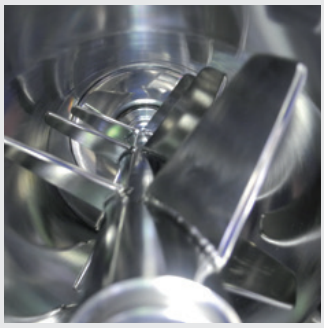
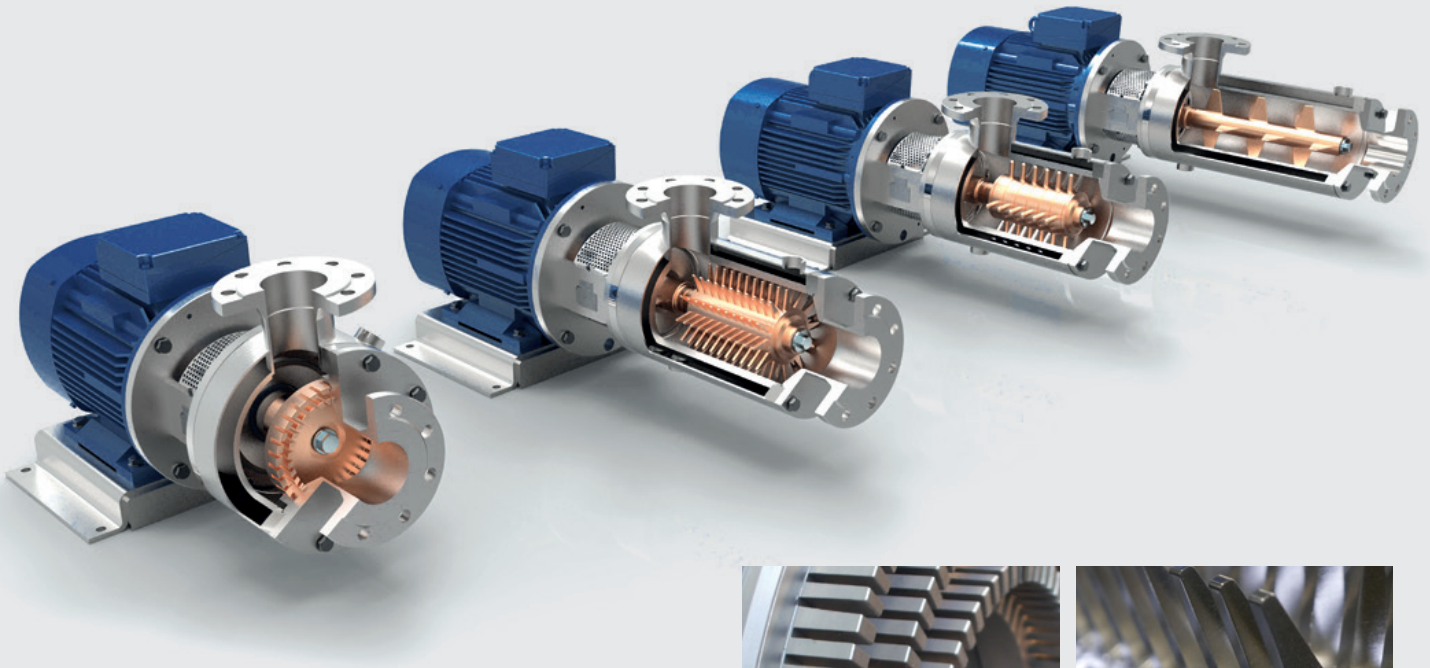
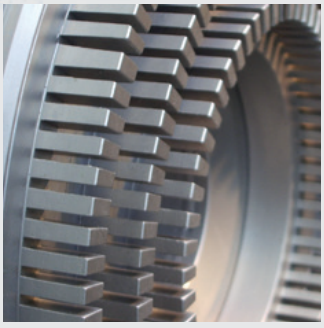
INDAG











Dynamic inline mixers

for continuous inline mixing

INDAG – Expert in dynamic mixing

For many years, we have been developing customised mixing solutions for a wide range of industries – always with the aim of meeting the highest technological and quality standards.

We have been working with continuous inline mixing for 70 years. We develop, design and build our machines in the north of Hamburg, 100 % made in Germany.

Our inline mixers enable efficient and precise mixing of liquids and combinations with gases or solids. Whether in the food industry, environmental technology, chemicals, pharmaceuticals or cosmetics – INDAG ensures optimum results for a wide variety of mixing applications.

Versatile applications – maximum efficiency
Our dynamic inline mixers are ideal for:

- Homogeneous mixtures
- Emulsions and dispersions
- Aeration or thermal processes such as boiling products

