

**ZINSSER
ANALYTIC**

by Gardner Denver

Automation of Synthesis Processes lifting your Research Output Frequency to the Next Level

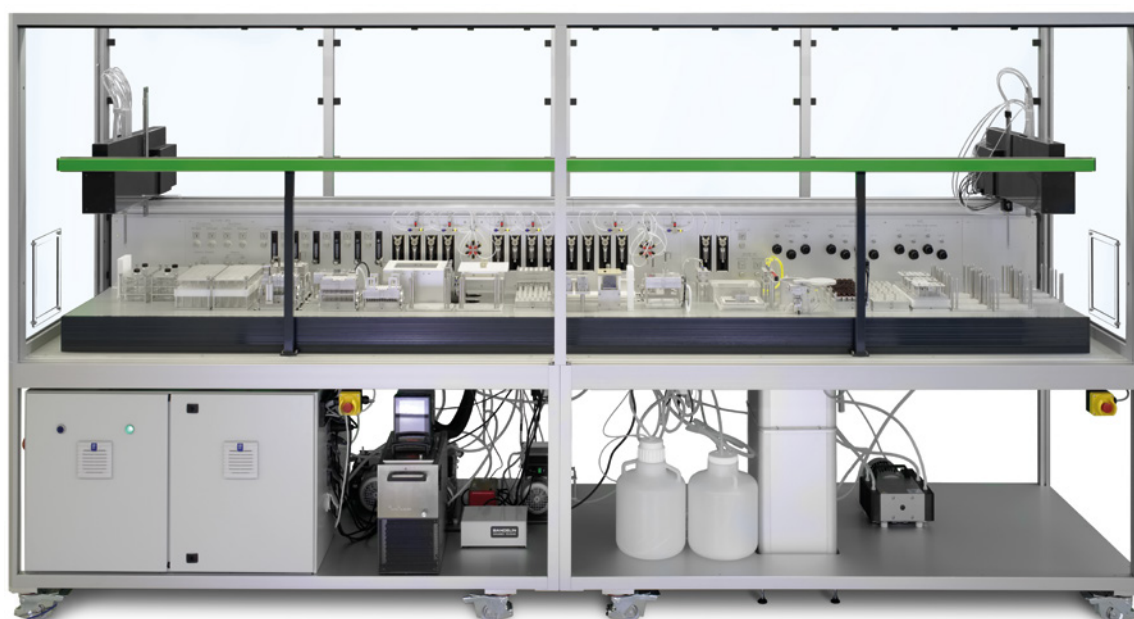
Expand your knowledge of synthesis parameters in a shortened time scale.



Designed for your processes

Addressing everyday workflow challenges by creating suitable automation solutions is our passion. Zinsser Analytic developed an automated solution for synthesis, tailored to application-specific needs:

