SRI LANKA STANDARD 682:1984

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SPECIFICATION FOR
HYDRATED LIME

SRI LANKA STANDARDS INSTITUTION

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SLS 682:1984

(Attached AMD 186 and AMD 503)

Gr. 6

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SRI LANKA STANDARD
SPECIFICATION FOR HYDRATED LIME

FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Sri Lanka Standards Institution on 1984-12-20, after the draft, finalized by the Drafting Committee on Chemicals and Chemical Products had been approved by the Chemicals Divisional Committee.

Hydrated lime (calcium hydroxide) is a dry powder obtained by treating quick lime with water, sufficient to satisfy its chemical affinity for water under conditions of hydration. Quick lime is a calcined material, a major part of which is calcium oxide (CaO) or calcium oxide in natural association with a lesser amount of magnesium oxide, capable of slaking with water.

All standard values in this specification are 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 should 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, the American Society for Testing and Materials and the Federal Supply Service of the General Services Administration of USA is gratefully acknowledged.

1 SCOPE

1.1 This specification prescribes the requirements and methods of sampling and test for hydrated lime, suitable for treatment of sewage, industrial water and potable water.

2 REFERENCES

CS 102	Presentation of numerical values
CS 124	Test sieves
SLS 351	Rectified spirit
SLS 428	Random sampling methods

3 REQUIREMENTS

3.1 General

3.1.1 Hydrated lime shall be in the form of a fine white powder which is free from lumps and hard caking. It shall be substantially free from foreign matter and core (see Note).

NOTE - Core is that fraction of limestone which has resisted dissociation in the kiln. It results from incomplete calcination or underburning.

3.2 Particle size

3.2.1 Not less than 99.5 per cent by mass of the material shall pass through a 600-µm sieve and not less than 98.0 per cent by mass shall pass through a 75-µm sieve when tested as prescribed in Appendix B.

3.3 Calcium hydroxide content

3.3.1 The material shall contain not less than 80 per cent by mass of calcium hydroxide when tested as prescribed in Appendix C.

3.4 Basicity factor

3.4.1 Basicity factor (see Note) of the material shall be not less than 0.72 when tested as prescribed in Appendix D.

NOTE - The basicity factor of a lime or limestone product is a measure of available alkalinity. It represents the grams of calcium oxide equivalent per gram of lime or limestone product and may be used for comparing the relative neutralizing values.

4 PACKAGING

4.1 Unless otherwise agreed to between the buyer and the seller, hydrated lime shall be packed in 25 kg and 50 kg quantities in paper bags having a polyethylene inner liner.

5 MARKING

5.1 Each package shall be legibly and indelibly marked with the following information:

a) Name of the product;

b) Name and address of the manufacturer;

c) Trade mark, if any; and

d) Net mass in kilograms.

6 SAMPLING

6.1 The procedure for sampling shall be as prescribed in Appendix A.

7 METHODS OF TEST

The material shall be tested by the appropriate methods prescribed in Appendices B to D.

8 CONFORMITY TO STANDARD

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

8.1.1 Each package examined as in A.6.1 satisfies the relevant packaging and marking requirements.

8.1.2 The sample tested as in A.6.2 satisfies the relevant requirements.

APPENDIX A

SAMPLING

A.1 LOT

A.1.1 In any consignment all the packages containing the same quantity of hydrated lime of one batch of manufacture or supply shall constitute a lot.

A.2 GENERAL REQUIREMENTS OF SAMPLING

A.2.1 In drawing, handling and preparation of samples the following precautions shall be observed:

A.2.1.1 Sampling and preparation of sample shall be conducted as expeditiously as possible in order to avoid undue exposure of the material to the air.

A.2.1.2 Samples shall not be taken from broken packages.

A.2.1.3 Sampling instrument shall be clean and dry when used.

A.2.1.4 Samples shall be placed in clean, dry and air-tight glass or other suitable containers.

A.2.1.5 The material being sampled, the sampling instrument and the containers for samples shall be protected from adventitious contamination.

A.2.1.6 The sample containers shall be sealed air-tight after filling and marked with necessary details of sampling.

A.2.1.7 Samples shall be stored in the shade.

A.3 SAMPLING INSTRUMENT

A.3.1 A sampling tube having a core diameter of not less than 25-mm shall be used.

A.4 SCALE OF SAMPLING

A.4.1 Each lot shall be tested separately for ascertaining its conformity to the requirements of this specification.

A.4.2 The number of packages to be selected from a lot shall be in accordance with Table 1.

TABLE 1 - Scale of sampling

Number of packages in the lot	Number of packages to be selected
Up to 08	02
09 to 27	03
28 to 64	04
65 to 100	05
101 to 300	06
301 to 500	07
501 to 800	08
801 to 1 300	09
1 301 and above	10

A.4.3 The packages shall be selected at random. In order to ensure randomness of selection random number tables as given in **SLS 428** shall be used.

