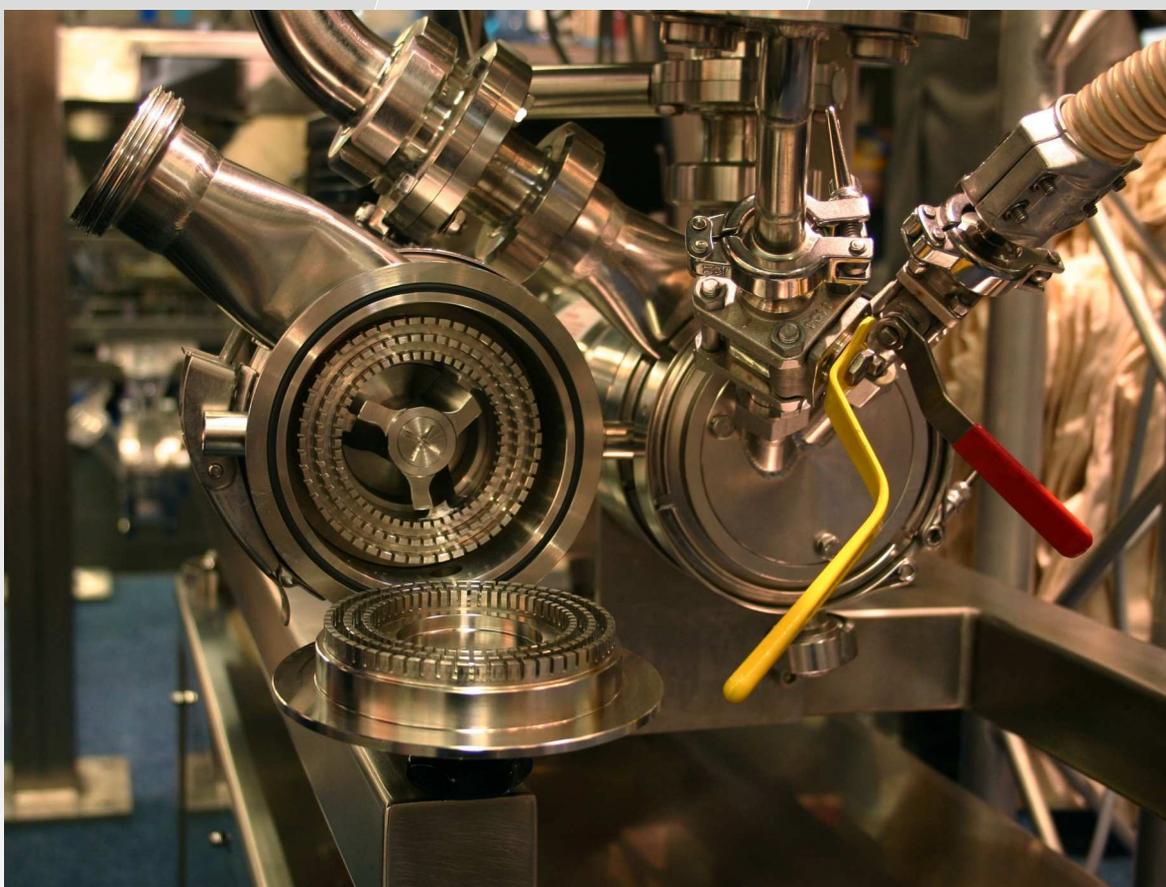


cav

chemie - anlagen + verfahren

The magazine for Chemistry and Pharma technics

Translation of an article published in the magazine CAV 01-2008



Ystral

Conversion possible

Universal changes over machines allow flexible processes and are the basis for a future oriented investment

Dr.-Ing. Hans-Joachim Jacob

A system that has proven itself for mixers and batch dispersers now consequently is applied to inline dispersing and powder wetting machines as well.

By simply changing two machine parts only, a Powder Wetting Machine is converted to work as an Inline Dispersing Machine with a peripheral speed of about 42 m/sec. The conversion is carried out easily and fast. The piping system in this case has not to be removed. The new tools even fit to older machines as well.

The application engineer or the operational person again and again faces the question which machine has to be implemented into a process. He very well knows the daily business, he knows about the actual wishes and requirements but he as well knows that processes are being modified very often as well.

