
**Hard coal and coke — Mechanical
sampling —**

**Part 1:
General introduction**

*Houille et coke — Échantillonnage mécanique —
Partie 1: Introduction générale*
(standards.iteh.ai)

[ISO 13909-1:2001](https://standards.iteh.ai/catalog/standards/sist/150758d3-943c-4c8f-ab6b-89751a9cef7f/iso-13909-1-2001)

<https://standards.iteh.ai/catalog/standards/sist/150758d3-943c-4c8f-ab6b-89751a9cef7f/iso-13909-1-2001>



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 13909-1:2001](https://standards.iteh.ai/catalog/standards/sist/150758d3-943c-4c8f-ab6b-89751a9cef7f/iso-13909-1-2001)

<https://standards.iteh.ai/catalog/standards/sist/150758d3-943c-4c8f-ab6b-89751a9cef7f/iso-13909-1-2001>

© ISO 2001

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

Contents

	Page
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Structure	5
5 General principles of sampling	5
6 Choice of sampling procedure	6
7 Integrated sampling systems	7
8 Packing and marking of samples	7
9 Sampling report	7
Bibliography.....	9

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 13909-1:2001

<https://standards.iteh.ai/catalog/standards/sist/150758d3-943c-4c8f-ab6b-89751a9cef7f/iso-13909-1-2001>

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 13909 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 13909-1 was prepared by Technical Committee ISO/TC 27, *Solid mineral fuels*, Subcommittee SC 4, *Sampling*.

ISO 13909 cancels and replaces ISO 9411-1:1994, *Solid mineral fuels — Mechanical sampling from moving streams — Part 1: Coal* and ISO 9411-2:1993, *Solid mineral fuels — Mechanical sampling from moving streams — Part 2: Coke*, of which it constitutes a technical revision. It also supersedes the methods of mechanical sampling of coal and coke given in ISO 1988:1975, *Hard coal — Sampling* and ISO 2309:1980, *Coke — Sampling*.

ISO 13909 consists of the following parts, under the general title *Hard coal and coke — Mechanical sampling*:

- *Part 1: General introduction*
- *Part 2: Coal — Sampling from moving streams*
- *Part 3: Coal — Sampling from stationary lots*
- *Part 4: Coal — Preparation of test samples*
- *Part 5: Coke — Sampling from moving streams*
- *Part 6: Coke — Preparation of test samples*
- *Part 7: Methods for determining the precision of sampling, sample preparation and testing*
- *Part 8: Methods of testing for bias*

Hard coal and coke — Mechanical sampling —

Part 1: General introduction

1 Scope

This part of ISO 13909 defines the basic terms used in the sampling of solid mineral fuels, describes the general principles of sampling and details the information to be provided in the documentation and the sampling report. It also lists the other parts and gives guidance on the selection of the appropriate part.

ISO 13909 does not include sampling of brown coals and lignites which is described in ISO 5069-1 and ISO 5069-2, nor sampling from coal seams, for which guidance is given in ISO 14180. Manual sampling of coal and coke is covered in ISO 1988 and ISO 2309.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 13909. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 13909 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

<https://standards.iteh.ai/catalog/standards/sist/150758d3-943c-4c8f-ab6b-7551a8-c75e-13909-1-2001>

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

ISO 3310-1:2000, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth.*

ISO 5725-1:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions.*

3 Terms and definitions

For the purposes of this part of ISO 13909, the following terms and definitions apply.

3.1

air-drying

process of bringing the moisture content of the sample near to equilibrium with the atmosphere in the area in which further reduction and division of the sample are to take place

NOTE Air-drying to equilibrium with the atmosphere applies to coal. Drying of coke is generally to facilitate sample preparation.

3.2

bias

systematic error which leads to the average value of a series of results being persistently higher or persistently lower than those which are obtained using a reference sampling method

3.3

coefficient of variation

standard deviation expressed as a percentage of the absolute value of the arithmetic mean

3.4

common sample

sample collected for more than one intended use

3.5

continuous sampling

taking of a sample from each consecutive sub-lot so that increments are taken at uniform intervals whenever the fuel is handled at the point of sampling

3.6

cut

increment (3.15) taken by a primary sampler or sample divider

3.7

cutter

mechanical sampling device which extracts increment(s)

3.8

divided increment

part obtained from the division of the increment in order to decrease its mass

NOTE Such division may be done with or without prior size reduction

3.9

duplicate sampling

particular case of replicate sampling with only two replicate samples

3.10

error

difference between the observation and the accepted reference value as defined in ISO 5725-1:1994, 3.5

NOTE This can be designated as systematic error (bias) or random error.

3.11

fixed mass division

method of sample division in which the mass retained is predetermined and independent of the mass of the feed

3.12

fixed ratio division

method of sample division in which the division ratio is predetermined

NOTE In fixed ratio division, the mass of sample retained is a fixed proportion of the mass of the feed.

