



Leather – Safety boots and safety shoes — Specification

Draft for Stakeholders comments only!

TANZANIA BUREAU OF STANDARDS

Foreword

This Draft Tanzania Standard is being developed by the Leather and Leather Products Technical Committee under supervision of the Textile and Leather Division Standards Committee and it is in accordance with the procedures of the Bureau.

This Tanzania Standard has been prepared with assistance drawn from:

IS 1989, Specification for leather safety boots and shoes.

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1 Scope

This Draft Tanzania Standard Specifies the requirements, and test methods for leather safety boots and safety shoes.

2 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

The following referenced documents are indispensable for the application of this document.

TZS 4 Rounding of numerical values.

TZS 188, Hides, Skin and Leather glossary of terms

TZS 26, Determination of conductivity, pH, water soluble matter, chloride and sulphate in aqueous extracts.

TZS 138, Textiles - Method for determination of colour fastness of textile materials to rubbing

TZS 280, Textiles - Method for determination of colour fastness of textile material to perspiration

TZS 193, Vegetable tanned sole – Specification

TZS 195, Leather - Chemical tests – Determination of matter soluble in Dichloromethane and free fatty acid content.

TZS 196 Leather, Determination of pH and difference figure of an aqueous extract.

TZS 200, Leather – Determination of nitrogen content and “Hide substance” – Titrimetric method.

TZS 205 Leather — Physical testing — Measurement of thickness

TZS 208, Leather – Determination of tear strength

TZS 211 Leather - Determination of colour fastness to – and – fro rubbing (wet and dry).

ISO 3376, Leather — Physical and mechanical tests — Determination of tensile strength and percentage elongation.

TZS 3574, Leather — Chemical determination of chromium(VI) content in leather.

ISO 11641, Leather — Tests for colour fastness — Colour fastness to perspiration - adopt.

ISO 23910, Leather — Physical and mechanical tests — Measurement of stitch tear resistance - adopt.

3 Terms and definitions

For the purposes of this Draft Tanzania Standard, the definitions given in TZS 188 shall apply.

4 Requirements

The safety boots and safety shoes shall comply with the requirements for design, materials, manufacture, finish and performance as given in Table 1 and 2 respectively.

5. Material requirements

5.1 Upper leather

The upper leather of the safety boots and safety shoes shall conform to the requirements as specified in Table 1.

5.2 Lining

The lining used in making the safety boots and safety shoes shall be of any material of an acceptable quality as agreed upon between buyer and seller and shall conform to the requirements specified in Table 2.

5.3 Bottom material

The bottom material shall be either vegetable tanned sole leather, PU or moulded solid rubber soles and heels. The sole leather shall be in accordance to TZS 193.

5.4 Laces

Laces shall be of acceptable fibres or blend of fibres, and of braided construction without cores. Lace ends shall be fused, uniformly make, colour and finish and shall comply with the requirements given in Table 4.

5.5 Tongue Lining

The tongue lining Shall be of an acceptable material.

5.6 Adhesive

The adhesive used in the manufacturing of leather safety boots and safety shoes shall be of an acceptable quality and compatible to the material of the component used.

5.7 Bottom Filling

Bitumen felt shall be used.

5.8 Metal Components

All metal components, whether functional or decorative, shall be of an intrinsically corrosion-resistant metal or shall have been coated to render them resistant to corrosion. They shall be of adequate size and strength for their intended function. Their design shall be such that, when closed, no sharp edges, prongs or decorative shapes protrude.

5.8.1 Buckles

Buckles may have one or more prongs, or may be of the plain or roller type, or be slide buckles. The width of a buckle shall be such as to ensure an acceptable fit with the belt to which it is attached.

5.8.2 Closure fittings

Spring-loaded closure fittings or clasps, when relevant, shall be as required, but shall be of acceptable design.

5.8.3 Rivets

All rivets shall be securely and neatly attached and of sufficient length to allow the caps to be firmly clinched; Spear-pointed, bran rivets of 14 ± 1 mm and 16 ± 1 mm length, shall be used.