Until today he cannot evaluate whether in one years time the range of products has to be extended or whether new components have to be treated, which might be more sensitive to shear energy and for this reason may not be dispersed anymore. Very often the initiative comes from the purchasing department as they could manage to order a more cost effective raw material that is coarser and now suddenly requires much

stronger dispersing.

Finally customers request may change as well and there is also a permanent request for higher quality. It does not make any sense to order and install a new machine for each new demand. The subsequently modification requires projecting and very often an interruption of the production, which might be very cost intensive during the required modification. In many cases it is required to install new pipes or new flanges for the vessels, inspection certification, extension of the monitoring system and even electrical control systems - the consequential cost are very high.

Anticipatory planning, possible modifications, flexibility and future orientation are important aspects during the evaluation of the required

investment.

For laboratory scale equipment it is already very common since a long time, to easily exchange the tools. It is mandatory for the whole palette of similar processes to realise the case with the same drive, the same installation and the same electrical control system. For this purpose, the drive is equipped with a coupling that allows a quick exchange of the tools.

Exchangeable tools for industrial machines

Now this stem has been applied to industrial machines and it proves to be very successful as well. The exchangeable shaft is designed in such a way that the rotating shaft is completely separated from the motor shaft. The sealing towards the product is effected by an integrated mechanical seal.

The coupling to the motor is easy to loosen and reconnected. The tool fitting (adapter) at the lower end of the exchangeable shaft is the very same for all different tools used. It is also possible to quickly and completely change the whole shaft including the tool or in case you use a single exchangeable shaft only to remove the shaft and then change the mixing tool only following the requirements of the process.

For a complete homogeneous mixing and suspending a Jetstream mixing head is used. Without the use of baffles in the vessel, this mixer creates a vertical circulation in the tank without any rotation of the mixture.

For an intensive dispersing a dispersing head is being used instead. This head works according to the rotor-stator-principle of a teeth-shear-ring machine and is used for size reduction of solid particles or for emulsifying.

A combination of a disperser and a Jetstream mixer is the Dispermix. While a Jetstream mixer homogeneously mixes the contents of the vessel, a partial stream of the product is forced through a dispersing zone and becomes simultaneously dispersed. This machine is very interesting as different to simple dispersing it avoids an inhomogeneous distribution of the dispersing effect.

Without any need to install a second mixer, even high viscosity products in a vessel can be homogeneously dispersed. For this reason the Dispermix besides the normal dispersing tasks may be used for a fast dissolving of thickening agents and for the reduction of agglomerates. The Dispermix is capable to dissolve even high thickening swelling materials (CMC, Xanthan, Guar, Carbopol and similar) quickly and absolutely free of agglomerates.

The Dispermix is available in a special version to break large solid lumps into a liquid. A good sample for this is the dispersing of fat and wax blocks or the dispersing of materials as frozen blocks. In this case the Dispermix provides an enormous reduction in time.



Multipurpose machine with moveable lift, quick coupling and exchangeable tools

**Tools:
Disperser,
Dispermix,
Jetstream mixer,
New: Induction mixer for powder induction**

With the three different tools mentioned above all processing tasks from gentle mixing to intensive dispersing may be carried out.

A newly developed system is the TDS Induction Mixer that may be used in combination with the Multipurpose-Machine. This mixer builds up a strong vacuum in the centre of the mixing head. With this vacuum powders may be inducted dust-free directly from a bag into a liquid by using an induction tube and hose. The bags must not be lifted and poured into the vessel. The mixing-in of the powder is effected below the liquid surface. No crust builds up at the wall or at the shaft of the mixer.

Multi functional machines in different sizes

The concept, to change the complete shaft via a coupling is not possible for very large or very heavy machines or if they are fixed to a vessel. But even for this case change over multipurpose machines are available.

In this case the mixing tool adapter is designed in such a way that all available variants of tools may be attached. The mixing head as well may be exchanged very easily. To exchange the tools, it is normally required to change the mixing head in the vessel or to remove the machine from the vessel.

When ordering such a machine adhere to the description „LDT-Multipurpose Machine“. Such a machine may not be recommended for any application but in most cases this type of machine works fine.

