

# Batch to Conti

## Improved Selectivity

### Our Methodology

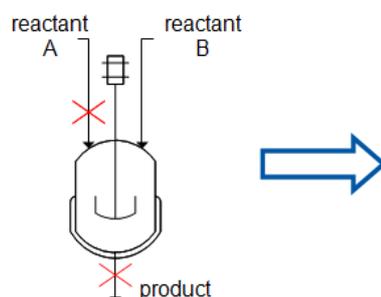


Optimization of Selectivity by means of Batch to Conti Transfer

Compared to semi-batch reactors the volume-specific heat transfer capacity of continuous tube reactors is higher by a factor of up to 10,000. Therefore, even extremely fast, highly exothermic reactions can be run continuously with direct stoichiometric reactant mixing. A slowdown of reactions by extended reactant dosing, which is required in semi-batch processes, is not necessary in continuous mode.

As a consequence, space-time yields rise significantly, reactor hold-up and required space for plants can be reduced. Short residence times for reactants, products and especially unstable intermediates as in multi-step processes with organometallic compounds are key to higher product selectivities and yields, since undesired side-reactions are suppressed. Furthermore, extremely low temperatures as in many semi-batch processes are not necessary, since the stabilization of intermediates is no longer required. Consequently, energy savings of up to 80 % are possible.

Benefits of a batch to conti transfer can be demonstrated by means of the synthesis of the fungicide Fluconazole. Compared to the patented semi-batch process, yield can be improved from 26 to 72 %, when critical synthesis steps are carried out in continuous operation mode. Reaction temperature is  $-15\text{ }^{\circ}\text{C}$  compared to  $-78\text{ }^{\circ}\text{C}$  in semi-batch mode.



### Interested? Contact us!

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### Your Benefit

- Higher product selectivity and yield
- Energy saving up to 80 %
- Constant high product quality
- Smaller production plants
- Improved safety due to small hold-up and plant housing
- Scale-up of extremely fast, highly exothermic reactions
- Process development, plant engineering and construction: all services from one source

### Our range of services

- Consulting Batch to Conti
- Experimental feasibility studies
- Process optimization
- Process Design Package
- Engineering of continuous plants
- Qualification and validation of plants

### Project examples

- Development of a continuous process for the production of a fungicide, yield improvement from 26 to 72%
- Development of a safe continuous process for acetylide synthesis
- Batch to conti transfer of a carboxylation process leading to process intensification and yield doubling

