Overview

Your applications
Our solutions

h.e.l

Formally known as:

www.helgroup.com

How we help customers

Research evolves as your knowledge grows, we understand that.

Your research tools need to meet your specific needs for application and scale.

You need your experiments to be consistently efficient, informative and safe.

Process knowledge, speed to discovery, data integrity and strong support capabilities underpin your research.

The H.E.L team of 70 includes highly skilled process and software engineers, based at their extensive research and manufacturing facilities in the UK, as well as sales and support offices around the world.
H.E.L has a long history of solving complex challenges for customers. For more than 30 years the Company has worked with businesses and laboratories globally, providing proprietary automated solutions for the pharma, biotechnology, chemical, battery and petrochemical sectors.

Following significant growth, and with annual revenues exceeding £10 million, the Company is extending the reach of its products to support and enable R&D and process optimization further across the US, China and India.

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Multi-reactor AutoLAB system

ASu II Automated Sampling Unit

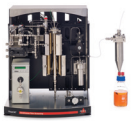
Hydrogenation, Catalysis and Synthesis Page 5

CAT reactor range

CAT96 reactor system

PolyBLOCK 4/8 reactor system

HP ChemSCAN II reactor system



FlowCAT reactor system

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Phi-TEC I calorimeter

Phi-TEC II calorimeter

BTC system

SIMULAR scale-up tool

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BioXplorer 100/400

BioXplorer P system

KEY CLIENTS

AkzoNobel

NOVARTIS

SIGMA-ALDRICH

BAYER

DUPONT

FUJIFILM

UCL

SANOFI

AstraZeneca

Pfizer

syngenta

Johnson & Johnson

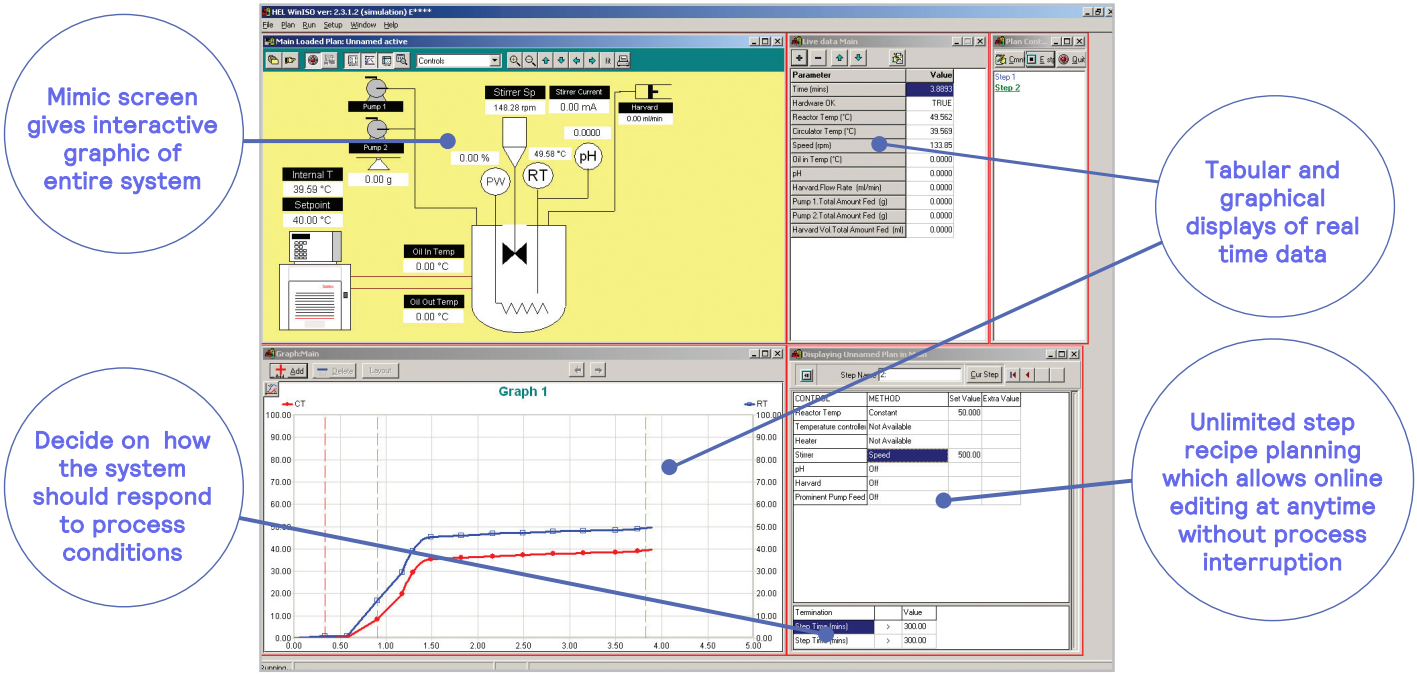
Roche

Exxon

Biocon

इंडियनऑयल IndianOil

WinISO Software



Whether your processes are unique and prone to change, or are standard tests that require precision and repetition, you require a powerful software platform that can manage this for you. We understand that you are looking to automate your process, control all relevant equipment and record accurate process analytics and experimental data.

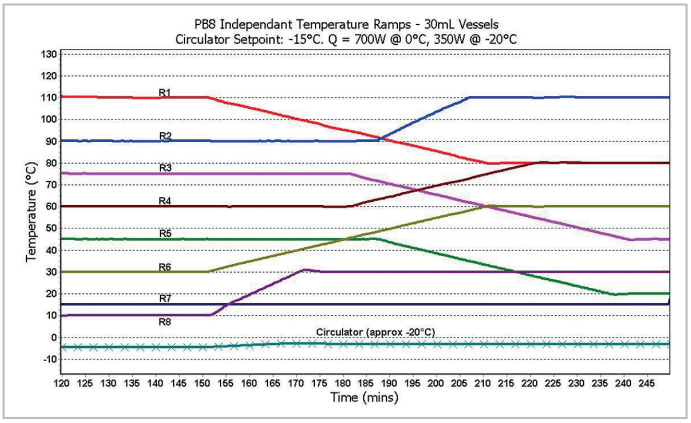
Our **WinISO** software platform is customisable to support your lab requirements – controlling your HEL systems and associated third party hardware.

WinISO has been shown over and again to improve efficiency with confident **automation**.

- Set up a **virtual run**
- Implement relevant **safety controls**
