

**DRAFT TANZANIA STANDARD**

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**Tile cleaners — Specification**

**TANZANIA BUREAU OF STANDARDS**

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Draft for Comments only

**Foreword**

This Draft Tanzania Standard is being prepared by Soaps and detergents Technical Committee under the supervision of Chemicals Divisional Standards Committee and it is in accordance with the procedures of the Bureau.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated expressing the result(s) of a test or analysis shall, be rounded off in accordance with TZS 4. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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## Tile cleaners — Specification

### 1. Scope

This Draft Tanzania Standard specifies requirements, sampling and test methods for tile cleaners used for light and heavy-duty cleaning.

### 2. Normative references

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

*TZS 35 Soaps – Sampling and test methods*

*TZS 59, Water for analytical laboratory use — Specification and test method*

*TZS 677/ISO 2271 Surface active agents – Detergents – Determination of anionic-active matter by manual or mechanical direct two-phase titration procedure.*

*TZS 676/ISO 2871-1 Surface active agents – Detergents – Determination of cationic-active matter content – Part 1 – High molecular-mass cationic-active matter*

*TZS 1780/EAS 814 Determination of biodegradability of surfactants — Test method*

### 3. Terms and definitions

Terms and definition given in TZS 35 shall apply

### 4. Requirements

#### 4.1 General requirements

4.1.1 Tile cleaners shall be of the following types

- a) General purpose tile cleaners
- b) Acidic tile cleaners

4.1.2 The product shall be a homogeneous aqueous liquid.

4.1.3 The product shall be miscible with water in all proportions.

4.1.4 The product shall not affect tile surfaces when used as directed by the manufacturer.

4.1.5 The active ingredients used shall be biodegradable when tested according to TZS 1780/EAS 814

## 4.2 Specific requirements

4.2.1 Tile cleaners shall comply with the specific requirements given in Table 1 when tested in accordance with the corresponding test method.

**Table 1 — Specific requirements for general purpose tile cleaners**

S/N	Characteristics	Requirements	Test method
i.	Solubility in water	Completely soluble	Annex A
ii.	Rinsing properties	To pass the test	Annex B
iii.	Surfactants, % m/m, min	5	TZS 677: 2002/ ISO 2271/Annex C
iv.	Total non-detergent organic matter, % m/m, <i>max.</i>	0.5	Annex D
v.	Rust inhibition	To pass the test	Annex E
vi.	Biodegradability	To pass the test	TZS 1780

**Table 2 — Specific requirements for acidic tile cleaners**

S/N	Characteristics	Requirements	Test method
i.	Solubility in water	Completely soluble	Annex A
ii.	Rinsing properties	To pass the test	Annex B
iii.	Surfactants, % m/m, min.	5	TZS 677: 2002/ ISO 2271/Annex C
iv.	Total non-detergent organic matter, % m/m, <i>max.</i>	0.5	Annex D
v.	Rust inhibition	To pass the test	Annex E
vi.	Biodegradability	To pass the test	TZS 1780
vii.	Total acidity, %, m/m	7 - 12	Annex F

## 5. Packaging, labelling and marking

### 5.1 Packaging

5.1.1 The product shall be packed in suitable containers that are securely closed, impervious to the product or shall not be corroded by the product, and shall be sufficiently strong to prevent contamination of the product arising from the ordinary risks of transportation, handling and storage.

**5.1.2** The lid or cap on the container shall be such that the product is easily and safely dispensed from the container.

## **5.2 Labelling**

**5.2.1** The labelling shall be either in English or Kiswahili or in combination as agreed between the manufacturer and the supplier. Any other language shall be optional.

- a) Name and type of product as “general purpose tile cleaner or acidic tile cleaner”
- b) manufacturer’s name and physical address

NOTE: The name, physical address of the distributor/supplier and trade mark may be added as required

- c) batch or code number;
- d) country of origin
- e) net contents;
- f) instructions for use;
- g) date of manufacture and best before date;
- h) For acidic tiles the precautionary notice with the following information:
  - i) the use of appropriate personal protective equipment (hand gloves, masks and goggles)
  - ii) the word 'CAUTION' shall be in a colour that contrasts with the surrounding for easy visibility and shall be followed with the statement, 'READ LABEL BEFORE USE';
  - iii) the following shall be marked immediately under name of product:
    - 'Keep Out of Reach of Children';
    - contains acid (the hazards involved and the necessary storage precautions to be used);
    - that, in case of floor spills, baking soda ash shall be sprinkled over the product and the affected area shall be rinsed with water;
    - the product shall not be used with any other cleaning product;
    - CORROSIVE ACID' ('INAWEZA KUCHOMA); followed by the symbol



'POISON/DANGER' ('SUMU/HATARI); followed by a skull and bones,



## **6. Sampling**

Sampling shall be done in accordance with Annex G

## **7. Quality of reagents**

Analytical grade reagents and water for analytical use as specified by TZS 59 shall be used for the appropriate tests.

