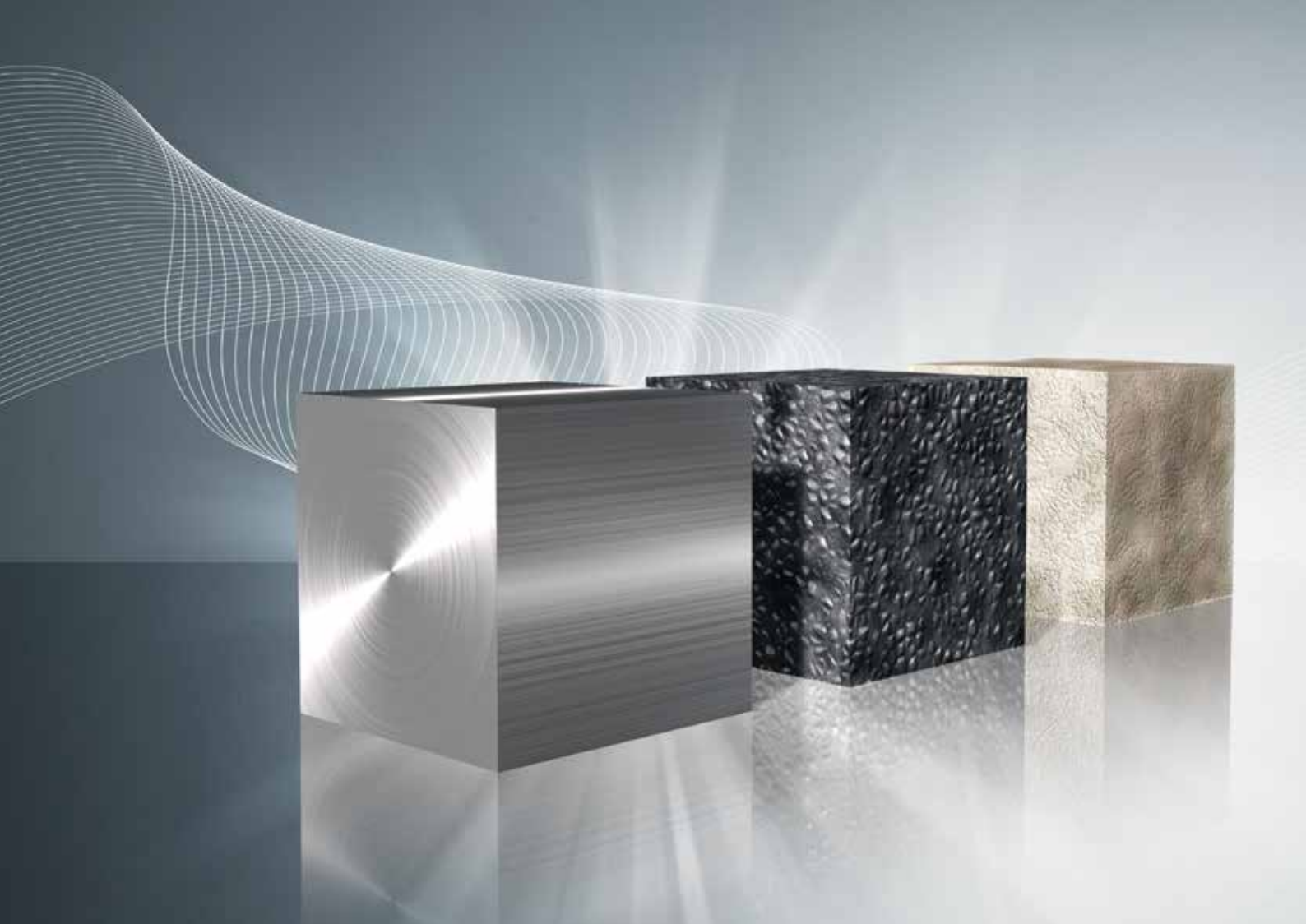




SYSTEM SOLUTIONS FOR METALLURGICAL AND MINERAL INDUSTRY



ALWAYS THE RIGHT MIX

**METALLURGICAL AND MINERAL INDUSTRY –
INNOVATIVE PROCESS TECHNOLOGIES FOR
APPLICATIONS IN HEAVY DUTY INDUSTRY**





DEVELOPMENT OF SYSTEM SOLUTIONS IN CLOSE COOPERATION WITH CUSTOMERS

LÖDIGE SYSTEM SOLUTIONS

- Mixing
- Granulating
- Homogenizing
- Drying / Cooling
- Coating
- Recycling



Metallurgical and Mineral Industry – An Important Economic Factor

Stone Age, Copper-Stone Age, Bronze Age, Iron Age ...within living memory minerals and ores define our existence and our progress. The value of raw materials, their sustainability and extended life cycle are contemporary issues with regards to their increasing shortage – and not only because of the metals being used by the industry.

Furthermore, we observe considerable production increases in the field of commodities like iron, steel, copper, aluminium, etc. Raw materials are and remain decisive for the fulfillment of our basic needs. Our industrial production was based and is still based on it, as well as our highly-developed infrastructure and our high standard of living.

This development must be internationally nurtured – our know-how will be essential in order to process and finally refine these materials according to the requirements dictated by the differentiated deposits found globally.

Lödige Solutions

The criteria to comply with processes in the Heavy Duty industry are the following:

- high efficiency with respect to throughput and mix quality,
- the best wear protection to achieve a long service life,
- high availability of the units,
- low-maintenance systems and
- easy inspection.

Partnership and Cooperation ensure Problem Solving and Project Success.

