Highly Precise Analysis in the Laboratory

With the introduction of the VAPODEST distillation systems C. Gerhardt has set new standards in today’s worldwide analytical instrument market. Whenever, highly precise analysis results are needed - C. Gerhardt has the answer.

VAPODEST offers solutions for demanding tasks in tomorrow’s lab. All systems have an automatic steam generator with a steam output, which can be set between 30 - 100%, thus all common distillations can be handled easily. Since the instrument is kept in stand-by mode when it is not needed, energy is saved but an immediate start of an analysis is also possible at any time. A wide range of distillation times can be programmed. Typically Kjeldahl-distillations are finished in 2-4 minutes.

The VAPODEST models with improved distillation time range from a semi-automatic distillation system, the VAPODEST 10s, to a fully automated distillation and titration system, the VAPODEST 50s carousel with autosampler and control via PC.

Operation via Operator Button

The instrument is operated very easily using an operator button. All steps of the analysis and programming, as well as error messages are clearly visible in the display. Suction and addition of chemicals can be programmed or done manually using the chemical resistant key board.

Safety in the Laboratory

- Transparent Protective Door
  Offers protection against splashes and facilitates observation of the distillation process.
- Safety Functions
  Distillations can only be started when the tube is inserted properly and the protection door is closed.
- Monitoring Functions
  Should there be any malfunction, the analysis is stopped or aborted immediately.
- Automatic Steam Generator
  Pressure control and overheating protection of the steam generator offer absolute protection.

Resources in the Laboratory

- Saving energy - Stand-by mode
  The instrument switches automatically to the stand-by mode during non-operation periods. During the stand-by mode the steam power is maintained. This feature ensures full steam power for distillations even after long breaks.
- Saving Cooling Water
  When the equipment is in the stand-by mode the cooling water supply is cut off automatically.

Quality in the Laboratory

- Direct Addition of Water Steam
  Optimal blending of the sample, so that crystallized digestion solutions are liquefied in seconds.
- High Quality Material
  All materials used have been tested intensively in Gerhardt’s own application lab.
- Plastic Housing
  Corrosion caused by chemicals is practically impossible. Thus, the life span of the instrument is increased dramatically.

Operation via PC - VAPODEST Manager

Model VAPODEST 50s and VAPODEST 50s carousel are operated via PC using the controlling software VAPODEST Manager. This software offers extensive documentation as well as monitoring functions and meets the requirements for certified laboratory management (more information on this matter can be found on page 9).
VAPODEST 20s
This rapid distillation system is extremely easy to operate due to the microprocessor control and the option to store up to 10 different methods. The reagents are added automatically and in addition to that feature, the reaction time can be programmed as well. This is extremely helpful for special distillations like the detection of nitrate with Devarda’s alloy. Classical applications like alcohol or ammonia distillation are of course no problem with this unit as well.

System configuration
- Programmable addition of reagent
- Distillation time can be set
- Programmable steam power, 30 - 100 %
- 10 programs can be stored and recalled
- Optical and acoustical error messages
- Complete with set of tubing and digestion tube
- Language selection

VAPODEST 30s
In addition to the features of the VAPODEST 20s mentioned before, the VAPODEST 30s has a programmable, automatic addition of water as well as a programmable, automatic suction of the sample residue. Thanks to these options, the instrument is the perfect distillation unit for all Kjeldahl-digestion solutions, as all required reagents can be added automatically. Any remaining, distilled sample residue can be withdrawn by suction automatically and put directly into the residue tank.

System configuration
- Programmable addition of reagent
- Programmable addition of H₂O
- Distillation time can be set
- Programmable steam power, 30 - 100 %
- 10 programs can be stored and recalled
- Time for suction of sample residue can be set
- Optical and acoustical error messages
- Complete with set of tubing and digestion tube
- Language selection

VAPODEST 45s
VAPODEST 45s is a programmable distillation system specifically for Nitrogen and Kjeldahl analysis. Up to 20 programs can be stored and called up on demand. VAPODEST 45s is prepared to take an external titrator so that the titration can be run automatically after the distillation.

