

PART XVI: FROSTINGS, FILLINGS, GLAZES, AND TOPPINGS

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PART XVI: FROSTINGS, FILLINGS, GLAZES, AND TOPPINGS

1601—INTRODUCTION

Many bakery goods and other foods are improved in appearance and flavor if they receive some final finishing. Cakes, eclairs, Boston cream pies, and other products gain identity only after they are filled and frosted. A streusel topping on a quick coffeecake will win enthusiastic approval because of this extra touch. An apple betty or chocolate pudding will have a smoother flavor if served with whipped toppings.

Excellent formula for frostings, fillings, glazes, washes, and toppings are provided in the Navy-Marine Corps Recipe Service. Their use will create higher acceptance and interest in the foods served in the mess.

1602—CLASSIFICATION AND FUNCTIONS OF ICINGS AND FROSTINGS

These terms are used interchangeably to describe the delicious candylike mixtures that beautify and enhance the flavor of most cakes and a few types of cookies. There is actually very little difference in function and uses between fillings and frostings. A frosting covers, or decorates, the outside of the cake. While an icing also covers, it is less decorative because it is not as frothy. For all practical purposes, however, icings and frostings are synonymous terms. Both are used between layers of cake, as well as on the top and sides. Icings, toppings, and glazes used on doughnuts, buns, and sweet rolls are also included in this group.

Frostings literally "make" a cake in some instances, being almost as closely associated as bread is with butter. Frostings make a nice outward appearance on a cake that might otherwise be uninteresting looking and tasting. A well-chosen frosting perfects the flavor of a cake and offers a pleasing texture contrast to the cake's firmness. Not only does it give eye appeal, but it adds a more moist surface and prevents moisture loss from the baked cake.

Many poundcakes, or other rich mixtures such as fruitcake, do not require frostings and are preferred in their plain state.

There are two major classes or groups of icings and frostings, the COOKED, or boiled as it is sometimes called, and the UNCOOKED. Each type requires special ingredients and techniques in preparation. Four basic types, with a wide number of variations included, are presented in the Navy-Marine Corps Recipe Service:

Uncooked
Vanilla water icing
Cream icing
Cooked
Boiled frosting
Royal or ornamental

1603—ICING INGREDIENTS

The major types of icing differ both in the amounts and kinds of ingredients used and in production techniques. Boiled frosting and marshmallow frosting, the cooked types, contain sugar sirups, beaten egg whites, and confectioner's sugar. In the uncooked class the

ingredients differ slightly in kind, more in quantity, and method of preparation from the cooked icings.

Water Icing

Butter (or shortening)

Water

Confectioner's sugar

Royal (or Ornamental)

Butter (or shortening)

Egg white

Confectioner's sugar

Cream of tartar

Variation of Cream Icing

Hot milk

Eggs

Brown or confectioner's sugar

Butter

Cream Icings

Butter (or shortening)

Confectioner's sugar

Liquid (fruit juice, milk, water, coffee, fruit puree)

Cooked Frosting

Sugar (confectioner's granulated)

Water

Egg white

Cream of tartar

1603-a—EGGS (WHOLE OR WHITES)—As a major ingredient in icings, fresh eggs are essential to quality productions. They add smoothness and creaminess to uncooked icings and structure to cooked icings.

1603-b—SUGAR—Sugar is the body of the icing; its granulation is important. In the completed icing, grittiness is objectionable both from the standpoint of eating quality and stability. The principal sugars used in icings are standard granulated, standard powdered, confectioner's, and corn sirups. Powdered sugar is preferable in uncooked icings because of its fine granulation and capability to dissolve rapidly. Some of the powdered sugar is dissolved when the liq-

uids are added, forming a sirup which helps bind the icing together.

1603-c—LIQUID—Liquid is necessary in icings to make them soft enough to spread, but they are a source of trouble if not kept under rigid control. The amount of liquid in an icing dictates the consistency of the product and the drying time required; hence, when a short-drying time is required, as with rolls and coffee-cake, the liquid must be held to a necessary minimum. Egg whites, substituted for water, give a drying effect. Water will dissolve about twice its weight of sugar in icing. Various types of milk are used. Evaporated and whole milk are good for rich, fudge frostings.

1603-d—CORN SIRUP—The amount of sirup that can be tolerated depends on the grind of the sugar and the amount of fat in the icing. Too much corn sirup will keep the frosting from hardening. Corn sirup, which contains glucose or invert sugar, prevents the formation of large, hard crystals.

1603-e—FAT—Butter, hydrogenated shortening compounds and emulsified-type shortenings are suited for the cream icings. Butter may be substituted for part of the shortening if butter flavor is desired. The butter color is not desirable in white frostings and it may be a bit softer.

1603-f—SALT—Salt is an important ingredient in icings because it brings out the other flavors and gives character to them.

1603-g—COLORING—There is no substitute for the attractive, natural color of icings. If artificial coloring is added, however, it should be done so with great care. Delicacy of color is the mark of a master craftsman. Excess color is undesirable.

1603-h—CREAM OF TARTAR—This product is used in frostings to change the chemical form of the sugar so that small crystals are formed. This gives a creamy texture icing.

1604—PRODUCTION OF UNCOOKED ICINGS

Uncooked icings are easy and quick to make and require very little skill in preparation. All ingredients should be tempered to 72° F when incorporated. Uncooked icing is made as follows:

1. Cream butter or shortening and flavoring until light and creamy;
2. Gradually add sugar and salt, then add liquid very gradually;
3. Whip at high speed for approximately 5 minutes.

The secret of a good cream icing is to obtain a high degree of creaming. For increased fluffiness, egg whites can replace liquid (substitute volume measures on an equal basis).

Royal or ornamental icing is used to make decorative or special occasion cakes. It is suitable for making decorative pieces such as flowers, lattice work, or other forms where fixed position is important in establishing design. The basic royal icing can be made stiffer with cornstarch if certain shapes of decorations are to be made by hand cutting. Roll the stiffened icing out on wax paper as is done with pie crust.

A slightly thinner icing with no starch added can be deposited from a pastry tube. By depositing on wax paper and drying, the items can be removed and placed on the cakes. Since this icing dries rapidly, keep unused portions covered. In fact, keep all icings covered when they are not being used. If starch is added, use on the same day prepared. For a lighter icing, add 1 tbsp of water for every pound of confectioner's sugar used and beat longer. This lighter ornamental icing is best used directly on products. After drying, it is fragile and items shaped from it are apt to crumble. Ornamental icing is excellent to use when other icings used for decorating might run or weep.

1605—PRODUCTION OF COOKED FROSTINGS

Success in making a cooked or boiled icing will depend to a great extent upon the proper development of a foam from the egg whites and the cooking of the sirup to the proper degree of doneness. The cooked icing requires more skill to make. The eggs should be beaten to a soft but firm peak.

If too dry, the icing will have coarse sugar crystals and low volume; if too wet and soft, the icing will be runny and thin. Rigorous scraping of the cooked sirup from the pan may cause the formation of large crystals and this may seed the entire mass and form a coarse structure. All cooked icings must be used on the day they are made.

Either crystalline or noncrystalline icings can be made from cooked sugar solutions. Cooked fudge is a crystalline type, containing small velvety particles. Marshmallow icing is non-crystalline type. In making either crystalline or noncrystalline icings, do the following:

1. Measure ingredients accurately;
2. Dissolve all sugar in water before the mixture reaches boiling temperature;
3. Cook in kettle, use a close fitting cover after mixture starts to boil, or wash down sides with pastry brush dipped in water;
4. Boil sugar to desired stage of concentration, remove from heat;¹
5. Do not stir;
6. Pour hot sirup gradually into egg whites, beating constantly for noncrystalline icing.

Corn sirup is often used to check drying and to inhibit crystal formation and to control the size of sugar particles and the action of the sirup when making and using icings. Cream of tartar changes part of the sugar into invert sugar and thus aids in the formation of small crystals, which give a creamy texture to the cooked ic-

¹ (See Part I, "Basic Principles of Food Production," par. 103-h, for explanation of sugar concentration.)

ings. One-sixteenth of a teaspoon of cream of tartar added for each pound of sugar is a general rule of thumb to use. Vinegar, milk, and egg whites also tend to produce small crystals. Cooling before starting to beat helps to produce fine crystals, and beating also helps. The major control in cooking sirups is the use of a thermometer. Sugar sirups can go from one stage to another within a few degrees temperature range.

Making cooked frosting requires a basic, thorough understanding of sugar cookery. Frosting production corresponds to the process used in candy making, in making sirups for ice cream, and other frozen desserts, and meringues utilizing sirups. Exact temperatures are essential to the production of all these dessert items. See Part I, "Basic Principles of Food Production," paragraph 103-h, for the details of sugar cookery that are applicable to making cooked frostings.

1606—CAKE DECORATION

Great skill and experience is required to decorate cakes and other products as done by the professional chef. Nevertheless, it is possible for one with much less experience to develop skill and do a presentable job of decorating cakes and other pastries for special occasions.

The first important step in decorating is to have an icing of the type and consistency required to make the desired shapes. Royal icing and cream icings are suitable for this purpose. Icings used for decorating should be stiffer than those used for spreading, except when the cakes are coated first with an icing before decorating in which case the icing should pour.

To ice cakes for decorating with a plain glaze, use a vanilla water icing. Heavy, stiff ornamental icing cannot be deposited from a pastry tube and icings which are too thin will not hold their shape. For simple borders have icing at

medium consistency, for flowers have it stiff enough to make the petal stand, and for writing have it somewhat thinner than medium but sufficiently stiff to draw out properly.

Icing for flowing work such as writing should be thinner than medium so that it will not break as it is moved over the surface. Thin icing by using a bit of water, simple sirup, or corn sirup.

Various cake shapes can be cut for individual servings from sheet cakes and iced on a wire grill or rack over a sheet pan. Individual cupcakes can be decorated similarly. (See illustration 1.)

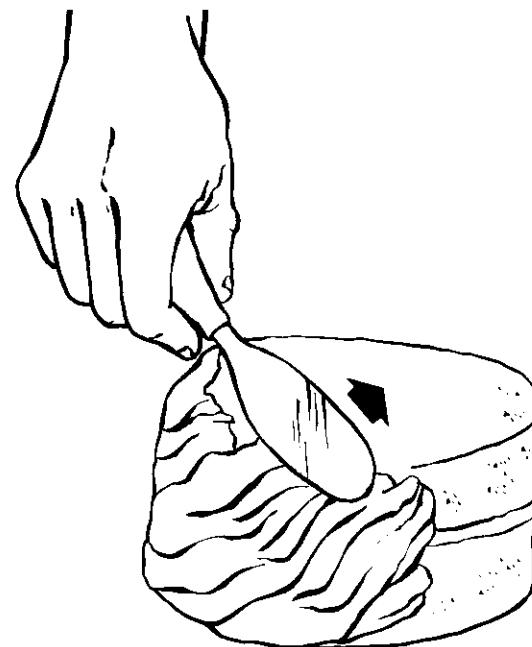


Illustration 1
Icing an Individual Cake With Cooked Frosting

Remove the racks with the coated cakes on them and set aside to dry. Scrape up the surplus icing on the sheet pan, set another rack of cakes over the pan and repour. After the cakes thoroughly dry, decorate. To stick prepared shapes securely to the iced cake, place a small quantity of ornamental or fresh icing to the dried surface and place the decoration upon this. See that the icing consistency is right for the job.

1606-a—EQUIPMENT FOR DECORATING CAKES—These are of several types. They may be pastry bags procured to fit the commercial tubes or they may be improvised.

1606-a(1)—Making and Using Paper Cone Decorators—Paper cones are easily made. Several can be made up and different icings or colored icings placed in them so the decorator can use these alternately in his work which is not possible if only one pastry bag is available. They are also disposable and sanitary because they are thrown away after each use. The best paper to use is parchment but heavy waxed paper can be used; however, wax paper is somewhat fragile and may break. A paper cone may be made as shown in illustration 2.

To fill a cone with icing, hold the base of the cone in the left hand and with a spatula set the icing down in the cone. Fill only up to $\frac{1}{2}$ full, not more. Do not allow air bubbles to get into the cone between the icing; if this happens, a sudden burst of air from the cone will throw icing out over your cake. Fold over the top making a double turn to keep the icing from flowing out the top when pressure is applied.

To make a desired shape, it is necessary to know how to apply the proper pressure and the angle at which the cone should be held. The cone may be held straight up (vertical) to make items such as drop flowers. If writing only is to be done, do not cut the tip but leave it with a small opening about the size desired for the writing. For writing, borders, leaves, flowers, and stems deposited directly on the top of the cake, a 45° angle is usually maintained and for border or string work on the side of the cake hold the cone level with the surface of the cake making a right angle with the sides.

For the making of flowers or other items on a flower nail, hold at a 45° angle. Pressure will always be applied with the right hand and none with the left hand by a right-handed decorator; a left-handed decorator would reverse these directions. The left hand is used to guide or support

