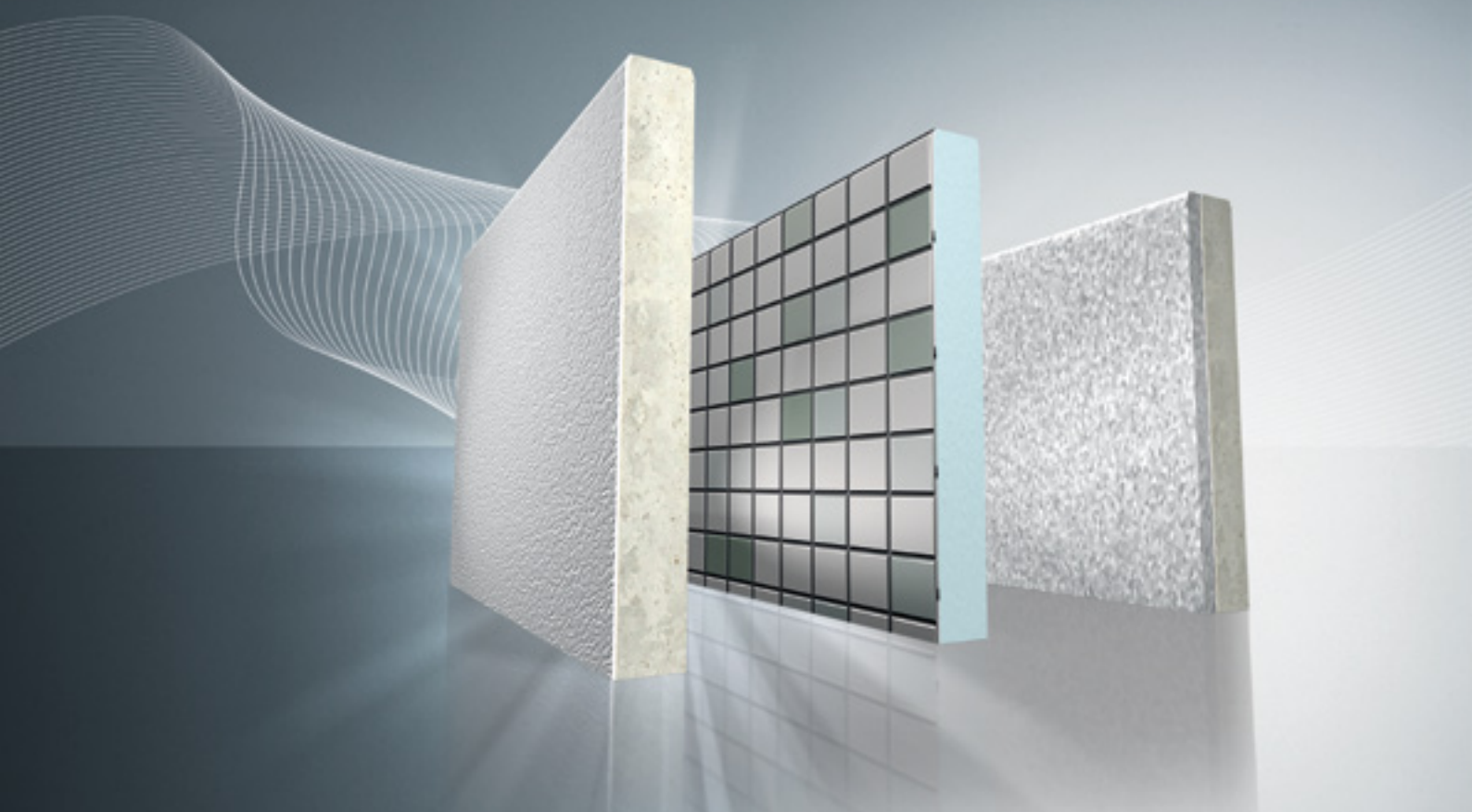




SYSTEM SOLUTIONS FOR THE BUILDING MATERIAL INDUSTRY



ALWAYS THE RIGHT MIX



ECONOMICALLY EFFICIENT MIXING AND PREPARATION



INTEGRATED DEVELOPMENT OF SYSTEM SOLUTIONS

LÖDIGE SOLUTIONS

- Mixing
- Granulating
- Homogenising
- Drying / cooling
- Encasing / coating
- Recycling



