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LAUNDRY SOAP — SPECIFICATION

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Laundry soap — Specification



Table of contents

1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Grades of laundry soap	2
5	Requirements	2
5.1	Physical requirements	2
5.2	Chemical requirements	3
6	Sampling	3
7	Method of test	3
8	Compliance with the standard	3
9	Packaging and labelling	4
9.1	Packaging	4
9.2	Labelling	4
	Annex A (normative) Determination of rosin content of fatty mater in soaps	5
	Annex B (normative) Staining test for laundry bar soaps	8
	Annex C (normative) Sampling and inspection	9

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Laundry soap — Specification

1 Scope

This African Standard specifies requirements, sampling and test methods for two grades of laundry soaps pure and built or filled laundry soaps in the form of cakes, tablets bars, produced from vegetable, animal oils, fats or a blend of all or part of these materials. It does not cover liquid soap for household purposes, and bar soap, in which synthetic detergents have been added to enhance its performance.

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.

ISO 456, *Surface active agents — Analysis of soaps — Determination of free caustic alkali*

ISO 457, *Soaps — Determination of chloride content — Titrimetric method*

ISO 672, *Soaps — Determination of moisture and volatile matter content — Oven method*

ISO 673, *Soaps — Determination of content of ethanol-insoluble matter*

ISO 862, *Surface active agents — Vocabulary*

ISO 684, *Analysis of soaps — Determination of total free alkali*

ISO 685, *Analysis of soaps — Determination of total alkali content and total fatty matter content*

ISO 1067, *Analysis of soaps — Determination of unsaponifiable, unsaponified and unsaponified saponifiable matter*

ISO 6839, *Anionic surface active agents — Determination of solubility in water*

3 Terms and definitions

For the purpose of this standard the definitions in ISO 862 and the following definitions apply.

3.1

pure laundry soap

well saponified unfilled laundry soap

3.2

built or filled laundry soap

laundry soap containing of builder or filler

3.3

colouring matter

any cosmetic grade colorants used to colour laundry soap

3.4

builder

complementary component of soap, usually inorganic, which with reference to the washing action, adds its characteristic properties to those of the essential constituents.

NOTE Builders are added to a soap to improve its effectiveness under the conditions of use. The action of builders is mostly physico-chemical and comprises a series of effects, which results in more economic usage and better cleansing action of soap especially in hard water areas. Substances commonly used as builders are soda ash, sodium silicates, sodium phosphates, borax and cellulose derivatives.

3.5 fillers

Materials added to soaps to increase the mass of the product but which in themselves do not improve effectiveness of the soap under the conditions of use. Fillers are generally inert and of an almost or completely non-detergent character.

3.6 free caustic alkali

the quantity of hydroxyl ion, reported as sodium hydroxide (NaOH) for sodium soaps or potassium hydroxide (KOH) for potassium soaps, which is found in solution after precipitation with barium chloride under the operating conditions described.

3.7 laundry soap

a soap which is intended for laundry purposes.

NOTE Laundry soap may contain fillers, builders, colouring matter, perfume, optical brighteners, preservatives, glycerin or oparifiers.

3.8 lot

an identified quantity of laundry soap produced under essentially the same conditions.

3.9 total fatty matter

the water-insoluble fatty material obtained by decomposing the soap with a mineral acid under the conditions specified. This term includes unsaponified matter, glycerides and any rosin acids contained in the soap, in addition to the fatty acids.

3.10 total free alkali

the sum of the free caustic alkali and the free carbonate alkali contents. The results are generally expressed as a percentage by mass as either sodium hydroxide (NaOH) for sodium soaps or potassium hydroxide (KOH) for potassium soaps. They may also be expressed in milliequivalents per gram.

4 Grades of laundry soap

Laundry soap shall be of the following grades and designations:

- a) Grade I (Pure laundry soap)
- b) Grade II (Built or filled laundry soap)

5 Requirements

5.1 Physical requirements

5.1.1 Appearance: Laundry soap shall be free from visible dirt and other foreign matter.

5.1.2 Texture: Laundry soap shall be of firm texture and possess good lathering and cleansing properties.

5.1.3 Odour: Laundry soap shall be free from objectionable odour. It shall not leave objectionable odour on clothes after washing and thorough rinsing with water.

