

General catalogue

Scope of supply



Scope of supply:

Jetstream mixers
DISPERMIX mixing and dispersing
Batch dispersing machines
Inline dispersing machines
TDS powder wetting machines
Processing systems

www.ystral.de

Consulting
Planning
Projecting
Engineering
Processing systems
Start-up
Service



Ystral

ystral gmbh
maschinenbau + prozesstechnik

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Ystral

The application is our focus

Processes

Dispersing

During a dispersing process, solid particles or droplets have to be reduced to a defined size. The correct adjustment between dispersing machine and product to be treated is very important. **ystral** dispersing machines offer a variety of tools to allow this adjustment.

Mixing

Homogenous mixing means uniformity of the entire contents of a vessel. The **ystral** Jetstream mixer works according to the principle of vertical mixing without induction of air. The Jetstream mixer offers the necessary flow for suspending heavy sediments, but without causing a vortex.

Mixing and dispersing

If a processing task requires not only homogenous mixing but also simultaneous dispersing, then we talk about mixing and dispersing. Under the name DISPERMIX, **ystral** has developed a machine that ideally combines the benefits of a Jetstream mixer and a batch disperser.

Powder wetting

Another special field for **ystral**. Powder induction, powder wetting and de-agglomeration – the **ystral** machine development offers excellent results and a high potential of rationalising.

Machines/ Processing systems

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Mixing

JETSTREAM MIXER

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Mixing and dispersing

DISPERMIX

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Mixing, mixing and dispersing, dispersing

MULTIPURPOSE

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Batch and Inline dispersing

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Powder induction and mixing

TDS INDUCTION MIXER

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Powder induction and dispersing

CONTI-TDS

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Development, consulting, planning and realisation

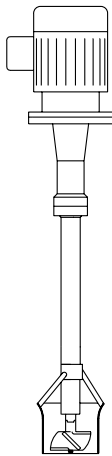
PROCESSING SYSTEMS

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Vessels, Big-Bag stations, controls, stands and more

PROCESSING MODULES

Effective macro and micro mixing are essential to achieve a consistent product quality in a variety of applications. The **ystral** Jetstream principle meets all the requirements to achieve a complete and homogenous mixture in a vessel as well as homogeneity and a stable result. Economy and an optimal mixing performance, as well as simple handling are easily achieved.



Function:
A fast rotating rotor creates a vertical stream in a stator, that is directed towards the bottom of a tank or a vessel. At the vessel bottom, the stream is diverted and forms a stream upwards on the wall of the vessel.

out strong turbulences and homogeneously distributed in the medium. Jetstream mixers reduce the energy input to the product. Up to 90% of the energy is transferred directly into vertical product motion.

Jetstream mixer

The predominant mixing principle

ystral
samples of applications

- Food:**
Yoghurts
Sugar solutions
Fruit concentrates
Milk mixed drinks
Desserts
- Cosmetics:**
Shampoos
Shower lotions
Creme lotions
Washing emulsions
- Pharmaceuticals:**
Rub-in gels
Tablet coatings
Cough syrups
- Chemistry:**
Wax emulsions
Methylcellulose solutions
Suspensions
Fibres
- Paints/Lacquers:**
Printing inks
Ceramic glazes
Pigment suspensions

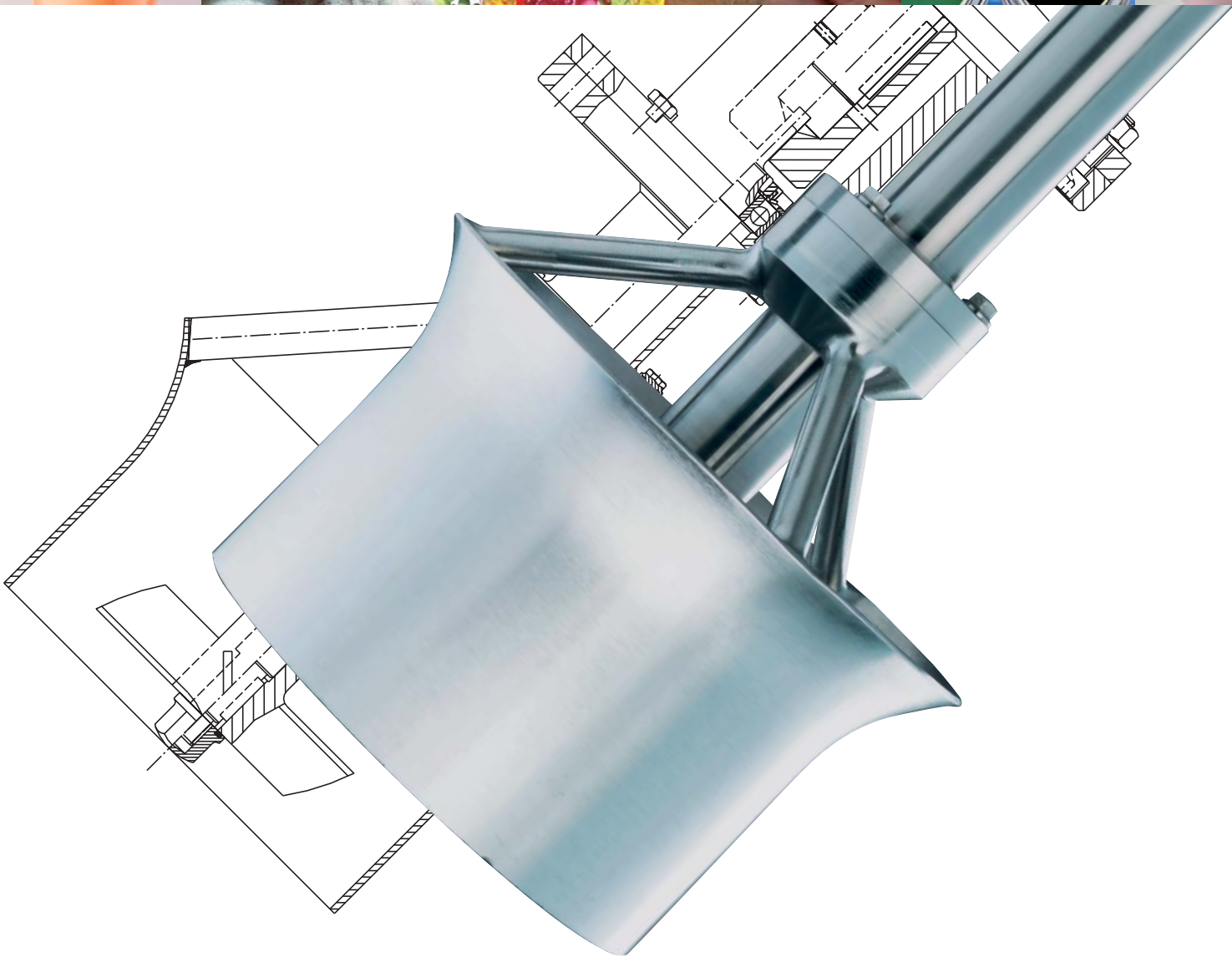
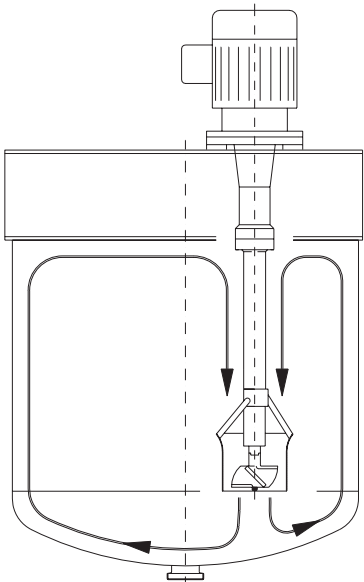


