



SWING SP

Automated Sample Preparation for e.g.
Analytics, Preformulation



CUSTOMER TESTIMONIAL

“Automated sample preparation and analytics was efficiently implemented and is now the routine method of Quality Control for these candies at Klosterfrau, replacing a system used in the previous 10 years that only performed the analytic step. The installed system allows then for increased efficiency and productivity.”



ROBUSTNESS AND EASE-OF-USE BY DESIGN

Dispensing / dosing technology combined with our overhead gravimetric (patented) capability and our user-friendly software, allow you to automatically dispense virtually any type of ingredients into any type of destination (vials, tubes, plates, reactors, ...) without moving the destination.

KEY ADVANTAGES

- Decrease in cost per sample up to 90+ %.
- Increase in productivity by a factor of 10+.
- Gravimetric dispensing and aspiration (liquids, solids, powders, granulates, spheres, low-viscous and highly-viscous materials, waxes, etc.) into the rack / reactor format of your choice.
- 4-Needle Head for volumetric liquid handling and sampling.
- The balance moves to the destination, increasing speed and efficiency.
- Balance resolution of 0.1 mg, or 0.01 mg.
- A large dispensing range, from a few mg up to several grams.
- Dispensing / dosing robotic tool can be combined with other tools to accommodate multiple workflows.
- Dispensed amount, mixing speed, temperature, 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.

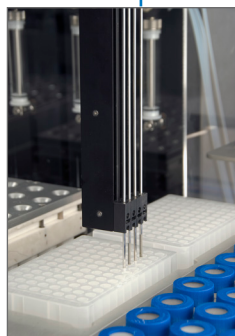


SWING SP workstation



The gravimetric solid handling units

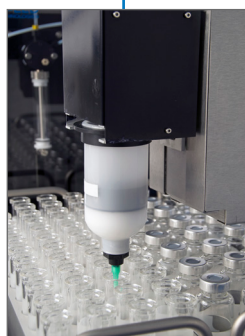
ENHANCE YOUR EFFICIENCY AND PRODUCTIVITY WITH OUR WORKFLOW SOLUTIONS!



