INTERNATIONAL STANDARD 2170

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Cereals and pulses — Sampling of milled products

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FOREWORD

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Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2170 was drawn up by Technical Committee ISO/TC 34, *Agricultural food products.*

It was approved in July 1971 by the Member Bodies of the following countries :

Australia	India	Portugal
Austria	Iran	Romania
Ceylon	Ireland	South Africa, Rep. of
Chile	Israel	Spain
Czechoslovakia	Korea, Dem.P.Rep. of	Turkey
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Germany	New Zealand	
Hungary	Poland	

No Member Body expressed disapproval of the document.

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Cereals and pulses — Sampling of milled products

0 INTRODUCTION

Correct sampling is an operation that requires most careful attention. Emphasis cannot therefore be too strongly laid on the necessity of obtaining a properly representative sample of milled cereal or pulse. Careless or inaccurate sampling could lead to misunderstanding and unwarranted financial adjustment.

The procedures given in this International Standard are recognized as good practice and it is strongly recommended that they be followed whenever practicable. It is recognized that it is difficult to lay down fixed rules to be followed in every case, and particular circumstances may render some modification of the method desirable, for example if it is desired to check the uniformity of a consignment by the examination of individual primary samples.

In certain areas there are widely recognized trade associations which prescribe rules for the sampling procedures to be used in contracts under their auspices. In no case will the methods described in this International Standard override the rules laid down in such contracts, or the rules of official inspecting organizations.

1 SCOPE AND FIELD OF APPLICATION

1.1 Scope

This International Standard specifies general conditions relating to sampling for the assessment of the quality and condition of milled products from cereals and pulses, intended for human or animal consumption, in powder, particulate or agglomerated form.

1.2 Field of application

This International Standard does not apply to whole unprocessed cereal grains or pulses, to seed grains or pulses, or to partially milled cereals or pulses which retain the form of the original material[1]. Starches and oils obtained from cereals or pulses are also excluded from the scope of this International Standard.

2 DEFINITIONS

Terms used in this International Standard have the following definitions :

2.1 consignment : The quantity of product despatched or received at one time and covered by a particular contract or shipping document.

2.2 lot : A stated portion of the consignment assumed to be of uniform characteristics which will allow the quality and condition to be assessed.

2.3 primary sample : A small quantity of product taken from a single position in the lot.

A series of primary samples is drawn from different parts of the lot which when bulked will be representative of the lot.

2.4 bulk sample : The quantity of product formed by combining and mixing the primary samples drawn from any one particular lot.

2.5 final lot sample (laboratory sample) : A sample representing the quality and condition of the lot, obtained by reduction of the bulk sample and intended for analysis or other examination.

3 GENERAL

3.1 Samples shall be drawn jointly by sampling superintendents appointed by buyers and sellers, or by a sampling superintendent appointed jointly.

3.2 Samples shall be fully representative of the lots from which they are drawn. Therefore, as the composition of the lot may not be uniform, a sufficient number of primary samples shall be drawn and carefully mixed, thus giving a bulk sample from which are obtained, by successive divisions, the final lot samples. If the lot consists of a number of freight containers, samples shall be drawn from each freight container.

1) For the sampling of cereals as grain, see ISO/R 950, *Cereals — Sampling (as grain)*. This method is also suitable for the partially milled cereals mentioned. See ISO/R 951, *Pulses — Sampling*, for the sampling of whole pulses. Examples of products which present difficulties in classification are given in Annex C.

3.3 It is essential that a product which is sea-damaged or otherwise damaged in transit or out of condition shall be kept separate from the sound product and sampled separately. Samples of the unsound material shall not be mixed with samples of sound material.

3.4 Special care is necessary to ensure that all sampling apparatus is clean, dry and free from foreign odours.

Sampling shall be carried out in such a manner as to protect the samples, the sampling instruments and the containers in which the samples are placed from adventitious contamination such as rain, dust, etc.

4 APPARATUS

The apparatus required falls under the following headings. Examples are given under each heading. (See also Figures 1 to 9 in Annex A.)

4.1 Sampling from bulk

Shovels, hand-scoops, cylindrical samplers and apparatus for drawing primary samples periodically from a flow of milled product.