- Be sure that your **data** is captured securely

WinISO allows you to record and control:

- Temperature
- pH
- Stirring speed and torque
- Pressure
- Feed rates (for solid, liquid and gas feeds)
- Solubility and super-solubility
- Automated sampling
- And a whole lot more



Simultaneous data capture from eight independent, parallel reactions

Lab Reactor Systems and Automation

You need a lab reactor that suits your process and that evolves with your research.

- From research to pilot scale
- Single or parallel reaction vessels
- Using high- or low- pressure reactions, or both at the same time
- Heating and cooling
- Batch or continuous processes
- Automatic sampling and data logging for long, unattended runs
- You also want to be able to automate your process for efficient, accurate, reproducible reactions

Whatever your requirements, the **AutoLAB, DigiPLATE** and **ASu II** systems from H.E.L are designed, configured and built to meet your specific requirements. They can be expanded over time, to meet you changing needs. Controlled by the powerful **WinISO** software platform, these systems will help you with a wide range of chemistry, in a wide range of applications, including:

- Hydrogenation
- Polymerisation
- Catalyst testing
- Crystallisation
- Synthesis
- And much more

Dual stand AutoLAB system

Multi-reactor AutoLAB system

ASu II Automated Sampling Unit

Hydrogenation, Catalysis and Synthesis

Your high-pressure catalysis is at the research, process development or scale-up stage, you are running in either a batch or continuous mode and you need **confidence** in a **high pressure system** that enables an efficient, safe process. Whether it's a single reaction, or testing multiple conditions in parallel, you are looking for key insights to optimise your chemistry and produce the quality and volume of material you need.

The HEL solutions support your work requirements, all the way up to pilot scale:

- The manual **CAT7, CAT18** and **CAT24** systems enable multiple simultaneous reactions
- The automated **CAT96** system supports parallel evaluation
- The **DigiCAT, PolyCAT, HP PolyBLOCK** and **HP ChemSCAN II** systems for single, or parallel reaction screening, with computer control and monitoring
- **AutoLAB** systems enable you to move to pilot scale work
- When continuous flow chemistry is required, the **FlowCAT** system has a range of options to suit your needs

Automation, process control, safety monitoring and data capture through the **WinISO** platform give you the confidence to run your catalytic experiments efficiently and effectively.

