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Solid mineral fuels — 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

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Contents

Page

Foreword

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

This second edition cancels and replaces the first edition (ISO 1213-2:1992), which has been technically revised.

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

1 Scope

This document 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

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

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
total mass lost by the *abrasion* (3.1) of four carbon steel blades when rotated in a specified mass of a solid mineral fuel under specified conditions

Note 1 to entry: Expressed in milligrams of metal lost per kilogram of solid mineral fuel.

3.3
abrasion value
resistance to *abrasion* (3.1) of the *coke* (3.42) after reaction with carbon dioxide in the CRI test, measured as the 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 solid mineral fuel

3.7
air-dried basis
means of expressing an analytical result based on the condition in which a solid mineral fuel is in equilibrium with atmospheric humidity

3.8
air-drying
process of bringing the moisture content 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 solid mineral fuel 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 fuel (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 solid mineral fuel under specified conditions

3.12
ash analysis
analysis of *ash* (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) obtained by heating under specified conditions

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

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

3.14
ash viscosity
measure of the resistance to flow of *ash* (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) 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)

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

3.17
batch
quantity of a solid mineral fuel produced at one time under relatively uniform conditions

3.18
bias
systematic *error* (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) that is constant and independent of the range of values measured

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

Note 1 to entry: Blast furnace coke is generally produced from blends of *bituminous coals* (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) resulting from impact and/or compression

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

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

3.24
brown coal and lignite
coals (3.39) of low *rank* (3.174) characterized by high inherent moisture, high *volatile matter* (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). 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 solid mineral fuel 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)

3.27
caking of coal
property of *coal* (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) of the *coke* (3.42) obtained by carbonization, under specified conditions, of an intimate mixture of the *coal* (3.39) and standard *anthracite* (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 solid fuel 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 fuel 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 fuel 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)

Note 1 to entry: 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.

3.33
carbon in mineral matter
carbon in the mineral matter carbonates of a solid mineral fuel

3.34
carboxyreactivity
rate of reaction of a solid mineral fuel with carbon dioxide under specified conditions

3.35
channel sample
sample of raw *coal* (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 solid mineral fuels

3.37
chute
inclined trough for conveying solid mineral fuel to a lower level

3.38
clinkering
aggregation of particles of *ash* (3.11) after it has melted during the course of combustion of a solid mineral fuel or during gasification

Note 1 to entry: The aggregated particles may include small amounts of unburnt solid mineral fuel.

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) compositions.

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

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

$$CV = \frac{s}{\bar{x}} \times 100\ \%$$

where *CV* is normally denoted as *v*.

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

3.43
coke reactivity index
CRI
percentage weight loss of *coke* (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) after reaction with carbon dioxide and carbon monoxide in the CRI test, measured as the 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 a solid mineral fuel without moisture and *mineral matter* (3.136) other than *pyritic sulfur* (3.170) and sulfidic sulfur

3.46
combustible sulfur
sulfur which reacts with oxygen when a solid mineral fuel 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) in which the portions retained from individual *increments* (3.106), *partial samples* (3.153) or *gross samples* (3.94) are of uniform mass

3.50
continuous sampling
taking of a sample from each consecutive *sub-lot* (3.221) so that *increments* (3.106) are taken at uniform intervals whenever the fuel 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 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) 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) required

Note 1 to entry: See also grind (3.93).

3.55
cut coke
screened *coke* (3.42) from which the oversize has been reduced by mechanical means and rescreened

3.56
cutter
mechanical sampling device which extracts *increments* (3.106)

3.57
deformation interval
softening interval
interval between the *deformation temperature* (3.58) and the *hemisphere temperature* (3.98)

3.58
deformation temperature
temperature at which deformation of a test piece prepared from *ash* (3.11), by a specified procedure, occurs

Note 1 to entry: When using cylindrical (or cubicoidal) test pieces, a change of the surface and the rounding of the edges at the rim or corner.

Note 2 to entry: When using pyramidal test pieces, the rounding of the tip of the test piece. Shrinkage or distortion of the test piece, or rounding of cracks and fins, are not criteria for deformation and should be ignored if the tip and edges remain sharp.

3.59
dial divisions per minute
ddpm
measure of stirrer rotation rate, in the Gieseler Plastometer method

Note 1 to entry: There are 100 dial divisions for each full 360° rotation of the stirrer. The *fluidity* (3.77) result is expressed as total dial division turned by the stirrer in a one-minute time period

3.60
dilatation
measure of the volume change produced by heating a *coal* (3.39) through its *plastic range* (3.162) under specified conditions

Note 1 to entry: Similar tests with their own specified conditions have been developed historically, including Audibert-Arnu and the Ruhr Coal test.

3.61
dirt band
DEPRECATED: shale band
layer of *mineral matter* (3.136) lying parallel to the bedding plane in a seam of *coal* (3.39)

3.62
divided increment
part obtained from the division of the *increment* (3.106) in order to decrease its mass

Note 1 to entry: Such division may be done with or without prior size reduction.