5.1.4 Staining property of colouring matter: When coloured laundry soap is used in washing any white fabric, it shall not leave any visible stains on the fabrics.

5.1.5 Stability: When immersed in distilled water for one hour at 25 – 30 °C, laundry soap shall not disintegrate, and when dried at room temperature for 24 h thereafter, it shall not crumble, crack or break.

5.1.6 Toxicity: Laundry soap shall be non-toxic and shall not irritate the skin.

5.2 Chemical requirements

Laundry soap shall comply with the requirements in Table 1.

Table 1 — Chemical requirements for laundry soap

Characteristics	Requirements		Method of Test
	Grade I	Grade II	
Total fatty matter, %(m/m) min.	62	45	ISO 685
Rosin acids content, fatty matter basis, %(m/m) max.	8	15	Annex A
Matter insoluble in ethanol, %(m/m) max.	2.5	20	ISO 673
Free caustic alkali, as NaOH, %(m/m) max.	0.1	0.3	ISO 456
Total free alkali, as NaOH, %(m/m) max.	0.2	0.4	ISO 684
Total unsaponified and unsaponifiable fatty matter, %(m/m) max	0.2	0.6	ISO 1067
Moisture and volatile matter content at 105° C, %(m/m) max.	30	36	ISO 672
Chloride content, as NaCl, %(m/m) max.	1.5	2	ISO 457
Staining	Shall pass the test		Annex B

6 Sampling

Samples shall be drawn at random from lots and the relevant sampling plan determined in accordance with Annex C.

7 Method of test

7.1 Samples of laundry soap shall be tested in accordance with the methods of test referred to in 5.1.5 and Table 1.

7.2 Before testing, reduce the sample taken in Clause 6 to a final sample by cutting each bar or cake of soap into eight parts by three mutually perpendicular cuts passing through the middle of each face.

Take two diagonally opposite eighths and, if the final sample so obtained exceeds 500 g, divide each eighth into two equal parts. Slice, grate finely or pass through a mechanical grinder, mix thoroughly and store in a completely filled container.

8 Compliance with the standard

The lot shall be deemed to comply with the standard, if after inspection and testing, it complies with the requirements specified in Clause 5.

9 Packaging and labelling

9.1 Packaging

Laundry soap shall be packed in clean, sound and dry containers made of a material which does not affect the product and which protects the product from excessive loss of moisture and from contamination.

9.2 Labelling

9.2.1 Bar or cake of laundry soap

Each bar or cake of laundry soaps, whether wrapped or unwrapped, shall be marked with:

- (i) trade name or brand name,
- (ii) soap grade and
- (iii) weight at the time of packaging.

9.2.2 Wrapper

Each wrapper shall be marked or labelled with the following particulars:

- a) name and grade of the product and/ or the trade name or brand name, if any;
- b) nominal mass of the soap at the time of packaging.

9.2.3 Carton

The carton of laundry soap shall be marked or labelled with the following particulars:

- a) name of the product, and the trade name or brand, if any;
- b) name and address of manufacturer;
- c) batch or code number;
- d) nominal mass at the time of packing;
- e) number of bars or cakes in the carton;
- f) grade;
- g) country of origin.

Annex A (normative)

Determination of rosin content of fatty matter in soaps

A.1 Scope

This Annex specifies a method for the determination of the rosin content of fatty matter in soaps.

NOTE The following method is not accurate for rosin concentrations below a mass fraction of 5 %.

A.2 Reagents

NOTE Use only analytical grade reagents and distilled water.

A.2.1 Diethyl ether

Free from peroxides.

A.2.2 Sodium chloride

A.2.3 Sodium sulfate

Anhydrous.

A.2.4 Hydrochloric acid solution

Dilute one volume of concentrated hydrochloric acid (density 1.16 g/mL) with two volumes of distilled water.

A.2.5 Sodium hydroxide solution

10 % mass fraction aqueous solution.

A.2.6 Naphthalene-2-sulfonic acid solution

Dissolve 40 g of naphthalene-2-sulfonic acid in 1 L of absolute methanol.

A.2.7 Sodium chloride solution, saturated

Shake an excess of sodium chloride with water at ambient temperature until no more dissolves. Keep the solution over solid sodium chloride.

