



SYSTEM SOLUTIONS FOR ENVIRONMENTAL TECHNOLOGY

SLUDGES, DUSTS, RECYCLING



ALWAYS THE RIGHT MIX

ECONOMICAL PROCESSING TECHNOLOGIES FOR THE ENVIRONMENTAL SECTOR





PROTECTING THE ENVIRONMENT **IS VITAL**

Be it preventing and reducing waste, conserving resources, reprocessing, recycling, or reusing – **Lödige systems can handle it all.**



Lödige offers sturdy, long-lasting systems for mechanical, chemical and thermal processing of sludges, ashes, dusts and other waste materials in the disposal lines of the municipal and industrial sectors. Working closely with our customers and employing our expertise in mixing and processing methods, we create tailor-made solutions for any task. That is why plant owners and planners in the disposal and recycling sector have been putting their trust in Lödige systems for decades.

Intelligent technologies for the environment

Between the ideal option of waste prevention and the rather unsustainable option of landfills, there is a broad spectrum of possibilities for reuse, recycling and energetic reclamation. All five stages of this waste treatment hierarchy have one thing in common: They would not be possible without process technology. The finite nature of our resources defines the framework. The challenge for machine and plant design is clear: Intelligent technologies and constant innovation are required if we are to take responsibility for the fate of future generations. Our engineering-based industry must serve as a provider of solutions and value – including on a global scale. In an industrial nation with access to highly sophisticated technology, the goals of economy and ecology should no longer be contradictory.

Project success through partnership and collaboration

We work closely together with our customers to design ideal solutions for their requirements. We regard our services as a comprehensive task with the aim of creating a treatment system that meets even the most stringent quality standards. Based on extensive consultation with our skilled process engineers, we develop an approach to solving the problem in the conceptual phase. Trials at our well-equipped technical centre ensure the ideal design of the system as well as its practical function.

At the hands of our qualified engineers, the process engineering concept is turned into a system of sturdy machinery and practical controls. State of the art production systems and certified production methods guarantee adherence to the defined system properties and the agreed delivery schedule. Specialised fitters and commissioning engineers install the supplied systems and integrate them, expertly and on time, in our customers' plants.

INDUSTRIES IN THE FIELD OF **ENVIRONMENTAL TECHNOLOGY**



Steel works/Metallurgy



Power stations and
incineration units



Mining and underground
mining companies



INDUSTRIES IN THE FIELD OF **ENVIRONMENTAL TECHNOLOGY**



Treatment of domestic and industrial sludges



Disposal and recycling



Composting and fermentation plants

STEEL WORKS/METALLURGY

Lödige offers systems for the following processes:

- Dust agglomeration of blast furnace dust with different binders
- Agglomeration of different steelwork dusts to improve their transportability and/or for recirculation in the process
- Lime treatment for iron ore desulphurisation
- Transformation of steelworks slurry by using dust and agglomerates
- Cooling of primary and secondary dust from the electric filter, input temperature 250° C/output temperature < 100° C
- Agglomeration of filter dust for a better dumping/disposal

Materials/Products:

- Dust with 400 °C
- Blast furnace dust
- Foundry dust
- Converter dust
- Cupola dust
- Burdening dust
- Shaft furnace dust
- Dust containing zinc
- Dust from sintering units
- Dust from sandblasting



Lödige Ploughshare® mixer for batch operation, type FKM 1200 D



Untreated iron dust



Agglomerated iron dust



POWER STATIONS AND INCINERATION UNITS

Lödige offers systems for the following processes:

- Binding of fly ashes with different binders
- Moistening of coke ashes
- Treatment of fly ash to make it suitable for pipeline transport
- Moistening and structuring of FGD dust to make it suitable for dumping
- Moistening of filter dust
- Stabilisation of residual materials by adding binders

Materials/Products:

- Fly ashes from waste incineration
- Fly ashes from power stations
- Fly ashes from wood burning
- Asbestos dusts
- Asbestos materials
- FGD products
- Plastic materials
- Dust from cement bypass



Lödige Ploughshare® mixer for continuous operation, type KM 6000 DW



Homogenised/hygienised FGD product



Fly ash



FGD gypsum



Bed ash

MINING AND UNDERGROUND MINING COMPANIES

Lödige offers systems for the following processes:

- Mixing of filling sands (soil excavation, dumping ground, screened sands)
- Production of special mortar
- Moistening and granulation of chalk
- Treatment of backfill materials

Materials/Products:

