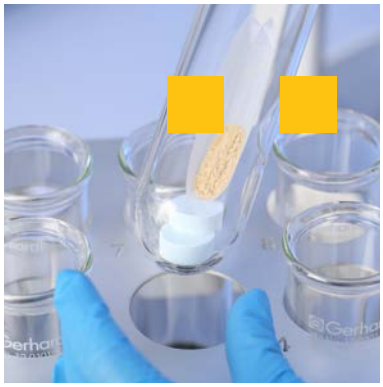
Gerhardt
Analytical Systems

KJELDATHERM, TURBOTHERM and VAPODEST

THE IDEAL KJELDAHL SYSTEM FOR ANY LABORATORY



SAFE

Reliable results and safe operation

FLEXIBLE

Comprehensive accessories for all sample types and sizes

RELIABLE

Uninterrupted process control and documentation

EFFICIENT

Sophisticated technology and adjustment options enable rapid sample runs

THE KJELDAHL ANALYSIS SYSTEM

A high degree of precision and universality make the Kjeldahl method the world's dominant standard method for determining the nitrogen content in food and animal feed as well as in soil and water samples. It can be used flexibly and universally, including with inhomogeneous sample material, and always provides reliable results.
C. Gerhardt offers you a complete package from start to finish: from tailoring everything to your needs, through to reliable laboratory runs at the end of the process.

UNSURPASSED FLEXIBILITY

LARGE RANGE OF EQUIPMENT AND ACCESSORIES

We offer different digestion and distillation systems, including matching accessories, depending on the type and volume of samples you need to handle. The components of your Kjeldahl system can be configured so that they will fit perfectly into your everyday laboratory work: There are infrared and block digestion units to match your needs, with or without lifts, and with various control systems. A large range of tube sizes and insert racks with different numbers of sample places enable individual configurations to fulfil your requirements.

DIGESTION UNITS

KJELDATHERM – the new block heating system

- Aluminium block for uniform and precise heating
- Ideal for large sample numbers
- Automated processes and methods
- For tube sizes of 100, 250 or 400 ml
- Convenient operation and lift function
- Standardised conditions for digestion
- Precise temperature/time control
- Data export for documentation & traceability of the process
- Eco Kit for rapid heating up and cooling down (optional)

TURBOTHERM – infrared heating system

- Rapid heating and cooling of samples
- For smaller samples numbers
- Ideal for strongly foaming samples at high volumes (e.g. sewage or sludge)
- Flexible applications: suitable for tubes with different volumes (100, 300, 400 or 800 ml)
- Data export for documentation & traceability

All digestion units can be combined with the effective VACUSOG (without water connection) and TURBOSOG fume scrubbers.

WATER STEAM DISTILLATION SYSTEMS

VAPODEST – steam fast distillation system

- Meets national and international standards
- Flexible use of different tubes
- High level of safety and reliability
- Library of predefined methods and creation of own methods
- Modern control system with different user levels
- Data transfer via import/export/dashboard or peripheral equipment such as bar code, scales, keyboard etc.
- Depending on the configuration of the VAPODEST model, there are different levels of automation

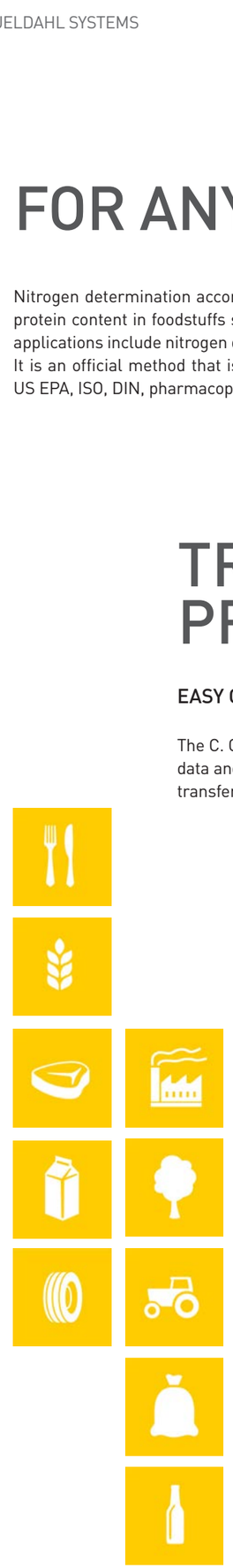
FOR ANY LABORATORY

Nitrogen determination according to the Kjeldahl method is used to calculate the protein content in foodstuffs such as drinks, meat, cereals and animal feed. Other applications include nitrogen determination in wastewater, soils and other samples. It is an official method that is described in various standards, such as the AOAC, US EPA, ISO, DIN, pharmacopeia and various international guidelines.