We develop optimum concepts for individual applications in close cooperation with our customers. We regard our services to the customer as being one that is aimed at developing and installing a processing system of highest quality. Competent process engineers confer with the customer to develop first solutions. Practice-orientated trials at our state-of-the-art Research and Test Centre provide the back up for development of a customer-specific system.

Qualified engineers convert the process concept into a system combining high quality machine technology of robust construction with functional controls. Modern production systems and certified manufacturing methods are guarantees for system quality and punctual delivery. Experienced technical personnel and commissioning engineers integrate Lödige systems efficiently and punctually into production units worldwide. The machine reliability especially required in case of heavy duty use is ensured by our maintenance and repair service available 24 hours a day.

LÖDIGE MIXING AND PROCESSING SYSTEMS FOR THE METALLURGICAL AND MINERAL INDUSTRY

Wide experience is required for handling raw materials for the metallurgical and mineral industry. Detailed knowledge of the behaviour of these products is essential for development of optimum mixing and processing systems. **More than 1,000 Lödige mixers are installed worldwide in this branch of industry.**

Leading producers entrust the production of their quality materials to our mixing and processing systems which they have optimized in cooperation with us to obtain customer and product orientated units. Lödige provides innovative, cost-effective and practice-proven systems for every possible method of modifying and finishing raw materials.

MINERAL INDUSTRY

Treatment of carbon and graphite materials



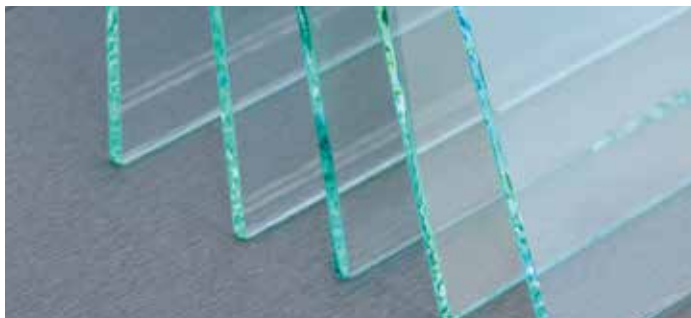
Treatment of raw materials and masses in the ceramics industry