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**Annex A**  
(normative)

**Test for solubility**

**A.1 Preparation of synthetic hard water**

Weigh to the nearest 0.001 g, about 0.264 g of  $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$  and 0.295 g of  $\text{MgSO}_4 \cdot 2\text{H}_2\text{O}$ . Transfer quantitatively to a 1-L volumetric flask; dissolve in a small portion of distilled water and make up to the mark with distilled water.

The resulting solution will have a concentration of 8.1 millimole per litre calcium hardness (as  $\text{CaCO}_3$ ).

**A.2 Procedure**

Using a pipette, transfer 5.0 mL of the sample into a test tube and add sufficient synthetic hard water prepared in A.1 to give a volume of 50 mL. Stir vigorously for 5 min, and observe for solubility.

**Annex B**  
(normative)

**Test for rinsing properties**

Dissolve 2.0 mL of the sample as completely as possible in 98 mL of synthetic hard water (see A.1) at ambient temperature, in a clean 250-mL Erlenmeyer flask. Stopper the flask and stir vigorously for 1 min. Pour out the solution. Rinse the flask by the same procedure, using three 75 mL portions of synthetic hard water alone. Invert the flask, allow to dry and examine for any residue not rinsed from the interior.

The flask shall contain no more residues after being dried than a similar allowed drying after rinsing with synthetic hard water alone.

**Annex C**  
(informative)

**Methods of test for synthetic detergents**

**C.1 Quality of reagents**

Unless otherwise specified, chemicals of analytical grade and water, distilled quality, shall be employed in all the tests.

**C.2 Qualitative identification of non-soapy detergents**

**C.2.1 General**

It is recommended that the quantitative examination of a sample is preceded by a qualitative identification of the type of non-soapy detergent present. The procedure given in C.2.4 permits ascertaining whether the material is based on soap or a non-soapy detergent. The method described in C.2.5 enables the identification of the type of non-soapy detergent, that is, whether it is cationic, anionic or non-ionic.

**C.2.2 Apparatus**

**C.2.2.1 Measuring cylinder**, 100 mL capacity; glass-stoppered

C.2.2.2 Volumetric flask 1-L

**C.2.2.3 Tests tubes**

**C.2.3 Reagents**

**C.2.3.1 Hydrochloric acid**, 5 % (m/v) solution

**C.2.3.2 Methyl orange indicator solution**, 0.1% (m/v) solution

**C.2.3.3 Methylene blue reagent** — Dissolve 0.5 g of methylene blue in distilled water and make up the volume to 100 mL. To 6 mL of this solution, add 120 mL of one mol sulfuric acid and 50 g of anhydrous sodium sulphate, and make up the volume to 1-L volumetric flask with distilled water.

**C.2.3.4 Chloroform**

**C.2.3.5 Cetyl dimethyl benzyl ammonium chloride solution**, 0.2 % (m/v) solution

**C.2.4 Procedure for identification of soapy and non-soapy detergents**

Take about 0.1 g of the sample in a test-tube, add about 20 mL of water and shake well until dissolution is complete. Add a drop of methyl orange indicator solution, and make it just acidic by adding a few drops of hydrochloric acid solution. If the lather is destroyed and fatty acids separate out, then the material is based on a soap. If the lather persists, then the active matter is non-soapy detergent.

**C.2.5 Procedure for identification of the type of non-soapy detergents**

**C.2.5.1** Dissolve about 0.1 g of the sample in about 20 mL of water, and take 10 mL of the solution in a measuring cylinder. Add 10 mL of methylene blue reagent and 15 mL of chloroform, shake well and allow to stand, observe whether the colour is in the chloroform layer or aqueous layer.

**C.2.5.2** If the colour is initially in the chloroform layer, add 0.1 mL of cetyl dimethyl benzyl ammonium chloride solution, and shake well and allow to stand. If the colour is regained in the chloroform layer, the active matter is anionic. If the colour is transferred to the aqueous layer, the active matter is non-ionic.

**C.2.5.3** If the colour is initially in the aqueous layer, add 0.1 mL of sodium lauryl sulphate solution, and shake well and allow to stand. If the colour is retained in the aqueous layer, the active matter is cationic. If the colour is transferred to the chloroform layer, the active matter is non-ionic.

### **C.3 Quantitative identification of active ingredient**

This shall be carried according to ISO 2271.

