

# LP ChemSCAN

## AUTOMATED CHEMICAL SCREENING SYSTEM



### Key Features

Use vials, flasks and stirred vessels interchangeably

Volume: 1ml - 350ml

Reaction temperature from -80°C to +250°C

128 stirred reaction vials possible

On-line scheduling of process steps

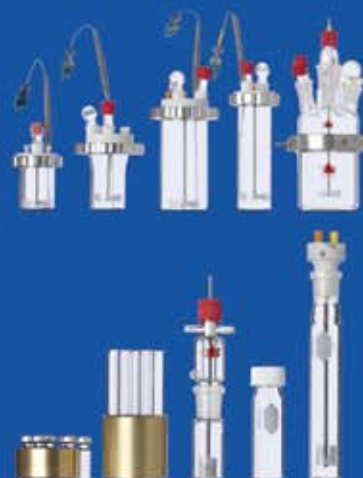
Full interaction with running experiment

HPLC integration with live data display

Automatic recipe changes based on HPLC results

### Parallel Evaluations Such As:

- ▶ Drug stressing
- ▶ Solubility studies
- ▶ Catalyst / route selection
- ▶ Custom applications



# Robotic Platform



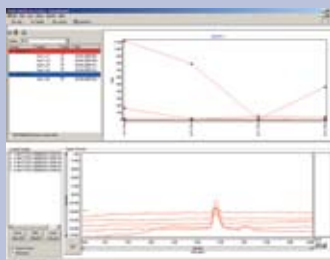
## Parallel development of chemical process by:

- An x-y-z robotic handling system built around the central chemical reaction block
- Make up reaction mixtures accurately and automatically
- Parallel dosing of reagents
- Control (and record) temperature and agitation
- Sample reactions at user-specified intervals
- Prepare (by dilution, quench etc) each sample
- Inject samples into integrated HPLC
- Complex recipes can be stored and re-run, on-line modifications made at any time.

## Sample Analysis:

- Automatic injection into most HPLC brands
- Full control and data exchange option with Agilent and Gilson (both DAD and VWD)
- Automatic control changes possible based on HPLC results
- Real time calculations with Chemstation software if needed.

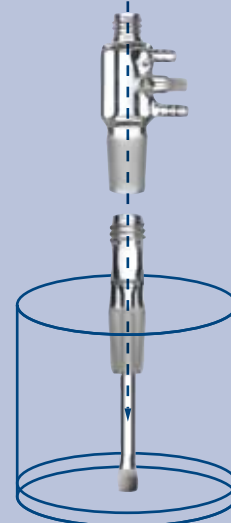
- Graphical display in real-time and overlay of chromatograms



## Slurry Sampling

Liquid sampling from slurry mixtures is possible, using our proprietary methods.

Robot needle



## Additional Options

- pH
- turbidity
- spectroscopy
- calorimetry
- mechanical stirrings



Range of miniature probes to allow sensing of pH, turbidity, etc.

## Dosing

Multiple vessels can be individually dosed directly from syringe pumps, allowing semi-batch process evaluation. These pumps can also be configured to control pH.



Dual syringe pump for parallel dosing of up to 16 vessels

# Reactors / Vials

## LARGER WELL-STIRRED VIALS

Custom vessels, 5ml to 100ml with internal temperature measurement/control. Mechanical agitation, reflux and inert features. Easy sampling, dosing, plus probes for pH, turbidity etc.

In many cases, mechanical stirring plus internal temperature measurement and control is possible.



## MULTIPLE VIALS AT DIFFERENT TEMPERATURES

Range of disposable vials, with and without septa – normal and high pressure versions. Complete with reflux/inert options using custom designed blocks. Temperatures monitored to within 1°C of internal vial temperature.



