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Perishable Produce and Quality Development  
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REPORT OF THE FIFTY-FOURTH SESSION

Addendum 11

Note by the secretariat

This document contains the revised UN/ECE Standard for Dried Apples (DF- 16) as adopted at the fifty-fourth session of the Working Party.

**UN/ECE STANDARD DF-16**  
concerning the marketing and commercial  
quality control of

**DRIED APPLES**  
moving in international trade between and to  
UN/ECE member countries

**I. DEFINITION OF PRODUCE**

This standard applies to dried apples from varieties (cultivars) grown from *Malus communis L.*, and intended for direct consumption. It does not apply to produce for processing.

Dried apples may be presented : <sup>1</sup>

- (a) Whole and not peeled
- (b) Whole and peeled
- (c) Whole with core
- (d) Whole, without core
- (e) Halved and peeled
- (f) Halved and not peeled
- (g) Rings
- (h) Sliced
- (I) In pieces

**II. PROVISIONS CONCERNING QUALITY**

The purpose of the standard is to define the quality requirements of dried apples 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 dried apples must be:
  - sound, in particular free from rotting or deterioration such as to make them unfit for consumption
  - prepared from fruit that is sufficiently ripe
  - clean, practically free from visible foreign matter
  - free from living insects or mites whatever their stage of development
  - free from visible damage by insects, mites or other parasites
  - free from mould or fermentation
  - free from abnormal external moisture.

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<sup>1</sup> Definitions set out in annex II.

- free from of foreign smell and/or taste.
- not over dried (burned)
- not hollow.

The condition of the dried apples must be such as to enable them

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

(ii) Moisture content

The moisture content must be not greater than 22 per cent for dried apples not treated with preserving agents and 25 per cent for those treated.<sup>2</sup>

- (iii) Preserving agents may be used, in accordance with the legislation of the importing country.

**B. Classification**

Dried apples are classified in three classes defined below:

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

Dried apples in this class must be of superior quality. They must be characteristic of the variety and/or commercial type. They must have uniform colour.

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***

Dried apples in this class must be of good quality. They must be characteristic of the variety and/or commercial type.

The following 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.

- slight defects of the skin (fruit not peeled)
- slight superficial defects
- slight defects of coloration and of texture.

(iii) ***Class II***

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<sup>2</sup> Moisture content is determined by one of the methods described in Annex I.

This class includes dried apples which do not qualify for inclusion in the higher classes but which satisfy the minimum quality requirements specified above.

The following defects may be allowed provided that the dried apples retain their essential characteristic as regards general appearance, quality, the keeping quality and presentation:

- defects of the skin (fruit not peeled)
- superficial defects
- defects of coloration and of texture.
- Pieces may be included only in Class II.

### III. PROVISIONS CONCERNING SIZING

Sizing of whole and halved apples is determined by the diameter of the widest part. The following minimum sizing is required for each class:

Class	Not peeled	Peeled
"Extra"	40 mm	35 mm
I	30 mm	27 mm
II	25 mm	23 mm

The difference between the diameters of the largest and smallest fruit in any package cannot be greater than 20 mm.

Sizing is compulsory for the "Extra" Class and Class I, but is not required for dried apples in rings, slices and dice.

Rings: should be a minimum of 25 mm across the longest diameter.

Slices: not less than 90 per cent by weight of all the units should be more than 10 mm wide.

### IV. PROVISIONS CONCERNING TOLERANCES

Tolerances in respect of quality and size shall be allowed in each package (or in each lot of produce transported in bulk) for produce not satisfying the requirements of the class indicated.

# **A. Quality tolerances**

Permitted defect <sup>a</sup>	Tolerances allowed (percentage of defective fruit, by weight for fruit presented in bulk and by number for pre-packed fruit)		
	Extra	Class I	Class II
Total tolerance	10	15	20
(a) Tolerance for individual defects. Within the limits of total tolerances, the following maximum tolerances are allowed:			
- Bruised fruit	3	5	10
- Stem, seeds <sup>b</sup>	2	5	7
- Core-carpel <sup>b</sup>	5	10	15
- Fermentation	0.5	1	2
- Slightly affected by rotting	0	0.5	1
- Mould	0	0.5	1
- Foreign matter(weight)	1	2	3
- Insect damage	2	4	6
- Colour and texture defects	2	5	10
(b) Limits not included in total tolerances:			
- Presence of unripe fruit	0	4	10
- Presence of pieces among whole and halved apples	2	7	13

<sup>a</sup> See annex II.

<sup>b</sup> This tolerance only applies to cored fruit.

# **B. Mineral impurities**

Not greater than 1g/kg acid insoluble ash.

