

Method for Sampling and Method of Determination of
Moisture Content of Garnierite Nickel Ore

JIS M-8109-1996

This is an English version of Japanese Industrial
Standard prepared by OMIC

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Garnierite Nickel Ore - Method for Sampling, Sample
Preparation and Determination of Moisture Content

SCOPE

This Japanese industrial Standard specifies the following methods for this purpose of determination of average grade and moisture contents of lot of garnierite nickel ore, hereafter referred to as "Ore".

- (1) Method of taking the sample
- (2) Method of sample preparation for moisture test sample and quality sample
- (3) Method of measuring of moisture content
- (4) Method of determination of the moisture content and dry mass of the lot

Remarks: 1. This standard, as a rule, conforms with JIS M 8100
 2. Methods relevant to this standard are specified in
 the following standards:
 JIS M 8100, JIS M 8126, JIS Z 8401, JIS Z 8801

Applicable Standards:

JIS M 8100 - Common Rules for Methods of Sampling Bulk Materials of Mining Products
JIS M 8126 - Methods for Determination of Nickel in Ores
JIS M 8129 - Methods for Determination of Cobalt in Ores
JIS Z 8401 - Rules for Rounding Off of Numerical Values
JIS Z 8801 - Sieves for Testing Purposes

DEFINITION OF TERMS

The definition of terms employed in this standard shall be as follows:

(1) Lot

A quantity of ore agreed upon between the parties concerned for the purpose of determining the average of the ore. The quantity of ore constituting a lot is called the size of the lot.

(2) Sub-lot

The average of the ore consisting of part of lot as divided, when required, into appropriate quantities.

(3) Increment

A quantities of ore taken by a sampling device, as a rule in a single motion, from lot or sub-lot. A unit quantity of ore taken from a sample by the increment reducing method is also call an increment. The weight of a increment is called the size of the increment.

(4) Partial Sample

The sample collecting on some increments, when required, after preparation of each increment is taken is called the partial sample.

(5) Belt Sampling

When the lot is being moved by a belt conveyor the increment shall be taken from a surface of belt and from the discharged outlet of conveyor.

(6) Truck Sampling

When the lot is being handled by truck or wagon, increment shall be taken from inside of truck or wagon.

(7) Hatch Sampling

Increment shall be taken from inside handling implements when the lot is being handled by such implements as grabs, buckets, sling tees, or freshly exposed surface of the ore in a lighter.

(8) Composition Sample

The general term of samples taken from lot or sub-lot for the purpose of determining the average grade of the composition. A sample taken from a prepared sample of a composition analysis sample.

(9) Moisture Sample

A general term of samples taken from a lot or sub-lot for the purpose of determining the average moisture content. A sample taken for determining moisture content, prepared by crushing and reduction, and subject to measurement is called a moisture measurement sample.

(10) Split-Used Sample

The split-use a sample signifies that the sample is divided into parts and employed for the measurement of two or more characteristics.

(11) Multiple-Used Sample

The multiple-use a sample signifies that the entire sample is employed in the determination of one characteristic, and thereafter, the same sample in the entirety or part is employed for the determination of another characteristic.

(12) Maximum Particle Size

The size of the mesh of a sieve corresponding to a sieve having a 5% oversize residual factor for the sample. The sieve of this standard shall, as a rule, conform with JIS Z 8801.

A SYMBOL

This standard is employed following the symbol.