Overhead volumetric dispensing



Overhead gravimetric dispensing

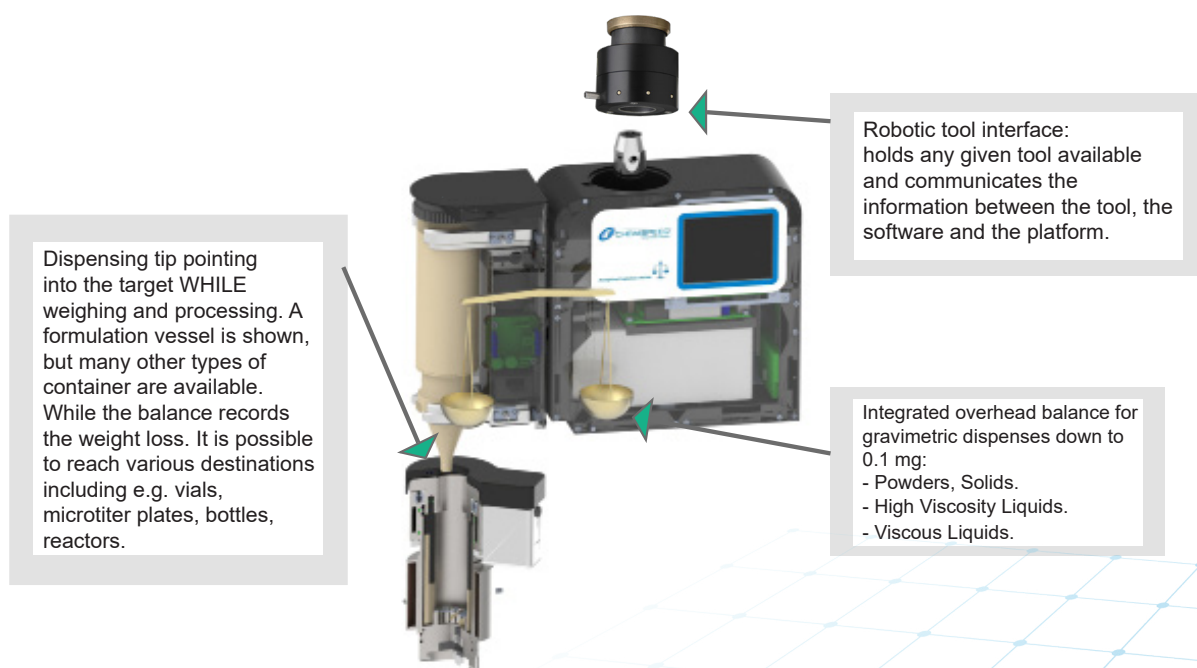


Overhead gravimetric dispensing of (highly) viscous liquids into vials



Capping and crimping

BREAKTHROUGH DISPENSING TECHNOLOGY: OVERHEAD GRAVIMETRIC DISPENSING WHILE MIXING, HEATING, REFLUXING AND / OR COOLING



TECHNICAL DETAILS

Chemspeed's SWING deck modularity allows the user to execute and perform a variety of compound, substance handling, sample preparation, reaction preparation workflows in a fully automated fashion.

The Gravimetric Dispensing Units (SWILE, GDU-P, GDU-P Fine Dosing, GDU-HV, GDU-V models) are used to perform automated, gravimetrically controlled dispenses of a wide range of ingredients in the milligram to multigram scale.

The modules pick the appropriate container, dispense the ingredients, and then place the container back to its station before picking the next one. All dispensing units include an overhead balance with a resolution of down to 0.1 mg, and allow dispensing and simultaneous weighing of ingredients into various vials, reactors, well-plates.

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



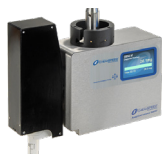
SWING XL dimensions:
2'350 x 950 x 1'920 mm
(7' 70" x 3' 2" x 6' 4")



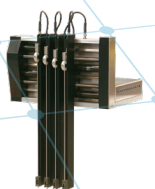
| | Compound Type | Balance Resolution | Dispensing Range | Dispensing Range and Viscosity Range with Heating | Dispensing Container Volume |
|-------------------|---|--|---|---|---|
| SWILE | Solids and Powders | Optionally down to 10 µg with a second balance | 100 µg to 30 mg | - | Disposable pick & dispense pipets |
| GDU-P fd | Solids and Powders | | mg to 20g | - | 30 / 100 mL |
| GDU-P | Solids and Powders | | mg to 100 g | - | 100 mL |
| The GDU-V | Low to Medium Viscous Liquids | | 1 mg to 100 g 1 mPa·s to 15 Pa·s | - | Disposable positive displacement syringes from 100 µL to 12.5 |
| The GDU-HV | Highly Viscous Liquids and Waxes Heated transfer option = 20 °C to 90 °C | | 1 mg to 100 g 1 mPa·s to 500'000 mPa·s | Up to waxes or substances with melt-viscosity of < 500'000 Pa·s | 65 mL |
| The 4-Needle Head | Liquids | Volumetric | µL to 25 mL 1 mPa·s to 200 mPa·s | - | 4 Syringes 1 mL, 10 mL, 25 mL |



The Gravimetric Dispensing Unit for solids and powders



The Gravimetric and Volumetric Dispensing Unit including Online Density Measurement on the fly for (viscous) liquids



The 4-Needle Head for liquids

- Exemplary dispensing time: 1g in 20 sec (depending on ingredient properties).
- Dispensing robotic tool capacity: (extendable with additional ingredient storage module)

SWING: - up to 144 cartridges for the **GDU-P Fine Dosing**, up to 32 cartridges for the **GDU-P**
- up to 65 cartridges for the **GDU-HV**, up to 180 syringes for the **GDU-V**

SWING XL: - up to 240 cartridges for the **GDU-P Fine Dosing**, up to 56 cartridges for the **GDU-P** model
- up to 125 cartridges for the **GDU-HV** model, up to 360 syringes for the **GDU-V**

