



**RWANDA
STANDARD**

**DRS
456-1**

First edition

Approved by RSB 2021-mm-dd

Surface disinfectants — Specification —

Part 1:

Disinfectants for general use

ICS 71.100.35

to appear on the last page

Reference number

DRS 456-1: 2021

© RSB 2021

In order to match with technological development and to keep continuous progress in industries, standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition

© RSB 2021

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without prior written permission from RSB.

Requests for permission to reproduce this document should be addressed to:

Rwanda Standards Board

P.O Box 7099 Kigali-Rwanda

KK 15 Rd, 49

Tel. +250 788303492

Toll Free: 3250

E-mail: info@rsb.gov.rw

Website: www.rsb.gov.rw

ePortal: www.portal.rsb.gov.rw

Contents	Page
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Requirements	2
4.1 Types.....	2
4.2 Raw materials.....	2
4.3 Active ingredients.....	2
4.4 General requirements.....	3
4.5 Specific requirements	3
5 Packaging and labelling.....	4
5.1 Packaging	4
5.2 Labelling	4
6 Sampling.....	5
Annex A (normative) Determination of corrosiveness	7
A.1 Corrosiveness to corrosion-resistant steel	7
A.2 Corrosiveness to aluminium	8
Annex B (normative) Determination of storage stability	9
B.1 Type 1 disinfectant/sanitizer.....	9
B.2 Type 2 disinfectant/sanitizer.....	9
Annex C (normative) Determination of freedom from visible impurities (type 2 disinfectant/sanitizer).....	10
Annex D (normative) Determination of water insoluble matter content	11
D.1 Procedure	11
D.2 Calculation.....	11

Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the World Trade Organisation/Technical Barrier to Trade (WTO/TBT) agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 456-1 was prepared by Technical Committee RSB/TC 24, *Organic and Inorganic Chemicals*.

In the preparation of this standard, reference was made to the following standard:

US 1693: Disinfectants/Sanitizers — Specification

The assistance derived from the above source is hereby acknowledged with thanks.

DRS 456 consists of the following parts, under the general title *Surface disinfectants — Specification*:

- *Part 1: Disinfectants for general use*
- *Part 2: Disinfectants based of iodophors*
- *Part 3: Disinfectants based on glutaraldehyde*

Committee membership

The following organizations were represented on the Technical Committee on Organic and Inorganic Chemicals (RSB/TC 24) in the preparation of this standard.

Star Construction and Consultancy Ltd

Rwanda Inspectorate, Competition and Consumer Protection Authority

Rwanda Food and Drugs Authority

Rwanda Investigation Bureau

Rwanda Forensic Laboratory

Rwanda Social Security Board

Rwanda Environment Management Authority

DRS 456-1: 2021

BARANYUZWE Cosmetics Ltd

SULFO Rwanda Industries Ltd

UBURANGA Natural Products

Divine Hope Company Ltd

University of Rwanda/College of Medicine and Health Sciences

University of Rwanda/College of Sciences and Technology

University of Rwanda/College of Education

Rwanda Polytechnic – IPRC Kigali

Standards for Sustainability (SfS)

Rwanda Standards Board (RSB) – Secretariat

Copy for public comments

Introduction

Surfaces frequently touched with hands are most likely to be contaminated. These include doorknobs, handrails, elevator buttons, light switches, cabinet handles, faucet handles, tables, countertops and electronics.

When cleaning public spaces, choose products that clean and disinfect all at once (e.g. premixed store-bought disinfectant cleaning solutions and/or wipes when available).

- a) **Cleaning products** remove germs, dirt, and impurities from surfaces by using soap (or detergent) and water. Cleaning does not necessarily kill germs, but by removing them, it lowers their numbers and the risk of spreading infection.
- b) **Disinfecting products** kill germs on surfaces using chemicals.

This document provides guidance on disinfecting products of public settings, including schools, universities, public libraries, museums, public transit, communal residences and workplaces.

Copy for public comments

Surface disinfectants — Specification — Part 1: Disinfectants for general use

1 Scope

This Draft Rwanda Standard specifies requirements, sampling and test methods for disinfectants intended for general use on inanimate surfaces including food contact and non-food contact surfaces.

It is applicable to disinfectants represented for use on no-critical medical devices, environmental surfaces and other inanimate objects.

It does not apply to disinfectants containing iodophor (s) and aldehydes as active ingredients.

