AutoLAB

Automated Bench & Pilot Reactors



Benchtop glass | Benchtop high pressure | Floor-standing pilot | Parallel

One configurable reactor platform.
From laboratory development to pilot scale.

h.e.l

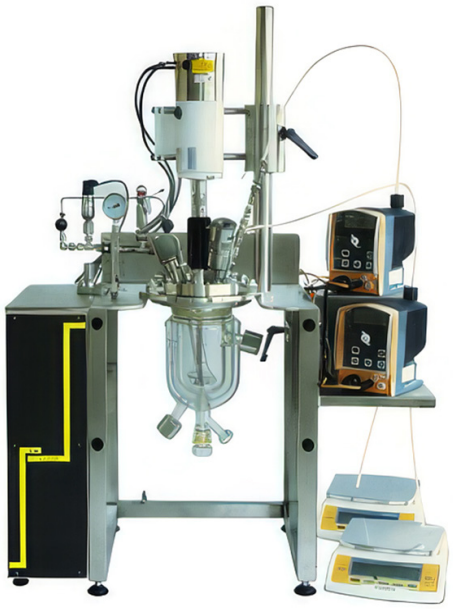
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Bench Scale Reactors

Reactors for research

Compact, modular reactor systems for routine and custom research applications.

- Compact designs for busy laboratories
- Vessel sizes from 0.5 to 2 L (compact stand) or up to 5 L (tall stand)
- Wide range of pressures and temperatures
- Single or dual stands, with shared or individual electronics and stirring
- Combine atmospheric and high-pressure reactors on one benchtop stand
- Single- or dual-jacket (triple-wall) glass reactors
- Choice of manual control or full-function PCs
- Standard and highly customized systems integrated with sensors, pumps and valves. Add features as you require
- Installation, training and support available





Jacketed Glass Reactor



Pressure Reactors

Floor Standing, Kilo-Lab Reactors

Pilot reactors

| Floor-standing design with a choice of support stands
| Standard volumes up to 20 L; customized solutions for larger reactors
| Systems customized for hydrogenation, polymerization, crystallization and other processes
| Electrical and oil-circulating jackets for a wide temperature range





AutoLAB is a flexible and expandable system for research and scale-up

| Simple manually controlled vessels or fully automated systems
| Develop and optimize processes on a flexible automated platform
| Add dosing, PAT, calorimetry and sampling as requirements evolve
| Maintain a more consistent control approach from bench to kilo scale
| Choice of circulators for heating and cooling
| Ex-proof setups available

Parallel Systems

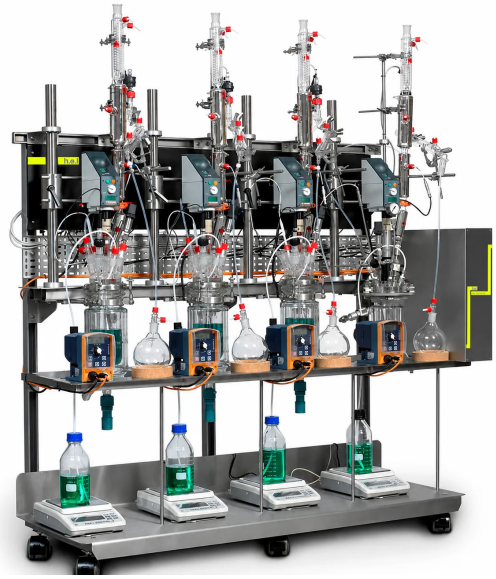
H.E.L Group has a well-established history of developing bespoke, automated reactor solutions for the chemical and pharmaceutical R&D community. Parallel systems are designed to specific, individual application and process requirements — with expandable functionality as your research evolves.



Eight 2 L reactors · robotic sampling · HPLC

Multi-reactor process development

- Eight 2-liter reactors, operated independently or as a single system
- Automated washing between runs
- Robotic sampling with on-line HPLC



Dedicated larger-scale crystallization

Parallel crystallization development

- Multiple reactors with independent temperature control
- In-situ FTIR and turbidity monitoring
- Automated dosing, reflux and distillation options

Mix and match

Interchangeable vessels: combine high- and low-pressure reactors, alternative materials (Hastelloy C22, titanium, zirconium) and adaptor inserts for tubes, flasks and reactors.

Customizable chemistry

Sampling, liquid and gas dosing, process monitoring, reflux and distillation, with third-party probes and modules such as gas uptake, online calorimetry and MSZW.

