DRAFT TANZANIA STANDARD

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First Edition

Leather for Oil Seal — Specification

TANZANIA BUREAU OF STANDARDS

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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:

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IS 3020, Leather for oil seal Specification.

1 Scope

This Draft Tanzania Standard prescribes material, requirements and test methods for leather for oil seals. It includes leather suitable for the manufacture of oil seals required for slow moving, or high speed shafts operating at room temperature or between 60°C and 100°C.

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 194, Leather – Determination of volatile matter.

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

TZS 197, Leather - Determination of sulphated total ash and sulphated water-insoluble ash.

TZS 196, Leather – Determination of total water – soluble matter, water – soluble inorganic matter and water soluble – organic matter.

TZS 199 Leather, Determination of pH and difference figure of an aqueous extract.

TZS 202, Leather — Physical and mechanical tests — Determination of resistance to grain cracking and grain crack index

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

3 Terms and definitions

For the purpose of this Draft Tanzania Standard, the following definition and the definitions given in TZS 188 (Hides, skins and leather glossary of terms).

3.1 oil seals

material generally used as seals and mounted on the ends of shafts or sleeves to retain oil in the bearing; Oil seals are used to seal air, fresh water, sea water, chemicals, oils and greases, etc.

4. TYPES

4.1 There shall be three types of leather for oil seals.

4.1.1 *Type* 1 - Full chrome tanned leather

4.1.2 *Type* 2 - Combination tanned leather (combination of vegetable and chrome tanning).

4.1.3 Type 3 - Full Vegetable tanned leather

5.0 REQUIREMENTS

5.1 Raw Materials — The material shall be of wet salted or green slaughtered hides or skinsand free from any visible defects and flay cuts, holes, etc.

5.2 Finishing — After tanning, the material shall be shaved on flesh side to the required thickness. The material shall be scoured thoroughly on the grain and shall be suitably dressed with oil and fats to make it suitable for being moulded into the required shape and design. The material may also be impregnated with a suitable resin or polymer as agreed to between the buyer and the seller.

5.3 Chemical Requirements — The material shall comply with the requirements given in Table 1 when tested in accordance with the prescribed methods.

Table 1 – Chemical Requirements for leather for oil seals

S/N	Characteristic	Materials and requirements			Test method
		Type 1	Type 2	Type 3	
1	Total Ash, percent by mass, max	9	9	2.5	Annex A
2	Solvent extractable substances, %	3.5 - 7.0	3.5 – 7.0	5 - 7	TZS 195
3	Chromium content (as Cr_2 O_3), Percentage by mass, Max	3.5	3.0	-	TZS 3574
4	Water soluble matter, Percent by mass, max	-	7	16	TZS 196
5	Water Insoluble ash, percent by mass, Max.	8.0	7.0	1	TZS 197
6	pH of water soluble, max	3.8	4.0	4.5	TZS 199
7	Degree of tannage , min,	-	55	55	Annex B

Table 2 – Physical Requirements for leather for oil seals

S/N	Characteristic	Materials and requirements			Test method
		Type 1	Type 2	Type 3	
1	Shrinkage in boiling water, percent area, *Max,*	3	3	25	Annex B
2	Resistance to hot oil	Shall not shrink more than 5 percent and shall remain soft and flexible at 100°C	Shall not shrink more than 5 percent and shall remain soft and flexible at 100°C	Shall not shrink more than 25 percent and shall remain soft and flexible at 70°C	Annex B

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3	Resistance to hot air	Shall remain soft and flexible at 100°C	Shall remain soft and flexible at 100°C	shall remain soft and flexible at 70°C	Annex C
4	Cracking of the grain	Shall not crack	Shall not crack	Shall not crack	TZS 202

PACKING AND MARKING

5.1 Packing

The leather for oil seal shall be packed in a suitable packaging as agreed to between the buyer and seller.

5.2 Marking — The packages shall be marked with the following information:

a) Name and type of the leather;

b) Name of the manufacturer, address and/or trade-mark, if any;

c) Quantity (number of pieces of the material);

d) Month and year of manufacture; and

e) Batch number.

5.2.1 The packages may also be marked with the “tbs” certification mark.

ANNEX A

(Normative)

Determination of Total Ash

A-1 SCOPE

A-1.1 This method prescribes a procedure for the determination of total ash in all types of leather. Ammonium salts are not included.

A-2 OUTLINE OF THE METHOD

A-2.1 A known quantity of the leather is burnt at 800 ± 25˚C and the residue is sulphated.

A-2.1.1 The method is inaccurate by the extent to which the leather contains organic metal compounds like silicone. The amount of mineral substances found by ashing may differ from the actual content owing to decomposition, reduction and escape of certain salts.

A-2.1.2 By treating the ash with sulphuric acid, the salts and oxides are converted into sulphate, but with some salts they shall again be transformed into oxides at the selected temperature of ignition.

A-3. APPARATUS

A-3.1 Crucible - platinum or silica crucible.

A-3.2 Desiccator

A-3.3 Muffle Furnace -fitted with pyrometer and having thermostatic control.

A-4. REAGENTS

A-4.1 Sulphuric Acid - 2 N (see IS: 266-196).

A-4.2 Ammonium Nitrate Solution - 10 percent solution (W/V).

A-5. PROCEDURE

A-5.1 Sample the leather and prepare a test portion for chemical testing.

