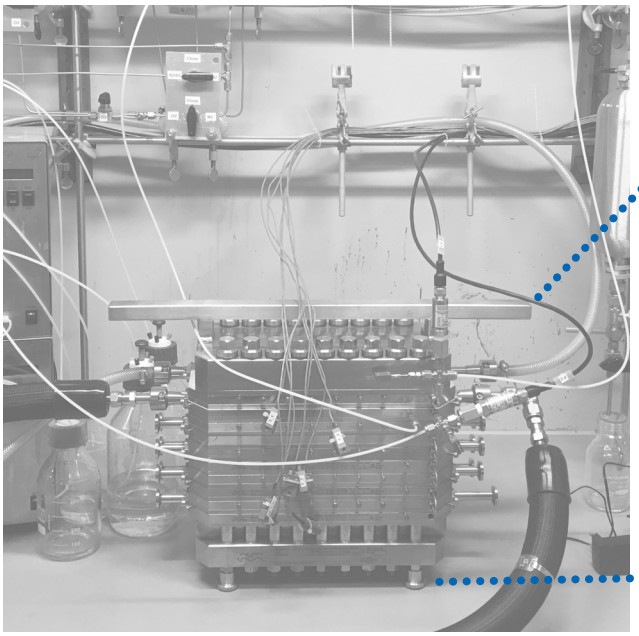
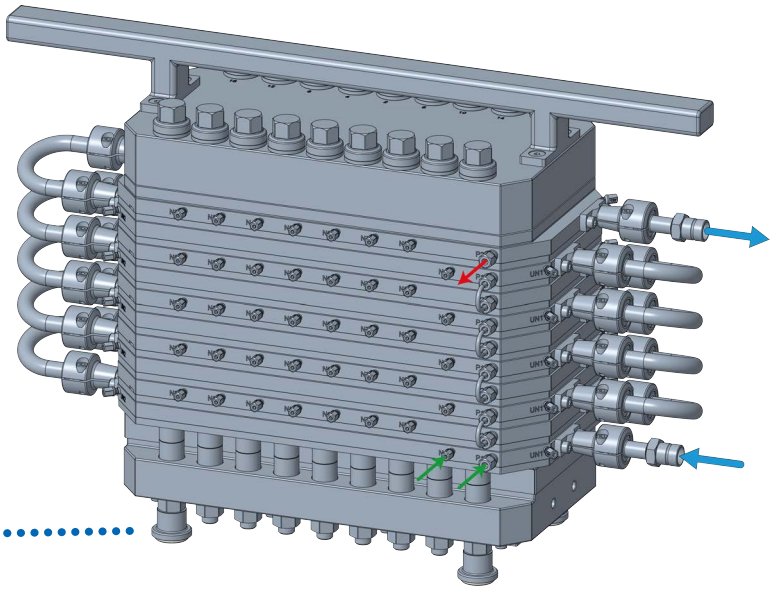
System Solution: ART® Reactor PR37

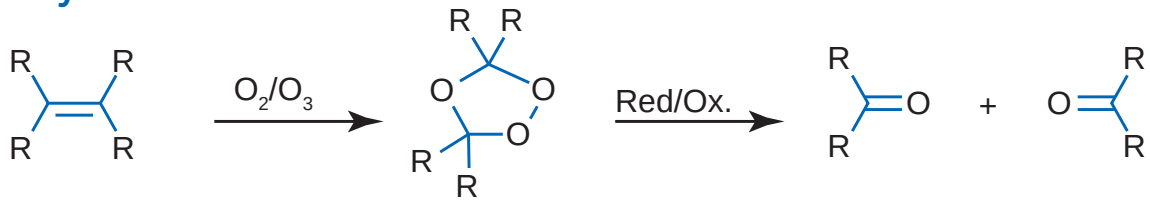
Typical reactions: ozonolysis, organometallic reactions, peroxide reactions, hydrogenation, nitration, etc.

Based on our experiences with a large number of different customer projects over many years we have come up with several reactor set-ups combining specific reactors from our portfolio with suitable pumps and other peripherals. These equipment combinations have already proven their usefulness in the field for certain types of reactions and are optimized for customer benefit. For the above applications the challenges lie above all in high reaction enthalpies, necessity of good mixing, multi-stage syntheses and the implementation of different temperature zones within one reactor.





Example: Ozonolysis



Operating conditions:

- ✓ Residence time: 1 … 2 min
- ✓ O_3 concentration: 5 … 10 wt%
- ✓ Pressure: 4 … 8 bar
- ✓ Temperature: -20 … 60 °C

Reference:

Scale-Up of Ozonolysis using Inherently Safer Technology in Continuous Flow under Pressure: Case Study on β-Pinene
Margaux Vaz, Daniel Courboin, Marc Winter, and Philippe M. C. Roth
Organic Process Research & Development 2021 25 (7), 1589-1597

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Our Process Development Team say:

High k-values and high A/V-ratios result in more efficient heat transfer.

Fast screening of reactions parameters because residence times are short.

High degree of automation leads to high process safety.

Can handle ozone safely under elevated pressures and achieve complete conversion.

Plug flow achieved even at low Reynolds numbers.

Technical Specifications	Laboratory scale	Pilot scale
Typical reactions	ozonolysis, organometallic reactions, nitration, peroxide reactions, hydrogenation, etc.	
Temperature range	-60 ... 200 °C	
Pressure limit	20 bar	
Reactor volume	1 ... 25 mL	70 ... 105 mL
Volume flow	2.5 ... 160 mL/min	7 ... 900 mL/min
Reaction (residence) time	10 s ... 10 min	
Media-wetted materials	Hastelloy® C22/C276, Stainless Steel 316, PTFE	

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