

# FOOD PRODUCT

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## Executive Summary

- Culinary insider's guide to the types and composition of icings and frostings.
- Traditional uses of icings and frostings.
- Technical information on creating processing-friendly products.

By Walter Zuromski, C.E.C., C.C.E.,  
and Maureen Akins, M.S.  
Contributing Editors

## The Icing on the Cake

In medieval times, icing—a sprinkling of sugar—was put on top of savory, as well as sweet, foods—fish pies, for instance. But the iced cakes we are familiar with today started to emerge in recognizable form in the 17th century. In those days, sugar was applied either directly to the cake, or to a layer of beaten egg white.

There is an interesting evolution for icing vs. frosting. The first icing was a boiled composition that combined sugar, egg whites and a flavoring, if desired. The icing was poured onto the cake vs. spreading it, as in frosting, clearly defining the difference between the two applications. Each has its own function and purpose: to add eye appeal, flavor, volume, and texture, as well as preserving moistness and freshness in the end product.

Each category of confectionery coatings delivers similar end results, but differ in their handling and functionality. The key functionality of each is they protect cakes and baked goods from becoming dry and stale. The first impression or memorable aspect of a cake or pastry is the frosting or icing texture and flavor, so consistency in this application is key to delivering a consistently appealing product.

### Simply icing

Icings differ from frostings in that they are not aerated, and generally their application is by pouring, brushing or dipping the pastry (while aerated frostings are applied with a spatula and/or pastry bag). Simple icings or glazes contain 6X powdered sugar and very small amounts of water. Sometimes, in larger-scale manufacturing, high-fructose corn syrup (HFCS) is added at a 10% level to keep the icing soft and pourable. The icing is generally applied at 100°F to baked goods such as doughnuts or fritters, which are generally dipped, typically right after they're fried or baked, as well as to Danish pastry, fruit tarts, and sweet-dough and fruit-cake products.

Glazes are transparent in most cases. They seal in moisture and add a level of flavor, while delivering an attractive, glossy finish to the baked good. Stabilization of glazes for these types of applications calls for a water-binding agent such as cellulose gum and a setting agent like carrageenan, which, when combined, maintain the desired clarity of the product while providing protection against cracking. Additionally, glazes using stabilizing systems will exhibit better freeze/thaw stability if frozen shelf life is desired.

## Chef Walter Zuromski & Maureen Akins



Walter Zuromski, C.E.C., C.C.E., is founder and president of Chef Services Group, Inc., a consultancy group located in Lincoln, RI. A former board member and member of the Research Chefs Association, he is a food operations, research & development expert with over 20 years experience in the foodservice restaurant chain and manufacturing industry segments. He is corporate research and development chef for TIC Gums, Belcamp, MD.

Maureen Akins, M.S., is a food scientist at TIC Gums, Inc., Belcamp, MD. She currently oversees areas of product development using gums to provide stabilization in meat, bakery, salad dressing, dairy and other applications. Akins is the current secretary of the Carbohydrate Division of the Institute of Food Technologists and a member of the Research Chefs Association. She has taught the hydrocolloids section of Culinology 101 sponsored by Johnson & Wales University, Providence, RI, for the past several years and regularly provides hydrocolloid seminars to groups across the country.

### Fondant designs

Fondant originates from the French word *fondre* (“to melt”), so named because it melts in your mouth when eaten. Fondant is typically a mixture of sugar, water, corn syrup and granulated sugar that is heated to 240°F and then cooled to approximately 90 to 110°F to form the desired crystal form. While bringing this mixture up to temperature, it becomes a thick syrup; the moisture is locked into the sugar crystals keeping this mixture shiny. When cooled, fondant is put into a mixer and blended with the paddle attachment until it becomes white and creamy.

Fondant is available fully prepared as rolled fondant or in a dry, just-add-water form. Today, ready-made fondant is available in the sugar-paste variety (pure white), dark chocolate or white chocolate.

This thick, creamy, sugary mass is used in different forms for decorating cakes and cookies. It can be rolled and draped over a cake, poured as a glaze or sculpted. Fondant is also used in many

candies, including in the centers of chocolate buttercream candies or pecan logs.

Fondant remains soft for quite a while, but will harden over time. Fondant or gum-paste recipes vary, but traditionally contain gum tragacanth, which enables a softer finish. Additionally, cellulose gum can be used to increase the flexibility and moisture-binding qualities of the dough. The resulting dough is very elastic and soft for rolling out and shaping into various decorations. Fondants created with either gum tragacanth or cellulose gum hold up fairly well in humidity, but gum paste has a tendency to soften slightly.

### The royal treatment

Purely a decorators icing consisting of a combination of egg whites and powdered sugar, royal icing tends to dry firm and must be used quickly. It is great for sealing a specialty cake and decorating wedding cakes with fine lace and borders to create dramatic architectural designs.

### Meringue's ins and outs

The basic components of classic icings go into the preparation of a meringue, but a meringue—as we know it in its basic form—is not an icing or frosting. The traditional recipe is a combination of egg whites, granulated sugar and a stabilizing agent such as cream of tartar (potassium bitartrate), which provides additional heat stability and increases the amount of air the egg whites can hold. The egg whites are typically beaten in a mixer until desired peaks occur. Underbeating incorporates too little air and, therefore, less volume, while overbeating can cause the whites to separate. After fully beaten to perfection, the meringue will have the consistency of shaving cream and is commonly topped onto a pie or a classic meringue dessert such as baked Alaska. Industrial meringues can be further stabilized with a setting agent, such as carrageenan, and an air-incorporating agent, such as methylcellulose, which provides additional protection of the meringue for frozen applications.

