Choosing & using the right **kneading system**

Everything you need to consider **when creating the perfect dough**

DIOSNA

Expertise and **process know-how**

Choosing the right mixer depends on many factors: Properties of the raw materials, required dough yield, targeted kneading time, temperature, and moisture, as well as dough stability with regard to preparation for further processing, and much more. Also, external factors influencing the process must be kept in mind, like exterior temperature.

The launch of DIOSNA's L-shaped mixer triggered the mixer evolution. The way it processes the dough imitates kneading by hand. The kneading arm moves the dough in an elliptical shape from the centre of the bowl towards the edge. This results in a high, homogeneous quality.

The first wendel mixer was developed as early as 1968. These high-performance systems are suitable for all types of dough and bring a new level of efficiency in larger businesses.

This was followed by the spiral mixer. These systems are convincing due to their compact design, versatile application possibilities and easy cleaning. Even the smallest batch sizes can be variably processed.

- **How to choose the right kneading machine for your purposes** and what you should pay special attention can you find in this whitepaper. The information is rounded off by a helpful checklist that you can use as a basis for an efficient counselling interview.

Mixer applications in the food industry

The quality of your baked goods starts with the right kneading. If a system is selected that is adapted to the production conditions, the prerequisites for optimal results are already in place.

In many companies, the choice of kneading machines is based on the given space. Not infrequently machines are integrated into an existing production hall with running systems or entire production lines are coordinated with them. Budget is also often a decisive factor in the purchase of a mixer.

As a rule, the decision is made between spiral and wendel mixers. Both systems are highly regarded and can be fully automated with a bottom discharge function via belts, in troughsubs or a linear transport with bowls.

One of the most important issues in larger companies is cleaning. For this reason, only premium machines are used here. Preferably in a high-quality stainless-steel version, as surfaces are particularly easy to clean. To further optimise the cleaning processes, we have developed Hygienic Design machines.

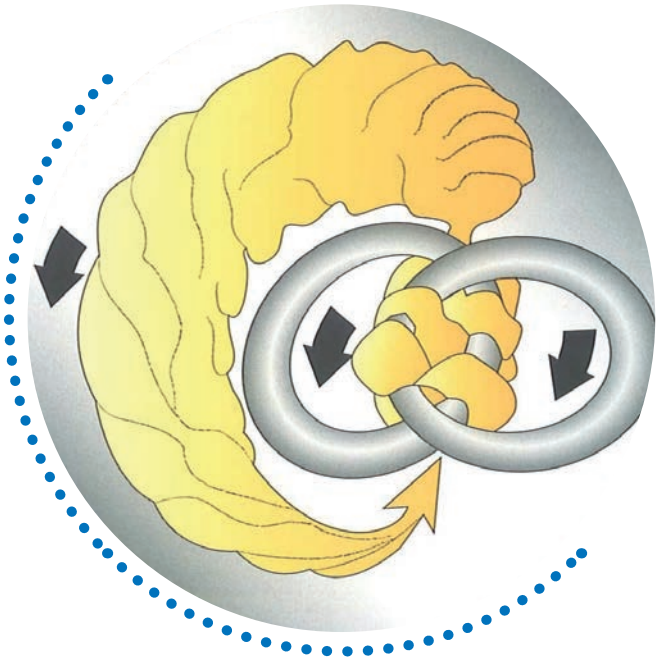
These systems are available as wendel mixers with bottom discharge or with a movable bowl. Thanks to the open construction with stainless steel profiles and free accessibility of all elements, faster and more thorough cleaning and a reduction of deposits is possible. In addition, surfaces are hygienic to prevent microbial and particulate contamination of the end product.

Purpose of the mixer

The decision between a spiral and wendel mixer is strongly dependent on the product and batch size. Medium and large batches of, for example, bread roll dough with a dough yield between 154 and 156 work equally well in both systems, as well as baguette doughs with a water content of 65 to 68 % measured by the flour quantity. Only for small quantities the application engineers advise against using the wendel mixer. The reason: For reproducible results with a satisfactory kneading, a filling of 50 % is required. Here the spiral mixer is the right choice, as it can handle even the smallest quantities.

