Systematic Workflow
Laboratory Automation for Pre- and Post-Analytics

System Solutions
for Clinical Laboratories and Microbiology
The Company – Foundation and History

Ever since the company was established in 1961, progress has been a top priority. Today, the SARSTEDT Group is a global company with 13 production sites in Europe, North America and Australia and 2,600 employees.

For decades, research and purpose-oriented product development using innovative technologies, along with constant dialogue with the customer, have been decisive factors in asserting our current market position as a leading supplier of laboratory and diagnostic products.

Quality under one roof – from product idea through to delivery

From development through to production and sales – all our services come from a single source.

PRODUCT DEVELOPMENT at our R&D centre is based on close dialogue with users and state-of-the-art technologies – from the initial idea through to the final product!

PRODUCTION is carried out at company-owned production sites around the world using high-tech equipment. More than 90% of the products in our portfolio are produced by SARSTEDT.

Our products are used directly on patients as well as in research and development laboratories and must therefore meet a high QUALITY STANDARD. We meet this demand through our modern integrated quality management system in accordance with EN ISO 13485.

International MARKETING & SALES of SARSTEDT products is primarily carried out via our 33 sales organisations. An extensive dealership network also attends to our customers’ needs.

Our team of skilled product specialists provides our customers with optimum and reliable advice and SERVICE.
Clinical Laboratories

Stand-Alone Solutions for Decapping & Recapping
- DC 1200
- RC 1200
- RC 1200 S

The Compact, Combined Solution for Decapping, Recapping and Sorting
- 900 Flex ID
- DC 900 Flex
- RC 900 Flex
- DC/RC 900 Flex

The Compact Standalone Aliquoter
- AL- Flex

Bulk Loader – An Efficient and Safe Solution for Sample Entry
- BL 1200
- HCTS2000 MK2

Modular Solutions for Complete Pre- and Post-Analytics
- HSS
- PVS 1625 / 2125 / 2625

Function Modules – The Choice is Yours

Microbiology

Petri Dish Organisation System
- POS 720/2

Petri Dish Transfer System
- PTS

Software

Consumables for Laboratory Automation

The SARSTEDT Product Range
The importance of laboratory automation has grown considerably in recent years. Saturated markets, intense competition and high cost pressures inevitably require the organisation, optimisation and automation of laboratory processes.

With more than 20 years' experience in the development, manufacturing and distribution of laboratory automation systems, we are competent consultants for our customers in this area. Our customer-specific automation solutions guarantee maximum flexibility and help you to make your processes safer, more effective and more economical.

As a provider of system solutions, we have a broad product portfolio of compact devices and modular automation solutions for pre- and post-analytical processes in clinical and microbiological laboratories. Our many years of experience and specialisation in pre- and post-analytics mean that we are able to respond to individual, complex laboratory requirements and offer customer-specific automation solutions for the laboratory processes in question. We have expertise in the following areas:

- Sample loading
- Sample identification
- Decapping of samples
- Aliquoting
- Recapping
- Sorting, distribution and archiving

We would be happy to discuss the options with you. You can find contact details on the back of the brochure.
Stand-Alone Solutions for Decapping and Recapping

**DECAPPING**

DC 1200
Automated **decapping** for tube diameters of 11–16 mm
- Tubes from various manufacturers with screw caps or push caps are opened in a mixed operation
- Decapping is carried out in the analysis rack – no reloading required
- Throughput of up to 1,200 tubes per hour
- Available for many common linear racks
- Prevents chronic repetitive strain injury (RSI)

RC 1200
Automated **recapping** for tube diameters of 13–16 mm
- Minimises evaporation
- Prevents contamination
- Archiving push cap fits all standard tubes with a diameter of 13–16 mm
- Automated re-processing (decapping/recapping)
- Throughput of up to 1,200 tubes per hour
- Available for many common linear racks
- Prevents chronic repetitive strain injury (RSI)

RC 1200 S
Automated **recapping with a screw cap** for Sarstedt tubes with a diameter of 13 or 15 mm
- Perfect recapping of tubes to preserve sample quality
  - Eliminates cross-contamination from previously used caps
  - Prevents evaporation
  - Fulfills all requirements for sample transport
  - Ideally suited for sample archiving
- Automated further processing (decapping/recapping)
- Throughput of up to 1,200 tubes per hour
- Available for many common linear racks
- Prevents chronic repetitive strain injury (RSI)
The compact, combined solution for decapping, recapping and sorting

DC/RC 900 Flex

- Pre- and post-analytics in the one compact device
- High throughput of up to 900 tubes per hour
- For tubes 11–16 mm in diameter
- Compatible with all common rack or carrier systems
- Online and offline operation
- Opens tubes with stoppers and screw caps
- Can sort by order, barcode, material, etc.
- Recapping of tubes with archiving push cap
- Closes 13 or 15 mm Ø Sarstedt tubes with screw caps, e.g. the S-Monovette®
- Can be retrofitted with decapping or recapping modules

The DC/RC 900 Flex combines pre- and post-analytics in a single compact standalone system. This ensures optimum utilisation of materials along with superior economic efficiency. Repetitive manual work, such as the strain of recapping and decapping sample tubes, is eliminated, thereby protecting human resources.

