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DRAFT EAST AFRICAN STANDARD

Liquid detergent for household use — Specification

EAST AFRICAN COMMUNITY

Third Edition 2020

Copyright notice

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Foreword

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

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS) and other deliverables. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. 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 finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards and other deliverables 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.

The committee responsible for this document is Technical Committee EASC/TC 074, *Surface active agents*

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

This third edition cancels and replaces the second edition (EAS 383:2013), which has been technically revised.

Introduction

This specification refers to non-soapy organic detergents and in particular anionic detergents. These may contain non-ionic active ingredients. Inorganic compounds such as phosphates and silicates generally termed as builders may also be included in this product.

Branched alky aryl sulphonates are non-biodegradable. The use of these starting materials is strongly discouraged for environmental conservation. However, when these starting materials are used, they shall be declared by the manufacturer.

liquid detergent for household use — Specification

1 Scope

This Draft East African Standard specifies the requirements, sampling and test methods for for liquid detergent for household general/multi- and dishwashing purposes.

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.

EAS 377-1, *Cosmetics and cosmetics products — Part 1: List of substances prohibited in cosmetic products*

EAS 377-2, *Cosmetics and cosmetics products — Part 2: List of substances which cosmetic products must not contain except subject to restrictions laid down*

EAS 377-3, *Cosmetics and cosmetics products — Part 3: List of colourants allowed in cosmetic products*

EAS 377-4, *Cosmetics and cosmetics products — Part 4: List of preservatives allowed in cosmetic products*

EAS 377-5, *Cosmetics and cosmetics products — Part 5: Use of UV filters in cosmetic products*

ISO 2271; *Surface-active agents — Determination of anionic active matter by manual or mechanical direct two phase titration* procedure.

EAS 814 *Determination of biodegradability of surfactants — Test method*

ISO 862, *Surface active agents — Vocabulary*

3 Terms and definitions

For the purposes of this standard, terms and definitions given in ISO 862 and the following shall apply.

3.1
active matter
in the formulation, the whole of surface active agents responsible for an activity specified

3.2
anionic surface active
surface active agents which ionizes in aqueous solution to produce negatively charged organic ions which are responsible for surface active

3.3
builder
complementary component of a detergent usually inorganic, which with reference to the washing action adds its characteristic to those of constituents

3.4
cationic surface active agent
surface active agent which ionises in aqueous solution to produce positively charged organic ions which are responsible for surface activity

3.5
detergent
product specially formulated for cleaning through the process of detergency

3.6
foam
mass of gasses cells separated by thin films of liquid and formed by juxtaposition of bubbles, giving a dispersion in which a large proportion of gas by volume is dispersed in a liquid

3.7
lot
all containers of the same size, shape, and design manufactured from the same raw materials under similar condition of production in a consignment

3.8
non-ionic surface active agent
surface active agent which does not produce ions in an aqueous solution. The solubilizing in water is due to the presence in molecule of functional groups which have a strong affinity for water

3.9
soap
an anionic surface active agent which exhibits the phenomenon of reversible hydrolysis by action of water. Their reaction is alkaline

3.10
solubilizing power
effectiveness of a dissolving surface active agent to confer on certain bodies of low solubility in the pure solvent, an apparent solubility by micelle formation

3.11
Biodegradable:
capable of being broken down by microorganisms

4 Requirements

4.1 General requirements

4.1.1 The detergent shall be a clear, homogeneous liquid. It shall remain stable after having been maintained at 5 °C for 24 h and shall remain clear, homogeneous fluid when maintained for a further 24 h at 30 °C.

4.1.2 The detergent shall be free from visible impurities, and objectionable odour. It shall contain synthetic organic active matter and foam stabilizing agents. It shall be completely miscible with water, and contain no soap.

4.1.3 The active ingredients used shall be biodegradable when tested according to EAS 814

4.1.4 The detergent shall have good cleaning and lathering properties.

4.1.5 All the substances used in the synthetic organic liquid detergent shall comply with the requirements of all parts of EAS 377.

4.2 Specific requirements

The detergent shall also comply with the specific quality requirements given in Table 1 when tested in accordance with the corresponding test method.