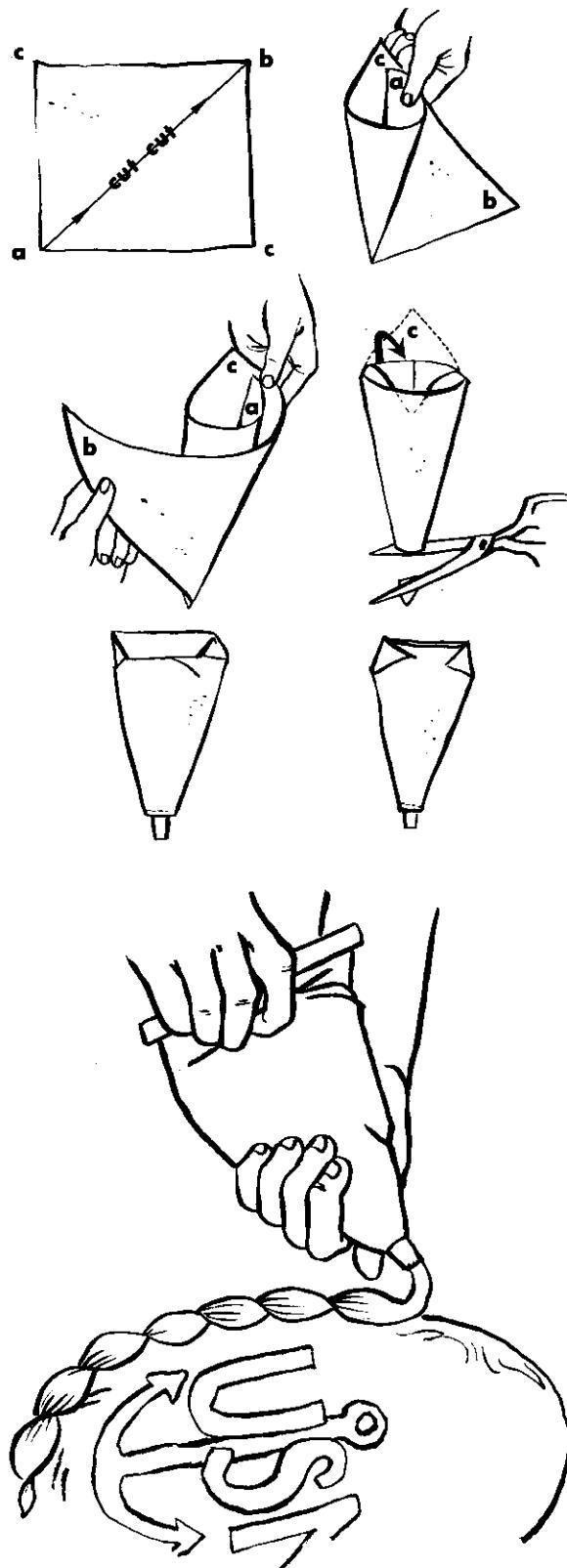


Illustration 2
Making a Paper Cone Decorator

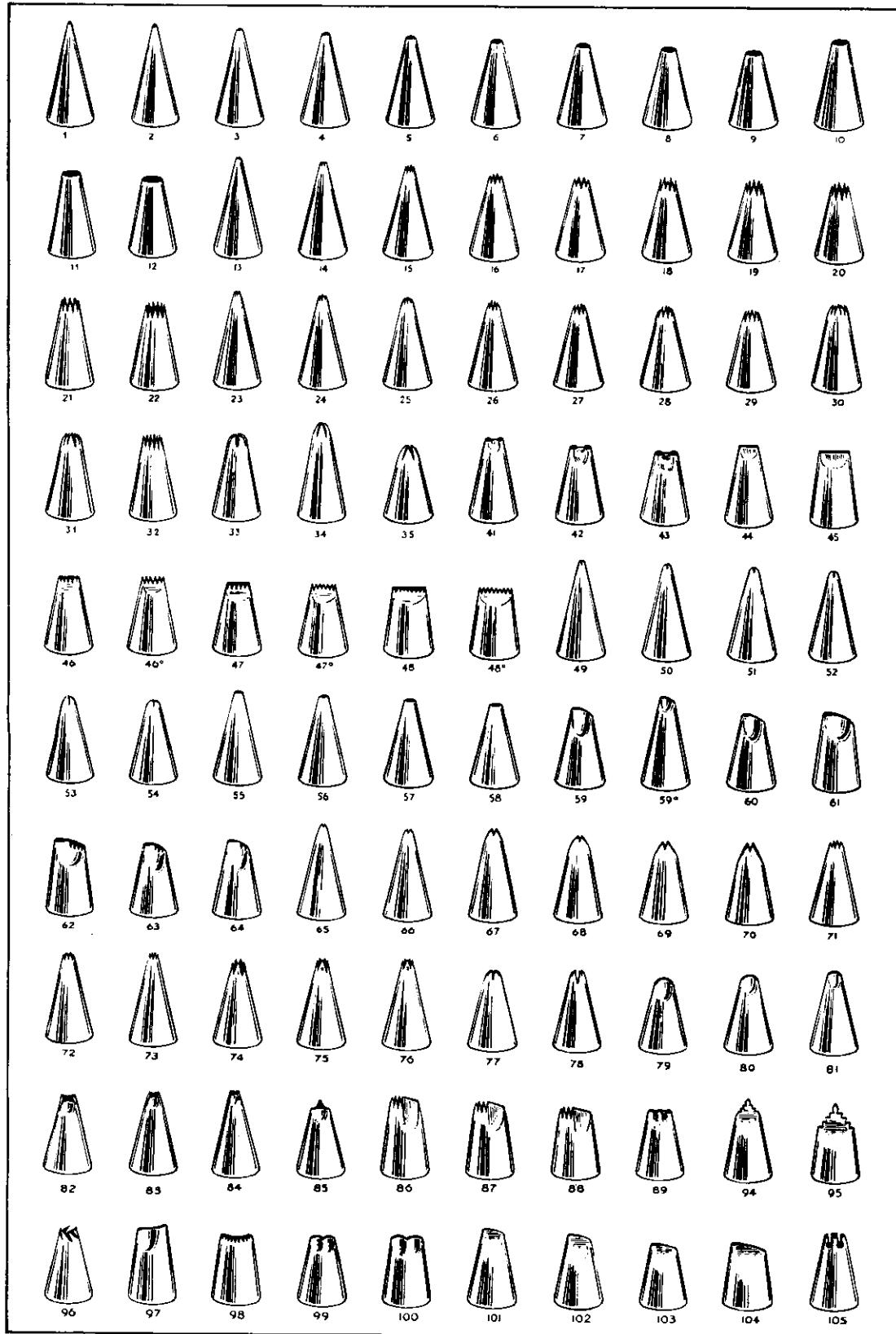


Illustration 3
Standard Decorating Tube Sizes.

the cone or to hold other objects while the right hand applies pressure and directs. Left-hand pressure will make it difficult to maintain a free, easy, gliding motion required and, also, will push icing out the top end of the cone. Right-hand pressure is applied either through the fingers and thumb for fine work or with the four fingers and palm of the right hand when a larger flow of icing is needed. If your icing breaks its flow, you have relaxed your pressure; a sudden blurb of icing indicates too much pressure.

1606-a(2)—Using Decorating Tubes—There are many metal tips available on the market, and the general mess can select those that are in standard stocks or make purchases on the open market to fit their individual requirements. (See illustration 3, p. D16-6.)

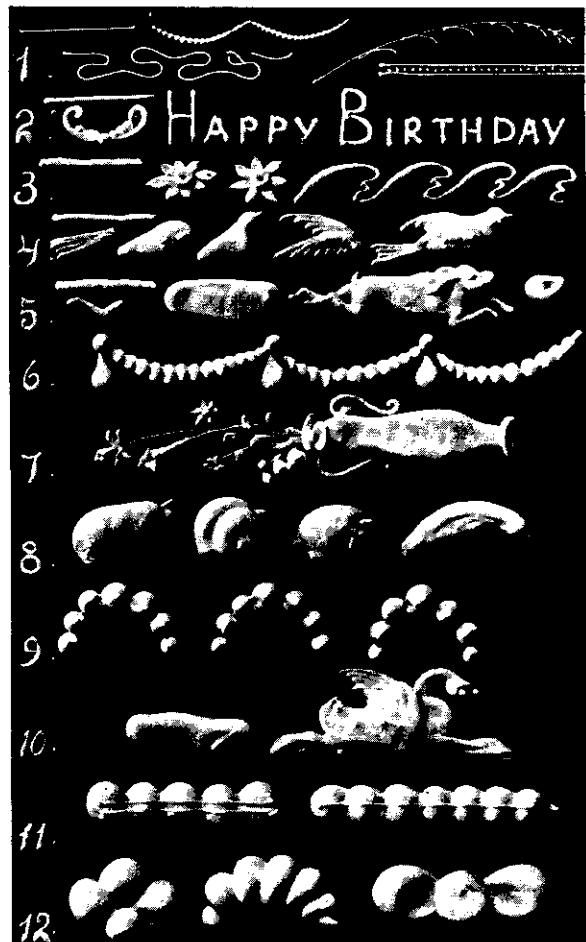
By varying colors of icings and the size of the metal tip, a wide variety of decorations can be made. Borders can be plain or elaborate depending on the tube used. (See illustration 4.) Writing should be carefully planned before starting so that it will be well centered. (See illustration 5.) Forming flower petals and leaves and writing are examples of what can be done in decorating. (See illustration 6, pps. D16-7 through D16-11.)



Illustration 4
Making a Border.



Illustration 5
Writing on Cake.



Plain Tubes (graduated in size)

No. 1 through 12—Tubes used for lines, lettering and writing, stems, flower buds, scrolls, and borders.



Open Star Tubes (graduated in size)

No. 13—Five-point star tubes used for straight and curved lines, small flowers, and scrolls.

Nos. 16, 17, 18—Six-point star tubes used for borders, stars, and star dots.

Nos. 19, 20, 21—Eight-point star tubes used for stars, borders, and designs.

No. 22—Nine-point tube for scrolls. Can be used for drop cookies, dessert toppings, whipped cream, and meringue.

Closed Star Tubes

Nos. 23, 24—Five-point star tube used for writing and lettering.

Nos. 25, 26—Six-point star for shells, rosettes, and border garlands.

No. 27—Seven-point star tube for outlining.

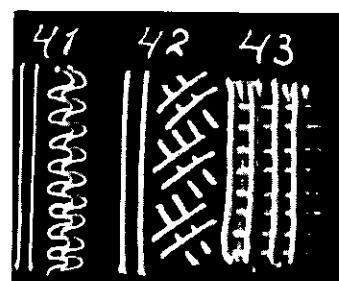
Nos. 28, 29, 30—Eight-point star tubes used for garlands, shells, stars, and borders.

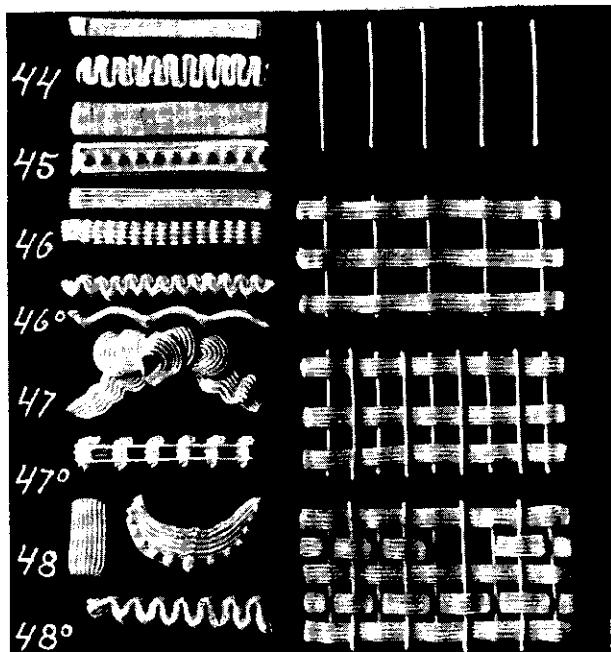
Nos. 31, 32, 33, 34, 35—Larger star tubes for borders, stars, and scrolls. Also may be used for stuffing celery and decorating deviled eggs.



Double-Line Tubes (graduated in size)

Nos. 41, 42, 43—Double-line tubes used to make spaced parallel lines for baskets, borders, and scroll work.



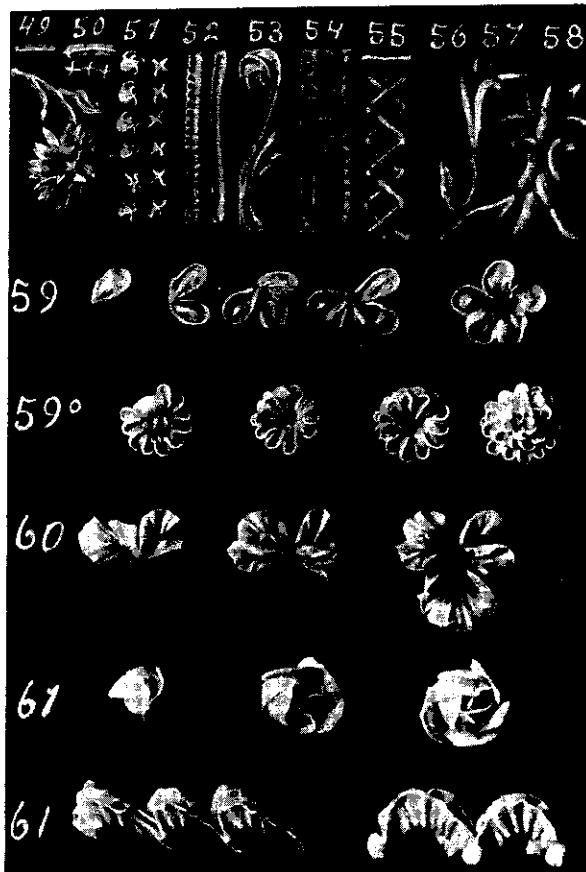


Plain and Fancy Ribbon Tubes (graduated in size)

Nos. 44, 45—Flat tubes for making bows on bouquets and borders.

Nos. 46, 47, 48—Tubes have serrations on one side so that flat fancy ribbons may be made.

Nos. 46°, 47°, 48°—Tubes have serrations on both sides and will make ribbon with crinkles.



Aster Tubes (graduated in size)

Nos. 49 through 54—These tubes are used for flowers, writing, and lettering.

Oval Tubes (graduated in size)

Nos. 55 through 58—Carved tubes used for scrolls, borders, flowers, and stems.

Flower Tubes

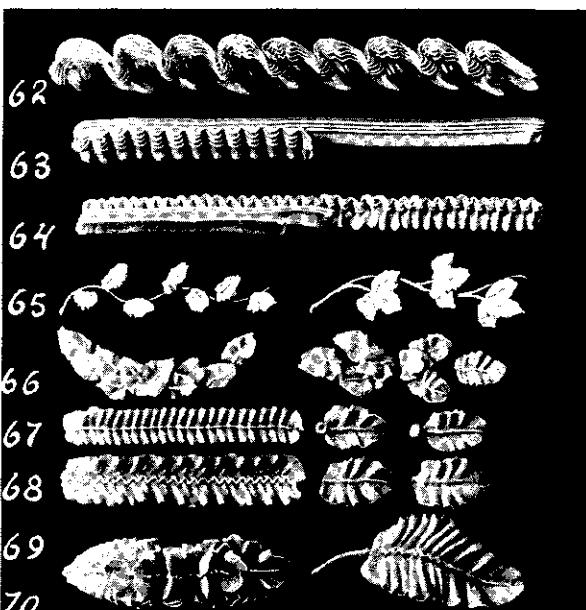
Nos. 59, 59°, 60, 61—Used to make small petal flowers such as apple blossoms, dahlias, pansies, and petals for rose buds.

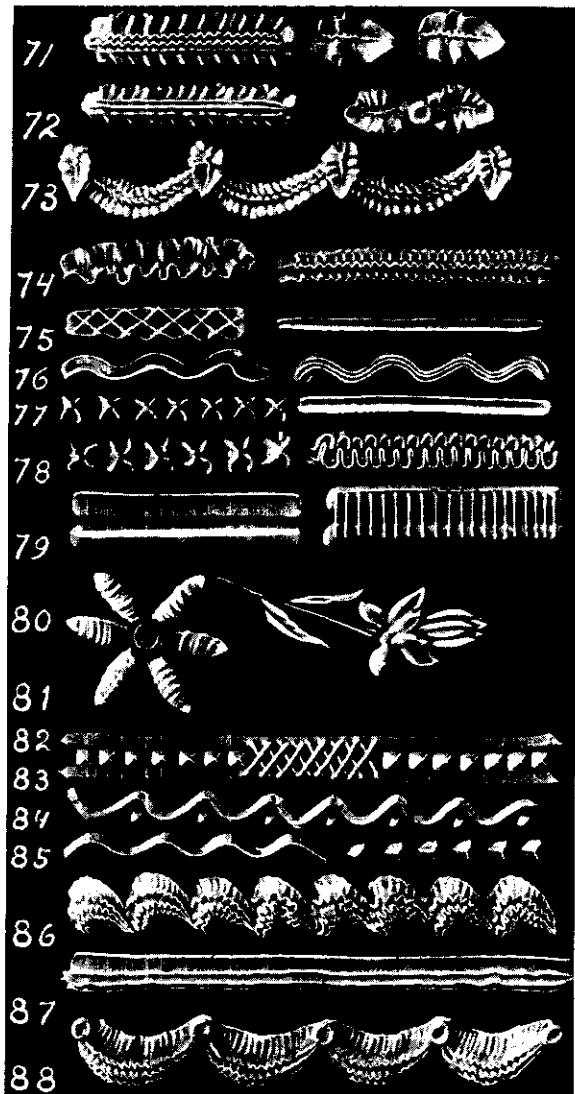
Fancy Border Tubes (graduated in size)

Nos. 62, 63, 64—Half of one side of these tubes is serrated to make two types of crinkles for borders and to finish the base of a cake.

Leaf Tubes (graduated in size)

Nos. 65 through 70—Leaf and border tubes.





Combination Leaf and Border Tubes (graduated in size)

Nos. 71, 72, 73—Make leaves with a ridge through the center, ornate borders and bases.

Nos. 74, 75, 76—These tubes are graduated but 74 is the largest.

Use seam side down for fluting and reverse side for a gather border.

Nos. 77, 78—For leaves, fantasy flowers, borders, and bases.

Flower Tubes (graduated in size)

Nos. 79, 80, 81—For flowers such as daffodils and narcissus. Unusual borders can be

made by turning to either the concave or convex side of the tube.

Square Tubes (graduated in size)

Nos. 82, 83, 84, 85—Use for square dots, borders, and scallops.

Border Tubes (graduated in size)

Nos. 86, 87, 88—Half serrated tubes for borders and bases.

Triple-Line Tube

No. 89—Three parallel lines can be made at one time for basket work.

French Leaf Tubes (graduated in size)

Nos. 94, 95—For special leaves, ferns, and borders.

Drop Flower Tube

No. 96—Makes a drop flower.