The building material industry – a major economic factor

As a traditional economic sector, the building material industry is an important driver of innovation for the entire construction industry. In Germany alone, approx. 150,000 people employed in this industry generate an annual turnover of 35 billion EUR. 600 million tons of mineral materials are produced, processed or prepared every year. Add to this the materials referred to as „secondary raw materials“ e.g. recycled building materials and slag. With modern production processes and products, this industry makes a major contribution to sustainable economic development. The products of this industry are vital for high-quality construction – this is true for cultural monuments like the Cologne Cathedral or the Frauenkirche church in Dresden just as much as for renovating the bathroom in your own home. The building material industry is always involved.

Lödige then turns the process engineering concept into a system of sturdy machinery and practical controls. State-of-the-art production systems and certified production methods guarantee adherence to system properties and the delivery schedule. Specialised fitters and commissioning engineers install the supplied systems worldwide and integrate them, expertly and on time, in our customers' plants. Our maintenance and repair service is reliably available for you around the clock, a service that is particularly essential in the case of harsh operating conditions.

Project success through collaborative partnership

The production processes in the building material industry make great demands on machines and systems. We work closely with our customers when developing the concept for an ideal solution. It is our aim to use an integrated approach in order to design and implement a processing system of the highest quality. Our experienced process engineers provide extensive consulting services in the concept phase in order to generate an approach to a solution. Practical trials at our well-equipped Technical Centre ensure the best possible design of the system.





LÖDIGE MIXERS FOR ALL APPLICATIONS IN THE BUILDING MATERIAL INDUSTRY

Insulation systems

- Insulation board mixtures
- Insulating material adhesive / plasters
- Silent surface materials
- Pore forming material mixture
- Styrofoam insulation agent

Plasters / mortars / screed

- Blast-furnace cement
- Colored plasters
- Exterior plasters
- Finishing plasters
- Grouting compounds
- Interior plasters
- Masonry mortar

Gypsum and plasterboards

- Drywall mixtures
- Joint filler for gypsum pallet systems
- Plasterboard mixtures

Additional construction chemicals / Additives

- Setting retarder
- Cellulose
- Fibre materials
- Fly ash / Slag
- Highly hydraulic lime
- Hydrated lime
- Pigments
- Quick-curing agent
- Powdered clay
- Cement

Bricks and fire-proof compounds

- Ceramic filter compounds
- Fire-proof compounds
- Kiln lining materials
- Mixture with paper fibres for bricks
- Roofing tile compounds

Adhesive and fillers

- Flex adhesive
- Tile adhesive
- Colored joint mortar
- Joint mortar
- Fillers

Structure protection

- Bitumen powder and chamotte powder
- Sealing compounds
- Waterproofing agents
- Wood protection agents

Concrete pre-mixtures

- Concrete screed
- Finished concrete pieces
- Leveling compounds
- Special concrete



LÖDIGE SYSTEMS GUARANTEE QUALITY AND COMPETITIVENESS

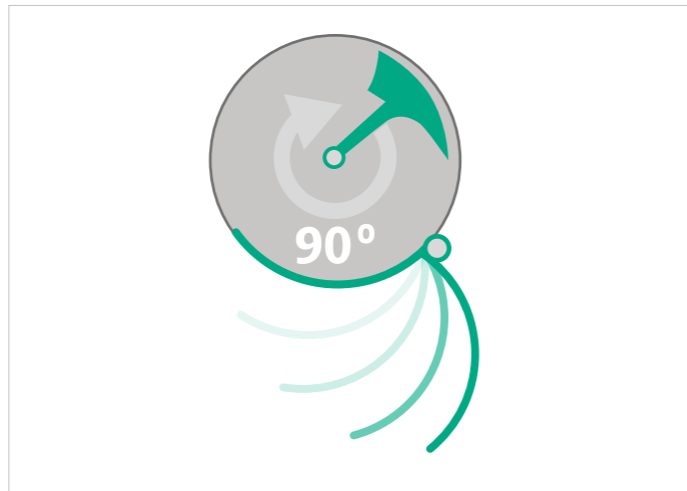
Lödige mixing and preparation systems for the building material industry do more than just ensure the best mixing homogeneity in the shortest possible mixing time. They are also characterised by wear resistance, maintenance-friendly design and a long service life, features that are essential for economically efficient production. Thus, our systems contribute significantly to ensuring our customers' competitiveness and product quality.

