



Sugar Techniques

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AFTER READING THIS CHAPTER, YOU SHOULD BE ABLE TO:

1. Boil sugar syrups correctly for decorative sugar work.
2. Make spun sugar, sugar cages, and poured sugar.
3. Pull sugar and use it to make simple pulled- and blown-sugar decorative items.
4. Prepare basic boiled-sugar confections.



MANY PASTRY CHEFS consider sugar work the pinnacle of their decorative art. One reason is surely the sheer beauty of skillfully made pulled- and blown-sugar pieces, which can be elaborate constructions of multicolored sugar flowers in blown-sugar vases, large sprays of sugar flowers cascading down the sides of a wedding cake, or sugar baskets filled with sugar fruit and set on sugar pedestals wrapped with sugar ribbons and bows.

Another reason, no doubt, is the difficulty of decorative sugar work. Becoming proficient at this art requires dedication and hours, even years, of practice and study, and chefs who have mastered it well deserve the respect their accomplishment brings them. Students are often irresistibly drawn to the challenge of learning these techniques when they see the results that are possible.

This chapter is an introduction to sugar work, beginning with the simpler techniques for making spun sugar and sugar cages, and proceeding to the more difficult procedures for preparing pulled and blown sugar. Later in the chapter, isomalt, a modern alternative to sugar for decorative work, is introduced. The chapter concludes with an introduction to confections based on boiled sugar.

BOILING SYRUPS FOR SUGAR WORK

IN CHAPTER 12, we explained the process of boiling sugar syrups for use in various desserts. When syrups are boiled until nearly all the water has evaporated, the sugar becomes solid when it cools. This process enables us to make decorative pieces out of sugar that is boiled to 300°F (149°C) or more and shaped while still hot.

As you learned in Chapter 4 (p. 66), sugar that is boiled in a syrup containing an acid undergoes a chemical change called *inversion*, in which a molecule of double sugar (sucrose) combines with a molecule of water and changes into two molecules of simple sugar (dextrose and levulose). Invert sugar, you remember, resists crystallization, and plain sucrose (granulated sugar) crystallizes easily. The amount of sugar that is inverted depends on the amount of acid present. This principle is used in the production of fondant icing (p. 420): Just enough cream of tartar or glucose is added to the syrup to create a mass of extremely fine sugar crystals that give fondant its pure white color.

This technique is also used for the sugar work discussed in this section, especially in pulled sugar. If too much cream of tartar or glucose is used, too much sugar is inverted, resulting in sugar that is too soft and sticky to work and that doesn't harden enough when cool. If not enough cream of tartar or glucose is used, too little sugar is inverted and the sugar is hard, making it difficult to work and easily broken.

As long as it is kept within limits, the exact amount of tartar or glucose to be used depends largely on the preferences of the pastry chef or confectioner. Some artists prefer to work with a harder sugar, while others prefer a softer one. Consequently, you will see many formula variations. Your instructor may have his or her own favorite to substitute for those in this book.

The temperature to which syrup is boiled is also important. The higher the temperature, the harder the sugar will be. The temperature range recommended in this book is 311° to 320°F (155° to 160°C), and the actual temperature used for the pulled and blown sugar items shown in the illustrations was 320°F (160°C). Nevertheless, you may see slightly different temperatures used in other books, because all chefs have their own preferred procedures.

Cooking the sugar to a higher temperature makes it harder and more brittle and thus more difficult to work. Cooking to a lower temperature makes a softer sugar that is easier to work, but the pieces may not hold up as well, especially in a humid climate. Inexperienced cooks may want to start with temperatures at the lower end of the range, and not worry about the keeping qualities of their pieces until they develop greater proficiency with sugar work.

Two more precautions are necessary regarding temperature and the addition of tartaric acid (cream of tartar). First, boiled invert sugar discolors more rapidly than pure sucrose. Therefore, the acid should not be added until near the end of the boiling process. In the recipes in this book, the tartaric acid is not added to the syrup until it has reached 275°F (135°C). Second, the syrup should be boiled rapidly over moderately high heat. Boiling slowly gives the syrup more time to discolor, and it will not be clear white.

If color is added to the syrup during boiling (for poured or pulled sugar), it should be added partway through the cooking, at about 260°F (125°C). If it is added earlier, it has more time to discolor, but it must be added early enough to allow the alcohol or water to cook off.

Slightly different syrups are used for each of the techniques in this chapter. Follow the specific recipes in each section, keeping these guidelines in mind:

1. Use pure white granulated cane sugar. Sift the sugar to remove any impurities that may have fallen into it during storage.
2. Place the sugar and water in a clean, heavy pan. Set the mixture over low heat and stir gently until the sugar is dissolved.

3. When the sugar is dissolved, raise the heat to moderately high and do not stir any more. To prevent crystallization, use a clean pastry brush dipped in hot water to wash any sugar crystals down the side of the pan. *Do not let the brush touch the syrup.*
4. Always use a sugar thermometer.
5. Add coloring and tartaric acid solution at the temperatures specified in the recipes.
6. Do not use liquid colors in an acid solution. For best results, use powdered colors and dissolve them in a little water or alcohol. Good-quality paste colors may also be used.

SPUN SUGAR AND CARAMEL DECORATIONS

Spun Sugar

Spun sugar is a mass of threadlike or hairlike strands of sugar used to decorate cakes and showpieces. Gâteau St-Honoré (p. 364) is often decorated with spun sugar.

Spun sugar should be made just before it is needed because it does not keep well. It gradually absorbs moisture from the atmosphere and becomes sticky. Eventually, this absorbed moisture causes the sugar to dissolve.