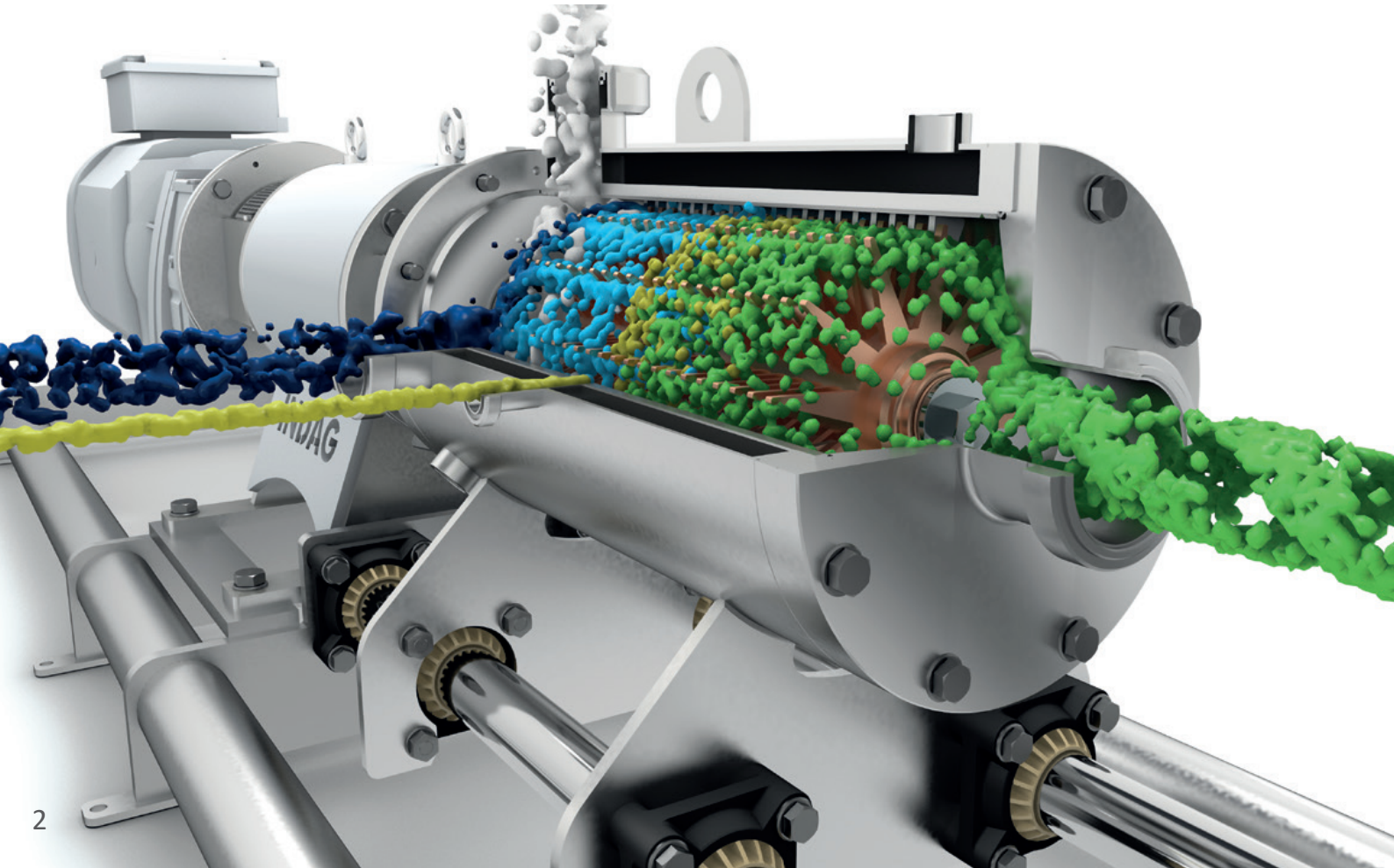
The product portfolio ranges from particularly gentle mixing to intensive high-shear mixing – suitable for use in production plants, laboratories or pilot plants.

Quality that convinces
Our mixers are characterised by:

- High energy efficiency
- Reliable continuous operation
- Easy cleaning
- Long service life with minimal maintenance

Highest hygiene and safety standards
Our mixers meet all relevant hygiene and safety requirements – for maximum product safety and process stability.

Partnership-based.
Personal.
Professional.
Our experienced technicians work closely with our customers – from the initial idea to commissioning and beyond. We develop solutions that are perfectly tailored to individual requirements.



Our product portfolio | Nonfood

High Pressure Inline Mixer **DLM/S HP** **04**
Mixing with high pressure for high viscosity products of the plastic and polymer industry

Solid-Liquid Inline Mixer **DLM/FS** **05**
Continuous homogeneous mixing of solids with liquids

Gentle Inline Mixer **DLM/M** **06**
Gentle mixing with paddle mixing elements for shear sensitive products

Dynamic Inline Mixer **DLM/P** **07**
Dynamic mixing with Pin mixing elements for shear sensitive products

Intensive Inline Mixer **DLM/S** **08**
Intensive mixing with star mixing elements for challenging mixing applications

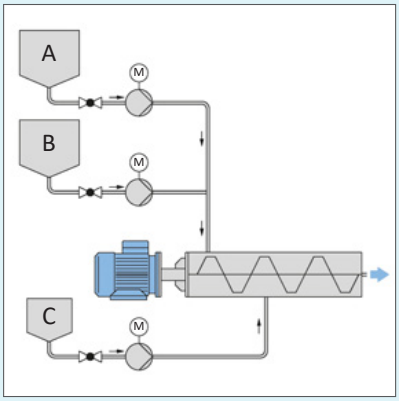
Inline Homogenizer **DLM/H** **09**
High shear mixing for emulsifying and dispersing

Laboratory and pilot plant mixer **DLM/S 007 Mini** **10**
Ideal mixer for laboratory and pilot plant trials from gentle to intensive mixing