Technical data	
Power	0,5 – 55 kW
Voltage	230/400 V, 50/60 Hz, special voltages
Speed	750/1.500 min ⁻¹ , 1.500/3.000 min ⁻¹ Stepless up to 3.600 min ⁻¹ with a frequency converter
Bearing flange	Coated aluminium, stainless steel 1.4571
Submersed part	Stainless steel 1.4571/1.4404, special materials
Sealing	Lip seal, mechanical seal single or double action, depends on field of application

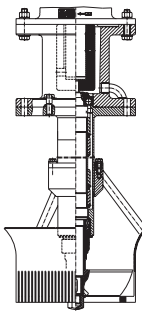
Principles:
Turbulences in the mixing head and a strong vertical circulation are conditions for optimal mixing of the entire contents of a vessel or a tank. Only the principle of a Jetstream mixer provides a balanced relationship between a micro and macro mixing action.

Technology:
Highest quality materials guarantee fault-free operation. Motor and mixing shaft are assembled separately. Rotating parts are protected against accidental contact. Optional modular design offers an ideal and individual adaptation to the mixing process. Jetstream mixers can be used under pressure or vacuum in a vessel or tank. The mixers can be fitted from top, from the bottom or to the side of a vessel. A variety of different machines are available to cope with different mixing processes.

Process:
The mixing of the medium is carried out without any incorporation of air by a vortex or along the mixing shaft. The entire contents of the vessel, even with materials of high viscosity, is fully influenced. A complete turnover of all product components is achieved throughout all levels in the vessel. The medium does not rotate in the vessel as happens with conventional stirrers, and baffles are not required. Heavy sediments are suspended with-



The **ystral** DISPERMIX is used when simple mixing is not sufficient but dispersing with a high-sheer rotor-stator-system is too intensive. The DISPERMIX causes intensive mixing in both the micro and macro range of the product and simultaneously disperses the product completely in one operation. An additional second step with a high shear machine is no longer required. The DISPERMIX offers optimum mixing and dispersing energy, high economy of operation and simple handling, and fulfils the needs of any demanding production process.



Function:
Together with the DISPERMIX stator, a high-speed rotor creates two liquid streams in different directions. A partial vertical stream is directed to the bottom of the vessel or tank where it is diverted and reflected and causes strong turbulence in the entire vessel or tank. The second partial

stream is redirected horizontally and forced to pass through the dispersing zone of the DISPERMIX.



stream is redirected horizontally and forced to pass through the dispersing zone of the DISPERMIX.

Principles:
Turbulences in the DISPERMIX head and strong vertical forces are essential for optimum mixing of the entire contents of the vessel or tank. The patented **ystral** DISPERMIX head works according to the principle of a rotor-stator system and causes strong turbulence in the vessel or tank, as well as particle size reduction of solids and agglomerates.

Process:
The product is mixed without incorporation of air by a vortex or along the mixing shaft. The entire contents of the vessel, even highly viscous products, are mixed homogeneously and

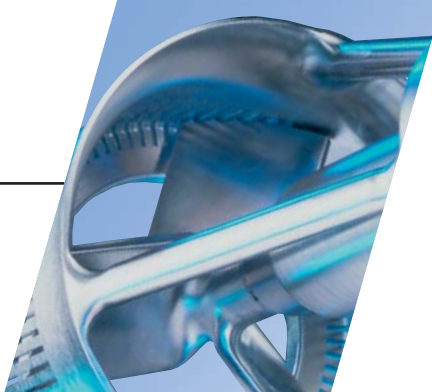
Technology:
High-quality materials guarantee reliable continuous operation. Motor and mixing shaft are assembled separately. Rotating parts are protected against accidental contact. Optional modular design offers an ideal and individual adaptation to the mixing process. The DISPERMIX can be used under pressure or vacuum in a vessel or tank. The mixers can be fitted from top, from the bottom or to the side of a vessel. A variety of different machines are available to cope with different mixing processes.

