INTERNATIONAL STANDARD

ISO 8858-3

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Hard coal — Froth flotation testing —

Part 3: Release evaluation

Houille — Essais de flottation —

Partie 3: Évaluation des émissions

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8858-3 was prepared by Technical Committee ISO/TC 27, *Solid mineral fuels*, Subcommittee SC 1, *Coal preparation: Terminology and performance*.

ISO 8858 consists of the following parts, under the general title *Hard coal — Froth flotation testing*:

— *Part 1: Laboratory procedure*

— *Part 2: Sequential evaluation*

— *Part 3: Release evaluation*

Introduction

The froth flotation of coal has widespread application for the recovery of fine coal particles and their separation from unwanted mineral matter. The response of coal to the froth flotation process is measured initially by a laboratory scale test. ISO 8858-1:1990 provides a means of evaluating the general flotation characteristics of a coal under a set of specified conditions and will not necessarily indicate the full potential of that coal. It is accepted that variation of the many parameters in the froth flotation process can be used to effect the beneficiation of the product. This part of ISO 8858 describes methods of applying certain test conditions to reveal the relative response of coals to the flotation process.

To facilitate the determination of how a particular coal will respond to froth flotation, a method of controlling the recovery of froth is used. This is done by inhibiting the process to a degree, determining the rate at which coal reacts and by progressively sampling the froth. This method provides a basis to vary test parameters to explore any special flotation characteristics.

This part of ISO 8858 is applicable to a wide range of coals and provides a method of comparison of flotation behaviour, and will facilitate the exchange of information relating to specific performance. It is expected that the use of this method will provide a tool for comparison of flotation characteristics.

From the results of the standard test, it is possible to draw evaluation curves similar to those obtained from the float and sinking of coal.

Because of the high reproducibility of results, the test represents a reliable means of comparing the flotation response of different samples.

Hard coal — Froth flotation testing —

Part 3: Release evaluation

1 Scope

This part of ISO 8858 describes a laboratory method for release evaluation of the froth flotation characteristics of hard coal, of particle size less than 0,5 mm. It is applicable to coal in powder form or in the form of a slurry.

2 Normative references

The following referenced documents are indispensable for the application 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 1213-1:1993, *Solid mineral fuels — Vocabulary — Part 1: Terms relating to coal preparation*

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*

ISO 8858-1:1990, *Hard coal — Froth flotation testing — Part 1: Laboratory procedure*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1213-1 apply.

4 Principle

A test portion of coal is mixed with water to form a suspension in the flotation cell, or a test portion of slurry is added to the cell and diluted. A collector and frother are added, the suspension is conditioned and air is then introduced to the cell while agitation is maintained by means of an impeller.

To study differing flotation characteristics, the flotation operation is inhibited in two ways, relating to reagent dosage rate in the first stage of the test and to air flow rate in the second stage.

A number of froth increments are obtained which give spaced points for comparison.

5 Reagents

Use only reagents of recognized analytical grade and the following.

5.1 Water, conforming to grade 3 of ISO 3696.

5.2 Collector, undiluted *n*-dodecane.

5.3 Frother.

Prepare a solution of 0,1 % (*V/V*) 4-methylpentan-2-ol (formerly called methyl isobutyl carbinol or MIBC) by diluting 1 ml of MIBC to 1 litre using water (see 5.1). All dosages of MIBC stated refer to this solution.

6 Apparatus

6.1 Flotation machine

As described in 6.1 of ISO 8858-1:1990, consisting of a mechanical impeller-type flotation machine designed for laboratory-scale flotation testing, comprising the following.

a) A flotation cell, of capacity approximately 3,5 litres, made from an inert material, such as stainless steel, glass or polymethyl methacrylate.

b) An impeller assembly, capable of being driven so that the periphery of the impeller moves at a speed of approximately 5,7 m/s. The impeller shall be positioned centrally with a clearance of no more than 5 mm from the base of the cell.

c) A means of supplying air to the impeller.

A typical flotation machine is shown in Figures 1 and 2.

6.2 Air flowmeter, with a needle valve to control the air flow rate to the flotation cell.

6.3 Constant level device, for maintaining the pulp at a constant level during the test.

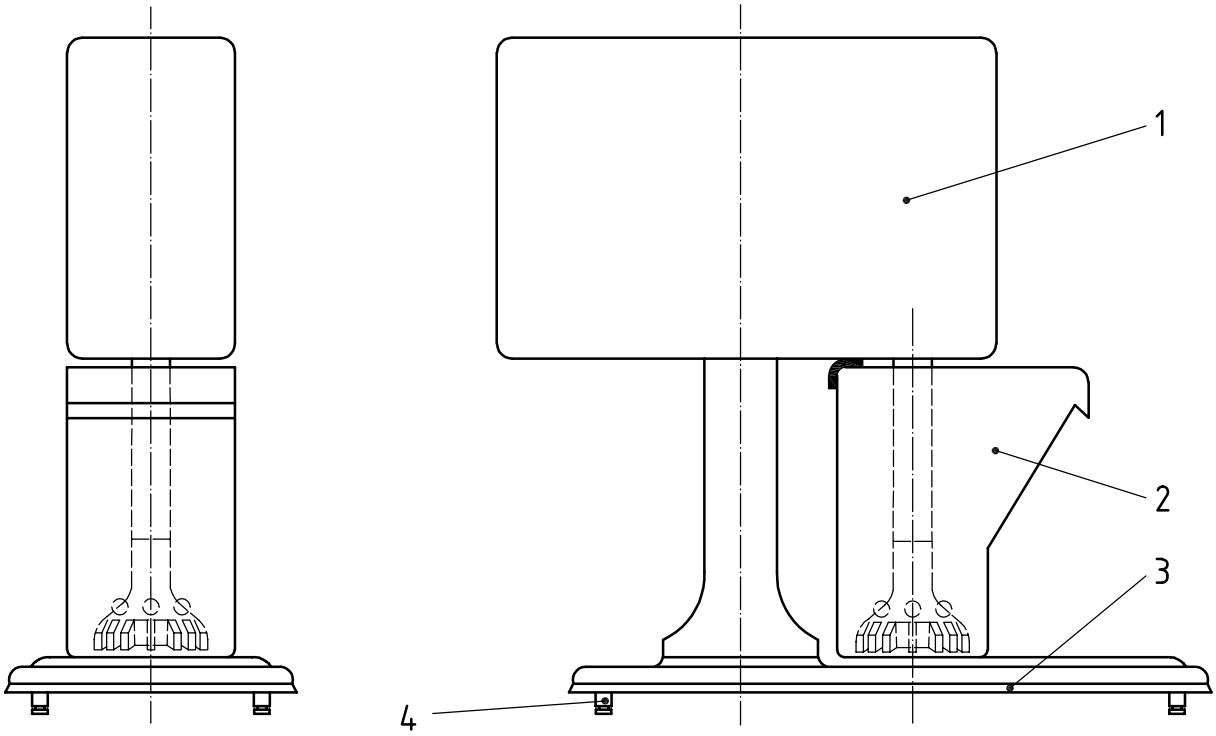
NOTE The level may be maintained by the manual addition of water.

6.4 Two scrapers, for removing the froth from the entire surface of the pulp, including the area behind the standpipe.

6.5 Calibrated micro-syringe or micro-pipette.

6.6 Containers, capable of holding individual samples of froth and tailings.

6.7 Timing device, accurate to ± 1 s and capable of being zeroed and started as required.



Key

1 drive mechanism
2 cell
3 metal base
4 levelling screws

Figure 1 — Typical flotation machine