
Detergent for industrial dishwashing equipment — Specification

DRAFT AFRICAN STANDARD FOR COMMENTS ONLY



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Foreword

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ARSO Central Secretariat
International House, 3rd Floor
P.O. Box 57363 — 00200 City Square,
NAIROBI, KENYA

Tel: + 254-20-2224561, +254-20-311641, +254-20-311608
Fax: + 254-20-218792

E-mail: arso@arso-oran.org
Web: www.arso-oran.org

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Detergent for industrial dishwashing equipment — Specification

1 Scope

This Draft African Standard specifies the requirements, sampling and test methods for different types of detergents used in industrial dishwashing equipment of which the parts that come into contact with the detergent are of stainless steel.

The detergents are not intended for cleaning crockery that has on-glaze decoration.

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.

EN 10088-1, *Stainless steels — Part 1: List of stainless steels*

ISO 1042, *Laboratory glassware — One-mark volumetric flasks*

ISO 3310-1, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

ISO 4788, *Laboratory glassware — Graduated measuring cylinders*.

ISO 2431, *Paints and varnishes — Determination of flow time by use of flow cups*.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

batch

defined quantity of raw material, packaging material or product issued from one process or series of processes so that it could be expected to be homogeneous

3.2

lot

definite amount of some product, material or service, collected together

Note 1 to entry: An inspection lot may consist of several batches or parts of batches.

3.3

defective

industrial dishwashing detergent or its container, that fails to comply with the requirements of this standard

4 Types

The detergent shall be of one of the following types, as required (see Annex A), modified if necessary for use in soft water only:

NOTE The designation "S" refers to detergents for use in soft water only.

- a) **type 1 (or type 1S)**: detergent in the form of a solid (which can be tablets, solid blocks, free-flowing granules or free-flowing powder) that is homogeneous, free from visible impurities, readily soluble in water, and of which the available chlorine content on the date of manufacture is at least 1.5 % (by mass).
- b) **type 2 (or type 2S)**: detergent in the form of a solid (which can be tablets, solid blocks, free-flowing granules or free-flowing powder) that is homogeneous, free from visible impurities and readily soluble in water.
- c) **type 3 (or type 3S)**: detergent in the form of a slurry that is readily soluble in water, yields a homogeneous slurry upon agitation, and of which the available chlorine content on the date of manufacture is at least 1.5 % (by mass).
- d) **type 4 (or type 4S)**: detergent in the form of a slurry that is readily soluble in water and that yields a homogeneous slurry upon agitation.
- e) **type 5 (or type 5S)**: detergent in the form of an aqueous solution that is homogeneous and readily soluble in water, and of which the available chlorine content on the date of manufacture is at least 1.5 % (by mass).
- f) **type 6 (or type 6S)**: detergent in the form of an aqueous solution that is homogeneous and readily soluble in water.

5 Requirements

5.1 General requirements

5.1.1 When stored or transported in the original container, a detergent in the form of a solid or a slurry shall not cake into hard lumps, and a detergent in the form of an aqueous solution shall not separate or form a precipitate.

5.1.2 The detergent shall be suitable for use in industrial dishwashing machines, shall not tarnish or corrode stainless steel or similar metals used in the construction of these machines.

5.1.3 The detergent shall not cause adhesion between the machine's sliding doors and their frames, when used in accordance to the manufacturer's instructions.

5.1.4 The product shall remain stable and homogeneous over the declared shelf life.

5.2 Specific requirements

5.2.1 The detergent shall comply with the requirements given in Table 1

Table 1 – Specific requirements for industrial dishwashing detergent

S/No.	Characteristics	Requirement	Test method
i)	Cleaning efficiency	The cleaning efficiency shall be at least equal to that of the standard detergent	Annex B
ii)	Water-insoluble matter content, % m/m, max	0.5	Annex C

iii)	Non-foaming behaviour	no foam shall be present at the end of the test	Annex D
iv)	Effect on corrosion-resistant steel	To pass test	Annex E
v)	Viscosity, mPa.s, max	1,650	ISO 2431
vi)	Attack on fine china glaze	To pass test	Annex F
vii)	Freeze-thaw stability		Annex G
viii)	Stability	shall not thicken or gel and shall remain homogeneous.	Annex H
ix)	Available chlorine, % m/m, min ^a	1.5	Annex J
^a this applies to type 1, 1s, 2, 2s, 3, 3s, 4, 4s, 5 and 5s			

