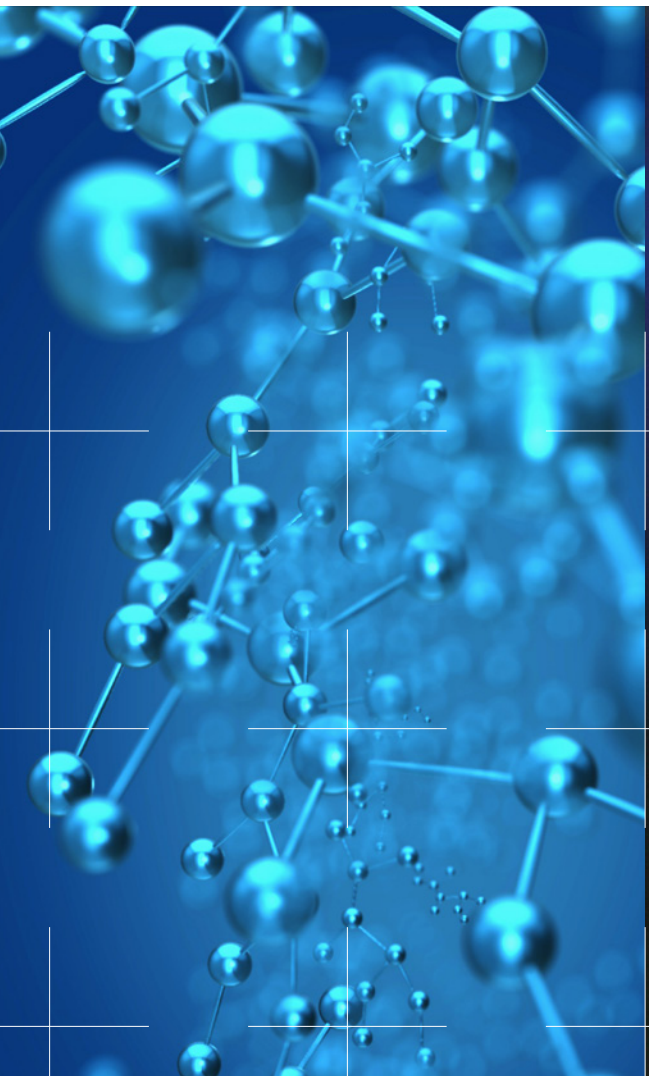
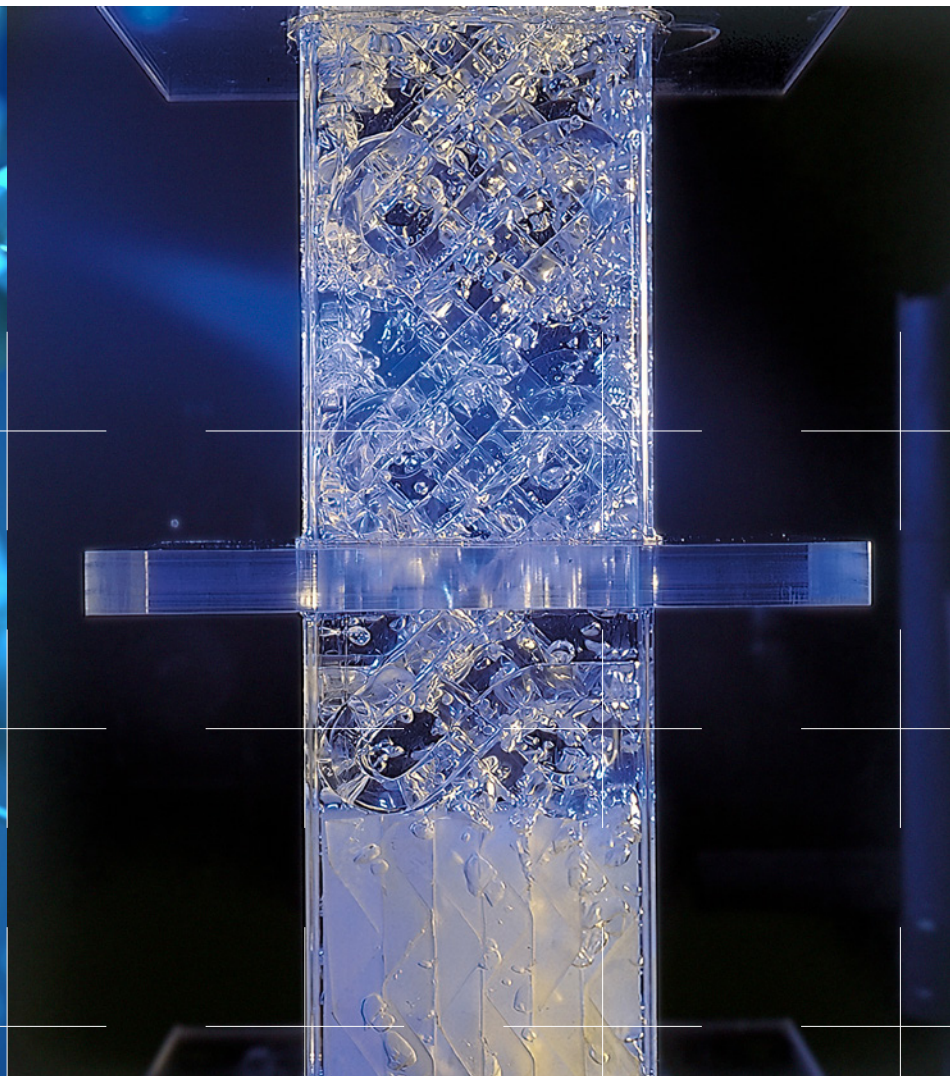
SULZER

