INTERNATIONAL STANDARD

ISO 4150

Second edition
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Green coffee — Size analysis — Manual sieving

Café vert — Analyse granulométrique — Tamisage manuel

Reference number
ISO 4150:1991(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 4150 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*.

This second edition cancels and replaces the first edition (ISO 4150:1980), of which it constitutes a technical revision. The tolerances on sieve sizes have been reduced and a requirement for the determination of the moisture content has been added.

Annexes A and B form an integral part of this International Standard. Annex C is for information only.

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Green coffee — Size analysis — Manual sieving

1 Scope

This International Standard specifies a routine method for carrying out size analysis of green coffee by manual sieving using laboratory test sieves.

The procedure includes the determination of the moisture content or loss in mass at 105 °C.

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 indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1447:1978, *Green coffee — Determination of moisture content (Routine method).*

ISO 2395:1990, *Test sieves and test sieving — Vocabulary.*

ISO 2591-1:1988, *Test sieving — Part 1: Methods using test sieves of woven wire cloth and perforated metal plate.*

ISO 3310-2:1990, *Test sieves — Technical requirements and testing — Part 2: Test sieves of perforated metal plate.*

ISO 3509:1989, *Coffee and its products — Vocabulary.*

ISO 4072:1982, *Green coffee in bags — Sampling.*

ISO 6673:1983, *Green coffee — Determination of loss in mass at 105 °C.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 2395 for test sieves and ISO 3509 for coffee apply.

4 Principle

Separation of a laboratory sample into fractions according to size by manual sieving, and expression of the results as percentages by mass. Determination of the moisture content or loss in mass at 105 °C of a reconstituted test portion.

5 Apparatus

5.1 Balance, capable of weighing to the nearest 0,1 g.

5.2 Nest of test sieves.

5.2.1 Dimensions and sieving medium.

The test sieves shall have a sieve surface area between 550 cm² and 1 000 cm². Suitable test sieves are, for example, square sieves of size 300 mm, complying with the requirements of ISO 2591-1, except that the approximate depth of the sieve may be reduced to 25 mm.

The perforated metal plate used as the sieving medium shall be made of metal of suitable strength, such as stainless steel, ordinary steel or zinc, 0,8 mm to 1 mm thick. Each plate shall be perforated in accordance with the requirements given in annex A or annex B of this International Standard.

The test sieves shall be marked by means of a label attached to the sieve giving the following details:

a) nominal aperture size or the dimensions of slotted apertures (see annex A or annex B), or failing this, the traditional numbering[1];

b) reference to the standard(s) with which the sieve complies;

c) the material of the sieving medium and that of the frame;

d) the name of the firm (manufacturer or vendor) taking responsibility for the sieve;

e) an identification number.

5.2.2 Construction.

The test sieve frames shall nest snugly with each other and with the lid and receiver.

The frame shall be smooth and the seal of the sieve so constructed as to prevent lodging of the coffee beans to be sieved.

5.2.3 Verification.

New test sieves shall be tested (for example by using the methods described in ISO 3310-2) and a certificate shall be available to this effect. Periodic checking should also be performed, since some changes in the dimensions of the apertures may occur after a period of use.

5.2.4 Types of sieve

5.2.4.1 Test sieves with round holes, 11 sieves (see annex A).

5.2.4.2 Test sieves with slotted holes, 7 sieves (see annex B).

5.2.5 Lid.

The lid shall comply with the requirements of ISO 2591-1.

5.2.6 Receiver.

The receiver shall comply with the requirements of ISO 2591-1.

6 Sampling

Take a laboratory sample of 300 g, prepared in accordance with ISO 4072.

NOTE 1 The same laboratory sample as used for the examination and determination described in ISO 4149[2], may be used for the purposes of this International Standard provided that the sample is fully reconstituted before the test portions are taken for the test sieving.

7 Procedure

7.1 Test portion

Weigh, to the nearest 0,1 g, 100 g of the laboratory sample.