5.2.2 Shelf life

After storage of the detergents in an unopened container, at a temperature not exceeding 25 °C and away from direct sunlight, for a period of three months after the date of manufacture, the available chlorine content of a detergent of type 1, type 1S, type 3, type 3S, type 5 or type 5S, determined in accordance with Annex J, shall be at least 1.5 % (by mass).

6 Packaging and labelling

6.1 Packaging

6.1.1 The packaging shall ensure integrity of the product during handling, storage and transportation

6.1.2 Bulk packaging; Only detergents of the same type and the same batch shall be packed together in one bulk package

6.2 Labelling

Each container shall bear the following information in prominent, legible and indelible marking:

- a) manufacturer's name and physical address;

NOTE The name, physical address of the distributor/supplier may be added as required.

- b) trade mark if applicable
- c) the type (see Clause 4), and words indicating that the product is an industrial dishwashing detergent;
- d) in the case of an S-type detergent, words indicating that the product is suitable for use in soft water only;
- e) directions/recommendations regarding the safe handling, use and storage;
- f) when relevant, a label with the word "Corrosive";
- g) the date of manufacture;
- h) the batch or lot identification number;
- i) Net content;
- j) in the case of a bulk package, the number of containers;

- k) list of ingredients;
- l) best before date; and
- m) country of origin.

7 Inspection and methods of test

7.1 Inspection

Inspect the containers taken in accordance with A.2 of Annex A for compliance with all the relevant requirements of the standard for which tests to assess compliance are not given in 5.4 to 5.11 (inclusive).

7.2 Test samples

7.2.1 Use the composite test sample taken in accordance with A.3 of Annex A.

7.2.2 Unless specified otherwise, all reagents used shall be of analytical grade, and water shall be distilled water or deionized water.

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Annex A

(normative)

Sampling and compliance

A.1 Sampling

The sampling procedure given in A.2 and A.3 shall be applied in determining whether a lot complies with the relevant requirements of this standard. The samples so drawn shall be deemed to represent the lot for the respective properties.

A.2 Sampling of containers

After checking the lot for compliance with the relevant requirements of 6.1 and 6.2, take from it at random the number of containers, relative to the appropriate mass or volume (as relevant) given below:

- a) five containers, if the lot is packed in containers of net mass not exceeding 5 kg or of net volume not exceeding 5 L; and
- b) three containers, if the lot is packed in containers of net mass exceeding 5 kg or of net volume exceeding 5 L.

A.3 Sample for testing

From the containers taken in accordance with A.2, draw enough detergent to provide a composite sample of total mass at least 1 kg or of total volume at least 5 L.

Take samples of approximately equal mass or volume (as relevant) from the containers and immediately pour the samples into a clean, dry, air-tight glass or plastics bottle that is clearly marked with the manufacturer's name or trade mark, the batch identification and the date of sampling.

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

A.4 Compliance with the standard

The lot shall be deemed to comply with the requirements of this standard if, on inspection of the containers and on testing of the samples taken in accordance with A.3, no defective is found.

Annex B (normative)

Test for cleaning efficiency

NOTE The entire test and assessment should be done by the same person.

B.1 Apparatus

B.1.1 Industrial dishwashing machine, that comprises the following:

- a) a single tank;
- b) a constant nozzle pressure of $33 \text{ kPa} \pm 3 \text{ kPa}$ for the bottom rotating arm and a constant nozzle pressure of $41 \text{ kPa} \pm 3 \text{ kPa}$ for the top rotating arm;
- c) a variable control to set the wash cycle to between 40 s and 190 s;
- d) a timer switch; and
- e) means for providing a constant water temperature of $55 \text{ }^{\circ}\text{C} \pm 1 \text{ }^{\circ}\text{C}$ during the wash cycle.