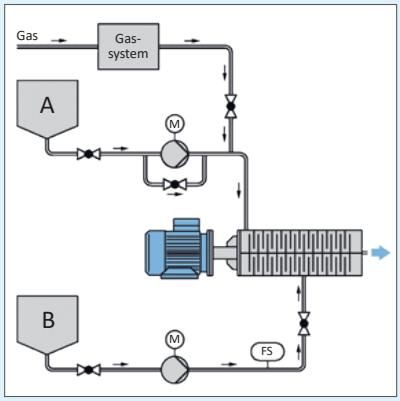
shear intensity

Applications

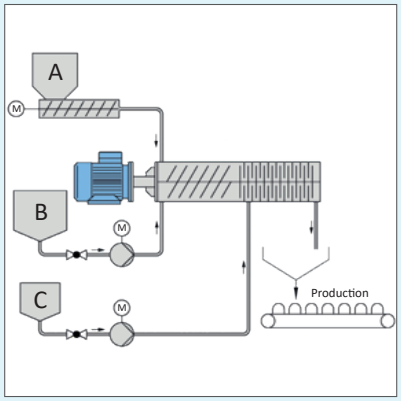
Liquid + Liquid



Liquid + Gas



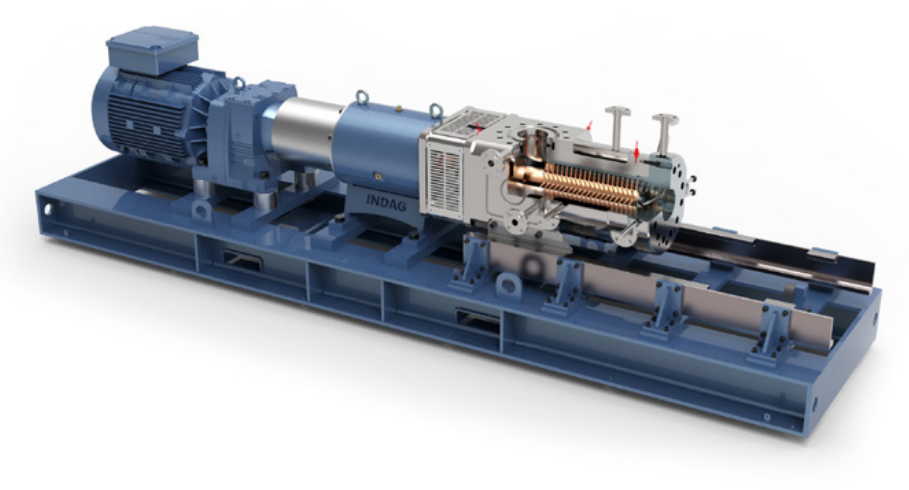
Liquid + Solids



DLM/S HP

High Pressure Inline Mixer

Mixing with high pressure for high viscosity products of the plastic and polymer industry



INDAG High-Pressure Inline Mixers type DLM/S HP are used in polymerisation, extrusion and compounding processes. Our mixing technology is specially designed to reliably mix additives or masterbatches into highly viscous polymers – at pressures up to 160 bar, viscosities up to 70,000,000 mPas and temperatures up to 330 °C. The DLM/S HP stands out by covering a wide speed range and allowing for a wide variety of additive concentrations.

Examples chemical applications:

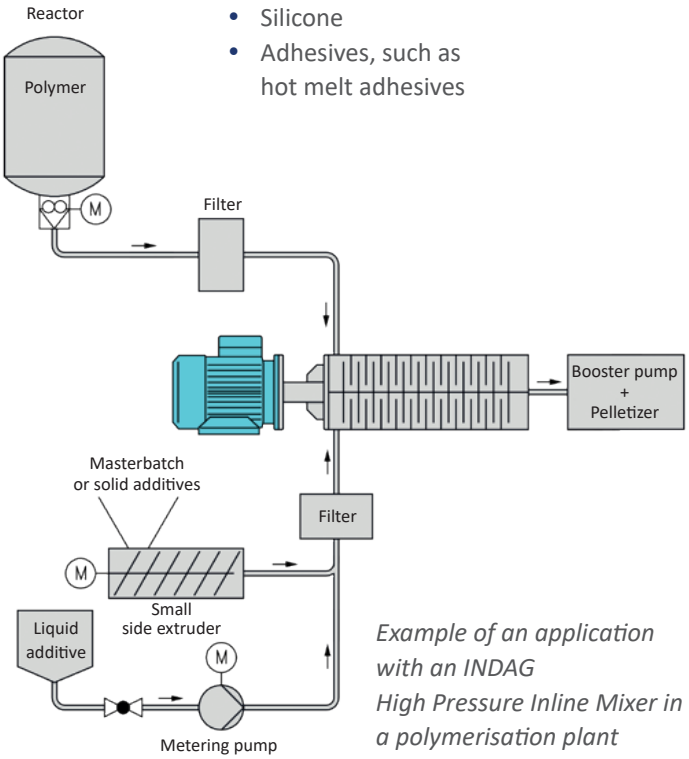
- Recycling of PET
- Mixing of masterbatch, e.g. carbon black
- Polymerisation & reaction processes
- Emulsification & dispersion of polymers
- Cross-linking of PBAT
- Mixing of pre-polymers

Examples of mixed plastics:

- PET, PBAT, PA6, PA66, PA56, PE, PC
- Silicone
- Adhesives, such as hot melt adhesives

Advantages of the DLM/S HP

- The mixer offers a particularly economical and energy-efficient alternative to extruders – both in terms of purchase price and operation.
- Easy way to improve product quality and product properties
- Fast return on investment
- Achieve higher prices and higher profit margins for improved and unique products
- Increase the throughput of existing production lines
- Maximum flexibility
- Easy and fast product changeover
- Better and more homogeneous mixing
- Low pressure loss
- Virtually no dead space
- No wear on rotor and stator (contactless)
- Drive power is efficiently converted into mixing energy
- Designed exclusively for mixing
- Double jacket for heating or cooling
- INDAG also supplies additive dosing pumps and additional equipment on request