Swiss and Italian meringues are used for frosting a cake, or as a filling to flavor the center. Swiss meringue frosting or buttercream involves heating egg whites and fine sugar to 110°F and, to avoid coagulating the eggs, constantly mixed at this temperature. When the sugar is no longer grainy, it is whipped to a high foam, like the consistency of marshmallow. Once this texture is achieved, soft butter and shortening are added to create this classic frosting. A good ratio for this mixture is 15% pasteurized egg whites, 30% fine sugar, 5% shortening and 50% unsalted sweet butter. For long-term stabilization, this type of meringue requires setting agents and emulsifiers—such as combinations of modified corn starch, carrageenan and polysorbate 80—to ensure consistent product quality.

Italian meringue buttercream frosting is stable and generally preferred by pastry chefs, as this icing is still excellent after going through a freeze/thaw cycle. Sugar is cooked in water to 240°F

to create a simple syrup and slowly poured into egg whites while beating them in the mixer.

Meringue-based buttercream frostings are very light and have excellent delivery of flavor and texture, and seal tortes perfectly, giving them excellent shelf life frozen or refrigerated. They're generally used to coat European-style tortes and fill the layers with numerous flavors, such as hazelnut, various fruits, chocolate, mocha and unique types such as ginseng tea mandarin orange, ginger vanilla bean, and many more. Some of the flavor trends now in dessert coatings make use of herbs such as cinnamon, basil, mint, sage, lemon verbena or kaffir lime leaves, as well liquors of various types.

Pastry chefs sometimes take liberty to create tortes or specialty desserts using both an icing or frosting to underlay a cake, for example with a star anise mandarin tea icing, and then coating this with a properly tempered chocolate ganache mixture of 50% semi-sweet chocolate and 50% heavy cream and then refrigerating the dessert to allow the coating to harden. The semisweet chocolate, chopped into small pieces, is heated to 180°F. The cream is then poured over the chocolate, and this is mixed to a thick, saucelike viscosity. The chocolate is tempered over an ice bath. The ganache is then poured over a prepared cake to enrobe it. This is then chilled until solid.

## All-American buttercream

This is frosting simply made from 10X confectionary sugar, milk powder, butter, shortening, water or egg whites, depending on the formulator. This type of frosting is found on cupcakes, as well as in standard cake production. More-tolerant versions with increased shelf stability benefit from a combination of modified starch, gums and emulsifiers.

These types of frostings can be whipped using a forced-air injector to produce very light and airy products. Formulations requiring this type of air-water-oil stabilization must be carefully balanced to ensure proper viscosity, emulsion stability and air incorporation are maintained throughout the extended shelf life of these products. Combinations of cellulose gum, methylcellulose and emulsifying agents like gum arabic and polysorbate 80 can provide the necessary balance for these types of emulsions.

## Finer functional points

Pastry chefs and bakers use icings and frosting to fill, enrobe and garnish cakes and pastries. Enrobing is simply the act of evenly coating a pastry or cake with frosting or icing, encasing it with a bold, sweet flavor such as vanilla bean, coconut, fruit, chocolate, hazelnut, tea or ginger, to name a few. Icings are not aerated and are

generally made from primarily sugar and water, or a fruit or chocolate base. From there, flavoring compositions are endless.

Frostings differ in that they may contain shortening or butter and egg products, which enable aeration. The choice of whether to glaze or enrobe in the case of icing vs. frosting depends on the type of dessert you're working on and the desired end texture of the coating. Flavors vary, and the trend is for lighter types of icing to deliver a translucent appearance with a glossy finish. Additionally, flavors translate better in a pourable icing format. The pourable icing can be infused with a cooked flavor, such as cinnamon stick or star anise infused into a tea syrup, which can then be brushed onto the torte to add flavor. Also, products with less viscosity tend to more-readily release flavors.

When formulating for confectionery toppings, stabilizing systems are commonly used to supplement the sugar-based systems to deliver desired textures, stability and machinability, as well as extended shelf life and consistent product quality. These systems may contain combinations of stabilizers, such as starches, gums and emulsifiers, to ensure proper control of sugar recrystallization, water migration and emulsion stability.

Typical types of gums used in icing and frosting applications include cellulose derivatives such as carboxymethylcellulose (also known as cellulose gum) and microcrystalline cellulose (also known as cellulose gel) and other viscosifying types of products such as xanthan, guar or locust bean gum. A wide variety of starches—film-forming, gelling and/or viscosifying types, including modified corn starches and native potato starches, depending on the application—also complete the picture for building viscosity and creating the desired short textures commonly associated with manufactured frostings. Some gelling agents used to provide set in icings include agar, carrageenan and alginates. Each of these ingredients has specific criteria for gelling that must be taken into consideration during the development phase.

Frostings that include a fat component will require the addition of an emulsifier to ensure product consistency and eliminate the potential for any phase separation. Typical products would likely include mono- and diglycerides, polysorbates, propylene glycol mono-stearates, and sodium stearoyl lactylate. Emulsifying types of modified starches and gums such as modified gum arabic, gum arabic, and propylene glycol alginate are also readily available for use in these types of applications. Depending on the requirements of the formula to include the type and usage level of fat, combinations of the above will be the most effective approach for complete stabilization.

Icings and frostings are a strong part of the pastry and baking business. Chefs use them still to enrobe, flavor, decorate, seal and protect the freshness of their creations. 