For very watery ciabatta doughs, the usability of wendel mixers is improved by frequency converters, which control the speed of the bowl and tool independently of each other and thus creating an optimal kneading process. In combination with a frequency converter, a filling level of a filling of 30 % is sufficient.

Spiral mixers are recommended only to a limited extent for most doughs and are not the first choice for halva or protein bars. Wendel mixers, especially if they are equipped with a frequency converter and, if necessary, with special tools, are very well suited for these dough groups.



Following the practitioners, the advantages of the kneading systems also depend on the stickiness of the respective dough. This is clearly evident in the category of mixed breads with a rye content of more than 60 % and a dough yield of 180. For medium and large batches, the experts recommend the wendel mixer for medium and large batches, but the spiral mixer for small doughs, and without a centre discharge. The reason is obvious: if the dough sticks, dough residues stick to the bowl when it is emptied, it must be reworked by hand.

The **most common mistakes** when using kneading machines

In many bakeries, poor dough quality or process disturbances are sometimes reported. But what is the reason for this? We analyse the most common mistakes:

The dough is...

- **...not kneaded out.**
  If your dough does not have the desired or expected quality, it is often because of a short kneading time.
- **...too warm and therefore behaves differently.**
  Especially in the summer months, dough is often too warm. The reason is that the flour stored in the silo becomes too warm and gives off heat accordingly.
- **...too cold.**
  Here we have the opposite phenomenon, which occurs, for example, in winter, when the flour stores are surrounded by ice. Also, in summer dough can quickly become too cold due to the addition of ice.
- **...too soft.**
  Check your ingredients and the function of the silo system. Have you made a mistake? Did you make a mistake when weighing the products and is the scale accurate?
- **...too firm.**
  Do you still work with the original recipes? In the passage of time and the use of new machines recipes should always be adapted to remain marketable and easy to process. Furthermore, proper preparation of the machines is always the foundation of optimal production.

In the event of any of the above problems, it is always recommended to get technological instructions from the manufacturer. Subsequent training for new or changing personnel is also advisable to ensure faultless operation and best dough quality.

Note the **special features!**

Wheat

- Wheat flour can be used to make numerous products. When producing pretzel dough, it should be ensured that the bowl has toothing. Due to the very firm dough, it would otherwise be possible that the grating wheel could spin.

- Puff pastry or Danish pastry should also have toothing, as the rather cold doughs could form condensation on the rim of the bowl, which can cause a similar problem at the grating wheel.

- For ciabatta doughs, the integration of a frequency converter is recommended to ideally adjust the machine to the dough. To use the energy optimally, the speed of the bowl and the kneading tool can be controlled independently of each other.

Rye

- Rye doughs are often very sticky due to the high dough yield. It is therefore recommended to knead the batches with mobile bowls. If the bowl is emptied in the middle of the bowl, dough residues would always require manual cleaning.

- An automated solution can be carried out in the linear transport process.

Raisins

- When making dough in conjunction with raisins, a wendel mixer is the best solution, since the raisins are not crushed during the kneading process. When using a spiral mixer, the fruit run should be used. In this case the bowl rotates to the right and the wendel tool to the left. (CS03 control necessary)

Conclusion

The wendel mixer is the latest development in the mixer evolution. This innovative solution is becoming more and more popular in modern bakeries. Artisan bakers have also made the transition from the L-shaped to the spiral mixer. Due to the increase in quality of the doughs with the same flexibility, this step is also absolutely recommendable. The wendel mixer offers a better kneading, higher water absorption and less dough heating than a spiral mixer.
In addition, the heat and energy input of the spiral mixer is much higher than that of the wendel mixer, because with the spiral, both the mixing and the kneading take considerably more time.