TRANSPARENT PROCESSES

EASY OPERATION AND DATA INTEGRITY

The C. Gerhardt Dashboard makes it very easy to enter sample data and then analyse it later. The data can for example be transferred to the VAPODEST 500 via the network.



WE SERVE YOUR INDUSTRY TOO!

Each industry has to comply with very specific provisions and standards when it comes to assessing raw materials, the production process and quality checks of finished products. At C. Gerhardt, we are very familiar with the day-to-day operations of a high-throughput laboratory. We are also well acquainted with the specific analytical challenges that each laboratory sector faces. Every laboratory has its own specific needs.

The Kjeldahl method is a reference method in nitrogen and protein analysis; analysis using our equipment fulfils most different national and international standards, a small selection of which is listed below:

- Meat: ISO 937
- Agriculture/fertilisers: AOAC 955.04
- Milk and dairy products: ISO 8968-1, AOAC 939.02
- Environment: ISO 5664, DIN 38406-5
- Foodstuffs: ISO 20483, AOAC 920.152

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Does your industry involve animal feed, beer, industrial applications, cereals, environment ...?
Our equipment can also be used here! Get in touch with us.

MAXIMUM ANALYSIS QUALITY

THANKS TO AUTOMATION, STANDARDISATION AND TECHNICAL PRECISION

The validity and consistency of your results are your prime asset. To keep the results largely unaffected by external influences, we automate the digestion and analysis processes as far as possible. Tried and tested C. Gerhardt applications make your work easier when dealing with new analysis tasks, in addition to providing you with a reliable basis for the highest quality of analysis.

Our KJELDATHERM block digestion systems have a precise temperature control system. Heating times and temperatures are maintained exactly and monitored. In combination with the special C. Gerhardt KJELCAT catalyst, you can therefore achieve perfect digestion results that can be reproduced at any time.

Our VAPODEST distillation systems provide documentation and operating functions based on the internationally applicable quality standards DIN EN ISO/IEC 17025 and GLP. Sturdy pumps control the addition of reagents with high precision. The steam can be regulated continuously from 0 to 100 percent, making it possible to perform special distillations. The unique, programmable "soft-start" function prevents strong reactions in the samples.

"As early as 1884, C. Gerhardt began building and selling the first digestion and distillation equipment according to Kjeldahl method."

UNCOMPROMISING SAFETY

Safety is the top priority when it comes to our equipment. For this reason, all our systems have comprehensive protective equipment. Here is a brief sample:

KJELDATHERM

- Safety window and lighting
- Drip tray for acid
- Exhausting manifold unit for resultant fumes
- Removable controller for operation outside the fume cupboard
- Overheating protection and overcurrent circuit breaker
- Visual and acoustic error messages
- Optional: stable lift for automatic, convenient lifting of the samples out of the block in order to cool the samples
- Eco Kit for optimising the heating times and cooling phases

TURBOTHERM

- Secure hook-on insert rack for cooling the samples
- Suction unit for resultant fumes
- Special electrical protection
- Improved construction prevents contact with hot elements
- Removable drip tray
- Overcurrent circuit breaker
- Rapid cooling of the heating elements

VACUSOG/TURBOSOG

- Optimum exhausting and neutralisation of aggressive acid fumes
- Separation and scrubbing of acid fumes in an upstream, two-stage preseparator
- Easy to clean
- The VACUSOG without water connection is almost maintenance-free; the activated carbon filter rarely needs to be changed
- Optional system with quick-release screw cap fastener and cooling water regulation

VAPODEST

- Transparent protection door: Can only be operated when the door is closed
- Multiple safeguards on steam generator
- SELV, Safety Extra Low Voltage - Electronic protection
- Self-diagnosis function: performance and function of all components are constantly monitored automatically
- Level sensors for chemical canisters - No need to decant chemicals

For more detailed information on the accessories and consumables, please request our product data sheets.

