~~ISO/TC 27/SC 1~~

~~Date: 2016-12-15~~

~~**ISO 1213-2:202X**~~

~~ISO/TC 27/SC 1Secretariat: SA~~

~~Coal and Coke — Vocabulary — Part 2: Terms relating to sampling, testing and analysis~~

~~*Combustibles minéraux solides — Vocabulaire — Partie 2: Termes relatifs à l'échantillonnage, l'essai et l'analyse*~~

Document type:

Document subtype:

Document language:

ISO/FDIS 1213-2

ISO/TC 27/SC 1

Secretariat: SA

Date: 2024-05-14

Coal and coke — Vocabulary —

Part 2:
Terms relating to sampling, testing and analysis

FDIS stage

Document type:

Document subtype:

Document language:

O:\Documents\TC027\SC001\087990 - ISO_AWI 1213-2 (Ed 3)\50.00\230\C087990e_trackchanges.docx

ISO copyright office
CP 401 • Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. Phone: + 41 22 749 01 11

Fax + 41 22 749 09 47

E-mail: copyright@iso.org

www.iso.org

Website: www.iso.org

Published in Switzerland

Contents ~~Page~~

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~~document 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~~ISO draws attention to the possibility that ~~some of~~ the ~~elements~~implementation of this document may ~~be~~involve the ~~subject~~use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights~~.~~ in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. 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~~of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT~~)~~), see ~~the following URL:~~ www.iso.org/iso/foreword.html.

~~The committee responsible for this~~This document ~~is~~was prepared by Technical Committee ISO/TC 27, *Coal and coke*, Subcommittee SC 1, *Coal preparation: Terminology and performance*.

This third edition cancels and replaces the first edition (ISO 1213~~-~~-2:2016), of which ~~has been technically revised.~~it constitutes a minor revision. The changes are as follows:

— the title has been updated to specify coal and coke;

— solid mineral fuels have been replaced by either coal and coke or, in some cases, just coal or just coke.

A list of all parts in the ISO 1213 series can be found on the ISO website.

~~Solid mineral fuels — Vocabulary — Part 2: Terms relating to sampling, testing and analysis~~

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Coal and coke — Vocabulary —

Part 2: Terms relating to sampling, testing and analysis

1 Scope

This document defines terms commonly employed in the sampling, testing and analysis of coal ~~(3.39)~~(3.39) and coke ~~(3.42).~~(3.42).

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

There are no normative references in this document.

3 Terms and definitions

~~For the purposes of this document, the following terms and definitions apply.~~

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

~~— IEC Electropedia: available at http://www.electropedia.org/~~

— ISO Online browsing platform: available at ~~http://www.iso.org/obp~~https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
abrasion
loss of material from particle surfaces of a *coal* ~~(3.39)~~(3.39) or *coke* ~~(3.42)~~(3.42) sample, or from other surfaces in contact with the particles, caused by friction between contacting surfaces

3.2
abrasion index
total mass lost by the *abrasion* ~~(3.1)~~(3.1) of four carbon steel blades when rotated in a specified mass of *coal* ~~(3.39)~~(3.39) under specified conditions

Note 1 to entry: Expressed in milligrams of metal lost per kilogram of a coal and coke sample.

3.3
abrasion value
resistance to *abrasion* ~~(3.1) of the *coke* (3.42)~~(3.1) of the *coke* (3.42) after reaction with carbon dioxide in the CRI test, measured as the mass fraction expressed as a percentage of a sample passing through a 0,5 mm sieve after tumbling under conditions specified

3.4
adiabatic calorimeter
calorimeter that adjusts its jacket temperature constantly to be identical to bomb temperature, thereby preventing heat losses

Note 1 to entry: The inner calorimeter chamber and the jacket exchange no energy because the water temperature in both is identical during the test. The water in the external jacket is heated or cooled to match the temperature change in the calorimeter proper.

3.5
accuracy
closeness of agreement between an observation and the "true" value

Note 1 to entry: The accuracy of a result should not be confused with its precision. A result may be precise but it is only accurate when it is free of *bias* (3.18).