Full-Bloom Rose Tubes

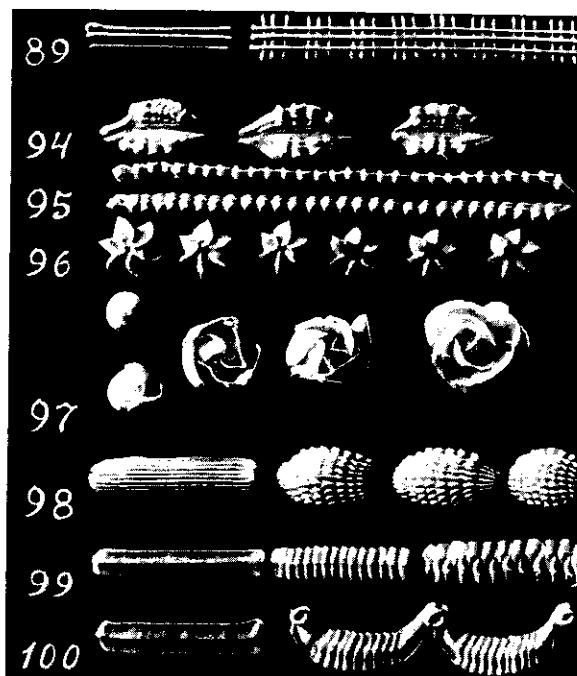
No. 97—Petals for rose in illustration 7, made with this tube.

Shell Tube

No. 98—For centers to designs and borders.

Special Border and Garland Tubes (graduated in size)

Nos. 99, 100—For large borders.



Flower Tubes (graduated in size)

Nos. 101 through 104—Use when flowers are to be made directly on the cake.

Overpiping Border Tubes

No. 105—Used for ornate borders and bases.

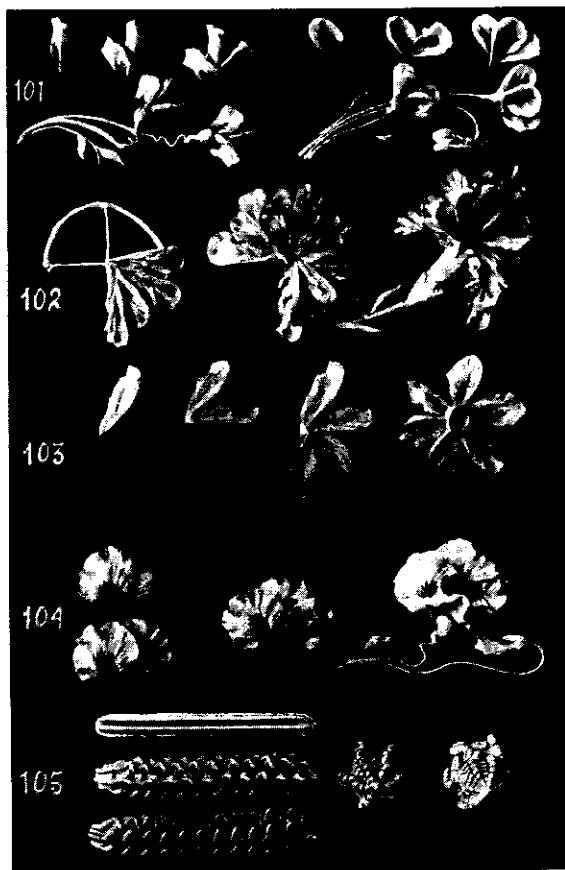


Illustration 6

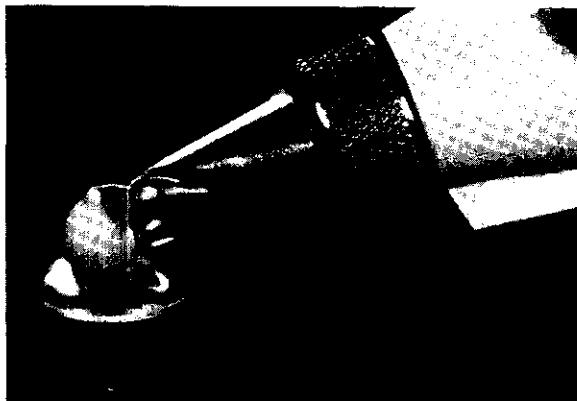
Decorating Tubes and What They Do (See illustration 6, pps. D16-7 through D16-11.)

Many forms of flowers and decorations are made by depositing icing in desired shapes on top of a decorating nail, or use the metal top of a glass jar covered with wax paper. The top of the decorator's nail is about $\frac{1}{2}$ in. to 1 in. in diameter of the jar top width. Hold the nail with the thumb and forefinger and turn in a counterclockwise manner. Use various metal tips, depending upon the size petal to be made. The secret of making a good flower is to turn the nail while at the same time exerting the proper amount of pressure to force out the icing from the tip.

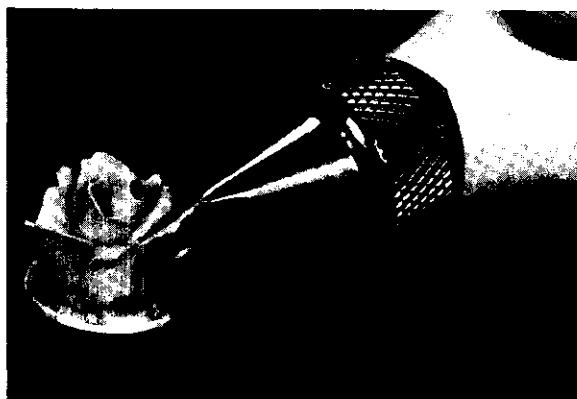
Practice will bring proficiency. To use ornamental icing and a decorator's nail, place a bit of icing in the center of the nail. This is the base for the flower on which it will dry. Use quick, deft motions in making the petals. After the flower is made, remove it by placing a small spatula or sharp knife under the wax paper. Set the paper and flower aside and allow it to dry. Then, remove and place on the cake. (See illustration 7, p. D16-12.) If cream icing is used, make the flower directly on the top of the nail and/or a glass jar top and lift off with a spatula, knife, or a pair of scissors. Small flowers of cream icing cannot be removed and placed on the cake. Individuals proficient in cake decorating can work directly on cakes in making some shapes.

To make a leaf, have the icing sufficiently soft to be able to draw it to a point. Use different leaf tube or combination leaf and border tube metal tips depending upon the size of leaf required. To make a small leaf, use a leaf tube, apply a little pressure and about halfway through the desired length release pressure and lift up, slightly drawing out the tip. For larger leaves, use the combination tube applying a slight side-to-side motion as pressure is applied, again pulling up and releasing pressure when the metal tip has passed the midway point of the leaf. The side-to-side motion gives a rough instead of a smooth edge. (See illustration 8, p. D16-12.)

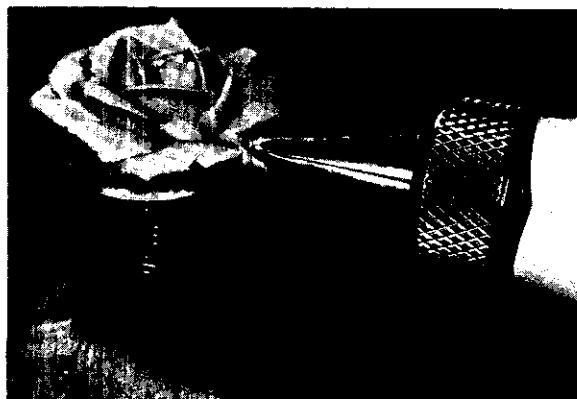
Use a plain, small tube tip to make stems of flowers or to do thin string work. Some small figures may also be made with this. Some simple flowers may also be made with these tubes. The shell, rope, and heavier ridged borders are made with an open star metal tip; small flowers may also be made with it. General mess personnel who wish to obtain a more complete knowledge of cake decoration may obtain the second edition of "Modern Cake Decorating," Wilton Enterprises, 11008 South Halsted Street, Chicago, Ill., or use a similar publication.



Step 1—Place a bit of icing in the center of the nail using tip Number 97.



Step 2—Hold the cone at a 45° angle and apply pressure to the tube at the same time turning the nail. A petal will be formed.



Step 3—As the flower petals are added, lower the cone to 90° to make outside petals.

Illustration 7
Making Flower Using a Decorator's Nail

Before decorating his cake, the inexperienced decorator should take the pan in which the cake was baked and work his design on the bottom; then decorate the cake. If desired, cutouts from sheet cakes can be made. (See illustration 9, p. D16-13.)

While professional decorators use paste colors, regular vegetable coloring is adequate for most coloring of icings. Blend a small quantity of the icing with the desired color and work in well to evenly distribute the color into a small mass; then transfer to a larger mass. In this manner you can control the shading to obtain the degree of coloring desired. Avoid deep colors except for a St. Patrick's Day green or red hollyberries for Christmas. A delicate blue water is preferred to an ugly, intense, dark heavy-blue mass on a cake. The following table may assist in blending the three primary colors of red, blue, and yellow into secondary colors:

Primary Blend	Result
Blue and yellow.....	Green
Yellow and red.....	Orange
Red and blue.....	Violet



Illustration 8
Making a Leaf



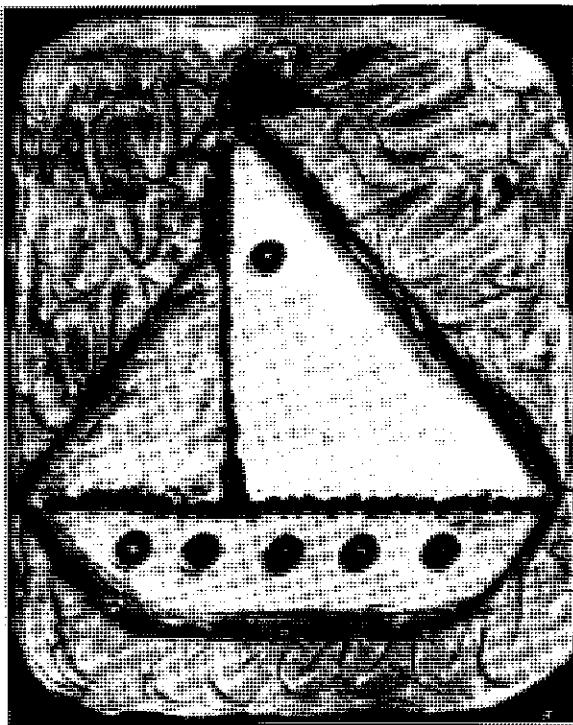
Step 1—Cut cake as indicated.



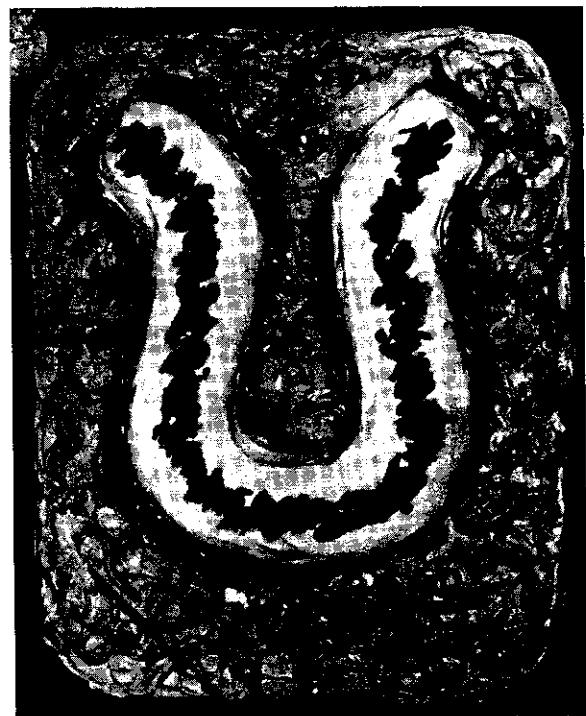
Step 2—Place cut pieces as indicated.



Step 4—Cut cake in horse shoe shape.



Step 3—Decorated as a boat.



Step 5—Cake decorated.

Illustration 9
Cutouts From Sheet Cake and How To Decorate

By shading violet with blue, purple is obtained and violet with red, a red violet is obtained. A red or yellow orange can be made by shading orange with these respective colors and a yellow or blue green will similarly result if green is shaded by yellow or blue.

It is possible to paint a scene on a flat piece of ornamental icing previously cut into desired shape and dried. Glaze this first with a bit of vanilla water icing. Dry well. After painting set upon the surface of the cake, and form bor-

ders around it to blend it into the cake top. (See illustration 10.)

1607—FILLINGS (OTHER THAN PIE)

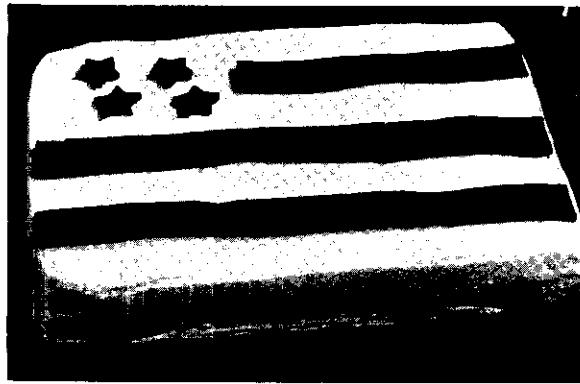
These mixtures are used with yeast-raised sweet doughs in the preparation of breakfast rolls, doughnuts, breads, and in a few types of cookies. Fillings such as sweet creams, jams, or jellies are used also between cake layers and



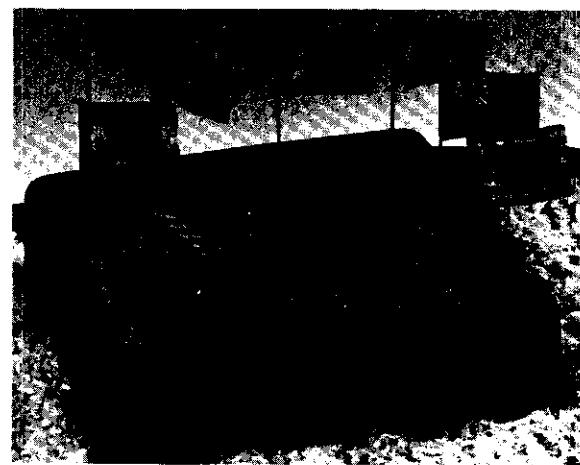
Example 1—Birthday Cake.



Example 2—Easter Cake.



Example 3—July 4th Cake.



Example 4—United Nations Day Cake.

Illustration 10
Examples of Finished Cakes Decorated for Various Occasions

in sponge-cake rolls. Fillings are added to obtain different taste and flavor effects. Some are spread, some sprinkled in a garnish manner.

Fillings for sweet doughs may or may not be thickened. Cake fillings are a thickened basic cream mixture; and pie fillings are distinguished from other fillings in that they always are thickened by eggs and/or cornstarch or flour.

The filling recipes in the Navy-Marine Corps Recipe Service can be used in the following ways:

Apricot Pineapple Conserve

Sweet dough fillings (squares or rounds)

Kolaches

Jelly roll

Fruit-filled cookie squares

Basic Cream Filling

Used on cakes (between layers if baked for other than sheet cakes)

Sweet doughs (usually in combination with fruit)

Cherry Pineapple Filling

Coffeecake

Jelly roll

Fruit-filled cookie squares

Poppy Seed Filling

Kolaches

Rooster comb (sweet dough variation similar to bear claws)

Fruit Filling

Sweet doughs (those made up in open top pie shape)

Sweet doughs (fruit-filled pockets)

Turnovers

Fruit-filled cookie squares

As a garnish

Blanc mange

Tapioca cream

1608—GLAZES AND WASHES

The dictionary definition of a glaze, "to overlay with a thin surface," or "to coat or add luster" aptly describes washes as well as the glazes used in the preparation of breads, sweet doughs, doughnuts, quick breads, cakes and cookies, and pastry.

1608-a—GLAZES—Glazes are of several types and used for different functions in food production. Glazes and washes may be grouped into the following categories:

1608-a(1)—Meat Glaze—Ham is the major meat requiring a glaze in preparation. At the final stage of baking, fruit puree or a mixture of brown sugar, dry mustard, and vinegar is spooned over or rubbed into the meat to give it a glossy, rich finish.

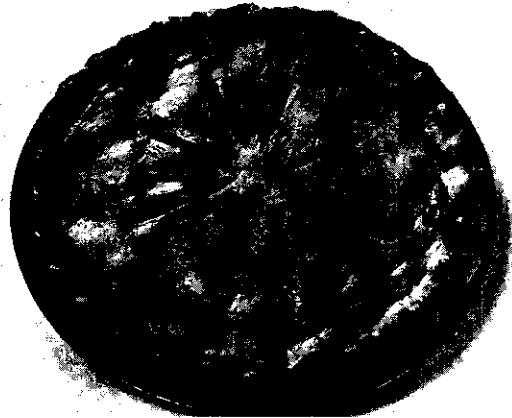
1608-a(2)—Sweet-Dough Glazes—The ingredients used for glazing the many variations of sweet doughs are either sieved fruit and sugar (cooked only long enough to dissolve the sugar) or pan glaze made by a combination of sugar, butter, and sirup, plus flavoring. Pan glazes are used on sweet dough variations such as pecan rolls. The glazes coat the nuts and make them adhere to the finished bun.

