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मानक

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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

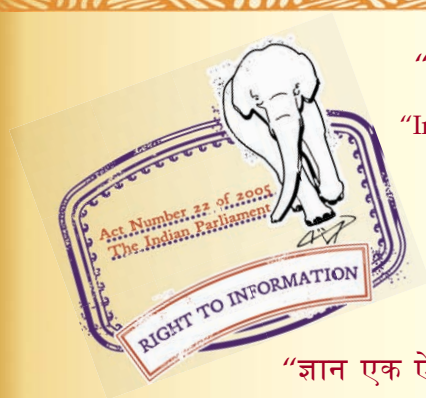
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

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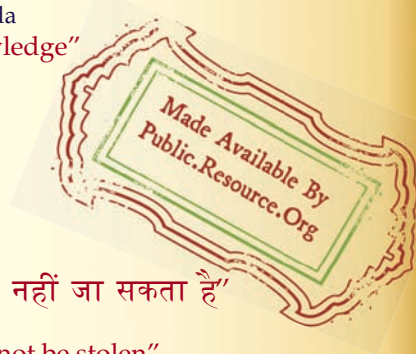
IS 8502 (1994): petroleum coke [PCD 3: Petroleum, Lubricants and their Related Products]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
पेट्रोलियम कोक — विशिष्ट
(पहला पुनरीक्षण)
Indian Standard
PETROLEUM COKE — SPECIFICATION
(*First Revision*)

UDC 665.777.4

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Petroleum Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

Petroleum coke is manufactured by delayed coking of residues obtained from crude oil distillation units of petroleum refineries. The raw coke obtained is either sold as such or after calcination. The raw coke has limited application in industry, while the calcined coke, is extensively used for the manufacture of carbon and graphite products and carbon anodes for the aluminium smelters.

The product as obtained from the delayed coking unit is called raw petroleum coke or green coke and the product obtained by calcining the green or raw coke at a temperature in the region of 1200-1300°C is known as calcined petroleum coke.

India is one of the major producers and consumers of coal and coke on an extensive scale and National Standards have been published covering methods used for sampling and testing of coal and coke. But petroleum coke is comparatively a newcomer in the field of industrial applications and the various industries utilizing both raw and calcined petroleum coke have so far been guided by either ASTM or individual specifications and methods of test to suit their requirements with the results that the major producers of this commodity are put to inconvenience. To overcome this difficulty, after collecting as much data as possible from various consumers and on giving due weightage to the various requirements, specifications and methods of test, this specification was first published in 1977. This revision has been prepared after a thorough review of the standard in consultation with the major producers and consumers of this product. In this revision requirements for volatile matter and trace metals such as silicon, iron and vanadium for raw petroleum coke have been modified.

Various documents relating to methods of test for coal and coke which are relevant and adaptable have been taken into consideration in this standard to avoid duplication of effort. The following Indian Standards for coal and coke fall under the above category:

IS 436 (Part 1/Sec 1) : 1964 Methods for sampling of coal and coke : Part 1 Sampling of coal, Sec 1 Manual sampling (*first revision*)

IS 436 (Part 2) : 1965 Methods for sampling of coal and coke : Part 2 Sampling of coke (*first revision*)

IS 1350 (Part 1) : 1984 Methods of test for coal and coke : Part 1 Proximate analysis (*second revision*)

IS 1350 (Part 3) : 1969 Methods of test for coal and coke : Part 3 Determination of sulphur (*first revision*)

IS 1354 : 1992 Methods of test for coke : Special tests (*second revision*)

IS 1355 : 1984 Methods of determination of chemical composition of ash of coal and coke

IS 7929 : 1975 Methods for determination of electrical resistivity of chemical coke

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 analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

PETROLEUM COKE — SPECIFICATION

(*First Revision*)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for raw and calcined petroleum coke used for the manufacture of electrodes, carbon and graphite products, carbon anodes and for other uses.

2 TYPES

The material shall be of the following types and grades:

- a) *Raw Petroleum Coke*
 - 1) *Grade A* — Low sulphur content
 - 2) *Grade B* — High sulphur content
- b) *Calcined Petroleum Coke*
 - 1) *Grade A* — Low sulphur content
 - 2) *Grade B* — High sulphur content

3 REQUIREMENTS

3.1 The material shall be a petroleum product, free from all foreign matter and visible impurities.

3.2 The material shall also comply with the requirements given in Table 1 when tested according to the appropriate methods prescribed under [P :] method of IS 1448 'Methods of test for petroleum and its products'. Reference to which is given in col 7 and 8 of the table.

