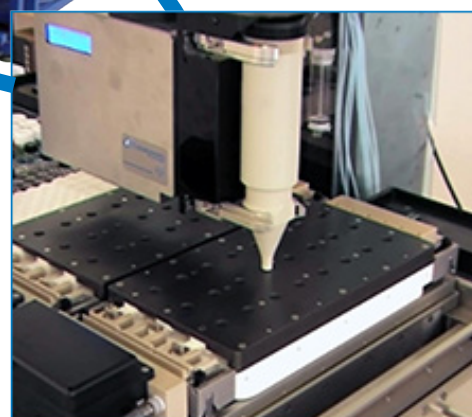


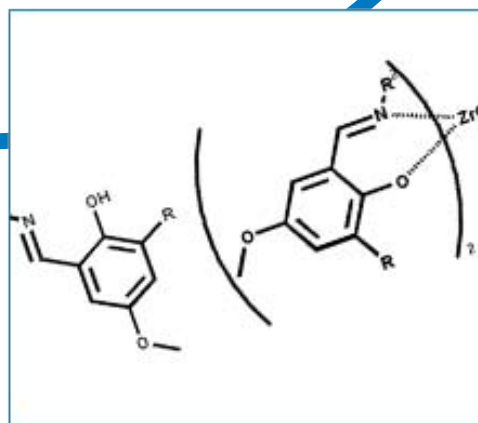
ISYNTH POSYCAT

Unattended Polyolefin Catalyst Synthesis and Screening



Customer testimonial

"Activities, polymer properties and morphologies of supported polyolefin catalysts examined match the results from conventional autoclaves."



Robustness and Ease-of-Use by Design

The leading technology in overhead gravimetric dispensing / dosing (patented) combined with our reactor and process excellence, and our user-friendly software, allow you to standardize and accelerate your ligand -, donor -, organometallic synthesis, solution- and slurry-phase polymerization screening, incl. prepolymerization workflows.

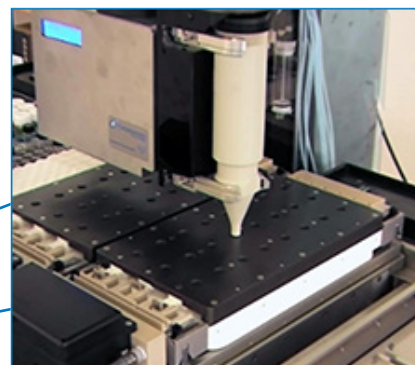
Precision – Speed – Accuracy
Performance – Versatility – R&D Cost Savings
High-Throughput

Key Advantages:

- Decrease in cost per experiment up to 90+ %.
- Increase in productivity by a factor of 10+.
- Integration with / in MBraun glove-box.
- Full automation of synthesis workflows including reagent preparation (liquids and solids), multistep synthesis, work-up, purification, analysis and product transfer to storage.
- Fully automated polymerization screening with flexible 96-well MTP pressure block, shakable / heatable / coolable, and sampling / dilution racks.
- Easy-to-use disposable glass reactors / vials.
- Gravimetric solid and viscous liquid dispensing.
- 4-Needle Head for volumetric liquid handling and sampling.
- Feeding and sampling under reaction conditions.
- Dispensed amount, stirrer speed, temperature, pressure, time..., and other data are stored in a read only log file.
- Easy access to data with a convenient interface to pull results into Excel or virtually any other software.
- Interface to DoE.



ISYNTH POSYCAT workstation



ISYNTH reactor blocks



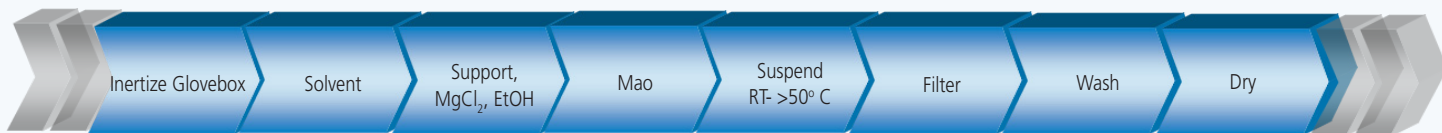
MTP pressure block

Enhance your Efficiency and Productivity with our Workflow Solutions!

