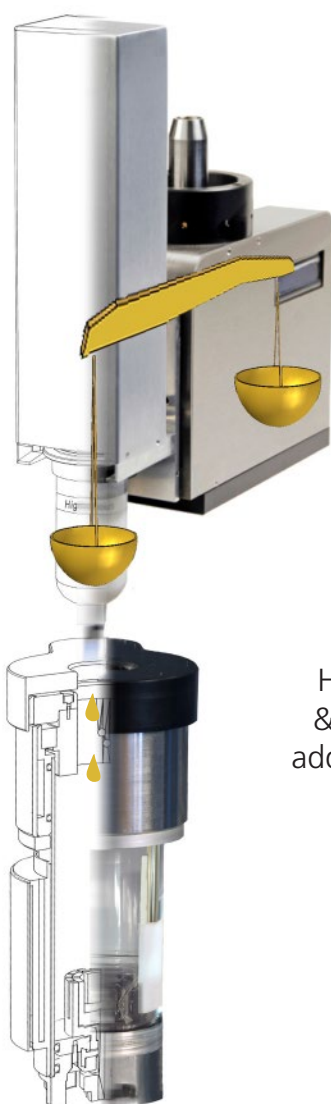


FORMAX[®] PERMAT

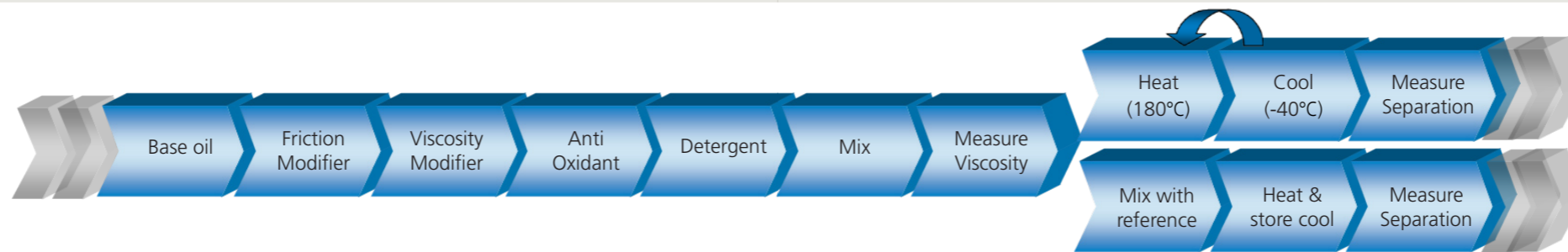
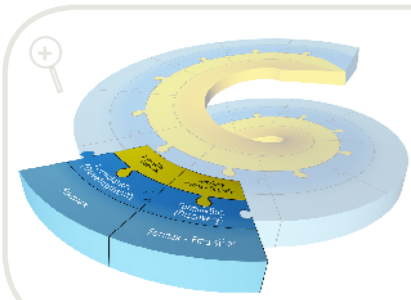
from concepts to success

- Stay competitive by faster and better mapping of both ingredients space and process space -



Highly efficient mixing
& reactor control while
adding gravimetrically any
compound!

