SRI LANKA STANDARD 759 : 1986

UDC 661.431

SPECIFICATION FOR

CHLORINATED LIME (BLEACHING POWDER) AND CALCIUM HYPOCHLORITE

SRI LANKA STANDARDS INSTITUTION

(Attached AMD 96, AMD 185 and AMD 504)
Gr. 6

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SRI LANKA STANDARD
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FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Sri Lanka Standards Institution on 1986-11-14, after the draft, finalized by the Drafting Committee on Chemicals and Chemical Products, had been approved by the Chemicals Divisional Committee.

Chlorinated lime which is commonly called bleaching powder can be considered as an impure form of calcium hypochlorite as it contains high amounts of calcium chloride and calcium hydroxide. In the product called calcium hypochlorite, these impurities are present in lesser quantities than in chlorinated lime.

In this specification two grades of chlorinated lime have been specified. A product complying with the requirements of Grade 1 will retain its available chlorine for a longer period when properly stored as its moisture content is low.

All values in this specification are given in SI units.

For the purpose of deciding whether a particular requirement of this specification is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with CS 102. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this specification.

In the preparation of this specification, the assistance obtained from the publications of the Indian Standards Institution, South African Bureau of Standards and the Federal Supply Services of the General Services Administration of United States of America is gratefully acknowledged.

1 SCOPE

This specification prescribes the requirements, methods of sampling and test for chlorinated lime (bleaching powder) and calcium hypochlorite, used for bleaching, sterilization and disinfection.

2 REFERENCES

CS 102 Presentation of numerical values

CS 124 Test sieves

SLS 428 Random sampling methods.

3 GRADES

Chlorinated lime shall be of the following grades :

Grade 1; and

Grade 2.

4 REQUIREMENTS

4.1 General requirements

4.1.1 The material shall be white to slightly yellowish-white in appearence and shall be free from hard lumps and any visible impurities. It shall be dry and free-flowing.

4.1.2 The material shall be partly soluble in water and in 96 per cent *(V/V)* solution of ethanol.

4.1.3 The material shall evolve chlorine copiously on the addition of 2 mol/l solution of hydrochloric acid. When the material is shaken with water and filtered, the filtrate shall yield the two reactions prescribed in Appendix B which are characteristic of calcium salts and chlorides.

4.2 Other requirements

Chlorinated lime and calcium hypochlorite shall also conform to the relevant requirements prescribed in Table 1 when tested according to the methods given in Column 6 of the table.

5 PACKAGING

The material shall be packed in air-tight, galvanized steel drums with suitable inner-linnings or other similar containers, as agreed to between the buyer and the supplier. The containers used shall be free from grease, dirt or any other foreign matter likely to cause decomposition of the material.

TABLE 1 - Requirements for chlorinated lime and calcium hypochlorite

Sl. No.	Characteristic	Requirement			Method of test
		Chlorinated lime		Calcium hypochlorite	
(1)	(2)	Grade 1 (3)	Grade 2 (4)	(5)	(6)
i)	Available chlorine, per cent by mass, min.	35.0	30.0	60.0	**Appendix C**
ii)	Loss of available chlorine on heating, on the basis of initial available chlorine, per cent by mass, max.	6.6	15.0	10.0	**Appendix D**
iii)	Moisture, per cent by mass, max.	0.3	3.5	2.0	**Appendix E**
iv)	Particle size :				**Appendix F**
	a) Particles passing through 1.70 mm sieve, per cent by mass, min.	99.5	-	-	
	b) Particles passing through 1.40 mm sieve, per cent by mass, min.	-	80.0	75.0	
v)	Bulk density, g/ml, min.	0.8	0.8	0.8	**Appendix G**

6 MARKING

Each container shall be legibly and indelibly marked or labelled with the following :

a) Name of the product;

b) Grade (for chlorinated lime);

c) Name and address of the manufacturer and/or distributor (including country of origin);

d) Trade mark, if any;

e) Net mass of the contents, in kilograms;

f) The words **KEEP AWAY FROM HEAT AND MOISTURE**; and

g) Batch or code number.

7 SAMPLING

The method of drawing representative samples of the material for ascertaining conformity to the requirements of this specification shall be as prescribed in Appendix A.

8 METHODS OF TEST

8.1 Tests for the requirements laid down in **4.1.3** and **4.2** shall be carried out as prescribed in Appendices B to G.

