

Australian Standard[®]

Coal and coke—Glossary of terms

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Australasian Institute of Mining and Metallurgy
Australian Institute of Energy
Australian Mining Industry Council
Australian Chamber of Commerce and Industry
Australian Coal Association
Australian Coal Industry Research Laboratories
Australian Coal Preparation Society
Bureau of Steel Manufacturers of Australia
CSIRO, Division of Coal and Energy Technology
Department of Minerals and Energy, Queensland
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OF

AS 2418—1995

Coal and coke—Glossary of terms

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The following are represented on Technical Committee MN-001:

Australasian Institute of Mining and Metallurgy
Australian Coal Association
Australian Coal Industry Reference Samples
Australian Coal Preparation Society
Bureau of Steel Manufacturers of Australia
Coalfield Geology Council of NSW
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NOTES

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PREFACE

This Standard was prepared by the Standards Australia Committee on Coal and Coke, as a revision of AS 2418.

The following Standards are superseded by this Standard:

AS

2418 Glossary of terms relating to solid mineral fuels

2418.1 Part 1: Terms relating to coal preparation

2418.2 Part 2: Terms relating to coal mining and geology

2418.3 Part 3: Terms relating to brown coal

2418.4 Part 4: Terms relating to sampling, sample preparation, analysis, testing and statistics

2418.5 Part 5: Terms relating to the petrographic analysis of bituminous coal and anthracite (hard coal)

2418.6 Part 6: Terms relating to coal utilization and coke

2418.7 Part 7: Terms relating to coal classification

A list of referenced and related documents is presented in Appendix A.

Where two-word terms consist of a noun and an adjective, the definition is provided with the noun, and a reference is made with the adjective; this philosophy is not used if the two words are never used separately.

Non-preferred terms are given in light typeface.

The particular coal discipline in which the term is used is presented in the column headed 'Used in'. The following legend is used in this column:

AT = analysis and testing

CF = coal flow

CK = coke

CL = coal classification

CP = coal preparation

LR = lower rank coal

MG = coal mining and geology

PT = petrography

SP = sampling and sample preparation

UT = coal utilization

A list of symbols used for terms defined in this Standard is presented in Appendix B.

The objective of this Standard is to provide users with an indication of what is generally understood in an Australian context by the terms that are commonly encountered in the coal industry.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the Appendices to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is for information and guidance only.

Originated in part as AS K140—1966.

Previous edition AS 2418.1—1980, AS 2418.2—1982, AS 2418.3—1982,

AS 2418.4—1982, AS 2418.5—1982, AS 2418.6—1982 and AS 2418.7—1982.

Revised and redesignated AS 2418—1995.



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STANDARDS AUSTRALIA

Australian Standard

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A

Term	Used in	Explanation
abrasion index	AT; UT	An index calculated from the mass lost by abrasion of four standard metal blades, when rotated in a standard mass of coal under specified conditions (<i>see</i> AS 1038.19). Symbol: <i>AI</i>
absolute deviation	AT	<i>See</i> deviation, absolute.
accuracy, sampling	SP	A measure of the closeness with which a sample represents the coal or coke from which it is taken.
accuracy of a method	AT	A measure of the ability of a method to provide a true value.
accuracy of a result	AT	The closeness of agreement between an experimental result and the true value. The accuracy of a result is not to be confused with its precision. A determination may be made with great precision, so that the standard deviation of a number of determinations on the same consignment of coal or coke may therefore be low, but the results will be accurate only if they are free from bias.
action, integral	CP	The action of a control element whose output signal changes at a rate that is proportional to the change of input with respect to time.
action, proportional	CP	The action of a control element having an output signal proportional to its input signal.
activating agent	CP	<i>See</i> activator.
activator	CP	A substance that when added to a pulp promotes flotation in the presence of a collecting agent.
active stockpile	CP	<i>See</i> stockpile.
actual performance curve	CP	<i>See</i> performance curve, actual.

Term	Used in	Explanation
actuator	CP	In a control system, the final item which adjusts the setting of the controlled variable in accordance with instructions received from the controller.
adaptive control system	CP	<i>See</i> control system, adaptive.
adit	MG	A nearly horizontal tunnel opening for access, drainage or ventilation of a mine.
adventitious ash	AT; CP	<i>See</i> ash, adventitious.
adventitious minerals	LR; PT	<i>See</i> minerals, adventitious.
aeration	CP	The introduction of air into the pulp in a flotation cell to form air bubbles.
agent, activating	CP	<i>See</i> activator.
agglomeration	CP	A process in which small particles are caused to adhere to one another. <i>See also</i> nodulizing.
agitator	CP	A device used to bring about a continuous vigorous disturbance in a pulp; frequently used to assist bubble formation.
air classification	CP	<i>See</i> classification, air.
air compressor	CP	<i>See</i> compressor, air.
air-dry basis	AT	A basis for reporting coal analyses, in which the analytical sample is spread out and conditioned through exposure for sufficient time that its moisture content comes into equilibrium with the humidity of the laboratory atmosphere. This is normally the condition of the sample as analysed. Symbol: ad
air-dry coal, moisture in	AT	<i>See</i> moisture in air-dry coal.
air-dry moisture	AT; CP; LR	<i>See</i> moisture in the analysis sample
air-dry sample, moisture in	AT	<i>See</i> moisture, residual.
air jig	CP	<i>See</i> jig, air.
air valve, jig	CP	The valve that controls the alternate admission and release of compressed air to each cell of a jig.

Term	Used in	Explanation
air valve, rotary	CP	A jig air valve that rotates on a central axis.
alarm	CP	A visual or audible signal to attract human attention to a condition or state.
allochthonous coal	PT	<i>See</i> coal, allochthonous .
ammoniacal liquor	UT	<i>See</i> liquor, ammoniacal .
amplifier	CP	A device for controlling power from a source so that more is available at the output than is supplied at the input. Power source examples are electrical, mechanical, hydraulic and pneumatic.
amplitude	CP	The maximum displacement from the mean position in an oscillating motion. In the case of a screen having a straight line motion or elliptical motion, it is half of the total movement or half of the major axis of the ellipse; in the case of a circular motion, it is the radius of the circle. <i>See also</i> stroke (mechanical).
analogue computer	CP	<i>See</i> computer, analogue .
analysis	AT	A quantitative statement of the experimentally determined physical and chemical characteristics of coal or coke. Alternatively, the procedure for making such determinations.
analysis, ash	AT; CP; UT	Determination of the inorganic constituents present in coal ash or coke ash, usually expressed as oxides (<i>see</i> AS 1038.14.1 and AS 1038.14.2).
analysis, ash fusibility	AT; UT	Measurement, in terms of temperature, of the state of fusion of coal ash or coke ash prepared and tested under standard conditions (<i>see also</i> deformation temperature, sphere temperature, hemisphere temperature and flow temperature). <i>See also</i> AS 1038.15.
analysis, duplicate	AT	Separate determinations of the same property on two test portions of coal or coke taken from the same analysis sample.

Term	Used in	Explanation
analysis, float-and-sink	AT; CP	The division of a sample into relative density fractions having defined limits, the proportions of the fractions being expressed as mass percentages of the total sample, commonly with an indication of the ash percentage (and other characteristics, if required) of each fraction (<i>see</i> AS 4156.1).
analysis, particle size	AT; CP	The division of a sample into particle size fractions having defined limits, the proportions of the fractions being expressed as percentages of the total sample (e.g. mass percentage or number percentage).
analysis, petrographic	AT; PT	The description, classification and assessment of the macroscopic and microscopic constituents of coal, and the textures and composition of the individual constituents (<i>see</i> AS 2856).
analysis, proximate	AT; CP	The analysis of coal or coke in terms of moisture, volatile matter, ash and fixed carbon. In the case of coke, the term 'residue' is used instead of fixed carbon (<i>see</i> AS 1038.3 <i>and</i> AS 1038.4).
analysis, quantitative micropetrographic	LR	The determination of the concentrations of microscopic constituents of coal. The maceral or microlithotype classifications of coal are most commonly used. These determinations are based on a point-count system of analysis.
analysis, release	AT; CP	A procedure employed in the laboratory to determine the best results possible in cleaning a coal by froth flotation.
analysis, sieve	AT; CP	Determination of the particle size analysis of a particular material by the use of standard sieves (<i>see</i> AS 3881 <i>and</i> AS 1038.18).
analysis, ultimate	AT	Analysis of coal or coke in terms of carbon, hydrogen, nitrogen, sulfur and oxygen (normally determined by difference) (<i>see</i> AS 1038.6.1, AS 1038.6.2, AS 1038.6.3.1, AS 1038.6.3.2, AS 1038.6.3.3, AS 1038.7, AS 1038.16 <i>and</i> AS 2434.6.1).
analysis sample	AT; SP	<i>See</i> sample, analysis .