NOTE 2 — For extra reinforcement of toe portion, headless nails/blue cut tacks of length 14 ± 1 mm may be used, if agreed to between the purchaser and the manufacturer.

5.8.4 Steel Toe Cap

The steel toe cap shall be of an accepted quality as per EN 12568.

5.8.5 Eyelets

Aluminium or brass coated steel eyelets shall be of the diameter suitable to freely allow passage of the laces.

5.8.6 Heel Pin — Heel pins 29 ± 1 mm long shall be used for leather sole and 25 ± 1 mm long shall be used for rubber heel.

5.8.7 Shank — Rustproof steel, ribbed 1.0 to 1.5 mm thick and not less than 12 mm in width shall be used.

5.9 Sewing thread

The sewing threads should be of acceptable quality

5.10 Tape

A fabric of an accepted quality shall be used.

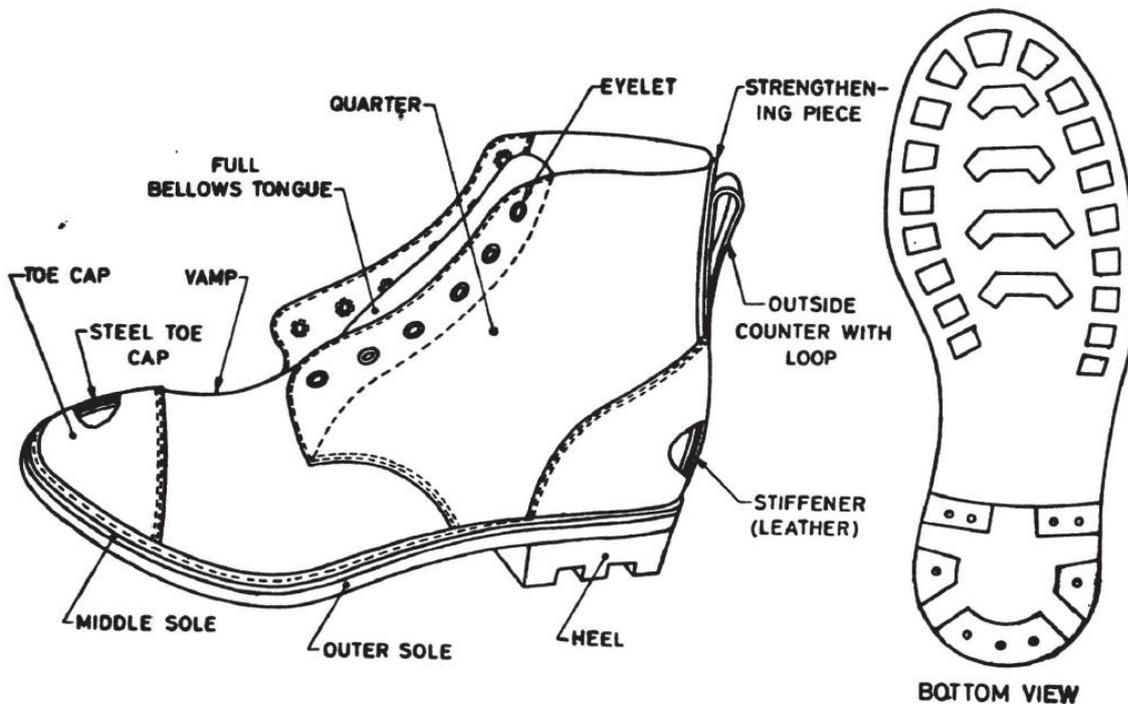


Figure 1. Safety boots components

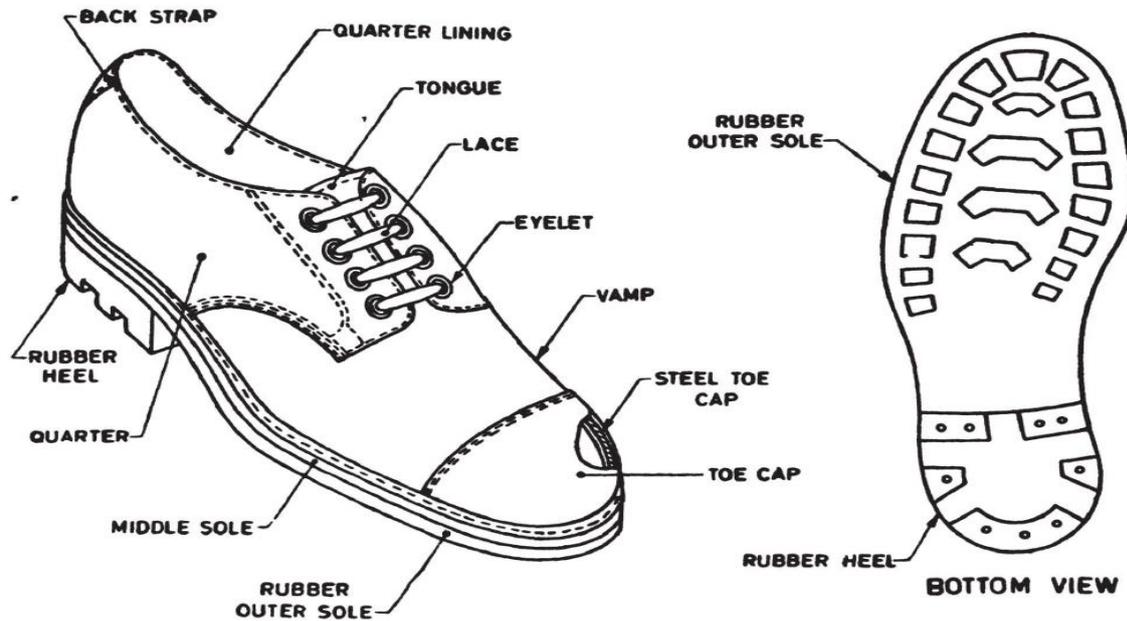


Figure 2. Safety shoes components

6. Design, Construction and Finish

6.1 Design

The safety shoes and safety boots design shall be upon agreement between the buyer and seller.

6.2 Construction

6.2.1 The various components of the safety boots and safety shoes shall be cut to the thickness, shape and design as required (see Fig. 1 and 2 and Table 1). The upper components, specially the vamps and tongues, shall be skived.

6.2.2 The upper shall be closed on lock stitch machines. The quarter sides, toe cap and tongue shall be stitched with threads with 20 - 25 stitches per dm.

6.2.3 The stitches at the top cap and counter shall be done with at least two rows of stitching about 3.3mm apart.

