

Glossary of

Terms of relating to sampling, testing and analysis of solid mineral fuels

Committees responsible for this British Standard

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- British Coal Corporation
- British Steel Industry
- Coal Products Ltd.
- Institute of Energy

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Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
Index	14
Table 1 — Types and compositions of carbominerite	2
Table 2 — Maceral groups in bituminous coal and anthracite and their subdivisions	7
Table 3 — Classification of the main microlithotypes in bituminous coal and anthracite	7
List of references	Inside back cover

National foreword

This British Standard has been prepared under the direction of the Solid Mineral Fuels Standards Policy Committee. It is identical with ISO 1213-2:1992 *Solid mineral fuels — Vocabulary — Part 2: Terms relating to sampling, testing and analysis*, published by the International Organization for Standardization (ISO), and in the preparation of which the United Kingdom played a full part.

This British Standard is a revision of, and supersedes, BS 3323:1978, which is withdrawn. The principal changes in this edition are as follows.

- a) The standard is applicable to solid mineral fuels in general.
- b) Many new terms are included while some others have been omitted.
- c) Sampling terms are now included.
- d) The appendices dealing with the NCB coal classification system and screen sizes for domestic bituminous coals have been omitted.

Cross-references

A British Standard related to ISO 565:1990 and ISO 3310-1:1990 is BS 410:1986 *Specification for test sieves*. BS 410:1986 includes the R 20 series of sieve sizes specified in ISO 565:1990 (see **3.113**) and the requirements for a sieve if nominal size of openings 212 µm are technically equivalent to those in ISO 3310-1:1990 (see **3.67**).

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This part of ISO 1213 defines terms commonly employed in the sampling, testing and analysis of solid mineral fuels.

Alternative names are given for several terms: in some cases, however, the use of the alternative name is deprecated (as indicated).

An alphabetical index, with numerical cross-reference is provided.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 1213. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 1213 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 565:1990, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*.

ISO 3310-1:1990, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*.

3 Terms and definitions

3.1

abrasion

loss of material from particle surfaces of a solid mineral fuel, or from other surfaces in contact with the particles, caused by friction between contacting surfaces

3.2

abrasion index

the total mass lost by the *abrasion* of four carbon steel blades when rotated in a specified mass of a solid mineral fuel under specified conditions, expressed in milligrams of metal lost per kilogram of solid mineral fuel

3.3

accuracy

the closeness of agreement between an observation and the “true” value

NOTE 1 The accuracy of a result should not be confused with its *precision*.

3.4

adventitious ash; extraneous ash (deprecated)

ash arising from *mineral matter* associated with, but not inherent in, a solid mineral fuel

3.5

air-dried basis

a means of expressing an analytical result based on the condition in which a solid mineral fuel is in equilibrium with atmospheric humidity

NOTE 2 The solid mineral fuel in this state is composed of residual moisture, *mineral matter* and organic matter.

3.6

anthracite

coal of high *rank*, with a low *volatile matter* content and a semi-metallic lustre, and which does not soften or swell when heated

3.7

apparent relative density

the ratio of the mass of a dry solid mineral fuel to the mass of a volume of water equal to the apparent volume of the solid mineral fuel at a specified temperature

NOTE 3 The apparent relative density should not be confused with the *bulk density* (see 3.21).

3.8

ash

the residue obtained by incineration of a solid mineral fuel under specified conditions

3.9

ash analysis

the analysis of *ash* for its elemental composition

NOTE 4 The elements usually determined are silicon, aluminium, iron, magnesium, titanium, calcium, sodium, potassium, phosphorus and sulfur, and these are usually expressed as oxides.

3.10

ash fusibility

characteristic physical state of the *ash* obtained by heating under specified conditions

NOTE 5 Ash fusibility is determined under either oxidizing or reducing conditions.

NOTE 6 See also *deformation interval* (3.43), *deformation temperature* (3.44), *flow temperature* (3.58), *hemisphere temperature* (3.76) and *melting interval* (3.100).

3.11

ash viscosity

a measure of the resistance to flow of *ash* in the fused state

3.12

base/acid ratio

the ratio of the mass of basic oxides [iron(III) oxide, calcium oxide, magnesium oxide, disodium oxide and dipotassium oxide] to the mass of acidic oxides [silica, aluminium oxide and titanium (IV) oxide] in *ash*

NOTE 7 This ratio can be used in the determination of the *fouling factor* and the *slagging factor*.

3.13**batch**

a quantity of a solid mineral fuel produced at one time under relatively uniform conditions

3.14**bias**

a systematic *error* which leads to results which are persistently higher or persistently lower than the “true” value

3.15**bituminous coal**

a general descriptive term for *coal of rank* between *anthracite* and *brown coal/lignite*

NOTE 8 The vitrinites in all coals in the bituminous range melt and form a *coke* when the coal is heated above 400 °C in the absence of air.

NOTE 9 In some countries coals of *rank* immediately below that of *bituminous coal* are referred to as sub-bituminous coals.

3.16**blast furnace coke**

strong, large *coke* for use in blast furnaces

NOTE 10 Blast furnace coke is generally produced from blends of *bituminous coals*, which may incorporate additives.

NOTE 11 Blast furnace coke usually has a low *reactivity* to carbon dioxide.