However, anyone who believes that they can make a qualified decision just with the technical or technological differences alone could be on the wrong track. It is not only the kneading machine that counts, but the interaction with the entire process chain. The capacities of the individual
process steps should also be coordinated with each other such as the product range to be produced with this line. It makes little sense, for example, to produce large batches if these cannot be processed quickly enough, so that the dough quality changes during this process step. This requires either a continuous adjustment of the control system of the downstream which is almost impossible to realise, or the acceptance of quality fluctuations in the end product.
Several smaller batches limit the problem to a minimum. However, if the same hourly output is required, more mixers may be necessary. At this point, at the latest, a gap between technology and economy opens.

The choice of a kneading machine is therefore easier said than done. To make the best choice for you and your company, it helps to fill out the following checklist and then look for professional advice.

- **Contact us now and request a free consultation.**
  Phone +49 541 33104-0
  Mail leadteam@diosna.com

FIND YOUR IDEAL KNEADING SYSTEM!

Checklist

Finding the right mixer for your company is not easy. Use our checklist to make your free consultation even more effective.

Which mixer do you currently use?
- ☐ L-shaped mixer
- ☐ Spiral mixer
- ☐ Wendel mixer
- ☐ Other: _____

What is your goal?
- ☐ Automated production
- ☐ Long dough rest
- ☐ Production of different products
- ☐ Production of many small doughs

How big are your batches?
- ☐ max. 120 kg
- ☐ max. 160 kg
- ☐ max. 200 kg
- ☐ max. 240 kg

How many batches per hour do you want to produce?
- ☐ 2-4 pcs.
- ☐ 3-5 pcs.
- ☐ 4-6 pcs.
- ☐ 5-7 pcs.
- ☐ Other: _____

Which doughs do you want to produce?
- ☐ Raisins
- ☐ Soft doughs (dough yield < 170)
- ☐ Firm doughs (dough yield > 155)

Which machine filling do you aim for?
- ☐ 50 %
- ☐ 30 %
- ☐ < 30 %

What degree of automation do you aim for?
- ☐ Manual addition
- ☐ Flour filling directly into the mixer
- ☐ Flour filling into the bowl

Which control system is connected?
- ☐ None
- ☐ Winback
- ☐ Proleit
- ☐ Other: _____

Are ingredients to be added by hand?
- ☐ No
- ☐ Fat
- ☐ Salt
- ☐ Nuts
- ☐ Raisins
- ☐ Chocolate
- ☐ Other: _____

Do you use an elevator tipper?
- ☐ Yes
- ☐ No
- ☐ In Zukunft Ja

Are you interested in additional services?
- ☐ Technical After Sales Service
- ☐ Technological training

Do you need other equipment besides the kneader?
- ☐ Hopper
- ☐ Table (hand weighing)
- ☐ Other: _____

Any Questions? We will gladly advise you:
+49 541 33104-721 | leadteam@diosna.com

About us
DIOSNA - Quality Made in Germany

The complete range: DIOSNA's machine engineering and technology offers everything from compact systems for small-scale operations to fully automated solutions for large-scale operations. The product portfolio for the food industry includes the most important processes of dough production from dosing, pre-dough preparation and kneading to transfer logistics - for research, pilot and industrial production. It also offers mixers, granulators, dryers and coating systems for the pharmaceutical and cosmetics industries.

Joint product development with the customer, process planning as well as optimisation, efficient project management and comprehensive after-sales and value-added services are continuously optimised and customer-centred yesterday, today and tomorrow.

That is why DIOSNA's customers have appreciated our quality, performance, competence and philosophy for over 135 years.

Author: Andreas Burlager, Product manager Sales Bakery, Diosna Dierks & Söhne GmbH

About the author: Andreas Burlager works for DIOSNA Dierks & Söhne GmbH in Osnabrück as „Product Manager Sales Bakery". He studied food technology in Hanover (degree DQR 7: State-certified food technician) and joined the technological sales force at DIOSNA in June 2018. After taking over the team management of technology in the following, he has been supporting the DIOSNA sales team as a product manager in the bakery area for 2 years.

DIOSNA Dierks & Söhne GmbH
Am Tie 23, 49086 Osnabrück, Germany
+49 541 33104-0
info@diosna.de
www.diosna.com