3.63
dry ash-free basis
means of expressing an analytical result based on a hypothetical condition in which the solid mineral fuel is considered to be free from both moisture and *ash* (3.11)

3.64
dry basis
means of expressing an analytical result based on the condition in which the solid mineral fuel is free from moisture

3.65
dry mineral-matter-free basis
means of expressing an analytical result based on a hypothetical condition in which the solid mineral fuel is considered to be free from both moisture and *mineral matter* (3.136)

3.66
duplicate determination
determination of a characteristic on two portions of the same *test sample* (3.226) carried out by the same operator using the same apparatus but at different times

3.67
duplicate sampling
particular case of *replicate sampling* (3.185) with only two replicate samples

3.68
error
difference between the observation and the accepted reference value as defined in ISO 5725-1:1994

3.69
falling stream
stream of solid mineral fuel in free fall, for example, from the end of a conveyor

3.70
final fluidity temperature
temperature at which stirrer rotation rate reached 1 ddpm in the Gieseler Plastometer test

3.71
fixed carbon
remainder after the percentages of the moisture in the analysis sample, *ash* (3.11) and *volatile matter* (3.239) are subtracted from 100 reported on an air-dried basis

Note 1 to entry: Fixed carbon may also be calculated to different bases.

3.72
fixed mass division
method of *sample division* (3.194) in which the mass retained is predetermined and independent of the mass of the feed

3.73
fixed rate division
method of increment or *sample division* (3.194) in which the portions retained from individual *increments* (3.106), *partial samples* (3.153) or *gross samples* (3.94) have a mass proportional to the mass of the increment, partial sample or gross sample

Note 1 to entry: In fixed rate division, the mass of sample retained is a fixed proportion of the mass of the feed.

3.74
fixed sulfur
sulfur which is present in the solid residue (non-volatile) after the pyrolysis of a solid mineral fuel at a particular temperature

3.75
flow temperature
temperature at which a test piece, prepared from *ash* (3.11) by a specified procedure, loses its profile and flows to the extent that its height is one third of its height at the *hemisphere temperature* (3.98)

3.76
flattened-heap method
method of *sample division* (3.194) in which a sample is flattened and divided into identical rectangles and from each rectangle, one *increment* (3.106) is taken using a scoop and bump plate and combined into a divided sample

3.77
fluidity
measure of the viscosity of a *coal* (3.39) in its plastic state determined under specified conditions

3.78
float sink analysis
laboratory procedure for analysing raw coal samples, using organic and/or other high specific gravity solutions adjusted to various gravities to predict *ash* (3.11) levels and yield for coal product(s) and reject(s) in a coal preparation plant

3.79
formed coke
coke (3.42) specially prepared from *coal* (3.39) by processes involving the compaction of particles into a regularly shaped artefact

3.80
forms of sulfur
collective term for the *pyritic sulphur* (3.170), *sulfate sulfur* (3.222) and *organic sulfur* (3.149) in a solid mineral fuel

Note 1 to entry: For the purposes of this definition, elemental sulfur and monosulfides, which may be present in certain solid mineral fuels, are disregarded.

3.81
fouling factor
measure of the tendency of *ash* (3.11) to form sintered deposits in the convective zone of a furnace

3.82
fouling index
empirical estimate of the fouling propensity of coal ash

3.83
foundry coke
very strong, very large, dense *coke* (3.42) for use in foundry cupola furnaces

Note 1 to entry: It is prepared in coke ovens from selected coking coal blends, and may incorporate additives. Many cokes including foundry and *blast furnace cokes* (3.21) have several functions, provide carbon for reduction, heat to melt the metal, support the burden and finally aid permeability for passage of CO_2 and CO.

3.84
free moisture
moisture which is lost by the solid mineral fuel sample in attaining approximate equilibrium with the atmosphere to which it is exposed

Note 1 to entry: This term sometimes called surface moisture.

3.85
froth flotation laboratory test
laboratory procedure for the froth flotation testing of fine *coal* (3.39) less than 0,5 mm under specified conditions

3.86
fuel
energy carriers intended for energy conversion such as *coal* (3.39) or *coke* (3.42)

3.87
fuel ratio
ratio of *fixed carbon* (3.71) to *volatile matter* (3.239) on the same basis of analysis

3.88
gas coke
coke (3.42)usually made from high volatile *bituminous coal* (3.20) at high temperature in gas making carbonization plants

3.89
general analysis
determination of the chemical and physical characteristics of a solid mineral fuel, other than the determination of *total moisture* (3.232)

3.90
general analysis test sample
sample, crushed to pass a sieve, of nominal size of 212 µm, complying with ISO 3310-1, used for the determination of most chemical and some physical characteristics of a solid mineral fuel

3.91
graded coke
coke (3.42) which has been screened between two specified sizes

3.92
Gray-King coke type
type, denoted by a letter, with a subscript in certain cases, which defines, by reference to a series of standard profiles, the size, strength and texture of the *coke* (3.42) residue obtained when a specified mass of *coal* (3.39) is heated in a retort tube under specified conditions