3.13

fuel

hard coal or coke

3.14

general-analysis test sample

sample, prepared to pass a sieve of nominal size of openings 212 μm complying with ISO 3310-1:2000, used for the determination of most chemical and some physical characteristics

3.15

increment

portion of fuel extracted in a single operation of the sampling device

3.16

intermittent sampling

taking of samples from only certain sub-lots of fuel

3.17**lot**

defined quantity of fuel for which the quality is to be determined

NOTE A lot may be divided into sub-lots.

3.18**manual sampling**

collection of increments by human effort

3.19**mass-basis sampling**

taking of increments whereby the position of each increment to be collected from the stream of fuel is measured by a mass interval of stream flow and the increment mass is fixed

3.20**maximum tolerable bias****MTB**

maximum bias that can be tolerated considering the practical consequences of such a value

3.21**mechanical sampling**

collection of increments by mechanical means

3.22**mechanical sampling system**

combination of sampling and sample preparation performed mechanically

3.23**moisture sample**

sample taken specifically for the purpose of determining total moisture

NOTE For coke, this sample may also be used for general analysis.

3.24**nominal top size**

aperture size of the smallest sieve in the range included in the R 20 Series (as defined in ISO 565, square hole) on which not more than 5 % of the sample is retained

3.25**off-line sample preparation**

sample preparation performed manually or mechanically on the samples produced by the mechanical sampling system, using equipment not integral to the mechanical sampling system itself

3.26**on-line sample processing**

processing of the primary sample material using equipment integral with the sampling system

3.27**outlier**

result which appears to be in disagreement with others from the same set of observations and which arouses suspicion that there has been a mistake in the sampling, sample preparation or analysis

3.28**physical sample**

sample taken specifically for the determination of physical characteristics, such as physical strength indices or size distribution

3.29

precision

closeness of agreement between independent test results obtained under stipulated conditions

NOTE This is often defined using an index of precision, such as two standard deviations.

3.30

primary increment

increment taken at the first stage of sampling, prior to any sample division and/or sample reduction

3.31

random error

error that is statistically independent of previous errors

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

3.32

relevant bias

bias which is of practical importance or is agreed between contracting parties

3.33

replicate sampling

taking at intervals of increments which are combined in rotation into different containers to give two or more samples of approximately equal mass

3.34

sample

quantity of fuel, representative of a larger mass for which the quality is to be determined

ISO 13909-1:2001
<https://standards.iteh.ai/catalog/standards/sist/150758d3-943c-4c8f-ab6b-89751a9cef7f/iso-13909-1-2001>

3.35

sample division

process in sample preparation whereby the sample is divided into representative, separate portions

3.36

sample preparation

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

NOTE Sample preparation covers mixing, particle size reduction, sample division and sometimes air-drying of the sample and may be performed in several stages.

3.37

sample reduction

process in sample preparation whereby the particle size of the sample is reduced by crushing or grinding

3.38

size analysis sample

sample taken specifically for particle size analysis

3.39

standard deviation

square root of the variance

3.40

stratified random sampling

taking of an increment at random within the mass interval or time interval determined for mass-basis sampling or time-basis sampling respectively

3.41**sub-lot**

part of a lot for which a test result is required

3.42**systematic sampling**

taking of increments at uniform mass or time intervals according to a predetermined plan

3.43**test sample**

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

3.44**time-basis sampling**

taking of increments whereby the position of each increment to be collected from the stream of fuel is measured by a time interval and the increment mass is proportional to the flow rate at the time the increment is taken

3.45**variance**

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

4 Structure

ISO 13909 is divided into eight parts. Parts 2, 3 and 4 relate to coal only; Parts 5 and 6 to coke only.

Basic statistical procedures and formulae which apply equally to the sampling of hard coal or coke and which underlie the decisions concerning numbers of sub-lots, increments and masses taken and information concerning the precision and bias of the sampling operation are, for the most part, found in Parts 7 and 8.

[ISO 13909-1:2001](https://standards.iteh.ai/catalog/standards/sist/150758d3-943c-4c8f-ab6b-89751a9cef7f/iso-13909-1-2001)

The parts are as follows: <https://standards.iteh.ai/catalog/standards/sist/150758d3-943c-4c8f-ab6b-89751a9cef7f/iso-13909-1-2001>

ISO 13909, *Hard coal and coke — Mechanical sampling*

Part 1: General introduction

Part 2: Coal — Mechanical sampling from moving streams

Part 3: Coal — Mechanical sampling from stationary lots

Part 4: Coal — Preparation of test samples

Part 5: Coke — Mechanical sampling from moving streams

Part 6: Coke — Preparation of test samples

Part 7: Methods for determining the precision of sampling, sample preparation and testing

Part 8: Methods of testing for bias

5 General principles of sampling

The purpose of taking and preparing a sample of fuel is to provide a test sample which, when analysed, will provide test results representative of the lot sampled.

The first stage of sampling, known as primary sampling, is the taking, from positions distributed over the entire lot, of an adequate number of fuel portions known as primary increments. The primary increments are then combined into a sample, either as taken or after having been divided in order to reduce the mass of the sample to a manageable