System configuration
- Addition of H₃BO₃
- Addition of H₂O
- Addition of NaOH / reagent
- Reaction time
- 20 programs can be stored and recalled
- Distillation time can be set
- Programmable steam power, 30 - 100 %
- Time for suction of sample residue can be set
- Optical and acoustical error messages
- Complete with set of tubing and digestion tube
- Language selection

Additional Functions when operated with Titrator
- Endpoint titration automatic
- Display of consumption of titration solution
- Display of pH-value

C. Gerhardt offers two models
- VAPODEST 45s, complete with titrator
- VAPODEST 45s, [without titrator] prepared for the connection of an external titrator

Order information see page 13
Sets of tanks with or without level sensor are available for all VAPODEST models as an option.
Fully Automatic Distillation System with Titration and Control via PC

The flagship of the Gerhardt VAPODEST range is the VAPODEST 50s. This fully automatic distillation system with integrated titration and control via PC (VAPODEST Manager) combines precision and comfort. The design of the corrosion-free plastic housing and arrangement of the distillation components offers ideal conditions for running the distillation.

All program procedures can be monitored and followed in the display. Control, data processing and definition of applications are managed by user-friendly controlling software VAPODEST-Manager. Besides control via PC the VAPODEST operation button offers fast operation of the instrument.

VAPODEST 50s offers outstanding characteristics for all labs which put an emphasis on a fully automated procedure with vast documentation options and highly precise results.

**Routine Analysis – Made Easy**

Many laboratories have to run a big number of different samples or work according to different methods day-in day-out. VAPODEST 50s supports you with your daily routine analysis. Thus, using data communication, the initial weight can be transferred efficiently and directly using the balance interface.

If required, any number of programs can be pre-defined and processed for all kinds of sample types. After terminating the analysis, all results can be calculated and displayed immediately as well as printed out if required. The design of the print-out can be defined according to your needs. Either all results of a series are displayed one after the other or each individual sample result is displayed separately on a sheet.

All analysis data can be collected in a database for monitoring and documentation purposes as well as printed out. For further processing of the data, they can be imported or exported with an excel program.

**Titration – Precise Work**

The titration unit is fully integrated for the evaluation of the analysis using a potentiometric, automatic endpoint recognition with a pH-electrode. As an option the titration can be done during the distillation (online titration). In such a case the duration of the analysis is reduced considerably. Dosing of the titration solution is done with the highly precise and almost maintenance-free, ceramic micro dosing pump which can be calibrated.

- Accuracy of micro dosing pump +/- 0.2 %
- Nearly unlimited life span
- Flow rate can be calibrated
- Online-Titration for fast analysis

**VAPODEST Manager - Everything under Control**

VAPODEST Manager is a powerful control and data processing software of the distillation units VAPODEST 50s and VAPODEST 50s carousel.

- Easy operation using common Windows technology
- At any given time, the user has an overview of all working conditions and running analyses
- Sample data can be imported and exported via balance, barcode scanner or LIMS-system
- Documentation of all relevant data and procedures in a log book
- Various user levels for transparent work organisation
- Application library for various applications
- and many more features

**Remote Diagnosis Worldwide**

The user has the option of a remote diagnosis via internet. This way, minor problems or error messages can be solved fast and easily by a service engineer. Furthermore, updates can be installed quickly.

**Auto Sampler**

For labs with high sample throughput and/or continuous operation C. Gerhardt offers the fully automated distillation system VAPODEST 50s carousel with an auto sampler for up to 20 samples (see page 8).

