DATASHEET

Continuous stirred-tank reactor (CSTR) for flow chemistry applications

The CSTR integrates seamlessly with Vapourtec's range of flow chemistry systems and reactors designed for continuous flow synthesis. The CSTR further expands the range of chemical reactions accessible using Vapourtec's market-leading product range.
The key advantages of the CSTR over plug flow or tubular reactors are significant, handling solids, separation of liquids and gases, active mixing and accessing long residence times.

CSTR applications

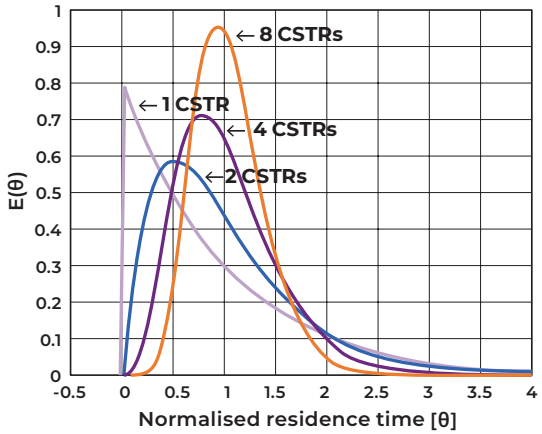
- Crystallisations
- Heterogeneous catalysis
- Enzymatic reactions
- Reversible reactions
- Liquid, gas, and solid separations
- Process optimisation for industrial processes

CSTR and continuous flow

Tubular reactors also named plug flow reactors give excellent performance as continuous flow reactors for two important reasons, extremely low back mixing and tight residence time distribution (RTD).

When used as a continuous flow reactor a single CSTR is rather unsuitable as the residence time distribution (RTD) exhibits significant variability and the back mixing is not controlled. When used as a cascade, multiple CSTRs can start to approach the performance of tubular reactors. Residence times and back-mixing can both be tightly controlled.

Residence time distribution (RTD) for cascade of CSTRs



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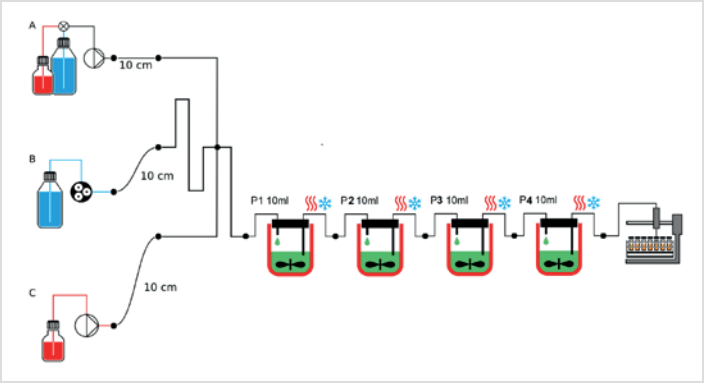
Developed for integration with R-Series and E-Series systems

Features of the CSTR Flow reactor

- Enables cascades of CSTRs
- Cascade of up to 8 reactors on an R-Series system, 2 on an E-Series system
- Perfect for flow reactions involving solids
- Compatible with E-Series and R-Series systems
- 5 ml to 40 ml volume per CSTR
- Pressurised reactions up to 5.0 bar
- Built in burst disc and optional protective screen
- Ability to heat and cool the reactor -10 °C to +150 °C
- Stirrer speeds selectable from 100 rpm to 1200 rpm
- Easy to disassemble & assemble for cleaning
- Wetted materials Glass, PTFE, PFA, Kalrez
- Option for photochemical CSTR. LED light sources available from 365 nm to 650 nm

CSTR: A key reactor in your flow chemistry experiment

All CSTRs are individually temperature controlled, to provide maximum versatility the stirring speed can also be set independently for each CSTR. A flow network with a cascade of CSTRs can be included in an automated flow chemistry experiment. The R-Series software will automatically calculate the dispersion of reagents as they pass through the CSTR cascade enabling telescoped reaction steps to be programmed and automatically run.



Safe pressurised reactions to 5.0 bar

Operation under pressure increases the range of reactions possible including:

- Reactions at temperatures greater than reflux
- Gas-liquid reactions
- Gas-liquid-solid reactions

Safety features include a burst disk and an optional safety screen.

Photochemical add-on for CSTR

- Various LED options: 365,385,400,420 and 450 nm (other wavelengths up to 650 nm by request)
- Each LED module has an input power of 70 W, delivering a radiant power up to 40 W
- Dimmable power
- Can be attached in seconds, without tools
- One or two Photochemical CSTRs can be powered from one standard Vapourtec LED power supply

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