

# Basis for innovation



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Responding flexibly to the market's requirements through simple recipe change in continuous production

**+** Whole-grain flour rather than wheat flour, organic products rather than standard ones, cookies in trendy colors, ingredients that will surprise your taste buds or even a brand new production concept? A plant engineering company can surely not satisfy all wishes, but it certainly can provide producers with the right tools to become innovative. The first one would be a plant design that offers a high level of flexibility.

In day-to-day production, systems should run smoothly around the clock, leaving little room for innovations and changes. However, producers must adapt to the preferences and tastes of the consumers in order to maintain their position on the market. These might include new ingredients such as the increased use of whole-grain flour, but it can also mean varying the raw material quantities or giving in to the trend of bread vending machines found in discount stores. Without the appropriate plant flexibility, components and processes, many innovative approaches will simply be nipped in the bud, regardless of which concept is to be implemented. A plant engineering company must therefore provide producers with a plant concept that

leaves room for new ideas while securing the investments made. Zeppelin Systems succeeds in many ways with its innovative small-quantity dosing unit, continuous production, intelligent control and modern hygienic concepts.

## Flexible dosing

One part of a flexible plant concept is the minor ingredient dosing unit. Like many other innovative systems, the KOKEISL system is impressively simple. The KOKEISL technology consists of a few components only and is therefore very easy to clean. The externally powered fluidizator is the only element in the product area. All

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surfaces in contact with the product are made of stainless steel and the seals conform to the FDA regulations, enabling easy WIP (wash in place). Frequent product changes are also no longer an obstacle thanks to quick cleaning.

The dosing units that work with an aperture valve technology feature a very large operating range. The KOKEISL fluidizator separates the bulk material from the hopper wall while slightly lifting it. Thanks to the KOKEISL fluidizator, operators obtain a constant flow despite variable flow rates. Even bulk material with poor flow characteristics is reliably discharged by gravity. The large dosing capacity range (coarse and fine flow ratio) enables easy product changes with a flexible filling station.

The dosing slide serves as a valve as well as for dosing. The component does not require any additional end cap that would prevent product loss at the end of the dosing process. A vibrating floor is also generally not required.

Replacing the dosing screw with the KOKEISL system is one of the greatest advantages as it enables an increased dosing capacity. Moreover, any amount of a wide range of bulk material can be discharged from the product flow with extreme precision and efficiency, allowing easy dosing of a few grams to several hundred kilos. Depending on the task, scale controls or an SPC module is used for intra-plant weighing and dosing. The KOKEISL system's gravimetric principle treats the product extremely gently and the system can easily be integrated into the automatic Zeppelin ingredients dosing system MinDos. This system can be applied to various plant concepts and includes a scale for minor ingredients which is mounted on a weighing frame with three load cells. From there, the ingredients are conveyed pneumatically. This clears the way for flawless recipe management.

### Flexible production

Flexibility is also a top priority with the Zeppelin Codos®System. The continuous mixing and kneading system has revolutionized the production of baked goods and snacks over the past years by intelligently combining raw material

conditioning and the kneading system. Research has shown that the way of adding raw material into the kneading process, for example the feeding location, amount, solid or liquid, considerably influences the end product, even after the baking process. The Zeppelin Codos®System always produces according to the same predetermined parameters to obtain baking results with very consistent texture and optics.

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Codos@System





++ figure 3

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MicDos ingredients  
metering plant from  
Zeppelin with built-in  
discharge and dosage  
module type KOKEISL

The main components of this highly compact system are the Codos®Mixer and the Codos®Kneader. A batch helical spiral mixer that produces a premix is located upstream the Codos®Mixer. A gravimetric dosing unit monitors the continuous addition of all ingredients, including the liquids. Interlocking spirals in the mixer ensure a thorough and gentle mixing of all dough components as well as an optimal wetting. At the end of the process, the Codos®Mixer discharges the homogenized raw materials onto a transfer belt that will transport the mixture to the Codos®Kneader.

