



भारतीय मानक ब्यूरो BUREAU OF INDIAN STANDARDS

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व्यापक परिचालन मसौदा

हमारा संदर्भ : सीईडी 43/टी-105

04 नवम्बर 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 (20669)WC	कोन वेधन विधि द्वारा मृदा की तरल सीमा के निर्धारण के लिए उपकरण – विशिष्ट का भारतीय मानक मसौदा (IS 11196 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: 05 दिसम्बर 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



भारतीय मानक ब्यूरो BUREAU OF INDIAN STANDARDS

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**DRAFT IN
WIDE CIRCULATION**

DOCUMENT DESPATCH ADVICE

Reference	Date
CED 43/T-105	04 November 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 others interests

Dear Madam/Sir,

Please find enclosed the following draft:

Doc. No.	Title
CED 43 (20669)WC	Draft Indian Standard Equipment for determination of liquid limit of soils by cone penetration method — Specification (<i>First Revision of IS 11196</i>) (ICS No. 93.020; 13.080.20)

Kindly examine the draft revision 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: 05 December 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

**EQUIPMENT FOR DETERMINATION OF LIQUID LIMIT OF
SOILS BY CONE PENETRATION METHOD — SPECIFICATION**

(First Revision of IS 11196)

Soil and Foundation Engineering
Sectional Committee, CED 43

Last date of Comments:
05 December 2022

Soil and Foundation Engineering Sectional Committee, CED 43

FOREWORD

(Formal clauses to 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 soil by cone penetration method as covered in IS 2720 (Part 5) : 1985 'Methods of the test for soils : Part 5 Determination of liquid and plastic limits (*second revision*)'.

This standard was first published in 1985. 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) Digital type equipment for determination of liquid limit test by cone penetration method has been added. Provisions on material and construction of digital type equipment have also been included.
- b) Provision for providing an arrangement of making soil thread for plastic limit test has also been incorporated considering that such arrangements are being provided by the manufacturer along with the equipment for liquid limit determination.
- 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

**EQUIPMENT FOR DETERMINATION OF LIQUID LIMIT OF
SOILS BY CONE PENETRATION METHOD — SPECIFICATION**

(First Revision of IS 11196)

Soil and Foundation Engineering
Sectional Committee, CED 43

Last date of Comments:
05 December 2022

1 SCOPE

This standard covers the requirements of the equipment for determination of liquid limit of soils by cone penetration 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>
617 : 1994	Cast aluminium and its alloys ingots and castings for general engineering purposes — Specification (<i>third revision</i>).
1875 : 1992	Carbon steel billets, blooms, slabs and bars for forgings — Specification (<i>fifth revision</i>).
2102 (Part 1) : 1993	General tolerances: Part 1 tolerances for linear and angular dimensions without individual tolerance indications (<i>third revision</i>).
2720 (Part 5) : 1985	Methods of the test for soils: Part 5 Determination of liquid and plastic limits (<i>second revision</i>).
4170 : 1967	Specification for brass rods for general engineering purposes.
4454 (Part 1) : 2001	Steel wire for mechanical springs — Specification: Part 1 Cold drawn unalloyed steel wire (<i>third revision</i>).
7883 : 1975	Specification for aluminium-manganese alloy sheet and strip for aircraft purposes (Alloy No. 31000).
6603 : 2001	Stainless steel bars and flats — Specification (<i>first revision</i>).

3 TYPES

3.1 Equipment for liquid limit test by cone penetration method can be of the following two types:

- a) Analogue type; and
- b) Digital type.

4 DIMENSIONS

Dimensions with tolerances of different component parts of the analogue type equipment shall be as detailed in Figs. 1 to 10. General assembly of different component parts of the digital type equipment shall be as detailed in Fig. 11. Dimensions with tolerances of cup and cone of digital type equipment shall be detailed in Fig. 9 and Fig. 10. Except where tolerances are specially mentioned against the dimensions, all dimensions shall be taken as nominal dimensions and tolerances of medium class as given in IS 2102 (Part 1) shall apply thereon.