Dispermix

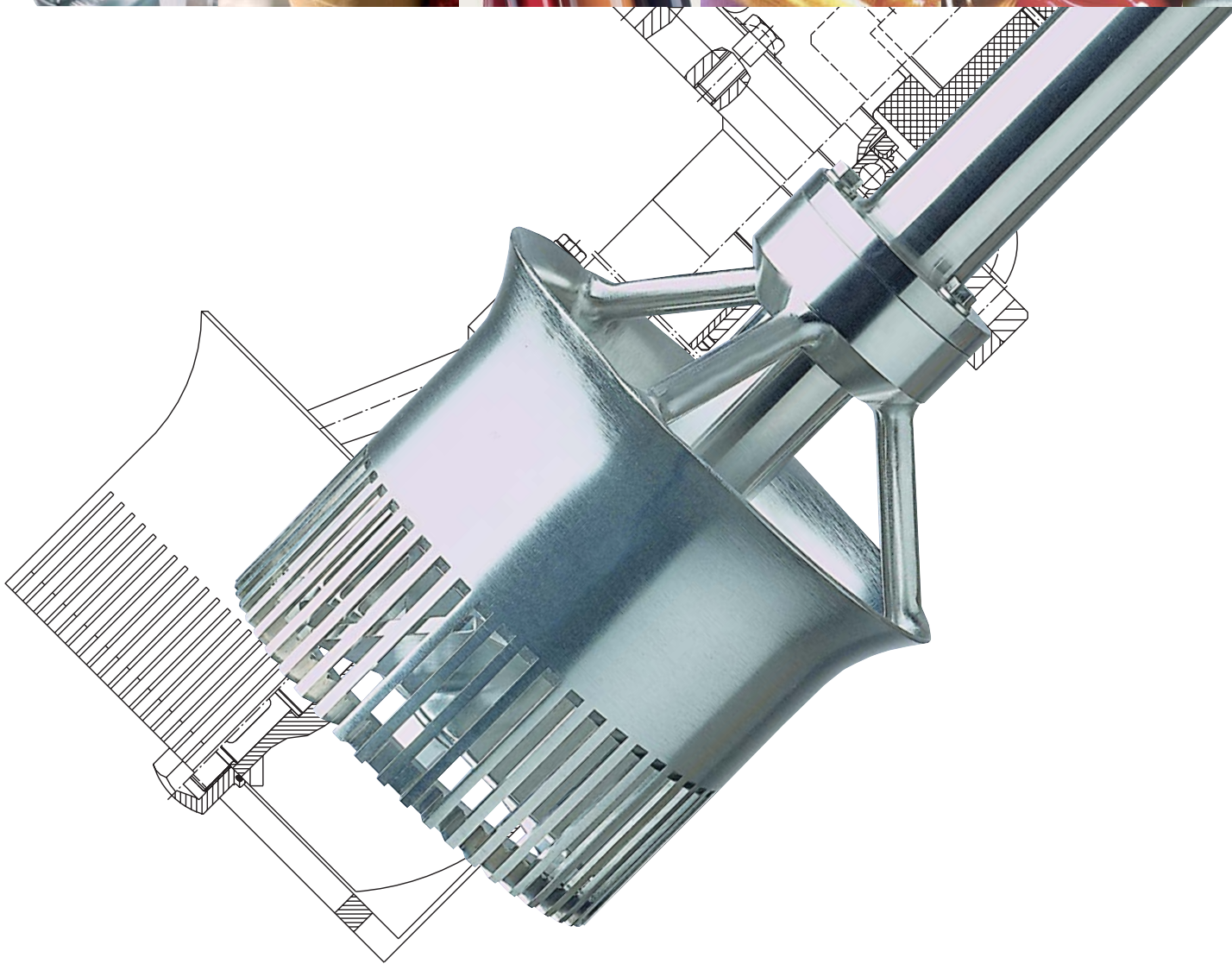
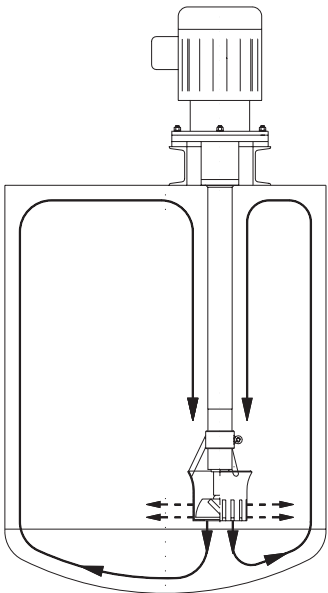
Mixing and dispersing with one machine

ystral samples of applications

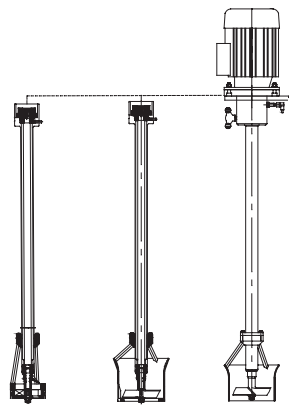
- | | | | | |
|--|--|---|---|---|
| Food:
Ice cream pre-mix
Sauces
Thickener solutions
Drink concentrates | Cosmetics:
SLES dilution
Carbopol solutions | Pharmaceuticals:
Gelatine solutions
Tylose solutions
Carbopol solutions | Chemistry:
Wax emulsions
Methylcellulose solutions
Suspensions
Emulsions | Paints/Lacquers:
Textile colours
Dispersion paints
Lacquers |
|--|--|---|---|---|



Technical data	
Power	0,5 – 55 kW
Voltage	230/400 V, 50/60 Hz, special voltages
Speed	750/1.500 min ⁻¹ , 1.500/3.000 min ⁻¹ Step-less up to 3.600 min ⁻¹ with a frequency converter
Bearing flange	Coated aluminium, stainless steel 1.4571
Submersed part	Stainless steel 1.4571/1.4404, special materials
Sealing	Lip seal, mechanical seal single or double action, depends on field of application



The advantage of the **ystral** Multipurpose aggregates is given by the modular design – exchangeable shafts and/or exchangeable mixing and dispersing tools. Previously this was only known from the laboratory field. With the **ystral** Multipurpose, this advantage now can be used in production applications as well. With only one machine a variety of products and product volumes may be produced with the most suitable tool. For the requirements in the sterile or pharmaceutical production, all connections are sealed following the GMP guidelines. A variety of drives and stands enhance the Multipurpose systems.



Function:
Mixing, mixing and dispersing, dispersing – with a minimum of steps the respective shafts can be changed resp. the suitable dispersing tool for the process may be attached. Flexibility is the advantage of the **ystral** Multipurpose system. Short set-up times, easy handling and easy cleaning. No interruption in production during cleaning.



Multipurpose

Exchangeable shafts/exchangeable tools

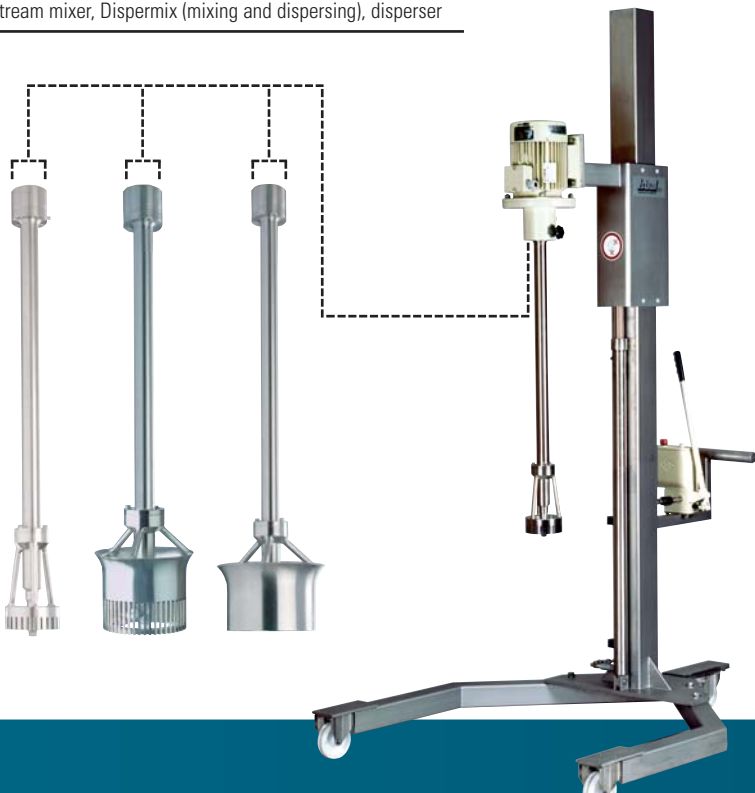
ystral
samples of applications

- | | | | | | |
|--|--|--|---|--|---|
| Food:
Jam
Baby food
Dough
Sugar solution
Ice cream | Cosmetics:
Shampoo
Hand care cream
Toothpaste
Lotions | Detergents:
Cleaning detergent
Polish
Starch
Washing starches | Pharmaceuticals:
Rub-in gels
Tablet coating
Nutrient solution | Chemistry:
Folds
Plant fertiliser
Fibres
Suspensions
Emulsions | Paints/Lacquers:
Lacquers
Offset printing inks
Textile colours
Dispersion paints |
|--|--|--|---|--|---|

