SVENSK STANDARD
SS-EN ISO 8049:2016

Fastställd/Approved: 2016-07-06
Publicerad/Published: 2016-07-07
Utgåva/Edition: 1
Språk/Language: engelska/English
ICS: 77.100

SWEDISH STANDARDS INSTITUTE

Ferronickel shot – Sampling for analysis (ISO 8049:2016)

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Europastandarden EN ISO 8049:2016 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 8049:2016.

Denna standard ersätter SS-EN 28049, utgåva 1.

The European Standard EN ISO 8049:2016 has the status of a Swedish Standard. This document contains the official English version of EN ISO 8049:2016.

This standard supersedes the Swedish Standard SS-EN 28049, edition 1.

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Denna standard är framtagen av kommittén för Rostfria stål, SIS/TK 135.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 8049

June 2016

ICS 77.100

Supersedes EN 28049:1992

English Version

Ferronickel shot - Sampling for analysis (ISO 8049:2016)

Ferro-nickel en grenailles - Échantillonnage pour analyse (ISO 8049:2016)

Ferronickelschrot - Probenahme für Analyse (ISO 8049:2016)

This European Standard was approved by CEN on 26 May 2016.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN ISO 8049:2016) has been prepared by Technical Committee ISO/TC 155 "Nickel and nickel alloys".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2016, and conflicting national standards shall be withdrawn at the latest by December 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 8049:2016 has been approved by CEN as EN ISO 8049:2016 without any modification.

Ferronickel shot — Sampling for analysis

1 Scope

This International Standard defines a method of sampling for analysis of ferronickel lots in the form of shot as specified in ISO 6501 in those cases where lots are constituted either heat by heat or by taking from blended stock.

The purpose is to determine the contents of the various elements

— either from slugs by physical analysis methods (such as X-ray fluorescence or emission spectral analysis), or

— from chips by dry methods (carbon, sulfur) or chemical analysis (other elements).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 513:2012, *Classification and application of hard cutting materials for metal removal with defined cutting edges — Designation of the main groups and groups of application*

3 Form and packaging of product

Grain size: between 3 mm and 50 mm.

Lot tonnage: equal to or greater than 5 t.

In the case of lots taken from blended stock, the nickel content range k to ($k + n$) % of the blended heats shall be chosen as follows:

— $15 \leq k \leq 59$;

— $1 \leq n \leq 5$;

— $16 \leq k + n \leq 60$.

NOTE The case of non-blended lots (case $n \leq 1$) is not dealt with in this International Standard.

The ferronickel shot is generally delivered in bulk form in units which may be trucks, containers, or railroad cars, of which the contained masses normally range from 5 t to 30 t, although in the case of railroad cars, loads may have masses up to 60 t.

This type of ferronickel can also be delivered drum-packed (the contained mass of which may be 250 kg).

4 Principle

In a single heat, intergrain homogeneity is practically ensured. It is therefore very easy to obtain a representative “primary sample” from a small number of “primary increments”.

In the case of a blended lot composed of several heats, a greater number of primary increments, N_P, should be taken, but the whole still constitutes the primary sample.

After blending and mass division of the primary sample, an “intermediate sample” is obtained having a reasonable mass for laboratory treatment. The treatment of the intermediate sample gives a “secondary sample”, which may be divided in N_s “secondary increments” not exceeding a mass of 1 kg individually.

Each secondary increment is then remelted under appropriate conditions so that no variation in composition can be observed and that N_s homogeneous small ingots be obtained (within-small-ingot homogeneity).

NOTE It is generally accepted that 1 kg is the maximum mass which can be accommodated in a laboratory furnace for re-casting under the required conditions. According to the grain size distribution of shot, it is often necessary for the secondary sample to exceed 1 kg in order to be representative. Hence, the necessity of melting several small ingots. See the statistical justification in Annex A.

The small ingots are then either used for physico-chemical analysis or machined into chips for chemical analysis. (This procedure is summed up in Figure A.1.)

