CDC 14 (964) DTZS
ICS 83.140.01

DRAFT TANZANIA STANDARD

Moulded rubber heels and soles - Specification

TANZANIA BUREAU OF STANDARDS

1st Edition

Foreword

This Draft Tanzania Standard is being developed by Rubber and rubber Products Technical Committee under supervision of the Chemical 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 5676: 1970 *Specification for mould solid rubber soles and heels* published by Indian Bureau of Standards.

KS 1635: 2001 *Specification for moulded rubber heels and soles* published by Kenya Bureau of Standards.

For the purpose of deciding whether a particular requirement of this Tanzania 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 TZS 4.

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1 Scope

This draft Tanzania Standard specifies the requirements, sampling and test methods for rubber full-soles with or without heels, half-soles and heels sold as finished products.

2 Normative references

The following referenced documents are indispensable for the application of this document. The latest edition of the referenced document (including any amendments) applies;

ISO 20344, *Personal protective equipment - Test methods for footwear*
TZS 4, *Rounding off numerical values*
TZS 275, *Footwear-Glossary of terms*
TZS 276, *Footwear - Method of sampling*
TZS 753 *Rubber, vulcanized or thermoplastic – Determination of tensile stress-strain properties.*
TZS 462 / ISO 48 *Rubber, vulcanized - Determination of hardness (hardness between 30 and 85 IRHD*
TZS 754 / ISO 188 *Rubber, vulcanized or thermoplastic – Accelerated ageing and heat resistance tests.*

3 Terms and definitions

For the purpose of this draft Tanzania Standard the definitions given in TZS 275 shall apply.

4 Requirements

4.1 Material - The rubber used for soles and heels shall be compounded from natural or synthetic rubbers or their blend, with or without the use of reclaimed rubber.

The rubber shall be vulcanized. The vulcanized rubber shall be homogenous and free from sulphur bloom. The surface shall be free from blemishes and defects. All cured spew and moulding flashes shall be neatly trimmed from the rubber so as to have clean edges.

4.2 The sole and heels shall be cleated or non-cleated with stippled or other background pattern.

4.3 The nail holes and washer nail holes in heels shall be suitably spaced so that the heel may be securely attached to the boot or shoe. There shall not be less than 7 holes and not more than 11 holes along the edge of the heel and between the cleats where cleats exist, situated at a distance of approximately 20 mm. Each nail hole shall have a suitable steel washer approximately midway between the two surfaces.

4.4 The thickness at the waist or seat of full-sole may be less than the substance of the fore-party by the amount not exceeding 1.5 mm subject to the substance of waist and seat being not less than 2 mm. (see Annex A).

4.2 Specific requirements.
The material, when tested according to the methods prescribed in Table 1.

Table 1 Specific requirements for soles and heels

S/No.	Property	Requirement	Test method
i.	Relative density, max.	1.35	Annex B
ii.	Hardness (IRHD) - Initial hardness - After ageing (100 ± 1 °C for 24 h)	 65 ± 5 + 5 -0	 TZS 462 / ISO 48 TZS 754/ISO 188
iii.	Tensile strength, N/mm^2 min.	15	TZS 753
iv.	Elongation at break, (%) min	500	TZS 753
v.	Abrasion resistance, (mm^2) max.	250	ISO 20344
vi.	Flexing resistance number of cycles - Initial crack, min. - Cut growth at the end of 120 000 cycles, (%) max	 60,000 600	Annex C

5. Packing and marking

5.1 Packing
Moulded rubber heels and soles shall be packed in a suitable package that withstand normal handling and transportation, and that will prevent damage of the product.

5.2 Marking
Each sole and heel shall be indelibly and legibly marked with the following information:
(a) Name of manufacturer or trade mark;
(b) Size of the footwear;
(c) Country of manufacture.

6. Sampling
Sampling for Moulded rubber heels and soles shall be done as per TZS 276.

7. Testing
Methods of tests for Moulded rubber heels and soles shall be as prescribed in the annexes.

Annex A

(normative)

DETERMINATION OF THICKNESS

A1. FULL SOLES

Measure the thickness at any point along the edge of the sole, excluding any raised or sunk pattern which covers a minor portion of the surface area of the fore part on any thickening at the toe. Measure the substance from the top of the pattern with stippled or any other background pattern not exceeding 0.5 mm in depth.

A2. HALF SOLES

Measure the thickness at any point along the edge of the sole, excluding any raised or sunk pattern which covers a minor portion of the surface area and excluding any level at the waist or thickening at the toe. Measure the substance from the top of the pattern with stippled or any other background pattern not exceeding 0.5 mm in depth.

A3. HEELS

Measure the substance at the back of the heel including any chevrons or protuberances at that pointbut excluding nail holes around and disregarding any recess on the reverse side of the heel.

Annex B

(normative)

METHOD FOR DETERMINATION OF RELATIVE DENSITY

B1. SCOPE

This annex prescribes the method for determination of density of solid vulcanized rubbers.

B2. PRINCIPLE

The mass of test piece in air and in water is determined by using a balance equipped with a straddle. The mass when immersed in water is less than that in air by the mass of water displaced, the volume of water displaced being equal to that of the test piece.

B3. APPARATUS

B3.1 Balance, accurate to 1 mg.

B3.2 Balance Pan Straddle.

A pan straddle of convenient size to support the beaker and permit determination of the mass of test piece in water.

B3.3 Beaker, 250 cm^3 capacity.

