

Pears

Revised 2018

Thermal Properties

	English	Metric
Moisture, %	83.81	--
Protein, %	0.39	--
Fat, %	0.40	--
Carbohydrate, %	15.11	--
Fiber, %	2.40	--
Ash, %	0.28	--
Specific Heat Above Freezing	0.91 Btu/lb*°F	3.80 kJ/(kg*K)
Specific Heat Below Freezing	0.49 Btu/lb*°F	2.06 kJ/(kg*K)
Latent Heat of Fusion	120 Btu/lb	280 kJ/kg

Storage Conditions

	Temperature		Storage Duration	Relative Humidity or Packaging
	°F	°C		
Fresh Storage	30 to 32	-1.1 to 0	2 to 7 months, depending on variety	90 to 95%
Ripening	60 to 72	15.6 to 22.2	2 to 7 days	85 to 95%
Freezing Point	29	-1.7		
Frozen Storage	0	-17.8	Up to 1 year	Vapor-proof packaging
	-10	-23.3	12 to 16 months	Vapor-proof packaging

Fresh Storage Duration*

Anjou	6 to 7 months
Bartlett	2 to 3 months
Bosc	3 to 4 months
Comice	4 to 5 months
Hardy	2 to 3 months
Kieffer	2 to 3 months
Packham's Triumph	5 to 6 months
Seckel	3 to 3.5 months
Winter Nelis	7 to 8 months

*These storage times allow for additional time for transportation and subsequent marketing. The storage life of Anjou, Comice, and Bosc can be extended 1 to 2 months by packaging in polyethylene liners or storage in controlled atmospheres (CA) of 1 to 2% oxygen, with less than 1% carbon dioxide, and balance nitrogen.

For best storage quality, pears should be cooled rapidly after harvest. Fruit temperatures should be brought down to 32°F (0°C) within 48 hours. The storage life may be 33% longer at 30°F (-1.1°C) than at 32°F (0°C). At 30°F (-1.1°C), precise temperature control is needed to prevent freezing. Pears low in solids may be damaged by freezing when stored below 30°F (-1.1°C). Intermediate temperatures of 36.5 to 50°F (2.5 to 10°C) are harmful to some cultivars of pears; Bartlett pears stored in this temperature range are dry textured rather than juicy.

The time that pears can be held safely in storage at 30 to 32°F (-1.1 to 0°C) varies with cultivar as shown above. If held beyond their normal storage life, some cultivars may not ripen properly and attain good flavor. Even though they may appear in good condition, the flesh will not soften, the skin "scalds" or turns brown, and breakdown occurs.

Pears lose weight rapidly due to evaporation, so relative humidity (RH) in storage rooms should be carefully maintained at 90 to 95%. When weight loss is a problem in the top bins of a stack in a commercial storage, the addition of polyethylene covers will reduce weight loss and visible shrivel. Most pears for long term storage are packaged in folded-over polyethylene carton liners with needle point or 1/4 inch (6 mm) perforations. The liners are opened when pears are removed from cold storage. For ripening purposes, the relative humidity can be lower, at 85 to 90%. Some winter pears require 4 to 6 weeks of cold storage before they will ripen normally at room temperature. Anjou, for example, need to be held at 30 to 31°F (-1.1 to -0.6°C) for at least 30 days before they will ripen with good quality.

Pears are good candidates for controlled atmosphere (CA) storage (1.0 to 2.0% O₂ plus less than 1.0% CO₂). Storage period of some varieties can be extended by several months with CA storage. However, fruit maturity and growing district are important factors in determining storage potential.

Diseases and Injuries

Superficial Scald (Anjou Scald)	This brown to black discoloration of the skin of Anjou and Packham's Triumph pears does no harm other than marring appearance. It may occur even in fruit held under good refrigerated storage conditions for long durations. Control: An antioxidant, Ethoxyquin, is applied as a dip, spray, or in wrapping paper.
Alternaria Rot	Occurs usually late in the storage season, usually at punctures. Decayed tissue is gray to black, dry in center, gelatinous at edge, and easily removable as a core from surrounding flesh. Control: Prevent skin breaks and remove from storage promptly when noted.
Blue Mold Rot	Frequently appears on pears as scattered spots. This is the most common and most destructive rot of pears in storage. Affected areas have a straw to brown color and soft, watery tissues. One phase of the disease develops when the fungus (<i>Penicillium expansum</i>) grows down the stem and rots the tissues of the neck. Control: Prevent skin breaks and lower fruit temperature to 30 to 31°F (-1.1 to -0.6°C). Use of approved fungicides, along with good housekeeping practices to prevent infection during packing.
Core Breakdown	Often accompanies pear scald. Soft, brown breakdown in core area, accompanied by disagreeable odor. Due primarily to over-maturity before harvest, or to holding pears too long at low storage temperatures. Control: Harvesting at optimum maturity should largely eliminate this problem.
Cork Spot	Primarily occurs on Anjou pears. Pears have small, brown corky regions in the flesh that cause surface pitting if near the skin. Control: It is due to growing conditions, not storage conditions, although it may first be observed in storage. Fruit with cork spot can be stored almost as long as normal fruit, although market value is depreciated.
Gray Mold Rot	Characterized by firm, dull brown, water-soaked decay with bleached borders and, when more advanced, by dirty white to gray masses or "nests" of decayed fruits. Control: Use approved fungicides; cool promptly to 30 to 31°F (-1.1 to -0.6°C).
Senescent Scald	This brown to black discoloration of the skin, which is frequently accompanied by softening of the underlying tissues, is associated with fruit that is not fully mature at harvest and is stored at temperatures above optimum. Control: Harvest at optimum maturity for long storage and cool promptly to desired storage temperature.
Freezing Injury	Symptoms are a glassy, water-soaked external appearance, with a tan, pithy region around the core. Pears frozen severely may break down completely or show marked sunken areas where slightly bruised while frozen.

	Control: For pears with low soluble solids content, hold at 30 to 31°F (-1.1 to -0.6°C). Even severely frozen pears will recover if thawed gradually at temperatures not exceeding 36°F (2.2°C).
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Freezing

Pears are frozen to only a limited extent as cored halves or diced pieces because they lose flavor and texture. Pears are more commonly frozen as purées. Freezing should be as rapid as possible. Individual Quick Freezing (IQF) is fastest for halves and diced pears, which are then transferred to cases for storage. Blast freezing of pear halves, pieces and puree is usually accomplished with pails, cans or drums placed in a staggered position to permit good air circulation at temperatures from -10 to -30°F (-23.3 to -34.4°C). Halves and dices may be frozen with sugar in a ratio of 5 parts fruit to one of sugar, usually in 30- to 50-lb (13.6- to 22.7-kg) fiberboard, plastic or metal containers.

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