COMPREHENSIVE RANGE OF ACCESSORIES

In addition to our analysis equipment, we offer a wide range of accessories and consumables. These were specifically developed and tested for use in our equipment and help ensure excellent analysis results.

LARGE RANGE OF SAMPLE TUBES, INCLUDING FOR NON-KJELDAHL APPLICATIONS

Different tube sizes and shapes can be used for every conceivable application, expanding the possibilities many times over.

- 250 ml, 400 ml, 800 ml and 1,200 ml sample tubes
- 100 ml micro digestion tubes
- 250 ml, 500 ml and 750 ml Kjeldahl flasks

KJELCAT CATALYST TABLETS

Highly effective catalyst tablets for a wide variety of applications. Perfectly coordinated for use with C. Gerhardt digestion units. Available in packaging units of 1,000 pieces.

- KJELCAT catalyst tablets, e. g. type Se, Cu, CuTi or Cu light
- Anti-foaming tablets for strongly foaming samples

LEVEL CONTROL SENSORS FOR CANISTERS

Reliable level control sensors can be connected to VAPODEST for automatic fill level monitoring of the canisters. When a specific fill level is reached, a corresponding message is shown on the display and the distillation is paused.

- Level control sensors for chemical tanks and sample waste canisters

KJELDATHERM

KJELDATHERM – digestion block heating system

- Automated for large numbers of samples (8–40 tubes)
- Flexible – suitable for many samples
- Complies with ISO 9001, ISO 17025 and GLP
- Optional, convenient lift function for automatic lifting of the insert racks
- Selection of predefined methods or individual programming
- Data export for LIMS
- Can be used for standard-compliant results (e.g. DIN EN ISO, AOAC, EPA, ASTM, EU Directive, APHA, Ph.Eur. 2.5.33 Method 7, Procedure A, etc.)
- On request: password-protected system with user management and logging of analyses
- Transparent and illuminated components
- Maximum safety and reliability
- Intuitive, removable control unit
- Programmable temperature/time control
- Comprehensive range of accessories, such as fume scrubbers, numbered insert racks, Eco Kit etc.

Lift function

Acid fume-protected surface

Inspection window

Sturdy surface

Intuitive menu navigation

Removable control unit

Insulated handle

Illumination

Circuit breaker

PREMIUM KJELDAHL SYSTEMS

"The variety of our accessories range is unsurpassed. We can satisfy any requirement."

OVERVIEW OF KJELDATHERM MODELS

KJELDATHERM AUTOMATIC

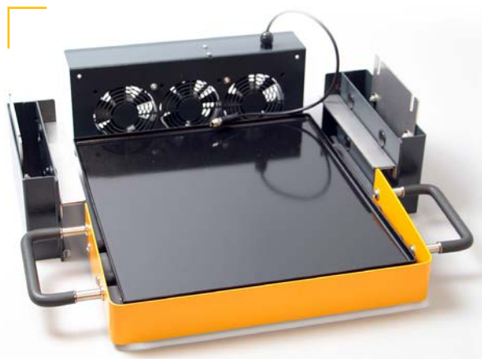
Automatic digestion unit **with lift function**, programmable controller unit, including data management, illuminated digestion chamber, **pre-heat function**, can be expanded with **tube cooling function** and **heat-retention device**

Type	Heating places	Tube sizes
KTL 8s	8	250 ml
KTL 8s-BS	8	400 ml
KTL 20s	20	250 ml
KTL 20s-BS	20	400 ml
KTL 40s	40	100 ml

KJELDATHERM

Digestion unit **without lift function**, programmable controller unit, including data management, illuminated digestion chamber, **pre-heat function**, can be expanded with **tube cooling function** and **heat-retention device**

Type	Heating places	Tube sizes
KT 8s	8	250 ml
KT 8s-BS	8	400 ml
KT 20s	20	250 ml
KT 20s-BS	20	400 ml
KT 40s	40	100 ml



KT Eco Kit

The KT Eco Kit, consisting of a thermoplate (available for KT 20s or higher) and fan, is the perfect enhancement for laboratories with a high sample throughput and modern energy efficiency standards.