- Mine filling materials
- Soil excavation
- Dumping ground



Soil excavation



Lödige Ploughshare® mixer for continuous operation, type KM 1200



Lödige Ploughshare® mixer for continuous operation, type KM 4200 DW



TREATMENT OF DOMESTIC AND INDUSTRIAL SLUDGES

Lödige offers systems for the following processes:

- Mixing and granulation of dehydrated sewage sludges with dried return product
- Treatment of mill scale sludges
- Hygienisation of dewatered sewage sludges
- Treatment of oil sludges
- Preparation of compost by mixing sawdust with dewatered sewage sludges
- Mixing of food leftovers and pectin waste with sewage sludges
- Production of a pumpable sludge by liquefying harbor slit

Materials/Products:

- Municipal sewage sludges
- Industrial sewage sludges
- Drill sludges
- Dilute acids
- Paint sludges
- Oil sludges
- Paper sludges



Lödige Ploughshare® mixer for continuous operation, type KM 600 DW



Sewage sludge wet



Sewage sludge dried

DISPOSAL AND RECYCLING

Lödige offers systems for the following processes:

- Mixing of reuse derived fuel (with sewage sludge amongst others)
- Moistening of fly ashes and dusts from waste incineration plants
- Mixing of residual materials

Materials/Products:

- Reuse derived fuel
- Used tyres
- Residual materials
- Fly ash from waste incineration
- Asbestos materials



Burned sewage sludge ash



Lödige Ploughshare® mixer for continuous operation, type KM 300 DW



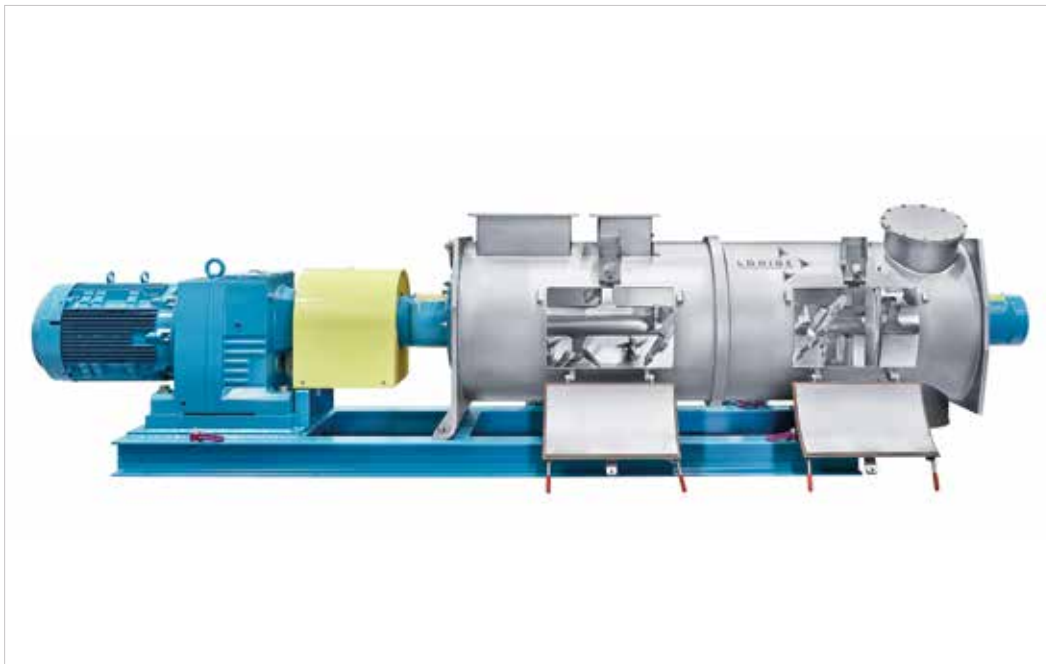
COMPOSTING AND FERMENTATION PLANTS

Lödige offers systems for the following processes:

- Treatment of soils with additives
- Treatment of dewatered digestates
- Mixing of digestates into compost
- Mixing of biological waste
- Mixing of green waste and digestates
- Treatment of poultry dung to make it suitable for the biogas plant

Materials/Products:

- Soils with additives
- Digestate
- Compost
- Biological waste
- Green waste and digestate



