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TANZANIA STANDARD

Textile auxiliaries-Maize starch for textile processing-Specification

TANZANIA BUREAU OF STANDARDS

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Foreword

This Tanzania Standard was published under the authority of the Board of Director of Tanzania Bureau of Standards.

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Tanzania Standards are developed through Technical Committees that are representatives of key stakeholders including government, academia, consumer groups, private sector and other interested parties. The Technical Committees work under the supervision of Divisional (sectoral) Committees. The Standards are developed in accordance with the Guide and Procedure for Development of Tanzania Standards and TZS 0: *Guide for presentation of Tanzania Standards*.

Tanzania Standards are subject to review to keep pace with science and technological advances. Users of the Tanzania Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

This Tanzania Standard was developed under the supervision of the Textile and Leather Division standards Committee (TLDC). The technical committee responsible for this standard is TDC7-Textile fibres

1. Scope

This Draft Tanzania Standard prescribes the requirements, sampling, and testing methods for maize starch intended for sizing and finishing material in textile industry.

2. Normative References

The following standards are referred to in the text in such a way that some or all of their content constitutes requirements of this Draft Tanzania Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

TZS 4, Rounding off numerical values

TZS 330, Cereals, Pulses and their products-Sampling

TZS 331, Cereal and Pulses – Test methods

3. Terms and definitions

For the purposes of this Draft Tanzania Standard, the following terms and definitions shall apply.

3.1

Starch

is a polysaccharide composed of glucose units, primarily produced by green plants during photosynthesis

3.2

maize/corn starch

is a white or light creamy , odorless, and tasteless powder derived from the endosperm of corn kernels

4 Requirements

4.1 The maize starch for textile sizing and finishing shall be in the form of a fine white in colour, except when prepared from yellow maize in which case it may be light creamy, free from dirt and other impurities. It shall also meet physical requirements given in Table 1 below.

Table 1 —Physical requirements for maize (corn) starch

SN	Characteristic	Requirements	Test methods
1	Identification	Similar or close to photomicrograph given in Fig. 1	TZS 331
2	Particle size	To pass through 180 micron IS sieve	
3	Cold water soluble, % Max.	0.4	
4	Viscosity at 75 °C, Min	30 second	Annex A

Note 1- When Redwood Viscometer No.1 is used for the determination of viscosity.

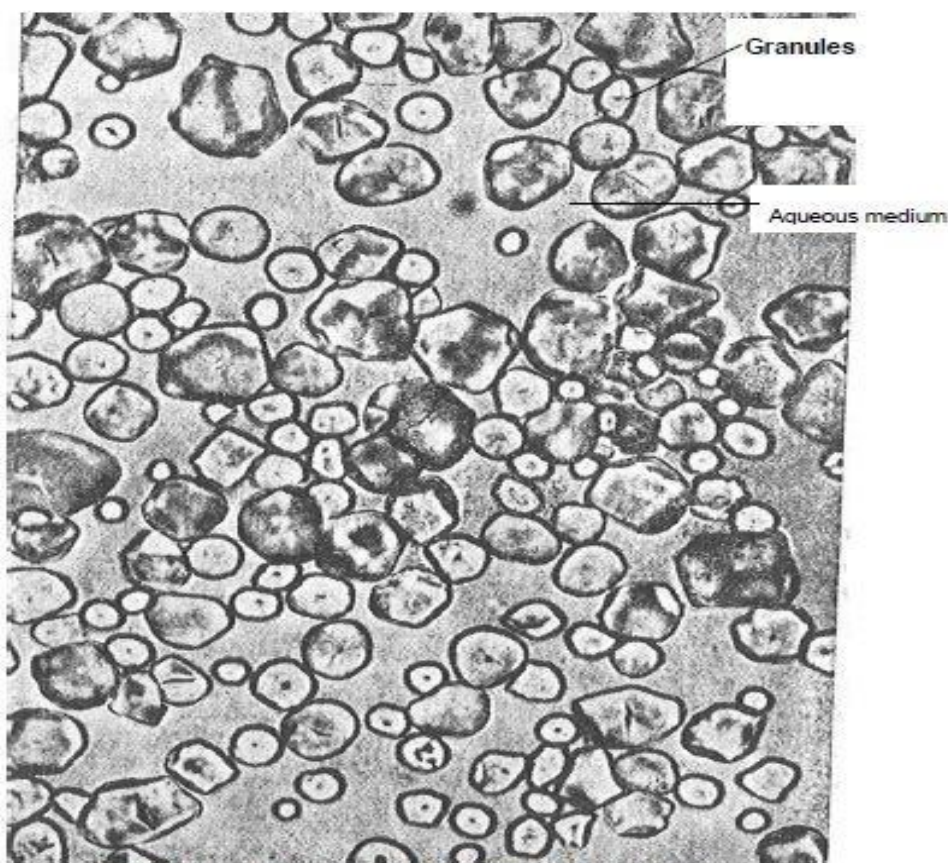


Figure A.1 — Photomicrograph of Maize Starch (X700)

4.2 The maize starch used as textile sizing and finishing material shall meet the chemical requirements given in Table 2 below.