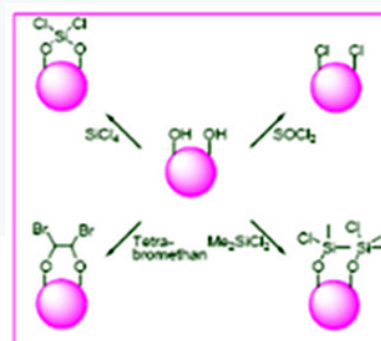
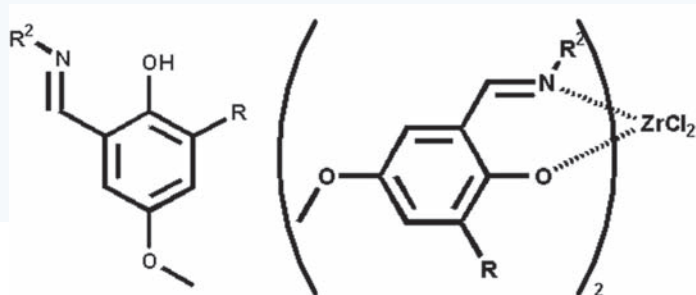
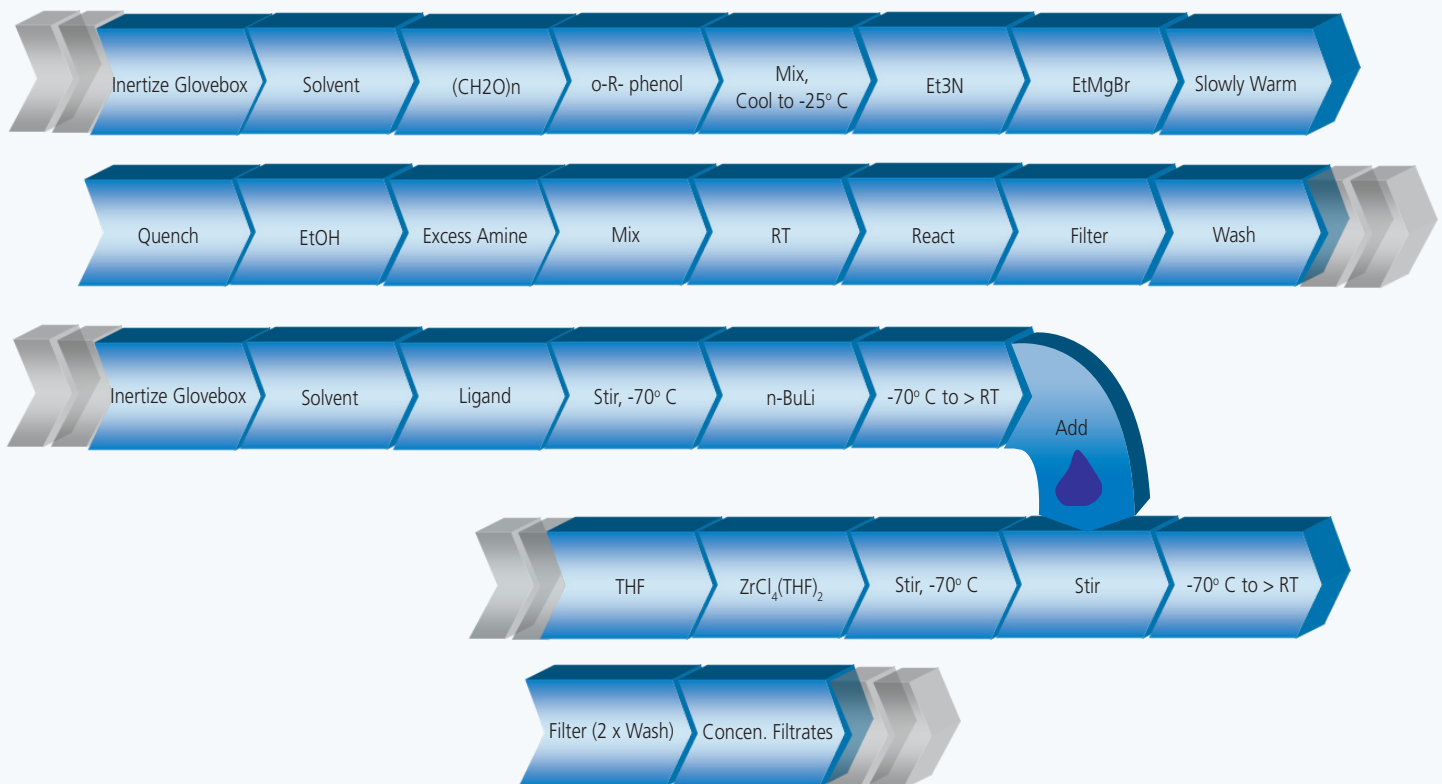
Catalyst screening