5 Taking of the primary sample and then of the intermediate sample

5.1 Blended lots

5.1.1 Bulk sampling in the case of a suitable system for taking the primary sample

This can be performed, for example, by emptying the shot into a bin with reclaim by belt conveyor. From the conveyor discharge, two possibilities are as follows:

— to have a true sampling system respecting the rules of the art for sampling of particulate material (such as a cross stream sampler);

— to take increments at regularly spaced intervals, using a power shovel with a dipper intercepting the shot stream in a representative manner.

The mass of each primary increment shall be, in this case, not less than 20 kg, and is generally between 20 kg and 50 kg.

The number of primary increments, N_p, to be selected is shown in Table 1.

Table 1 — Minimum number of primary increments to be selected

Sample	Tonnage	Range of nickel contents, n				
		$n < 1$	$1 \leq n < 2$	$2 \leq n < 3$	$3 \leq n < 4$	$4 \leq n \leq 5$
Numbers of primary increments N_p	5 to 50	5	10	15	20	30
	50 to 200	7	12	17	22	35
	200 to 500	10	15	20	25	40
	500 to 2 500	15	20	25	30	45
Number of secondary increments N_s[a]		1	2	3	4	5

[a] This indicates the number of small ingots to be remelted in the hypothesis of 1 kg per small ingot. (If the maximum mass which can be remelted is 1lx kg, the number of small ingots to be remelted is $x \times N_s$.)

The primary sample shall then be mass-divided into smaller units, in order to obtain an intermediate sample having a mass which can reasonably be sent to the laboratory for further preparation, 20 kg to 50 kg, say.

This can be accomplished with automatic mass dividers (such as rotary dividers) of suitable size with respect to the particle size of the product being handled.

Failing such equipment, the division can be made by alternate shovelling from the primary sample stockpile. As a precaution against material spill during shovelling, it is recommended that a scoop or coal-miner's-type shovel be used.

For example, every fifth shovelful or less would be taken and this division would be repeated a sufficient number of times to obtain the desired sample mass of 20 kg to 50 kg.

5.1.2 Sampling of bulk material when no adequate primary sampling system is available

In this case, hand sampling shall be performed by alternate shovelling on each unit to be checked (truck, railroad car, container, etc.). The number of units to be checked is the number N_p in Table 1 or the total number of units if it is less than N_p. For this purpose, the rules for random sampling given in Annex B may be applied.

EXAMPLE When unloading a 20 t truck on to the ground, sampling could proceed as follows:

— shovel the 20 t, setting aside every fifth shovelful;

— from the 4 t obtained, set aside every fifth shovelful;

— from the 800 kg obtained, set aside every fifth shovelful;

— from the 160 kg obtained, set aside every fifth shovelful;

— send the 32 kg obtained to the laboratory.

In this example, an intermediate sample is obtained for the checked unit.

If more than one unit is checked in the same lot, intermediate samples in each unit can be blended and mass division carried out again until an intermediate sample representative of the lot is obtained. In this case, the intermediate sample mass can be reduced to 10 kg to 20 kg.

5.1.3 Sampling of a drum-packed lot

The number of drums from which increments should be taken is the number N_p in Table 1 or the total number of drums if this is less than N_p.

NOTE In general, drum-packaging is used for low-tonnage lots. The first line of the table is therefore applicable in most cases.

A minimum of 1 kg of shot or more, if required, per selected drum is taken to obtain a mass in excess of 20 kg, generally between 20 kg and 50 kg.

If the contents of each drum are assumed to be homogeneous, the sample may be taken from the top of the drum. If not, the drums shall be emptied and the sample taken by alternate shovelling.

5.1.4 Sampling of a container-packed lot

5.1.4.1 Principle

This sampling method is applicable only for the determination of the nickel content (Ni).

The aim of this proposal is to simplify the sampling mode of a ferronickel delivery at customer site. Indeed generally,

— the end user does not have the appropriate means to proceed rigorously with this standard to sample the product, and

— when the end user gets the analytical results on the delivery, the lot is already partially or totally consumed, and consequently a further contradictory sampling is not possible.