8.2 During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

9 CRITERIA FOR CONFORMITY

A lot shall be declared as conforming to the requirements of this specification if the following conditions are satisfied :

9.1 Each container examined as in **A.5.1** satisfies the packaging and marking requirements.

9.2 Each individual sample tested as in **A.5.2** satisfies the relevant requirements.

9.3 The test results on the composite sample satisfy the relevant requirements.

APPENDIX A

SAMPLING

A.1 LOT

All the containers containing material belonging to a single batch of manufacture or supply and of the same grade (for chlorinated lime) shall constitute a lot.

A.2 GENERAL REQUIREMENTS OF SAMPLING

A.2.1 Samples shall not be exposed to the atmosphere for a longer time than necessary and sampling shall be done as rapidly as possible.

A.2.2 To draw representative samples from the containers selected for sampling, an appropriate sampling instrument (galvanized iron sampling tube, scoop) shall be used.

A.2.3 The sampling instrument shall be clean and dry when used.

A.2.4 The samples shall be placed in clean, dry and air-tight containers on which the material has no action.

A.2.5 Each sample container shall be sealed air-tight after filling and marked with necessary details of sampling.

A.2.6 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

A.2.7 The samples shall be stored in a cool and dry place.

A.3 SCALE OF SAMPLING

A.3.1 Samples shall be obtained from each lot for ascertaining its conformity to the requirements of this specification.

A.3.2 The number of containers to be selected from a lot shall be in accordance with Table 2.

TABLE 2 - Scale of sampling

Number of containers in the lot (1)	Number of containers to be selected (2)
Up to 50	3
51 to 90	5
91 to 150	6
151 to 300	7
301 and above	8

A.3.3 The containers shall be selected at random. In order to ensure randomness of selection, tables of random number as given in **SLS 428** shall be used.

A.4 PREPARATION OF SAMPLES

A.4.1 Equal quantities of material shall be drawn from different parts of each container selected as in **A.3.2** using an appropriate sampling instrument to form a sample of not less than 100 g. The material obtained from each container shall constitute an individual sample to represent the container and shall be transferred to a separate sample container.

A.4.2 Equal quantities of material shall be drawn from different parts of each container selected as in **A.3.2** using an appropriate sampling instrument. The material so obtained shall be mixed to form a composite sample of not less than 300 g and transferred to a sample container.

A.5 NUMBER OF TESTS

A.5.1 Each container selected as in **A.3.2** shall be examined for packaging and marking requirements.

A.5.2 The individual samples prepared as in **A.4.1** shall be tested for the following requirements :

a) Available chlorine;
b) Loss of available chlorine on heating; and
c) Moisture.

A.5.3 The composite sample prepared as in **A.4.2** shall be tested for the other requirements of this specification.

APPENDIX B

IDENTIFICATION OF CALCIUM SALTS AND CHLORIDES

B.1 CALCIUM SALTS

Add a few drops of a solution of ammonium oxalate to the filtrate obtained as in **4.1.3**. Formulation of a white precipitate which is only sparingly soluble in 6 mol/l solution of acetic acid but is soluble in hydrochloric acid, indicates the presence of calcium salts.

B.2 CHLORIDES

Acidify 2 ml of the filtrate obtained as in **4.1.3** with 2 mol/l solution of nitric acid and add 0.4 ml of 0.25 mol/l solution of silver nitrate. Shake and allow to stand. Formation of a curdy white precipitate which yields the following reaction indicates the presence of chlorides.

Centrifuge and wash the precipitate with three quantities, each of 1 ml of water. Carry out this operation rapidly in subdued light, disregarding the fact that the supernatant solution may not become pefectly clear. Suspend the precipitate in 2 ml of water and add 1.5 ml of 10 mol/l solution of ammonia. The precipitate dissolves easily with the possible exception of a few large particles that dissolve slowly.

APPENDIX C

DETERMINATION OF AVAILABLE CHLORINE

C.1 REAGENTS

C.1.1 *Sodium arsenite,* 0.1 mol/l solution. Dissolve 4.948 g of arsenious oxide in 150 ml of warm water containing approximately 3 g of sodium hydroxide. Cool, neutralize the excess alkali with 25 per cent (*V/V*) solution of sulfuric acid using phenolphthalein as the indicator, until the solution is just decolourized. Add 300 ml of water containing about 25 g of sodium bicarbonate. If a pink colour develops, add a few drops of the dilute sulfuric acid to decolourize the solution. Transfer quantitatively to a 1-litre volumetric flask, dilute to volume and mix.

C.1.2 *Starch solution.* Mix approximately 2 g of soluble starch with sufficient cold water to form a thin slurry. Add the slurry to approximately 1 litre of boiling water, add 1 g of salicylic acid and boil until the solution is clear. Cool and store in a glass stoppered bottle.