MAO - supportation



Single site ligand and catalyst synthesis

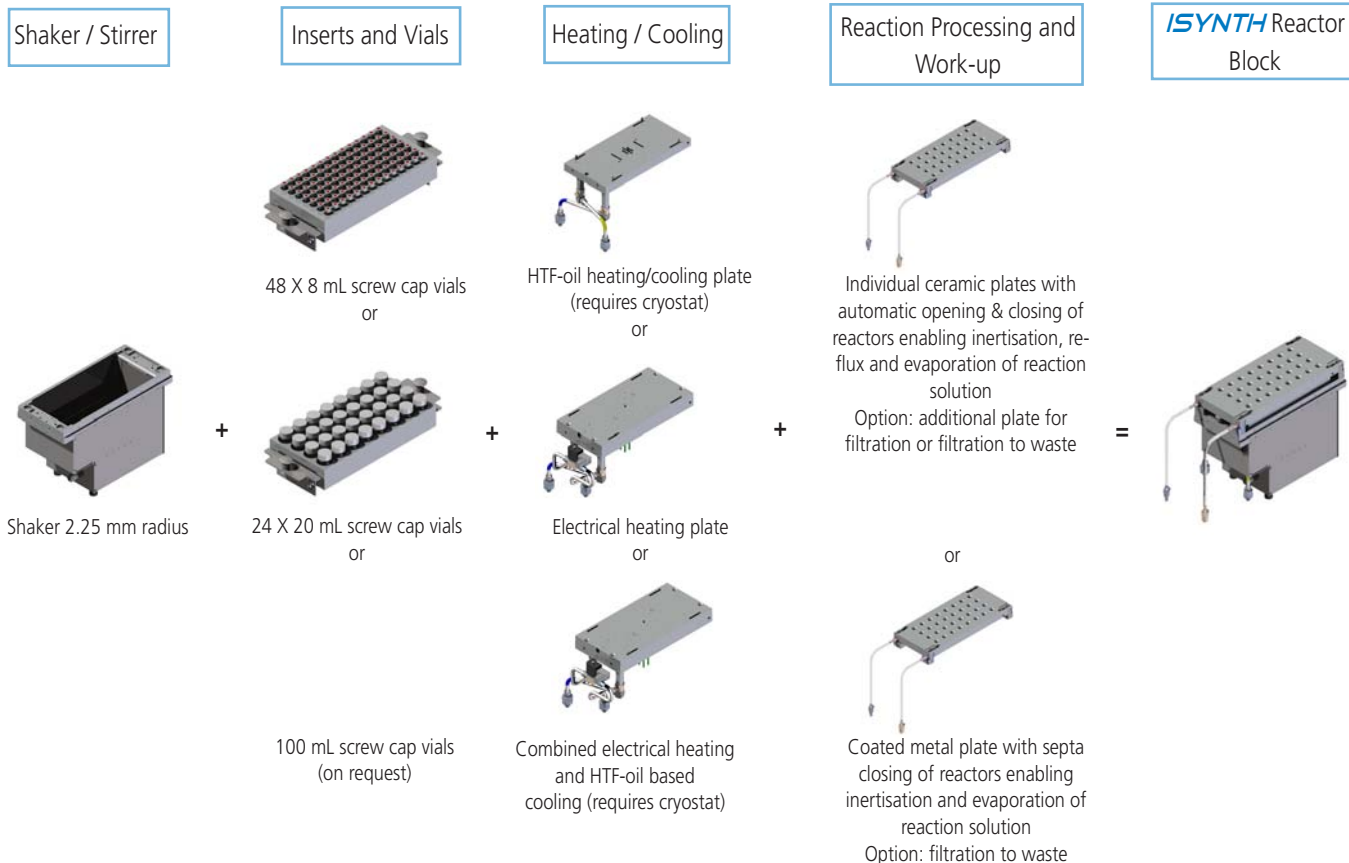


Technical Details

Chemspeed's *ISYNTH POSYCAT*'s deck modularity allows the user to execute and perform a variety of ligand -, donor - and organometallic synthesis workflows in a fully automated fashion.

