



Coal — Determination of moisture in the analysis sample — Direct gravimetric method

Charbon — Détermination de l'humidité de l'échantillon pour analyse — Méthode gravimétrique directe

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 331 was developed by Technical Committee ISO/TC 27, *Solid mineral fuels*.

This second edition was submitted directly to the ISO Council, in accordance with clause 6.11.2 of part 1 of the Directives for the technical work of ISO. It cancels and replaces the first edition (i.e. ISO 331-1975), which had been approved by the member bodies of the following countries:

Austria	India	Romania
Bulgaria	Israel	South Africa, Rep. of
Canada	Italy	Spain
Chile	Japan	Turkey
Czechoslovakia	Netherlands	United Kingdom
Denmark	New Zealand	USA
France	Poland	USSR
Germany, F.R.	Portugal	Yugoslavia

The member body of the following country had expressed disapproval of the document on technical grounds:

Belgium

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0 Introduction

Since coal is hygroscopic, its moisture will vary with change of humidity of the atmosphere, and the moisture in the analysis sample, therefore, should be determined whenever portions are weighed out for other analytical determinations, for example volatile matter, calorific value, carbon and hydrogen, etc. If all the portions taken for analysis are weighed out on the same day and at about the same time, and if the analyses are begun without delay, one determination of moisture will suffice.

1 Scope and field of application

This International Standard specifies a method of determining the moisture content of the analysis sample of hard coal, brown coal and lignite using a gravimetric procedure.

NOTE — Alternative volumetric methods are given in ISO 348 and ISO 1015.

2 References

ISO 348, *Hard coal — Determination of moisture in the analysis sample — Direct volumetric method.*

ISO 1015, *Brown coals and lignites — Determination of moisture content — Direct volumetric method.*

3 Principle

The sample of coal is heated at 105 to 110 °C in a stream of oxygen-free, dry nitrogen and the moisture driven off is collected in an absorption tube containing a desiccant. The increase in mass of the absorption tube (after deducting the result of a separate blank determination) is due to moisture in the sample of coal.

NOTE — If suitable precautions are taken against re-absorption of moisture by the dried coal, the loss in mass of the sample may be measured and compared with the gain in mass of the absorption tube. This procedure is of advantage in discriminating between coals which are rich in absorbed gases and those which are not.

4 Reagents

4.1 Desiccant

A suitable desiccant is dry magnesium perchlorate (see the note). It is important that the same desiccant be used in both the drying tower and the absorption tubes, since the incoming nitrogen and the gas leaving the system should be dried to exactly the same degree.

NOTE — Attention is drawn to the care needed in the handling and the disposal of magnesium perchlorate. National requirements must be observed.

4.2 Nitrogen

Maximum oxygen content: 30 ppm (see the annex).

5 Apparatus

The balance used shall be sensitive to 0,1 mg.

5.1 Source of heat, such that a glass retort tube is maintained at a constant and uniform temperature within the range 105 to 110 °C. A convenient source is an electrically heated and thermostatically controlled aluminium block oven.

5.2 Drying tower, packed with a desiccant to dry the stream of nitrogen entering the retort tube.

5.3 Flowmeters, capable of measuring a flow rate sufficient to maintain two atmosphere changes per minute in the retort tube. If a pressure drop over a constriction is used as a means of measuring flow rate, the manometer liquid should be a non-volatile oil.

5.4 Glass retort tubes, of about 50 ml capacity, having a suitable inlet for dry nitrogen and an outlet for moisture-laden nitrogen, and capable of holding 1 g of the sample, spread out in a uniform layer either in the retort tube itself or in a boat which is inserted into the tube.