HP ChemSCAN II parallel high pressure reactor system

FlowCAT continuous reactor system

CAT18 high pressure reactor vessel

CAT96 Automated 96-well high pressure reactor system

PolyBLOCK 4/8 high pressure parallel automated reactor system

Parallel Synthesis

You have a range of demands on your time and projects change frequently, so flexibility in your chemistry reactors is critical for you. Whether it's running multiple reactions in parallel, or scaling out to produce larger volumes, your reactor systems need to be able to respond quickly to your needs. Your bench space is also at a premium, so you need a system with an economical footprint. One that can change and grow along with your needs.

The H.E.L **PolyBLOCK** range enables working volumes from 96-well plates, all the way up to 500 ml.

- In the **PolyBLOCK 4, 8,** or **8XL** systems, each reaction zone can be independently controlled for a wide range of reaction conditions including temperature, pressure and stirring
- With straightforward experimental design and simple data capture enabled by the **WinISO** control software, PolyBLOCK users often report increased productivity through automated running and increased experimental reproducibility
- With more specific customisation requirements for parallel processing, the **AutoMATE II** platform enables a broad range of configurations, also supported by the **WinISO** platform

PolyBLOCK 4 parallel automated reactor system

PolyBLOCK 8 parallel automated reactor system

PolyBLOCK Plate 96 well reactor system

Crystallisation

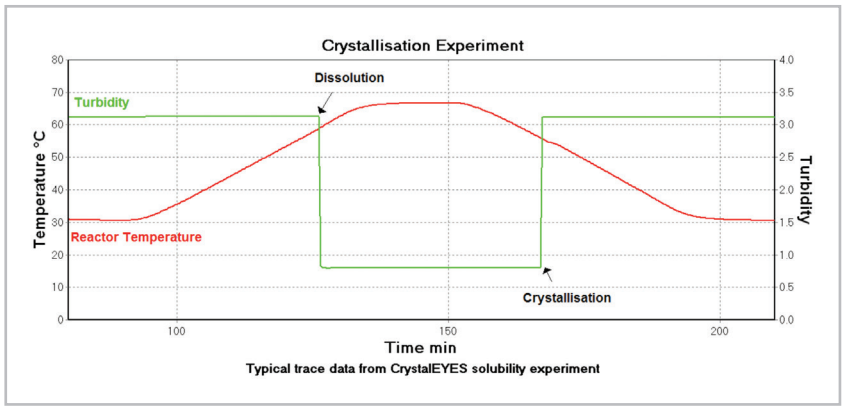
CrystalSCAN system with 8 reaction zones

You know that crystallisation parameters for your drug are essential to be able to purify it. Obtaining accurate solubility/MSZW data can take days of time. This is especially true if you have to work through multiple rounds of heat/cool cycles, due to solvent/anti-solvent additions. You are very aware that accurate heating, cooling and stirring control and data logging are essential for accurate results.

If you already have reaction systems set up, then the **CrystalEYES** system integrates the H.E.L data capture and system monitoring, giving you accurate data in a semi-automated fashion.

When full automation for multiple heat/cool cycles in required, the **CrystalSCAN** system will run these unattended and deliver you the data you need – automatically determining the MSZW. With either 4-position or 8-position systems, it's possible to run multiple conditions and/or samples simultaneously, giving you even greater efficiency and throughput.

Throughout your experimental design and experiment run, the **WinISO** software monitors and reports back on the experimental data, giving you straightforward MSZW determination.



Typical changes to indicate solubility and super solubility points, as sample is heated and cooled

Probes for a range of physical characteristics are fully integrated into the systems

Safety and Calorimetry

If you are screening processes and reactions to establish safe working parameters, you need data that you can rely on to ensure the safety of your colleagues, your facilities and the wider public. Detecting exothermic runaway reactions, dangerous gas generation and safe control measures are critical to designing your processes for safety at scale. If you are investigating a plant-scale run-away, then this data is crucial for root-cause analysis and implementing control measures.

Designing batteries and their safe working limits also requires accurate detection of catastrophic failures and the conditions that lead to them. This can be anything from operating temperature, through incorrect installation or charging, to physical damage of the battery.