3.6
adventitious ash
DEPRECATED: extraneous ash
ash arising from *mineral matter* (3.136) associated with, but not inherent in a *coal* (3.39) or *coke* (3.42) sample

3.7
air-dried basis
means of expressing an analytical result based on the condition in which a *coal* (3.39) or *coke* (3.42) sample is in equilibrium with atmospheric humidity

3.8
air-drying
process of bringing the mass fraction of the sample near to equilibrium with the atmosphere, in the area in which further reduction of the sample are to take place

Note 1 to entry: The coal or coke sample in this state is composed of absorbed moisture, mineral matter and organic matter.

3.9
anthracite
coal (3.39) of high *rank* (3.174), with a low *volatile matter* (3.239) content and a semi-metallic lustre, and which does not soften or swell when heated

3.10
apparent relative density
ratio of the mass of a *coal* (3.39) (lump sample) to the mass of an equal volume of water (at the same temperature), inclusive of any voids within the fuel subjected to the test

Note 1 to entry: The apparent relative density should not be confused with the *bulk density* (3.25).

3.11
ash
residue obtained by incineration of a *coal* (3.39) or *coke* (3.42) sample under specified conditions

3.12
ash analysis
analysis of *ash* ~~(3.11)~~(3.11) for its elemental composition

Note 1 to entry: The elements usually determined are silicon, aluminium, iron, magnesium, manganese, titanium, calcium, sodium, potassium, phosphorus and sulfur, and these are usually expressed as oxides.

3.13
ash fusibility
characteristic physical state of the *ash* ~~(3.11)~~(3.11) obtained by heating under specified conditions

Note 1 to entry: Ash fusibility is determined under either *oxidizing atmosphere* ~~(3.61)~~(3.61) or *reducing atmosphere* ~~(3.176)~~(3.176) conditions.

Note 2 to entry: See also *deformation temperature* ~~(3.58),~~(3.58), *sphere temperature* ~~(3.215),~~(3.215), *hemisphere temperature* ~~(3.98)~~(3.98) and *flow temperature* ~~(3.75).~~(3.75).

3.14
ash viscosity
measure of the resistance to flow of *ash* ~~(3.11)~~(3.11) in the fused state

3.15
as received basis
as sampled basis
means of expressing an analytical result based on the condition where *total moisture* ~~(3.232)~~(3.232) is included

3.16
base/acid ratio
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* ~~(3.11)~~(3.11)

Note 1 to entry: This ratio can be used in the determination of the *fouling factor* ~~(3.81)~~(3.81) and the slagging factor.

3.17
batch
quantity of *coal* ~~(3.39)~~(3.39) or *coke* ~~(3.42)~~(3.42) produced at one time under relatively uniform conditions

3.18
bias
systematic *error* ~~(3.68)~~(3.68) which leads to the average value of a series of results being persistently higher or persistently lower than those obtained using a reference sampling method

Note 1 to entry: Bias is the total systematic error as contrasted to random error. There may be one or more systematic error components contributing to the bias. A larger systematic difference from the accepted reference value is reflected by a larger bias value.

3.19
bias of scale
bias (3.18)*bias* (3.18) that is constant and independent of the range of values measured

3.20
bituminous coal
general descriptive term for *coal* (3.39)(3.39) of *rank* (3.174)(3.174) between *anthracite* (3.9)(3.9) and *brown coal and lignite* (3.24)(3.24)

Note 1 to entry: 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 2 to entry: In some countries, coals of rank immediately below that of bituminous coal are referred to as sub-bituminous coals.

3.21
blast furnace coke
strong, *large coke* (3.116)(3.116) for use in blast furnaces

Note 1 to entry: Blast furnace coke is generally produced from blends of *bituminous coals* (3.20),(3.20), which may incorporate additives.

Note 2 to entry: Blast furnace coke usually has a low reactivity to carbon dioxide.

3.22
breakage
particle size reduction (3.155)(3.155) resulting from impact and/or compression

3.23
breeze
undersize after separating the smallest size of *graded coke* (3.91)(3.91)

Note 1 to entry: Breeze is usually less than 10 mm in size.