Thanks to a combination of short mixing times and optimised discharge systems, high numbers of cycles are possible. The result is a notable increase of the production volume, while the mixer size remains the same. Moreover, the sophisticated discharge system significantly minimises residue volumes, which leads to a considerable reduction of the effort and time required for cleaning in the event of recipe changes. Short mixing times are yet another advantage: A significant reduction in energy consumption can be achieved provided the drive power is optimally adapted.

The optionally combinable, standardised assembly groups for dosed, even product discharge ensure that the product does not separate as it is transported further.

Use of specific product-adapted sealing systems ensures a long service life for the heavy-duty machine. Easy accessibility for inspections and cleaning as well as replacement of wear parts reduces the time and effort required for servicing and decreases downtimes. Materials and surface characteristics have been selected and processed so that they are resistant to severe wear. This is how Lödige guarantees long service lives.

Well-tested mixing tools that were developed through numerous trials and applications are optimally configured for any mixing task to achieve a consistent product quality.



90° opening angle of the discharge door on a Lödige Ploughshare® Mixer type DBE. Ideal for residue-free discharge and minimising the time and effort required for cleaning



Lödige Ploughshare® Mixer for batch operation, type DBE 2000, with discharge system across the entire container length. Lödige Ploughshare® Mixers for batch operation, type DBE, are built for gross volumes from 130 l to 6,000 l.



Lödige Ploughshare® Mixer for batch operation, type DBE 3000, with open door in special building material design

MODES OF OPERATION OF LÖDIGE MIXING SYSTEMS MIXING AND PREPARATION IN A HORIZONTAL SYSTEM

Ploughshare® Shovels arranged on a horizontal shaft in a special system rotate as mixing elements in a horizontally fitted, cylindrical mixing drum. The size, number, positioning, geometrical shape and the circumference speed of the mixing tools are adapted to each other such that they set the components filled into the mixing drum into a three-dimensional motion. The turbulence stimulated in this way in the mix – the entire material is permanently in contact with the mixing tools – prevents the formation of dead zones or zones with poor movement in the mixing chamber and supports quick and precise mixing.

Due to the special shape of the mixing elements, the mix is removed from the drum wall during the radial movement and crushing of particles between the drum wall and the mixing tools is prevented. This makes the mixing and fluidisation process destined for mixing processes for components with very different characteristics regarding bulk density, grain size, rheological properties and percentages by mass.

Especially for the materials being processed in the building material industry, modified ploughshare-like shovels, also referred to as "Becker Shovels", achieve this effect even more specifically. Provided the operating parameters in special applications are observed, this mixing tool type can even achieve advantages with regard to mixing time and the specific energy requirement. For specific mixing tasks it may become necessary to support the effect of the mixing unit by using separately driven choppers rotating at high speeds.



Lödige Ploughshare® Mixer type FKM 2000 D for batch operation with special Ploughshare® Shovels in serrated version



Principle of the mechanically generated fluidised bed.



MIXING AND GRANULATING SYSTEMS

Machines for product development

The functional principle of Lödige Laboratory Systems is identical to that of Lödige production machines. They therefore enable product development under real industrial conditions. A scale-up of the parameters determined in tests and the knowledge gained here on product behaviour to production scale is possible without restriction.



Lödige Ploughshare® Mixer (laboratory machine) with fixed container. Sizes 5, 10 and 20 l; optionally with machine support

Machines for small-scale production

The specific criteria for mixing tasks with small production quantities or batch sizes are met by graded machine sizes and equipment for manual handling or semi-automatic operation. For special applications, the machines can also be equipped with automated loading and emptying systems. The advantages of this system design are particularly evident in variable applications, such as with frequent product changes or the need for flexible process handling. Application-adapted machine technology ensures high system availability with reduced service intervals. The possibility of fast and comprehensive cleaning is guaranteed by a suitable machine design.