4.2 Sampling from bags

Sack-type spears or triers.

4.3 Mixing and dividing

Shovels and dividing apparatus.

5 LOCATION OF SAMPLING

The location and time of sampling shall be determined by the agreements between the parties concerned. Particular recommendations applying to loading and discharge, respectively, are given in 5.1 and 5.2.

5.1 Loading

It is important that milled products which are to be sampled before despatch by vessel shall be sampled at the place of loading, during or immediately before loading.

5.2 Discharge

When milled products are received from ocean-going vessels or river transport, sampling shall be carried out during discharge from the vessel.

5.3 Sampling from freight containers, tank cars or tank trucks

The sampling of products from freight containers, tank cars or tank trucks shall be carried out at the place of original loading or of final unloading.

1) Metric tons (i.e "tonnes"). 1 t = 1 000 kg.

6 DRAWING OF PRIMARY SAMPLES

6.1 Primary samples from products carried in bulk

6.1.1 *Carriage by sea or inland waterway*

6.1.1.1 Unless otherwise specified in the contract, consignments shall be considered in lots of 500 t[1] or such part thereof as constitutes a single consignment or balance.

If the consignment is carried in a number of barges, each barge load shall constitute a lot.

6.1.1.2 When sampling takes place while the product is in motion, primary samples shall be drawn at time intervals dependent on the rate of flow.

6.1.1.3 When a bulk product is sampled in the hold during loading or discharge, primary samples shall be drawn from as many places as possible, excluding the run, and at intervals determined by the rate of loading or discharge.

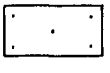
6.1.1.4 If sampling takes place from weigh hoppers before weighing, primary samples shall be drawn by means of cylindrical samplers, shovels, or mechanical samplers, in accordance with the practice of the port.

6.1.1.5 The procedure for silos or warehouses is necessarily dependent on local conditions.

6.1.2 *Carriage by rail or road*

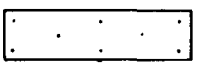
6.1.2.1 Unless otherwise specified in the contract, each laden wagon or lorry shall be sampled.

6.1.2.2 *If sampling takes place from laden wagons or* lorries, the primary samples shall be drawn throughout the whole depth of the product by means of a cylindrical sampler inserted vertically at the following points :



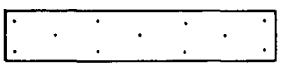
Wagons or lorries up to 15 t :

Five sampling points (middle and approximately 500 mm from sides)



Wagons from 15 to 30 t :

Eight sampling points



Wagons from 30 to 50 t :

Eleven sampling points

If agreed between the buyer and seller, primary samples may be drawn at three levels (top, middle and bottom) instead of through the whole depth of the product.

6.1.2.3 If the type of wagon does not allow samples to be drawn in this manner, or by agreement between buyer and seller, the method of sampling shall be as described in 6.1.1.2.

6.1.3 *Carriage in freight containers, tank cars or tank trucks*

Primary samples shall be drawn as described in 6.1.2.2.

6.2 Primary samples from products carried in bags or prepacked units

6.2.1 *Carriage in bags*

Unless otherwise specified in the contract or unless the practice at a port requires otherwise, the consignment shall be considered as a whole and primary samples shall be drawn from different parts of each bag to be sampled (for example, top, middle and bottom) by means of a sack-type spear from the following numbers of bags :

Number of bags	
in consignment	**to be sampled**
Up to 10	Each bag
10 to 100	10, drawn at random
More than 100	Square root (approximately) of total number, drawn according to a suitable sampling scheme [1]

When the walls of the bags sampled consist of material which does not permit the holes made by the sampling spear to close up naturally after removal of the spear, the holes shall be patched effectively after the samples have been drawn.

6.2.2 *Carriage in pre-packed units*

Pre-packed units are usually transported in outer cases or cartons containing a convenient number of units.

The procedure applicable to bags, described in 6.2.1, shall be used for determining the appropriate number of outer cases or cartons to be sampled. If the total number of outer cases or cartons in the consignments does not exceed 1 000, only one pre-packed unit shall be drawn from each of the other cases or cartons drawn for sampling.

