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Guide to the prepacking of fruits and vegetables

Guide pour le préemballage des fruits et légumes

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Guide to the prepacking of fruits and vegetables

1 Scope

This International Standard gives general guidance on the conditions and the methods of prepacking and packing for transport of the main types of fruits and vegetables sold fresh.

Prepacking is intended to protect goods against possible damage which may result in deterioration in their freshness and to facilitate in their marketing in as much as the products are well presented and suitable for self-service marketing.

2 Materials for prepacking

Materials used for prepacking should conform to health and hygiene standards and should be capable of protecting the product. The following materials may be used:

- portable plastic film and paper bags, and plastic film and paper bags, as well as plastic plates;
- portable net “tubes”, or net “tubes” and bags made of plastic, viscose, textile fibre or a combination of these materials;
- trays or boxes (boxes of height greater than 25 mm) made of cardboard, papier mâché, plastic or wood pulp with a flat or profiled bottom. Packing materials may have a functional surface and colour (e.g. the foil should be transparent; cucumbers may be packed in green packing materials) provided that any visual defect in the product is not masked by the design, colour, mesh size, etc.

However, the packing materials used may vary according to the country and the relevant regulations.

3 Prepacking systems

A product is said to be prepacked when it has been conditioned outside the presence of the buyer in a package, whatever its nature, which covers it completely or partially so that the quantity of product contained cannot be modified without the package being opened or noticeably modified, or without noticeable modification of the product. A prepackage comprises both the product and the package in which it is presented for sale.

The main prepacking systems are given in 3.1 to 3.8.

3.1 Direct application of shrink or stretch film — System A

This is mainly used to pack one fruit or vegetable item of large volume (for example citrus fruits, greenhouse cucumbers, lettuces, head lettuces, round-headed cabbages).

3.2 Application of a band of film to a tray or box — System B

This is used particularly for fruits and vegetables of small volume. The package formed contains several items.

It consists of a tray or box around which a band of film (usually shrink film) is wrapped.

The band of film is fed over the longer side of the tray or box in order to leave slits, after the formation of the package, on the shorter sides for air circulation. This type of prepacking is thus particularly suitable for fruits and vegetables with a high rate of moisture loss by evaporation (since a high relative air humidity might speed up the development of microbial contamination).

It should not be possible to remove one item without damage to the film. The packing film is joined by heat, parallel to the longer side of the container (tray or box). The mass of the contents should not normally exceed 1 kg.

3.3 Application of film to a tray or box to form a complete package — System C

This is also used for fruits and vegetables of small volume. The package formed contains several items. Films permeable to water vapour are used [for example poly(vinyl chloride) films with or without a special anti-condensation layer].

Monoaxial shrink films (in the direction of the roll) should have the same width as, or be a little wider than, the largest dimension (length) of the tray or box. Biaxial shrink films should be wider than the largest dimension of the tray or box so that after shrinking the film forms a cover on the shorter walls of the tray or box.

Stretch films are usually joined by heat, parallel to the longer side of the tray or box. Stretch film is usually moulded to the bottom of the box.

3.4 Prepacking in net "tubes" — System D

This is mainly used for small fruits and vegetables which are not susceptible to mechanical damage. The package formed contains several items.

The net "tube" is closed at one end before filling and at the other end after filling. Thus a closed bag is formed. When "tubes" allowing an enlargement of the diameter are used it is necessary that the filling be carried out in such a way that the ratio of the final length to the final diameter does not exceed 3 to 1.

Net "tubes" may generally be used for spheroidal products (for example citrus fruits, onions and potatoes). The mass of the contents is generally between 1 kg and 3 kg.

3.5 Prepacking in net bags — System E

The conditions and use are the same as those for system D (see 3.4). The bags are used with a closure at the bottom applied either just before packing or by the manufacturer of the net. The second closure is made after filling. The mass of the contents is generally between 1 kg and 3 kg. This system is also for packages of large capacity, sometimes up to 15 kg (notably potatoes).

3.6 Prepacking in plastic film and paper bags — System F

The conditions and use are the same as those for systems D and E (see 3.4 and 3.5). The mass of the contents is generally not more than 2 kg. The bags may be perforated (see 3.7).

Film bags may be shrunk after closure.

3.7 Prepacking in portable plastic film and paper bags or net "tubes" — System G

The conditions and use are the same as those for system D (see 3.4). The bottom and side assembly are made up, either by the manufacturer of the packaging or by the packer, from a "half-tube" before the package is filled. After filling, the upper closure, which has a piece joined to it for carrying the package, is added.

Portable bags may be perforated in the upper third of the assembly, or over the whole surface of walls of surface area 100 mm × 100 mm with holes of diameter 5 mm (five holes are sufficient). The mass of the contents is normally between 2 kg and 3 kg.

3.8 Prepacking in boxes — System H

In contrast with the other systems mentioned, prepacking in fold-out boxes is carried out manually. This type of packing is mainly used at the time of harvest for expensive fruits (for example kiwifruits or other exotic fruits), or for other products susceptible to mechanical damage (for example cherries, strawberries, raspberries). The boxes can be filled, and placed directly in the transport package.

4 Quality of foodstuffs for prepacking

Only fruits and vegetables complying with the relevant quality standards should be prepacked.

5 Treatment of foodstuffs before packing (prepacking)

Before packing (prepacking) all goods should be sorted and classified according to the relevant quality standards.