3.93
grind (verb)
DEPRECATED: mill (verb)
action of reducing the particle size of a sample to produce fine particles

3.94
gross sample
quantity of a solid mineral fuel consisting of all the *increments* (3.106) or *partial samples* (3.153) taken from a *sub-lot* (3.221), either in the condition as taken or after the increments have been individually reduced and/or divided

3.95
hand placing
operation by which an attempt is made to pass each particle of solid mineral fuel through a stationary sieve by presenting it to the sieve in all possible orientations but without the use of force

3.96
hand shaking
manual shaking
operation in which a sieve is held in the hands and is given a gentle horizontal oscillatory motion

3.97
hardgrove grindability index
measure of the grindability of a *coal* (3.39) determined by testing a specially prepared sample in standard apparatus

3.98
hemisphere temperature
temperature at which the height of a test piece, prepared from *ash* (3.11) by a specified procedure, is equal to half the width of the base, and its shape becomes approximately hemispherical

3.99
high temperature coke
solid, agglomerated carbonaceous residue of the pyrolysis of *coal* (3.39) at temperatures above 850 °C

3.100
humic acid
group of complex organic, amorphous compounds of high relative molecular mass occurring as free acids and as metal salts (humates) in *coal* (3.39), which can be extracted by a sodium hydroxide solution

3.101
huminite
group of medium grey *macerals* (3.121) having *reflectances* (3.177) generally between those of the associated darker *liptinites* (3.117) and the lighter *inertinites* (3.109)

3.102
hydrogen in mineral matter
hydrogen in the *water of constitution* (3.243) in the *mineral matter* (3.136) of a solid mineral fuel

3.103
hydroreactivity
rate of reaction of a solid mineral fuel with water vapour under specified conditions

3.104
hygroscopic moisture of brown coals and lignites
part of *total moisture* (3.232) which is retained by a brown coal or lignite after exposing it to the atmosphere and allowing it to attain a constant mass, at 20 °C ± 2 °C and (70 ± 5) % relative humidity

3.105
ignition temperature
minimum temperature at which a solid mineral fuel liberates enough *volatile matter* (3.239) to form, together with the surrounding atmosphere, a flammable mixture

3.106
increment
portion of *fuel* (3.86) extracted in a single operation of the sampling device

Note 1 to entry: For some types of sampling device, a single operation consists of a double pass (back and forth) through the stream.

3.107
inert (inorganic)
constituents of a solid mineral fuel which decrease its efficiency in a specific use

3.108
inert (organic)
maceral (3.121) components of a *coal* (3.39) which do not soften or swell during the process of carbonization

3.109
inertinite
maceral (3.121) group that comprises macerals whose *reflectance* (3.177) in low and medium-rank *coals* (3.39) and in sedimentary rocks of corresponding *rank* (3.174) is higher in comparison to the macerals of the *vitrinite* (3.241) and *liptinite* (3.117) groups

3.110
inherent ash
ash (3.11) arising from *mineral matter* (3.136) present in the original plant material from which the solid mineral fuel was formed and from mineral matter incorporated intimately in the solid mineral fuel during the *coalification* (3.40) process

3.111
intermittent sampling
taking of a sample from only certain *sub-lots* (3.221) of *fuel* (3.86)

3.112
irsid indices
percentages of a specially prepared sample of *coke* (3.42) remaining on a test sieve of 40 mm nominal size of openings (round hole) and passing a test sieve of 10 mm nominal size of openings (round hole), denoted by I_{40} and I_{10}, respectively, after the sample has been subjected to 500 revolutions by a specified procedure in a rotating drum

Note 1 to entry: Other indices, for example, I_{20}, may be reported in addition to, or in place of, I_{40} if required.

3.113
isoperibol calorimeter
isothermal type calorimeter that has a jacket of uniform and constant temperature

Note 1 to entry: These calorimeters have the inner chamber surrounded by a water jacket in which the temperature is maintained at ambient temperature. The outer jacket acts like a thermostat and the thermal conductivity of the interspace between the two chambers is kept as even as possible.

3.114
laboratory sample
sample prepared from the gross or *partial sample* (3.153) as delivered to the laboratory and from which further samples are prepared for test purposes

3.115
large coal
coal (3.39) above a specified lower limiting size, without any upper size limit

3.116
large coke
coke (3.42) with lower size of 20 mm and above, with or without upper size limit

3.117
liptinite
maceral (3.121) distinguished from other macerals by its lower reflectance

Note 1 to entry: Fluorescence properties have become an important secondary distinguishing feature.

Note 2 to entry: Liptinite macerals have a low reflectance and high hydrogen content until their properties converge with those of *vitrinite* (3.241).

3.118
lot
defined quantity of *fuel* (3.86) for which the overall quality is to be determined

Note 1 to entry: A lot may be divided into a number of *sub-lots* (3.221).

3.119
low temperature coke
solid, agglomerated carbonaceous residue of the pyrolysis of *coal* (3.39) at a temperature between 500 °C and 850 °C

3.120
lump section
piece of solid mineral fuel of size suitable for polishing and examination under the microscope

Note 1 to entry: One face of the lump section, usually that perpendicular to the bedding plane, is ground and polished.

