

# Optimizing development resources for efficient product development

## Company insight



## Who is SYSTAG

Swiss based SYSTAG, System Technik AG, founded 1965, is specialised in automation of Fine Chemicals and Pharmaceutical processes from millilitre Lab-Scale up to Kilo-Lab-Scale. Our innovative systems are designed to provide easy scale-up at every key stage from development through piloting to production control technology.

## Company Insight

### Why is there a need for automation in R&D laboratories?

Well, nowadays, efficient process research and development are, more than ever, an absolute must for contract manufacturers and API manufacturers. New products/processes need to be pushed through to market readiness faster and faster. However, development departments suffer from a shortage of resources and the available employees are often overburdened with administrative tasks. So it is no wonder that in many cases there is no time for serious process development anymore. Time-consuming routine work such as dosing, tempering and similar control tasks can be left to an automated laboratory reactor while limited human resources can then be used for more important work.

### What is the benefit of Controlled Lab Reactors?

SYSTAG's Controlled Lab Reactor [FlexyPAT](#) and the Parallel Synthesis Workstation [FlexyCUBE](#) can help chemists greatly if systematic laboratory automation is available even in the very earliest stages of development. On the other, thanks to comprehensive data capture and visualization, complex interrelationships can be spotted even at a very early stage of development. At the same time processes become much more robust and reproducible, artefacts as well as dependence on individuals may be eliminated easily. By the widespread use of lab automation, based on customized controlled lab reactor, an enormous increase of efficiency of an entire group or even of a department is achieved.



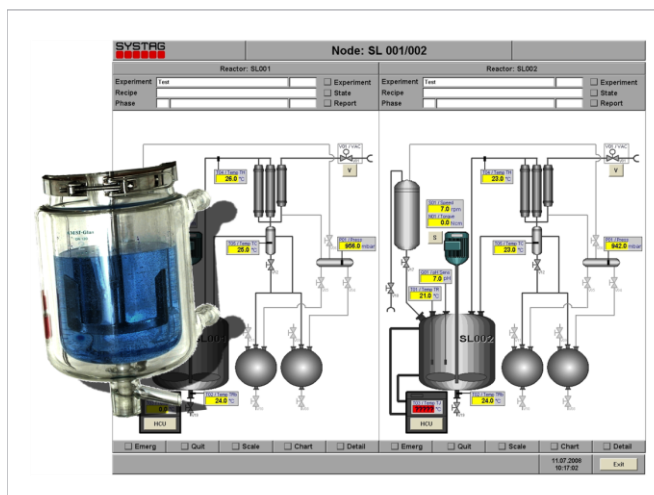
FlexyCUBE - Parallel Synthesis Workstation

## Company Insight

Nowadays, strategic process optimization as Quality by Design (QbD) or statistic Design of Experiments (DoE) become indispensable for fast and efficient process research and process optimization. A part of this, regulations and data traceability are coming more and more over into the very early stages of development. Without seriously controlled lab reactors it isn't possible to follow all those norms and standards anymore.

### What are the strengths of SYSTAG's automated systems?

SYSTAG develops modular and innovative tools for automating chemical synthesis reactions, from the laboratory scale through to scale-up or mini-pilot. SYSTAG has more than 50 years of experience of applications and automation, based on our close cooperation with the chemical and pharmaceutical industry. We develop and offer customer-specific, systematic laboratory automation, all from a single source. Our know-how is your advantage and our Swiss quality products and exceptional customer service are OUR trademark – and YOUR gain.



