



G4G TECHNICAL GUIDELINES

Baked Goods: Quality & Troubleshooting

D-G-4

Good-quality baked goods

Feature	Biscuits	Muffins	Yeast Breads & Rolls
Color	Uniform, golden brown top and bottom, creamy white inside, and free from yellow or brown spots.	Uniform, golden brown outside, creamy white inside, or slightly yellow and free from streaks.	Even, rich brown color, creamy white inside, and free from streaks.
Shape & size	Uniform (in shape and size) with straight sides and a smooth level top. The volume is at least twice the size of the unbaked product.	Uniform shape and size, well-rounded pebbled top, and free from peaks or cracks.	Well-proportioned and symmetrical with a well-rounded top.
Crust	Tender, moderately smooth, and free of excess flour.	Tender with a thin, slightly rough, or pebbled shiny appearance.	Crisp-tender with an even thickness over entire surface and no cracks or bulges.
Texture	Slightly moist, tender, and flaky crumb with a medium-fine grain.	Moist, tender, and light crumb with medium-fine, evenly distributed air spaces.	Soft, springy texture, tender, and slightly moist with fine grain and thin-walled cells.
Flavor*	Pleasing, well-blended flavor with no bitterness.	Pleasing, well-blended flavor with no bitterness or other off-flavors.	Wheat-like, sweet nutty flavor, and no off-flavors.

*Flavor notes are for a general-purpose white flour and might vary if a different flour is used.

Key baking ingredients

- **Flour.** Flour provides most of the bulk of the baked item. For bread baking, use a wheat flour high in gluten (protein) because it gives bread its fine texture and supports the ingredients during rising.
- **Yeast.** Yeast is a fungus that feeds on starch and sugars, releasing carbon dioxide (CO₂) and alcohol. The CO₂ bubbles give dough a light, airy texture.
- **Fat.** Fat gives a softer texture and helps prevent the CO₂ bubbles from escaping from the mixture too soon.



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- **Sugar.** Sugar provides a direct food source for the yeast, improving its action.
- **Vitamin C.** This nutrient also shortens the time needed for dough to “mature.”
- **Baking soda.** Releases CO₂ according to the equation: $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$. However, as this reaction also produces a strong base—Na₂CO₃—that has to be neutralized with acid in order to avoid bitter final product, baking powder is usually used instead.
- **Baking powder.** Baking powder is baking soda with acid added. This neutralizes the base and produces more CO₂ according to the following equation: $\text{NaHCO}_3 + \text{H}^+ \rightarrow \text{Na}^+ + \text{H}_2\text{O} + \text{CO}_2$.
- **Egg.** Like fat, beaten egg white helps to retain gas bubbles. Whole egg alone acts as a binder.
- **Salt.** Salt adds flavor and strengthens soft fat and sugar mixtures.

Poor-quality baked goods

Ingredients, mixing time, oven temperature, and other factors can affect the color, taste, texture, and overall quality of baked goods. If you experience problems with your baked goods—biscuits, muffins, breads, rolls, or layer cakes—see below for some possible causes.

Biscuits

- **Tough.** Not enough shortening or leavening, too much liquid, dough too cold, oven not hot enough, or overmixing.
- **Heavy.** Wrong proportion of ingredients, improper mixing, oven not hot enough, or dough too stiff.
- **Poor flavor.** Wrong proportion of ingredients or improper mixing. Flavor notes are for a general-purpose white flour and might vary if a different flour is used.
- **Coarse or uneven grain.** Too much leavening, not enough liquid, or improper mixing. “Not flaky” due to not enough shortening or improper mixing of shortening and flour.
- **Texture is too dry.** Dough too stiff, overbaking, oven not hot enough, or not enough sugar or shortening.
- **Texture is too crumbly.** Not enough liquid or too much leavening, sugar, or shortening.
- **Tough or hard crust.** Too much flour, overmixing, oven too hot, or overbaking.
- **Irregular crust.** Rough or blisters due to too much liquid or incorrect kneading or rolling.
- **Color streaks or spots.** Ingredients not mixed well.
- **Irregular shape.** Too much liquid, dough not rolled to uniform thickness, improper cutting of dough, or uneven oven heat.



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- **Dark color.** Oven too hot, overbaking, dough too stiff, oven not hot enough, or insufficient sugar.
- **Pale color.** Dough too stiff, oven not hot enough, or insufficient sugar.