NOTE 1 Using this standard, it is not possible to determine the bactericidal activity of the undiluted product. Some dilution is always produced by the addition of inoculum, standard hard water and sterile skimmed milk.

NOTE 2 If a product complies with the test requirements, it can be considered to be bactericidal, but it should not necessarily be inferred that the product is a suitable disinfectant/sanitizer for a defined purpose.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

RS EAS 384, *Disinfectants — Glossary of terms*

DRS 457, *Determination of bactericidal efficacy of disinfectants*

ISO 15510, *Stainless steels — Chemical composition*

3 Terms and definitions

For the purposes of this standard, the terms and definitions given in RS EAS 384 and the following apply.

3.1

active ingredient

any chemical or biological component that includes in the formulation of a disinfectant/sanitizer product in sufficient concentration to achieve the intended anti-microbial purpose of the specific product.

3.2

inanimate surface

any surface other than live human or live tissue (e.g., skin)

3.3

lot

quantity of disinfectant in sealed containers of the same size and bearing the same batch identification, from one manufacturer, submitted at any one time for inspection and testing

3.4

main active ingredient

active ingredient presents in highest quantity or concentration in a disinfectant product

3.5

standard conditions

temperature of $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and a relative humidity of $50\% \pm 5\%$

4 Requirements

4.1 Types

The product shall be one of the following types:

Type 1: a homogeneous liquid/gel; or

Type 2: a solid, supplied in form of tablets, free-flowing beads, granules or powder.

4.2 Raw materials

The product shall not contain ingredients that are recognized as being potentially hazardous or toxic when used in accordance with the manufacturer's recommendations, nor shall they form toxic or potentially toxic reaction products.

4.3 Active ingredients

4.3.1 The product shall contain one or a mixture of which permit the product to serve its purpose.

NOTE A mixture of active ingredients is permitted provided that the ingredients are compatible and do not interact in a manner that reduces the product activity.

4.3.2 Active ingredients and their concentrations as per listed in table 1 shall ensure the declared efficacy and shall be safe and approved by competent authority.

Table 1 — Active ingredients and their working concentrations

S/N	Active ingredient	Working concentration	Contact time (minutes)
1.	Accelerated hydrogen peroxide ¹	0.5 %, min.	1
2.	Benzalkonium chloride ²	0.05 %, min.	10
3.	Chloroxylonol	0.12 %, min.	10
4.	Ethyl alcohol	70 %, min.	10
5.	Isopropanol	70 %, min.	10
6.	Sodium hypochlorite	0.05 – 0.5 %	5
7.	Active chlorine generated from other precursors ³	0.476 – 4.762 g/L	5
8.	Sodium chlorite	0.25 %, min.	10

NOTE 1 Product with hydrogen peroxide as the active ingredient will be assessed on a case-by-case basis; efficacy reports should be provided by the supplier

NOTE 2 Alternative name: Alkyl dimethyl benzyl ammonium chloride

NOTE 3 Active chlorine could be generated from other precursors such as calcium hypochlorite, hydrochloric acid, sodium chloride, sodium dichloroisocyanurate, tosylchloramide sodium, and tichloroisocyanuric acid, under certain conditions.

4.4 General requirements

4.4.1 The product shall not:

- a) Leave an objectionable odour on surfaces; and
- b) Impart any colour, taste, odour or flavour to food products or drinking water, when used in accordance with the manufacturer's recommendations.

4.4.2 The product intended to use on food contact surfaces, including water contact surface, shall not contain perfumes.

4.5 Specific requirements

The product shall also comply with the specific requirements given in the table 1 when tested in accordance with the corresponding test method.

Table 1 – Specific requirements for surface disinfectants for general use

S/N	Characteristic		Requirement		Test method
			Type 1	Type 2	
i)	Corrosiveness	Corrosion-resistant steel, mg/100 mm ² , max.	0.05		Annex A
		Aluminium test strip	No evidence of pitting, etching or discolouration		
ii)	Storage stability		Homogeneous and free-flowing	Not cake into lumps	Annex B
iii)	Freedom from visible impurities		-	Pass the test	Annex C
iv)	Water insoluble matter content, max.		5 g/L	2.5% (by mass)	Annex D
v)	Bactericidal efficacy and suitability for the purpose		To pass the test		DRS 457 Annex E

5 Packaging and labelling

5.1 Packaging

5.1.1 The container (including the closure) in which the product is packaged shall not interact chemically and physically with the product and shall be strong enough to protect the product adequately during normal handling, transportation and storage.