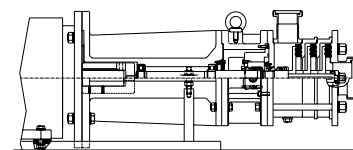
Technical data	
Power	0,5 – 55 kW with exchangeable mixing and dispersing tools 1,5 kW – 7,5 kW with exchangeable shafts
Voltage	230/400 V, 50/60 Hz, special voltages
Speed	750/1.500 min ⁻¹ , 1.500/3.000 min ⁻¹ Step-less up to 3.600 min ⁻¹ with frequency converter
Shaft	Shaft with bearing separated from the motor, plug-in connection to the drive
Submersed part	Stainless steel 1.4571/1.4404, special material
Seal	Lip seal, mechanical seal single or double action, depends on field of application
Tools	Jetstream mixer, Dispermix (mixing and dispersing), disperser

Process:
For a variety of processes a range of drives, shafts with different seal systems and tools are available. Batch sizes for the machines with exchangeable shafts from 30 to 2.000 litres are possible.

Technology:
All the experience and technology know-how is reflected in the Multipurpose aggregates. Highest quality materials with a suitable specification, especially selected for a process are self-evident. The easy to handle modular system was developed and realised together with partners from different fields of application. The modular system is enhanced by stands in a variety of executions, stationary or moveable.



The **ystral** high-speed dispersing machines work according to the rotor-stator principle using high peripheral speed. The extremely fine distribution of solids (suspension) and liquid (emulsion) in a basic liquid is given by the interaction of different particle size reduction procedures. The high precision dispersing tools are individually adapted to the respective process application.



Function:

The **ystral** inline and batch dispersing machines work according to the principle of a rotor-stator system. Due to the narrow gap between rotor and stator, and also the high peripheral speed of the rotating rotor, very high shear gradients are applied. The product passes through slots of the rotor teeth into the shearing zone and lea-

- inline dispersing without processing vessel, directly in one passage

In a batch operation the product is dispersed in the vessel or circulated through the external machine until the required particle size reduction is achieved. When pumping the product through an external inline machine, an additional dispersing process is applied.

Disperser

High shear gradients with the rotor-stator principles



ystral

samples of applications

Food:

Fruit puree
Vegetable puree
Mustard slurry
Sauces and soups
Dough

Cosmetics:

Basic materials
O/W-emulsions
W/O-emulsions

Pharmaceutical:

Extraction
Reactive agents
Creams

Chemistry:

Diatomite earth suspensions
Activated carbon suspensions
Bitumen emulsions
Separating emulsions
Cleaning agents

Paints/Lacquers:

Printing ink
Offset printing ink
Pigment suspensions
Dispersion paints



Technical data	
Power	1,5 – 55 kW
Voltage	230 / 400 V, 50 Hz, special voltages
Speed	1.500 / 3.000 min ⁻¹ , stepless up to 3.600 min ⁻¹ with a frequency converter (6.000 / 12.000 min ⁻¹ for Z 66)
Bearing flange	Coated aluminium, coated steel stainless steel 1.4541 / 1.4571
Sealing	Lip seal, mechanical seal single or double action, depends on field of application
Mixing head	Stainless steel 1.4571/1.4404
Peripheral speed	10 – 54 m/s
Flow rate	200 – 100.000 l/h

ves it through the slots of the stator. In low and medium viscosity products, the machine performs the pumping action itself. The multi-tooth system of the rotor and stator apply other mechanical forces to the product to increase the rate of particle size reduction.

For the direct inline process, the required degree of dispersing can be achieved using a multiple shear ring machine. All **ystral** machines may be operated in horizontal or in vertical position.

Technology:

The rotor-stator system may be equipped with up to three dispersing stages and up to six dispersing rings for each stage. The size of the slots is determined by the process and may vary from stage to stage or for each shear ring.

If necessary, the dispersing chamber may be equipped with a cooling or heating mantle. Depending on the application, different types of sealing may be installed:

- Single action seals cooled and lubricated by the product itself
- double action seals cooled and lubricated by an external cooling system
- pressurised cooling and lubricating system.