Table 1 — Specific requirements for liquid detergent for household use

S/N	Characteristics	Requirements		Test method
		General purpose	Dishwashing	
ii	Matter insoluble in water % (m/m), max,	0.5	0.5	Annex A
iii	Rinsing properties	To pass the test	To pass the test	Annex B
iv	Active ingredient content, % m/m, min.	5	12	ISO 2271/ Annex C
v	pH at 27 °C of 1 % solution, v/v	6.5 - 11.5	6 - 12	Annex D
vi	Total non-detergent organic matter, % m/m, max.	0.5	0.5	Annex E
vii	Inorganic salts content, % (m/m), max	n/a	5	Annex F

5 Packaging and labelling

5.1 Packaging

The product shall be packed in a suitable, well-closed container to protect the integrity of the product during transportation and storage.

5.2 Labelling

Each container shall be legibly and indelibly labelled either in English, Kiswahili or French or combination or any other language as agreed between the manufacturer and supplier with the following information;

a) name of the product as "General purpose/multi-purpose" or "dishwashing liquid detergent";
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) net content;
e) country of origin;
f) instructions for use (which shall be in either English, Kiswahili or French or in combination as agreed between the manufacturer and supplier");
g) date of manufacture and
h) best before date.

6 Sampling

Sampling shall be done in accordance with Annex G.

7 Criteria for conformity

The lot shall be deemed to comply with the requirements of this standard if, after inspection and testing, the requirements of Clause 4 are satisfied.

Annex A
(normative)

Determination of matter insoluble in water

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 ± 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 ± 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

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

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)

Test for rinsing properties

B.1 Preparation of synthetic hard water

Weigh to the nearest 0.001 g, about 0.264 g of $CaCl_2.2H_2O$ and 0.295 g of $MgSO_4.2H_2O$. 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.

B.2 Dissolve 2.0 mL of the liquid detergent as completely as possible in 98 mL of synthetic hard water (see B.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.

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Annex C
(normative)

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 quantities 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 **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 sulphuric acid and 50 g of anhydrous sodium sulphate, and make up the volume to one litre 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 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 of the 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.

Annex D
(normative)

Determination of pH

D.1 General

pH determination should be made in an acid free atmosphere.

D.2 Apparatus

D.2.1 **Any standard pH meter**, equipped with a low sodium error glass electrode. The instrument shall be calibrated and standardized with standard buffer solutions (see D.3.2) before use.

D.2.2 **Volumetric flask**, 1000-mL capacity

D.2.3 **Beakers**, 1000-mL

D.3 Reagents

D.3.1 Distilled water shall be boiled thoroughly or purged with carbon dioxide-free air to remove carbon dioxide and shall be protected with soda lime or soda asbestos while cooling and in storage. The pH of this water shall be protected with soda lime or soda asbestos while cooling and in storage. The pH of this water shall be between 6.2 and 7.2 at 27 °C. The residue on evaporation when heated at 105 °C for one hour shall not exceed 0.5 mL per litre.

D.3.2 Standard buffer solutions with the pH range of 9 to 11 at 27 °C for calibrating the pH meter.

D.4 Procedure

Weigh to the nearest milligram approximately 10 g of the material and transfer to a 1-L volumetric flask. Partially fill the flask with distilled water and agitate until the sample is completely dissolved. Adjust the temperature of the solution and the distilled water to 27 °C ± 2 °C and fill to the calibration mark with distilled water, stopper the flask mix thoroughly and allow the solution to stand at a temperature of 27 °C ± 2 °C for two hours prior to measuring the pH. Measure the pH of the solution at 27 °C ± 2 °C using a glass electrode.

Annex E
(normative)

Determination of non-detergent organic matter

E.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 alkylolamide present in the material.

E.2 Apparatus

E.2.1 Evaporating basin

E.2.2 Separating funnels, 1 000-mL capacity.

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

E.2.4 Buchner flask, 500-mL capacity, fitted with a sintered glass filter funnel (porosity 4)

E.3 Reagents

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

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

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

E.4 Procedure

E.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.

E.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.

E.4.3 Wash the combined ether extracts and rinsing (see E.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.

E.5 Calculation

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

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.

Annex F
(normative)

Determination of inorganic salts

F.1 Procedure

Take the dish containing the material after evaporation. 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.

F.2 Calculation

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

$$\left(\frac{(M_1 - M_3)}{(M_1 - M_o)} x100\right)$$

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 G
(normative)

Sampling

G.1 Procedure

G.1.1 In a single consignment, all packages (cartons) containing toilet soap cakes 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 F.1 — Scale of sampling

Number of packages (cartons) in the lot ***N***	Number of packages (cartons) to be selected ***n***	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^{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.