ISYNTH components

Catalyst synthesis

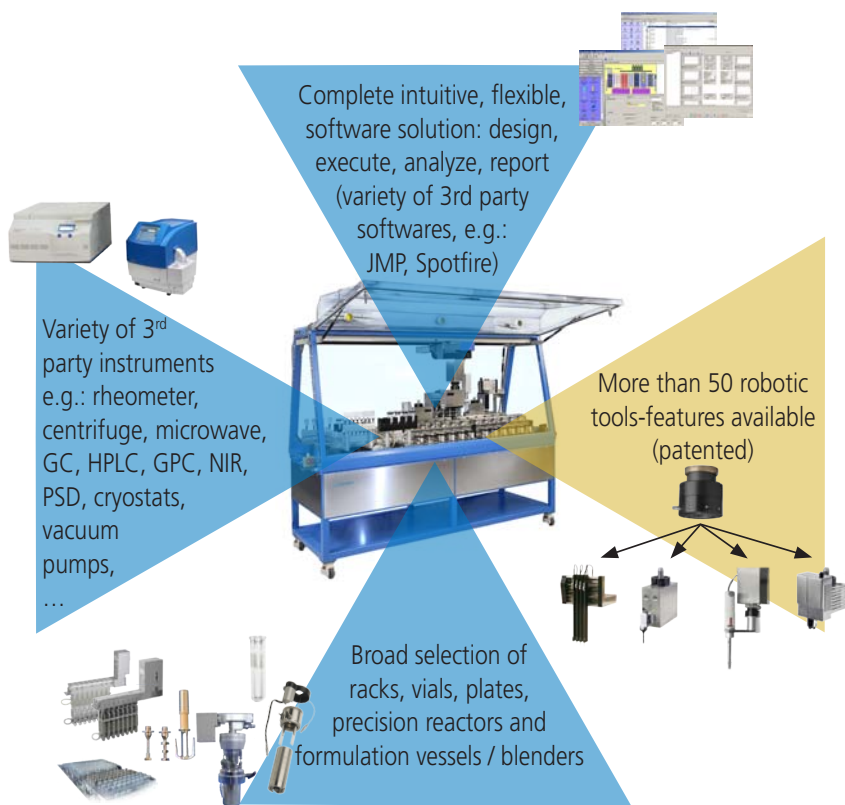


Catalyst screening at ambient and elevated pressure in 96-well plates

- Flexible MTP format (24, 48, 96).
- MTP pressure block, 100 bar
 - Flexible reactive gas supply (e.g. H₂, ethylene, propylene).
 - Shakable, heatable, coolable.
 - Automated closing / opening.
- Flexible vial and MTP transfer tool for e.g. automated transfer to / from MTP pressure block.
- Inertized stock solutions.
- Inertized and shaken catalyst suspensions.
- Large choice of disposable reactors.
- Sampling and dissolution / dilution for online analytics.



4 Dimensions of Modularity and Flexibility



– Off-the-Shelf-Design –

- Individual platform configuration tailored to your workflow with market-proven off-the-shelf components.
- Robotic platforms which can easily be integrated with one another to enable multi-workflow processes (e.g. Formulation, Application and Testing procedures all integrated in a single platform).

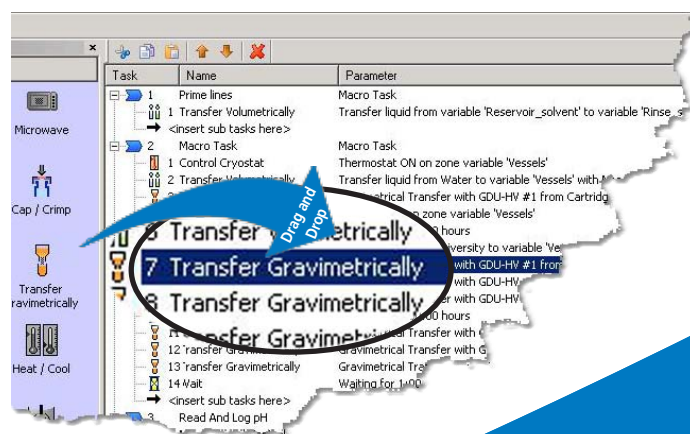


Complete Software Solution: Design, Execute, Analyze, Report

Chemspeed's AutoSuite User Interface & Executor software packages execute and control all modules of the entire product development cycle. They control all Chemspeed robotic platforms and any other integrated 3rd party software and hardware.

