SRI LANKA STANDARD 748 : 2014
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SPECIFICATION FOR
GROUND ROCK – PHOSPHATE
(FERTILIZER GRADE)
(First Revision)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard

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SLS 748 : 2014

Gr. 5

SRI LANKA STANDARDS INSTITUTION
17, Victoria Place
Elvitigala Mawatha
Colombo 8
Sri Lanka

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This standard does not purport to include all the necessary provisions of a contract.

Sri Lanka Standard
SPECIFICATION FOR GROUND ROCK PHOSPHATE (FERTILIZER GRADE)
(First Revision)

FOREWORD

This standard was approved by the Sectoral Committee on Agriculture and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2014- 09-02.

This standard was first published in 1986. In this revision, the types LRP 1 and LRP 2 in the previous standard have been designated as HERP - High grade Eppawela ground rock –phosphate and ERP - Eppawela ground rock-phosphate respecting the total phosphate content of HERP has been modified, limits have been specified for potentially toxic elements.

This standard is subject to the restrictions imposed under the Fertilizer Act No. 68 of 1988 of Sri Lanka, amendments and the regulations framed thereunder, where applicable. Guidelines for the determination of compliance of a lot to the requirements of this standard based on statistical sampling and inspection are given in Appendix **A**.

For the purpose of deciding whether a particular requirement of this standard 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 **SLS 102**. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this standard.

In the preparation of this standard, the valuable assistance derived from following publications are gratefully acknowledged: AGP fertilizer specification of the Food and Agriculture Organization (FAO) of the United Nations and the Association of Official Analytical Chemists (AOAC).

1 SCOPE

This standard prescribes the requirements and methods of sampling and test for ground rock-phosphate of fertilizer grade.

2 REFERENCES

SLS 102	Rules for rounding off numerical values
SLS 124	Test sieves
SLS 544	Code of practice for handling and storage of bagged fertilizers

SLS 559 Method for sampling fertilizers
SLS 645 Methods of test for fertilizers
Part 2 Determination of moisture content
Part 5 Determination of phosphorous content
Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC), 18th Edition, 2nd Revision 2007

3 TYPES

Ground rock-phosphate of fertilizer grade covered in this standard shall be of the following types:

3.1 IRP Imported ground rock – phosphate

3.2 HERP High grade Eppawela ground rock –phosphate

3.3 ERP Eppawela ground rock-phosphate

4 REQUIREMENTS

4.1 General requirements

The material shall consist essentially of naturally occurring phosphate rock in the form of free - flowing powder. It shall be free from visible foreign matter.

4.2 Other requirements

4.2.1 *Particle size*

Not less than 90 per cent of the material shall pass through a sieve of aperture size of 0.15mm and the balance shall pass through a sieve of aperture size of 0.25 mm. The test sieve shall conform to **SLS 124.**

4.2.3 *Moisture and chemical requirements*

The material shall also comply with the requirements given in Table **1** when tested according to the methods given in Column **4** of the Table.

TABLE 1- Moisture and chemical requirements for ground rock phosphate, fertilizer grade

SI. No. (1)	Characteristic (2)	Requirement			Method of test (6)
		IRP (3)	HERP (4)	ERP (5)	
i)	Total phosphorous content on dry basis as P_2O_5, per cent by mass, min.	28.0	38.0	28.0	SLS 645 : Part 5
ii)	Moisture content, per cent by mass, max.	3.0	1.0	3.0	SLS 645 : Part 2
iii)	Citric acid soluble phosphorous content, on dry basis, calculated as P_2O_5 per cent by mass, min.	9.0	5.5	4.0	SLS 645 : Part 5
iv)	Fluoride content calculated as F, per cent by mass, max.	3.0	3.0	3.0	Appendix C

4.2.4 The material shall also comply with the requirements given in Table **2.**

TABLE 2 – Limits for potentially toxic elements for ground rock-phosphate fertilizer grade

Sl. No. (1)	Element (2)	Limit (3)	Method of test (4)
i)	Arsenic, as As, mg/kg, max.	25	AOAC Official Method 2006.3 ***See the note***
ii)	Cadmium, as Cd, mg/kg, max.	1.0	
iii)	Lead, as Pb, mg/kg, max.	15	
iv)	Chromium, as Cr, mg/kg, max.	35	
v)	Mercury, as Hg, mg/kg, max.	1.0	Atomic Absorption Spectrophotometry after microwave digestion

Note: *Atomic Absorption Spectrophotometry after microwave digestion can be used as an alternative method to analyze potentially toxic elements; AOAC 999.10 for Pb and Cd*

5. PACKAGING AND MARKING

5.1 Packaging

The material shall be suitably packed in sound, strong, and moisture-proof multiwall paper bags, jute bags or woven polypropylene bags with polyethylene inner lining having a minimum thickness of 50 µm.

5.2 Marking

5.2.1 The packages shall be legibly and indelibly marked with the following information:

a) Name of the product as, "*GROUND ROCK -PHOSPHATE (FERTILIZER GRADE)*" in capital letters;
b) Name and address of the manufacturer/importer/distributor including country of origin ;
c) Type as IRP, HERP or ERP;
d) Registered trade mark if any;
e) Net mass, in kg;
f) The total phosphorous content and citric acid soluble phosphorous content on dry basis, as P_2O_5, per cent by mass;
g) Batch number or code number;
h) Date, month and year of manufacture, and
i) The words "NO HOOK USED" in capital letters.

