

How Ice Cream is Made?

Everybody has a favorite flavor or brand of ice cream, and the debate over whose ice cream is the best rages on each year. While each manufacturer develops its own special recipes, ice cream production basics are basically the same everywhere.

The most important ice cream ingredients come from milk. The dairy ingredients are crucial in determining the characteristics of the final frozen product. Federal regulations state that ice cream must have at least 10% milkfat, the single most critical ingredient. The use of varying percentages of milkfat affects the palatability, smoothness, color, texture and food value of the finished product. Gourmet or superpremium ice creams contain at least 12% milkfat, usually more.

Ice cream contains nonfat solids (the non-fat, protein part of the milk), which contribute nutritional value (protein, calcium, minerals and vitamins). Nonfat dry milk, skim milk and whole milk are the usual sources of nonfat solids.

The sweeteners used in ice cream vary from cane or beet sugar to corn sweeteners or honey. Stabilizers, such as plant derivatives, are commonly used in small amounts to prevent the formation of large ice crystals and to make a smoother ice cream. Emulsifiers, such as lecithin and mono- and diglycerides, are also used in small amounts. They provide uniform whipping qualities to the ice cream during freezing, as well as a smoother and drier body and texture in the frozen form.

These basic ingredients are agitated and blended in a mixing tank. The mixture is then pumped into a pasteurizer, where it is heated and held at a predetermined temperature. The hot mixture is then "shot" through a homogenizer, where pressure of 2,000 to 2,500 pounds per square inch breaks the milkfat down into smaller particles, allowing the mixture to stay smooth and creamy. The mix is then quick-cooled to about 40°F and frozen via the "continuous freezer" method (the "batch freezer" method) that uses a steady flow of mix that freezes a set quantity of ice cream one batch at a time.

During freezing, the mix is aerated by "dashers," revolving blades in the freezer. The small air cells that are incorporated by this whipping action prevent ice cream from becoming a solid mass of frozen ingredients. The amount of aeration is called "overrun," and is limited by the federal standard that requires the finished product must not weigh less than 4.5 pounds per gallon.

The next step is the addition of bulky flavorings, such as fruits, nuts and chocolate chips. The ingredients are either "dropped" or "shot" into the semi-solid ice cream after it leaves the freezer.

After the flavoring additions are completed, the ice cream can be packaged in a variety of containers, cups or molds. It is moved quickly to a "hardening room," where sub-zero temperatures freeze the product to its final state for storage and distribution.

What Does It All Mean?

There are many choices in today's ice cream case to suit a wide variety of consumer tastes. There is plenty of information on food labels, but what does it really mean? Here, the International Ice Cream Association sheds some light on how ice cream and related products are labeled.

Labeling Definitions

The U.S. Food and Drug Administration (FDA) sets standards of identity for many foods so that consumers will get a consistent product, no matter what brand or type they buy. For ice cream, FDA permits the use of nutrient descriptors such as "light," "reduced fat" and "lowfat" so that consumers know exactly what they're selecting in terms of nutritional content. These FDA standards follow the federal Nutrition Labeling and Education Act (NLEA), which governs all food labeling.

Here are some of the terms consumers are seeing in the supermarket, and exactly what those terms mean:

- **Ice cream** is a frozen food made from a mixture of dairy products, containing at least 10% milkfat.
- **"Reduced fat" ice cream** contains at least 25% less total fat than the referenced product (either an average of leading brands, or the company's own brand).
- **"Light" ice cream** contains at least 50% less total fat or 33% fewer calories than the referenced product (the average of leading regional or national brands).
- **"Lowfat" ice cream** contains a maximum of 3 grams of total fat per serving (½ cup).
- **"Nonfat" ice cream** contains less than 0.5 grams of total fat per serving.

Quality Segments

In addition, there are commonly used marketing phrases that describe ice cream products in terms of quality segments, such as "superpremium," "premium" and "economy." Several factors can contribute to a product's quality segment, such as price, brand positioning, product packaging, quality of ingredients and the amount of overrun (air) in the product. Overrun refers to the amount of aeration the ice cream undergoes during its manufacture that keeps the mixture from becoming an inedible frozen mass. Overrun is governed by federal standards in that the finished product must not weigh less than 4.5 pounds per gallon.

- **"Superpremium" ice cream** tends to have very low overrun and high fat content, and the manufacturer uses the best quality ingredients.
- **"Premium" ice cream** tends to have low overrun and higher fat content than regular ice cream, and the manufacturer uses higher quality ingredients.
- **"Regular" ice cream** meets the overrun required for the federal ice cream standard.
- **"Economy" ice cream** meets required overrun and generally sells for a lower price than regular ice cream.