3.121
maceral
smallest microscopically identifiable constituents of *coal* (3.39) and of fossil organic matter finely dispersed in sediments

3.122
maceral group
collective term for *macerals* (3.121) having broadly similar properties in a single *coal* (3.39) of specific *rank* (3.174)

Note 1 to entry: See Table 2.

Table 2 — Macerals as defined in the IC CP 1994 system

Maceral group	Maceral sub-group	Maceral		Maceral variety
Vitrinite/ huminite	Telovitrinite/ telohuminite	Telinite	Textinite	
		Collotelinite	Ulminite	
	Detrovitrinite/ detrohuminite	Vitrodetrinite	Attrinite	
		Collodetrinite	Densinite	
	Gelovitrinite/ gelohuminite	Corpogelinite	Corpohuminite	
		Gelinite	Gelinite	
Inertinite	Not sub-groups sensu stricto: (with plant cell structure)	Fusinite Semifusinite Funginite		
	(lacking plant cell structure)	Secretinite Macrinite Micrinite		
	(fragmented inertinite)	Inertodetrinite		
Note 1 to entry: Huminite maceral subgroups can be used synonymously with those from the vitrinite group. Huminite macerals, however, cannot be used synonymously with vitrinite macerals.				

Table 2 *(continued)*

Maceral group	Maceral sub-group	Maceral	Maceral variety
Liptinite		Cutinite Suberinite Sporinite	
		Resinite	
		Exsudatinite Chlorophyllinite	
		Alginite	Telalginite
			Lamalginite
		Liptodetrinite	
		Bituminite	
Note 1 to entry: Huminite maceral subgroups can be used synonymously with those from the vitrinite group. Huminite macerals, however, cannot be used synonymously with vitrinite macerals.			

3.123
microlithotype
naturally occurring *maceral* (3.121) or association of macerals with a minimum band width of 50 µm

Note 1 to entry: Microlithotypes are classified in one of three categories, namely, monomaceral, bimaceral and trimaceral microlithotypes, according to whether they contain significant proportions of macerals of one, two or three *maceral groups* (3.122). For the bimaceral and trimaceral microlithotypes, the proportion of an individual maceral group is more than 5 % by volume in each case.

Note 2 to entry: The classification of the main microlithotypes in *bituminous coal* (3.20) and anthracite and their maceral group compositions are given in Table 3.

Table 3 — Classification of the main microlithotypes

Microlithotype	Maceral-group composition (total greater than or equal to 95 % by volume, mineral-free basis)
Monomaceral	Vitrinite
Vitrite	Liptinite
Liptite	Inertinite
lnertite	
Bimaceral	Vitrinite + Liptinite
Cia rite	Inertinite + Liptinite
Durite	Vitrinite + Inertinite
Vitrinertite	
Trimaceral	Vitrinite + Liptinite + Inertinite
Trimacerite	

3.124
manual sampling
collection of *increments* (3.106) by human effort

3.125
mass based sampling
taking of *increments* (3.106), whereby the position of each increment to be collected from the stream of *fuel* (3.86) is measured by a mass interval of stream flow and the increment mass is fixed

Note 1 to entry: Each increment or *divided increment* (3.62) constituting the *partial sample* (3.153) or the *gross sample* (3.94) should be of almost uniform mass.

3.126
maximum fluidity
maximum rate of rotation for the stirring shaft in dial *divisions per minute* (3.59), in the Gieseler Plastometer test

3.127
maximum fluidity temperature
temperature at which the stirring shaft rotation reached the maximum rate in the Gieseler Plastometer test

3.128
maximum reflectance
highest value of *reflectance* (3.177) obtained when any polished section of a particle or lump of *coal* (3.39) is rotated in its own plane in linearly polarized light

3.129
mean size
weighted average particle size of any sample

3.130
mechanical sampling
taking of *increments* (3.106) by mechanical means

3.131
mechanical sampling system
operational mechanism and/or mechanical installation for taking *increments* (3.106) and *sample preparation* (3.195)

3.132
mechanical strength
measure of the strength of *coke* (3.42) by applying mechanical stresses in a rotating drum

3.133
melting interval
interval between the *hemisphere temperature* (3.98) and the *flow temperature* (3.75)

3.134
micum index
percentage of a specially prepared sample of *coke* (3.42) remaining on a test sieve of 40 mm nominal size of openings (round hole) and passing a test sieve of 10 mm nominal size of openings (round hole), denoted by M_{40} and M_{10}, respectively, after the sample has been subjected to 100 revolutions by a specified procedure in a rotating drum

Note 1 to entry: Other indices, e.g. M_{60} and M_{20}, may be reported if required.

3.135
milled coke
coke (3.42) reduced in size by milling (grinding) so that it will meet a *nominal top size* (3.144) of minus 212 µm with minimum fines

3.136
mineral matter
inorganic material, excluding moisture but including *water of constitution* (3.243), in a solid mineral fuel

Note 1 to entry: Mineral matter is calculated on a mass basis either from a direct determination at low temperature or from the ash yield at high temperature.