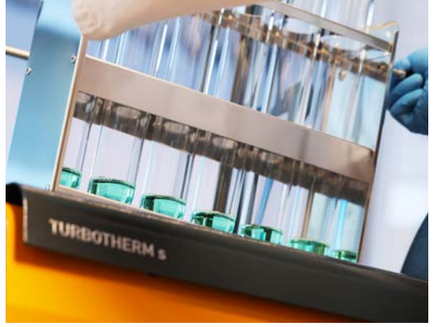
BENEFITS:

The heating up and cooling down times for the samples are reduced significantly.

TURBOTHERM

TURBOTHERM – digestion infrared heating system

- Universally usable with sample tubes of different volumes (100 to 800 ml)
- Rapid heating and cooling of samples
- High level of safety and reliability
- Energy/time control
- Suitable for large sample weights
- Very well suited to strongly foaming samples at high volumes (e.g. sewage or sludge)
- Convenient and ergonomically adjustable controller unit with colour display
- Electronic control with up to 99 programs
- ISO 17025-compliant data management: Traceability, user management and logging of analyses
- Methods library with predefined methods
- Ideal for smaller numbers of samples
- Documentation of the temperature in the heating chamber for optimal process tracking (optional)



OVERVIEW OF TURBOTHERM MODELS

Type	Places	Tube sizes
TTs 625	6	250 ml
TTs 125	12	250 ml
TTs 440	4	400 ml
TTs 480	4	800 ml
TTs 100	12	100 ml

Temperature kit (optional)
The current digestion temperature is recorded and shown on the display. For optimum process control, the temperature behaviour is documented in a traceable manner over the entire digestion time (installation of the temperature sensor can only be carried out at the factory).

MULTI-LEVEL CONSOLE

The multi-level console makes it possible to hook both the insert rack and the exhaust manifold onto the apparatus. This ensures that work is safe, space-saving and convenient.

DIGESTION MODE

COOLING AND STAND-BY MODE

FUME SCRUBBER

Powerful, infinitely variable fume scrubber system for separating out and neutralising the inorganic acid fumes that are generated during Kjeldahl digestion.

The **VACUSOG** without water connection or **TURBOSOG.**

Ideal accessories for all C. Gerhardt **KJELDATHERM** and **TURBOTHERM** digestion units and classic digestion apparatus with exhaust.

VAPODEST

VAPODEST – Automated steam distillation system

- Different levels of automation
- Transparent processes
- Intuitive operation and methods library
- Data management ISO 9001, ISO 17025, GLP
- Safe, high quality and transparent design with protection functions
- High level of safety and reliability
- Intelligent accessories, such as level sensors for chemical canisters, large range of tubes
- User levels with different rights
- Fulfils national and international standards
  (e.g. DIN EN ISO, AOAC, EPA, ASTM, EU Directive, APHA, Ph.Eur. 2.5.33 Method 7, Procedure A)
- Data export e.g. to LIMS
- Language selection
- Tamper-proof data storage

C. Gerhardt Dashboard –

EASY OPERATION AND DATA INTEGRITY

The Dashboard makes entering and then analysing sample data easy. The data is transferred to the VAPODEST 500 / 500 C via the network.

- VAPODEST 500 can be integrated into any network via LAN
- Any number of devices can be connected to the Dashboard
- Easy data entry and sample evaluation
- Clear user management with unique permissions
- Convenient connection of peripheral devices (printer, scales, bar code scanner and integration in LIMS)
- Data can be imported and exported to and from LIMS
- Data processing meets requirements of GLP, ISO 17025

TITRATION = PRECISION WORK

The built-in titration unit evaluates the analysis by means of a pH combined electrode and potentiometric automatic endpoint determination. The titration solution is dosed using an almost wear-free, high-precision calibratable micro dosing pump.

- Stable flow rates
- Virtually unlimited running time
- Flow rate can be calibrated
- Online titration for quicker analyses
- Maximum precision and transparency of process parameters with pH measurement
- Automatic endpoint detection for each sample

ACCESSORIES

Canisters, level control sensors for canisters, catalyst tablets, sample tubes in various sizes and further accessories are available on request.

OVERVIEW OF VAPODEST

The VAPODEST series is available in different levels of automation. From the simple smart version for small numbers of samples, to fully automated systems with integrated titration and autosampler for a high sample throughput. All the devices are compatible with a wide variety of Kjeldahl digestion tubes and flasks.