With a long heritage in safety and hazard evaluation, H.E.L has a range of solutions to support your safety and hazard testing requirements.

- For batteries, **the iso-BTC** models the heat-release profile during battery charge and discharge cycles at constant temperatures
- The **BTC** systems allow testing of larger, industrial, batteries for physical damage and shorting, as was well as for typical performance characteristics during charging, heating and discharge
- Accurate, automated screening for chemical stability, handling and reaction runaway is available through the **TSu II** Thermal Screening Unit
- More precise measurements are provided from the **Phi-TEC** range of adiabatic calorimeters. Due to the low Φ-factor of the **Phi-TEC II** system, direct vent sizing information, and other critical data are produced
- If your requirements are to model your plant operations at scale, then the **SIMULAR** system will simulate your plant operations at scale, and allow you to design a safe and effective large-scale operation

TSu II Thermal Screening Unit

Phi-TEC I Adiabatic Reaction Calorimeter

SIMULAR scale-up tool

BTC system

Phi-TEC II low Φ-factor calorimeter

Biological Applications

You want to control and evaluate a wide range of variables in your bio process systems. You are looking to perform parallel process optimisation work on your growth and expression systems, with capability to scale-out when you need to. You need a system that is designed to meet the specific needs of your research goals and cell line, whether it is mammalian or microbial. You also want detailed monitoring and data logging to enable you to fully dissect what is going on within your experiments.

Our bioreactor solutions enable users to work with culture volumes from 20 ml to 2 L.

- For smaller volumes of up to 700 ml, the **BioXplorer** systems are highly flexible and allow users to control and monitor a wide range of culture conditions, from temperature and pH, through to liquid and gas addition. With a small footprint and capability to integrate into robotics systems, they are suited to a wide range of laboratories and applications

- The **BioXplorer P** series introduce the capability to run your cultures at pressures of up to 10 bar (~145 PSI), allowing investigation gas fermentation studies and head space pressure at scale. With high temperature resistance, the P series are fully suited to Sterilisation In Place (SIP) processes

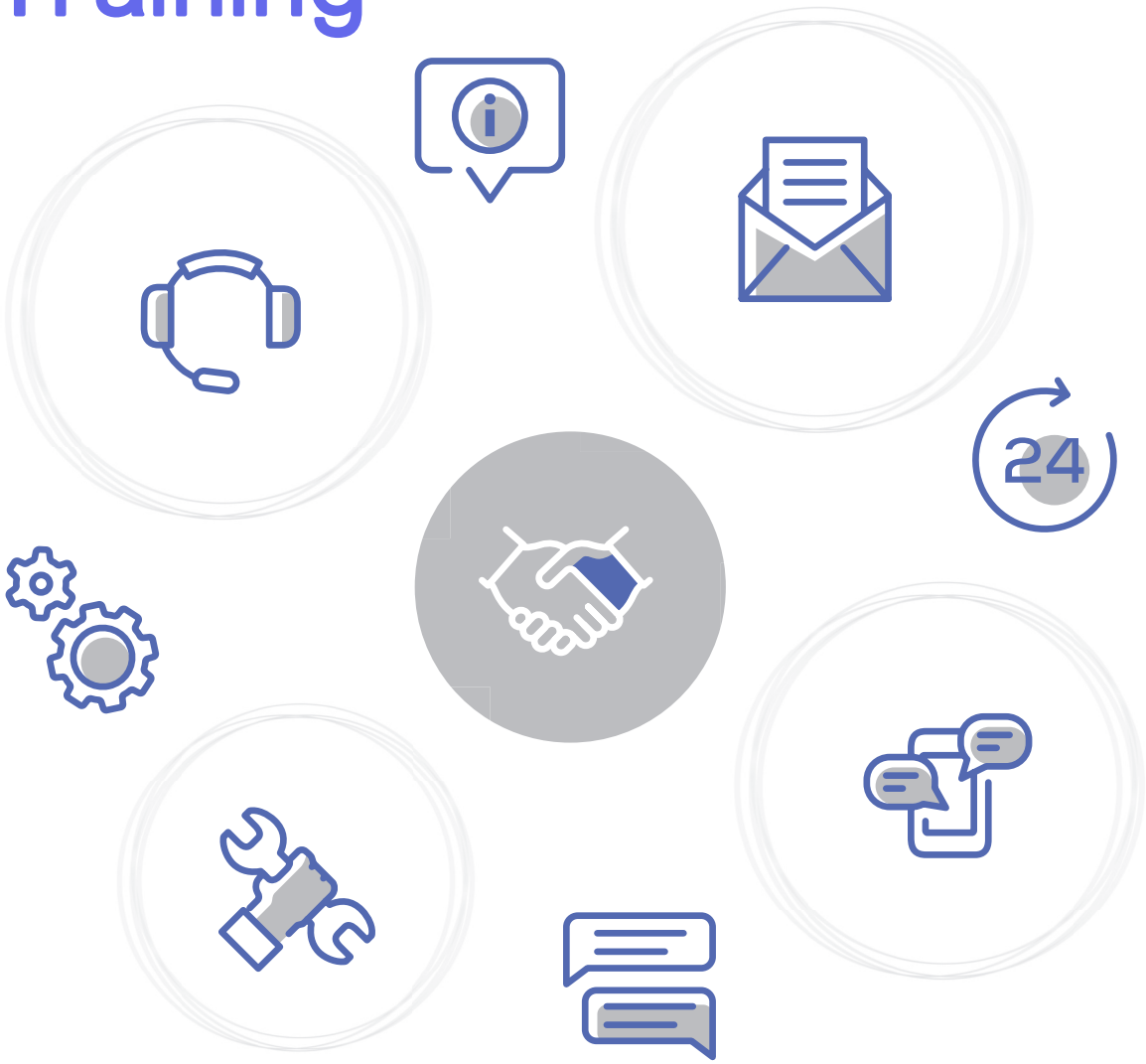
- For larger working volumes, the **BioXplorer 5000P** systems offer flexible reactor options for volumes of up to 2 L vessels. As part of the BioXplorer P range, the 5000P also enables investigation into pressure on the culture, along with SIP capabilities

