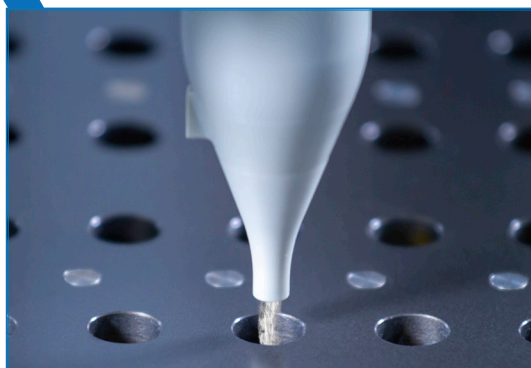
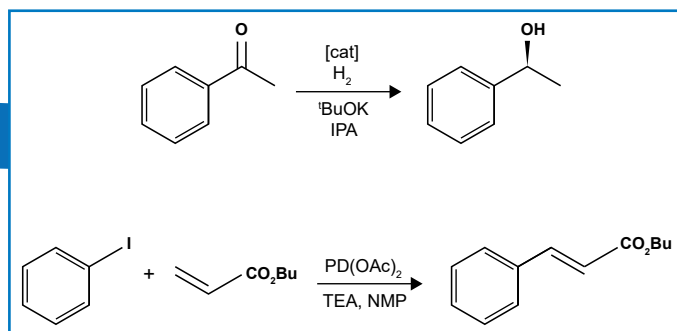




# ISYNTH AI

Automated Active Ingredients (AI) Library Synthesis in Disposable Glass Vials / Reactors and / or Reusable Double-Jacket Reactors



## ROBUSTNESS AND EASE-OF-USE BY DESIGN

The leading technology in overhead gravimetric dispensing / dosing (patented) combined with our disposable or reusable or microwave reactors, and our user-friendly software, allow you to standardize and accelerate your parallel synthesis workflows.

### KEY ADVANTAGES

- Decrease in cost per experiment up to 90+ %.
- Increase in productivity by a factor of 10+.
- Easy-to-use disposable glass reactors / vials and / or reusable double-jacket reactors and / or microwave reactors.
- Reagent preparation (liquids and solids), multistep synthesis, work-up, purification, analysis and product transfer to storage.
- Ventilated, conditioned hood for e.g. sensitive, low-temperature chemistry.
- - 70 to 200 °C.
- 4-Needle Head for volumetric liquid handling and sampling.
- Gravimetric solid dispensing into an unlimited choice of vial / plate / reactor formats.
- The balance moves to the destination, increasing speed and efficiency.
- Balance resolution of 100 µg or 10 µg.
- A large dispensing range, from a few mg up to several grams.
- Powder dispensing / dosing robotic tool can be combined with other tools to accommodate multiple workflows.
- Dispensed amount, mixing 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.