Another advantage of the Codos®System is its high degree of flexibility – it can process nearly any dough. Process control offers a wide range of options: the Codos®System is a relatively open construction which allows breakable ingredients such as flakes, or fresh and delicate fruits such as blueberries to be flexibly incorporated into the mixture at the end of the kneader. Thanks to the kneader's gentle product handling, the ingredients remain nearly intact. Although continuous kneaders are generally smaller in volume compared to batch kneaders, they feature a larger specific surface area which enables a better heat transfer and a more precise heating/cooling of the products. Many fresh and long-life baked goods producers around the world

now use the Codos®System. The clients are particularly impressed by the fact that the raw materials can be added to the dough at various process steps, allowing for easier recipe and product changes.

### New process concepts

Sourdough production is an excellent example to show that a new process concept leads not only to more flexibility in production but also to improved quality. Normally, sourdough is leavened in one or more stages in dough trays and dosed manually – an elaborate and labor-intensive process. This led us to developing the automatic batch process and continuous sourdough production. For the latter, all the raw materials are dosed continuously. Using a vertical mixer, flour, water and starter are mixed homogeneously and free of lumps before the dough is pumped into fermentation tanks to ferment. The tank sizes are selected according to the desired fermentation rate. Using a heat exchanger, the starter is cooled to 5°C and stored in a cooled insulated tank. That way, sourdoughs can be stored over a longer period of time until further processing. Furthermore, fermentation times and temperatures can be modified which is useful when, for example, other flours are used. Production capacities can be easily expanded at a later stage. The producer benefits from the continuous process plant concept that not only ensures constant quality but also facilitates plant cleaning to fulfill the most stringent hygiene requirements.

### Flexible controls

Modern plants in the food industry must guarantee production with a high level of quality and safety. State-of-the-art and flexible production processes would be unimaginable without the appropriate automation technologies that fulfill the demanding requirements relating to process stability, repeatability and quality control. Exact weighing, precise dosing and control of the temperature within the smallest margins are standard in any modern production process. Precise recording, controlling and documentation of the parameters can be achieved only with the most sophisticated automation and control technology. All of Zeppelin Systems' automation

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++ figure 5



concepts are designed to fit perfectly to one another and to fulfill all the requirements of the food industry. We offer everything from simple scaling to fully automatic production with connection to the Internet. Many companies have been using the Zeppelin PrismaWEB<sup>2</sup> batch management system with great success for years now. The system documents every recipe change and allows tracking of all batches delivered and raw materials supplied. This provides a maximum of security as it enables production managers to react quickly if necessary.

#### Unconditional safety

The topic of quality assurance has gained in importance considerably over the past few years. This is mostly due to the aspect of hygiene. Zeppelin Systems is a pioneer in creating standards for the hygienic design and construction of components in food production. The company has been an active member of the EHEDG (European Hygienic Engineering & Design Group) for many years and takes part in the elaboration of related standards. The topic of hygienic design covers more than that of a single machine; this aspect must be taken into consideration for the complete production line as well. This means, for example, easier access to the plant for better cleaning methods, or the use of protective systems such as silo drying, the integration of sifters to prevent the

ingress of impurities and last but not least, highly efficient supply and exhaust air filters. Construction material aspects such as the design of surfaces for easier cleaning should also be taken into consideration.

#### Conclusion and outlook

Innovation does not only mean designing intelligent plants and components, but starts with the right questions: how can hygienic production be implemented so that it remains affordable and unburdens the producers in their day-to-day operations? Can a batch process be converted into a continuous process although it has not really worked in the past? Is a dosing screw always the best solution when it comes to changes in ingredient amounts? Zeppelin Systems has already found the answers to these questions. Producers benefited from the practical implementation of these ideas. They were often seen as trend-setters when their production facility also got revamped by implementing continuous dough processing, including the modernization of the piping design and selection of new valve systems – a considerable advantage in terms of hygiene. Zeppelin Systems will surely not run out of ideas in the future to make production processes for the food industry safer and more efficient without compromising the hygiene and safety aspects. +++

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Zeppelin Systems handles the entire automation hierarchy and can therefore guarantee seamless process automation. The right program for every level

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With the web-based batch management system there are no limits to modern production control.