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Potatoes — Guidelines for storage in artificially ventilated stores

*Pommes de terre — Guide pour le stockage en entrepôt à ventilation
forcée*



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Foreword

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Introduction

Methods of storing potatoes depend to a large extent on local climatic conditions, the degree and type of mechanization available and the end use of the potatoes. In many countries, potatoes are commonly stored in clamps, but special stores with artificial ventilation are being increasingly used.

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Potatoes — Guidelines for storage in artificially ventilated stores

1 Scope

This International Standard establishes guidelines for the storage of potatoes, intended for use as seed potatoes, for consumption, or for processing, in artificially ventilated stores.

The application of these guidelines will permit preservation of the growth potential and productivity of seed potatoes and of the good cooking quality (e.g. characteristic flavour, lack of discoloration and light colour of fried products) of potatoes for consumption.

These guidelines are applicable only in regions with temperate climates.

2 Preliminary operations

2.1 Harvest

Potatoes intended for storage should be harvested at full maturity, which is generally characterized by the resistance of the skin to removal when it is rubbed by hand.

During harvesting, special care should be taken to avoid damage to the potatoes. This is important, because it allows storage losses to be kept to a minimum.

Harvested potatoes should not be left in open-air conditions where they are subject to damage by rain and sunlight.

2.2 Quality of potatoes

Potatoes intended for storage should not

- be infected with late blight or wet rot;
- be injured by frost;

- contain more than 10 % of severely damaged tubers per lot;
- exhibit more than 5 % of waste per lot (e.g. attached or loose earth, detached growth shoots and other extraneous matter).

2.3 Storeroom equipment and preparation of storerooms for use

Before the potatoes are put into store, the storerooms should be cleaned and disinfected with officially approved chemical substances. The external walls and roof of the storerooms should be thermally insulated and airtight to eliminate atmospheric effects. Moisture insulation should be placed on the warm side of walls to reduce the penetration of water vapour.

The storerooms should be equipped with

- devices for loading, unloading and transportation;
- means of ventilation, temperature and humidity control and a ventilation control system;
- electricity (lighting and power);
- grading apparatus.

2.4 Additional considerations

Potatoes intended for direct consumption should be protected from daylight and minimum electric lighting should be used. Seed potatoes may be stored in daylight.

Treatment with chemical substances to prevent sprouting or rotting may be performed in conformity with the regulations in force in the country concerned.

3 Storage of potatoes

3.1 Methods of storing potatoes in storerooms

Potatoes may be stored in piles 3 m to 5 m high, or in containers stacked up to 6 m high. The minimum distance between the upper layer of the pile or the last container and the roof should be 1 m.

All loading, unloading and grading operations should be carried out with care to avoid damaging the potatoes.

Special care should be taken to avoid the mixing of different varieties of potatoes.

3.2 Storage conditions

3.2.1 Five storage phases may be distinguished as follows.

a) Drying

If necessary, the potatoes should be completely dried by ventilation with outside air, provided that the temperature of the outside air is not less than 0 °C.

b) Maturation of tubers and healing of wounds

This lasts for about 2 weeks after the potatoes have been put into store. The temperature should be 12 °C to 18 °C and the relative humidity 90 % to 95 %.

c) Decrease in the storeroom temperature

The appropriate temperature [see d)] should be attained as quickly as possible, preferably within 2 weeks to 3 weeks after termination of maturation and wound healing. The relative humidity should be maintained at 90 % to 95 %.

d) Establishment of conditions for long-term storage

The following conditions should be established in the storeroom, depending on the end use of the potatoes:

- seed potatoes: the temperature should be between 2 °C and 4 °C;
- potatoes intended for consumption: the temperature should be between 4 °C and 6 °C;
- potatoes intended for further processing: the temperature should be between 6 °C and 10 °C.

The relative humidity should be maintained at 85 % to 95 %.

e) Preparation for use

The following conditions should be established in the storeroom, depending on the end use of the potatoes:

- seed potatoes: increase the temperature to 10 °C to 15 °C over a 3 week to 5 week period to stimulate sprouting; the relative humidity should be 75 % to 80 % and the minimum illuminance should be 75 lx;
- potatoes intended for consumption: increase the temperature to 12 °C over a 2 week period;
- potatoes intended for further processing: if their sugar content is too high or their colour is too dark, increase the temperature to 15 °C to 18 °C over a 2 week to 4 week period.

3.2.2 The control of the temperature and relative humidity may be achieved by ventilation with air from the interior or exterior of the storeroom or a mixture of the two.

Ventilation with air from the exterior should be carried out only if the temperature outside is at least 2 °C colder than that inside.

Ventilation with interior air is carried out to minimize the difference in temperature between the top and the bottom of the piles or stacks. This temperature difference should not exceed 1 °C.

The flow of air introduced (rate of air change) or circulated (air-circulation ratio) in a given time depends on local climatic conditions.

4 Examination of stored potatoes

4.1 General examination

General examination includes checking the correct functioning of equipment and measuring instruments, and checking the condition of the potatoes (appearance of moisture or rotting).

4.2 Detailed examination and requirements for ventilation

If mechanical ventilation is used, the following rules should be observed:

- a) before each ventilation operation, the temperature shall be measured in the interior of the storeroom, at at least two locations (the lower and upper layers of a pile or stack), and exterior to the storeroom. These measurements indicate