Multipurpose machines are designed in such a way that all screws, connections and all threads and seals follow the GMP regulations. This is absolutely necessary for applications in the pharmaceutical and food production. For applications in the Chemistry this is a real advantage for cleaning purpose.

Also as an Inline-Disperser

Machines installed outside of a vessel should provide the same features to be flexible, multi functional and easy to modify.

Powder wetting machines such as the Conti-TDS are designed to induct and disperse powders dust-free into liquids. They are equipped with a dispersing chamber with at least three or more connections: one or more inlets for liquids, one or more inlets for the powder and one outlet for the ready-made product.

The machine is installed outside of the vessel and pumps the liquid in a circuit without the need of an additional pump. With the circulation, the machine produces a strong vacuum in the dispersing zone that then is being used to induct powders or other liquids while simultaneously and effectively dispersing the product.

The picture shows a machine type Conti-

TDS-2 that is a smaller version. The machines are being offered in different sizes up to a power of 250 kW.

For processing tasks where no further powder or additional liquids have to be inducted and where all the power should be applied as dispersing energy, now special tools are available which allow an easy and quick modification from a powder wetting and dispersing system to a real six shear rings dispersing machine.

The exchange is very simple: simply loosen two screws and change two components. With the tools shown in the picture you get a six shear ring-dispersing machine with a peripheral speed of up to 42 m/s and a shear gradient of about 100.000 s⁻¹.

The speciality of the machine concept is the fact that for the modification the piping system connected to the machine remains untouched. Different to all other inline dispersing machines where the liquid inlet is placed at the front side of the machine and which has to be removed for any modification the inlet for the Conti-TDS is placed at the motor side of the mixing chamber. The connections of the liquid may stay attached during the required modification. The fact that the liquid enters the mixing chamber from the motor side respectively from the sealing side is not only an advantage when modifying the machine, it is also a great advantage when cleaning the machine.

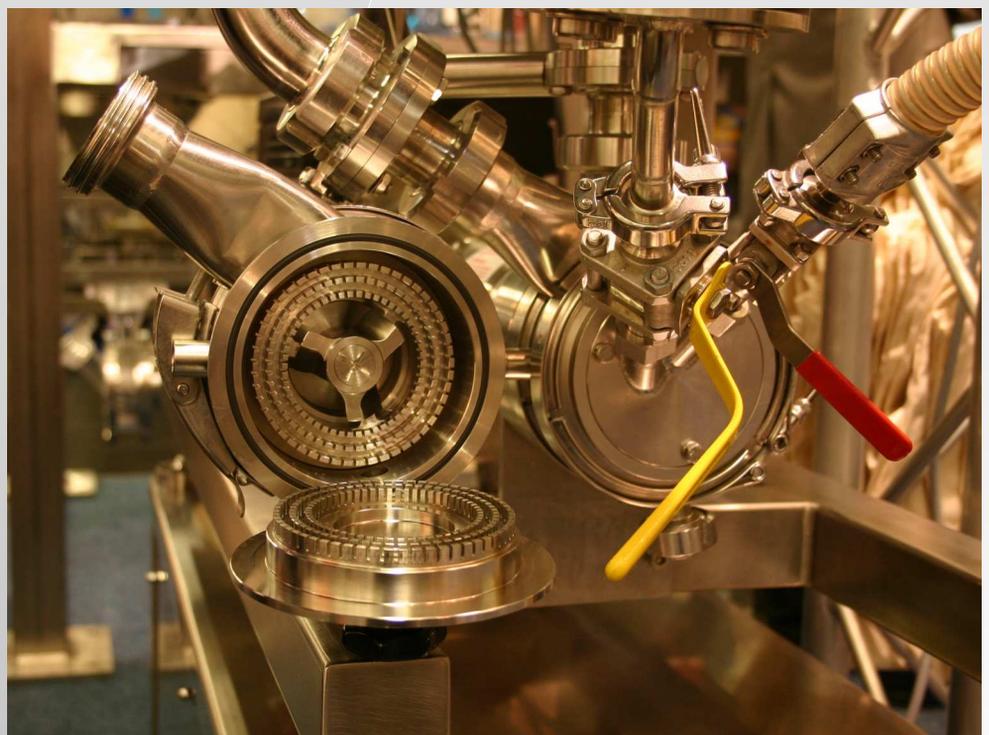
It is very difficult to clean powder inducting and dispersing machines with a vertical oriented shaft, where the bearing and sealing is installed below and the liquid enters the chamber from top. The central area below the rotor is not sufficiently cooled and lubricated neither during the operation nor during a cleaning process.