Order information see page 13

Sets of tanks with or without level sensor are available for all VAPODEST models as an option.
VAPODEST 50s carousel - Fully Automatic Distillation System with Autosampler

**VAPODEST 50s carousel - Fully Automatic Distillation System with Autosampler**

**Distillation System with Autosampler, Titration and Control via PC**

This model is Gerhardt’s solution for the most sophisticated lab requirements: the distillation system with automated sample feed for fully automated analysis. The sample tubes are taken from the carousel and fed directly into the VAPODEST 50s for further processing. This robust system, based on a pneumatic drive ensures very reliable running. Furthermore, all functions are checked continuously by an error diagnosis system.

**Routine Analysis**

This model was developed for continuous operation with high sample throughput. The operator time required is reduced; by loading up to 20 samples for automatic analysis and can contain samples, blanks and standards. Storage tanks contain sufficient volume of chemicals for all the analyses (2 x 20 litre, 2 x 10 litre, 1 x 5 litre).

**Types of Carousel**

Different sizes of carousel (optional) allow the processing of various sizes of sample tubes, e.g.:
- 20 x 250 ml tubes
- 16 x 400 ml tubes
- 12 x 800 ml tubes

Carousel handling, exchange and cleaning is very easy.

**Protection Hood**

For safety reasons a transparent hood covers the carousel.

**Storage Tanks**

The level of the tanks is monitored constantly and they are stored conveniently in a drawer, saving valuable bench space.

**Order information see page 13**

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**VAPODEST Manager**

**Modern Controlling Software**

**VAPODEST Manager** is a powerful control and data processing software for the distillation unit VAPODEST 50s and VAPODEST 50s Carousel.

In the menu settings, the parameters of the operation and the configuration of the instrument are defined. This includes among other things, the settings, language, connection to the balance, import and export of sample data in CSV format as well as entering the titration parameter.

In the service module, calibration of the pumps and the titrator are done. Various levels of users allow a result oriented and transparent organisation of labour. It is possible to find out who has analysed what sample at what time. Masks are used for compiling the methods, which allows easy setting of the parameters.

Titration options include online titration to speed the process, automatic or fixed recognition of the endpoint, check of blank value and standard substances. The calculation of the results can be done using various formulae or can be done freely.

The print out presents all data relevant for the sample and user.

**Main Functions**

- **System setting**
  Functions for selection of language, basic functions, calibration of the pumps, pH-calibration, titration functions, statistics about the instrument, and many more features.

- **Create a method (Programming)**
  Determine program parameters for the various methods, store and administer them. All parameters necessary for controlling the distillation/titration are defined as well.

- **Sample input**
  Defining the series and input of sample data e.g. the sample name, weight, kind of sample etc. A series can have up to 20 samples, which can be different sample types, blank samples and standards.

- **Execution of method**
  Start analysis and monitor status of analysis. All steps of the analysis are monitored continuously.

- **Table of results**
  Display of the results, administration of results, information about running of analysis, import and export of table with results, and much more.

**Quality Control**

- Setting up program libraries
- Assigning of administrator rights
- Traceability of all analysis data like date, results, user, program data, error etc
- Print out of serial and single samples
- Result data with filter and sorting functions and many more.
### Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>VAP 20s</th>
<th>VAP 30s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cooling water consumption per min.</strong></td>
<td>5 l</td>
<td>5 l</td>
</tr>
<tr>
<td><strong>Distillation time / sample</strong></td>
<td>2-4 min.</td>
<td>2-4 min.</td>
</tr>
<tr>
<td><strong>Recovery rate %</strong></td>
<td>&gt; 99</td>
<td>&gt; 99</td>
</tr>
<tr>
<td><strong>Dimensions (W x d x H)</strong></td>
<td>440 x 340 x 690</td>
<td>440 x 340 x 690</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>25 kg</td>
<td>29 kg</td>
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</table>

