RWANDA STANDARD

DRS 277:2021

Second edition

Water quality — Chemicals used for treatment of water intended for human consumption

Part 6: Hydrated lime

ICS 71.100.80

Reference number

DRS 277: 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

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

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 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.

RS 277 was prepared by Technical Committee RSB/TC 013, *Water and Sanitation*.

This second edition cancels and replaces the first edition RS 277: 2015 which has been technically revised.

Committee membership

The following organizations were represented on the Technical Committee on Water and Sanitation (RSB/TC 013) in the preparation of this standard.

Enviroserve Rwanda

Ministry of Trade and Industry (MINICOM)

Ministry of Environment (MoE)

Ruliba Clays

Rwanda Environmental Management Authority (REMA)

Rwanda Mines, Petroleum and Gas Board (RMB)

Rwanda Polytechnic (RP)

Rwanda Utility Regulatory Authority (RURA)

Shine Engineers Multisectoral Company Ltd (SEMC)

Star Construction and Consultancy (SCC)

Standards for Sustainability (SFS)

SULFO Rwanda

University of Rwanda- College of Science and Technology (UR-CST)

Water and Sanitation Corporation (WASAC)

Rwanda Standards Board (RSB) – Secretariat

Water quality — Chemicals used for treatment of water intended for human consumption — Part 6: Hydrated lime specifications

1 Scope

This Committee Draft Standard lays down requirements and methods of test for hydrated lime used for treatment of water intended for human consumption

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 17378-2 *water quality — determination of arsenic and antimony — part 2: method using hydride generation atomic absorption spectrometry (hg-aas)*

ISO 21587-1, *Chemical analysis of aluminosilicate refractory products (alternative to the X-ray fluorescence method) — Part 1: Apparatus, reagents, dissolution and gravimetric silica*

ISO 21587-2, *Chemical analysis of aluminosilicate refractory products (alternative to the X-ray fluorescence method) — Part 2: Wet chemical analysis*

ASTM C25 – 19 *Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime*

ASTM E449 – 18 *Standard Test Methods for Analysis of Calcium Chloride*

ISO 3165, *Sampling of chemical products for industrial use — Safety in sampling*

ISO 8213, *Chemical products for industrial use — Sampling techniques — solid chemical products in the form of particles varying from powders to coarse lumps*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply

3.1

available lime

oxides of calcium and magnesium which enter into a desired reaction under the conditions of a specific method or process

3.2

hydrated lime

very finely divided powder resulting from the hydration of quicklime, consisting essentially of calcium hydroxide, $Ca(OH)_2$. Hydrated lime used to be slaked lime too

3.3

lot

quality of hydrated lime that bears the same batch identification, from one manufacturer, submitted at any one time for inspection and testing

3.4

quicklime

calcium oxide CaO, the result of burning limestone

3.5

limestone

calcium carbonate, $CaCO_3$, sometimes called agricultural lime

3.6

w/v

weight per volume

3.7

manufacturer

party and manufacturers, fabricates, or produces materials or products

4 Chemical requirements

4.1 When tested, the hydrated lime shall comply with all the appropriate requirements given in the Table 1:

Table 1 — Chemical Requirements

S/N	Constituents	Hydrated lime			Test method
		Grade A	Grade B	Grade C	
i.	Available lime (calculated as calcium oxide percent, min	95.0	95.0	95.0	ISO 21587 (part 1&2)
ii.	Available lime (calculated as calcium hydroxide), percent, min	92	87	83	ASTM E449 - 18
iii.	Magnesium oxide, percent, max.	0.6	0.6	0.6	ISO 21587

4.2 Impurities

The product shall conform to the requirements specified in Table 2

Table 2 — impurities

S/N	Constituents	Limit in mass fraction in % of dry product			Test method
		Grad A	Grad B	Grad C	
i.	Carbon dioxide, percent, max	3.0	4.0	5.0	ASTM C25 - 19
ii.	Si expressed as SiO_2 max.	2.5	3.0	4.0	ISO 21587 (part 1&2) ASTM C25 - 19
iii.	Al expressed as Al_2O_3 max	0,5	1,0	2,0	
iv.	Fe expressed as Fe_2O_3 max	0,5	1,0	1,5	
v.	Mn expressed as MnO_2 max.	0,2	0,4	0,5	
vi.	$CaCO_3$ max.	7,0	8,0	9,0	ASTM C25 - 19
vii.	Water insoluble matter, max	2	2	2	ASTM C25 - 19

