



## **FINAL DRAFT EAST AFRICAN STANDARD**

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**Liquid household hand dishwashing detergent — Specification**

**EAST AFRICAN COMMUNITY**

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## Foreword

Development of the East African Standards has been necessitated by the need for harmonising requirements governing quality of products and services in East Africa. It is envisaged that through harmonised standardisation, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to achieve this objective, the Partner States in the Community through their National Bureaux of Standards, have established an East African Standards Committee.

The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organisations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalisation of standards, in accordance with the procedures of the Community.

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

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## Liquid household hand dishwashing detergent — Specification

### 1 Scope

This East African Standard specifies requirements for liquid detergent for household dishwashing. It does not cover detergent for machine dishwashing and multipurpose cleaning.

### 2 Normative references

ISO 2268, *Surface active agents (non-ionic) — Determination of polyethylene glycols and non-ionic active matter (adducts) — Weibull method*.

ISO 2271, *Surface active agents-Detergents — Determination of anionic-active matter (direct two-phase titration procedure)*

### 3 Definitions

For the purpose of this standard the following definitions apply.

#### 3.1

##### liquid detergent

A liquid preparation consisting of surface active agents as base and primarily used for cleaning household kitchen utensils.

#### 3.2

##### surface active agent

A chemical compound which, when dissolved or dispersed in a liquid, is preferentially adsorbed at an interface, thereby giving rise to a number of physico-chemical properties of practical interest. The compound includes at least one group having an affinity for markedly polar surfaces, ensuring in most cases solubilisation in water, and another group which has little or no affinity for water.

#### 3.3

##### product unit

A unit of the final product packed in a suitable container.

#### 3.4

##### lot

A number of containers consisting of product units of the same size type and style, which have been manufactured under essentially the same conditions.

### 4 Requirements

#### 4.1 General requirements

##### 4.1.1 Materials

The liquid detergent shall consist essentially of anionic, cationic, non-ionic or surface active agents or their mixture. It may contain added materials such as buffers, preservatives, emollients, opacifiers, stain removers, perfumes, viscosity controlling agents, foam control agents or approved colouring agents and these shall not have any irritant or undesirable effect on the skin and hands under normal condition of usage.

##### 4.1.2 Appearance

## FDEAS 296:2011

**4.1.2.1** The liquid detergent shall be a uniform aqueous solution, which, if so required, may be coloured. When examined visually shall be homogenous and free from any sediment or foreign matter.

**4.1.2.2** It shall be free from abrasives and organic solvents, and solids shall not precipitate from it during storage at ambient temperature.

**4.1.2.3** It shall not be irritating to the skin and it shall not contain any ingredients in quantity that is toxic to human beings under normal conditions of use.

### 4.1.2 Consistency

On being cooled to  $4.5\text{ }^{\circ}\text{C} \pm 0.5\text{ }^{\circ}\text{C}$  for 24 hours, the detergent shall show no separation and shall remain liquid.

### 4.1.3 Odour

When so required, the detergent shall be perfumed. The detergent and solution of the detergent in water at  $60\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  shall have an acceptable odour. During storage at ambient temperature, the odour of the detergent shall remain such as to be acceptable, and when perfumed, the fragrance shall not change.

### 4.1.4 Residual test

The detergent shall not leave residual test on washed articles.

### 4.1.5 Rinsing properties

When tested according to annex c the detergent shall be free-rinsing

### 4.1.6 Storage stability

The detergent shall, after storage period of 12 months in the original container under normal storage conditions specified by the manufacturer, still comply with all the requirements of this standard.

### 4.1.7 Cleaning efficiency

When the detergent is tested in accordance with Annex G, its cleaning efficiency shall be not lower than that of the standard detergent.

## 4.2 Chemical and physical requirements

The liquid detergent shall also comply with the requirements of the Table 1.

**Table 1 — Chemical and physical characteristics**

S/N	Parameter	Requirement	Method of test
1	Matter insoluble in water, max, % (m/m)	0.5	Annex A
2	pH value range	6.0 – 9.0	Annex B
3	Total surface active matter content, min	12	ISO 2268 ISO 2271
4	Inorganic salts content, % (m/m), max	5	Annex E
5	Formaldehyde	Shall be absent	Annex F

## 5 Sampling and compliance with the standard

### 5.1 Sampling

The following sampling procedure shall be applied in determining whether a lot complies with the relevant requirements of the standard. The samples so drawn shall be deemed to represent the lot.