7.2 Selection of sieves

Select a nest of sieves (5.2) with slotted apertures (5.2.4.2) if dealing with a sample of substantially pea bean (often referred to as peaberry) coffee; otherwise use a nest of sieves with round apertures (5.2.4.1). Assemble the sieves in descending order of aperture size. From the result of a preliminary test or prior knowledge, select three or four suitable sieves, discarding those with larger apertures through which all beans will pass. Place the receiver (5.2.6) under the sieve with the smallest apertures.

7.3 Sieving and weighing

7.3.1 Pour the test portion (7.1) onto the upper sieve and put the lid (5.2.5) in place.

7.3.2 Agitate gently by hand for 3 min with slight vertical shaking, agitating in a direction parallel with the length of the apertures, if using sieves with slotted apertures, and with a slight corner-to-corner tilting action if using sieves with round apertures. At the end of this operation, give a sharp knock in order that beans only loosely held in apertures will fall through. Beans remaining in apertures shall be considered to be retained on the sieve in question.

7.3.3 If the sieves with the smaller apertures (i.e. Nos. 7, 10, 12, 12 1/2, 14 or 15 for the sieves with round holes) have not been selected for the first sieving operation, take the undersize in the receiver, and repeat the operations described in 7.3.1 and 7.3.2, using three or four sieves at a time, until the sieve with the smallest apertures has been used or until no whole coffee beans or other matter pass through the sieve of smallest aperture size used.

7.3.4 Weigh, to the nearest 0,1 g, the oversize collected on each of the sieves used and, if applicable, the undersize collected in the receiver.

7.4 Additional observations

Note whether any of the fractions contains a significant proportion of foreign matter, bean fragments or broken beans.

1) The traditional numbering is given for information purposes. It corresponds to the nominal aperture size of round apertures or to the width of slotted apertures, expressed in 64ths of an inch, closest to the metric dimension adopted.

7.5 Number of determinations

Carry out three determinations using 100 g test portions taken from the same laboratory sample.

After completing the first determination it is necessary to proceed immediately, and within a known time interval, to the determination specified in 7.6.

7.6 Moisture content

Recombine all the fractions of the first test portion and determine the moisture content or the loss in mass at 105 °C in accordance with either ISO 1447 or ISO 6673 respectively.

8 Expression of results

8.1 For each determination, express the result as a percentage by mass in the following manner:

oversize or residue (for each of the sieves used in the determination)	... % (*m*/*m*)
undersize or fines (for the sieves of smallest aperture size used or for the receiver)	... % (*m*/*m*)

8.2 For each determination, the total percentage of oversize and undersize shall be equal to (100 ± 0,5) % of the mass of the test portion. If it is not the case, the test is not valid and shall be repeated using another laboratory sample.

8.3 Take as the result for each sieve and for the receiver the mean of the results of the three determinations (7.5), expressed as defined above, provided that the requirement specified in 8.2 is satisfied.

9 Test report

The test report shall specify the method and type of sieve used, and the results obtained. It shall give details of any foreign matter or defects found and recorded in accordance with 7.4 and shall include the results of the moisture content (or loss in mass at 105 °C) determination, with a reference to the method used (i.e. either ISO 1447 or ISO 6673) and the time lapsing between completion of the operations in 7.4 and this determination being carried out. It shall also mention all operating details not specified in this International Standard, or regarded as optional, together with any incidents which may have influenced the results.

The test report shall include all information necessary for the complete identification of the sample.

Annex A
(normative)