All tubes 65–100 mm in length and 11–16 mm in diameter are processed in a mixed operation without pre-sorting (other tube sizes can be accommodated upon request). Whether caps or screw caps, all caps are safely removed and disposed of hygienically.

The customisable working platform can be configured for common rack and carrier systems, for both analysers and archiving. The control software can be programmed with any tube-processing criteria and is designed for both online and offline operation. Tubes with a diameter of 13–16 mm are closed with an archiving cap. The modular concept makes it possible to include only the decapper or recapper module at first and then retrofit the other function at a later stage.
AL-Flex - The Compact Stand-alone Aliquoter

For subdistribution into secondary tubes

AL-Flex

- Intelligent volume management
- Contamination-free pipetting
- Integrated barcode labelling of aliquot tubes immediately before filling
- Compatible with aliquot tubes in three sizes
- All source and target carriers are freely configurable

To achieve the shortest analysis time possible, tests must be conducted on several analysis devices at the same time. For this purpose, sample material from a primary tube is distributed into one or several secondary tubes.

Compared with other pre-analytical work steps, the subdistribution of samples into secondary tubes is a slow process. It therefore benefits the throughput times of patient samples to separate this processing step from others in the preparation of samples. The AL-Flex provides the required technical solution for this.

Open primary tubes intended for subdistribution are loaded into the system in predefined source carriers. In the laboratory information system (LIS), a query for every primary tube retrieves the information required for the secondary tubes. The AL-Flex labels each secondary vessel with a copy of the primary barcode and pipettes the required volume into it. Conductive disposable tips facilitate precise fill-level measuring and contamination-free pipetting. Secondary and primary vessels are both transferred onto previously defined target carriers and manually brought to the analysis unit for further processing.
Bulk-Loader – Efficient and Safe Solutions for Sample Entry

Loading of unracked sample tubes

- Ideal in combination with any analysis line
- Sample tubes can be fed in bulk, no pre-sorting or pre-packing required
- Process any closed tube type 75–120 mm in length and 11–19 mm in diameter (each with cap), including those with false bottoms
- For all sample types (serum/plasma, serum gel/plasma gel, EDTA, citrate, blood sugar, urine)
- Integral ID module
- Automated sample entry accessioning
- Task-orientated sorting into a variety of carrier systems or bins
- Safe, rapid and error-free continuous operation

System range:
- BL 1200 – from bulk loader to rack
  - Throughput of up to 1,200 tubes per hour
  - Up to 600 tubes per platform sorting surface,
  - Up to 1,200 tubes with two platforms
- HCTS2000 MK2 – from bulk loader to bin
  - Throughput of up to 2,000 tubes per hour
  - Up to 22 distribution targets plus 1 faulty sample compartment
  - Up to 200 tubes per target bin

The innovative bulk loader completely revolutionises sample entry in the clinical laboratory. Closed specimen tubes (e.g. the S-Monovette®) are simply poured into the chute of the bulk loader, without having to handle each individual tube separately.

After mechanical separation, the tubes are identified by their tube type and ID number (barcode) via the integrated ID module.

According to customer specifications, samples can be distributed and sorted into centrifuge adapters, feeder/exit trays for laboratory lines, analysis device racks, standard carriers, BL 1200 archive carriers or HCTS2000 MK2 target bins. Tubes are distributed either according to pre-defined parameters or to sample-related information received from the LIS. Plausibility checks detect and separate out faulty samples.
Multifunctional concept with high sample throughput

- Sample accessioning
- Tube decapping
- Sorting into analyser racks
- Tube recapping after analysis
- Sorting tubes into archiving racks
- Pre- and post-analytics in one compact device
- High throughput of up to 1,200 tubes per hour
- Compatible with all common rack and carrier systems
- Barcode reader and camera for tube identification
- Recapping of tubes with archiving push cap
- Recapping Sarstedt tubes 13 or 15 mm in diameter with screw caps
- Can be retrofitted with decapping or recapping modules

At a throughput of up to **1,200 tubes per hour**, the HSS is ideally suited for rapid and efficient sorting of sample tubes before and after analysis tasks. Depending on the sample material, centrifuged or non-centrifuged tubes are placed directly onto the HSS feeder platform in their respective racks. The HSS registers the barcode and tube type, opens the sample tubes according to the workstation and then transfers them into any common rack types (e.g. Abbott, Beckman, Roche, Siemens, etc.) for analysis. After routine analysis, the sample tubes can be sorted again or taken directly from the analysis racks, recapped and transferred to archiving racks.