**5.1.1** From the lot draw at random five containers,

- a) if the lot is packed in containers of a net volume not exceeding 5 litres or
- b) three containers, if the lot is packed in containers of net volume exceeding 5 litres

Inspect the containers for compliance with the requirements of 4.1.

**5.1.2** From each of the containers drawn take specimen of approximately equal volume so as to provide a composite sample of total volume at least one litre. Use this sample for testing.

NOTE Before drawing a specimen, thoroughly mix the contents of the relevant container.

## **5.2 Compliance with the standard**

The lot shall be deemed to comply with the requirements of this standard if, after inspection and testing, the samples taken in accordance with 5.1 are found to comply with the relevant requirements of the standard.

## **6 Packing and marking**

### **6.1 Packing**

Liquid detergent shall be filled in suitable containers and shall be properly sealed with a tamper proof seal. The containers shall be strong enough to withstand normal handling and transportation and that will prevent leakage and contamination of the product.

### **6.2 Marking**

The container and carton boxes where used, shall be clearly marked with the following information:

- a) the words "liquid detergent for hand dishwashing";
- b) the name of the liquid detergent or the registered trade mark;
  - c) the volume of contents ;
  - d) list of ingredients
- d) the code number or batch number; and
- e) the name and address of the manufacturer
- f) instructions for use
- g) Date of manufacture
- h) best before date

**Annex A**  
(Normative)**Determination of insoluble matter****A.1 Principle**

A known mass of sample is diluted and filtered. The residues are then dried to constant mass.

**A.2 Procedure**

**A.2.1** Weigh, to the nearest (to  $\pm 0.001$  g) approximately 5 g of the test sample, into a 400 ml beaker and add 200 ml of distilled water. Heat on a steam bath, with frequent stirring, until the sample is completely dispersed.

**A.2.2** Filter the solution immediately, under suction, through a previously dried and tared sintered glass crucible of porosity 2. Ensure that the insoluble matter is quantitatively transferred to the filter.

**A.2.3** Wash the beaker and the residue in the crucible five times with 40 ml of hot distilled water.

**A.2.4** Allow the wash solution to drain completely and dry the crucible to constant mass at  $105 \pm 2$  °C in an air oven.

**A.2.5 Calculation**

The insoluble matter content S is given, as a percentage by mass, by the formula

$$S = \frac{M_4 - M_2}{M_1} \times 100$$

where,

$M_1$  is the mass, in grams, of the test sample;

$M_2$  is the mass in grams of the sintered glass crucible;

$M_4$  is the mass, in grams, of the sintered glass crucible and the residue after drying.

**Annex B**  
(Normative)

**Measurement of pH value**

Dissolve 1.0 ml of the test sample in 100 ml of carbon-dioxide free distilled or de-ionised water and measure the pH, at room temperature, using a pH meter equipped with a glass electrode capable of measuring pH values to an accuracy of 0.1 or better.

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**Annex C**  
(Normative)

**Determination of rinsing properties**

- C.1** Accurately weigh (to  $\pm 0.001\text{g}$ ) approximately 0.4 g of the test sample into a thoroughly cleaned 500 ml conical flask and add 200 ml of the distilled water.
- C.2** Stopper the flask and shake it vigorously for 1 minute
- C.3** Pour out the solution and rinse the flask by adding 200 ml of the distilled water, shaking vigorously for 1 minute and pour off the water.
- C.4** Invert the flask and allow to dry.
- C.5** Carry out a blank repeating the above procedure but omitting the test sample.
- C.6** Compare the two flasks.

**Annex D**  
(Normative)

**Determination of moisture and volatile matter**

**D.1 Principle**

A known mass of sample is oven-dried to constant mass.

**D.2 Procedure**

Weigh, to the nearest 0.001g, 5 g of the sample in a tared evaporating dish, which has been previously dried and cooled. Heat the dish and its content on a steam bath until most of the volatile matter has escaped. Continue heating at  $105\text{ }^{\circ}\text{C} \pm 20\text{ }^{\circ}\text{C}$  in an oven for 2 hours. Cool in a desiccator and weigh. Repeat the operation of heating, cooling and weighing until the difference in mass between two successive weighing is less than 0.01g. Retain the residue in the dish for subsequent test as per E.3.

