

13 trends & mega trends in process engineering

Process technology is changing: New technological possibilities, changed requirements in production and ever more frequent product changes, but also more strict specifications with regard to occupational and environmental protection are fundamentally changing production processes. Get to know 13 trends that will shape the future of mechanical process technology.

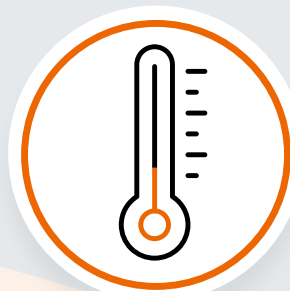


1 POLLUTION-FREE PROCESS CONTROL

New findings with regard to the health hazards when handling powders and liquids and more rigorous specifications concerning occupational safety, but also growing hygiene demands and the use of sensitive electronics increasingly make process control that is free from dust, gas and fumes a must-have.

> IMPLEMENTATION WITH YSTRAL

Technologies from ystral enable the processing of powders and liquids in a closed process. Exposure of the operator to dust, fumes and gases that are hazardous to health is significantly reduced by this, and the raw materials can be processed without losses.



2 COLD CHEMISTRY

Many processes, which previously had to be carried out at high temperatures, can be implemented by means of dispersing under high shearing and optimised pressure conditions with significantly lower process temperatures. This not only lowers the energy requirement, but also enables a more gentle processing of raw materials.

> IMPLEMENTATION WITH YSTRAL

Technologies from ystral enable cold chemical engineering processes. The YSTRAL Conti-TDS inline disperser introduces about 70% less energy into a process by means of more efficient dispersing compared to traditional procedures. Thanks to this introduction of low energy, processes can be realised at lower temperatures.



3 LESS/NO BIOCIDES

Manufacturers of very different industries want to reduce biocides in their products or completely avoid them – for many different reasons, i.e., because the handling of biocides is critical or because they bring undesirable effects in the end product. Giving up the use of biocides is possible, if the product is not contaminated with germs in the production process – particularly germs from the ambient air.

> IMPLEMENTATION WITH YSTRAL

Contamination of the product with germs is significantly reduced or completely avoided with a closed, clean process, with powder induction below the liquid level and the use of sterile filters. For example, cosmetics can be produced completely without preservatives by using YSTRAL technologies. Paints and varnishes keep their eco label despite more stringent biocide limit values.



4 NO CLEANING AGENTS

So far, vessels have often been cleaned with cleaning agents at the end of a process. This is not just time-consuming – discharge and disposal of the cleaning waste generated is also complex. For this reason, an increasing number of manufacturers are looking for ways to simplify their cleaning processes and dispense with cleaning agents.

> IMPLEMENTATION WITH YSTRAL

YSTRAL machines have been designed in accordance with the rules of Hygienic Design, and are therefore easy to clean. In case of subsequent batches with similar product groups, cleaning is integrated into the process and usually occurs at the start of a process. Any residue of the previously manufactured product is washed off under high pressure – not with cleaning agents, but with recipe components of the following batch such as the solvent template.



5 CUSTOMIZATION IN PRODUCTION TECHNOLOGY

In process technology, due to variable requirements and more and more frequent product changes, a flexible machine and system design is becoming increasingly important. Whilst with a rigid design, machines and systems must be replaced completely in case of a process change, with a modular system, selective adaptations are sufficient to render a machine or system fit for changed requirements.

> IMPLEMENTATION WITH YSTRAL

YSTRAL machines and systems are constructed modularly. A universal basic machine can be easily tailored to new requirements by replacing individual tools. ystral systems follow the modular principle: Physical modules, such as Big-Bags and containers, but also control modules can be flexibly combined with each other and adapted or extended as required.



6 PROCESS INTENSIFICATION

Process intensification accelerates processes, reduces the energy requirement and improves the quality of the end product – for example, by locally intensifying the mixing effect in the process vessel, by applying a vacuum to less than half a litre than to the whole system, and by using the solvent and reaction enthalpy for heating or cooling.

> IMPLEMENTATION WITH YSTRAL

With YSTRAL technologies, process intensification takes place in many different forms. For example, with the YSTRAL Jetstream Mixer, the entire content of a process vessel is slowly circulated vertically, while media are introduced into the mixing head under high turbulence. This way, the vessel content can be mixed through homogeneously much faster compared to a conventional agitator.



7 PROCESS INTEGRATION

Many process steps, for which separate machines were often used still up to now, can be combined in a single machine, which enables different process steps to be realised in parallel with only one system. The advantages: Saving time and space, reduced manpower requirement and easier control.

> IMPLEMENTATION WITH YSTRAL

Dispersers and mixers from ystral are the Swiss knives in process technology. For example, the YSTRAL Conti-TDS inline disperser combines several processes for the processing of powders in liquids: transport, dosing, addition, mixing as well as dispersing and dissolving.

