

Vapourtec Reactor Guide



Vapourtec's comprehensive range of interchangeable flow reactors enables users to select the most appropriate reactor for each application. Designed to accommodate a broad range of chemistries, reaction types and operating conditions, reactors can be easily interchanged as experimental requirements change. Compatible with both R-Series and E-Series systems, the range enables a single flow chemistry platform to support diverse applications without compromising reactor performance or control.

R-Series FLEXIBLE | PRECISE | AUTOMATED

The R-Series is Vapourtec's highly flexible, modular flow chemistry platform, providing precise control from simple reactions through to fully automated, multi-step synthesis. A wide choice of pumps and rapidly interchangeable reactors allows the system to be configured for diverse chemistry, while powerful software automates experiments and records reaction data. Its modular architecture allows the R-Series to expand as research requirements evolve, protecting your investment and providing a platform you won't outgrow.



E-Series ROBUST | INTUITIVE | PRODUCTIVE

The E-Series brings everything needed for high-performance flow chemistry into one compact, intuitive system. Designed for rapid setup and straightforward operation, it combines integrated pumping, touchscreen control and interchangeable reactors, allowing researchers to focus on their chemistry rather than configuring equipment. Precise control of flow, temperature and pressure makes the E-Series ideal for reaction development, optimization and routine synthesis.



Reactor	Page Number
Standard Tubular Reactor	2
High-Temperature Tubular Reactor	3
Tubular Reactor with Heated Mixer	4
Cooled Tubular Reactor	5
Large Diameter Tubular Reactor	6
Glass Chip Microreactor and Micromixer	7
Fixed Bed Reactor	8
High-Temperature Fixed Bed Reactor	9
Cooled Fixed Bed Reactor	10
Variable Bed Flow Reactor (VBFR)	11
Continuously Stirred-Tank Reactor (CSTR)	12
Photochemical CSTR Flow Reactor	13
Ion Electrochemical Reactor	14
UV-150 Photochemical Reactor	16
Immobilised Photocatalyst Reactor	18
Heated Back Pressure Regulator	20

Standard Tubular Reactor

Vapourtec Tubular Reactors use a small-bore coiled tube housed within an insulated glass manifold. Temperature is controlled by circulating heated or cooled air, providing excellent visibility and uniform heating with no hot spots. Reactor coils can be swapped in seconds without tools or heat-transfer fluids.



Application examples

- Homogeneous reactions under precisely controlled conditions
- High-temperature pressurised reactions up to 150 °C
- Highly exothermic reactions requiring efficient heat transfer
- Acid-mediated transformations requiring excellent chemical resistance

Key advantages

Vapourtec Tubular Reactors combine excellent visibility (PFA versions), broad chemical compatibility and precise control of temperature and residence time. The dry-heating design enables rapid temperature changes and allows reactors to be exchanged in seconds without messy heat-transfer fluids, improving safety while making it quick and easy to change reactor volume, reactor material or application.

Tubular Reactor features

- Ambient to 150 °C temperature range
- 2 ml, 5 ml and 10 ml reactor sizes
- Materials options PFA, stainless steel 316, copper or Hastelloy® C-276
- Residence times 20 seconds to 200 minutes
- Pressure up to 42 bar at 150 °C for Hastelloy® and stainless steel
- Pressure up to 15 bar at 150 °C for PFA

Part Number	Description
50-1009	Standard Tube Reactor assembly (ambient to 150 °C)
50-1011	10 ml replacement PFA tube cartridge
50-1012	5 ml replacement PFA tube cartridge
50-1036	2 ml replacement PFA tube cartridge
50-1079	10 ml copper coil (150 °C)
50-1091	5 ml copper coil (150 °C)
50-1092	2 ml copper coil (150 °C)
50-1228	2 ml Stainless Steel 150 °C reactor coil (coil only, potted)
50-1229	5 ml Stainless Steel 150 °C reactor coil (coil only, potted)
50-1230	10 ml Stainless Steel 150 °C reactor coil (coil only, potted)
50-1232	2 ml Stainless Steel 150 °C reactor coil (coil only, potted) 100 bar (Stainless Steel fittings)
50-1233	5 ml Stainless Steel 150 °C reactor coil (coil only, potted) 100 bar (Stainless Steel fittings)
50-1234	10 ml Stainless Steel 150 °C reactor coil (coil only, potted) 100 bar (Stainless Steel fittings)
50-1250	25 ml Stainless Steel reactor for use in 50-1009 150 °C (2.5 mm bore)
50-1251	20 ml Stainless Steel reactor for use in 50-1009 150 °C (2.5 mm bore)
50-1238	10 ml replacement standard Hastelloy® coil
50-1010	Replacement temperature sensor for tube reactor

High-Temperature Tubular Reactor

The High-Temperature Tubular Reactor uses a small-bore metal coil housed within a double-insulated enclosure. Circulating heated air provides uniform, hotspot-free temperature control and enables rapid heating and cooling. Reactor coils can be swapped in seconds without tools or heat-transfer fluids.



Application examples

- Homogeneous reactions under precisely controlled conditions
- High-temperature pressurised reactions up to 250 °C
- Acid-mediated transformations requiring excellent chemical resistance
- Accelerated reaction screening and kinetic studies at elevated temperatures

Key advantages

Vapourtec High-Temperature Tubular Reactors combine broad chemical compatibility and precise control of temperature and residence time distribution.