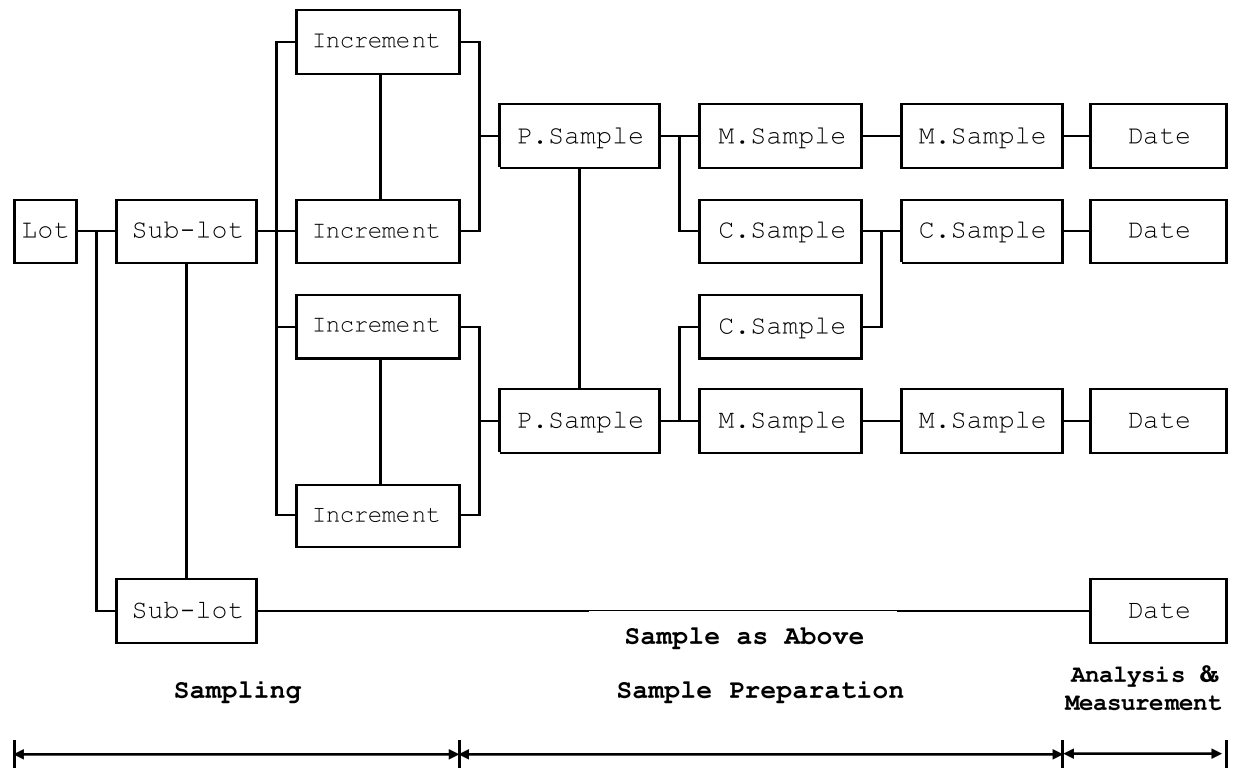
- N : Size of the lot or lot weight
- n : Number of the taken sample from one lot
- σ : Precision indicated by the standard deviation
- σ_b : Dispersion among primary sampling units or among strata expressed by the standard deviation
- σ_w : Dispersion among the increments in the primary sampling units or in the stratum expressed by the standard deviation
- σ_s : Sampling precision expressed by the standard deviation
- σ_p : Preparation precision expressed by the standard deviation
- σ_{pm} : Including preparation and analysis or measurement precision expressed by the standard deviation
- σ_{spm} : Including sampling, preparation, analysis or measurement precision expressed by the standard deviation (Composite precision)

4. GENERAL ITEMS4.1 A Summary of Sampling and Sample Preparation

A Summary of sampling and sample preparation are as follows (Fig. 1)

- (1) The size of lot shall be decided, thereafter meet the size of lot number of sub-lot shall be decided.
- (2) The meet of maximum particle size and the quality variation of characteristic shall be decided on method of sampling and number of increment.
- (3) Be taken increment, thereafter increments be collected and core partial sample.
- (4) This partial sample are crushed, reduced then shall be made composition analysis sample and moisture measurement sample.

