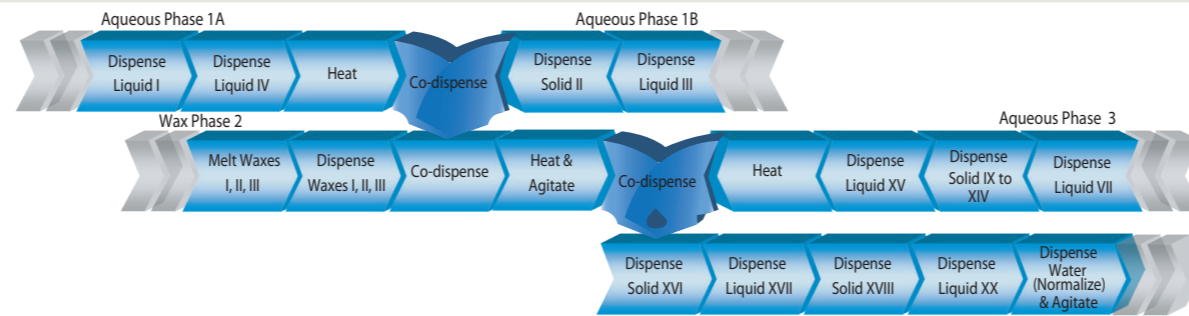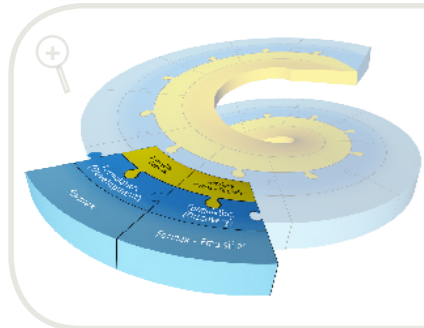# FORMAX® HAIR CARE & COLORANTS (e.g.Personal Care)

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!

CHEMSPEED TECHNOLOGIES

Process Workflow Diagram

Aqueous Phase 1A: Dispense Liquid I → Dispense Liquid IV → Heat → Co-dispense

Aqueous Phase 1B: Dispense Solid II → Dispense Liquid III

Wax Phase 2: Melt Waxes I, II, III → Dispense Waxes I, II, III → Co-dispense → Heat & Agitate → Co-dispense

Aqueous Phase 3: Heat → Dispense Liquid XV → Dispense Solid IX to XIV → Dispense Liquid VII

Dispense Solid XVI → Dispense Liquid XVII → Dispense Solid XVIII → Dispense Liquid XX → Dispense Water (Normalize) & Agitate
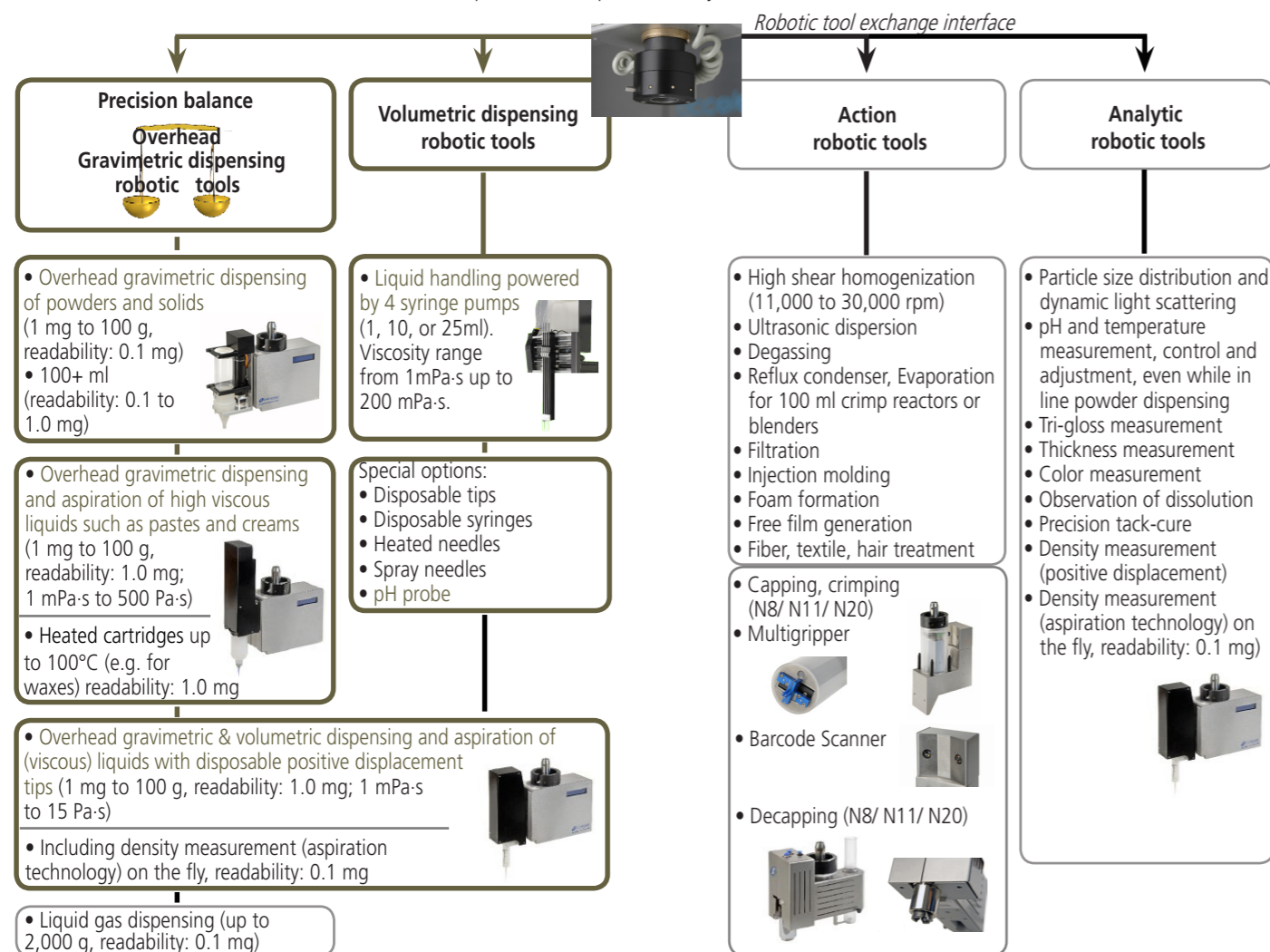