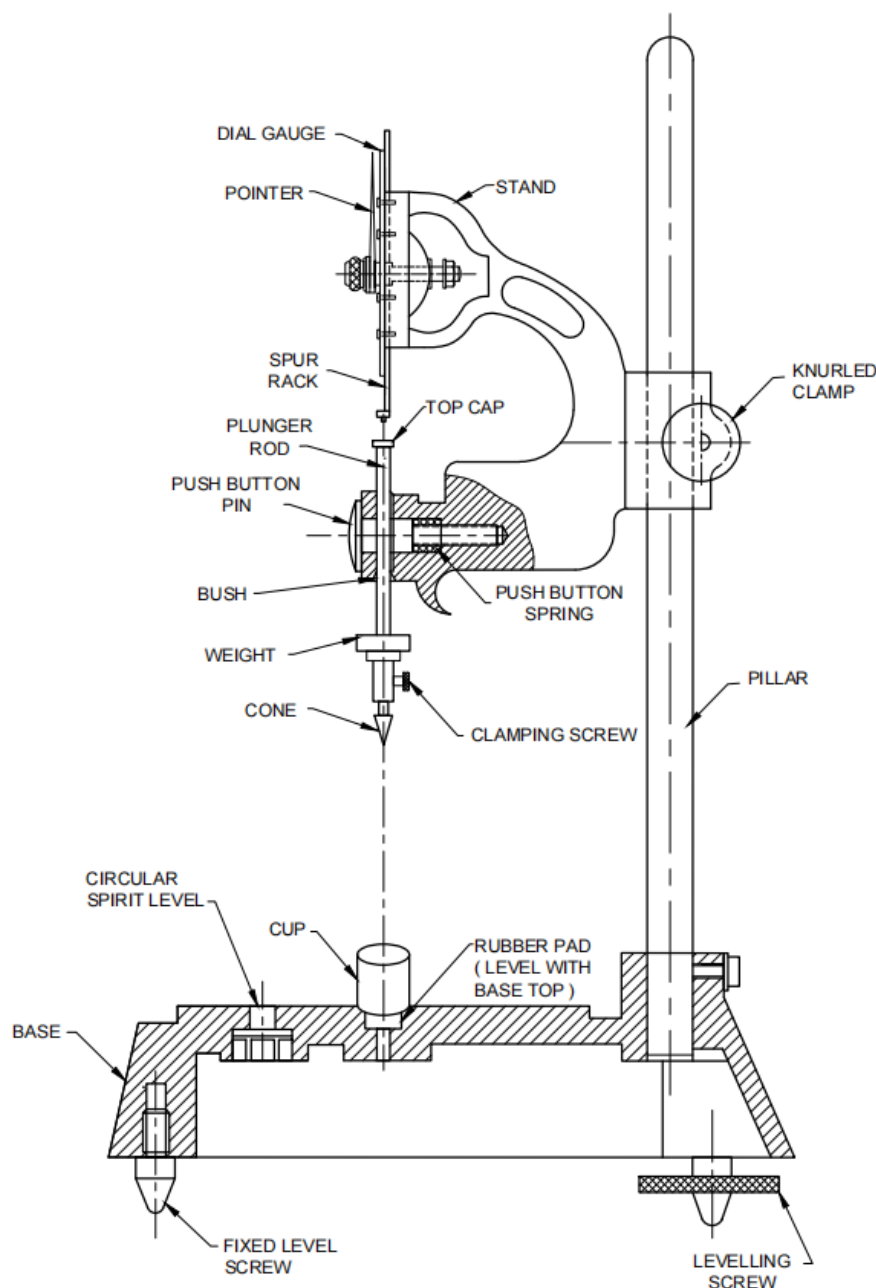
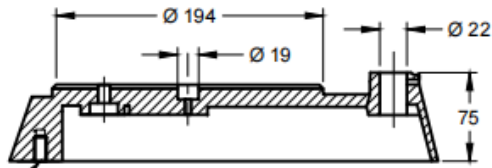
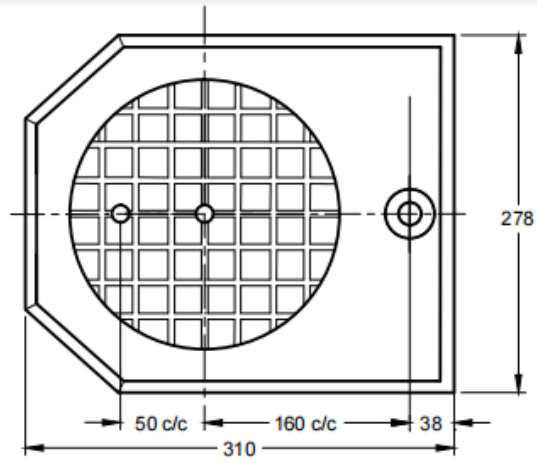
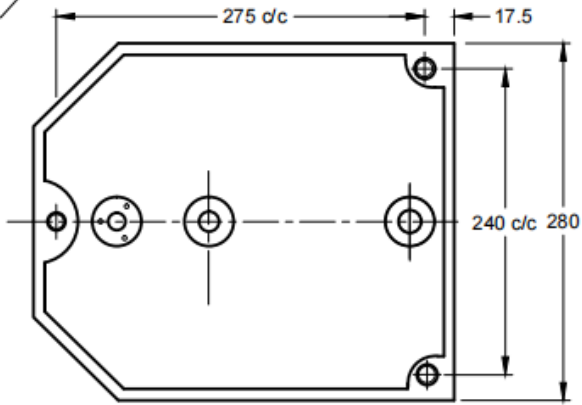


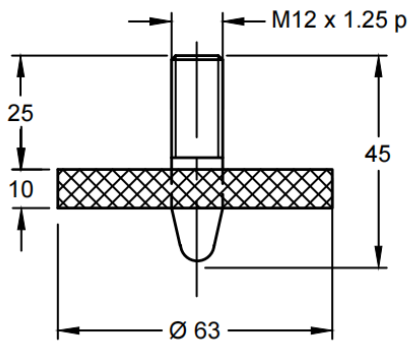
FIG. 1 GENERAL ASSEMBLY FOR ANALOGUE TYPE EQUIPMENT