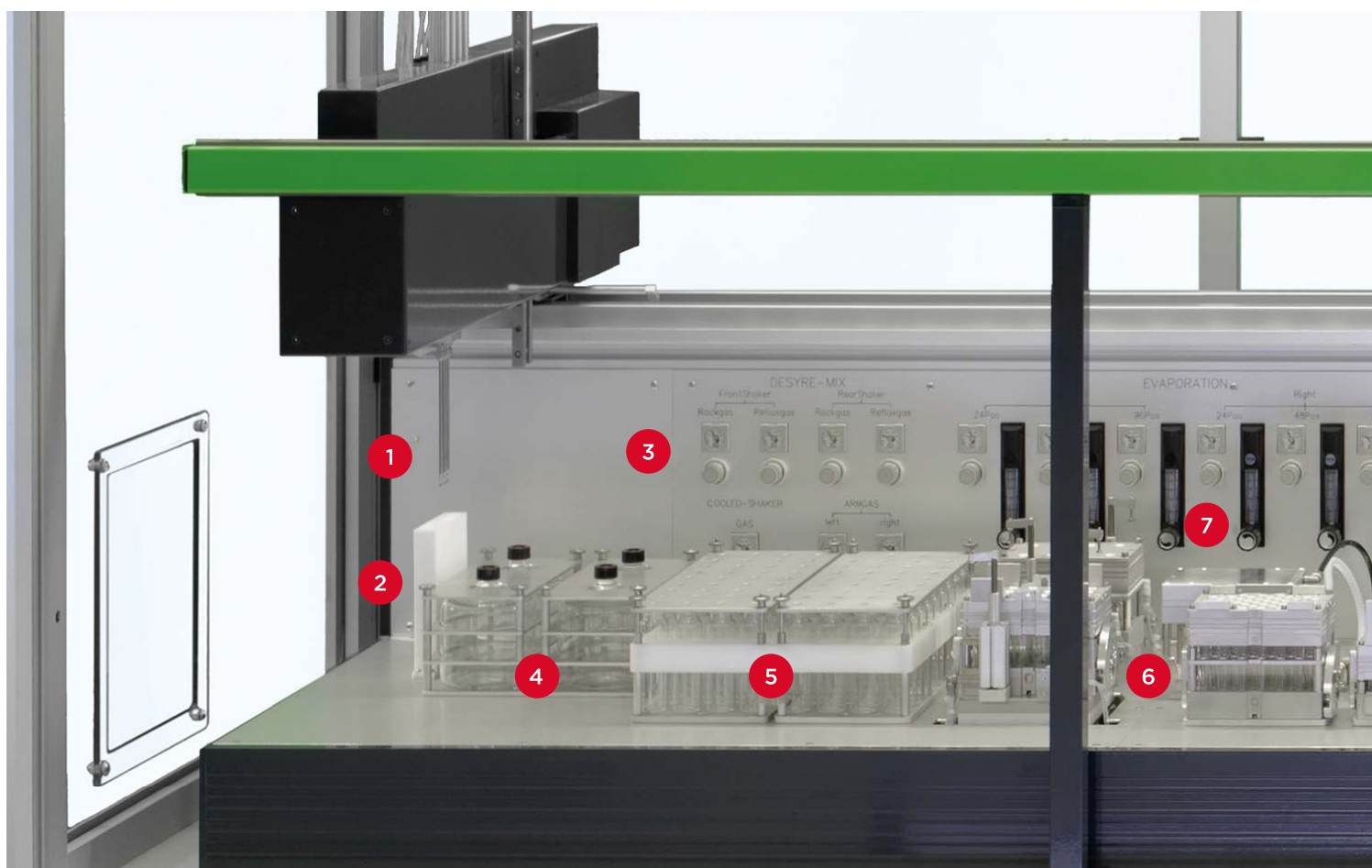
- ✓ Highly flexible robotic system
- ✓ Fast and efficient parameter screening
- ✓ Customised software interface
- ✓ Enhanced precision in dosage
- ✓ Reliable results
- ✓ Improved reproducibility
- ✓ Fully automated product workup



With our flexible liquid- and powder-handling system, all your synthesis challenges are addressed:

