



## **Kjel Line - Steam Distillation**

Meeting the highest demands in nitrogen determination

# The best practice to analyze your samples

Thanks to a broad range of possible matrices

Any sample matrix, such as for Total Kjeldahl nitrogen (TKN), Total Volatile Basic Nitrogen (TVBN) or inorganic nitrogen (Devarda) is suitable for nitrogen analysis. Easily achieve compliance to specific norms and regulations for samples of your interest.

## Food / Beverages



## Feed / Agricultural Products



### Common Sample Types

Cereals, dairy products, meat, pastry, seafood, ready meals, plant-based food

Mixed and finished feed (ruminant, swine, poultry), ingredients such as oil seed meals, cereals, hulls & bran.

### Analytes

Protein, Total Kjeldahl Nitrogen (TKN), Non-Protein Nitrogen (NPN), Total Volatile Basic Nitrogen (TVBN), casein, hydroxyproline

Protein, Total Kjeldahl Nitrogen (TKN), Non-Protein Nitrogen (NPN)

### Compliance to Norms & Regulations

Protein: AOAC 2001.11 / 920.53 / 920.87 / 925.31 / 928.08 / 930.25 / 950.48 / 979.09 / 981.10 / 991.20 / ISO 937 / 3188 / 8968-3

Protein: AOAC 2001.11 / 920.87 / 930.25 / 945.39 / 950.09 / 979.09 / 981.10 / ISO 1656 / 3188 / 20483



### Pharma / Biotechnology



Raw materials, APIs, excipients, vaccines ointments, natural products, nutraceuticals, blood plasma products, toxins, cosmetics, biopharmaceuticals

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Ammonia, Total Kjeldahl Nitrogen (TKN), urea

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Nitrogen: USP 461 / Ph.Eur. 2.5.9. / AOAC 960.52

Protein: Ph.Eur. 2.5.33. Method 7.

### Chemicals / Fertilizers



Basic chemicals, petrochemicals and specialty chemicals, fertilizers, cosmetics, lubricant oils

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Ammonia, Total Kjeldahl Nitrogen (TKN), nitrate/nitrite

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Nitrate/nitrite: DIN 38409 Part 28, DIN CEN/TS 15476

Nitrogen: AOAC 955.04 / 981.10 / DIN EN 15750

### Environmental Samples



Water samples, soil samples, waste water, fly ash

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Ammonia, Total Kjeldahl Nitrogen (TKN), nitrate/nitrite

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Nitrate/nitrite: DIN 38409 Part 28, DIN CEN/TS 15476

Nitrogen: DIN EN 13342 / 38409 Part 28

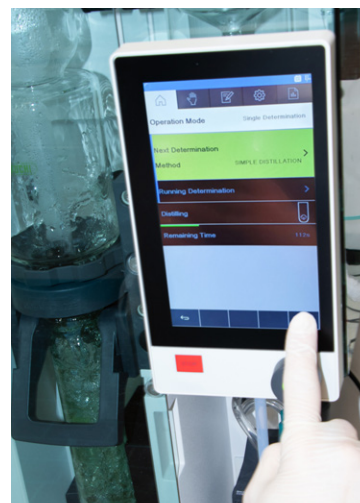




# Kjel Line

## The smart way to Kjeldahl nitrogen determination

BUCHI's latest steam distillation units are extremely accurate, ensure the sustainable use of resources and offer maximal safety during operation. The instruments have been designed to fit your individual needs and to enable the highest performance in the most convenient way.



### Maximize Accuracy & Performance

thanks to AutoDist function and OnLevel sensor

The Kjel Line enables the highest accuracy for Kjeldahl determinations. Several features contribute to a maximum performance:

- Automatic recognition of distillation start for perfect reproducibility
- Distillation endpoint is recognized automatically for highest accuracy
- Automated titration with connected titrators for minimum user interaction

### Save Resources & Time

with the reaction detection sensor and more

Saving resources and time is key to efficient Kjeldahl determination. Therefore, BUCHI has developed numerous technologies to improve process efficiency:

- Optimized alkalization step for saving up to 30 % of reagent
- Intelligent cooling water control for lower water consumption
- No preheating required resulting in higher time-efficiency
- Automated distillation & titration enables unattended operation

### Experience Highest Convenience & Safety

with innovative sensor technology

Perfect usability and modular upgradeability are key characteristics in the entire Kjel Line. Main features include:

- Innovative sensor technology that minimizes exposure of the user to chemicals
- Intuitive touch screen for easy process handling
- Upgradeable on demand to automate your analysis in the most convenient way





# Maximize Accuracy & Performance

## High-tech components for highest reproducibility

The Kjell Line is designed to provide the most reproducible results at highest accuracy levels. With our innovative features you will experience an outstanding performance with a highly automated system.



