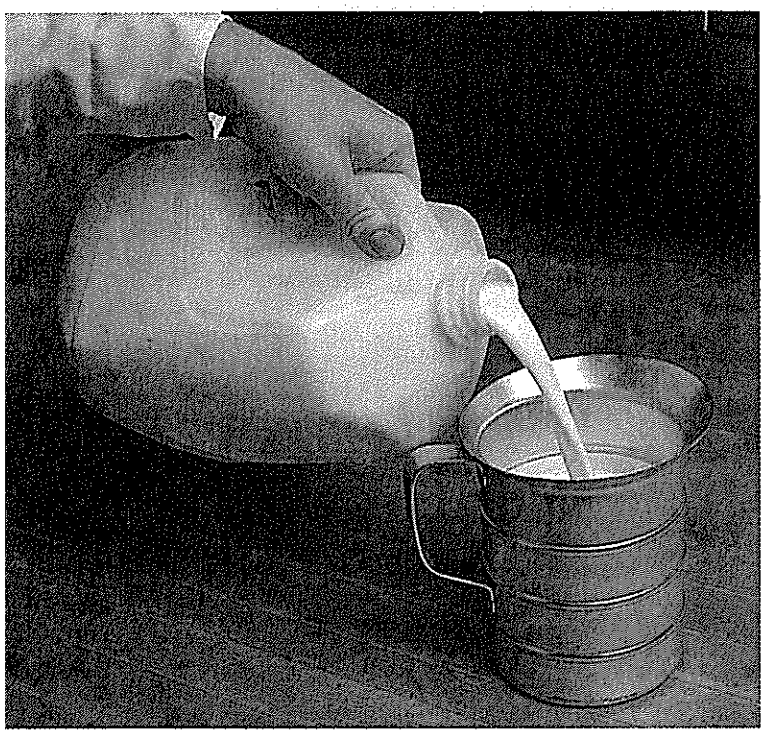


Fig. 28-7. Accurate measuring of ingredients contributes to successful yeast dough products.

SCALING INGREDIENTS

Accurate measurement, or scaling, of all ingredients is critical in the preparation of yeast doughs. Successful formulas are based on proportional mixtures of ingredients. Too much or too little of an ingredient will affect yeast activity, gluten formation, and product quality.

Use a baker's scale to weigh all ingredients that are denser than milk or water. This includes flour, yeast, shortening, eggs, honey, molasses, malt, and oil. Milk and water may be measured with volume measures. See Fig. 28-7.

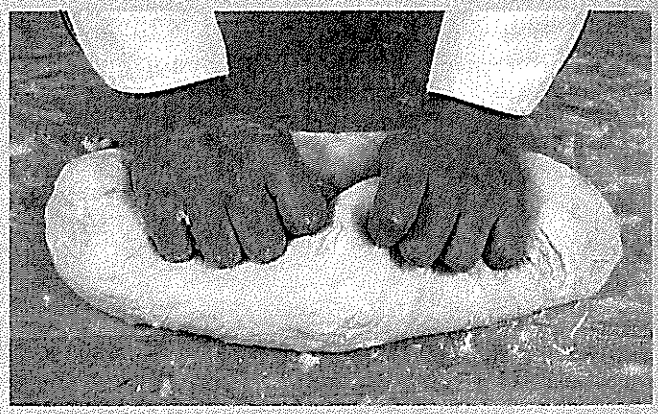
Scale each ingredient separately. Make sure the weight of each ingredient corresponds to the weights called for in the formula. In some formulas, ingredients are given as a percentage of the total weight of the flour. Foodservice operations usually post procedures for converting percentages to weights and weights to percentages.

