SLOVENSKI STANDARD
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Manganove rude ï Vzorļenje ï 2. del: Priprava vzorcev

Manganese ores -- Sampling -- Part 2: Preparation of samples

Minerais de manganèse -- Échantillonnage -- Partie 2: Préparation des échantillons

Ta slovenski standard je istoveten z: **ISO 4296-2:1983**

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International Standard 4296/2

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Manganese ores — Sampling — Part 2: Preparation of samples

Minerais de manganèse — Échantillonnage — Partie 2: Préparation des échantillons

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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 developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

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.

International Standard ISO 4296/2 was developed by Technical Committee ISO/TC 65, *Manganese and chromium ores,* and was circulated to the member bodies in March 1983.

It has been approved by the member bodies of the following countries:

Australia	Germany, F.R.	South Africa, Rep. of
Austria	India	Thailand
Bulgaria	Italy	United Kingdom
China	Japan	USSR
Czechoslovakia	Poland	
Egypt, Arab Rep. of	Romania	

The member body of the following country expressed disapproval of the document on technical grounds:

France

Printed in Switzerland

Manganese ores — Sampling — Part 2: Preparation of samples

0 Introduction

ISO 4296 consists of the following parts:

Part 1: Increment sampling.

Part 2: Preparation of samples.

1 Scope and field of application

This part of ISO 4296 specifies methods of preparing samples of manganese ores for determining the chemical composition and moisture content of a consignment. The methods are applicable to all manganese ores, whether natural or processed.

Details of the riffle divider to be used are given in the annex.

2 References

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

ISO 4296/1, *Manganese ores — Sampling — Part 1: Increment sampling.*

ISO 4299, *Manganese ores — Determination of moisture content.*

3 Definitions

3.1 lot: A definite quantity of an ore, processed or produced under conditions which are presumed uniform.

3.2 consignment: A quantity of an ore delivered at one time. The consignment may consist of one or more lots or parts of lots.

3.3 increment:

1) A quantity of ore taken at one time from a consignment.

2) A quantity taken in the increment division method.

3.4 subsample:

1) A quantity of an ore consisting of several increments taken from a part of a consignment.

2) A composite of several increments which have been crushed and divided individually.

3.5 gross sample:

1) The quantity of an ore consisting of all the increments taken from a consignment.

2) An aggregation of all the increments or all the subsamples after they have been crushed and divided individually.

3.6 divided sample: A sample obtained by a method of division.

3.7 moisture sample: The sample taken for the determination of moisture content of the consignment or part of the consignment.

3.8 sample for chemical analysis: The sample taken for the determination of chemical composition of the consignment or part of the consignment.

3.9 final sample: Any sample for determination of moisture content or chemical composition, which is prepared from each increment, each subsample, or from the gross sample in accordance with the specified method for that type of sample.

3.10 whole-through sieve size: The size of openings, in millimetres, of a sieve through which 100 % of the sample passes.

4 General rules

4.1 The sample for each required determination shall be taken according to ISO 4296/1.

4.2 Samples for moisture determination and chemical analysis shall be prepared separately. Moisture content shall be determined immediately.

4.3 Before and during preparation, increments and gross samples shall be protected from contamination and effects of weather.

4.4 The division shall be conducted by a method which is known from previous experience to have the minimum bias and precision prescribed in this part of ISO 4296.

4.5 When the sample is very wet or sticky and sample preparation cannot be carried out, the sample shall be pre-dried. The pre-drying moisture content may be determined in accordance with ISO 4299.

4.6 The mechanical installation for sample preparation shall be installed at the nearest point to the sampling facilities.

4.7 Samples taken by a manual method shall be provided with a label giving the following information:

a) the number of the sample;

b) the mass of the sample;

c) the maximum particle size of the ore;

d) the date of sampling;

e) the name of the consignment.

The samples shall be delivered to the place for preparation of samples.