Conti-TDS-2 for the induction and dispersion of powders into liquid

Material collects itself beneath the rotor and may be removed only with a complete disassembly of the mixing head.

This does not apply to the Conti-TDS-machines. Here the liquid flows with a maximum speed even in the area behind the rotor. Without any disassembly the machine may be completely cleaned.



Rotor and Stator for the modification of a Conti-TDS-2 to a six ring dispersing machine with a peripheral speed of up to 42m/s

Inquiry No. / Quotation No. _____

**To be filled
in by ystral**

Representative _____

Date _____

Customer No. _____

Report No. _____



Customer Process Questionnaire
- End product / Components -

Page 1 of 2

Customer name _____

Contact person _____

Address _____

Division / function _____

Telephone No. _____

Extension _____

Telefax No. _____

Which end product do you want to produce, ...

- Name _____
- Quantity _____ kg Ltr.
- normal process temperature _____ °C
- max. permitted temperature _____ °C
- max. viscosity _____ mPas (=cP) at _____ °C
measuring method _____ (for all given viscosities)
- spec. weight _____ kg/dm³

- Is the end product abrasive?
 no yes: strong weak
- Has the end product the tendency to foam?
 no yes: strong weak
- Is the end product sticky or lumpy?
 no yes
- What particle size and/or particle size distribution do you want to reach in the end product?
_____ μm

...which components are to be treated?

Information about the basic liquid (initial conditions)

- Name _____
- Quantity _____ kg Ltr.
- Temperature _____ °C
- Flow characteristics similar to... _____
- Viscosity _____ mPas (=cP)
- spec. weight _____ kg/dm³

Information about further liquid components

Name	_____	_____	_____
Quantity	_____ <input type="checkbox"/> kg <input type="checkbox"/> Ltr.	_____ <input type="checkbox"/> kg <input type="checkbox"/> Ltr.	_____ <input type="checkbox"/> kg <input type="checkbox"/> Ltr.
Adding temperature	_____ °C	_____ °C	_____ °C
Adding viscosity	_____ mPas (=cP)	_____ mPas (=cP)	_____ mPas (=cP)

Information about solid / powder components

Name	_____	_____	_____
Quantity	_____ kg	_____ kg	_____ kg
Bulk density	_____ kg/dm ³	_____ kg/dm ³	_____ kg/dm ³
Does the solid / powder have the ability to flow?	<input type="checkbox"/> no <input type="checkbox"/> yes: <input type="checkbox"/> good <input type="checkbox"/> bad	<input type="checkbox"/> no <input type="checkbox"/> yes: <input type="checkbox"/> good <input type="checkbox"/> bad	<input type="checkbox"/> no <input type="checkbox"/> yes: <input type="checkbox"/> good <input type="checkbox"/> bad
Has the solid / powder the tendency to create dust?	<input type="checkbox"/> no <input type="checkbox"/> yes	<input type="checkbox"/> no <input type="checkbox"/> yes	<input type="checkbox"/> no <input type="checkbox"/> yes
What is the initial particle size of the solid / powder?	Primary grain _____ mm Agglomerate _____ mm	Primary grain _____ mm Agglomerate _____ mm	Primary grain _____ mm Agglomerate _____ mm
From what type of container is the solid / powder processed?	<input type="checkbox"/> Bag <input type="checkbox"/> Big Bag <input type="checkbox"/> Drum <input type="checkbox"/> Silo	<input type="checkbox"/> Bag <input type="checkbox"/> Big Bag <input type="checkbox"/> Drum <input type="checkbox"/> Silo	<input type="checkbox"/> Bag <input type="checkbox"/> Big Bag <input type="checkbox"/> Drum <input type="checkbox"/> Silo

Information about other components