MIXING & KNEADING

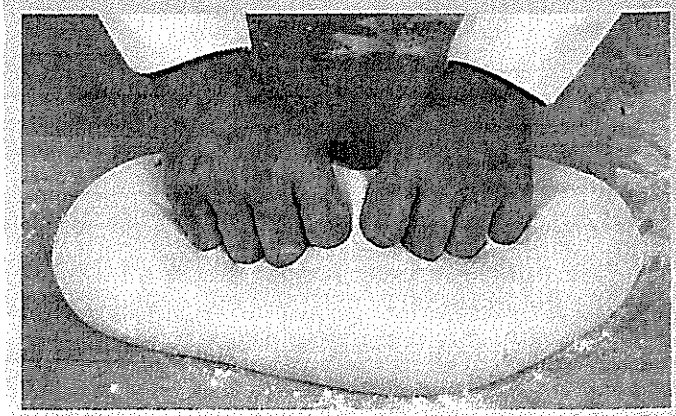
When you mix dough ingredients thoroughly, it ensures even yeast distribution, gluten development, and a uniform mixture. Once the ingredients are mixed, the dough must be kneaded to further develop the gluten. **Kneading** means to work the dough until it is smooth and elastic.

1. Grasp the dough and bring it toward you. See Fig. 28-8A below.

2. Form a fist and push the dough away with your knuckles. See Fig. 28-8B below.

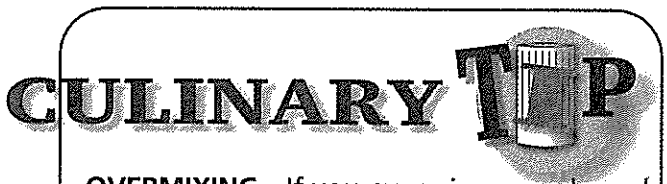


3. Repeat the process until the dough is smooth and elastic. See Fig. 28-8C below.



In continuous bread making or commercial baking, mixing and kneading are done in a spiral mixer. There are four stages to this process.

- **Pickup.** Use a low speed to mix the water and yeast. If oil is used, add it immediately after the liquid ingredients. Then incorporate the dry ingredients, and add solid fats or shortenings last. Once all ingredients have been added to the mixer, turn the speed to medium.
- **Cleanup.** During this stage the ingredients come together into a ball around the dough hook. The bottom of the mixing bowl can be clearly seen. At this stage all liquid is absorbed into the flour.
- **Development.** During this longest stage of mixing and kneading, oxygen is incorporated into the dough and gluten is developed. The dough will be uneven in color and will tear easily.
- **Final clear.** This stage is reached when proper gluten has developed. To verify gluten formation, cut off a small piece of dough and stretch it apart with your fingers. It should stretch to such a thinness that light can be seen through the dough. You should also be able to stretch the dough several times without it breaking. At this point, remove the dough from the mixer.



OVERMIXING—If you overmix or overknead a regular yeast dough, you will cause the ingredients in the dough to "let down." A **let down** is a condition in which the ingredients in a dough completely break down. Overmixed dough is warm and sticky and falls apart easily. Adding flour can help offset overmixing to a certain extent.

FERMENTATION

Once a regular yeast dough has been kneaded thoroughly by hand or has reached the final clear stage in a mixer, the dough is ready for fermentation. Fermentation (fuhr-muhn-TAY-shuhn) is the process by which yeast converts the sugars in dough into alcohol and carbon dioxide. Gases that are trapped in the gluten cause the dough to rise.

For fermentation to take place in dough, do the following:

- Shape the kneaded dough into a ball.
- Coat it with a thin film of oil.
- Cover the dough to keep it from drying out. Avoid popping any bubbles that may appear beneath the dough surface.
- Place the dough in a proofing cabinet, or proofer, which shields the dough from drafts and temperature changes.

Use a probe thermometer to measure the dough temperature before placing it in the proofer. See Fig. 28-9. If you're not using a proofer, regularly measure dough temperature throughout fermentation. Remember that allowing dough to become too cool will slow yeast action, while heat over 90°F will cause fermentation to accelerate.

Fermentation is complete when the dough has approximately doubled in size. You can test whether fermentation is complete by inserting two fingers into the dough up to the knuckles and then removing them. If the finger pressure leaves a slight impression around which the dough closes very slowly, fermentation is complete. The dough is then ready to be punched.