from concepts to success



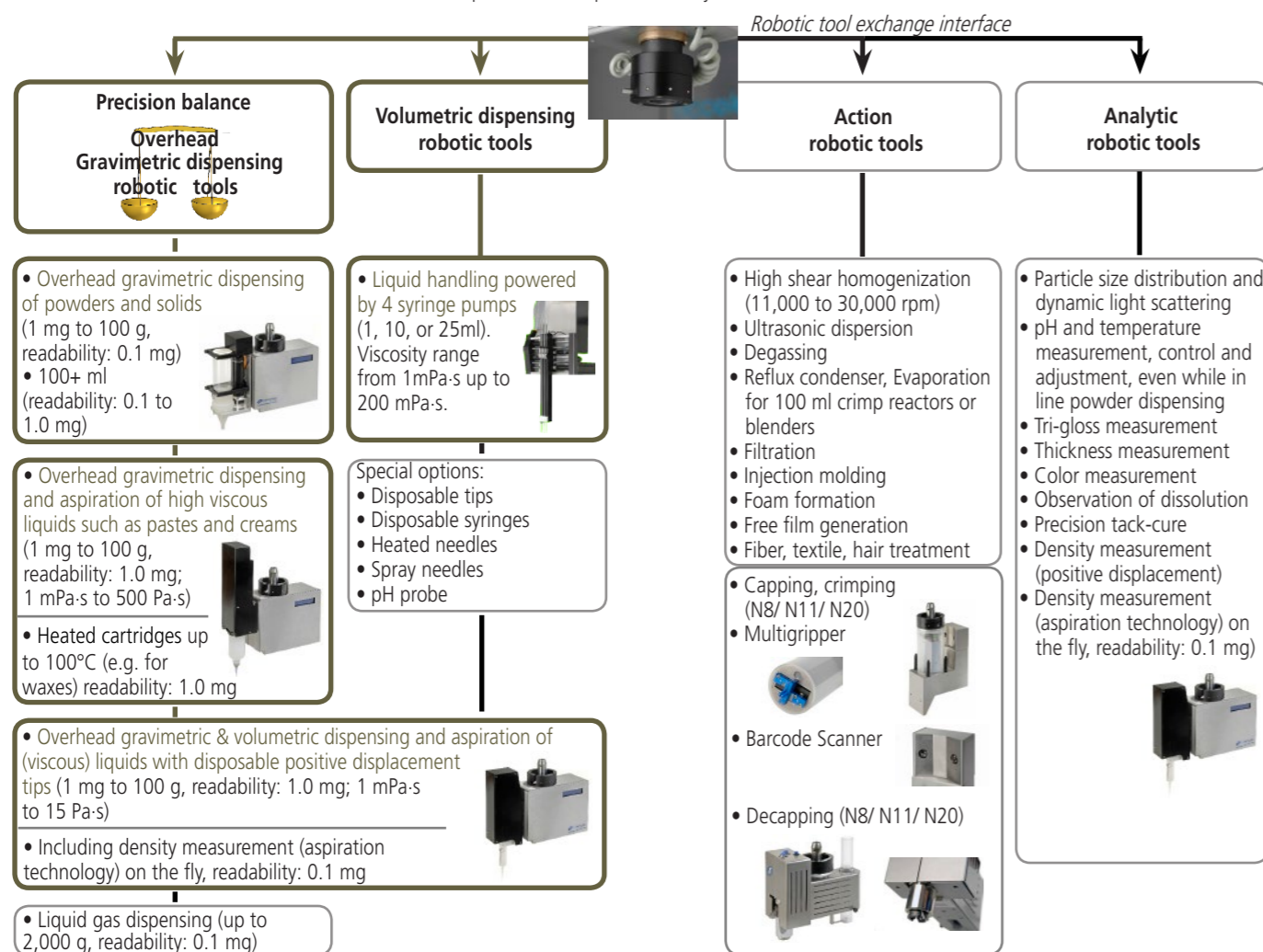
FORMAX PERMAT, a modular robotic platform enabling quality formulations for oil, lubricant, diesel, and gasoline

FORMAX PERMAT is Chemspeed's software-driven robotic platform for challenging formulation workflows in the oil, lubricant, diesel and gasoline industries.

- **FORMAX PERMAT** brings paradigm shifting modularity enabling an easy to use workflow task driven software
- Exchangeable robotic tools
- Unrivaled gravimetric dispensing technology while mixing & scraping, heating, refluxing, and cooling
- High quality, flexible and modular formulation vessels
- A large choice of hardware and software tools allow fine tuned adaptation to your workflow

Unrivaled gravimetric dispensing technology & exchangeable robotic tools

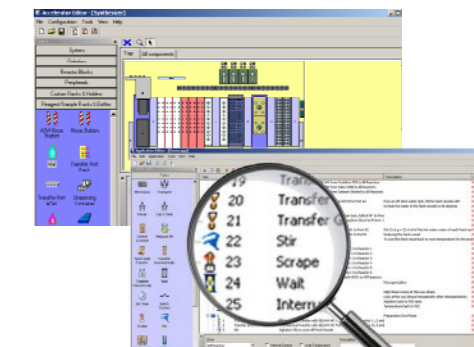
More than 30 features can be delivered with Chemspeed's unique robotic tool exchange technology, including unrivaled overhead gravimetric dispensing tools while mixing & scraping, heating, refluxing and cooling. Generating and analysing complex formulations becomes more efficient and accelerates the product development R&D cycle.



Powered by **AutoSuite FORMAX PERMAT** user interface

AutoSuite FORMAX PERMAT is an intuitive user interface software which allows easy workflow orientated programming. Many features such as the gravimetric dispensing steps are automatically calibrated, eliminating tedious optimisation steps.