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**Annex D**  
(normative)

**Determination of non-detergent organic matter**

**D.1 General**

The term non-detergent organic matter includes hydrocarbons, fatty alcohols and perfumes. Using petroleum ether and under the conditions prescribed, non-detergent organic matter only is extracted leaving any alkylamide present in the material.

**D.2 Apparatus**

**D.2.1 Evaporating basin**

**D.2.2 Separating funnels**, 1 000-mL capacity.

**D.2.3 Wide mouthed flat-bottomed flask**, 200-mL capacity

**D.2.4 Quick fit buchner flask**, 500-mL capacity, fitted with a sintered glass filter funnel (porosity 4)

**D.3 Reagents**

**D.3.1 Ethyl alcohol**, 50 %, 70 %, 90 % and 96% (by volume)

**D.3.2 Petroleum ether**, boiling range 40 °C to 60 °C non-volatile residue at 80 °C maximum 0.001%

**D.3.3 Acetone**, non-volatile residue at 80 °C maximum 0.001 %

**D.4 Procedure**

**D.4.1** For the removal of inorganic salts, weigh accurately about 5 g of the material in a 150-mL squat beaker. Extract with 50 mL of hot 90 % ethanol by heating on the steam bath for about 2 min stirring and breaking up any hard lumps with a glass rod flattened at the end.

Allow the solid matter to settle and decant the hot alcoholic solution through a sintered glass filter funnel (porosity 4) fitted to a 500-mL Buchner flask to which suction is applied. Repeat the extraction in a similar manner with five further consecutive 30-mL quantities of boiling 90 % ethanol. Pass each extract in turn through the filter into the flask.

**D.4.2** Transfer quantitatively all the combined filtrate from the Buchner flask to a 1-L separating funnel and rinse the flask four times with 40-mL quantities of distilled water, transferring each wash in turn to the separating funnel. Add 100 mL of petroleum ether, swirl gently to ensure adequate mixing and allow the two phases to separate. Run off the aqueous alcoholic layer into a second separating funnel, and extract with 75 mL of petroleum ether. Repeat the extraction of the aqueous alcoholic phase in the third separating funnel with a further 75 mL of petroleum ether. Combine the three ether extracts in the first separating funnel. Rinse each of the two empty funnels with a few millilitres petroleum ether and add the rinsing to the combined ether extracts.

**D.4.3** Wash the combined ether extracts and rinsing (see D.4.2) with four successive 50-mL portions of 70 % ethyl alcohol, shaking and removing the alcoholic phase each time. Transfer the ether layer in stages to a tared flask and evaporate off the solvent. Add 10 mL of acetone and evaporate off the solvent. Rotate the flask on a steam bath during the operation. Cool the flask to about 60 °C to 65 °C, gently blow out the last traces of solvent with a current of dry air, cool in a desiccator and weigh.

## D.5 Calculation

The non- detergent organic matter shall be expressed as follows:

$$\text{Non- detergent organic matter, \% , by mass} = 100 \frac{m_1}{m}$$

where

$m_1$  is the mass, in grams, of the non-detergent organic matter in the flask; and

$m$  is the mass, in grams, of the material taken for the test.

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## Annex E

(Normative)

### Method for assessing rust inhibition

#### E.1 Apparatus

##### E.1.1 Squat and tall 1-L Pyrex glass beakers

##### E.1.2 Oven, capable of maintaining $105\text{ °C} \pm 2\text{ °C}$

**E.1.3 Test panel**, made of stainless steel, of approximate dimensions 125 mm x 63 mm x 1.5 mm. The panels shall have a cold-rolled finish on both faces. They shall be undamaged and unmarked, flat and with their edges free from burrs.

##### E.1.4 Stainless steel tongs, for handling the panels

**E.1.5 Panel holders**, made of inert material such as polypropylene for use during pre-cleaning and drying operations

**E.1.6 Rubber bands**, of rectangular cross-section, measuring when lying flat and unstretched, approximately 80 mm x 6 mm

##### E.1.7 Magnesium carbonate (technical), for use as an abrasive in cleaning panels

##### E.1.8 Distilled water

##### E.1.9 Watch glass, large enough to cover the tall 1-L beakers in E.1.1

#### E.2 Pre-cleaning of test panels and rubber bands

##### E.2.1 Panels

**E.2.1.1** Swab the test panels, two for each test, with cotton wool using a warm 1 % v/v solution of a general-purpose detergent.

**E.2.1.2** Scour the panels with cotton wool using water as a lubricant and the magnesium carbonate as an abrasive.

NOTE Scouring also removes any films produced by reaction between the detergent and the abrasive, for example, magnesium silicate.

**E.2.1.3** Without delay, thoroughly rinse the panels under hot tap water, ensuring that all of the magnesium carbonate is removed.