A.5 PREPARATION OF SAMPLE

A.5.1 A representative sample of material shall be obtained from each package selected as in A.4.2 in accordance with the method given in **A.5.2**.

A.5.2 The sampling tube shall be inserted into a package being sampled so that it will take a core of material from substantially the entire length of the package.

A.5.3 The material obtained from each package shall be thoroughly mixed and reduced by coning and quartering to obtain a test sample of not less than 150 g.

A.6 NUMBER OF TESTS

A.6.1 Each package selected as in **A.4.2** shall be examined for packaging and marking requirements (this may be done at the place of sampling).

A.6.2 The samples prepared as in A.5.3 shall be tested for requirements specified in **3** of this specification.

APPENDIX B

DETERMINATION OF PARTICLE SIZE

B.1 APPARATUS

B.1.1 *Test sieves,* with nominal aperture 600-µm and 75-µm conforming to **CS 124**.

B.2 PROCEDURE

B.2.1 Weigh about 100 g of the sample of hydrated lime to the nearest 0.1 g and place on a 600-µm sieve, which is nested above a 75-µm sieve. Wash the material through the sieves by means of a stream of water from a faucet. Use a piece of rubber tubing attached to the water faucet for the washing. The velocity of the water may be increased by pressing the tubing, but shall not cause any splashing of the sample over the sides of the sieve. Continue the washing until the water coming through the sieve is clear, but in no case should the washing be continued for more than 30 minutes. Take care not to let water accumulate on the 75-µm sieve, as the openings will be clogged and the operation cannot be completed in 30 minutes. Dry the residues on both sieves in an atmosphere free from carbon dioxide at a temperature between 100 °C and 120 °C, and weigh. Continue the drying and weighing operation until the difference between two successive weighings is not more than 0.01 g.

B.3 CALCULATION

B.3.1 Calculate the percentage residue retained on each sieve, based on the original mass of the sample. The mass of the material retained on the 600-µm sieve shall be added to the mass of the material on the 75-µm sieve to obtain the mass of the material retained on the 75-µm sieve.

APPENDIX C

DETERMINATION OF CALCIUM HYDROXIDE CONTENT

Two methods have been prescribed for the determination of calcium hydroxide content. For routine analysis, the iodine method prescribed in C.1 may be used but in case of dispute, the sugar method prescribed in C.2 shall be used.

C.1 IODINE METHOD (ROUTINE METHOD)

C.1.1 Reagents

C.1.1.1 *Sodium thiosulfate,* standard volumetric solution $c(Na_2S_2O_3)$ = 0.05 mol/l, freshly standardized against standard iodine solution.

C.1.1.2 *Iodine,* standard volumetric solution $c(I_2)$ = 0.05 mol/l, freshly standardized against standard sodium thiosulfate solution.

C.1.1.3 *Starch indicator solution,* triturate 5 g of starch and 0.01 g mercuric iodide with 30 ml of cold water and pour it slowly with stirring, into one litre of boiling water. Boil for three minutes. Allow the solution to cool and decant the supernatant clear liquid.

C.1.2 Procedure

C.1.2.1 Take 0.1 g to 0.2 g of the material, weighed to the nearest 0.001 g in a glass-stoppered conical flask and add about 80 ml of boiling water. Shake it for 30 minutes till hydration is complete. Cool the solution and add a known excess of iodine solution (C.1.1.2), say 75 ml, and stir occasionally until the lime has gone into solution.

Any insoluble silica present is easily distinguished from the milky-appearance of lime. The solution after excess addition of iodine should be of the same colour as a solution of 10 ml of iodine in 100 ml of water, that is, deep red. Allow about 10 minutes for complete reaction of lime with iodine. The excess of iodine is titrated against sodium thiosulfate solution (C.1.1.1) using the starch solution (C.1.1.3) as indicator.

C.1.3 Calculation

Calcium hydroxide content, per cent by mass $= \dfrac{3.704\ (75\ c_1 - 2Vc_2)}{m} \times 100$

where,

V = volume, in ml, of sodium thiosulfate solution (C.1.1.1);

c_1 = concentration of the iodine solution (C.1.1.2), in mol/l;

c_2 = concentration of the sodium thiosulfate solution, in mol/l; and

m = mass, in g, of the material taken for the test.

C.2 SUGAR METHOD (REFERENCE METHOD)

C.2.1 Reagents

C.2.1.1 *Rectified spirit,* conforming to SLS 351.