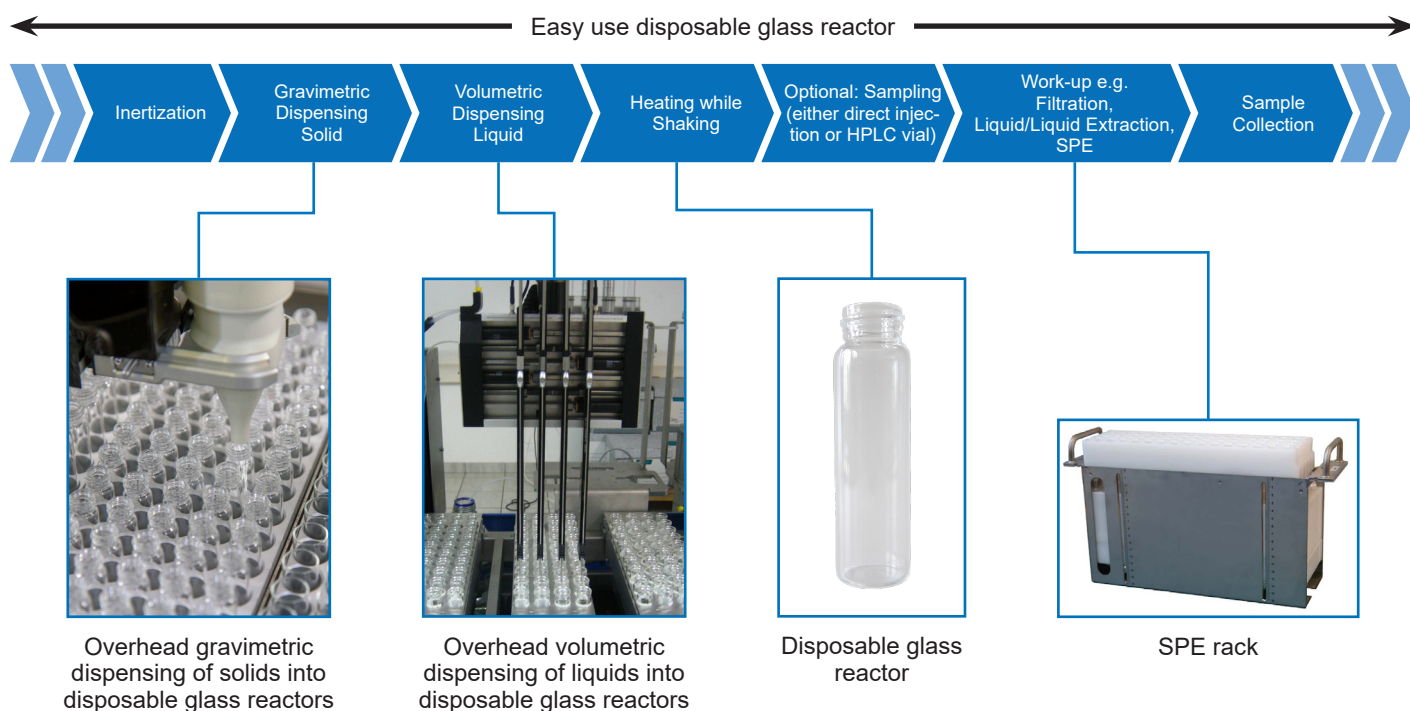


ISYNTH workstation

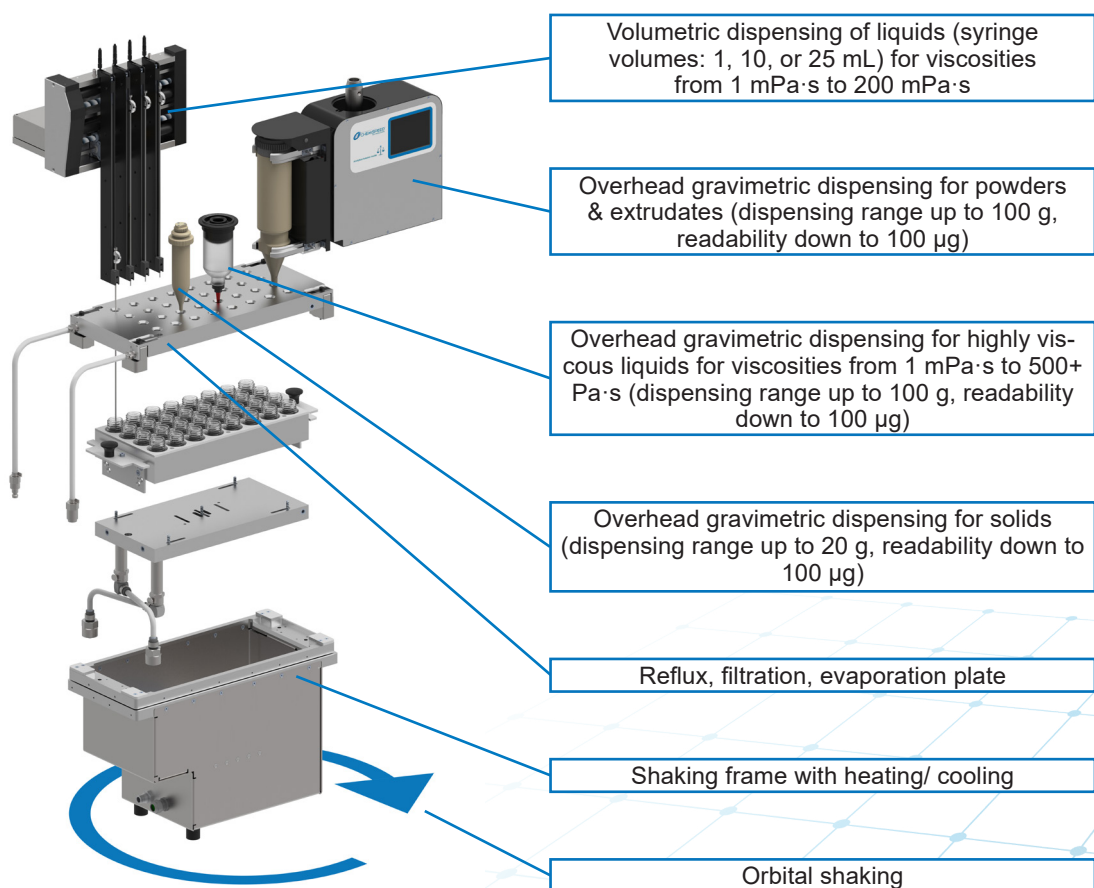


ISYNTH reactor blocks  
with disposable vials

## ENHANCE YOUR EFFICIENCY AND PRODUCTIVITY WITH OUR WORKFLOW SOLUTIONS!



## CHEMSPEED'S UNIQUE, PROPRIETARY ARRAY SYNTHESIS REACTOR TECHNOLOGY WITH DISPOSABLE VIALS





## TECHNICAL DETAILS

Chemspeed's **ISYNTH AI** deck modularity allows the user to execute and perform a variety of workflows in a fully automated fashion, including reaction preparation, multistep synthesis, work-up, purification, analysis and product transfer to storage.

**ISYNTH** dimensions:  
1'480 x 910 x 1'860 mm  
(4' 4 3/8" x 3' x 6' 1 1/4")

**ISYNTH XL** dimensions:  
2'350 x 950 x 1'920 mm  
(7' 70" x 3' 2" x 6' 4")



## ISYNTH COMPONENTS

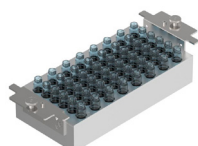
### Shaker / Stirrer

### Inserts & Vials

### Heating / Cooling

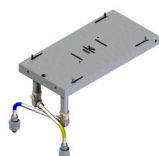
### Reaction processing & Work-up

### ISYNTH Reactor Block



48 x 2/8 ml  
screw cap  
glass vials

OR



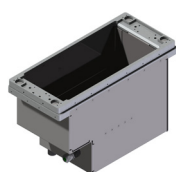