3.24
brown coal and lignite
coals (3.39)(3.39) of low *rank* (3.174)(3.174) characterized by high inherent moisture, high *volatile matter* (3.239)(3.239) and low calorific value

Note 1 to entry: In some countries, the terms are used to describe all low-rank coals up to *bituminous coals* (3.20).(3.20). In other countries, the coals at the higher end of the range are referred to as sub-bituminous coals.

3.25
bulk density
mass of a portion of a *coal* (3.39) or *coke* (3.42)(3.39) or *coke* (3.42) sample divided by the volume of the container which is filled by that portion under specified conditions

Note 1 to entry: Bulk density values can have range and may depend on previous handling, time and weather. The values on stockpiles can also vary from loose free fall situations to compacted filled by that portion under specified conditions.

3.26
bulk sample
sample of large mass, taken in a particular operation for a specific reason such as for *float sink analysis* ~~(3.78)~~(3.78)

3.27
caking of coal
property of *coal* ~~(3.39)~~(3.39) when heating without access of air to a plastic condition with formation of the connected non-volatile residue

3.28
caking index
measure of the caking power of a coal in terms of the *mechanical strength* ~~(3.132)~~(3.132) of the *coke* ~~(3.42)~~(3.42) obtained by carbonization, under specified conditions, of an intimate mixture of the *coal* ~~(3.39)~~(3.39) and standard *anthracite* ~~(3.9)~~(3.9)

3.29
calorific value gross at constant volume
absolute value of the specific energy of combustion, in joules, for unit mass of a *coal* ~~(3.39) or *coke* (3.42)~~(3.39) or *coke* (3.42) sample burned in oxygen in a calorimetric bomb under the conditions specified

Note 1 to entry: The products of combustion are assumed to consist of gaseous oxygen, nitrogen, carbon dioxide and sulfur dioxide, of liquid water (in equilibrium with its vapour) saturated with carbon dioxide under the conditions of the bomb reaction, and of solid ash, all at the reference temperature.

Note 2 to entry: Equipment such as Adiabatic and or Isothermal bomb calorimeters are used to determine this result.

3.30
calorific value net at constant volume
absolute value of the specific energy of combustion, in joules, for unit mass of the *coal* ~~(3.39) or *coke* (3.42)~~(3.39) or *coke* (3.42) sample burned in oxygen under conditions of constant volume and such that all the water of the reaction remains as water vapour (in a hypothetical state at 0,1 Mpa), the other products being as for the gross calorific value all at the reference temperature

Note 1 to entry: The net calorific value at constant volume is the negative value of the net specific energy of combustion.

3.31
calorific value net at constant pressure
absolute value of the specific heat (enthalpy) of combustion in joules, for unit mass of the *coal* ~~(3.39)~~(3.39) or *coke* ~~(3.42)~~(3.42) sample burned in oxygen at constant pressure under such conditions that all the water of the reaction products remains as water vapour (at 0,1 Mpa), the other products being as for the gross calorific value, all at the reference temperature

3.32
carbominerite
collective term for inter growths of minerals and *macerals* ~~(3.121)~~(3.121)

Note 1 to entry: The various types of carbominerite with their compositions are given in ~~Table 1.~~Table 1.

Table 1 — Types and compositions of carbominerite

Type	Volume fraction % 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.	

3.33
carbon in mineral matter
carbon in the mineral matter carbonates of a *coal* ~~(3.39)~~(3.39) or *coke* ~~(3.42)~~(3.42) sample

3.34
carboxyreactivity
rate of reaction of a *coal* ~~(3.39)~~(3.39) or *coke* ~~(3.42)~~(3.42) sample with carbon dioxide under specified conditions

3.35
channel sample
sample of raw *coal* ~~(3.39)~~(3.39) and associated inorganic material taken by removing a channel of even cross-section from the seam

Note 1 to entry: Where the full section of the seam is not accessible or not required, this term may refer to a sample taken either from a specifically defined portion of the seam, or from the floor to roof as mined or exposed.