B.1.2 Laboratory oven, maintained at a temperature of $100 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$.

B.1.3 Paint brush, that is of approximate width 38 mm.

B.1.4 Sieve, of nominal diameter 200 mm and of nominal aperture size $250 \text{ }\mu\text{m}$, and that complies with ISO 3310-1.

B.1.5 Magnetic stirrer, that consists of a hotplate combination and a magnetic follower of dimensions 55 mm x 10 mm.

B.1.6 Volumetric flask, one-mark, of capacity 2 000 mL and that complies with the requirements for class B flasks of ISO 1042.

B.1.7 Graduated measuring cylinder, of nominal capacity 2 000 mL that has a pouring spout, and that complies with ISO 4788.

B.1.8 Oxford automatic pipettor, of the bottle type, and that has an adjustable capacity in the range 1.0 mL to 10.0 mL.

B.1.9 Flat basin, of approximate dimensions 350 mm x 350 mm x 50 mm, to hold an aqueous iodine/potassium iodide solution to assess starch residues.

Note: **Caution!** Keep the basin in a fume cupboard (and covered when not in use), to minimize iodine release to the atmosphere.

B.1.10 Round dinner plates, of fine china (non-domestic use), white, undecorated, of nominal diameter 250 mm.

B.2 Materials and reagents

B.2.1 Standard detergent powder for industrial dishwashing equipment.

B.2.2 Standard detergent liquid for industrial dishwashing equipment.

B.2.3 Standard starch.

B.2.4 Iodine crystals, resublimed.

B.2.5 Potassium iodide.

B.2.6 Deionized water

B.3 Standard hard water

Dissolve 3.520 g of chemically pure calcium chloride ($\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$) and 3.947 g of chemically pure magnesium sulfate ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$) in distilled water and dilute to 20 L with distilled water. (This standard hard water has a hardness of approximately 200 mg/L, calculated as calcium carbonate.)

B.4 Starch suspension

B.4.1 Pour 500 mL of cold water into a 1 L beaker. Add a magnetic follower, then place the beaker on a magnetic stirrer and stir vigorously without heating.

B.4.2 Weigh 30.0 g $\pm$ 0.1 g of the standard starch into a 250 mL glass beaker. Transfer the starch quantitatively, in small increments, to the 1 L beaker. In order to prevent the formation of lumps, ensure that most of the previous increment is in suspension before the next increment is added.

B.4.3 Allow the stirring, without the application of heat, to continue for at least 5 min, and ensure that no lumps are present.

B.4.4 Heat the suspension under constant stirring until foam starts to rise.

B.4.5 Strain the suspension through the sieve into the Oxford automatic pipettor, which has been set at 2.0 mL.

B.5 Iodine/potassium iodide solution for starch residue detection

B.5.1 Mix 44 g of iodine crystals with 88 g of potassium iodide and dissolve the mixture in 1 000 mL of water. Filter the solution through a filter paper of medium porosity, into a 2 L volumetric flask.

B.5.2 Wash the filter paper three times by pouring three 25 mL portions of water through the filter paper, into the flask.

B.5.3 Make up to the mark with water, and mix well.

B.5.4 Store in the dark in an amber bottle as stock solution.

B.6 Testing procedure

NOTE In this subclause, references to "water" imply standard hard water (see B.3) or, in the case of detergents for use in soft water only, distilled or deionized water.

B.6.1 Pipette 2.0 mL of the starch suspension onto each dinner plate, and then use the paint brush (pre-wetted between each application) to spread the starch suspension evenly over the top side of the plate. Soil five plates for each sample under test and for each standard detergent to be used.

B.6.2 Pre-dry the plates in a clean atmosphere at a temperature of $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and a relative humidity of $(50 \pm 5)\%$ for at least 1 h.

B.6.3 Continue the drying in a preheated oven at $100\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for at least 14 h, and then allow to cool.

