

SPECIFICATIONS FOR POTASSIUM PERMANGANATE

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GENERAL

TABLE OF CONTENTS

		PAGE NUMBER	
1	Ambient Conditions	8bl - 2	
2	Suitability for Potable Water	8 bl - 2	
3	Definitions	8 bl - 2	
4	Inspection and Testing	8 bl - 2	
5	Protection during Delivery	8 bl - 3	
6	Storing handling and hauling of Materials	8 bl - 3	
7	Manufacturer's Certificate	8 bl - 3	
8	Quality and workmanship	8 bl - 3	
9	Technical Specification for Potassium Permanganate	8 bl - 4	8 bl - 6

GENERAL

1 Ambient Conditions

All materials shall be in every respect suitable for storage, use and operation in the conditions of temperature and humidity appertaining in Sri Lanka.

The annual average temperature is 35 °C while the relative humidity varies generally from 70% during the day to 90% at night.

2 Suitability for Potable Water

Potassium Permanganate that will come into contact with potable water shall not constitute a toxic hazard and shall not support microbial growth, and shall be suitable for drinking water.

3 Definitions

The definitions given in the relevant standards which are referred to in the specification shall apply for the terms used in this specification.

4 Inspection and Testing

The Manufacturer/ Supplier shall supply, furnish and prepare the necessary test samples of materials and supply labour facilities and appliances for such testing as may be required to be carried out in his premises according to this specification. If there are no facilities at his own works for performing the prescribed tests, the Contractor/ Supplier shall bear the cost of carrying out all those tests in an accredited laboratory acceptable to the Purchaser/ Employer.

The Engineer and nominated Inspection Agency shall have full access to all parts of the plant that are concerned with the manufacturing, testing, furnishing, preparation of materials for the performance and testing under this Specification.

The Manufacturer/ Supplier shall furnish the Engineer with reasonable facilities and space (without any cost to the Employer/ Purchaser) for the inspection, testing and obtaining of such information, as he desires regarding the character of material in use and the progress and manner of the work.

Further all materials shall be tested to the appropriate tests at the manufacturer's premises and shall be supported by a test certificate from the manufacturer.

The Manufacturer/ Supplier shall be held responsible for the assuring the quality of the goods supplied by him up to the final delivery point. Potassium Permanganate is tested at the Purchaser's/ Employer's final delivery point by the Purchaser/ Employer and goods shall conform to the relevant standard and to this specification for the acceptance.

5. Protection During Delivery

The Manufacturer/ Supplier shall provide protection to the material as approved by the Engineer, prior to the materials leaving the place of manufacture and shall maintain such protection until the items reach their destination in order to guard effectively against damage during transit and storage and the ingress of foreign matter inside the packages.

All details of the proposed method of providing such protection shall be submitted at the time of tendering.

The cost of providing protection shall be included in the unit prices offered in the Bills of Quantities.

6. Storing, Handling and Hauling of Materials.

All materials shall be stored in an approved location and in such a manner as to preserve their quality and condition.

Storage shall be in accordance with the manufacturers recommendation and shall be stored in a dry place with a proper packing.

Materials and components shall be handled in such a manner as to avoid any damage or contamination and in accordance with the recommendations of the manufacturers.

The Manufacturer/ Supplier shall give instructions to the shipper on precautions to be taken in the handling of materials during loading, towage delivery and unloading and shall give particulars of these instructions to the purchaser.

7. Manufacturer's Certificate

The Manufacturer/ Supplier shall supply to the Engineer a certificate stating that each item supplied has been subjected to the tests laid down herein and conforms in all respects to this Specification or such other Specification which has been submitted to and approved by the Engineer. In addition to this, Manufacturer/ Supplier shall provide certificate for the conformity to the Standards (BS EN 12672:2016) from an independent testing agency mentioned in General condition of contract.

8. Quality and Workmanship

The Bidder shall provide ISO 9001 : 2015 Quality Management System requirement certificate for Quality Assurance for the goods manufacturing factory from an accredited agency for Potassium Permanganate. Accredited Agency shall be a member of International Accredited Forum (IAF) and shall have the authority for the accreditation of mentioned goods in their scope of accreditation. Scope of the production shall be clearly specified in the certificate. Manufacturer shall maintain the validity of this certificate during the contract Period. If the supply is made from several factories, ISO 9001 : 2015 certificates for quality management system requirement shall be submitted for each factory.

9. Technical Specifications for Potassium Permanganate

9.1. Specification

- 9.1.1 All materials to be supplied under this contract shall conform to BS EN 12672:2016 – Chemicals used for Treatment of Water intended for Human Consumption – Potassium Permanganate.
- 9.1.2 The appearance shall be of crystals of dark purple or bronze like colour almost opaque by transmitted light and of a blue metallic lustre by reflected light.
- 9.1.3 Density shall be 2.70 g/cm^3 at 20°C and bulk density shall be between $1.45 - 1.6 \text{ g/cm}^3$.
- 9.1.4 The Potassium Permanganate content shall not be less than a mass fraction of 98.5% in the technical grade, and a mass fraction of 97.5% in the free-flowing grade.
- 9.1.5 The solubility in water is given in following table.

Temperature $^\circ\text{C}$	KMnO_4 g/l
5	35.51
10	42.43
15	51.31
20	62.15
25	74.95
30	89.71

9.1.6 Purity Criteria

MnO_2 (water insoluble) less than a mass fraction of 1.00%

Moisture (H_2O) : less than a mass fraction of 0.5%

9.1.7 Chemical parameters

The chemical parameters shall comply to the following table.

Parameters	Maximum Limit (mg /kg)
Arsenic (As)	20
Cadmium (Cd)	50
Chromium (Cr)	50
Mercury (Hg)	10
Nickel (Ni)	50
Lead (Pb)	50
Antimony (Sb)	50
Selenium (Se)	50

9.3. Transportation & Storage

Means of delivery

The product shall be delivered in steel drums certified for goods RID / ADR class 5.1. In order that the purity of the product is not affected, the steel drums shall not have been used previously for different product or these shall have been specially cleaned and prepared before use.

9.4. Marking & Labeling

All markings shall be legible and durable unless otherwise specified.

9.4.1 Marking

Each package shall be marked legibly & indelibly with the following information : (letter height shall be 50 mm)

- a) The name: “Potassium permanganate”.
- b) Name and address of the manufacturer and local agent including country of Manufacturer.
- c) Registered Trade mark.
- d) Net mass, in Kg.
- e) Type and Grade
- f) Employer’s/Purchaser’s Name as ‘NWSDB’
- g) Conformity to standard as “EN 12672:2016”
- h) Date of manufacture & Date of expiry.
- i) Contract No.
- j) Batch or code number.

9.4.2 Rules for safe handling and use

- The supplier shall provide current safety instructions covering first aid spillage fire etc.

9.4.3 Labeling

The following Risk and Safety labeling requirements shall apply to Potassium permanganate.



Figure 1 – GHS03



Figure 2 – GHS07



Figure 3 – GHS09

- Signal word

Danger

- Hazard Statements:

H272 May intensify fire;
oxidizer

H302 Harmful if swallowed.

H410 Very toxic to aquatic life
with long lasting effects.

9.5. Sampling & Testing

Sampling and testing shall be in accordance with the BS EN 12672:2016.