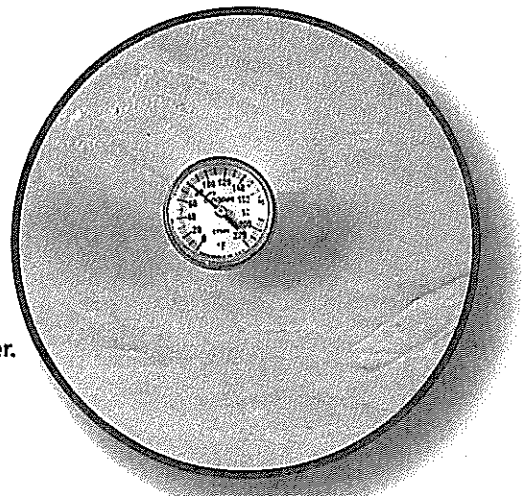


Fig. 28-9. This is a dough thermometer.

Fig. 28-10. To punch down dough, press your fist into the middle of the dough. Then fold the outer edges to the middle.

Punching

The action of turning the sides of the dough into the middle and turning the dough over is called **punching**. See Fig. 28-10. This is done by pressing gently and firmly, not by hitting or kneading the dough. Punching accomplishes four important actions.

- **Maintaining the dough temperature.** By effectively turning the dough inside out, punching moves the cooler exterior surfaces to the middle. This evens the dough temperature.
- **Releasing carbon dioxide.** If too much of the gas developed during this first stage of fermentation remains within the dough, it will become concentrated and slow the later stages of fermentation.
- **Introducing oxygen.** Punching the dough incorporates oxygen from the air.
- **Developing gluten.** Any handling of the dough strengthens the gluten.

Dividing Dough

Once the dough has been punched, it must be divided for baking. Commercial bread formulas give portions by weight. To divide dough, use a bench scraper to cut the dough into uniform pieces. See Fig. 28-11. Weigh the pieces on a baker's scale, as when scaling ingredients.

You will need to work quickly when portioning dough. Fermentation continues during this process. The last pieces portioned may become overfermented if there is any delay. Keep the large mass of dough covered as you work so its surface does not dry out. If any small pieces of dough are left, divide them evenly and add them to the larger pieces. Tuck them under each portion so they will be well incorporated. Otherwise the smaller pieces will ferment too fast.

Rounding Dough

Divided dough must be rounded, or shaped, into smooth balls. To do this, put the dough on the bench. With the palm of your hand, cup the dough with a circular motion, working the dough with your fingertips. This will cause the dough to form into a smooth, firm, round ball.

Rounding dough provides it with a skin to prevent the loss of too much carbon dioxide. Some formulas call for the dough to be folded over during rounding. This provides a kind of secondary punching after dividing. If the dough is not rounded, it will rise and bake unevenly, with a lumpy or rough surface.

Fig. 28-11. Use a bench scraper to divide dough.

When rounding, perform each of the subsequent actions, such as shaping and panning, in the same order, so the dough ferments consistently. The first portion rounded should also be the first piece to be shaped, and so on.

Bench Rest

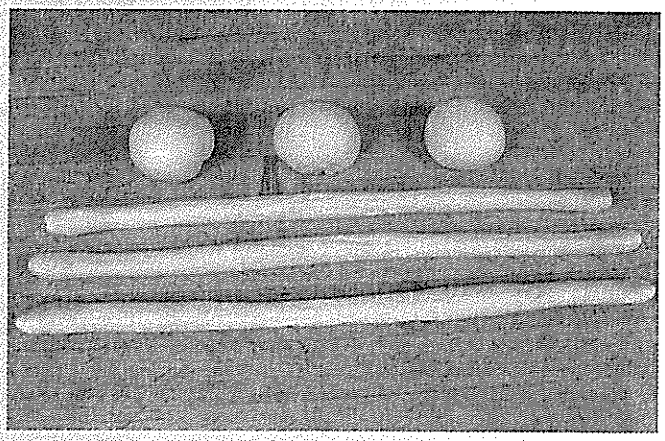
Depending on the formula, at this time the rounded portions may need to be placed in bench boxes or left covered on the work bench. A bench box is a covered container in which dough can be placed before shaping. This short, intermediate proofing stage, called a **bench rest**, allows the gluten to relax. The dough becomes lighter, softer, and easier to shape.

