

auto-MATE

HIGH PRESSURE

HIGH PRESSURE MINIATURE MULTIPLE REACTOR SYSTEM

The auto-MATE^{HP} is the high pressure parallel synthesis system of the market leading process optimisation tool auto-MATE^{PLUS}. This fully automated system is computer controlled and provides truly scalable data in continuous, batch and semi-batch chemistries involving one, two or three-phase systems.

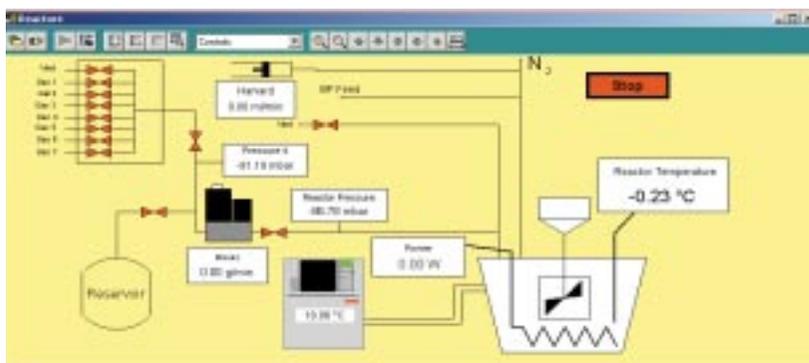


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auto-MATE^{HP}

The auto-MATE^{HP} is designed to enable the study of reactions up to 100 bar (1500psi) and allows for full independent control and monitoring of your chemistry. It allows both multiple and parallel feeds of liquids and gases, pressure, temperature and agitation rates.

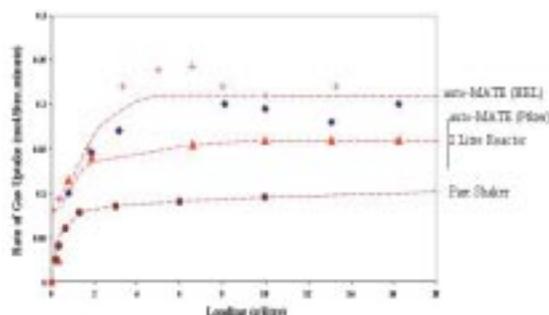
Mimic of a tailored system for high pressure chemistry



Combined heat output and gas consumption data from auto-MATE



Effect of catalyst loading on hydrogenation rate. Hydrogenation of cyclohexane in methanol 10% Pd/C



auto-MATE^{HP} is fully controlled by the winISO software, created specifically in-house for multiple reactor applications. It allows for totally unattended operation and live display (and modification) of all reactor parameters and conditions.

Real-time editing

Using winISO all changes are logged so that a full record of the procedures changes are available.

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Scalable data

A key aspect of the design is that process conditions, developed on the auto-MATE, will generally scale up reliably without intermediate piloting.

Recipe creation

The development of even the simplest of plans is as easy as a series of logical steps. Options such as logic and loops are readily available. Control of parameters such as temperature, feed rate and pH can be related to any number of measured variables and used as step terminations. Plans can be saved and reused, and also changed live, during operation as the progress of a chemistry demands.

Calorimetry

The auto-MATE^{HP} is unique in that it offers a full reaction calorimetry option, which allows for a more comprehensive understanding of the chemistry and ultimately better, more scaleable data.

Typical features

Many applications have involved combinations of gases, liquids and solids. This system produces scalable high pressure data from four small reactors operating in parallel and controlled from a single PC.

The hardware features:

- ▲ Single reactor or blocks of 4 (fixed head or fixed reactor)
- ▲ Reactor volume 50 or 100 ml (standard)
- ▲ Pressure rating 100 bar/1500psi or higher
- ▲ Temperature range – 50 to 200°C (or wider)
- ▲ Individual temperature and pressure control
- ▲ Mechanical stirring with individual speed control
- ▲ Range of stirrer designs
- ▲ Gas consumption by mass flow sensor
- ▲ High pressure liquid addition
- ▲ Reaction calorimetry data



Tailored designs

HEL have designed and built many one-off variations of the auto-MATE^{HP} for both specific and general applications. Systems have included the provision of the facility for running the units continuously for days, with automated recipe change, automated washing and recharging plus robotic sampling after each run.

