SRI LANKA STANDARD 911 : 1990

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SPECIFICATION FOR

POTASSIUM CHLORATE

SRI LANKA STANDARDS INSTITUTION

SPECIFICATION FOR POTASSIUM CHLORATE

SLS 911:1990

(Amd 427 and Amd 514 Attached)

Gr. 5

SRI LANKA STANDARDS INSTITUTION
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SRI LANKA STANDARD

SPECIFICATION FOR POTASSIUM CHLORATE

FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Sri Lanka Standards Institution on 1991-01-31, after the draft, finalized by the Drafting Committee on Safety Matches, had been approved by the Chemicals Divisional Committee.

Clause 4.1 of this specification calls for agreement between the purchaser and the supplier.

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 an 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 specificaion.

In the preparation of this specification the assistance obtained from the publications of the Bureau of Indian Standards is gratefully acknowledged.

1 SCOPE

This specification prescribes the requirements and methods of sampling and test for potassium chlorate for use in the safety match industry.

2 REFERENCES

CS 102 Presentation of numerical values.
CS 124 Test sieves.
SLS 428 Random sampling methods.
SLS 692 Safety colours and safety signs.

3 REQUIREMENTS

3.1 Appearance

The material shall be in the form of a white powder free from grit and visible impurities.

3.2 Particle size

The particle size of the material shall be such that not more than 1 per cent by mass of the material is retained on 212 um sieve and not more than 30 per cent by mass of the material passes through 53 um sieve when tested as given in 6.2.

3.3 Other requirements

The material shall also comply with the requirements given in Column 3 of Table 1, when tested by the method given in Column 4 of the table.

TABLE 1 - Requirements for potassium chlorate

Sl. No. (1)	Characteristic (2)	Requirement (3)	Method of test (Ref. to clause and Appendices) (4)
i)	Potassium chlorate, as $KClO_3$, per cent by mass, min.	99.3	Appendix A
ii)	Moisture per cent by mass, max.	0.05	6.3
iii)	Chlorides, as Cl, per cent by mass, max.	0.04	Appendix B
iv)	Insoluble matter, per cent by mass, max.	0.05	Appendix C

4 PACKAGING AND MARKING

4.1 Packaging

The material shall be packed in suitable containers as agreed to between the purchaser and the supplier. Necessary precautions shall be taken against risk of dangerous explosions which might occur when the material is heated or subjected to concussion.

4.2 Marking

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

a) Name of the product;
b) The word " Explosive" with the appropriate symbols for labelling dangerous goods" (see SLS 692);
c) Name and address of the manufacturer and/or supplier and country of origin;
d) Registered trade mark, if any;
e) Net content, in kilograms; and
f) Batch or code number.

5 SAMPLING

5.1 Lot

In any consignment all the containers of potassium chlorate of same size, belonging to one batch of manufacture or supply shall constitute a lot.

5.2 General requirements of sampling

In drawing, preparing and handling of samples the following precautions and directions shall be observed.

5.2.1 Necessary precautions shall be taken against risk of dangerous explosions which might occur when the material is heated or subjected to concussion or triturated with organic and oxidizable substances.

5.2.2 The sampling instrument used shall be clean and dry.

5.2.3 The samples shall be placed in suitable clean and dry sample containers which shall be marked with relevant details.

5.3 Scale of sampling

5.3.1 Samples shall be tested from each lot for ascertaining its conformity to the requirements of this specification.

5.3.2 The number of containers to be selected from the 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 500	3
501 to 1 200	4
1 201 to 3 200	5
3 201 and above	7

5.3.4 The containers shall be selected at random. In order to ensure randomness of selection, tables of random numbers as given in SLS 428 shall be used.

5.4 Preparation of samples

5.4.1 *Individual samples*

A representative sample of material shall be drawn from each container selected as in 5.3.2 using a suitable sampling instrument. The material taken from each container shall be transferred to separate sample containers. The minimum size of a sample shall be 150 g.

5.4.2 *Composite sample*

Approximately equal quantities of representative samples shall be drawn from each container selected as in 5.3.2 using a suitable sampling instrument, mixed together and reduced by the method of coning and quartering to get a composite sample of about 100 g. The composite sample shall be transferred to a sample container.

5.5 Number of tests

5.5.1 Each container selected as in 5.3.2 shall be inspected for packaging and marking requirements.

5.5.2 The individual samples prepared as in 5.4.1 shall be tested for particle size and potassium chlorate content.

5.5.3 The composite sample prepared as in 5.4.2 shall be tested for moisture , chlorides and insoluble matter.

6 METHODS OF TEST

Tests shall be carried out according to 6.2, 6.3 and Appendices A to C of this specification. Unless otherwise stated, reagents of analytical grade and distilled water or water of equivalent purity shall be used.