The customer-specific configuration of the layout for various carriers can be easily and completely modified by means of a **FlexPlate**, enabling the use of a variety of source and target carriers for routine or archival processing, for example.
Sample Distribution System PVS

Ideal for aliquoting...

PVS 1625

- All-in-one system for pre- and post-analytics
- Scalable from 1625 to 2625 track
- Ideal in combination with any analysis line
- Modular configuration according to customer needs with:
  - Sample loading in racks or in bulk
  - ID module
  - Decapper
  - Recapper
  - Aliquoter
  - Sorter
- For all common tube types: 13–16 mm in diameter and 65–100 mm in length
- Compatible with most racks and carrier types

The PVS 1625 is a tailor-made automation system for pre- and post-analytical processing of samples. It is not bound to a particular rack or carrier system, but can process any source or target carrier. As an open system, it is complementary to any analysis line or can be used independently.

Unracked sample tubes are loaded via the Bulk Loader (see p. 14) or in racks via the loading platform. This makes it equally capable of handling closed and open tubes.

ID modules for reading barcodes and identifying tube types are available.

Barcoded secondary tubes are produced and the requested volumes pipetted into them at the aliquoter. Sample mix-ups are eliminated and the available sample amount will be used in the most efficient way.

Two types of recapper modules are available for archiving or for send-out samples. Tubes are either closed with an archiving push cap (for any diameter between 13 and 16 mm) or with a screw cap (for Sarstedt tubes with a 13 or 15-mm diameter, e.g. S-Monovette®).

For aliquot tubes and caps, see p. 30.
Modular Design Ensures Maximum Flexibility

Assemble a system tailored to your individual needs!

Sample loading

- Identification
- Decapping
- Aliquoting
- Recapping
- Sorting/archiving

Modules

Closed sample tubes are loaded by pouring them into the chute of the Bulk Loader module without having to handle each individual tube separately. Alternatively, open or closed sample tubes in any rack or tray are placed onto the loading platform and fed from there into the system. Use of the FlexPlate provides the maximum number of options for sample carriers (see p. 17).

For precise sample processing, each tube must be identified by the barcode, which can also include information about the sample material to be analysed. The tube type is also identified to ensure trouble-free processing. ID modules with a range of functions are available for the reading of barcodes and identification of tube types via camera.

The decapper module removes screw caps and push caps alike. All tubes 11–19 mm in diameter and 75–120 mm in length (each with cap) are processed in a mixed operation and without prior sorting (different sizes upon request).

The push caps and screw caps are safely removed and disposed of hygienically.

The aliquoter produces barcoded secondary tubes and fills these with the requested volumes. Sample mix-ups are avoided and the available sample volume is used in the most efficient way. Refer to p. 30 for information on available secondary tubes.

The AMC module can pipette small volumes into multiwell plates or cluster tubes for space-saving long-term archiving or for bio-banking. This enables archiving to become part of routine processes – there is no need for a separate work step.

Two types of recapper modules are available. Tubes are either closed with a universal stopper suitable for any diameter between 13 and 16 mm, or with a screw cap for Sarstedt tubes (e.g. S-Monovette®) with a diameter of 13 or 15 mm.

The sample tubes are sorted according to analysis requests from the LIS (laboratory information system) or according to strict distribution rules, e.g. cap colour. All common rack and carrier systems can be used (see FlexPlate, p. 17).

For the Bulk Loader HCT32000 MK2, tubes are sorted into target bins for individual working areas.

Tubes sorted for archiving are logged with sample ID, carrier number, position on the carrier and time stamp. Complete sample tracking enables immediate access to all samples.
As product quality requirements increase and human resources decrease, the field of microbiology too must make increasing use of automation. New developments in collection materials and increasing standardisation are helping to take this process forward. Sarstedt has 20 years’ experience in this area too.

Our Petri Dish Organisation System makes the working steps required to prepare culture medium dishes more transparent, safer, and more efficient. Mix-ups are avoided while maintaining a consistently high throughput.

Our Petri Dish Transfer System makes laboratory processing procedures significantly faster by automatically transporting stacked sets of Petri dishes to workstations.
Petri Dish Organisation System

POS 720/2

• Labor-saving and easy to operate
• Reliable provision of all required Petri dishes
• Accurate machine-readable labelling of dishes with barcode and plain text
• Reliable identification of dishes throughout processing
• Additional labels for special media and bouillons available at the workstations

With POS 720/2, up to 700 Petri dishes per hour are labelled and stacked in sets in a fully automatic process.

Designed to accommodate 600 dishes (15 magazines of 40 dishes each), the system is characterised by high capacity and flexibility. Labelling and reading errors in microbiology laboratories are reduced and processes are made more transparent, improving quality and competitiveness.