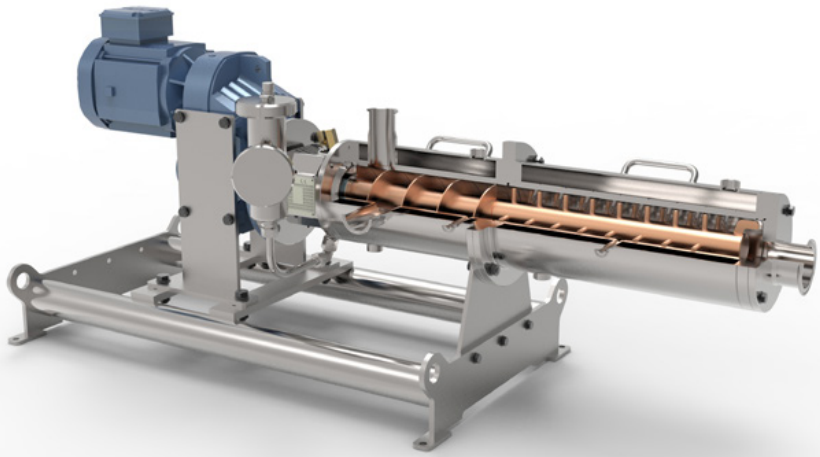


Example of an application with an INDAG High Pressure Inline Mixer in a polymerisation plant

DLM/FS

Solid-Liquid Inline Mixer

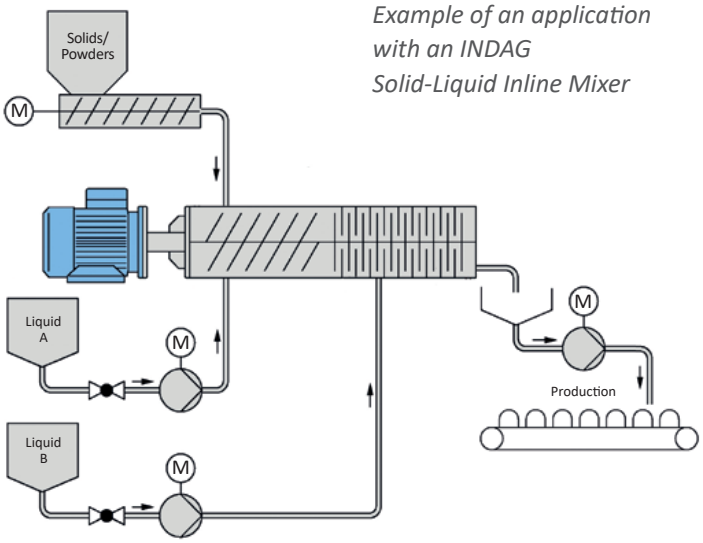
Continuous homogeneous mixing of solids with liquids



The Solid-Liquid Inline Mixer type DLM/FS is used for the continuous mixing of liquids with solids. The solids can be up to 20 mm in size (ball diameter) or powdery. Depending on the geometry of the mixing elements, the solids can be mixed in very gently or at an increased shear rate. This ensures that powders are finely distributed and larger solids or granulates are not damaged during mixing. Solids can also be mixed into foams without damaging them.

Application examples:

- Adhesive + powder mixture
- Silicone + fillers
- Oils + powders, solids
- Polyethylene + pigment powder
- Polymers + fillers
- Polymer + pigment powder
- Polyurethanes + fillers
- Water + zinc sulphide dust



Example of an application with an INDAG Solid-Liquid Inline Mixer

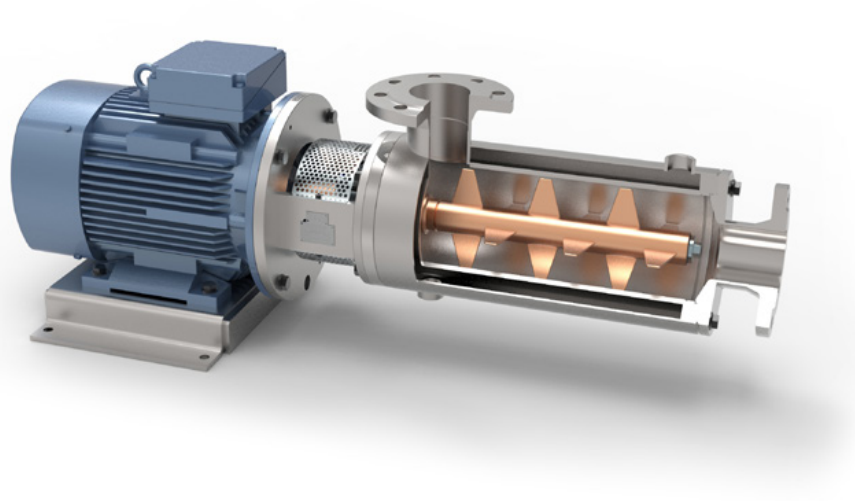
Advantages of the DLM/FS

- Very good, homogeneous mixing results even when mixing in very small quantities (0.1 %)
- Efficient input of mixing energy
- Variable mixing energy by changing the speed via frequency converter
- Temperature increase of the products less than 1 °C
- Gentle mixing of shear-sensitive products
- Easy disassembly for manual cleaning
- Double jacket for heating or cooling
- Very good self-cleaning during CIP cleaning