Muffins

- **Tough.** Overmixing, or not enough shortening or sugar.
- **Heavy.** Overmixing, or not enough baking powder or shortening.
- **Poor flavor.** Wrong proportion of ingredients or improper mixing. Flavor notes are for a general-purpose white flour and might vary if a different flour is used.
- **Coarse or uneven grain.** Insufficient beating of eggs, too much or not enough leavening, overmixing, tunnels due to not enough liquid or shortening, or overmixing.
- **Texture is too dry.** Batter too stiff, overbaking, too much leavening, or not enough sugar or shortening.
- **Texture is too crumbly.** Not enough liquid, too much baking powder, or oven not hot enough.
- **Tough or hard crust.** Overmixing, too much flour, or not enough sugar, shortening, or butter.
- **Irregular crust.** Peaks due to mixture being too stiff, overmixing, or oven too hot.
- **Crust is too smooth.** Too much liquid or overmixing.
- **Color streaks or spots.** Eggs and milk not blended well.
- **Irregular shape.** Too much flour, not enough liquid, overmixing, too much batter in pan, or oven too hot.
- **Dark color.** Too much sugar, oven too hot, or overbaking.
- **Pale color.** Overmixing, oven not hot enough, or underbaking.

Yeast breads & rolls

- **Tough.** Not enough shortening, insufficient proofing time, or overbaking.
- **Heavy.** Under-proofing or overmixing.
- **Poor flavor.** Wrong proportion of ingredients or fermentation time too long. Flavor notes are for a general-purpose white flour and might vary if a different flour is used.
- **Coarse or uneven grain.** Improper makeup, too much water, undermixing, or overmixing.
- **Texture is too dry.** Over-proofing, not enough water, or improper mixing.
- **Texture is too crumbly.** Not enough water or improper mixing.
- **Tough or hard crust.** Not enough shortening or butter, overbaking,



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insufficient fermentation, or too much rolling in flour.

- **Irregular crust.** Blisters due to improper makeup or too much rolling in flour.
- **Color streaks or spots.** “Crusting” during fermentation of dough, undermixing, or too much dusting flour during makeup.
- **Irregular shape.** Improper shaping, too much dough for bread pan, or insufficient proofing time.
- **Dark color.** Too much sugar or milk, insufficient fermentation time, or oven too hot.
- **Pale color.** Not enough sugar or milk, dough too warm during mixing and excessive fermentation, or oven not hot enough.

Layer cakes

- **Uneven layers.** Batter too thick or spread unevenly, oven trays not level, or damaged or warped pans.
- **Peaks in center.** Oven too hot in beginning, insufficient shortening, batter too stiff, excess gums or pregelatinized starches, insufficient moisture, excess flour, or incorrect leavening.
- **Shrinkage.** Too much water.
- **Undersized.** Short fermentation time, batter-specific gravity (a way to measure the air added into cake batter) too low, leavening too low, unbalanced formula, oven too hot or cold, improper mixing, or insufficient cake batter in pan.
- **Dark-colored crust.** Excessive top heat, sugar, milk, or corn syrup, or oven too hot.
- **Light-colored crust.** Oven too cold, milk or whey too low, pH too low, low sugar, or unbalanced formula.
- **Uneven baking.** Oven heat not uniform or variation in baking pans.
- **Tough.** Insufficient sugar or shortening, excess flour or egg white, improper flour type, or oven too hot.
- **Thick, hard crust.** Oven too hot or excessive baking.
- **Sticky crust.** Excess sugar or corn syrup, or improper cooling.
- **Soggy crust.** Excess water in cake or insufficient cooling before wrapping.
- **Cracked crusts.** Oven too hot or batter too stiff.
- **Heavy.** Insufficient leavening, underbaking, or excess shortening, sugar, or liquid.
- **Too light or crumbly.** Batter-specific gravity too low, excessive leavening, or excess shortening.
- **Coarse grain.** Excessive leavening or batter-specific gravity too low.
- **Poor symmetry.** Excess sugar, insufficient egg or flour, excessive leavening, oven too cold, or underbaking.



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Eggs & baking

Eggs provide a number of functions for baked products. They offer richness and structure, coagulation, foaming, and water-holding properties. They also act as an emulsifier and thicken icings and fillings. An egg wash can be used to brown the crust in specialty breads, provide texture and mouthfeel in muffins, or add volume (through aeration) in cakes.

Eggs provide the basic structure for a baked product due to coagulation. When eggs are heated or beaten, they coagulate, or turn mixtures from liquid to semisolid or solid. Coagulation binds ingredients together and provides structure.