Shaping Dough

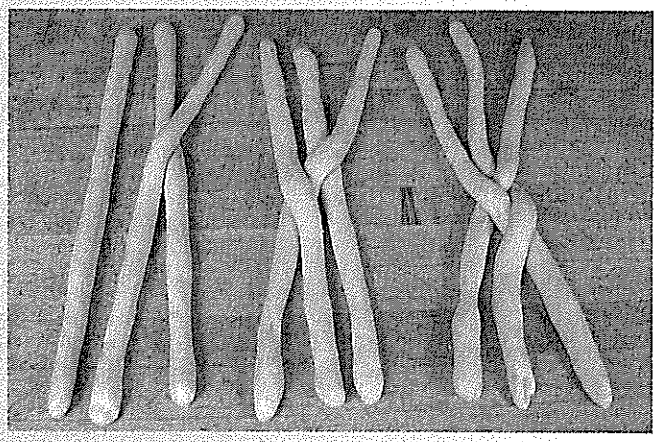
Once the portions have been properly rounded and, if necessary, rested, they must be shaped. **Shaping** forms the dough into the distinctive shapes associated with yeast products. Some general principles apply to the shaping process.

- **Work quickly.** Fermentation continues during shaping. Cover the portions you are not working with to prevent them from drying out.
- **Shape pieces in order.** Start with the first piece you rounded. Maintain the same order to ensure consistency.
- **Use very little flour.** A dusting of flour on your hands and the work surface will keep the dough from sticking. Too much will dry it out.
- **Place any seam at the bottom.** Seams, or the places where edges of the dough meet, should be straight and tight. The seam is the weakest part of the piece. Seams can open during baking and ruin the product's shape.
- **Shaping loaves.** Although bread loaves come in a wide variety of textures and tastes, there are essentially two ways to shape dough into loaves. Pan loaves are rolled and placed, seam down, into prepared loaf pans. In baking, loaves receive their characteristic shape from the support offered by the high sides of the loaf pans. Free-form loaves, such as braided loaves, are shaped by hand. They are baked, seam side down, on flat pans or paddles, or directly on a hearth. Use the following steps to make braided loaves:

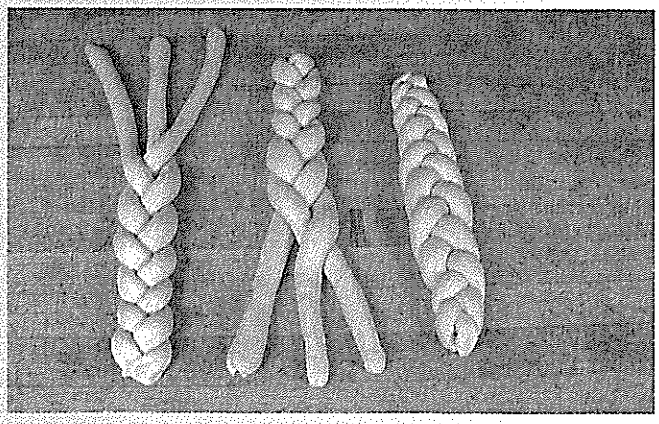
1. Divide dough into three parts. Roll into three equal strips. See Fig. 28-12A below.



2. Cross strip 2 over strip 3. Cross strip 1 over strip 2. Cross strip 2 over strip 1. Repeat until half the bread is braided. See Fig. 28-12B below.



3. Flip the bread over so the three unbraided strips are facing you. Repeat step 2 until the whole loaf is braided. See Fig. 28-12C below.