5.1.2 The closure shall not be made of cork or of any material that contains cork.

5.1.3 Only packs of the same size and bearing the same batch identification shall be packaged together in a bulk pack.

5.2 Labelling

5.2.1 The following information shall appear prominently, legibly and indelibly on each product container or on a label securely attached to each container:

- a) the manufacturer's name or trademark, or both;
- b) a statement that the product is a disinfectant and the main active ingredient used in its formulation
- c) a statement of the nominal volume or mass of the contents in metric units;
- d) an indication of the intended use areas for which the product is claimed to be suitable;

NOTE 1 Intended use areas may include one or more of the following: general residential settings, industrial/institutional settings (such as commercial settings, schools and offices), hospitals (for non-critical medical devices), food processing/food handling areas and equipment, barns/animal housing settings and any other specific area.

- e) general instructions for use of the product. The instructions shall include the recommended concentration, dilution level and the minimum exposure period for each purpose;
- f) hazard and toxicity warnings, where relevant;

- g) a statement about the safety precautions to be taken when using the product and the first aid steps to be taken in case of direct ingestion or skin contact;
- h) the bath identification number, or the production date of the batch or both;
- i) the expiry date of the product, where relevant;
- j) adequate draining, rinsing and/or drying requirements from surfaces after use;
- k) appropriate instructions for the storage of the product, including a warning to store away from children; and
- l) a warning to avoid contact with known incompatible substances, items and foodstuffs (see Annex F).

NOTE 2 The manufacturer should substantiate any virucidal claim made about the product.

6 Sampling

6.1 General

The following sampling procedure shall be applied in determining whether a lot submitted for inspection and testing complies with the relevant requirements of this standard. The sample so drawn shall be deemed to represent the lot.

6.2 Sample for inspection

After inspecting the lot for compliance with Clause 4, take, at random, the number of containers, as relevant, shown in column 2 of Table 2, relative to the appropriate lot size shown in column 1.

Table 2 — Samples for inspection and testing

Lot size (number of containers)	Sample size for physical examination (number of containers)	Sample size for microbiological examination (number of containers)
0 to 5 000	3	3
5 001 to 12 500	6	3
12 501 to 25 000	9	3
25 001 to 50 000	16	3
50 001 upwards	30	3

6.3 Sample for testing

After inspection of the containers taken in accordance with 6.2,

- a) take, at random, half the number of containers and use them for the storage stability test; and

- b) thoroughly mix the contents of each of the remaining containers and, take from each container the lesser of the total volume and 250 mL, and obtain a composite test sample by combining and thoroughly mixing these quantities. Use these samples for testing for compliance with the requirements of Clause 4.

Copy for public comments

Annex A (normative)

Determination of corrosiveness

A.1 Corrosiveness to corrosion-resistant steel

A.1.1 Test strips

Use one strip, of size approximately 80 mm x 25 mm x 1 mm, of a hot-rolled, annealed and polished stainless steel that complies with the requirements for grade X2CrNi18-9 as specified in ISO 15510.

A.1.2 Procedure

A.1.2.1 Accurately determine the total area of the surfaces of the steel test strip and degrease it by washing in a mixture of equal volumes of ethanol and acetone. After allowing the strip to air-dry, heat it for 30 min in an oven maintained at $105\text{ °C} \pm 5\text{ °C}$, cool it in a desiccator and immediately determine its mass to the nearest 0.1 mg.

A.1.2.2 Prepare the test solution of the product under test, at the concentration recommended by the manufacturer, and transfer 250 mL of the freshly prepared solution to a suitably stoppered glass bottle.

A.1.2.3 Completely immerse the test strip in the solution in the glass bottle. Stopper the bottle and maintain it at $25\text{ °C} \pm 2\text{ °C}$ for 16 h.

A.1.2.4 Remove the test strip from the test solution, rinse it thoroughly, first with water, then with acetone, and allow it to air-dry. Then heat the test strip for 30 min in an oven maintained at $105\text{ °C} \pm 5\text{ °C}$, cool it in the desiccator, and immediately determine its mass to the nearest 0.1 mg.

A.1.2.5 Examine the test strip for compliance with the requirements.

A.1.3 Calculation

The loss in mass, M , expressed in milligrams per 100 square millimetres ($\text{mg}/100\text{mm}^2$) of surface area, shall be calculated as follows:

$$M = \frac{100}{A} \times (m_1 - m_2)$$

Where,

M is the loss in mass, in milligrams per 100 square millimetres, of the steel test strip,

A is the total surface area, in square millimetres,

m_1 is the mass, in milligrams, of the test strip before the test, and

m_2 is the mass, in milligrams, of the test strip after the test.

