UNECE STANDARD DF-03
concerning the marketing and commercial
quality control of

INSHELL HAZELNUTS
moving in international trade between and to
UNECE member countries

I. DEFINITION OF PRODUCE

This standard applies to inshell hazelnuts from varieties (cultivars) grown from *Corylus avellana L.* and *Corylus maxima Mill* and their hybrids without involucre or husk and which are intended for direct consumption.

II. PROVISIONS CONCERNING QUALITY

The purpose of the standard is to define the quality requirements for inshell hazelnuts at the export control stage, after preparation and packaging.

A. Minimum requirements [1]

(i) In all classes subject to the special provisions for each class and the tolerances allowed, the inshell hazelnuts must be:

(a) Characteristics of the shell
- well formed; shell is not noticeably misshapen;
- intact; a slight superficial damage is not considered as a defect;
- sound; free from defects likely to affect the natural keeping quality of the fruit;
- free from damage caused by pests;
- clean; practically free of any visible foreign matter;
- dry; free of abnormal external moisture;
- free of adhering husk (not more than 5% of individual shell surface in aggregate, may have adhering husk).

(b) Characteristics of the kernel
- intact; slight superficial damage is not considered as a defect;
- sound; produce affected by rotting or deterioration such as to make it unfit for consumption is excluded;
- sufficiently developed; empty, shrunken or shrivelled fruit are to be excluded;
- clean; practically free of any visible foreign matter;
- free from living or dead insects whatever their stage of development;

[1] *The definition of defects is given in Annex II to this document.*

- free from damage caused by pests;
- free from mould filaments visible to the naked eye;
- free from rancidity;
- free of abnormal external moisture;
- free from foreign smell and/or taste;
- free from blemishes (including the presence of black colour) or deterioration rendering them unfit for consumption. [2]

Inshell hazelnuts must be harvested when fully ripe.

The condition of the hazelnuts must be such as to enable them

- to withstand normal transport and handling, and
- to arrive in a satisfactory condition at the place of destination.

(ii) Moisture Content

Inshell hazelnuts shall have a moisture content of not exceeding 12 per cent for the whole hazelnut and 7 per cent for the kernel. [3]

B. Classification

Inshell hazelnuts are classified in three classes defined below:

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

The inshell hazelnuts in this class must be of superior quality. They must be characteristic of the variety and/or commercial type. [4]

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 and presentation in the package.

(ii) ***Class I***

Inshell hazelnuts in this class must be of good quality. They must be characteristic of the variety and/or commercial type. [4]

---

[2] *The presence of hazelnuts with a brown or dark brown core, normally accompanied by a slight separation of the cotyledons that does not entail an alteration of odour or taste of the kernels, is not considered a defect.*

[3] *The moisture content is determined by one of the methods given in Annex I to this document.*

[4] *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.*

Slight defects may be allowed provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.

(iii) ***Class II***

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

Defects may be allowed provided the inshell hazelnuts retain their essential characteristics as regards the quality, keeping quality and presentation.

III. PROVISIONS CONCERNING SIZING

Sizing or Screening is determined by the maximum diameter of the equatorial section. It is expressed either by an interval determined by a maximum size and a minimum size (sizing), or by mentioning the minimum size following by the words "and over", or the maximum size followed by the words "and less" (screening). Sizing is compulsory for produce in classes "Extra" and "I" but optional for produce in Class "II". The following classification is laid down:

Size [a]	**Screening** [a]
22 and above	22 mm and above (or and less)
20 to 22 mm	20 mm and above (or and less)
18 to 20 mm	18 mm and above (or and less)
16 to 18 mm	16 mm and above (or and less)
14 to 16 mm	14 mm and above (or and less)
12 to 14 mm	

[a] *In addition to this size table, provided that the size or screen in millimetres is also expressed in the marking, any size including larger sizes may be used with option size names.*

Only inshell hazelnuts with a diameter equal to or above 16 mm may be included in the "Extra" class, and in Class "I" only those with a diameter equal to or above 14 mm. For produce presented to the final consumer under the classification 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 tolerance for defects of shell (calculated on the total inshell weight basis)	3 [a]	5	7
Total tolerances for defects of the kernel (calculated on the kernel weight basis)	5 [b]	8 [c]	12 [c]
of which mouldy, rotten, rancid [d] or damaged by insects [e] (calculated on the kernel weight basis)	3 [b f]	5 [f]	6 [f]
Foreign matter (calculated on the total inshell weight basis)	0.25	0.25	0.25
Empty nuts (calculated by count)	4	6	8