DLM/M

Gentle Inline Mixer

Gentle mixing with paddle mixing elements
for shear sensitive products



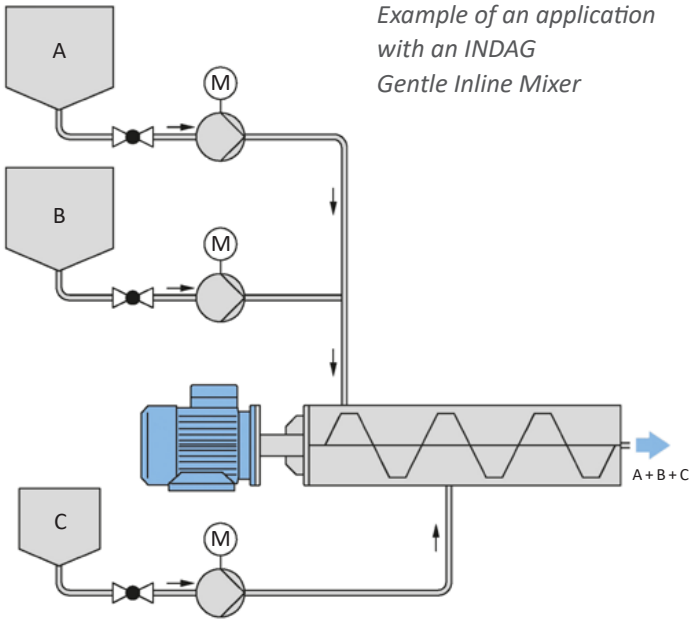
The Gentle Inline Mixer type DLM/M is used for gentle and homogeneous mixing of a wide variety of flowable products, even liquids with high solid content. Since the mixing elements in the DLM/M are located exclusively on the rotor and not in the stator, even fibrous solids do not cause blockages.
Additives can be gently mixed into foams without impairing the foam quality.

Application examples:

- Antifoam + methanol
- Water-based paint + pigments dissolved in water
- Latex + chemicals
- Sulphuric acid + water
- Soap + hydrochloric acid
- Water + coolant concentrate
- Glycerine, methanol + HCL 35%
- Vegetable oil + caustic soda
- NaOH + crude glycerine
- PVAC latex

Advantages of the DLM/M

- No pressure loss
- No clogging or tangling
- Very good, homogeneous mixing results
- Variable mixing energy through speed change via frequency converter
- Can be used at high pressures and high temperatures
- Double jacket for heating or cooling
- Very good self-cleaning during CIP cleaning

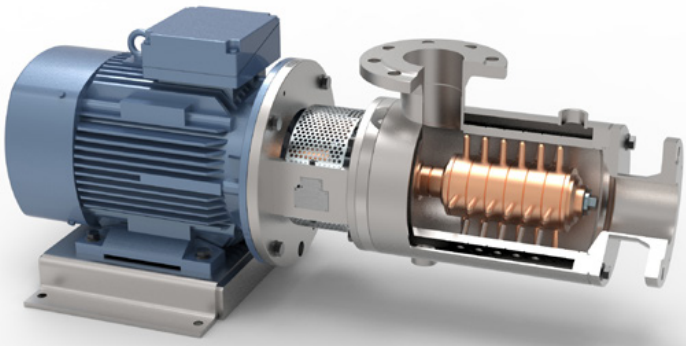


Example of an application with an INDAG Gentle Inline Mixer

DLM/P

Dynamic Inline Mixer

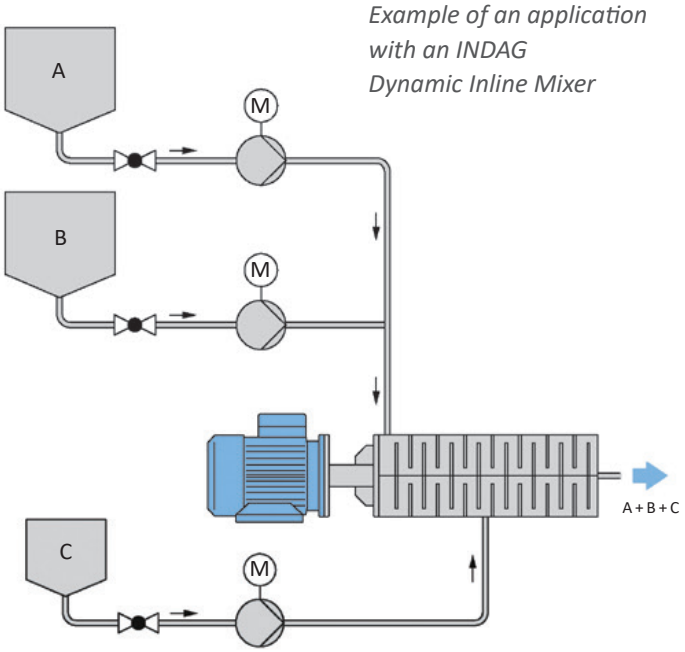
Dynamic mixing with Pin mixing elements
for shear sensitive products



The Dynamic Inline Mixer type DLM/P is used for the homogeneous mixing of shear-sensitive liquids with additives. Additives can be mixed homogeneously in very small quantities of less than 0.01 %. The shape of the mixing elements also reduces the heat input into the product stream to a minimum. This means that temperature increases can be kept below 1°C. Temperature-sensitive products can thus be mixed gently and homogeneously.