Treatment of non-ferrous metals in powder metallurgy



Treatment of glass mixtures



Treatment of welding and soldering agents



Treatment of corundum materials for the abrasive materials industry



Treatment of refractory materials





LÖDIGE MIXERS FOR ALL APPLICATIONS IN THE MINING AND STEEL INDUSTRY

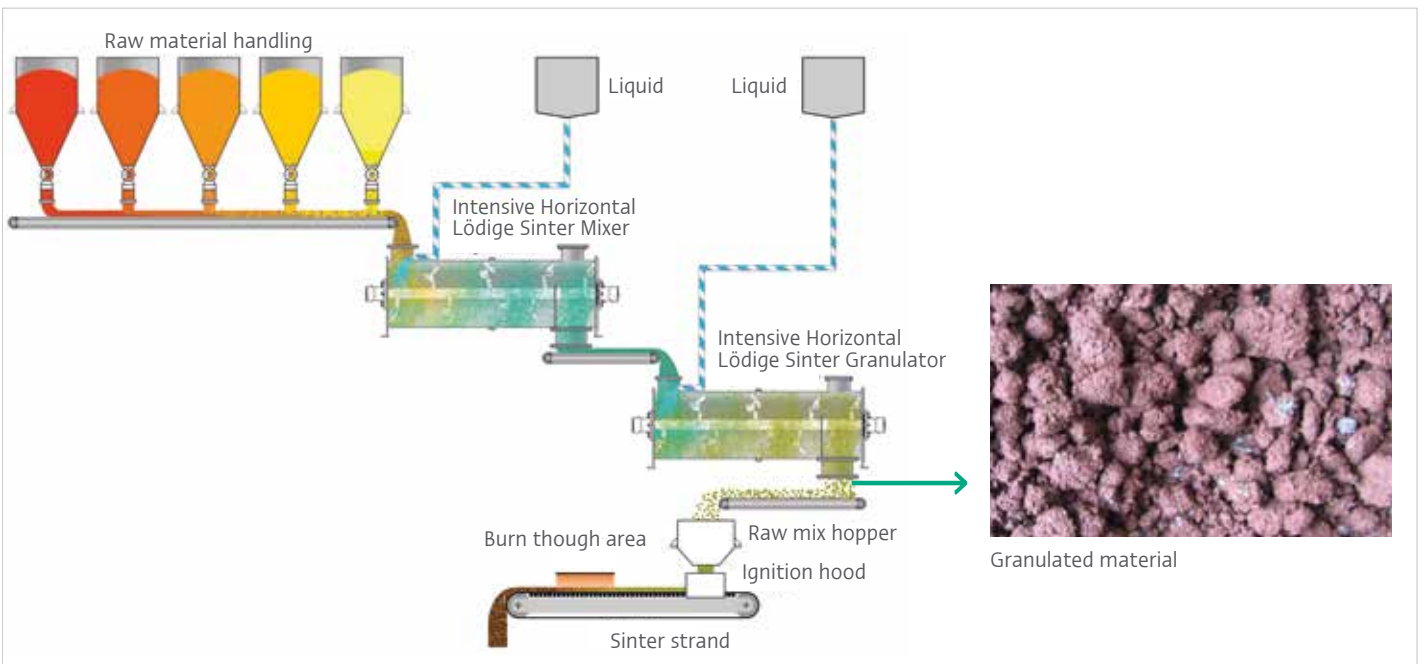
METALLURGY

Intensive mixers for making pellets from ore concentrate



Lödige Intensive mixers are perfect for producing premixes for pelletising discs.

Intensive mixers and granulators for producing sinter material



Intensive mixers and granulators for recycling steel mill waste materials



Electro filter dust untreated



Electro filter dust granulated

OPERATION OF LÖDIGE MIXING SYSTEMS

Ploughshare® Shovels rotate as mixing elements in special arrangement on a horizontal shaft in a horizontal, cylindrical mixing drum. The size, number and positioning, geometric shape and peripheral speed of the mixing elements are coordinated to cause three dimensional movement of the components. This mixing principle applies to the Ploughshare® mixers for both continuous operation and batch operation.