VAPODEST 200 – 400

Smart distillation systems

with low numbers of samples for flexible laboratories

VAPODEST 200
Convenient fast distillation system with 7" touch display. Thanks to the stepless programming of the steam output, it is also ideal for alcohol determination and other distillations.

VAPODEST 300
Ideal starter device for Kjeldahl digestion solutions, since water and sodium hydroxide can be added automatically and the hot and distilled sample can be extracted. Same equipment as a VAPODEST 200 but with programmable addition of water and extraction of sample waste.

VAPODEST 400
The apparatus is suitable for all laboratories with a varied sample throughput and strict requirements when it comes to an error-free distillation process. The additional, programmable addition of boric acid makes the apparatus even easier to use when handling chemicals.

VAPODEST 450

Automatic analysis system with external titrator

For all laboratories with a varied sample throughput

VAPODEST 450
The distillation system offers a complete program run for a reliable analysis. By connecting an external titrator, VAPODEST 450 offers a complete analysis system.

Additional functions if operated with a titrator
- Automatic endpoint titration
- Displays consumption of titration solution
- Displays pH value

C. Gerhardt offers two models
- Complete system, including titrator
- Complete system without titrator, but prepared for operation with an external titrator

VAPODEST 500

Fully automated system for precise analysis

with integrated titration and data handling via the CG Dashboard

VAPODEST 500
VAPODEST 500 is the highlight of the current VAPODEST series and features outstanding characteristics for all laboratories that value a fully automated process with comprehensive documentation and high-precision results.

The apparatus helps you in your daily routine analyses. For example, you can reliably transfer the sample weight directly with the balance interface. After the analysis is complete, all the results are calculated and displayed immediately and can be printed out, if desired. The results can be printed out individually or all together once the entire series is complete.

The "CG Dashboard" data software makes it possible to transfer all data effortlessly via the internal laboratory network to the VAPODEST 500 unit.

VAPODEST 500 C

Fully automated distillation system with autosampler

with integrated titration and automatic autosampler

VAPODEST 500 C
Distillation system with automatic sample feed for a fully automated analysis process in the laboratory. The samples are transported directly out of the carousel into the VAPODEST 500 distillation system. The sturdy pneumatic technology ensures a completely reliable functional sequence.

The device is designed for continuous operation with large sample numbers. The time that operators need to be physically present at the apparatus is reduced to the time spent loading the sample tubes and filling the chemicals. A series of analyses can consist of up to 20 samples and can include samples, blank samples and standards.

The storage tanks have plenty of space for sufficient quantities of chemicals. Commercially available canisters can also be used, meaning there is no need to decant chemicals.

Type	Programmable addition of NaOH	Programmable addition of H_2O	Programmable addition of H_3BO_3	Suction for sample waste	Automatic titration	Suction receiver	Automatic autosampler
VAP 200	•	--	--	--	--	--	--
VAP 300	•	•	--	•	--	--	--
VAP 400	•	•	•	•	--	--	--
VAP 450	•	•	•	•	--	•	--
VAP 450 w. titration	•	•	•	•	with external titrator	•	--
VAP 500	•	•	•	•	with integrated titration	•	--
VAP 500 C fully automated	•	•	•	•	with integrated titration	•	•