4.3 Hydrated lime for water treatment shall not contain inorganic contaminants in excess of limits indicated in Table 3.

Table 3 — limits of inorganic contaminants in hydrated lime for water treatment

S/N	Substance	Limit, mg/L, max.	Test methods
i	Arsenic as As,	0.01	ISO 17378-2
ii	Lead as Pb,	0.01	ISO 8288
iii	Mercury as Hg,	0.001	ISO 12846

iv	Nitrite as NO_2^-	0.1	ISO 6777
v	Cadmium as DRS,	0.003	ISO 5961
vi	Chromium as total Cr,	0.005	ISO 9174
vii	Copper as Cu^{++}	1	ISO 8288
viii	Cyanide as CN^-	0.07	ISO 6703
ix	Anionic surfactant (reacting with methylene blue)	Absent	ISO 7875
x	Barium as Ba^{++}	0.7	ISO 11885

5 Physical requirements

5.1 The hydrated lime shall be free from fuel ashes and under burnt particles.

5.2 The hydrated lime shall be a fine white powder which shall pass through a 425 micro sieve.

5.3 The Table 4 gives some physical characteristics for hydrated lime

Table 4 — Some physical properties of hydrated lime

Property	**Hydrated lime**
Specific gravity	2.1 – 2.4
Bulk density	300 – 600 kg/m3
Solubility in water	1,85 g/l at 0 °C 1,65 g/l at 20 °C 1,53 g/l at 30 °C
Melting point	Decomposes at 580 °C and forms calcium oxide and water
Particle distribution	should be uniform
Particle size	Product shall be free from lumps or foreign material that might interfere with the operation of dry feed, pneumatic or hydraulic equipment

6 Packaging and marking

6.1 Packaging

Hydrated lime shall be packaged in air-tight or moisture-proof containers.

6.2 Marking

6.2.1 The container or the attached label shall be legibly and indelibly marked with the following information:

a) name or trade name and physical addresses of the manufacturer

b) name “hydrated lime for water treatment”;

c) grade of the hydrated lime;

d) lot number;

e) net weight of contents when packed; and

f) statement of conformity to the standard

6.2.2 The supplier shall provide a certificate of analysis against the standard

NOTE The user should verify the relevance of that certificate

7 Sampling

Additionally, to the sampling provisions in annex A; Observe the general recommendations of ISO 3165 and prepare the laboratory sample(s) required by the relevant procedure described in ISO 8213.

Annex A
(normative)

Sampling and specification of tests

A.1 General sampling procedure

Sampling shall be done expeditiously as possible in order to avoid undue exposure of the material to the air. Sample shall not be taken from broken packages. The breaking down and canning and quartering or bulk samples shall be carried out under cover. The samples so drawn shall be deemed to represent the lot.

A.2 Sampling of hydrated lime delivered in bulk

The hydrated lime supplied in bulk, take approximately equal portions from at least 20 different positions in order to form a composite sample of at least 12 kg. The portion shall be taken in such a manner that the composite sample represents an average of all parts of the lot, and shall not contain a disproportionate share of the top or bottom layers. Proceed in accordance with clause A.4.

A.3 Sampling of hydrated lime delivered in containers

For hydrated lime delivered in containers, if the lot consists of twelve or less containers, sample each container. If a lot consists of more than twelve containers at random from the lot. Take approximately equal representative quantities of not less than 1 kg with clause A.4.

A.4 Mixing the composite sample

Mix the composite sample thoroughly on a clean, dry, hard surface and spread it out flat and scoop the mass together into a cone. Flatten the cone and divide into four equal parts. Remove the two diagonally opposite parts. Mix the two remaining parts together and from a cone out of it again. Repeat the operation of mixing, conning and quartering until finally about 3 kg of the average sample representative of the lot is left. Divide into three approximately equal representative portions, immediately place each portion in an airtight container of such size that it is nearly filled by the sample and mark with full details including the date of sampling. Submit one sample to the laboratory for test, one sample to the manufacturer and keep the third sample for reference.

A.5 Compliance with specification

The test samples prepared for each lit shall be subjected to various physical and chemical tests. The lot shall be declared complying with this specification only if the prescribed tests conform to the requirements of this standards.

Bibliography

[1] ASTM C50: 2013, Standard Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products

[2] ASTM D1129: 2013 Terminology related to water

[3] BS EN 12485: 2010, Chemicals used for treatment of water intended for human consumption — Calcium carbonate, high-calcium lime, half-burnt dolomite, magnesium oxide and calcium magnesium carbonate — Test methods

[4] IS 1514 (1990): Methods of sampling and test for quick lime and hydrated lime [CHD 1: Inorganic Chemicals]

[5] ANSI/AWWA Standard for Quicklime and Hydrated Lime. ANSI/AWWA B202-93, AWWA, 1993.

[6] ISO 3696, Water for analytical laboratory use — Specification and test methods

[7] Guidance Note for Completion of a Material Safety Data Sheet. National Occupational Health and Wellington, 1996

[8] Standard Methods for the Examination of Water and Wastewater. 19th Ed., APHA, AWWA, WEF. 1995.

DRS 277: 2021

Price based on 6 pages