<table>
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<tr>
<th>Type</th>
<th>VAP 35s</th>
<th>VAP 50s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cooling water consumption per min.</strong></td>
<td>5 l</td>
<td>5 l</td>
</tr>
<tr>
<td><strong>Distillation time / sample</strong></td>
<td>2-4 min.</td>
<td>2-4 min.</td>
</tr>
<tr>
<td><strong>Recovery rate %</strong></td>
<td>&gt; 99</td>
<td>&gt; 99</td>
</tr>
<tr>
<td><strong>Dimensions (W x d x H)</strong></td>
<td>440 x 340 x 690</td>
<td>440 x 340 x 690</td>
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<tr>
<td><strong>Weight</strong></td>
<td>29 kg</td>
<td>33 kg</td>
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<table>
<thead>
<tr>
<th>Type</th>
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<th>VAP 50s CAROulset</th>
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<tbody>
<tr>
<td><strong>Cooling water consumption per min.</strong></td>
<td>5 l</td>
<td>5 l</td>
</tr>
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<td>2-4 min.</td>
<td>2-4 min.</td>
</tr>
<tr>
<td><strong>Recovery rate %</strong></td>
<td>&gt; 99</td>
<td>&gt; 99</td>
</tr>
<tr>
<td><strong>Dimensions (W x d x H)</strong></td>
<td>440 x 340 x 690</td>
<td>1010 x 670 x 1655</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>33 kg</td>
<td>198 kg</td>
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</table>

### Applications

**Protein Determination in:**
- Animal fats and oils e.g. AOAC 979.09, 903.87
- Fish oil and fish products e.g. § 440.05.00.15
- Milk and milk products e.g. AOAC 982.05
- Meat and meat products e.g. AOAC 938.08
- Base material for fermentation, e.g. AOAC 903.53.00.09
- Tobacco
- Animal feed e.g. AOAC 970.02
- Meat
- Wort, beer, wine
- and many more.

**Nitrogen Determination in:**
- Meat e.g. § 440.01.11, § 408
- Cereale
- Cereal
- Milk
- Milk
- and many more.

**Water Steam Distillation:**
- Hazel
- Alcohol
- Total residue
- Determination of ammonium
- Preservation
- Sulfur dioxide
- soluble nitrogenous base preservation
- Natural rubber
- and many more.

**Analytical methods**

- **Protein determination**
  - Grain and grain products e.g. AOAC 920.87
  - Eggs and egg products e.g. § 64.05.00,15
  - Milk and milk products, e.g. § 64.01.00,10
  - Meat and meat products, e.g. AOAC 928.08
  - Raw material for breweries, e.g. AOAC 920.53,950.09
  - Tobacco
  - Animal feed e.g. AOAC 990.03
  - Starch
  - Malt, wort, beer
  - and many more.

- **Nitrogen determination**
  - Animal fats and oils e.g. AOAC 979.09, 903.87
  - Fish oil and fish products e.g. § 440.05.00.15
  - Milk and milk products e.g. AOAC 982.05
  - Meat and meat products e.g. AOAC 938.08
  - Base material for fermentation, e.g. AOAC 903.53.00.09
  - Tobacco
  - Animal feed e.g. AOAC 970.02
  - Meat
  - Wort, beer, wine
  - and many more.

### Distillation Systems

**Technical data**

- **Type**: Vap 20s, Vap 30s
- **Cooling water consumption per min.**: 5 l, 5 l
- **Distillation time / sample**: 2-4 min., 2-4 min.
- **Recovery rate %**: > 99, > 99
- **Dimensions (W x d x H)**: 440 x 340 x 690, 440 x 340 x 690
- **Weight**: 25 kg, 29 kg

**Distillation Systems**

- **Technical data All Systems in Comparison**
  - **Type**: Vap 20s, Vap 30s
  - **Cooling water consumption per min.**: 5 l, 5 l
  - **Distillation time / sample**: 2-4 min., 2-4 min.
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  - **Weight**: 25 kg, 29 kg

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  - Base material for fermentation, e.g. AOAC 903.53.00.09
  - Tobacco
  - Animal feed e.g. AOAC 970.02
  - Meat
  - Wort, beer, wine
  - and many more.

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- Cereal
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- Milk
- and many more.

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- Total residue
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- Sulfur dioxide
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- Natural rubber
- and many more.