3.17**bottom size; lower size**

the size corresponding to the 95 percentile on the cumulative *size distribution* curve of a material, i.e. the largest sieve size on which 95 % of the material is retained

3.18**breakage**

Particle size reduction resulting from impact and/or compression

3.19**breeze**

the undersize after separating the smallest size of *graded coke*

NOTE 12 Breeze is usually less than 10 mm in size.

3.20**brown coal and lignite**

coals of low *rank* characterized by high inherent moisture, high *volatile matter* and low calorific value

NOTE 13 In some countries the terms are used to describe all low *rank* coals up to *bituminous coals*. In other countries the coals at the higher end of the range are referred to as sub-bituminous coals.

3.21**bulk density**

the mass of a portion of a solid mineral fuel divided by the volume of the container which is filled by that portion under specified conditions

3.22**carbominerite**

collective term for inter-growths of minerals and *macerals*

NOTE 14 The various types of carbominerite with their compositions are given in Table 1.

Table 1 — Types and compositions of carbominerite

Type	Volume percentage of minerals
Carbargilite	20 to 60, clay minerals
Carbopyrite	5 to 20, sulfides
Carbankerite	20 to 60, carbonates
Carbosilicite	20 to 60, quartz
Carbopolyminerite ^a	20 to 60, various minerals
^a The term is used also for carbopolyminerite containing a maximum of 5 % of mineral matter, provided that sulfides form a substantial part of the mineral matter.	

3.23**carbon in mineral matter**

the carbon in the *mineral matter* carbonates of a solid mineral fuel

3.24**carboxyreactivity**

the rate of reaction of a solid mineral fuel with carbon dioxide under specified conditions

3.25**char**

the solid, partially or non-agglomerated carbonaceous material produced by the pyrolysis of solid mineral fuels

3.26**chute**

an inclined trough for conveying solid mineral fuel to a lower level

3.27**clinkering**

the aggregation of particles of *ash* after it has melted during the course of combustion of a solid mineral fuel or during gasification

NOTE 15 The aggregated particles may include small amounts of unburnt solid mineral fuel.

3.28**coal**

combustible sedimentary rock formed from altered plant remains consolidated under superimposed strata

NOTE 16 The characteristics of different coals are due to differences in source plant material, in the conditions and the degree of change that the material has undergone in its geological history, and in the range of impurities present. Coals can be characterized macroscopically by their lithotype composition and microscopically by their *maceral* and *microlithotype* compositions.

3.29**coalification**

process by which sedimented compacted plant remains are transformed into *coal*

NOTE 17 This process is characterized by an increase in the carbon content in the plant remains and a decrease in the *volatile matter* yield from the plant remains. As coalification proceeds, the *reflectances* of the *macerals* tend to increase. Vitrinite is used as a reference material for the determination of the *rank* of *coal* because its *reflectance* increases uniformly with the extent of coalification.

3.30**coefficient of variation**

the *standard deviation*, *s*, expressed as a percentage of the absolute value of the arithmetic mean, $|\bar{x}|$

$$v = \frac{s}{|\bar{x}|} \times 100$$

NOTE 18 This term is usually designated as *v*.

3.31**coke**

the solid, agglomerated carbonaceous residue produced by the pyrolysis of *coal* in the absence of air

3.32**combustible matter**

theoretical state of a solid mineral fuel without moisture and *mineral matter* other than *pyritic sulfur* and sulfidic sulfur

3.33**combustible sulfur**

the sulfur which reacts with oxygen when a solid mineral fuel is burnt under specified controlled conditions

3.34**common sample**

a *sample* collected for more than one intended use

3.35**complete seam profile sample for each bench**

collective designation of the coal samples taken separately from each coal bench and band of the tested seam or a part of it which is a section of a thick seam

3.36**coning and quartering**

an operation in which the thoroughly mixed material is piled into a conical heap on a clean, dry, non-absorbent surface, then flattened into a uniform circular layer and divided into four equal portions by cuts at right angles, one pair of opposite quarters being retained while the other pair is rejected

3.37**constant mass division**

the method of increment or *sample division* in which the portions retained from individual *increments*, *partial samples* or *gross samples* are of uniform mass

3.38**continuous sampling**

the taking of a *sample* from every unit of the solid mineral fuel being handled

3.39**correlation coefficient**

a measure of the degree of correlation between the members of paired sets

3.40**crucible swelling number**

the number which defines, by reference to a series of standard profiles, the size and shape of the residue obtained when a specified mass of *coal* is heated in a covered crucible under specified conditions

3.41**crush (to)**

to reduce the *particle size* of a *sample* to produce mainly coarse particles

NOTE 19 See also *grind* (3.70).

3.42**cut coke**

screened *coke* from which the over-size has been reduced by mechanical means and rescreened

3.43**deformation interval; softening interval**

the interval between the *deformation temperature* and the *hemisphere temperature*

3.44**deformation temperature**

the temperature at which deformation of a test piece prepared from ash, by a specified procedure, occurs

NOTE 20 The deformation observed takes the following forms:

- when using cylindrical (or cubicoidal) test pieces, a change of the surface and the rounding of the edges at the rim or corner;
- when using pyramidal test pieces, the rounding of the tip of the test piece.