Care shall be taken to ensure that a pre-packed unit is drawn in a random manner from the entire contents of the outer case or carton drawn for sampling. The selection of pre-packed units occupying the same corresponding position in a number of outer cases or cartons shall particularly be avoided.

The pre-packed units drawn in this manner shall be considered as primary samples.

7 BULK SAMPLE

The bulk sample shall be formed by bringing together the primary samples.

7.1 If the primary samples are drawn from material which is not pre-packed, they shall be well mixed.

7.2 If the bulk sample consists of pre-packed units, the whole shall be forwarded for examination unless a different procedure is agreed between the buyer and the seller.

8 FINAL LOT SAMPLES

If the bulk sample is formed by combining primary samples of material which is not pre-packed, it shall be divided down to the required number of final lot samples by use of apparatus mentioned in section 4. The number of final lot samples to be drawn for analysis and arbitration shall be specified in the contract or otherwise agreed between buyer and seller.

9 SIZE OF SAMPLES

The following sizes of samples are usually suitable if the bulk sample is formed by combining primary samples of material which is not pre-packed.

Lot	Primary sample	Bulk sample	Final lot sample
Up to 500 t	1 kg (max.)	100 kg (max.)	3 kg

Larger or smaller final lot samples may be required in some cases, according to the tests to be carried out.

10 PACKAGING AND LABELLING OF SAMPLES

10.1 Packaging of samples

10.1.1 The samples shall be packed in containers made of a material which has no action on the product, for example glass bottles or jars, tins with close-fitting lids, unglazed, unbleached, insewn cotton bags of very close texture, or paper bags.

1) See, for example, Annex B.

10.1.2 Samples for the determination of moisture, or for other tests in which it is important to avoid the loss of volatile matter (for example examination for evidence of chemical treatment), shall be packed in air-tight and moisture-tight containers fitted with air-tight closures. The containers shall be completely filled and the closures shall be sealed to prevent loosening or tampering.

10.1.3 The bags or other containers shall carry the seal of each sampler.

10.2 Labels for samples

If paper labels are used for the samples, they shall be of a suitably high quality for the purpose. The eyelet hole of the label should be reinforced. The label shall be sealed to the container holding the sample and shall carry the seal of each sampler; these seals shall be arranged in such a way as to guarantee the inviolability of the sample.

The information on the label shall include such of the following items of information as are required by the terms of the contract :

1 Ship, wagon or freight container

2 From

3 To

4 Arrived

5 Quantity

6 Bulk/Number of bags

7 Goods

8 Identification mark or lot number

9 Name of seller

10 Name of buyer

11 Contract number and date

12 Date of sampling

13 Date of final discharge

14 Place and point of sampling

15 Sampled by . . . .

The information recorded on the label shall be indelibly marked.

By agreement between seller and buyer, a duplicate label may be included inside the sample container, unless the sample is intended for moisture determination.

11 DESPATCH OF SAMPLES

Samples shall be despatched as soon as possible, and only in exceptional circumstances more than 48 h after sampling has been completed, non-business days excluded.

12 SAMPLING REPORT

If a sampling report is prepared, besides giving the usual information it shall make reference to the state of the product sampled, including signs of insect, mite or rodent infestation visible in the warehouse, silo or during working the vessel or other carrier. This infestation is not always readily apparent in the sample except on close inspection or sieving. The report shall also refer to the sampling technique applied, if this differs from that described in this International Standard, and all the circumstances that may have influenced sampling.

ANNEX A

EXAMPLES OF SAMPLING APPARATUS

NOTE – Many different types and variations of apparatus are available, and dimensions, in millimetres, are included solely as a guide.