A-5.2 Weigh about 5 g from the test portion to an accuracy of 0.001 g and carbonize it over a low flame in a crucible, that has previously been heated to 800 ± 25˚C, cooled and weighed, so that the leather burns with a small flame.

A-5.3 Carbonize, particularly curried leather, carefully so that the greases burn slowly.

A-5.4 Thoroughly moisten the ash with sulphuric acid and heat over a low flame until sulphuric acid fumes are no longer visible.

A-5.5 Then ignite in the muffle furnace at 800 ± 25˚C.

A-5.6 If carbon-free residue is not obtained in spite of heating at 800 ± 25˚C, moisten the residue with a little of ammonium nitrate solution and make it red hot again until it is free from carbon.

A-5.6 If complete ashing is not possible even with the help of ammonium nitrate extract, the contents of the crucible with hot water and filter through an ash-free filter paper.

A-5.7 Ash the carbon residue with filter paper, add the filtrate to the content of the crucible, evaporate on the water-bath; again heat at 800 ± 25˚C until the last traces of visible carbon are removed.

A-5.8 Cool in a desiccator and weigh.

A-5.9 Repeat heating, cooling and weighing until the weight of the residue is constant.

NOTE 1 -For the determination of ash, the dried leather obtained from the determination of volatile matter in accordance with TZS 194 can be used in all cases.

NOTE 2 - It is advisable to extract silicone impregnated leather with the solvent before determining the ash.

NOTE 3 - The ash may be used to determine its constituents of chrome oxide, aluminium oxide or other cations of mineral filler substances.

A-6. CALCULATION

A-6.1 Calculate the total ash as follows:

$$\text{Total ash, percent by weight} = \frac{W1}{W2} x100$$

Where;

w_1 = weight in g of the sulphated ash, and

W_2 = weight in g of the material taken for the test.

ANNEX B

(NORMATIVE)

AREA STABILITY OF LEATHER ON IMMERSION IN WATER AND OIL

B-1. SCOPE

B-1.1 This method covers the determination of the area stability of leather in water and oil. The procedure is applicable to mechanical leathers. Suggested times and temperatures are given.

B-2. METHOD

B-2.1 This method is intended to detect practical differences in area changes of leathers when the leathers are immersed in water and oil at given temperatures and exposure times.

B-3. APPARATUS

B-3.1 Thermometer — Immersion thermometer having a range from 20 to 150°C.

B-4. REAGENTS

B-4.1 Distilled Water

B-4.2 Immersion Oil — oil of following description;

Aniline point, °C	123.9 ± 1
Kinematic viscosity measured at 99°C, m^2/s	19.5 × 10-6 ± 2 × 10-6
Flash point, °C, *min*	244

NOTE 4 — Any other oil or oil mixture may be specified depending on the service condition.

B-5 TEST PIECE

5.1 The leather test piece shall be a piece 5.08 ± 0.07 cm^2 in area. A small hole, not in excess of 0.32 cm in diameter may be punched on the centre line of the test piece and 0.64 cm from the edge. Condition the test piece in accordance with the laboratory testing condition procedure.

A-6. PROCEDURE

B-6.1 Measure the length of the test piece on the grain side along each of the four sides at a distance of 0.3 ± 0.1 cm from the edge and report the average value.

B-6.2 Compute the area by squaring the average value for the sides.

B-6.3 Place the test piece to be measured, grain side up, on a smooth surface of contrasting colour, and place a ruler divided into 0.05 cm intervals on to the grain side, applying just enough pressure to flatten the test piece.

B-6.4 Suspend the test pieces, not more than six per single test, on a copper wire in 800 ± 10 ml of distilled water or oil specified in **B**-4.2 for a period of 16 to 24 h at room temperature.

B-6.5 The test piece shall be no closer than 2.0 cm to the surface of the beaker from which the heat is applied.

B-6.6 Space the test piece by brass nuts of 0.4 to 0.5 cm thickness.

B-6.7 Also prevent the test pieces from touching the wall of the beaker by means of spacers.

B-6.8 Heat the fluid at the rate of 3 to 5°C per minute until it reaches the test temperature and keep it at the test temperature for the length of time suggested below:

Fluid	*Time*	*Temperature*
Distilled water	1 hour or as specified (tolerance ±2 percent)	Boiling temperature
Oil	„	100 ± 2°C or as specified

B-6.9 Use a power stirrer for oil. If water is used, stir it by hand until the boiling temperature has been reached. After boiling has started replace has dropped 1.5 cm below the level reached when the boiling has started.

B-6.10 At the end of the test time remove the test pieces from the fluid, wipe free of excess fluid, and allow to cool to room temperature.

B-6.11 Compute the area as described above and record.

B-7. CALCULATION

B-7.1 Calculate the percentage area change as follows:

$$\text{Area change, percent} = \frac{B-A}{B} \text{ X } 100$$

Where;

B = final area, and

A = initial area.

B-8. PRECISION

B-8.1 Although the statistical analysis of area change data indicate poor quantitative precision, it is possible to rank leathers qualitatively in the order of their resistance to area change at given temperatures and exposure times.

ANNEX C

(NORMATIVE)

DETERMINATION OF RESISTANCE TO HOT AIR

C-1 PROCEDURE

C-1.1 Heat the test specimen of 100 × 20 mm in size at 100 ± 2°C for 100 hours in a current of hot air oven.

C-1.2 Cool it to room temperature and compare with the original as regards flexibility and softness.