Term	Used in	Explanation
analysis sample, moisture in the	AT; CP; LR	<i>See</i> moisture in the analysis sample .
angle, contact	CP	<i>See</i> contact angle .
angle of reclaim	CP	<i>See</i> reclaim, angle of .
angle of repose	CP	<i>See</i> repose, angle of .
anisotropic	MG	Having different physical properties when measured in different directions.
anisotropy	MG	Property of a substance having different physical properties when measured in different directions.
anthracite	CL; PT	Coal of very high rank; in AS 2096, defined as having a volatile matter content of less than 8.0% (daf).
anticline	MG	A convex upward fold structure having older rocks in its core. The folded strata or layers are inclined downward from the axial plane.
aperture (size)	AT; CP	The dimension or dimensions defining the opening in the screening surface, usually with a qualification as to the shape of aperture, e.g. 'round-hole', 'square-mesh', 'long-slot', 'wedge-wire'.
aperture, mesh	AT	The dimension or dimensions of the aperture in a sieve, usually with a qualification as to the shape of aperture.
apparent density	AT; CP; LR	<i>See</i> density, particle .
apparent relative density	AT; CP	<i>See</i> relative density of lump sample .
apron feeder	CP	<i>See</i> feeder .
arithmetic mean	AT	<i>See</i> mean, arithmetic .
as-analysed basis	AT	The basis on which results obtained directly from the analysis of a coke sample are reported (<i>see</i> AS 1038.16). Symbol: aa
as-despatched basis	AT	<i>See</i> as-sampled basis . Symbol: as

Term	Used in	Explanation
as-fired basis	AT	<i>See as-sampled basis.</i> Symbol: as
as-received basis	AT	<i>See as-sampled basis.</i> Symbol: as
as-sampled basis	AT	The basis on which the result is not subject to any qualification and the analyses are reported for the sample having total moisture as sampled. Symbol: as
ash	AT; LR; PT	(a) <i>Analytical</i> The inorganic residue after the incineration of coal or coke to constant mass under standard conditions. In general, it differs in mass and composition from the original mineral matter. <i>See</i> AS 1038.3, AS 1038.4 <i>and</i> AS 2434.8.
	UT	(b) <i>Industrial</i> The residue of predominantly inorganic matter after the industrial combustion of coal or coke. NOTE: In the case of lower rank coals, ash can differ considerably from the mass and composition of the mineral matter in the coal and can also vary considerably depending on the combustion conditions and sampling procedure. Symbol: A
ash, adventitious	AT; CP	Ash arising from mineral matter that was not associated with the original plant material from which the coal was formed; this form of mineral matter can be removed readily by physical means.
ash, bottom	UT	The ash deposited in the bottom of a furnace as distinct from the fly-ash that is carried out with the products of combustion.
ash, extraneous	CP	Ash arising from that part of the mineral matter associated with but not inherent in coal.
ash, furnace	UT	A mixture of ash, unburned fuel, riddlings, and clinker resulting from the combustion of coal or coke, which collects in furnace bottoms, as distinct from fly-ash. <i>See also</i> ash, bottom .
ash, incremental	CP	<i>See</i> ash, instantaneous .

Term	Used in	Explanation
ash, inherent	AT; CP	Ash arising from finely dispersed mineral matter present in the original plant material or from which the solid mineral fuel was formed, or from mineral matter incorporated intimately in the solid mineral fuel during the coalification process.
ash, instantaneous	CP	The maximum ash percentage of any particle in any given relative density fraction mass.
ash analysis	AT; CP; UT	<i>See analysis, ash.</i>
ash curve, characteristic	CP	Any curve, obtained from the results of a float-and-sink analysis, that relates cumulative ash percentages to cumulative floats (or sinks) mass percentages. The cumulative ash percentage is plotted on the abscissa (horizontal axis) with the cumulative floats (or sinks) mass percentage plotted on the ordinate (vertical axis). Standard washability curves of this type are the cumulative-floats curve, the cumulative-sinks curve and the instantaneous (or incremental) ash curve. Yield-ash curves, for either total plant or individual separating device performance predictions, are also of this type.
ash curve, cumulative	CP	<i>See floats curve, cumulative; sinks curve, cumulative; and curves, washability.</i>
ash curve, incremental	CP	<i>See ash curve, characteristic; ash curve, instantaneous; and curves, washability.</i>
ash curve, instantaneous	CP	A standard washability curve that relates the maximum ash percentage of any particle (contained in a cumulative-floats mass) to the cumulative-floats mass of a known ash percentage. <i>See also ash curve, characteristic and curves, washability.</i>
ash error	CP	<i>See error, ash.</i>
ash-free basis	AT	In expressing an analysis, a basis that refers to a hypothetical condition in which the coal or coke is assumed to be free of ash. Symbol: af

Term	Used in	Explanation
ash-free, moist basis	AT; CL	A hypothetical condition in which the sample is assumed to be free of ash, with a moisture determined by its moisture-holding capacity; used in classification systems, e.g. AS 2096, especially for calorific value. Symbol: afm
ash fusibility	UT	The partial or complete melting of ash constituents, possibly leading to formation of clinker or fused or partially fused furnace ash deposits.
ash fusibility analysis	AT; UT	<i>See analysis, ash fusibility.</i>
ash fusibility temperature	AT; UT	<i>See deformation temperature, sphere temperature, hemisphere temperature and flow temperature.</i>
ash monitor	CP	<i>See monitor, ash.</i>
ash-relative density curve	CP	A curve that relates the ash percentage of a coal or coal particles to the relative density. <i>See also relative density curve, characteristic.</i>
assay, Fischer	AT	A laboratory carbonization assay, which provides yields of coke, tar, water and gas under prescribed heating conditions.
ASTM coke strength factors	CK; UT	<i>See tumbler test, ASTM.</i>
ASTM tumbler test	CK; UT	<i>See tumbler test, ASTM.</i>
atmosphere, oxidizing	AT	An atmosphere consisting of either carbon dioxide or air. <i>See also analysis, ash fusibility.</i>
atmosphere, reducing	AT	An atmosphere consisting of 50 ±5% hydrogen and 50 ±5% carbon dioxide by volume. <i>See also analysis, ash fusibility.</i>
auger	SP	A device for obtaining a sample by boring.
autochthonous coal	PT	<i>See coal, autochthonous.</i>
automatic control	CP	<i>See control, automatic.</i>
automatic plastometer	AT	<i>See plastometer, automatic.</i>
average	AT	<i>See mean, arithmetic.</i>
axi-symmetric flow	CF	<i>See flow, mass.</i>

B

Term	Used in	Explanation
backwater	CP	<i>See</i> water, hutch.
baffle	CP	A device such as a steel plate, used to check, retard or divert the flow of materials.
baffle, froth	CP	A fixed plate fitted to the side of the launder of a thickener to prevent floating fine-coal froth entering the clarified water circuit.
bag filter	CP; UT	<i>See</i> filter, bag.
ball mill	AT; CP; SP; UT	<i>See</i> mill, ball.
balling	CP	<i>See</i> agglomeration and nodulizing.
band	MG; PT; SP	<i>See</i> clay band, dirt band and parting.
banded coals	MG	<i>See</i> coals, banded.
band press filter	CP	<i>See</i> filter, band press.
bar screen	CP	<i>See</i> screen.
barometric leg	CP	The pipe connection between the moisture trap and water seal in the vacuum arrangement of a filter installation.
barrel washer	CP	<i>See</i> washer, barrel.
basin	MG	A large geological depression filled with tectonically related sedimentary or volcanic rocks.
basket centrifuge	CP	<i>See</i> centrifuge, basket.
batch	AT	A quantity of some commodity produced at one time under relatively uniform conditions.
bath	CP	A vessel containing a medium used to separate coal by the float-and-sink method.

Term	Used in	Explanation
bath, dense-medium	CP	A dense-medium separator for beneficiating coarse coal, consisting of a large stationary or rotating tank through which coal and medium are passed. Various mechanical devices are used for removal of product, middlings and reject.
Baum jig	CP	<i>See</i> jig, Baum.
bed	MG	The smallest formal unit in the hierarchy of lithostratigraphic units. In a stratified sequence of rocks, it is a unit layer that is lithologically distinguishable from other layers above and below. Several contiguous beds of similar lithology may also together constitute a formal unit. <i>See also</i> classification, lithostratigraphic.
bed moisture	AT; CL; LR; MG	<i>See</i> moisture, bed (natural).
bedding	MG; PT	Stratification in sedimentary rocks brought about by deposition of different materials. The term is normally used where the individual layers (or beds) are greater than 10 mm in thickness. <i>See also</i> lamination.
bedding plane	MG	<i>See</i> plane, bedding.
beehive coke oven	CK; UT	<i>See</i> coke oven, beehive.
belt, picking	CP	A continuous conveyor (e.g. in the form of a rubber, felt or steel apron, steel plate or link construction), on which raw coal is spread so that selected components may be removed manually.
belt feeder	CP; SP; UT	<i>See</i> feeder.
belt press filter	CP	<i>See</i> filter, belt press.
belt weigher	CP	<i>See</i> weigher, belt.
beneficiate	CP	To increase the commercial value of a coal by appropriate treatment.
between-laboratories tolerance	AT	<i>See</i> reproducibility.