3.3 Optional Requirements

In addition to the requirements prescribed in Table 1 the material shall also comply with the requirements in 3.3.1 to 3.3.3 as agreed to between the purchaser and the supplier.

3.3.1 Size Analysis

The product shall meet the requirements of size analysis, the limit and the method of test shall be as agreed to between the purchaser and the supplier.

3.3.2 Electrical Resistivity

The product shall also meet the requirements of electrical resistivity, the values shall be reported as per two-electrodes method of IS 7929 : 1975 or by any other suitable method as agreed to between the purchaser and the supplier.

3.3.3 Trace Metals

In addition to the requirements of trace metals as given under Sl No. (viii) of Table 1, the material shall also meet the requirements of the following trace impurities. The limits and the methods of test for the determination of these trace impurities shall be as agreed to between the purchaser and the supplier.

- a) Titanium (Ti); and
- b) Calcium (Ca).

4 SAMPLING

4.1 Representative samples of the material shall be drawn and prepared in accordance with IS 1447 (Part 4) : 1989 'Methods of sampling of petroleum and its products : Part 4 Sampling of petroleum coke for laboratory analysis'.

5 PACKING AND MARKING

5.1 Packing

The material shall be supplied in suitable containers as agreed to between the purchaser and the supplier.

5.2 Marking

Each container shall be marked with the following information and any other information as agreed to between the purchaser and the supplier:

- a) Name, type, grade and mass of the material;
- b) Indication of the source of manufacture, initials or trade-mark, if any; and
- c) Batch or code number.

5.2.1 Each container may also be marked with the Standard Mark.

5.2.2 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Table 1 Requirements for Petroleum Coke(*Clauses 3.2, 3.3 and 3.3.3*)

SI No.	Characteristics	Requirement for				Method of Test	
		Raw Petroleum Coke		Calcined Petroleum Coke		Annex	IS 1448
		Grade A	Grade B	Grade A	Grade B		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Moisture content (as received), percent by mass, <i>Max</i>	10	10	—	—	—	P : 132
ii)	Moisture content (after initial drying for raw petroleum coke only), percent by mass, <i>Max</i>	2.0	2.0	0.1	0.1	—	do
iii)	Ash, percent by mass, <i>Max</i>	0.45	0.45	0.5	0.5	—	P : 126
iv)	Volatile matter, percent by mass, <i>Max</i>	11.0	11.0	0.4	0.4	—	P : 134
v)	Density:						
a)	Vibrated bulk, g/cm ³	—	—	To be reported		—	P : 130
b)	Real*, g/cm ³ , <i>Min</i>	—	—	2.03	2.03	—	P : 133 and P : 139
vi)	Fixed carbon, percent by mass, <i>Min</i>	85.0	85.0	99.0	99.0	A	—
vii)	Sulphur total, percent by mass, <i>Max</i>	1.25	2.5	1.25	2.5	—	P : 33
viii)	Trace metals:						
a)	Silicon (Si), percent by mass, <i>Max</i>	To be reported		0.05	0.05	—	P : 131
b)	Iron (Fe) percent by mass, <i>Max</i>	do		0.04	0.04	—	P : 127
c)	Vanadium* (V), percent by mass	do		0.03	0.03	—	P : 79
d)	Nickel (Ni), percent by mass,	do		To be reported		—	P : 128

*For graphite industry a higher real density and low vanadium content product is required; the limits for this may be settled between the purchaser and the supplier.

ANNEX A

[*Table 1, SI No. (vi)*]

DETERMINATION OF FIXED CARBON IN PETROLEUM COKE

A-1 GENERAL

Fixed carbon in petroleum coke is the solid residue other than ash, moisture and volatile matter obtained by a process of calculation.

A-1.2 Total moisture, ash and volatile matter shall be determined by the methods given in IS 1448 [P : 132] : 1989; IS 1448 [P : 126] :

1988 and IS 1448 [P : 134] : 1989 respectively.

NOTE — Fixed carbon is made up of mainly carbon but may contain as contaminants sulphur, hydrogen, nitrogen and oxygen.

A-2 CALCULATION

Fixed carbon, percent by mass = $100 - (\text{Moisture} + \text{ash} + \text{volatile matter})$

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This Indian Standard has been developed from Doc : No. PC 3 (765).

Amendments Issued Since Publication

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