3.137
mineral sulfur
sum of the *pyritic sulfur* (3.170) and *sulfate sulfur* (3.222) in a solid mineral fuel

Note 1 to entry: For the purposes of this definition, elemental sulfur and monosulfides, which may be present in certain solid mineral fuels, are disregarded.

3.138
minerite
collective term for intergrowths of minerals with different *macerals* (3.121) where the proportion of the total *mineral matter* (3.136) is more than 60 % by volume or if more than 20 % by volume of sulfide minerals are present

3.139
moist
<ash-free basis> means of expressing an analytical result based on a hypothetical condition in which the solid mineral fuel is considered to be ash-free but with a moisture content equal to the *moisture-holding capacity* (3.141)

3.140
moist
<mineral-matter-free basis> means of expressing an analytical result based on a hypothetical condition in which the solid mineral fuel is considered to be mineral-matter-free but with a moisture content equal to the *moisture-holding capacity* (3.141)

3.141
moisture-holding capacity
moisture content of a solid mineral fuel in equilibrium with an atmosphere of 96 % relative humidity at a temperature of 30 °C determined under specified conditions

Note 1 to entry: Moisture holding capacity is also referred to as equilibrium moisture.

3.142
moisture in air-dried sample
moisture in the solid mineral fuel sample after it has attained approximate equilibrium with the atmosphere to which it is exposed

3.143
moisture in the general analysis sample
moisture content of the general analysis sample of a solid mineral fuel after it has attained approximate equilibrium with the atmosphere in the laboratory and which is removable under specified conditions

3.144
nominal top size
smallest sieve in the *range* (3.173) included in the R 20 series on which not more than 5 % of the sample is retained

Note 1 to entry: See ISO 565, square hole.

Note 2 to entry: See also *top size*, *upper size* (3.229).

3.145
off-line sample preparation
sample preparation (3.195) performed manually or by mechanical equipment not integral with the *mechanical sampling system* (3.131)

3.146
on-line sample preparation
sample preparation (3.195) by mechanical equipment integral with the sampling system

3.147
organic coal substance
part of a *coal* (3.39) which contains all of the organically combined carbon, hydrogen, nitrogen, oxygen and sulfur.

Note 1 to entry: Also includes other organically combined elements in plant tissue such as calcium, magnesium, iron, phosphorus, potassium and some trace elements.

3.148
organic hydrogen
hydrogen in the organic matter of a solid mineral fuel

3.149
organic sulfur
sulfur which is bound in the organic matter of a solid mineral fuel

3.150
outlier
result which meets statistical criteria identifying it as an outlier, using, for example, Cochran's maximum variance test, and for which there is direct physical evidence of causation by gross deviation from the prescribed experimental procedure

3.151
oxidizing atmosphere
gaseous medium consisting of oxygen, air, carbon dioxide, water vapour or a mixture of these, irrespective of the proportions used

3.152
oxyreactivity
rate of reaction of a solid mineral fuel with oxygen under specified conditions

3.153
partial sample
sample representative of a part of the whole *sub-lot* (3.221), constituted in order to prepare *laboratory samples* (3.114) or *test samples* (3.226)

Note 1 to entry: A partial sample may be obtained by combining all increments from a *sub-lot* (3.221) into two or more sets, each set being composed of consecutive increments, the number of which need not be the same in all sets.

3.154
particle size
size of the sieve opening in which the particle is retained (i.e. does not pass)

Note 1 to entry: This may refer to sieves with round or square shaped holes. The shape of the holes shall be stated.

3.155
particle size reduction
process of crushing or grinding the sample to reduce the *particle size* (3.154)

3.156
particulate block
solid block consisting of particles of crushed *coal* (3.39) representative of the sample, bound in resin, cast in a mould and with one face ground and polished

3.157
pass
<in sample division> passage of an *increment* (3.106) or a sample once through a sample divider

3.158
petrography
description of the macroscopic and microscopic characteristics of rocks including *fuels* (3.86) and also including the textures and composition of the individual constituents and their classification and assessment

Note 1 to entry: In its narrower sense, petrography covers the microscopic examination analysis and measurement of coal and coke.

3.159
petroleum coke
solid agglomerated product consisting principally of carbon, obtained most often by thermal cracking of materials derived from petroleum

3.160
physical sample
sample taken specifically for the determination of physical characteristics, e.g. *size analysis* (3.205) or strength indices

3.161
pillar sample
section of a seam taken in the form of a block or series of blocks of *coal* (3.39) with associated inorganic rock which when arranged in correct vertical sequence, represent a true section of the seam

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

3.162
plastic range
difference between the initial softening temperature and the *solidification temperature* (3.214), in the Gieseler Plastometer test

3.163
ply sample
sample taken from an individual ply or leaf or from a series of plies or leaves of a coal seam

3.164
porosity of coke
ratio of the volume of the voids within a piece of *coke* (3.42) to its apparent volume

Note 1 to entry: It is the difference between the *true relative density* (3.236) and the *apparent relative density* (3.10) of a sample of coke expressed as a proportion of the true relative density.