6.1 Precaution

Necessary precautions shall be taken when testing since potassium chlorate when heated, subjected to concussion or triturated with organic and oxidizable subsances may explode.

6.2 Determination of particle size

Weigh, to the nearest 0.1 g, about 100 g of the material and transfer to an assembly of test sieves having 212 µm and 53 µm aperture sizes. The test sieves shall conform to CS 124. Sieve the material for 10 minutes in a sieve shaking machine which rotates at a speed of 290 revolutions per minute and weigh the material retained on 212 µm sieve and passing through 53 µm sieve. Record the percentage retention on 212 µm sieve and percentage passing through 53 µm sieve.

6.3 Determination of moisture content

Weigh, to the nearest 0.1 mg, about 5 g of the material in a tared weighing bottle. keep the bottle in an oven maintained at 105 ± 2 °C for 3 hours. Cool in a desiccator and weigh.

Moisture content, per cent by mass $= \frac{(m - m_1)}{m} \times 100$

where,

m is the mass in grams of material; and
m_1 is the mass, in grams, of the material after drying.

7 CRITERIA FOR CONFORMITY

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

7.1 Each container inspected as in 5.5.1 satisfies the relevant requirements.

7.2 Each individual sample when tested as in 5.5.2 satisfies the relevant requirements.

7.3 The composite sample when tested as in 5.5.3 satisfies the relevant requirements.

APPENDIX A
DETERMINATION OF POTASSIUM CHLORATE CONTENT

A.1 REAGENTS

A.1.1 *Ferrous ammonium sulfate*, approximately 0.1 mol/l solution.

A.1.2 *Sulphuric acid*, approximately 1 mol/l solution.

A.1.3 *Manganous sulfate solution*

Dissolve 10 g of manganous sulphate ($MnSO_4.4H_2O$) in water and dilute to 100 ml.

A.1.4 *Potassium permanganate*, standard solution, $c(KMnO_4) = 0.02$ mol/l.

A.2 **PROCEDURE**

Dry the material over concentrated sulfuric acid in a desiccator for 24 hours. Weigh, to the nearest milligram, 0.1 g of the dried material and dissolve in 20 ml of water in a 250-ml conical flask. Add 35 ml of ferrous ammonium sulfate solution (A.1.1) using a burette and about 10 ml of sulfuric acid (A.1.2). Close the flask with a valve stopper to prevent access of air and boil for 15 minutes. Cool the contents of the flask, add 10 ml of manganous sulfate solution (A.1.3) and titrate the excess of ferrous, ammonium sulfate against standard potassium permanganate solution (A.1.4). Carry out a blank titration in the same manner with 35-ml of ferrous ammonium sulfate solution (A.1.1), about 10-ml of sulfuric acid (A.1.2) and 10 ml of manganous sulfate solution (A.1.3).

A.3 **CALCULATION**

$$\text{Potassium chlorate, per cent by mass} = 2.043 \frac{(V_2 - V_1)}{m} \times c$$

where,

V_1 is the volume, in millilitres, of standard potassium permanganate solution used for the test;

V_2 is the volume, in millilitres, of standard potassium permanganate solution used for the blank;

c is the concentration, in mol/l, of standard potassium permanganate solution; and

m is the mass, in grams, of the material taken for the test.

APPENDIX B
DETERMINATION OF CHLORIDES

B.1 **APPARATUS**

Nessler tube, 50-ml capacity.

B.2 **REAGENTS**

B.2.1 *Nitric acid*, concentrated (rel. den = 1.42).

B.2.2 *Silver nitrate*, approximately 40 g/l solution.

B.2.3 *Chloride*, standard solution.

Dissolve 1.649 g of sodium chloride dried at 105 ± 2 °C, in a 100-ml volumetric flask and dilute up to the mark. Pipette 10 ml of this solution and transfer into a 100 - ml volumetric flask and dilute up to the mark.

One millilitre of this solution contains 0.1 mg of chloride, as Cl.

B.3 **PROCEDURE**

Weigh, to the nearest milligram, 1 g of the material and dissolve in 30 ml of water in a Nessler tube. Add 5 drops of concentrated nitric acid (B.2.1) and 1 ml of silver nitrate solution (B.2.2). Make up the volume to 50 ml mark with water. Carry out a control test in a Nesler tube using 4 ml of the standard chloride solution and the same quantities of other reagents. Make up the volume to 50 ml. After 5 minutes compare visually the turbidity.