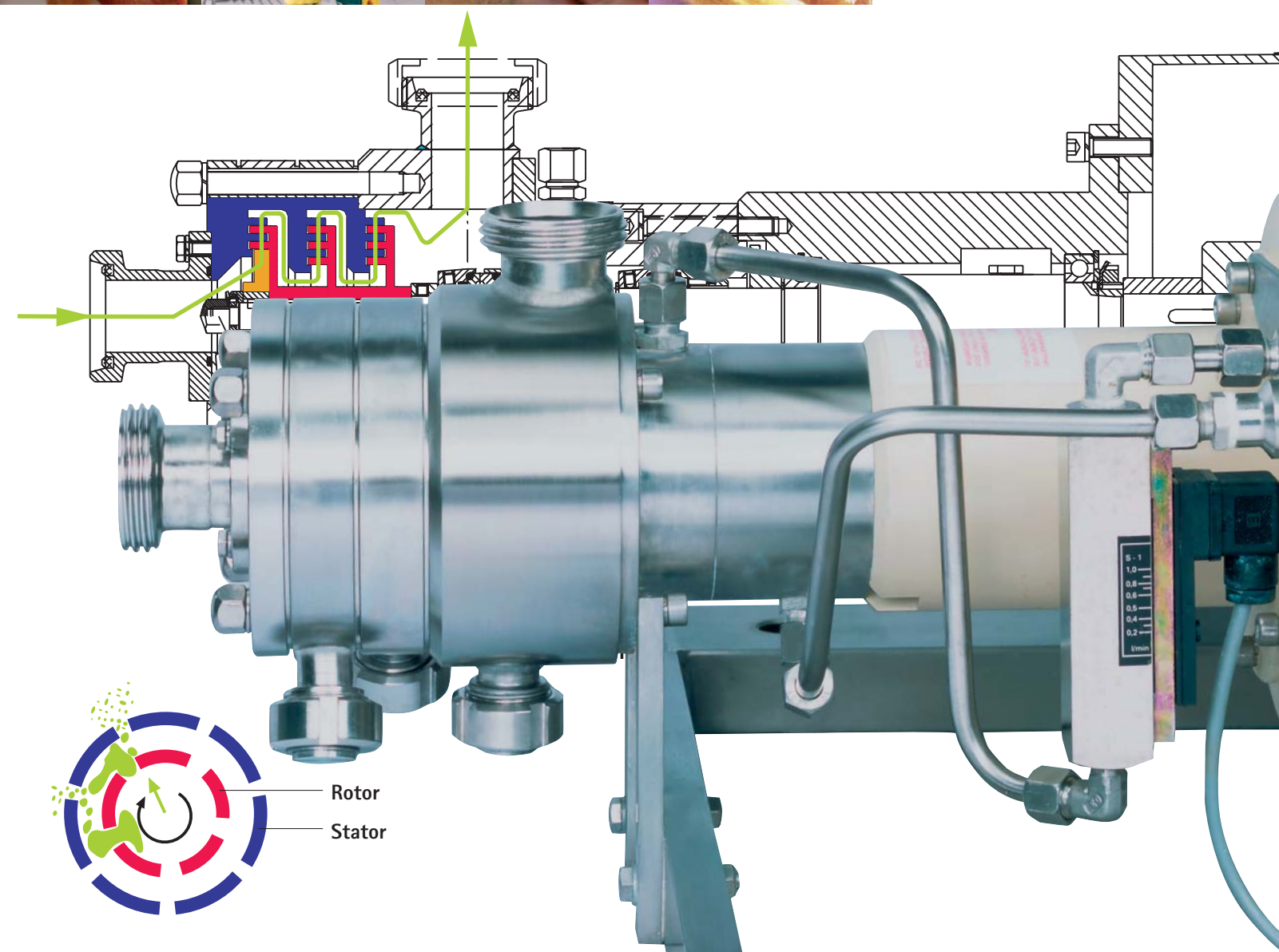
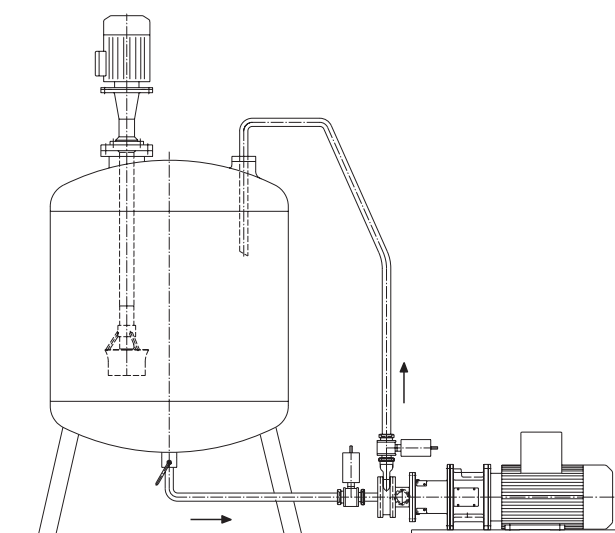
Principles:

The product is forced through the rotor-stator system. The inner rotor ring accelerates the product to maximum speed. The stator reduces the speed of the product to zero and then the next rotor ring again accelerates it. This results in a very effective particle size reduction and a homogeneous distribution of the solid particles and/or droplets in the liquid product.

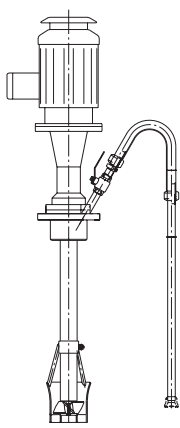
Process:

Three forms of operation are possible:

- batch dispersing directly in a vessel
- batch dispersing in a loop with an external inline dispersing machine



The best way of handling powders is to use a process that does not allow the formation of dust at all. Higher product quality by effective wetting, dispersing and better utilisation of the raw material are further arguments in favour of the **ystral** Transporting and Dissolving System (TDS). With TDS induction mixers, sophisticated processes may be undertaken easily and economically. It is possible to induct liquids or gases as well.



Function:
The **ystral** TDS induction mixer inducts the powder into the liquid and simultaneously suspends the product in the vessel. All the advantages of a Jetstream mixer are provided. Sedimentation is avoided and absolute homogeneity is guaranteed during the whole process.

without polluting the environment by the carbon particles and with the function as a mixer the Activated Carbon may be kept in suspension.

TDS induction mixer

Dust-free inducting and wetting of powders

ystral
samples of applications

Induction of:
Aerosil, Cab-O-Sil,
Activated Carbon
Aluminium oxide
Salts, liquids
gases and more