A.2.8 Sodium chloride solution, 10 %

Dissolve 10 g of sodium chloride in 100 mL of water.

A.2.9 Standard ethanolic potassium hydroxide solution, 0.2 N

A.2.9.1 Preparation

Purify 95 % (by volume fraction) ethanol by boiling 1.5 L of it over 20 g of potassium hydroxide for 1 h under reflux. Distil, discarding the first 50 mL of the distillate and stopping the distillation when approximately 1.3 L have been distilled. Dissolve 12 g of potassium hydroxide in 1 L of the purified ethanol, allow the solution to stand for approximately one week, and then decant the clear supernatant liquid from any potassium carbonate that has precipitated.

A.2.9.2 Standardization

Accurately weigh out approximately 1 g of potassium hydrogen phthalate (previously dried at $110\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for 3 h) into a 250 mL Erlenmeyer flask. Add approximately 100 mL of carbon dioxide-free distilled water and three drops to five drops of the phenolphthalein indicator, and swirl gently until the solid has dissolved. Titrate the solution with the standard ethanolic potassium hydroxide solution, until a permanent pink colour is formed.

A.2.9.3 Calculation

Normality of the standard ethanolic potassium hydroxide solution (N):

$$N = \frac{A \times 4.897}{B}$$

where

A is the mass of the potassium hydrogen phthalate, in grams;

B is the volume of the standard ethanolic potassium hydroxide solution used for the titration, in millilitres.

A.2.10 Methyl orange indicator

Dissolve 0.2 g of methyl orange in 100 mL of carbon dioxide-free water.

A.2.11 Phenolphthalein indicator

Dissolve 0.5 g of phenolphthalein in 100 mL of freshly boiled, 95 % (by volume fraction) ethanol.

A.3 Procedure**A.3.1 Preparation of fatty matter****A.3.1.1 Carbolic soaps**

A.3.1.1.1 Weigh out accurately into a 600 mL beaker such quantity of the test sample as contains approximately 40 g of fatty matter and dissolve it in approximately 400 mL of hot water, to which 40 mL of the sodium hydroxide solution has been added.

A.3.1.1.2 Salt out the soap by adding sufficient sodium chloride to the hot solution to saturate it (at ambient temperature) with sodium chloride. Filter the soap quantitatively, and allow it to drain.

A.3.1.1.3 Dissolve the drained soap in approximately 400 mL of hot water, and repeat the salting out and filtering procedure.

A.3.1.1.4 Wash the soap thoroughly with the saturated sodium chloride solution, and proceed in accordance with A.3.1.2.2 to A.3.1.2.7.

A.3.1.1.5 Reserve the combined filtrates and washings for the determination of carbolic acids.

A.3.1.2 Other soaps

A.3.1.2.1 Weigh accurately into a 600 mL beaker such quantity of the test sample as contains approximately 40 g of fatty matter.

A.3.1.2.2 Dissolve the soap in approximately 400 mL of hot distilled water, cool the solution, and slowly add an excess of the hydrochloric acid solution. Cover the beaker with a watch-glass and heat the contents until the fatty matter separates into a clear layer, but do not allow the temperature to exceed $60\text{ }^{\circ}\text{C}$.

A.3.1.2.3 In the cases of liquid and gel soaps, acidify the soap as it is.

A.3.1.2.4 Cool to approximately 25 °C and transfer the contents of the beaker to a separating funnel. Rinse the watch-glass and the beaker with portions of the diethyl ether totalling 100 mL and add them to the separating funnel. Shake the mixture in the separating funnel vigorously for 1 min, and let it stand until the two phases have separated.

A.3.1.2.5 Draw off and discard the aqueous layer and wash the ether extract with 50 mL portions of the sodium chloride solution until the last washing is neutral to the methyl orange indicator.

A.3.1.2.6 Filter the washed ether extract into a 250 mL beaker through a filter paper containing approximately 5 g of anhydrous sodium sulfate, and wash the separating funnel and the filter with small portions of the diethyl ether.

A.3.1.2.7 Evaporate the ether extract plus washings on a warm water bath. When the residue is just dry, heat it rapidly to 130 °C and immediately place the beaker in a desiccator to cool.