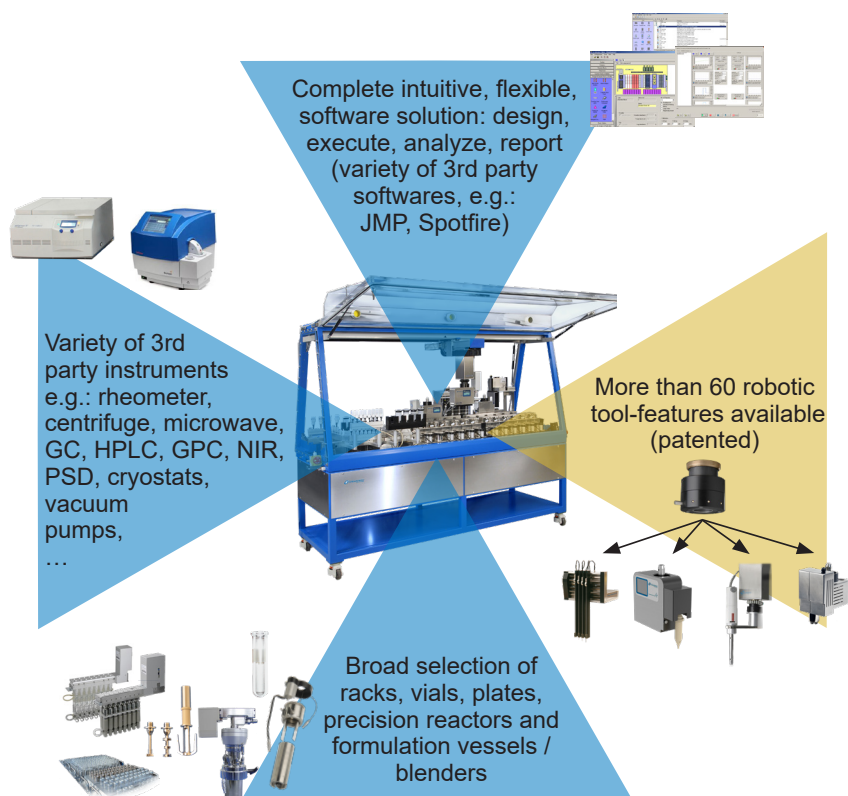
- Reduced dispensing time: the balance moves from one target to the next, continuously dispensing and weighing without having to move the target to the balance. The anti-drip system avoids cross contamination and enables to add any ingredient into any (fixed) formulation vessel, reactor, vial etc. wherever on the platform deck while mixing, heating, cooling etc.
- One dispensing design and one AutoTeaching tool to cover all your ingredients. The sophisticated algorithm of the software finds automatically the best conditions to dispense your ingredient.
- Automatic exchange of a dispensing cartridge if one is empty, the system automatically takes the next container.



Multiple dispensing configurations: one-to-one, one-to-many, many-to-one, many-to-many

Volumetric dispensing and aspiration of liquids is done with a **Multi-Channel Liquid Handling Tool (4-Needle Head)**, with four independent needles. The four needles can be operated simultaneously or individually. If required the tool can be equipped with needles of different inner diameters. Larger diameter needles for the handling of suspensions or liquids with higher viscosities, smaller diameter needles for handling of small volumes.

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 SWING 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.