C.2.1.2 *Hydrochloric acid,* standard volumetric solution c(HCl) = 0.1 mol/

C.2.1.3 *Sodium hydroxide,* standard volumetric solution c(NaOH) = 0.1 mol/

C.2.1.4 *Sugar solution,* approximately 15 per cent sucrose (*m/V*) in carbon dioxide - free water.

C.2.1.5 *Phenolphthalein indicator solution,* dissolve 0.5 g of phenolphthalein in 100 ml of rectified spirit.

C.2.2 Procedure

C.2.2.1 Weigh to the nearest 0.001 g about 1 g of the finely powdered material into a 500-ml volumetric flask and wet it with the minimum amount of rectified spirit (C.2.1.1). Shake with about 400-ml of sugar solution (C.2.1.4) for 3 hours mechanically. Dilute to volume. Filter through a coarse, dry filter paper (Whatman No. 40 of its equivalent) into a dry flask. Discard the first 25 ml of the filtrate. Pipette out 50 ml from the filtrate into another flask to which 50 ml of hydrochloric acid (C.2.1.2) is added and titrate with sodium hydroxide solution (C.2.1.3) using phenolphthalein (C.2.1.5) as indicator.

C.2.2.2 Run a blank using 50 ml of sugar solution and 50 ml of hydrochloric acid.

C.2.3 Calculation

$$\text{Calcium hydroxide content, per cent by mass} = \frac{37.04\,(V_1 - V_2)\,c}{m} \times 100$$

where,

V_1 = volume, in ml, of sodium hydroxide solution (C.2.1.3) used in blank;

V_2 = volume, in ml, of sodium hydroxide solution used with the material;

c = concentration of the sodium hydroxide solution in mol/l; and

m = mass, in g, of the material taken for the test.

APPENDIX D

DETERMINATION OF BASICITY FACTOR

D.1 REAGENTS

D.1.1 *Sulfuric acid*, standard volumetric solution, $c(H_2SO_4) = 0.250$ mol/l.

D.1.2 *Potassium hydroxide*, standard volumetric solution, $c(KOH) = 0.500$ mol/l.

D.2 PROCEDURE

D.2.1 Weigh to the nearest 0.001 g about 1 g of the sample which has been ground to pass a 150-µm sieve (conforming to CS 124) and transfer to a 500-ml erlenmeyer flask containing about 20 ml of cold water. Add from a burette 100 ml of sulfuric acid (D.1.1) and stopper with a two-hole rubber stopper. Place the flask on a hot plate and boil for 15 minutes. (Glass beads may be added to prevent bumping). Remove the flask from the hot plate and cool in water. Add several drops of phenolphthalein indicator solution and titrate the excess acid with potassium hydroxide solution (D.1.2).

D.3 CALCULATION

Calculate the basicity factor as follows:

$$\text{Basicity factor} = \frac{V_1c_1 - V_2c_2}{m} \times 0.028$$

where,

V_1 = volume, in ml, of sulfuric acid solution (**D.1.1**) required for titration of the sample;

V_2 = volume, in ml, of potassium hydroxide solution (**D.1.2**) required for titration of the excess;

c_1 = concentration of the sulfuric acid solution in mol/l;

c_2 = concentration of the potassium hydroxide solution in mol/l; and

m = mass, in g, of sample.

AMD 186

AMENDMENT NO. 01 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 calcium hydroxide content.

AMD 186

AMENDMENT NO. 01 TO SLS 682 : 1984
SPECIFICATION FOR HYDRATED LIME

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Clause C.1.3 Calculation

Delete the equation given in clause C.1.3 and substitute the following:

“Calcium hydroxide Content, percent by mass $= \dfrac{7.40\,(75\ C_1 - VC_2/2)}{m}$

AMD 503

AMENDMENT NO: 02 TO SLS 682: 1984
SRI LANKA STANDARD SPECIFICATION FOR HYDRATED LIME

EXPLANATORY NOTE

The scope of SLS 682: 1984 covers the use of hydrated lime suitable for treatment of sewage, industrial water and potable water. This amendment is issued to exclude the hydrated lime used for treatment of potable water from the scope of SLS 682, since a new Standard has been formulated for purification of water supplies.

This amendment is issued accordingly

AMD 503

Amendment No: 02 approved on 2017-12-04 to SLS 682: 1984

SRI LANKA STANDARD SPECIFICATION FOR HYDRATED LIME

CLAUSE 1 SCOPE

Delete the existing scope and include the following:

"**1.1** This Specification prescribes the requirements, methods of sampling and test for Hydrated Lime, suitable for treatment of sewage and Industrial water.

1.2 This Specification does not cover Hydrated Lime suitable for treatment of potable water".

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SLS

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SRI LANKA STANDARDS INSTITUTION

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The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

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In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

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