NOTE A.3.1.2.2 to A.3.1.2.7 should be completed in the shortest possible period of time, so as to prevent oxidation of the fatty acids.

A.3.2 Determination of rosin content

A.3.2.1 Weigh accurately into a 150 mL flask with a ground-glass joint approximately 2 g of the prepared fatty matter (A.3.1.2.7) and reserve the rest in the case of soap powders for the fatty matter titre determination.

A.3.2.2 Add exactly 25 mL of the naphthalene-2-sulfonic acid solution to the flask and two or three glass beads, and boil under reflux for 30 min.

A.3.2.3 Carry out a blank test at the same time, using exactly 25 mL of the naphthalene-2-sulfonic acid solution only.

A.3.2.4 Cool the contents of both flasks (sample and blank) to ambient temperature, add 0.5 mL of the phenolphthalein indicator to each flask, and immediately titrate to the end point with the standard ethanolic potassium hydroxide solution.

A.4 Calculation

Rosin content of fatty matter, as a mass fraction percentage (*R*):

$$R = \frac{(A - B) \times N \times 34.6}{C} - 1.0$$

where

A is the volume of the standard ethanolic potassium hydroxide solution used for the titration of the sample solution, in millilitres;

B is the volume of the standard ethanolic potassium hydroxide solution used for the titration of the blank solution, in millilitres;

N is the normality of the standard ethanolic potassium hydroxide solution;

C is the mass of the fatty matter taken, in grams.

Annex B
(normative)

Staining test for laundry bar soaps

Two methods are described.

B.1 Method 1: Undissolved Powder (5.0 % Product concentration)

B.1.1 Principle

Test pieces of cloth of defined area are rubbed with soap and then dipped in water overnight then scrubbed and rinsed in running water.

B.1.2 Materials

Pieces of white cotton, nylon and Crimplene C cloth.

B.1.3 Procedure

NOTE The staining test is conducted in triplicate for all cloth types.

B.1.3.1 Rub evenly about 10 g of soap over a 15 cm x 7.5 cm test swatch placed on a china plate.

B.1.3.2 Pour gently 50 ml of hot water (approximately 55 °C) into the plate so that the test swatch is covered and left overnight (16 h).

B.1.3.3 Hand rub the swatch 10 times and then rinse each of the three test swatches are rinsed twice in about 2 litres of water and then dried in the drier.

B.2 Method 2: Pre-dissolved Soap (2.5 % Product concentration)

B.2.1 Principle

The method involves subjecting fabrics to prolonged soaking in a highly concentrated soap solution.

B.2.2 Materials

Pieces of white cotton, nylon and Crimplene C cloth of dimension 15 cm x 7.5 cm

B.2.3 Procedure

NOTE The staining test should be conducted in triplicate for all cloth types.

B.2.3.1 Weigh 10 g of soap in a honey jar and then add 200 ml of hot water at a temperature of approximately 60 °C, shake until when the soap is thoroughly dissolved.

B.2.3.2 Place a test swatch A 15 cm x 7.5 cm in the soap solution (B.2.3.1) and allow to stand overnight.

B.2.3.3 Transfer the test swatch in a bowl containing 1 litre of water and then agitate vigorously by hand for 10 s.

B.2.3.4 Rinse the test swatches in 5 litres of water by hand. The times should be fixed for all washes, and then dry swatches.

Annex C (normative)

Sampling and inspection

C.1 Lot and batch

C.1.1 Batch

The soap is from one vat or pan. In the continuous production process, the soap from one day's production shall constitute a batch.

C.1.2 Lot

In a single consignment, all packages containing laundry soap bars or cakes drawn from the same batch of production shall constitute a lot.

C.2 Sampling

C.2.1 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 and product units from each container respectively to be selected for drawing the sample shall be in accordance with Table C.1.

Table C.1 — Guidance for sampling

Number of packages (cartons) in the lot N	Number of containers (cartons) to be selected n	Number of product units to be selected from each container
4 – 15	3	3
16 – 40	4	4
41 – 65	5	2
66 – 110	7	2
111 and above	10	1

C.2.2 The packages (cartons) 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 $N \div n$.

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.

C.2.3 Inspection — Inspect the cakes selected for compliance with the requirements specified under table1 and performance requirements.

ENQUÊTE PUBLIQUE N° 19

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