[a] *Reservation by the US delegation requesting 4% for Extra Class.*

[b] *Reservation by Romania requesting a 1% tolerance for mouldy in Extra Class. Romania agrees with the 3% total tolerance in Extra Class for mouldy, rotten, rancid or damaged by insects or animal pests.*

[c] *In calculating these percentages, a slight deformation of the kernel is not considered to be a defect.*

[d] *An oily appearance of the flesh does not necessarily indicate a rancid condition.*

[e] *Living insects or animals are inadmissible in any class whatsoever.*

[f] *Reservation by Poland requesting 0.5% tolerance for mouldy. Any trace of damage by rodents is a disqualifying defect.*

For Extra Class and Class I, there may be a maximum of 12 per cent by number or weight of inshell hazelnuts belonging to different varieties or commercial types. These allowances are also applicable to Class II in case the variety or commercial type is indicated.

B. Mineral impurities

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

C. Size tolerances

For all classes, a maximum of 10 per cent by number or weight of inshell hazelnuts not conforming to the size indicated is tolerated provided:

- the nuts correspond to the sizes immediately below or above when the size is designated by an interval determined by the minimum diameter and the maximum diameter (sizing);

- the nuts correspond to the size immediately below when the size is designated by an indication of the minimum diameter followed by “and above” or “and +” (screening);

- the nuts correspond to the size immediately above when the size is designated by an indication of the maximum size followed by the words "and less" or “ and – “ (screening).

V. PROVISIONS CONCERNING PRESENTATION

A. Uniformity

The contents of each package must be uniform and contain only inshell hazelnuts of the same origin, quality, variety or commercial type and size (if sized).

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

B. Packaging

Inshell hazelnuts 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

Inshell hazelnuts must be presented in bags and/or solid containers. All pre-packages within each package must be of the same weight.

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 [5]

[5] *The national legislation of a number of European countries requires the explicit declaration of the name and address. However, in the case where a code mark is used, the reference "packer and/or dispatcher (or equivalent abbreviations)" has to be indicated in close connection with the code mark.*

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

B. Nature of produce

- "Inshell Hazelnuts".
- 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 expressed by:
  - the minimum and maximum diameters (sizing), or
  - the minimum diameter followed by the words “and above” or “and +” or the maximum diameter followed by the words "and less" or “and – “ (screening);
  - in addition, size name (optional).
- Best before followed by the date (optional).
- Weight (gross or net).[6] 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 (optional).[7]

E. Official control mark (optional)

This standard was first published in 1970 as UN/ECE Standard for Unshelled Hazel Nuts
Revised 1991, 2000
The UN/ECE Standard for Unshelled Hazel Nuts
has led to the development of an explanatory brochure published by the OECD Scheme
Inclusion of new Annex I 2002

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

[7] *Mandatory, at the request of the importing country.*

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 ± 2º 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 105º 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 ± 2º 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. [8]

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.

[8] *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 INSHELL HAZELNUTS

Cracks or splitting :	Any crack which is open and conspicuous, and larger than one-fourth the circumference of the shell.
Defects of shell :	Any defect affecting the shell but not the kernel.
Dry :	Means that the shell is free from surface moisture, and that the shells and kernels combined do not contain more than 12 per cent moisture.
Empty :	Means a hazelnut containing no kernel.
Foreign matter :	Any matter not normally associated with the product.
Insect damage :	Visible damage caused by insects or animal parasites or the presence of dead insects or insect debris.
Intact :	Means that the shell is not broken, split or mechanically damaged; a slight crack is not considered as a defect provided the kernel is still protected.
Mould :	Mould filaments visible to the naked eye either on the outside or on the inside of the kernel.
Rancidity :	Oxidation of lipids or free fatty acids producing a disagreeable flavour. An oily appearance of the flesh does not necessarily indicate a rancid condition.
Rotten/Decay :	Significant decomposition caused by the action of micro-organisms.
Shrivelled :	The wrinkling of more than 50% of the skin surface of the compact fruit, usually occurring in seasons when there are high crop yields, or when 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.
Well formed :	Means that the shell is not noticeably misshapen and that its shape concords with the characteristic varietal or commercial type.