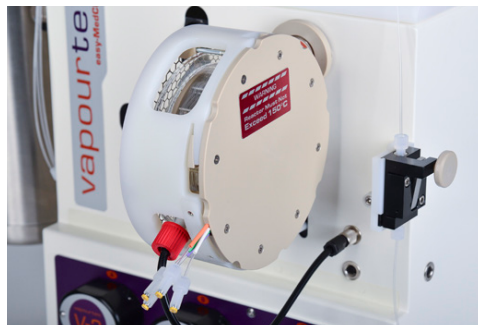
Tubular Reactor features

- Ambient to 250 °C temperature range
- 2 ml, 5 ml and 10 ml reactor sizes
- Material options stainless steel 316 or Hastelloy® C-276
- Residence times 20 seconds to 200 minutes
- Pressures up to 100 bar

Part Number	Description
50-1120	High-Temperature Tube Reactor assembly (ambient to 250 °C)
50-1134	25 ml replacement Stainless Steel tube cartridge for high-temperature reactor
50-1121	10 ml replacement Stainless Steel tube cartridge for high-temperature reactor
50-1122	5 ml replacement Stainless Steel tube cartridge for high-temperature reactor
50-1123	2 ml replacement Stainless Steel tube cartridge for high-temperature reactor
50-1080	10 ml replacement copper coil cartridge for high-temperature reactor
50-1088	5 ml replacement copper coil cartridge for high-temperature reactor
50-1089	2 ml replacement copper coil cartridge for high-temperature reactor
50-1236	5 ml replacement Hastelloy® reactor cartridge for high-temperature manifold
50-1157	2 ml replacement Hastelloy® reactor cartridge for high-temperature reactor
50-1237	10 ml replacement Hastelloy® reactor cartridge for high-temperature reactor

Tubular Reactor with Heated Mixer

The Tubular Reactor with a Heated Mixer uses a small-bore PFA coil housed within an insulated heated enclosure. The enclosure also contains two mixers and three coils for reagent pre-heating. This versatile design is ideal when reagents must be heated before mixing, or when reactions require quenching or dilution prior to cooling.



Application examples

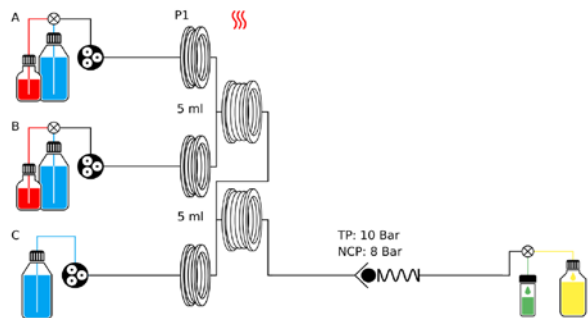
- Homogeneous reactions under precisely controlled conditions
- Mixing of reagents only after pre-heating to reaction temperature
- Quenching or dilution of reactants while hot
- High-temperature pressurised reactions up to 150 °C
- Acid-mediated transformations requiring excellent chemical resistance

Key advantages

The Vapourtec Tubular Reactor with Heated Mixer enables reagents to be pre-heated before mixing, ensuring controlled reaction initiation. It also allows quenching or dilution of reactants while maintaining reactor temperature, supporting precise reaction control and improved process flexibility.

Tubular Reactor with Heated Mixer features

- Ambient to 150 °C temperature range
- Pressure up to 15 bar at 150 °C
- 2 ml, 5 ml and 10 ml reactor sizes
- Includes two heated mixers
- Resistant to strong acids, wetted materials PFA only
- Residence times 20 seconds to 200 minutes



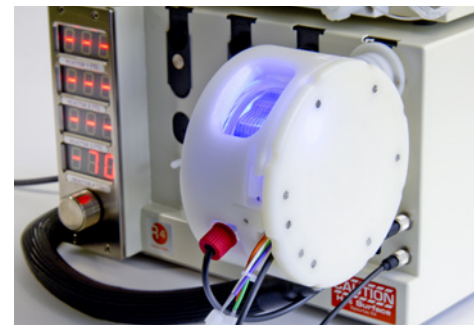
Typical flow diagram for the tubular reactor with heated mixer

Part Number Description

50-1138	Heated Mixer Reactor complete assembly
50-1188	Heated Mixer Reactor replacement lid assembly

Cooled Tubular Reactor

The Cooled Tubular Reactor uses a small-bore PFA coil housed within a double-insulated cooling enclosure. The enclosure also contains two mixers and three coils for reagent pre-cooling. This versatile design allows reagents to be cooled before mixing and enables reactions to be quenched or diluted prior to returning to ambient conditions. Cooling is achieved using dry ice with a Vapourtec cooling module.



Application examples

- Lithiation and Halogen-Lithium Exchange
- Grignard Additions
- Swern Oxidation
- Diazotisation Reactions
- Selective Hydride Reductions
- Ozonolysis

Key advantages

The Cooled Tubular Reactor provides accurate, programmable temperature control from ambient down to -70 °C. Reagents are pre-cooled before mixing using a cooled mixer, helping to minimise uncontrolled reactions. A second cooled mixer allows precise quenching of reactants when required.