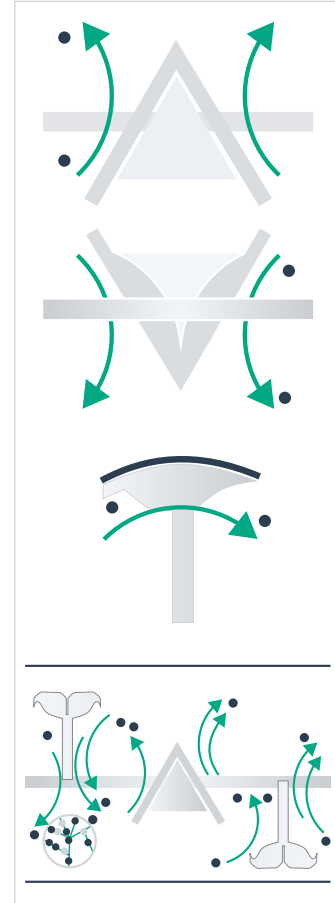
Turbulence in the product, with total involvement of all material, prevents the formation of dead or low-movement zones in the mixing drum and promotes high speed, precision mixing.

The specially shaped shovels lift the product radially from the wall of the drum to prevent particles from becoming squashed between the mixing elements and the drum wall.

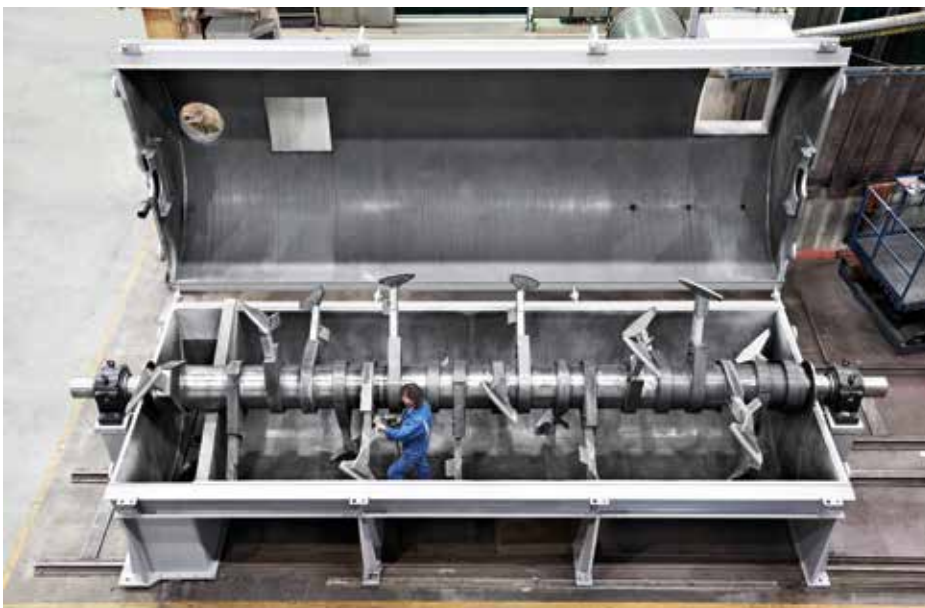
The mechanically generated fluid bed is, therefore, ideal for mixing components with widely varied bulk densities, particle sizes, rheological properties and mass fractions.

The effect can be further intensified by Ploughshare® Shovels specially modified for mixing components in the metallurgical materials industry – so-called, Becker Shovels'. This type of mixing element provides definite advantages with regard to the product and power consumption in compliance with specified process parameters.

In special cases the mixing elements may require additional support which is provided by separately driven, high speed choppers.



Schematic representation of the mechanically generated fluid bed



Lödige Ploughshare® Mixer für continuous operation KM 57000



CONTINUOUS MIXING AND GRANULATING IN A HORIZONTAL SYSTEM

The continuous Ploughshare® Mixer KM also operates according to the mechanically generated fluid bed introduced to mixing technology by Lödige. This mixing system achieves high throughputs which can be varied depending on residence time, filling degree and product properties.

The addition of liquids and the coating of particles are possible in the continuous process too. The continuous process is operable at filling degrees between 20 and 50 % without influencing the mix quality.

The mixing elements are designed to achieve constant backmixing during the residence time prior to discharge the mixed product via the outlet. The adjustment of the size of the discharge opening by means of a slide or an adjustable weir has a direct influence on the residence time.

The Lödige High Speed Continuous Mixer CoriMix® CM excels with wide range of applications for mixing, humidifying, granulating and densifying processes.