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



Poultry dung untreated



Poultry dung neutralised/
homogenised

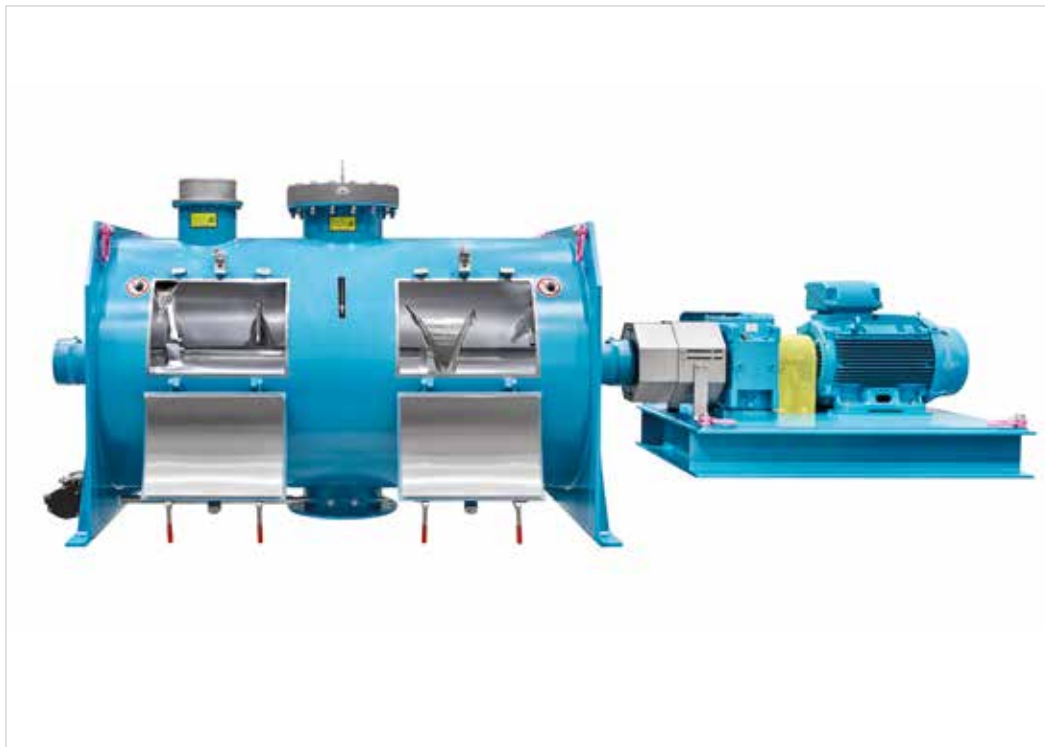
TECHNOLOGY THAT SETS NEW STANDARDS: DISCONTINUOUS MIXING AND GRANULATION IN A HORIZONTAL SYSTEM

By inventing the Ploughshare® mixer, Lödige has revolutionised mixing and processing technology. Numerous patented innovations based on this system are proof of the incredible potential of this technology.

The heart of the mixer is a special systematic arrangement of Ploughshare® shovels on a horizontal shaft. They rotate in a horizontally fitted, cylindrical mixing vessel. The size, number, positioning, shape and circumferential speed of the elements are adapted to each other such that they cause a three-dimensional movement of the components during the mixing process. During this process, the mixture is continuously gripped by the mixing tools. This reliably prevents dead space or low-movement zones, while guaranteeing quick, precise mixing action.

Due to the special shape of the mixing elements, the mixture is removed from the vessel wall during the radial movement, thus preventing the crushing of particles between the vessel wall and the mixing tools. This mixing principle is perfect for mixing processes involving components that differ in their bulk weight, grain size, rheological characteristics and percentage of mass. Especially for the materials being processed in environmental technology, modified ploughshare-like shovels, also referred to as "Becker shovels", achieve this effect even more specifically.

Some mixing tasks necessitate supporting the mixing effect of the mixing elements. For this purpose, separately driven choppers rotating at high speed are installed.



Lödige Ploughshare® mixer for batch operation, type FKM 2000

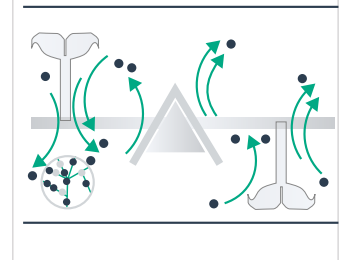
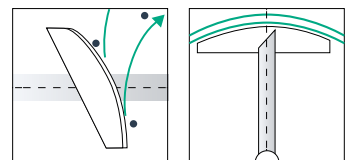


Diagram of the mechanically generated fluidised bed



Mixing and cooling in the horizontal system. Greatest contact frequency of the product with the cooling surface – no friction

Shovel type: Becker shovels



NON-STOP OPERATION: CONTINUOUSLY OPERATING HORIZONTAL SYSTEMS

The Ploughshare® mixer is also available for continuous operation. Equipped with tools that are specifically adapted to the particular task, it produces mixtures of the highest quality. The high throughput rates achieved in continuous production can be varied based on dwell time, filling level and component properties. The continuous three-dimensional movement of mixture components in the Ploughshare® mixer ensures consistent separation of the particles in the fluidised bed. This makes it very easy to add fluids and coat the particles in a continuous process. The process can be performed with filling levels between 20 % and 50 % without any impact on the mixing quality.