■ **Shaping rolls.** Yeast rolls are like individually portioned loaves. Shape rolls with the same care used to shape loaves. This will produce items with an attractive, even surface and uniform size.

Depending on the formula, rolls may be shaped and baked on flat sheets, like free-form loaves. They may also be placed in special pans that offer additional structure during baking. Cloverleaf and butterflake rolls, for example, are baked in greased muffin pans. Brioche (bree-OSH) rolls, like brioche loaves, are baked in special fluted tins. Pan rolls, Parker House rolls, and knots are baked on flat sheets or in shallow baking pans.

When panning rolls, allow enough room between the rolls to ensure even browning. Avoid crowding. Most formulas indicate how many rolls will fit on a sheet and how they should be placed. See Fig. 28-13.

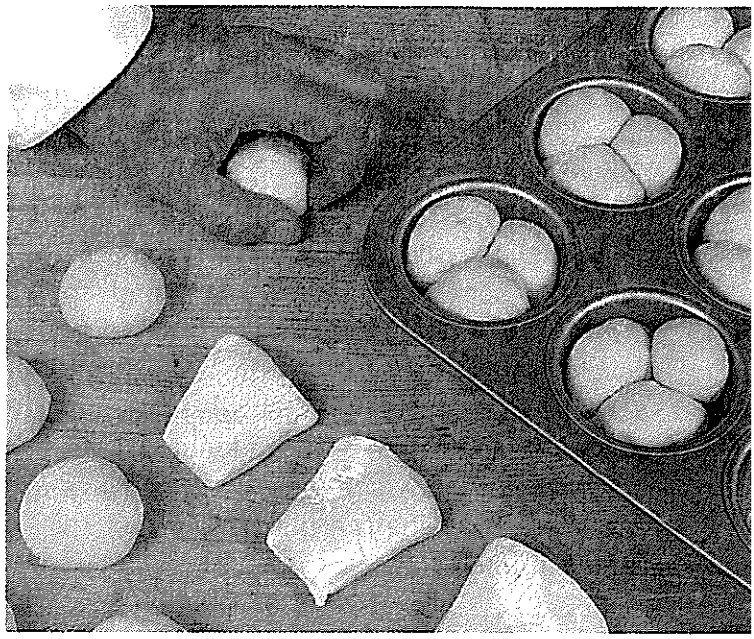


Fig. 28-13. A variety of rolls can be made by shaping dough, ranging from simple pan rolls to more elaborate Brioche, Parker house, clover leafs, and knots.

Panning Dough

Shaped dough is ready for **panning,** or placing in the correct type of pan. Some items should be shaped directly on the pan such as baguettes and hearth-style breads. Each formula specifies the size and type of pan to be used and indicates how the pan should be prepared. In general, perforated pans dusted with cornmeal are used for baking lean doughs. Sheet pans lined with parchment or lightly greased are used for soft medium doughs.

FINAL PROOFING

The final fermentation stage for regular yeast dough items is called final proofing. **Proofing** allows the leavening action of yeast to achieve its final strength before yeast cells are killed by hot oven temperatures. Yeast dough items are proofed once they have been shaped and panned.

Final proofing requires higher temperatures and humidity levels than fermentation—temperatures of 85°F–95°F and humidity levels of 80–90%. The use of a proofer is essential to maintain these conditions.

The length of the final proofing time depends on the type of dough. Most doughs are fully proofed when finger pressure leaves an indentation that closes slowly around the center but does not collapse. Fully proofed items are slightly less than double in size.

Proofing time is shortened for rich and sweet doughs. This is done to keep the weight of the heavier dough from collapsing during baking. Some other items, such as rye breads, are also deliberately underproofed. Underproofed dough is known as young dough. Overproofed dough—dough that has more than doubled in size during final proofing—is called old dough.

WASHING, SLASHING & DOCKING

Many yeast dough products require special additional preparations before baking. These preparations, called washing, slashing, and docking, affect the baking quality and eye appeal of the finished items.