Prepare a workstation by propping a lightly oiled wooden rod or rolling pin on the edge of a table so it projects horizontally beyond the edge of the table by 1 to 2 feet (30–60 cm). Spread plenty of paper on the floor below to catch drippings. To spin the sugar, you will need a wire whip with the ends cut off.



Tools for sugar work. Top: sugar lamp. Bottom, left to right: sugar thermometer, rubber gloves, leaf molds, blowpipe, cutoff wire whip for spun sugar.

PROCEDURE: Making Spun Sugar

1. Prepare the syrup as in the formula on page 674. When the correct temperature is reached, remove the pan from the heat and allow the syrup to stand for a few minutes until it is slightly cooled and thickened.
2. Dip the cutoff wire whip in the syrup and tap lightly to remove excess. Wave or flick the whip vigorously over the wooden rod so the sugar is thrown off in fine, long threads.



3. Repeat until the desired amount of spun sugar is hanging from the rod. Carefully lift the mass from the rod.



4. Coil the sugar, or shape as desired for decoration.



5. If the syrup cools too much to spin, simply rewarm it over low heat.

Caramel Cages and Other Shapes

Sugar cages are delicate, lacy sugar domes made of caramelized sugar. Their decorative effect can be impressive and elegant. Sugar cages can be made large enough to cover whole cakes, bombes, Bavarian creams, and other desserts, or small enough to decorate individual portions.

Bowls of the desired size can be used as molds for large cages. Ladles are usually used for small, single-portion cages. Lightly oil the bottom of the ladle or other mold so the sugar can be removed when it is hard.

PROCEDURE: Making Caramel Cages

1. Prepare a syrup as in the formula on page 674. Testing with a sugar thermometer is the most accurate way to determine the stage of the boiled syrup.



2. Cool the syrup slightly. Holding the mold in one hand, dip a spoon in the sugar and drizzle it in a random, lacy pattern over the mold, turning the mold so all sides receive some of the syrup.



3. Trim off excess, let the sugar cool until hard, and carefully lift off.



Other shapes can be made by piping or drizzling the sugar onto a silicone mat or oiled work surface. To create fine, even lines of sugar, use a paper cone, as described in the formula procedure. Wear rubber gloves to protect your hands from the heat. For a rougher or more casual look, dip a spoon in the sugar and drizzle it onto the mat. The caramel shape decorating the panna cotta dessert pictured on page 615 was made this way.

Sugar spirals make elegant garnishes for some plated desserts. These are made using the Procedure for Making a Sugar Spiral.

PROCEDURE: Making a Sugar Spiral

1. Prepare a syrup as for making caramel cages (p. 674).
2. Wind a strand of hot syrup around a lightly oiled pencil or thin wooden rod.
3. Slip the spiral off the pencil when the sugar has hardened.



SPUN SUGAR

Yield: about 12 oz (360 g)

Ingredients	U.S.	Metric	Sugar at 100%	PROCEDURE
			%	
Sugar	10 oz	300 g	100	<ol style="list-style-type: none"> 1. Make a syrup of the sugar, water, and glucose. See page 256 for guidelines on cooking sugar syrups. 2. Boil to 255°F (125°C); add coloring, if desired. 3. Continue to boil to 320°F (160°C), and then stop the cooking immediately by plunging the base of the pan into cold water. Remove from the cold water and allow to stand 2–3 minutes to thicken slightly. 4. Lightly oil a rolling pin or metal pole and suspend it horizontally. Place sheets of paper on the floor under the pole to catch drips. 5. Dip a cutoff wire whip in the syrup and flick it over the pole, as in the illustrations. Continue until the desired quantity is made. 6. Lift the spun sugar from the pole and shape as desired.
Water	5 oz	150 g	50	
Glucose	2 oz	60 g	20	
Coloring, if desired				

CARNIVAL TREAT

Cotton candy, the popular circus and carnival treat, is nothing more than spun sugar made from a flavored, colored syrup. The syrup is forced through tiny holes in a spinning head that flings the fine threads of sugar against the sides of a bowl, where it is wound around a paper cone. The amount of sugar in an entire portion of cotton candy is usually less than 1 ounce (30 g).

CARAMEL FOR CAGES AND OTHER SHAPES

Yield: about 10 oz (300 g)

Ingredients	U.S.	Metric	Sugar at 100%	PROCEDURE
			%	
Sugar	10 oz	300 g	100	<ol style="list-style-type: none"> 1. Make a syrup of the sugar, water, and glucose. See page 256 for guidelines on cooking sugar syrups. 2. Boil to 320°F (160°C), then stop the cooking immediately by plunging the base of the pan into cold water. Remove from the cold water and allow to stand 2–3 minutes to thicken slightly. 3. Wear rubber gloves to protect your hands from the hot syrup. Pour the syrup into a paper cone. Snip off the tip and pipe desired shapes onto a silicone mat or oiled work surface. Allow to cool. Remove and store in an airtight container until use. 4. For cages, lightly oil the bottom of a ladle. Dip a spoon in the syrup (or, for more delicate sugar, dip the point of a knife in the syrup) and drizzle it in a lace pattern over the bottom of the ladle. Trim off excess with scissors. Let stand 2 minutes then carefully lift off.
Water	10 oz	300 g	100	
Glucose	1.33 oz	40 g	13	

POURED SUGAR

Poured sugar, also called *cast sugar*, is boiled sugar that is allowed to harden in various shapes. Usually it is cast in flat sheets like glass, although, like nougatine, it can be bent and shaped while it is hot and pliable. The syrup can also be colored before it finishes cooking.