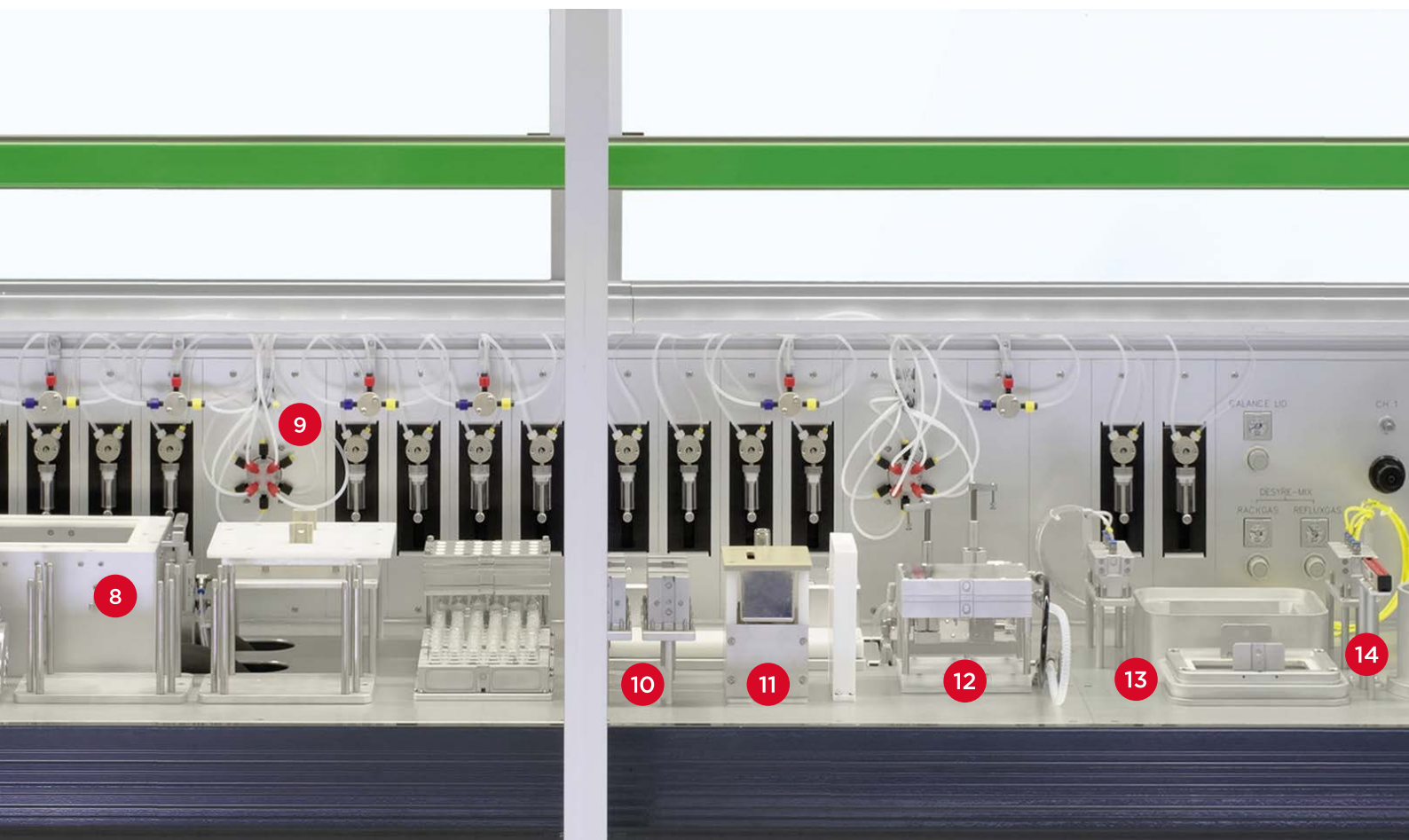
- ✓ Liquid- and powder-handling
- ✓ Product purification
- ✓ Screening of target syntheses adding knowledge to your database
- ✓ Solid- and liquid-phase-extraction
- ✓ Filtration
- ✓ Crystallization screening
- ✓ Solubility screening
- ✓ Aliquot taking for analysis