Cooled Tubular Reactor features

- Ambient to -70 °C temperature range
- Pre-cooling of 3 reagents
- Cooled reagent mixer & cooled quench mixer
- 1 ml, 2 ml, 5 ml and 10 ml reactor sizes
- Wetted materials PFA
- Residence times 5 seconds to 200 minutes
- Pressure up to 42 bar

Part Number Description

50-1140	R-Series cooled gas generator (enables cooled tube reactors to be operated from ambient to -70 °C)
50-1141	Cooled Tube Reactor assembly
50-1142	Second Cooled Tube Reactor kit including heat exchanger
50-1146	2 ml replacement PFA tube cartridge for Cooled Tube reactor
50-1145	5 ml replacement PFA tube cartridge for Cooled Tube Reactor
50-1144	10 ml replacement PFA tube cartridge for Cooled Tube Reactor
50-1197	Replacement Dual-Core PFA tube cartridge for Cooled Tube Reactor

Large Diameter Tubular Reactor

The Large Diameter Tubular Reactor is a 20 ml reactor constructed from large-bore (3.2 mm ID) PFA tubing. To maintain excellent mixing performance while preserving tightly controlled residence time distribution, the reactor incorporates static mixing elements throughout its length. All wetted surfaces are PFA, ensuring broad chemical compatibility, including with aggressive reagents and solvents.



Application examples

- Scale up of homogeneous reactions via larger reactor volumes
- Biphasic liquid-liquid reactions
- Biphasic liquid-gas reactions
- Acid-mediated transformations requiring excellent chemical resistance
- Amide formation and other reactions in mixed phases

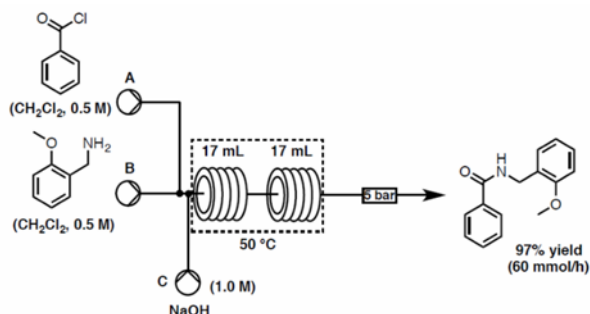
Key advantages

A large internal volume within a compact footprint supports straightforward scale-up while maintaining efficient use of laboratory space. Full-length static mixing elements provide excellent mixing performance, particularly in biphasic and triphasic systems. All wetted materials are PFA, ensuring excellent chemical compatibility across a wide range of reagents and solvents.

Large Diameter Tubular Reactor features

- Temperature range - ambient to 150 °C
- 20 ml internal volume
- Full length static mixers
- Wetted materials - PFA
- Residence times 30 seconds to 200 minutes
- Pressure up to 10 bar at 150 °C

Schematic for an amide synthesis under Schotten-Baumann conditions using two 20 ml reactors for rapid mixing



Part Number	Description
50-1426	Large Diameter Tubular Reactor for rapid mixing (does not include glass heat exchanger)

Glass Chip Microreactor and Micromixer

The Chip Reactor, mixer housing, and reactor range offer an effective solution for challenging reactions. Microscale channels provide rapid mixing, ideal for mixing-limited processes, while the high surface-area-to-volume ratio enables excellent heat transfer for fast and exothermic reactions. Temperature is precisely controlled using chilled gas for cooling and circulated hot air for heating, allowing rapid and accurate temperature changes. Small internal volumes reduce risk in hazardous chemistry and minimise reagent use.



Application examples

- Fast and exothermic reactions. High surface area to volume ratio.
- Mixing limited reactions. Microscale channels enable rapid mixing.
- Hazardous chemistry. Small internal volumes reduce risk.
- Screening and optimization. Small reactor volume reduces reagent consumption.
- Amide formation and other reactions in mixed phases.

Key advantages

The microscale channels enable rapid mixing and efficient heat transfer, ideal for fast, exothermic, and mixing-limited reactions. Precise temperature control using chilled gas and heated air ensures quick response. Low internal volumes enhance safety, reduce reagent use, and support efficient screening, particularly for hazardous and mixed-phase reactions.

Chip Reactor features

- Temperature range - 40 °C to 150 °C
- Reactor volumes 0.2 ml to 1.7 ml
- Residence times 2 seconds to 30 minutes
- Two chip reactors or mixers can be fitted in each housing
- Pressure up to 20 bar at 150 °C
- 7 standard designs, specials on request
- Wetted materials – Borosilicate glass
- Suitable for homogeneous reactions only

Part Number	Description
50-1480	Chip Reactor manifold for heating/cooling complete assembly
50-1273	0.2 ml Lab-MS Glass micromixer chip
50-1268	0.2 ml Lab-MX Glass micromixer chip
50-1272	1.7 ml Lab-V Glass residence time chip
50-1269	1.1 ml Lab-VS Glass residence time chip
40-1773	1.5 ml glass micromixer chip 2 input
40-1774	1.0 ml glass micromixer chip 2 input preheating
40-1775	0.6 ml glass micromixer chip 3 input preheating

Fixed Bed Reactor

The standard Fixed Bed Reactor is a thick-walled glass column within a glass manifold. The reactor can be packed by the user providing flexibility. Fixed Bed Reactors may be used for workups, scavengers, solid-supported catalysts or solid-supported reagents. The temperature of the outside of the reactor wall is controlled. The glass components allow excellent visibility of the reactor contents.