FORMAX® HAIR CARE & COLORANTS, a modular robotic platform enabling quality formulations for hair care (colorant, gel, shampoo, conditioner)

FORMAX® HAIR CARE & COLORANTS **is Chemspeed's software-driven robotic platform for challenging formulation workflows in the hair care & colorants industry.**

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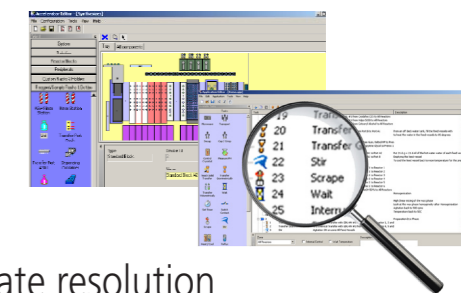
More than 30 features can be delivered with Chemspeed's unique robotic tool exchange technology, including unrivaled overhead gravimetric dispensing tools while mixing & scraping, heating, refluxing and cooling. Generating and analysing complex formulations becomes more efficient and accelerates the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

Robotic tool exchange interface

Precision balance
Overhead Gravimetric dispensing robotic tools

- Overhead gravimetric dispensing of powders and solids (1 mg to 100 g, readability: 0.1 mg)
- 100+ ml (readability: 0.1 to 1.0 mg)

- Overhead gravimetric dispensing and aspiration of high viscous liquids such as pastes and creams (1 mg to 100 g, readability: 1.0 mg; 1 mPa·s to 500 Pa·s)
- Heated cartridges up to 100°C (e.g. for waxes) readability: 1.0 mg

- Overhead gravimetric & volumetric dispensing and aspiration of (viscous) liquids with disposable positive displacement tips (1 mg to 100 g, readability: 1.0 mg; 1 mPa·s to 15 Pa·s)
- Including density measurement (aspiration technology) on the fly, readability: 0.1 mg

- Liquid gas dispensing (up to 2,000 g, readability: 0.1 mg)

Volumetric dispensing robotic tools

- Liquid handling powered by 4 syringe pumps (1, 10, or 25ml). Viscosity range from 1mPa·s up to 200 mPa·s.

Special options:
- Disposable tips
- Disposable syringes
- Heated needles
- Spray needles
- pH probe

Action robotic tools

- High shear homogenization (11,000 to 30,000 rpm)
- Ultrasonic dispersion
- Degassing
- Reflux condenser, Evaporation for 100 ml crimp reactors or blenders
- Filtration
- Injection molding
- Foam formation
- Free film generation
- Fiber, textile, hair treatment

- Capping, crimping (N8/ N11/ N20)
- Multigripper

- Barcode Scanner

- Decapping (N8/ N11/ N20)

Analytic robotic tools

- Particle size distribution and dynamic light scattering
- pH and temperature measurement, control and adjustment, even while in line powder dispensing
- Tri-gloss measurement
- Thickness measurement
- Color measurement
- Observation of dissolution
- Precision tack-cure
- Density measurement (positive displacement)
- Density measurement (aspiration technology) on the fly, readability: 0.1 mg

