

**SPECIFICATION FOR POWDERED
ACTIVATED CARBON**

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GENERAL

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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

Powdered Activated carbon will come into contact with potable water shall not constitute a toxic hazard, shall not support microbial growth, and shall be suitable for human consumption.

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 format for test certificate shall be in accordance with the format given in the schedule of particulars and test results shall be submitted in these format.

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.

Contractor is held responsibility for the assuring quality of the goods supplied by him until the final delivery point. Powder Activated Carbon is tested at the Employer's final delivery point by the Engineer and goods shall conform to the standard for the acceptance.

5. Marking

All markings shall be legible and durable unless otherwise specified and shall be as specified in this Specification.

6. Protection During Delivery

The contractor shall provide protection to the approval of 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 tendered in the Bills of Quantities.

7. 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 contractor 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.

8. Manufacturer's Certificate

The Contractor 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, contractor shall provide certificate for the conformity to the Standard (BSEN 12903:2009) from an independent testing agency mentioned in General conditions of contract. Testing at Manufacturers factory by the Engineer will perform as specified.

9. 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 Powdered Activated Carbon. 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.

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10.0 Technical Specification for Powdered Activated Carbon

10.1 General

All materials to be supplied under this contract shall conform to BSEN 12903:2009 and chemicals used for treatment of water shall be suitable for human consumption. Supplier shall provide documentary evidence of compliance with the International Standards to the effect that Powdered Activated Carbon is of food grade quality.

10.2 Physical Properties

10.2.1 Appearance

The product is a black powder.

10.2.2 Particle size

At least a mass fraction of 95% shall have a particle size less than 150 µm.

10.3 Activated Carbon shall be in wood base and shall confirm to the requirement given in table1.

Table1.

Parameter	Analysis	Unit
Bulk Density	0.33 – 0.35	g/cc
Absolute density	2.1	g/cc
Moisture content (max%)	5	wt%
Ash content (max%)	15	wt%
Methylene blue No (Minimum)	180	mg/g
Iodine No. (minimum)	1200	mg/g

10.4 Other Requirements

10.4.1 Purity Criteria

The product shall confirm to the requirements specified in table 2.

Table 2

Impurity	Limit in mass fraction (%)
Ash : max	15
Water (at the time of packing) max.	5
Water soluble material max.	3
Zinc max	0.002

10.4.2 Water extractable substances

The product shall conform to the requirement specified in table 3.

Table 3

Substance	Limit in product (dry basis) mg/kg
Arsenic (As) max.	10
Cadmium (Cd) max.	5
Chromium(Cr) max.	50
Mercury (Hg) max	1
Nickel (Np) max.	20
Lead (Pb) max.	10
Antimony (Sb) max.	5
Selenium (Se) max	10
Cyanide (CN) max.	50
PAH	0.2

10.5 Transport and Storage

10.5.1 Means of delivery

The product shall be delivered in paper sacks (10kg each bag) or polypropylene bags (25 kg each bag) with suitable inner linings. In order that the purity of the product is not effected the means of delivery shall not have been used previously for different product or it shall have been specially cleaned and prepared before use.

10.5.2 Storage

Product shall storage be kept away from oxidants.

(eg. Hydrogen peroxide, potassium permanganate, chlorates, Nitrates, Volatile solvents and moisture).

10.6 Marking and Labeling

Each package shall be marked legibly and indelibly with following information:
(Letter height shall be 50 mm)

- a) The name: "Powdered Activated Carbon".
- 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 "BSEN 12903:2009"
- h) Date of manufacture & Date of expiry.
- i) Contract No.
- j) Batch or code number.

10.7 Sampling & Testing

10.7.1 Prepare the laboratory sample(s) required by the relevant procedures described in BSEN 12902:2004.

10.7.2 Testing

The following tests shall be carried out to determine the physical & chemical properties of the Powdered Activated Carbon in accordance with EN 12902:2004.

10.7.2.1 Physical properties

1. Particle size distribution
2. Bulk density

10.7.2.2 Chemical properties

1. Ash
2. Water content
3. Water-soluble material
4. Content of Zinc
5. Water-extractable substances
6. Iodine number

10.8. Safe handling and use

It is recommended to handle the product so as to avoid dust formation.

Powdered activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion can reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate sampling and work procedures for potentially low-oxygen areas should be followed.

Certain types of chemically activated carbon might have special requirements for transport and storage in bulk, advice should be sought from the manufacturer.

Local regulations can require transfer equipment to be electrically grounded to avoid ignition/explosion of dust by discharge of static electricity.

10.9 Emergency procedures

10.9.1 First aid

In case of skin contact, it is recommended to wash with soap and water.

In case of eye contact, it is recommended to flush with plenty of water for 15 min.

In case of inhalation, it is recommended to move to fresh air.

10.9.2 Spillage

It is recommended to sweep or to vacuum unused carbon and to discard in a refuse container or repackage.

10.9.3 Fire

Any extinguishing media can be used, it is recommended to use foam extinguishers.

Self-contained breathing apparatus should be worn because carbon dioxide and carbon monoxide can be produced during combustion.