Application examples

- Heterogeneous reagents – e.g. bases or drying media
- Heterogeneous catalysis – Supported metal catalysts (Pd, Pt, Ni, Zn)
- Enzymatic catalysis – Immobilised enzymes
- Scavenger resins
- Solid-supported chemistry – Use of functionalised resins
- Inline purification – Polishing reactions

Key advantages

Vapourtec Fixed Bed Reactors provide flexible, user-packed glass columns for heterogeneous reagents, catalysts, enzymes, and scavenger resins. They enable clean, continuous transformations, inline purification, and safe flow hydrogenation. Precise temperature control and excellent visibility ensure reliable performance.

Fixed Bed Reactor features

- Ambient to 150 °C temperature range
- Optional 6.6 mm, 10 mm and 15 mm internal diameters
- Materials of construction PTFE, borosilicate glass, FFKM seals
- Reactor volumes 3.5 ml to 18 ml
- Residence times 30 seconds to 350 minutes
- Pressure up to 20 bar at 150 °C dependent on reactor diameter

Part Number	Description
50-1003	Replacement temperature sensor for Column Reactor
50-1005	Column Reactor manifold and thermocouple for 6.6 mm bore columns
50-1095	Column Reactor manifold and 150 x 6.6 mm Omnifit fixed/adjustable
50-1013	Column Reactor manifold and thermocouple for 10 mm and 15 mm bore columns
50-1382	6.6 mm bore x 150 mm length Fixed/Adjustable Omnifit
30-3292	6.6 mm bore x 150 mm length Fixed/Fixed Omnifit
50-1383	10 mm bore x 150 mm length Fixed/Adjustable Omnifit
50-1384	15 mm bore x 150 mm length Fixed/Adjustable Omnifit

High-Temperature Fixed Bed Reactor

The High-Temperature Fixed Bed Reactor is a thick-walled metal column within a double-insulated housing. The reactor can be packed by the user providing flexibility. High-Temperature Fixed Bed Reactors are generally used for metal catalysis. The temperature of the outside of the reactor wall is controlled.



Application examples

- Continuous flow hydrogenation - Supported metal catalysts (e.g. Pd, Pt, Ni) allow safe, efficient hydrogenations
- Continuous flow hydration over a fixed bed - Solid acid or base catalysts enable selective hydration reactions
- Direct alkylation of N-heterocycles and amines - Packed-bed catalysts or reagents facilitate efficient C–N bond formation
- Click chemistry - Immobilised catalysts (e.g. Cu-based) support rapid, high-yielding cycloaddition reactions
- Post cracking work-up of high value petroleum products

Key advantages

Vapourtec High-Temperature Fixed Bed Reactors combine robust metal construction with precise thermal control for demanding catalytic processes. User-packed columns provide flexibility for metal catalysts, enabling safe, efficient continuous reactions at elevated temperatures. Ideal for hydrogenation, hydration, alkylation, and click chemistry, they deliver reliable performance, improved selectivity, and scalable processing.

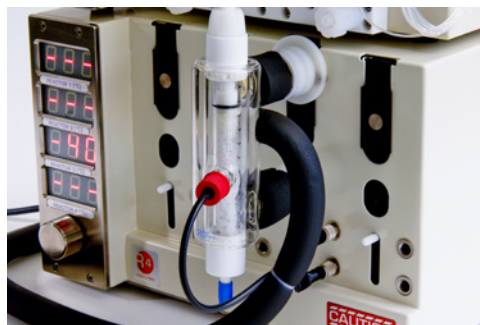
High-Temperature Fixed Bed Reactor features

- Precise temperature control, ambient to 250 °C
- Optional 6 mm or 10 mm internal diameters
- Materials of construction PTFE, stainless steel or Hastelloy® C-276, FFKM seals
- Reactor volumes 2.5 ml to 7.5 ml
- Residence times 30 seconds to 150 minutes
- Pressure up to 50 bar at 250 °C

Part Number	Description
50-1365	High-Temperature Column complete assembly includes 3.8 ml Stainless Steel column, PT100 and cooling coil
50-1550	3.8 ml Stainless Steel replacement reactor only
50-1348	Cooling coil, 1 ml
50-1562	PT100 temperature sensor only
50-1349	Frits PTFE (pack of 10 pieces)

Cooled Fixed Bed Reactor

The Cooled Fixed Bed Reactor enables catalyst, reagent and scavenger packed columns to be operated at temperatures down to -70°C , extending the capabilities of continuous flow chemistry to cryogenic heterogeneous reactions. Combining precise temperature control with the benefits of immobilised reagents and catalysts, the reactor provides a simple and efficient platform for performing temperature-sensitive transformations under continuous flow conditions.



Key advantages

Many heterogeneous reactions benefit from low temperatures to improve selectivity, suppress side reactions or stabilise reactive intermediates. The Cooled Fixed Bed Reactor enables these reactions to be performed safely under continuous flow conditions while maintaining excellent temperature control across the packed bed. Because cooling is achieved using a compact dry ice module, no external recirculating chiller is required, making cryogenic packed-bed chemistry straightforward to implement on existing Vapourtec flow systems.