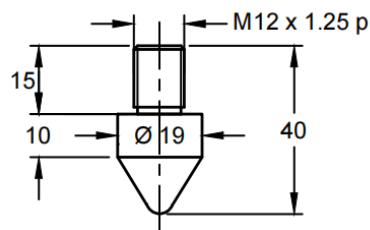
3 TAPPED HOLES
M 12 x 12.5 p



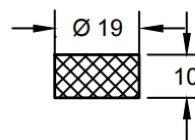
2A BASE BODY



2B LEVELLING SCREW



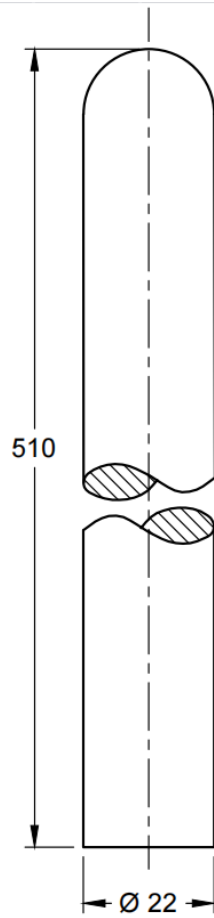
2C FIXED LEVEL SCREW



2D RUBBER PAD

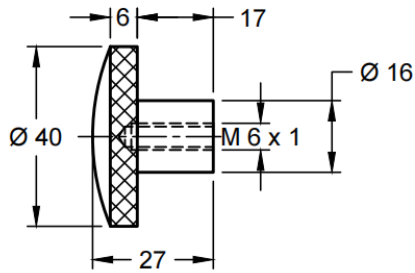
All dimensions in millimetres.

FIG. 2 BASE BODY

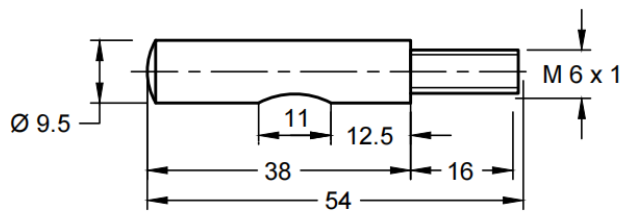


All dimensions in millimetres.

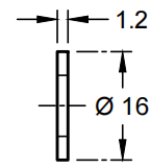
FIG. 3 PILLAR



4A KNURLED CLAMP



4B CLAMP PIN



4C WASHER

All dimensions in millimetres.

FIG. 4 BRACKET— *Contd*

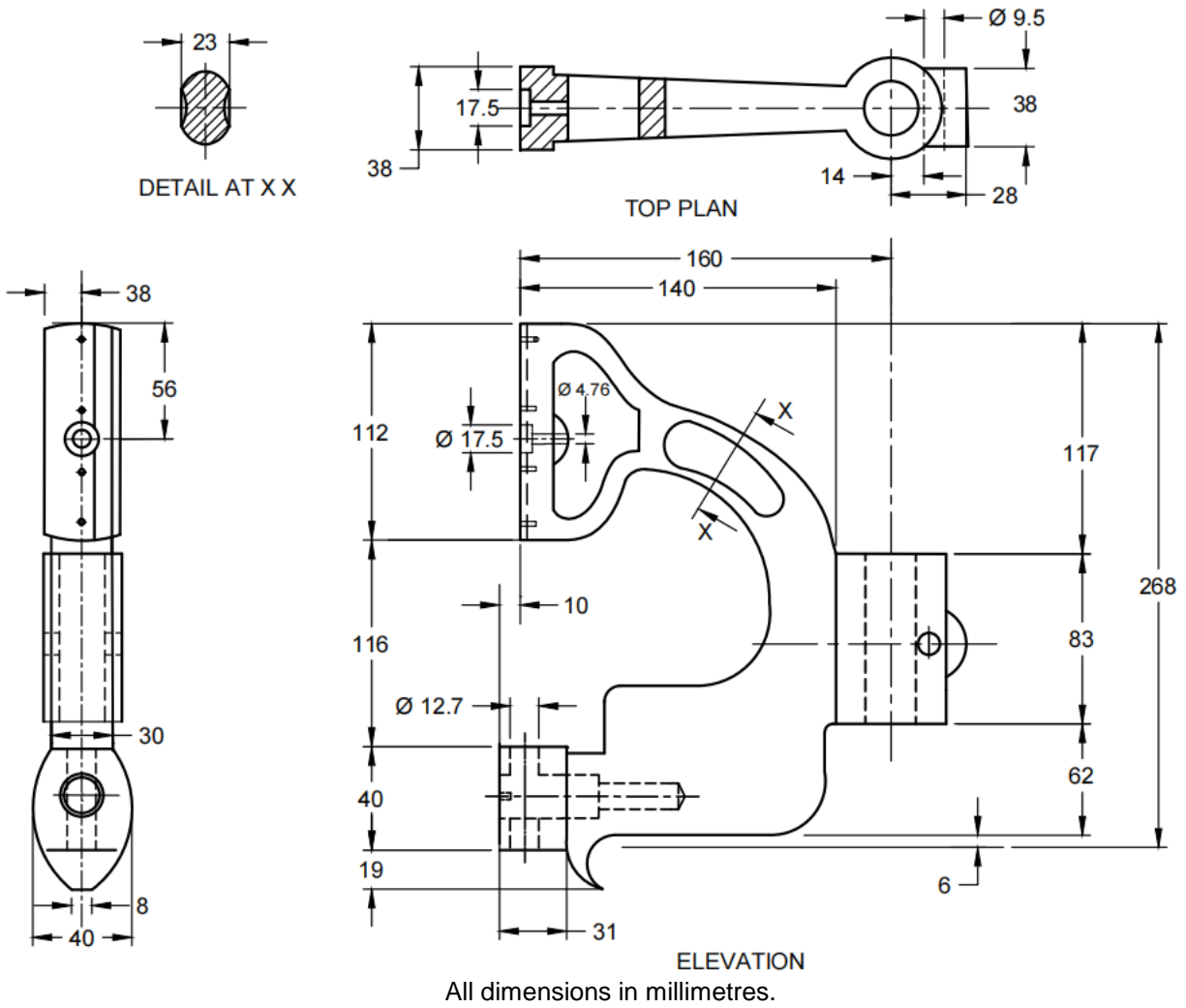
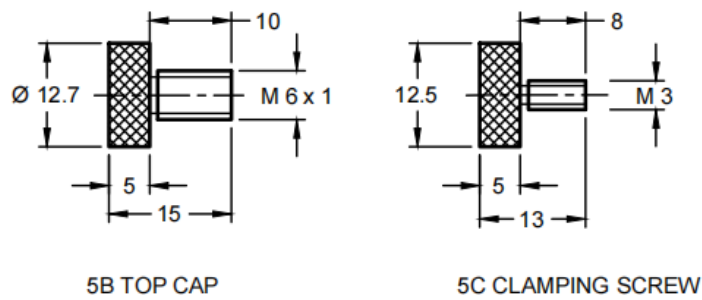
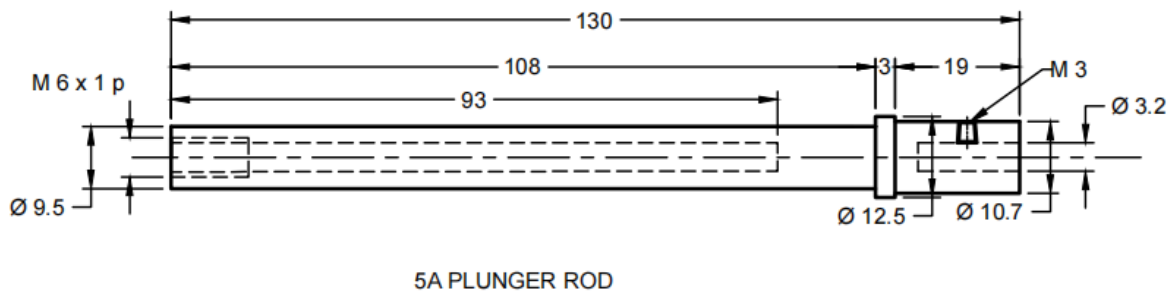
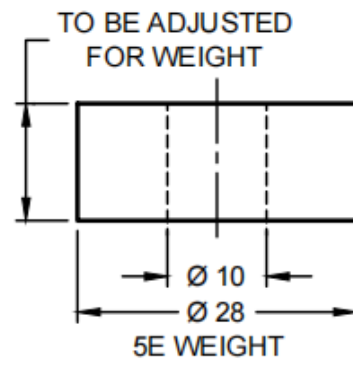
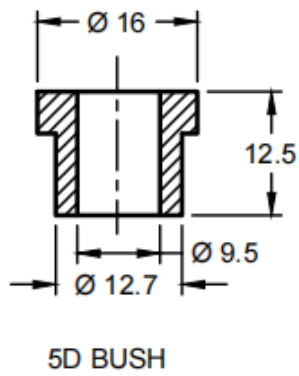