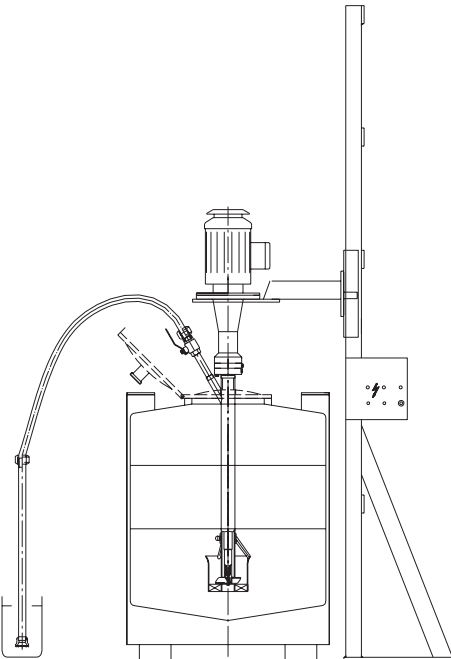
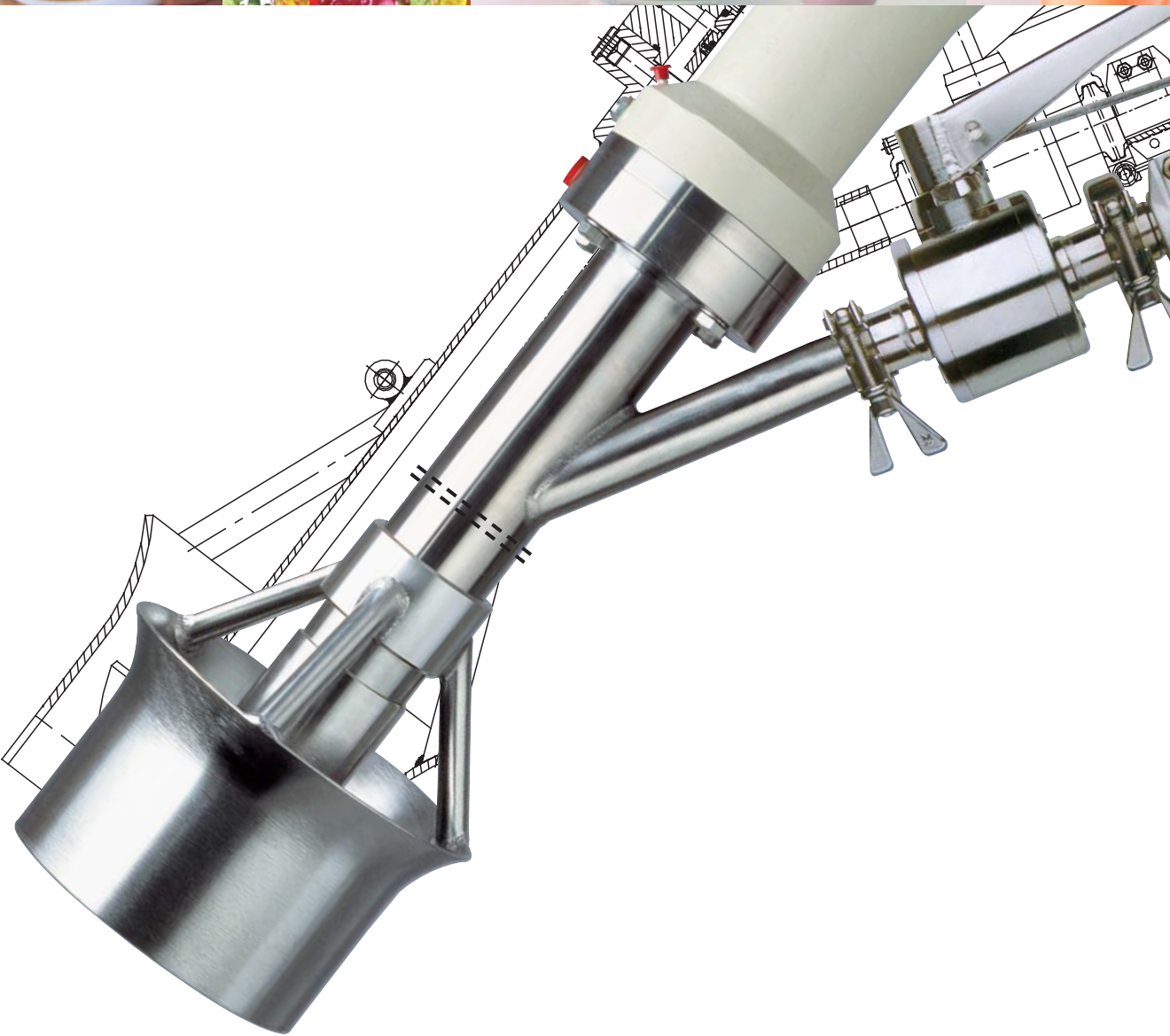


Technical data	
Power	1,1 – 25,0 kW
Voltage	230 / 400 V, 50 Hz, special voltages
Speed	1.500 / 3.000 min ⁻¹ Step-less from 360 – 3.600 min ⁻¹ with frequency converter
Bearing flange	Coated aluminium, stainless steel 1.4571
Submersed part	Stainless steel 1.4571/1.4404, special materials
Seal	Lip seal, mechanical seal single or double action, depends on the application

Principles:
Powder is inducted through an induction hose and brought into the liquid below the surface. The powder is finely distributed and immediately wetted and dispersed. The required vacuum to induct the powder is created in the mixing head of the machine itself according to the Venturi principle. The fine distribution of the powder when it comes in contact with the liquid results in a spontaneous and complete wetting of all powder particles.

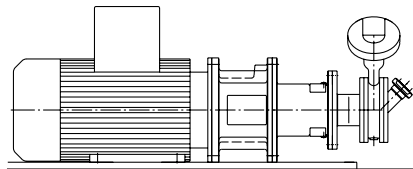
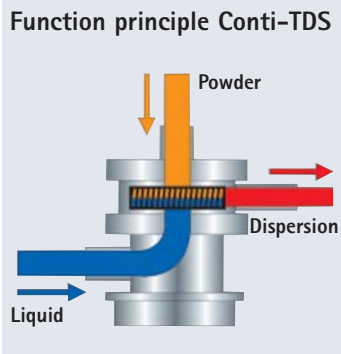
Technology:
The machine is operated in two speed ranges: high speed for the induction and low speed for mixing and suspending after powder induction. A separate cleaning connection allows the inner parts of the machine to be cleaned. Motor and mixing shaft use separate bearings. Seal and bearings are arranged outside of the submersed parts. All rotating parts are protected against accidental contact.

Process:
The treatment of e.g. Aerosil, Cab-O-Sil or similar is carried out without any development of dust with very short wetting and suspending times. No dust concentrations dangerous to health come up. No dust comes out from the surface of the liquid. The treatment of Activated Carbon is carried out



Dust and loss-free emptying of containers, feeding of powder, dosing and adding, wetting and dispersing to a completely agglomerate-free result – all processing steps in one machine – the **ystral** "Conti-TDS". By combining all the processing steps into one machine, enormous rationalisation potential is offered. Production time is minimised, partial processing steps are completely avoided, production cost is reduced to a minimum. The basic idea of the Conti-TDS technology is that not only the powder is wetted, but also dispersed into a liquid under vacuum. Agglomerates are avoided, better reactivity, higher efficiency of the raw material and higher product quality are the results.

Technical data	
Power	5,5 – 200 kW
Voltage	230 / 400 / 500 V, 50 Hz, special voltages
Speed	1.500 / 3.000 min ⁻¹ , step-less up to 3.600 min ⁻¹ with frequency converter
Dispersing chamber	Stainless steel 1.4571/1.4404, special materials tools are exchangeable, fast clamping, type of seal and material depends on the application, CIP cleaning
Liquid flow rate	2,4 – 90 m³/h
Powder induction rate	up to 15 t/h
Maximum viscosity	2.000 – 200.000 mPas (depends on type and assignment of the machine)



Function:
The Conti-TDS system is based on the principle of an inline dispersing machine. A rotor-stator system transports and disperses liquid with high shear energy. The liquid that flows through the dispersing chamber builds up a high induction vacuum. This vacuum inducts powder without dust or

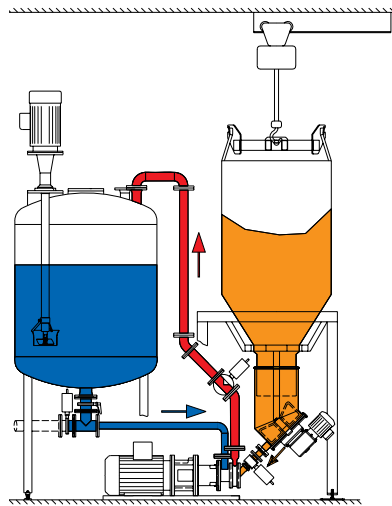
Process:
Typical installation is operation in recirculation, attached to a vessel. The machine may be attached to several vessels or may be placed on casters and installed to vessels in different working areas. It is easy to integrate the machine into existing processing systems. A continuous process may be



wastage, from any possible container directly into the liquid. Induction may be done directly from a paper sack, powder hopper, container, barrel, Big-Bag or silo. After powder induction, the machine may be used as an inline dispersing machine to circulate and further disperse the product.