HARDWARE DESIGN



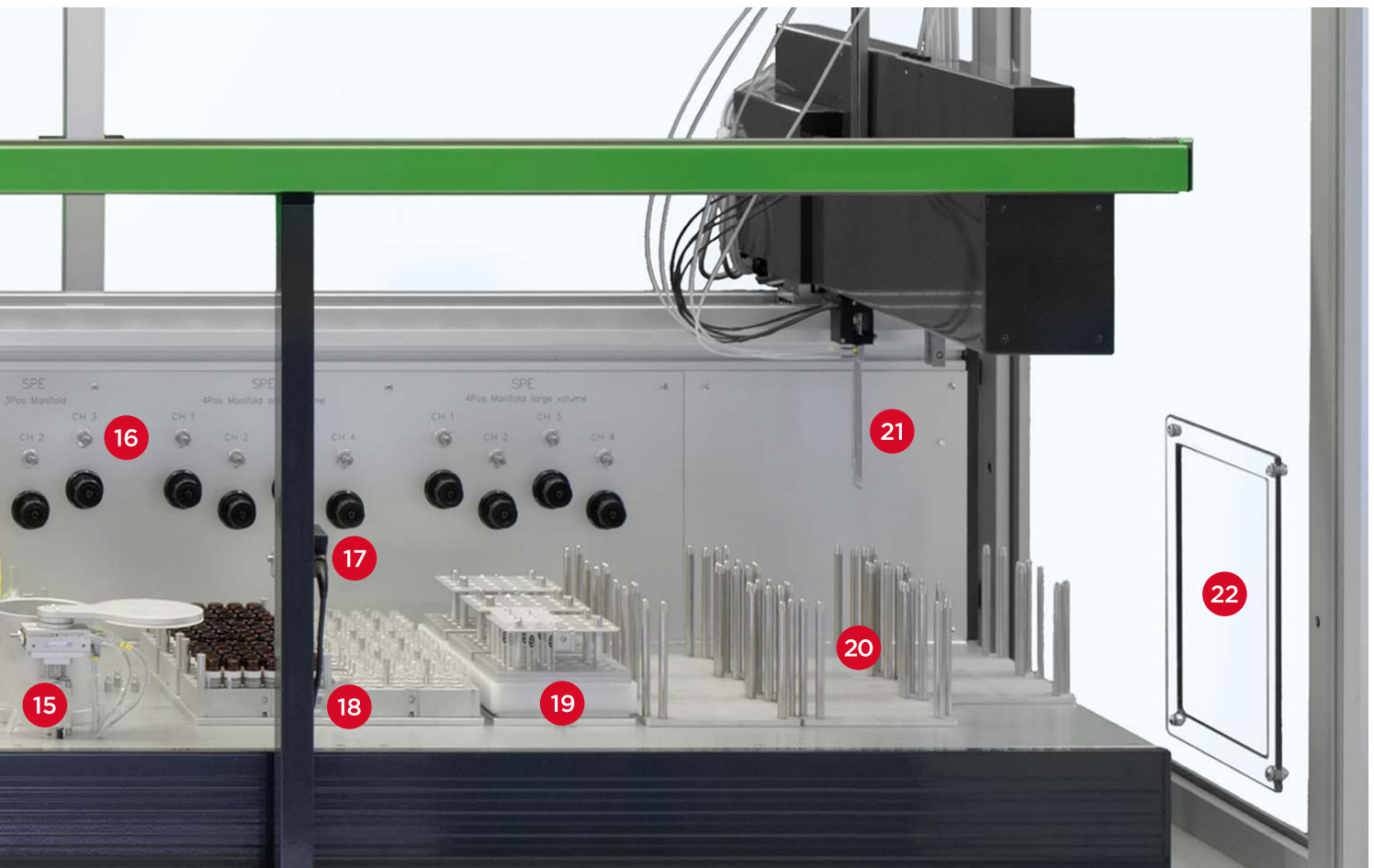
- 1 3-Channel tips and gripper for racks and pick up tools
- 2 Wash station
- 3 Control panel for DESYRE-Mix[®] gas supplies
- 4 Racks with two 300 mL solvent bottles
- 5 Racks with 36x 40 mL reagent vial
- 6 Multiple DESYRE-Mix[®] with hotplates up to 150 °C
- 7 Control panel for Evaporation manifold gas supplies

HARDWARE DESIGN



- 8** Heavy-duty vortexer with isolated cooling box down to -20 °C
- 9** Six-way-valve with precision syringe pumps of different volumes
- 10** Pick up tools for gripper for different vial sizes
- 11** Ultrasonic bath for cleaning of tip
- 12** Evaporation manifold with parking station
- 13** Vacuum filtration station for usage with filter blocks or SPE cartridges
- 14** Ioniser for reduction of static charge

HARDWARE DESIGN

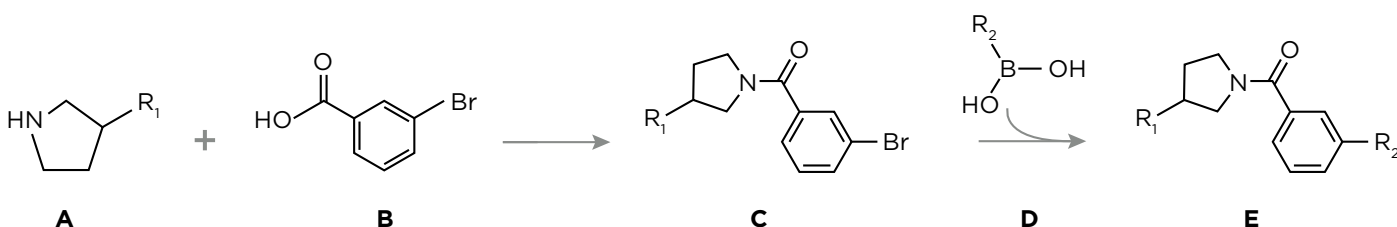


- 15** 5-Digit balance for single vials
- 16** Control panel for SPE manifolds
- 17** 2D-Barcodereader for vials
- 18** Racks with glass vials
- 19** Multiple cartridge racks
- 20** Stacker for vial racks for storage
- 21** Two 3-channel tips, one shower tip, one standard liquid handling tip and gripper for racks and pick up tools
- 22** Cabinet for automation with removable window for shuttle module