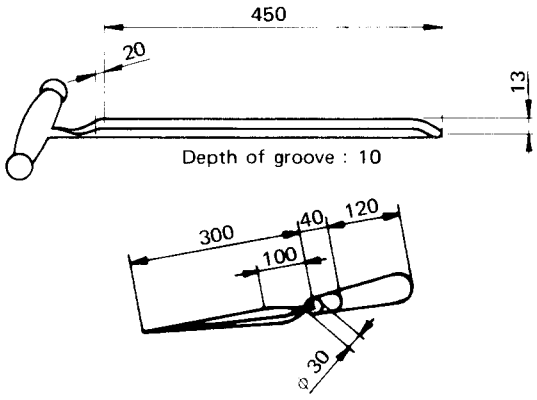


FIGURE 1 – **Sampling spears (open triers)**

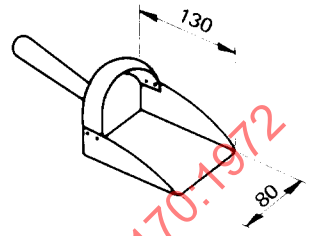


FIGURE 2 – **Hand-scoop**

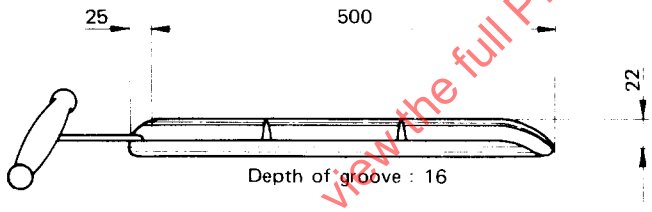


FIGURE 3 – **Divided sampling spear (open trier)**

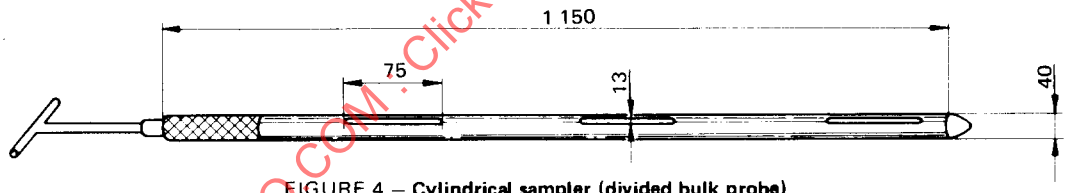


FIGURE 4 – **Cylindrical sampler (divided bulk probe)**

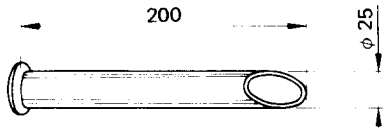


FIGURE 5 – **Running iron (sack-type trier)**

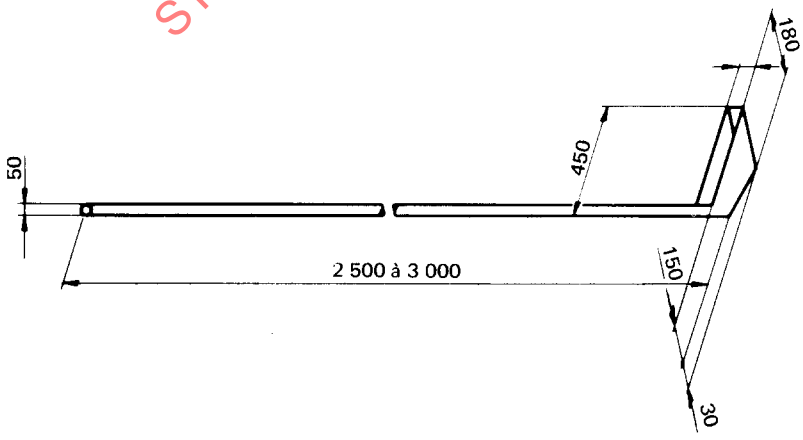


FIGURE 6 – **Falling stream sampler (Pelican-type)**

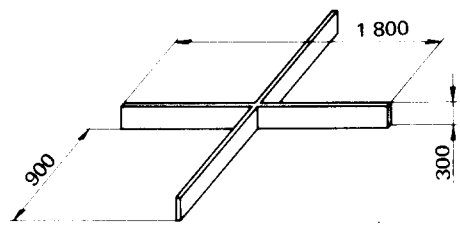


FIGURE 7 – **Quartering irons**