FIG. 4 BRACKET



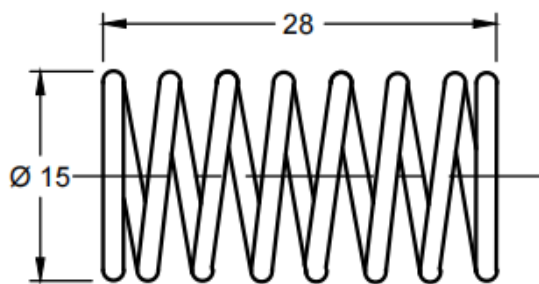
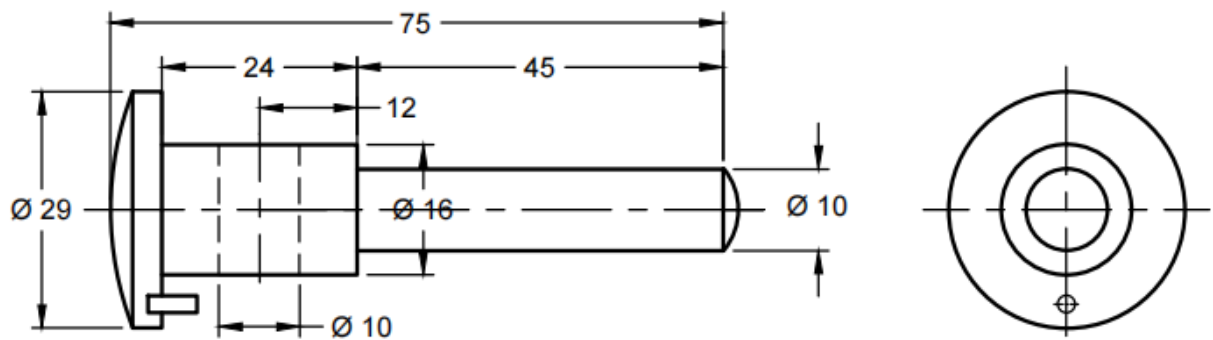
All dimensions in millimetres.

