
International Standard



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Fresh fruit and vegetables — Arrangement of parallelepipedic packages in land transport vehicles

Fruits et légumes frais — Disposition des emballages parallélépipédiques dans les véhicules de transport terrestre

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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.

International Standard ISO 6661 was developed by Technical Committee ISO/TC 34, *Agricultural food products*, and was circulated to the member bodies in July 1982.

It has been approved by the member bodies of the following countries :

Austria	Iran	South Africa, Rep. of
Brazil	Iraq	Spain
Czechoslovakia	Israel	Sri Lanka
Egypt, Arab Rep. of	Kenya	Tanzania
Ethiopia	Korea, Rep. of	Turkey
France	Malaysia	USSR
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Hungary	Portugal	
India	Romania	

The member body of the following country expressed disapproval of the document on technical grounds :

Australia

Fresh fruit and vegetables — Arrangement of parallelepipedic packages in land transport vehicles

0 Introduction

Long experience shows that while the quality of packing has an influence on the preservation of fresh fruits and vegetables in the course of distribution, and in particular of transportation, the manner of arranging packages within the vehicles also plays an important role. Account should be taken in this respect of the fact that packages without covers are now used in very many instances and for a large number of products.

The arrangements recommended differ according to whether pallets are used or not.

1 Scope and field of application

This International Standard gives guidance on the arrangement of packages of fresh fruits and vegetables in land transport vehicles.

It is applicable to parallelepipedic packages constituted of any material, with or without covers, and whether palletized or not.

2 References

ISO 3394, *Dimensions of rigid rectangular packages — Transport packages*.

The following International Standard should also be consulted :

ISO 3676, *Packaging — Unit load sizes — Dimensions*.

3 Definitions

For the purpose of this International Standard, the following definitions apply :

3.1 stack : All the packages superposed on the same package (see figure 1).

3.2 row : All the packages arranged side by side on the same level (see figure 1).

3.3 layer : All the rows at the same level (see figure 2).

4 Non-palletized packages

4.1 General recommendations

4.1.1 The packages should permit stable loading.

4.1.2 The packages should be conceived in such a manner that stacking can be carried out with minimum risk to their contents, especially if they do not have a cover. The packages should also permit adequate ventilation of their contents.

4.1.3 The packages should constitute, whether with or without covers, compact loads.

4.1.4 In the length of the vehicle, the load should not present any discontinuity and should lean against the two end walls of the vehicle.

4.1.5 Loading should be to the same height throughout.

4.2 Special recommendations

4.2.1 Arrangement of packages

The packages should be loaded with no intervening spaces between them and should be arranged in transverse compact rows. Nevertheless, it is recommended that provision be made for air flow along the centre line of the load to ensure the circulation of air. The packages should be placed so that their longer sides are parallel with the length of the vehicle.¹⁾ However, owing to the fact that there is generally a small empty space between the edge of a transverse row and the side wall of the vehicle, the successive rows of the same layer should lean alternately against one and the other side wall.

These empty spaces, and others resulting from the particularities of certain types of vehicles, should be filled with appropriate and continuous wedges.

Two arrangements which respect these principles, and which are shown in figure 2, can be adopted : they are given, however, as examples only.

1) In the case of transport of packages without covers, in refrigerating and deep-freezing vehicles, a different kind of arrangement, to be determined in each special case, may be adopted.

4.2.1.1 Arrangement a) [see figure 2a)]

The packages are exactly superposed in regular stacks. The sub-groups, each of them constituted by a series of superposed transverse rows, lean alternately against one or the other side wall of the vehicle. The width of the space between a sub-group and the wall of the vehicle against which the sub-group is not leaning does not exceed the width of one package. All the layers are similar. This arrangement requires careful alignment and stacking of the packages, and stacks in good contact with each other.

4.2.1.2 Arrangement b) [see figure 2b)]

In each series of transverse rows, the rows lean alternately against one or the other side wall of the vehicle. This arrangement is preferable to that mentioned in 4.2.1.1, but it requires

- that the space between each row and the wall of the vehicle against which the row is not leaning does not exceed one-third of the width of a package;
- in the case of packages without covers, that the packages are provided with appropriate means for stacking.

4.2.1.3 Conditions

Whatever the arrangement adopted, it is necessary

- a) that the part of the load placed next to the side doors of the vehicle does not lean against them; in order to assure better stability in this part of the load, these packages may, exceptionally, be arranged so that their longer sides are perpendicular to the side wall of the vehicle;
- b) that, when it is not possible to load to the same height throughout, the packages forming the incomplete upper layer are gathered in one lot distributed on one level only, and fixed to avoid displacement.

4.2.2 Storage lengthwise

The general recommendations lay down that the load of the vehicle should not present any discontinuity in the longitudinal direction and should lean against the two end walls of the vehicle.

