
Coal and coke — Vocabulary —
Part 1:
Terms relating to coal preparation

Charbon et coke — Vocabulaire —

Partie 1: Termes relatifs à la préparation du charbon

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 27, *Coal and coke*, Subcommittee SC 1, *Coal preparation: Terminology and performance*.

This third edition cancels and replaces the second edition (ISO 1213-1:1993), which has been technically revised.

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

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

Introduction

This document takes into account the distinction between processes or operations and the methods or machines for carrying them out.

[Clause 3](#) is devoted primarily to coal properties and the principal operations involved in coal preparation, and also includes general terms such as those relating to capacities and flowsheets.

[Clauses 4](#) to [7](#) cover the detailed terminology relating to sizing, cleaning, separation of solids from water or air, and size reduction.

[Clause 8](#) deals with the terms involved in interpreting or expressing the results of coal preparation operations.

[Clause 9](#) includes some miscellaneous terms.

[Clause 10](#) covers terms related to blending and homogenization.

[Clause 11](#) covers terms related to automatic control. Of necessity, it covers only a limited selection of terms. A list of other International Standards, which together provide a more comprehensive set of terms, is given in Bibliography.

Most of the clauses are subdivided, and in each case the first subclause includes general terms and the remaining subclauses cover groups of related terms. As far as possible, this logical principle has been carried through into the arrangement of the terms themselves, which are also numbered for ease of reference. An alphabetical index is also provided, with a numerical cross-reference.

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Coal and coke — Vocabulary —

Part 1: Terms relating to coal preparation

1 Scope

This document defines terms commonly employed in coal preparation.

Note For terms relating to petrographic analysis, see ISO 7404-1.

2 Normative reference

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:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1 General coal preparation terms

3.1.1 **coal preparation**

collectively, physical and mechanical processes applied to coal to make it suitable for a particular use

3.1.2

run of mine

r.o.m.

r.o.m. coal

coal produced by mining operations, before screening, *crushing* (7.1.2) or preparation

3.1.3

raw coal

coal that has received no preparation other than possibly *screening* (4.2.1) or *crushing* (7.1.2)

3.1.4

raw coal feed

raw coal (3.1.3) supplied to a plant or machine, in which it undergoes some form of preparation

3.1.5

coal cleaning

treatment of *raw coal* (3.1.3) to lower the quantity of undesirable constituents, through the difference in either density or surface properties

3.1.6

cleaned coal

clean coal

coal produced by a cleaning process (wet or dry)

3.1.7

middlings

product of *coal preparation* (3.1.1) that, because of its ash percentage, is intermediate between coal and *discard* (3.1.11)

Note 1 to entry: It follows therefore that the relative density of middlings is intermediate between those of coal and discard. Middlings may be reprocessed.

3.1.8

true middlings

bone

middlings (3.1.7) so nearly homogeneous that their quality cannot readily be improved by *crushing* (7.1.2) and recleaning

3.1.9

false middlings

interbanded middlings

middlings (3.1.7) in which the particles consist of bands of coal and shale, and from which the coal may be liberated by *crushing* (7.1.2)

3.1.10

reject

refuse

material extracted from the *feed* (3.3.6) during cleaning, for retreatment or *discard* (3.1.11)

3.1.11

discard

dirt

stone

material extracted from the *raw coal* (3.1.3) and finally discarded

3.1.12

recirculation

operation in which the whole or part of a product from a process is returned to the *feed* (3.3.6) to a process

Note 1 to entry: For example, return of the crushed overflow from a screen to the screen feed for rescreening.