Leveraging continuous **mixing and reaction technology**

As a technology leader at the forefront of innovative mass and heat transfer technologies, Sulzer Chemtech can help you enhance your mixing and reaction operations with key equipment, as well as support your move from batch to more effective continuous processing. sulzer.com/**chemtech**





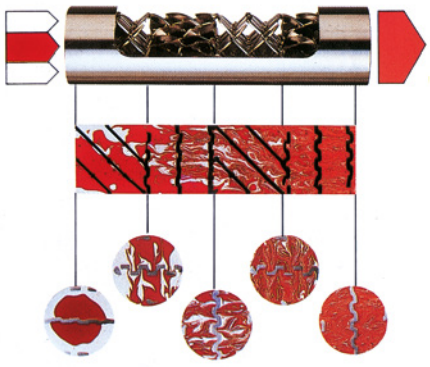
Change from batch to continuous processing

Key to most processing industries, mixing and reaction operations play a leading role in determining a product's quality, cost and ultimately, the competitiveness of its producer. In many cases, batch setups prevent companies from fully realizing their capabilities.

Method of batch to continuous

The shift from batch to continuous operations can help you intensify your processes and increase your product yield. When looking at mixing and reaction trains, Sulzer Chemtech's solutions can help you in the transition, offering highly effective setups to maximize the capabilities of your plant.

Our unique, patent-pending reactor concept is based on our state-of-the-art static mixing technology with exchangeable modules. This design streamlines configuration while maximizing flexibility.
The setup has been developed to narrow residence time distribution, with extremely high Bodenstein numbers in the range of 100 per meter length. In addition, the solution features accurate temperature control and helps users to feed reactants at the right place, increasing yield while reducing side reactions. As a result, users can improve their productivity and product quality, increasing profitability and competitiveness.



Highlights

- Excellent mixing and flow characteristics (plug-flow) with low shear
- Narrow residence time distribution
- Designed to simplify thorough in-line cleaning and sterilization
- Reduced wall effects to prevent overheating
- High selectivity
- Modular design that supports flexible operating conditions and scale-up
- Compact design that can fit in applications with limited room available
- Flexible and easy to use

Supported industries

- Chemicals/Petrochemical
- Healthcare
- Pharmaceuticals and biotech
- Food and beverage
- Personal care
- Polymer and expanded plastic
- Reactive resins, adhesives, sealants, paints and coatings
- Fibers

Applications

- Micromixing / small-scale systems
- Splitting and recombination
- Forced mass transport
- Contacting
- Decrease of diffusion path
- Several injection points possible
- Plug flow behaviour
- Melting of pasty products, i.e Vaseline
- Maintaining uniform temperature and viscosity of adhesives
- Tempering spinning solutions
- Cooling of plastics
- Heating up of emulsifiers

Complete product range for static mixing, heat exchange and reaction technologies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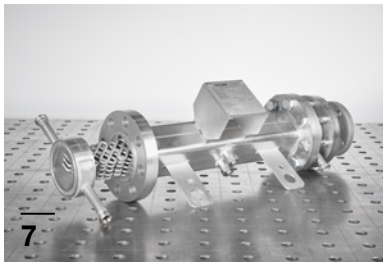
1. CompaX
2. KVM
3. SMF
4. SMV
5. SMXL Heat Exchanger
6. SMI
7. SMR Reactor
8. SMX
9. Contour
10. SMXL - Multi Tube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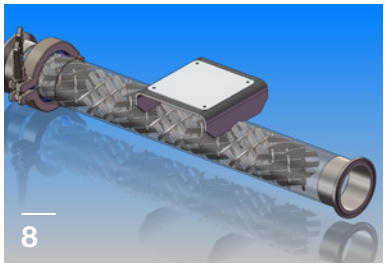
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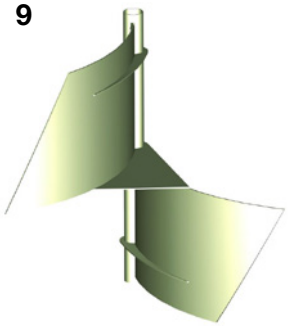

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Static mixing-reaction technology for a better product quality

Additional features of Sulzer Chemtech's reaction technology

- Maximized reaction yield
- Suitable for reactions with solid contents
- Excellent temperature control of exothermic and endothermic reactions
- Fast reaction times
- Suitable for CIP practices
- Suitable for pharmaceutical applications that require FDA approval and validation