HTF-oil heating/cooling plate  
(requires cryostat)

OR



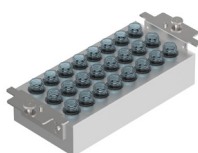
Individual ceramic plates with automatic opening & closing of reactors enabling inertisation, reflux and evaporation of reaction solution

Option: additional plate for filtration or filtration to waste



Shaker 2.25 mm radius

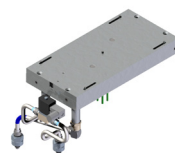
+



24 x 20 ml screw cap glass vials

OR

+



Electrical heating plate

OR

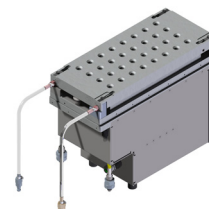
+

OR



Coated metal plate with septa closing of reactors enabling inertisation and evaporation of reaction solution  
Option: filtration to waste

=



Disposable glass reactor

- In solution and on solid phase synthesis.
- In sophisticated disposable reactor formats.
- Under ambient & elevated pressure up to 100bar.
- Under inert gas or reactive gas conditions.
- Including many work-up functions such as vacuum, filtration, evaporation, liquid / liquid extraction, crystallization.
- Synthesis of branched and multistep protocols for library synthesis.
- Synthesis of peptide libraries (peptide wizard software).