Application examples

- Continuous reactions using immobilised metal catalysts
- Low-temperature heterogeneous catalysis
- Organometallic and organolithium chemistry
- Continuous reactions using supported reagents
- Immobilised enzyme catalysis
- Temperature-sensitive packed-bed reactions

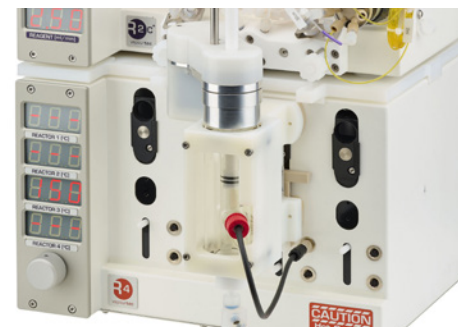
Cooled Fixed Bed Reactor features

- Ambient to -70°C operating range
- Compatible with 6.6 mm and 10 mm ID packed columns
- 150 mm cooled column assembly
- PTFE, borosilicate glass and FFKM wetted materials
- Simple dry ice cooling (no recirculating chiller required)
- Suitable for catalyst-, scavenger- and reagent-packed columns
- Pressures up to 20 bar

Part Number	Description
50-1140	Cooling Module for R4 (enables cooled reactors to be operated from ambient to -70°C)
50-1181	Cooled medium column assembly 150 mm supplied with umbilical and end fittings

Variable Bed Flow Reactor (VBFR)

The Variable Bed Flow Reactor (VBFR) is Vapourtec's patented reactor technology developed specifically for solid-phase synthesis. An automatically adjustable reactor piston continuously compensates for changes in resin volume caused by solvent swelling and shrinking, maintaining a uniformly packed resin bed throughout the synthesis. This eliminates channel formation, improves reagent distribution and ensures consistent reaction conditions from the beginning to the end of the synthesis. The VBFR can also continuously monitor changes in resin bed volume throughout the synthesis, providing valuable process information that can be used to detect and localise peptide aggregation in real time.



Application examples

- Fast-Flow solid-phase peptide synthesis
- Polymer-supported synthesis
- Continuous solid-supported chemistry
- Solid-phase oligonucleotide synthesis
- Automated combinatorial chemistry
- Resin screening and optimization
- Process development for scale-up

VBFR features

- Patented technology
- Automatic resin bed compression
- Prevents channel formation during synthesis
- Maintains a uniformly packed resin bed
- Automatic compensation for resin swelling and shrinking
- Compatible with inline UV monitoring
- Supports high-speed Fast-Flow synthesis
- Reactor volumes from research to pilot scale

Key advantages

Unlike conventional packed-bed reactors, the VBFR continuously adjusts reactor volume to compensate for resin swelling and shrinking throughout the synthesis cycle. This maintains a uniformly packed resin bed, preventing channel formation and ensuring even reagent distribution through the resin. The result is improved coupling efficiency, lower solvent consumption, excellent reproducibility and faster, more efficient solid-phase synthesis across a wide range of applications.

Part Number	Description
50-1571	Reactor compression control unit
50-1482b	VBFR mount
50-1574	Dual core pre-activation reactor (0.8 ml + 0.4 ml)
50-1575	Dual core pre-activation reactor (1.6 ml + 0.8 ml)
50-1530	6.6 mm x 150 mm reactor with the adjusting mechanism (reactor compression)
50-1531	10 mm x 150 mm reactor with the adjusting mechanism (reactor compression)
50-1532	15 mm x 150 mm reactor with the adjusting mechanism (reactor compression)

Peptide Synthesis Parts

50-1573	Peptide synthesis reactor housing
50-1576	Training (includes 3 days at Vapourtec lab, 2 days on-site at installation and 3 days continued application support)
50-1349	Frits PTFE (pack of 10 pieces)

Continuously Stirred-Tank Reactor (CSTR)

The Vapourtec CSTR enables continuous processing of heterogeneous, multiphase and precipitation-prone reactions that cannot readily be performed in tubular reactors. Efficient integrated stirring maintains uniform mixing throughout the reactor, allowing solids, immiscible liquids and gases to be processed continuously with excellent heat transfer and temperature control. If your chemistry can't be performed in a tubular reactor, use the CSTR.



Application examples

- Slurry and suspension chemistry
- Biphasic liquid-liquid reactions
- Gas-liquid reactions
- Precipitation and crystallization processes
- Continuous crystallization
- Multiphase catalysis
- Continuous reagent dosing

Key advantages

Unlike tubular flow reactors, mixing within the CSTR is independent of flow rate, making it ideal for reactions involving solids, precipitates and multiple phases. Efficient integrated stirring provides excellent heat and mass transfer, maintains uniform solid suspension and promotes effective gas-liquid contact while reducing sedimentation and reactor fouling. Multiple reactors can be connected in series to create defined residence time distributions, providing a flexible platform for continuous process development and scale-up.

CSTR features

- Integrated magnetic stirring (100–1200 rpm)
- Continuously adjustable reaction volume (5–40 ml)
- Pressurised operation up to 5 bar
- Precise temperature control from –10 °C to +150 °C
- Handles gas-liquid-solid reaction mixtures
- Modular multi-reactor configurations
- Excellent visibility of reaction contents
- Fully integrated with Vapourtec R-Series software

Part Number Description

50-1743	CSTR Flow Reactor assembly
50-1760	Protective screen for 1 CSTR
50-1761	Protective screen for 2 CSTRs
50-1762	Protective screen for 3 CSTRs
50-1763	Protective screen for 4 CSTRs
50-1765	CSTR thermocouple
50-1766	CSTR tubing kit
50-1767	Replacement stirrer set

Photochemical CSTR Flow Reactor

The Photochemical CSTR combines efficient continuous stirring with high-intensity LED irradiation to enable photochemical reactions involving solids, slurries and multiple phases. Continuous stirring maintains a uniformly mixed reaction mixture, ensuring efficient light exposure while preventing catalyst sedimentation and enabling heterogeneous photochemical reactions that are difficult or impossible to perform in conventional tubular photoreactors.