Term	Used in	Explanation
bias	SP	The tendency to obtain a value that is either persistently higher or persistently lower than the reference value; in practice, the difference between the reference value and the average result obtained from a large number of determinations. <i>See</i> AS 4264.4.
bin	CF; CP	A vessel used for the storage of materials, the lowermost portion of which is usually constructed in the form of a hopper.
bin, mass-flow	CF; CP	<i>See</i> bin .
bin blending	CP	<i>See</i> blending, bunker .
‘bird-nesting’	UT	The formation of partly fused, loosely bonded deposits of sintered fly-ash on the heating surfaces of boiler furnaces and auxiliaries.
bituminous coal	CL; PT	<i>See</i> coal, bituminous .
black coal	CL; PT	<i>See</i> coal, black .
black end	UT	An incompletely carbonized part of a coke oven charge or piece of coke. <i>See also</i> spongy end .
blast furnace	UT	<i>See</i> furnace, blast .
blast-furnace coke	CK; UT	<i>See</i> coke, blast-furnace .
bleed	CP	A portion of total flow removed from a circuit either to balance the circuit or to treat that portion elsewhere.
blend	CL; UT	A mixture of two or more coals prepared to a particular specification for marketing or use.
blending	CP	Mixing in predetermined and controlled quantities to give a uniform feed or product.
blending, bunker	CP	A method of blending whereby the components are stored separately in bunkers or bins that are discharged simultaneously in predetermined and controlled quantities.
blocky coke	CK; UT	<i>See</i> coke, blocky .
blower	CP	<i>See</i> compressor, air .
boghead coals	CL; PT	<i>See</i> coals, boghead .

Term	Used in	Explanation
boiler	UT	A device for producing steam by heating water. The main types are water-tube, especially for large applications, and shell or fire-tube boilers.
boiler ancillaries	UT	<i>See</i> boiler auxiliaries .
boiler auxiliaries	UT	Plant and equipment associated with the operation of a boiler, e.g. fans, the boiler feed water heater, the combustion air-heater and some other parts.
bonded deposits	UT	<i>See</i> deposits, bonded .
bone coal	CL; MG	<i>See</i> coal, splint and coal, stony .
boom, loading	CP; SP	A hinged portion of a conveyor, designed to receive materials at a fixed level and discharge them at varying levels; usually employed for loading coal into wagons.
boom loader	CP; SP	<i>See</i> boom, loading .
bord	MG	The main openings driven into the coal in the ‘first workings’ of a panel or block of coal being extracted by the bord and pillar mining method. <i>See also</i> headings .
bord and pillar mining	MG	<i>See</i> mining, bord and pillar .
bottom ash	UT	<i>See</i> ash, bottom .
bound moisture	AT; CP	Non-preferred term. <i>See</i> moisture, residual .
bowl, filter	CP	<i>See</i> tank, filter .
bowl centrifuge	CP	<i>See</i> centrifuge, screen-bowl and centrifuge, solid-bowl .
Bradford breaker		<i>See</i> breaker, rotary .
breakage	CP	(a) Voluntary or involuntary size reduction of a solid. (b) Small material produced by involuntary breakage during mechanical handling or processing.
breaker, froth	CP	A device to reduce the volume of froth flotation concentrates by de-aeration.

Term	Used in	Explanation
breaker, pick	CP	A machine for breaking coal by the splitting action of mechanically-operated picks.
breaker, rotary	CP	A rotating perforated steel drum through which passes material of the required size. The oversize material is lifted by flights inside the drum and allowed to fall back so that friable materials break by impact and pass through the perforations; the more competent material may not break and is discharged from the end of the drum.
breaking	CP	Reduction in the top size of large particles (e.g. as in run-of-mine coal).
breccia, fault	MG	An accumulation of large rock fragments that occur as a result of faulting and that remain within the fault zone. The fragments are usually angular and may be either cemented or loosely bonded.
bright coals	MG; PT	<i>See</i> coals, bright.
bright lithotypes	MG; PT	<i>See</i> coals, bright.
briquette	UT	An agglomerate formed by compacting a particulate material in a briquetting press, with or without an added binder material.
briquette, brown-coal	LR	A solid lump fuel of enhanced heating value manufactured from brown coal by crushing (e.g. to minus 6 mm), drying to about the air-dry moisture content, and pressing into the desired form, often without the addition of a binder.
briquetting	CP	The moulding of small or fine coal (with or without the admixture of a binder) into a uniform product of predetermined size and shape by the application of pressure.
briquetting, partial	UT	<i>See</i> form coal process.
briquetting coal	CL	<i>See</i> coal, briquetting.
brown coal	CL; LR	<i>See</i> coal, brown.
brown coal, air-dry	LR	Brown coal dried in air to moisture equilibrium under ambient conditions.

Term	Used in	Explanation
brown coal, bed-moist	LR	Brown coal containing its natural bed-moisture content.
brown coal, dry	LR	Brown coal reduced to zero moisture content as determined by AS 2434.1.
brown coal, soft (weich) matt (matt) bright (glanz)	CL; LR	German terminology to describe brown coals of varying rank, increasing from soft to bright.
brown coal, thermal de-watering of	LR	Process for non-evaporative removal of water from brown coal by the application of heat. The water is removed as liquid water by thermal treatment (150°C to 300°C) in a saturated atmosphere such as saturated steam (Fleissner drying process) or pressurized water followed by drainage.
brown-coal briquette	LR	<i>See</i> briquette, brown coal.
brown-coal char	LR; UT	<i>See</i> char, brown-coal.
brown-coal lithotypes	LR; MG	<i>See</i> lithotypes, brown-coal.
bucket-wheel excavator	MG	<i>See</i> excavator, bucket-wheel.
bucket-wheel loader	CP; SP	<i>See</i> loader, bucket-wheel.
bucket-wheel reclaimer	CP; SP	<i>See</i> loader, bucket-wheel.
bulk density	AT; CF; CK; CP; UT	<i>See</i> density, bulk.
bulk density meter	CP	A device for monitoring the bulk density of coal to provide an indication of quality.
bulk material	CF	Semi-cohesive particulate material such as coal and other minerals.
bulk sample	MG; SP	<i>See</i> sample, bulk.
bunker, surge	CP	A bunker (hopper) designed to receive a feed at fluctuating rate and to deliver it at some predetermined rate.
bunker blending	CP	<i>See</i> blending, bunker.
bunker coal	CL	<i>See</i> coal, bunker.

Term	Used in	Explanation
bunkering	UT	The temporary storage of coal or coke in bunkers, bins or hoppers for feeding either to transport facilities or directly to plant for use.
burnout, carbon	UT	<i>See</i> carbon burnout .
by-product coke oven	UT	<i>See</i> coke oven, by-product .

C

Term	Used in	Explanation
cake, filter	CP	<i>See filter cake.</i>
caking coal	CL; PT	<i>See coal, caking.</i>
caking properties	AT	The propensity for a coal to form a coherent residue on fast heating. The term caking may be qualified (e.g. strong, weak, non), or quantified (e.g. by crucible swelling number).
calibration	CP	All of the operations for the purpose of determining the values of the errors of measuring instruments, material measures and measurement standards (and, if necessary, to determine other metrological properties, including influence quantities). NOTE: The general usage of the term is often extended to include operations such as adjustment, gauging and scale graduation. Such usage is deprecated.
calorific value, basis of reporting	AT	The analysis basis (e.g. dry; as-received; dry, ash-free) on which the calorific value, gross or net, is reported.
calorific value, gross	AT; CL	The number of heat units liberated per unit quantity of fuel burned in oxygen under standard conditions; the products of combustion are assumed to consist of gaseous oxygen, carbon dioxide, nitrogen and oxides of nitrogen, water (in equilibrium with its vapour and saturated with carbon dioxide) and solid ash. Symbol: q_{gr} <i>See also AS 1038.5.1 and AS 1038.5.2.</i>
calorific value, net	AT	The number of heat units liberated per unit quantity of fuel burned in oxygen under standard conditions; the products of combustion are assumed to consist of gaseous oxygen, nitrogen and oxides of nitrogen, carbon dioxide, sulfur dioxide, water vapour and solid ash. Symbol: q_n

Term	Used in	Explanation
calorific value, gross or net at constant pressure	AT	The gross or calorific value when determined under constant pressure conditions. The calorific value of coal, gross or net, at constant pressure cannot be determined directly, but may be calculated from calorific value, gross or net, at constant volume using theoretical formulas. <i>See also</i> AS 1038.16. NOTE: The normal combustion of coal in a pulverized coal-fired boiler represents ‘net constant pressure’ conditions.
calorific value, gross or net at constant volume	AT	The gross or net calorific value when determined under constant volume conditions in an adiabatic or isothermal-type bomb calorimeter.
cannel coals	CL; PT	<i>See</i> coals, cannel.
capacity	CP	<i>See</i> capacities, operational.
capacities, operational	CP	Figures given on flowsheets (<i>see</i> AS 1414) to indicate quantities passing various points in the plant per unit time, taking account of fluctuations in the rate of supply and composition (i.e. size and content of impurity) and the balance of the circuits, as follows: (a) <i>Design capacity</i>—the rate of feed, defined by limits expressing the extent and duration of load variations, at which specific items of plant, subject to a performance guarantee, operate continuously and give the guaranteed results on a particular quality of feed. (b) <i>Peak design capacity</i>—a rate of feed, in excess of the design capacity, that specific items of plant will accept for short periods without fulfilling the performance guarantees given in respect of them. (c) <i>Mechanical maximum capacity</i>—the highest rate of feed at which specific items of equipment, not subject to performance guarantees, will function on the type and quality of feed for which they are supplied.
car, shuttle	MG	<i>See</i> shuttle car.