C.1.3 *Iodine, standard volumetric solution,* $c(I_2) = 0.05$ mol/l
Mix 12.70 ± 0.05 g of iodine with twice its mass of potassium iodide. Dissolve in a small quantity of water, filter into a 1-litre volumetric flask, dilute to the mark, and mix well. Pipette 50 ml of the sodium arsenite solution **(C.1.1)** into an Erlenmeyer flask, dilute with 100 ml of water, and add approximately 5 g of sodium bicarbonate. Add 5 ml of starch solution **(C.1.2)** and titrate with iodine solution from a burette until a permanent blue colour is obtained (see Note). Calculate the concentration of the iodine solution as follows :

$$\text{Concentration, in mol/l, of iodine solution} = \frac{5.0000}{V}$$

where,

V = volume, in ml, of iodine solution used.

NOTE - Iodine solution shall be added cautiously and dropwise near the endpoint.

C.2 PROCEDURE

Weigh, to the nearest 0.001 g, approximately 5 g of material and quantitatively transfer to a porcelain mortar. Add 30 ml to 40 ml of water, grind and mix until a smooth paste is obtained. Add more water, stir well, allow the insolubles to settle for a few seconds, and decant the supernatant liquid into a 1-litre volumetric flask. Add more water to the insolubles in the mortar, grind, mix and decant as before. Repeat the operation until all of the material has been transferred to the volumetric flask. Rinse the mortar and pestle and add the rinsings to the volumetric flask. Dilute to the mark with water. Mix thoroughly and without allowing the material to settle, pipette a 50-ml aliquot into a 250-ml Erlenmeyer flask containing 50 ml of water. From a burette or pipette add 50 ml of sodium arsenite solution (C.1.1).

Add an excess of sodium bicarbonate (5 g to 10 g) and 5 ml of starch solution **(C.1.2)**. Titrate the excess sodium arsenite solution with iodine solution **(C.1.3)** from a burette until a permanent blue colour is obtained (see Note in C.1.3).

C.3 CALCULATION

$$\text{Available chlorine, per cent by mass} = \frac{3.546\,(V_1c_1 - V_2c_2)}{m}$$

where,

V_1 = volume, in ml, of sodium arsenite solution used;

V_2 = volume, in ml, of iodine solution used;

c_1 = concentration, in mol/l, of sodium arsenite solution;

c_2 = concentration, in mol/l, of iodine solution; and

m = mass, in g, of sample in aliquot.

APPENDIX D

DETERMINATION OF LOSS OF AVAILABLE CHLORINE ON HEATING

D.1 PROCEDURE

Weigh, to the nearest 0.001 g, approximately 15 g of the sample in a 75-mm diameter evaporating dish. Place the dish on a steam bath at 100 ± 2 °C for 2 hours. Cover with a watch glass and allow to cool to room temperature. Transfer the material to a porcelain mortar and proceed from this point with the determination of available chlorine as described in **C.2** except that instead of a 50-ml aliquot, use a 20-ml aliquot.

D.2 CALCULATION

Calculate the per cent available chlorine of the heated sample as given in C.3.

$$\text{Loss of available chlorine, on the basis of initial available chlorine, per cent by mass} = \frac{(A - B)}{A} \times 100$$

where,

A = per cent by mass, of initial available chlorine obtained without heating; and

B = per cent by mass, of available chlorine after heating.

APPENDIX E

DETERMINATION OF MOISTURE

E.1 PROCEDURE

Weigh, to the nearest 0.1 g, approximately 15 g of the sample in an open, dry weighing glass and place it for 24 hours in a vacuum desiccator (**Caution**, see Note) over fused anhydrous calcium chloride, under an absolute pressure of 30 mm to 40 mm of mecury. Weigh the sample again.

NOTE - Place the desiccator within a protective enclosure.

E.2 CALCULATION

$$\text{Moisture content, per cent by mass} = \frac{m_1 - m_2}{m_1} \times 100$$

where,

m_1 = mass, in g, of the sample before drying; and

m_2 = mass, in g, of the sample after drying.

APPENDIX F

DETERMINATION OF PARTICLE SIZE

F.1 PROCEDURE

Weigh, to the nearest 0.1 g, approximately 50 g of the sample and place it on the relevant sieve conforming to **CS 124**. Shake the sieve till no more material passes through it and weigh the material passing through the sieve.