■ **Washing.** Applying a thin glaze of liquid to the dough's surface before baking is called adding a wash. Depending on the type of item and the wash used, washing can lighten or darken the crust's color, and make the surface shiny and glossy. See Fig. 28-14.

Apply the wash with a pastry brush, either before or after proofing. Check the formula for timing. If you apply the wash after proofing, be careful not to puncture the surface and deflate the dough. Use a small amount of wash for each item. Avoid puddling or dripping egg washes, which cause uneven browning. Excess washing can burn or cause items to stick to the pan.

Fig. 28-14.

DESIRED EFFECT	TYPE OF WASH
A crisp crust	Water
A glossy, firm crust	Egg white & water
A deep-colored, glossy crust	Whole egg & water
A deep-colored, soft, glossy crust	Whole egg & milk
A deep-colored, soft crust	Milk

SAFETY & SANITATION

AVOIDING CONTAMINATION—Never apply an egg wash to a product that has already been baked. The egg will remain uncooked, presenting the risk of salmonella bacteria.

■ **Slashing.** Making shallow cuts in the surface of the item, done just before baking, is called **slashing**. Slashing, also called stippling, helps gases escape from hard-crusted breads during baking. This allows for higher rising and the development of a more tender crumb. Improperly slashed breads will burst or break along the sides during baking. The patterns made by slashing, which leave a scarred or cross-hatched impression in the baked crust, also add visual appeal. See Fig. 28-15. To slash dough, follow these guidelines:

- Use both hands, steadying the item with one hand while you cut with the other.
- Use a utility blade; a sharp, unserrated knife; or a clean, sharp razor. Blunt or serrated edges bruise or tear the surface of the dough.
- Make shallow, slightly angled cuts, just under the surface of the dough.
- Make all cuts of equal length, overlapping cuts by one-third of their length.
- Make the slashes on the full surface of the dough in a symmetrical pattern.

■ **Docking.** The process of making small holes in the surface of an item before baking is called **docking**. Used primarily with rich doughs or rolled-in doughs, docking allows steam to escape and promotes even baking. Docking also keeps rich doughs from rising too much during baking. Follow the formula's directions for docking. Use a sharp-tined fork or a skewer to dock the dough.

BAKING YEAST DOUGH

Baking is the process that changes dough into breads or rolls through the application of heat. Oven temperature and baking time are determined by five factors.

■ **Dough type.** Young, underfermented doughs require cooler oven temperatures, higher humidity, and longer baking times than fully proofed doughs. Old, overfermented doughs require higher oven temperatures, less humidity, and shorter baking times.

■ **Dough richness.** Lean doughs require higher oven temperatures and shorter baking times. Rich doughs require lower oven temperatures and longer baking times.

■ **Portion size.** Smaller items, such as rolls, require shorter baking times than larger items, such as loaves.

■ **Desired color.** The desired color of the crust often depends on the tastes of the customer. Higher oven temperatures and longer baking

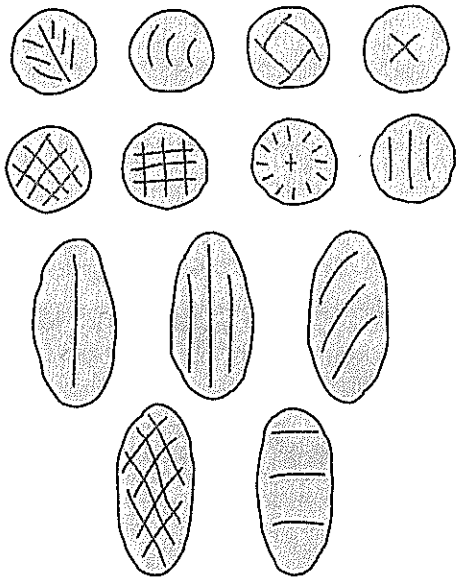


Fig. 28-15. Use a utility blade or sharp knife to make slashes. Why are many breads slashed before baking?

times generally yield a darker crust color than lower temperatures and shorter baking times. An egg wash can add color to a crust that must be baked at a low temperature or for a short time.

