

ISO 12743:2021-05 (E)

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

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.....	8
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.....	24
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.....	25
8.3.1	General.....	25
8.3.2	Design criteria.....	25
8.3.3	Cutter speed.....	26
8.4	Mass of increments.....	27
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.....	29
9.5	Number of increments.....	29
9.6	Sampling interval.....	29
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.....	32
11.5	Constitution of subsamples and lot samples.....	32
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.....	33
13	Sampling of concentrate in bags or drums.....	36
13.1	General.....	36
13.2	Mass of primary increments.....	36
13.3	Number of primary increments.....	36
13.4	Method of sampling.....	37
13.4.1	General.....	37
13.4.2	Sampling during filling or emptying.....	37
13.4.3	Spear sampling.....	37
13.5	Constitution of subsamples and lot samples.....	37
14	Sampling of stockpiles.....	38
15	Methods of comminution, mixing and division.....	38
15.1	General.....	38
15.2	Comminution.....	38
15.2.1	General.....	38
15.2.2	Mills.....	38
15.3	Mixing.....	39
15.3.1	General.....	39
15.3.2	Methods of mixing.....	39
15.4	Division.....	40
15.4.1	Chemical analysis samples.....	40

15.4.2	Moisture samples	41
15.4.3	Number of increments for division	41
15.4.4	Minimum mass of divided sample	41
15.4.5	Rotary sample division	42
15.4.6	Cutter-type division	43
15.4.7	Manual increment division	43
15.4.8	Spear division	43
15.4.9	Fractional shovelling	44
15.4.10	Ribbon division	45
15.4.11	Riffle division	47
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		58
Annex C (informative) Mechanical sample cutters		62
Annex D (informative) Checklist for mechanical sampling systems		67
Annex E (normative) Manual sampling devices		71
Annex F (informative) Apparatus for manual sampling of concentrates from stopped belts		73
Annex G (informative) Sampling of stockpiles		74
Annex H (normative) Increment division scoops for conducting manual increment division		76
Bibliography		77