Principles:
The dispersing of the liquid causes an enormous enlargement of the liquid surface that is used for the wetting process. The vacuum causes an expansion of the air content in the powder to a multiple of the original. The distance in-between the powder particles are enlarged proportionally which facilitates penetration and increases the wetting capability of the liquid. Even difficult to wet powders, spontaneously swelling or sticky powders may be treated without any problem.

realised by using two vessels working in flip-flop, a combination of batch and storage tank or as a min/max processing system. Several powders may be inducted and dosed in a given sequence; swelling and dispersing time can be adjusted. De-aeration is no problem. Product changes are easy to handle. Continuous inline process is possible as well with the same machine. For extremely high viscosity products such as offset printing inks, silicon sealants, knifing filler or glue, the machine is used in combination with a volumetric pump.

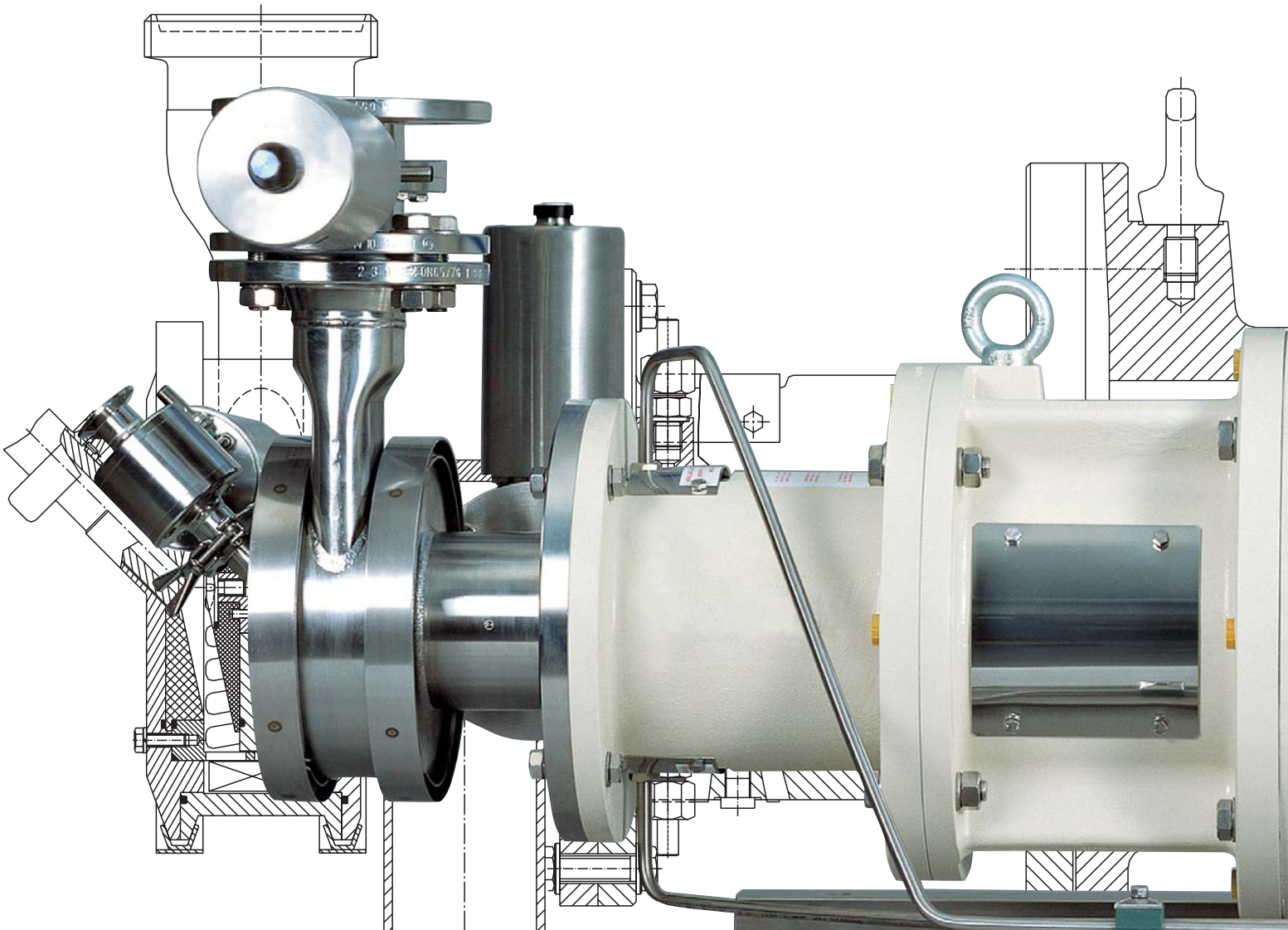


Conti-TDS

Powder inducting, wetting and dispersing

ystral samples of applications

- | | | | | |
|---|---|--|--|---|
| Food:
Salad sauces
Baby food
Milk drinks
Aromatics | Cosmetics:
Toothpaste
Shampoo
Natural cosmetics
Shaving foam | Pharmaceuticals:
Rub-in gels
Tablet coatings
Cough syrup
Gelatine solutions | Chemistry:
Artificial resin
Cleaning detergents
Fibres
Plant fertilisers
Folts | Paints/Lacquers:
Paints
Offset printing inks
Textile colours
Dispersion paints |
|---|---|--|--|---|



As an experienced and innovative enterprise in the production of machines, components and processing systems, **ystral** offers complete solutions for a variety of processing tasks. The program offers individual machines up to production and turn-key systems. Processing systems are designed and built on the basis of the reliable **ystral** mixing, dispersing and powder wetting machines. Advantage of this concept: planning, trials, execution and start-up – all from one source – from **ystral**.

Proceeding:
Processing systems are developed in close co-operation with the customer. Good team work, and full co-ordination of the different process requirements guarantee a successful concept.