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- **Dimensions (W x d x H)**: 440 x 340 x 690, 440 x 340 x 690
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  - **Cooling water consumption per min.**: 5 l, 5 l
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  - **Dimensions (W x d x H)**: 440 x 340 x 690, 440 x 340 x 690
  - **Weight**: 25 kg, 29 kg

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- **Protein Determination in**
  - Animal fats and oils e.g. AOAC 979.09, 903.87
  - Fish oil and fish products e.g. § 440.05.00.15
  - Milk and milk products e.g. AOAC 982.05
  - Meat and meat products e.g. AOAC 938.08
  - Base material for fermentation, e.g. AOAC 903.53.00.09
  - Tobacco
  - Animal feed e.g. AOAC 970.02
  - Meat
  - Wort, beer, wine
  - and many more.

**Nitrogen Determination in**

- Meat e.g. § 440.01.11, § 408
- Cereale
- Cereal
- Milk
- Milk
- and many more.

**Water Steam Distillation**

- Hazel
- Alcohol
- Total residue
- Determination of ammonium
- Preservation
- Sulfur dioxide
- soluble nitrogenous base preservation
- Natural rubber
- and many more.

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1) Special voltages on request
2) 120 V not included
3) Special configurations
4) Standard configuration
5) Digestion tubes type KTG 250 ml, KDD 400 ml and KDD 800 ml can be used
6) Kjeldahl flasks type KD 250 ml, KD 500 ml and KD 750 ml can be used (please check consult only for single determination with adapter)
Distillation Systems

Order informations

VAPODEST 20s, 30s

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-0020</td>
<td>VAP 20s</td>
<td>VAPODEST 20s, Distillation system complete with tubing set and digestion tube</td>
</tr>
<tr>
<td>12-0025</td>
<td>VAP 30s</td>
<td>VAPODEST 30s, Distillation system complete with tubing set and digestion tube</td>
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VAPODEST 45s

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>12-0030</td>
<td>VAP 45s</td>
<td>VAPODEST 45s, Distillation system complete with tubing set and digestion tube, prepared for the connection to an external titrator</td>
</tr>
<tr>
<td>12-0035</td>
<td>VAP 45s</td>
<td>VAPODEST 45s, Distillation system complete with titrator, tubing set and digestion tube</td>
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VAPODEST 50s

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>12-0040</td>
<td>VAP 50s</td>
<td>VAPODEST 50s, complete with VAPODEST Manager, data cable for PC-connection, digestion tube, buffer solution, KCL-solution, tubing set, mains cable, pH-electrode</td>
</tr>
</tbody>
</table>

VAPODEST 50s Carousel

Same as VAPODEST 50s plus auto sampler

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>12-0050</td>
<td>VAP 50s C</td>
<td>VAPODEST 50s Carousel, complete with carousel for 20 x 250 ml tubes (max. capacity 300 ml)</td>
</tr>
<tr>
<td>12-0051</td>
<td>VAP 50s C</td>
<td>VAPODEST 50s Carousel, complete with carousel for 16 x 400 ml tubes</td>
</tr>
<tr>
<td>12-0052</td>
<td>VAP 50s C</td>
<td>VAPODEST 50s Carousel, complete with carousel for 12 x 800 ml tubes</td>
</tr>
<tr>
<td>12-0053</td>
<td>VAP 50s C</td>
<td>VAPODEST 50s Carousel, complete with carousel for 16 x 800 ml tubes</td>
</tr>
</tbody>
</table>

VAPODEST 50s OT (Upper Part Carousel)

VAPODEST 50s OT is identical to the VAPODEST 50s, however, it is prepared to be upgraded to a VAPODEST 50s carousel at a later point. Thus, should your sample throughput increase dramatically, you can easily upgrade the VAPODEST 50s OT by adding a VAPODEST 50s auto sampler carousel later on.