1608-a(3)—Doughnut Glazes—See part VI, paragraph 614-e for a discussion of this subject.

1608-b—WASHES—Washes are more frequently used than glazes for sweet dough variations, often being applied in addition to glazes or toppings in many products. They are used also on pastry, some quick breads, yeast breads (rolls and buns), and bar-type cookies. (See illustration 11, p. D16-16.)



Example 1—Applying a wash to a pie.



Example 2—A pie that has had a wash.



Example 3—A pie that was improperly washed.

Illustration 11
Washing a Two-Crust Pie

Washes serve two functions: (1) To wash off excess flour and facilitate browning; and (2) to provide a surface to help affix added toppings (nuts, fruits such as raisins, poppy or sesame seeds, or onions). (See illustration 12, p. D16-17.)

Wash	
Butter, melted (or shortening).....	
Egg (beaten, whole).....	
Egg white (slightly whipped and diluted with water).....	
Milk (whole or evaporated, undiluted).....	
Milk-egg-sugar-cinnamon mixture.....	
Cornstarch-water mixture (made by boiling 1 or 2 tbsp cornstarch with 1 qt of water).	
Milk-baking powder mixture (1 pint cold milk with 6 oz baking powder).	
Milk-whole egg-salad oil.....	

There are many different types of washes that serve these various functions in food production. Any one of the following materials or combinations of materials qualify:

Product	
Yeast breads and rolls, sweet doughs.	
Poppy or sesame seed rolls, raisin buns, bar-type cookies.	
Onion rolls (to make onions adhere), French bread, pastry.	
Breads, rolls, and pies.	
Scones, sweet dough variations, pastry.	
French bread.	
Pastry.	
Pastry.	



Illustration 12
Example of French Bread With and Without
Cornstarch Wash

1609—TOPPINGS

This term is a general one applied to a wide array of miscellaneous ingredients that are sprinkled or spooned over baked products, especially yeast-raised rolls and buns, breakfast cakes, and cookies. Toppings are used on many desserts as well, including custards, gelatins, ice cream, and pies.

The list of topping ingredients is a long one because in addition to the customary types used in the preparation of baked products and desserts, an imaginative chef can add even more to glorify his creations. The Navy-Marine Corps Recipe Service contains several basic recipes that are used on standard products. These are:

Topping
Streusel.....
Honey.....
Jelly.....
Cinnamon sugar mix.....
Ice cream topping.....
Vanilla water icing in combination with chopped or ground nuts and fruits.
Whipped cream or milk (fresh, evaporated, chilled, or dried).

In addition, there are several topping recipes built into other recipes, such as snickerdoodle or crumb cake.

Toppings have two functions: (1) To garnish or provide eye appeal; and (2) to add flavor and texture contrast to the product being embellished.

The preparation of toppings is a simple matter, but great attention should be given to such details as uniform slicing, chopping, and grinding of nuts and fruits to be used as topping materials, as well as to their application in an artistic, eye-appealing manner.

The appropriate point at which to apply the toppings is a most critical step in their use. Streusel topping, for example, should be applied to quick coffeecake batter before it is placed in the oven for baking. All sweet doughs to be topped with vanilla water icing or with a glaze should be warm (but not hot). If nuts or fruits are to be used in addition to the icing, add before the topping has "set," or hardened. Otherwise, these small-sized materials will not adhere to the baked product.

Ice cream toppings, made from jams and jellies and water whipped together, are another category of highly used toppings in the Navy general mess. These toppings are used as sauces and are so classified in the Navy-Marine Corps Recipe Service.

Product Use
Coffeecakes.
Sweet rolls, French pastry.
Sweet rolls, coffeecake.
Quick coffeecake, doughnuts.
Ice creams.
Sweet rolls, cookies.
Gelatin desserts, fruit desserts, pies.

1609-a—WHIPPED-TYPE TOPPINGS—These are a special category of products that require exacting techniques to prepare and to hold for service because of their relatively unstable nature. Temperatures of the product being whipped determines to a great extent how it responds to whipping. Beater speed, as well as the manner of adding flavoring materials, are points to be considered. Whipped toppings can be produced faster by electric mixers. The degree of stiffness obtained depends upon the five major factors, which are:

1. mixing bowls and beaters must be thoroughly chilled;
2. evaporated milk, stabilized cream, or water for reconstituting dry topping materials should be 40° F or below at the initial whipping period;
3. large quantities of cream (or any of the products named in item 2) should not be whipped at one time;
4. powdered or sifted confectioner's sugar should be used because of its fine grain and solubility and should be added after the whipping materials are stiff; however, it must be added gradually, a few scoops at a time;
5. stand-up quality of whipped toppings also depends upon the degree of beating. Whipping the mixture to the optimum point results in the best quality product. Over-beating results in a mixture that separates.

Sterilized, stabilized cream intended for whipping has 30 percent fat content, and such cream produces a stiff and stable whip, other factors being equal (temperatures controlled, sugar added at right time, and so forth). Cream with an 18 percent butterfat content is not intended for topping use. Cream is classified as "coffee" or "whipping," being so identified by a Federal standard which specifies a minimum butterfat of 18 percent for "coffee cream" and 30 percent for "whipping cream." Heavy whipping creams, not procured for Navy use, may contain as much as 40 percent butterfat. The thickness of the cream, or the amount of fat in it, is affected by temperatures. If warm, the fat is thinner, and if cold, thicker. It is for this reason that the

cream must remain below 40° F for at least 4 hours before attempting to whip.

Using evaporated milk (undiluted) for toppings is not only feasible, but makes a very good mixture, if properly handled. There are two critical factors in handling this milk for topping: (1) it must be very cold (not frozen); and (2) it requires the use of a stabilizer to "set" the whip. The stabilizers used most frequently are lemon juice and gelatin. The following recipe is appropriate:

WHIPPED TOPPING USING EVAPORATED MILK

Yield: 4 qt. 3½ cups
(100 servings, 3 tbsp. per dessert)

1. Scald one 14½-oz can of evaporated milk.
2. Soften 1 tbsp of plain gelatin in 3 tbsp of cold water.
3. Dissolve softened gelatin in the scalded evaporated milk.
4. Add contents of two 14½-oz cans of evaporated milk to gelatin-evaporated milk mixture and mix thoroughly.
5. Chill the mixture until thickened and set (about 40° F).
6. Whip chilled mixture on No. 3 speed, making sure beater and bowl also are thoroughly cold. When mixture is stiff and holds a peak, stop beater and sprinkle 1¼ cups of sifted confectioner's sugar over the top of the foam. Whip only until sugar is well blended.
7. Add 1 tbsp vanilla extract and whip to blend.
8. Chill until serving time. Or serve within 1 hour from time of preparation to insure a stable topping.

1609-b—DEHYDRATED TOPPING—This is a very stable product and particularly adapted to Navy use because of its refrigerated space-

saving potential. A 1-lb can of this topping will yield about 1 gal of whipped topping with careful rehydration and whipping techniques. Manufacturers' directions on labels differ from product to product, as do recommended types and quantities of flavoring and sweetening agents used with the topping. Generally, however, the manufacturers' directions for reconstituting the dehydrated topping specify using 1 qt of whole milk (or its equivalent in evaporated milk, diluted). The techniques for whipping, described in paragraph 1609-a, apply to the preparation of this topping.

1609-c—WHEN TO APPLY WHIPPED TOPPINGS—The standup endurance of the whipped toppings is short lived at best, so every precaution must be taken to prevent an early or premature collapse of their foam structure. The product being topped with whipped cream should be thoroughly chilled before it is applied. Application of the topping to individual desserts should not precede the opening of the mess line by more than a few minutes. Whipped toppings used on pies should also be applied as close to serving time as possible, preferably after portioning and cutting.

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PART XVII: PIE DOUGHS AND FILLINGS

1701—INTRODUCTION

Pie, an American favorite, rates high in the Navy general mess. Many messes base their reputation on the high quality and variety of pies baked and served.

Good pies are the result of a combination of high-quality ingredients and skilled technique in mixing and handling. All too often materials are less to blame for poor pies than technique of production. A baker must have a knowledge of the reactions taking place when flour, shortening, salt, and water are brought together in a piecrust mixture. Likewise, careful filling preparation is required, although it is much less often responsible for poor pie quality than improperly prepared piecrust.

1702—TYPES OF PIES AND FILLINGS

Pies are classified according to their type of crust and fillings:

Single crust . . . Baked shell—cooked fillings.
Unbaked shell—uncooked fillings.

Double crust, Plain or lattice top.
unbaked.

Sheet-type pies Cobbler—fruit filling baked
with no crust. with biscuit dough topping.

Novelty crusts. Cookie-cake crumbs—cooked
fillings.

1702-a—**SINGLE-CRUST PIES**—Baked pie shells are filled with lemon, chiffon, and cream fillings (plain, butterscotch, chocolate, cream-fruit, or gelatin-thickened), or thickened fruit fillings with crumb toppings. Unbaked pie

shells are filled with custard, pumpkin, pecan, or lemon cake chiffon, and baked with the crust. (See illustration 1.)

1702-b—**TWO-CRUST OR DOUBLE-CRUST PIES**—The typical double-crust pie has an uncooked top and bottom crust between which a fruit filling is placed and baked along with the crusts. Another type of double-crust pie has a lattice, rather than a plain, top crust. (See illustration 2.)

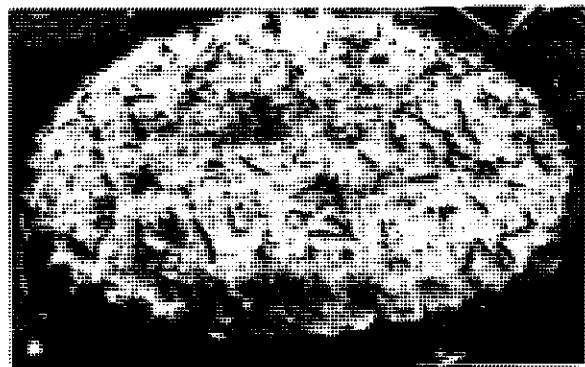


Illustration 1
Example of a One-Crust Pie

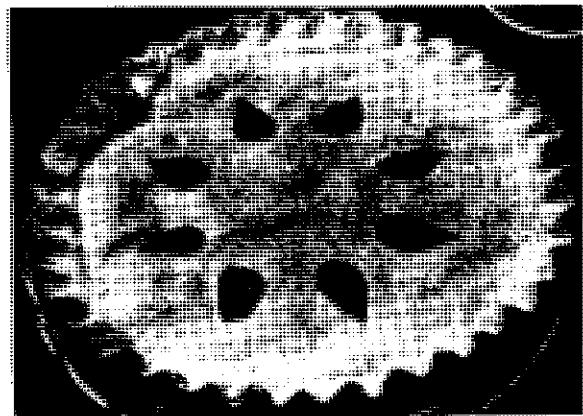


Illustration 2
Example of a Two-Crust Pie

1702-c—SHEET-TYPE PIES—The cobbler is treated under pies because the filling preparation is similar to that of pies except that a baking powder biscuit crust is used instead of a regular piecrust.

1703—PIECRUST INGREDIENTS

Plain piecrust baked according to the Navy-Marine Corps Recipe Service is composed of hard wheat flour, shortening, cold water, and salt. An alternate recipe utilizes salad oil in place of shortening and milk in place of water for the liquid. A discussion of these ingredients shows the importance of selecting, scaling, and proper mixing.

1703-a—LIQUID—This is the most critical ingredient in piecrust, for the quantity used and its method of incorporation into the flour-salt-shortening mixture can make the difference between a tough, rubbery crust and a tender one.

When water comes in contact with the flour, the dough formed has an elastic property from the development of gluten, the protein in the flour. The quantity of water and the amount of handling will depend upon how much elasticity the dough has. The amount of water used should be sufficient to form a dough that handles well; that is, one not too sticky or wet, nor too crumbly to separate from the dough mass.

The more thoroughly the shortening and flour are mixed, the less water the dough will take. This is a desirable characteristic of piecrust dough. A dough that is undermixed and wet will shrink as it bakes, making it difficult to obtain a brown crust. On the other hand, using too small a quantity of liquid will result in a flour-shortening mixture that is too crumbly and too difficult to handle. What actually happens in such a mixture is that there is practically no development of the flour gluten. Some development of gluten is necessary.

1703-b—FAT—Shortening, oil, lard, or butter is responsible for flake tenderness, taste, palatability, and keeping quality of piecrust. The most essential quality factor for fats to be used in piecrusts is freshness. Rancid fat, or fat which has been improperly stored and has absorbed odors from other foodstuff, should not be used. (See Part I, "Basic Principles of Food Production," par. 103-b, for additional information on fats procured for use in the Navy general mess.)

Solid fat gives a flakier piecrust than melted or soft fat because it does not blend completely or as efficiently with the flour. Firm fat remains in a layer when the pastry dough is rolled. Soft shortening CANNOT be used for piecrust. Instead of coating the flour, soft shortening soaks into it, leaving no raw flour to absorb moisture; thus, no structure can be obtained when crust is baked.

1703-b(1)—Shortening—The shortening should be plastic at room temperature, neutral in flavor, bland in taste, and stable under normal conditions. Shortening is a lubricant, and it should cover a sufficient amount of the flour to make the piecrust tender and yet leave enough uncoated flour to combine with the water to form gluten structure. The plasticity, or workability, of hydrogenated shortenings at room temperature makes them a desirable type of fat to use.

1703-b(2)—Oil—Piecrust may be made with oil. Piecrust formulas specifying oil as the fat ingredient incorporate cold milk as the liquid in place of cold water. When oil is used, it is combined with the milk to form an emulsion and is quickly added to the flour. The milk contains solid matter which water does not. Solids give a slight toughening effect needed with oil-flour mixtures that would otherwise make too short and crumbly a pie dough.

1703-b(3)—Butter—Butter crusts are the hallmark of many a famous pie chef. Undoubtedly, butter flavor is highly desirable, and it may be

used in piecrust in any quantity desired as long as it is plentiful and proper substitution ratios are observed. Butter is only 80 percent fat and a soft fat, so use about $\frac{1}{3}$ more butter when substituting it for the total shortening content, but it will be necessary to cut liquid about $\frac{1}{3}$ to facilitate dough handling. A combination of shortening and butter can be used, however, and will make a high-quality crust if the two are thoroughly mixed. Refrigerate the mixture of butter-shortening before use for better workability into the flour.

1703-b(4)—LARD—Lard has a lower smoke point than hydrogenated shortening and, generally, is not used for frying and is not considered an all-purpose fat. The major use of lard is in piecrust production, and authorization is limited to ashore general messes. This fat has excellent shortening power and is plastic; that is, very "workable" in pie dough. It may be substituted weight for weight for hydrogenated shortening in making piecrust.

1703-c—FLOUR—Piecrust formulas in the Navy-Marine Corps Recipe Service specify the use of hard wheat or bread flour. Bread flour is less apt to soak up fat than soft wheat flour and, for this reason, yields pie dough that is less difficult to roll and pan. (For additional information see Part I, "Basic Principles of Food Production," par. 103-c.)

Soft wheat flour is frequently the type commercially used for piecrust made by automatic mechanical rollers and cutters.

The major difference in soft- and hard-wheat-type flours is the amount of gluten, or flour protein, present. Gluten is responsible for the elastic property of flour. Hard wheat flour is high in gluten. A piecrust formula containing hard wheat flour should have sufficient fat to compensate for the possible development of gluten or toughness, if the dough should be mishandled. Soft wheat flour has considerably less of the protein gluten in its composition and requires less fat to yield a tender piecrust.

Generally, a rule of thumb to remember in making piecrust using soft wheat flour is to allow about $\frac{1}{3}$ as much hydrogenated shortening by measure as flour. When using hard wheat flour, use about $\frac{1}{4}$ as much shortening by measure as flour. On a percent basis, this means using about 8 percent less fat with soft wheat flour.

1703-d—SALT—Salt has a desirable binding effect upon the dough, develops flavor, and enhances the flavor of other ingredients. The amount used should be as high as possible without masking the flavor of the other ingredients. The amount of salt in piecrust formulas is 2 to 3 percent based on the weight of the flour (expressed as 100 percent).

