



# SLOVENSKI STANDARD SIST EN ISO 14284:2023

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**Jeklo in železo - Vzorčenje in priprava vzorcev za ugotavljanje kemijske sestave  
(ISO 14284:2022)**

Steel and iron - Sampling and preparation of samples for the determination of chemical composition (ISO 14284:2022)

Eisen und Stahl - Entnahme und Vorbereitung von Proben für die Bestimmung der chemischen Zusammensetzung (ISO 14284:2022)

Aciers et fontes - Prélèvement et préparation des échantillons pour la détermination de la composition chimique (ISO 14284:2022)

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**ICS:**

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English Version

## Steel and iron - Sampling and preparation of samples for the determination of chemical composition (ISO 14284:2022)

Aciers et fontes - Prélèvement et préparation des échantillons pour la détermination de la composition chimique (ISO 14284:2022)

Eisen und Stahl - Entnahme und Vorbereitung von Proben für die Bestimmung der chemischen Zusammensetzung (ISO 14284:2022)

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Contents	Page
European foreword.....	3

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## European foreword

This document (EN ISO 14284:2022) has been prepared by Technical Committee ISO/TC 17 "Steel" in collaboration with Technical Committee CEN/TC 459/SC 2 "Methods of chemical analysis for iron and steel" the secretariat of which is held by SIS.

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of an identical text or by endorsement, at the latest by May 2023, and conflicting national standards shall be withdrawn at the latest by May 2023.

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

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STANDARD

ISO  
14284

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**Steel and iron — Sampling and  
preparation of samples for  
the determination of chemical  
composition**

*Aciers et fontes — Prélèvement et préparation des échantillons pour  
la détermination de la composition chimique*

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# Contents

Page

<b>Foreword</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Requirements for sampling and sample preparation</b> .....	<b>3</b>
4.1 General.....	3
4.2 Sample.....	4
4.2.1 Quality.....	4
4.2.2 Size.....	5
4.2.3 Identification.....	5
4.2.4 Sample conservation.....	5
4.2.5 Sample for arbitration.....	5
4.3 Sampling.....	6
4.3.1 Sample from a melt.....	6
4.3.2 Sample from a product.....	6
4.4 Preparation of a sample.....	6
4.4.1 Preliminary preparation of a sample.....	6
4.4.2 Test sample in the form of chips.....	6
4.4.3 Test sample in the form of fragments.....	7
4.4.4 Test sample in the form of a solid block.....	7
4.4.5 Preparation of a test sample by remelting.....	9
4.5 Safety precautions.....	9
4.5.1 Personal protection.....	9
4.5.2 Machinery.....	9
4.5.3 Hazardous materials.....	9
<b>5 Liquid iron for steelmaking and pig-iron production</b> .....	<b>9</b>
5.1 General.....	9
5.2 Spoon sampling.....	10
5.2.1 Methods.....	10
5.2.2 Maintenance of equipment.....	11
5.3 Probe sampling.....	11
5.3.1 General.....	11
5.3.2 Methods.....	12
5.4 Preparation of a test sample.....	12
5.4.1 Preliminary preparation.....	12
5.4.2 Test sample for a chemical method.....	12
5.4.3 Test sample for a thermal method.....	12
5.4.4 Test sample for a physical method.....	12
<b>6 Liquid iron for cast iron production</b> .....	<b>13</b>
6.1 General.....	13
6.2 Spoon sampling.....	13
6.2.1 General.....	13
6.2.2 Methods.....	13
6.2.3 Chilled sample.....	14
6.2.4 Non-chilled sample.....	14
6.2.5 Maintenance of equipment.....	14
6.3 Probe sampling.....	15
6.4 Preparation of a test sample.....	15
6.4.1 Preliminary preparation.....	15
6.4.2 Test sample for chemical methods.....	15
6.4.3 Test sample for thermal methods.....	16
6.4.4 Test sample for physical methods.....	16