**E.2.1.4** Then, rinse the panels in boiling, distilled water immersing each panel in turn in water contained in three 1-L beakers.

**E.2.1.5** Dry in an oven at  $105\text{ °C} \pm 2\text{ °C}$ .

**E.2.1.6** Allow to cool in a dry, dust-free position.

## **E.2.2 Rubber bands**

**E.2.2.1** Place the rubber bands in a hard-boiling 1 % v/v solution of a general cleaning detergent for 10 min.

**E.2.2.2** Rinse under hot tap water.

**E.2.2.3** Then rinse in distilled water and allow to dry.

## **E.3 Procedure**

**E.3.1** The procedure shall be carried out in duplicate in accordance with E.3.2 – E.3.9.

**E.3.2** In a 1-L beaker, make up 950 mL of the sample dilution under test. Make up to the mark.

**E.3.3** Place two rubber bands around each test panel in the direction of the long axis of the panel, ensuring that the bands are flat against both sides of the panel and that the panel is not touched by the fingers.

**E.3.4** Five minutes after placement of the bands, immerse the panels on their ends as upright as possible in the test solution, so that there is at least 10 mm of solution above the panels. Note the time. Place the watch glasses on the beaker.

**E.3.5** Leave the panels in the test solution for 72 h. Each morning and evening, top up the solution to the mark with distilled water.

**E.3.6** At the end of 72 h remove the panels from the test solution, remove the bands and rinse the panels under hot, running water.

**E.3.7** Then rinse three times as prescribed in C.2.1.4.

**E.3.8** Finally, dry the panels in the oven at  $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ .

**E.3.9** Examine the panels for:

- a. evidence of corrosion, and
- b. discolouration.

**NOTE** Pitting is most likely to occur where the rubber band contacts the edges of the panel.

## **E.4 Interpretation of results**

If the duplicate panels from the test detergents show the same characteristics, record the results. If the duplicates differ, repeat the test using fresh panels.

## **E.5 Report**

The product shall be deemed to contain an effective rust inhibitor if no visible corrosion or discolouration of the panels has occurred.

**Annex F**  
(normative)

**Determination of acidity**

Accurately weigh 10 g of sample in a 250-mL Erlenmeyer flask and add 25 mL of distilled water. Add approximately 15 mL of 5 % aqueous calcium acetate solution and warm contents to 50 °C. Cool and filter into beaker.

Carefully rinse the Erlenmeyer flask precipitate with 3 to 4 aliquots of distilled water collecting all rinsing with the filtrate. Titrate the filtrate with standard 1 mol/L NaOH solution.

Calculate as follows:

$$\text{percent acidity} = \frac{\text{concentration of NaOH (mol/L)} \times \text{mL of NaOH} \times C}{\text{mass of sample}}$$

where

C = 3.647 for HCl or

C = 3.132 for H<sub>3</sub>PO<sub>4</sub>

**Annex G**  
(normative)

**Sampling**

**G.1 Procedure**

**G.1.1** In a single consignment, all packages (cartons) containing tiles cleaner drawn from the same batch of production shall constitute a lot. For ascertaining the conformity of the lot to the requirements of this standard, tests shall be carried out on each lot separately. The number of packages to be selected for drawing the sample shall be in accordance with Table G.1.

**Table G.1 — Scale of sampling**

Number of packages (cartons) in the lot <i>N</i>	Number of packages (cartons) to be selected <i>n</i>	Number of samples
4 to 15	3	3
16 to 40	4	4
41 to 65	5	2
66 to 110	7	2
111 and above	10	1

**G.1.2** The packages shall be selected at random, using tables of random numbers. If these are not available, the following procedure shall be applied:

Starting from any package, count all the packages in one order as 1, 2, 3.... *N*, selecting every  $k^{\text{th}}$  package, where *k* is the integral part of  $N \div n$ .

**G.1.3** From each package thus selected, draw at random an equal number of cakes so as to obtain a total mass of at least 2 kg.

**G.2 Preparation of test samples**

**G.2.1 Composite sample**

Weigh each cake separately (including any material that may have adhered to the wrapper), and calculate the average mass. Cut each of the remaining cakes into eight parts by means of three cuts at right angles to each other through the middle. Grate finely the whole of two diagonally opposite eighths of each specimen. Mix the gratings and place in a clean, dry, airtight glass container.

**G.2.2 Samples for testing**

Immediately after preparation of composite sample (G.2.1), take at one time all test samples required for the tests in 4.2. Weigh out the test sample required for determination of free alkali or acid content, and use it immediately.

## Bibliography

TZS 624:2014 *Synthetic organic liquid detergent for household use — Specification*

TZS 583-1:2014 *Toilet cleansers — Specification — Part 1: Acidic liquid toilet cleansers*

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