6.2.4 The stitches at the sides shall be done with at least 2 (two) rows of stitching about 6mm apart or 3 (three rows) of stitching about 3mm apart.

6.2.5 The back seam shall be reinforced by stitching a tape (see 5.10) over the seams.

6.2.6 The counter shall be turned over to within 15 mm at the top of the leg so as to form a jug loop as shown in Fig. 1.

6.2.7 The joint of the quarters shall be reinforced by stitching a wide strip of leather at the back.

6.2.8 Eyelets shall be fitted at equal spacing in each and clenched without distortion.

6.2.9 The full vamp shall be lined with leather and tongue with raised woollen/flannel cloth. The tongue shall be full bellows. A layer of raised woollen/flannel cloth shall be stitched to the flash side of the tongue to act as cushioned padding.

6.2.10 The stiffener shall be reinforced with cement toe compound. Steel toe cap shall be placed in between the toe cap and full vamp to the exact shape and contour of the last.

6.2.11 In the case of leather soled footwear the heel shall consist of whole lifts, two-piece lifts or one split lift and a top piece.

6.2.12 The boots shall be well lasted. The lasting edge of the stiffeners shall come under the grip of the lasting tacks and clear lasting allowance of about 13 mm shall be provided all round.

6.2.13 The steel shank shall be fitted to the waist of the insole. The middle sole shall be riveted with rivets of 14 mm and 16 mm lengths. Rivets of 16 mm length shall be used at the toe and the seat and rivets of 14 mm length at the remaining portion using 10 to 14 rivets per decimetre.

