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Fluorspar — Sampling and sample preparation

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Contents

	Page
Foreword	iv
1 Scope	1
2 Definitions	1
3 General procedure	2
3.1 General procedure for sampling	2
3.2 General procedure for sample preparation	2
4 Fundamentals of sampling and sample preparation	2
4.1 Overall precision	2
4.2 Mass of increment	3
4.3 Number of increments and precision of sampling	3
4.4 Method of taking increments	3
4.5 Precision of sample preparation and overall precision	4
4.6 Constitution of samples	4
4.7 Division rules	4
4.8 Method of division	5
4.9 Split use and multiple use of sample	5
4.10 Comminution	5
4.11 Mixing	5
4.12 Predrying	5
4.13 Requirements for sampling and sample preparation	5

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5	Apparatus	5
5.1	Apparatus for sampling	5
5.2	Apparatus for sample preparation	5
6	Method of sampling	5
6.1	Sampling from conveyors	5
6.2	Sampling from wagons or containers	7
6.3	Sampling from ships or stockpiles	7
6.4	Sampling from bagged material	8
7	Combining increments for sample preparation	8
7.1	Combining increments taken by mass-basis sampling	8
7.2	Combining increments taken by time-basis sampling	8
8	Methods of division	8
8.1	Manual increment division method	8
8.2	Manual riffle division method	10
8.3	Coning and quartering method	10
8.4	Mechanical division method	11
9	Preparation of test samples	11
9.1	Preparation of test samples for particle size determination	11
9.2	Preparation of test samples for moisture determination	11
9.3	Preparation of test samples for chemical analysis	11
9.4	Distribution of test samples for chemical analysis	12
9.5	Further grinding of the test sample	12
9.6	Examples of sample preparation	12
10	Packing and marking of test samples for chemical analysis	12
Annex A	Details of different sizes of riffle divider	15

ISO 8868 : 1989 (E)

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 approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8868 was prepared by Technical Committee ISO/TC 175, *Fluorspar*.

Annex A forms an integral part of this International Standard.

Fluorspar — Sampling and sample preparation

1 Scope

This International Standard specifies sampling methods for a lot of fluorspar and methods for the preparation of samples taken from the lot for the purpose of determining the quality characteristics of the lot. It covers

- a) the underlying theory;
- b) the basic principles, and;
- c) the basic requirements for the sampling device and its operation.

Details of different sizes of riffle divider are given in annex A.

The methods of sampling and sample preparation specified are applicable to all grades of fluorspar, i.e. acid grade, ceramic grade and the three metallurgical grades (concentrate, briquettes and gravel).

The methods are applicable to the sampling of fluorspar from conveyors, wagons and containers, ships and stockpiles, and from bagged material at the time of loading or discharging of a lot.

Samples are prepared for the determination of the following quality characteristics:

- a) particle size distribution;
- b) moisture content;
- c) chemical composition.

2 Definitions

For the purposes of this International Standard, the following definitions apply.

2.1 lot: Definite quantity of fluorspar, the quality characteristics of which are to be determined.

2.2 increment: Quantity of fluorspar taken at one time from a larger body of fluorspar. There are two types of increment as follows:

- a) a quantity of fluorspar taken at one time from a lot using a sampling device.
- b) a quantity of fluorspar taken using the increment division method.

2.3 partial sample: A quantity of fluorspar consisting of a composite of two or more increments taken from a lot. This includes also a composite of two or more complete increments which have been individually crushed and/or optionally divided, as necessary, in accordance with this International Standard and prior to combining.

2.4 gross sample: A quantity of fluorspar consisting of a composite of all of the increments taken from a lot. This includes also the composite of all of the increments or all of the partial samples which have been individually crushed and/or optionally divided, as necessary, in accordance with this International Standard and prior to combining.

2.5 manual sampling: Sampling by human effort with sampling devices, including mechanically assisted devices.

2.6 mechanical sampling: Sampling by mechanical means.

2.7 test sample: Any sample, for the determination of the chemical composition, moisture content or particle size distribution, which is prepared in accordance with the specified method for that type of sample.