Term	Used in	Explanation
carbominerite	PT	A collective microlithotype term for intergrowths of minerals with macerals. The main types of carbominerite are given in Table 1.
carbon, fixed	AT	A figure obtained by subtracting from 100 the sum of the percentages of moisture, volatile matter and ash of coal expressed on a common moisture basis; forms part of the proximate analysis. Symbol: <i>FC</i>
carbon burnout	UT	The measure of combustion efficiency based on the completeness of burnout of the carbon in coal, a function of coal combustion reactivity and combustion conditions. Combustibles in fly-ash represent a penalty in fly-ash collection and disposal, and a loss of useful energy not recovered in the furnace.
carbon dioxide in the oxidation residue	AT	The carbon dioxide derived from the carbonates in the oxidation residue (see residue, oxidation). Symbol: CO_{2R}
carbonaceous mudstone	MG; PT	See mudstone, carbonaceous .
carbonaceous shale	MG; PT	See mudstone, carbonaceous .
carbonate carbon in coal	AT	The carbon in the coal that is present as mineral carbonates (see AS 1038.23). Symbol: C_m

TABLE 1
TYPES AND COMPOSITIONS OF THE
MAIN CARBOMINERITES
(Definitions from the ICCP)¹

Type	Volume percentage of minerals
Carbargillite	20 to 60 clay minerals
Carbopyrite	5 to 20 sulfides
Carbankerite	20 to 60 carbonates
Carbosilicite	20 to 60 quartz
Carbopolyminerite	20 to 60 different minerals*

* The lower limit can be reduced depending on the content of sulfides.

Term	Used in	Explanation
carbonization	PT; UT	The process of decomposing coal by heating in a mainly reducing atmosphere to produce the following: (a) A carbon enriched solid (e.g. coke or char). (b) Liquid or gaseous products (e.g. coal gas, tars). <i>See also</i> pyrolysis.
carbonization temperature	UT	The maximum temperature attained by the coal charge in a carbonization oven or retort.
carbonyl group	LR	A functional group of the form >C=O encountered in the molecular structure of low rank coals.
carboxylate group	LR	The ionized form of the carboxylic acid group,  or COO^-: the point of bonding of exchangeable cations to the organic coal substance and therefore principally responsible for the acid-base and ion exchange characteristics of low rank coals.
cations, exchangeable	LR	Cations that are associated with the organic coal substance. These can be displaced by treatment with acids or solutions of other cations. <i>See also</i> AS 2434.9.
cauliflower end	UT	The cauliflower-like portion of the coke formed adjacent to the heating wall of an oven.
cells, flotation	CP	Coal preparation equipment in which froth flotation operations are carried out; they may be any or all of the following: (a) <i>Primary cells (rougher cells)</i>—a group of flotation cells in which the raw feed is given a preliminary treatment, either or both of the products being subsequently re-treated. (b) <i>Cleaner (recleaner) cells</i>—secondary cells for the re-treatment of the concentrate from primary cells. (c) <i>Scavenger cells</i>—secondary cells for the re-treatment of tailings.
cement coal	UT	<i>See</i> coal, cement .
cementitious coal	UT	<i>See</i> coal, cement .

Term	Used in	Explanation
centrate	CP	In a slurry, the liquid that is separated from the solid material by use of a centrifuge.
centrifuge, basket	CP	A device for de-watering in which wet coal is held by centrifugal force against a surface that permits the outward passage of water and retains the coal, which is discharged mechanically.
centrifuge, screen-bowl	CP	A de-watering device combining in one machine a bowl and a basket centrifuge.
centrifuge, solid-bowl	CP	A device for de-watering in which the retaining surface is imperforate. The retained particles are collected by a scroll and discharged from one end of the machine. The water overflows from the opposite end.
centrifuging	CP	De-watering with the aid of centrifugal force.
chain-grate stoker	UT	<i>See stoker.</i>
channel sample	MG; SP	<i>See sample, channel.</i>
char	UT	A carbonized or partly carbonized product formed by pyrolysis of coals that do not fuse under the conditions used (<i>see</i> AS 2434.5).
char, brown-coal	LR; UT	Carbonaceous residue remaining after the devolatilization or carbonization of brown coal. The char retains the original form of the coal without plastic deformation or agglomeration in the process. High-volatile (low-temperature) char containing more than 5% volatile matter results from incomplete devolatilization. High-volatile chars can be prepared by ‘low’ temperature carbonization in the range 450°C to 700°C. Char that has been devolatilized at high temperatures (>700°C) and therefore has a low volatile content (<5%) is termed low-volatile (high-temperature) char.
characteristic ash curve	CP	<i>See ash curve, characteristic.</i>
chart, Ringelmann	UT	<i>See Ringlemann chart.</i>
check screen	CP	<i>See screen.</i>

Term	Used in	Explanation
chevron stockpiling	CP	<i>See</i> stockpiling .
chitter	MG	Waste rock broken and separated from coal during beneficiation. The term is usually applied to material coarser than 0.5 mm in particle size.
cinder	CL	<i>See</i> coal, cinder .
cinder coal	CL	<i>See</i> coal, cinder .
circuit, closed	CP	(a) A water circuit designed so that the only water added is that necessary to replace the loss in the products and that due to atmospheric evaporation. (b) A system of crushing or grinding in which oversize material is separated and recycled.
circuit, lock-out	CP	A facility to allow a machine to be rendered inoperative by local or remote switches or contacts, e.g. during maintenance work.
circuit, open	CP	(a) A water circuit so designed that water is required in excess of that necessary to replace losses in product and by evaporation due to a loss by free discharge or seepage. (b) A system of crushing or grinding in which oversize material is not recycled.
circuit, water	CP	The complete system of pipelines, pumps, sumps, tanks, troughs and accessories used for the circulation of water in a coal preparation plant, including the water treatment plant.
circulating medium	CP	<i>See</i> medium, circulating .
clarain	MG; PT	A bright coal lithotype, having lustre intermediate between vitrain and durain, and characterized by dull microbands parallel to the coal banding.
clarification	CP	The concentration and removal of solids from water to reduce the suspended solids to a minimum.
clarified water	CP	Within a coal preparation plant, recycled water that has had suspended solids removed by a thickener.

Term	Used in	Explanation
clarifier	CP	<i>See</i> thickener rakes .
classification	CP	(a) The separation of particles according to their particle size, or density or shape. <i>See also</i> screening and AS 1634. (b) <i>See</i> coal classification .
	CL; PT	
classification, air	CP	The process of particle sizing in a current of air. <i>See also</i> classification (a) .
classification, dry	CP; UT	The process of separating finer particles from coarser particles in a dry or gas-borne condition, e.g. in coal pulverizing mills, or separation of grits from dust in flue gases. <i>See also</i> de-dusting .
classification, general	CL	A broad division, e.g. into higher rank and lower rank coals, as in AS 2096.
classification, lithostratigraphic	MG	The organization of rock strata into units on the basis of their lithologic character. The conventional hierarchy of formal lithostratigraphic terms is as follows: (a) <i>Group</i> —two or more formations. (b) <i>Formation</i> —primary unit of lithostratigraphy. (c) <i>Member</i> —named lithologic entity within a formation. (d) <i>Bed</i> —named distinctive layer in a member or formation. (<i>See</i> Staines .) ²
classifier	CP; UT	A device that separates particles according to their particle size, shape or density.
classifying cyclone	CP	<i>See</i> cyclone .
classifying screens	CP	<i>See</i> screen .
clastic rocks	MG	<i>See</i> rocks, clastic .
clay band	MG; PT; SP	A layer of claystone deposited parallel to the bedding plane and usually thicker than a parting.
clay bed	MG; PT; SP	<i>See</i> clay band .
clean coal	CP	<i>See</i> coal, clean .