**C. Size tolerances**

- "Extra" class: 10% by number or weight of dried apples not conforming to the size range indicated.  
"Class I": 15% by number or weight of dried apples not satisfying the size indicated.  
"Class II": 20% by number or weight of dried apples not satisfying the size range indicated.

**V. PROVISIONS CONCERNING PRESENTATION**

**A. Uniformity**

The contents of each package (or lot for produce presented in bulk) must be uniform in colour and contain only dried apples of the same origin, quality and size.

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 fruit must be of the same variety and/or commercial type and of the same colour.

**B. Packaging**

Dried apples must be packed in such a way so 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 and stamps bearing trade specifications is allowed provided the printing or labelling has been done with non-toxic ink or glue.

Packages (or lot if the produce is presented in bulk) must be free of all foreign matter.

**C. Presentation**

Dried apples must be presented as specified below:

- For immediate consumption, small packages (e.g. pre-packages) may be used.
- The buyer and seller must agree on the size and number of packages packed in a case. In no instance may the weight of the large containers or cases exceed 25 kg.

**VI. PROVISIONS CONCERNING MARKING**

Each package<sup>3</sup> or compartmented package must bear the following particulars in letters grouped on the same side, legibly and indelibly marked and visible from the outside:

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<sup>3</sup> *For dried apples transported in bulk, these particulars must appear on a document accompanying the goods and be attached in a visible position inside the transport vehicle.*

**A. Identification**

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

**B. Nature of the produce**

- "Dried Apples"
- Whole and not peeled
- Whole and peeled
- Whole with core
- Whole, without core
- Halved and peeled
- Halved and not peeled
- Rings
- Sliced
- In pieces (dice)
- Name of the variety (optional) and/or commercial type.

**C. Origin of the produce**

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

**D. Commercial specifications**

- class
- size (optional for Class II)
- crop year(optional)
- net weight, or the number of package units, followed by the unit weight in the case of packages containing such units
- preservative (if used)
- "Naturally" dried (optional)
- "Best by end date" (optional).

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

This standard was first published in 1998

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

## ANNEX I

### DETERMINATION OF THE MOISTURE CONTENT FOR DRIED FRUIT

#### METHOD I - LABORATORY REFERENCE METHOD<sup>1</sup>

##### 1. Definition

The moisture content of dried fruit is defined as being the loss of mass determined under the experimental conditions described in this annex.

##### 2. Principle

The principle of the method is the heating and drying of a sample of dried fruit at a temperature of  $70^{\circ}\text{C} \pm 1^{\circ}\text{C}$  at a pressure not exceeding 100 mm Hg.

##### 3. Apparatus

Usual laboratory apparatus is used together with the following items:

- 3.1 Electrically heated constant-temperature oven, capable of being controlled at  $70^{\circ}\text{C} \pm 1^{\circ}\text{C}$  at a pressure of 100 mm Hg.
- 3.2 Dishes with lids, of corrosion-resistant metal of about 8.5 cm in diameter.
- 3.3 Mincer, either hand or mechanically operated.
- 3.4 Desiccator, containing an effective desiccant.
- 3.5 Precision balance.

##### 4. Procedure

###### 4.1 Preparation of the sample

Take approximately 50 g of dried fruit from the laboratory sample, and mince these twice with the mincer.

###### 4.2 Test portion

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<sup>1</sup> This method is the same as that prescribed by the AOAC: *Official Methods of Analysis*, XIIIth edition, 1980, 22.013 - Moisture in Dried Fruits, Official Final Action.



Place 2 g of finely divided asbestos<sup>2</sup> into the dish, tare the dish with its lid and the asbestos, dried beforehand. Weigh, to the nearest 0.01 g about 5 g of prepared sample.

#### 4.3 Determination

Moisten the sample and the asbestos thoroughly with a few ml of hot water. Mix the sample and the asbestos together with a spatula. Wash the spatula with hot water to remove the sample residues from it, letting the residues and the water fall into the dish.

Heat the open dish on a boiling-water bath (bain-marie) to evaporate the water to dryness. Then place the dish, with the lid alongside it, in the oven and continue drying for six hours at 70° C under a pressure not exceeding 100 mm Hg, during which time the oven should not be opened. During drying admit a slow current of air (about two bubbles per second) to the oven, the air having been dried by passing through H<sub>2</sub>SO<sub>4</sub>. The metal dish must be placed in direct contact with the metal shelf of the oven. After drying, remove the dish, cover it immediately with its lid and place it in the desiccator. After cooling to ambient temperature, weigh the covered dish to the nearest 0.01 g.