AutoSuite *ISYNTH* is a software with a user friendly interface which allows easy workflow oriented programming. Many features such as gravimetric dispensing are automatically calibrated, eliminating tedious optimization steps.

- The AutoTeaching tool simplifies dispensing applications without manual trials and is applicable to e.g. solids eliminating the need for manual optimization before the dispenses are done.
- **Easy programming: drag-and-drop workflow steps or just execute standard workflow protocols.**
- Barcode tracking.
- Easy integration with virtually any LIMS or ELN software.
- AutoSuite Application Programming Interface (API) for 3rd party software and hardware integration.
- Optional, Chemspeed VLab for DoE and Data Analysis / Reporting. It includes a full document management system (electronic lab-journal) and is 21 CFR Part 11 compliant. The software scales from a single PC to large network installations with multiple hardware and clients.

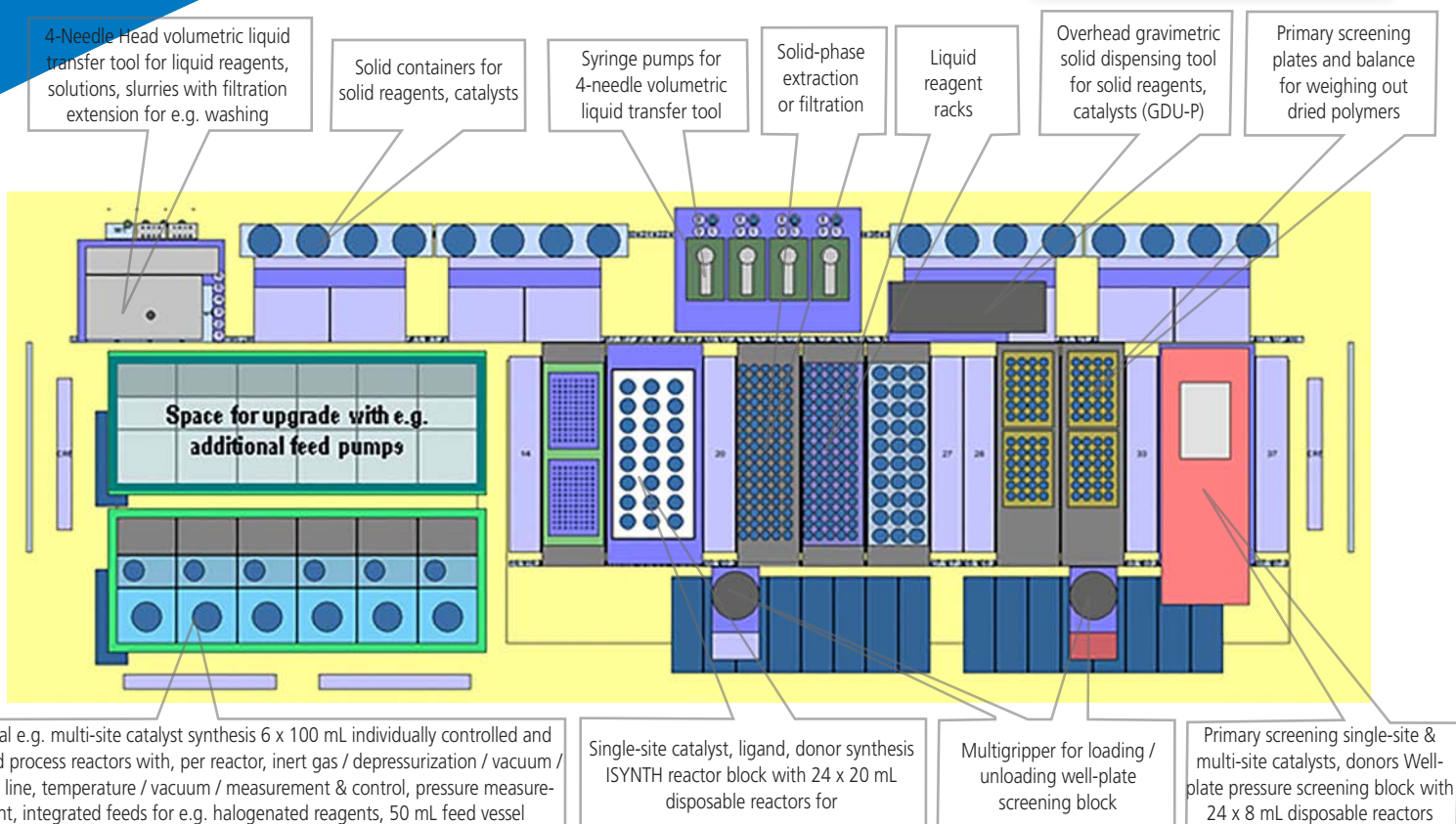


Easy Programming – Intuitive interface



Platform Configuration Example

A typical *ISYNTH POSYCAT* deck consists of up to 36 independently controlled tank reactors, along with reagent / sample and solid dispensing container racks. Tools include a 4-Needle Head for liquid additions, Solid Dispensing Unit for the addition of solid reagents.



All tools and accessories from Chemspeed's *SWING*, *AUTOPLANT*, *FORMAX*, *APPLICATOR* and *INVESTIGATOR* platforms are fully compatible with the *ISYNTH POSYCAT* platforms and vice versa.

Example upgrade options:

- Individually controlled and operated process reactors for e.g. optimization / scale-up, multi-site (Ziegler-Natta) catalyst synthesis.