Beyond the bench

Go larger with bespoke floor-standing options, or combine parallel reactors with other bench-scale reactors on a multi-reactor stand.

Choose Your Features

Process monitoring and control (and PAT)

Range of probes (pH, turbidity, particle sizing, FTIR, NIR, etc.) can be monitored and fully integrated into the control system. Feedback control based on these signals is available for both PAT applications and process improvement generally, and can be fully customized to your requirements.

Liquid dosing

Low-pressure and high-pressure options available with varying flow rates, including pressurized liquid feeding.



Gas measurement

Integrated mass flow controllers and other options for gas consumption monitoring.

Digital wet gas and “U-tube” method for wet/corrosive vented gas rate monitoring.



Reflux / distillation

Manual and computer-controlled distillation – both standard Dean–Stark and distillation/ reflux-controlled versions.



Sampling

Manual sampling options, including liquid sampling at pressure.

Circulators

Standard −50 to 250 °C; options extend the range to 350 °C (circulator dependent). H.E.L works with high-quality manufacturers such as Huber and Julabo, with full integration into H.E.L software. The right circulator is chosen for your reactor’s heating and cooling needs.



Process Optimization / Calorimetry

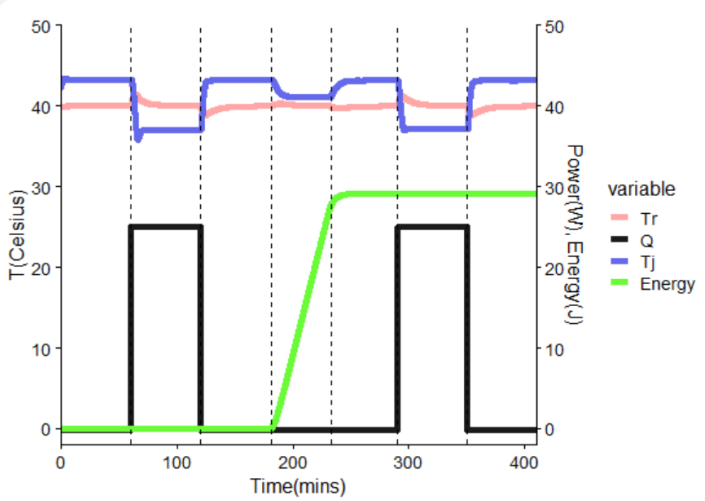
Real-time calorimetry

Add to any high- or low-pressure AutoLAB system

| Designed for development chemists

| No calibration or calorimetry theory required

| Integrated software and heat-flow measurement



On-line calorimetry without specialist user expertise. Faster process development and more confident scale-up.

Hydrogenation

Gas-liquid reactions under pressure

| Automated liquid and gas dosing

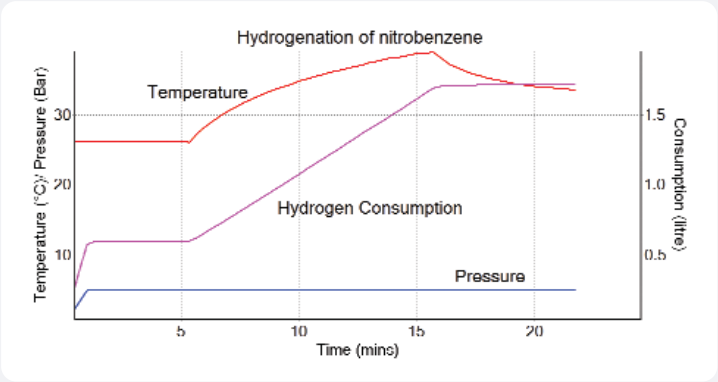
| Automated on-line gas consumption

| Homogeneous or heterogeneous catalysis

| Single or parallel systems







Wide range of baffles and impellers available in different shapes and materials: PTFE-coated steel, glass, stainless steel and Hastelloy