6.2.14 The leather sole shall be securely stitched aloft in an open channel with the middle sole by the lock stitch method using threads. The number of stitches shall be 16 to 20 per dm. The outer sole shall be pieced under the heel provided the joint shall be not less than 25 mm behind the breast of heel. The pieced sole shall be of the same quality and thickness as sole.

6.2.15 The outer sole shall be screwed by machine all round 25 mm apart maximum with brass screw wire. All screws shall penetrate through the outer sole, middle sole, upper and the insole without protruding. The heels shall be attached by 12 to 14 heel pins from inside.

6.2.16 In case of boots with rubber sole, the inside surface of the sole shall be suitably roughened and coated with a thin layer of adhesive which shall also be applied on the outer (flesh) surface of the leather middle sole.

6.2.17 The rubber sole shall be stitched with middle sole by the lock stitch method using linen threads. The number of stitches shall be 12 to 15 per dm. For reinforcement, 9 heel pins of 25 mm length shall be used from inside through the holes provided for the purpose both by hand or machine method. A leather welt or split-lift may also be placed below the heel.

6.3 Finish

6.3.1 The sole and heel edges shall be neatly trimmed, scoured and finished to match the colour of the boot. The edge setting shall be uniformly done by using matching colour heel ball.

6.3.2 The sole and heel edges of the rubber sole boots/shoes shall be secured and finished smooth.

6.3.3 Each pair of boots/ shoes shall be provided with a pair of full sock and laces.

6.3.4 Boots/shoes with leather sole may be fitted with hobnails and rustproof toe tips and heel tips using toe tip and heel tip nails flush with the tip fillings, as agreed between buyer and seller.

6.3.5 The upper shall be finished bright by polishing.

6.3.6 The safety boots and safetyshoes shall be free from injurious folds and wrinkles in the upper, trapped air, blisters,

embedded foreign matter, excessive surface markings. No metallic grinderies shall protrude and cause discomfort to the wearers.

6.3.7 The finish shall be in accordance with sound manufacturing practice.

6.3.8 For the safety boots; The height of the leg when measured from inside shall be 150 ± 3 mm (both odds of a pair shall be equal in height) for size 8 and shall increase or decrease by 3 mm from size to size.

6.3.9 The height of the heel when measured at the back portion in line with jug loop shall be 30 ± 2 mm for all sizes. The heel shall be in proper alignment with the tread of the sole.

7. Mass

7.1 Boots with Leather Sole and Heel

7.1.1 The mass of boots with hobnails, toe tips and heel tips shall not exceed 1750 g per pair of size 8.

7.1.2 The mass of boots without hobnails, toe tips and heel tips shall not exceed 1650 g per pair of size 8.

7.1.3 The mass of the boots with heel tips and toe tips, without hobnails shall not exceed 1700 g per pair of size 8.

7.1.4 The mass shall increase or decrease by 75 g per pair for bigger or smaller sizes respectively.

7.2 Boots with Rubber Sole and Heel

7.2.1 The mass of boots shall not exceed 1750 g per pair of size 8.

7.2.2 The mass shall increase or decrease by 50 g per pair for bigger or smaller sizes respectively.

7.3 Shoes with leather Sole and Heel.

7.3.1 The mass of boots with hobnails, toe tips and heel tips shall not exceed 1600 g per pair of size 8.

7.3.2 The mass of boots without hobnails, toe tips and heel tips shall not exceed 1500 g per pair of size 8.

7.4 Shoes with rubber Sole and Heel

7.4.1 The mass of Shoes shall not exceed 1600 g per pair of size 8.

7.4.2 The mass shall increase or decrease by 50 g per pair for bigger or smaller sizes respectively.

8 PERFORMANCE TEST

8.1 The safety boots when subjected to the impact test prescribed in Annex B shall withstand a blow of 14 kgf.m.

8.2 The test is intended to ensure that the toe portion of the boot is strong enough to withstand the specified impact without any injury to wearer's toes.

8.3 the clearance inside the boot at the moment of maximum depression when subjected to impact test shall be:

- a) 15.0 mm or more in case of leather sole with hobnails, and
- b) 13.5 mm or more in case of leather sole without hobnails or rubber sole.

Table 1 – Physical requirements for upper leather for Safety Boots and Safety Shoes.

