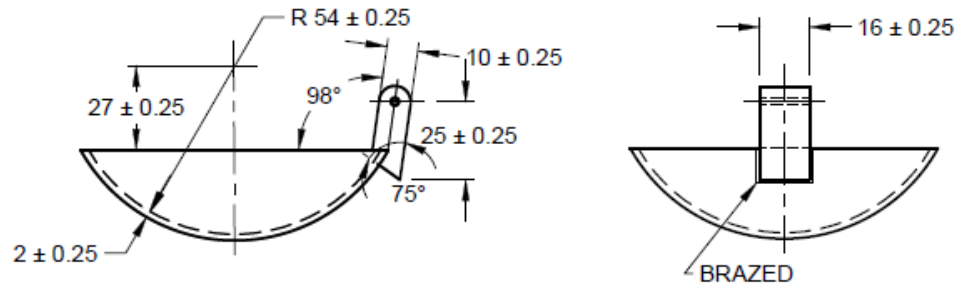
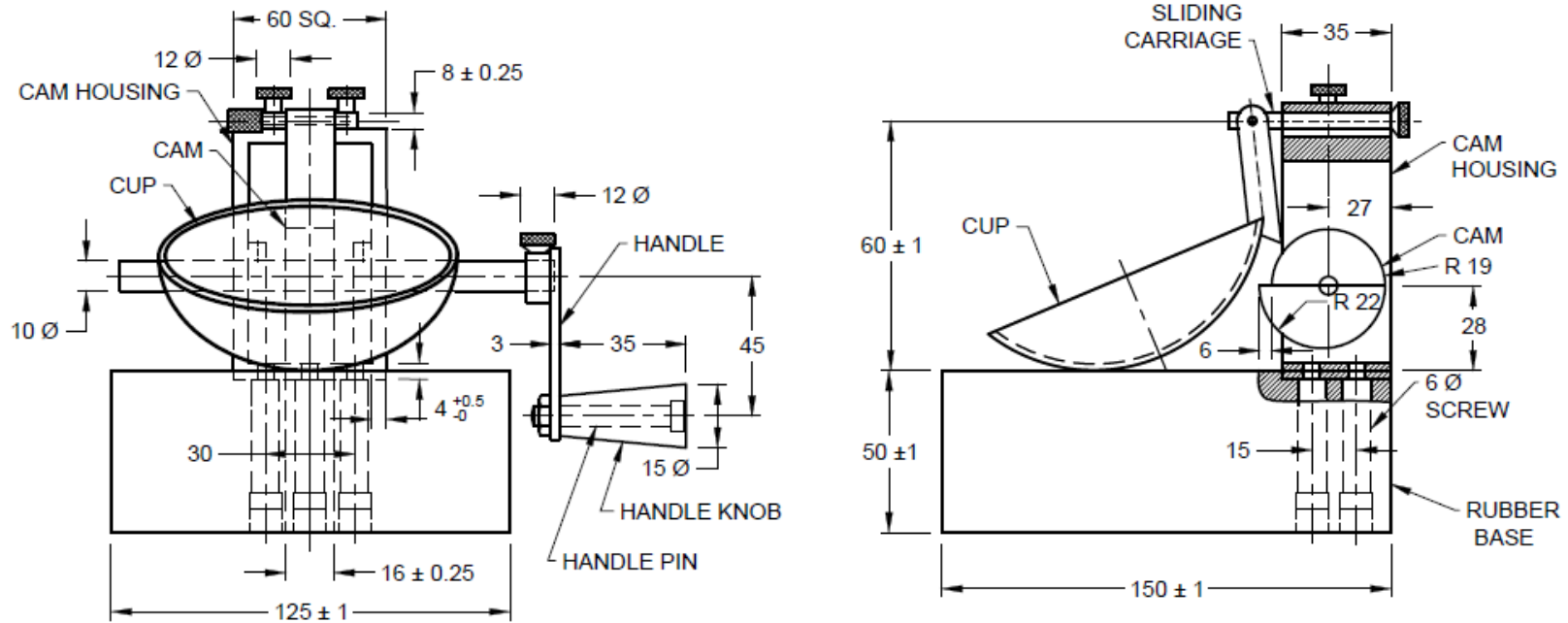
**Table 1 Materials for Different Component Parts of
Liquid Limit Device**
(Clause 4.1)

