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Trdna fosilna goriva - Smernice za vzorļenje premogovih plasti

Solid mineral fuels -- Guidance on the sampling of coal seams

Combustibles minéraux solides -- Principes directeurs pour l'échantillonnage des veines de charbon

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INTERNATIONAL STANDARD

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Solid mineral fuels — Guidance on the sampling of coal seams

Combustibles minéraux solides — Principes directeurs pour l'échantillonnage des veines de charbon

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Contents

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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.

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.

International Standard ISO 14180 was prepared by Technical Committee ISO/TC 27, *Solid mineral fuels*, Subcommittee SC 4, *Sampling*.

Annexes A and B of this International Standard are for information only.

Introduction

A coal seam may consist of a single stratum of one lithotype of relatively uniform maceral constitution, or it may consist of a number of layers of different coal lithotypes varying in thickness and lateral extent. The seam may also contain discrete layers of inorganic sediments or carbonaceous shales of varying thickness. Veins of concordant or discordant secondary mineral matter or intrusive igneous rock may also be present. The lithotype layers may vary considerably in hardness, texture and structure according to the nature of the coal and inorganic sediments. The inorganic layers may also thicken laterally, splitting the seam into two or more separate entities. Thus, it is not always possible to obtain samples of a full seam or seam section at one sampling point. Where significant variation in seam thickness, lithotype profile and structure occurs and a representative sample is required, several samples may have to be taken.

Methods of sampling for the assessment of the physical, chemical, petrographic or utilization properties are described for the following:

a) sampling from small and large diameter drill cores;

b) sampling from exposed seam faces;

c) sampling from trial open-cut excavations;

d) sampling from underground workings.

In a seam of variable quality, it will be necessary to take a number of samples to improve the representativity of sampling.

In operating mines, the manager should be consulted and approval should be obtained before sampling sites are selected and sampling proceeds. In all sampling situations, experienced and qualified personnel will be required for supervision and to ensure that accurate records are made of location, thickness and lithotype descriptions and that all safety precautions have been addressed.

Solid mineral fuels — Guidance on the sampling of coal seams

SAFETY PRECAUTIONS — It is strongly recommended that a risk analysis of the sampling exercise be undertaken by an experienced safety officer before work begins.

1 Scope

This International Standard provides guidance on methods for taking samples from coal seams in the ground, whether from exploration tenements, or from operating underground or open-cut mines. The following methods are described:

a) bore core sampling;

b) drill cuttings sampling;

c) open-cut slot sampling;

d) adit, drift or shaft sampling;

e) pillar sampling;

f) channel sampling;

g) strip sampling.

This International Standard does not apply to sampling from moving streams in production or any other source of coal that is not *in situ*.

Recommendations are made for selection and preparation of the sampling site, and methods are described for taking both small and bulk samples, and for preparing the samples for transport.

NOTE Annex A gives an example of a sample record form that may be used to record sampling and other relevant data, and ISO 9411-1 [1] describes how to determine the mass of a representative sample at various nominal top sizes.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document 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.

ISO 1213-2:1992, *Solid mineral fuels — Vocabulary — Part 2: Terms relating to sampling, testing and analysis*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 1213-2 and the following apply.

3.1
bulk sample
sample of large mass, taken in a particular operation for a specific reason, such as for pilot washing, coal preparation or burning tests

NOTE It is not possible to define the minimum size of a bulk sample.

3.2
channel sample
sample of the coal and associated inorganic material taken by removing a channel of even cross-section from the seam

NOTE Where the full section of the seam is not accessible or not required, this term may refer to a sample taken either from a specifically defined portion of the seam, or from the floor to roof as mined or exposed.

3.3
coal seam
stratum or sequence of strata composed of coal as a significant component and significantly different in lithology to the strata above and below it

NOTE It is laterally persistent over a significant area and it will be of sufficient thickness and persistence to warrant mapping or description as an individual unit.