There are several ways of preparing molds for casting the sugar. For round shapes, simply use a flan ring or charlotte ring. Metal molds in other shapes (like large cookie cutters) can also be used. For other shapes, bend a strip of metal into the desired shape. An easy way to make a mold of any shape is to roll heat-resistant plasticine (a type of modeling clay) into a rope and work it to the desired shape on an oiled marble slab or silicone mat. Whatever mold you use, it should be lightly oiled to prevent the sugar from sticking.

Once the edges of the sugar shape have hardened enough, remove the mold. When the entire shape has hardened enough, slide a palette knife under it to detach it from the work surface. (This is not necessary if you are using a silicone mat, which will peel away easily.)

To bend cast sugar, remove it from the work surface while it is still soft enough to be pliable. If it gets too hard, simply place it on an oiled baking sheet and heat it in an oven just until it is pliable. Then bend as desired, or use an oiled mold to shape it as you would nougatine (p. 664).

Another item that can be made simply by pouring sugar onto a surface is sugar lace. Sugar lace can be seen in the display piece pictured on page 682. The base of this piece is made with poured sugar.

PROCEDURE: Pouring Sugar

1. Prepare the syrup as in the formula on page 676. Color the syrup as desired, as indicated in the formula.
2. When the syrup reaches the proper temperature, briefly plunge the base of the saucepan into cold water to stop the cooking. Let stand for a moment.
3. Place a lightly oiled mold on a sheet of parchment. Pour the hot syrup—in this case, colored black—into the mold to the desired thickness.
4. Before the sugar cools, you can marble it with another color—here, a little white coloring.



PROCEDURE: Making Sugar Lace

1. Pour a small pool of boiled sugar onto a square of silicone paper.



2. With a palette knife, quickly spread it to a thin layer.



3. Before the sugar hardens, crinkle the paper to shape the sugar.



ISOMALT

Isomalt is a sugar substitute chemically derived from regular sugar (sucrose). It can be melted or boiled and worked in many of the same ways as regular sugar. Although it is significantly more expensive than sugar, many pastry chefs prefer it for certain kinds of decorative work. (More information on working with isomalt is on page 684).



KEY POINTS TO REVIEW

- What steps are taken to boil syrups correctly and avoid crystallization?
- What is the procedure for making spun sugar?
- What is the procedure for making caramel cages?
- What is the procedure for making poured or cast sugar?

POURED SUGAR

Yield: about 2 lb 6 oz (1200 g)

Ingredients	U.S.	Metric	Sugar at 100%
			%
Sugar	2 lb	1000 g	100
Water	1 lb	500 g	50
Glucose	6.5 oz	200 g	20
Coloring, as desired			

PROCEDURE

1. Prepare molds of the desired shape: Brush metal rings with oil, or roll heat-resistant plasticine to the desired shape, then brush it with oil. Place the molds on a silicone mat or an oiled or parchment-covered marble slab.
2. Make a syrup of the sugar, water, and glucose. See page 256 for guidelines on cooking sugar syrups.
3. Boil to 255°F (125°C); add coloring, if desired.
4. Continue to boil to 330°F (165°C). If desired, add a few drops of another color at this point without mixing to create a marbled effect.
5. Stop the cooking immediately by plunging the base of the pan into cold water. Remove from the cold water and allow to stand 2–3 minutes to thicken slightly.
6. Pour into desired mold until approximately ¼ in. (5 mm) thick.
7. Once the edges have set enough, remove the rings. Score lightly with an oiled knife, if desired.
8. Use a little reheated sugar as glue to attach pieces together.

PULLED SUGAR AND BLOWN SUGAR

Pulled sugar and *blown sugar* are, perhaps, the most difficult of the pastry chef's decorative art forms. This section outlines the basic procedure for making pulled sugar. Several techniques for making ribbons, flowers, leaves, and blown fruits are illustrated in detail, and a number of other techniques are explained in the text.

Before beginning work, assemble your equipment. The following tools are the most important items you will need, depending on which pieces you are making:

- Sugar thermometer, for accurate control of the temperature of the boiling syrup.
- Sugar lamp or other warmer, to keep the stock of sugar warm and soft. (See the Sugar Lamp sidebar on page 679.)
- Scissors and knife, lightly oiled, for cutting the sugar.
- Alcohol lamp, for melting sugar to fasten pieces together.
- Blowpipe, for blowing sugar. A pipe with a bulb for inflating is easier to use than one that is blown with the mouth.
- Silicone mat or oiled marble slab, for pouring out the cooked syrup.
- Fan or hair dryer, for cooling sugar items.
- Rubber gloves, to protect from burns when handling hot sugar (some experienced chefs prefer to work without gloves).

Prepare the syrup according to the formula below. Note the need for liquid tartaric acid, which is a solution of equal weights of cream of tartar and water, prepared as indicated in the recipe.

Once the pulled sugar is prepared, it can be used at once or cooled and stored in an airtight container for later use. To use stored sugar for pulled or blown items, first reheat it under a sugar lamp (warming lamp) or in an oven preheated to 170°F (75°C). Turn the lumps of sugar over from time to time so they warm evenly. This is particularly important when using a sugar lamp and should be done regularly the entire time you are working with the sugar, because the heat comes only from above.

After it has been heated to the proper temperature, the sugar must again be pulled and folded as in step 7 of the formula below until it is cooled to a workable temperature and is even in texture. Test the sugar by pulling a bit from the edge of the ball with your thumb and forefinger and attempting to break it off. If it breaks off cleanly, the sugar is ready. This pulling and folding procedure is sometimes called *pearling* because of the pearl-like appearance it gives the sugar. This appearance is caused by the incorporation of air in the sugar structure during the pulling. For this reason, another common name for pearling is *aerating*. If this process is not followed, it will not be possible to work the sugar properly.