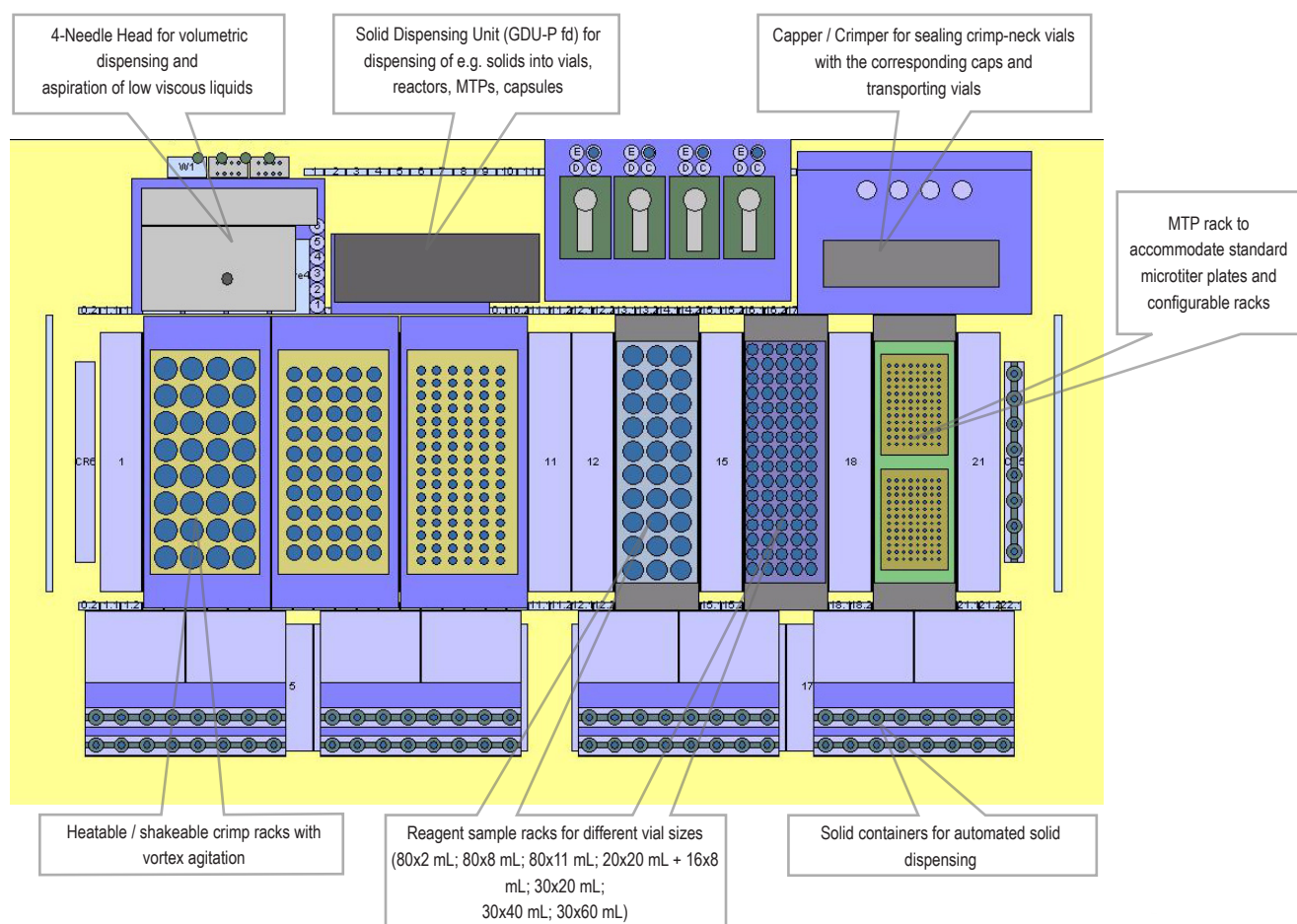
- The AutoTeaching tool simplifies dispensing applications without manual trials and is applicable to e.g. solids eliminating the need for manual optimization before the dispenses are done.
- Easy programming: drag-and-drop workflow steps or just execute standard workflow protocols.
- Barcode tracking.
- **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 |
|--------------------------|------------|--------------------------|---|
| Control Cryostat | 1 | Hybrid Standard Demo | Execute Once |
| | 1 | Show Dialog | Yes/No/Stop-Dialog: 'you want to run DEMO?' |
| | 2 | Show Dialog | Yes/No/Stop-Dialog: 'you want to run DEMO?' |
| Transfer Gravimetrically | Macro Task | Execute Once | |
| | 1 | Transfer Gravimetrically | Gravimetric Transfer with GDU-P #1 from P04 01... |
| Transfer Volumetrically | Macro Task | Execute Once | |
| | 1 | Transfer Gravimetrically | Gravimetric Transfer with GDU-P #2 from P05 01... |
| Measure and Control pH | Macro Task | Execute Once | |
| | 2 | Transfer Gravimetrically | Gravimetric Transfer with GDU-P #3 from P06 01... |
| Microwave | Macro Task | Execute Once | |
| | 3 | Transfer Gravimetrically | Gravimetric Transfer with GDU-Ps #1 from P01 Na2CO... |
| Reflux | Macro Task | Execute Once | |
| | 4 | Transfer Gravimetrically | Gravimetric Transfer with GDU-HV #1 from HV01 Sun... |
| | Macro Task | Execute Once | |
| | 5 | Transfer Gravimetrically | Gravimetric Transfer with GDU-HV #2 from HV02 Sun... |
| | Macro Task | Execute Once | |
| | 1 | Transfer Gravimetrically | Transfer liquid from valve port 1+3 to Waste 1+3 with Ne... |
| | Macro Task | Execute Once | |
| | 2 | Transfer Gravimetrically | Transfer liquid from valve port 1+3 to Waste 1+3 with Ne... |
| | Macro Task | Execute Once | |
| | 1 | Transfer Gravimetrically | Transfer liquid from valve port 1+3 to Waste 1+3 with Ne... |
| | Macro Task | Execute Once | |
| | 2 | Stir | Agitation ON on zone F Reactor 01-02 |
| | Macro Task | Execute Once | |
| | 3 | Scrape | Agitation ON on zone F Reactor 01-02 |

**EASY PROGRAMMING
INTUITIVE INTERFACE**

PLATFORM CONFIGURATION EXAMPLE

Exemplary **SWING SP** deck with shakeable / heatable / coolable crimp racks; reagent / sample racks, solid container racks; and the following tools: a 4-Needle Head for liquid handling or a Gravimetric Dispensing Unit (GDU-P) for solid dispensing, and a Capper / Crimper.