## REFLUXING/PURGING

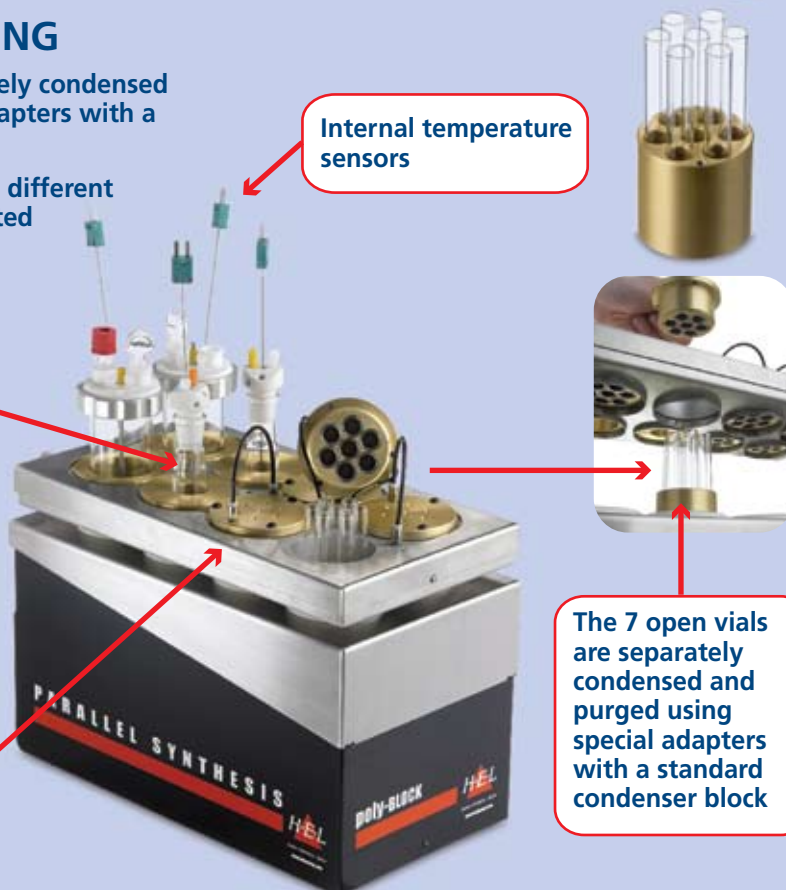
The 7 open vials are separately condensed and purged using special adapters with a standard condensing block.

Thus, 56 stirred samples at 8 different temperatures can be evaluated simultaneously.



Larger 30ml vial condensed/purged

Cold condenser and purge block



# winISO Software

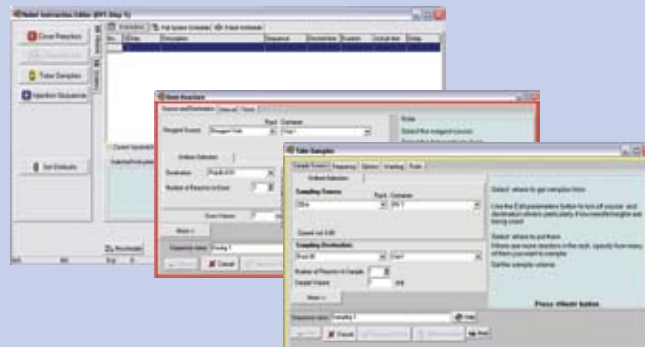
HEL's Proprietary winISO software is developed and maintained in house with a proven track record of improvement and flexibility to meet exact user requirements. Employed in over 600 automated reaction systems, the user friendly software offers excellent features and is widely regarded as the industry leader.

## Simple set-up



Key information is displayed at all times. This will even show chemical names and quantities – updated as the experiment progresses. Active sections on the robot bed are highlighted.

## Real-time Editing



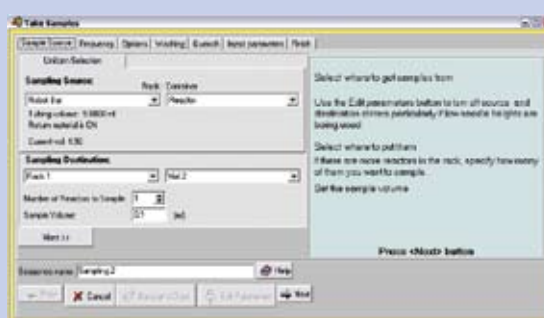
Use of wizards allows robot instructions to be conveniently divided for ease of checking and editing. Instructions can be edited while the robot is in operation – essential in many cases.