Term	Used in	Explanation
clean coal concentrate	CP	<i>See</i> concentrate, clean coal.
cleaned coal	CP	<i>See</i> coal, cleaned.
cleaning	CP	(a) <i>Dry</i>—the separation of impurities from coal by methods not requiring the use of liquids or suspensions. (b) <i>Wet</i>—the separation of impurities from coal by methods involving the use of liquids or suspensions.
cleat	MG; PT	A fracture, or system of fractures, in a coal seam or lithotype, usually roughly perpendicular to the bedding and along which the coal is more easily broken up. The term is used to distinguish between fractures in the coal and the joints in the overlying and underlying rocks.
cleavage	MG; PT	A plane, or series of planes, along which a mineral crystal or a rock can be readily split.
clinker	UT	The agglomerated, semi-vitrified, and mainly inorganic residue resulting from slag formation in the combustion or gasification of solid fuel in a bed.
closed circuit	CP	<i>See</i> circuit, closed.
closed loop control	CP	<i>See</i> control, loop.
closed loop control (system)	CP	<i>See</i> control, loop.
cloth, filter	CP	<i>See</i> filter cloth.
cloth, screen	CP	<i>See</i> Screen cloth.
coal	CL; LR; PT	A sedimentary rock composed predominantly of solid organic material, with a greater or lesser proportion of mineral matter. Coal is derived from the accumulation of plant remains in a sedimentary basin, and is altered to solid rock by heat and pressure applied during the basin's development. The different coal varieties are products of different parent materials, different conditions of accumulation, and different tectonic histories.
coal, allochthonous	PT	Coal originating from accumulations of plant debris that has been transported from its place of growth and deposited elsewhere.

Term	Used in	Explanation
coal, autochthonous	PT	Coal that has been formed from accumulations of plant debris at the place where the plants grew. Two modes of origin are distinguished: terrestrial and aquatic.
coal, bituminous	CL; PT	A general term descriptive of coal intermediate in rank between sub-bituminous coal and semi-anthracite, and including coking coals; in AS 2096, defined as having volatile matter content 14.0% (daf) or greater <i>and</i> gross calorific value 26.50 MJ/kg (afm) or greater (24.00 MJ/kg (afm) or greater provided that the crucible swelling number is at least 1). Bituminous coals may be either bright or dull and are usually banded.
coal, black	CL; PT	Coal of anthracite, semi-anthracite, bituminous or sub-bituminous rank.
coal, briquetting	CL	A marketing term for coal that is suitable for the manufacture of briquettes, sometimes for mixing with coking coals to be fed to coke ovens.
coal, brown	CL; LR; PT	The phase of coalification between peat and sub-bituminous coal. Low rank coal is defined in AS 2096 as having a gross calorific value of less than 19.00 MJ/kg (afm).
coal, bunker	CL	Coal supplied as fuel to ships.
coal, caking	CL; PT	Coal that leaves an agglomerated carbonaceous residue when heated. Not all caking coals are good coking coals. NOTE: Some technologists distinguish between caking coals and coking coals on the basis of the residue left after different rates of heating.
coal, cement	UT	A marketing term for coal used in the manufacture of cement.
coal, cementitious	UT	<i>See</i> coal, cement .
coal, cinder	CL	Coal that has been significantly carbonized <i>in situ</i> by natural igneous activity; usually localized.
coal, clean	CP	The coal product from a wet or dry cleaning process (<i>see also</i> coal, cleaned and coal, washed).

Term	Used in	Explanation
coal, cleaned	CP	Coal that has been beneficiated.
coal, coarse	CP; UT	Large-size coal particles, nominally > 50 mm.
coal, coking	CL; PT; UT	(a) Coal that exhibits the behaviour of softening, caking or agglomeration, subsequent swelling and then resolidification with shrinkage, over certain temperature intervals, usually during slow heating. (b) Bituminous coal suitable for the production of coke. (c) Bituminous coal that exhibits plasticity on slow heating.
coal, coking, hard	CL; UT	A coal that, when coked alone, produces a hard coke; it is normally a strongly-coking low-volatile or medium-volatile bituminous coal.
coal, coking, semi-hard	CL	A marketing term for coal that is marginally inferior to hard coking coal.
coal, coking, semi-soft	CL	A marketing term for coal that, because of higher ash or poorer coking properties, is marginally inferior to soft coking coal.
coal, coking, soft	CL	A coal that, when coked alone, produces a relatively soft coke. It is normally a high-volatile coking coal. It is often a valuable component of coking blends.
coal, devolatilized	CP; MG; UT	<i>See</i> coal, heat-affected.
coal, energy	UT	<i>See</i> coal, thermal.
coal, fat	MG	Term used in several European countries for coking coals having medium volatile matter. <i>See also</i> coal classification.
coal, fine	CP; UT	Finely-sized coal particles, nominally 3 mm.
coal, free-burning	CL	Coal, of high volatile matter, that does not cake in the fuel bed.
coal, gas	CL	Bituminous coal of relatively high volatile matter and suitable for the manufacture of coal gas and gas coke.
coal, gasification	UT	Coal that is suitable for the production of gas.

Term	Used in	Explanation
coal, graded	CL; CP	<i>See</i> coal, sized .
coal, hard	CL; PT	Coal that is relatively resistant to degradation on handling. <i>See also</i> coal, higher rank .
coal, heat-affected	CL MG CP; UT	Coal having properties that have been modified by heat— (a) from an igneous intrusion <i>in situ</i> ; or (b) as a result of spontaneous heating (during storage and handling). The result is to produce a coal having an anomalous combination of properties. <i>See also</i> coal, cinder .
coal, high rank	CL; PT	More mature coal of the ‘higher rank coal’ class. It includes semi-anthracites and anthracites. The lower limit of high rank coal, according to the ECE ³ classification system, has been proposed as 2.0% mean random reflectance of vitrinite.
coal, high-volatile bituminous	CL	The least mature (lowest rank) category of bituminous coal; quantitatively defined, and further divided into three sub-categories, A, B and C, in the ASTM classification system.
coal, higher rank	CL; PT	Coal that is geochemically mature, as defined quantitatively in AS 2096 (gross calorific value ≥ 27 MJ/kg (daf) and 21 MJ/kg (afm)). Includes the more mature sub-bituminous coals, bituminous coals, semi-anthracites and anthracites.
coal, long-flame	CL	Bituminous coal of high volatile matter.
coal, low-grade	CL; CP	Coal that has only limited uses owing to undesirable characteristics, e.g. high mineral matter content.
coal, low rank	CL; LR; PT	Coal in the early stages of the coalification process.
coal, low-volatile bituminous	CL	The most mature (highest rank) category of bituminous coal; quantitatively defined in the ASTM classification system.

Term	Used in	Explanation
coal, lower rank	CL; LR; PT	Coal that is geochemically immature, as defined quantitatively in AS 2096 (gross calorific value less than 27 MJ/kg (daf) <i>or</i> 21 MJ/kg (afm)). This class includes the less mature sub-bituminous coals and all brown coals.
coal, medium rank	CL	Coal having a position in the classification system between high rank and low rank coal.
coal, medium-volatile bituminous	CL	Coal in the middle of the bituminous coal range with regard to rank; quantitatively defined in the ASTM classification system.
coal, metallurgical	UT	<i>See</i> coal, coking.
coal, non-caking	CL	A coal that does not agglomerate under fast heating conditions, e.g. combustion on a grate. In general, such a coal has a very low crucible swelling number.
coal, non-coking	CL	A coal that does not agglomerate under slow heating conditions, e.g. in a coke oven. In general, such a coal has very low values for crucible swelling number, Gray-King coke type and dilatation characteristics.
coal, organic	LR	A hypothetical substance that includes only the organic carbon, hydrogen, oxygen, nitrogen and sulfur of coal. It is defined by expressing results on a dmmf basis for higher rank coals and a dmif basis for brown coals.
coal, orthohydrous	CL	Coal of normal or typical hydrogen content, e.g. falling within the coal band of Seyler's classification system.
coal, outcrop	CL	Coal mined near the coal seam subcrop. <i>See also</i> coal, oxidized .
coal, oxidized	CL	Coal having properties that have been affected by exposure to air or oxygen. Initially, this may involve only deterioration of coking properties. On longer exposure, it may involve increase in oxygen content and decrease in carbon and hydrogen contents. <i>See also</i> coal, weathered .