FIG. 5 PLUGNER — *Contd*



All dimensions in millimetres.

FIG. 5 PLUGNER

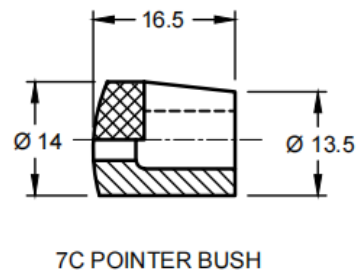
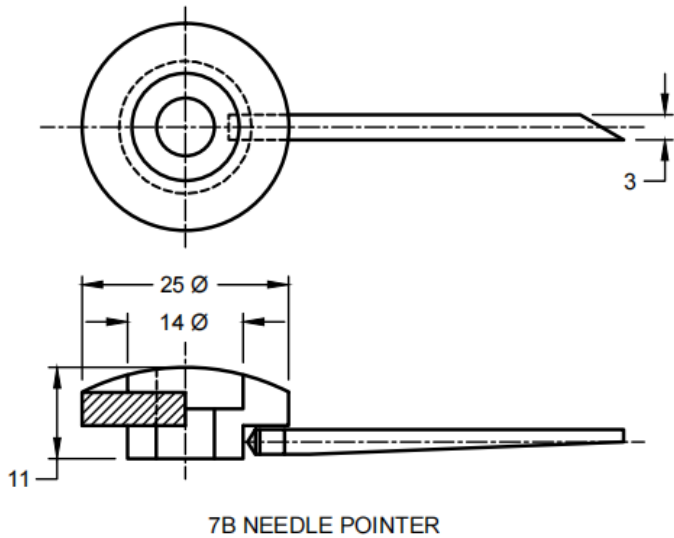
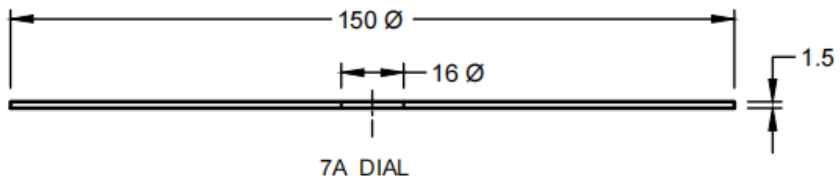
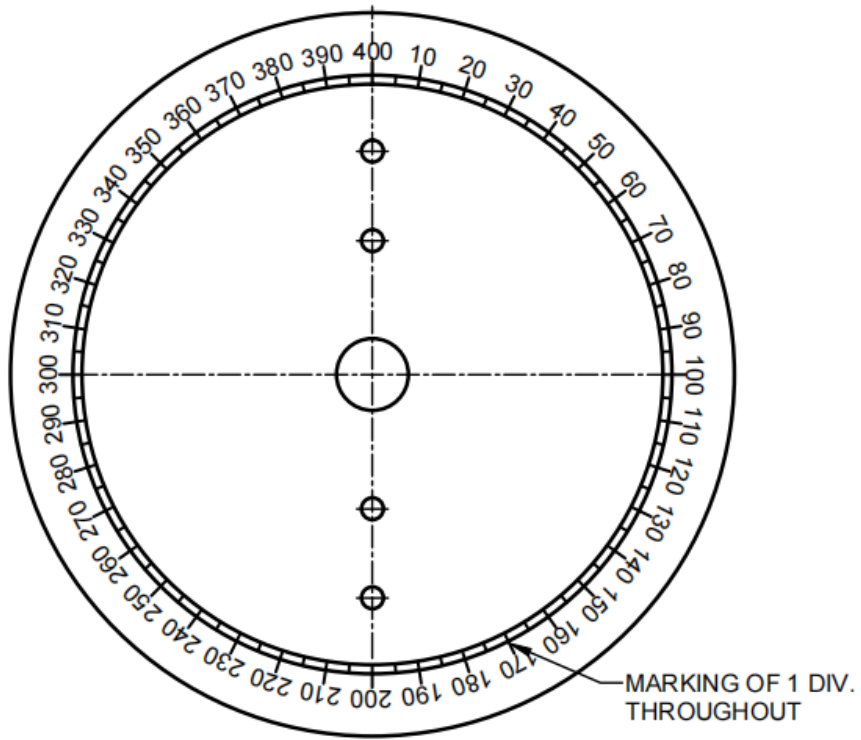


SPRING DATA	
O.D.	Ø 15
TOTAL LENGTH	28
NO. OF COILS	8
WIRE DIA	1.5

ALL DIMENSIONS IN mm

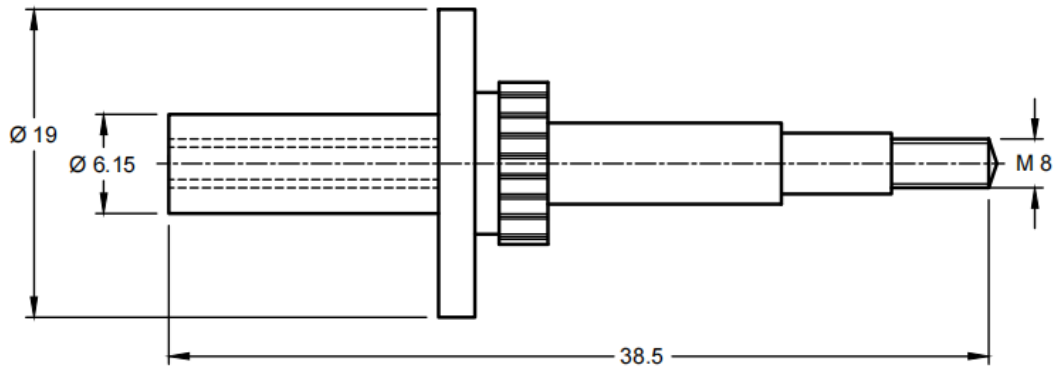
All dimensions in millimetres.