3.165
post reaction strength
measure of the residual strength of a *coke* (3.42) after it has been subjected to a *reactivity* (3.175) test

3.166
precision
closeness of agreement between independent test results obtained under stipulated conditions

Note 1 to entry: It is often defined using an index of precision, such as two standard deviations.

Note 2 to entry: A determination may be made with great precision, and the standard deviation of a number of determinations on the same sampling unit may therefore be low, but the results will be accurate only if they are free from *bias* (3.18).

3.167
primary increment
increment (3.106) taken at the first stage of sampling, prior to any *sample division* (3.194) and/or *sample reduction* (3.196)

3.168
production seam profile sample
sample taken from the section of the seam being worked

3.169
proximate analysis
analysis of a solid mineral fuel reported in terms of moisture in the analysis sample, *volatile matter* (3.239), *ash* (3.11) and *fixed carbon* (3.71)

Note 1 to entry: Analysis carried out on equilibrated samples crushed to minus 212 µm, such as the general analysis test sample (3.90) and or individual *sub-lot* (3.221) samples, lot samples, etc.

3.170
pyritic sulfur
sulfur present in the *mineral matter* (3.136) of a solid mineral fuel as pyrite or marcasite

3.171
random error
error (3.68) that is statistically independent of previous errors

Note 1 to entry: This implies that any two errors in a series of random errors are uncorrelated, and that individual errors are unpredictable in consequence of the partitioning of error into systematic (bias) and random components. The theoretical mean of the random errors is zero. Whereas individual errors are unpredictable, the mean of the random errors in a series of observations tends towards zero as the number of observations increases.

3.172
random reflectance
microscopically determined *reflectance* (3.177) of the polished surface of a *maceral* (3.121) (usually vitrinite) determined in non-polarized white light at 546 nm

3.173
range
difference between the greatest and least values of a number of observations

3.174
rank
position of a *coal* (3.39) in the *coalification* (3.40) series indicating maturity in terms of chemical and physical properties

Note 1 to entry: Higher rank coals are of greater maturity.

3.175
reactivity
rate of reaction of a solid mineral fuel with a given agent under specified conditions

Note 1 to entry: See also carboxyreactivity (3.34), hydroreactivity (3.103) and oxyreactivity (3.152).

3.176
reducing atmosphere
gaseous medium consisting of methane, carbon monoxide, hydrogen or a mixture of these, irrespective of the proportions used

3.177
reflectance
percentage of the normal incident light reflected from a polished surface

Note 1 to entry: In the context of organic *petrography* (3.158), reflectance refers to the microscopically determined percentage of incident white light reflected from the polished surface of macerals (usually vitrinite) under oil immersion at 546 nm.

3.178
reflectance standard
polished surface of a material of known *reflectance* (3.177) which is used for calibrating reflectance measuring equipment

Note 1 to entry: It is essential that the reflectance standard meets stringent requirements with regard to the properties of the material of which it is composed, and the way in which it is mounted and prepared.

3.179
relative density of the analysis sample
ratio of the mass of a volume of a representative sample, ground to pass a 212 µm aperture sieve, to the mass of an equal volume of water at the same temperature

3.180
repeatability
precision (3.166) under *repeatability conditions* (3.181)

3.181
repeatability conditions
conditions where independent observed values or test results are obtained with the same method on identical test material in the same laboratory by the same operator using the same equipment within short intervals of time

3.182
repeatability critical difference
value less than or equal to which the absolute difference between two final values, each representing a series of observed values or test results obtained under *repeatability conditions* (3.181), may be expected to be, with a specified probability

Note 1 to entry: Examples of final values are the mean and the median of the series of observed values or test results. The series itself may consist of only one single observation.

3.183
repeatability limit
value less than or equal to which the absolute difference between two single observed values or test results obtained under *repeatability conditions* (3.181) may be expected to be, with a probability of 95 %

Note 1 to entry: The symbol used is γ.

Note 2 to entry: The repeatability limit corresponds to the *repeatability critical difference* (3.182) for two single observed values or test results and a probability of 95 %.

3.184
repeatability standard deviation
standard deviation (3.216) of observed values or test results obtained under *repeatability conditions* (3.181)

Note 1 to entry: It is a measure of the dispersion of the distribution of observed values or test results under repeatability conditions.

Note 2 to entry: Similarly, "repeatability variance" and "repeatability coefficient of variation" could be defined and used as measures of the dispersion of observed values or test results under repeatability conditions.

3.185
replicate sampling
taking from the *sub-lot* (3.221) of *increments* (3.106) which are combined in rotation into different containers to give two or more samples of approximately equal mass, each being representative of the whole *sub-lot* (3.221)

Note 1 to entry: See also duplicate sampling (3.67).

