
International Standard



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Cucumbers — Guide to storage and refrigerated transport

Concombres — Guide pour l'entreposage et le transport réfrigérés

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

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 7560 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:

| | | |
|---------------------|------------------------|-----------------------|
| Australia | Israel | Portugal |
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| Ethiopia | Malaysia | Tanzania |
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No member body expressed disapproval of the document.

Cucumbers — Guide to storage and refrigerated transport

1 Scope and field of application

This International Standard describes methods for obtaining conditions for the successful storage and long distance transport of cucumbers (*Cucumis sativus* Linneaus), intended either for direct consumption or for industrial processing.

2 References

ISO 2169, *Fruits and vegetables — Physical conditions in cold stores — Definitions and measurements.*

ISO 6661, *Fresh fruit and vegetables — Arrangement of parallelepipedic packages in land transport vehicles.*

UN-ECE Standard No. 23/Rev. 1, *Cucumber.*

3 Conditions of harvesting and packing

3.1 Harvesting

Cucumbers should be cut from the plant and should be handled carefully. Mechanical damage should be avoided, especially around the stalk of the fruits.

3.2 Quality requirements

Cucumbers intended either for consumption in the fresh state or for industrial processing should be harvested at a development stage corresponding to the quality requirements specified in the relevant product standard. They should be characteristic of the variety and suitable for the intended use; the seeds should be soft and undeveloped.

The cucumbers should not be withered, senescent, yellowish or yellow ripened.

Quality requirements for cucumbers produced under conditions of forced growth for transport for direct consumption are given in UN-ECE Standard No. 23/Rev. 1.

3.3 Packing

The methods of packing should be such as to maintain the quality of the cucumbers during storage, transportation and handling.

Medium-long salad cucumbers intended for consumption in the fresh state and pickling cucumbers for industrial processing, may be packed in wooden crates or perforated fibreboard boxes.

Very small pickling cucumbers (from 3 to 6 cm long) and salad cucumbers grown under conditions of forced growth should be packed in wooden crates or perforated fibreboard boxes, and the salad cucumbers should be packed in layers in the package, which should not contain more than 10 to 15 kg. Wrapping individually in film or cellophane or waxing the cucumbers is recommended.

4 Optimum conditions for storage and transport

4.1 Temperature

The optimum temperature for the storage and transport of cucumbers is between +7 and +10 °C. Because of the susceptibility of cucumbers to cold the temperature should only temporarily be allowed to fall below +7 °C. Above +10 °C, cucumbers turn yellow within 10 days, and at +15 °C, even sooner, depending on the stage of development of the cucumbers. Once yellowing has begun, the product is no longer suitable for storage and transport.

After harvest, cucumbers should be packed as soon as possible and put into cold store so that they are cooled to +7 to +10 °C until loading.

4.2 Relative humidity

The optimum relative humidity is from 90 to 95 %. Air with a lower relative humidity would favour wilting and loss in mass of the cucumbers. In the case of cucumbers for direct consumption, wrapping individually in film or cellophane, or waxing, serves to maintain this relative humidity.

4.3 Other conditions

During storage and transport, the circulation of air should be assured so that constant temperature and relative humidity are maintained.

Yellowing of the cucumbers will be hastened by ethylene; products producing ethylene, such as apples, pears, peaches, bananas, tomatoes, melons and citrus fruits should not be present in the same store or transport vehicle.

4.4 Duration of storage and transport

Cucumbers are highly perishable and they should therefore be stored and transported for the shortest time possible. The quality can be maintained for about 10 days at the optimum temperature of +7 to +10 °C and at 90 to 95 % relative humidity. If each fruit is packed separately in polyethylene film, cucumbers produced under conditions of forced growth can be stored at +12 to +13 °C for two weeks. Cucumbers stored or transported at temperatures below +7 °C should be used within 2 to 4 days or immediately after storage or on arrival, as, at higher temperatures, fruits previously kept at low temperatures soon show signs of damage caused by the cold (shallow surface pits followed by decay, caused by micro-organisms).

5 Storage

Cucumbers packed in wooden crates or fibreboard boxes may be placed in a precooled cold store in stacks, according to the load-bearing capacity of the containers.

6 Transportation

6.1 Means of transport

Refrigeration of the cucumbers should be maintained during transport. For this purpose, ice or mechanically refrigerated railway trucks or refrigerated lorries may be used.

6.2 Requirements for the transport vehicle and loading

For the transportation of cucumbers the vehicle used shall not have previously carried materials harmful to health (for example fertilizers, plant protection materials or other chemical

substances). It should be in good technical condition, for example fans should be in working condition, drains should be free in ice-refrigerated railway trucks, and floor racks assuring the circulation of air in railway trucks or lorries should be in position.

Before loading the temperature of the loading space in the vehicles should be cooled to that required, either by icing the bunkers or by mechanical refrigeration.

Wooden or fibreboard boxes containing cucumbers should be stacked lengthwise (facing forward), and only boxes necessary for filling spaces between the stacks, to prevent them from moving during transport, should be put crosswise. Similarly any remaining gaps should be filled with empty boxes or crates for the same purpose. (See also ISO 6661.)

The ice bunker of ice-refrigerated railway trucks should be re-iced to capacity after loading.

If, as a consequence of warm weather or a long transit period, the ice could melt in ice-refrigerated railway trucks during transport, re-icing should be carried out at an interim station to ensure that, at the destination, the trucks arrive with their bunkers not less than one-third full.

7 Operations on arrival

After unloading, cucumbers should be continuously cooled or used immediately, depending on the storage and transport conditions, as follows:

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a) cucumbers stored or transported at temperatures below +7 °C should be used immediately;

b) cucumbers stored or transported at temperatures between +7 and +10 °C may continue to be stored up to the recommended duration of storage.