## ISO 14284:2022(E)

6.5	Sampling and sample preparation for the determination of oxygen and nitrogen.....	16
6.5.1	General.....	16
6.5.2	Method.....	16
6.5.3	Preparation of the test portion.....	16
<b>7</b>	<b>Liquid steel for steel production.....</b>	<b>17</b>
7.1	General.....	17
7.2	Spoon sampling.....	17
7.2.1	Methods.....	17
7.2.2	Maintenance of equipment.....	17
7.3	Probe sampling.....	18
7.3.1	General.....	18
7.3.2	Methods.....	18
7.4	Preparation of a test sample.....	18
7.4.1	Preliminary preparation.....	18
7.4.2	Test sample for chemical methods.....	18
7.4.3	Test sample for thermal methods.....	19
7.4.4	Test sample for physical methods.....	19
7.5	Sampling and sample preparation for the determination of nitrogen and oxygen.....	19
7.5.1	Methods of sampling.....	19
7.5.2	Preparation of the test portion.....	20
7.6	Sampling and sample preparation for the determination of hydrogen.....	20
7.6.1	General.....	20
7.6.2	Methods of sampling.....	21
7.6.3	Preparation of the test portion.....	21
<b>8</b>	<b>Pig-irons.....</b>	<b>21</b>
8.1	General.....	21
8.2	Increment sampling.....	21
8.2.1	Number of increments.....	21
8.2.2	Methods.....	22
8.2.3	Consignment of mixed pig-irons.....	22
8.3	Preparation of a test sample.....	22
8.3.1	General.....	22
8.3.2	Test sample for chemical methods.....	23
8.3.3	Test sample for thermal methods.....	23
8.3.4	Test sample for physical methods.....	24
<b>9</b>	<b>Cast iron products.....</b>	<b>24</b>
9.1	General.....	24
9.2	Sampling and sample preparation.....	24
9.2.1	General.....	24
9.2.2	Test sample for chemical methods.....	25
9.2.3	Sample in the form of a solid block for analysis by thermal methods.....	26
9.2.4	Test sample for physical methods.....	26
<b>10</b>	<b>Steel products.....</b>	<b>26</b>
10.1	General.....	26
10.2	Selection of a laboratory sample or a test sample from a cast product.....	27
10.3	Selection of a laboratory sample or a test sample from a wrought product.....	27
10.3.1	General.....	27
10.3.2	Sections.....	27
10.3.3	Plates or slabs.....	27
10.3.4	Light sections, bars, rods, sheets, strips and wires.....	27
10.3.5	Tubes and pipes.....	29
10.4	Preparation of a test sample.....	29
10.4.1	General.....	29
10.4.2	Test sample in the form of chips.....	29
10.4.3	Test sample in the form of a solid block.....	29
10.5	Sampling of leaded steel.....	30

10.6	Sampling and sample preparation for the determination of oxygen .....	30
10.6.1	General .....	30
10.6.2	Methods of sampling .....	30
10.6.3	Preparation of a test portion .....	31
10.7	Sampling and sample preparation for the determination of hydrogen .....	31
10.7.1	General .....	31
10.7.2	Methods of sampling .....	31
10.7.3	Preparation of a test portion .....	32
<b>Annex A (informative) Sampling probes for use with liquid iron and steel .....</b>		<b>33</b>
<b>Annex B (informative) Sampling probes for use with liquid steel for the determination of hydrogen .....</b>		<b>41</b>
<b>Bibliography .....</b>		<b>44</b>

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[SIST EN ISO 14284:2023](https://standards.iteh.ai/catalog/standards/sist/bf1b87c2-3ddf-4f51-aa2e-766c2f6257b8/sist-en-iso-14284-2023)

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## ISO 14284:2022(E)

## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 1, *Methods of determination of chemical composition*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 459/SC 2, *Methods of chemical analysis for iron and steel*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 14284:1996), which has been technically revised. The main changes are as follows:

- figures updated;
- [Clause 3](#) updated;
- text updated;
- new sampling probes added;
- units changed to SI units.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Steel and iron — Sampling and preparation of samples for the determination of chemical composition

## 1 Scope

This document specifies methods for sampling and sample preparation for the determination of the chemical composition of pig irons, cast irons and steels.

Methods are specified for both liquid and solid metal.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### chemical method

method for the determination of chemical composition in which the *test sample* (3.16) or the *test portion* (3.17) is submitted to chemical reactions

### 3.2

#### physical method of analysis

##### physical method

method for the determination of chemical composition in which the determination is carried out without submitting the *test sample* (3.16) to chemical reactions

EXAMPLE Optical emission spectrometric (OES) method or X-ray fluorescence spectrometric (XRF) method.