Lödige Ploughshare® Mixer for batch operation, type FKM 450 D, with sack chute and discharge station

CONTINUOUS MIXING AND GRANULATING IN A HORIZONTAL SYSTEM

The Lödige Ploughshare® Mixer for continuous operation uses the same mixing and fluidisation process. The throughput volumes of this mixing system are high and can be varied based on retention time, filling level and component properties. Even in continuous mode, the process can be performed at filling levels between 20% and 50% without any impact on the mixing quality. The mixing tools are set so that there is constant remixing for the duration of the retention time before the finished mix is guided toward further processing steps through the discharge opening. The size of the discharge opening set by a slide or adjustable weir has a significant effect on the retention time.

The Lödige Ringlayer Mixer is characterised by a wide application range for mixing, moistening, granulating and densification tasks.

The system is based on the high peripheral speed of the mixing tools of up to 40 m/s, the resulting centrifugal force forming a concentric annular layer of product. The shearing intensity in the profile of the annular layer is strong, due to the significant speed difference between the rotating, specially shaped mixing tools



Lödige Ploughshare® Mixer for continuous operation, type KM DW with internal weir

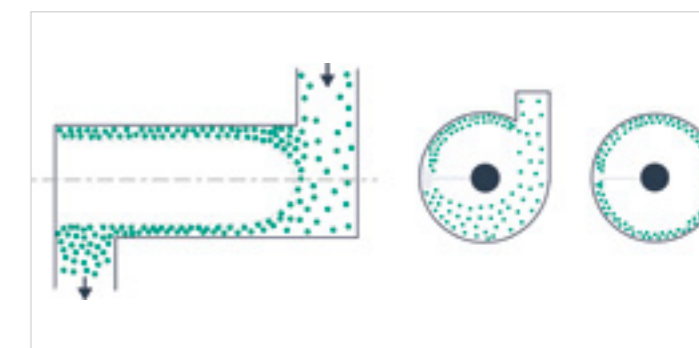
and the mixer wall. The filling level and speed, geometry and mixing tool settings as well as the mixing drum length and volume throughput affect the retention time. The system provides the option of dividing the mixing compartment into zones with different shearing intensities. This permits ideal adaptation to varying product properties. Liquid components are guided directly into the product annular layer – this ensures a homogeneous distribution of liquid within the product. Unwanted moistening of the mixing shaft and mixer wall are prevented. CoriMix® systems are equipped with opening drums for easy cleaning throughout their entire length.