In practice, however, there is very often an empty space either within the load (vehicle loaded from the side) or between the load and an end wall (vehicle loaded from the back). It is necessary to fill up this space carefully so as to avoid any possibility of displacement of the packages.

4.2.3 Non-homogeneous loads

If the load of a vehicle is composed of packages of different types or if the packages contain goods of different kinds, the following recommendations should be observed :

- group the packages in as many homogeneous lots as there are types of different packages or goods;

— form and stow each lot in conformity with the preceding recommendations, placing the most compact and least fragile goods in the lower layer;

— if the consignment is formed of lots of very different masses, carry out loading so that the load is suitably distributed between the axles of the vehicle.

5 Palletized packages

In the case of palletized packages, it is necessary to consider both the arrangement of the packages on the pallet, and that of palletized loads within the vehicle.

5.1 Arrangement of packages on the pallet

[see figure 3a)]

The packages should be placed in successive and carefully arranged layers.

One pallet should carry only packages of the same dimensions.

The shape of the packages and their arrangement on the pallet should be chosen so that the surface of the pallet is used to the best effect.¹⁾

There should be no empty spaces within the palletized load.

The edge of the load and that of the pallet should, in principle, coincide. However, any overhang shall not exceed 10 mm.

When the packages are of medium height (less than about 200 mm), it is advisable to maintain the cohesion of the load by surrounding it using appropriate means, for example with two cords, one placed at mid-height of the load and the other at three-quarters of the height.

If the packages are constituted of a material having a certain flexibility, or if they are small (less than 400 mm × 250 mm), it is advisable to fit each vertical edge of the load with a rigid angle bar held by horizontal cords.

If the packages are constituted of a rigid material and if their height is in excess of about 200 mm, only one cord need be used.

5.2 Arrangement of palletized loads in the vehicle [see figure 3b)]

The palletized loads should be arranged so that they constitute transverse rows of two or three pallet loads, according to the direction in which they are oriented. The choice of this direction is determined by the necessity to use the surface provided by the vehicle to best effect and by the interest which is attached to the longer sides of the packages being parallel with the length of the vehicle.

The part of the load placed next to the side doors of the vehicle should not lean against them.

1) See ISO 3394.

In the length of the vehicle, the load should not present any discontinuity and should lean against the two end walls of the vehicle.

In practice, however, there is very often an empty space either within the load (vehicle loaded from the side) or between the load and an end wall (vehicle loaded from the back). It is necessary to fill up this space carefully, by means of non-palletized packages for example, or by other appropriate means, so as to avoid any possibility of displacement of the palletized loads and of the packages themselves.

5.3 Packages in box pallets with or without covers

The dimensions of the packages should be such that it is possible to constitute stable loads within the box pallets; if there is

an empty space between the load and the inner wall of the box pallet which is liable to compromise this stability, it is advisable to fill it up with appropriate materials or by appropriate means.

The box pallets should be arranged in the vehicle so as to use the surface to best effect. In the length of the vehicle, the load should not present any discontinuity and should lean against the two end walls of the vehicle. This arrangement is recommended for box pallets which are not stacked. It is essential in the case of stacked box pallets. In practice, if there is a space, it should be filled, taking into account, however, the type of products being transported and the necessity to ensure air circulation.

Box pallets may be stacked if they are provided with appropriate means.