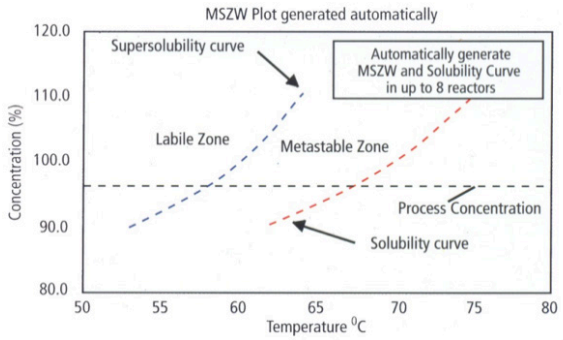


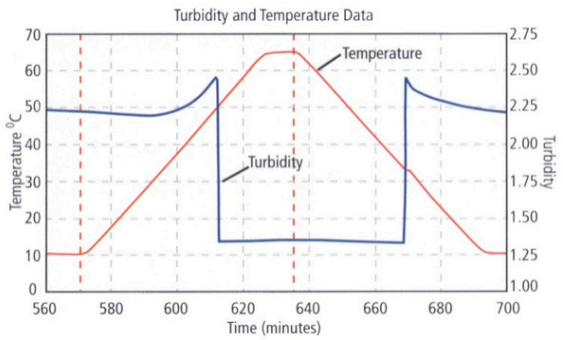




Crystallization

Turbidity for solubility and MSZW





Customized probes use H.E.L's proprietary turbidity sensing for accurate detection of solubility boundaries.

Petrochemical & Polymerization Processes

Complex synthesis reactions

- Research-scale and complete pilot plants
- High-viscosity reactions
- High temperature and pressure
- Batch and continuous processes



AutoLAB customers include

Pharmaceuticals & biotech

Amgen · AstraZeneca · Cipla · Dr Reddy's Laboratories · Eli Lilly · GSK · Boehringer Ingelheim · Merck · Novartis · Pfizer · Bristol Myers Squibb

Fine chemicals & petrochemicals

Air Products · AkzoNobel · Sasol · Chevron · DSM · Lonza · DuPont · Eastman Chemical · ExxonMobil · Fujifilm · Johnson Matthey · Shell · Trinseo Deutschland · Synthopol Chemie

Universities & research

University of Cambridge · Imperial College London · University of Leeds · Max Planck Institute · McMaster University · Newcastle University · Queen's University Belfast · Dstl · Trinity College Dublin · University College London · University of Massachusetts · University of Mumbai · University of Warsaw · Technical University of Munich

Specifications

Configuration	Typical working volume	Vessel / wetted materials	Temperature range	Pressure range	Heating / cooling	Control options	Typical applications
Bench glass reactor	0.5–2 L (compact stand); up to 5 L (tall stand)	Borosilicate glass; single or dual jacket	–50 to 250 °C*	Not pressure rated	Jacketed; circulator and utility options	Manual or PC automation. Integrated sensors, pumps, valves and PAT	Routine synthesis, crystallization, process development
Bench metal pressure reactor	0.5–5 L	316 stainless steel or Hastelloy C276/C22; PTFE-lined options available; other alloys on request	–50 to 250 °C*	100 bar (0.5–2 L); 40 bar (5 L)	Jacket and circulator, or electric mantle; optional cooling coil	Manual or PC automation. Integrated sensors, pumps, valves and PAT	Hydrogenation, gas-liquid reactions, high-pressure chemistry
Floor-standing kilo-lab glass reactor	Standard up to 20 L; larger reactors customized	Borosilicate glass; single or dual jacket	–50 to 250 °C*	Not pressure rated	Jacketed; circulator options	Manual or PC automated system. Integrated sensors, pumps, valves and PAT	Scale-up, polymerization, crystallization and complex synthesis
Floor-standing kilo-lab metal reactor	Standard up to 20 L; larger reactors customized	316 stainless steel or Hastelloy C276/C22; PTFE-lined options available	–50 to 250 °C*	10 bar (10–20 L)	Electrical or oil-circulating jacket	Manual or PC automated system. Integrated sensors, pumps, valves and PAT	Scale-up, high-pressure and complex synthesis
Multiple reactor system	0.5–20 L	Glass/metal options and wetted materials	–50 to 250 °C*	Up to 100 bar (volume dependent)	Independent temperature control	Independent reactor control, dosing and data logging	Catalyst screening, hydrogenation and comparative studies
Custom pilot plant	Application dependent	Glass or metal; materials selected for process compatibility	Application dependent	Application dependent	Engineered heating and cooling package	Manual or PC automated system. Integrated sensors, pumps, valves and PAT	Batch or continuous pilot processes and integrated unit operations

* Standard configuration; 350 °C or more in special configurations. Temperature range depends on the circulator and reactor materials. Higher pressures are possible in customized systems.

H.E.L Group

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