S/N	Parameter	Upper leather	Test Method
1	Tensile strength N, min	210	ISO 3376
2	Tearing strength N, min	45	TZS 208
3	Stitching tear strength kg/cm thickness, min	50	ISO 23910
4	Colour fastness		
	To rubbing, min i) Dry ii) wet	4 3	TZS 211
5	pH	3 - 5	TZS 196
6	Thickness, mm	1.6 – 2.2	TZS 205

Table 2 – Physical requirements for lining for safety boots and safety shoes

S/N	Parameter	Leather lining	Other linings	Test Method
1	Tearing strength, min	40	15	TZS 208
2	Stitching tear strength kg/cm thickness, min	45	-	ISO 23910 (For leather lining)
3	Colour fastness			
	To rubbing, min i) Dry ii) wet	4 3	4 3-4	TZS 211 (for leather lining) TZS 138 (for other linings)
	To perspiration, min	3	4	ISO 11641 (for leather lining) TZS 280 (for other lining)
4	pH	3 - 5	5 - 8	TZS 196 (for leather lining) TZS 26 (for other lining)
5	Thickness, mm	0.5 – 0.9	0.5 – 0.9	TZS 205

Table 3 – Chemical requirements for upper leather and leather lining for Safety Boots and Safety Shoes.

S/N	Parameter	Upper leather	Leather lining	Test Method
1	Hide substance , min, %	55	55	TZS 200
2	Solvent extractable substance by mass, %	3.0 – 7.0	3.0 – 7.0	TZS 195
3	Chromium content by mass, min, %	3.5	0.75	TZS 3574
4	pH,	3.5 – 4.8	3.5 – 4.8	TZS 196

9. MARKING

9.1 Each boot and shoe shall be marked with following particulars:

- a) The name of manufacturer and address or its recognized trade – mark, if any on the insole and on the sock;
- b) The size and fitting numbers on outer sole and on the waist of the sock;
- c) Batch/Code No. where it can be visible
- d) The year of manufacture: and
- e) Any statutory marking.

10 PACKING

10.1 The boots or shoes shall be packed in a packing material that it would be free from any damage and contaminant. The packing may also be upon agreement between buyer and seller.

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Annex A
(normative)

Method of Detection of Sulphur dyes in black Coloured laces

A.1 Procedure

A.1-1 Boil the laces in alkaline hydrosulphite solution for one minute. If the shade is reduced to pale brown or yellow colour and on oxidation restored to the original colour, sulphur dyes shall be suspected to be present.

A.1-2 For confirmation, boil the laces in acid stannous chloride solution in a test tube covered with a piece of filter paper moistened with lead acetate. A blackish/brown stain with metallic lustre confirms the presence of sulphur dyes.

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Annex B
(normative)
Determination of Impact Value

B-0. GENERAL

B-0.1 An impact test for determining the performance of toes of protective boots/shoes reinforced with steel toe cap to withstand a blow of 14 kgf.m is described here.

B-1. REQUIREMENTS

B-1.1 Test Specimen — The boot or shoe shall be tested only after minimum of 24 hours from its manufacture.

B-1.2 The test shall be made on the toe of finished boot/shoe sampled from each size of a lot.

B-2. TEST MACHINE

B-2.1 The test machine shall be such that a 27.0 ± 0.2 kg mass can be allowed to fall freely on vertical guides from various predetermined heights to strike a cylindrical mild steel plunger, 28 mm in diameter and 14.5 mm long. The plunger shall be freely supported in a vertical guide, and shall have attached to its lower end a horizontal mild steel bar 115 mm long, 38 mm wide and 100 mm thick. The bar shall be such that it can rest on the toe of the boot/shoe in a position specified in

B-4.1. The upper end of the plunger shall have a mild steel plate 63 mm wide screwed to it which can be replaced if worn out. The above dimensions shall have a tolerance of ± 1 mm.

B-2.1.1 The base of the machine shall be solidly constructed of hard wood 5 mm thick. To this shall be bolted a metal block 50 mm thick to support the steel plate on which the boot/shoe rests.