GOING TO THE NEXT LEVEL

Success at advanced decorative work requires not only good instruction but also a great deal of practice and repetition. Many of the most commonly used sugar techniques are explained and illustrated in this chapter. Doing these procedures only once or twice, however, will not make you an accomplished *décorateur* (a pastry chef specializing in or skilled at decorative work). To develop your sugar skills, it is suggested that you practice the techniques in this chapter repeatedly until you are comfortable with them.

Once you have gained some mastery over the basic techniques, you will have skills that will enable you to produce a wide variety of décor. At that point, you might want to consult books on more advanced decorative work, some of which are listed in the Bibliography (p. 755). As you will see, the variety of shapes you can make with sugar is limited only by your own imagination and skill.

PULLED SUGAR AND BLOWN SUGAR

Yield: about 2 lb 6 oz (1200 g)

Ingredients	U.S.	Metric	Sugar at 100% %	PROCEDURE
Sugar	2 lb	1000 g	100	
Water	9.5 oz	300 g	30	
Glucose	6.5 oz	200 g	20	
Color	as desired	as desired		
Tartaric acid solution (see <i>Note</i>)	8 drops	8 drops		
NOTE: To prepare tartaric acid solution, use equal weights of cream of tartar and water. Bring the water to a boil, remove from the heat, and add the cream of tartar. Let cool.				<ol style="list-style-type: none"> 1. Make a syrup of the sugar, water, and glucose. See page 256 for guidelines on cooking sugar syrups. 2. Boil to 255°F (125°C); add coloring, if desired. (Color can also be added when the sugar is poured out in step 5.) 3. Continue to boil to 275°F (135°C) and add the tartaric acid. 4. Continue boiling. When the temperature reaches 320°F (160°C), or whatever final temperature is desired (see p. 670), stop the cooking immediately by plunging the base of the pan into cold water. Remove from the cold water and allow to stand 2–3 minutes to thicken slightly. 5. Pour out onto a silicone mat or oiled marble slab. If color was not added in step 2, you can add it now, as on page 679. 6. Let cool slightly; but before the sugar begins to harden around the outside edges, fold the edges into the center. Repeat until the sugar mass can be picked up off the table. 7. Begin stretching the sugar and folding it back onto itself. Repeat until the mixture is cooler and makes a faint crackling or clicking sound when pulled. Do not attempt to pull the sugar when it becomes too cool, as it could start to crystallize. Cut the sugar into smaller pieces with scissors and then place under a sugar lamp to keep them at workable temperature. Pull and fold the pieces one at a time so they will have a uniform texture and temperature. The sugar will take on a silky or pearly appearance after about 12 to 20 folds. Do not pull too much, or the sugar will lose this pearly appearance and become less shiny. 8. The sugar is now ready to be shaped into blown or pulled sugar decorations.

Ribbons

A sugar ribbon of a single color is made simply by pulling a piece of sugar out into a thin ribbon shape. This sounds easy, but making a thin, delicate strip of perfectly even thickness and width takes a great deal of practice and skill. Be sure the piece of sugar is uniformly warm and that all parts of the strip stretch the same amount.

To make a two-colored ribbon, start with two pieces of sugar in contrasting colors. Shape them into strips of the same size and shape. Press them together side by side, then stretch them into a ribbon. For multiple stripes, cut the two-colored strip in half when it is partly stretched. Lay the two pieces side by side so you have four alternating stripes. Finish stretching them into a ribbon shape. (You can produce a ribbon of three or more colors with the same technique.)

To make a bow, cut off a length of ribbon with scissors and bend it into a loop. Cool the loop in front of a fan so it holds its shape. Make as many loops as desired. Fasten them into a bow by heating one end of each loop over a gas flame to soften the sugar, and then pressing the heated ends together.

PROCEDURE: Making Pulled Sugar

1. Pour the cooked sugar onto a silicone mat.



2. If a color is desired and was not added during cooking, add the color now with an eyedropper.



3. As the sugar cools, fold the edges toward the center so it cools evenly.



4. When the color is blended in, pick up the mass of sugar and begin to stretch and fold it.



5. Pull and fold the sugar until it has a silky or pearly appearance and makes a faint clicking sound when stretched.



6. Store the lumps of sugar under the sugar lamp as you work them in order to keep them at the proper temperature.



SUGAR LAMP

A sugar lamp is simply a fixture for an infrared heat bulb, usually 250 watts. The bulb housing is on a long, flexible neck, which enables the pastry chef to adjust the distance between the heat source and the sugar when it is on a silicone mat.



To be workable, sugar for pulling or blowing must be warm enough to be pliable, generally around 100° to 130°F (38° to 55°C) for pulling, and as high as 175°F (80°C) for blowing, depending in part on the preference of the chef. Because the heat lamp warms the sugar mostly from the top, the sugar must be turned and folded to warm it uniformly.

Let the lump of sugar rest under the lamp until the surface is shiny and almost liquid in appearance. Then pull the sugar gently into an oblong shape and fold the ends over so they meet in the middle. (Alternatively, simply fold it in half.) Take care not to trap air bubbles between the layers of sugar. Repeat several times until the sugar is uniformly warmed and soft.

As you work with one piece of sugar to create decorative items, repeatedly turn over the remaining lumps of sugar under the lamp so they stay uniformly heated and soft.

PROCEDURE: Making Pulled Sugar Ribbons

1. Make equal-size ropes of the selected colors and place them side by side under the sugar lamp.



2. Pull or stretch to begin to form the ribbon.



3. Fold the ribbon so the two ends are side by side; snip in half with oiled scissors.



4. Repeat this pulling and doubling procedure until you have a ribbon of the desired pattern and width.



5. Before the sugar hardens, bend it into folds to resemble a slightly crinkled ribbon.



6. Snip the ribbon into desired lengths with lightly oiled scissors.



Flowers and Leaves

The basic techniques for making simple flowers are detailed in the Procedure for Making a Pulled Sugar Lily (p. 681), which illustrates the production of both a lily and a leaf. Note the mold used to mark the veins in the leaf. If such a mold is not available, you can mark the pattern of veins using the back of a knife.

