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Hard coal and coke — Guidance to the inspection of mechanical sampling systems

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National foreword

This British Standard is the UK implementation of ISO 21398:2019. It supersedes BS ISO 21398:2007, which is withdrawn.

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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, *Solid mineral fuels*, Subcommittee SC 4, *Sampling*.

This second edition cancels and replaces the first edition (ISO 21398:2007), of which it constitutes a minor revision. The changes compared to the previous edition are as follows:

— the normative references have been updated and the dates removed;

— the references in Clause 5 have been updated;

— Bibliographic references have been updated.

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.

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Introduction

The objective of this document is to provide users of new and existing mechanical sampling systems for minerals with guidance on their operation and inspection.

An ‘informative’ annex is for information and guidance only.

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Hard coal and coke — Guidance to the inspection of mechanical sampling systems

1 Scope

This document sets out recommended practices for the inspection of mechanical sampling systems. It serves as a guide for conformance with applicable ISO/TC 27 standards.

This document covers general considerations including precision, mineral variability and bias, establishment of inspection systems and inspection procedure.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13909 (all parts), *Hard coal and coke — Mechanical sampling*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13909-1 and the following 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
audit
<external> critical review of a mechanical sampling system, which measures its conformance with stipulated operating specifications, undertaken by a suitably qualified independent person who is not directly involved in the management of that system

3.2
audit
<internal> critical inspection and review of a mechanical sampling system, which measures its conformance with stipulated operation specifications, undertaken by a suitably qualified person who is not a day-to-day operator of that particular system

3.3
operational inspection
observations and inspections of operation conditions undertaken by the operator during sampling of a lot

Note 1 to entry: The operator is the person responsible for monitoring the sampling system on a shift-to-shift basis.

4 Safety

This document does not purport to address safety issues that can be associated with its use. It is the responsibility of the user of this document to establish appropriate safety and health practices in line with site safety regulations and relevant Occupational Health and Safety Acts. It is highly recommended that the auditor or inspector start by conducting a careful review of all safety rules and procedures regarding the sampling system to be inspected.

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5 General considerations

5.1 Precision

Precision tests are recommended for each coal or coke type used in the system. If there is a significant change in a coal or coke type or a new coal or coke type introduced, then a precision test should be carried out. These tests should be in accordance with ISO 13909-7. The Manager or Supervisor should maintain a record of the precision of sampling, preparation and analysis of each type of coal and coke sampled with the system.

5.2 Bias

It is recommended that, after commissioning and auditing of a new system or any major engineering modifications of an existing system, a bias test be carried out to confirm the system. It is recommended that the system be verified in accordance with ISO 13909 (all parts) procedures. Reference is made to ISO 13909-2, and ISO 13909-5, where bias tests may be mandatory under certain conditions. When choosing a coal or coke type for bias testing, refer to ISO 13909-8. It is recommended that further bias sample pairs be taken on a regular basis to confirm that the initial bias result is still relevant. If a significant change is made to the sampling system, or a new mineral having more difficult sampling characteristics is introduced, a new bias test should be considered.

5.3 Operation of sampling system

The mechanical plant system should be started some time in advance of the start of conveying the coal or coke so that any foreign substances (including water) are purged. Where hydraulic drives are used, sufficient time should be allowed for the hydraulic oil and the associated system to attain temperature equilibrium. It is recommended, particularly in multi-coal or coke sampling systems, that one primary cut be allowed to pass through the mechanical system as a conditioner before actual sampling commences.

It is recommended that the operator review any sampling records for the plant maintained by the previous operator. These records should include quantities of coal or coke handled and sampled, and notations as to system malfunctions, stoppages, blockages or other deficiencies. The operator should use a suitable checklist, such as the example given in Annex A. It is recommended that the operator complete all items on a suitable checklist designed for the system. For large, multi-user systems, an operators' inspection report, such as the example in given Annex B, should be developed.

Sufficient suitably designed inspection points should be available to observe that the falling-stream and cross-belt cutters cut the full stream of coal or coke and that cutter apertures can be inspected for blockages and blinding.

6 Establishment of inspection system

6.1 General

6.1.1 To ensure reliable operation, it is recommended that a sampling checklist (see Annex B) and operators' sampling record (see Annex C) be developed with input from the following sources:

a) original design criteria;

b) sampling equipment operating and maintenance manuals;

c) management responsible for the system;

d) personnel operating or maintaining the system;

e) for a new system, the designers and commissioning personnel;

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f) relevant International Standards where applicable;

6.1.2 The general method for establishing these procedures is as follows:

a) Reference should be made to ISO 13909-2 and ISO 13909-5 to ascertain the correct sampling scheme.

b) Reference should be made to the equipment supplier's operating and maintenance manual to ascertain correct procedures for operation and intervals for routine maintenance. The manuals can provide useful information based on the system design. Such information as conveyor rates, conveyor speeds, material parameters (particularly sizing and variability) are significant data and should always be kept in mind when any changes are contemplated.

c) Existing sampling and maintenance records for an extended period should be examined. This information provides guidance for operators to ensure that the required level of inspection and maintenance is carried out to ensure reliable operation and possibly to alert operators to any inappropriate maintenance or modifications that can have been made to the equipment.

d) Personal experience of maintenance, operational and sampling personnel should be sought with respect to the sampling system. This information, together with that obtained from items b) and c), enable appropriate operators' manual, operators' sampling record and system checklist to be prepared.

6.2 Audit — External

A scheme for regular audits of the sampling system should be established. Reference should be made to the original operating parameters and equipment supplier's design data establish conformance with the currently applicable International Standards.

NOTE Annex B provides a typical reference list.

It is recommended that correct operation of all new systems be confirmed by an audit following the commissioning stage before being accepted as operational. Also, the design and operation of the system should be confirmed by an audit prior to any bias test.

6.3 Audit — Internal

It is recommended that a scheme for routine inspections of the sampling system by operators should be established. The frequency and detail of inspections is determined by such factors as, but not limited to, reliability of the system, handling characteristics of the sampled material and frequency of use of the system and purpose of sampling (e.g. process control compared to large multi-user port facilities).

6.4 Operational inspections

It is recommended that operational procedures and inspections should be established and carried out immediately before, during and immediately after operation of the sampling system for a given lot or sub-lot. These procedures and inspections are less extensive than those undertaken as audits or mechanical inspections as given in 7.2 and 7.3. They should be designed to be simple inspections of the integrity of the sampling process. For large, multi-user facilities, it is recommended that a system of operational reports, as per the example in Annex B, be developed.

7 Procedures

7.1 Audit — External

When assessing the conformance of a mechanical sampling system, an auditor should refer to Annexes A and B, the relevant parts of ISO 13909-2 and ISO 13909-5, and the design flow chart of the system being evaluated. It is recommended that a person who is not directly involved in the operation and management of that sampling system carry out an audit at least once per year.

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