1703-e—MILK—Milk is used in pie dough formulas containing oil and acts as a binder in an oil-milk emulsion.

1704—MIXING METHODS FOR PIE-CRUST

The method and degree of mixing, as well as the proportion and type of ingredients used, are responsible for the type of crust produced. The technique used in mixing the fat and flour to lubricate the flour particles is an extremely important step in piecrust production. By altering the size of the fat particles cut or worked into the flour, different types of crust are obtained. These are:

Long Flake—The flour is worked up with the fat until fat is the size of walnuts giving a long flake when baked. Flakiness of crust is indicated by thin layers of baked dough separated by open spaces in the baked crust. This type of crust handles well and is considered by some to soak up less liquid from fillings.

Short Flake—The flour is worked up with the fat until the fat is the size of peas giving a short flake when baked.

Mealy Crust—The fat is worked up with the flour until the particles are very small. This gives a mealy crust when baked. Mealiness of crust is indicated by good shortness, tenderness, and a sharp break of the crust after baking. The Navy-Marine Corps Recipe Service utilizes the mixing method of mealy crust. A mealy crust can be mixed either by hand or by machine.

1704-a—HAND MIXING—This method is recommended for small-scale production. The steps in hand mixing are:

1. Blend half of the flour and all of the fat with a pastry blender;
2. Add the rest of the flour and rub in well with a pastry blender;
3. Dissolve salt in water, add to flour and fat and mix lightly until the desired consistency is obtained. (See illustration 3.)

1704-b—MACHINE MIXING—The method of machine mixing ingredients for a mealy crust should be used in large-scale food operations. The steps in machine mixing are:

1. Mix all of the fat with all of the flour until it resembles coarse cornmeal;
2. Dissolve salt in water, add and mix lightly. Excessive mixing will produce a tough crust with considerable shrinkage.

A modified mixing technique has become widely used in commercial operations in recent years. This is the PASTE-MIX METHOD. In this method, a small portion of the flour is reserved to be mixed with the liquid to form a paste. The paste mixture is then added to the flour-fat mixture and remixed until just blended.

1704-c—MIXING TEMPERATURE FOR PIE-CRUST INGREDIENTS—Refrigerate ingredients to facilitate handling of pie dough, particularly if storerooms and galleys are warm. Flour and shortening should be about 60° F for best mix-



Illustration 3

Blending Shortening With Flour Using a Pastry Blender for Piecrust

ing. Water, however, should be 40° to 50° F. Fat is too hard for mixing if it comes directly from the refrigerator. Fat also measures and/or weighs much more accurately at 60° F. and mixes with the flour much more efficiently than if warm. If warm water is added to the fat-flour blend, there is a greater tendency for the over-development of the gluten. The mixing operation itself generates heat. Ingredients should be the proper temperature at the beginning of the mixing period to offset the heat given off by mixer or by atmosphere.

1705—MAKEUP OF PIE DOUGH

After mixing, roll pieces of the dough into 3-in cylinders. Allow the dough to rest for 1 hour or longer under refrigeration. Resting increases the stretching property of the dough so that it handles much more easily when it is rolled out and made up. If desired, dough can be mixed and allowed to rest overnight, or the blended flour-fat mixture can be refrigerated in a covered container and kept for several days. (See illustration 4, p. D17-5.)

1705-a—DIRECTIONS FOR ROLLING AND PANNING DOUGH—Lightly flour or "dust" flour onto a pastry board or solid tabletop. This will prevent the dough from sticking and tearing as it is rolled. The use of dusting flour also reduces the number of strokes needed to roll dough and decreases the possibility of overdevelopment of the gluten. Dust dough scrapers and rolling pin.

1705-a(1)—Dividing Dough—Cut dough into pieces of a size required for tops and bottoms. Top pieces should be 7 oz and bottoms 8 oz for standard issue piepans. Use a dough divider knife to do this, dipping it in flour between each cutting so that the dough does not stick to the knife.

1705-a(2)—Rolling Dough—Dust each piece of cut dough with flour. Then flatten each piece with the palm of your hand before rolling with dusted rolling pin. Use quick, deft strokes. Start from the center and roll toward edge in all directions. Roll, do not force the dough out, making a circular shape. Forcing or stretching out will cause the dough to shrink later in baking. Shift the position of the dough circle being formed to keep it from sticking to the board. (See illustration 5.)



Illustration 5
Rolling Pie Dough Into Circular Shape

Dough should be rolled into a circle about 1 to 2 in larger than the size desired and should be rolled to $\frac{1}{8}$ -in thickness. To test the size, invert the piepan bottom side up over the circle instead of placing the dough over the piepan. Cut the circle 1 in larger than the pan with a sharp knife or use a pastry wheel. The piecrust dough is now ready to pan.



Illustration 4
Dividing the Dough Into 3-In. Cylinders

1705-a(3)—Panning Dough—DO NOT GREASE PIE PANS. Pie dough is sufficiently rich with fat to prevent sticking. Fold the rolled dough in half, lift to the pan, and unfold carefully. (See illustration 6, p. D17-6.) Avoid stretching the dough because this will cause shrinkage during baking. Fit it carefully so there will be no air spaces between pan and dough. Gently push dough down into bottom of pan and pat out any air pockets that form. Edges are formed, finished, and/or sealed as discussed under makeup of one-crust pies (unbaked); one-crust pies (baked); two-crust pies (one-piece top); and two-crust pies (lattice top).

1705-b—STYLES OF PIE DOUGH MAKEUP—

These are discussed under the various subparagraphs which follow.

1705-b(1)—Makeup of One-Crust Pie Dough (Unbaked Crust)—Roll and cut according to the general directions given in paragraph 1705-a(2). Edge trimming for one-crust pies can be done by one of many ways. Fluted, high-standing edges are one of the most commonly used. Sample ways to make your piecrust attractive are discussed in paragraph 1705-b(3). Frilled edgings on piecrusts serve a useful purpose by helping to prevent additional shrinkage of dough if it has been mishandled or stretched during panning. The crust is now ready to have the filling poured.

1705-b(2)—Makeup of One-Crust Pie Dough (Baked Crust)—Divide, roll, and place dough as described in paragraph 1705-a. One-crust pie doughs to be baked before filling should be docked with a fork or regular bakery pie docker. Docking or pricking of pie dough is done to prevent the dough from "blistering." If it does not expand uniformly during baking, it bursts. Docking enables any entrapped air or steam formed underneath the crust during baking to escape. (See illustration 7.)



Illustration 6
Fold and Place in Pan

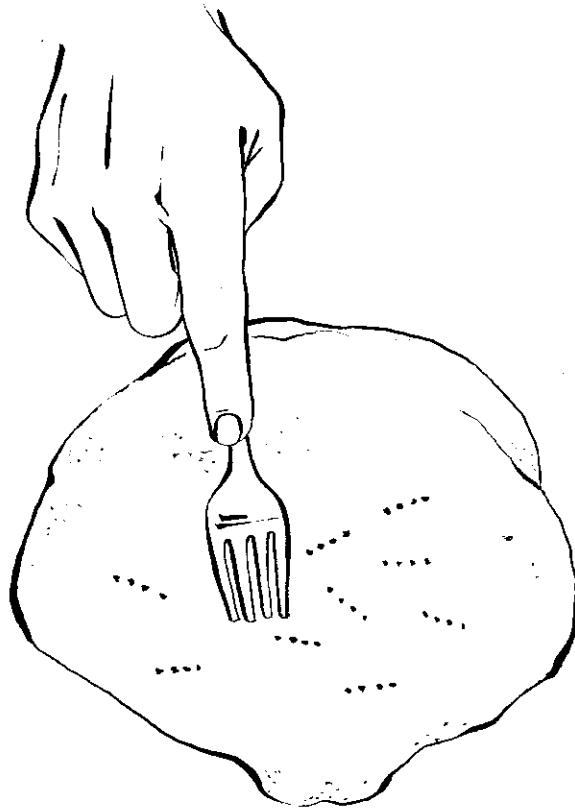


Illustration 7
Docking Pie Dough

1705-b(3)—Makeup of Two-Crust Pie Dough (One-Piece Top)—Be sure to roll and cut top and bottom crusts separately. Divide, roll, and place bottom dough as described in paragraph 1705-a. Roll out top crust, using 7 ozs of dough, and follow rolling procedure described for bottom dough.

Top crusts to be used for fruit pies are less likely to break under pressure of steam forming during baking if openings or slits are made near the center of the cut round. Avoid large gashes but make them large enough for steam to escape. Slicing will be difficult and too much steam will escape if slits are large.

Fill crust with pie filling, using $3\frac{1}{2}$ cups per pie. Wash the rim of the bottom crust by brushing with water, moistening it sparingly. The vent opening or slit in the top crust and sealed piecrust edges will prevent the filling from boil-

ing over during baking. (See illustration 8.)

Next, transfer top crust to the bottom dough in the pie tin that contains filling. Two methods may be used to do this. The dough may be placed over a rolling pin and rolled onto the top of the filled lower crust; or, the tops may be folded in half and again in fourths, transferred, and unfolded onto the filled lower crust.

The excess dough on the edges of the pie should now be trimmed. Press hands against the rim of the pie. Seal the edges of the top and moistened bottom crust by pressing the edges firmly together. The edge can be finished off by any one of the edging examples, except those meant especially for one-crust pies (coin, cornucopia, and scalloped). (See illustration 9, p. D17-8.)

Two-crust pies usually are glazed or washed to remove excess dusting flour adhering to the dough from the rolling operation. Several glazes are described in section D, part 16, paragraph 1608. Allow glaze to dry on crust before baking it. Drying will eliminate dark spots.

1705-b(4)—Makeup of Two-Crust Pie Dough (Lattice Top)—Lattice-top pies are made exactly like regular two-crust pies except that the top crust is cut into strips $\frac{1}{2}$ in wide with a knife

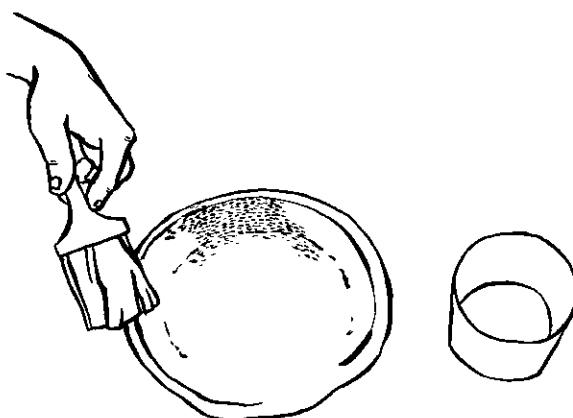


Illustration 8
Washing Rim of Lower Crust

or pastry wheel. The cut strips are placed over the filled lower crust; this is done by criss-crossing or placing the strips over and under alternately where they intersect. (See illustration 10, p. D17-9.) Trim the edges of the lower crust and edges of the strips. Bring bottom crust up over strip ends and finish off with desired edging.

1705-b(5)—Cobblers—There are two types of desserts called cobblers. One is a deep-dish dessert made with pie fillings, usually fruit, without a bottom crust and finished off with a biscuit topping. The other is a sheet-type pie, with lower and top crusts made of regular pie dough. Fillings for the latter type pie are usually fruit.

To make a sheet-type pie cobbler, roll 3 to 4 lb of pie dough into a rectangular shape to fit a standard baking sheet (18 by 26 in), or a deeper baking pan of any similar suitable size. Follow directions for panning, filling, and placing top described under makeup for two-crust pies in paragraph 1705-b (3) and (4). Sheet pies or cobblers normally require about 7 to 10 lb of filling.

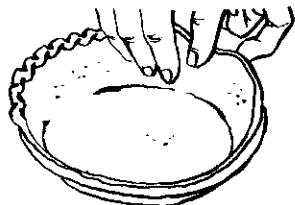
Cobblers without piecrust or deep-dish type desserts topped with biscuit dough, are easily produced. The cooked fillings are made as directed for regular fruit pies. Use about $7\frac{1}{2}$ qt of filling per one standard roasting pan (18 by 24 in).

The biscuit topping is made as directed in the Navy-Marine Corps Recipe Service for "Baking Powder Biscuits." Makeup of this topping may be varied to add eye appeal to the dessert and to permit proper cooking of the thickening agent, cornstarch, used in the filling. Topping variations include:

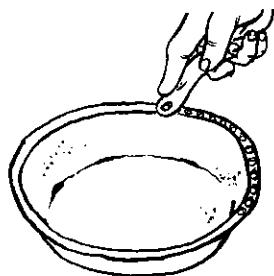
1. Thin, Drop Biscuit Dough dropped from a No. 30 scoop onto filling mixture, 50 biscuits per roasting pan.

PIE CRUST EDGINGS

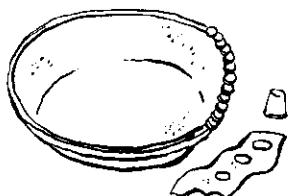
Try these edgings to make your pastry attractive as well as tasty. (Coin, Scalloped and Cornucopia are for one-crust pies only.)



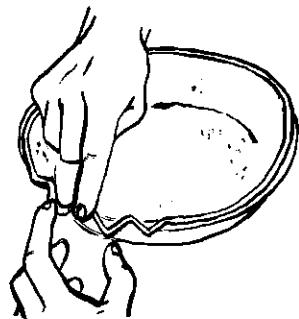
Fluted—Form a high standing rim. Place right index finger inside rim; make flutes every $\frac{1}{2}$ inch by pushing pastry into V with left thumb and index finger outside rim. Pinch flutes for clean edges.



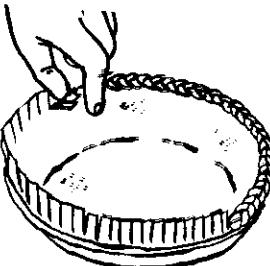
Polka Dot—Allow $\frac{1}{2}$ inch overhang; fold under and form a rim. Press rounded end of bottle opener firmly into pastry rim. Repeat around outside rim.



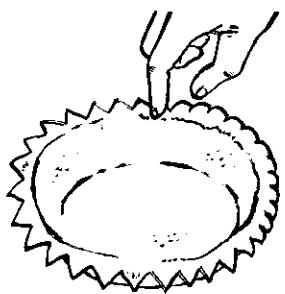
Coin—Trim pastry even with edge of pan. Cut $\frac{3}{4}$ -inch circles from rolled pastry—use center of doughnut cutter or thimble. Overlap circles on slightly moistened rim; press down lightly.



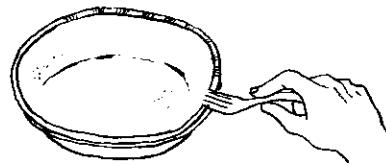
Rope—Form a standing rim. Place thumb on pastry rim at an angle; press pastry against thumb with knuckle of index finger.



Leaf—Form a high standing rim. With scissors, clip rim at an angle every $\frac{1}{4}$ inch. Press down clipped rim to right and left.



Cornucopia—Allow 1 inch additional overhang; do not turn under or make rim. With scissors, cut overhang into triangles at 1-inch intervals. Roll points in toward rim. Seal "cornucopias" on inner edge.



Fork Scalloped—Form standing rim. Mark edges every $\frac{3}{4}$ inch as for fluted edge. Flatten rim to pan between points with floured fork.

Illustration 9
Making Edging on Pie Crusts

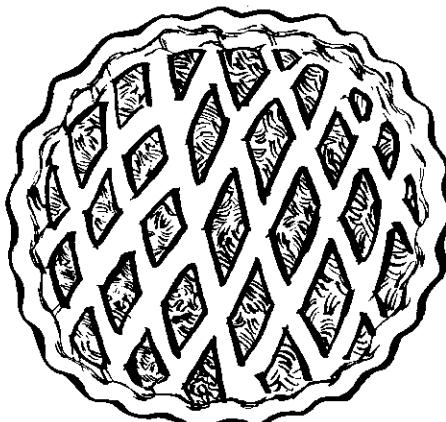


Illustration 10
Lattice-Top Pie

2. Rolled, Round Biscuit Dough, approximately $\frac{1}{2}$ in thick, cut in $2\frac{1}{2}$ -in rounds or squares. Brush and sprinkle with sugar.
3. Rolled Biscuit Dough, approximately $\frac{1}{4}$ in thick, uncut, docked, placed to cover entire pan. If this topping is used, put in sheet pans (18 by 26 in).