**D.3 Calculation**

The moisture and volatile matter content is given, as a percentage by mass, by the formula

$$\frac{(M_1 - M_2)}{(M_1 - M_0)} \times 100$$

where

$M_0$  is the mass, in grams, of the dish

$M_1$  is the mass, in grams, of the dish and the sample before heating

$M_2$  is the mass, in grams, of the dish and the sample after heating

**Annex E**  
(Normative)**Determination of inorganic salts****E.1 Procedure**

Take the dish containing the material after evaporation as obtained in 6.2. Heat it at 450 °C in a muffle furnace to destroy organic matter. Cool the dish and its contents, add a few drops of concentrated sulphuric acid and heat again to dryness. Cool and weigh. Repeat the process of heating, cooling and weighing until constant mass is obtained.

**E.2 Calculation**

The inorganic salts content is given, as a percentage by mass, by the formula

$$\left( \frac{M_1 - M_3}{M_1 - M_0} \times 100 \right)$$

where

$M_0$  is the mass, in grams, of the dish as per D.

$M_1$  is the mass, in grams, of the dish and the sample before heating as per D.

$M_3$  is the mass, in grams, of the dish and the residue.

## Annex F (normative)

### Determination of formaldehyde

#### F.1 Reagents

Ammonium nitrate, 15 g  
Acetyl acetone, 0.2 mL  
Acetic acid (glacial), 0.3 mL  
Distilled water, dilute to 100 mL

#### F.2 Procedure

Add 2.5 mL of the reagent to the sample in a clean glass container. Sample size is about 0.5 g solids and liquids. Heat the mixture for 10 min at 60 °C. A yellow colour develops if formaldehyde is present. This is due to the formation of 3,4-diacetyl-1,4-dihydropyridine.  
Positive controls (0.025 % to 0.1 % formaldehyde) and negative control (distilled water) should be tested for comparison.

## Annex G (normative)

### Cleaning efficiency

#### G.1 Apparatus

- a) *basin* - A flat-bottom flask crystallizing basin of diameter of approximately 40mm;
- b) *Beakers* - 800ml beakers of inside diameter approximately 90 and height approximately 135mm;
- c) *clamp* - A suitable clamp that can be so fitted to the stirrer as to allow a panel to be gripped and rotated with its long dimension vertical,

2) Whatman GF/A glass fibre filter paper or equivalent is suitable.

- d) *test panel* - A plastic panel of size 100mmx38mmx3mm cut phenolic laminated sheet that will not soften, swell, or lose mass when immersed in chloroform for 24h. Mark a soiling area of 64mmx38mm on each face of the panel;
- e) *stirrer* - A mechanical stirrer capable, when supporting a test panel, of operating smoothly and continuously at 60rpm-62rpm;
- f) *water bath* - A water bath of suitable size and capable of maintaining 750ml detergent solution at  $40.4^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ ;
- g) *watch-glass* - of diameter approximately 40mm and
- h) *spatula* - fitted with a flexible steel blade.

#### G.2 Materials

- a) *acetone*, analytical grade;
- b) *chloroform*, analytical grade;
- c) *soil*, unhomogenized fat shortening of softening point  $38.0^{\circ}\text{C}$  and  $39.0^{\circ}\text{C}$  and
- d) *standard detergent*- A standard detergent having mean cleaning efficiency of  $85 \pm 1\%$ .

The softening point is determined as follows:

Cut three softening point tubes of length 50mm to 60mm from capillary tubing of inside diameter 0.83mm to 1.1mm and wall thickness of 1mm. Heat the soil to approximately  $80^{\circ}\text{C}$  and remove any impurities and traces of moisture by filtering it at this temperature through a bed of chemically pure anhydrous sodium sulphate on filter paper. So dip three tubes into the soil (at  $\pm 80^{\circ}\text{C}$ ) that the soil rises to a height of approximately 10mm in each tube, and chill immediately by holding the tubes against a piece of ice. When the soil has solidified, place the tubes in a tightly stoppered test tube and keep them for 10min in a refrigerator or water bath at  $4^{\circ}\text{C}$ - $10^{\circ}\text{C}$ . Transfer the stoppered test tube and contents to another water bath maintained at  $10^{\circ}\text{C}$  - $12^{\circ}\text{C}$  and leave in this water bath for 20min. Remove the tubes and attach them by means of a rubber band to a total immersion thermometers having a range of  $-2^{\circ}\text{C}$  to  $+ 80^{\circ}\text{C}$

and conforming to the requirement for low softening point thermometers. So position them that the lower ends of the tubes are level with the bottom of the mercury bulb. Add distilled water at 10°C - 12°C to a 500ml beaker to a depth of 70mm and suspend the thermometer and tubes vertically in the water so that bottom of the thermometer is immersed to a depth of about 30mm, agitate the water with a slow stream of air or by some other suitable means and heat in such a manner that the temperature of the water is raised uniformly at a rate of 2°C per min. Continue heating until the soil column in each tube rises and note the temperature at which each column commences to rise. Take the mean of the three results as the softening point of the soil.

