

Unique Throughput
Day and Night

SOLUTIONS BY **LC** *Tech*

**AUTOMATED SAMPLE PREPARATION
FOR WATER ANALYSIS**

FREE-STYLE™™
XANA

Unique Automation for Sample Preparation in Water Analysis

Developed for Water

Sample preparation in water analysis has special requirements for automation, in particular where the processing of large-volume or particulate-laden samples is required.

The module of the FREESTYLE robotic system has been specifically developed for sample preparation of large-volume water samples, for example of drinking-, raw- or river water. Without the need for supervision, the system processes samples reliably over 24 hours and 7 days/week through all stages beginning with the raw sample up to filling into GC vials, ready for subsequent analysis. Samples with suspended matter in many cases can also be pushed through the SPE columns in a controlled manner due to well-regulated pressurisation of up to 4 bar. By running individual processing steps in parallel and simultaneous processing of several samples, a high sample throughput is realised.

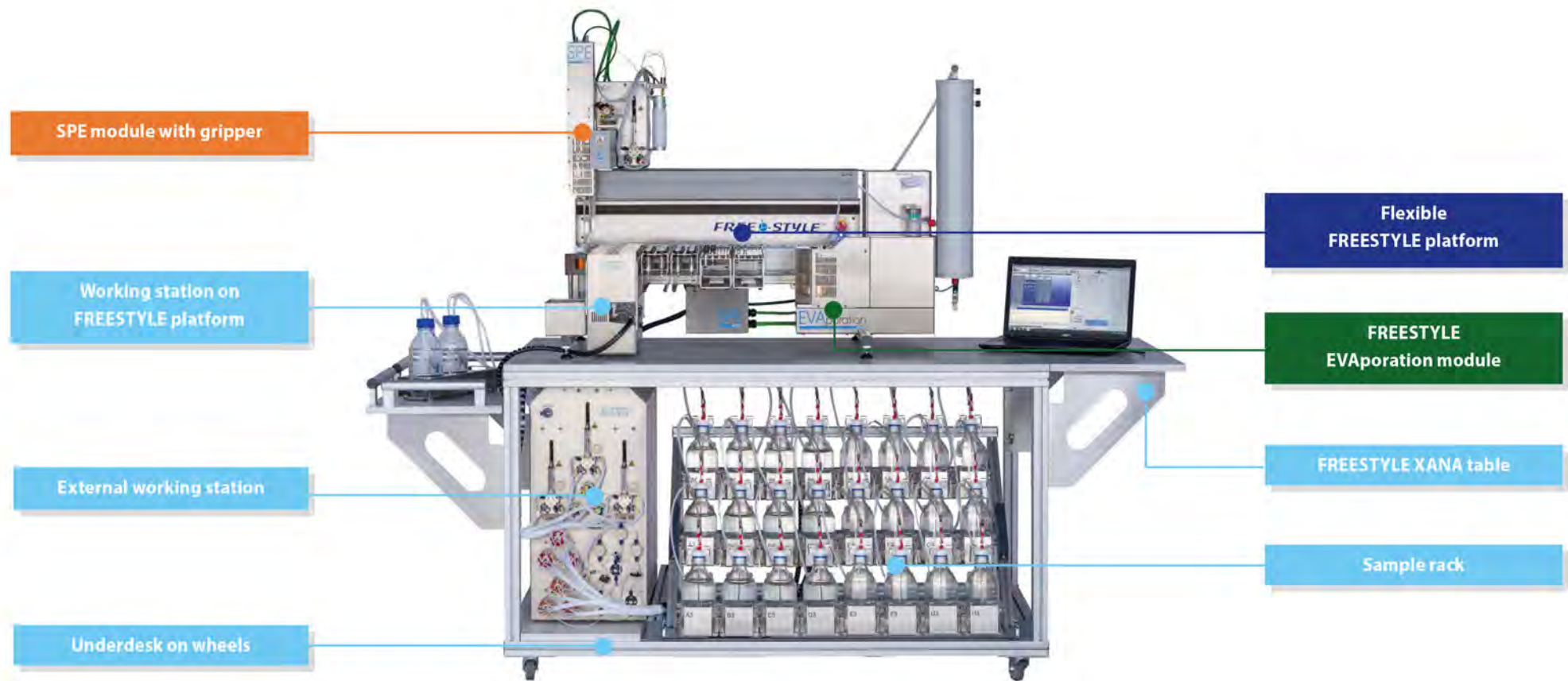
FREESTYLE XANA consists of the basic building block of the xyz-robotic system, FREESTYLE BASIC, and the SPE module. As an option, the platform can be fitted with an EVaporation module, whereby the sample can be eluted directly into the EVaporation chamber. The transfer into the GC vial will be done after precise concentration to a defined end volume, if required in combination with an automated solvent exchange. The extract is ready for the measurement in the analytical system. Moreover, each module can be used separately for solid phase extraction, evaporation or for combined applications.