Application examples

- Heterogeneous photocatalysis
- Photocatalysis using suspended catalysts
- Slurry photochemistry
- Gas-liquid photochemical reactions
- Visible-light synthetic transformations
- Photopolymerization
- Continuous photochemical process development

Key advantages

Conventional tubular photochemical reactors are often unsuitable for suspensions or heterogeneous photocatalysis because catalyst particles can settle, leading to poor irradiation and reactor fouling. The Photochemical CSTR overcomes these limitations through continuous stirring, maintaining a uniformly mixed reaction throughout the illuminated volume. The result is improved catalyst utilisation, excellent reproducibility and efficient continuous processing of photochemical reactions involving solids, slurries and multiple phases.

Photochemical CSTR features

- Integrated magnetic stirring (100–1200 rpm)
- Continuously adjustable reaction volume (5–40 ml)
- Pressurised operation up to 5 bar
- Precise temperature control from 10 °C to +150 °C
- Uniform, high-intensity LED irradiation
- Maintains suspended photocatalysts throughout the reaction
- Handles slurry, gas-liquid and heterogeneous photochemistry
- Modular multi-reactor configurations

Part Number Description

50-1915	CSTR Clamp + 365 nm high power LED Complete Assy
50-1916	CSTR Clamp + 385 nm high power LED Complete Assy
50-1917	CSTR Clamp + 400 nm high power LED Complete Assy
50-1918	CSTR Clamp + 420 nm high power LED Complete Assy
50-1919	CSTR Clamp + 450 nm high power LED Complete Assy

Ion Electrochemical Reactor

The Ion Electrochemical Reactor enables continuous electrochemical synthesis using interchangeable electrode plates housed within a compact flow cell. The narrow electrode gap provides efficient mass transfer and current distribution, enabling electrochemical transformations to be performed with excellent reproducibility while minimising supporting electrolyte requirements.



Application examples

- Electrochemical oxidation
- Electrochemical reduction
- C-H functionalisation
- Paired electrolysis
- Cross-coupling reactions
- Electrosynthesis of pharmaceutical intermediates
- Reaction screening and optimization

Key advantages

Continuous electrochemistry provides precise control over current density, residence time and mass transport, improving reproducibility compared with batch electrolysis. By using electrical current in place of stoichiometric oxidising or reducing agents, many electrochemical transformations can be performed with reduced reagent waste, simplified work-up and improved process safety. The compact flow cell design delivers efficient electron transfer while minimising the inventory of reactive intermediates. Interchangeable electrode materials provide flexibility across a broad range of oxidative and reductive transformations, making the Ion reactor suitable for reaction discovery, optimization and process development.

Ion Electrochemical Reactor features

- Adjustable narrow-gap flow cell
- Adjustable electrode spacing, area and reactor volume
- Interchangeable electrodes in over 20 materials
- Precise current density control
- Efficient mass transfer between electrode surfaces
- Reduced supporting electrolyte requirements
- Temperature control from -10 °C to +80 °C
- Pressurised operation up to 5 bar
- Quick and simple electrode replacement
- Integrated with Vapourtec R-Series and E-Series systems

Part Number	Description
50-1600	Ion Electrochemical Reactor (standalone)
50-1601	Ion Electrochemical Reactor (Integrated)
50-1602	Ion Electrochemical power supply
50-1614	Magnesium plain, pack of 2
50-1620	Stainless Steel-plain, pack of 5
50-1621	Stainless Steel-with 3 ports, pack of 5
50-1622	Nickel-plain, pack of 5
50-1623	Nickel-with 3 ports, pack of 5
50-1624	Tin-plain, pack of 5
50-1625	Tin-with 3 ports, pack of 5
50-1626	Aluminium-plain, pack of 5
50-1627	Aluminium-with 3 ports, pack of 5
50-1628	Zinc-plain, pack of 5
50-1629	Zinc-with 3 ports, pack of 5
50-1630	Titanium-plain, pack of 5
50-1631	Titanium-with 3 ports, pack of 5
50-1632	Copper-plain, pack of 5
50-1633	Copper-with 3 ports, pack of 5
50-1634	Lead-plain, pack of 5
50-1635	Lead-with 3 ports, pack of 5
50-1636	Flexible graphite-plain, pack of 5
50-1637	Flexible graphite-with 3 ports, pack of 5
50-1638	Niobium, pack of 2
50-1639	Lead bronze (SAE660), pack of 2
50-1640	Rigid graphite, pack of 2
50-1641	Silver coated-plain, pack of 2
50-1642	Gold coated-plain, pack of 1
50-1643	Platinum coated-plain, pack of 2
50-1645	Rigid graphite with 3 ports - pack of 2
50-1646	Platinum coated niobium with 3 ports - pack of 2
50-1647	Platinum plated titanium with 3 ports - pack of 2
50-1644	Platinum plated-plain, pack of 2
40-2180	Cobalt-plain, pack of 1
40-2181	Boron doped diamond-plain, pack of 1
40-2182	Tungsten, pack of 1
40-2183	Glassy carbon, pack of 1
40-2233	Glassy carbon, pack of 1 with 3 ports

UV-150 Photochemical Reactor

The UV-150 Photochemical Reactor enables efficient continuous flow photochemistry using high-intensity LED, low-pressure mercury or medium-pressure mercury light sources with interchangeable wavelength filters. The thin-layer flow cell ensures that all reaction molecules remain within a few millimetres of the light source, providing efficient and uniform light exposure throughout the reaction. Precise control of irradiation time, temperature and residence time enables reproducible photochemical transformations while simplifying reaction optimization and scale-up.