## Recipe Steps



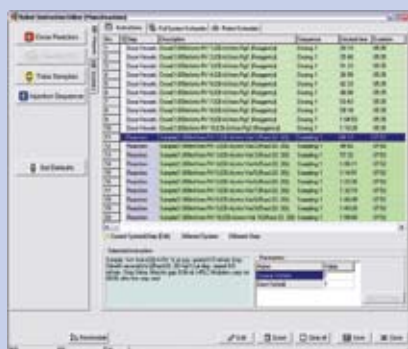
winISO allows operations to be divided into "steps" (eg : dose solvent, dose reagent, sample, inject, etc) – without limit. This makes tracking of recipe and subsequent review or editing much easier. Any instructions can be edited while the system is running.

## Different Levels of User Interaction



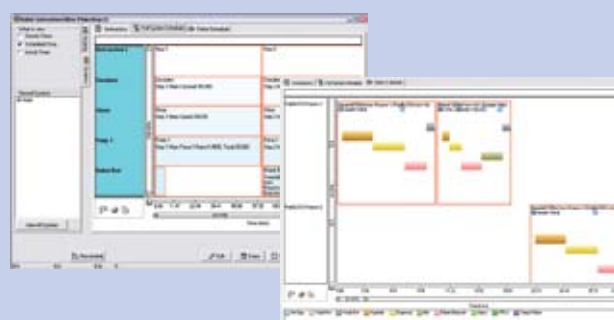
We understand that accessibility is important. Different access levels allow users with varying experience to use the LP ChemSCAN in an easy manner.

## Logical Instructions



Robot actions are written in sequence with clearly identifiable step numbers. This allows simple identification of experimental progress.

## Scheduler



HEL's proprietary intelligent scheduling software allows the prioritisation of each user's most important tasks. Real time changes to scheduling are available at any time during the running experiment.

# Reaction Blocks

## Flexible Reaction Blocks – The Heart of the LP ChemSCAN

- Control up to 2 multi-zone PolyBLOCK reaction blocks with LP ChemSCAN.
- PolyBLOCKs allow different types and sizes of vessels to be used in each of 4 to 16 zones.
- Each zone separately stirred and controlled at a different temperature.
- Range of vials and reactors with possibility of inert purging, refluxing and agitation.
- For vials over 10ml, mechanical agitation is possible using special inverted anchor stirrers as well as reagent temperature measurement and control (with other optional probes such as pH).

### PB8

PB8 can handle vessels up to 100ml fully stirred as well as vials and flasks – any combination of vessels and vials can be mixed. Each of the 8 zones are separately stirred and temperature is individually controlled.



1 reaction block with Gilson GX271

### PB4

PB4 can handle vessels up to 350ml. All vials and smaller vessels can also be used, giving 4 separate temperature zones.

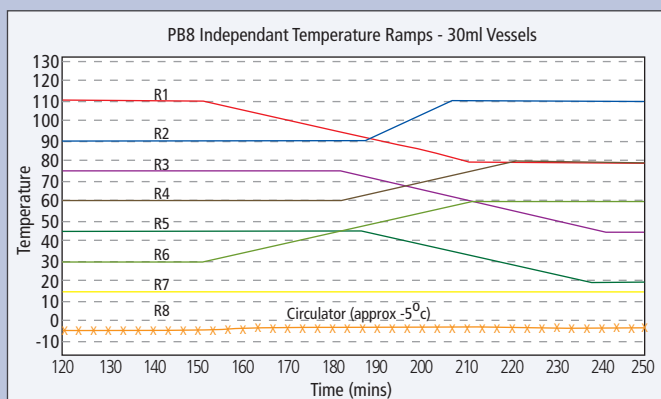


2 reaction blocks (PB4 and PB8) with Gilson2155W

## TEMPERATURE

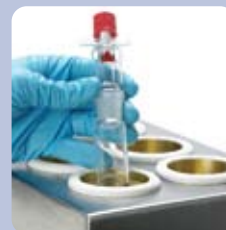
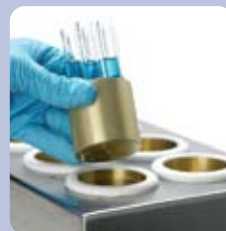
Four or eight independent temperatures – 80°C to +250°C – accurately controlled. A range of over 100°C can be covered at any time, with control of either the internal vessel temperature or the zone (external) temperature. Accurately control ramps down to 0.01°C/minute and over 3°C / minute.

Data shows the 8 vessels in PB8 unit.