Sl No. (1)	Part (2)	Material (3)	Special Requirement (4)	Conforming To (5)
i)	Base	Vulcanized rubber	Resilience ¹⁾ : 30 to 40 percent	Grade Z80 of IS 5192 (Part 1)
ii)	Base feet	Vulcanized rubber	Resilience ¹⁾ : 30 to 40 percent	Grade Z80 of IS 5192 (Part 1)
iii)	Cup	Sheet brass	-	IS 410
iv)	Cam housing	Cast brass	-	IS 292
v)	Sliding carriage		-	IS 292
vi)	Cam	Brass	-	IS 4170
vii)	Pin	Brass	-	IS 4170
viii)	Handle	Brass	-	IS 4170
ix)	Handle Knob	Brass	-	IS 4170

¹⁾ The resilience of the materials shall be determined in accordance with IS 3400 (Part 11).

4.2 Construction

The liquid limit device shall be constructed in accordance with Fig. 1. It shall consist of a base carrying a sliding carriage assembly to which a cup shall be hinged. The cup shall be suspended in such a way that it may be raised and dropped through a height of 10 mm with the help of a lead screw provided at the back of the sliding carriage. For ease of operation, the handle to rotate the cam shall be provided for right-hand operation. The base feet shall be fixed to the base, and the both shall be made of the same material. The cup shall have dimensions as detailed in Fig. 1. The inside of the cup shall be finished smooth. The cup shall have a brass follower block brazed to it for being suspended from the sliding carriage with the help of a brass pin. It shall be suspended from the top bracket with the help of the brass pin in such a way that it falls freely without having much play at its hinge. The sliding carriage shall have two grooves to facilitate adjustment of fall of the cup to 10 mm. The contract face of the cam shall be smoothly curved. The sliding carriage shall be secured to the top of the cam housing with two knurled head screws made of brass. The handle shall be fixed to the cam shaft. The handle knob shall have free rotating movement.



DETAILS OF CUP

All dimensions in millimetres.

FIG. 1 LIQUID LIMIT DEVICE

5 GROOVING TOOLS AND GAUGE BLOCK

5.1 The grooving tool shall be of three types, namely, Type A, Type B and Type C (see Fig. 2).

5.2 Materials

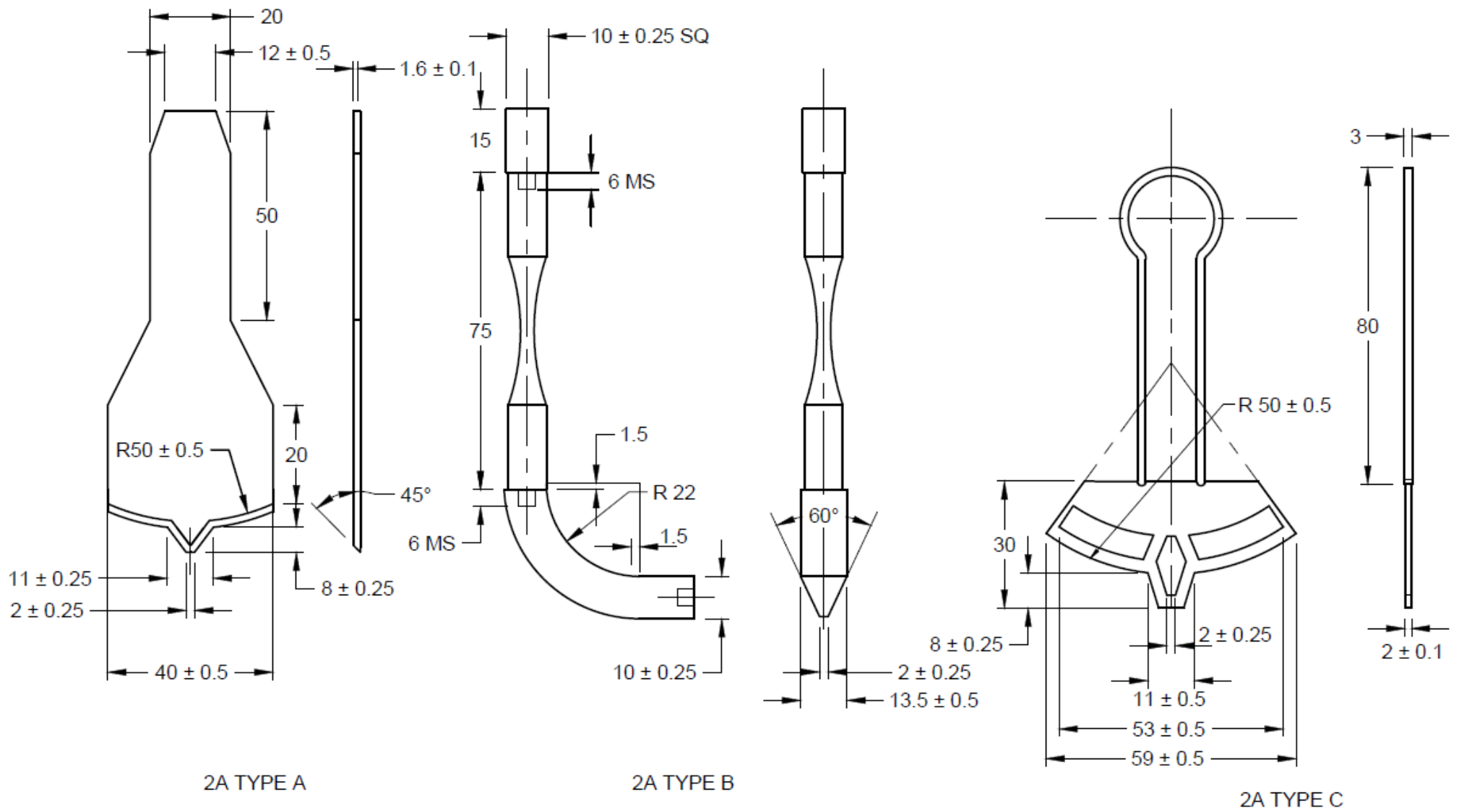
The materials of construction of the three different types of the grooving tools and of the gauge block shall be as given in Table 2.