Application examples:

- Emulsion + pearl phase
- Polyol + isocyanate + catalyst
- Adhesive + isocyanate
- TPU production
- TPU modification
- Detergent + additives
- Adhesives with colours
- Polymer mixtures



Example of an application with an INDAG Dynamic Inline Mixer

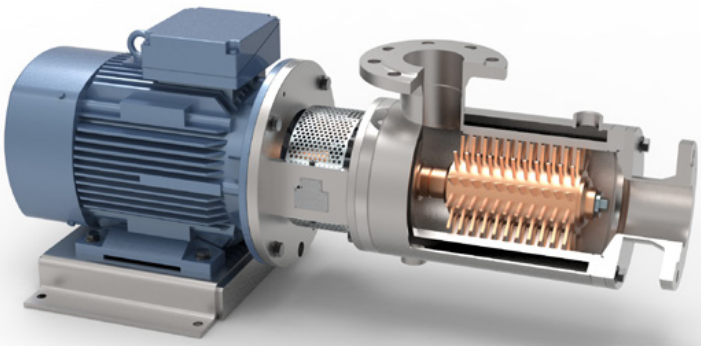
Advantages of the DLM/P

- No pressure loss
- Very good, homogeneous mixing results even when mixing in very small quantities (0.01 %)
- Efficient input of mixing energy
- Variable mixing energy by changing the speed via frequency converter
- Temperature increase of the products less than 1 °C
- Can be used at high pressures and high temperatures
- Double jacket for heating or cooling
- Very good self-cleaning during CIP cleaning

DLM/S

Intensive Inline Mixer

Intensive mixing with star mixing elements
for challenging mixing applications



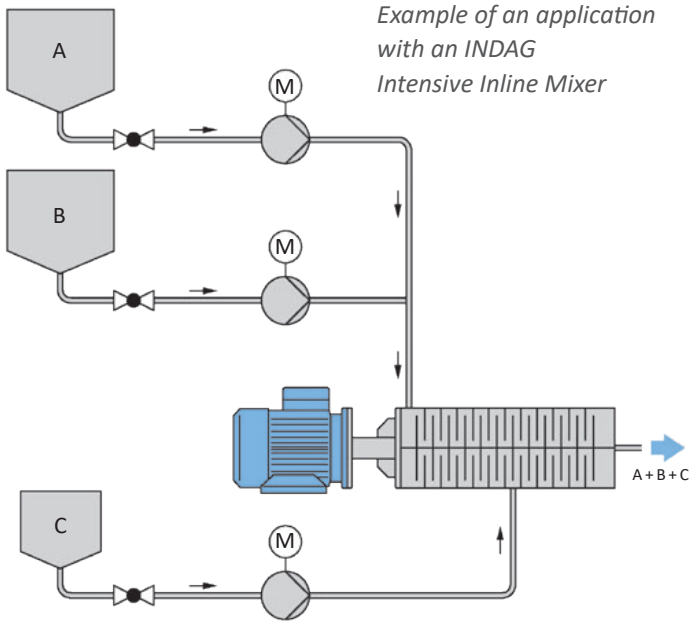
The Intensive Inline Mixer type DLM/S is used for effective mixing, emulsifying, dispersing and foaming of various liquids and liquids with gases.

Application examples:

- Emulsions of silicone oil, water and emulsifier
- Dispersions of polymer and water vapour
- Foams made from latex, vulcanising paste and gelling agents
- Mixing of plastic melts (PET, PA, PE, PBT) and additives
- Mixing of vegetable oil, methanol and methylate

Advantages of the DLM/S

- No pressure loss
- No blockages
- Very good, homogeneous mixing results even when mixing very small quantities
- Efficient input of mixing energy
- Variable mixing energy by changing the speed via frequency converter
- Can be used at high pressures and high temperatures
- Double jacket for heating or cooling
- Excellent self-cleaning during CIP cleaning

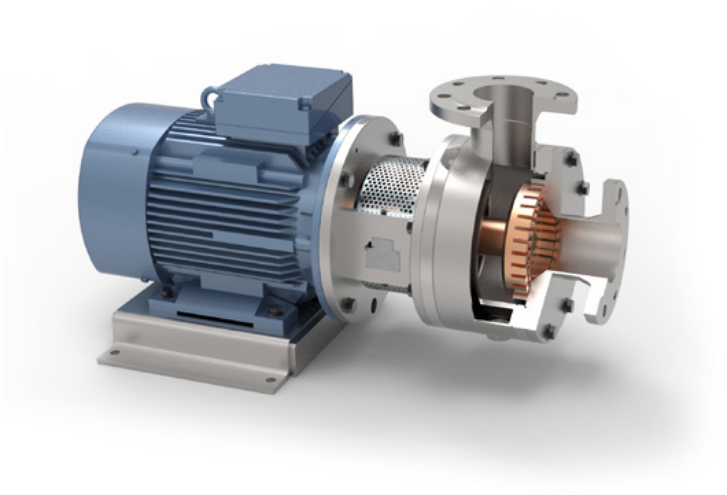


Example of an application with an INDAG Intensive Inline Mixer

DLM/H

Inline Homogenizer

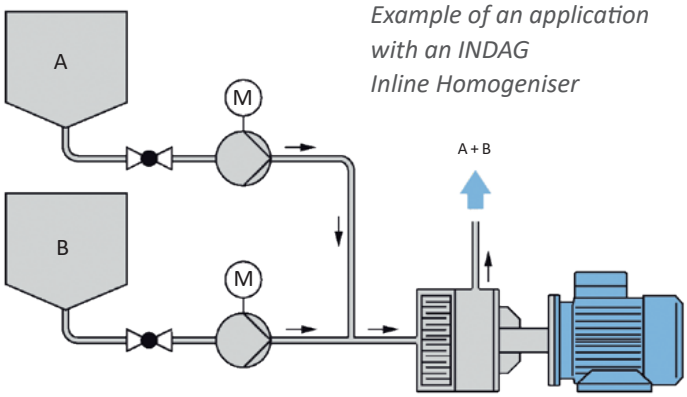
High shear mixing for emulsifying and dispersing



The INDAG Inline Homogeniser type DLM/H is used for effective dispersion (emulsification) and for producing a suspension of liquids and solids. Solids can also be comminuted in liquids. Compared to batch systems, an INDAG DLM/H reduces process time and improves product quality.

