

UNECE STANDARD DF-04
concerning the marketing and commercial
quality control of

HAZELNUT KERNELS
moving in international trade between and to
UNECE member countries

I. DEFINITION OF PRODUCE

This standard applies to whole hazelnut kernels from varieties grown from *Corylus avellana L.* and *Corylus maxima Mill.* and their hybrids from which the protective ligneous epicarp has been removed.

II. PROVISIONS CONCERNING QUALITY

The purpose of the standard is to define the quality requirements of hazelnut kernels at the export control stage after preparation and packaging.

A. Minimum requirements

- (i) In all classes subject to the special provisions for each class and the tolerances allowed, the hazelnut kernels must be:
- intact; the absence of part of the tegument or a scratch less than 3 mm in diameter and 1.5 mm in depth shall not be regarded as a defect;
 - dry, free from abnormal external moisture;
 - clean, and in particular, free from visible foreign matter;
 - sound; produce affected by rotting or deterioration such as to make it unfit for consumption is excluded;
 - sufficiently developed; shrunken and shrivelled kernels are to be excluded;
 - free of any rancidity;
 - free of blemishes rendering them unfit for consumption;¹
 - free from living insects or mites whatever their stage of development;
 - free from visible damage by insects, mites or other parasites;
 - free from mould;
 - free of foreign smell and/or taste.

The condition of the hazelnut kernels must be such as to enable them:

- to withstand transport and handling; and
 - to arrive in satisfactory condition at the place of destination.
- (ii) Moisture content

¹ *This requirement does not apply to internal or external blemishes consisting of an alteration of the odour or taste of the hazelnuts, always provided that the hazelnuts remain fit for consumption.*

The hazelnut kernels shall have a moisture content of not greater than 6 per cent.²

B. Classification

Hazelnut kernels are classified in the three classes defined below:

(i) ***"Extra" Class***

The Hazelnut Kernels in this class must be of superior quality. They must be characteristic of the variety and/or commercial type.³

They must be practically free from defects with the exception of very slight superficial defects provided that these do not affect the general appearance of the produce, the quality, the keeping quality or its presentation in the package.

(ii) ***Class I***

Hazelnut kernels in this class must be of good quality. They must be characteristic of the variety and/or commercial type³.

They may have slight defects of form and colour, provided that these do not affect the general appearance of the produce, the quality, the keeping quality or its presentation in the package.

(iii) ***Class II***

This class comprises hazelnuts which do not qualify for inclusion in the higher classes, but satisfy the minimum requirements specified above.

Defects may be allowed provided that the Hazelnut Kernels retain their essential characteristics as regards general appearance, the quality, keeping quality and presentation.

² *The moisture content is determined by one of the methods given in Annex I of this document (Reference to the compendium of standards).*

³ *Commercial Type: Means that the hazelnuts in each container are of the similar general type and appearance or belong to a mix of varieties officially defined by the producing country.*

III. PROVISIONS CONCERNING SIZING

Sizing is determined by the maximum diameter of the equatorial section by means of round-holed screens. It is expressed either by an interval defined by a maximum size and a minimum size, by a reference to a minimum size followed by the word "and above" or by a reference to a maximum size followed by the word "and less".

Sizing or screening is compulsory for Extra class and Class I but optional for Class II.

The minimum size is 9 mm for Hazelnut Kernels in Extra Class and Class I, with the exception of hazelnuts of the piccolo type or hazelnuts having a similar designation for which a diameter of from 6 mm to 9 mm is allowed.

Hazelnut Kernels are either sized or screened.

(i) Sized hazelnuts

For sized hazelnuts, the difference in diameter between the minimum and maximum size must not exceed 2 mm. All sizes are allowed, subject to observance of the minimum size fixed above for Extra Class and Class I.

(ii) Screened hazelnuts

Screened hazelnuts means hazelnuts whose maximum diameter is over or under a stated figure, subject to observance of the minimum size fixed above for Extra Class and Class I. For produce presented to the final consumer under the specification screened, the size "and less" is not allowed.

IV. PROVISIONS CONCERNING TOLERANCES

Tolerances in respect of quality and size are allowed in each package for produce not satisfying the requirements of the class indicated.