## QUICK EXCHANGE BETWEEN APPLICATIONS

Vessels can be changed simply and quickly. Any combination of different vials or reactors can be used to suit applications.



# HPLC Integration

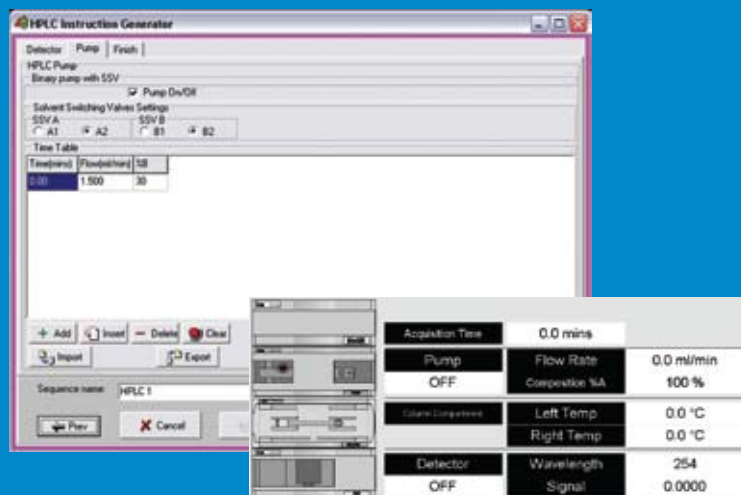
## Control

LP ChemSCAN can inject sample into most commercial HPLC systems and trigger analysis. The full strength of the system lies in direct control of certain HPLC systems (Agilent and Gilson), which allows different HPLC methods to be employed in a single experiment. This even includes automatic switching of elution methods if required. Real time display of data within winISO allows process conditions to be changed instantaneously in the running experiment.

Both Diode Array Detection (DAD) and Variable Wave Detection (VWD) techniques can be controlled in this way – for Agilent and Gilson HPLCs.



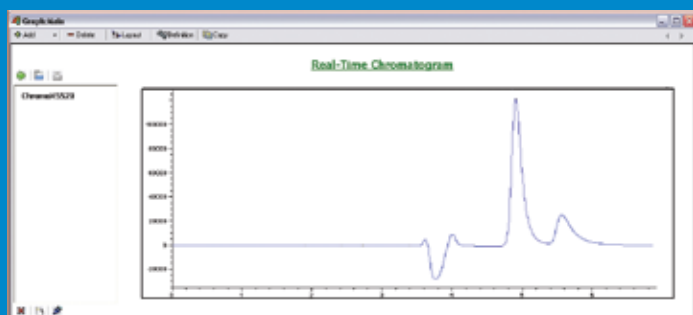
Range of reagent/sample vial sizes/types.



Programme different settings for different stages of process or make interactive changes.

## Real-time chromatogram

A chromatogram that is currently being acquired can be displayed in real-time along with other process data displayed in winISO. When the acquisition is complete, the chromatogram is saved as a ChemStation compatible data file for later review.

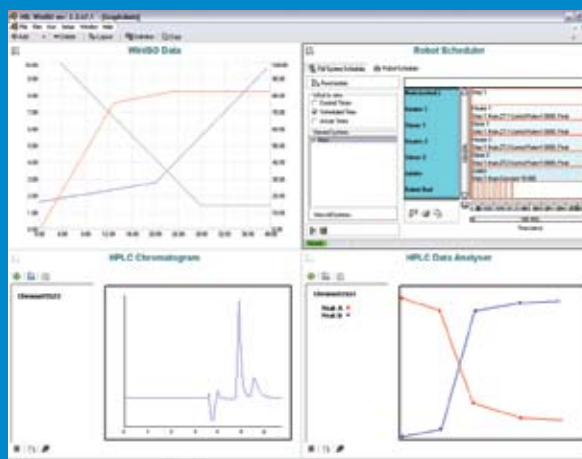


Track changes by automatic overlaying of chromatograms.

**HPLC results can automatically drive recipe changes**

## Real-time calculations

LP ChemSCAN also allows real time calculations on raw data using Agilent's Chemstation software. The calculation results can be accessed and used for process decisions. The bottom right hand display shows data obtained via Agilent ChemStation software to show concentration changes over time.



Turn raw data into quantitative results, as experiment proceeds. Use results to make process changes.

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