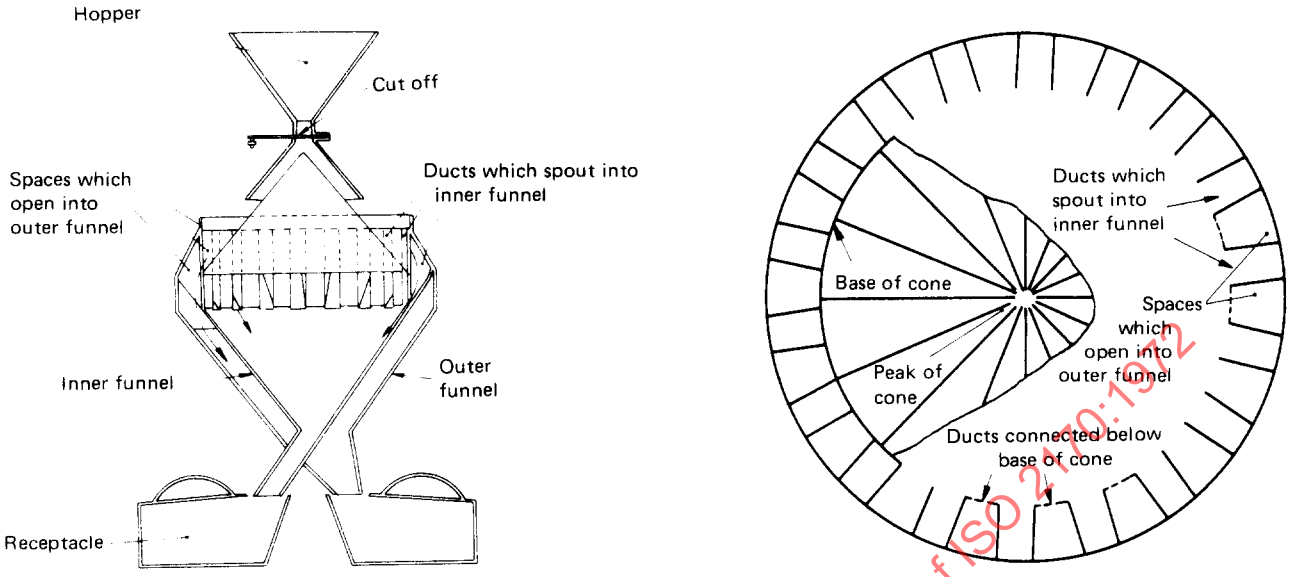


FIGURE 8 – **Conical divider (Boerner type)**

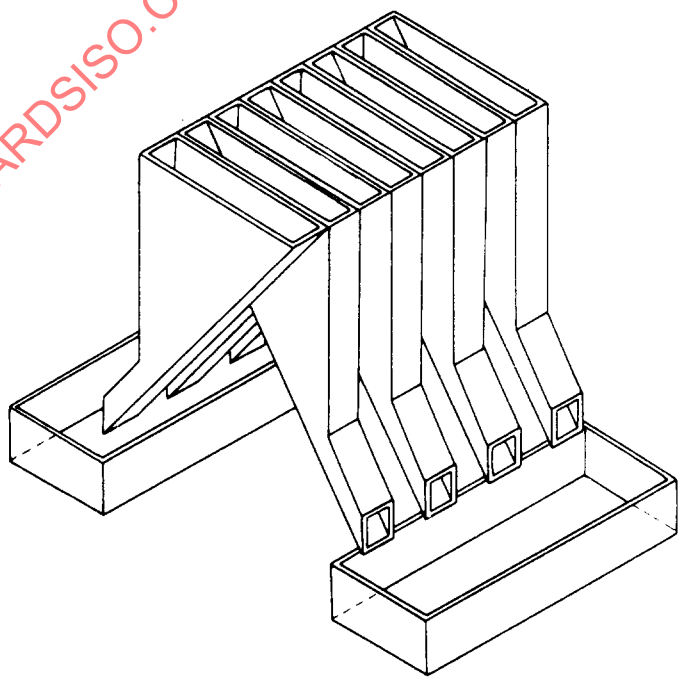


FIGURE 9 – **Multiple-slot divider**

ANNEX B

SAMPLING SCHEME FOR CONSIGNMENTS OF MORE THAN 100 UNITS (BAGS OR CASES)

For consignments larger than 100 units, the number of units to be sampled equals approximately the square root of the number of units in the consignment. The consignment is mentally divided into a number of groups, each including a number *a* of units corresponding with the square root of the number of units in the consignment (rounded upwards).