Fig. 6 RELEASE MECHANISM



All dimensions in millimetres.

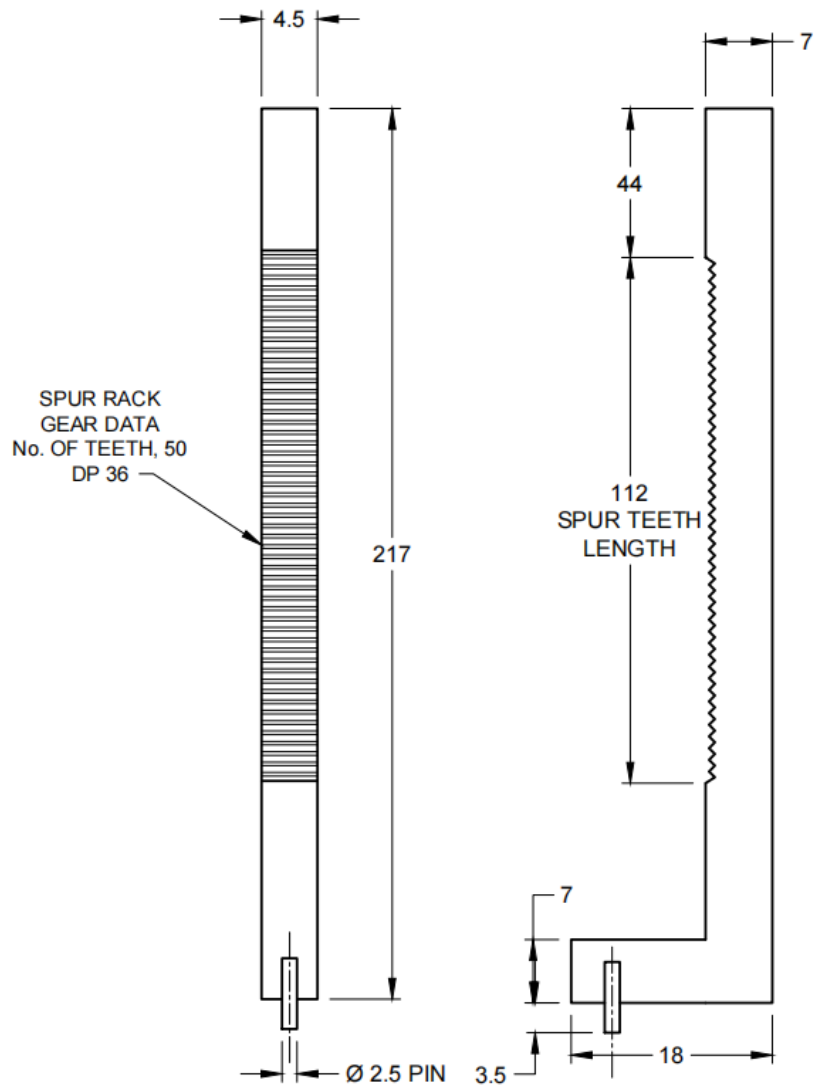
FIG. 7 DIAL GAUGE— *Contd*



7D PINCH SHAFT

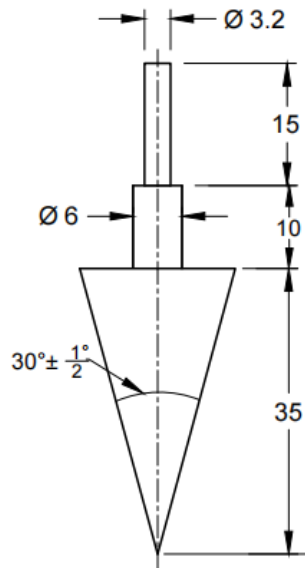
All dimensions in millimetres.

