

Ferronickel ingots or pieces — Sampling for analysis —

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National foreword

This British Standard has been prepared under the direction of the Non-ferrous Metals Standards Policy Committee and is the English language version of EN 28050:1992, “*Ferronickel ingots or pieces — Sampling for analysis*” published by the European Committee for Standardization (CEN). It is identical with ISO 8050:1988 published by the International Organization for Standardization (ISO).

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 18, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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English version

Ferronickel ingots or pieces — Sampling for analysis

(ISO 8050:1988)

Ferro-nickel en lingots ou en morceaux —
Échantillonnage pour analyse
(ISO 8050:1988)

Ferronickelbarren oder -stücke —
Probenahme für Analyse
(ISO 8050:1988)

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

On the proposal of the CEN Central Secretariat, the Technical Board has decided by Resolution BT C157/1990 to submit the International Standard ISO 8050:1988 "*Ferronickel ingots or pieces — Sampling for analysis*" to the formal vote.

This European Standard EN 28050 was approved by CEN on 1992-05-08.

National standards identical to this European Standard shall be published at the latest by 1992-11-30 and conflicting national standards shall be withdrawn at the latest by 1992-11-30.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 8050:1988 was approved by CEN as a European Standard without any modification.

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1 Scope

This International Standard specifies a method for sampling of ferronickel lots in ingot or piece form with a view to obtaining a representative laboratory sample for the determination of the chemical composition of the lot.

As agreed between the purchaser and the supplier, a choice is to be made between two procedures:

- The first procedure can be applied at the producer's plant during casting (description in clauses 3 and 5).
- The second procedure can be applied to lots as delivered at the buyer's premises¹⁾ (description in clauses 4 and 5). It includes two alternatives for sample taking (drilling and milling).

Each party is entitled to participate in (or be represented at) sampling operations.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 513:1975, *Application of carbides for machining by chip removal — Designation of the main groups of chip removal and groups of application*.

ISO 3855:1977, *Milling cutters — Nomenclature*.

ISO 4957:1980, *Tool steels*.

ISO 6352:1985, *Ferronickel — Determination of nickel content — Dimethylglyoxime gravimetric method*.

ISO 6501:1988, *Ferronickel — Specifications and conditions of delivery*.

3 Sampling of each heat at the producer's plant

3.1 Taking the primary sample during casting

3.1.1 Each increment²⁾ shall be taken using a spoon and cast in a mould to obtain a suitable small ingot for chemical or physical analysis. The usual geometry of such ingots is that of a frustum. It is desirable that the dimensions lie within the following limits:

- height: 100 to 140 mm
- upper diameter: 35 to 50 mm
- lower diameter: 30 to 40 mm

The ingot mould shall be made of material that allows the sample to cool rapidly; a large block of copper would meet this requirement.

If necessary, the sample shall be killed to obtain a small ingot of sound metal (free of cracks and blowholes). Killing is most often done with aluminium, in wire or chip form, at 1 to 2 g of aluminium per kilogram.

The large height of the small ingots permits small shrinkholes to be confined to the upper part, thus ensuring that the lower part of the ingot is perfectly sound and homogenous and hence suitable for analysis. Generally, a height of 120 mm will guarantee that the sound portion extends at least 70 mm up from the base.

3.1.2 In general, the small ingots are used for physical analysis on solid metal after a disc is cut from them.

Whenever possible, this analysis should produce results as accurate as those obtained from chemical analysis of chips. To achieve such accuracy, it is often necessary to analyse several small ingots several times each.

A specified number of small ingots shall therefore be taken at regularly spaced intervals during the casting.

Examples are given in Annex A to indicate the number of small ingots to be taken and the number to be analysed. It is suggested that four to eight small ingots be taken from each heat.

¹⁾ This procedure can be applied at the producer's plant, at the buyer's premises or at an intermediate transit place, as agreed between the interested parties.

²⁾ Increment: portion of the lot taken in a single operation; in this standard: portion of molten metal.