3.4
core sample
cylindrical sample of the whole or part of a coal seam obtained by drilling using a coring barrel

NOTE The diameter of the core may vary from 50 mm to 2 000 mm depending on the reason for which the sample is required. However, 50 mm to 200 mm is the most common core diameter range.

3.5
cuttings sample
sample of coal chips produced from the rotary drilling of a coal seam using a non-coring bit such as a blade bit or roller bit

3.6
pillar sample
section of a seam taken in the form of a block, or series of blocks, of coal with associated inorganic rock which, when arranged in correct vertical sequence, represent a true section of the seam

NOTE Where the full section of the seam is not accessible or not required, this term may refer to a sample taken either from a specifically defined portion of the seam, or from the floor to roof as mined or exposed.

3.7
ply sample
sample taken from an individual ply or leaf or from a series of plies or leaves of a coal seam

3.8
strip sample
sample similar to a channel sample but smaller in cross-section

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

4 Selection of sampling site

If a sample is to be taken to provide a representative sample of the seam, the site should be chosen, as far as possible, to avoid cracks and breaks, random lenses of rock or mineral matter, or other abnormalities or irregularities in the face to be sampled. However, on occasion, the purpose may be to sample a particular mode of development of the seam section, in which case the sample should be taken at the best available site exhibiting this feature. The location of the sampling point should be recorded accurately (see clause 6).

5 Sampling procedures

5.1 General

Before sampling an exposed face, the section to be sampled should, as far as practicable, be uniformly dressed and squared up, and any loose, overhanging or protruding pieces of coal or rock should be removed. Where a face is weathered, the immediate surface material should be removed to a depth sufficient to eliminate weathering effects. In the case of underground face sampling, contamination by stone dust is to be avoided, as this will influence the analysis.

Care should also be taken to prevent contamination by out-of-seam materials, or other sources such as drilling fluid.

In all cases, but particularly for lower rank coals, it is imperative that the sample be promptly packed in its container to minimize loss of moisture and be transported to the laboratory as soon as practicable.

If the laboratory cannot begin analysis immediately, arrangements should be made to keep the sample in cold storage to prevent oxidation of the coal. Any coal not being analysed should be returned to cold storage until it is required.

5.2 Core sampling

5.2.1 Purpose of core sampling

Core sampling is usually employed for sampling coal seams that are not exposed in outcrop or by mining. Sometimes, however, this method is used even though exposed faces are available. This is because it is often faster, less labour-intensive and more representative than pillar or strip sampling, especially if a suitable drilling rig is readily available. For example, many open-cut mines take cores of the seam to be uncovered in the next mining strip to obtain coal quality data for mine planning purposes. Coring of the uncovered coal seam by a drilling rig sitting directly on top of the coal is also common practice where specific coal quality parameters need to be known for blending purposes or for specific cargoes where the customer may be particularly sensitive to certain coal properties or inorganic impurities.

Cores can be obtained routinely in diameters ranging from 50 mm to 200 mm depending on the amount of material required for testing. It is generally advisable that, for routine sampling operations, 100 mm cores be taken as this size provides a good compromise between representativity and cost. However, it is now possible to take very large cores where a bulk sample is required for marketing, coal processing or coal utilization studies. These cores are obtainable with a foundation drilling rig (commonly known as a bucket rig) but are generally limited to reasonably shallow depths. In this way, a 100 t sample can be obtained at reasonable cost. The coal is usually loaded directly into a truck and covered for transport to the laboratory or pilot beneficiation plant. When taking this type of sample, it is advisable to drill several small-diameter pilot drill holes at the sampling site, to locate the top of the seam accurately so that coring can begin at a predetermined distance above the seam.

5.2.2 Method of sampling cores

Once the sampling intervals have been defined, the coal from each ply is placed in a suitable container such as a thick plastics bag, 20 litre plastics drum, 200 litre lined drum, PVC split tube or gas desorption cylinder.

NOTE Guidance on core sampling and sampling intervals is contained in AS 2519 [2].

Care should be taken to collect all of the sample, including fines in the bottom of the core split tubes, to maintain representativity. This can be achieved by using a shaped scoop and a paintbrush.