5.2.2 The following information may also be included;

a) The carbonate of lime content, calculated as $CaCO_3$;and
b) The fluoride content, calculated as F.

6. HANDLING AND STORAGE

The handling and storage of the material shall be as prescribed in **SLS 544**.

7. METHODS OF TEST

7.1 Tests shall be carried out as prescribed in AOAC 999.10 and AOAC Method **2006.3, Part 2** and **5** of **SLS 645** and Appendices **B** and **C** of this standard.

7.2 Unless otherwise stated, use only reagents of analytical grade and only distilled water or water of equivalent purity.

APPENDIX A
COMPLIANCE OF A LOT

The sampling scheme given in **SLS 559** should be applied where compliance of a lot to the requirements of this standard is to be assessed based on statistical sampling and inspection.

Where compliance with this standard is to be assessed based on manufacture's control systems coupled with type testing and check tests or any other procedure, an appropriate scheme of sampling and inspection should be adopted.

A.1 SCALE OF SAMPLING

A.1.1. The sampling shall be carried out as prescribed in **SLS 559**.

A.2 NUMBER OF TESTS

A.2.1 Each package selected as prescribed in **SLS 559** shall be inspected for packaging and marking requirements given in **5.**

A.2.2 Tests for the requirements given in **4** shall be carried out on the composite sample prepared as in **SLS 559.**

A.3 CRITERIA FOR CONFORMITY

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

A.3.1 Each package inspected as in **A.2.1** satisfies the relevant requirements.

A.3.2 The test results on the composite sample when tested as in **A.2.2** satisfy the relevant requirements.

APPENDIX B
DETERMINATION OF PARTICLE SIZE

B.1 PROCEDURE

B.1.1 Weigh, to the nearest 0.1 g, 50 g of the material and transfer to a sieve of 0.15 mm aperture size (conforming to **SLS 124**) with the lower receiver attached. Shake the sieve for 5 minutes, frequently tapping the sides. Disintegrate soft lumps which can be crumbled by the application of the fibers of a soft brush, taking care that the hard part of

the brush does not make contact with the sieve, and that the brush is not used to brush particles through the sieve. Brush out the powder in the lower receiver and weigh. Replace the receiver and repeat the shaking and tapping procedure for 2 minutes. Add the powder in the receiver to the first portion and weigh. Repeat the process until not more than 0.04 g passes through the sieve during 2 minutes.

B.1.2 Weigh, to the nearest 0.1 g, about 50 g of the material and transfer to a sieve of 0.25 mm aperture size (conforming to **SLS 124**) with the lower receiver attached and proceed as in **B.1.1**.

B.2 CALCULATION

Calculate the mass of the material passed through the sieve as a percentage by mass of the material taken for the test.

APPENDIX C
DETERMINATION OF FLUORIDE

C.1 REAGENTS

Reagents used shall be of analytical reagent grade and shall not contain any impurities that will affect the results of analysis. Distilled water or water of equivalent purity shall be employed throughout.

C.1.1 *Perchloic acid*, (2+1) dilute solution

C.1.2 *Potassium permanganate*, saturated solution

C.1.3 *Sodium hydroxide solution*

C.1.3.1 c (NaOH) = 0.2 mol/l

C.1.3.2 c (NaOH) = 1 mol/l

C.1.4 *Monochloroacetic acid*, c (CH_2Cl COOH) = 0.4 mol/l

C.1.5 *Thorium nitrate*, c (Th $(NO_3)_4.4H_2O$) = 0.16 mol/l

C.1.6 *Hydrochloric acid*, c (HCl) = 0.1 mol/l

C.1.7 *Alizarin indicator solution*, 0.1 per cent aqueous solution of sodium alizarin sulphonate

C.1.8 *Phenolphthalein indicator*

C.2 PROCEDURE

Weigh, to the nearest milligram, approximately 0.5 g of the sample and transfer to a steam distillation flask which has been previously rinsed with a boiling 10 per cent Sodium hydroxide solution to eliminate all traces of gelatinous silicon dioxide accumulating in the flask. Add 15 ml of dilute perchloric acid and distil at 125 ^{0}C to 150 ^{0}C until 150 ml of distillate has been obtained. If the material is pyritiferous, moisten the sample in the distillation flask with 2 ml to 3 ml of a saturated solution of potassium permanganate **(C.1.2)** and increase the concentration of the added perchloric acid accordingly. Add a few drops of phenolphthalein (**C.1.8**) to the distillate and then Sodium hydroxide solution **(C.1.3.2)** until just alkaline. Dilute to exactly 250 ml and take a 50 ml aliquot. Add 5 drops of alizarin indicator solution **(C.1.7)** and then Hydrochloric acid **(C.1.6)** until the pink colour of the alizarin is discharged. Add 2.5 ml of monochloroacetic acid **(C.1.4)** sodium hydroxide buffer solution (**C.1.3.1**) and titrate with standard thorium nitrate solution **(C.1.5).** Carry out a blank determination.

C.3 CALCULATION

Calculate the per cent by mass of fluoride (as F) in the sample.

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SRI LANKA STANDARDS INSTITUTION

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