Term	Used in	Explanation
coal, PCI	CL; UT	A marketing term for coal that is suitable for pulverized coal injection (PCI) into blast furnaces as a fuel. <i>See also</i> pulverized coal injection .
coal, part-cleaned	CP	A mixed product of cleaned and uncleaned fractions of coal.
coal, part-washed	CP	<i>See</i> coal, part-cleaned .
coal, perhydrous	CL	Coal containing more hydrogen than is normal for coal of that rank, e.g. falling above the coal band of Seyler's classification system.
coal, prime coking	CL; UT	A coking coal that can be used alone, or blended with poorer coking coals, to produce coke suitable for metallurgical use.
coal, raw	CL; CP; PT	Coal that has received no preparation, other than possible screening or preliminary crushing. <i>See also</i> coal, run-of-mine .
coal, raw feed	CP	Coal supplied to a plant or machine, in which it undergoes some form of preparation.
coal, reactive	CL	Coal that, because of its low rank or petrographic composition, is subject more than usual to reactions, e.g. oxidation. Such coals may be subject to spontaneous combustion. <i>See also</i> 'heating' of coal .
coal, reductant	UT	Coal that is suitable for use as a reductant in the beneficiation process of a mineral.
coal, run-of-mine	CL; CP	Coal produced by mining operations, before screening, crushing or preparation. <i>See also</i> coal, raw .
coal, saleable	CL	Any coal that meets a market specification (with or without the need for preparation).
coal, short-flame (non-preferred term)	CL	A European term for thermal coals of low to medium volatile matter.
coal, sized	CL; CP	Coal screened between specified particle size limits.
coal, small	CP; UT	Coal having particle size intermediate between coarse coal and fine coal, typically 3 mm to 50 mm.

Term	Used in	Explanation
coal, small, graded	UT	Small coals screened between specified size limits. <i>See also</i> coal, small .
coal, soft	CL; LR	(a) In classification, a term referring generally to lower rank coals. (b) Coal relatively friable and subject to degradation on handling. (c) European term for coal of lower rank than hard coal; coal having gross calorific value (moist mineral matter-free) less than 24 MJ/kg.
coal, splint	CL	A commercial term for hard coal having dull lustre and uneven fracture.
coal, stony	MG	Highly carbonaceous sedimentary rock having a black, dull or satiny lustre.
coal, sub-bituminous	CL; LR; PT	A general term descriptive of coal intermediate in rank between brown coal and bituminous coal. It is defined in AS 2096 as coal having a gross calorific value in the range 19.00 MJ/kg to 23.99 MJ/kg (afm) inclusive, or to 26.49 MJ/kg inclusive provided that the crucible swelling number is 0 or 1/2.
coal, sub-hydrous	CL	Coal containing less hydrogen than is normal for coal of that rank, e.g. falling <i>below</i> the coal band of Seyler's classification system.
coal, thermal	CL	A marketing term for coals used for combustion purposes, e.g. for steam raising.
coal, washed	CL	Coal prepared for the market by coal preparation operations in addition to crushing and sizing.
coal, weathered	CL; MG; PT	Coal that has been oxidized by exposure to the atmosphere or subjected to oxidation at or near the Earth's surface during some period of its geological history. In the case of lower rank coal, it is generally characterized by high oxygen and low moisture contents. Weathered coal may have a granular or fragmented appearance, and may also display desiccation cracks. Exposed coal <i>in situ</i> or mined coal in stockpiles is subject to weathering processes. This may result in deterioration of coal quality, especially coking properties of higher rank coals. Other effects in higher rank coals are increased moisture and lowering of calorific value.

Term	Used in	Explanation
coal classification	CL; PT	The division of coals into various classes for scientific or commercial purposes. There are several classifications, including the following: (a) <i>Classification and coding systems for Australian coals</i>—Two classification systems and two coding systems (AS 2096) as follows: (i) A general classification of coals by rank into two classes, namely higher rank coal and lower rank coal, by gross calorific value expressed on both a daf and an afm basis. (ii) A classification of coals by rank in terms of the traditional names, namely anthracite, semi-anthracite, bituminous coal, sub-bituminous coal and brown coal on the basis of volatile matter (daf), gross calorific value (afm) and crucible swelling number. (iii) A coding system for higher rank coals (REVCAS code) that uses 11 digits to indicate within narrow ranges the values of the parameters mean maximum reflectance of vitrinite, <i>R</i>; gross calorific value (daf), <i>E</i>; volatile matter (daf), <i>V</i>; crucible swelling number, <i>C</i>; ash (d), <i>A</i>; and total sulfur (d), <i>S</i>. (iv) A coding system for lower rank coals (REVMAS code) that uses 11 digits to indicate within narrow ranges the values of the parameters mean maximum reflectance of vitrinite or vitrinite precursor, <i>R</i>; gross calorific value (daf), <i>E</i>; volatile matter (daf), <i>V</i>; bed moisture (as), <i>M</i>; ash (d), <i>A</i>; and total sulfur (d), <i>S</i>. (b) <i>ASTM classification</i> (ASTM D 388)—a system of classifying coals by rank, used widely in the USA. It is based either on stated limits of volatile matter or fixed carbon on a dry, mineral matter-free basis (dmmf), or on stated limits of calorific value on a moist, mineral matter-free basis (mmm). (Moist refers to coal containing its natural bed moisture.)

Term	Used in	Explanation
		(c) <i>UN/ECE codification system for medium and high rank coals</i>—a classification and codification system as follows: (i) A general classification of coals by rank into two classes, namely low-rank and higher-rank coals on the basis of gross calorific value (afm) and mean random reflectance of vitrinite. (ii) A codification system for higher-rank coals that uses 14 digits to indicate within narrow ranges the values of eight parameters, namely mean random reflectance of vitrinite, reflectogram characteristics; maceral group composition; crucible swelling number; volatile matter (daf); ash (d); total sulfur (d) and gross calorific value (daf). (See ECE/COAL/115.)³ (d) <i>NCB classification</i>—a code number system of classification of higher rank coals devised by the National Coal Board (now British Coal) in the United Kingdom. It is based on a determination of the volatile matter on a dry, mineral matter-free (dmmf) basis and the coke type as obtained in the Gray-King carbonization test at 600°C. (e) <i>Seyler's classification</i>—a system of coal classification based on carbon and hydrogen content, calculated on a dry, mineral matter-free (dmmf) basis (based on the Parr formula). Coals are plotted on a chart where the horizontal axis gives the carbon content on a reverse scale and the vertical axis gives the hydrogen content.
coal cleaning	CP	The treatment of coal to yield a product having a lower mineral matter content.
coal conversion	PT; UT	The general term applied to techniques of coal gasification and liquefaction, and solvent refining to convert coal to other forms of fuel or chemical products or both.
coal liquefaction	UT	See liquefaction, coal .

Term	Used in	Explanation
coal lithotypes	LR; MG	<i>See lithotypes, coal.</i>
coal measures	MG	A layered sequence essentially of sedimentary rocks containing coal seams.
coal organic matter	CL	<i>See coal substance.</i>
coal petrography	PT	<i>See coal and petrography.</i>
coal petrology	PT	<i>See coal and petrology.</i>
coal preparation	CP	(a) Collectively, the physical, mechanical or chemical processes applied to coal to make it suitable for a particular use. (b) The treatment of raw coal to reduce the quantity of undesirable constituents.
coal preparation plant	CP	A plant in which a coal preparation process is carried out.
coal rank	CL	The position of a coal relative to other coals in the coalification series from peat (lowest rank) to anthracite (highest rank), indicating its maturity in terms of its general chemical and physical properties. A comparison of some coal rank terms and parameters is given in Table 2.
coal rank, chemical	CL	The relative position of a coal in the coalification series peat to anthracite as indicated by its chemical properties, e.g. carbon content.
coal rank, physical	CL	The relative position of a coal in the coalification series peat to anthracite as indicated by its physical properties, e.g. vitrinite reflectance or bed-moisture content.
coal reserves	LR; MG	<i>See reserves and reserves, coal.</i>
coal resource	MG	<i>See resources.</i>
coal seam	MG	A stratum or sequence of strata composed of coal as a significant component and significantly different in lithogy to the strata above and below it; it is laterally persistent over a significant area. It will be of sufficient thickness and persistence to warrant mapping or description as an individual unit.