- Large choice of sample, reagent, and customized racks.

Breakthrough for polyolefin R&D and QC – The SMOLEFIN® Concept:

Chemspeed has recently made a real breakthrough that changes how you run Polyolefin R&D and QC. What ever others propose to you, technically, Polyolefin Synthesis is not solved yet but Chemspeed has a solution, solving the technical challenges even with the most active and difficult to handle homogeneous and heterogeneous catalysts known today, and beyond.

It is both an easy to evaluate and extremely easy to apply technology, making Polyolefin Synthesis the first time technically as easy as standard synthesis. The SMOLEFIN concept together with our versatile reactor and robotic technology solves all technical challenges from catalyst synthesis, testing, and characterization to storage in a globally standardized way without changing the chemistry at all.

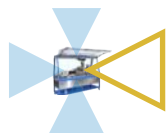


Variety of Plug-in (3rd Party) Solutions

Chemspeed integrates a large number of 3rd party components either on and / or off the deck.

Available upgrade options:

- Analysis module (NIR, PSD, GC, HPLC, GPC, DSC, FTIR...).
- Cleaning module.



Robotic Tool-Features


More than 50 robotic tool-features can be integrated with Chemspeed's unique robotic tool exchange technology, including unrivaled overhead gravimetric dispensing, which can operate while mixing, heating, refluxing and cooling. Virtually any combination of these robotic tools is possible.

Highlighted are the most common and recommended robotic tool-features for the **ISYNTH POSYCAT** robotic platform.

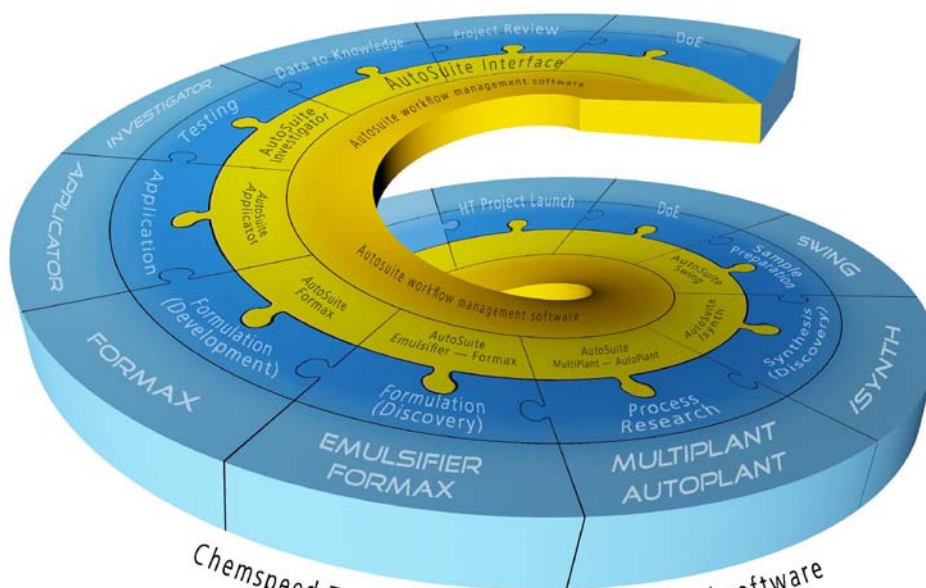


Robotic tool exchange interface (proprietary)