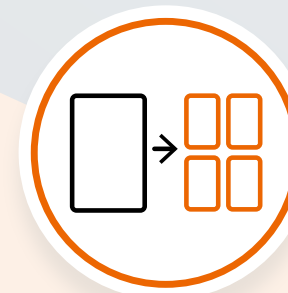


8 INTENSIVE PROCESSES OUTSIDE OF THE VESSEL

In traditional process technology, many processes take place in the vessel – this includes intensive processes such as dispersing. This renders production processes inefficient, energy-intensive and slow, and it is difficult to ensure a consistent product quality. For this reason, intensive processes are realised in the circuit outside the vessel more and more frequently.

> IMPLEMENTATION WITH YSTRAL

With the YSTRAL Conti-TDS dispersing machine, the crucial processes of wetting and dispersing are concentrated in one chamber with an effective volume of approx. half a litre. This way, the machine generates an energy density that is 1,000 times higher compared to the classic High Speed Dissolver with the same capacity.

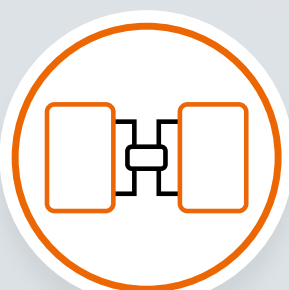


9 BATCH SIZE REDUCTION

In different industries – particularly in the pharmaceutical industry – the trend is towards a decrease in batch sizes. Large process vessels play an increasingly smaller part in day-to-day production, as small batches mean more flexibility, less space requirement, easier cleaning and significantly accelerated processes.

> IMPLEMENTATION WITH YSTRAL

Technologies from ystral provide users with the highest degree of flexibility, as different batch sizes do not result in any deviations in quality, and compared to a high speed dissolver for example, the fill level does not impact the process flow and the achieved result.

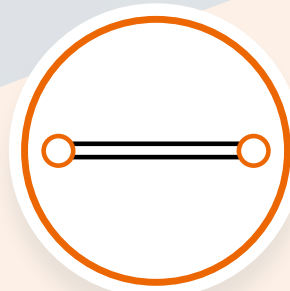


10 TWIN TANK INSTEAD OF SINGLE TANK

In a production process with only one vessel, an inline disperser cannot be used throughout, as the machine is not required for process steps such as filling or pumping. However, if the inline disperser is operated on two process vessels, the downtimes of the disperser can be minimised, significantly boosting the system efficiency.

> IMPLEMENTATION WITH YSTRAL

With the Twin Tank concept, ystral achieves an increased system efficiency by at least 60% with minimum additional space requirement – only a second process vessel, which is connected to the disperser by a pipe, is required. If the auxiliary times and process times are identical, the system efficiency can even be increased by 100%.

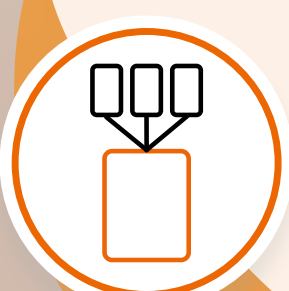


11 INLINE INSTEAD OF BATCH

An increasing number of manufacturers are switching from batch production in the process vessel to continuous production without vessel for large output quantities. In this process, the powder materials are entered into a controlled liquid flow, and in food applications for example, the product can be directly filled once it has passed a heat exchanger and a control filter.

> IMPLEMENTATION WITH YSTRAL

ystral realises inline production processes for manufacturers from very different industries – from cosmetics and paints up to foodstuffs. Even the production of ice cream, which is very complex in terms of process technology, has already been realised by ystral with an inline process completely without process vessel, mixer or storage tanks.



12 SLURRIES INSTEAD OF POWDER

In process technology, the trend is from production from scratch to slurry production – this is for many reasons. As the powders are introduced individually for slurries, the raw material can be dispersed optimally. Furthermore, slurries can be precisely dosed, and can be more easily pumped over long distances compared to powders.

> IMPLEMENTATION WITH YSTRAL

ystral uses slurry concepts for a large number of applications. As powder materials are unlocked colloiddally with the vacuum expansion technology from ystral, and the air contained in the powder is separated, the slurries produced must only be mixed at the end. Pure inline processes are also possible as an alternative to the process vessel.



13 PREDICTIVE MAINTENANCE

Progress in sensor technology enables the anticipatory monitoring of machines and making predictions of how long critical machine components will still work properly. It is thus possible with Predictive Maintenance to replace machine components *before* they become faulty and bring a system to an unanticipated standstill.

> IMPLEMENTATION WITH YSTRAL

Sensor technology is either preinstalled in YSTRAL machines, or used as required, to check the condition of critical machine components. For example, ystral uses acoustic sensors to check bearings, and pressure sensors to detect whether a seal has become porous.

