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# International Standard



# 6821

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Greenhouse tomatoes — Guide to refrigerated transport

*Tomates forcées — Guide pour le transport réfrigéré*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (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 set up 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 6821 was developed by Technical Committee ISO/TC 34, *Agricultural food products*, and was circulated to the member bodies in April 1980.

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

<u>ISO 6821:1981</u>		
Australia	Ireland	Philippines
Austria	Israel	Poland
Brazil	Kenya	Portugal
Canada	Korea, Dem. P. Rep. of	Romania
Czechoslovakia	Malaysia	South Africa, Rep. of
Egypt, Arab Rep. of	Mexico	Spain
France	Netherlands	Turkey
Hungary	New Zealand	USA
India	Peru	USSR

No member body expressed disapproval of the document.

# Greenhouse tomatoes — Guide to refrigerated transport

## 1 Scope and field of application

This International Standard describes conditions for the refrigerated transport of tomatoes for direct consumption, produced under conditions of forced growth.

It is not applicable to tomatoes for industrial processing.

The limits of application of this International Standard are defined in the annex.

## 2 Preparation of tomatoes for transportation

### 2.1 Harvesting

Tomatoes should not be harvested until they have reached the mature green state which will allow for their normal successive ripening under appropriate conditions.

In specific cases, the exact maturity at harvest is determined in conformity with the intended use of the tomatoes and the desirable degree of ripeness on the intended market.

Colour is the most important criterion of the degree of ripeness. It is recommended that the colour of tomatoes be determined by means of a colour standard chart elaborated on the basis of objective colour measurements.

### 2.2 Quality requirements

Tomatoes to be transported by refrigerated vehicles should be sound, clean, free from injury, with normal firmness and without excessive surface moisture. Their appearance and size should meet the requirements defined by relevant standards.

## 2.3 Handling

The handling of tomatoes includes :

- a) sorting : fruits which do not meet the quality requirements should be rejected;
- b) sizing : tomatoes are graded into standard ranges of sizes, taking precautions to minimize mechanical injury to the fruits;
- c) colour sorting : it is recommended to sort the fruit by colour (degree of ripeness) visually using appropriate colour charts or by a colour sorting machine.

## 2.4 Packing

After sorting and sizing, the tomatoes should be packed in wooden, fibreboard or plastic boxes. The packages should allow for access of air to the fruits.

## 2.5 Precooling (or pre-refrigeration)

Precooling of the tomatoes as soon as possible after sorting and sizing is recommended to ensure that the temperature of the fruit on loading differs by no more 2 °C from the recommended transport temperature.

## 2.6 Loading into the refrigerated vehicle

Tomatoes should be loaded not later than 24 h after harvesting.

The period during which the tomatoes are stored without temperature control depends on the local climate and the duration of transit.

The packages should be stacked solidly in the vehicle while allowing air circulation through the stacks.

### 3 Conditions for refrigerated transport

#### 3.1 Temperature

The temperature to be maintained during the transport of a given lot of tomatoes should be defined taking into account the expected duration of transit and the degree of ripeness required at the intended market.

Recommended temperatures are given in the table.

Transport of tomatoes in degrees of ripeness 4 and 5 is not recommended over periods longer than 3 days.

In order to ensure normal ripening during transport, in the conditions indicated in the table, the recommended temperatures should be maintained during the whole transit period.

#### 3.2 Relative humidity of the air

The relative humidity should be within the range 80 to 90 %.

When unloading tomatoes after refrigerated transport, it is recommended that excessive moisture formation on the fruit surface be avoided.

Depending on the climatic conditions at the place of delivery, unloading into moderately refrigerated premises may be carried out.

Table

Degree of ripeness* on loading	Transport period, days			
	2 to 3		4 to 6	
	Temperature during transport, °C	Degree of ripeness after transport	Temperature during transport, °C	Degree of ripeness after transport
1	9 to 10	2	9 to 10	3
	10 to 12	3	10 to 12	4
2	9 to 10	3	9 to 10	4
	10 to 12	4	—	—
3	9 to 10	4	9 to 10	5
4	6 to 8	4	—	—
5	6 to 8	5	—	—

\* The degrees of ripeness used in the table are defined in conformity with the EEC Standard AGRI/Wp1/EUROSTAN 2 as follows :

- 1 — turning;
- 2 — light pink;
- 3 — pink to light orange;
- 4 — orange to light red;
- 5 — red.

## Annex

### Limits of application

This International Standard gives general recommendations and may be applied with or without modifications according to specific conditions, such as varieties and particularities of tomatoes grown in different countries, handling practices, distances of transportation, terminal market requirements, etc.