B-3. MEASUREMENT OF IMPACT VALUE

B-3.1 Point of Measurement of Clearance Inside the Boot or Shoe — The position or point of measurement of clearance inside the boot/shoe shall be found by using a size 8 last of the same shape as that on which the boot/shoe to be tested was made (see Fig. 3) The toe point is found by placing the last on a flat surface so that its inside surface and toe touches two vertical planes at right angles to each other.

- *M* is the point of contact of the toe with one of these planes.
- A line *MX* is drawn from toe to heel (the heel point can be located by eye with sufficient accuracy) and 28 mm is marked off down this line from the toe to give point *A*.
- A line perpendicular to *XY* is drawn through
- A cutting the outside edge of the last at *P* and the inside edge at *Q*.

NOTE — For a new last shape, the procedure given in **B-3.1** may be modified suitably by the testing laboratory if in their opinion the position obtained for measuring clearance is not a reasonable one.

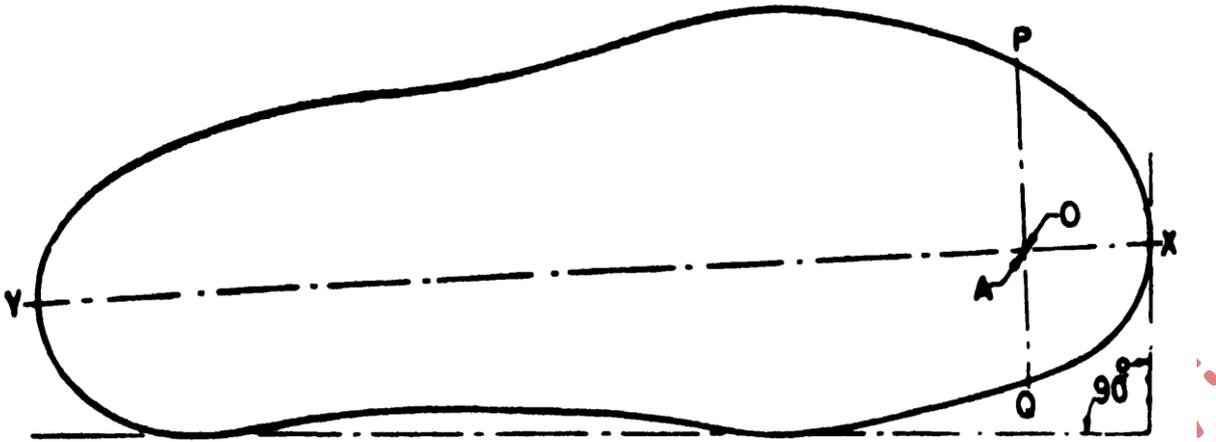


Figure 3 – Position for the measurement of clearance inside the boot and sole.

B-3.1.1 The boot/shoe to be tested shall be drilled through the sole in such a manner that with the last in it, the drill comes through the insole at the point O on the last, and is approximately perpendicular to the surface of the last at the point. A suitable jig can be devised for this purpose.

B-3.2 Method of Measurement of Clearance at the Moment of

Maximum Depression — A device capable of measuring the clearance at moment of maximum depression, between the insole and the upper shall be fixed to the insole by means of a screw passing through the hole

drilled in the position defined in

B-3.1.1. A suitable measuring device is shown in Fig. 4.

B-4. PROCEDURE

B-4.1 Clamping of Boot or Shoe — The boot/shoe, with the measuring device inserted, shall be tightly clamped so that it cannot move longitudinally or laterally, with its toe part on the flat horizontal steel plate. The angle of the boot/shoe shall be such that the forward 65 mm of the sole is judged by the operator to be on the average horizontal, and the boot/shoe shall be supported in this position by a wedge under the heel, the wedge being such that it supports only the heel and no part of the sole.

B-4.2 Position of Boot or Shoe — The boot or the shoe clamped as specified in **B-4.1** shall be positioned under the striking bar so that the measuring capsule is 10 mm behind the central line of the bar. The bar shall rest on the boot or the shoe with its longest direction roughly at right angles to the length of the boot or shoe.