FREESTYLE BASIC platform equipped with SPE and EVaporation module.



FREESTYLE XANA - Configuration



SPE module with gripper:

Transports the SPE columns to the required position on the FREESTYLE platform and executes the elution steps.

Sample rack with 24 positions for 1 L sample containers each.

Underdesk on wheels; external processing station and sample rack are already assembled.

Working station on the FREESTYLE platform:

3 SPE columns are simultaneously being processed in two blocks: in Block 1 the 3 columns are being conditioned, loaded and washed whereas in the subsequent Block 2 the previous 3 columns are being dried in parallel. *More on page 4*

External working station:

Control centre of the water module including the mechanics for pumping 1-4 L samples, valves and sensors for process monitoring.

Flexible FREESTYLE platform

For easy hanging of racks for SPE columns and elution containers.

Optional:

EVAporation module for precise concentration to a continuously adjustable end volume between 0.2 mL and 5.0 mL; direct elution from the SPE column into the EVAporation chamber.

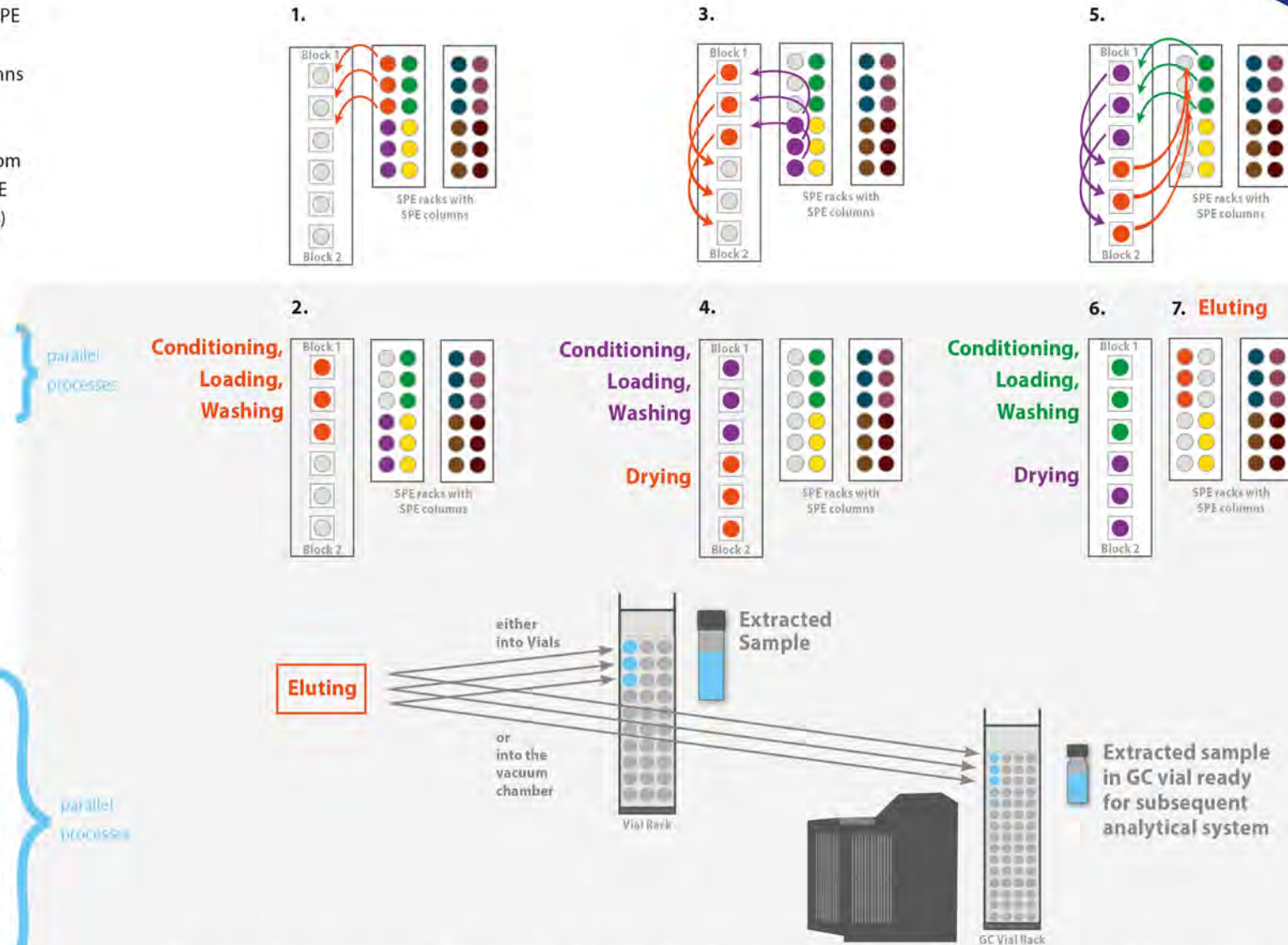
FREESTYLE XANA table with side parts that can easily be hooked