EXECUTION OF EVERY POSSIBLE PROCESS

We want to help you to unleash your full potential in high throughput synthesis. Accordingly we use a modular and parallel executable design of hardware. With our automation, every common and even complex synthesis steps, are achievable.

As an example for a fully automated synthesis, including preparation and product workup, the synthesis of Phenyl(1-pyrrolidiny)methanone-derivatives is shown. Starting materials are pyrrolidine-derivatives (A) and *m*-bromo-benzoic acid (B) and the product is built through two separate reaction steps.



PREPARATION

1. Dispense reagents into vials
2. Prepare standard solutions of **A**, **B** and coupling agent

ASSEMBLY OF C

1. Mix solutions of 8 different **A** with **B**
2. Shake
3. Add solution of coupling agent
4. Add solution of base
5. Shake and heat
6. Take an aliquot for LCMS
7. Cool down
8. Add water
9. Add extraction solvent
10. Shake
11. Separate organic and aqueous phase
12. Evaporate organic phase
13. Quantify crude product **C** (mass)

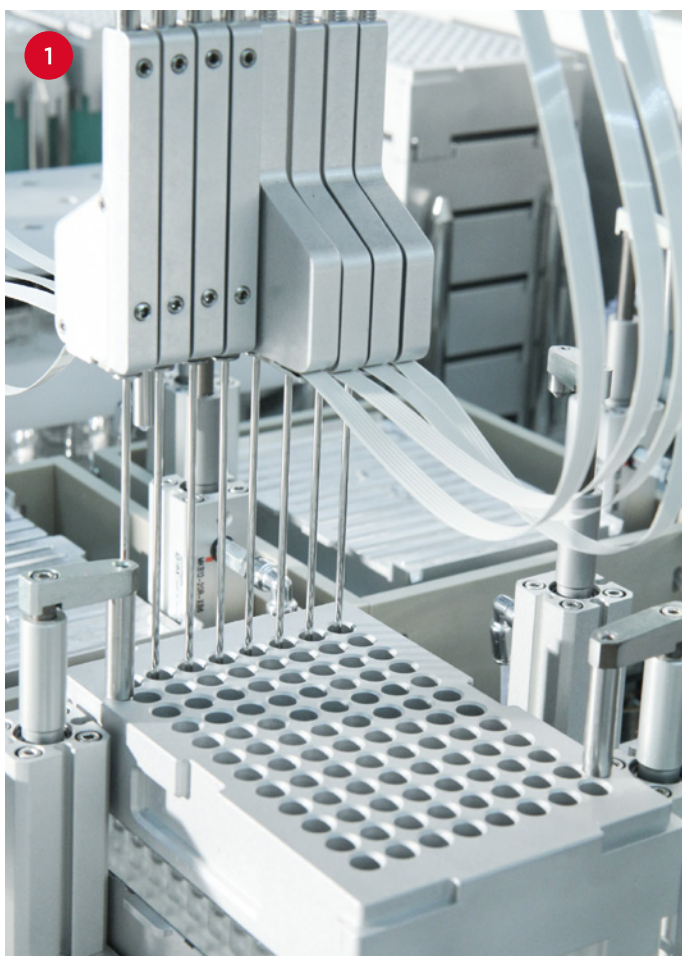
RESULT: 8x crude product of amides C

ASSEMBLY OF E

1. Dissolve **C** in new solvent
2. Distribute solution of **C** to new reaction vials
3. Add 12 different boronic acids **D**
4. Put under inert gas atmosphere
5. Add catalyst
6. Add base
7. Shake and heat
8. Take an aliquot for LCMS
9. Continue shaking and heating
10. Cool to room temperature
11. Add water
12. Add extraction solvent
13. Shake
14. Separate aqueous from organic phase
15. Evaporate organic solvent
16. Quantify crude product **E** (mass)
17. Dissolve **E** in a new solvent
18. Dispense into 96 HPLC-vial rack for HPLC purification