- **Weather.** Oven temperatures may need to be adjusted to compensate for less-than-ideal temperature and humidity conditions during dough preparation. Altitude (AL-tuh-tood), or the location of the baking site above sea level, affects baking, too. The moisture in dough evaporates more slowly at higher altitudes, such as those found in mountainous areas. Oven temperatures may be increased slightly to prevent the dough from expanding too much and breaking down the cell structure in the bread.

Formulas will list the ideal oven temperature and baking time. Slight adjustments may be necessary. Appropriate placement of pans in the oven is also important. Air and heat must be allowed to circulate freely around the pans. This can be accomplished by placing pans at the appropriate distance from the heating element. Crowding the oven slows baking time and results in unevenly baked items.

Baking with Steam

Breads with thin, crispy crusts, such as French and Italian loaves, benefit from the addition of steam to the oven during baking. The steam keeps the crumb soft while adding a glossy shine to the surface. As the sugars in the crust caramelize, a thin, crispy crust is formed. See Fig. 28-16.

Some bakery ovens are equipped to inject a desired amount of steam into the oven for several seconds depending on the type of bread and the formula. In ovens without steam injectors, a pan can be added with just enough water so the water evaporates during the early stages of baking.

Stages of Baking

As yeast dough products bake, their internal temperatures rise. Each of the four stages of the baking process contributes to the final product:

1. **Oven spring.** During the first five minutes of baking, the dough suddenly rises and expands as the yeast reacts to the heat of the oven. This final leavening effort, occurring before internal temperatures become hot enough to kill the yeast cells, is called **oven spring.** Steam injection helps achieve oven spring. Oven spring will not occur if there is too much salt or not enough yeast in the dough or if the dough was overproofed. At this early stage, the dough is very soft and will collapse if touched.

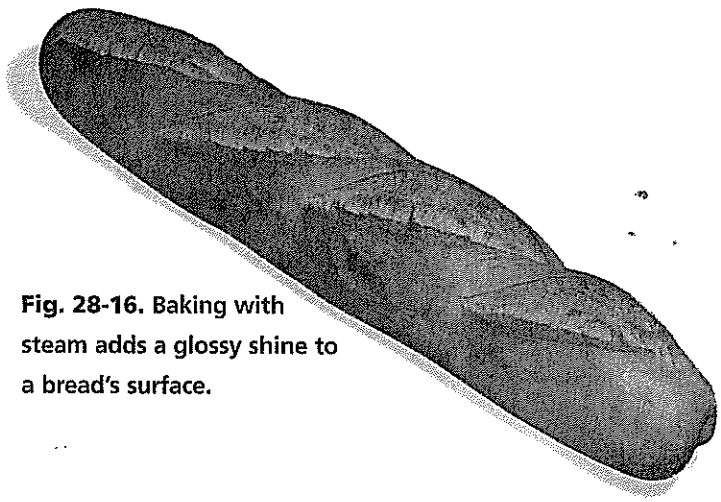


Fig. 28-16. Baking with steam adds a glossy shine to a bread's surface.

2. **Structure develops.** As the internal temperature rises from 130°F, starch granules in the dough begin to absorb moisture and swell up. At 150°F, the starches gel and become the final structure of the bread. At 165°F, the gluten begins to dry out and coagulate as the starch gel replaces it. The crumb is formed during this stage.
3. **Crust forms.** At 165°F, the crust begins to form as the starches and sugar on the surface of the dough brown and thicken. The product will appear done at this stage, but additional baking time is needed to evaporate the alcohol given off by the yeast. Yeast products removed from the oven too early will not taste right.
4. **Finished product.** By the time the internal temperature has reached 176°F, the alcohol will have evaporated. Finished products have an internal temperature of approximately 220°F.

Fig. 28-17.