- For deep insights into your bio process conditions, our range of gas analysers and **BioVIS** cell density and monitoring probes give you the insights that drive your research

BioXplorer P system, for parallel mini bioreactors

BioXplorer 100 in a typical 8-reactor configuration

Upgrades, Support and Training



We understand that your needs can change over time and you may need

- **A system upgrade**
- **Training for new team members**
- **Support on your processes**
- **To book some time with our service team**

Whatever it is, we are here to help you through your needs and put the right solution in place to help you move forward. Our dedicated service team and highly knowledgeable technical staff can work with you to find the right solution for you.

YOUR APPLICATIONS OUR SOLUTIONS

	Parallel Chemistry	Catalytic Processes	Automated Lab Reactors	Safety and Calorimetry	Crystal and Particle Studies	Biological Applications
Asu II	•		•			
AutoLAB			•			
AutoMATE II	•					
BioVIS						•
BioXplorer						•
BTC				•		
iso-BTC				•		
CAT reactors	•	•	•			
CrystalEYES					•	
CrystalSCAN		•			•	
DigiCAT		•				
FlowCAT		•				
FlowCAT SA		•	•			
HP AutoLAB		•	•			
HP AutoMATE II	•	•	•			
HP ChemSCAN	•	•	•			
HP PolyBLOCK	•	•				
Online Calorimetry			•			
Phi-TEC I				•		
Phi-TEC II				•		
PolyBLOCK	•					
PolyBLOCK Plate	•					
PolyCAT		•				
Simular			•	•		
Tandem systems						•
TSu				•		

About HEL

H.E.L Group's mission is to work together with chemistry, safety and biotechnology experts to engineer and unleash the full potential of the scientific community. To this end, H.E.L develops and manufactures innovative scientific instruments and software designed to optimize the efficiency, safety and productivity of key processes in chemistry and biology applications.

Since 1987, we have been supporting clients across the globe in the fields of pharmaceuticals, fine chemicals, petrochemicals and biotechnology.

- Our **knowledgeable staff** are highly qualified scientists, engineers and programmers
- Our product **quality** is backed up with ISO9001 certification
- With a strong focus on the customer, our **service and support** enables our customers to keep working efficiently
- Our **wide range of customisable products** put the customer at the heart of what we do, with solutions designed around their needs

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