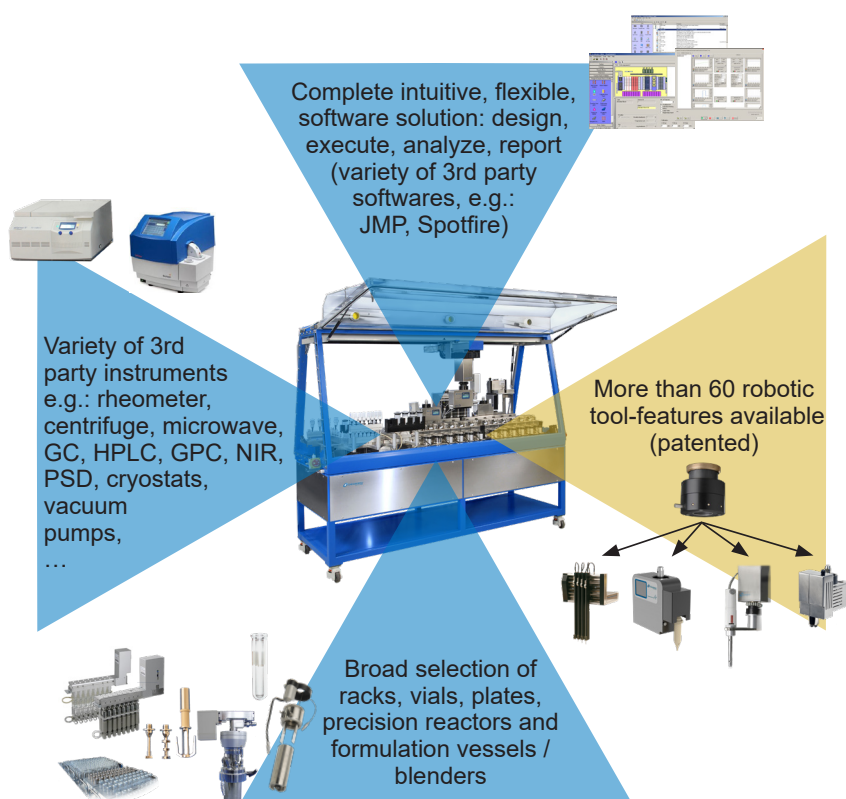


The Gravimetric Dispensing Units for solids and powders (SWILE, GDU-P fd, GDU-P)

The Gravimetric Dispensing Units (SWILE, GDU-P fd and GDU-P models) are used to perform automated, gravimetrically controlled dispenses of a wide range of solids and powders in the milligram to multigram scale.

The modules pick the appropriate chosen container, dispense the solids and powders, and then place the container back to its station before picking the next one. Both dispensing units include an overhead balance, and allow dispensing and simultaneous weighing of solids and powders into various vials, reactors, well-plates.

## 4 DIMENSIONS OF MODULARITY AND FLEXIBILITY



- Individual platform configuration tailored to your workflow with market-proven off-the-shelf components.
- Robotic platforms which can be easily integrated into other systems 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.