B.6.4 After preparation, ensure that the cooled plates are tested within 72 h.

B.6.5 Prepare the following concentrations of detergents:

- a) 1.5 g/L of the standard detergent powder dissolved in water;
- b) 0.3 % (by volume) of the standard detergent liquid dissolved in water; and
- c) in the case of the test sample, the concentration recommended by the manufacturer.

B.6.6 Load the machine with five soiled plates and wash them, using the detergent under test. Remove the plates, load the dishwashing machine with the remaining five soiled plates and wash them, using the standard detergent. In each case, use six consecutive wash cycles of $180 \text{ s} \pm 2 \text{ s}$.

B.6.7 Assess the plates immediately after they have been washed.

B.6.8 Assessment

B.6.8.1 Prepare a 1:9 dilution of iodine/potassium iodide stock solution with distilled water (for example, 500 mL of stock solution with 4 500 mL of distilled water), and transfer it to the flat basin.

B.6.8.2 Dip the plates (treated as in B.6.1) in the iodine/potassium iodide solution (see B.6.8.1), and then assess the plates that were washed with the standard detergent and the plates that were washed with the detergent under test. A dark blue-black stain on a plate indicates the presence of starch residue.

B.6.8.3 Compare plates that were washed in the same position in the dishwashing machine, and assess the plates on the following 0 to 10 point scale:

- 0 nothing removed
- 10 completely clean.

Annex C (normative)

Test for water-insoluble matter content

C.1 Apparatus

Normally available laboratory glassware, together with

C.1.1 Laboratory oven, maintained at a temperature of $105\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

C.1.2 Magnetic stirrer, that consists of a hotplate combination and a magnetic follower.

C.2 Reagents and materials

C.2.1 Standard hard water (see B.3).

C.2.2 Glassfibre filter paper, clean, dry and tared, that has a retention and a filtration speed equivalent to those of a Whatman GF/A glassfibre filter paper.

C.3 Procedure

NOTE In this subclause, references to "water" imply standard hard water (see B.3) or, in the case of detergents for use in soft water only, distilled or deionized water.

C.3.1 Pour 250 mL of water into a 500 mL beaker and heat on the magnetic stirrer to approximately $60\text{ }^{\circ}\text{C}$.

C.3.2 Accurately weigh (to $\pm 0.001\text{ g}$) approximately 10 g of the test sample into a second 150 mL tall-form beaker.

C.3.3 Add a magnetic follower to the first beaker and transfer the sample quantitatively, in small increments, to the heated water in the first beaker, while stirring continuously.

C.3.4 Ensure that most of the previous increment is dissolved before the next increment is added.

C.3.5 Continue heating, while stirring continuously, until all the soluble material in the sample is dissolved.

C.3.6 Remove the magnetic follower from the beaker and filter the solution, under suction, through the glassfibre filter paper, and ensure that any insoluble matter is transferred quantitatively to the filter.

C.3.7 Wash the beaker and the residue onto the filter four times with approximately 50 mL portions of water at ambient temperature.

C.3.8 Allow the filter to drain completely, and then dry it and the residue at a temperature of $105\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for 3 h.

C.3.9 Allow to cool in a desiccator, and then determine the mass of the filter plus the residue.

C.4 Calculation

Calculate the water-insoluble matter content, W , as a percentage (by mass), as follows:

$$W = \frac{m_1}{m_2} \times 100$$

where

m_1 is the mass of the residue after drying, in grams, and

m_1 is the mass of the original sample, in grams.

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Annex D

(normative)

Test for non-foaming behaviour

NOTE In this subclause, references to "water" imply standard hard water (see B.3) or, in the case of detergents for use in soft water only, distilled or deionized water.

D.1 Prepare 1 L of a 5 g/L solution of the test sample in water.

D.2 Transfer 50 mL of the solution to a 100 mL measuring cylinder that has a suitable stopper.