Characteristics of perforated metal plate test sieves with round holes

Table A.1

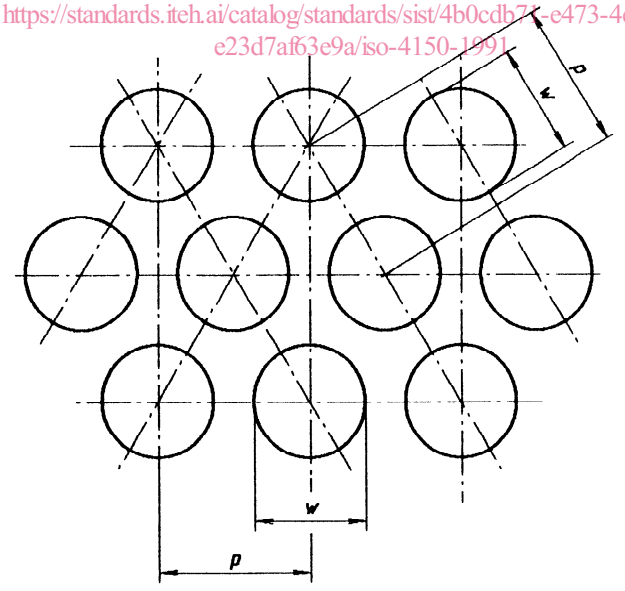
Aperture size (mm)		Sieve No.
Nominal diameter w	Tolerance	
8,00	± 0,09	20
7,50	± 0,09	19
7,10	± 0,09	18
6,70	± 0,08	17
6,30	± 0,08	16
6,00	± 0,08	15
5,60	± 0,07	14
5,00	± 0,07	12 1/2
4,75	± 0,07	12
4,00	± 0,06	10
2,80	± 0,05	7

The sequence of aperture diameters is taken from the R 40 series of preferred numbers in ISO 3[1].

The sieves Nos. 7, 10, 12, 12 1/2, 14, 16, 17, 18 and 20 shall comply with the requirements of ISO 3310-2, except that the tolerance on the nominal diameter shall be as shown in table A.1.

The technical specifications of sieves Nos. 15 and 19 shall be obtained by interpolation from those given in ISO 3310-2, except that the tolerance on the nominal diameter shall be as shown in table A.1.

The arrangement of the apertures shall be such that the aperture centres are at the apices of equilateral triangles (see figure A.1).



NOTE – Values of the pitch p are given in ISO 3310-2.

Figure A.1 — Round holes — Staggered arrangement

Annex B
(normative)

Characteristics of perforated metal plate test sieves with slotted apertures

The sequence of slot widths is taken from the R 40 series of preferred numbers in ISO 3[1].

The slots shall be arranged in rows (see figure B.1) or staggered. The values given for the pitches should be regarded as a nominal guide.

Table B.1

Aperture size (mm)			Pitch (mm)		Sieve No.
Width w_1	Tolerance on width	Length w_2	p_1	p_2	
5,60	± 0,07	30	9,6	36	14
5,00	± 0,07	30	9,0	36	13
4,75	± 0,07	20	8,6	25 or 26	12
4,50	± 0,07	20	8,2	25 or 26	11
4,00	± 0,06	20	7,5	25 or 26	10
3,55	± 0,06	20	6,8	25 or 26	9
3,00	± 0,05	20	6,0	25 or 26	8

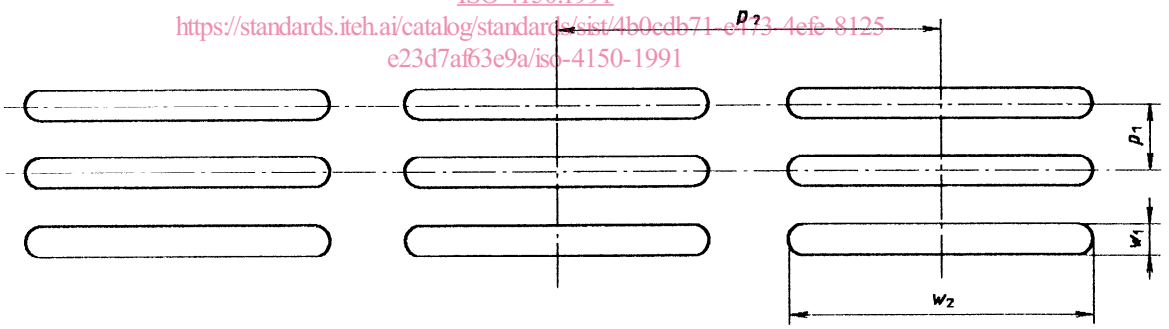


Figure B.1 — Slotted apertures — Arrangement in rows

Annex C
(informative)

Bibliography

[1] ISO 3:1973, *Preferred numbers — Series of preferred numbers.*

[2] ISO 4149:1980, *Green coffee — Olfactory and visual examination and determination of foreign matter and defects.*

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