3.36
char
solid, partially or non-agglomerated carbonaceous material produced by the pyrolysis of a *coal* ~~(3.39)~~(3.39) sample

3.37
chute
inclined trough for conveying *coal* ~~(3.39)~~(3.39) or *coke* ~~(3.42)~~(3.42) to a lower level

3.38
clinkering
aggregation of particles of *ash* ~~(3.11)~~(3.11) after it has melted during the course of combustion of *coal* ~~(3.39)~~(3.39) sample or during gasification

Note 1 to entry: The aggregated particles may include small amounts of unburnt *coal* ~~(3.39)~~.(3.39).

3.39
coal
combustible sedimentary rock formed from altered plant remains consolidated under superimposed strata

Note 1 to entry: 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* ~~(3.123)~~(3.123) compositions.

3.40
coalification
process by which accumulated plant matter is compacted and transformed into *coal* ~~(3.39)~~(3.39)

3.41
coefficient of variation
standard deviation ~~(3.216),~~(3.216), expressed as a percentage of the absolute value of the arithmetic mean

Note 1 to entry: to entry: $CV = \frac{s}{\bar{x}} \times = \frac{s}{\bar{x}} \times 100$

~~Value of the arithmetic mean $\bar{x}$~~

~~Value of Standard deviation s~~

where

- s is the value of standard deviation;
- $\bar{x}$ is the arithmetic mean;

Note 2 to entry: *CV* is normally denoted as *v*.

3.42
coke
solid, agglomerated carbonaceous residue produced by the pyrolysis of *coal* ~~(3.39)~~(3.39) in the absence of air

3.43
coke reactivity index
CRI ~~(3.4.3)~~ test
~~Mass~~mass fraction loss, expressed as a percentage of *coke* ~~(3.42)~~(3.42) after reaction with carbon dioxide and carbon monoxide under specified conditions

3.44
coke strength after reaction
CSR
strength of *coke* ~~(3.42)~~(3.42) after reaction with carbon dioxide and carbon monoxide in the *CRI* ~~(3.43)~~(3.43) test, measured as mass fractions expressed as a percentage retained on either a 10,0 mm or a 9,5 mm sieve after tumbling under specified conditions

3.45
combustible matter
theoretical state of *coal* ~~(3.39)~~(3.39) or *coke* ~~(3.42)~~(3.42) without moisture and *mineral matter* ~~(3.136)~~(3.136) other than *pyritic sulfur* ~~(3.170)~~(3.170) and sulfidic sulfur

3.46
combustible sulfur
sulfur which reacts with oxygen when a *coal* ~~(3.39)~~(3.39) or *coke* ~~(3.42)~~(3.42) sample is burnt under specified controlled conditions

Note 1 to entry: Most of the reacted sulfur reports as SO_2 in the chimney gas, but under certain conditions, some of the sulfur is captured by alkaline minerals in the ash

3.47
common sample
sample collected for more than one intended use

3.48
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

3.49
constant mass division
method of increment or *sample division* ~~(3.194)~~(3.194) in which the portions retained from individual *increments* ~~(3.106)~~,(3.106), *partial samples* ~~(3.153)~~(3.153) or *gross samples* ~~(3.94)~~(3.94) are of uniform mass

3.50
continuous sampling
taking of a sample from each consecutive *sub-lot* ~~(3.221)~~(3.221) so that *increments* ~~(3.106)~~(3.106) are taken at uniform intervals whenever the *coal* ~~(3.39)~~(3.39) or *coke* ~~(3.42)~~(3.42) is handled at the point of sampling

3.51
correlation coefficient
measure of the degree of correlation between the members of paired sets

3.52
core sample
cylindrical sample of the whole or part of a *coal* ~~(3.39)~~(3.39) seam obtained from drilling using a coring barrel

Note 1 to entry: The diameter of the core may vary from 50 mm to 1000 mm depending on the reason for which the sample is required. However, 50 mm to 200 mm is the most common core diameter range.

3.53
crucible swelling number
CSN
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* ~~(3.39)~~(3.39) is heated in a covered crucible under specified conditions

Note 1 to entry: ASTM Standards use the term free swelling index (FSI) for this test.

3.54
crush (verb)
action of reducing the particle size of a sample to produce particles at the required *nominal top size* ~~(3.144)~~(3.144) required