It may happen that for some exceptional reasons there are not enough small ingots available which are suitable either for accurate physical analysis or for accurate analysis of chips taken from them: some small ingots may no longer be available or may contain cracks or blowholes. In these circumstances, the ingots constituting the heat shall be sampled. Five ingots³⁾ shall be taken from the heat, and the procedure described beginning at clause 4.1.3³⁾⁴⁾ shall then be followed.

3.2 Secondary sampling of small ingots taken from the heat

3.2.1 Cutting

Each small ingot shall be cut in two about 10 or 15 mm from the bottom (the smaller-diameter end) with a cut-off wheel (made of carborundum or corundum, for example).

The use of water cooling is recommended, because it avoids heating of the sample and hence changes in the crystalline structure of the metal.

3.2.2 Use of the two pieces of the small ingot

3.2.2.1 The disc cut off the small ingot may be used for physical analysis (i.e. X-ray fluorescence or optical emission spectrometry) of the solid metal after adequate machining of the cut surface.

For the number of small ingots to be analysed and the number of determinations per small ingot, see Annex A.

3.2.2.2 The larger piece may be used for preparing chips, using one of the two following methods:

a) Drilling

With the freshly cut surface facing upwards, the piece shall be drilled to a depth such that the pipe in the upper part of the small ingot (i.e. at the wider end) is not reached.

It is desirable to limit the depth of the drilled hole to 50 mm. By using a 20 mm diameter drill, more than 100 g of chips are obtained.

All the chips shall be collected. An assembly similar to that of Figure 1 may be used for this purpose. It is particularly suitable when using a drill bit designed for oil cooling but fed with compressed air (see Annex D, D.6.3). The assembly shall be made of materials which will not contaminate the chips. The recommended conditions for drilling are described in Annex D.

b) Milling

The conical surface adjacent to the freshly cut surface shall be cleaned by grinding with a corundum (aluminium oxide) or carborundum grinding wheel and then milled to a depth of about 20 mm from the cut surface (this will provide 100 g of chips).

All the chips shall be collected.

The recommended conditions for milling are described in Annex D.

All the chips obtained from the selected small ingots by one of the two techniques described above shall be combined to constitute the secondary sample which is treated according to the procedure in clause 5 to obtain the final laboratory sample.

4 Sampling of a lot of ingots or pieces

4.1 Sampling of ingots or pieces

4.1.1 Lots comprising one heat

The procedure as described in the last paragraph of 3.1 is used (5 ingots or pieces are taken in accordance with the rules for random sampling).

4.1.2 Lots comprising several heats

The minimum number N of ingots or pieces to be taken is given by the following rules⁵⁾:

For lot tonnages between 5 and 80 t

$$N = 50$$

For lot tonnages between 80 and 500 t

$$N = 54 - \frac{T}{20} \quad (\text{see footnote } ^6)$$

where T is the mass, in metric tons, of the lot.

These rules are illustrated in Table 1.

³⁾ The rules for random sampling given in Annex B may be used.

⁴⁾ A very small number of ingots constitutes a sufficiently representative sample of the heat, because the contents of different ingots from the same heat do not vary greatly (see Annex C).

⁵⁾ These rules have been established making the following practical assumptions:

- the lots are composed of heats each of mass about 20 t;
- the nickel contents of the heats in the lot lie within the range from k to $(k + 1)$ %, where k is an integer;
- variations in nickel content within ingots and between ingots from the same heat are negligible compared with the range k to $(k + 1)$ %.

Complete justification of these rules is given in Annex C.

⁶⁾ This rule applies only when the tonnage does not exceed 500 t. If, following an agreement between the purchaser and the supplier, a consignment is between 500 and 1 000 t, the interested parties may agree to use one of the following procedures:

- division of the consignment into lots of tonnages not exceeding 500 t;
 - taking, from the whole consignment, only the number of ingots or pieces specified for a tonnage of 500 t, i.e. $N = 29$.
- This procedure considerably diminishes the quantity of work involved in taking secondary samples from ingots or pieces.