RESULT: 96 x crude product of amides E

PRECISION IN EVERY DETAIL



1 Liquid Handling

- Multiple channel pipetting probes for precise pipetting of liquids and volatiles as well as “coax-gas” and flow controlled vacuum.
- Precision in distribution syringes in connection to syringe pumps and manifold valves with various volumes.

15 Solid Handling

- Solid transfer pipette for flowable powder (10 - 300 μ L).
- A rack for powder tips, discarding and cleaning stations.
- Optional with a 4- or 5-digit balance for single vials.
- From 24 to 96-well CRISSY®-Blocks are applicable with a 4-digit balance.

13 Filtration / Solid-Phase-Extraction

- Filtration station for filter panels and cartridge racks in MTP format (microtiter plate format: 128 mm x 86 mm).
- Combined with pressure tools and corresponding pressurestat or vacuum.
- Eluent is collected in corresponding racks with MTP format.
- Fully automated workflow completed by the gripper.
- Parking spots for some positions of cartridge racks or filter panels could be included.
- Evaporation is done by equipping the reaction block with an evaporation manifold (up to 96) and using the DESYRE-Mix® for shaking and heating lightly from the bottom. Combined with the nitrogen flow this produces an evaporation effect.

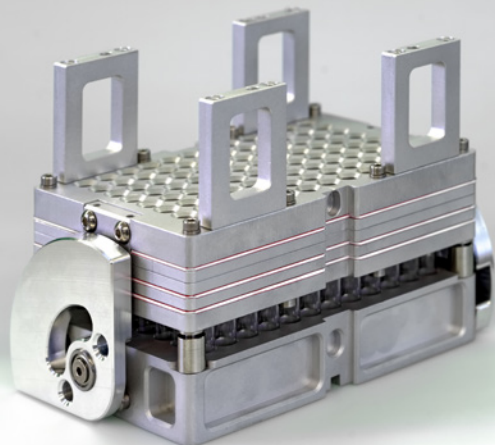
6 8 Vortexing

- High speed shaker DESYRE-Mix® with integrated hotplate heating up to 150 °C for reaction blocks.
- Heavy-duty shaker with additional to heating a cooling down to -20 °C, with connection to circular cooling thermostat, is possible.
- Inert gas option for cooling box.
- Fixation of reaction blocks with pneumatic clamps throughout vortexing.



PRECISION IN EVERY DETAIL

18

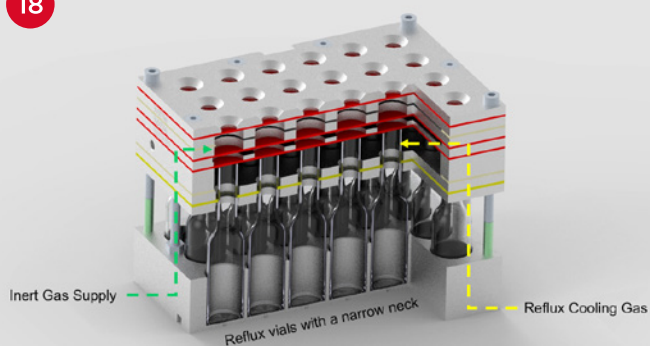


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Racks and reaction blocks

- Each rack is equipped with a carrier for defined positioning on the platform ensuring the correct positions of the tips during pipetting.
- Flexible replacement of carriers with racks, is easily possible when the used method changes.
- Reagents rack (4 x 300 mL or 24 x 20 mL or 40 mL) with caps and septum.
- Modular racks for your DESYRE-Mix®:
 - Reaction blocks from 8 to 96 positions (1 mL up to 40 mL each).
 - Reflux blocks with 8 or 24 positions (7 mL up to 20 mL).
 - All racks are available in aluminium or stainless steel.
 - Septa and sealing mats are available.
 - DESYRE®-blocks.
 - CRISSY®-blocks and lid/unlid them.