Application examples

- Photoredox catalysis
- Visible-light organic synthesis
- UV photochemistry
- Photooxidation and photoreduction
- [2+2] Cycloaddition reactions
- Photochemical reaction screening
- Continuous photochemical process development

Key advantages

Unlike conventional batch photochemistry, the UV-150 eliminates the light penetration limitations associated with larger reaction vessels by ensuring every reaction molecule remains close to the light source. Uniform irradiation improves reaction reproducibility while reducing over-irradiation and unwanted side reactions. Interchangeable light sources, wavelength filters and reactor volumes provide exceptional flexibility across a wide range of photochemical transformations, while the modular reactor design enables rapid optimization, straightforward maintenance and seamless integration with Vapourtec flow chemistry systems.

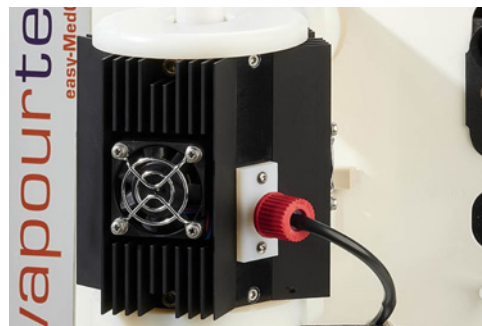
UV-150 Photochemical Reactor features

- High-intensity LED, low-pressure and medium-pressure mercury light sources
- Interchangeable wavelength filters
- Thin-layer flow cell for uniform irradiation
- Interchangeable reactor volumes (2, 5 and 10 ml)
- Precise temperature control from -20 °C to +80 °C
- Pressurised operation up to 12 bar
- Suitable for gas-liquid photochemistry
- Safety interlock prevents accidental light exposure
- Rapid replacement of contaminated or fouled reactor cells
- Fully integrated with Vapourtec R-Series and E-Series systems

Part Number	Description
UV-150 - Medium Pressure Mercury	
50-1286	UV-150 photochemical medium pressure mercury reactor kit
50-1437	UV-150 photochemical medium pressure mercury lamp, holder and power supply
50-1291	UV-150 replacement medium pressure mercury lamp only
50-1296	Wavelength filter type 1 (silver)
50-1297	Wavelength filter type 2 (gold)
50-1298	Wavelength filter type 3 (red)
50-1299	Wavelength filter type 4 (blue)
50-1284	Wavelength filter type 5 (silver)
50-1285	Wavelength filter type 6 (silver)
50-1455	Wavelength filter type 7 (silver)
50-1456	Wavelength filter type 8 (silver)
50-1457	Wavelength filter type 9 (silver)
UV-150 - Low Pressure Mercury	
50-1337	UV-150 photochemical low pressure mercury reactor kit (light source not included)
50-1338	UV-150 photochemical low pressure mercury power supply and lamp holder (light source not included)
50-1342	254 nm low pressure mercury lamp, ultraviolet C (9 W)
50-1341	310 nm low pressure mercury lamp, ultraviolet B (9 W)
50-1339	370 nm low pressure mercury lamp, ultraviolet A (9 W)
UV-150 - Standard High Efficiency LED	
50-1434	UV-150 photochemical standard LED reactor kit - (light source not included)
50-1453	UV-150 photochemical standard LED power supply with umbilical (light source not included)
50-1440	360 to 390 nm, peak 365 nm LED, 3 W (Gen-1)
50-1439	360 to 390 nm, peak 365 nm LED, 16 W (Gen-2)
50-1441	360 to 390 nm, peak 380 nm LED, 4.2 W (Gen-1)
50-1442	390 to 420 nm, peak 395 nm LED, 6 W (Gen-1)
50-1443	390 to 420 nm, peak 405 nm LED, 9 W (Gen-1)
50-1444	390 to 420 nm, peak 410 nm LED, 12 W (Gen-1)
50-1445	420 to 450 nm, peak 420 nm LED, 18 W (Gen-1)
50-1446	420 to 450 nm, peak 430 nm LED, 24 W (Gen-1)
50-1447	420 to 450 nm, peak 430 nm LED, 24 W (Gen-1)
50-1448	420 to 450 nm, peak 450 nm LED, 24 W (Gen-1)
50-1449	450 to 480 nm, peak 470 nm LED, 24 W (Gen-1)
50-1450	480 to 510 nm, peak 495 nm LED, 13 W (Gen-1)
50-1451	510 to 540 nm, peak 525 nm LED, 3 W (Gen-1)
50-1458	Cool white LED
UV-150 - High Power LED	
50-0295	UV-150 photochemical high power LED power supply (light source not included)
50-0300	365 nm LED and umbilical assembly, 150 W - 61 W (umbilical included)
50-0310	385 nm LED and umbilical assembly, 60 W - 30 W (umbilical included)
50-0297	400 nm LED and umbilical assembly, 150 W - 83 W (umbilical included)
50-0298	420 nm LED and umbilical assembly, 150 W - 53 W (umbilical included)
50-0299	450 nm LED and umbilical assembly, 150 W - 108 W (umbilical included)
Replacements Coils - Spectrometer - Spares	
50-1289	2 ml replacement fluoropolymer reactor coil for UV-150
50-1583	2 ml replacement fluoropolymer rewindable tubing for use with 50-1289
50-1288	5 ml replacement fluoropolymer reactor coil for UV-150
50-1582	5 ml replacement fluoropolymer rewindable tubing for use with 50-12
50-1580	10 ml replacement fluoropolymer reactor coil for UV-15
50-1581	10 ml replacement fluoropolymer rewindable tubing for use with 50-158
50-1283	Spectrometer 165-800 nm, resolution 0.5 nm and fibre optic probe
50-1010	Replacement temperature sensor for UV-150 reactor