A. Quality tolerances

Permitted defects	Tolerances allowed (per cent of defective fruit by weight)		
	EXTRA	Class I	Class II
Total tolerances ^a	5	12	16
Rancid, ^b rotten, mouldy, having a bad smell or taste, damaged by insects or attacked by rodents ^{c d}	1 ^e	2 ^{e f}	3 ^e
Not fully developed, including shrunken and shrivelled, stained and yellowish kernels	2	4	8
Mechanically damaged and pieces ^g	3	8	10
Twin hazelnuts (not included in the total tolerance)	2	5	8
Inshell hazelnuts, shell or tegument fragments, dust and foreign matter	0.25	0.25	0.25

^a Total tolerance for old crop shall be 6 per cent, 13 per cent and 18 per cent respectively in Extra Class, Class I and Class II provided that the marking indicates the crop year or the mention "Old Crop".

^b An oily appearance of the flesh does not necessarily indicate a rancid condition.

^c For hazelnuts of an old crop, these tolerances are increased to 1.5 per cent, 2.5 per cent and 4 per cent respectively in Extra Class, Class I and Class II, provided that the marking indicates the crop year or "old crop".

^d Living insects or animal pests are inadmissible in any class.

^e Reservation by Poland requesting 0.5% tolerance for mouldy. Any trace of damage by rodents is a disqualifying defect.

^f Reservation by Romania requesting 1% tolerance for mouldy for Class I. Romania agrees with the 2% total tolerance for "Rancid, rotten, mouldy, having a bad smell or taste damaged by insects or attacked by rodents" for Class I."

^g The percentage of pieces may not exceed 0.5 per cent, 1 per cent and 2 per cent respectively in Extra Class, Class I and Class II.

For Extra Class and Class I, there may be a maximum of 10 percent of kernels belonging to different varieties, commercial types, or shapes, from the same local production area. These requirements are also applicable to Class II in case the variety or commercial types are indicated in the marking.

B. Mineral impurities

Ashes insoluble in acid must not exceed 1g/kg.

C. Size tolerances

For all classes, 5 per cent by weight for round nuts and 10 per cent for pointed and oblong nuts, by weight of hazelnuts not satisfying the size range indicated. (An exception exists for kernels sized with 1 mm intervals. Tolerances for these kernels are 10 per cent for round nuts and 15 per cent for pointed and oblong nuts.) The presence of hazelnuts 0.2 mm above or below the size laid down shall not be regarded as a defect.

V. PROVISIONS CONCERNING PRESENTATION**A. Uniformity**

The contents of each package must be uniform and contain only hazelnuts of the same origin, quality, commercial type or variety.

The visible part of the contents of the package must be representative of the entire contents.

B. Packaging

Hazelnut Kernels must be packed in such a way as to protect the produce properly.

The materials used inside the package must be new, clean and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly of paper or stamps bearing trade specifications is allowed provided the printing or labelling has been done with non-toxic ink or glue.

Packages must be free of all foreign matter.

C. Presentation

Hazelnut Kernels must be presented in bags or solid containers. All pre-packages within each package must be of the same weight and contain Hazelnut Kernels of the same class, variety or commercial type.

VI. PROVISIONS CONCERNING MARKING

Each package must bear the following particulars in letters grouped on the same side, legibly and indelibly marked and visible from the outside:

A. Identification

Packer)	Name and address or
and/or)	officially issued or
Dispatcher)	accepted code mark ⁴

⁴ *The national legislation of a number of European countries requires the explicit declaration of the name and address.*

Shipping mark (where applicable). The shipping mark must correspond with the shipping mark on the Bill of Lading.

B. Nature of produce

- "Hazelnut Kernels".
- Name of the variety or commercial type for classes "Extra" and I (optional for Class II)

C. Origin of produce

Country of origin and, optionally, area where grown, or national, regional or local place name.