FIG. 7 DIAL GAUGE



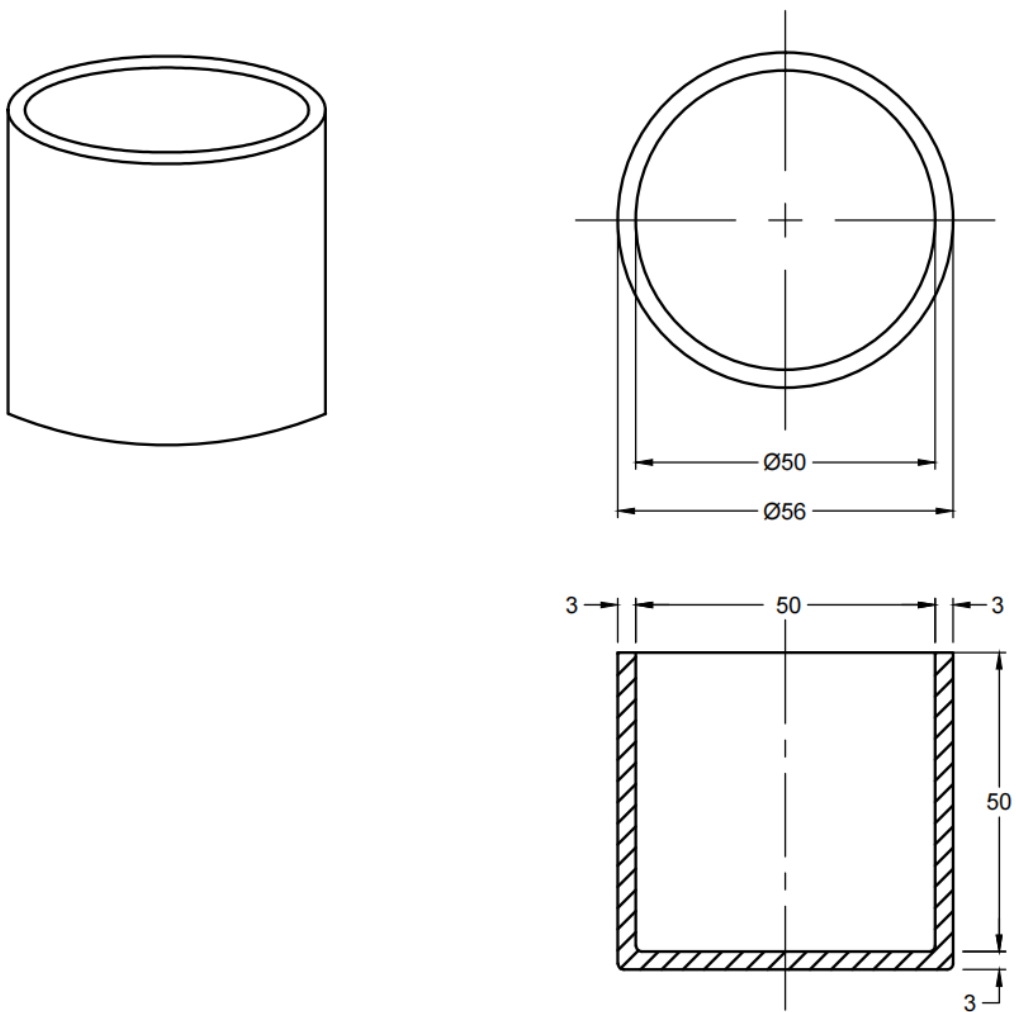
All dimensions in millimetres.

FIG. 8 SPUR RACK



All dimensions in millimetres.

FIG. 9 CONE



All dimensions in millimetres.