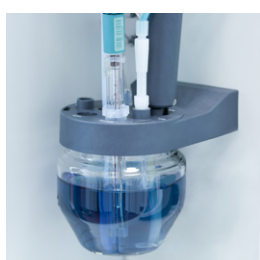
### AutoDist Function

Thanks to the AutoDist function, measurements are unaffected by temperature differences within the device. This function recognizes the start of the condensation process and adjusts the distillation start time automatically in the individual measurement. This is achieved with a built-in temperature sensor within the condensate vessel and leads to more reproducible results.



### OnLevel Sensor

With the OnLevel sensor, we deliver highest accuracy in each measurement. The desired distillation volume can be set for any vessel size and shape, using a simple and intuitive mechanism. This leads to an accurate measurement that is highly reproducible. With this feature we meet the specific accordance to norms for which the distillate volume is of particular importance.



### Automatic Titration

Automated titration is key to achieving the highest performance possible in Kjeldahl protein determination. Titration dosage, as well as endpoint recognition via suitable electrodes, is carried out automatically. This allows for minimum user interaction and high throughput at the same time.



### MaxAccuracy Mode

In laboratories, deviations of the supply voltage are possible within a range of up to 10 % of the original value. This can potentially affect the steam power output. In order to avoid these deviations, a voltage stabilizer is integrated to maintain the required supply voltage. This enhances measurement accuracy and ensures highest reproducibility for every result.







# Save Resources & Time

## Benefit from every sample determination

Saving both resources and time results in reduced operational costs. Our features simplify your workflow while limiting the environmental impact of the nitrogen determination process.



### **Sensor for Reaction Detection**

With the innovative reaction detection sensor, you benefit from an optimized alkalization step. The sensor is located next to the sample tube and monitors the reaction at the alkalization step. As soon as the optimum alkaline conditions are reached, the system stops the dosing of base. With this feature, you can save a substantial amount of chemicals and related costs over time. The reaction detection sensor can save up to 30 % of reagent consumption, compared to standard methods.



### **Cooling Water Control**

The cooling water control automatically saves water by intelligent flow limitation. Once steam distillation starts, water begins to flow through the condenser and the distillate is collected. Before and after distillation, the device automatically closes the cooling water valve. This feature saves approximately 20 % of water during determinations and eliminates concerns regarding the water supply.



### **High Degree of Automation**

With the Kjel Line, you profit from a highly automated system with minimum user interaction. The distillation procedure is carried out automatically. Furthermore, the units can be equipped with titrators and electrodes for automatic titration. High levels of automation enable unattended operation, freeing up your time for other tasks.





# Experience Highest Convenience & Safety

## Intuitive and safe system operation

Our safety features and intuitive control panel guarantee an easy-to-use operation and a flawless user experience. With the various upgrades available, you can configure the system to fit your needs.



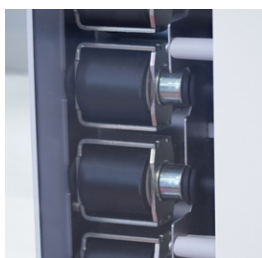
### Safe Operation

The Kjel Line instruments reduce user exposure to a minimum thanks to innovative sensor technology. Safety sensors monitor cooling water flow, steam generator pressure and if the sample tube is put correctly in place. Tank level sensors detect water, waste and reagent levels. The safety shields are fully transparent and equipped with secure control sensors. If the safety shields are opened during operation, the process is stopped automatically. The steam power is adjustable (10 - 100 %) and steam ramps are programmable to handle foaming samples.



### Exceptional User Experience

Our instruments can be easily incorporated into your lab, so that you can immediately use the instrument. The intuitive touch screen provides fast feedback and enables easy process handling. With StatusLight, the process can be easily monitored from a distance. Use of glass parts enables direct visibility of the steam distillation and titration, giving you better control of the process. These features combine to optimize user interaction, reduce operational risks and save time.



### Upgradeable on Demand

With our versatile components, you can easily upgrade and automate your system for highest convenience. All parts can be chosen separately and can be combined one after another. The modular design allows you to achieve an optimal combination of features to suit your individual needs. In this way, you receive the optimum combination of features and peripherals according to your needs.