D. Commercial specifications

- Class
- Size: either by the minimum and maximum diameters, or by the minimum diameter followed by the words "and above", or the maximum diameter followed by the words "and less" (optional for Class II).
- Weight (gross or net)⁵. If the gross weight is indicated, the tare must not exceed 2.5 per cent for sacks of 50 kg and above, and 3.0 per cent for sacks of lesser weight. If the nuts are presented in double sacks other than paper or polyethylene, the net weight must be indicated. Net weight, or number of pre-packages followed by net unit weight for packages containing pre-packages.
- Crop year according to the legislation of the importing country.⁶

E. Official control mark (optional)

This standard was first published as UN/ECE Standard for Decorticated Hazel Nuts in 1970
Revised 1991, 2000
Inclusion of new Annex I 2002

⁵ *Net weight has to be indicated at the request of the importer or the importing country.*

⁶ *Reservation by Turkey and Romania requesting that the crop year be marked.*

ANNEX I
DETERMINATION OF THE MOISTURE CONTENT FOR DRY PRODUCE (NUTS)

METHOD 1 - LABORATORY REFERENCE METHOD

1. Scope and application

This reference method serves to determine the moisture and volatile matter content for both inshell nuts and shelled nuts (kernels).

2. Reference

This method is based on the method prescribed by ISO: ISO 665-2000 Oilseeds - Determination of moisture and volatile matter content.

3. Definition

Moisture content and volatile matter content for dry produce (inshell nuts and shelled nuts): loss in mass measured under the operating conditions specified in ISO 665-2000 for oilseeds of medium size (see point 7.3 of ISO 665-2000). The moisture content is expressed as mass fraction, in percent, of the mass of the initial sample.

For whole nuts, when moisture content is expressed both on the whole nut and on the kernel, in cases of dispute between the two values, the moisture content value of the whole nut takes precedence.

4. Principle

Determination of the moisture and volatile matter content of a test portion by drying at $103 \pm 2^\circ \text{C}$ in an oven at atmospheric pressure, until practically constant mass is reached.

5. Apparatus (see ISO 665-2000 for more details)

- 5.1 Analytical balance sensitive to 1 mg or better.
- 5.2 Mechanical mill.
- 5.3 3 mm round-holes sieve.
- 5.4 Glass, porcelain or non-corrosive metal containers, provided with well-fitting lids, allowing the test portion to be spread to about 0.2 g/cm^2 (approximately 5 mm height).
- 5.5 Electric oven with thermostatic control capable of being regulated between 101 and 105°C in normal operation.
- 5.6 Desiccator containing an effective desiccant.

6. Procedure

Follow the operating conditions as specified in ISO 665-2000 for oilseeds of medium size (point 7 and 7.3 of ISO 665-2000), but with the following specific modifications, concerning the preparation of the test sample.

Although ISO 665-2000 sets up one initial period of 3 hours in the oven set at $103 \pm 2^\circ \text{C}$, for nuts it is recommended one initial period of 6 hours.

6.a Determination of the moisture and volatile matter content of kernels:

For shelled nuts, homogenize the laboratory sample and take a minimum of 100 g of kernels as a test sample.

For inshell nuts, take a minimum of 200 g and, using a nutcracker or hammer, remove the shells and fragments or particles of shell, using the rest as a test sample. The kernel skin (cuticle or spermoderm) is included in the test sample.

Grind and sieve the test sample until the size of the particles obtained is no greater than 3 mm. During the grinding operation, care should be taken to avoid the production of a paste (oily flour), the overheating of the sample and the consequent loss of moisture content (for example, if using a mechanical food chopper, by successive very short grinding and sieving operations).

Spread evenly over the base of the vessel about 10 g of the ground product as a test portion, replace the lid, and weigh the whole vessel. Carry out two determinations on the same test sample.

6.b Determination of moisture and volatile matter content on whole nuts (shell plus kernel):

Homogenize the laboratory sample and take a minimum of 200 g of nuts as a test sample. Remove all the foreign matter (dust, stickers, etc.) from the test sample.

Grind the whole nuts using either a Rass Mill, a Romer Mill or a Brabender apparatus or similar, without overheating the product.

Spread evenly over the base of the vessel about 15 g of the ground product as a test portion, replace the lid, and weigh the whole vessel. Carry out two determinations on the same test sample.