Another popular flower to make with pulled sugar is, of course, the rose. Rose petals are made by following the same basic technique as for lily petals, except the petal is pulled into a round shape, rather than stretched into a long form. Roll the first petal into a tight cone shape. Then curl additional petals around the center cone, just as you would for a marzipan rose (p. 659). Make the outer petals a little larger than the inner ones, and curl back the edges to resemble real rose petals.

An alternative method is to make all the petals first without assembling them. Then heat the bottom edges of the petals over the flame of an alcohol lamp so they stick together, and assemble them to make the flower.

To make a stem that will support the weight of a flower, draw a strong piece of wire through warm pulled sugar until it is completely coated. While the sugar is still soft, bend the covered wire to the desired shape.

PROCEDURE: Making a Pulled Sugar Lily

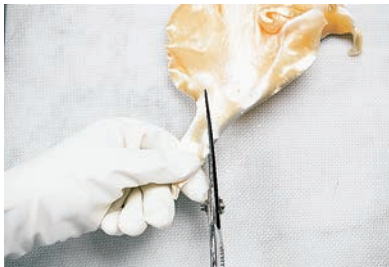
1. Stretch one side of a ball of pulled sugar to make a thin edge.



2. Grasp this thin edge and pull outward to make a pointed petal.



3. Snip off the petal with oiled scissors. Repeat to make additional petals.



4. Attach the petals together into the shape of a lily.



5. For the inside of the flower, stretch pulled sugar into thin strands.



6. Fold two pieces of these sugar strands, as shown, and insert in the flower.



7. To make leaves, pull sugar as for the petals, but make the pieces wider to resemble leaves.



8. Lay the leaf pieces on one half of a leaf mold.



9. Press the piece of sugar with the other half of the mold to give it the texture of a leaf. The finished flowers are shown on page 682.



Simple Baskets

To create a simple basket, roll out a piece of pulled sugar with a rolling pin into a thin sheet. Mold it over an oiled bowl or large tin can, just as you would shape nougatine. You can also attach a handle.

Woven Baskets

A woven pulled-sugar basket filled with pulled-sugar flowers or fruit is one of the most impressive of all display pieces. To make the basket, you need a base board into which an uneven number of holes has been drilled. The holes should be evenly spaced and should form a circle, oval, or square. In addition, you need wooden pegs that fit loosely into these holes. The holes should be drilled at an angle so the pegs tilt outward. This makes the basket wider at the top than at the bottom.

Before weaving the basket, oil the pegs and board lightly. Then take a ball of soft pulled sugar and start to pull a rope or cord of sugar from the ball. Starting at the inside edge of one of the pegs, weave the sugar cords in and out around the pegs, pulling out more of the sugar as you go. Be careful to keep the thickness of the cord uniform. Continue weaving the sugar around the pegs until the basket is as high as desired.

Now make pulled sugar rods the same size and number as the wooden pegs. One by one, pull out the pegs and replace them with the pulled sugar rods. If necessary, trim the tops of the rods with a hot knife or scissors.

Next, shape a base for the basket using poured sugar (p. 675) or pulled sugar rolled out with a rolling pin. Attach it to the basket with hot boiled syrup.

To finish off the top and bottom edges, twist two cords of pulled sugar together to make a rope. Coil the rope around the top and bottom edges of the basket and seal the ends together. Make a handle for the basket by shaping heavy wire and then weaving a rope of sugar around it.



Parts of the sugar display piece before assembly.

Blown Sugar

Hollow sugar fruits and other items are blown from pulled sugar in much the same way glass is blown. Traditionally, sugar was blown with the mouth, using a length of tube, and many chefs still prefer this method. Today, however, the use of a blowpipe inflated with a squeeze bulb (see p. 671) has become common and makes the work a little easier. Especially for the beginner, this type of blowpipe is easier to control than a tube blown with the mouth.

The shape of the sugar piece depends on how it is manipulated and supported with the hands and on how it is cooled or warmed. To make round objects, such as apples, hold the blowpipe and sugar upward at an angle, so the weight of the sugar does not cause it to elongate. For long, thin objects such as bananas, stretch the sugar gently as you blow.

If the sugar on one side becomes too thin, cool that side slightly with a fan until it hardens. By watching demonstrations and practicing, you can learn to control the temperature of the piece on all sides in order to shape it as you want. The best sugar pieces have a thin, delicate wall of sugar that is of even thickness all around.

More complex pieces, such as animals, birds, and fish, can be made with practice. For example, to make a long-necked bird, first blow the sugar into the shape of a vase and then stretch out the neck to form the long neck of the bird. An animal's head and body may be blown separately and attached. Parts such as wings and fins are made separately from pulled sugar.

When the blown sugar has hardened, add more coloring to make fruit look more realistic. If the pieces were blown from colored pulled sugar, you may need to add only a few highlights and markings with an artist's brush. An alternative method is to use uncolored sugar for blowing and

then a sprayer for adding layers of color to give a more blended effect. When done skillfully, this can give the fruit a more natural look. For spraying, dissolve powdered color in alcohol. If a dull rather than a shiny surface is appropriate for the item, dust the finished piece with cornstarch.

The Procedure for Blowing Sugar illustrates the major steps in making blown-sugar fruits.



Finished sugar display piece.