Processing systems

Turn-key solutions from ystral

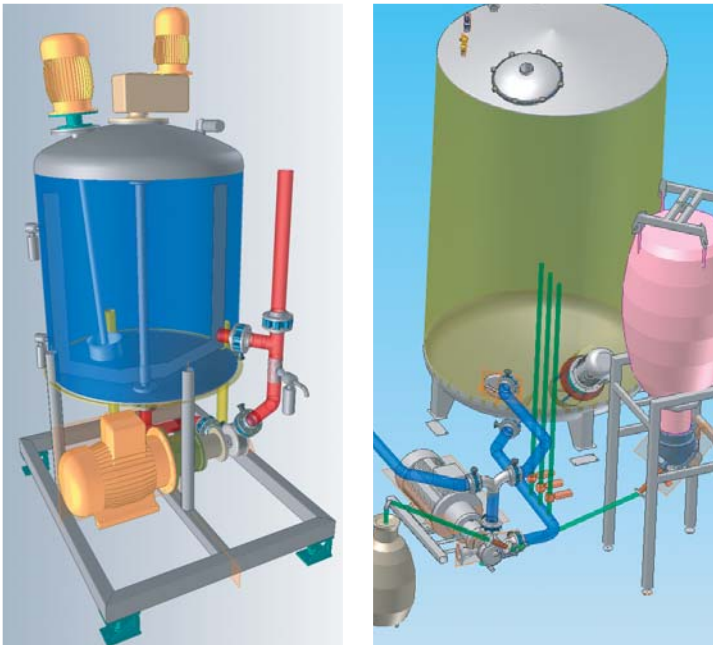
ystral
samples of applications

Food: Jam Baby food Dough Sugar solutions Ice creams	Cosmetics: Shampoo Hand care cream Toothpaste Lotions	Detergents: Cleaning detergents Polish Starches Washing starches	Pharmaceuticals: Rub-in gels Tablet coatings Nutrient solutions	Chemistry: Foil Plant fertilisers Fibres Suspensions Emulsions	Paint/Lacquers: Lacquers Offset printing inks Textile colours Dispersion paints
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The planning is supported by trials with the machines in the pilot plant trial area.

Safe:
Turn-key processing systems are being tested together with the customer prior to delivery. The systems are installed on site by **ystral** technicians and a start-up is carried out. A processing guarantee from **ystral** provides the required assurance for a successful production.



ystral processing system modules harmonise with each other. With a variety of elaborated modules, **ystral** offers individual and system solutions for a variety of applications.

Processing modules

Carefully detailed variety

Process vessels



Vessels for powdery or liquid basic components



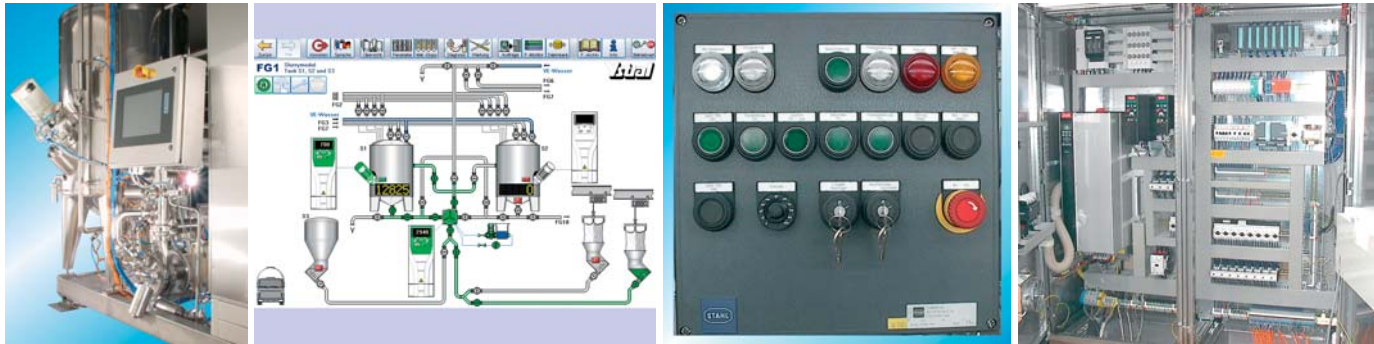
Big-Bag emptying stations



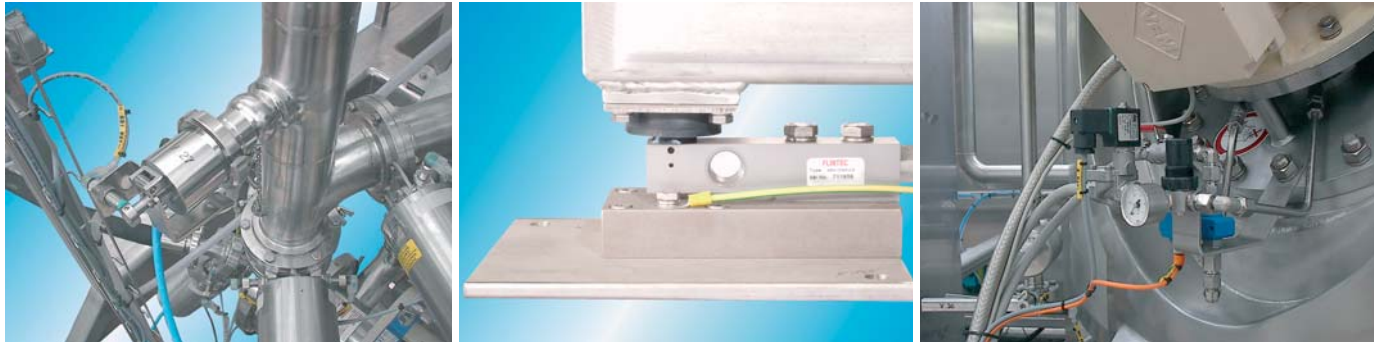
Systems for fluidising of powdery components and docking stations for Big-Bags



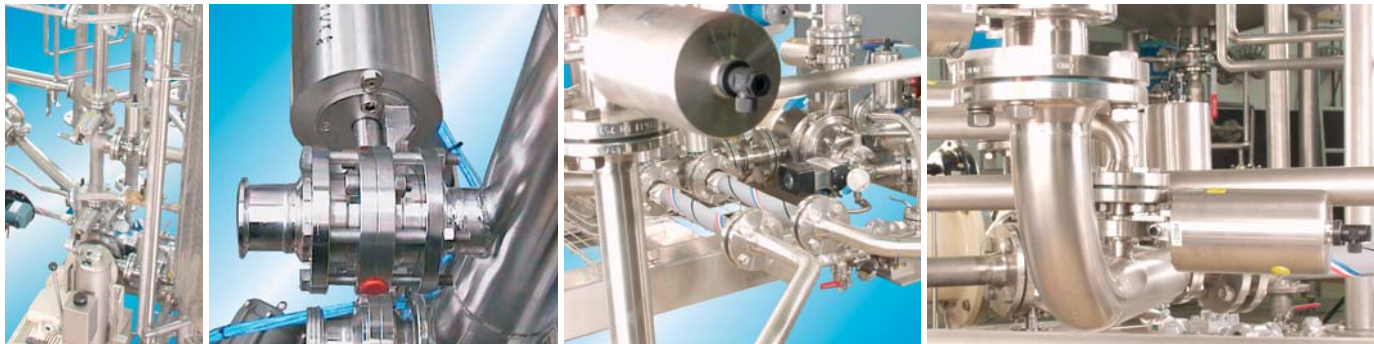
Controls and switchboards



Measurement and control technology/sensor technology



Armatures and piping systems



Stands

