

DETAILED METHODOLOGY

- **Sample Collection**

a. **In case of coal dispatch by rail**, each rake of Coal supplied to the Purchaser from the Delivery Point will be considered as a lot for the purpose of sampling.

I. Each rake of coal can be further divided into number of lots based on grades of coal or number of wagons belonging to the customer

II. Each rake shall be divided into equal sub-lots as under:

No. of wagons in the rake	Number of sub-lots
Up to 30 wagons	4
>30 wagons up to 50 wagons	5
>50 wagons and above	6

III. **From each of the sub-lots**, one wagon each will be selected as per a random table in BIS Standards (IS: 436 (Part I/Section I) 1964) or its latest version for collection of increments.

IV. **In each wagon selected for sampling**, the sample will be drawn from the spot in a manner so that if in one wagon the sample is collected at one end, in the next wagon the spot will be in the middle of the wagon and in the third wagon at the other end and this sampling procedure will be repeated for subsequent wagons.

V. Before collecting the samples, the spot will be levelled and at least 25 cm of Coal surface will be removed/scrapped from the top and the place will be levelled for an area of 50 cm by 50 cm.

VI. About 50 kg of the sample will be collected from each selected wagon in the rake by drawing 10 increments of approx. 5 kg each with the help of shovel/scoop.

VII. Samples collected from all the selected wagons/sub lots in a rake will be mixed to form a gross sample. Item (IV) to (VI) above shall be applicable for Coal supplied in all types of wagons.

VIII. In case of the rake having live overhead traction line, the power supply in the overhead traction shall be switched off to facilitate collection of samples from the wagons pursuant to points (IV) to (VI) above.

b. **In Case of coal dispatch by Road**, Samples of Coal will be collected at the Delivery Point/dispatch location during the day between 6.00 hr to 18.00 hr only from the trucks of the purchasers opted for 3rd party sampling

I. The first sample of Coal shall be collected from the first truck at the Delivery Point belonging to a Purchasers Opting for Sampling. After subsequent samples of Coal shall be collected from every 8th (eighth)

truck from which the first sample has been collected. The same process shall be repeated for every 8th truck thereafter.

- II. Before collecting the sample, the spot at the top of the truck will be levelled and at least 25 cm of Coal surface shall be removed/scrapped from the top and the place will be levelled for an area of 50 cm by 50 cm for collection of sample.
- III. About 30 kg of the sample shall be collected from each truck by drawing 6 increments of approx. 5 kg each with the help of shovel/scoop.
- IV. All the samples collected from every selected truck/sub-lot will be mixed together to form a gross sample.

- **Sample Preparation**

The gross sample collected at the Delivery Point will be reduced to laboratory samples in the size of **12.5mm** for total moisture and **212 microns IS Sieve (Top Size)** for Testing and Analysis. The Preparation of Lab samples is done at Coal company preparation rooms located at the dispatch area.

The preparation consists of following steps:

- 1) **Primary Crushing:** The gross sample collected is fed to primary crusher and the coal size is reduced to 12.5mm size with the help of mechanical crushing.
- 2) After Primary crushing of coal sample, one portion (one fourth of the gross sample) called Part-1 will be used for determination of total moisture and the other portion (three fourth of the gross sample) called Part-2 will be used for Testing and analysis.
- 3) **Secondary Crushing:** After primary crushing of coal, Part-2 of the coal sample is sent to secondary crusher, coning and quartering of coal sample is carried out at secondary crusher and the sample is further reduced to 3.35 mm of size.
- 4) **Pulveriser:** Coning and quartering of coal sample is done and pulveriser will reduce the coal sample to powdered form and the top size of 212 Micron is attained. Precaution will be taken so that further sieving and pulverising is not needed at the time of testing

***In case the pulveriser is not in working condition, the testing is done at sample of 3.35-micron size.**

The final pulverized sample will be divided into four equal parts viz. Set – I, set – II, Set-III and Set-IV.

- a. Set – I is handed over to Third Party for testing and analysis
- b. Set-II of the sample shall be handed over by the Coal Company
- c. Set-III of the sample shall
 - (i) **in case of rail mode**, be handed over to the Purchaser;
 - (ii) **in case of road mode**, be handed over in equal portions to all of the Purchasers on that particular day; and
- d. Set-IV of the sample called referee sample is sealed jointly by Third Party and representatives of each of the Parties and is kept at the sample preparation room with lock and key arrangement under custody of Third Party. The referee sample is retained in double sealed condition (duly signed by the Third Party and the representatives of the Parties) for 30 (thirty) days from the date of sample collection.

- **Transportation of sample:**

The Set I of the coal sample is transported to coal testing labs for testing and analysis of coal sample in a sealed condition.

- **Testing and Analysis:**

- 1) **Determination of total moisture:**

The part 1(one fourth of gross sample) of size 12.5 micron is used for total moisture test. The total moisture test is carried out at coal company labs, witnessed by each of the representative of the party.

- 2) **Determination of Ash, moisture and Gross Calorific Value(GCV):**

The testing and analysis of coal sample is carried out at coal testing Labs, selected by Third Party, as per as per ***BIS Standards (IS: 1350 Part 1-1984)*** or ***BIS Standards (IS: 1350 Part-II-1970)***. The determination of Ash, moisture and GCV is done on equilibrated moisture basis. **(at 60% RH and 40^o Celsius)**

- **Referee Sample:**

In case of any dispute regarding findings of the result, any of the party may opt for analysis of referee sample. The communication of referee sample should be made within 7(seven) days of communication of report. The disputing party holds the right to choose one of the government labs from the list.