F.2 CALCULATION

$$\text{Material passing through the sieve, per cent by mass} = \frac{m_1}{m_o} \times 100$$

where,

m_o = mass, in g, of the sample used; and

m_1 = mass, in g, of the sample passing through the sieve.

APPENDIX G

DETERMINATION OF BULK DENSITY

G.1 APPARATUS

G.1.1 *Test sieves*, of aperture sizes 1.40 mm and 1.70 mm conforming to CS 124.

G.1.2 *Graduated cylinder*, of 100-ml capacity and from which the lip has been removed.

G.1.3 *Glass sleeve*, of about 70 mm in length and closely fitting the graduated cylinder in G.1.2.

G.1.4 *Ringstand*

G.1.5 *Large rubber stopper*

G.2 PROCEDURE

Weigh, to the nearest 0.1 g, approximately 40 g of the sample, previously passed either through a 1.40-mm sieve or 1.70-mm sieve (G.1.1) as the case may be (see Sl. No. iv of Table 1) into a graduated cylinder (G.1.2). Stopper the graduated cylinder and pass a glass sleeve (G.1.3) over it. Clamp the sleeve to a ringstand (G.1.4). Place a large rubber stopper (G.1.5) under the cylinder and adjust the sleeve so that the cylinder is 100 mm above the rubber stopper when the base of the cylinder touches the lower edge of the sleeve. Raise the cylinder until it touches the sleeve, then release. Continue raising and dropping the cylinder until 100 cycles are completed. Read the volume of the sample.

G.3 CALCULATION

$$\text{Bulk density, grams per millilitre} = \frac{m}{V}$$

where,

m = mass, in g, of the sample used; and

V = volume, in ml, of the sample.

AMENDMENT NO. 1 APPROVED ON 1987-10-08

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Appendix D

Delete the existing Appendix and substitute the following :

D.1 APPARATUS

D.1.1 *Test tube*, dry clean tube of length about 150 mm and an internal diameter of about 25 mm.

D.1.2 *Air condenser*, consisting of a piece of glass tubing of length about 375 mm and an internal diameter of about 5 mm.

D.1.3 *Oven*, maintained at 100 ± 2 ^{o} C.

D.2 REAGENTS

as in C.1.

D.3 PROCEDURE

Weigh, to the nearest 0.001 g, approximately 15 g of the sample into the test tube (D.1.1). Attach the air condenser (D.1.2) by means of a rubber stopper in such a way that the tube extends about 12 mm beyond the stopper into the test tube. Incline the test tube at an angle of about 15 ^{o} above the horizontal and rotate to loosen the material. Heat the apparatus for 2 hours in an oven (D.1.3) maintained at 100 ± 2 ^{o} C. Detach the air condenser, close the test tube with a solid rubber stopper and allow the test tube and its contents to cool to room temperature.

Thoroughly mix the contents of the test tube and determine the available chlorine content, as given in C.2.

D.4 CALCULATION

Loss of available chlorine, on the basis of initial available chlorine, per cent by mass $= \dfrac{A - B}{A} \times 100$

where,

A = per cent by mass, of initial available chlorine; and
B = per cent by mass, of available chlorine after heating.’

AMD 185

AMENDMENT NO. 02 TO SLS 759 : 1986 SPECIFICATION FOR CHLORINATED LIME (BLEACHING POWDER) AND CALCIUM HYPOCHLORITE

EXPLANATORY NOTE

This amendment is introduced to correct the equation given for the calculation of Available Chlorine Content.

AMD 185

AMENDMENT NO. 02 APPROVED ON 1995-07-20 TO 759 : 1986

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Clause C.3 Calculation

Delete the equation given in clause C.3 and substitute the following:

"Available chlorine, percent by mass = $\frac{35.46 \times 2 (V_1 C_1 - V_2 C_2)}{m}$

AMD 504

AMENDMENT NO: 03 TO SLS 759: 1986

SRI LANKA STANDARD SPECIFICATION FOR CHLORINATED LIME (BLEACHING POWDER) AND CALCIUM HYPOCHLORITE

EXPLANATORY NOTE

This amendment is introduced to correct the concentration of Sodium Arsenite given in Clause **C.1.1** of Determination of available chlorine.

This amendment is issued accordingly.

AMD 504

AMENDMENT NO. 03 APPROVED ON 2017-12-04 TO SLS 759: 1986

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APPENDIX C

C.1 REAGENTS

Clause No. C.1.1

Delete the concentration of Sodium arsenite "0.1 mo/l solution" given in 1st line of paragraph and substitute the "0.05 mol/l solution".

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SRI LANKA STANDARDS INSTITUTION

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