- The AutoTeaching tool allows to dispense solids, liquids, viscous liquids, and waxes without manual optimizing steps, and with high precision, accuracy and speed
- Easy programming: drag-and-drop workflow steps
- Barcode tracking
- Smooth integration into Chemspeed's workflow management software (see reverse)
- AutoSuite Application Programming Interface (API) for 3rd party software and hardware integration (standard integration of Spotfire, JMP, VirtualLab etc. as well as many instruments listed on the reverse page)



High-precision blenders for faster and better mapping of ingredients and process space

Chemspeed is able to dispense virtually any type of compound into any type of container (vial, microtiter plates, bottles, reactors, formulation vessels etc.) (Please refer to other Workflow Brochures)

Chemspeed's **FORMAX PERMAT** deck-modularity allows the user to perform complex formulation workflows in a fully automated fashion: addition of virtually any type of ingredients (solid, (viscous) liquid, paste, wax etc.) while mixing & scraping, heating, refluxing, and cooling, in-line analysis, control and much more. High quality is assured by e.g. accurate viscosity, pH, temperature and stirring control. There is an increasing need for especially tailored oils, lubricants, diesel, and gasoline for engines, turbines, cutting technologies etc.

For example in the car industry, the Kyoto protocol has put pressure on the lubricants industry to supply new more efficient products to decrease the CO₂ emission of cars. Traditionally lubricants are tailored more or less manually on the chemical workbench, managing to blend only tens of new test formulations a day.

As high output of even very complex blends is requested, Chemspeed's fully unattended Formax robotic platform allows scalable parallel blending:

- Unrivaled gravimetric dispensing of powders, viscous liquids, pastes and even waxes **while** mixing & scraping, heating, refluxing and cooling in Chemspeed's individually operated and controlled high-precision formulation vessels
- Self-contained workstation for low-temperature stability testing (down to -70°C) and safe working with inflammable materials
- Blending, stability testing, degradation testing on one robotic platform
- Up to 36 fully unattended, high-precision formulations per run with process data
- Dispensed quantities, time, temperature (internal & external), stirring, scraping speeds, stirring (& scraping) energy consumption... are real time monitored and stored in a read-only logfile.



Example of a tray configuration with 24 precision formulation vessels (up to 36 precision formulation vessels), 3 gravimetric overhead dispensing robotic tools, a variety of racks with vials, syringes, heated and disposable pre-formulation vessels and much more...



Overhead gravimetric dispensing of solid while mixing, heating and cooling in the precision formulation vessel



Overhead gravimetric dispensing of paste while mixing, heating and cooling (optional aspiration & heating for e.g. hot transfer)



Expanded view of the precision formulation vessel/ blender: scraper, reflux condenser & measurement unit



Accessories

All tools and accessories of Chemspeed's Swing, Sweigher, Swave, Synthesizer SLT II, Formax, Applicator and Investigator are fully compatible with the **FORMAX PERMAT** robotic platform and vice versa (see the high output product development spiral below). Please refer to Chemspeed's other workflow brochures for modularity examples.

- Formulation adjustment and analysis module: viscosity measurement / adjustment and viscosity control; formulation homogeneity determination; sample aging kit
- Pre-formulation vessels and sample preparation accessories: racks (heatable stirred, stock solution etc.); solvent reservoirs; disposable (process) vials; microplate holders
- Application module: different substances for automated film formations, UV & heat gradients
- Testing module: DMTA, colour, gloss etc.
- Conditioned sample chamber for stability and aging testing
- Cleaning module
- Tailor-made customer care module
- Many tools, including formulation vessels and storage/ ageing dispensing cartridges are optionally available as disposables



High output product development spiral

Chemspeed's AutoSuite workflow management software integrates with:

1. All of Chemspeed's robotic platforms for

- Sample preparation workflows
- Parallel array synthesis workflows
- Parallel process research workflows
- High output formulation workflows
- High output application workflows
- High output testing workflows

2. Third party instruments

Chemspeed integrates a vast number of 3rd party components (e.g. in robotic tools). Please refer to Chemspeed's Workflow Portfolio brochure and/ or contact your Chemspeed's representative.

3. Third party software such as

- SpotFire (premium data visualization and selection)
- JMP (design of experiments - DoE)
- VirtualLab (lab journal, workflow management, instrument control)
- and many other laboratory software through industry standard languages (SQL, .net, C#, etc)