PROCEDURE: Blowing Sugar

1. Make a depression in a lump of hot pulled sugar and insert the end of the blowpipe.



2. Press the sugar firmly around the pipe to seal.



3. For a pear, inflate the bulb of sugar slowly, shaping the fruit as it is blown up.



4. Continue to inflate the sugar, shaping it with the fingers. When the desired shape and size are achieved, harden the sugar by cooling it with a fan.



5. Heat the neck of the pipe over a flame and detach the pear from the pipe. Mold the stem end with the fingers.



6. Mold other fruit in a similar fashion, such as bananas . . .



7. . . . and apples.



8. These finished fruits have been colored with a sprayer (see p. 657) and highlighted with a small paintbrush.



KEY POINTS TO REVIEW

- What is the procedure for making pulled sugar and preparing it for use in making pulled- and blown-sugar items?
- What techniques are used to make ribbons, flowers, and leaves from pulled sugar?
- What is the basic procedure for blowing sugar?

Working with Isomalt

As noted in the Isomalt sidebar (p. 676), this product has become popular with pastry chefs as a substitute for sugar in poured, pulled, and blown sugar pieces. Isomalt has less of a tendency to absorb moisture from the air, so finished work made with it lasts longer and stays drier. In addition, it is less likely to crystallize, so it stays clearer than sugar. Cast sugar pieces made with isomalt can be as clear as glass. In fact, when using isomalt it is not necessary to add glucose or tartaric acid to prevent crystallization, as it is for sugar.

A disadvantage of isomalt (besides its higher cost) is that its working temperature (the temperature that the sugar must be when you are pulling or blowing it) is somewhat higher than sugar, so it may not be the best material for beginners. Other than the temperature difference, however, isomalt is handled much like sugar, so many instructors recommend that those pulling sugar for the first time work with sugar first, until they get comfortable with the techniques. They can then transfer these skills to working with isomalt.

The Guidelines for Preparing Isomalt will help you prepare isomalt for use in decorative work. After the isomalt is ready, it can be poured out onto a silicone mat and handled like sugar for pulling. Alternatively, it can be poured into molds, like poured or cast sugar.

GUIDELINES: Preparing Isomalt

1. Isomalt can be melted dry, but its working temperature will be higher than isomalt cooked with water. That is why many pastry chefs prefer to mix it with water. For each 1 lb of isomalt, add 2 oz water (125 g water per 1 kg isomalt). Mix in a heavy stainless steel pot until the mixture resembles wet sand.
2. Distilled water is recommended, because it is less likely to discolor the isomalt.
3. Cook the mixture until it reaches a temperature of 335°F (168°C). During the first stage of cooking, wash down the sides of the pot with a brush dipped in water, just as for cooking sugar.
4. As soon as the desired temperature is reached, immediately plunge the bottom of the pot into cold water for about 5 seconds to stop the cooking and to keep the temperature from rising more.
5. Add any desired color when the isomalt has cooled to about 310°F (154°C). Drop the color onto the top of the hot isomalt and swirl it lightly until the bubbling stops, to cook off moisture. Then stir in the color thoroughly.
6. Place the pot in an oven preheated to 300°F (149°F) until the isomalt is perfectly clear and contains no bubbles. This will take about 15 minutes.
7. Once the isomalt is clear, pour it into molds until hardened, or pour it out onto a silicone mat and proceed as for pulled sugar.
8. Store cooked isomalt in an airtight container to prevent it from absorbing moisture. For long-term storage, it is helpful to put packets of food-grade silica gel in the container to absorb any moisture.
9. Remelt stored, cooked isomalt by placing it in a stainless steel pot and setting it in a 300°F (149°C) oven until melted. Or melt it in a microwave at medium power. Stop the microwave every 5 minutes and stir the isomalt so that it heats evenly.

BOILED SUGAR CONFECTIONS

EXCEPT FOR CHOCOLATES, a large proportion of old-fashioned candies are based on a boiled sugar solution. The background material in Chapter 12 and this chapter prepare you to make the recipes that follow. In particular, review the information on boiling sugar syrups, including the steps to avoid crystallization, explained in Chapter 12.

Hard candies are simply a flavored syrup boiled to the hard-crack stage. Note that the recipe below is the same as for pulled sugar, with the addition of flavoring. Fancy candies, such as multi-colored ribbon, can be made using the procedures for pulled sugar. Alternatively, simple candies can be made by preparing the candy through step 6 in the recipe procedure. Then roll the sugar to a uniform thickness with an oiled rolling pin and cut it into small squares with an oiled knife.

Toffee is essentially the same as the butter caramel introduced in Chapter 12 (p. 277), with the addition of flavorings and other ingredients that transform it into a delectable candy. Note that the core of the toffee recipe, the sugar and butter, are the same as in the butter caramel recipe.

Peanut brittle is a similar confection, but with less butter and with the addition of a large quantity of peanuts. Soft caramels, too, are made in a similar fashion, except the syrup is made with cream or milk instead of water, and the candy is cooked to a lower temperature so less moisture is cooked away, resulting in confections that are soft rather than hard.

Finally, classic, old-fashioned fudge also should be understood as a boiled sugar confection rather than as a chocolate candy. Although chocolate is often used as a flavoring, other flavorings may be used as well. The basic procedure for fudge is similar to that for making fondant icing: The boiled syrup is cooled to the proper temperature and then agitated to create extremely fine crystals. Review the fondant recipe (p. 421) and compare with the fudge recipe given here. A critical point in both procedures is the temperature to which the syrup is cooled. If it is stirred or agitated while it is still too warm, the crystals will be too large and the texture will be grainy.



KEY POINTS TO REVIEW

- What guidelines should be followed when working with isomalt to make pulled sugar items?
- In what ways are toffee, peanut brittle, and soft caramels similar? In what ways are they different?
- Why is fudge considered basically a boiled sugar confection rather than a chocolate confection?