Application examples:

- Water + oil
- Vegetable oil + phosphoric acid
- Vegetable oil + citric acid
- SLES dilution
- Soybeans / rapeseed oil + phosphoric acid
- Water + flavourings, altrodextrin (emulsion production)
- Water + emulsifier, stabiliser
- Water + wax
- Bentonite suspension + waste water
- Biodiesel + acid process water
- Biodiesel + water
- CPO + acid
- Miscella degumming



Example of an application with an INDAG Inline Homogeniser

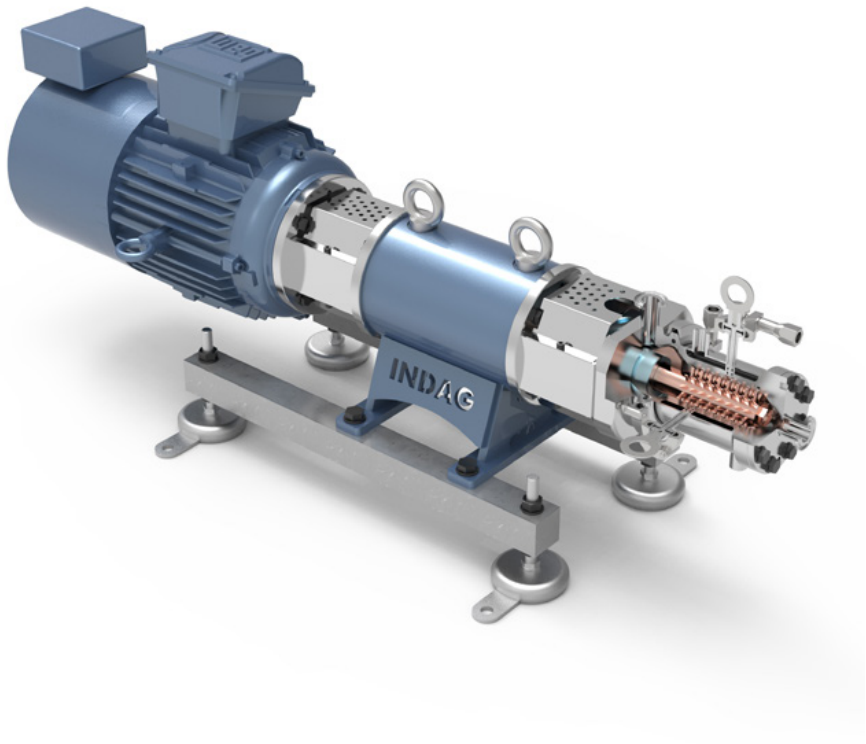
Advantages of the DLM/H

- Efficient input of mixing energy
- Optimal complete heating capability
- Hygienic design
- Suitable for use at high pressures and high temperatures
- Variable shear rates and speed changes via frequency converter
- Double jacket for heating or cooling
- Excellent self-cleaning during CIP cleaning

DLM/S-007 Mini

Laboratory and pilot plant mixer

Ideal mixer for laboratory and pilot plant trials
from gentle to intensive mixing



The INDAG Laboratory and pilot plant mixer, type DLM/S-007 Mini, is used for the effective mixing, emulsifying, dispersing and foaming of various liquids and liquids with gases. The DLM/S-007 Mini was specially designed for experimental applications with interchangeable mixing elements. The interchangeable mixing elements, in conjunction with a generously dimensioned drive for a speed range of 100 to 6000 revolutions per minute, ensure maximum flexibility for experimental applications. It is also possible to change the shape or spacing of the mixing elements. This means that the INDAG DLM/S, DLM/M or DLM/P mixers can be simulated in a single device. The dwell time can be adjusted by changing the number of mixing elements. The speed and thus the shear force application can be changed via a frequency converter.

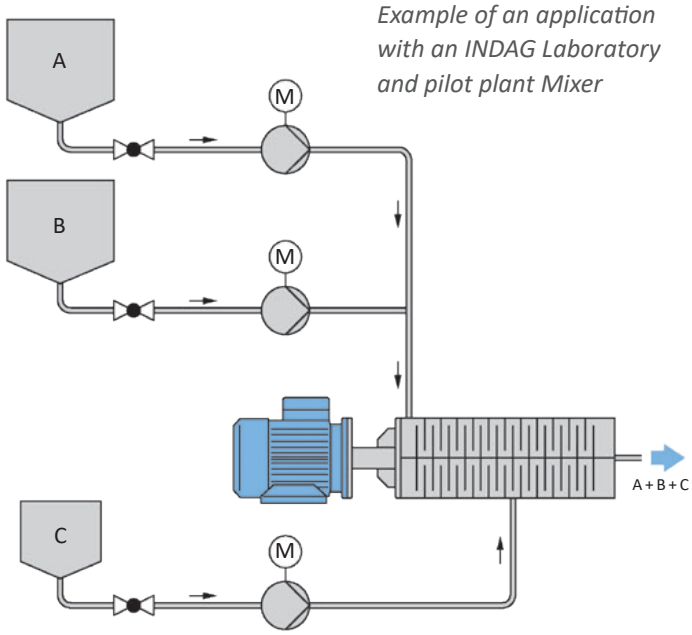
Application examples:

- Product development
- Recipe development

Advantages of the DLM/S-007 Mini

- Maximum flexibility thanks to the option of installing all types of INDAG mixing elements
- Proven scale-up of test results from laboratory tests to production mixers
- Multiple inoculation points for dosing even highly reactive media
- Double jacket for heating or cooling
- Frequency range of 5 – 100 Hz enables a very wide range of shear rates (10 – 7500 1/s)
- Easy disassembly via tri-clamp connection on the housing for modifications or cleaning

