

This chart depicts typical shelf life for ground beef using common production practices, packaging techniques and normal temperature controls. Ground beef is being used as an example, but similar conditions would apply to steaks, chops and roasts from other meat types. Shelf life can vary widely for meat products depending upon temperature control, packaging and distribution systems. As a result, the actual age of a “fresh” product can also vary greatly. Shelf life is determined through careful scientific research into products’ sensory cues over time (odor, visual appearance of the package, color, taste and texture), and through laboratory analysis under controlled conditions to determine how long a product remains safe, wholesome and enjoyable. This information is used by industry to establish “use-by” dates on the package. Shelf life of meat products today is much longer than in the past thanks to modern technologies, refrigerated distribution and sanitary practices. The following is a brief description of each of the major ground beef categories shown on the chart.

Carcass Trim Ground in Store:

Historically, carcass sides or quarters were shipped directly to retail stores where butchers would make steaks and roasts and use the remaining trimmings to produce ground beef. Ground beef was packaged in a foam tray with over-wrap film – what many people call “plastic wrap.” Beef in its natural state is dark bluish-purple. However, oxygen can permeate over wrap film and cause a chemical reaction with the myoglobin in meat, leading to a red color. Ongoing exposure to oxygen causes “oxidation” – the same process that turns a cut apple brown – and causes red meat to become brown and develop “off” flavors. This leads to a short shelf life of about three days. This system is rarely used today in modern meat retailing.

Vacuum Packaged Primal / Trim Ground in Store:

During the past fifty years, with the advent of meat sold in boxes of vacuum packages where oxygen is removed, the industry essentially discontinued shipping carcasses to retail stores. Vacuum, low-oxygen packages stored in optimal refrigeration conditions can have dramatically longer shelf lives of up to 70-80 days, and the typical industry average age of vacuum packaged primals at time of use is about 35 days. A survey in 2006 showed the

range to be from 3 days to 83 days. Once the vacuum package is opened and large cuts are sliced into smaller ones, trimmings often remain. These are then ground at the retail store, packaged in a foam tray with an oxygen permeable film and given three days shelf life. At the end of this shelf life, the product may be, on average, a total of 38 days old. For decades, vacuum packaged, refrigerated, fresh product has been sent on trans-oceanic shipments. When the product reaches the foreign destination and enters retail, it is typically more than 45 days old, yet still fresh, wholesome and delicious thanks to the oxygen-free packaging environment.

Bulk Chub / Re-ground in the Store:

The largest volume of ground beef at retail is distributed in coarse or fine ground form and packaged in 10 pound “chubs.” Upon arrival at the store, workers open the chub, re-grind and re-package the ground beef in a foam tray with oxygen permeable film. Once re-ground and tray packaged, the ground beef has three additional days shelf life. This system allows a maximum shelf life of about 23 days total including three days in the display case. This method has been the mainstay for retail ground beef for several decades.

Case-Ready Retail Chub:

Case ready packaging formats represent a fast growing trend in retail ground beef distribution. With case-ready, all grinding and packaging occurs at a plant under U.S. Department of Agriculture inspection. Finished, retail product is packaged in clip-sealed chubs that resemble packaging used for cookie dough. In this “case-ready” packaging format, the film is impermeable to oxygen, opaque and printed with consumer information, including a use-by date. The consumer cannot view the product until opened in the home; therefore, color is not a factor in the purchase decision. Ground beef in this format has a shelf life of about 23 days from packaging. This format has been widely used by retailers for over 25 years and in certain retail markets, it represents one of the fastest growing formats for ground beef.

Case-Ready

Modified Atmosphere Packaging / High Oxygen

Modified Atmosphere Packaging (MAP) allows for a more attractive presentation to the consumer by allowing

a view of the product through a clear film. As with other case-ready formats, the product is ground and processed at the plant under USDA inspection. The package is a rigid gas-impermeable tray with a hermetically sealed lid of clear film. During packaging, the gases normally found in air -- nitrogen, oxygen and carbon dioxide -- are removed and replaced with other gases. One common mixture is 80% oxygen and 20% carbon dioxide. This MAP gas mix results in a bright red color, but due to the negative oxidative effects of oxygen the product only has a shelf life of about 11 days. Frequently, antioxidants, such as chemical extracts of rosemary, must be added to the product to extend shelf life and protect color and flavor against the negative impact of oxygen.

Case-Ready

Modified Atmosphere Packaging / Low Oxygen with Carbon Monoxide

Another MAP case-ready system that has been widely used since 2003 uses a gas mixture containing 70% nitrogen, 29.6% carbon dioxide and 0.4% carbon monoxide. This gas blend differs from the high oxygen blend primarily due to its lack of oxygen. The substitution with minute amounts of carbon monoxide allows the meat to maintain the same natural red color that is present at the time of processing and exposure to oxygen, but without the harmful, oxidative effects that oxygen causes. As a result, the shelf life is equal to other similar low-oxygen formats with about 23 days shelf life from packaging. In this low-oxygen format, antioxidants are unnecessary and only add cost to the system. Bottom line: the consumer buys fresh meat, with an appealing color that has the extended shelf-life normally associated only with vacuum packaged products.

Summary

Case-ready processing and packaging of fresh meat provides a multitude of consumer benefits including enhanced quality and safety. The shelf life of low-oxygen packaged products is very similar, and through case-ready packaging, the ability to control the age of meat at the time of processing is greatly improved over traditional methods of retail store cutting. Certain case-ready packaging, such as high oxygen MAP, dramatically reduces potential shelf life of meat and likely will result in increased consumer complaints.

GROUND BEEF SHELF LIFE* (DAYS)

DAY 0 = DAY OF PRODUCTION

- DISPLAYED AND SOLD IN TRAY
- STORED IN CHUB / VACUUM PACK
- DISPLAYED AND SOLD IN CHUB / TRAY

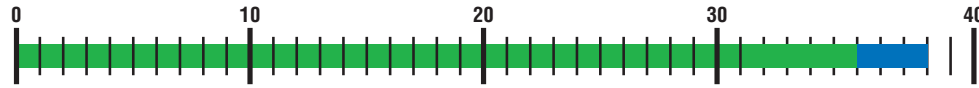


CARCASS TRIM GROUND IN STORE

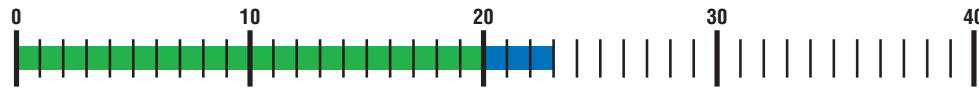


VACUUM PACKAGED PRIMAL / TRIM GROUND IN STORE

(35 days is a typical industry average, however maximum shelf life could be twice as long)



BULK CHUB / RE-GROUND IN STORE



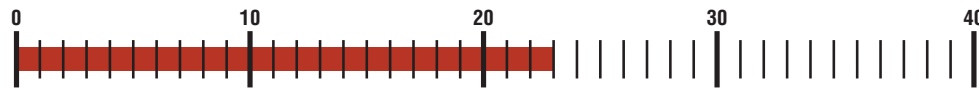
CASE READY CHUB



CASE READY MODIFIED ATMOSPHERE PACKAGING / HIGH OXYGEN



CASE READY MODIFIED ATMOSPHERE PACKAGING / LOW OXYGEN WITH CARBON MONOXIDE



*Under normal refrigerated storage conditions.