



THE ABCS OF INDUSTRIAL BAKERY MIXERS

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Whether you're scaling up production in your bakery facility or striving for optimal gluten development for a current product, choosing the best mixer for your purposes is a must. But having so many options can lead to confusion. Where to begin? We've broken down the basics below so you can proceed with confidence.

primary considerations

Batch Size

First things first. When our team works with you, we consider your operation's weekly production volume to determine the optimal batch size. The batch size will establish the mixer capacity. "Capacity" here refers to the size of the bowl necessary to hold your product. The bowl size takes into consideration the amount and type of flour as well as the dough hydration.

Type of Dough or Batter

Does your product require bread dough using yeast? Each bread formulation is inherently different. When considering a new mixer, a critical factor is the RPM of the mixer blade. The rate at which the mixing blade rotates can greatly affect final dough temperature and development. For example, a traditional white pan bread requires different mixer rotation speed than a high-hydration fermented ciabatta.

If your product is a batter, icing, or other non-yeast product, necessary considerations include the type of mixer attachment needed to produce the ideal result. Different mixer types can impart a varied level of torque. For example, the creaming process (the beginning part of a great cookie) requires a high level of torque to emulsify fat and sugar.

Functionality

Depending on the breadth of your product operation, you may need the versatility of one mixer that can accommodate many attachments (i.e., whisk, dough hook, or paddle). A small pie-making operation provides a perfect example: A paddle attachment would be the correct tool to properly incorporate fat into a flour mixture to yield a flakey crust. While meringue, on the top of a lemon meringue pie, would require a whisk attachment to create a pillowy texture.

Power requirement/space requirement

It is essential that your mixer's power requirements are aligned with that of the facility. If you're constructing a facility from the ground up, the design should accommodate these requirements and a professional design team will create a flexible floor plan that includes not only your current equipment but at your request, future equipment. If you are adding equipment to an existing operation, the design team can help provide layouts showing your desired mixer's dimensional footprint and workspace. Space is typically a limited resource. A carefully designed layout will optimize available space.

Process Flow

While a particular mixer may meet all the needs for your batter or dough, it's essential to look at how the mixer integrates with the downstream process. Consider how your product is transported from the mixing stage to forming, resting, or topping. For example, is it going to be tilted onto a table, wheeled over to a workstation, or deposited directly onto a conveyor?

After you've considered the above factors, you're ready to investigate the specific types of mixers available.

mixer styles



The first obvious difference in mixer styles is the orientation: vertical or horizontal. Vertical mixers are most suitable for small to medium size capacities (ranging from 10lbs to 500lbs). Horizontal mixers are more commonly used in larger-scale operations, with some as large as 5,000 lbs.

Vertical Mixers

Vertical Mixers are most likely to appear in a semi-automated production facility where flexibility is a priority. These mixers allow for different attachments and bowl styles.

Planetary Mixers

A planetary mixer, the "jack of all trades" mixer, consists of a stationary bowl and a mixing attachment offset from the center of the bowl. This configuration allows the dough or batter to uniformly shift from side to side in the bowl. This shifting imparts high levels of friction, which can translate to warmer and rougher mixing. Typically, a bread dough that contains roughly 5 to 10% fat (or higher) would be suitable for a planetary mixer. The higher fat content helps to coat the flour starches and prevent preemptive gluten development. Planetary mixers are commonly found in commercial kitchens and retail baking operations.

Pros

- Available in a variety of sizes with many attachments
- Can accommodate a vast number of products, including icings, cookies, and cakes. In fact, I have toggled between batches of Salted Rye Bread, Short Cookie Dough, Chiffon Cake and Vanilla Buttercream all on the same planetary mixer in a single shift.

Cons

- Planetary mixers cannot accommodate a wide range of batch sizes
- Creates a higher final dough temperature to meet proper gluten development

Spiral Mixers

Spiral mixers simulate hand kneading of bread or any yeasted dough. They have a rotating bowl with a rotating spiral-shaped attachment and are available with options for a fixed, removable or discharge bowl. Spiral mixers gently handle dough by mixing smaller portions of dough at once while the remainder has time to rest. This method accommodates softer/more artisanal doughs.



Pros

- Allow for range of batch sizes as they can effectively mix or grab as little as 10% of their capacity
- Gentler/less friction-reliant mixing – lower margin of error
- Lower dough temperature for optimal gluten development

Cons

- Not versatile for varying products. Spiral mixers are used only for yeast dough.

Fork Mixers

Fork mixers are a newer addition to the mixer market. While spiral mixers copy the kneading motion, fork mixers simulate a very delicate folding motion. The bowl is either free-floating, reliant on the interaction between the fork and bowl to spin it, or a motor-driven rotation bowl. The fork attachments come in two- or three- pronged variations and the bowls are offered as fixed, removable, tilt or discharge.

Pros

- Superior for high hydration, delicate dough
- Low friction and gentle on dough

Cons

- Not as effective for doughs below 50% hydration
- Slower mixing time

Twin Arm Mixers

Twin arm mixers are created to closely resemble the motion of two human arms working in harmony to knead dough. The bowl rotates while the arms move in sync vertically. Twin arm mixers are best suited for high-hydration doughs or low-hydration and low-protein doughs, such as American style biscuits or graham cracker crust. The end products of the twin arm mixer are extremely high quality due to the low levels of friction.

Pros

- Produces high quality end products
- Low friction and gentle on dough

Cons

- Longest mixing times
- Must be low protein or high hydration dough
- Does not accommodate smaller batch sizes

Horizontal Mixers

Horizontal mixers are more commonly seen in sizeable operations, as these mixers can hold a large amount of product (some as much as 5,000 lbs.).

Horizontal mixers are typically incorporated into highly automated production lines. They can easily be oriented to match the layout requirements of such production lines because they are customizable with respect to orientation of the components and can easily be integrated into automated production lines.

Primary factors to consider when selecting a horizontal mixer are the agitator type and the frame type. The agitator type will be determined by the kind of product being produced. Here is a quick breakdown:

Sigma Arm (Single and Double) style agitator effectively incorporates flour and other dry ingredients together with fat in a low hydration dough. Some examples of products it accommodates are short dough or molded cookies, crackers, corn tortillas, muffins, stiff fillings, granola, and sweet doughs.

High Shear type agitator works in more of a whipping facet. It is best suited for whipped creams or toppings, icings, slurries, and cream/pudding fillings.

Roller Bar mixers (typically triple bar) handle higher protein yeast doughs. Bagels, bread doughs, dinner rolls, pizza dough and English muffins are some of the more common products roller bar mixers can produce.

Frame Type: Enclosed vs. Open

Horizontal mixers are often available in both enclosed and open styles. The enclosed style is best suited for a harsh environment with heavy washdown and sanitation requirements. The open frame tends to be more suitable for an environment with less dust and airborne particles. Mixing is most often at the very beginning of a food processing line. Therefore, choosing a mixer that will consistently produce your unique product and accommodate your downstream needs will help to accomplish your specific goals.

making it work

Choosing the right mixing equipment for your bakery operation is vital, but the proper integration of this equipment within your facility requires expertise. Also essential is maintaining equipment and the operating environment. Take time to research, talk to vendors, and consult a firm with considerable process and facility design experience to protect your investment.

For assistance with your bakery expansion, renovation, or new building project, contact us here. ■