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Črni premog - Določanje zrnatosti s sejalno analizo

Hard coal - Size analysis by sieving

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Houille - Analyse granulométrique par tamisage
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ICS:

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Hard coal — Size analysis by sieving

Houille — Analyse granulométrique par tamisage

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Contents	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Apparatus	1
4.1 For all methods.....	1
4.2 For dry sieving.....	2
4.3 For wet sieving.....	2
5 Sampling of test sample	2
5.1 General.....	3
5.2 Drying.....	3
5.3 Division (other than wet coal of nominal top size less than 4 mm).....	3
5.4 Division of wet coal of nominal top size less than 4 mm.....	4
6 Procedure	4
6.1 General.....	4
6.2 Dry sieving.....	4
6.2.1 Sample of maximum particle size greater than 22,4 mm.....	4
6.2.2 Sample of maximum particle size between 4 mm and 22,4 mm— manual method.....	5
6.2.3 Sample of maximum particle size less than 4 mm—manual method.....	5
6.2.4 Sample of maximum particle size between 4 mm and 22,4 mm; minus 4 mm—mechanical method.....	6
6.3 Wet sieving.....	6
7 Expression of results	7
7.1 Calculation.....	7
7.2 Graphical presentation.....	7
8 Test report	8
Annex A (informative) Guide to sampling	12
Annex B (informative) Example of removal by wet sieving of fine material from a sample having a maximum particle size less than 4 mm	13

ISO 1953:2015(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 27, *Solid mineral fuels*, Subcommittee SC 1, *Coal preparation: Terminology and performance*.

This third edition cancels and replaces the second edition (ISO 1953:1994), of which it constitutes a minor revision.

Introduction

Size analysis involves the separation of a sample of coal into size fractions having defined limits. In the methods described in this International Standard the results are expressed in terms of the percentage mass of coal remaining on sieves of different aperture sizes. This information can be of use in a number of applications, including the following: assessing the yields of products from run-of-mine coals; providing design data for coal preparation plants; checking that products from screening plants are within the required limits; assessing the performance of coal-crushing plants; and selecting coals for particular processes and equipment.

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Hard coal — Size analysis by sieving

1 Scope

This International Standard specifies reference methods for the size analysis of coal by manual sieving (wet or dry), using test sieves of aperture sizes between 125 mm and 45 μm . A guide to sampling is given in [Annex A](#).

This International Standard is applicable to all hard coals. It is not applicable to coke or other manufactured fuels.

In the case of pulverized coal which has been ground so that a high proportion passes through the test sieve of smallest aperture size, the methods described in this International Standard will determine only the percentage oversize.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1213-1, *Solid mineral fuels — Vocabulary — Part 1: Terms relating to coal preparation*

ISO 1213-2, *Solid mineral fuels — Vocabulary — Part 2: Terms relating to sampling, testing and analysis*

ISO 13909 (all parts), *Hard coal and coke — Mechanical sampling*

ISO 18283, *Hard coal and coke — Manual sampling*

ISO 3310-1, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

ISO 3310-2, *Test sieves — Technical requirements and testing — Part 2: Test sieves of perforated metal plate*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1213-1 and ISO 1213-2 apply.

4 Apparatus

4.1 For all methods

4.1.1 Test sieves, exclusively round-hole or exclusively square-hole, complying with ISO 3310-1 or ISO 3310-2, as appropriate.

The recommended series of test sieves for general purposes is 125 mm, 90 mm, 75 mm, 63 mm, 50 mm, 45 mm, 31,5 mm, 22,4 mm, 16 mm, 11,2 mm, 8 mm, 5,6 mm, 4 mm, 2 mm and 1 mm nominal aperture sizes, square-hole, or the same sizes of round-hole sieves. If this series is inadequate for the sizing of graded coals, sieves from the supplementary sizes 100 mm, 80 mm, 40 mm, 25 mm, 20 mm, 12,5 mm, 10 mm and 6,3 mm may be included. For samples greater than 125 mm, single square-hole gauges of the required dimensions may be used for the larger pieces. Test sieves of nominal aperture size 4 mm and less should be of metal wire cloth; the recommended series of nominal aperture sizes is 4 mm, 2,8 mm, 2 mm, 1,4 mm, 1 mm, 710 μm , 500 μm , 355 μm , 250 μm , 180 μm , 125 μm , 90 μm , 63 μm and 45 μm .