Example of an application with an INDAG Laboratory and pilot plant Mixer



Trials and rental mixers

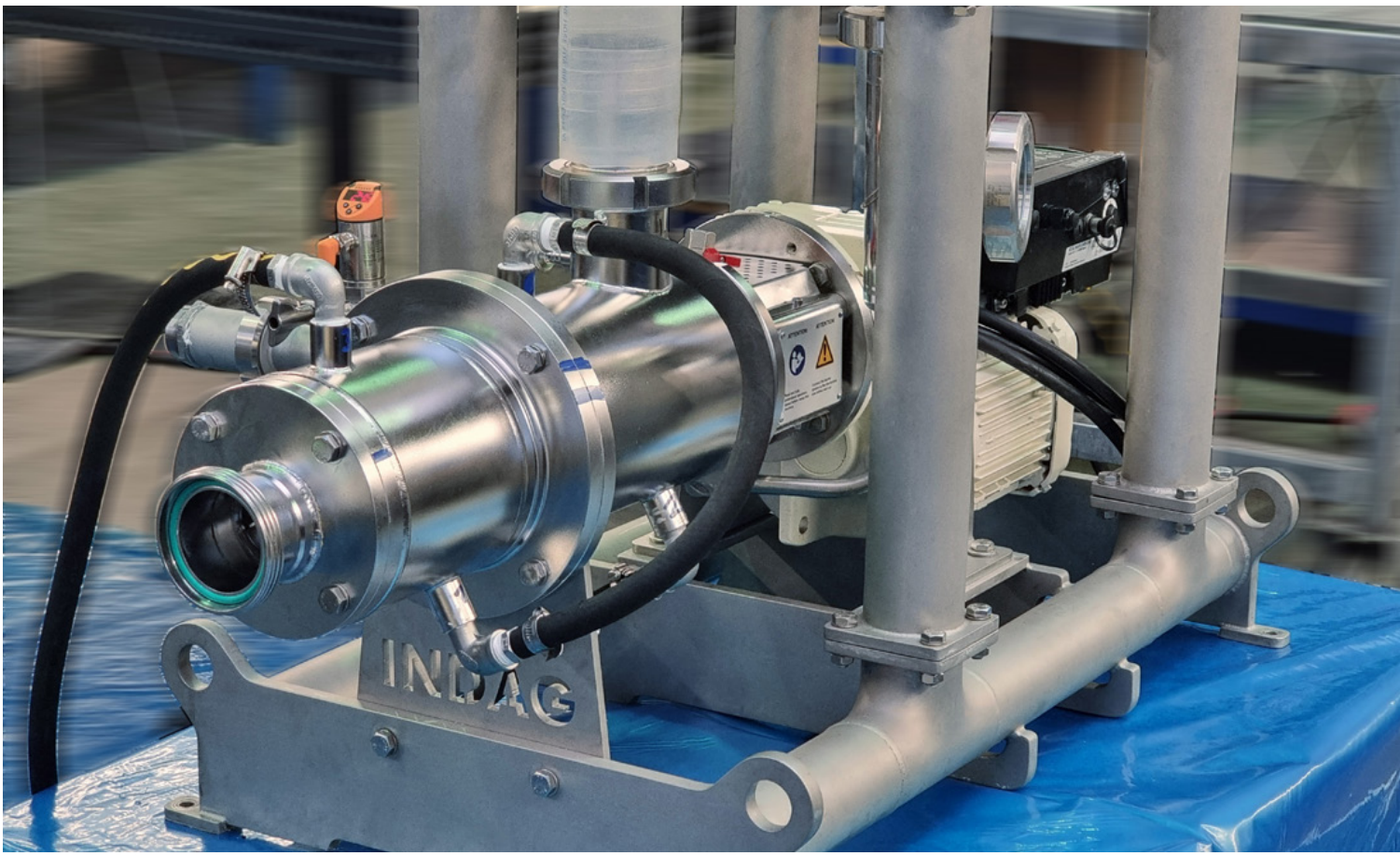
INDAG offers you the opportunity to carry out tests. These can be conducted either directly at INDAG or, alternatively, at your premises via a machine rental service. We would be happy to discuss the ideal implementation tailored to your needs with you in person at any time in order to find the best possible solution together

- Our machinery comprises a pool of almost 40 different test mixers, which are characterised by different designs and properties. The rental mixers are supplemented by a variety of different pumps and solid dosing units, which make it possible to cover various process requirements.

- The rental period for the test units is usually around 4 weeks, although we can of course offer more flexible or longer terms if required. Our test units are characterised by a high degree of flexibility, as they are equipped with interchangeable mixing elements. This allows us to customise the test conditions and test a wide variety of material combinations and process parameters.

- Another key advantage is the proven scalability of our test units to production machines. This means that the findings and parameters obtained during the tests can be directly transferred to your subsequent production processes, giving you a high degree of planning reliability and process optimisation.

- In addition, we offer the option of conducting internal tests on our premises. These tests usually take only one day, but still provide meaningful and practical results that help you make informed decisions.







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INDAG has been developing, designing and manufacturing dynamic inline mixers in Borsfleth near Hamburg for 70 years. INDAG mixers are designed to meet the highest standards of quality and effectiveness. Please feel free to contact us – together we will develop your technical solution.

Product range and services

Our product range includes:
Dynamic inline mixers for gentle, intensive or high-shear mixing. Possible applications are: mixing, emulsifying, dispersing and foaming.
Our services include: commissioning, maintenance and repair of INDAG mixers, spare parts support and customer service based on many years of experience.

indag.com