3.1.13

foreign coal

coal received at a preparation plant from a source other than that to which the plant is attached

3.1.14

imported coal

coal coming from a foreign country, or other state within the country

3.1.15

low-grade coal

combustible material that has only limited uses owing to undesirable characteristics (e.g. ash percentage or size)

3.1.16

part-cleaned coal

mixed product of cleaned and uncleaned fractions of coal

3.1.17**segregation**

partial separation of a material into its constituents, occurring as a result of differences in particle characteristics such as particle size or relative density

3.1.18**beneficiate**

to increase the commercial value of a coal by appropriate treatment

3.1.19**coal preparation plant**

plant in which a *coal preparation* ([3.1.1](#)) process is carried out

3.1.20**compressor air**

compressor, either rotary or reciprocating, used to produce air at a pressure suitable for specific operations in the *coal preparation plant* ([3.1.19](#))

3.1.21**concentrate clean coal**

cleaned product from a beneficiation process e.g. *froth flotation* ([5.1.22](#))

3.1.22**demagnetise**

to promote *dispersion* ([6.1.12](#)), by means of a suitable magnetic field, in a *dense medium* ([5.4.2](#)) of solids that have been flocculated magnetically

3.1.23**Durham cone**

laboratory apparatus used for evaluation of the flow or handling characteristics of coal

3.1.24**flowsheet**

diagram indicating the method of treating the *raw coal* ([3.1.3](#)) in a preparation plant, by showing in correct sequence the chief units of plant, the principal operations and (normally) the quantities of each stage

3.1.25**haematite**

iron oxide mineral, typically forming the non-magnetic component of *industrial magnetite* ([3.1.30](#))

3.1.26**idlers**

<conveyor> rollers for supporting a conveyor belt

3.1.27**impact box**

container interposed at impact points in the flow of material to resist wear

3.1.28**tramp iron**

pieces of magnetic metal, metallic equipment of machine parts, used welding rods that have become accidentally mixed with the run-of-mine coal

3.1.29**magnetite**

strongly magnetic iron oxide mineral, making up the magnetic component of *industrial magnetite* ([3.1.30](#))

3.1.30

industrial magnetite

commercially available magnetic material used for preparation of *dense medium* (5.4.2) for use in *coal preparation* (3.1.1), commonly referred to as *magnetite* (3.1.29)

3.1.31

metering box

container, having single or multiple compartments, and a *weir* (3.1.44) or weirs to provide the controlled addition of one or more *reagents* (3.1.36)

3.1.32

percentage recovery

amount of a certain constituent in the product, expressed as a percentage of that constituent in the *feed* (3.3.6)

3.1.33

finger planimeter

flow rate indicator for determining the volumetric rate of flow of a solid particulate material, in which a series of flexible steel fingers mounted on a common frame are situated above a conveyor belt with the fingers resting on the belt surface

3.1.34

pilot plant

coal preparation plant (3.1.19) of limited capacity but duplicating the operations of a proposed plant or a part of the proposed plant, so that the effectiveness of the designed process may be determined

3.1.35

metering pump

variable, positive-displacement pump to control the addition of *reagents* (3.1.36) to a *coal preparation plant* (3.1.19) circuit

3.1.36

reagent

chemical substance added to the preparation plant circuit for some specific purpose

3.1.37

residence time

mean time for which a unit of material is within a vessel or process

3.1.38

solids concentration

- a) <by mass> mass of solids in a solids/liquid mixture or *suspension* (5.1.11), expressed as a percentage of the total *pulp* (5.6.6) or *slurry* (5.1.21) mass
- b) <by volume> volume of solids in a solids/liquid mixture or *suspension* (5.1.11), expressed as a percentage of the total *pulp* or *slurry* (5.1.21) volume
- c) <by other means> mass or volume of solids in a solids/liquid mixture or *suspension* (5.1.11), expressed as a mass per unit volume, or volume per unit mass, of the total *pulp* (5.6.6) or *slurry* (5.1.21) respectively

3.1.39

spigot

orifice of a device [e.g. the apex of a *cyclone* (5.5.8)] through which the underflow discharges