Table 2 —Chemical requirements for maize (corn) starch

SN	Characteristic	Requirements	Test methods
1	Moisture content, %, Max	13	TZS 331
2	Starch content, Min	98	
3	Ash content, %, Max.	0.25	
4	Free acidity, ml Max	40	
5	pH, Min	4.5	
6	Petroleum –hydro-carbon extractable matter, % Max	0.15	Annex B

Note1- If the original test specimens are analyzed as such in order to eliminate the time-consuming oven-drying, the observed mass should be corrected for moisture content while calculating the results.

Note2- Annex B specifies the petroleum-hydrocarbon extractable matter test for maize starch used in textile industry. It requires that the extractable matter should not exceed about 0.15% by mass, ensuring starch purity and suitability for textile sizing.

Note3- Petroleum-hydrocarbon extractable matter is measured to identify the amount of the residual oils, waxes, or hydrocarbons in maize starch. The excess extractable can interfere with yarn sizing, reduce adhesion, and cause uneven finishes to ensure clean, safe, and effective for textile processing.

6. Packing

Unless otherwise agreed to between the seller and buyer, the maize starch should be packed in moisture-proof bags such as polyethylene lined high density polyethylene (HDPE) woven sacks.

7. Marking

Each package shall be marked with the following information:

- Name or trade-mark and address of manufacturer,
- Net weight of the contents (kg).
- Country of origin,
- Packing/Production date.

8. Sampling

8.1 Unless otherwise specified in the contracts, the procedure for sampling of maize starch for test evaluation shall be done in accordance to TZS 330.

8.2 The starch content and particle size shall be tested on individual samples and the remaining characteristic on composite samples.

9. Criteria for conformity

9.1 Where the value specified in maximum (mean +0.5 range) shall not exceed specified value

9.2 Where the value specified is minimum (mean -0.5 range) shall not fall below the specified value

(Annex A)
Experimental Procedure for
Paste Preparation and Viscosity Measurement

A-1 Materials

A-1.1 Dry sample material (6.0 g)

A-1.2 Distilled water (200 mL, plus additional for compensation)

A-1.3 Beaker (suitable size)

A-1.4 Paddle-type mechanical stirrer

A-1.5 Boiling water bath

A-1.6 Cover plate

A-1.7 Analytical balance

A-1.8 Viscometer (appropriate type for paste viscosity measurement)

A-2 Safety Notes

A-2.1 Always wears lab coat, gloves, and safety goggles.

A-2.2 Handle boiling water baths with care to avoid burns.

A-2.3 Ensure electrical equipment (stirrer, viscometer) is properly grounded.

A-3 Method

A-3.1 Sample Preparation

A-3.1.1 Weigh **6.0 g** of the dry material using an analytical balance

A-3.1.2 Transfer the material into a beaker containing **200 ml** of distilled water.

A-3.2 Initial Weighing

A-3.2.1 Place the beaker with its contents on the balance.

A-3.2.2 Record the combined weight of the beaker, stirrer, and mixture.

A-3.3 Cooking Process

A-3.3.1 Position the beaker in a boiling water bath

A-3.3.2 Cover the beaker with a plastic plate to minimize evaporation.

A-3.3.3 Stir continuously using a paddle-type mechanical stirrer at **45–50 revolutions per minute (rpm)**.

A-3.4 Intermediate Measurement

A-3.4.1 After 1.5 hours, weigh the beaker, stirrer, and contents again.

A-3.4.2 Add sufficient distilled water to compensate for any loss due to evaporation.

A-3.5 Final Cooking

Continue cooking for an additional 10 minutes under the same stirring conditions.

A-3.6 Viscosity Determination

Measure the viscosity of the prepared paste at the required temperature using a suitable viscometer.

(Annex B)

Estimation of Petroleum-Hydrocarbon extractable matter

B-1 Prepare the Sample

B-1.1 Weigh a representative maize starch sample for testing.

B-1.2 Take **10 g** of maize starch

B-1.3 Dry at **105°C** to constant weight

B-1.4 Cool in a desiccator before extraction

B-2 Extract with Petroleum Ether

B-2.1 Remove hydrocarbon-soluble matter using Soxhlet extraction

B-2.2 Use **150 mL petroleum ether** (boiling range 40–60°C)

B-2.3 Run Soxhlet extraction for **6 hours**

B-2.4 Collect extract in a pre-weighed flask

B-3 Evaporate Solvent

B-3.1 Concentrate the extract to dryness for weighing.

B-3.2 Evaporate petroleum ether under reduced pressure

B-3.3 Dry residue at **105°C** for 30 minutes

B-3.3 Cool in desiccator

B-4 Weigh Residue

B-4.1 Determine mass of extractable matter

B-4.2 Weigh flask with residue

B-4.3 Subtract tare weight of flask

B-4.4 Record extractable matter weight

B-5 Calculate the Percentage

B-5.1 Express extractable matter as % of sample weight

$$\text{Extractable Matter (\%)} = \frac{\text{Residue}}{\text{Sample}} \times 100$$

Where:-

Residue = mass of extract left after solvent evaporation (in grams).

Sample = initial mass of maize starch taken for the test (in grams).

The result is expressed as a **percentage by mass**.

Limit: **≤ 0.15% by mass**