Fig. 1 Summary of Sampling and Sample Preparation (An Example)



4.2 The Handling of Samples

Throughout the handling, preparation, and measurement of the sample, attention shall be paid to prevent change in quality or loss of the sample and all apparatus shall be kept scrupulously clean to prevent foreign substances mixing with the sample.

(1) Sample container:

Sample Container shall be as follow:

- a) Container to be employed for the purpose of transporting or storing various sample shall be hold the entire quantity of the sample, be clean and strong, and shall be capable of being closed or sealed.
- b) In particular, it is necessary that the container for moisture samples shall be airtight and made of non-hygroscopic material, and also the interior of the container shall not be corroded.

Remark: straw and jute bags are not suitable as containers for moisture sample.

(2) Packing and marking of prepared composition analysis sample

Prepared samples shall be sealed in container which shall be coated with aluminum foil or Poly-ethylene bag and these shall be sealed in paper bag and forwarded, distributed, or stored. The package shall, as a rule, be the following items.

- a) Name of the Commodity (Brand)
- b) Name of the lot (Ship's name) and size
- c) Number of sub-lot
- d) Date of sampling and preparation
- e) Name of factory of sampling and preparation
- f) Name of in charge of sample preparation
- g) Other necessary information

(3) Storing of samples

Storing of the samples shall be as follows:

- (a) Prepared sample in accordance with (2) shall be stored as a rule, for 6 months
- (b) When storing samples, to prevent any change in quality, sample shall be sealed in a container and attention paid to the place of stage to exclude any effects of temperature, direct sunlight and moisture

(4) Forwarding of sample

Sample other than the composition sample shall not, as a rule, be forwarded, provided that, when forwarding can not be avoided, the forwarding method shall be decided by consultation between the parties concerned.

4.3 Determination of Average Quality

For the nickel content, analysis shall be performed on each sub-lot accordance with JIS M 8126, and mean value of this analysis shall be taken as the average quality of the sub-lot. The average quality of the lot is determined by calculating the weighted average value

of the sub-lot down to three decimal places and rounding off the result to two decimal places. For moisture content, the value obtained from the method specified in 5. Method of determination moisture content shall be taken as the value for the lot.

4.4 Rounding off of Numerical Value

Numerical value shall be rounded off in accordance with JIS Z. 8401.

4.5 Other Item

Other item shall be performed as follows:

- (1) The necessary item shall be not specified on this standard. This item shall be decided by consultation between the parties concerned.
- (2) In case it is considered difficult to apply a part of specification of this standard. The method based on the agreement between parties concerned may be used in place of this specification.
- (3) Check experiment of the sampling method shall, as a rule, be performed according to Appendixes V, VI and VII. Examination shall be made to determine whether the specified accuracy is being maintained with change in handling process of lot, or whether there is any bias of contents.

5. KIND OF SAMPLING

5.1 The Size of lot and Sub-lot

As a rule, the size of one lot shall be the quantity of one shipment of ore that is contracted, although maximum size of sub-lot shall be within 5,000 tons.

5.2 Characteristics and Accuracy

5.2.1 Characteristics

The characteristics having accuracy specified shall be, as a rule, the nickel and moisture contents.

5.2.2 Overall accuracy

The value of overall accuracy shall be expressed Table 1.

Table 1 Overall Accuracy ($2\sigma_{spm}$)

Characteristics	Size of lot (t)			
	30,000 More 45,000 Less	20,000 More 30,000 Less	10,000 More 20,000 Less	10,000 Less
Ni-Contents %	0.025	0.030	0.040	0.050
H ₂ O Contents %	0.5	0.6	0.8	1.0

5.2.3 Sampling accuracy

The value of sampling accuracy shall be expressed Table 2.

Table 2 Sampling Accuracy ($2\sigma_s$)

Characteristics	Size of lot (t)			
	30,000 More 45,000 Less	20,000 More 30,000 Less	10,000 More 20,000 Less	10,000 Less
Ni-Contents %	0.020	0.024	0.032	0.040
H ₂ O Contents %	0.48	0.58	0.76	0.94