5 Equipment

The following equipment shall be used for sample preparation.

5.1 Crushers and **grinders,** suitable for the size and hardness of the ore particles to avoid ore heating and loss of moisture while crushing.

5.2 Screens, and **sieves,** complying with ISO 565.

5.3 Manual and **mechanical dividing apparatus,** (slot, radial slot, etc.).

5.4 Drying ovens, capable of being controlled at 105 to 110 °C.

5.5 A technical balance.

5.6 Shovels.

NOTE — Provision shall be made to prevent contamination of the equipment.

6 Sample preparation

6.1 Preparation of moisture sample

6.1.1 The moisture sample shall always be stored in an air-tight container in order to avoid evaporation of moisture if sample preparation is not carried out immediately.

6.1.2 After crushing to − 22,4 mm, (− 20 mm) or − 10 mm, each increment, each subsample or the gross sample shall be thoroughly mixed and the final moisture sample of 5 or 1 kg, respectively, obtained.

6.1.3 If pre-drying of an ore is required, the moisture sample shall be taken before pre-drying.

6.1.4 It is recommended that moisture samples be prepared by the increment division method in order to avoid moisture evaporation.

Any other methods may be used, if it can be demonstrated that there is no bias in the result obtained by the method.

6.1.5 The moisture content shall be determined in accordance with ISO 4299.

6.2 Preparation of sample for chemical analysis

6.2.1 Each increment, each subsample or the gross sample shall be ground to − 0,1 mm in size in accordance with table 1 and the agreed sample preparation process.

When the division is performed on an individual increment or subsample before the formation of a gross sample, the gross sample shall be obtained at some stage of division by combining quantities proportional to the mass of the individual increment or subsample.

From this sample, four sets of final analysis samples, each of mass 50 g or more, shall be prepared by the increment division method or any other method if it can be demonstrated that there is no bias in the result so obtained. The samples are intended for the seller, the purchaser, an arbitrator, and one to be held in reserve. The reserve sample shall be retained for 6 months. The mass of the final samples may be increased by agreement between the interested parties.

6.2.2 The final analysis samples shall be placed in suitable containers with the label marked in accordance with clause 8 and sent for chemical analysis. An example of the sample preparation process is shown in figure 1.