D.3 Place the cylinder in a water-bath and heat to a temperature of $70\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. Once this temperature is reached, quickly remove the cylinder, shake it vigorously for 10 s and immediately return it to the water-bath. Allow it to stand at $70\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ for 15 s.

Annex E

(normative)

Test for effect on corrosion-resistant steel

E.1 Apparatus

E.1.1 Apparatus as given in ISO 2431.

E.1.2 Additional laboratory oven, maintained at a temperature of $80\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

E.2 Test strip

One strip, of size approximately 80 mm x 10 mm x 1 mm, of a hot-rolled, annealed and polished corrosion-resistant steel that complies with the requirements for steel of class X4CrNi18-12 of EN 10088-1.

E.3 Procedure

Use the relevant procedure in ISO 2431, but modify as follows: Completely immerse the test strip in an aqueous solution at 10 g/L concentration of the bottled detergent under test. Heat the unstoppered bottle and contents in the oven to a temperature of $80\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, then stopper the bottle and maintain it at $80\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for 2 h.

E.4 Results

Any loss in mass of the corrosion-resistant steel test strip shall not exceed 2.0 mg per 100 mm² of surface area of the test strip, and the test strip shall show no evidence of pitting, etching or discoloration.

Annex F

(normative)

Test for attack on fine china glaze

F.1 Test pieces

Two test pieces of glazed fine china that have the same degree of gloss, each of which has a glazed area of approximately 1 500 mm². Keep one of the test pieces as the reference specimen for assessment.

F.2 Procedure

NOTE In this subclause, references to "water" imply standard hard water (see 5.3.3) or, in the case of detergents for use in soft water only, distilled or deionized water.

F.2.1 Using a volumetric flask, prepare 1 L of a 2 g/L solution of the test sample in water. Transfer 150 mL of the prepared solution to a 250 mL wide-neck flask. Add one test piece, and boil (under reflux) for 6 h.

F.2.2 Repeat the boiling procedure twice more and use a fresh quantity of the prepared solution each time.

F.2.3 Remove the test piece from the flask, rinse and dry it, and, by comparing it with the reference test piece, visually examine its gloss for evidence of attack.

F.2.4 There shall be no visible reduction of the gloss of the glaze of the test piece"

Annex G

(normative)

Test for freeze-thaw stability

G.1 Apparatus

Normally available laboratory glassware, together with means of maintaining a temperature of 0 °C.

G.2 Procedure

G.2.1 Fill a 500 mL glass bottle (that has a suitable stopper) with the test sample, stopper the bottle and subject it to a freeze-thaw cycle that consists of freezing at a temperature of 0 °C for 16 h followed by thawing at an ambient temperature of 23 °C ± 2 °C for 8 h.

G.2.2 Repeat the freeze-thaw cycle twice more.

G.3 Compliance

A detergent supplied as an aqueous solution shall not thicken or gel and shall remain homogeneous.

Annex H (informative)

Test for stability

H.1 Apparatus

H.1.1 Laboratory oven, maintained at a temperature of $40\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$.

H.1.2 Refrigerator, maintained at a temperature of $4\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$.

H.2 Procedure

H.2.1 Fill two 500 mL glass bottles (that have suitable stoppers) with the test sample, and stopper the bottles. Place one bottle in the oven for 90 days and place the other bottle in the refrigerator for 90 days.

H.2.2 Examine the contents of both bottles for compliance with Annex J.

H.3 Results

A detergent supplied as an aqueous solution shall not thicken or gel and shall remain homogeneous.

Annex J

(normative)

Test for stability

NOTE Use distilled or deionized water for the preparation of all solutions.

J.1 Reagents

J.1.1 Phenolphthalein indicator

Dissolve 1 g of phenolphthalein in 100 mL of 95 % ethanol.

J.1.2 Starch solution

NOTE The starch solution should be freshly prepared immediately before use.

Prepare the starch solution as follows:

- make a paste of 1 g of soluble starch and a small amount of water;
- pour the paste (while stirring constantly) into 100 mL of boiling water; and
- boil for approximately 1 min, and allow to cool.