The mixing units can be set to perform constant re-mixing even during the dwell times. This guarantees that the mixture keeps moving at all times until it is drained through the discharge opening for further processing. The duration of dwell times can be adapted to the specific requirements. The size of the discharge opening, which can be regulated using slides or an adjustable weir, has a significant effect on the dwell time. This reliably compensates for any system-induced dosage fluctuations.

Mixing and preparation in a ring layer system

Be it mixing, moistening, granulation or compaction – the compact Lödige ring layer mixer CoriMix® type CM is perfect for a particularly wide range of applications.

The operating principle of the CoriMix® type CM is based on its high speed: The mixing tool moves the product at up to 40m/s. The resulting centrifugal force pushes the product into a ring layer with a high shearing intensity in its profile. This intensity is the result of the significant speed difference between the rotating, specially shaped mixing tools and the mixer wall. The filling level and speed, geometry and mixing tool settings as well as the mixing vessel length and volume throughput affect the dwell time of the components.

At the same time, the system is highly variable: The mixing compartment can be divided into zones with different shearing intensities. This permits adaptation to the individual characteristics of the products being mixed. Liquid components are guided directly into the ring layer to ensure perfectly homogeneous distribution within the product. This also successfully prevents unwanted moistening of the mixing shaft and mixer wall. The cleaning process is also incredibly user-friendly: The drum of the CoriMix® systems can be opened along its entire length, making it easily accessible.

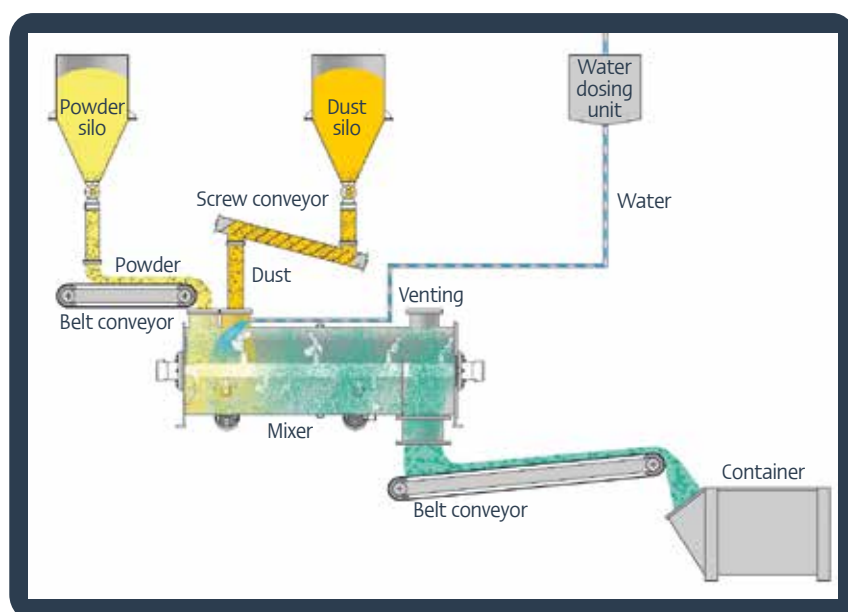


Diagram of the continuous mixing process

PRODUCT DEVELOPMENT UNDER REAL-WORLD CONDITIONS

The functional principle of Lödige laboratory systems is identical to that of Lödige production machines. This makes product development under real-world, industrial conditions possible. It is possible to scale up the parameters obtained during trials and the insights about product behaviour gained here to production scale without any restrictions.



Ploughshare® mixer (laboratory machine) with fixed container, sizes 5, 10, 20 l, optionally with base frame



Ploughshare® mixer for batch operation, type FM 130



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 sintering materials, iron ore mixtures or corundum compounds 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.



Shaft with cleaning rings



Metal lining



Rubber lining



PU lining



Aluminium/ceramics



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Lödige offers high-quality partial systems and service for process engineering applications in various industries in the fields of mixing, granulation, coating, drying, reaction 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, 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.

ALWAYS THE RIGHT MIX