Lödige Ringlayer Mixer type CoriMix® CM 350



Special version with replaceable wear lining in a mixer type KM D

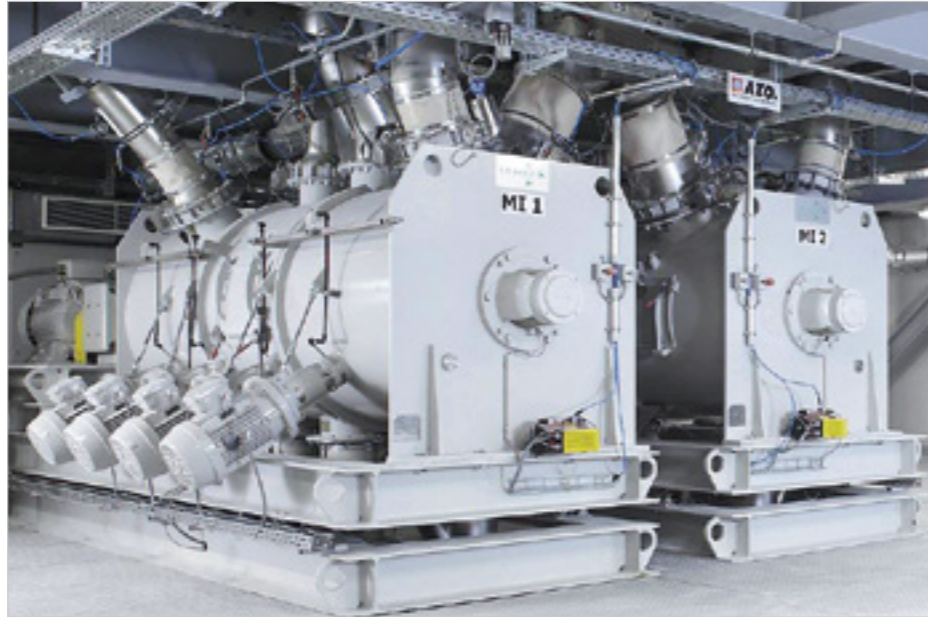


Principle of the Ringlayer Mixer



SOPHISTICATED INSTRUMENTATION AND CONTROL TECHNOLOGY FOR READY-FOR-USE SYSTEM SOLUTIONS

Instrumentation and control technology is developed and supplied in coordination with the plant manufacturer or operating company. Modular components offer the option of implementing a variety of automation levels up to and including integration into the central operation controls.



Lödige Ploughshare® Mixer for batch operation, type FKM 4200 D for preparation of special adhesive



Lödige Ploughshare® Mixer type FKM 1200 D with automatic bagging



Lödige process unit with heating/cooling jacket for preparing special mixes

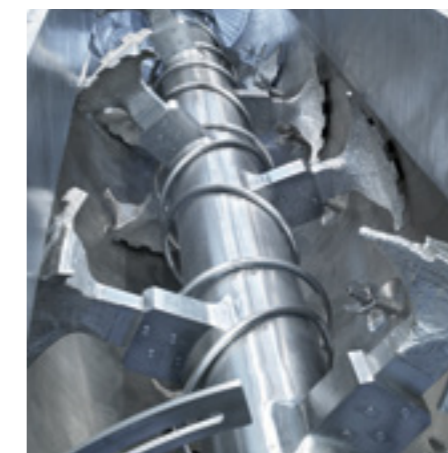
QUALITY DOWN TO THE SMALLEST DETAIL FOR PERFECT CUSTOMER-SPECIFIC SOLUTIONS

Top machine quality ensures the maximum service life and high availability of the system, bearing in mind the product-specific plant specifications. As a solution and service provider, we ensure the high quality of the systems we supply with our qualified after-sales service. After all, only precision down to the smallest detail can guarantee the long-term function of a system. By adapting the mixing system and the integral system components to the requirements of the manufacturing process, we ensure that the product quality meets our customers' high demands. Starting with assembly or monitoring thereof through mechanical and process engineering start-up, Lödige also offers its consulting expertise for inspection intervals, performing inspections and stock-keeping of spare parts. Lödige can also provide advice on matters of process optimisation or conversion, e.g. if new tasks arise for a plant. Moreover, we train our customers' personnel in the operation and maintenance of the machines and control systems.

With over 30 machines, the Lödige Technical Centre in Paderborn/Germany offers a wide variety of options for performing trials. Moreover, our customers can make use of the rental machine service, e.g. for performing test series at their own premises.



Lödige Ploughshare® Mixer for batch operation, type FKM 2400 D in special version adapted specially to customer requirements



Mixing elements in serrated version adapted ideally to the task



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Lödige offers high-quality partial systems and services for process engineering applications in various industries in the fields of mixing, granulating, coating, drying, reacting and related processes. Our motivated employees and their expertise in processes, development and production are the key to our success and the success of our partners all over the world. Focusing on core industries and proximity to our customers through local presence is a crucial component of the positive development of our company.

Lödige was founded in 1938 and is a family-run company in the third generation. With the invention of the Ploughshare® mixer, Lödige provided the industry with a mixing unit that can cover a wide range of different processing tasks. This unit forms the basis for numerous innovations in the field of mixing and processing technology.

Industrial mixing and processing technology has been significantly influenced by Lödige and will continue to be so in the future. Over 500 patents and more than 35,000 machines and systems delivered demonstrate the extent of our experience in developing customised system solutions. With a staff of over 500, Lödige is an internationally operating company and supports its customers with a network of subsidiaries, technical offices and representatives.

ALWAYS THE RIGHT MIX