Definitions of Frozen Dessert Products

Ice cream and frozen desserts come in many flavors and types that allow the consumer to choose from a host of delicious choices. Whether the flavor is vanilla, chocolate, pumpkin pie or cookie dough, ice cream and its related products share certain basic characteristics that are often unknown to — or misunderstood by — many consumers.

Frozen desserts come in many forms. Each of the following foods has its own definition, and many are standardized by federal regulations:

- **Ice Cream** consists of a mixture of dairy ingredients such as milk and nonfat milk, and ingredients for sweetening and flavoring, such as fruits, nuts and chocolate chips. Functional ingredients, such as stabilizers and emulsifiers, are often included in the product to promote proper texture and enhance the eating experience. By federal law, ice cream must contain at least 10% milkfat, before the addition of bulky ingredients, and must weigh a minimum of 4.5 pounds to the gallon.
- **Frozen Custard or French Ice Cream** must also contain a minimum of 10% milkfat, as well as at least 1.4 % egg yolk solids.
- **Sherbets** have a milkfat content of between 1% and 2%, and a slightly higher sweetener content than ice cream. Sherbet weighs a minimum of 6 pounds to the gallon and is flavored either with fruit or other characterizing ingredients.
- **Gelato** is characterized by an intense flavor and is served in a semi-frozen state that is similar to "soft serve" ice cream. Italian-style gelato is more dense than ice cream, since it has less air in the product. Typically, gelato has more milk than cream and also contains sweeteners, egg yolks and flavoring.
- **Sorbet and Water Ices** are similar to sherbets, but contain no dairy ingredients.
- A **Quiescently Frozen Confection** is a frozen novelty such as a water ice novelty on a stick.
- **Frozen Yogurt** consists of a mixture of dairy ingredients such as milk and nonfat milk which have been cultured, as well as ingredients for sweetening and flavoring.
- **Novelties** are separately packaged single servings of a frozen dessert -- such as ice cream sandwiches, fudge sticks and juice bars -- that may or may not contain dairy ingredients.

Keep It Cool!

The International Ice Cream Association offers these suggestions on the proper handling and storage of ice cream and frozen desserts to help consumers enjoy America's favorite treat to the fullest.

Ice cream is a perishable product and should be treated carefully. When frozen desserts are exposed to temperatures above 10°F, they become subject to adverse changes in body, texture and flavor characteristics. Although individual manufacturers' recipes yield ice cream of varying consistency and flavor, all ice cream will be negatively affected if improperly handled or stored. Because of the fluctuating temperatures in most home freezers, IICA recommends that people follow these tips, and enjoy ice cream within a month of purchase.

Here are some tips on how to keep ice cream in its most delectable form:

In the Store:

- Make the ice cream aisle your last stop during your trip to the supermarket.
- Check the temperature of your grocer's freezer case. The temperature in the supermarket's freezer case should not be above -20°F. If kept at a proper temperature, ice cream will be thoroughly frozen and will feel hard to the touch. If the product is soft, you may wish to bring it to the attention of the store manager.
- In an open top freezer case, always select ice cream and frozen treats stored below the freezer line.
- Put ice cream products in the separate section of your grocery cart, or place on top of other groceries.
- Insulate ice cream products for the ride home. When your groceries are packed, request a freezer bag or additional brown paper bag to insulate your ice cream.
- Make the grocery store or ice cream parlor your last errand before going home. This will insure that your ice cream does not sit in a warm car while you are making other stops.

At Home:

- Do not allow ice cream to repeatedly soften and re-freeze. When ice cream's small ice crystals melt and re-freeze, they can eventually turn into large, unpalatable lumps.
- Your freezer should be set at between -5°F and 0°F. Ice cream is easy to dip between 6°F and 10°F, the ideal serving temperature range.
- Store ice cream in the main part of the freezer. Do not store ice cream in the freezer door, where ice cream can be subject to more fluctuating temperatures since the door is repeatedly open and shut.
- Keep the ice cream container lid tightly closed when storing in the freezer.
- Don't store ice cream alongside uncovered foods; odors may penetrate ice cream and affect its flavor.

By following these simple suggestions, you can help ensure that your ice cream and other frozen dessert treats will stay the way they left the manufacturer — attractive and delicious!

Taken from the **International Dairy Foods Association** website.

Milk Industry Foundation | National Cheese Institute | International Ice Cream Association
<http://www.idfa.org/>