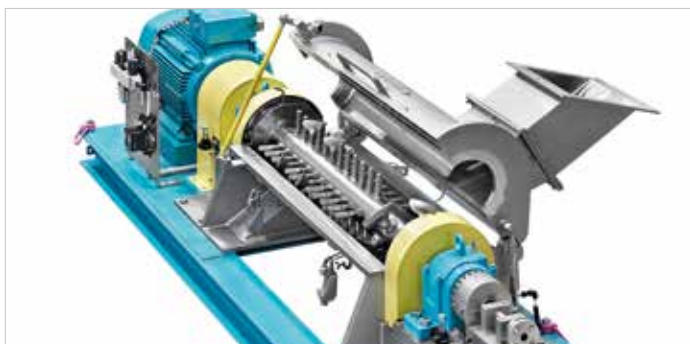
The system is based on the high peripheral speed of the mixing shaft of up to 40 m/s, the resultant centrifugal force forming an annular layer of product. The high shearing intensity in the annular layer is generated by the high differential speed between the rotating, specially shaped mixing tools and the mixer wall. Depending on the application, the residence time can be influenced by modifying the degree of filling, the rotation speed, the geometry and adjustment of the mixing tools as well as the mixing drum length and the volume flow rate. The system offers the possibility to divide the mixing chamber into zones of different shear intensity, thus permitting system optimisation for varying product properties. The liquid components are directly introduced into the annular layer. This ensures a homogeneous distribution within the product and avoids wetting of the mixer wall and mixing shaft. CoriMix® systems provide optimal cleaning as the mixing drum is divided axially over the entire drum.



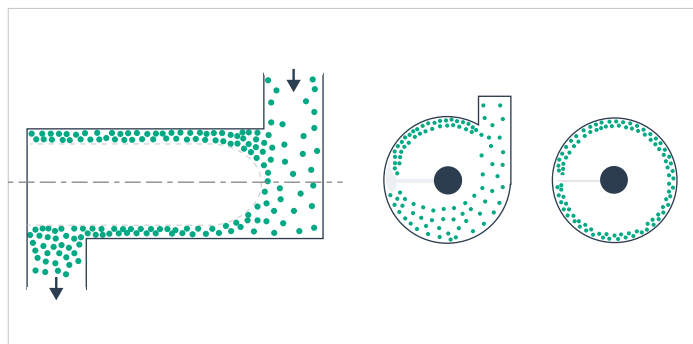
Lödige Ploughshare® Mixer for continuous operation of type KM-DW with inside discharge weir



Lödige Ploughshare® Mixer for continuous operation of type KM-D in special design with exchangeable anti-wear lining



Lödige High Speed Continuous Mixer of type CoriMix® CM



Annular layer generated by the high speed in the CoriMix® CM

MIXING AND GRANULATING SYSTEMS

Machines for Product Development

Lödige laboratory systems are ideal for the development of products under real industrial conditions. They provide unlimited scale-up to product size of parameters obtained during trials and relevant know how concerning product behaviour.



Laboratory Mixer of type L with static drum, available in 5, 10 and 20 l volume, mixing support as an option

Machines for Small Production

Essential criteria for special mixing applications in small production quantities and small batches are provided by processing systems in practical, graded sizes.

The machines are designed for manual or semi-automatic operation. This system has particular advantages in cases where there is frequent change of product, where the use of the machine must be variable and flexible process handling is essential. The high availability due to application orientated machine technology reduces service frequency. The machine design guarantees easy and thorough cleaning.



Lödige Ploughshare® mixer for batch operation with a sack chute and discharge station