1705-b(6) Novelty Piecrust—Graham crackers, vanilla cookies, gingersnaps, or other dry cake or cookie crumbs may be used as a crust for a cream-type filling. To make crust for 17 pies or 100 servings, use 3 lb of crumbs, $1\frac{1}{2}$ lb granulated sugar, $1\frac{1}{2}$ lb butter (soft or melted), $\frac{1}{4}$ lb of flour, and $\frac{1}{2}$ oz of salt. Season with cinnamon or nutmeg as desired. Mix well in a mixer. Place about 6 oz of the mixture into each pan. Press out to cover the entire bottom and sides. Chill several hours. The Navy-Marine Corps Recipe Service for "Egg Nog Pie" can be used in a crumb crust, topped with a sprinkling of the crumbs.

1705-b(7) Tarts and Turnovers—Piecrust may be used to make turnovers. Turnover fillings are like those used for regular pies. Turnovers may be made by cutting piecrust with the edge of an opened No. 10 can. About 2 oz of filling is placed in the center of one round piece and the edges are folded over and sealed tightly. (See illustration 11.) Cut a vent so steam from

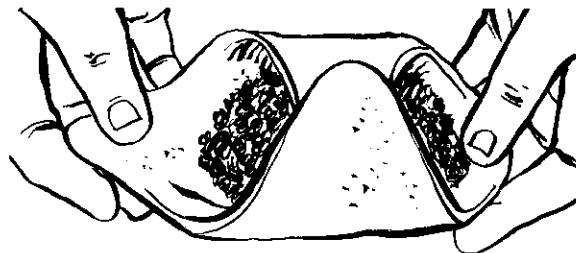


Illustration 11
Shaping a Turnover

the filling can escape during baking. Moisten the outer edge of the crust to seal so that the filling does not seep out during baking.

1706—BAKING PIECRUST

Times and temperatures for baking pies and piecrusts are given in table A, p. D17-10.

1707—PIE FILLINGS

The basic types of pie fillings used in the Navy general mess and the variations specified for each of these types in the Navy-Marine Corps Recipe Service are:

Fruit Fillings—(fruits suspended in thickened fruit juice)—

Canned fruits packed in sirup—apricot, peach, pineapple

Canned fruits packed in water—apple, blueberry, cherry

Canned fruit mixture—mince

Dehydrated fruit—apple, prune

Fresh fruit—cranberry, orange, rhubarb

Frozen fruits packed four to five parts fruit to one part sugar—blackberry, blueberry, boysenberry, cherry, raspberry, rhubarb

Cream Fillings

Cream fillings with fruit—pineapple, banana, coconut, strawberry, prune, raisin butter-scotch cream

TABLE A
BAKING TIMES AND TEMPERATURES FOR PIES

Type	Temperature (° F)	Time (Minutes)
2-crust (unbaked):		
Canned fruit w/thickened filling.....	425	30
Frozen fruit w/thickened filling.....	425	45
Dried raisins w/thickened filling.....	425	45
1-crust (unbaked):		
Pumpkin.....	425	40
Sweet potato.....	350	30
Custard, plain.....	400	30
Custard, butterscotch.....	375 350	Initial 10 Final 10
Fruit crumb topping: Dutch apple.....	350	50
Pecan.....	350	45
1-crust (baked):		
Cream pies w/meringue topping.....	450 350	10 16-20
Biscuit topping:		
Apricot cobbler.....	400	40
Blueberry, cherry, and peach cobbler.....	400	30

Flavored cream fillings—peanut butter, chocolate, butterscotch, raisin butterscotch cream, lemon

Plain cream filling—vanilla

Custard Fillings

Flavored custard—butterscotch, pumpkin, sweet potato

Plain custard—vanilla

Chiffon Fillings

Eggnog and pineapple chiffon

1707-a—INGREDIENTS AND PROCEDURE FOR MAKING FRUIT FILLINGS—Ingredients for and methods of mixing fruit-filled pies are discussed under the types of processed and fresh fruits used in their preparation. Fruit fillings are cooked before being placed in the lower unbaked pie crust and are covered with a top crust before baking.

1707-a(1)—Canned Fruit Fillings—Fruits canned in sirup or water are prepared by this procedure:

Step 1—Drain fruit and set aside juice.

Step 2—Add water to juice, if necessary, to obtain the required quantity.

Step 3—Bring juice to boiling point (212° F). Part of the sugar may be added at this point or as stated in step 5.

Step 4—Add water or juice to cornstarch.

Step 5—Add cornstarch mixture to boiling juice; combine mixture with sugar.

Step 6—Bring back to boil. Cool.

Step 7—Suspend drained fruit in thickened mixture.

Pineapple fillings are prepared by a slightly different method. Cornstarch is combined with sugar and salt and mixed in with the pineapple

and water. Canned apple pies are made also by a different technique because this fruit is packed with relatively little liquid. Cornstarch is mixed with dry ingredients and sprinkled on the apple slices.

Thickening agents are a key ingredient used for fillings of all types, whether fruits are canned or processed by other preservation methods. For complete information on starch thickeners, see Part I, "Basic Principles of Food Production," paragraph 103-q. Cornstarch is the thickening agent most often used for fruit fillings in most recipes in the Navy-Marine Corps Recipe Service. Cold water soluble (or precooked) starches may also be used for fruit pie fillings. Cornstarch thickens more quickly than flour, and this rule-of-thumb substitution ratio should be noted in using one of these thickening agents in lieu of the other:

FOR ONE GALLON OF LIQUID USE—

2 lb flour
1 lb cornstarch

The exact proportion of either will depend upon the acidity of the fruit and the amount of sugar used for sweetening. Fruits high in acid and requiring more sugar will need more than 1 lb of cornstarch to thicken 1 gal of fruit juice. Acid causes thinning, and a high concentration of sugar retards the thickening action of the starch. The amount of precooked starch used depends on the type of fruit filling.

The reason for adding a quantity of water to cornstarch or flour previous to incorporating it with other ingredients is to make the starch (corn or wheat) particles more readily soluble and thus reduce the length of time the mixture is cooked. This is a most important step in fruit-pie-filling production. Starch begins to thicken at around 145° F but complete thickening will not occur until over 200° F temperature has been reached. Bring fruit juices and liquids containing acids to this temperature quickly after the starch is added. Acids will break down starch if cooking is prolonged; and prolonged stirring also may break it down. Cool quickly before suspending fruit in the mixture.

1707-a(2)—Frozen Fruits—Pie fillings made from frozen fruits are less frequently used than canned fruits because the canned counterparts of those frozen fruits which are available are of high quality and do not require frozen storage. This is a factor of prime importance afloat. However, a number of frozen fruits may be used in pie fillings in accordance with the Navy-Marine Corps Recipe Service. Those recommended for pie use are raspberries, strawberries, boysenberries, and blackberries. Frozen rhubarb is used in place of fresh rhubarb by most general messes.

In addition, frozen blueberries and cherries may be substituted for the canned fruit in these pie recipes. When substitutions are made, the total quantity of sugar in the recipe must be reduced. Frozen fruit is packed four to five parts of fruit to one part of sugar and hence does not require as much sweetening.

The amount of sugar required for pie fillings may vary according to the natural sweetness of the fruit as well as the amount used in packing the fruit for freezing preservation. Normally, about 4 lb of sugar is needed for 30 lb of drained fruit. For 100 servings or 17 pies use 30 lb of berries. Use juices drained from the berries that have been thawed at room temperature in an unopened container or previously thawed in refrigerator overnight. Measure the juice. Add a sufficient quantity of water to make up about 4 gal liquid. Use 1 lb of cornstarch per gallon of liquid. Other ingredients used for flavoring and the method of mixing should proceed according to the standard recipe.

1707-a(3)—Dehydrated and Dried Fruits—Dehydrated prunes and dried raisins are reconstituted by combining fruit, water, sugar, and seasoning and bringing to a boil. The procedure for mixing fillings made from these reconstituted fruits is the same as for canned and frozen fruits described in paragraph 1707-a(1).

1707-b—INGREDIENTS AND PROCEDURES FOR MAKING CREAM FILLINGS—The cream

fillings made by recipes in the Navy-Marine Corps Recipe Service are variations of plain cream filling. Cut fruits can be added to the basic recipe without altering the ingredients or method of combining them. When cocoa, chocolate, peanut butter, or lemon juice is introduced as an ingredient, the basic method of combining cream-type pie fillings must be altered.

1707-b(1)—Basic Cream Filling—To produce the basic cream filling, four steps are necessary to mix ingredients properly:

1. Scald about $\frac{1}{4}$ of the total quantity of milk used in the recipe with the salt and half of the sugar;
2. Combine the other half of the sugar and cornstarch and dissolve in the remaining portion of the cold milk;
3. Add cornstarch-sugar-milk mixture to hot milk and cook until thick;
4. Add a portion of the thickened mixture to beaten eggs and pour back into the thickened slurry; cook for about 2 minutes.

This procedure accomplishes several objectives which are important to producing good cream pie fillings. Mixing the sugar with the milk in two stages tends to disperse the sugar and dissolve it more readily than when all the sugar is added to the hot milk. Another important reason is to thoroughly cook the cornstarch. The starch must first be dissolved in a cold liquid to enable it to cook properly. If too much sugar is present in this stage of mixing, a portion of the starch will be insoluble and will not cook thoroughly. Starch has a tendency to thin out in a mixture containing too much sugar.

How the starch-thickened mixture of sugar, salt, and milk is added to the eggs is another critical step; it should be accompanied by good agitation with a wire whip. Overcooking of eggs will result if they are not properly combined into the cooked starch-thickened mixture.

Where service conditions allow, plain cream pie fillings may be made up as required and refrigerated for short periods prior to use. Crusts lose crispness if filled and stored in the refrigerator for long periods prior to service.

Plain cream pies or fruit-cream pies usually are served with toppings. Plain cream topped with toasted coconut is a favorite general mess dessert. Fruit-cream pie toppings may be made of whipped cream, dehydrated topping, or meringues.

1707-b(2)—Butterscotch Filling—This cream-type filling is different from basic cream filling in that brown sugar is an ingredient which has an acid reaction on the mixture, causing it to become thin and runny if improperly prepared. The correct procedure to prevent this from occurring is to stir cold milk into the cooked butter, brown sugar, and salt mixture slowly. If milk is added too fast or if not sufficiently stirred, the sugar will crystallize.

1707-b(3)—Lemon Filling—The preparation of lemon pie fillings differs from that of cream fillings principally because milk is not used as the liquid. The acid reaction of lemon juice on the milk will curdle the mixture.

The method of combining ingredients is also altered from that used for cream pies to prevent the loss of thickening action of cornstarch when lemon juice, highly acid, is added. The method for the preparation of lemon pie detailed in the Navy-Marine Corps Recipe Service should be followed to produce satisfactory lemon pies; this is:

1. Combine sugar, salt, lemon rind, and water; bring to boil;
2. Dissolve cornstarch in water and gradually add to boiling liquid;
3. Cook until thickened, agitating constantly;
4. Turn off heat, stir in eggs;
5. Add butter and lemon juice;
6. Chill mixture thoroughly and follow by thorough whipping for 2 minutes.

1707-b(4)—Other Cream Pie Variations—
When cocoa, peanut butter, and acid fruit variations are added to the basic cream filling mixture, extreme care should be taken.

Cocoa contains starch, hence less cornstarch is added to this pie filling to prevent it from becoming too thick. On the other hand, peanut butter contains a high percentage of fat and must be carefully weighed before blending into a cream mixture. Too much fat introduced into the mixture at this stage will thin it and prevent the filling from setting up when cooled.

Fruits must likewise be carefully folded into the cream filling mixture. Fruits must be drained of juice so that additional liquid is not added, resulting in a thinning out of cream fillings. Pineapple, bananas, and strawberries should be added after the filling has cooled to prevent discoloration and a mushy texture.

1707-c—INGREDIENTS AND PROCEDURE FOR MAKING CUSTARD FILLINGS—This class of pie is one in which the custard, a mixture of milk, eggs, and sugar, is poured into a bottom crust. The crust is baked and the filling coagulates simultaneously during the process.

1707-c(1)—Ingredients—Materials used in making plain custard fillings are:

1. Milk gives flavor, holds water, prevents shrinkage, and aids surface color of custards. The types of milk which may be used are fresh milk; condensed and evaporated; or powdered milk, whole or dry, nonfat.
2. Eggs are essential ingredients in true custard fillings. The eggs coagulate to give the jellylike consistency of custard. Either fresh or frozen eggs may be used.
3. Sugar contributes to flavor. The larger the amount of sugar, the softer the consistency.
4. Stabilizers and flavoring materials are used also. A true custard has a thickening

agent incorporated only for stabilization purposes. Custard may be made successfully without thickening agent. The thickener used is wheat flour.

Ingredients such as butter are used in custards for flavoring. Butter has a tendency to thin the mixture, making it necessary to add starch to avoid the breaking of the gel formed. Butter helps to produce a smoother, softer custard.

1707-c(2)—The Preparation Method—The basic method of making custard fillings is:

1. combine dry ingredients,
2. add dry ingredients to slightly beaten eggs,
3. add a small portion of egg-dry ingredient mixture to scalded milk,
4. Add mixture to remainder of scalded milk,
5. blend in butter and vanilla,
6. pour into pie shells,
7. sprinkle on nutmeg.

The preheating or scalding of milk for custards is done to prevent curdling of milk, but perhaps the major reason for this is to reduce the cooking time.

Custard fillings are poured into single unbaked pie shells. Some bakers feel that allowing pie shells to dry a short time is necessary to produce satisfactory crusts on custard pies. If time permits, pie shells may be dried overnight in the refrigerator.

Fill pie shells and move to the oven carefully to avoid spilling. The custard mixture should not wash up on the piecrust rim. If it does, this area of the custard will become too brown before the center completely cooks.

Precautions should be taken when baking pies. Rules to follow are:

Do not have too hot an oven, as this will cause center of filling to be raw, edges to be over-baked, and crust to be raw.

- Do not have oven too cold, as this will cause crust to be raw and soak up filling.
- Do not underbake, as filling will be raw and thin in the center.
- Do not overbake, as this breaks down filling and causes it to be watery.

Custards are fully cooked when firm enough that a knife inserted into the center of the custard comes out sufficiently clean.

This basic custard recipe has a delicate flavor, is not overly sweet, nor does it taste strongly of vanilla. By the same token, do not overestimate the amount of nutmeg, as this spice greatly influences the flavor of the filling. Nutmeg will settle on the bottom of the filling mixture if it is combined into the mixture. Sprinkling the nutmeg on the top of the custard mixture will not only prevent it from overflavoring the custard, but will improve its texture as well.

1707-c(3)—Custard Pie Variations—Basically pumpkin pies are custard pies with pumpkin and additional spices added. Milk is a key ingredient in making good pumpkin pies. It does not require scalding, however, and the way it is incorporated with other ingredients is important. Canned pumpkin varies slightly in the amount of moisture it contains and to compensate for this factor, pumpkin filling must absorb milk prior to its being baked. If this is not done, the filling will crack and shrink because too much moisture has escaped from the surface. After standing for 1 hour, the pumpkin-milk mixture should be of the proper consistency to add beaten eggs and bake.

Sweet potato filling is made similarly to the procedure described for custard pie. The sweet potatoes (canned, cooked, fresh, or reconstituted instant) are mixed with the scalded milk. Egg yolks are separated from the whites. The latter are whipped and folded into the mixture. The filling is then poured into unbaked pie shells and baked.

1707-d—INGREDIENTS AND PROCEDURE FOR MAKING CHIFFON FILLINGS—The unique characteristic of chiffon fillings is that they incorporate topping materials—meringues and whipped cream—as part of the filling mixture. The meringue is made by beating egg whites and adding sugar, or meringue powder is used. In eggnog pie, both meringue and whipping cream are used.

The chiffon pie is characteristically light, with a smooth texture. Other ingredients used in chiffon pies are thickening agents, including whole eggs or egg yolks, wheat flour, and/or cornstarch, or gelatin. Sweetening agents include white granulated sugar and corn sirup. Major flavoring ingredients are composed of materials for which the pies are named. These are discussed under each type of chiffon pie.

1707-d(1)—Pineapple Chiffon—This is a more typical chiffon pie than others contained in the Navy-Marine Corps Recipe Service. The method used for preparation is similar to that described for canned fruit fillings. The thickened mixture with the pineapple suspended is folded into a whipped meringue, ladled into baked pie shells, and refrigerated before slicing and serving.