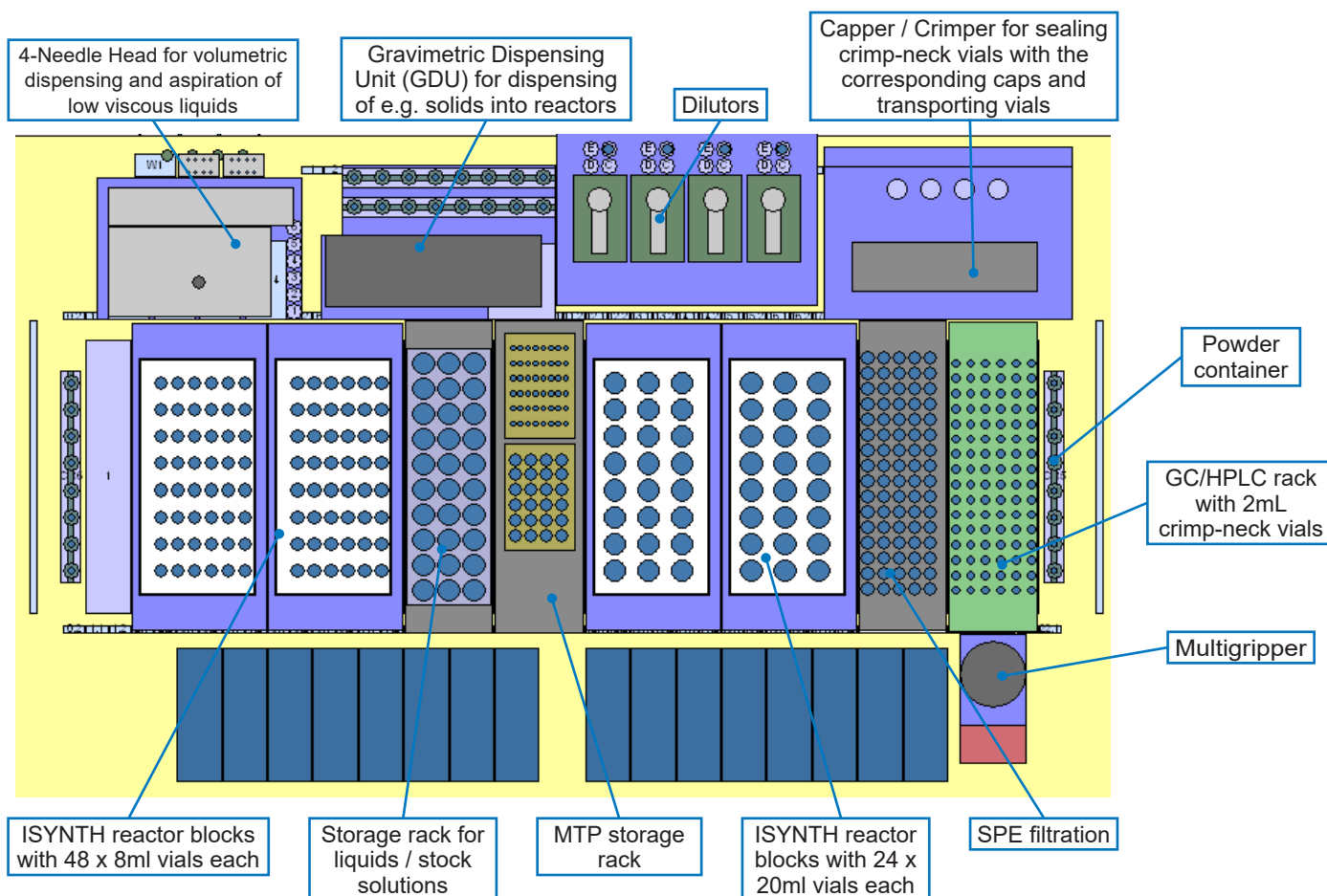
- The AutoTeaching tool simplifies dispensing applications without manual trials and is applicable to e.g. solids eliminating the need for manual optimization before the dispenses are done.
- Easy programming: drag-and-drop workflow steps or just execute standard workflow protocols.
- Barcode tracking.
- **ARKSUITE** Workflow Studio and Internet of the Lab Tools (e.g. DoE, data mgt, substance parameter database, inventory mgt, product mgt, run mgt). It includes a full document management system (electronic labjournal) and is 21 CFR Part 11 compliant. The software scales from a single PC to large network installations with multiple hardware and clients.

Task	Name	Parameter
1	Hybrid Standard Demo	Execute Once
2	Show Dialog	Yes/No/Stop-Dialog: 'you want to run DEMO?'
3	Show Dialog	Yes/No/Stop-Dialog: 'you want to run DEMO?'
4	Macro Task	Execute Once
5	Macro Task	Execute Once
6	Transfer Gravimetrically	Gravimetric Transfer with GDU-P #1 from P04 01...
7	Macro Task	Execute Once
8	Transfer Gravimetrically	Gravimetric Transfer with GDU-P #2 from P05 01...
9	Macro Task	Execute Once
10	Transfer Gravimetrically	Gravimetric Transfer with GDU-P #3 from P06 01...
11	Transfer Gravimetrically	Gravimetric Transfer with GDU-Ps #1 from Ps 01 Na2CC
12	Macro Task	Execute Once
13	Transfer Gravimetrically	Gravimetric Transfer with GDU-HV #1 from HV01 Sun...
14	Transfer Gravimetrically	Gravimetric Transfer with GDU-HV #2 from HV02 Sun...
15	Macro Task	Execute Once
16	Macro Task	Execute Once
17	Transfer Gravimetrically	Transfer liquid from valve port 1+3 to Waste 1+3 with Ne
18	Macro Task	Execute Once
19	Transfer Gravimetrically	Transfer liquid from valve port 1+3 to Waste 1+3 with Ne
20	Stir	Agitation ON on zone F Reactor 01-02
21	Scrape	Agitation ON on zone F Reactor 01-02