3.186
reproducibility
precision (3.166) under *reproducibility conditions* (3.187)

3.187
reproducibility conditions
conditions where observed values or test results are obtained with the same method on identical test material in different laboratories with different operators using different equipment

3.188
reproducibility critical difference
value less than or equal to which the absolute difference between two final values, each representing a series of observed values or test results obtained under *reproducibility conditions* (3.187), may be expected to be, with a specified probability

Note 1 to entry: Examples of final values are the mean and the median of the series of observed values or test results. The series itself may consist of only one single observation.

3.189
reproducibility limit
value less than or equal to which the absolute difference between two single observed values or test results obtained under *reproducibility conditions* (3.187) may be expected to be, with a probability of 95 %

Note 1 to entry: The symbol used is *R*.

Note 2 to entry: The reproducibility limit corresponds to the *reproducibility critical difference* (3.188) for two single observed values or test results and a probability of 95 %.

3.190
reproducibility standard deviation
standard deviation (3.216) of observed values or test results obtained under *reproducibility conditions* (3.187)

Note 1 to entry: It is a measure of the dispersion of the distribution of observed values or test results under reproducibility conditions.

Note 2 to entry: Similarly, "reproducibility variance" and "reproducibility coefficient of variation" could be defined and used as measures of the dispersion of observed values or test results under reproducibility conditions.

3.191
riffle
non-mechanical divider in which the material is divided by means of alternate parallel slots, each of the same width, feeding into two opposite and separate containers

Note 1 to entry: Care is taken in distributing the feed evenly so that all slots have an equal chance in the division. Closed types with holding hoppers and gate mechanisms to smooth the feed to the riffle are recommended.

3.192
sample (noun)
portion taken from a *lot* (3.118) or *sub-lot* (3.221) to be representative of it with regard to the characteristic to be investigated

3.193
sample (verb)
process of taking a portion of a material which is representative of the whole

3.194
sample division
process in *sample preparation* (3.195) whereby the sample is divided into separate representative portions, one or more of which is retained

3.195
sample preparation
process of bringing samples to the condition required for analysis or testing

Note 1 to entry: Sample preparation covers mixing, sample division, particle size reduction and sometimes air drying of the sample and may be performed in several stages.

3.196
sample reduction
process in *sample preparation* (3.195) whereby the *particle size* (3.154) of the sample is reduced by *crushing or grinding* (3.54)

3.197
sampling frame
parallel-sided frame used for taking a stopped-belt increment of a *fuel* (3.86)

Note 1 to entry: The distance between the parallel sides of the frame should be not less than 3,0 times the nominal top size of the solid mineral fuel.

3.198
sapoznikov
Russian method of determining plastometric parameters such as "y" plastic thickness and "x" plastometric shrinkage.

Note 1 to entry: See GOST 1186-87.

3.199
seam section
sample of a coal seam taken from roof to floor, either as one representative mass or split into a number of subsections of different qualities

3.200
segregation
accidental separation of particles of different physical characteristics

Note 1 to entry: It takes place when fuel particles are in motion which have differences in size, shape, moisture and electrostatic properties.

3.201
shale
generic term for certain fine-grained sedimentary rocks, commonly occurring as an impurity in coal seams

Note 1 to entry: This term should not be used as a general term for washery rejects.

3.202
shatter index
percentage of a specially prepared sample of *coke* (3.42) remaining on a test sieve of stated size of openings after the sample has been subjected to a specified dropping test

3.203
sieving test machine
machine designed to simulate the *hand shaking* (3.96) procedure specified in the method for carrying out a *size analysis* (3.205)

3.204
silica ratio
ratio of the mass of silica to the total mass of silica, iron(III) oxide, calcium oxide and magnesium oxide in *ash* (3.11)

Note 1 to entry: It is expressed as a percentage.

Note 2 to entry: This ratio gives an indication of the refractoriness of the ash and the tendency to form slag.

3.205
size analysis
DEPRECATED: sieve analysis
process or the result of the separation of a sample into *size fractions* (3.209) with defined limits, the proportions of the fractions being expressed as percentages of the total sample

3.206
size analysis sample
sample taken specifically for *particle size* (3.154) analysis.

3.207
sized coal
DEPRECATED: graded coal
coal (3.39) which has been screened between two specified sizes

3.208
size distribution
DEPRECATED: size consist
proportions of various *particle sizes* (3.154) in a product

3.209
size fraction
part of the sample belonging to a specified *size range* (3.210) limited by either one or two sieve sizes

3.210
size range
top size (3.229) (upper-size) and the bottom size (lower size) of a solid mineral fuel

3.211
slagging factor
measure of the tendency of *ash* (3.11) to form fused deposits in the radiant zone of a furnace

3.212
small coal
DEPRECATED: smalls
coal (3.39) with a specified *nominal top size* (3.144) but with no lower size limit

Note 1 to entry: The nominal top size is usually between 50 mm and 4 mm.

3.213
small coke
coke (3.42) with *nominal top size* (3.144) of 20 mm or smaller

3.214
solidification temperature
temperature at which the stirring shaft stops in the Gieseler Plastometer test

3.215
sphere temperature
temperature at which the height is equal to the width of the base in the Ash Fusion test

3.216
standard deviation
positive square root of the *variance* (3.238)

Note 1 to entry: This term is usually designated as σ.