B3.4 Sinker, for test pieces with density less than 1 mg/m^3

B4. PREPARATION OF TEST PIECES

B4.1 The test piece shall consist of a piece of rubber with smooth surfaces, free from crevices and dust, and having a mass of at least 2.5 g.

B4.2 A minimum of two tests shall be made

B4.3 Samples shall be conditioned 25 ± 2 ^oC for at least 3 h before the test pieces are cut.

B4.4 Testing shall be done immediately or the samples shall be kept at this temperature until testing is done.

B5. PROCEDURE

B5.1 Suspend the test piece from the hook on the balance using a suitable length filament so that the bottom of the test piece is about 25 mm above the straddle. The filament shall be made from a material which is insoluble in water and does not absorb a significant amount of water and shall be counter balanced or the weight and the mass deducted from subsequent weighing of the test piece where the filament has a mass of less than 0.01 g such as nylon filament, accounting for its mass is not necessary. If means of suspension is other than a filament, the volume and mass of the suspension shall be taken into account in making the final calculation.

B5.2 Weigh the test piece to the nearest mg in air. Repeat the weighing with the test piece (and sinker see B5.3) immersed in water freshly boiled and cooled to 25 ± 2 ^0C contained in a beaker placed on the straddle.

B5.3 If the rubber has a density less than 1 mg/m^3, a sinker is necessary. The sinker shall further be weighed alone in water. Alternatively, a liquid with a different density to water may be used. Liquid shall not affect the rubber.

B5.4 Remove or minimize air bubbles adhering to the test piece by either adding trace amounts (say 1 part in 10 000) of surfactants e.g. detergents, or dipping the test piece momentarily into methyl alcohol or industrial methylated spirit taking precautions to minimize carrying over alcohol.

B5.5 Determine the mass to the nearest milligram, watching the pointer for a few minutes to make sure it does not drift gradually as a result of convection currents.

B6. EXPRESSION OF RESULTS

B6.1 Calculate the density as follows:

(a) Density (megagram per cubic metre), is given by the formula

$$\frac{m_1}{m_1 - m_2}$$

where

m_1 is the net mass of the rubber;

m_2 is the mass of the rubber less the mass of an equal volume of water, determined by weighing in water, both at the standard temperature.

This method is accurate to the nearest unit in the second place of decimals.

The density of water at standard laboratory temperature may be taken as 1.00 Mg/m^3

(b) When a sinker has been used, the density is calculated as

$$\frac{m_1}{m_1 + m_2 - m_3}$$

where,

m_1 is the net mass of the rubber;

m_2 is the mass of the sinker less the mass of an equal volume of water, determined by weighing in water;

m is the mass of the sinker and rubber less the mass of a volume of water equal to their combined volumes, determined by weighing in water.

B7. TEST REPORT

B7.1 Complete identification of product.

B7.2 Results expressed according to B6.

B7.3 Any other circumstance that may affect result.

B7.4 Reasons for carrying out test using any other liquid other than water.

B7.5 Reference to this appendix.

Annex C

(normative)

TEST METHOD FOR FLEXING RESISTANCE OF SOLES AND HEELS

C1. OUTLINE OF THE METHOD

This method of test determines resistance to initial cracking and percent cut growth of rubber soles and heels of footwear, cut out directly from the material, by the Ross flexing machine.

C2. APPARATUS

C2.1 Ross Flexing Machine — The machine allows the flexed area of the specimen to bend freely over a rod, approximately 9.5 mm in diameter, through an angle of 90°.

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C2.1.1 Rule - A rule of suitable length, graduated in steps of 0.25 mm is used for measuring the length of cut growth.

C3. PROCEDURE

C3.1 Test Specimens - Cut out directly from the outer soles test specimens of dimensions 25 ± 1 mm width and a minimum of 150 mm in length by the standard knife for cutting specimens for Ross flexing machine.

C3.2 Procedure - Separate the inner layer of the sole carefully without damaging the skin of the sole layer. Pierce one of the test specimens by the use of piercing tool. For this, adjust the piercing tool in the holder with the cutting edge projecting 7.25 ± 0.25 mm from the base of specimens when tapped. Before piercing the test specimen, lubricate the test specimen with the solution of soap that does not react with the compound. Place the test specimen with the designed surface of the sole on the top and cut by the piercing tool parallel to the width of the test specimen, at a right angle to and across the longitudinal centre line of the specimen at a point 61.9 ± 0.1 mm from the clamped end.

C3.3 Clamp un-pierced test specimens to the holder arm of the flexing machine in such a position that the designed surface of the sole could be flexed at 90° angle. The holder arm shall be in a horizontal position when the test specimens are attached. Let down the adjustable top rollers until they just touch the holder and lock in this position by means of the wing nuts, permitting free travel of the test specimens between the rollers during the bending movement.

C3.4 After the test specimens have been attached as described, start the machine at 100 ± 5 cycles per minute. Make frequent observation, recording the number of cycles and increase in the cut length for the purpose of determining the rate of increase in the cut length. While observing the cut growth the holder arm shall be at an angle approximately 45° vertically.

C3.5 Continue the test until the cut length has increased 500 per cent, that is, until the combined length of the cut and crack has increased to a total of 18.25 mm

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C3.6 In some cases, the cut growth is not in a straight line as the continuation of the cut made by the piercing tool, and ‘star shaped’ cracking may develop.
In the event, the cut growth shall be measured as the length of the longest continuous crack regardless of its direction.

C4. Test Report - Report the results from observation of at least two test specimens averaged and reported as the number of the cycles for the initial crack and also for 600 per cent cut growth.