NOTE — If the entire quantity of a test sample is subjected to the test, the test sample may also be called the test portion.

2.8 test portion: Representative part of a test sample which is actually subjected to the tests for the determination of the chemical composition, moisture content or particle size distribution.

2.9 sample for chemical analysis: Sample taken for the determination of the chemical composition of the lot or part of the lot.

2.10 moisture sample: Sample taken for the determination of the moisture content of the lot or part of the lot.

2.11 particle size sample: Sample taken for the determination of the particle size distribution of the lot or part of the lot.

2.12 nominal top size, w_5 : Particle size corresponding to the size of the opening of the sieve on which approximately 5 % (m/m) of the fluorspar charge is retained.

NOTE — The nominal top size of the lot may be ascertained either from past experience or by experiment. However, if no information is available, a visual estimation is acceptable.

ISO 8868 : 1989 (E)

2.13 stratified sampling: Sampling of a lot, which can be divided into several parts (called strata), by specific means in such a way that specified proportions of the sample are drawn from the different strata. The method is applied to sampling of lots from wagons or containers and from ships or stockpiles.

2.14 systematic sampling: Sampling in which increments are taken from a lot at regular intervals. There are two types of systematic sampling as follows.

2.14.1 systematic sampling on a mass basis: Systematic sampling in which the sampling interval used is a mass interval.

2.14.2 systematic sampling on a time basis: Systematic sampling in which the sampling interval used is a time interval.

2.15 two-stage sampling: Sampling by which primary sampling units are first selected from a lot and then secondary sampling units are taken from those selected primary sampling units. The method is applied to sampling from wagons or containers and from bagged material.

2.16 coefficient of variation, CV: Ratio of the standard deviation to the absolute value of the arithmetic mean.

NOTE — The ratio may be expressed as a percentage.

2.17 sample preparation: Process of preparing the sample for the determination of its quality characteristics. Sample preparation includes sample division, crushing, mixing and sometimes predrying and may be performed at several stages.

2.18 sample division: The process in sample preparation whereby the mass of a sample is reduced by partition or extraction.

2.19 proportional-mass division: Type of sample division for obtaining divided samples the masses of which are proportional to the mass of the sample or increment to be divided (such as might be obtained by using a riffle or mechanical splitters).

2.20 constant-mass division: Type of sample division resulting in divided increments which have a coefficient of variation equal to or less than 20 %, where the source material had a coefficient of variation greater than 20 %.

2.21 split use of sample: Method whereby the sample is split into two or more parts, which are used individually for the determination of two or more quality characteristics.

2.22 multiple use of sample: Method whereby the sample in its entirety is used for the determination of one quality characteristic. The same sample in its entirety, or part of this sample, is then used for the determination of another different quality characteristic.

3 General procedure

3.1 General procedure for sampling

Sampling shall be carried out while a lot is being transferred.

The general procedure for sampling shall be as follows:

- a) identify the lot to be sampled;
- b) ascertain the nominal top size of the lot;
- c) determine the mass of increment to be taken according to the nominal top size;
- d) determine the minimum number of increments to be taken from the lot;
- e) determine the type of interval to be used for taking increments by systematic sampling and stratified sampling and the interval to be used for selecting the wagons or containers or the bags in the case of two-stage sampling;
- f) determine the place of sampling and the method of taking increments;
- g) take increments during the whole period of handling of the lot.

3.2 General procedure for sample preparation

The test samples for the required determinations shall be prepared from the increments taken according to the following general procedure:

- a) determine whether the test sample is to be prepared from each increment or each partial sample or the gross sample according to the requirements for the determination of the quality characteristics;
- b) determine whether the sample is to be in split use or in multiple use;
- c) select the method of sample division to be used at each stage of the sample preparation;
- d) establish the processes to be used in the sample preparation, including the processes of division, crushing, mixing and predrying (if necessary);
- e) prepare the test sample according to the procedure established in d).

4 Fundamentals of sampling and sample preparation

4.1 Overall precision

The methods presented in this International Standard are designed to achieve the overall precisions shown in table 1, at a