3.1.40

splitter box

receiver fitted with an adjustable device to divert or apportion flow

3.1.41**spoil bank**

stockpile of *reject* (3.1.10) material; may also refer to waste material (e.g. overburden) from mining operations

3.1.42**trash**

extraneous material associated with the run-of-mine coal, e.g. wood, metal, and plastic materials

3.1.43**belt weigher**

apparatus used to quantify the mass flow of a material on a belt conveyor

3.1.44**weir**

plate or dam (over which the liquid must flow) to control the level of the liquid

3.2 Cleaning characteristics**3.2.1****washability**

amenability of a coal to improvement in quality by cleaning, generally through its relative density/ash relationship

3.2.2**float-and-sink analysis**

division of a sample into relative density fractions having defined limits, the amounts of the fractions being expressed as weight percentages of the total sample, commonly with an indication of the ash percentage (and other characteristics, if required) of each fraction

3.2.3**washability curve**

curve obtained from the results of a *float-and-sink analysis* (3.2.2) permitting the *theoretical yield* (8.3.2) of *floats* (8.3.11) or *sinks* (8.3.12) to be read off

Note 1 to entry: The following are examples of washability curves:

- a) characteristic ash curve; see 3.2.4;
- b) cumulative floats curve; see 3.2.6;
- c) cumulative sinks curve; see 3.2.7;
- d) densimetric (relative density) curve; see 3.2.8;
- e) near-density curve; see 3.2.9;
- f) instantaneous ash curve; see 3.2.15;
- g) ash/relative density curve. See 3.2.14.

3.2.4**characteristic ash curve**

curve obtained from the results of a *float-and-sink analysis* (3.2.2) showing, for any mass percentage of *floats* (8.3.11) [or *sinks* (8.3.12)] the ash percentage of the highest density (or lowest density) fraction passing into these *floats* (8.3.11) [or *sinks* (8.3.12)], the mass percentage being plotted on the ordinate (vertical axis) and the ash percentage on the abscissa (horizontal axis)

3.2.5**cumulative curve**

curve expressing the results of combining successive relative density fractions or size fractions

3.2.6

cumulative floats curve

curve obtained from the results of a *float-and-sink analysis* (3.2.2) by plotting the cumulative mass percentage of *floats* (8.3.11) at each relative density against the cumulative ash of the total *floats* (8.3.11) at that density

3.2.7

cumulative sinks curve

curve obtained from the results of a *float-and-sink analysis* (3.2.2) by plotting the cumulative mass percentage of *sinks* (8.3.12) at each relative density against the cumulative ash of the total *sinks* (8.3.12) at that density

3.2.8

densimetric curve

<relative density curve> curve obtained from the results of a *float-and-sink analysis* (3.2.2) by plotting the cumulative mass percentage of *floats* (8.3.11) or *sinks* (8.3.12) against the relative density

3.2.9

near-density curve

difficulty curve

curve obtained from the results of a *float-and-sink analysis* (3.2.2), or from the *densimetric curve* (3.2.8), by plotting the mass percentage within the limits $\pm 0,1$ of a given relative density against that relative density

3.2.10

performance curve

curve used to show the relationship between properties of coal and results of a specific treatment

3.2.11

actual performance curve

performance curve (3.2.10) showing the results actually obtained from a *coal preparation* (3.1.1) treatment

3.2.12

expected performance curve

performance curve (3.2.10) showing the expected results of a *coal preparation* (3.1.1) treatment

3.2.13

M-curve

Mayer curve

vectorial curve, obtained by plotting the cumulative ash percentages against their cumulative *yields* (8.1.3), used to express the *washability* (3.2.1) of a coal, plotted on a vectorial diagram in which the projection of the vector on the ordinate (vertical axis) represents the percentage of the product (coal) and the direction of the vector represents the percentage of a particular constituent of the product

3.2.14

ash/relative density curve

curve obtained from the *float-and-sink analysis* (3.2.2) by plotting the ash percentages of successive fractions against the mean relative density of the fraction