PRODUCT FAILURE	POSSIBLE CAUSE
Poor shape	• Too much liquid in dough. • Improper shaping of dough. • Incorrect proofing. • Too much steam in oven.
Blisters on crust	• Too much liquid in dough. • Improper fermentation.
Top crust separates from the loaf	• Loaf poorly shaped. • Top not slashed. • Dough dried out during proofing. • Lack of moisture in oven.
Large holes in crumb	• Too much yeast. • Overkneaded dough. • Inadequate punching of dough.
Poor flavor	• Improper fermentation. • Inferior, spoiled, or rancid ingredients.

Testing for Doneness

Appearance is not the best test for doneness. A better gauge of whether a product is done is the thump test. Tap the top of the loaf. If the loaf gives off a hollow sound, indicating that it is filled with air and not moisture, it's done. If the bottom of the loaf is damp or heavy, it probably requires additional baking. Watch rolls and small loaves carefully, as their bottom surfaces may burn before the crust color develops fully.

Another way to test for doneness is to look at the crust. If it is evenly brown on top and bottom, it's done. With practice, you will come to recognize the appropriate degree of browning and crust formation. Fig. 28-17 explains some causes of problems with yeast dough.

COOLING & STORING YEAST PRODUCTS

Once a yeast dough product is removed from the oven, it must be cooled and stored properly to maintain the highest possible quality.

- Remove yeast products from their pans immediately.
- Place them on cooling racks or screens at room temperature. One exception is rolls baked on sheets. These may be left on the sheets to cool, if they are well spaced.
- Cool yeast products completely before slicing or wrapping.

■ **Glazing.** In some cases, you will brush melted butter or shortening or a glaze onto a hot yeast dough product immediately after removing it from the oven. Sweet dough products such as coffee cake and Danish pastry may be glazed with a mixture of water and sugar or corn syrup while they are still warm.

■ **Staling prevention.** Yeast dough products begin the process of staling as soon as they are baked. Staling causes yeast dough products to

lose their freshness. During staling, the crust becomes moist and tough, while the interior crumb of the bread becomes dry and crumbly. Staling also causes breads to lose flavor. There are several procedures for slowing the staling process.

1. **Additions to dough.** Depending on the formula, ingredients such as malt syrup may be added to the dough at the mixing process to help slow staling. Commercial bakeries may also add chemicals such as monoglycerides (MAH-noh-glih-suh-ryds) and calcium propionate (PRO-pee-uh-nate) to lengthen shelf life.
2. **Adequate proofing.** Underproofed items stale more quickly than those that have received proper proofing.
3. **Avoid refrigeration.** Refrigeration speeds up the staling process of yeast breads.

■ **Proper packaging and storage.** Do not wrap products while they are still warm. Most breads should not be kept for more than one day in a foodservice operation. If you're keeping them longer than one day, wrap them tightly in moisture-proof wrapping and store them in a freezer to prevent staling. Wrap items with thin, crisp crusts, such as French baguettes, in paper. They will lose their characteristic crunchiness and become soggy if wrapped in plastic. Soft dough products can be packaged in paper or plastic. Sweet dough products can be packaged in a pastry box or wrapped in plastic. See Fig. 28-18.

SERVING BREADS & ROLLS

Yeast breads and rolls can be served at breakfast, lunch, or dinner. They can be part of or served with every course of a meal, from appetizers to salads to desserts.

A variety of spreads can be used with yeast breads and rolls. In addition to butter, other common spreads include cream cheese, flavored butter, jellies and jams, and olive oil.

Fig. 28-18. Properly wrapping and storing yeast products is essential for maintaining quality products.

SECTION 28-2 Knowledge Check

1. List, in order, the stages involved in making regular yeast dough products.
2. Define fermentation and explain when it takes place.
3. Explain how to prevent staling in yeast doughs.

MINI LAB

Prepare the Soft Rolls formula on page 644. Follow the formula directions carefully. Serve and evaluate the rolls.