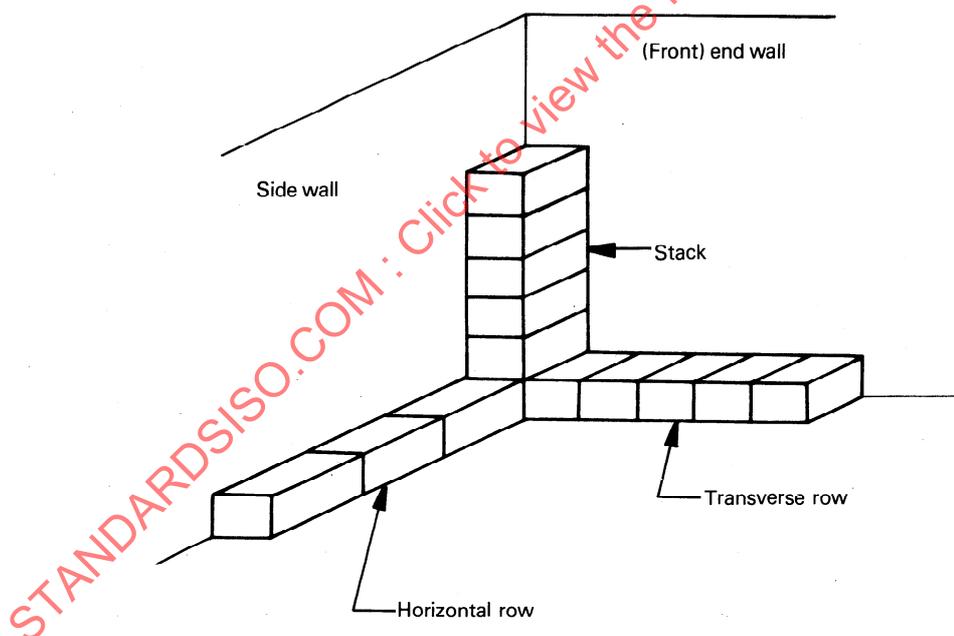


Figure 1 — Stack and rows packages

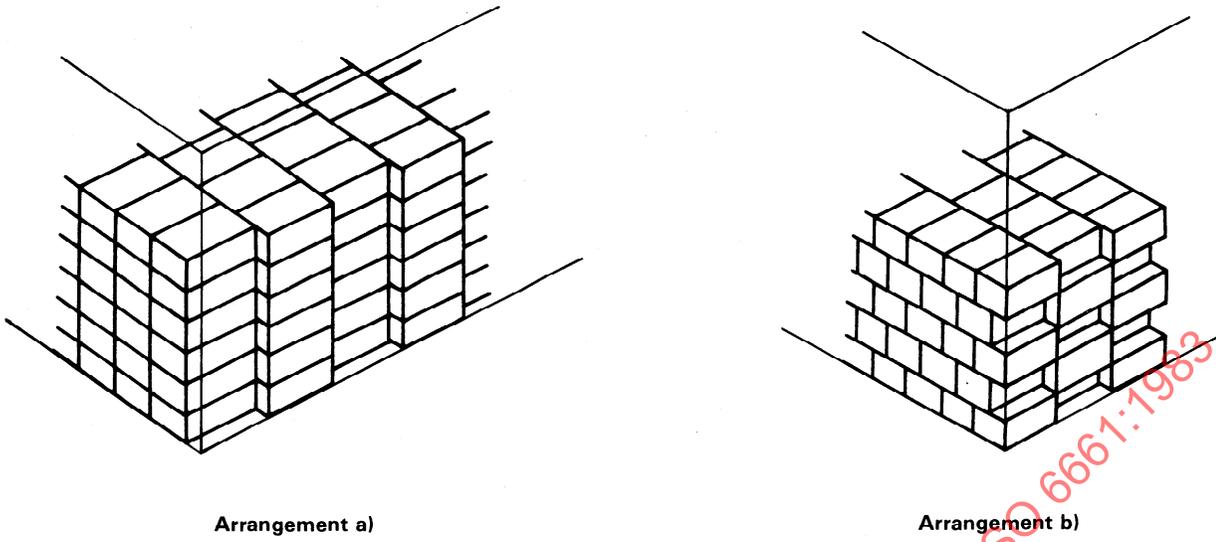


Figure 2 — Arrangement of packages for non-palletized transport

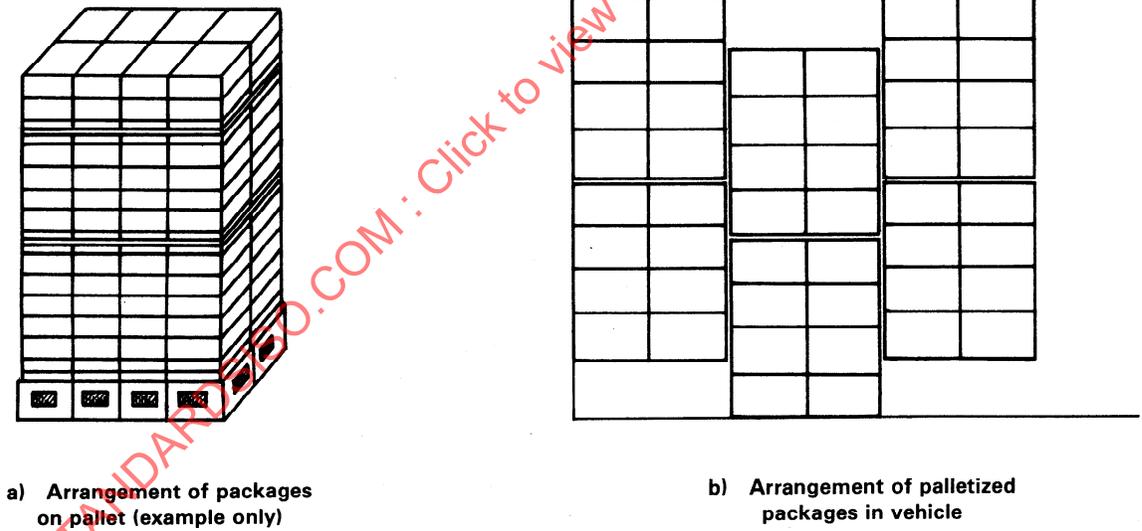


Figure 3 — Palletized transport