
**Copper, lead, zinc and nickel
concentrates — Sampling procedures
for determination of metal and
moisture content**

*Concentrés de cuivre, de plomb, de zinc et de nickel — Procédures
d'échantillonnage pour la détermination de la teneur en métal et de
l'humidité*

ITeH Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 12743:2018](https://standards.iteh.ai/catalog/standards/iso/f97400f9-db59-4ca7-8390-3aa889a936a3/iso-12743-2018)

<https://standards.iteh.ai/catalog/standards/iso/f97400f9-db59-4ca7-8390-3aa889a936a3/iso-12743-2018>



iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 12743:2018](https://standards.iteh.ai/catalog/standards/iso/f97400f9-db59-4ca7-8390-3aa889a936a3/iso-12743-2018)

<https://standards.iteh.ai/catalog/standards/iso/f97400f9-db59-4ca7-8390-3aa889a936a3/iso-12743-2018>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Sampling theory	4
4.1 General.....	4
4.2 Total variance.....	4
4.3 Sampling-stage method of estimating sampling and total variance.....	6
4.4 Simplified method of estimating sampling and total variance.....	9
4.5 Interleaved sample method of measuring total variance.....	10
5 Establishing a sampling scheme	12
6 Mass of increment	17
6.1 General.....	17
6.2 Mass of increment for falling-stream samplers.....	17
6.3 Mass of increment for cross-belt samplers.....	17
6.4 Mass of increment for manual sampling from stationary lots.....	17
6.4.1 Primary increments.....	17
6.4.2 Mass of secondary and subsequent increments.....	18
6.5 Mass of increment for stopped-belt reference sampling.....	18
7 Methods of sampling from concentrate streams	18
7.1 General.....	18
7.2 Mass-basis systematic sampling.....	18
7.2.1 General.....	18
7.2.2 Sampling interval.....	19
7.2.3 Sample cutter.....	19
7.2.4 Taking of primary increments.....	19
7.2.5 Constitution of subsamples and lot samples.....	19
7.2.6 Types of division.....	20
7.2.7 Division of increments.....	20
7.2.8 Division of subsamples.....	20
7.2.9 Division of lot samples.....	20
7.3 Time-basis systematic sampling.....	21
7.3.1 General.....	21
7.3.2 Sampling interval.....	21
7.3.3 Sample cutter.....	21
7.3.4 Taking of primary increments.....	22
7.3.5 Constitution of subsamples and lot samples.....	22
7.3.6 Types of division.....	22
7.3.7 Division of increments and subsamples.....	22
7.3.8 Division of lot samples.....	22
7.4 Stratified random sampling.....	22
7.4.1 Fixed mass intervals.....	22
7.4.2 Fixed time intervals.....	23
8 Mechanical sampling of concentrate streams	23
8.1 General.....	23
8.2 Design of the sampling system.....	23
8.2.1 Safety of operators.....	23
8.2.2 Location of sample cutters.....	23
8.2.3 Provision for interleaved sampling.....	23
8.2.4 Provision for stratified random sampling.....	24
8.2.5 Checking precision and bias.....	24
8.2.6 Avoiding bias.....	24

8.2.7	Minimizing bias.....	24
8.2.8	Configuration of the sampling system.....	24
8.3	Sample cutters.....	24
8.3.1	General.....	24
8.3.2	Design criteria.....	25
8.3.3	Cutter speed.....	26
8.4	Mass of increments.....	26
8.5	Number of increments.....	27
8.6	Sampling interval.....	27
8.7	Routine checking.....	27
9	Manual sampling of concentrate streams.....	28
9.1	General.....	28
9.2	Choosing the sampling location.....	28
9.3	Sampling implements.....	28
9.4	Mass of increments.....	28
9.5	Number of increments.....	28
9.6	Sampling interval.....	28
9.7	Sampling procedures.....	29
9.7.1	General.....	29
9.7.2	Full stream cut from a falling stream.....	29
9.7.3	Partial stream cuts from a falling stream.....	29
9.7.4	Sampling from moving conveyor belts.....	30
10	Stopped-belt reference sampling.....	30
11	Sampling from grabs.....	31
11.1	General.....	31
11.2	Mass of primary increments.....	31
11.3	Number of primary increments.....	31
11.4	Method of sampling.....	31
11.5	Constitution of subsamples and lot samples.....	31
12	Sampling from trucks, railway wagons and sampling hoppers.....	32
12.1	General.....	32
12.2	Mass of primary increments.....	32
12.3	Number of primary increments.....	32
12.4	Method of sampling.....	32
12.5	Constitution of subsamples and lot samples.....	32
13	Sampling of concentrate in bags or drums.....	35
13.1	General.....	35
13.2	Mass of primary increments.....	35
13.3	Number of primary increments.....	35
13.4	Method of sampling.....	36
13.4.1	General.....	36
13.4.2	Sampling during filling or emptying.....	36
13.4.3	Spear sampling.....	36
13.5	Constitution of subsamples and lot samples.....	36
14	Sampling of stockpiles.....	37
15	Methods of comminution, mixing and division.....	37
15.1	General.....	37
15.2	Comminution.....	37
15.2.1	General.....	37
15.2.2	Mills.....	37
15.3	Mixing.....	38
15.3.1	General.....	38
15.3.2	Methods of mixing.....	38
15.4	Division.....	39
15.4.1	Chemical analysis samples.....	39