A.2 Corrosiveness to aluminium

A.2.1 Test strips

Use two strips, each of size approximately 75 mm x 19 mm x 1.5 mm, of bright-finished uncoated aluminium Type EN AW 1050A.

A.2.2 Procedure

NOTE Should the mass loss evaluation method be required for the corrosiveness to aluminium, use the procedure given in A.1.2.

A.2.2.1 Degrease the aluminium test strips by washing in a mixture of equal volumes of ethanol and acetone. Allow the strips to air-dry, then heat them for 15 min in an oven at $105\text{ °C} \pm 5\text{ °C}$ and allow them to cool in a desiccator.

A.2.2.2 Prepare the test solution of the product under test, at the highest concentration recommended by the manufacturer, and transfer 250 mL of the freshly prepared solution to a suitably stoppered glass bottle.

A.2.2.3 Completely immerse the test strips (see A.2.1) in the solution in the glass bottle. Stopper the bottle and maintain the bottle at $25\text{ °C} \pm 2\text{ °C}$ for 16 h.

A.2.2.4 Remove the test strips from the test solution, rinse them thoroughly with water and then acetone and allow to air-dry. Then heat the test strips for 30 min in an oven at $105\text{ °C} \pm 5\text{ °C}$ and cool in a desiccator.

A.2.2.5 Remove the test strips, and visually inspect them for evidence of pitting, etching or discoloration.

A.2.2.6 Examine the test strips for compliance with the requirements.

Annex B (normative)

Determination of storage stability

B.1 Type 1 disinfectant/sanitizer

B.1.1 Store each disinfectant/sanitizer in its original unopened container at $5\text{ °C} \pm 1\text{ °C}$ for 24 h.

B.1.2 Check for compliance with 4.5.2.1.

B.2 Type 2 disinfectant/sanitizer

B.2.1 Store each disinfectant/sanitizer in its original unopened container under standard conditions for six months.

B.2.2 Check the compliance with 4.5.2.2.

Copy for public comments

**Annex C
(normative)**

**Determination of freedom from visible impurities (type 2
disinfectant/sanitizer)**

C.1 Spread approximately 50 g of each test sample over the bottom of a 150-mm diameter Petri dish.

C.2 Check for compliance with 4.5.3 by viewing at a range of approximately 600mm.

Copy for public comments

Annex D (normative)

Determination of water insoluble matter content

D.1 Procedure

D.1.1 Pipette 5.0 ml of a type 1 disinfectant/sanitizer, or place 2 g of a type 2 disinfectant/sanitizer into a beaker and add 250 ml of standard hard water.

D.1.2 Heat in a steam bath with frequent stirring until the sample is completely dispersed.

D.1.3 Filter the solution immediately, under suction, through a tarred 1.6- μm glass fibre filter and ensure that the insoluble matter is quantitatively transferred to the filter.

D.1.4 Wash the beaker and the residue five times with 20 ml volumes of hot standard hard water. Wash the filter with distilled water (to remove salts from the hard water).

D.1.5 Allow the solution to drain completely and dry the residue at $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ until constant mass is attained. Cool in a desiccator and weigh.

D.2 Calculation

Type 1 disinfectant/sanitizer

The water-insoluble matter content in the test solution, expressed in grams per litre (g/l), shall be calculated using the following formula:

$$\text{Water-insoluble matter content} = \frac{m}{V}$$

Where,

m is the mass, in grams, of the residue after it has been dried; and

V is the volume, in litres, of the test solution.

Type 2 disinfectant/sanitizer

The water-insoluble matter content, S , expressed as a percentage by mass (%), shall be calculated using the following formula:

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

Where,

m_1 is the mass, in grams, of the test sample taken; and

m_2 is the mass, in grams, of the residue after it has been dried.

Copy for public comments

Bibliography

- [1] ISO/IEC Directives, Part 2, *Rules for the structure and drafting of International Standards*, 2016
- [2] ISO/IEC TR 10000-1, *Information technology — Framework and taxonomy of International Standardized Profiles — Part 1: General principles and documentation framework*
- [9] IEC 60027 (all parts), *Letter symbols to be used in electrical technology*
- [10] ISO 80000-1, *Quantities and units — Part 1: General*
- [11] ISO 690, *Documentation — Bibliographic references — Content, form and structure*
-
-

Copy for public comments