According to the type of foodstuff, various preliminary treatments may be carried out such as

- washing or dry brushing of root vegetables
- polishing of apples
- removal of spoiled outer leaves from cauliflowers
- removal of loose skin from onions
- removal of the outer leaves from head lettuces, round-headed cabbages, etc.
- removal of the floral stem from kohlrabis.

6 Packing for transport

Prepacked goods are placed in packages for transport. The package for transport should be such that it prevents mechanical or other damage of the prepacked goods.

For foodstuffs prepacked in accordance with 3.1, 3.2, 3.3, 3.6 and 3.8, up to a mass of 1 kg per package, solid packages for transport, of dimensions appropriate for a simple standard pallet (800 mm × 1 200 mm), are preferred. For foodstuffs prepacked in accordance with 3.4, 3.5 and 3.7, a net sack may be used as a package for transport.

7 Marking

7.1 It is recommended that each prepackage or prepacked unit be marked or labelled with the following particulars, according to the product characteristics and commercial practice:

- a) name of the product;
- b) grade (according to the relevant quality standard);
- c) the name of the packaging firm (usually the place and the name of the firm);
- d) date of packing;
- e) net mass of the contents;
- f) retail price.

It is also recommended that the following be mentioned:

- g) price per kilogram (if this is not a legal requirement);
- h) variety;
- i) origin of the foodstuff.

7.2 Each package for transport should be marked with the number of prepackages it contains.

It is also recommended that

- a) the name of the packaging firm (usually the place and name of the firm), and
- b) the date of packing

be mentioned.

8 Recommended prepacking systems

Table 1 shows the prepacking systems most frequently used for certain products.

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Table 1

Product	Prepacking system							
	A	B	C	D	E	F	G	H
Vegetables¹⁾								
Asparagus ²⁾	+	+	+	-	-	+	-	-
Baby corn	-	-	+	-	-	-	-	-
Beetroot	-	-	-	+	+	+	+	-
Brussels sprouts	-	-	-	+	+	+	-	-
Cabbage lettuce; head lettuce ⁶⁾	+	-	-	-	-	+	+	-
Carrot (without tops)	-	-	-	+	+	+	-	-
Carrot (with tops)	-	-	-	-	+	+	-	-
Cauliflower	+	-	-	-	-	+	-	-
Celery (without tops)	+	-	-	+	+	+	+	-
Celery (with tops)	-	-	-	-	-	+	-	-
Chinese cabbage, type "Pe-tsai"	+	-	-	-	-	+	+	-
Common bean; kidney bean (in the pod)	-	+	-	-	-	-	-	-
Cucumber	+	-	-	-	-	+	+	-
Curly kale; kale; collard	-	-	-	-	-	+	-	-
Dill	+	-	-	-	-	+	-	-
Eggplant; aubergine	+	-	-	-	+	+	-	-
Fennel	+	-	-	-	-	+	-	-
Garlic	-	-	+	+	+	-	-	-
Globe artichoke	+	+	+	-	+	+	-	-
Horseradish	+	-	-	-	+	+	-	-
Leek ²⁾	+	-	-	-	-	+	+	-
Melon	+	-	-	-	-	-	+	-
"Mixed vegetables" (shredded) ³⁾	-	+	+	-	+	+	-	-
Onion (dry)	-	-	-	+	+	-	+ ⁴⁾	-
Onion (with tops)	-	-	-	-	-	+	-	-
Parsley	-	-	-	-	+	+	+	-
Pea; garden pea (for shelling)	-	+	-	-	-	-	-	+
Potatoes ⁵⁾ — early	-	-	-	+	+	+	+	-
— late	-	-	-	+	+	+	+	-
Radish (without tops)	-	-	-	+	+	+	-	-
Radish (with tops) ²⁾	-	-	-	-	+	-	-	-
Rhubarb	+	-	-	-	-	+	+	-
Round-headed cabbage ⁶⁾	+	-	-	-	-	+	+	-
Savoy cabbage ⁶⁾	+	-	-	-	-	+	+	-
Scorzonera; black salsify	-	-	-	-	+	+	+	-
Spinach	-	+	+	-	-	+	-	-
Squash; winter squash	+	-	-	+	-	-	-	-
Sugar peas (pods)	-	+	+	-	-	-	-	-
Sweet corn; maize	+	-	-	-	-	+	+	-
Tomato	-	+	+	+	+	+	+	-
Witloof chicory; French endive	+	-	-	-	-	+	+	-

1) Names taken from ISO 1990-1 : 1982, *Fruits — Nomenclature — First list*, ISO 1990-2 : 1985, *Fruits — Nomenclature — Second list*, ISO 1991-1 : 1982, *Vegetables — Nomenclature — First list*, ISO 1991-2 : 1985, *Vegetables — Nomenclature — Second list*, ISO 1956-1 : 1982, *Fruits and vegetables — Morphological and structural terminology — Part 1*, and ISO 1956-2, *Fruits and vegetables — Morphological and structural terminology — Part 2* (to be published).

2) Packed in bundles.

3) According to local custom, for example for the preparation of soups, sauces and side dishes.

4) Net "tubes" only.

5) Packages containing potatoes should be protected from the light.

6) Only for unprepared cabbage.

7) Only for varieties with a firm consistency, less susceptible to mechanical damage.

8) With the exception of varieties which are susceptible to low oxygen concentrations.