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

Available upgrade options:

- Shakable and heatable racks. (even fully conditioned).
- High performance reactor (array) technology.
- High performance formulation vessels
- Automated robotic tools (more than 50).

VARIETY OF PLUG-IN (3RD PARTY) SOLUTIONS

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

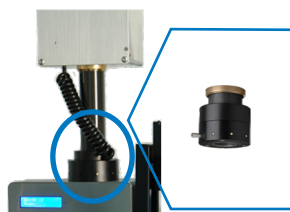
Available upgrade options:

- Analytical interfaces for e.g. GC, HPLC, NMR, NIR, particle size distribution, imaging.
- ...

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 **SWING SP** robotic platform.



Robotic tool exchange interface (proprietary)

Precision balance Overhead gravimetric dispensing robotic tools (proprietary)

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).

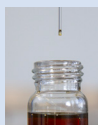
Resolution: 100 µg (or 10 µg with an on-deck balance).



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.

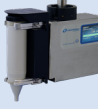
Resolution: 100 µg (or 10 µg with an on-deck balance).



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).

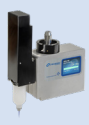


Overhead gravimetric dispensing of highly viscous liquids, pastes and creams (1 mg to 100 g) with viscosities from 1 mPa·s to 500'000 mPa·s (based on Newtonian substances).

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).



Volumetric dispensing robotic tools

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.

Action robotic tools

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.



Analytic robotic tools

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.

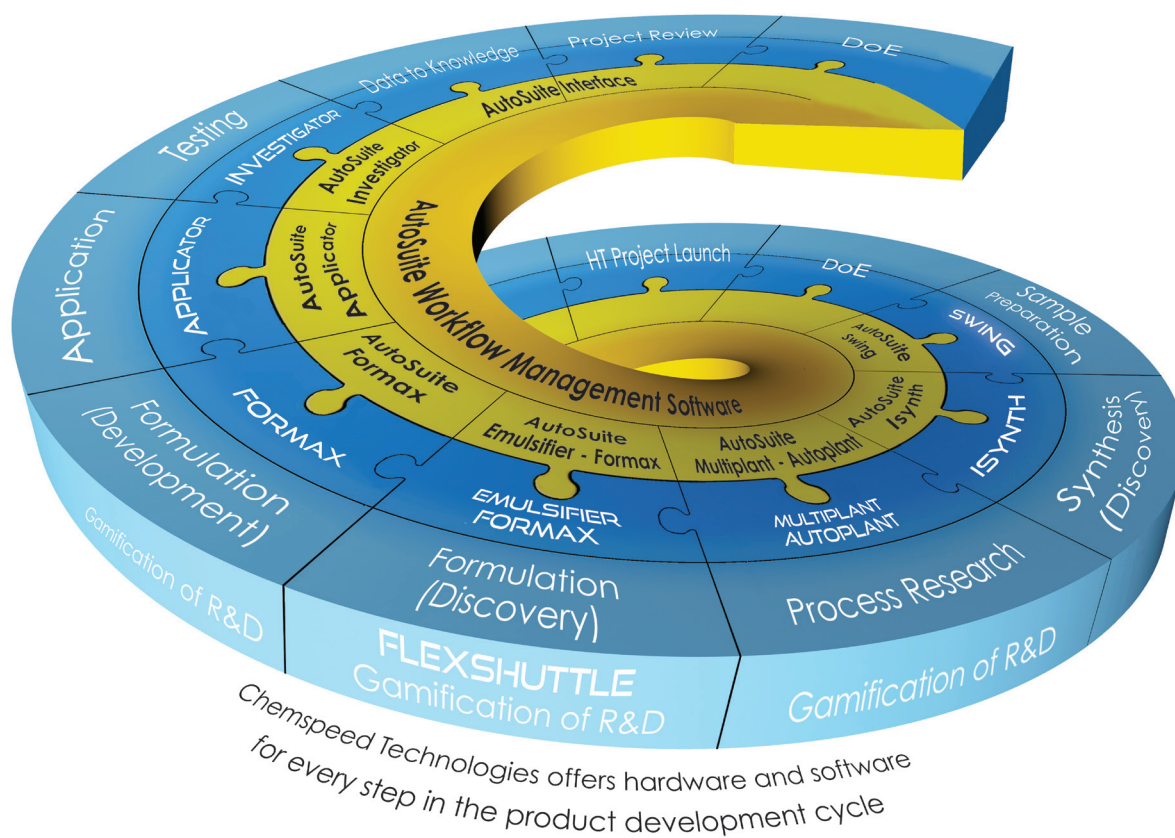
Precision tack-cure.



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