**EASY PROGRAMMING  
INTUITIVE INTERFACE**

## PLATFORM CONFIGURATION EXAMPLE

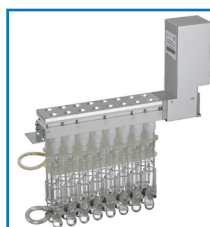
Exemplary **ISYNTH AI** deck with shakable racks, MTP storage rack, GC / HPLC vial rack, powder container, SPE filtration, dilutors and the following tools: A 4-Needle Head for liquid dispensing, a Gravimetric Dispensing Unit (GDU) for solid dispensing, a Multigripper for vial transfer, a Capper / Crimper.



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

Available upgrade options:

- Reusable double-jacket reactor arrays.
- Microwave reactors for batch and continuous microwave-assisted synthesis.



- Connection to HPLC (MS), GC (MS) including interfaces.
- Additional on-board balance for vial and plate weighing.
- Large choice of sample, reagent and customized racks.

## VARIETY OF PLUG-IN (3<sup>RD</sup> PARTY) SOLUTIONS

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

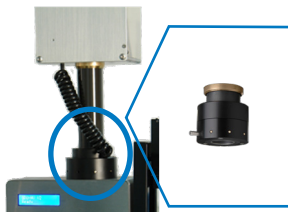
Available upgrade options:

- Microwave Synthesizer.
- Centrifuge.
- HPLC (MS).
- GC (MS).

## ROBOTIC TOOL FEATURES

More than 60 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 and cooling. Virtually any combination of these robotic tools is possible.

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



Robotic tool exchange interface (proprietary)

### Precision balance Overhead gravimetric dispensing robotic tools (proprietary)

### Volumetric dispensing robotic tools

### Action robotic tools

### Analytic robotic tools

Overhead gravimetric 1:1 "pick & decision dispense" of solids & powders **DIRECTLY** from virtually any source to any destination (<100 µg to 100 mg).

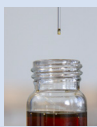
Disposable pick & dispense tips (no dead volume).  
Resolution: 100 µg  
(or 10 µg with an on-deck balance).



Overhead gravimetric 1:1 "pick & decision dispense" of liquid to sticky compounds **DIRECTLY** from virtually any source to any destination (<100 µg to 100 mg).

Disposable pick & dispense tips (no dead volume).

Resolution: 100 µg  
(or 10 µg with an on-deck balance).



Overhead gravimetric fine dispensing of solids & powders (100 µg to 20 g).

Dispensing container volume of 30 ml.

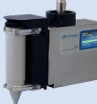
Resolution: 100 µg  
(or 10 µg with an on-deck balance).



Overhead gravimetric dispensing of solids & powders (1 mg to 100 g, larger volumes are available).

Dispensing container volume of 200 ml.

Resolution: 1 mg (or 10 µg with an on-deck balance).

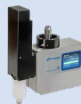


Overhead gravimetric dispensing of highly viscous liquids, pastes and creams (1 mg to 100 g) with viscosities from 1 mPa·s to 500'000 mPa·s (based on Newtonian substances).

Dispensing container volume of 65 ml.

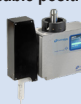
Resolution: 1 mg (or 10 µg with an on-deck balance).

- Optional aspiration feature.  
- Optional transfer of hot (up to 90 °C) substrates via heatable cartridges (e.g. for waxes).



Overhead gravimetric aspiration and dispensing of viscous liquids with viscosities from 1 mPa·s to 15'000 mPa·s via disposable positive displacement syringes (0.1 to 12.5 ml).

Resolution: 1 mg (or 10 µg with an on-deck balance).



Liquid handling powered by 4 syringe pumps (syringe volumes: 1, 10 or 25 ml) for viscosities from 1 mPa·s to 100 mPa·s.

Special options:

- Disposable tips (1'200 µL).
- Disposable syringes.
- Heated needles (up to 100 °C).
- Spray needles
- pH and temperature measurement and control
- Coated needles, PEEK needles...



Liquid gas dispensing with gravimetric control.  
Resolution: down to 100 µg.

Multigripper for vial, MTP transport and much more.

Automated barcode scanner.



Screw capper.