3.217
stratified random sampling
taking of an *increment* (3.106) at random within the mass interval or time interval determined for mass basis sampling or *time basis sampling* (3.228), respectively

3.218
strip mixing and splitting method
method of *sample division* (3.194), in which splitting sections are taken using a *sampling frame* (3.197) from a strip of sample to be divided

Note 1 to entry: A single strip sample may often be regarded as being too small to guarantee that all horizons of the seam are adequately represented. However, a number of such samples may be taken to achieve better representativity in a variable seam.

3.219
strip sampling
sample similar to a *channel sample* (3.35) but smaller in cross section

3.220
struck levelling
method of levelling the surface of a solid mineral fuel in a container when determining *bulk density* (3.25), whereby a straight edge is slid across the top of the container, any piece of solid mineral fuel which touches the straight edge being removed

3.221
sub-lot
part of a *lot* (3.118) for which a test result is required

Note 1 to entry: There may be two or more sub-lots per lot

3.222
sulfate sulfur
sulfur present in the *mineral matter* (3.136) of a solid mineral fuel as sulfate

3.223
sulfur in ash
sulfur which is present in the *ash* (3.11) after a solid mineral fuel is burnt under specified controlled conditions

3.224
systematic sampling
taking of *increments* (3.106) at equal intervals of time, space or mass over the whole *lot* (3.118) or *sub-lot* (3.221), the first increment being taken at random within the first such interval

3.225
test portion
quantity of material taken from the *test sample* (3.226) and used for one determination

3.226
test sample
sample which is prepared to meet the requirements of a specific test

3.227
thermal stability
dimensional stability of a solid mineral fuel heated under specified conditions

3.228
time basis sampling
taking of *increments* (3.106), whereby the position of each increment to be collected from the stream is measured by a time interval and the increment mass is proportional to the flow rate at the time the increment is taken

Note 1 to entry: Each increment or *divided increment* (3.62) constituting the partial sample or the *gross sample* (3.94) should be of a mass proportional to the flow rate of the solid mineral fuel stream at the time of taking the increment.

3.229
top size
upper size
size corresponding to the 5th percentile on the cumulative *size distribution* (3.208) curve of a material, i.e. the largest sieve size on which 5 % of the material is retained

3.230
total carbon
sum of the carbon in the organic matter and the carbon in the *mineral matter* (3.136) of a solid mineral fuel

3.231
total hydrogen
sum of the *organic hydrogen* (3.148), the hydrogen in the *mineral matter* (3.136) and the hydrogen in the moisture of a solid mineral fuel

3.232
total moisture
moisture in the solid mineral fuel as sampled, and removable under specified conditions

3.233
total moisture sample
sample taken specifically for the determination of *total moisture* (3.232)

3.234
total oxygen
sum of the oxygen in the organic matter, the oxygen in the *mineral matter* (3.136) and the oxygen in the moisture of a solid mineral fuel

3.235
total sulfur
sum of mineral and *organic sulfur* (3.149) in a solid mineral fuel

3.236
true relative density
ratio of the mass of a sample of dry solid mineral fuel ground to pass a 212 µm sieve to the mass of an equal volume of water (at a specified temperature)

3.237
ultimate analysis
analysis of a solid mineral fuel reported on an air-dried basis in terms of its carbon, hydrogen, nitrogen, sulfur and *ash* (3.11)

Note 1 to entry: Moisture in the analysis sample and oxygen by difference. May also be reported on other basis such as dry ash free basis.

Note 2 to entry: This definition includes hydrogen and oxygen present in the water of constitution of the mineral matter associated with the coal substance and carbon and oxygen present in mineral carbonates.

Note 3 to entry: Oxygen is usually reported by difference and calculated on an air-dried basis by the sum of carbon, hydrogen, nitrogen, sulfur, ash and moisture in the analysis sample expressed as percent mass fraction subtracted from 100.

3.238
variance
measure of dispersion, which is the sum of the squared deviations of observations from the average divided by one less than the number of observations

Note 1 to entry: This term is usually designated as *V*.

3.239
volatile matter
loss in mass, corrected for moisture, when a solid mineral fuel is heated out of contact with air under specified conditions

3.240
volatile sulfur
sulfur liberated among the volatile products in the pyrolysis of a solid mineral fuel

3.241
vitrinite
designates a group of *macerals* (3.121) whose colour is grey and whose *reflectance* (3.177) is generally between that of the associated darker *liptinites* (3.117) and lighter *inertinites* (3.109) over the rank range in which the three respective *maceral groups* (3.122) can be readily recognized

3.242
washed coal
coal (3.39) which has been treated by a wet cleaning process

3.243
water of constitution
water chemically bound to the *mineral matter* (3.136) and remaining after the determination of *total moisture* (3.232)

3.244
zero standard
non-reflecting standard used for calibrating reflectance-measuring equipment

Bibliography

[1] ISO 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

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

Alphabetical index