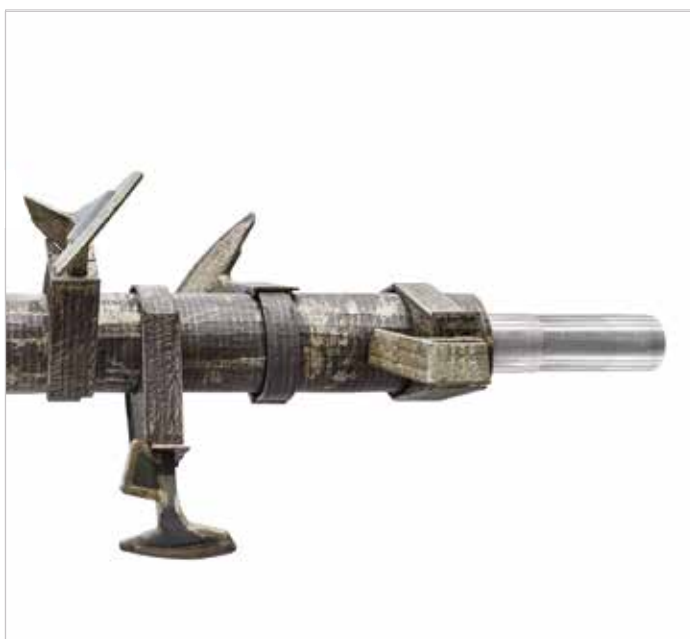


WEAR PROTECTION FOR A LONG SERVICE LIFE

Sometimes a little more protection is crucial: Proper wear protection is essential, especially where abrasive products such as sinter materials, iron ore mixtures or corundum materials are processed. Selecting the right material is key to protecting machines from wear as much as possible:

Decades of experience in the field of heavy duty applications have given Lödige the necessary expertise in wear protection and have led to an extensive portfolio of suitable solutions for diverse requirements.

Wear protection for mixing tools and main shaft



Mixer shaft with special lining made of composite material



Shovel with special tungsten carbide welding

Wear protection for the drum



Metal lining



Rubber lining



Pu-lining



Aluminium/ceramics

PRACTICE-PROVEN PROCESS MEASURING AND CONTROL TECHNOLOGY FOR READY TO USE SYSTEM SOLUTIONS

Process measuring and control technology is developed and supplied as required. The modular components of this system mean that the customer can expand the automation, including recipe administration and integration in central operation controls, as required.



Continuously operating Ploughshare® mixer for cooling of anode paste



Ploughshare® Mixer with automatic bag filling



Complete system for processing heavy duty mixes



QUALITY IN DETAILS FOR PERFECT USER-ORIENTATED SYSTEMS

Top quality machines and product-orientated unit specifications guarantee maximum service life spans and constant availability of the system. Our Customer Service is targeted at maintaining this quality. Long-term, effective operation of a system can only be guaranteed by detailed precision. Lödige adapts the mixing system and integral system components to the exact requirements of the product to ensure consistent high-quality products.

In addition to installation of our machines and supervision of commissioning with and without product, Lödige also provides advice on inspection intervals, inspection methods and spare parts to be held in stock.

We supply information for example on new applications for a unit and answer questions regarding optimization or modification of processes. In addition to this we provide instruction to personnel for operation and maintenance of the unit and control systems. Contact us for information about the wide range of facilities available for running trials at our Research and Test Centre.

You can also hire a machine and run trials on site. Compare our services. In addition to the product-orientated production system, Lödige also offers a competent partnership to you which includes service to safeguard your investment and the high quality of your system.



Lödige Ploughshare® mixers for continuous operation: with rubber lining as wear protection for mixing iron ore



Mixing elements in serrated design optimally suitable for the application



**Gebrüder Lödige
Maschinenbau GmbH**

Elsener Straße 7–9
33102 Paderborn
Germany

Phone: +49 5251 309-0

Fax: +49 5251 309-123

E-mail: info@loedige.de

Contact numbers

Sales Department:

+49 5251 309-107

Customer Service Hotline:

+49 5251 309-111

www.loedige.de

Lödige supplies high-grade components, subsystems and systems for technical processing applications in a wide range of industries. We are specialized in the field of mixing, granulating, coating, drying and reaction. Our profound knowledge of processes, development and production enables us to contribute to the success of our partners throughout the world.

Lödige, which was founded in 1938, is a family-run business in its third generation now. With the invention of the Ploughshare® Mixer, Lödige created a mixing unit that can cover a wide range of different processing tasks. This unit forms the basis for numerous innovations in the area 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 demonstrate our experience with customer-oriented system solutions. Lödige operates with more than 500 employees worldwide and supports its customers with a network of subsidiaries, technical offices and agencies.