Vial diameter range: from 10 mm to 50 mm.  
Larger ranges available.



Torque range: from 0.1 Nm to 1 Nm.

Capping, crimping and decapping (N8 / N11 / N13 / N20).



High shear homogenization (11'000 rpm to 30'000 rpm).



Overhead stirrer (20 rpm to 200 rpm). Different stirrer types available.

Ultrasonic dispersion (100 W).



Vacuum / Degassing.  
Reflux condenser.  
Evaporation.  
Filtration.

High speed injection molding.  
Foam formation.

Draw Down with disposable or reusable precision spiral and / or gap bars.  
Free film generation.  
Dip coating.  
Spray coating.  
Wet-on-wet coating.



Robotic transfer arm to serve 3rd party instruments e.g. centrifuge.



Online density measurement (aspiration technology), on the fly.

Resolution: 1 mg  
(or 10 µg with an on-deck balance).



Brookfield Viscometer (RVDV-II+ Pro BK).



Tri gloss measurement.  
Thickness measurement.  
Color measurement.  
Precision tack-cure.



Camera.  
Observation of dissolution.

Particle size distribution and dynamic light scattering.

Precision tack-cure.

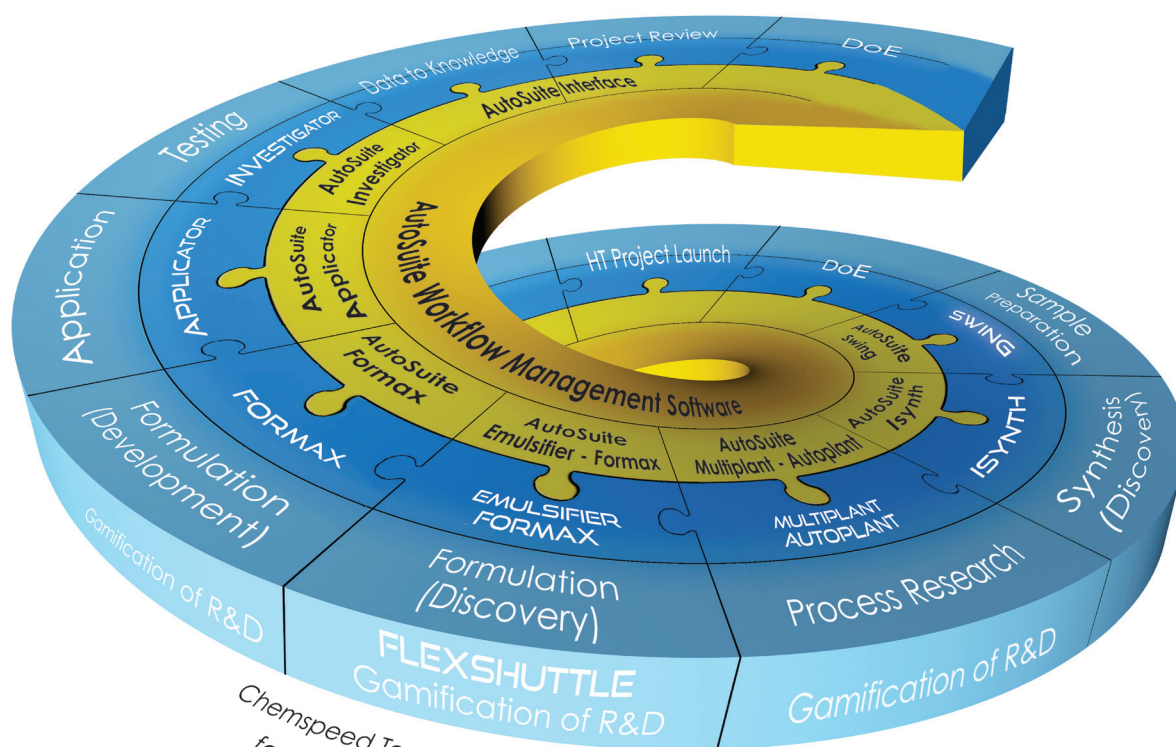




Swiss Quality Products  
An International Team of Highly  
Experienced Chemists

More than 20 Years of Experience in  
Automated Experimentation  
Customized Workflow Solutions

**Chemspeed Technologies** 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, agrochemical, 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