Immobilised Photocatalyst Reactor

The Immobilised Photocatalyst Reactor enables continuous heterogeneous photochemistry using photocatalysts immobilised within a transparent packed-bed reactor. Continuous flow through the illuminated catalyst bed provides efficient contact between the reaction solution and catalyst while eliminating catalyst separation and simplifying product purification. The reactor is compatible with a wide range of immobilised photocatalysts, providing a simple and reproducible platform for continuous photocatalytic synthesis.



Application examples

- Heterogeneous photocatalysis
- Continuous photoredox catalysis
- Photocatalytic oxidation reactions
- Photocatalytic reduction reactions
- Continuous fine chemical synthesis
- Catalyst screening and optimization
- Catalyst lifetime and stability studies

Key advantages

Immobilising the photocatalyst within the reactor eliminates catalyst separation while maintaining continuous catalytic activity throughout the reaction. Continuous flow processing ensures efficient contact between the reaction solution and the illuminated catalyst bed, improving reaction efficiency, catalyst utilisation and reproducibility. The easily replaceable reactor cartridge allows rapid cleaning or replacement following contamination or fouling, while the catalyst bed can be quickly repacked with fresh or alternative photocatalysts. This provides a flexible platform for catalyst screening, process development and continuous photocatalytic synthesis. The reactor enables catalyst reuse, simplifies downstream purification and reduces catalyst consumption, making heterogeneous photocatalysis an attractive alternative to homogeneous photochemical processes.

Immobilised Photocatalyst Reactor features

- Compatible with a wide range of immobilised photocatalysts
- Uniform irradiation of the catalyst bed
- Continuous packed-bed operation
- Excellent residence time control
- Low catalyst inventory
- Easily replaceable reactor cartridge
- Simple catalyst replacement and repacking
- Fully integrated with Vapourtec R-Series and E-Series systems

Part Number	Description
50-1432	Photocatalytic Reactor
50-1584	365 nm Photocatalytic LED
50-1585	365 nm Photocatalytic LED (Gen-2)
50-1587	395 nm Photocatalytic LED
50-1588	405 nm Photocatalytic LED
50-1589	410 nm Photocatalytic LED
50-1590	420 nm Photocatalytic LED
50-1591	430 nm Photocatalytic LED
50-1592	440 nm Photocatalytic LED
50-1593	450 nm Photocatalytic LED
50-1594	470 nm Photocatalytic LED
50-1595	495 nm Photocatalytic LED
50-1596	525 nm Photocatalytic LED

Heated Back Pressure Regulator

The Heated Back Pressure Regulator (BPR) extends the heated flow path to the point of pressure release, preventing cooling of the reaction stream between the reactor and the back pressure regulator. By maintaining the reaction at elevated temperatures until pressure is released, it prevents product precipitation, reduces the risk of blockages and enables reliable operation of high-temperature continuous flow processes.



Application examples

- High-temperature continuous flow synthesis
- Preventing product precipitation after heated reactions
- Neat and solvent-free flow chemistry
- Processing viscous reaction mixtures
- Reactions producing high-melting products
- Continuous crystallization avoidance
- Pressure-dependent flow chemistry

Key advantages

Many high-temperature flow reactions suffer from product precipitation as the reaction stream cools between the heated reactor and the back pressure regulator. The Heated BPR maintains the reaction at elevated temperature until pressure is released, preventing blockages and ensuring reliable continuous operation. By maintaining products in solution throughout the flow path, the Heated BPR improves process robustness, supports neat and viscous chemistries, and extends the range of reactions that can be performed under pressurised continuous flow conditions.

Heated BPR features

- Operating temperatures up to 150 °C
- Available in 8 bar and 18 bar pressure ratings
- Maintains elevated temperature to the point of pressure release
- PEEK and perfluoroelastomer wetted materials
- Fully integrated with Vapourtec R-Series and E-Series systems
- Compact, modular design

Part Number	Description
50-1430	Heated Back Pressure Regulator Reactor complete assembly



About Vapourtec

Vapourtec is the world's leading manufacturer of laboratory-scale flow chemistry instruments. Founded in 2003, Vapourtec has supplied more than 1,000 flow chemistry systems to researchers in academia and industry around the world.

Headquartered near Cambridge, UK, Vapourtec designs and manufactures the R-Series and E-Series flow chemistry systems, together with a growing range of Fast-Flow peptide synthesis technologies. Vapourtec systems support research from reaction discovery and optimization through to process development and scale-up.

Combining chemistry, engineering and application expertise, Vapourtec continues to develop new technologies that enable researchers to perform chemistry with greater control, reproducibility and automation.



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