Space for up to 8 stacks, each with 18 dishes

Dish magazine for up to 15 dish stacks
Stacker for dish sets
Dishes can be labelled on the side...
...or on the base
Petri Dish Transfer System

• System for transporting stacks of dishes to the workstations
• Customised configuration of the track length and route
• Labor-saving and easy to operate
• Reliable provision of all required Petri dishes
• Reliable identification of dishes throughout processing
• Additional labels for special media and bouillons available at the workstations

The Petri Dish Transfer System PTS transports the dish stacks pre-sorted by the POS 720 to the streaking stations. The system can be customised to meet individual customer needs and is free-standing and height-adjustable within a defined range. Laboratory tables and benches can be conveniently positioned close to the PTS.

The design is based on the individual requirement of the culture medium at the workstation in question. Samples are identified by barcode and the dishes required thus specified. These are sorted and labelled by the POS 720/2 and transported by the PTS to the required workstation.

Layout example for PTS with four workstations (AP1–AP4)
Intelligent distribution, transparent configuration and intuitive handling

The control and operating software is so versatile, just like the laboratory automation systems themselves. Software development, maintenance and system know-how are among Sarstedt’s areas of expertise.

Special features:
- Easy-to-learn system operation
- Swift and simple configuration
- Transparent system status layout
- Effortless sample tracking
- Optimal archiving sample administration
- Plausibility check
- Completeness check
- Easy access to information on faulty samples
- Comprehensive statistical functions

The program is available on a Windows-based touch panel PC which is an integral system component. As a “user interface”, it links both the user to the automation system and the automation system to the laboratory information system (LIS) or to any middleware installed. Enabling easy visualisation of system components, it displays internal sample transport paths, logistical transfer, the orientation and filling status of the carriers on the feeding and release platforms, as well as the current status of the functional modules.

There are almost no limits to the configuration of workstations, carriers, tests and the processing of special distribution rules and priority criteria. Information on the sample processing status and orders can be easily retrieved, and empirical data compiled and printed. The information storage period on the database can be defined according to customised requirements.

Communication between the automation system and the LIS proceeds in query or batch mode.
Following the introduction of automation in clinical labs, the requirements for blood collection tubes have changed. These tubes must comply with a range of defined preconditions for sample identification using barcode readers, centrifugation, decapping, recapping, subdistribution, and the transportation of samples in pucks in analysis lines. The S-Monovette® 7/8 x 13 mm is ideally suited to meet these requirements and available with any preparation.

Depending on the application, aliquot tubes are available in a diameter of 13 or 15 mm, with or without false bottom, and with a push or screw cap. If required, the tubes are automatically recapped. Screw cap tubes are ideal for long-term storage and transport.

Archiving push caps and screw caps

Archiving push caps for any tube 13–16 mm in diameter are ideal to minimise the evaporation of sample material during storage. Tubes can be automatically capped and decapped. Screw caps are recommended for long-term storage and transport.

A conductive black tip is used to dispense samples into aliquot tubes. The fluid level is determined conductively. During the pipetting process, the tip descends as the fluid level drops. The slim design enables pipetting from narrow tubes.

The universal block rack made from polypropylene is highly resilient, stackable and autoclavable. It makes an ideal target carrier for various workstations as well as an archiving rack. The double- or quadruple-block options, in particular, provide a space-saving solution for the storage of samples. Racks are available in a range of colours for easy identification and organisation.

Made from crystal-clear polystyrene, our Petri dishes for use with hot agar are heat-resistant to 80°C. Thanks to their enhanced dimensional stability, they are particularly suited for all automated processing steps from labelling, stacking, streaking and incubation through to automated analysis.

Blood Collection and Diagnostic Products
- Venous Blood collection
- Capillary blood collection
- Prepared tubes
- Urine and faeces collection
- Sputum vessels
- Miscellaneous tests

Laboratory Products
- Special tubes and centrifuge tubes
- Reagent tubes and screw cap micro tubes
- PCR, liquid handling, bacteriology
- Cell and tissue culture
- CryoPure freezing system
- Cuvettes, special vessels, micro test plates
- General laboratory products

Medical/Hospital Products
- Urine drainage systems
- Incontinence care
- Infusion/transfusion systems
- Transfusion medicine
- Anaesthesia
- Miscellaneous medical products

Medical/Laboratory Equipment
- Sample preparation
- Analysers
- Electrophoresis
- Thin-layer chromatography

Transfusion medicine
- Blood mixing and weighing devices and donor beds
- Tube sealing systems
- Incubators/agitators
- Cool transport and indicators
- Plasma thawers/warmers
- Blood bag systems and accessories
If you have any questions, we’d be happy to help!

Visit our website: www.sarstedt.com