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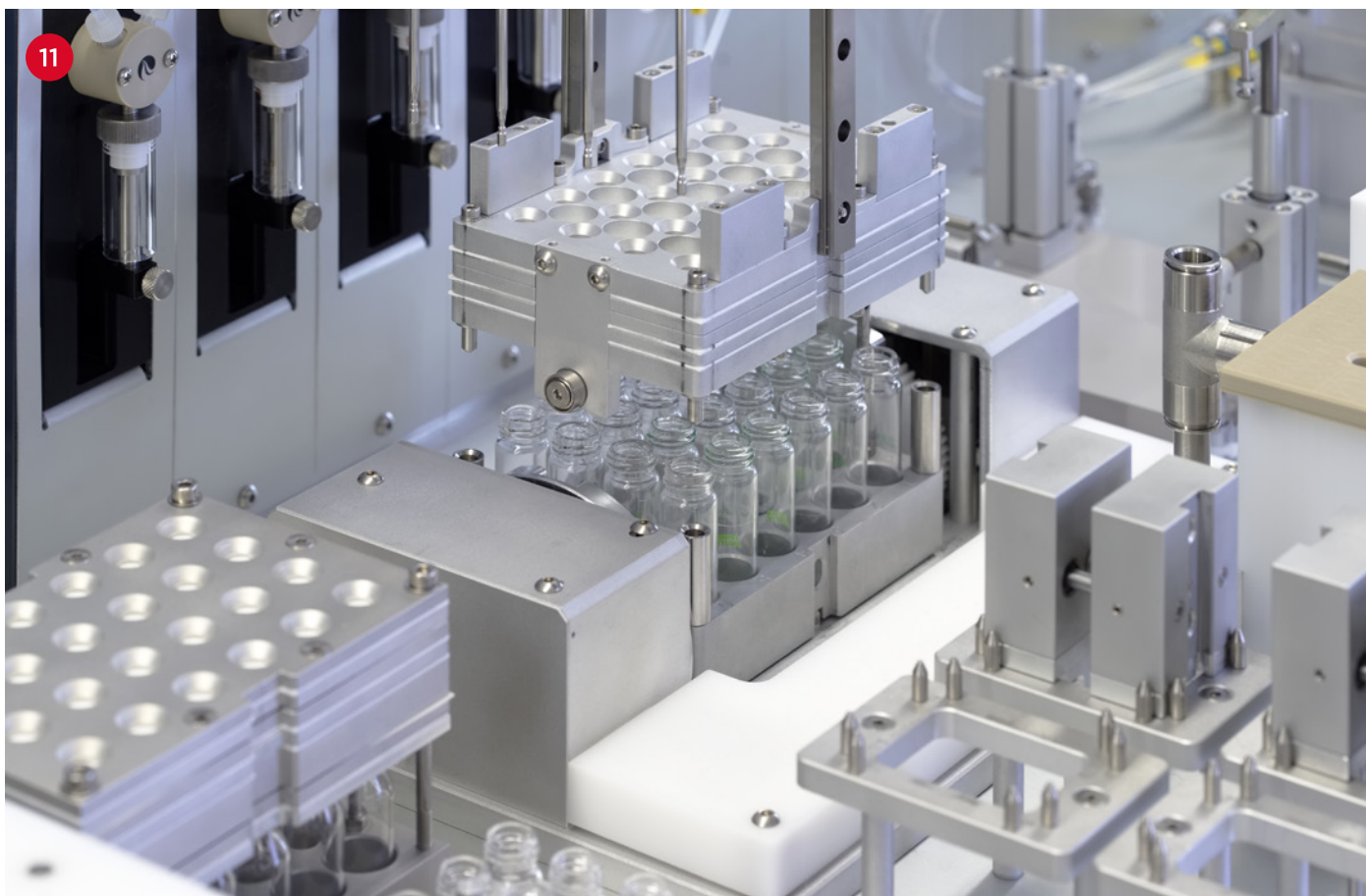


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Additional Features

- Barcode reading station for reactor blocks and racks
- Sonication bath for probe cleaning
- Automated lid- and unlid-station for DESYRE®-blocks