3.2.15

ash/instantaneous

maximum ash percentage of any particle in any given relative density fraction mass

3.2.16

ash curve instantaneous

standard *washability curve* (3.2.3) 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

3.2.17**ash adventitious**

ash arising from mineral matter that was not associated with the original plant material from which the coal was formed; this form of mineral can be removed readily by physical means

3.2.18**ash extraneous**

ash arising from that part of the mineral matter associated with but not inherent in coal

3.2.19**ash inherent**

ash arising from finely dispersed mineral matter present in the original plant material or from which the coal was formed, or from mineral matter incorporated intimately in the coal during the coalification process

3.2.20**Rosin-Rammler curve**

particular form of particle size distribution curve graphed on specific ordinate and abscissa scales that results in any individual material's size distribution, due to natural *breakage* (7.1.6), being represented by a straight line

3.3 Capacity and throughput**3.3.1****nominal capacity**

notional figure, expressed in mass per hour, used in the title of a *flowsheet* (3.1.24) and in the general description of a plant, applying to the plant and to the specific product under consideration

3.3.2**operational capacities**

figures given on a *flowsheet* (3.1.24) to indicate quantities per unit time passing various points in the plant, taking account of fluctuations in the rate of supply and composition (as to size and impurity content)

3.3.3**design capacity**

rate of *feed* (3.3.6) at which specific items of plant must operate continuously and give the guaranteed results on a particular quality of *feed* (3.3.6)

3.3.4**peak design capacity**

rate of *feed* (3.3.6) in excess of the *design capacity* (3.3.3) that specific items of plant equipment will accept for short periods without necessarily fulfilling the performance guarantees given in respect of them

3.3.5**mechanical maximum capacity**

highest rate of *feed* (3.3.6) at which specific items of equipment, not subject to performance guarantees, will function on the type and quality of *feed* (3.3.6) for which they are supplied

3.3.6**feed**

material for treatment supplied to an appliance or plant

3.3.7**basic flowsheet**

schematic diagram representing the various preparation process stages in the treatment of the *raw coal* (3.1.3)

3.3.8

process flowsheet

basic flowsheet (3.3.7) indicating the main operational steps within the plant, the movement of the various materials between the steps and the final products obtained, and often also the average mass flow at various points in the plant

3.3.9

equipment flowsheet

diagram indicating, by standard symbols, the units of equipment used in the various operational steps carried out within a *coal preparation plant* (3.1.19)

3.3.10

materials flowsheet

flowsheet (3.1.24) principally concerned with solid materials

3.3.11

liquids flowsheet

flowsheet (3.1.24) to indicate the flow of liquids throughout a series of operations

3.3.12

weighted flowsheet

capacity flowsheet

materials flowsheet (3.3.10) used in the design of a plant, including statements of the mass flow per hour at principal points in the plant

3.3.13

capacity design

rate of *feed* (3.3.6), defined by limits expressing the extent and duration of load variations, at which specific items of plant equipment, subject to a performance guarantee, operate continuously and give the guaranteed results on a quality of *feed* (3.3.6)

3.3.14

capacity peak design

rate of *feed* (3.3.6), in excess of the *design capacity* (3.3.3) that specific items of plant equipment will accept for short periods without fulfilling the performance guarantees given in respect of them

3.3.15

capacity mechanical maximum

highest rate of *feed* (3.3.6) at which specific items of equipment, not subject to performance guarantees, will function on the type and quality of *feed* (3.3.6) for which they are supplied

4 Terms related to sizing

4.1 General

4.1.1

sizing

division of a material into products between *nominal size* (4.1.6) limits

4.1.2

classification

separation of particles according to their size, density and shape by control of their settling rate through a fluid medium

4.1.3

size analysis

process or the result of the division of a sample into size fractions, each within defined limits, the mass or number of particles in each fraction being expressed as percentages of the total sample