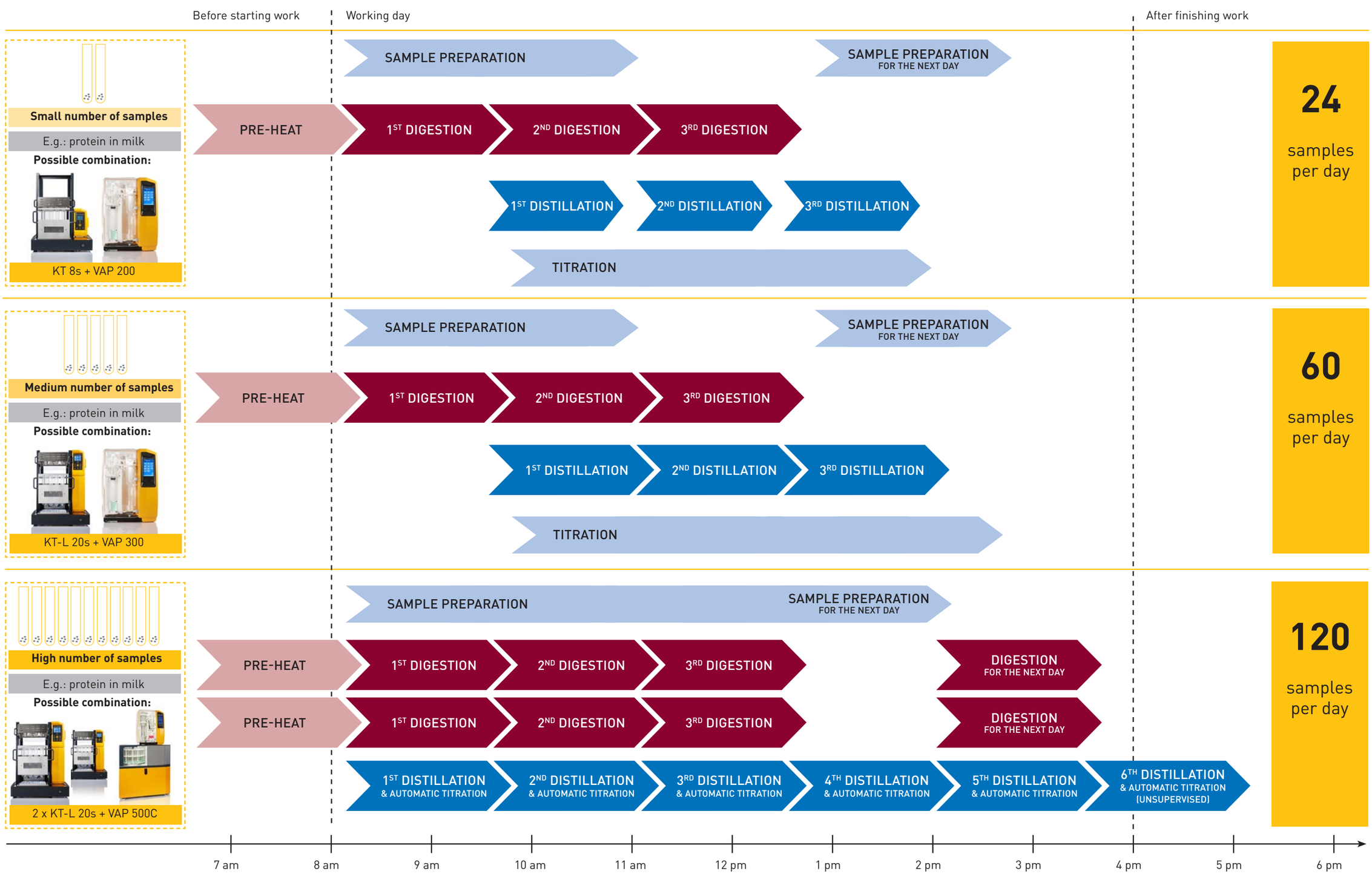
PREMIUM KJELDAHL SYSTEMS

THE OPTIMUM SYSTEM FOR YOUR INDUSTRY

The timeline shows the maximum possible sample quantity per working day (8 h) on the basis of various devices combinations involving KJELDATHERM digestion units and VAPODEST distillation systems. The prerequisite for the actual sample throughput is an error-free analysis run for all samples. Depending on the sample type and the specifications, digestion and distillation times and device combinations can all vary.

EFFECTIVELY EXTEND THE WORKING DAY

Depending on the level of automation in the individual systems, you have the option of extending the working day. The programmable pre-heat function warms the digestion blocks up to the desired digestion temperature before the working day begins. This way, you can start digestion as soon as you start work in the morning. Once the working day is over, VAPODEST can analyse up to 20 samples more, fully automated and without supervision.



MANUAL KJELDAHL ANALYSIS

For laboratories with small number of samples, C. Gerhardt offers individual heaters, serial heaters and flask heaters in its range. These apparatus are the result of years' of experience.
Thanks to the comprehensive range of accessories, laboratory heaters from C. Gerhardt can be expanded to form classic distillation equipment, digestion apparatus and extraction apparatus. All laboratory heaters meet today's regulations and directives.