TABLE 2
CLASSIFICATION OF COALS BY RANK
 (Approximate comparison of different systems)*

Australian (AS 2096)		ECE General	USA (ASTM)	UK (NCB)	Germany
General	Traditional				
2	Higher rank coal (gross specific energy (afm) ≥ 21.00 MJ/kg and gross specific energy (daf) ≥ 27.00 MJ/kg)	(High rank if $\bar{R}_r \geq 2.0$)	Meta-anthracite	Anthracites 100 class	Meta-anthracite
4			Anthracite		Anthracite
6				Semi-anthracite	
8			Low-volatile bituminous coal		Forge (ess) coal
10				Medium-volatile bituminous coal	
12			High-volatile A bituminous coal		Gas coal
14				High-volatile B bituminous coal	
16			High-volatile C bituminous coal		Flame coal
18				Sub-bituminous B coal	
20			Sub-bituminous C coal		Dull (matt) coal
22				Lignite A	
24			Lignite B		
26					
28					
30					
32					
34					
36					
38					
40					
42					
			Lower rank coal (gross specific energy (afm) < 21.00 MJ/kg or gross specific energy (daf) < 27.00 MJ/kg)	Low rank coal (gross specific energy (afm) < 24 MJ/kg and $\bar{R}_r < 0.6$)	
	Bituminous coal (VM ≥ 14.0 (daf) and gross specific energy (afm) ≥ 26.50 MJ/kg (or ≥ 24.00 MJ/kg if CSN ≥ 1))				
	Sub-bituminous coal (GSE 19.00 to 23.99 MJ/kg (afm) or 19.00 to 26.49 if CSN 0 or 1)				
	Brown coal (GSE < 19.00 MJ/kg (afm))				
	High-volatile C bituminous coal if agglomerating (otherwise sub-bituminous A coal)				
	Bituminous coal if CSN ≥ 1				
	Sub-bituminous coal				
	Sub-bituminous coal				
	Lignite A				
	Lignite B				

*Exact comparison not possible because of different nature of systems, analytical methods and bases of expression.

Term	Used in	Explanation
coal substance	CL	The complex organic material of coals, consisting essentially of carbon, hydrogen, nitrogen, oxygen and sulfur, but excluding moisture and mineral matter.
coal systematics	CL	The characterization of coals based on the interrelationship of their properties and the variations with rank.
coal type	CL; LR; PT	Recognizable categories of coal determined by the plant and inorganic material that was deposited and the physical and biochemical conditions that prevailed in the peat sedimentary environment. Coal type is best expressed in terms of macerals, microlithotypes or lithotypes. Differences in properties that are due to type should be clearly distinguished from those due to rank.
coalification	MG; PT	The process of gradual physical and chemical change which takes place during the progressive development of coal from plant remains, through peat, brown coal and bituminous coal, to anthracite. It is characterized essentially by decreasing moisture and volatile matter, and by an increasing proportion of carbon.
coals, banded	MG	Coals composed of alternate bright and dull layers parallel to the bedding plane.
coals, boghead	CL; PT	Members of the sapropelic coal group, resembling cannel coals in general appearance and properties, but distinguished microscopically by the presence of alginite, and macroscopically by a brown or yellow streak when scratched. <i>See also torbanite.</i>
coals, bright	MG; PT	Coals of bright, lustrous appearance consisting predominantly of the lithotypes vitrain and clarain.
coals, cannel	CL; PT	Members of the sapropelic coal group. Generally tough, unbanded and of satin sheen or waxy lustre and distinguished microscopically from boghead coal by the presence of sporinite and macroscopically by a black shiny streak when scratched. Generally high in volatile matter, these coals are readily ignited and burn with a luminous smoky flame.

Term	Used in	Explanation
coals, dull	MG; PT	Coals of dull appearance, consisting mainly of durain; dullness may also be imparted by a high mineral matter content or high liptinite content.
coals, Gondwanan	CL	Coals from geological strata that once formed part of the supercontinent of Gondwana, e.g. Australian, South African, South American, Indian and Antarctic coals of Permian age. Their properties can differ from Laurasian coals.
coals, humic	CL; LR; PT	Coals derived from plant debris that has passed through the peat stage of coalification. They include most of the common banded coals, but do not include sapropelic coals.
coals, immature	CL	A general term used to describe low rank coals.
coals, Laurasian	CL	Coals from geological strata that once formed part of the supercontinent of Laurasia, e.g. coals of carboniferous age from North America and Europe. <i>See also</i> coals, Gondwanan .
coals, mature	CL	A general term used to describe higher rank coals (<i>see</i> AS 2096).
coals, sapropelic	CL	Unbanded coal types exhibiting marked conchoidal fracture and formed from the natural accumulation of plankton, algae, spores, pollen grains, waxes, or resins, some of which may still be recognizable microscopically in a matrix of desmocollinite; they include coals, boghead and coals, cancell .
coarse coal	CP; UT	<i>See</i> coal, coarse .
cobbles	UT	Large, graded coal.
code, REVCAS	CL; MG	A coding system for higher rank coals according to the Australian system (<i>see</i> AS 2096). The name is an acronym for the properties used. <i>See also</i> coal classification .
code, REVMAS	CL; MG	A coding system for lower rank coals according to the Australian system (<i>see</i> AS 2096). The name is an acronym for the properties used. <i>See also</i> coal classification .

Term	Used in	Explanation
code number	CL	A series of digits used systematically to denote the rank and selected properties of coals (<i>see also coal classification</i>).
codification	CL	<i>See coding.</i>
coding	CL	The use of a code number to indicate the value, within specified ranges, of one or more coal properties. <i>See also coal classification and AS 2096.</i>
coding, partial	CL	An incomplete coding where some data are not available. The appropriate numbers are replaced by 'x'.
coefficient, distribution	CP	<i>See partition coefficient.</i>
coefficient, partition	CP	<i>See partition coefficient.</i>
coefficient of variation	SP	<i>See variation, coefficient of.</i>
cohesion	CF	The shear stress at yield under zero normal stress. NOTE: This parameter is not normally quantified.
coke	CK	The agglomerated product of coal carbonization, generally at a temperature in excess of 900°C.
coke, blast-furnace	CK; UT	Coke specially prepared for use in blast furnaces; usually strong coke having a narrow size range.
coke, blocky	CK; UT	Approximately cubic pieces of coke.
coke, finger	CK; UT	Long narrow pieces of coke, or coke that breaks into long pieces.
coke, formed	CK; UT	Coke formed by the coking of agglomerates (usually briquettes) of coal, or partly carbonized coals or chars, to produce coke lumps of uniform size and shape determined by the size and shape of the original agglomerates.
coke, graded	UT	<i>See coke, sized.</i>

Term	Used in	Explanation
coke, green	UT	Coke that has not attained the required carbonization temperature in the coking process. <i>See also</i> black end, spongy end and tar end.
coke, hard	CK; UT	Strong coke produced from low-volatile or medium-volatile coals at high temperature.
coke, high-temperature	UT	Coke produced where the minimum temperature in the charge during carbonization exceeds 900°C.
coke, low-temperature	CK; UT	Coke in which the maximum temperature during carbonization was approximately 750°C. <i>See also</i> semi-coke.
coke, natural	CL	Coke that has been formed by the influence of an igneous intrusion or other natural processes. <i>See also</i> coal, cinder.
coke, prismatic	CK; UT	<i>See</i> coke, finger.
coke, run-of-retort	UT	Coke from a retort, oven or chamber after quenching but before undergoing any screening or other preparation.
coke, sized	UT	Coke screened between specified particle size limits.
coke, soft	CK	Low-strength coke that is produced from high-volatile coking coals at high temperatures but may also be produced from better coking coals at lower temperatures.
coke, spongy	CK; UT	Low-strength coke having a sponge-like appearance.
coke breeze	UT	Small coke generally below 10 mm in size.
coke drum tests	CK; UT	<i>See</i> coke tumbler tests.
coke nuts	UT	Graded coke of a size varied in local practice. The top size is generally of the order of 25 mm, and the lower size 10 mm.
coke oven, beehive	CK; UT	A coke oven in which a mass of coal is carbonized by heat produced by combustion of the coal volatiles above the upper surface of the mass. Because volatile materials are burnt, no by-products are obtained.

Term	Used in	Explanation
coke oven, by-product	UT	A coke oven in which a mass of coal is carbonized by heat conducted through the oven walls from adjacent flue chambers in which a fuel gas is burnt. The ovens are arranged in a battery of alternating oven chambers and flue chambers. Volatile materials are collected and recovered as gaseous and liquid by-products.
coke oven gas	UT	<i>See gas, coke oven.</i>
coke reactivity index	CK	The percentage of a specially prepared sample of coke that reacts with carbon dioxide under specified conditions. Symbol: <i>CRI</i>
coke strength after reduction	CK	The percentage of a specially prepared sample of coke that, after reacting with carbon dioxide, remains in a 10 mm square-mesh sieve after rotating for 600 revolutions in a special tumbler. Symbol: <i>CSR</i>
coke tumbler tests	CK; UT	Standardized tests designed to measure the strength of coke by tumbling in a revolving drum. Strength indices are calculated from a size analysis of the product. <i>See AS 1038.13.</i>
coking coal	CL; PT; UT	<i>See coal, coking.</i>
coking pressure	UT	The maximum pressure, expressed in kilopascals (KPa), exerted by the oven charge on the walls of the oven during coking. It is recommended that the area in contact with the coal be reported along with the coking pressure. In reality, the area of coke in contact with the oven wall at the time of maximum pressure may be much less than the original contact area.
coking rate	UT	A measure of the rate at which a coal charge is heated in a by-product coke oven. It may be calculated in two ways, as follows: (a) The width of the oven divided by the time between charging and pushing the oven, expressed in millimetres per hour. (b) The width of the oven divided by the time between charging and the attainment of a specific centre-of-charge temperature (e.g. 900°C or 1000°C). <i>See also AS 2267.</i>