1707-d(2)—Eggnog Filling—This filling incorporates gelatin as a thickening agent or stabilizer. When gelatin is used, it must be rehydrated first in a cold liquid, followed by dissolving in a hot liquid. The procedure for mixing is basically the same as that described for cream pies in paragraph 1707-b. The mixture is not cooked except the hot milk added to egg yolks. Refrigerate.

Once chilled, meringue and whipped cream are folded into the thickened gelatin-egg-milk-sugar mixture. It is then ladled into baked single crusts and again refrigerated before serving.

1708—PIE TOPPINGS AND MERINGUES

Cream pies are finished off with topping materials which may be made from sweetened whipped egg whites or meringues, meringue powder, whipped cream, or reconstituted toppings. Fillings should be cool to cold in temperature before placing toppings on them.

1708-a—MERINGUES—Meringues are used for toppings on puddings, floating island puddings, baked Alaskas, and other desserts as well as pies.

1708-a(1)—Basic Ingredients and Preparation of Meringues Made From Egg Whites—Egg whites and sugar are used in equal quantities. Salt and vanilla add flavor.

Fresh or frozen egg whites will whip best if they are at room temperature or slightly above. Beat until slightly foamy, using high speed. On medium speed, add sugar a little at a time. Make sure that a good stiff foam has resulted. Improper beating or excess sugar may cause droplets of moisture to form on the meringue surface. Baking of egg white reduces its ability to hold the sugar and this may separate out as small droplets or as moisture underneath the meringue. If weepage, that is, watery meringues, results after baking or moisture difficulty is encountered, dust cornstarch over the meringue just before whipping is finished. One ounce ($\frac{1}{4}$ c) will be sufficient for the $2\frac{1}{4}$ lb of egg whites. This is an important factor in preventing weepage and in obtaining a high quality meringue.

After the meringue is made, measure out approximately 2 to 3 cups and place in the center of each pie. Spread with a spatula out to the edges. See that the meringue is attached to the crust edge since this helps to reduce slippage. Have the meringue 1 to 2 in deep in the center and slightly less at the edge. Leave the top rough. Bake 16 to 20 minutes in a 350° F oven.

The meringue should be golden brown on the top and completely baked inside so that it is dry and can be cut. Excessive or too little heat will severely reduce meringue quality.

A poor meringue is of low volume, rubbery and tough, and may show excessive weepage. Good meringues have good volume, are tender, and of dry quality and fine flavor.

1708-a(2)—Preparation of Meringue From Meringue Powder—An additional type of material used is prepared meringue powder, requiring only the addition of water and sugar to be made into a satisfactory soft meringue.

Directions for the preparation of 10 qt of meringue powder are to dissolve $1\frac{1}{2}$ cup (6 oz by weight) of the product in a quart of cold water and mechanically beat with a beater or wire whip until a stiff foam is obtained. Add 3 lb of fine granulated sugar slowly and beat until meringue stands in stiff peaks.

1708-b—DEHYDRATED TOPPING—This topping is a ration-dense, high-quality product. One pound plus 3 to $3\frac{1}{2}$ pints whole milk or reconstituted nonfat milk yields approximately 2 gal of whipped topping.

Reconstitute the product as directed on the container. The mixture should be cooled to 40° – 45° F before whipping. Use a clean, dry bowl, also chilled, for whipping the topping. Use high speed on the mixer. If the manufacturer specifies that flavorings or sweeteners (or both) be added, instructions should be followed as directed on the can label. This product makes a very satisfactory pie topping, has good stability and standup quality.

1708-c—WHIPPED CREAM OR EVAPORATED MILK TOPPINGS—Details on these toppings may be found under paragraph 1609, "Topping" (section D, part XVI).

1709—EVALUATING PIE STANDARDS

Consult table B, p. D17-17, "Causes and Remedies for Faulty Pies," to evaluate your pie production standards.

1710—CUTTING AND SERVING PIES

If pies are held for any length of time they may stale and seem to acquire flavor from the pan. Do not make pies too far in advance. Remember that many fillings of pies are highly perishable. Cream and custard pie fillings are especially susceptible to the growth of food-poisoning bacteria. Observe strict adherence to the 3-hour rule. Do not hold these fillings longer than 3 hours cumulative time, at temperatures between 40° F and 140° F (as set forth in section D, part I, par. 102g(1)). Cool pies containing cream or custard-type fillings carefully and quickly. If necessary to hold for service, refrigerate. These pies are best served chilled because the fillings set up better, slicing is easier, and crew acceptance is greater.

When cut for service, cream and custard pies should not show rigid, firm edges but should be of sufficient softness to just hold shape. Custard pies should show a sharp edge where cut and a shiny cut surface.

Never cut fruit pies while hot. They can be served just slightly warm or cold. The filling should be sufficient to hold shape between the crusts. Crusts should be tender and the mealiness or flakiness should suit the type of pie. Fruit pieces should be whole and distinct.

Cut pies first into half and then each half into equal thirds for six cuts. Most recipes call for six cuts per pie, but extra rich pies, such as pecan, may be cut into smaller pieces. Use a sharp knife, cut evenly, and lift with a broad spatula so neat portions are obtained. Place carefully upon the service dish or mess tray, removing the spatula with a short, deft movement backward to release the pie portion on the serving dish.

TABLE B
CAUSES AND REMEDIES FOR FAULTY PIES

Nature of Trouble	Possible Causes	Possible Remedies
Excessive shrinkage of crusts.....	Not enough shortening..... Too much water..... Dough worked too much..... Flour too strong..... Dough mixed too warm..... Shortening too soft..... Rubbing flour and fat too much..... Insufficient baking.....	Increase the shortening. Cut quantity of water. Do not overmix. Use a weaker flour or increase shortening content. Have water cold. Have shortening at right temperature. Do not rub too much. Bake longer.
Crust not flaky.....		
Bottom crust soaks too much juice.....		
Tough crust.....	Crust too rich..... Too cool an oven..... Flour too strong..... Dough overmixed..... Overworking the dough..... Too much water..... Not enough bottom heat..... Oven too hot..... Having filling hot..... Oven too cold..... Fruit slightly sour..... No holes in top crust..... Crust not properly sealed..... Overbaked..... Oven too hot..... Too long baking..... Moisture in egg whites..... Poor egg whites..... Grease in egg whites.....	Reduce amount of shortening. More bottom heat. Increase the shortening. Just incorporate the ingredients. Work dough as little as possible. Reduce amount of water. Regulate oven correctly. Regulate oven correctly. Use only cold fillings. Regulate oven temperature. Use more sugar. Have a few openings in top crust. Seal bottom and top crust on edges. Take out of oven as soon as set. Regulate oven temperature. Take out of oven as soon as set. Use a stabilizer in the meringue. Check egg whites for body. Be sure equipment is free from grease.
Soggy crust.....		
Fruit boils out.....		
Custard pies curdle..... Blisters on pumpkin pies.....		
Bleeding of meringue.....		

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PART XVIII: ICE CREAM, GELATIN, AND PUDDINGS

1801—INTRODUCTION

Dessert is the final impression of a meal and should be of satisfying quality. Usually everyone likes to top off a meal with something completely pleasing, something which leaves one with a pleasant taste and something which satisfies to the last bite.

Rules for good meal planning demand that all foods in the meal blend together with the right likenesses and contrasts of color, texture, temperature, shape, and flavor. All of these points must be considered when planning the type of dessert for any meal. Any dessert should harmonize with the food which precedes it. With a light meal the dessert may be a hearty one, while with a hearty meal a light dessert is in order. With a meal which has been rich and highly seasoned, a simple mild-flavor dessert is best.

1802—CLASSIFICATION OF DESSERTS

Desserts may be classified in a number of ways, but perhaps recipe titles and familiar names afford the simplest and best way to group them. Several types of desserts are discussed elsewhere in this "Manual," as shown:

Desserts	Reference in Section D, "Food Production"
Cakes and cookies.....	See parts XV and XVI.
Creampuffs and eclairs. See part VII, par.	
	705-a(4).
Dumplings.....	See part VII, par.
	705-a(5).
Fruits, fresh, stewed, See part XIII, par.	
baked.	1302.
Gingerbread.....	See part VII, par.
	705-a(7).
Pies.....	See part XVII.

Desserts to be discussed in Part XVIII, "Ice Cream, Gelatin, and Puddings," include:

Ice cream	Puddings
Hard	Cream
Soft	Custard
Gelatin	Steamed
Plain	Baked fruit—Bread
Jellied fruit	mixtures
Whipped	

1803—GELATIN

Gelatin desserts are light, simple, and colorful. These may vary from plain-flavored gelatin dessert served with a topping to gelatin-fruit mixtures to gelatin-pudding mixture.

1803-a—PLAIN FRUIT GELATIN—As the name implies, this is the simplest of gelatin dishes and forms the basis of other gelatin desserts.

Fruit-flavor gelatin dessert powders procured for the military services contain these ingredients:

Gelatin
Sweetening agents
Acid
Salts
Coloring material
Flavoring material: Cherry, lemon, lime, orange, raspberry, or strawberry

These ingredients are combined in quantities which produce a good gel. Acid and sugar in the right proportions are necessary in the product formula to obtain a good consistency in a finished gelatin dessert. Color is added to agree with the flavoring material.

1802-a(1)—Preparation—Several factors may affect the setting or gelling of gelatin. The chief factor is the concentration of a gelatin-water mixture. When too much gelatin is used in proportion to the water, the gel is too stiff and the texture of the finished product will be tough and rubbery. Too much liquid in proportion to the amount of gelatin will produce watery or soft and runny gelatin. The texture of the gelled dessert should be firm, but tender. If gelatin recipes or directions on container are followed, the right concentration will be obtained. Use this recipe or follow directions printed on the container:

Directions for Preparing Fruit Flavor Gelatin

(Yield: One 24 oz container yields approximately 35 servings)

1. Place contents of package in a large bowl. Add 2 qts of boiling water.
2. Stir until completely dissolved.
3. Add 2 qts of cold or ice water.
4. Pour into shallow pans.
5. Chill at normal refrigerator temperatures (about 40° F) until firm.

Temperature is another factor affecting gelatin. At 95° F, or above, gelatin mixtures will not set or remain solid even if previously gelled. Low temperatures of 32° F or below will break the gel more quickly, and such a mixture will melt more rapidly than gelatin which has set at 32° F to 45° F. Melted gelatin will regel without a loss in quality. In addition, other factors may be responsible for gels which do not set properly.

Defect	Cause
Mixture does not harden.	Gelatin not completely dissolved.
Mixture not even...	Fresh pineapple (uncooked) may have been added.

The addition of fresh pineapple to gelatin will prevent the gel from setting up because pineapple contains an enzyme, bromelin, which digests the gelatin protein and destroys its power to gel.

1803-b—GELATIN DISHES—In recipes in the Navy-Marine Corps Recipe Service fruit-flavor gelatin is combined with fruit for desserts. There are many combinations of gelatin flavors and canned or fresh fruits which make pleasant desserts. Here are a few suggestions:

Gelatin Flavor	Canned or Fresh Fruit
Cherry.....	Cherries, light or dark, sweet.
Any Flavor.....	Fruit cocktail, pineapple (not fresh), bananas, or apples.
Cherry, raspberry, strawberry.	Peaches or pears.

1803-b(1)—Preparation of Fruit-Gelatin—Juice drained from the fruit may be used for part of the liquid (1/2 or less) in preparing gelatin. Using all fruit juice would make it too sweet, and this much sugar might soften the set. Make certain the fruit is well drained before adding to gelatin. Fruit should be accurately measured. Fruit slices or halves can be used, or these may be diced. The gelatin should be chilled until it has thickened to the consistency of fresh egg white before adding the fruit.

1803-b(2)—Whipped Gelatin—An attractive gelatin dessert can be made by combining whipped gelatin and vanilla cream pudding. Gelatin whips easily when slightly thickened. Use medium speed on an electric beater and whip until the mixture is light and fluffy.

Vanilla cream pudding blended into the whipped gelatin makes a rich, smooth, light-colored product. Any flavor gelatin powder may be used in preparing this dish, but the dark-colored gelatins—raspberry, strawberry, and cherry—are usually more attractive when whipped because the mixture becomes light colored when cream pudding is added.

1803-b(3)—Other Dessert Uses of Gelatin—Plain gelatin is used as an ingredient in several dessert dishes, although no recipes are included in the Navy-Marine Corps Recipe Service except for the eggnog pie filling which utilizes plain

gelatin. Other familiar desserts in which plain gelatin is used as a binder are:

Bavarian cream, a variation of soft custard into which gelatin and whipped cream and sometimes egg whites and flavoring are folded.

Spanish cream, a gelatin-custard whip. The custard is stiffened with gelatin and stiffly beaten egg whites are folded into partially set gelatin custard.

Charlotte Russe—This is a dessert composed of gelatin, whipped cream, and lady fingers. Gelatin of the type used in these desserts must first be combined with cold water to hydrate or "swell" or mixed with sugar to disperse it. Hot water or other liquids must be added to the rehydrated gelatin to dissolve it. When cooled for the right period of time, gel is formed. In preparing this type gelatin, observe these factors: (1) temperature at the time of gelling; (2) dissolving the gelatin crystals completely; (3) amount of liquid used; and (4) addition of fresh pineapple.

1803-c—SERVING GELATIN DESSERTS
Gelatin desserts should not be placed on the line until ready to serve and should be kept on ice before service to prevent melting. Servings should be cut with a sharp knife and the slices loosened for easy removal from the pan. Dehydrated whipped topping and dessert sauces make excellent garnishes as well as tasty additions to gelatin desserts.

1804—PUDDINGS

Puddings are a dessert which can take several forms, be cooked by one of several methods, be served hot or cold, utilize reusable foods, and add immeasurable eating pleasure to a meal.

1804-a—PUDDING CLASSIFICATION—Recipes for pudding in the Navy-Marine Corps Recipe Service may be classified according to the

type ingredients used and their method of preparation. These classifications are:

Baked Custard-Type with egg and/or bread

Baked custard with variations
Bread pudding with variations
Rice pudding with variations

"Boiled" Milk Puddings with cornstarch

Blanc mange
Chocolate pudding

"Boiled" Cream-Type with egg and various starch thickeners

Vanilla cream
Plain
Plain with fruit
Butterscotch
Chocolate or fudge
Rice-fruit
Rice
Tapioca

Steamed Type with eggs and leavener

Plain
Burnt sugar

Baked Crisps or Cake-Type

Apple Betty, crisp, Dutch bake, and torte
Peach crisp
Cranberry-apple crunch
Fudge
Mocha

"Instant" Prepared Puddings

Commercial products of several flavors

1804-b—PUDDING PREPARATION—The production of the various type puddings is discussed. Strict sanitation measures are necessary in pudding production. The 3-hour rule must be observed in those recipes containing milk and eggs.

1804-b(1)—Custard and Bread Pudding—Plain baked custard is simple, delicious, and usually inexpensive. Authentic custard has egg as the only thickening agent and contains milk, sugar, and flavoring, and is baked in moderate heat until firm.

The most commonly used method for making custard is to scald the milk before combining it with other ingredients. Scalding accomplishes several things: (1) it speeds up the cooking time, (2) custards are less likely to curdle, and (3) allows for more even cooking. When combined with beaten whole eggs to which sugar has been added, the milk should be added gradually with continuous agitation so that eggs do not cook.

The egg-milk-sugar mixture should be poured into baking sheets. This will facilitate easy removal of cut portions. Custards should bake until "just done," which is determined by slipping the tip of a knife into the middle of the mixture. If it is sufficiently cooked, the knife comes out clean. Baked custards should be cooled as soon as they are done to prevent curdling or syneresis (weeping).

Baked custard may be flavored with brown sugar or caramelized white sugar instead of vanilla and nutmeg. Caramelized sugar is made by slowly cooking white granulated sugar over direct heat until a brown color is obtained. The sugar so heated becomes liquid as it melts and must be combined rapidly with scalded milk before it crystallizes and becomes brittle.

Baked rice pudding is another popular baked custard variation. Rice should be thoroughly cooked as for steamed rice (but unseasoned with salt) before combining with the custard mixture. The proportion of basic custard ingredients is not altered when cooked rice is added. Rice does not thicken the mixture, although it is chiefly a starchy ingredient.