### 3.3

#### thermal method of analysis

##### thermal method

method for the determination of chemical composition in which the *test sample* (3.16) is submitted to a process of heating, combustion or fusion

### 3.4

#### melt

liquid metal from which a *sample* (3.25) is taken

### 3.5

#### spoon sampling

method in which a *sample* (3.25) is taken from the *melt* (3.4), or during the pouring of the melt, using a long-handled spoon and poured into a small mould

### 3.6

#### spoon sample

*sample* (3.25) obtained from *spoon sampling* (3.5)

## ISO 14284:2022(E)

## 3.7

**probe sampling**

method in which a *sample* (3.25) is taken from the *melt* (3.4) using a commercially available sampling probe that is immersed in the melt

## 3.8

**probe sample**

*sample* (3.25) obtained from *probe sampling* (3.7)

## 3.9

**suction sampling**

method of *probe sampling* (3.7) in which the probe is immersed in the *melt* (3.4) and the sample chamber in the probe fills by aspiration

## 3.10

**stream sampling**

method of *probe sampling* (3.7) in which the probe is inserted into a stream of liquid metal and the sample chamber in the probe fills by the force of the metal flow

## 3.11

**immersion sampling**

method of *probe sampling* (3.7) in which the probe is immersed in the *melt* (3.4) and the sample chamber in the probe fills by ferrostatic pressure or gravity

## 3.12

**cast product**

steel or cast iron product that has not been subjected to deformation

EXAMPLE An ingot, a semi-finished product obtained by continuous casting, a casting.

## 3.13

**wrought product**

product obtained by hot and/or cold plastic deformation processes such as extruding, forging, hot rolling, cold rolling or drawing, either exclusively or in combination

EXAMPLE Rods, bars, wires, tubes, profiles, sheets, strips, forgings.

## 3.14

**batch sample**

sufficient amount of cast iron, pig iron or steel selected from a product batch for the purpose of obtaining one or more *laboratory samples* (3.15)

## 3.15

**laboratory sample**

part of a *sample* (3.25) that is processed so that it can be sent to the laboratory for the purpose of obtaining one or more *test samples* (3.16)

## 3.16

**test sample**

part of a *batch sample* (3.14), part of a *laboratory sample* (3.15) taken from a batch sample or part of a *sample* (3.25) taken from the *melt* (3.4) and brought to the appropriate condition required for analysis

Note 1 to entry: The test sample can also be the batch sample itself or a sample taken from the melt.

Note 2 to entry: The categories of test samples are the following:

- sample in the form of a solid block;
- sample obtained by remelting;
- sample in the form of chips obtained by machining;
- sample in the form of fragments obtained by *crushing* (3.19);

- sample in the form of powder obtained by *comminution* (3.18).

### 3.17

#### **test portion**

part of a *test sample* (3.16), or part of a *sample* (3.25) taken from the *melt* (3.4), submitted to analysis

Note 1 to entry: In some cases, the test portion may be selected from the *batch sample* (3.14) itself.

Note 2 to entry: Specific types of test portions in the form of solid blocks are the following:

- small disc, commonly described as a slug, obtained by punching;
- small appendage, commonly described as a lug;
- small-diameter rod, commonly described as a pin, obtained by cutting.

### 3.18

#### **comminution**

operation of reducing particle size by *crushing* (3.19) or *grinding* (3.21)

### 3.19

#### **crushing**

mechanical reduction of the particle size of a material by fracturing large pieces into multiple smaller pieces

### 3.20

#### **finishing**

method of preparing a *sample* (3.25) of metal for a *physical method of analysis* (3.2) in which the surface of the *test sample* (3.16) is abraded using a rotating disc or a continuous belt coated with an abrasive material

### 3.21

#### **grinding**

method of preparing a *sample* (3.25) of metal for a *physical method of analysis* (3.2) in which the surface of the *test sample* (3.16) is abraded using an abrasive wheel

### 3.22

#### **milling**

method of preparing chips or the surface of a *sample* (3.25) for a *physical method of analysis* (3.2) in which the surface of the *sample* (3.25) is machined using a rotating, multi-edged cutting tool

### 3.23

#### **consignment**

quantity of metal delivered at one time

### 3.24

#### **increment**

quantity of metal obtained by sampling at one time from a *consignment* (3.23)

### 3.25

#### **sample**

portion of material selected from a larger quantity of material

## 4 Requirements for sampling and sample preparation

### 4.1 General

This clause covers the general requirements for the sampling, the sample and the sample preparation of liquid iron and steel. Specific requirements applying to each category of liquid and solid metal are given in the relevant subclauses.