FIG. 10 CUP

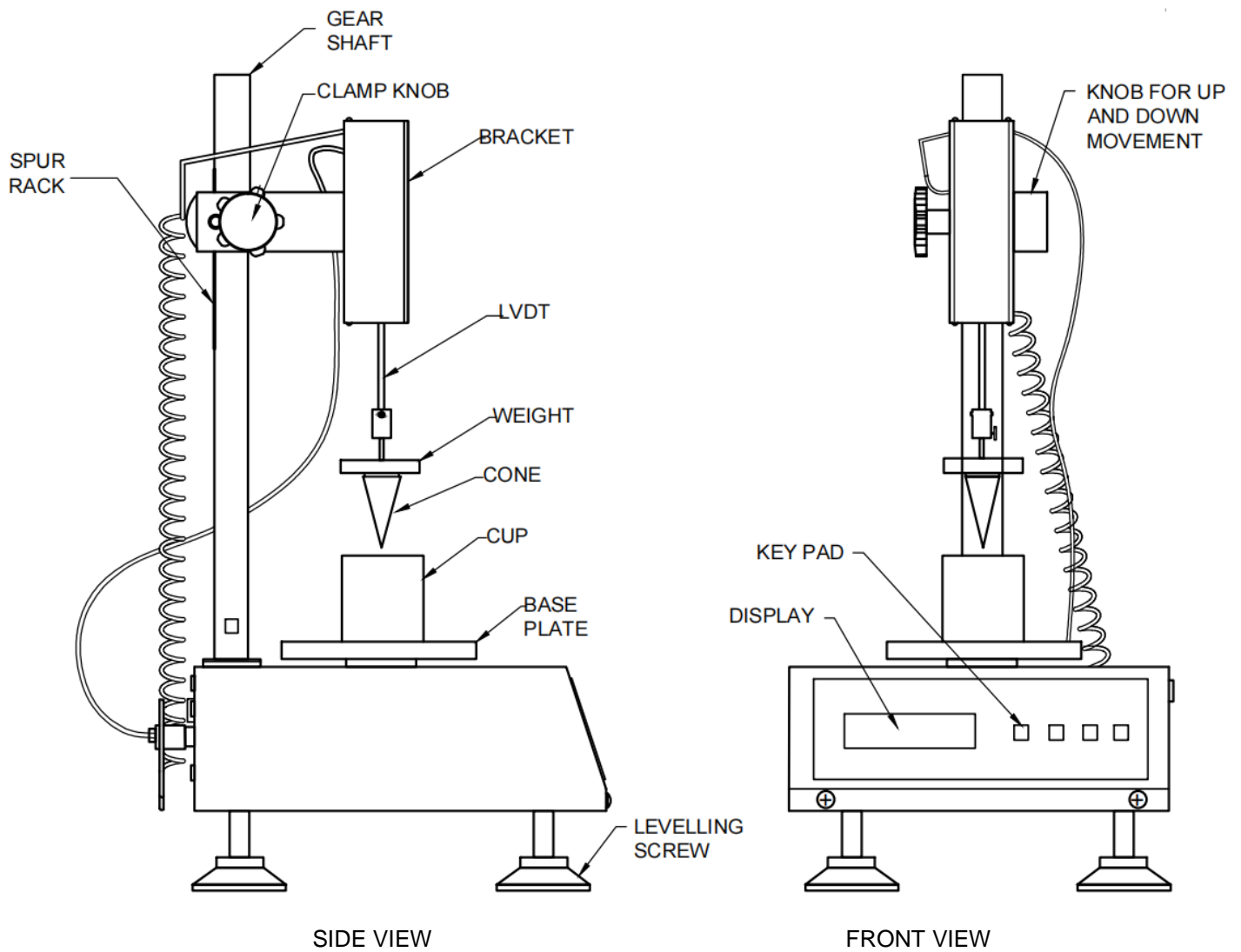


FIG. 11 GENERAL ASSEMBLY OF DIGITAL SOIL CONE PENETROMETER

4 MATERIALS

The materials of construction of various component parts of the analogue type and digital type equipment shall be as given in Table 1 and Table 2 respectively.

**Table 1 Materials of Construction of Various Component Parts of Analogue
Type Equipment
(Clause 4)**

SI No. (1)	Components Parts (2)	Material (3)	Special Requirement (4)	Relevant IS Number (5)
i)	Base body	Cast aluminium	Painted	IS 617
ii)	Levelling screws	Mild steel	Nickel/Chrome plated	IS 1875
iii)	Pillar	Mild steel	Nickel/Chrome plated	IS 1875
iv)	Bracket	Cast aluminium	Painted	IS 617
v)	Knurled clamp	Mild steel	Nickel/Chrome plated	IS 1875
vi)	Clamp pin	Mild steel	Nickel/Chrome plated	IS 1875
vii)	Plunger rod	Mild steel	Nickel/Chrome plated	IS 1875
viii)	Top cap	Mild steel	Nickel/Chrome plated	IS 1875
ix)	Clamping screw	Mild steel	Nickel/Chrome plated	IS 1875
x)	Bush	Brass	–	IS 4170
xi)	Weight	Brass	–	IS 4170
xii)	Push button pin	Mild steel	Nickel/Chrome plated	IS 1875
xiii)	Push button-spring	Spring steel	Nickel/Chrome plated	IS 4454 (Part 1)
xiv)	Dial	Aluminium	Anodized	IS 7883
xv)	Needle pointer	Mild steel	Nickel/Chrome plated	IS 1875
xvi)	Pointer bush	Brass	–	IS 4170
xvii)	Pinion shaft	Mild steel	Nickel/Chrome plated	IS 1875
xviii)	Spur rack	Mild steel	Nickel/Chrome plated	IS 1875
xix)	Cone	Stainless steel	–	IS 6603
xx)	Cup	Brass	–	IS 4170

Table 2 Materials of Construction of Various Component Parts of Digital Type Equipment
(Clause 4)

SI No.	Components Parts	Material	Special Requirement	Relevant IS Number
(1)	(2)	(3)	(4)	(5)
i)	Base plate	Stainless steel	–	IS 6603
ii)	Base body	Mild steel	Nickel/Chrome plated	IS 1875
iii)	Levelling screws	Mild steel	Nickel/Chrome plated	IS 1875
iv)	Bracket	Cast aluminium	Painted	IS 617
v)	Clamp Knob	Mild steel	Nickel/Chrome plated	IS 1875
vi)	Knob for up and down movement	Mild steel	Nickel/Chrome plated	IS 1875
vii)	Weight	Brass	–	IS 4170
viii)	Spur rack	Brass	–	IS 4170
ix)	Cone	Stainless steel	–	IS 6603
x)	Cup	Brass	–	IS 4170
xi)	Gear shaft	Stainless steel	–	IS 6603

5 CONSTRUCTION

5.1 Analogue Type

The base, pillar, bracket, plunger, release mechanism, dial gauge, spur rack, cone and cup shall be according to details given in Figs. 1 to 10. The mass of plunger along with its components and cone as given in Fig. 5 and Fig. 9 shall be 80 ± 0.5 g (for this purpose thickness of weight given in Fig. 5E be adjusted) and when assembled the pin fixed at the bottom of the rack shall be in line and concentric with the plunger assembly.

5.2 Digital Type

The equipment shall be power operated and shall have facility for adjusting the height of the cone in relation to soil test specimen in the cup. The linear variable differential transformer (LVDT) provided for test shall have provision for accommodating the cone. The equipment shall have electrical indicator with visual display. Provision shall be made to stop the equipment after 5 ± 0.1 s of the penetration of cone. The mass of cone along with the sliding components of the LVDT shall be 80 ± 0.5 g (for this purpose thickness of weight which shall be in accordance with Fig. 5E be adjusted).

5.3 An arrangement of making soil thread of 3 mm thickness as per IS 2720 (Part 5) for conducting plastic limit test may also be provided with the equipment for liquid limit test.

6 MARKING

6.1 The following information shall be clearly and indelibly marked suitably on the equipment:

- a) Name of the manufacturer or his registered trade-mark or both;
- b) Type of apparatus, analogue or digital; 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 thereunder, and the product may be marked with the Standard Mark.