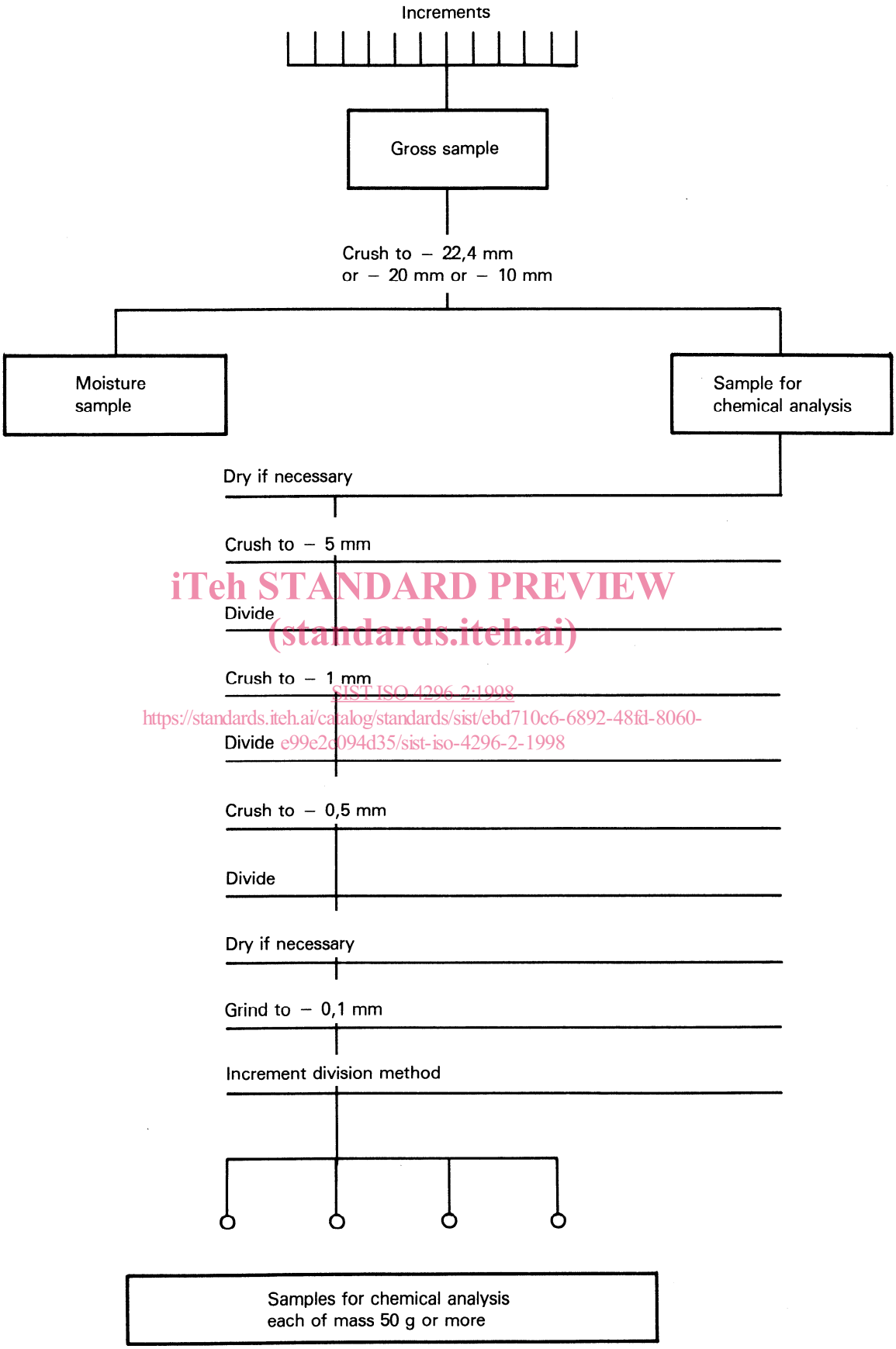


Figure 1 — Example of sample preparation

7 Sample division

7.1 Minimum mass of sample

The minimum mass of sample after division by any division method, depending on the whole-through sieve size, shall be as specified in table 1.

Table 1 — Minimum mass of sample after division

Whole-through sieve size	Minimum mass of sample
mm	kg
> 16 (15) to 22,4 (20)	45
> 10 to 16 (15)	25
> 5 to 10	10
> 2,8 (3,0) to 5	3
> 1,0 to 2,8 (3,0)	2
> 0,5 to 1,0	1
> 0,1 to 0,5	0,4
< 0,1	0,2

7.2 Division methods

7.2.1 When dividing samples, carry out the following processes:

a) coning and quartering;

b) division by riffle divider;

c) increment division method;

d) division by a mechanical dividing apparatus.

7.2.2 The coning and quartering method may be conducted on an ore of any particle size.

Mix the sample on a plate by heaping into a cone. Form the conical heap by depositing each shovelful on top of the preceding one, taking care to place it on the apex of the cone.

Form a new cone twice more in a similar way, taking care to work steadily around the previous cone until it is all transferred. The third cone shall be flattened into a disc of uniform thickness and diameter.

Then cut the disc into quarters by a special spider. Two diagonally opposite sectors shall be completely removed and rejected and the remainder shall be combined and crushed according to table 1.