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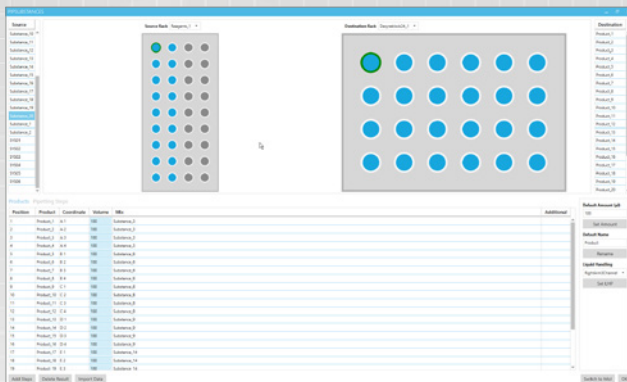


SOFTWARE SOLUTION FOR YOUR SPECIFIC PROCESS

Every process step is designed modularly. Therefore a variety of processes, using differing powders, chemicals and solvents, may be completed. The customized sequential arrangement of the process is composed with a specified MS Excel® file or our Worklist-Generator which is then executed with our WinLissy®-software.

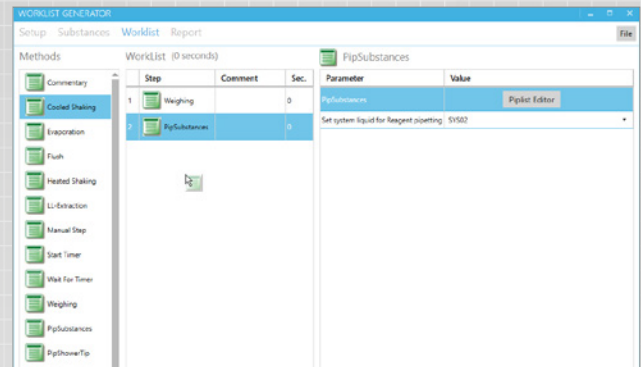
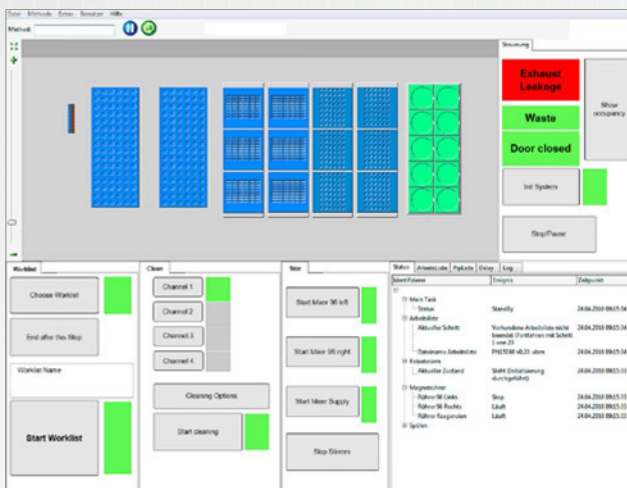
Worklist-Generator

With the Worklist-Generator you can create individual processes with many adjustable parameters for sub steps. Drag and drop the needed methods to the desired positions of the worklist.



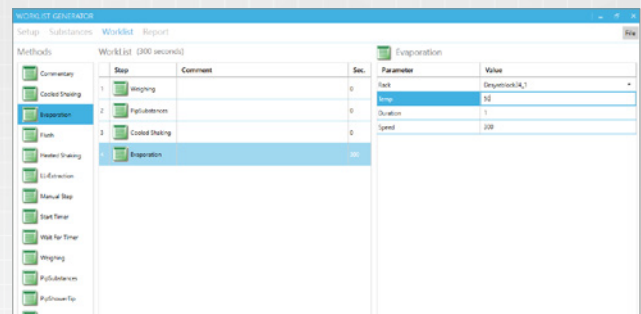
Method Definition

Input the desired time or anything the method requires, while you are defining the process.



Pipetting-Editor

For pipetting steps, the Pipetting-Editor is opened for the definition of racks and number of steps. Every filled position is indicated blue and the selected positions are highlighted green.



WinLissy®-Software

With our WinLissy®-software every prepared worklist of the Worklist-Generator is executable. Communication with customer specific databases or LIMS is easily conceivable.

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