The limit for chloride prescribed in Table 1 is deemed to have satisfied if the turbidity of the sample solution is not greater than that of the control test solution.

APPENDIX C
DETERMINATION OF INSOLUBLE MATTER

C.1 **APPARATUS**

Sintered glass crucible, G No. 4.

C.2 **PROCEDURE**

Weigh, to the nearest milligram, about 25 g of the material and dissolve in 250 ml of water. Filter through a tared sintered glass crucible (C.1). Wash the residue free of soluble matter and dry to a constant mass at 105 $\pm$ 2 ^{o}C.

C.3 CALCULATION

$$\text{Insoluble matter, per cent by mass} = \frac{m_1}{m} \times 100$$

where,

m is the mass, in grams, of the material taken for the test; and

m_1 is the mass, in grams, of the residue.

AMD 427

AMENDMENT NO: 01 TO SLS 911 : 1990
SRI LANKA STANDARD SPECIFICATION FOR POTASSIUM CHLORATE

SRI LANKA STANDARDS INSTITUTION

Amendment No: 01 approved on 2012-03-28 to SLS 911 : 1990

AMENDMENT NO: 01 TO SLS 911 : 1990
SRI LANKA STANDARD SPECIFICATION FOR POTASSIUM CHLORATE

EXPLANATORY NOTE

It was decided to introduce the packing material and shelf life of potassium chlorate under the clause **4** Packaging and marking since the activity of potassium chlorate is depend on the packing material and life time.

2nd sentence of the test method for the determination of particle size (clause **6.2**) was corrected in order to obtain an accurate reading.

AMENDMENT NO: 01 TO SLS 911 : 1990
SRI LANKA STANDARD SPECIFICATION FOR POTASSIUM CHLORATE

Insert the following as 3rd paragraph of **FOREWORD.**

" FOREWORD

This standard is subjected to the restrictions imposed under the Defence Act No. 21 of 1956 and the regulations framed thereunder."

4 PACKAGING AND MARKING

Delete 1st sentence of the paragraph and insert the following :

"4.1 Packaging

The material shall be packed in polyliner iron drum with desiccant bags or in suitable containers as agreed to between the authorized purchaser under the Defence Act and the supplier."

4.2 Marking

Insert the following under clause **4.2**

"g) Date of manufacture and shelf life."

6.2 Determination of particle size

Delete 2nd sentence of the paragraph and insert the following:

"Sieve the material for 10 minutes (until a constant weight of the sieve is achieved) in a sieve shaking machine which rotates at a speed of 290 revolutions per minute and weigh the material retained on 212 μm sieve and passing through 53 μm sieve."

AMENDMENT NO: 02 TO SLS 911: 1990

SRI LANKA STANDARD SPECIFICATION FOR POTASSIUM CHLORATE

SRI LANKA STANDARDS INSTITUTION

Amendment No: 02 approved on 2018-11-16 to SLS 911: 1990

SRI LANKA STANDARD SPECIFICATION FOR POTASSIUM CHLORATE

APPENDIX A
DETERMINATION OF POTASSIUM CHLORATE CONTENT

Delete the text given in Appendix **A** and substitute the following:

"**A.1 REAGENTS**

A.1.1 Concentrated Hydrochloric acid
A.1.2 Sodium hydrogencarbonate, analytical grade
A.1.3 Iodate free Potassium iodide
A.1.4 Sodium thiosulphate solution, 0.1 M

A.2 PROCEDURE

A.2.1 Dry the material over Sulfuric acid for 24 h. Weigh, to the nearest milligram, 0.4 g of the material and dissolve in water in a 250-ml volumetric flask. Take 25 ml of the solution in a glass-stoppered conical flask and add 3 ml of concentrated Hydrochloric acid followed by two portions of about 0.3 g each of Sodium hydrogencarbonate to remove air. Add immediately about 1.0 g of iodate-free Potassium iodide and 22 ml of concentrated Hydrochloric acid. Stopper the flask, shake the contents, and allow it to stand for 5-10 minutes. Titrate the solution with standard 0.1M Sodium thiosulphate. Carry out a blank titration in the same manner.

A.3 CALCULATION

$$\text{Potassium chlorate, per cent by mass} = \frac{C\,(V_2 - V_1)\,20.4}{m}$$

C is the concentration, in mol/l, of standard Sodium thiosulphate solution;
V_1 is the volume, in mililitres, of standard Sodium thiosulphate solution used for the test;
V_2 is the volume, in mililitres, of standard Sodium thiosulphate solution used for the blank; and
m is the mass, in grams, of the material taken for the test."

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SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

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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