Loop reactors

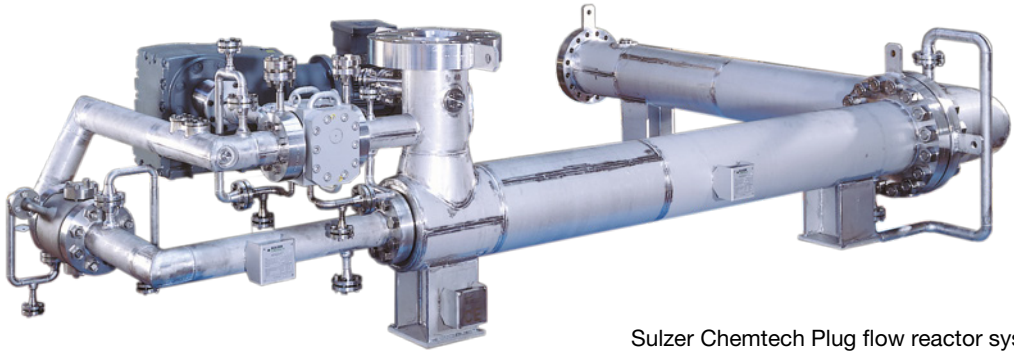
Reaction technology – Common applications

- Loop reactors
- Reaction systems
- In-line reactors / plug flow reactors
- Micro-reactors

In-line reactors

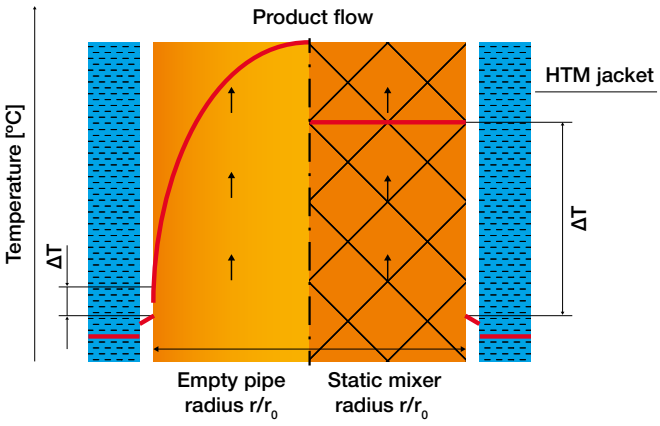
Advantages of Sulzer Chemtech's reactors

- Continuous operation
- Low energy demands
- Reduced CAPEX and maintenance, as no moving parts required
- Compact footprint
- Low volume/hold up of processed product
- Easy start up and operation

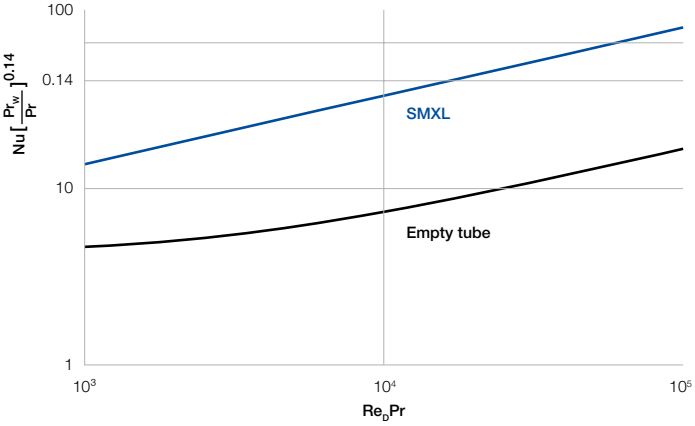


Sulzer Chemtech Plug flow reactor system

Enhancing heat transfer with mixing technology



Temperature Profile - Empty pipe vs. SMXL



A closer look at the technology

The heat transfer capacity is maximized by combining a high heat transfer coefficient and a large heat transfer surface area, in relation to the operating volume.
The operational advantages of Sulzer Chemtech's reactors align with those of our static mixers. In particular, we can offer high void fraction, low pressure drop and, hence, low energy consumption. The absence of moving parts leads to reduced maintenance and its associated costs. Also, temperature deviations are evened out by intensive radial mixing.

Compete service offering to ensure customer satisfaction

Sulzer Chemtech is committed to supporting its customers with solutions that can address their specific requirements and existing setups. To this end, our staff continuously optimizes and develops key systems and processes based on real-world conditions. To deliver optimum performance, we leverage

- Finite Element Analysis (FEA) and simulations
- Computational Fluid Dynamics (CFD) simulations
- Non-destructive testing

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The Chemtech division is the global market leader in innovative mass transfer, static mixing and polymer solutions for petrochemicals, refining and LNG.

Chemtech is also leading the way in ecological solutions such as biopolymers as well as textile and plastic recycling, contributing to a circular economy. Our product offering ranges from technology licensing to process components all the way to complete separation process plants. Customer support ranges from engineering and field services to tray and packing installation, tower maintenance, welding and plant turnaround projects – ensuring minimal downtime.