INTERNATIONAL STANDARD

**ISO 4150**

Third edition
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# Green coffee or raw coffee — Size analysis — Manual and machine sieving

*Café vert — Analyse granulométrique — Tamisage manuel et à la machine*



Reference number
ISO 4150:2011(E)



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## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 4150 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 15, *Coffee*.

This third edition cancels and replaces the second edition (ISO 4150:1991), which has been technically revised.

# Green coffee or raw coffee — Size analysis — Manual and machine sieving

## 1 Scope

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

## 2 Normative references

The following referenced documents are indispensable for the application 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 3, *Preferred numbers — Series of preferred numbers*

ISO 2395, *Test sieves and test sieving — Vocabulary*

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

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



ISO 3509, *Coffee and coffee products — Vocabulary*

ISO 4072, *Green coffee in bags — Sampling*



## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2395 (for test sieves) and ISO 3509 (for coffee) apply.

## 4 Principle

A laboratory sample is separated into fractions according to size by manual (or machine) sieving, and the results are expressed as percentage mass fractions.

## 5 Apparatus

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

**5.2 Nest of test sieves**.

For the dimensions and sieving medium, the test sieves shall have a sieve surface area of between 550 $cm^2$ and 1 000 $cm^2$. 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.

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

a) traditional numbering (see Annex A);

NOTE 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.

b) nominal aperture size or the dimensions of slotted apertures (see Annex B);

c) in the case of round holes, the diameter of the sieve current is determined in the verification (see Annex A);

d) reference to the International Standard(s) with which the sieve complies;

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

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

g) identification number.

In terms of 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 being sieved.

For verification, new test sieves shall be tested (for example 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 can occur after a period of use.

**5.3 Test sieves**.



**5.3.1 Test sieves with round holes**, 11 sieves (see Annex A).



**5.3.2 Test sieves with slotted holes**, 7 sieves (see Annex B).



**5.4 Lid**.

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

**5.5 Receiver**.

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

**5.6 Machine for sieving**, having the following features.

a) The results obtained over each sieve shall be equal to using the manual method. In Annex D, a guide is presented to carry out this verification.

b) The machine shall contain a tray to allow for the assembly of a set with any number of sieves in order to carry out a complete analysis.

c) It shall consist of sieves which are easy to fix.

d) It shall have an adjustable timer in the 0 min to 3 min range.

## 6 Sampling

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

NOTE The same laboratory sample as used for the examination and determination described in ISO 4149 can be used for the purposes of this International Standard, provided the sample is fully reconstituted before the test portion is taken for the test sieving.

# 7 Procedure

## 7.1 Test portion

Weigh, to the nearest 0,1 g, 300 g of the laboratory sample.

## 7.2 Selection of sieves

Select a nest of sieves (5.2) with round apertures (5.3.1). Assemble the sieves in descending order of aperture size. If dealing with a sample of substantially peaberry coffee, to determine the percentage mass fraction of peaberry in the test portion, use a sieve with slotted openings (5.3.2).

Discard the sieves with larger apertures through which all beans can pass.

NOTE The common sieve numbers are 18, 17, 16, 15, 14 and 12.

Place the receiver (5.5) under the sieve with the smallest apertures.

## 7.3 Sieving and weighing

Pour the test portion (7.1) on to the upper sieve and put the lid (5.4) in place.

### 7.3.1 Manual sieving

**7.3.1.1** Spread a clean, dry, soft cloth under the receiver, in order to obtain smooth sliding.



Spread the cloth (see 7.2) over a flat surface and then put the nest of sieves on it.

**7.3.1.2** Agitate uniformly the nest of sieves for 3 min, one way (back and forth) without raising it from the surface at a speed of between 110 cycles per min and 130 cycles per min with a displacement of 10 cm approximately.



NOTE A speed with 150 cycles per min and 160 cycles per min and a displacement of 5 cm can be used.

If using slotted aperture sieves, agitate in a direction parallel to the length of apertures. Beans remaining in apertures shall be considered to be retained on the sieve in question.

Remove all the beans from each sieve separately, to avoid loss of the beans. Put the lid on the top of the respective sieve, then put one hand under the sieve and push the beans up. Then, carefully place the beans on a tray.

**7.3.1.3** Weigh to the nearest 0,1 g, the beans collected on each of the sieves used and in the receiver.

### 7.3.2 Machine sieving

**7.3.2.1** Put the nest of sieves on the machine (5.6) firmly, and turn the equipment on for 3 min. If using slotted aperture sieves, agitate in a direction parallel with the length of apertures. Beans remaining in apertures shall be considered to be retained on the sieve in question.

**7.3.2.2** Remove all the beans from each sieve separately, to avoid loss of the beans. Put the lid on the top of the respective sieve, then put one hand under the sieve and push the beans up. Then, carefully place the beans on a tray.

**7.3.2.3** Weigh to the nearest 0,1 g, the beans collected on each of the sieves used and 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. In this case, apply ISO 4149.

## 8 Statement of results

**8.1** The result, $w_{gc}$, is expressed as a mass fraction retained over each sieve in the following manner:

$$w_{gc} = \frac{m_S}{m_T} \times 100$$

where

$w_{gc}$ is the mass fraction retained with the sieve number, $S$;

$m_S$ is the coffee bean mass, with the sieve number, $S$, expressed in grams;

$m_T$ is the total mass of the sample, expressed in grams.

**8.2** The total percentage of all sieves shall be equal to (100 ± 0,5) % of the mass of the test portion. If this is not the case, the test is not valid and shall be repeated using another laboratory sample.

## 9 Precision

### 9.1 General

The results of an interlaboratory test are given in Annex C.



### 9.2 Repeatability

The absolute difference between two single test results for a given sieve size, $S$, obtained using the same method on the identical test material in the same laboratory by the same operator using the same equipment within a short interval of time, should not be greater than the repeatability limit, $r_S$, for this sieve.



$$r_S = 2{,}8 \times S_r = 0{,}0187 \times \bar{w}_S + 0{,}099\ 1$$

where $\bar{w}_S$ is the mean of the results on the respective sieve.

### 9.3 Reproducibility

The absolute difference between two single test results for a given sieve size, $S$, obtained using different equipment, should not be greater than the reproducibility limit, $R_S$, for this sieve.

$$R_S = 2{,}8 \times S_R = 0{,}1237 \times \bar{w}_S + 0{,}590\ 9$$

where $\bar{w}_S$ is the mean of the results on the respective sieve.

## 10 Test report

The test report shall contain at least the following information:

a) reference to this International Standard, i.e. ISO 4150:2011;

b) all the information necessary for the complete identification of the sample;

c) specification of the method and type of sieve used;

d) the test result(s) obtained;

e) the details of any foreign matter or defect found and recorded in accordance with 7.4;

f) all operating details not specified in this International Standard or regarded as optional, together with any incidents which can have influenced the result(s).