7. Expression of results and test report

Follow all the instructions as specified in ISO 665-2000 (point 9 and 11) for method of calculation and formulae, and for test report, without any modification.⁷

8. Precision

For conditions of repeatability and reproducibility apply specifications of ISO 665-2000 (point 10.2 and 10.3) for soya beans.

METHOD 2: RAPID METHOD

1. Principle

Determination of the moisture content using a measuring apparatus based on the principle of loss of mass by heating. The apparatus should include a halogen or infra-red lamp and a built-in analytical balance, calibrated according to the laboratory method.

The use of apparatus based on the principle of electrical conductivity or resistance, as Moisture Meters, Moisture Testers and similar, is also allowed always at condition that the apparatus has to be calibrated according with the laboratory reference method for the tested product.

2. Apparatus

- 2.1 Mechanical mill or food chopper.
- 2.2 3 mm round-holes sieve (unless indicated otherwise by the instructions for use of the apparatus).
- 2.3 Halogen or infrared lamp with built-in analytical balance sensitive to 1 mg or better.

3. Procedure

- 3.1 Preparation of sample

Follow the same instructions as given for the laboratory reference method (points 6.a and 6.b), unless indicated otherwise by the instructions for use of the apparatus, particularly with regard to the diameter of the fragments.

⁷ The main points specified are as follows:

- moisture and volatile matter content is expressed as mass fraction, in percent, of the mass of the initial sample.
- The result is the arithmetic mean of the two determinations; the difference between the two determinations should not exceed 0.2 % (mass fraction).
- The result has to be reported to one decimal place.

3.2 Determination of moisture content

Carry out the determination on two test portions of approximately 5 to 10 g each, unless indicated otherwise by the instructions for use of the apparatus.

Spread the test portion over the base of the test receptacle, thoroughly cleaned in advance, and note the weight of the test portion to within 1 mg.

Follow the procedure indicated in the instructions for use of the apparatus for the product to be tested, in particular with regard to the adjusting of temperatures, the duration of the test and the recording of the weight readings.

4. Expression of results

4.1 Result

The result should be the arithmetic mean of the two determinations, provided that the conditions of repeatability (4.2) are satisfied. Report the result to one decimal place.

4.2 Repeatability

The difference in absolute value between the respective results of the two determinations performed simultaneously or one immediately after the other by the same operator, under the same conditions on identical test material, must not exceed 0.2%.

5. Test report

The test report must state the method used and the results obtained. The report must contain all information necessary for the full identification of the sample.

ANNEX II

DEFINITIONS OF TERMS AND DEFECTS FOR HAZELNUT KERNELS

Clean:	Means practically free from plainly visible adhering dirt or other foreign material.
Foreign matter:	Means any substance other than the hazelnut kernel, or portions of kernels.
Insect damage:	Visible damage caused by insects or animal parasites, or the presence of dead insects or insect debris.
Mould:	Mould filaments visible to the naked eye either on the outside or on the inside of the kernels.
Pieces:	Kernels which more than one third of the fruit is missing and which do not pass through a 5 mm round meshed sieve.
Rancidity:	Oxidation of lipids producing a disagreeable flavour. An oily appearance of the flesh does not necessarily indicate a rancid condition.
Rotten:	Significant decomposition caused by the action of micro-organisms.
Shrivelled:	The wrinkling of more than 50 per cent of the fruit skin surface of the compact fruit, usually occurring in seasons where there are high crop yields, or where there is stress from drought or poor nutrition, or as an inherited trait.
Shrunken:	A condition yielding undeveloped firm fruit obtained after fertilization during rapid kernel growth in extremely high temperatures.
Stains or physiological alterations:	Alterations of colour and odour from excessive heat during drying, aging or storage in unfavourable conditions, etc. (the presence of hazelnut kernels with a brown or dark brown centre, normally accompanied by a small separation of the cotyledons, that does not affect taste or smell, is not considered as a defect).
Twins:	Hazelnuts of characteristic shape as a consequence of the development of two kernels in the same nut.
Yellowish:	Hazelnuts that have deep yellowish shade at the cut accompanied or not by softness of the hazelnut and/or slight symptoms of smell or taste alteration.