For sizes *N* of 101 . . . 10 000 units, the number of units forming one group has been indicated in the adjacent Table. For each of these groups 1 unit is drawn for sampling.

If there is a remainder after dividing the consignment into groups of *a* units, 1 unit from this remainder is also drawn for sampling.

It is recommended that the sampler should write down the numbers 1 . . . *a* and each time should cross out one number before drawing from the group of *a* units and sampling the unit that corresponds with this number.

Example

The consignment contains 200 units (*N*). For *N* equal to 197 . . .225 the size *a* of each group equals 15 units. Note the numbers 1, 2, 3, . . .,14, 15. Cross out one number, for example 7. Take from the first group of 15 units the seventh unit and sample it. Cross out another number, for example 3. Take from the second group of 15 units the third unit and sample it. Continue in this way until 13 groups of 15 units (a total of 195 units) have been sampled. The remaining group is smaller than 15 units; still take 1 unit at random out of it. A total of 14 units (= *a* − 1) has therefore been sampled out of a consignment of 200 units.

TABLE

N = Number of bags in consignment; *a* = Number of bags in group.

N	*a*	*N*	*a*	*N*	*a*
101 . . . 121	11	1 601 . . . 1 681	41	4 901 . . . 5 041	71
122 . . . 144	12	1 682 . . . 1 764	42	5 042 . . . 5 184	72
145 . . . 169	13	1 765 . . . 1 849	43	5 185 . . . 5 329	73
170 . . . 196	14	1 850 . . . 1 936	44	5 330 . . . 5 476	74
197 . . . 225	15	1 937 . . . 2 025	45	5 477 . . . 5 625	75
226 . . . 256	16	2 026 . . . 2 116	46	5 626 . . . 5 776	76
257 . . . 289	17	2 117 . . . 2 209	47	5 777 . . . 5 929	77
290 . . . 324	18	2 210 . . . 2 304	48	5 930 . . . 6 084	78
325 . . . 361	19	2 305 . . . 2 401	49	6 085 . . . 6 241	79
362 . . . 400	20	2 402 . . . 2 500	50	6 242 . . . 6 400	80
401 . . . 441	21	2 501 . . . 2 601	51	6 401 . . . 6 561	81
442 . . . 484	22	2 602 . . . 2 704	52	6 562 . . . 6 724	82
485 . . . 529	23	2 705 . . . 2 809	53	6 725 . . . 6 889	83
530 . . . 576	24	2 810 . . . 2 916	54	6 890 . . . 7 056	84
577 . . . 625	25	2 917 . . . 3 025	55	7 057 . . . 7 225	85
626 . . . 676	26	3 026 . . . 3 136	56	7 226 . . . 7 396	86
677 . . . 729	27	3 137 . . . 3 249	57	7 397 . . . 7 569	87
730 . . . 784	28	3 250 . . . 3 364	58	7 570 . . . 7 744	88
785 . . . 841	29	3 365 . . . 3 481	59	7 745 . . . 7 921	89
842 . . . 900	30	3 842 . . . 3 600	60	7 922 . . . 8 100	90
901 . . . 961	31	3 601 . . . 3 721	61	8 101 . . . 8 281	91
962 . . . 1 024	32	3 722 . . . 3 844	62	8 282 . . . 8 464	92
1 025 . . . 1 089	33	3 845 . . . 3 969	63	8 465 . . . 8 649	93
1 090 . . . 1 156	34	3 970 . . . 4 096	64	8 650 . . . 8 836	94
1 157 . . . 1 225	35	4 097 . . . 4 225	65	8 837 . . . 9 025	95
1 226 . . . 1 296	36	4 226 . . . 4 356	66	9 026 . . . 9 216	96
1 297 . . . 1 369	37	4 357 . . . 4 489	67	9 217 . . . 9 409	97
1 370 . . . 1 444	38	4 490 . . . 4 624	68	9 410 . . . 9 604	98
1 445 . . . 1 521	39	4 625 . . . 4 761	69	9 605 . . . 9 801	99
1 522 . . . 1 600	40	4 762 . . . 4 900	70	9 802 . . . 10 000	100

For consignments larger than 10 000 units, *a* equals the square root of *N*, rounded upwards.