J.1.3 Standard sodium arsenite solution ($c(\text{NaAsO}_2) = 0.05 \text{ mol/L}$)

Prepare the standard sodium arsenite solution as follows:

- dissolve exactly 4.946 g of arsenious oxide in 150 mL of warm water that contains about 3 g of sodium hydroxide;
- allow to cool, add 1 drop of the phenolphthalein indicator, and neutralize the excess alkali with dilute sulfuric acid (1:3) until the solution is just decolorized;
- transfer quantitatively to a 1 L volumetric flask, and add 500 mL of water that contains about 25 g of sodium bicarbonate;
- if a pink colour develops, add dilute sulfuric acid drop by drop until the solution becomes colourless; and
- dilute the solution to the mark with water, and mix well.

J.1.4 Standard iodine solution ($c(\text{I}_2) = 0.05 \text{ mol/L}$)

J.1.4.1 Preparation

Prepare the standard iodine solution as follows:

- mix $12.7 \text{ g} \pm 0.05 \text{ g}$ of iodine with twice this mass of potassium iodide;
- dissolve in 100 mL of water, and filter the solution through a filter paper of medium porosity into a 1 L volumetric flask;

- c) wash the filter paper three times by pouring three 25 mL portions of water through the filter paper into the flask; and
- d) make up to the mark with water, and mix well.

J.1.4.2 Standardization

Pipette 25.0 mL of the standard sodium arsenite solution into a 250 mL conical flask, add 25 mL of water, then add about 5 g of sodium bicarbonate and allow it to dissolve completely.

While shaking the flask continuously, titrate the solution with the iodine solution until the fading of the yellow colour (formed on shaking) slows down.

Add 5 mL of the starch solution, and continue the titration until a permanent blue colour is obtained.

Calculate the concentration of the iodine solution, in moles per litre, as follows:

$$c(I_2) = \frac{1.25}{V}$$

Where

V is the volume of iodine solution used in the titration, in millilitres.

J.2 Procedure

NOTE In this subclause, references to "water" imply standard hard water (see B.3) or, in the case of detergents for use in soft water only, distilled or deionized water.

J.2.1 In the case of a detergent of type 1 or type 1S, grind the sample to a fine powder in order to increase the rate of solution.

J.2.2 Weigh out approximately 25 g of the sample to the nearest 0.001 g.

J.2.3 Transfer the sample quantitatively to a 250 mL volumetric flask that contains approximately 200 mL of water.

J.2.4 Stopper the flask and swirl it until most of the sample is dissolved.

J.2.5 Make up to the mark with water, add a magnetic follower, place the stoppered flask on a magnetic stirrer and vigorously stir the contents of the flask until all of the sample is dissolved.

J.2.6 While stirring, pipette a 25 mL aliquot into a 250 mL conical flask, and add 25 mL of water.

J.2.7 Using a burette, add 50.0 mL of the standard ($c(\text{NaAsO}_2) = 0.05 \text{ mol/L}$) sodium arsenite solution.

J.2.8 Add about 5 g of sodium bicarbonate, allow it to dissolve, and then titrate the excess sodium arsenite solution with the standard iodine solution ($c(I_2) = 0.05 \text{ mol/L}$) (see J.1.4.2), adding 5 mL of the starch solution as indicator towards the end of the titration.

J.3 Calculation

Calculate the available chlorine content, R , as a percentage (by mass), as follows:

$$R = \frac{(2.5 - VM) \times 70.91}{C}$$

Where;

V is the volume of iodine solution needed in the titration, in millilitres,

M is the concentration of the standard iodine solution, in moles per litre, and

C is the mass of the sample, in grams (see J.2.2).

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Bibliography

- [1] Working Group to identify and acknowledge useful literature used in the preparation of this standard.
- [2] KS 1696:2001, *Specification for detergent for industrial dishwashing equipment*
- [3] SANS 232:2012, *Detergent for industrial dishwashing equipment*
- [4] ARS 1467: 2019, Detergent for industrial dishwashing equipment

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