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Powered by AutoSuite FORMAX® HAIR CARE & COLORANTS user interface

AutoSuite FORMAX® HAIR CARE & COLORANTS 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)
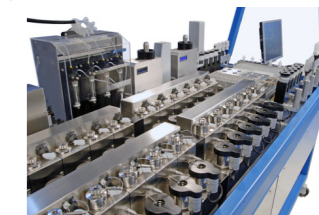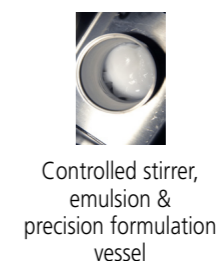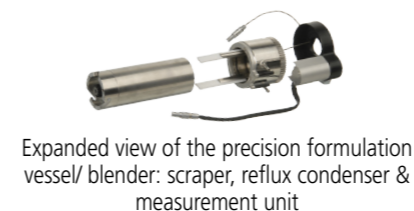
High-performance formulation vessels for e.g. accurate resolution of color shades

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® HAIR CARE & COLORANTS* deck-modularity allows the user to perform complex formulation workflows for hair care and colorants 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. the accurate resolution of broad range of color shades and control of NH_3 contents.**

Precision formulation vessels technical specifications:
- Individual powerful stirring for each precision formulation vessel for highest mixing, dissolving, emulsification power
- Agitation up to 6,000 rpm or 600+ rpm at 1,000 Pa·s even during gravimetric addition of highly viscous reagents or powders
- Conveniently exchangeable scrapers for maximum formulation quality (from 20 to 200 rpm)
- Continuous feed pumps & feed vessels
- Various stirrer designs: dissolver disk, rotor-stator etc.
- PT100 internal and external temperature control +/-0.1°C
- Independent electrical and fluidic heating / cooling systems for highest accuracy (-70 to 250°C +/-0.1°C)
- Precision calorimetry measurement (in precision calorimetric probe 1W)
- Viscosity measurement / Rheometry
- pH measurement and control
- Vacuum connections for degassing, extraction, evaporation
- Different gas supplies (e.g. inert or other gases)
- Large choice of pre-formulation vessels (magnetically stirred, shaken, heated, cooled vessels, reactors, high pressure reactors, disposable vials, etc.)

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 precision formulation vessel

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

Various stirrer designs: rotor-stator and dissolver disk

Controlled stirrer, emulsion & precision formulation vessel

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

Accessories

All tools and accessories of Chemspeed 's Swing, Sweigher, Swave, Synthesizer SLT II, Formax, Applicator and Investigator are fully compatible with the FORMAX HAIR CARE & COLORANTS 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
- Mixing module for colorant and developer
- Hair treatment module (massaging, spraying)
- Testing module for color (L*a*b) and gloss
- Conditioned sample chamber for stability and aging testing
- Cleaning module
- Tailor-made customer care package
- 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:

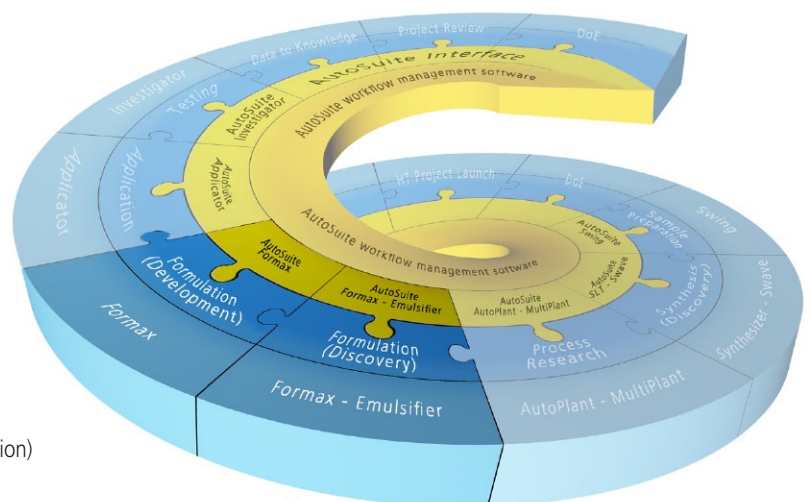**1. All of Chemspeed's robotic platforms for**
- Sample preparation workflows
- Parallel array synthesis workflows
- Parallel process research workflows
- High output formulation workflows
- High output application workflows
- High output testing workflows

2. Third party instruments
Chemspeed integrates a vast number of 3rd party components (e.g. in robotic tools). Please refer to Chemspeed's Worfklow 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)

Harware - Software - Logistics
Chemspeed Technologies offers all.