FlexySys - synoptic interface

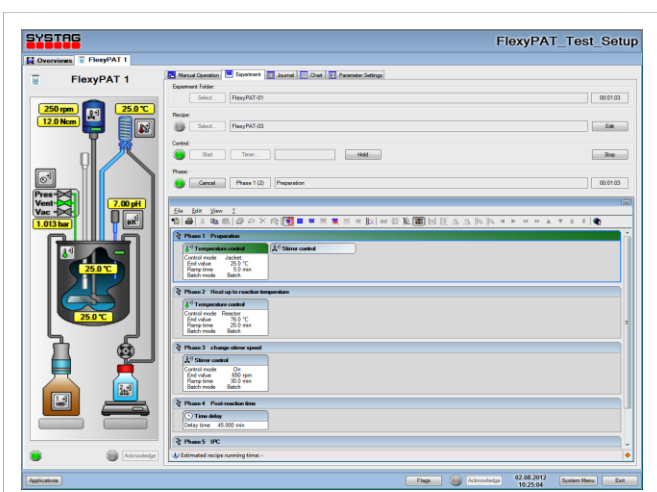
## Company Insight

### What are typical application area for FlexyCUBE and FlexyPAT controlled lab reactors?

Well, basically spoken wherever temperature controlled jacketed lab reactors or round bottom flask are used to perform synthetic reactions, the use of "automated lab reactors" is imposed.

This ranges from the chemical and pharmaceutical process research in millilitre-scale, to the process development, thermal safety investigations for reaction calorimetry, up to the scale-up (Kilogram scale).

Typical applications are for example, Hydrogenation with elaborate inertisation cycles, or crystallization optimization with recurrent heating / cooling loops, with regards for the Meta-Stable Zone determination. This involves, in particular in combination with an on-line turbidity meter, to determine the turbidity point and the solubility of a product at different concentrations in function of temperature. If you want to do this on the conventional, manual method, a large number of tests are needed, with meticulous logging and subsequent evaluation. A "controlled laboratory" on the other hand, performs all necessary steps fully automatic. These include not only the various heating / cooling cycles, but also the need dosage between each cycle to obtain the solubility of a product at different concentrations. Here with the time saving is within the range of factor in these applications, in contrast to the conventional procedure. Furthermore the reproducibility is an extremely important factor, in particular, in a series of tests.



FlexySys - User Interface with recipe window

## Company Insight

To take the example of hydrogenation again, is also to mention that in addition to the economy the safety factor plays a significant role. For hydrogenation, or generally for gas reactions, the inerting (oxygen sensitivity) is often of paramount importance. All these phases are done with an automated lab reactor by a so called standard operation procedure (SOP) autonomously while maintaining the quality all the time. Furthermore, the exact recording of quantity of gas in hydrogenations is crucial.

In addition to the precise temperature control and pressure control the mixing (stir efficiency) at different stirring speeds, and thus the gas absorption, are essential, if for example, various catalysts are examined (catalyst screening). It is almost impossible to control and record all these parameters in a reproducible and continuous manner without laboratory automation. And right here the proven solutions from SYSTAG show their strengths.

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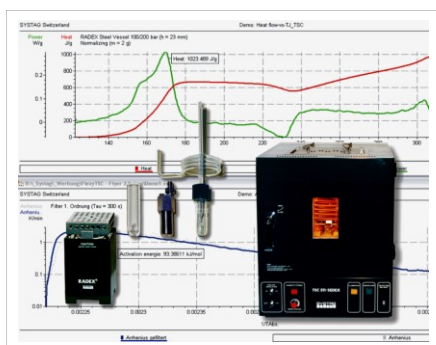
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PPR - Parallel Pressure Reactor System

## More highlights



### FlexyTSC

#### Adiabatic Thermal Hazard Calorimeter

Provides experts with support in thermal hazard screenings of solids, liquids and non-homogeneous substances or even reaction mixtures.



### Calo2310

#### Reaction Calorimeter with Heat-Flow & Heat Balance Method

The "All-in-One-Calorimeter" impresses with a unique combination of heat flow & heat balance calorimetry at the same time, and provides a plausibility check for all measurements.



### FlexyPlant

#### Automation of Kilo-Lab and Pilot Plants in R&D

Customised solutions for automated process management for lab reactor and chemical process units. By request qualification in compliance with cGMP, conform to CFR21 Part11.