

**UNECE STANDARD DF-09**  
concerning the marketing and commercial  
quality control of

**UNSHELLED PISTACHIO NUTS**  
moving in international trade between and to  
UNECE member countries

**I. DEFINITION OF PRODUCE**

This standard applies to unshelled pistachio nuts from varieties (cultivars) grown from Pistachio (*Pistacia vera L.*), from which the protective pericarp has been removed and which are intended for direct consumption. For processed pistachio nuts the quality requirements indicated in this standard will apply with regard to processing characteristics.

**II. PROVISIONS CONCERNING QUALITY**

The purpose of the standard is to define the quality requirements of unshelled pistachio nuts 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 unshelled pistachio nuts must be:

(a) **Characteristics of the shell**

- intact; slight superficial damage is not considered as a defect
- sound, free from defects likely to affect the natural keeping quality of the fruit
- clean, practically free of any visible foreign matter provided that the edible part of the fruit is protected
- dry; free from abnormal external moisture
- free of residues of pericarp
- either naturally split or split mechanically.

(b) **Characteristics of the kernel**

- intact
- sound; produce affected by rotting or deterioration such as to make it unfit for consumption, is excluded
- sufficiently developed
- free from living insects or any other living animal pests
- free from visible damage by insects, mites or other parasites
- free from mould
- free from rancidity or foreign smell and/or taste.

The condition of the unshelled pistachio nuts 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**

The unshelled pistachio nut kernels shall have a moisture content of not greater than 6.5 per cent.

<sup>1 2</sup>

## B. Classification

Unshelled pistachio nuts are classified in three classes defined below:

(i) **"Extra" class**

Pistachio nuts in this class must be of superior quality. They must be of normal shape and characteristic of the variety and/or commercial type. 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**

Pistachio nuts in this class must be of good quality. They must be characteristic of the variety and/or commercial type. Slight defects may be allowed 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 includes unshelled pistachio nuts which do not qualify for inclusion in the higher classes but which satisfy the minimum requirements specified above. Defects may be allowed provided that the unshelled pistachio nuts retain their essential characteristics as regards general appearance, quality, keeping quality and presentation.

## III. PROVISIONS CONCERNING SIZING

Sizing of unshelled pistachio nuts is compulsory for produce in "EXTRA" Class and is determined by the maximum diameter of the equatorial section which is determined by means of a screen with circular perforations, or the number of pistachio nuts per 100/grammes according to the following table:

	Diameters (mm) <sup>a</sup>		Number of pistachio nuts per 100 g <sup>a</sup>	
	Round <sup>b</sup>	Long <sup>b</sup>	Round <sup>b</sup>	Long <sup>b</sup>

<sup>1</sup> Reservation by Germany and the Netherlands for a maximum level of 6.0 per cent moisture.

<sup>2</sup> The methods described in Annex I of this document will be used to determine the moisture content. The reference method would be the Laboratory Method in the case of dispute.

<b>Very large (V.L.)</b>	12 and above	11 and above	Up to 77	Up to 92
<b>Large (L.)</b>	11-12	10-11	77-88	92-112
<b>Medium (M.)</b>	10-11	9-10	89-109	113-138
<b>Small (S.)</b>	9-10	8-9	Over 109	Over 138

<sup>a</sup> *By screened or weighed pistachio nuts is meant pistachio nuts whose maximum diameter or number respectively is over or under a stated figure.*

<sup>b</sup> *Pistachio nuts are divided according to their variety as:*

- a) round*
- b) long.*

#### **IV. PROVISIONS CONCERNING TOLERANCES**

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

**A. Quality tolerances**

Permitted defects <sup>a</sup>	Tolerances allowed (per cent of defective fruit by number or by weight)		
	Extra	Class I	Class II
Total tolerances for kernel and shell defects:	5	10	15
<b>Shell defects</b>			
- Stained shells <sup>b</sup>	2	3	4
- Laterally split shells	1	4	6
- Cracks, traces of pericarp, blemishes	1	2	3
- Unsplit shells	2	3	5
<b>Kernels defects:</b>			
- Not fully developed, shrivelled and stained kernels	3	6	10
- Rancid, decay, having a foreign smell or taste, damage by insects <sup>c 3</sup>	1	1.5	3
- Mould <sup>3 4</sup>	0.5	0.5	1
- Empty nuts	1	3	5
- Foreign matter	0.2	0.2	0.2

<sup>a</sup> Standard definitions of the defects are listed in Annex II attached to this standard.

