

0 or 10 F. Products should not be held in break-up rooms any longer than is absolutely necessary.

10. Product, when received at the retail store, should be put immediately into a 0 F storage room.

11. Display cases in retail stores should be continuously held at temperatures of 0 F or lower.

12. Display cases should not be overloaded, especially above the frost line.

13. Temperature of the display cases should be recorded. An alarm should also be provided to warn of excessive rise in temperature.

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FROZEN MEAT PRODUCTS

Types of Products and Method of Preparation, Sanitation, Packaging, Age of Meat for Freezing, Effect of Storage Temperature on Quality, Storage Life of Frozen Meats, Effect of Packaging, Changes in Product During Storage, Effect of Freezing Temperature on Quality, Effect of Thawing on Quality

EARLY sales experience with frozen meats did little to encourage further expansion in this field. The difficulty at that time was that space for display and storage was extremely limited, and the consumer was not prepared to accept frozen meat products.

More recently, hotels, restaurants and hospitals (the institutional trade) were among the first to recognize the advantages to be gained from the use of frozen meats. Such organizations account for about 20 percent of the meat consumed. The fact that frozen pre-portioned meat with known price per unit could be supplied by the packers had strong appeal to the institutional buyers. The portions could be supplied in different weights, in any grade or cut or degree of trim desired. Meat handling had been a costly and troublesome operation when performed by the institutions themselves, so there was little incentive to continue it.

The retail customer also came to recognize the convenience offered by frozen meat in prepared form. Surveys show that this factor of convenience is of prime importance. A majority of consumers buy meat for use two or three days after purchase, and not for longer storage. Meat in stable form gives desired flexibility in meal planning. Many consumers who lack confidence in their ability to select good quality meat find a branded product of known quality answers this problem.

A partial list of uncooked frozen meat products includes: various types of steaks (boneless or with bone in); chops (veal lamb, and pork); cutlets of veal or pork (regular or breaded); chip steaks (laminated thin slices of meat); ground meat as patties or in chop shape (regular or breaded); roasts of many types; stew meat; and variety meats such as oxtails, kidneys, liver, and sweetbreads. Precooked meat dishes vary widely

and include beef, lamb, veal, pork, and kidney steaks, ham sticks, Swiss and Salisbury steaks, beef, veal and lamb goulash, corned beef, corned beef hash, roast pork and dressing, pot roast and roast beef in gravy, veal and pork sausage patties, meat balls and spaghetti, meat loaf, stuffed peppers, and others. Various types of pies available are beef, lamb, veal, pork, ham and chili pot pies. Entire dinners are frozen on metal foil plates and include as entrees ham steak, meat loaf, roast or pot roast of beef, spareribs, steak, Swiss steak or veal cutlet.

The statistics of production for frozen meats and prepared foods containing meats, fish, or fowl show extremely rapid growth rates in the last 13 years (Table 1). Although frozen meat accounts for only a small percentage of the total meat used, the steady growth indicates that an increasingly more important amount of meat will be converted into these more convenient forms. The rate of growth of frozen meats in the more convenient forms for the period from 1950 to 1959 is more rapid than that of all frozen foods (Table 2).

TYPES OF PRODUCTS AND METHOD OF PREPARATION

The feature of convenience is the most obvious one to the consumer, and the retailer as well will concur on this point. To the latter, other advantages are: saving of space and cost of doing his own meat cutting, better by-product utilization by the packer, saving of freight cost, storage space, and display space.

Fresh Meats

In addition to the familiar methods of meat handling, special processing steps and equipment have been developed for the production of frozen meats. The basic steps are cutting or sawing, chipping, grinding and forming, pressing and slicing.

Steaks and chops may be prepared either with the bone left

Table 1 Total Meat, Frozen Meat, Precooked Prepared Meat, Fish and Fowl, and Total Frozen Food Produced 1946-1959

Year	Millions of Pounds			
	Total Meat	Frozen Meat	Precooked Prepared Meat, Fish, Fowl	Total Frozen Food
1946	22,934	20	51	1,900
1947	23,338	15	50	1,533
1948	21,300	25	40	1,792
1949	21,662	27	60	2,380
1950	22,075	35	75	3,317
1951	21,898	55	135	4,349
1952	22,904	80	200	5,449
1953	24,688	125	325	6,399
1954	25,214	175	450	7,249
1955	26,896	250	625	7,882
1956	27,576	325	750	9,007
1957	27,794	365	840	9,044
1958	26,052	340	920	8,767
1959	27,925	325	1040	10,276

Table 2 Increase of Consumption of Frozen Meat and Precooked Prepared Meat, Fish, and Fowl over Total Frozen Food Consumption of 1949

Year	Percent of 1949 Total Consumption		
	Frozen Meat	Precooked Prepared Meat, Fish, Fowl	Total Frozen Food
1950	130%	125	139
1951	204	225	184
1952	296	333	229
1953	463	542	265
1954	648	750	304
1955	926	1042	331
1956	1202	1250	378
1957	1352	1400	380
1958	1259	1533	368
1959	1202	1733	432