DIGESTION APPARATUS

Apparatus for classic, manual Kjeldahl digestion.

For Kjeldahl flasks of sizes 50, 100, 250, 500 and 750 ml. Each heater can be adjusted individually and continuously. With efficient glass exhaust manifold (with adapters tailored to the flask size), Kjeldahl flasks, stands and mains cable.

DISTILLATION APPARATUS

Apparatus for classic, manual Kjeldahl distillation.

For Kjeldahl flasks of sizes 50, 100, 250, 500 and 750 ml. Each heater can be adjusted individually and continuously. With Kjeldahl flasks, Reitmair tops, condenser tubes, discharge tubes, Erlenmeyer flasks, all rubber connectors, stands and mains cable.

KJELDAHL COMBINED APPARATUS

The space-saving alternative to two individual pieces of equipment.

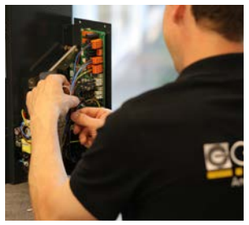
Combined apparatus for classic, manual nitrogen determination using the Kjeldahl method.

SERVICE AND MAINTENANCE

C. Gerhardt products are quality products for daily routine operation in the laboratory. We only use high quality materials with long service lives to provide you with maximum functionality and reliability.

Laboratory equipment is exposed to high load. Acid fumes, heat and high sample throughput leave traces on every device. As a result, tubes, seals, pumps and glass parts have to be checked and cleaned at regular intervals and replaced, if necessary.

A maintenance and service agreement from C. Gerhardt maintains the serviceability and reliability of your digestion and distillation equipment. Maintenance can also be performed in accordance with DIN 31051, if desired.



SCOPE OF MAINTENANCE FOR VAPODEST (depending on apparatus type)
- General visual inspection and cleaning
- Replacement of steam and extraction tubes
- Cleaning the steam system
- Check of the pump delivery volumes
- Check/calibration of the autosampler
- Software update (if available)
- Complete functional test
- Analytical check with standard solution
- Electrical check according to VDE 0701
- Documentation of the work performed
- Issue of a test sticker

SCOPE OF MAINTENANCE FOR KJELDATHERM/TURBOTHERM
- General visual inspection and cleaning
- Check of lift mechanism (if present)
- Visual inspection of heating elements (TURBOTHERM)
- Electrical check according to VDE 0701
- Documentation of the work performed
- Issue of a test sticker

OTHER SERVICES
- Repairs on-site or on the premises of C. Gerhardt
- Cost estimates
- Help by telephone or E-mail
- Individual solutions for your equipment pool

IQ/OQ/PQ QUALIFICATION
We also perform IQ/OQ/PQ in accordance with our manufacturer specifications for these products.

Our authorized C. Gerhardt Partner is happy to develop an individual maintenance and service contract with you for equipment from our company.

Presented by:

C. Gerhardt – Quality made in Germany

AUTOMATING STANDARD ANALYSES

C. Gerhardt have developed highly specialised equipment for the complete automation of certain analyses. They automate recurring analysis processes in accordance with national and international standards and norms. They continuously provide precise and reproducible analysis results quickly, at low cost, economically and highly efficiently.

An excerpt from our product portfolio

COMPLETELY AUTOMATIC HYDROLYSIS

HYDROTHERM – automatic acid hydrolysis system for fat determination according to Weibull-Stoldt. When combined with SOXTHERM, HYDROTHERM is an ideal system solution for total fat determination.

COMPLETELY AUTOMATIC FAT EXTRACTION

SOXTHERM – automatic fast extraction system for fat determination

COMPLETELY AUTOMATIC NITROGEN ANALYSIS

N-Realyzer – nitrogen/protein determination of solid and liquid samples according to the Dumas combustion method. A cost-efficient, fast and convenient alternative to the classic Kjeldahl method for almost all sample matrices.

COMPLETELY AUTOMATIC CRUDE FIBRE EXTRACTION

FIBRETHERM – completely automated processing of the boiling and filtration processes for determining crude fibre, ADF and NDF.

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Gerhardt
Analytical Systems

C. Gerhardt GmbH & Co. KG
Cäsariusstraße 97 · 53639 Königswinter · Germany
Tel.: +49 (0) 2223 2999-0 · www.gerhardt.de