Table 2 Materials for Grooving Tools and Gauge Block

Sl No.	Part	Material	Special Requirement	Conforming to Indian Standard
(1)	(2)	(3)	(4)	(5)
i)	Grooving tool, Type A	Sheet brass or Cast brass	Smooth finish	IS 410 or IS 292
ii)	Grooving tool, Type B:			
	a) Handle	Brass rod	Smooth finish	IS 4170
	b) Tool	Cast brass	Smooth finish	IS 292
iii)	Grooving tool, Type C:			
	a) Tool	Sheet brass	Smooth finish	IS 410
	b) Handle	Brass wire	Smooth finish	IS 4413
iv)	Gauge block	Cast brass	Smooth finish	IS 292

5.3 Construction

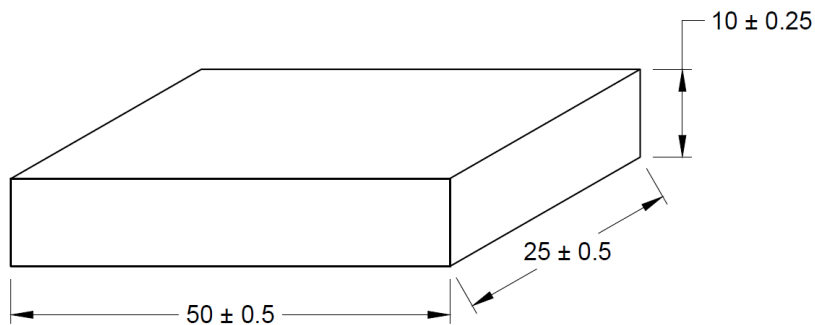
5.3.1 The shapes and dimensions of the grooving tools shall be in accordance with Fig. 2. In the case of Type B grooving tool, the handle shall be of such a shape and dimensions that it serves for the gauge block.



All dimensions in millimetres.

FIG. 2 GROOVING TOOLS

5.3.2 The shape and dimensions of the gauge block shall be in accordance with Fig. 3. The gauge block shall be finished smooth.



All dimensions in millimetres.

FIG. 3 GAUGE BLOCK

6 MARKING

6.1 The liquid limit device, the grooving tools and the gauge block of the Casagrande apparatus shall be clearly marked with the following information:

- a) Name of manufacturer or his registered trade-mark or both;
- b) Type (where applicable); and
- c) Date of manufacture.

6.2 BIS Certification Marking

The product conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed there under, and the product may be marked with the Standard Mark.