B-4.3 Adjust the mass to a height of 508 ± 5 mm above the top of the vertical plunger as specified in **B-2.1** and allow it to fall freely. This gives the mass an impact of 14 kgf.m as required in **clause 8**. Measure the clearance inside the boot or the shoe at the moment of maximum depression in mm and report the value.

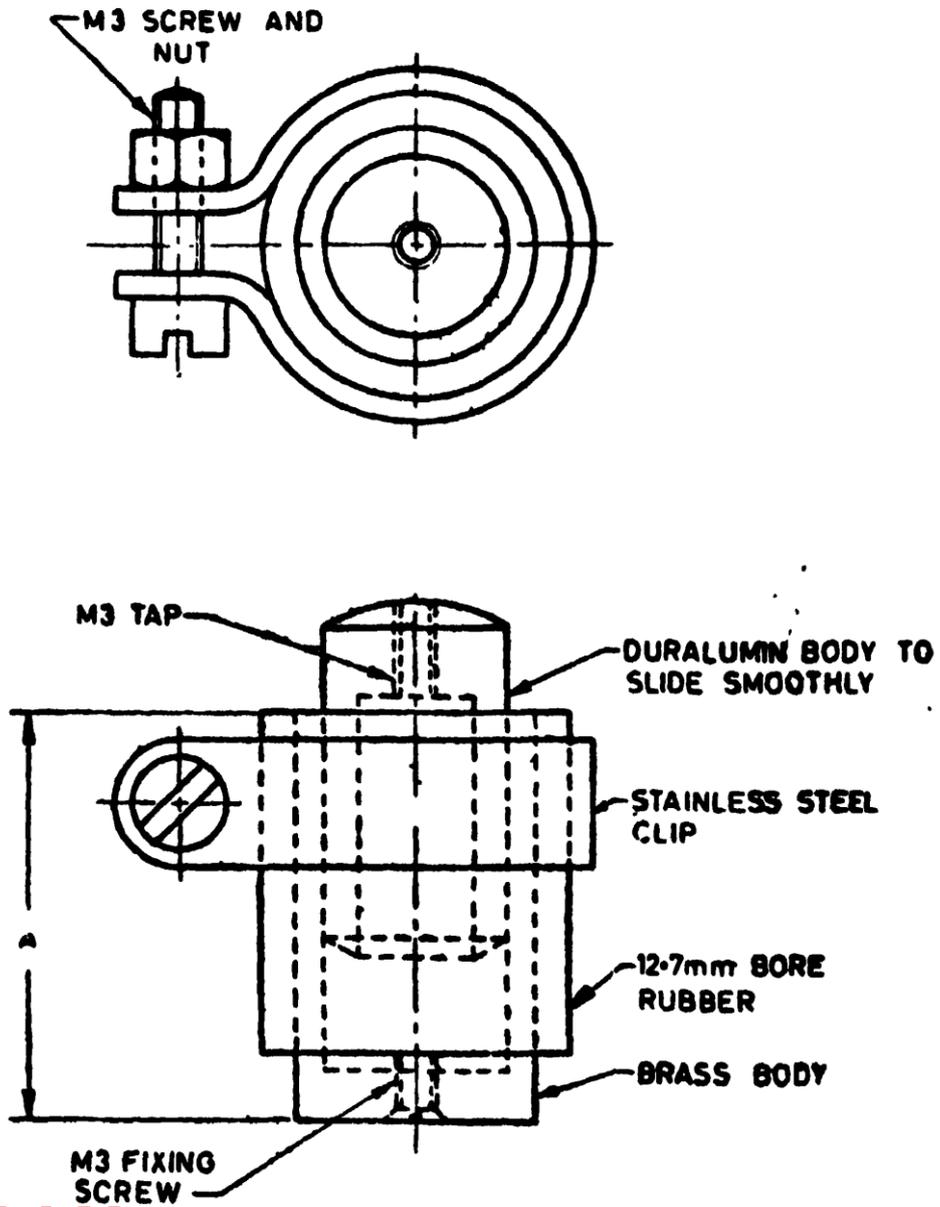


Figure 4 – Capsule for measuring the clearance at the time of maximum depression.

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