15.4.2	Moisture samples	40
15.4.3	Number of increments for division	40
15.4.4	Minimum mass of divided sample	40
15.4.5	Rotary sample division	41
15.4.6	Cutter-type division	42
15.4.7	Manual increment division	42
15.4.8	Spear division	42
15.4.9	Fractional shovelling	43
15.4.10	Ribbon division	44
15.4.11	Riffle division	46
16	Sample requirements	49
16.1	Moisture samples	49
16.1.1	Mass of test portion	49
16.1.2	Processing of samples	49
16.2	Chemical analysis samples	49
16.3	Physical test samples	50
17	Packing and marking of samples	50
Annex A (normative) Sampling stage method of estimating sampling and total variance		51
Annex B (informative) Estimation of total variance — Barge unloading using a grab		59
Annex C (informative) Mechanical sample cutters		63
Annex D (informative) Checklist for mechanical sampling systems		68
Annex E (normative) Manual sampling devices		72
Annex F (informative) Apparatus for manual sampling of concentrates from stopped belts		74
Annex G (informative) Sampling of stockpiles		75
Annex H (normative) Increment division scoops for conducting manual increment division		77
Bibliography		78

[ISO 12743:2018](https://standards.iteh.ai/standards/iso/f97400f9-db59-4ca7-8390-3aa889a936a3/iso-12743-2018)

<https://standards.iteh.ai/catalog/standards/iso/f97400f9-db59-4ca7-8390-3aa889a936a3/iso-12743-2018>

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 183, *Copper, lead, zinc and nickel ores and concentrates*.

This third edition cancels and replaces the second edition (ISO 12743:2006), which has been technically revised.

The main changes to the previous edition are as follows:

- The minimum cutting aperture for cross-belt cutters in [8.3.2.3](#) i) has been reduced to 30 mm.
- A NOTE has been added to [15.4.10](#) indicating that ribbons with smaller dimensions can be formed depending on the mass of sample to be divided, and that the ribbon division method is particularly suitable for dividing chemical analysis samples.
- The requirements for preparation of chemical analysis samples in [16.2](#) have been expanded.

Copper, lead, zinc and nickel concentrates — Sampling procedures for determination of metal and moisture content

WARNING — This document can involve hazardous materials, operations and equipment. It is the responsibility of the user of this document to establish appropriate health and safety practices and to ensure compliance with any other restrictions.

1 Scope

This document sets out the basic methods for sampling copper, lead, zinc and nickel concentrates from moving streams and stationary lots, including stopped-belt sampling, to provide samples for chemical analysis, physical testing and determination of moisture content, in accordance with the relevant International Standards. Where the concentrates are susceptible to significant oxidation or decomposition, a common sample that is sufficiently representative, i.e. unbiased and sufficiently precise, is used for moisture determination and chemical analysis to eliminate bias (see ISO 10251). Any large agglomerates (>10 mm) present in the primary sample are crushed prior to further sample processing. Sampling of concentrates in slurry form is specifically excluded from this document.

Stopped-belt sampling is the reference method for collecting concentrate samples against which mechanical and manual-sampling procedures can be compared. Sampling from moving streams is the preferred method. Both falling-stream and cross-belt samplers are described.

Sampling from stationary lots is used only where sampling from moving streams is not possible. The procedures described in this document, for sampling from stationary lots, only minimize some of the systematic sampling errors.

2 Normative references

ISO 12743:2018

<https://standards.itec.ai/catalog/standards/iso/f97400f9-db59-4ca7-8390-3aa889a936a3/iso-12743-2018>

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10251, *Copper, lead, zinc and nickel concentrates — Determination of mass loss of bulk material on drying*

ISO 12744, *Copper, lead, zinc and nickel concentrates — Experimental methods for checking the precision of sampling*

ISO 13292, *Copper, lead, zinc and nickel concentrates — Experimental methods for checking the bias of sampling*

3 Terms and definitions

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

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

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