Term	Used in	Explanation
coking stoker	UT	<i>See stoker.</i>
collecting agent	CP	<i>See collector.</i>
collector	CP	A reagent added to a pulp to promote adherence between coal particles and air bubbles.
collector, dust	CP	<i>See dust collector</i>
colour index	LR	A unit derived from the measurement of the colour of dry, finely ground brown coal. The index is based on the combined readings from a Hunterlab colorimeter (L: black-white; a: red-green; and b: yellow-blue). Low values (about 60) represent dark brown and high values (about 145) indicate light brown. Colour index is a good indicator of lithotype, but is also influenced by rank.
combustion	PT; UT	A rapid process of oxidation accompanied by the evolution of heat and light. Complete combustion of coal or coke yields carbon dioxide, water, oxides of nitrogen, oxides of sulfur, and ash as the main products. Incomplete combustion may yield carbon monoxide, hydrocarbons, tars, and other carbonaceous products.
combustion, spontaneous	UT	Burning of coal as a result of spontaneous heating. <i>See also 'heating' of coal.</i>
combustor, fluidized-bed (FBC)	CP; UT	A device in which the fuel is burned in a bed of inert solid particles fluidized by air distributed from underneath. The FBC has advantages such as an operating temperature lower than that of a pulverized fuel combustor (less formation of oxides of nitrogen), uniform temperature distribution, and the ability to use limestone or dolomite in the bed to absorb oxides of sulfur. Fluidized-bed combustors can be designed to operate under atmospheric (AFBC) or pressurized (PFBC) conditions.
command signal	CP	The quantity or signal that is set or varied by some device or person external to, and independent of, the control system, and is intended to determine the value of the controlled condition.

Term	Used in	Explanation
comminution	CP; SP	The processes of particle size reduction in crushers and grinding mills.
common sample	SP	<i>See sample, common.</i>
compacting, stockpile	UT	The process of consolidating a stockpile of coal to minimize the free space between particles, to reduce the effects of weathering and any tendency to spontaneous heating.
compaction	CF	The process of permanent volume reduction of a bulk material by application of a consolidating stress.
compressor, air	CP	A compressor, either rotary or reciprocating, used to produce air at a pressure suitable for specific operations in the coal preparation plant.
computer, analogue	CP	A computer that handles information expressed in an analogue form.
computer, digital	CP	A machine that carries out arithmetic and logical operations on data represented in a binary digital format; the operations are controlled by means of a program of instructions (also in binary digital format) stored within the machine.
computer, hybrid	CP	A computer formed from a combination of an analogue and a digital computer.
concealed outcrop	MG	<i>See outcrop, concealed.</i>
concentrate, clean coal	CP	The cleaned product from a beneficiation process, e.g. froth flotation.
concentrate, flotation	CP	The product recovered in froth flotation.
concentrating table	CP	<i>See table, concentrating.</i>
conchoidal fracture	MG	<i>See fracture, conchoidal.</i>
condition, controlled	CP	The physical quantity or condition of the controlled body, process or machine that the system controls.
conditioner	CP	An apparatus in which conditioning takes place.

Term	Used in	Explanation
conditioning	CP	The preparatory stage in the flotation process in which the reagents are brought into intimate contact with the solids of the pulp.
cone, settling	CP	A tank used to settle coarse solids from the circulating water.
cone crusher	UT	<i>See</i> crusher .
cone-ply stockpiling	CP	<i>See</i> stockpiling .
configuration	CP	The specific set or arrangement of equipment supplied as part of a system; the term applies particularly to the size and number of storage and input/output devices.
coning and quartering	SP	An outmoded procedure used in sample division. The material is formed into a cone which is flattened. The truncated cone is divided into quarters. Opposite quarters are collected to comprise the sample. NOTE: This procedure is not recommended, as it can lead to biased samples.
consolidation	CF	<i>See</i> compaction .
constant-mass division	SP	<i>See</i> division, constant-mass .
contact angle	CP	The angle between the tangent to the fluid/fluid interface and the tangent to the solid surface at any point along the line of contact of the interface and the solid; usually measured inside the water phase where water is involved. Maximum and minimum values measured under static conditions are termed ‘advancing’ and ‘receding’ contact angles respectively; usually this is qualified by stating the phase in which the angle is measured (e.g. oil-advancing contact angle).
continuous miner	MG	<i>See</i> miner, continuous .
continuous plastometer	AT	<i>See</i> plastometer, continuous .
continuous sampling	SP	<i>See</i> sampling, continuous .
contours, structure	MG	Lines on a plan joining points of equal elevation of a single horizon relative to a datum plane. The horizon is usually the top or bottom of a bed, and the plan is used to depict structures three-dimensionally.

Term	Used in	Explanation
contraction, maximum	AT	In the dilatometer test, the maximum downward movement of the dilatometer piston, measured from the zero point and expressed as a percentage of the initial pencil length. Symbol: <i>c</i>
control, automatic	CP	(a) The provision of equipment to enable plant and machinery to perform some or all of their operations without the intervention of an operator or attendant. (Not to be confused with remote control which itself may or may not include provision for automatic control.) (b) The process of comparing measured values with a reference value (set point) and correcting deviations from the reference value by automatic means.
control, emission	UT	The control of particulate and gaseous pollutants in exhaust gases to conform to set limits.
control, local	CP	Operator control of a plant from a position adjacent to the motive power.
control, loop	CP	A form of parameter control of which there are two types, as follows: (a) <i>Open loop</i>—a system of control using feedback, but not using any automatic means of determining deviations from the target value. The feedback signal or signals is (are) normally displayed visually, deviations being corrected manually. (b) <i>Closed loop</i>—a system of (automatic) control in which the operation being performed is measured and compared with the desired performance. The deviation is used to activate the control element in such a manner that it reduces the deviation to zero. An important feature of such systems is the way in which the deviation is modified before being fed back to the control element. Closed loop controllers may have proportional, integral or derivative action or a combination of these.

Term	Used in	Explanation
control, manual	CP	The operation of a plant in response to command actions taken by an operator as opposed to those taken automatically.
control, remote	CP	The initiation of control operations for a process or machine at a point remote from the motive power.
control, sequence	CP	The starting or stopping of a series of related events in a prescribed order.
control action	CP	A term describing the relationship between the input signal and the output signal of a control element.
control signal	CP	<i>See</i> signal, control .
control size	AT; CP	<i>See</i> size, control .
control system	CP	An arrangement of measuring devices, controllers and actuators organized and adjusted to control a process in a specified manner.
control system, adaptive	CP	A system in which automatic means are used to change the parameters in a way that is intended to achieve the best possible performance of the system at all times.
controlled condition	CP	<i>See</i> condition, controlled .
controlled device	CP	A machine or some other piece of equipment which is controlled by a system.
controller	CP	An instrument usually comprising— (a) a unit for comparing a measured variable and the desired value in a control loop; and (b) the controller that, in response to signals from the comparator unit, acts in whichever direction is needed to maintain the desired value.
controller, dedicated	CP	A controller that is responsible for the control of a specific section of a plant.
controller, programmable	CP	A computer device that functions according to codes or instructions programmed into it by the user, with one or more application programs being stored in an accessible memory.

Term	Used in	Explanation
controller, programmed	CP	A controller incorporating a sequence of predetermined commands to a control system as a function of time or some other variable; the controller will perform only the functions for which it was designed. NOTE: Programmable logic controller (PLC) is a device for performing this task.
conventional thickener	CP	<i>See</i> thickener .
converter	CP	A device that receives analogue signals in one form (e.g. pneumatic) and produces an equivalent output in another form (e.g. electronic); it is usually qualified by naming the types of signals received and produced.
core, large	MG	Bore cores nominally 100 mm or greater in diameter; common sizes are nominally 100 mm, 150 mm and 200 mm (<i>see</i> AS 2519).
core, slim	MG	Bore cores having diameters usually in the range 45 mm to 65 mm (<i>see</i> AS 2519).
core flow	CF; CP	<i>See</i> flow, funnel .
core recovery	MG	<i>See</i> recovery, core .
core sample	MG; SP	<i>See</i> sample, core .
correct medium	CP	<i>See</i> medium, dense .
correctly placed material	CP	Material properly included in the products of a sizing or density separation. For example: (a) <i>In cleaning</i>—material of relative density less than the separation density that has been correctly directed to the low-density product stream, or material of relative density greater than the separation density that has been correctly directed to the high-density product stream. (b) <i>In sizing</i>—undersize contained in the undersize stream or oversize contained in the oversize stream of a sizing operation. <i>See also</i> correctly placed material, total of.