Sophisticated Parallelisation

Unique with XANA:
Throughput of 65 samples
in 24 hours!

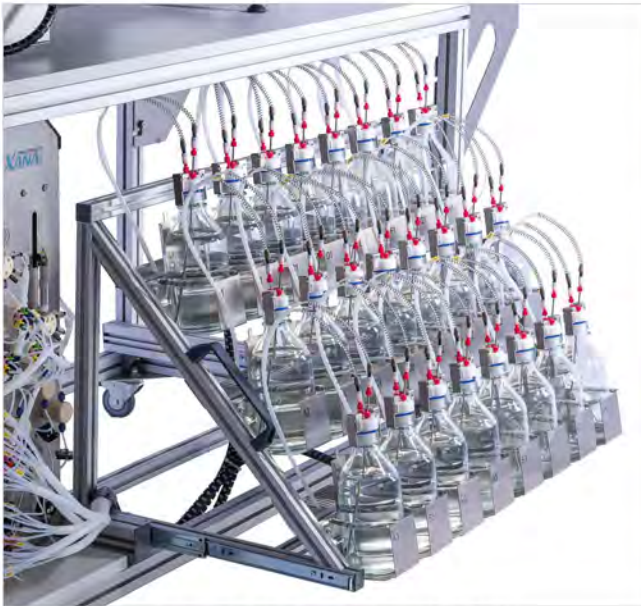
Operating Principle of FREESTYLE XANA

1. The SPE gripper places up to 3 columns from the SPE rack into Block 1 of the working station:
2. Conditioning, loading and washing of this 3 columns simultaneously.
3. The SPE gripper places the 3 prepared columns from Block 1 into Block 2 of the working station. The SPE gripper fetches the next batch of columns (up to 3) from the SPE rack and places them into Block 1 of the working station.
4. Block 1: Conditioning, loading and washing of up to 3 columns simultaneously
Block 2: Drying of the first 3 columns
5. The SPE gripper places 3 dried columns from Block 2 back onto the SPE rack. The SPE gripper places 3 loaded and washed columns from Block 1 into Block 2 of the working station. The SPE gripper fetches the next columns (up to 3) from the SPE rack and places them into Block 1 of the working station.
6. Continuous Parallelisation
Block 1: Conditioning, loading and washing of up to 3 columns simultaneously.
Block 2: Drying of up to 3 columns simultaneously.
7. The first 3 columns are eluted into vials or into the vacuum chamber of the EVaporation module. After the precise EVaporation to the desired end volume, the filling into the GC vials is taking place making the water sample ready for the subsequent analysis.



The required processing time of 3 samples is determined by the block with the longest lasting process step. A high sample throughput of 65 samples/day is achieved by parallelisation of the individual process steps and simultaneous processing of 3 samples.

Flexible Sample Volumes



Extendible sample rack for 24 x 1 L sample bottles



Easy filling of the sample rack with sample bottles



Sample bottle with closure for single handed operation

Large Volumes, High Sample Throughput, Little Effort

In water analysis mainly large-volume samples are intended. Hence, the FREESTYLE XANA sample rack provides space for 24 x 1 L sample bottles. Optionally, sample volumes of 1 L up to 4 L can be loaded onto the columns. For even larger sample volumes 10 L sample reservoirs can be connected alternatively. By doing so, 3 x 10 L samples can be loaded onto the columns.

The handling of the sample rack is simple: integrated in an underdesk on wheels the sample rack can be pulled out, so every position is easy to reach and thus loading of the rack with samples is straightforward.

Sample bottles are placed into the rack slightly tilted and capped with a specially designed sample bottle closure, which holds the suction capillary at an angle, so it reaches the lowest corner of the containers and the sample load is maximised.

The Key to Flexibility

FREESTYLE Software: One for All

The FREESTYLE software provides the user with a powerful and easy-to-use software.

