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Company profile

Microinnova – the flow company

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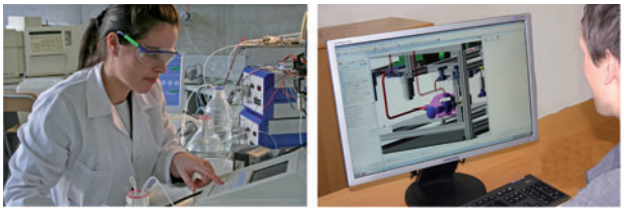
Smart production – lean, clean and green

The core competence of Microinnova Engineering is the development and optimization of production processes and equipment for the chemical and pharmaceutical industries. Over the last 8 years, Microinnova has successfully shaped the market for industrial flow chemistry applications.

Microinnova provides complete turn-key plants and production systems, as well as services in the fields of chemical process development, engineering, automation and commissioning. Likewise, the extensive capabilities of the company include equipment and solutions for process optimisation and improvement of already existing plants.



Development and engineering services.

Consistent research and development strengthen Microinnova's position in the industry as a specialist in continuous flow chemistry, micro process engineering and other intensification technologies.

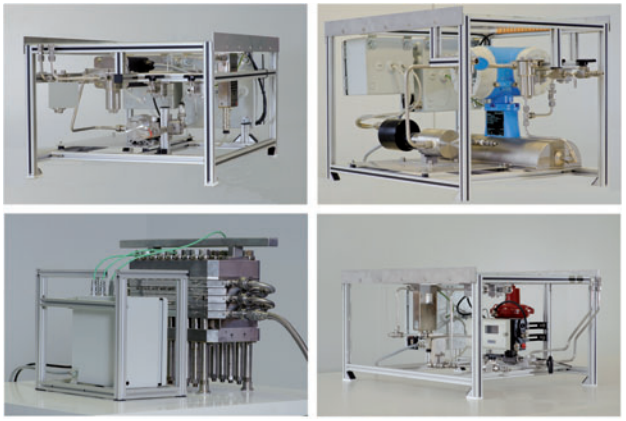
Better success through better systems

With a perfectly integrated system of methods, development tools and production equipment, Microinnova offers process development, engineering services, scale-up and delivery of plants in continuous production mode ranging from kilo-lab to pilot and industrial multi-tons-per-hour quantities.

Microinnova is an independent system integrator. According to chemical process requirements, the chemists and engineers calculate, select and, finally, set up the ideal equipment. Of course, factors such as material suitability, cost-effectiveness, flexibility and specific customer requirements are also included. Systems can be designed according to GMP and other guidelines.

Modularity for highest flexibility

The consistent use of continuous flow chemistry, micro reactors and other intensification technologies open up new possibilities for the production of fine chemicals, intermediates and APIs. This includes, for example, *in-situ* production: chemical substances are released in the required volumes, produced when needed and fed directly into the further process. Sus, transportation and handling risk is ruled out.



Feed modules size S and S^{+}, reactor module Alfa Laval™ and product module backpressure of a Flow Miniplant.

The modular design of Microinnova systems allows for maximum adaptability to changing requirements or new productions, thus making flow chemistry comparable to the flexibility in batch. Microinnova makes flow chemistry economically viable in small and large production scales.

Flow process development services

Three teams work in parallel in the laboratory and test areas of Microinnova to generate fast and reliable results. Customers are involved in each development step and kept informed constantly. Microinnova provides a large pool of high-performance equipment to allow highly efficient work

and precise development. Chemists and engineers may choose from twenty-five different types of micro-structured, straight scalable reactors and systems to explore and improve flow synthesis routes and design efficient plants. Professional working conditions lead to rapid, profound and cost-effective results for partners in the chemical and pharmaceutical industries.

Engineering services

Microinnova transforms continuous flow processes from the lab-scale to small and bulk manufacturing scales. Experts provide customers with all essential information at each stage of the project:

- assessment of already existing plants to evaluate room for improvement by means of (partly) adaption to flow,
- conceptual and basic engineering for economic estimation,
- detailed planning and documentation for profound decisions,
- turn-key equipment.

Finally, customers get valuable information, equipment and documentation, considering all requirements regarding safety, usability, economic and ecological aspects and guidelines such as GMP or ATEX.

Small systems for continuous flow production

The Flow Miniplant is Microinnova's plant for the production of quantities between 1 and 100 l/h. It bridges the gap between lab-scale flow process development and bulk manufacturing. It is an indispensable strong tool for development and small-scale flow production as well.

Flow Miniplant: Bench-top pilot plant, plant for development and small-scale production.

Basic specifications of the Flow Miniplant:

- throughput: S-class 1–10 l/h; S^+-class up to 20 l/h,
- pressure: 0 to 20 bars,
- temperature: -80°C to +200°C.

The Flow Miniplant is constructed from different ready-made modules for feeding, reaction, plug-flow, etc. (Each module contains the necessary components for the process step such as pumps and sensors.) They can easily be changed, rearranged or supplemented according to the needs of your actual chemistry. A new operating system allows simple connection and easy control of the entire Flow Miniplant.

Large systems featuring modularity

Microinnova large-scale manufacturing systems are designed to cover a wide range of processing conditions and all production strategies.

- Plant optimisation (small retrofit plant changes for big effects on their performance)
- Unit operation to switch from batch to flow in individual process steps (one or more)
- Modular multipurpose featuring batch-flexibility when operated in continuous flow production mode.
- Dedicated plant – specialised for economic bulk production.

Microinnova unit operation: replacement of one or more individual batch-steps with continuously operated modules.

Microinnova's modular systems offer double flexibility: inter-module and on-module. Inter-module flexibility means modules out of a pool can be exchanged and rearranged "as they are." On-module flexibility means each module skid can be assembled individually for specific requirements. Reserve volumes called "engineered spaces" are planned to be equipped quickly and easily with different, larger components or apparatus, for example, different residence-time modules or reactors.

Basic specifications for large-scale manufacturing equipment:

- throughput: 100 l up to several tons per hour
- pressure: up to 80 bars
- temperature: -80°C to +300°C.