Coconut custard is another favorite pudding. To maintain maximum crispness of the coconut, do not combine it with the custard until the mixture has partially baked.

Bread puddings have a custard base. These are menu favorites as well as economical desserts because leftover bread can be used. The crusts should be cut from the bread slices and

the slices cut in 1-in cubes. These are then placed in a pan and a custard mixture and butter are added to it. The quantity of eggs used in custard for bread pudding is less than that used for plain custard. Bread contains considerable quantities of starch which thickens the mixture even though the amount of milk is increased beyond that used for regular custard. Bread puddings combined with fruit are pleasant flavored desserts.

1804-b(2)—Cream-Type Puddings—This group of puddings constitutes a large number of recipes in the Navy-Marine Corps Recipe Service.

The basic cream pudding recipe is composed of scalded milk added to a paste made with flour, salt, sugar, and cold milk. This mixture is gradually combined with beaten whole eggs and cooked. When cooled, banana, toasted coconut, or pineapple may be added to vary the basic recipe.

Other variations of the basic cream pudding include the ingredient differences noted in table A, D18-5. The major differences in cream pudding ingredients are the addition of butter, cocoa, or an ingredient which thickens. These alter the basic proportions of egg-sugar-milk-flour used.

When brown sugar is added for butterscotch flavor, the quantity of sugar in the recipe almost triples the amount of white sugar used for basic cream pudding. This quantity is necessary to produce a true butterscotch flavor. Other ingredient proportions change also to accommodate this quantity of sugar.

The milk is increased and the eggs are decreased. Note that equal quantities of flour and cornstarch are specified for both basic cream and butterscotch puddings. Cornstarch has twice the thickening power of flour, however, so that the consistency of the two puddings would be relatively the same.

TABLE A
PROPORTIONS OF MAJOR INGREDIENTS USED FOR CREAM PUDDINGS

Pudding Recipe	Milk (Gallons)	Whole Eggs	Thickeners	Sugar	Butter (Ounces)	Cocoa (Pounds)
Vanilla cream.....	2 $\frac{1}{2}$	2 lb.....	1 $\frac{1}{2}$ lb flour..	2 $\frac{1}{2}$ lb (white). 6 lb (brown).	.....	.....
Butterscotch.....	3	1 lb.....	1 $\frac{1}{2}$ lb corn- starch.	.....	12	.....
Chocolate.....	2 $\frac{1}{2}$	1 $\frac{1}{2}$ lb.....	1 $\frac{1}{2}$ lb flour..	3 $\frac{1}{4}$ lb (white). 2 $\frac{1}{2}$ lb (white).	6	1
Tapioca cream (plain or w/chocolate, caramel, or spice flavors).	2 $\frac{1}{2}$	14 oz.....	1 lb tapioca.	.....	.....	.....
Creamy rice (plain or w/ raisins or dehydrated prunes).	1 $\frac{1}{2}$	2 lb.....	$\frac{1}{2}$ lb corn- starch.	3 lb.....	6	.....

Tapioca cream pudding contains fewer eggs than the basic cream pudding. The tapioca itself is the only starch thickener. Special cooking precautions are necessary when tapioca is used as a thickener in puddings containing egg. The tapioca should be thoroughly cooked and the egg must not be overcooked. The addition of scalded milk to the mixture of egg yolks, tapioca, sugar, salt, and cold milk shortens the cooking period.

1804-b(3)—Cornstarch Puddings—Blanc mange and chocolate pudding are two types of milk puddings which are thickened solely by cornstarch. They do not contain egg. Cornstarch puddings are referred to also as blanc mange, a French word meaning "white food."

Blanc mange is made by combining sugar and part of the milk and heating to the boiling point. A paste is made of cold milk and cornstarch before it is added to the hot milk and cooked to the proper consistency. Blanc mange is served cold and is particularly good with dessert sauces or fresh fruit.

Chocolate pudding is made by adding chocolate to basic blanc mange recipe, or it may be made from basic cream pudding with eggs. (See Table A, "Proportions of Major Ingredients Used for Cream Puddings.")

1804-b(4)—Steamed Puddings—There are many kinds of steamed puddings, but the type included in the Navy-Marine Corps Recipe Service is made from a batter similar to that used for cakes. The batter is placed in a bread pan and cooked in a steam cooker. These puddings are usually served hot, and are especially flavorful if served with a lemon sauce or hard sauce. They are especially appropriate for holiday meals such as Christmas or Thanksgiving, or as cold weather desserts.

1804-b(5)—Crisps and Cake-Type Puddings—Crisps are fruit puddings, sweetened and variously flavored, and baked with a crumb topping. The crumb topping is made with flour, shortening, and sugar. Rolled oats, other cereal, or bread crumbs may be used for variety. A similar topping is "built" into recipes such as apple brown Betty, Dutch apple bake, cranberry apple

crunch, and applesauce torte, although the effect in texture is different from the fruit crisps.

1804-c—SUGGESTIONS FOR SERVING PUDDING-TYPE DESSERTS—The variety of toppings, garnishes, or sauces to be used with desserts is almost unlimited. These should be chosen to complement the color and flavor of the pudding, be appropriate to the season, or emphasize a special occasion. The following is a suggested list of such "finishing touches" for plain and fancy and hot or cold puddings:

Plain cream

Whipped cream, plain, sweetened, delicately tinted, flavored with vanilla, mint or coffee

Whipped topping (dehydrated)

Soft custard

Colorful jam or jelly

Fruit sauce made from strawberries, raspberries, cherries, pineapple, oranges, apricots

Lemon sauce, plain or spiced

Orange sauce, plain or spiced

Hard sauce

Puddings may be served hot or cold and with hot or cold sauces. Puddings thought to be especially good served warm or hot are:

Steamed burnt sugar pudding

Apple Betty pudding

Fudge pudding

Mocha pudding

1804-d—INSTANT PUDDINGS—These are flavored starch desserts which can be prepared instantly with the addition of milk. Instant dessert powders are available in chocolate, vanilla, and butterscotch flavors. In addition to flavoring materials, the powders contain sugar, starch, salt, setting or gelling agents, coloring material, emulsifiers, powdered shortening, and nonfat dry milk.

These instant dessert powders will not only find use as a pudding but may be used as pie fillings, or as a filler in such recipes as Washington or Boston cream pie.

Directions for Use

(One 32-oz container yields forty 4-oz servings)

1. Pour 1 gal of cold milk (fresh fluid, rehydrated whole or nonfat, or diluted evaporated) into a mixer bowl.

2. Weigh or measure the following quantities of dessert powders and add to the milk:

2 1/4 lb or 1 3/4 qt chocolate flavored dessert powder or

2 lb or 1 1/2 qt if using vanilla or butterscotch powder

3. Whip on low speed until milk is dampened (about 15 seconds) or mix by hand, using a wire whip. Scrape down sides and bottom of bowl. Continue whipping (use medium speed on mechanical mixer) for 2 to 3 minutes or until pudding is smooth.

4. Pour into shallow pans or individual serving dishes. Pudding will firm in about 15 minutes. It should be served cold.

1805—ICE CREAM

Ice cream is eaten in liberal quantities in the Navy general mess. The procurement of prepared mixes, ready to freeze when reconstituted with water, greatly simplifies the production of ice cream. These mixes are scientifically blended to obtain an end product of optimum flavor, texture, and body.

The basic recipe for using commercial ice cream mixes in the Navy-Marine Corps Recipe Service may be varied to include nine additional flavors.

In addition, commercially prepared ice cream is procured where local production of ice cream is not feasible.

1805-a—ICE CREAM COMPOSITION—Ice cream procured already frozen contains butter-

fat, milk solids, sugar, flavoring, and a small amount of gelatin. Ice cream may or may not contain egg. Ingredients are used in proportions according to the standards established by laws which specify that the fat used in cream must be butterfat derived from milk. The amount of milk solids (expressed as serum solids or nonfat milk solids) and the amount of air incorporated into the ice cream mixture is controlled by law in many states. Additional requirements imposed include minimum weight per gallon, or a minimum weight of food solids per gallon, or a minimum volume.

1805-a(1)—Commercial Ice Cream—The factors most essential in obtaining a satisfactory commercial ice cream product are included in a Federal specification on which military procurements are based. Commercial ice cream authorized for the Navy general mess must contain not less than 10 percent milk fat if of plain flavor and 8 percent milk fat for flavors including chocolate, fruit, nuts, or other materials. The Federal specification also expresses minimum weight per gallon and food solids per gallon for finished ice cream:

Class	Weight Per Gallon (Pounds)	Food Solids Per Gallon (Pounds)
1	4.5	1.6
2	4.9	1.7
3	5.1	1.8
4	5.4	1.9

The milk fat (or butterfat) content of the ice cream is a chief factor in ice cream flavor; it also improves body, or firmness. Texture, or smoothness of the ice cream, is affected by the amount of fat present because this is related to the amount of air that can be incorporated. Eggs, if present, also contribute to air incorporation.

Milk solids also improve ice cream body and texture. Sugar is used as a sweetening agent. Commercial ice cream usually contains 14-16 percent sugar. Too much sugar affects the rate

of freezing. Irish moss or vegetable stabilizers are the most commonly used in commercial ice cream; stabilizers prevent ice cream from losing shape while melting. Most commercial ice cream is produced from a mix.

In addition to State regulations governing what goes into commercial ice cream, there are many regulations imposed for health, safety, and sanitation control. Chief among these controls is pasteurization. Since ice cream contains milk, it is highly subject to contamination. Freezing does not kill the bacteria and micro-organisms that may enter ice cream via contaminated equipment and ingredients.

Improper frozen storage, too, may contribute to contamination of ice cream. Most commercial ice creams are hardened after freezing, or aged at -20° F to -30° F. The ideal serving temperature is about 8° F, so ice cream should be stored at 0° F or below. Ice cream should be dispensed in as sanitary a manner as possible.

1805-a(2)—Prepared Ice Cream Mixes—Navy general messes prepare ice cream from two types of ice cream mix, dehydrated (or powdered) and paste.

These prepared mixes are composed of milk (raw whole or nonfat); butterfat (cream, or churned fat, or anhydrous milk fat); modified milk product (fluid or powdered); sweetening agent; flavoring; stabilizers; eggs; and salt. These are combined into a formula which, when reconstituted and frozen, gives an ice cream containing approximately 10.6 percent butterfat and, if properly frozen and whipped, will yield 100 percent overrun. Overrun, or swell, of ice cream refers to its increase in volume which results from beating air into it during freezing.

These mixes offer many advantages to the Navy general mess because they are—

1. a convenient, ready source of ice cream;
2. of uniform quality;
3. sanitary (pasteurized);

4. storage space saving over ready prepared commercial ice cream;
5. laborsaving and timesaving;
6. require minimum skill to obtain successful products.

1805-b—ICE CREAM PRODUCTION—The processes of making ice cream are the same

when using the dehydrated and paste mixes. There are differences in reconstitution ratios and in flavoring.

1805-b(1)—Reconstituting the Mixes—Ice cream mix is reconstituted in these ratios:

	Mix		Water Measure (Quarts)	Vanilla		Yield	
	Weight (Pounds)	Measure		Weight (Ounces)	Measure (Cup)	Volume (Gallons)	Portions (3/4 cup)
Powder.....	4 1/4	Varies...	3 1/2	4	1/2	2 1/2	50
Paste.....	12 1/2	5 qt.....	5	.....	.....	5	100

Tips on Reconstituting the Mix

1. **CONTAINER.** Select one that is large enough to allow for mixing the mixes and water thoroughly with wire or electric whip.

2. **WATER.** Measure or weigh accurately. Place water in container BEFORE adding powder or paste. The temperature of the water is important. NEVER ADD WARM WATER. Freezing of mix will proceed more rapidly if water used for reconstitution is 40°-70° F.

3. **MIXES.** These will go into solution readily. Pour powder on top of water SLOWLY and stir thoroughly to dissolve the mixes into a solution. Make certain that all lumps are dissolved. Reconstitution may continue during freezing, but DO NOT OVERWHIP the mix while reconstituting so that volume is gained prior to freezing.

Refrigeration of reconstituted mix may be necessary to reduce the temperature of the mix to 40° F. Whipping will increase temperature.

1805-b(2)—Freezing—Ice cream freezers used in the Navy general mess are usually a batch type with a 2 1/2-gal capacity. The output of a batch-type freezer will vary with the sharpness of

the blades, refrigeration supplied, and the overrun desired.

Ice cream for the Navy general mess should be drawn from the freezer at 100 percent overrun, at a temperature of 24°-25° F. Refrigerant temperature around the freezer cylinder should register about -15° F. Generally, the average batch-type freezer would have an output of eight batches per hour, figuring on the basis of this schedule:

Freezing time..... 3 to 4 minutes.
Whipping time..... 2 to 3 minutes.
Empty freezer and refill..... 1 minute.

Make sure the batch size going into the freezer is of the right size. To illustrate, a 2 1/2-gal freezer has an actual volumetric capacity of 3 gal. If the volume is to double during freezing, 2 1/2 gal of reconstituted mix should go into the freezer. This quantity can be adjusted slightly if the freezing rate cannot be controlled. (See illustration 1, pps. D18-10 and D18-11.)

Continuous-type freezers are being used in the Navy general mess more and more. This type of freezer may be a model to produce either hard or soft ice cream. Ice cream mix

formulas (either powder or paste) must be adjusted for use in soft ice cream machines. Activities faced with the problem of using regular mix in soft ice cream machines can solve it readily by the simple addition of standard stock gelatin to the paste mix. The stability of the resulting product compares favorably with ice cream aged in hardening cabinets.

Using the ratio of 12.5 lb mix to 5 qt water, soft ice cream is made by following these directions:

1. Heat to boiling 2 of the total 5 qt of water.
2. Add 1 to 1½ oz of plain gelatin and dis-

solve; add the remaining 3 qt of water and mix thoroughly.

3. Add to the ice cream paste and thoroughly chill the ice cream mix.
4. Adjust the freezer so that the temperature of the dispensed ice cream is approximately 20° F. The quantity of plain gelatin used will depend upon the melt-down time desired. For example, if the trays or plates are warm and the ambient temperature is in excess of 80° F, 1½ oz of gelatin should be used.

Using dehydrated ice cream powder, with instant dessert powder as a stabilizer, the following formula can be used in soft ice cream machines:

SOFT SERVE ICE CREAM (using dehydrated instant mix)

YIELD: 100 Portions

Ingredients	Weight	Measure	Method
Dessert powder, instant...	1½ lb....	.....	1. Pour water into container. Slowly add dessert powder. Beat on low speed until smooth, approximately 2 minutes.
Water (40° to 70° F).....	.....	6 qt.....	2. Add ice cream mix to pudding; continue to beat on low speed until well blended, or use wire whip.
Ice cream mix, dehydrated.	.....	2 No. 10 cans.	3. Add water to above mix. Rewhip.
Water (40° to 70° F).....	.....	6 qt.....	

VARIATIONS

In variation 1, 2, and 4, add flavoring agent just prior to freezing time.

1. **VANILLA SOFT ICE CREAM:** In step 1, use vanilla instant dessert powder. Add 12 oz (1½ cups) vanilla flavoring.

2. **CHERRY DELIGHT SOFT ICE CREAM:** In step 1, use vanilla instant dessert powder. Add 8 oz (1 cup) vanilla flavoring, and 5 oz (10 tbsp) cherry beverage base.

3. **COFFEE SOFT ICE CREAM:** In step 1, NOTE.—1. When filling the machine pour only enough of the mixture into the machine to fill the freezer. Cycle the machine once before filling the reservoir.

use vanilla instant dessert powder; use 2 qt water and 4 qt chilled freshly brewed coffee. In step 2, use 6 qt chilled coffee in lieu of water.

4. **CHOCOLATE SOFT ICE CREAM:** In step 1, use chocolate instant dessert powder. Combine ½ cup cocoa with 1 qt water; bring to a boil and simmer 5 minutes. Cool; add 6 oz (¾ cup) vanilla. Add to basic mixture in step 2; add 5 qt water.

2. The chilled mixture should be stirred before being poured into the freezer and stirred frequently during the process to prevent "settling" or separation.



Step 1—Pour water in mixing container. Add mix to water. Stir thoroughly with wire whip.



Step 3—Draw off test sample.



Step 2—Pour reconstituted mix into freezer.



Step 4—Weigh test sample to determine proper volume or 100 percent overrun.

Illustration 1
Steps in Making Ice Cream Using Mixes