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-0048</td>
<td>VAP 50s OT</td>
<td>VAPODEST 50s Upper Part prepared for a possible upgrade to a VAPODEST 50s Carousel at a later time</td>
</tr>
</tbody>
</table>

Universal level sensors for chemical tanks

Sensors for the automatic level control for chemical storage tanks (variable adjustable). The universal level sensors are available as a single article or arranged to complete sets for analytical systems:

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1005780</td>
<td>-</td>
<td>Universal level control for reagent storage tank</td>
</tr>
<tr>
<td>1005721</td>
<td>-</td>
<td>Universal level control for sample waste tank</td>
</tr>
<tr>
<td>1009307</td>
<td>NIV20</td>
<td>Universal level control set for VAP20s</td>
</tr>
<tr>
<td>1009308</td>
<td>NIV30</td>
<td>Universal level control set for VAP30s</td>
</tr>
<tr>
<td>1009309</td>
<td>NIV40</td>
<td>Universal level control set for VAP45s</td>
</tr>
<tr>
<td>1009310</td>
<td>NIV50</td>
<td>Universal level control set for VAP50s</td>
</tr>
</tbody>
</table>

VAPODEST and KJELDAHERM

Digestion and distillation from one source

The perfect combination for our VAPODEST program is the digestion range KJELDAHERM. Further product information is available from our product brochure KJELDAHERM or from the Gerhardt representative in your country.
Other Program
On request we will be happy to supply you with further brochures regarding our other products.

**HYDROTHERM - Hydrolysis Systems**
HYDROTHERM is a unique system for automated acid hydrolysis prior to the classic fat determination acc. to Weibull-Stoldt. There are a total of 6 positions which are divided into 3 modules with 2 digestion positions. Each module can be started individually. The control software HYDROTHERM-Manager is used to develop methods as well as for the documentation of the procedure.

**SOXTHERM - Extraction Systems**
Based on the experiences of customers and partners worldwide C. Gerhardt has improved the successful SOXTHERM range. Depending on the demands and sample throughput of the laboratory, the customer can now choose between 2, 4, and 6 place, programmable units. The SOXTHERM can either be controlled via PC with SOXTHERM Manager or using the controller MULTISTAT.

**TURBOTHERM and KJELDATHERM - Digestion Systems**
The extensive KJELDATHERM digestion program produced by C. Gerhardt offers many options. The TURBOTHERM programmable infrared rapid heating digestion unit has very short and reliable heating up and cooling down periods. The KJELDATHERM block digestion unit makes use of an aluminum block, where the sample tubes are heated up to exactly the temperature required.

**DUMATHERM - Dumas Nitrogen / Protein Combustion Systems**
DUMATHERM offered by C. Gerhardt is a highly efficient, precise and fast analysis system. For most sample matrices, it is a real alternative to other classical procedures. DUMATHERM comprises all advantages of the Dumas method and is entirely controlled and operated using the comfortable controlling software DUMATHERM-Manager.

**FIBREBAG and FIBRETERM - Crude fibre-, ADF- and NDF-determination**
The FIBREBAG method developed by C. Gerhardt revolutionized the classical determination acc. to Weender, van Soest and others and reduces the handling to a minimum. The boiling process is controlled and the unique, highly precise filtration tissue of the FIBREBAGs ensures optimal results. C. Gerhardt offers automatic and manual systems.

**LABOSHAKE and THERMO - Shakers and Laboratory Heaters**
Programmable shakers for heavy loads, incubator shakers, rotary shakers as well as flask heaters - all on the highest technical level - are standard features in any modern lab. Traditionally, these general products have been part of the C.Gerhardt product range for many years. With various accessories, the flask heaters can be used for the classical digestion, distillation and extraction as well.

All stages from research & development to shipment have undergone a constant quality control under EN ISO 9001:2008.

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**Your dealer**

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D-53639 Königswinter

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E-Mail info@gerhardt.de
Internet www.gerhardt.de

Technical details correct as from 10/2011
Later modifications possible.