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When a complete size analysis is required, it is preferable, subject to the range of sieve aperture sizes available, that the mass of coal in any size fraction does not exceed 30 % of the total mass of sample being sieved. The largest aperture size sieve should be that on which not more than 5 % mass fraction of the sample is retained and the smallest aperture size sieve should be that through which not more than 5 % mass fraction of the sample passes.

It is important to check the sieves from time to time, by the methods described in ISO 3310-1 and ISO 3310-2, to ensure that the aperture dimensions are within the specified tolerances. Worn or damaged sieves can give rise to serious errors in size analysis and should be discarded.

4.1.2 Receivers, for collecting material passing through the sieves.

4.1.3 Weighing scale, capable of measuring the mass of the sample to be sieved to the nearest 0,1 %.

4.1.4 Trays, smooth, of non-corrodible material, of at least 400 mm × 400 mm, depending on the mass of sample and number of analysis required.

4.1.5 Watch- or clock-glasses.

4.2 For dry sieving

4.2.1 Lids, to fit the test sieves.

4.2.2 Flat brush, for cleaning the sieves and for brushing dust from the trays.

4.2.3 Hardwood block, about 150 mm long with a 10 mm × 10 mm cross-section, for tapping the sieves.

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4.2.4 Shovel or scoop. <https://standards.iteh.ai/catalog/standards/sist/810059cd-ef7-4884-a323-5c26adff45901/sist-iso-1953-2016>

4.2.5 Vibratory sieve shaker for mechanical sieving.

4.3 For wet sieving

4.3.1 Pressure filter.

4.3.2 Buchner funnel and Buchner flask.

4.3.3 Filter paper.

4.3.4 Oven, capable of being controlled to ± 5 °C in the range 30 °C to 110 °C.

5 Sampling of test sample

The sample shall be taken in accordance with ISO 13909 or ISO 18283, subject to the following provision:

a) the number of increments and the increment masses, for both manual and mechanical sampling, should comply with the requirements of ISO 13909 or ISO 18283.

or

b) the minimum mass of the gross sample should comply with [Table 1](#).

Table 1 — Minimum mass of sample for size analysis

Nominal top size of coal mm	Minimum mass for a precision of 1 % kg	Minimum mass for a precision of 2 % kg
300	54 000	13 500
200	16 000	4 000
150	6 750	1 700
125	4 000	1 000
90	1 500	400
75	950	250
63	500	125
50	280	70
45	200	50
38	130	30
31,5	65	15
22,4	25	6
16,0	8	2
11,2	3	0,70
10,0	2	0,50
8,0	1	0,25
5,6	0,50	0,25
4,0	0,25	0,25
2,8	0,25	0,25
2,0	0,25	0,25
1,0	0,25	0,25
< 0,5	0,25	0,25

Preparation of test sample

5.1 General

Drying is necessary if the coal is wet and dry sieving is to be performed. The gross sample may be divided if its mass greatly exceeds the value given in [Table 1](#). If the gross sample is to be dried and divided, the division shall be carried out first whenever practicable. If no preparation is necessary, the test sample is the gross sample.

5.2 Drying

Air-dry the sample either at ambient temperature or at an elevated temperature not exceeding 40 °C. Cool, if necessary, and allow the moisture content to come to equilibrium with the laboratory atmosphere.

If caking or swelling tests are to be carried out subsequently on the sample, the drying temperature should not exceed 40 °C.

5.3 Division (other than wet coal of nominal top size less than 4 mm)

Divide the sample by means of a suitable mechanical sample divider or riffle avoiding size degradation and loss of dust. For sample that contains larger pieces of particle size greater than say 50 mm, where a suitable mechanical sample divider or riffle is not available, use either the flattened heap method,