| Precision balance | Volumetric dispensing | Action | Analytic |
|---|--|--|--|
| Overhead gravimetric dispensing robotic tools (proprietary) | Volumetric dispensing robotic tools | Action robotic tools | Analytic robotic tools |
| <ul style="list-style-type: none">Overhead gravimetric dispensing of solids & powders (0.1 mg to 20 g) Dispensing container volume: 15 mL or 30 mL resolution: 0.1 mg (or 0.01 mg with a second balance)Overhead gravimetric dispensing of solids & powders (1 mg to 100 g, larger volumes are available) Dispensing container volume: 100 mL resolution: 1 mg (or 0.01 mg with a second balance)Overhead gravimetric dispensing of highly viscous liquids, pastes and creams (1 mg to 100 g) with viscosities from 1 mPa-s to 500'000 mPa-s (based on Newtonian substances) resolution 1 mg (or 0.01 mg with a second balance)Optional aspiration featureOptional transfer of hot (up to 90 °C) substrates via heatable cartridges (e.g. for waxes)Overhead gravimetric aspiration and dispensing of viscous liquids (1 mg to 100 g) with viscosities from 1 mPa-s to 15'000 mPa-s via disposable positive displacement syringes, resolution: 1 mg (or 0.01 mg with a second balance) | <ul style="list-style-type: none">Liquid handling powered by 4 syringe pumps (syringe volumes: 1, 10, or 25 mL) for viscosities from 1mPa-s to 100 mPa-s Special options:<ul style="list-style-type: none">Disposable tips (1'200 µL)Disposable syringesHeated needles (up to 100°C)Spray needlespH and temperature measurement and controlCoated needles, PEEK needles...Liquid gas dispensing with gravimetric control resolution: down to 0.1 mgOverhead gravimetric / volumetric aspiration and dispensing of viscous liquids (0.1 µL to 12.5 mL) with viscosities from 1 mPa-s to 15'000 mPa-s via disposable positive displacement syringes, resolution: down to 1 µL | <ul style="list-style-type: none">Multigrripper for vial and MTP transport and much moreAutomated barcode scannerScrew capper Vial diameter range: from 10 mm to 50 mm Larger ranges available Torque range: from 0.1 Nm to 1 NmCapping, crimping (N8 / N11 / N13 / N20)Decapping (N8 / N11 / N13 / N20)High shear homogenization (11'000 to 30'000 rpm)Overhead stirrer (20 to 200 rpm) Different stirrer types availableUltrasonic dispersion (100 W)Vacuum / DegassingReflux condenserEvaporationFiltrationHigh speed injection moldingFoam formationDraw-down with disposable or reusable precision spiral and / or gap barsFree film generationDip coatingSpray coatingWet-on-wet coatingRobotic transfer arm to serve 3rd party instruments e.g. centrifuge | <ul style="list-style-type: none">Online density measurement (aspiration technology), on the fly resolution: 1 mg (or 0.01 mg with second balance)Brookfield Viscosimeter (RVDV-II+ Pro BK)Tri gloss measurementThickness measurementColor measurementPrecision tack-cureCameraObservation of dissolutionParticle size distribution and dynamic light scattering |

15+ Years of Experience in Automated Chemistry.
 Customized Workflow Solutions.
 Swiss Quality Products.
 An International Team of Highly Experienced Chemists.

Chemspeed Technologies AG is the leading provider of high-throughput and high-output research & development workflow-solutions from single bench-top / standalone automated workstations (powder dispensing - sample preparation- synthesis - process development - formulation - application - testing) up to complete and integrated product development workflows for the entire product development processes in the chemical, material science, renewables & energy, pharmaceutical, agro-chemical, specialty chemical, home care, cosmetics and nutrition industries, as well as academia.



Chemspeed Technologies offers hardware and software for every step in the product development cycle

Discover our enabling portfolio for the entire product development cycle!