HARD CANDIES

Yield: about 2 lb 6 oz (1200 g)

Ingredients	U.S.	Metric	Sugar at 100%	
				%
Sugar	2 lb	1000 g	100	
Water	9.5 oz	300 g	30	
Glucose or corn syrup	6.5 oz	200 g	20	
Tartaric acid solution (see p. 678)	8 drops	8 drops		
Coloring	as desired	as desired		
Flavoring, such as peppermint, lemon or other citrus, cinnamon	few drops	few drops		

PROCEDURE

1. Make a syrup of the sugar, water, and glucose. See page 256 for guidelines on cooking sugar syrups.
2. Boil to 255°F (125°C) and add coloring, if desired. (Color may also be added when the sugar is poured out, in step 5.)
3. Continue to boil to 275°F (135°C) and then add the tartaric acid.
4. Continue boiling. When the temperature reaches 320°F (160°C), or whatever final temperature is desired (see p. 670), stop the cooking immediately by plunging the base of the pan into cold water. Remove from the cold water and allow to stand 2–3 minutes to thicken slightly.
5. Pour out onto a silicone mat or an oiled marble slab. If color was not added in step 2, you can add it now, as on page 679.
6. Let cool slightly and add the flavoring to the top of the sugar. Before the sugar begins to harden around the outside edges, fold the edges into the center. Repeat until the sugar mass can be picked up off the table.
7. Begin stretching the sugar and folding it back onto itself. Repeat until the mixture is cooler and makes a faint crackling or clicking sound when pulled. Do not attempt to pull when the sugar becomes too cool, as it could start to crystallize. Cut the sugar into smaller pieces with scissors and place under a sugar lamp to keep them at workable temperature. Pull and fold the pieces one at a time so they will have a uniform texture and temperature. The sugar will take on a silky or pearled appearance after about 12 to 20 folds. Do not pull too much, or the sugar will lose this pearled appearance and become less shiny.
8. Pull each lump of sugar into a rope about ½ in. (12 mm) thick. With scissors, snip off pieces ½ in. (12 mm) long.
9. Let cool. Store in an airtight container.

TOFFEE

Yield: about 3 lb 6 oz (1650 g)

Ingredients	U.S.	Metric	Sugar at 100%
			%
Granulated sugar	2 lb	1000 g	100
Water	8 oz	250 g	25
Glucose or corn syrup	5 oz	160 g	16
Butter	1 lb	500 g	50
Salt	0.2 oz (1 tsp)	6 g	0.6
Almonds, chopped fine	3 oz	90 g	9
Vanilla extract	0.2 oz (1 tsp)	6 g	0.6

VARIATIONS

After scoring the toffee, allow it to cool until just warm, and spread it with a thin layer of melted chocolate. Sprinkle with finely chopped almonds. Cool and break into pieces.



PROCEDURE

1. Lightly oil a marble slab and arrange oiled caramel rulers (see the Caramel Rulers and Caramel Cutters sidebar) on the slab to make a rectangle about 15 × 16 in. (38 × 40 cm).
2. Make a syrup of the sugar, water, and glucose. See page 256 for guidelines on cooking sugar syrups.
3. Boil to 280°F (138°C).
4. Add the butter and salt and stir in. Continue to boil to 315°F (157°C).
5. Stir in the almonds and vanilla. Continue to boil to 320°F (160°C).
6. Pour the syrup onto the prepared marble slab.
7. When the syrup has begun to firm up but is still soft and hot, score or mark the toffee into 1-in. (2.5-cm) squares using a knife, a wheel knife, or a caramel cutter.
8. When the toffee has cooled and hardened, break apart into squares.

CARAMEL RULERS AND CARAMEL CUTTERS

Caramel rulers are heavy steel bars used to contain hot syrups when poured out onto a marble slab or other flat surface. They are useful in many boiled-sugar preparations, especially in the production of soft caramels, toffee, and similar confections.

A caramel cutter, also called a *toffee cutter*, consists of a row of wheel cutters spaced along a steel rod, with handles on both ends, like a rolling pin. Spacers of various lengths enable the worker to adjust the tool to cut multiple rows of the desired width. Using a caramel cutter, you can cut or score a sheet of caramel into uniform squares with one pass of the cutter lengthwise and one pass crosswise.

PEANUT BRITTLE

Yield: 4 lb 4 oz (2125 g)

Ingredients	U.S.	Metric	Sugar at 100%	
				%
Granulate sugar	2 lb	1000 g		100
Glucose or corn syrup	1 lb 7 oz	720 g		72
Water	12 oz	380 g		38
Raw peanuts (see <i>Note</i>)	1 lb 8 oz	750 g		75
Butter	1.75 oz	55 g		5.5
Vanilla extract	0.33 oz (2 tsp)	10 g		1
Salt	0.2 oz (1 tsp)	6 g		0.6
Baking soda	0.33 oz (2 tsp)	10 g		1

Note: If raw peanuts are not available, use unsalted, roasted peanuts and add them just before pouring out onto marble.