### G.3 Procedure

Carry out simultaneously three determinations on the test sample taken in accordance with 5.1.2 and three determinations on the standard detergent as follows:

- a) Using a syringe, pipette 1.00ml of the standard detergent or the test sample as relevant into about 950ml of the standard water (see 6.2) at  $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , then make up to 1 litre in a volumetric flask with the standard hard water and mix the solution well. Transfer 750ml of this detergent solution to a 800ml beaker (6.6.1) (b), and place it, in the water bath. Adjust the temperature of the water bath to maintain the temperature of the detergent
- b) Melt approximately 15g of the soil in an oven maintained at  $50^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , then weigh  $1000\text{g} \pm 0.003\text{g}$  of the melted soil into the watch glass and place it in the oven. Let the rest of the melted soil set for not less than 2h at  $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$  and, using a glass rod stir the solidified fat into a smooth paste.
- c) Thoroughly clean the panel with chloroform. Weigh out accurately  $0.300 \pm 0.003\text{g}$  of the soil paste on to one soiling area of the panel. With the spatula, divide the soil portion into approximately equal portions, and transfer one portion to the other soiling area. Make sure no spread soil is lost, and that no soil extends over the edges of the panel. In each case remove any soil adhering to the blade of the spatula by wiping both sides of the blade along one of the edges of the panel and spread the scraped off soil over the relevant soiling area. Repeat this procedure until only a very small amount of scraped off soil adheres the edge of the panel. So fit the prepared panel in the clamp (6.6.1) (c) that the jaws of the clamp are positioned of the panel above the soiled areas and attach this panel assembly to the stirrer. So adjust the panel that its long dimension is vertical.
- d) When the detergent solution has approximately reached the test temperature, remove the watch-glass containing the melted soil from the oven and immediately and carefully submerge in the detergent solution stir the detergent solution gently with a glass rod for 1min, then let it stand until it has reached temperature equilibrium and almost all of the foam has disappeared (approximately 2h).

NOTE - With certain products the foam layer may still persist after 2h Disregard such foam layer and continue with 6.6.3 below.

Carefully lower the panel into the centre of the detergent solution until the surface of the solution reaches the marked top lines of the soiling areas. Leave the vertically immersed panel in the detergent solution for 1min without agitation and then rotate it for 10 min at 60rpm - 62rpm. At the end of this period let the detergent solution come to rest, and slowly withdraw the panel assembly vertically from the detergent solution.

Avoid any possible foam adhering to the panel.

Then lower the panel assembly carefully into the centre of a beaker containing 750ml of distilled water maintained at  $40.4^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ , until the water level just reaches the

- e) it for 10min

marked top lines of the soiling areas. Rotate the panel for one min at 60rpm – 62rpm. At the end of this period let the water come to rest, slowly withdraw the panel assembly vertically from the rinse bath, and let the panel cool in a vertical position for approximately 2 min.

- f) Remove the panel from the clamp and transfer the remaining soil from it into a tared basin by thoroughly rinsing each side of the panel with a sufficient amount of the chloroform from a wash bottle. Evaporate on a steam bath until free from chloroform, add approximately 15ml of acetone, and evaporate to dryness (approximately 30min). Leave the basin in a desiccator over-night and then weigh the basin and contents,

NOTE - The preparation of the panel and the washing and rinsing procedure shall be done in a room maintained at  $25 \pm 2^\circ\text{C}$ , *G.4 Calculation*

$$\text{Soil removal, \%} = \frac{(0.3 - B) \times 100}{0.3}$$

where

$B$  = mass of soil recovered in the basin.

Report the soil removal of the test sample as the mean of the five determinations.

## Bibliography

SABS 825, *Hand dish washing and light duty detergent (liquid)*

SABS 20825, *Environmentally acceptable hand dish washing and light duty detergent (liquid)*

MS 80, *Specification for liquid detergent for household hand dish washing*

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