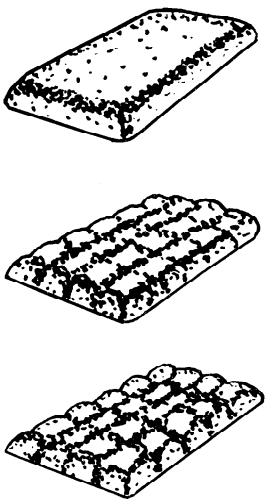
7.2.3 Divide ores of particle size less than 22,4 (20) mm by use of a riffle divider.

The riffle divider shall be selected according to the whole-through sieve size of the ore (see table 2 and the annex).

Place the sample in a container after mixing and divide it into two parts by dropping the sample uniformly, by lightly shaking the container, into the middle of the riffles.

One of the two parts obtained shall be taken at random and not divided further than the mass specified in table 1.

7.2.4 Divide ores of particle size less than 10 mm by means of the increment division method. (See figure 2).



a) Spread the sample on a smooth (non-moisture absorbing) surface into a layer having a flat rectangular surface and a uniform thickness as specified in table 3.

b) Divide into 20 equal parts; for example into 5 equal parts lengthwise and 4 equal parts breadthwise.

c) Take a shovelful of sample from each part by inserting the shovel to the bottom of the sample layer. Combine the 20 shovelfuls of sample into a divided sample.

Figure 2 — Manual increment division method

According to the particle size, select the appropriate shovel (see figure 3) as specified in table 4. If the mass of the divided sample is less than that specified in table 1, the larger shovel shall be taken.

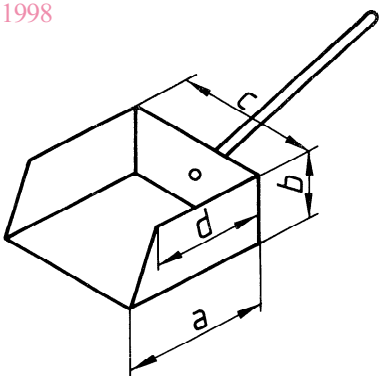


Figure 3 — Shovel for increment division (see table 4)

7.2.5 When the sample is divided by a mechanical dividing apparatus, the apparatus shall be checked in advance in order to confirm that there is no bias.

8 Informative label for consignments of ore

The following information shall be indicated in the certificate accompanying the consignment:

a) the name and address of the seller;

b) the name and address of the purchaser;

c) the number and date of the certificate;

d) the name of consignment (name of ship, train, etc.);

e) the mass, in tonnes, of the consignment;

f) the type and quality characteristic of ore;

g) any other items, if necessary.

9 Precision of sample preparation

The method specified in this part of ISO 4296 is designed to obtain a precision of preparation within ± 0,7 % (absolute percentage in manganese or moisture content) with 95 % probability.

Table 2 — Dimensions of riffle divider

Whole-through sieve size	Opening width of riffle	Riffle divider number
mm	mm	
> 16 (15) to 22,4 (20)	50 ± 1	50
> 10 to 16 (15)	30 ± 1	30
> 5 to 10	20 ± 1	20
> 2,8 (3,0) to 5	10 ± 1	10
≤ 2,8 (3,0)	6 ± 1	6

Table 3 — Thickness of layer in accordance with particle size

Values in millimetres

Particle size	Thickness of layer
> 5 to 10	30 to 40
> 2,8 (3,0) to 5	25 to 35
> 1 to 2,8 (3,0)	20 to 30
> 0,5 to 1	10 to 20
> 0,1 to 0,5	10 to 15
≤ 0,1	5 to 10

Table 4 — Dimensions of shovel for increment division

Particle size	Dimensions of shovel (mm)				Volume (approx.)
mm	*a*	*b*	*c*	*d*	cm^3
> 5 to 10	60	35	60	50	125
> 2,8 (3,0) to 5	50	30	50	40	75
> 1 to 2,8 (3,0)	40	25	40	30	40
> 0,5 to 1	30	15	30	25	15
> 0,1 to 0,5	20	10	20	20	4
≤ 0,1	15	10	15	12	2