<sup>b</sup> These tolerances would not count toward the global tolerances.

<sup>c</sup> For pistachio nuts of the old crop, these tolerances are increased to 2.5 per cent and 4 per cent respectively in Class I and Class II, provided that the marking indicates the crop year. Not more than 0.25 per cent by weight of nuts containing dead insects or parts of dead insects.

**B. Mineral impurities**

Not greater than 1g/kg.

**C. Size Tolerances**

For all classes of screened pistachio nuts, 5 per cent by weight or count may be of a size different from the size laid down.

**V. PROVISIONS CONCERNING PRESENTATION**

<sup>3</sup> *The national legislations of Germany and of Switzerland do not permit tolerances for produce affected by mould or the presence of live or dead insects.*

<sup>4</sup> *Reservation of Poland that the tolerance for mould should be 0.5 per cent regardless of the class.*

**A. Uniformity**

The contents of each package (or lot for produce presented in bulk) must be uniform and contain only pistachio nuts of the same origin, quality and size (if sized).

The visible part of the contents of the package (or lot for produce presented in bulk) must be representative of the entire contents. For "Extra class" and Class I the produce must be of the same variety and/or commercial type.

**B. Packaging**

Unshelled pistachio nuts 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 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.

**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 <sup>5</sup>

**B. Nature of the produce**

-           Unshelled Pistachio Nuts.

**C. Origin of the produce**

-           Country of origin and, optionally, district where produced or the national, regional or local place name.

**D. Commercial specifications**

-           class

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<sup>5</sup>       *The national legislation of a number of European countries requires the explicit declaration of the name and address.*

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- commercial type or variety
- type as "round" or "long"
- size (if sized)
- crop year (optional).

**E. Official control mark (optional)**

Adopted 1990  
Inclusion of new Annex I 2002

**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  $0.2 \text{ g/cm}^2$  (approximately 5 mm height).
- 5.5 Electric oven with thermostatic control capable of being regulated between 101 and  $105^\circ \text{C}$  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 Rasmill, 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.<sup>6</sup>

## 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.

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<sup>6</sup> 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 USED IN THE STANDARD FOR**  
**UNSHELLED PISTACHIO NUTS**

<b>Defects of the shell:</b>	Any defect affecting the shell but not the kernel (blemishes, cracks, traces of pericarp etc.).
<b>Unsplit shells:</b>	Pistachio shells which are not split open, but contain a fully developed kernel.
<b>Defects of the kernel:</b>	Any defect adversely affecting the appearance and edibility of the kernel.
<b>Fully developed:</b>	The condition of pistachio in which the kernel has developed fully.
<b>Shrivelled:</b>	Kernel which is seriously shrunken, wrinkled and tough.
<b>Rancid:</b>	Oxidation of lipids producing a disagreeable flavour. An oily appearance of the flesh does not necessarily indicate a rancid condition.
<b>Foreign smell or taste:</b>	Any odour or flavour that is not characteristic of the product.
<b>Damage by insects or attacked by rodents:</b>	Visible damage by insects or rodents, or the presence of dead insects or insect debris.
<b>Mould:</b>	Mould filaments visible to the naked eye.
<b>Empty nuts:</b>	The condition of pistachio in which the kernel is not developed.
<b>Foreign matter:</b>	Any matter or material not usually associated with the product.
<b>Decay:</b>	Significant decomposition caused by the action of micro-organisms.
<b>Clean:</b>	Practically free from plainly visible adhering dirt or other extraneous matter.
<b>Stained Shell:</b>	When an aggregate amount of brown to dark brown discoloration affects more than one-fourth of the total shell surface or more than one half of one side of the shell.
<b>Mineral impurities:</b>	acid insoluble ash.