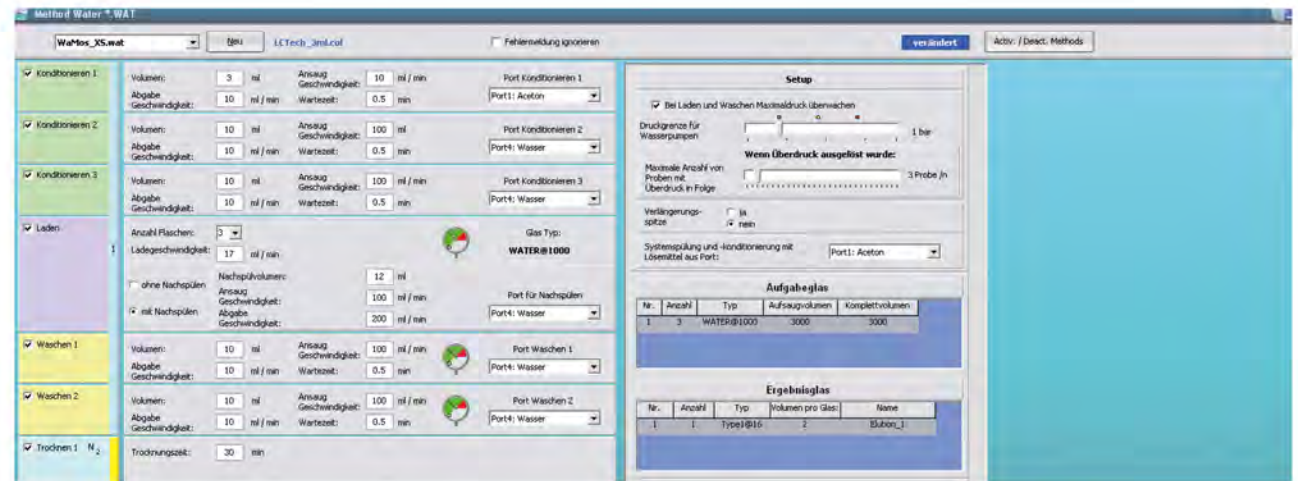
All FREESTYLE modules are pre-configured and can be operated via the FREESTYLE software.

Each module includes a method editor backed with a default method. The user can, however, simply modify this by change of various processing parameters and save it as a new method. Alternatively, new methods can be created, e.g. to transfer an already validated manual method. Combinations of existing methods like SPE-EVA are also possible.

Thus, the software provides the flexibility to change from a large volume application to any SPE application with a smaller sample volume by just a few mouse clicks.

During creation of the sample list in the main window of the water module, the samples are marked in the specially installed sample rack by mouse click.

It is possible to add new samples at any time during processing and to prioritise recently entered samples – even during ongoing operation. A prioritised sample will be automatically started immediately after the current sample has been finished.



Screen method input



Screen sample input

Unique: XANA applies the pressure - up to 4 bar when loading onto SPE columns

Innovative Technology - Made in Germany



Processing station on the FREESTYLE platform



External processing station

FREESTYLE XANA - Technical Specifications:

- Developed for unattended 24/7 operation
- 24 samples are loaded in groups of 3 for sequential throughput
- Use of 3 mL and 6 mL SPE columns made of polypropylene
- Liquid and pressure tight up to 4 bar
- Free adjustable flow rates of 0.1 – 30 mL/min
- Drying with pre-set nitrogen pressure
- Up to 8 solvents selectable for conditioning and washing

One System, Many Advantages

The FREESTYLE XANA robotic system offers innovative automation for unattended, automated processing of large volume water samples around the clock, seven days a week.

With 24/7 operation, the parallelisation of the processing procedures and the simultaneous processing of 3 samples, a high sample throughput is achieved. While the system is reliably processing the samples, the user of the system has time to focus on other tasks.

The Pressure Makes the Difference

With a positive pressure of up to 4 bar during loading FREESTYLE XANA in many cases pushes even samples with suspended matter through the SPE columns.

Permanent pressure monitoring during loading and elution gives users the security they need. If a pre-defined pressure value is exceeded, the system will stop the processing of this sample, which will be marked in the sequence list. The interrupted sample is stowed securely for post-processing action. After rinsing the system will start with the next sample.

Since the FREESTYLE system can be used for the processing of water samples as well as for automated solid phase extraction or evaporation, it is equally well suited for use in both smaller and high throughput laboratories.



FREESTYLE XANA

Column adapter and caps depend on used columns.

FREESTYLE XANA	P/N 14769
FREESTYLE XANA with table	P/N 15082
FREESTYLE XANA with EVaporation module for concentration and filling into 1 mL GC vials	P/N 14771
FREESTYLE XANA with EVaporation module and table	P/N 15081

Column adapter and caps depend on used columns.
Please contact us for your individual offer.

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