### 5. Calculation and expression of results

The moisture content of the sample, as percentage by mass is calculated as follows :

$$\text{Moisture content} = \frac{M_1 - M_2}{M_1 - M_0} \times 100$$

Where:

- M<sub>0</sub>: is the mass of the empty dish with its lid and containing the asbestos, g.
- M<sub>1</sub>: is the mass of the dish with its lid, asbestos and test portion before drying, g.
- M<sub>2</sub>: is the mass of the dish with its lid after drying, g.

The results are expressed to one decimal place.

Duplicate determinations should agree to 0.2% moisture.

### METHOD II - RAPID ROUTINE METHOD

#### 1. Principle

A rapid method based on the principle of electrical conductivity.

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<sup>2</sup> *Dried sand which has previously been washed in hydrochloric acid and then rinsed thoroughly with water may be used in the place of the asbestos. Analysts using this technique should note that it is a deviation from the AOAC procedure, and should mention this in their report.*

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## **2. Procedure**

Moisture content in fruit

Moisture meter method

Final action.

### **Apparatus**

Dried fruit moisture tester meter - Type A series (DFA of California, PO/Box 270A, Santa Clara, CA 95052); see Fig. 22.03 for elec. circuit.

### **Determination**

Grind sample three times through food chopper, using cutter with 16 teeth. If testing hot fruit from processor, cool fruit as follows: Mix ca. 60 g chopped solid CO<sub>2</sub> with fruit and then grind mixture three times before taking moisture reading. Pack ground sample into Bakelite cylinder with fingers, making certain that it is packed tightly around bottom electrode. Fill cylinder completely with tightly packed sample and level.

Lower top electrode and press it into sample until top electrode lever is against stop. Insert thermometer into ground sample until thermometer bulb is ca. halfway between electrodes.

Select correct table for type and condition of fruit being tested (Table/22:01: natural or low moisture, tap 6 setting; Table 22:02: processed, tap 3 setting). Set switch (S2) to number given on table selected.

Plug tester into 110 v ac outlet and put switch to "on". (Red light indicates current.) Keep push button down and turn dial so that meter needle moves toward 0. Adjust dial so that needle is at its lowest, or turning, point. After making fine adjustment of dial to meter 0 or turning point, read dial and then read thermometer.

### **Use of tables**

Choose temperature column of appropriate table nearest to sample temperature. Read down this column to figure closest to dial reading, then read across to "% Moisture" column.

### **Example**

Examination of processed raisin sample gave following data: dial setting 76 and temperature 74° F, on tap 3. Looking down 74° column (Table 22:02), obtain 75.2 at 18.5% moisture and 78.4 at 19.0% moisture. Since reading is nearer to 18.5 than 19.0%, report sample as containing 18.5% moisture, or interpolate.

(Refs.: JAOAC 52,858 (1969); 54,219 (1971); 55,202 (1972))

## ANNEX II

### DEFINITIONS OF TERMS AND DEFECTS FOR DRIED APPLES

- |     |                            |  |
|-----|----------------------------|--|
| (a) | Whole apples:              | entire apples.   |
| (b) | Halved apples:             | the apples have been cut longitudinally into approximately equal halves.   |
| (c) | Slices:                    | the apples have been cut longitudinally into several slices.   |
| (d) | Rings:                     | the apples have been cut crosswise into several rings.   |
| (e) | Dice:                      | the apples have been cut into approximately equal sized cubes.   |
| (f) | Stem, seeds:               | pieces of dried apple with the stem and/or seeds attached.   |
| (g) | Core-carpel:               | pieces of dried apple with attached core-carpel exceeding in the aggregate the area of a circle 6 mm in diameter.                                    |
| (h) | Bruised fruits:            | apples with different bruises.   |
| (i) | Damage caused by insects : | visible damage caused by insects and animal parasites or the presence of dead insects or insect debris.  |
| (j) | Rotten:                    | visible decomposition of any portion of apples caused by the action of microorganisms.   |
| (k) | Mould:                     | mould filaments visible to the naked eye.  |
| (l) | Fermentation:              | Damage by fermentation to the extent that the characteristic appearance and/or flavour is affected.  |
| (m) | Foreign matter:            | any matter other than dried apples.  |
| (n) | Mineral impurities:        | acid insoluble ash.  |
| (o) | Skin damage:               | tears in the skin or damage to the skin by sunburn, hail, limb-rubs or other means which result in darker colour or hard, tough or leathery texture. |
| (p) | Colour:                    | uniform colour not darker than dark amber.   |
| (q) | Maturity:                  | fully ripe.  |
| (r) | Excessively dried:         | over-dried (burned) or hollow.   |