PROCEDURE

1. Lightly oil a marble slab.
2. Combine the sugar, corn syrup, and water in a heavy saucepan. Bring to a boil to dissolve the sugar and make a syrup. See page 256 for guidelines on cooking sugar syrups.
3. Boil the syrup until the temperature reaches 250°F (121°C).
4. Add the peanuts and butter.
5. Continue to boil until the mixture reaches 312°F (155°C). Stir constantly and gently, to prevent burning on the bottom.
6. Remove the pan from the heat. Stir in the vanilla, salt, and baking soda. Use caution, as the hot syrup will foam up for a moment.
7. Pour the mixture onto the marble slab.
8. The syrup will flow outward more than the peanuts. To ensure an even distribution of nuts, use an oiled palette knife to carefully spread some of the peanuts toward the edges of the slab of syrup.
9. *Optional step to make a thinner, finer-textured candy:* Put on a pair of latex gloves to protect your hands during this step. As soon as the syrup has cooled enough so the edges can be lifted with the palette knife, carefully raise the edges with your gloved hands and pull outward to stretch the candy so it becomes thinner between the nuts. This is easiest to do with two or more workers on opposite sides of the slab, as it cools and hardens quickly. Be careful not to touch any part of the sugar that is still molten. As the candy hardens, break off pieces from the edge, and continue stretching the rest of the brittle.
10. Cool completely and store in airtight containers.

SOFT CARAMELS

Yield: 3 lb (1.5 kg)

Ingredients	U.S.	Metric	Sugar at 100%	
				%
Heavy cream	3 pt	1.5 L	200	
Granulated sugar	1 lb 8 oz	750 g	100	
Glucose or corn syrup	6.5 oz	200 g	27	
Salt	0.15 oz (¾ tsp)	4 g	0.6	
Butter	6.5 oz	200 g	27	
Vanilla extract	0.5 oz (1 tbsp)	15 mL	2	

VARIATIONS

CHOCOLATE CARAMELS

Add 3.5 oz (100 g) melted unsweetened chocolate after the butter has been stirred in.

NUT CARAMELS

Before pouring out the cooked mixture onto the parchment, stir in 10 oz (300 g) finely chopped walnuts or pecans.

PROCEDURE

1. Place a sheet of parchment on a marble slab or other work surface. Arrange oiled caramel rulers on the parchment in a rectangle about 12 × 16 in. (30 × 40 cm).
2. Combine the cream, sugar, and glucose in a heavy saucepan. Bring to a boil, stirring to dissolve the sugar.
3. Turn the heat to low and cook, stirring, until the mixture reaches 230°F (110°C).
4. Add the butter and vanilla. Continue to cook slowly, stirring constantly, until the mixture reaches 245°F (118°C).
5. Pour the mixture onto the prepared parchment. Allow to cool completely.
6. When completely cool, cut into 1-in. (2.5-cm) squares or other desired shape.
7. If desired, dip cooled caramels in tempered chocolate (p. 646).

CARAMEL TEXTURE

Within a narrow range, the texture of soft caramels may vary from soft to fairly firm but still chewy. To test the texture as you are cooking, drop a small amount into a bowl of cold water and examine the texture of the cooled caramel. It should form a ball that is soft but firm enough to hold its shape. If it is too soft, cook the mixture a little longer. If it is too firm, stir a little water into the mixture and test again.

CHOCOLATE FUDGE

Yield: 2 lb 12 oz (1375 g) without walnuts

Ingredients	U.S.	Metric	Sugar at 100%	
				%
Granulated sugar	2 lb	1000 g		100
Milk	12 oz	375 g		37.5
Glucose or corn syrup	4 oz	125 g		12.5
Butter	4 oz	125 g		12.5
Unsweetened chocolate, chopped fine	5 oz	155 g		15.5
Salt	0.1 oz (½ tsp)	3 g		0.3
Vanilla extract	0.5 oz (1 tbsp)	15 g		1.5
Walnuts, chopped (optional)	6 oz	200 g		20

PROCEDURE

1. Prepare a 9-in. (23-cm) square pan by lining it with aluminum foil.
2. Combine the sugar, milk, and glucose in a heavy saucepan. Bring to a boil, stirring constantly, until the sugar is dissolved. See page 256 for guidelines on cooking sugar syrups.
3. Continue to cook the mixture over moderate heat until the temperature reaches 230°F (110°C). Stir gently and slowly as the mixture cooks, to prevent scorching on the bottom of the pan.
4. Add the butter and stir gently until it is blended in.
5. Add the chocolate, salt, and vanilla. Stir until the chocolate is melted and blended in.
6. Continue to boil, stirring very gently, until the mixture reaches 236°F (113°C).
7. Pour onto a marble slab. Let cool, undisturbed, until the temperature reaches 110°F (43°C).
8. When the fudge has reached the proper temperature, mix it with a bench scraper or metal spatula until it thickens and becomes less shiny. If using nuts, add them at this time.
9. Quickly, while the mixture is still quite soft, transfer the fudge to the prepared sheet pan to cool completely.
10. When cool, cover tightly and let stand at room temperature overnight. This maturing or ripening period improves the texture.
11. Cut into squares of desired size.

VARIATIONS

VANILLA FUDGE

Omit the chocolate.

BROWN SUGAR FUDGE

Use brown sugar instead of white sugar. The acidity of the sugar will curdle the milk during the first stages of cooking, but this will not harm the finished product.

PEANUT BUTTER FUDGE

Omit the chocolate and instead add 25% (8 oz/250 g) peanut butter in step 5.

TERMS FOR REVIEW

inversion

sugar cage

cast sugar

pulled sugar

spun sugar

poured sugar

isomalt

blown sugar



QUESTIONS FOR DISCUSSION

1. When boiling sugar for pulled sugar, why is it important to boil it rapidly?
2. Describe the procedure for making spun sugar (assuming you have already boiled the syrup).
3. Explain the importance of the final cooking temperature when cooking a syrup for pulled sugar.
4. Discuss the effect of tartaric acid in the production of pulled sugar. Include in your discussion the time it is added and the total quantity used.
5. Describe the procedure for making a pulled-sugar ribbon using two alternating colors of sugar.
6. If pulled sugar is made in advance and stored, what must be done to make it workable?