## Product Overview

The best solution for every need

	<b>EasyKjel</b>	<b>BasicKjel</b>	<b>MultiKjel</b>
Color Display	Yes	Yes	Yes
Alkalization with NaOH Pump	Yes	Yes	Yes
Dilution with H <sub>2</sub> O pump	-	Yes	Yes
AutoDist	-	Yes	Yes
Sample Disposal	-	Optional	Yes
Pro Touch Screen	-	Optional	Yes
Boric Acid Dosing	-	-	Yes
Receiving Solution Disposal	-	-	Optional
Acid Pump	-	-	Optional
Titration Vessel on Distillation Unit with Stirrer	-	-	Optional
Peripherals	OnLevel Sensor, Chiller + Connection Set, Tank Level Sensors, Status Light	OnLevel Sensor, Chiller + Connection Set, Tank Level Sensors, Status Light	OnLevel Sensor, Chiller + Connection Set, Tank Level Sensors, Status Light Reaction Detection Sensor, Barcode Reader, Titrator, Dosing Unit





# Accessories



## Reaction Detection Sensor

The reaction detection sensor is available for MultiKjel configurations. It can save up to 30 % of NaOH reagent solution for the alkalization process so that you can work more cost-efficiently and environmentally friendly.



## External Titrator

The external titrator is available for MultiKjel configurations. The titrator enables you to start the titration automatically, for fully automated determination from the steam distillation unit until the final titration step. To save time, the titration can be already started during an ongoing distillation.



## Consumables

BUCHI offers not only high quality instrumentation but also approved consumables and chemicals for Kjeldahl that are tested for the most common reference applications. Kjeldahl tablets, boric acid solutions, weighing boats, indicator, buffer solutions, potassium chloride, activated charcoal and reference substances for fast and reliable digestions, proper operation and reliable qualifications are available.



## Recirculating Chiller

The recirculating chiller is available for all configurations. The chiller eliminates temperature fluctuations when tap water is used. Enhance instrument performance and benefit most from OnLevel sensor and the AutoDist function by ensuring a high cooling capacity.



## IQ/OQ

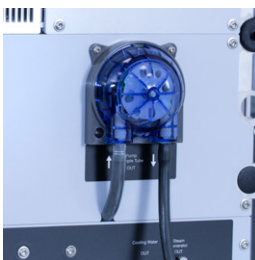
IQ/OQ is available for BasicKjel and MultiKjel configurations which enables a system operation according to required specifications. Obtain a signed document that proves the instrument functionality and use the system in regulated environments.





### **Tank Level Sensors**

Tank level sensors are available for all configurations. The sensors alert the user if a tank is empty or overflowing. In this way, the sensors eliminate measurement losses that can result from a missing liquid supply and avoid potential mess in the lab due to tank overflow.



### **Instrument Upgrade Kits**

Instrument upgrade kits are available for BasicKjel and MultiKjel configurations so that you can upgrade the system on demand. Get started with a lower priced system and upgrade later on if necessary.



### **OnLevel Sensor**

The OnLevel sensor is available for all configurations where no titration vessel is mounted. The sensor stops the distillation automatically after a defined condensate volume is reached. The sensor can be easily set and adjusted manually via a magnetic backplate. Obtain reproducible condensate volumes independent of the system lifetime.



### **Splash Protectors**

Glass and plastic splash protectors are available. Glass splash protectors enable you to monitor the process to support method development and optimization. Plastic splash protectors are more robust and durable. Depending on the application, different splash protector variants enable the best performance.



### **StatusLight**

This practical accessory is available for all configurations. With StatusLight, you can monitor the state of the system from a distance, so you can immediately recognize when determinations are finished and react to warnings accordingly.





## Service & Training



### **The BUCHI Bluetooth Dongle – The key to access BUCHI Cloud Services**

The BUCHI Bluetooth Dongle establishes a wireless connection to the BUCHI Cloud via the BUCHI Monitor App on your mobile device. You can use the Monitor App and easily update your instrument to the latest firmware in a few minutes. [www.buchi.com/en/buchi-cloud-services](http://www.buchi.com/en/buchi-cloud-services)

## BUCHI Service packages

### **BUCHI START – The highest efficiency from the very beginning**

From a professional installation to a carefree agreement that will leave you with full cost predictability and the highest possible system efficiency. [www.buchi.com/start](http://www.buchi.com/start)

«Install»

- Product installation and testing
- Hands-on training from a certified technician
- Evaluation of the immediate surroundings of your new product
- Best integration of your new product into the existing infrastructure

«IQ/OQ»

- Product or system installation
- Installation and Operational Qualification

### **BUCHI EXACT – Certified accuracy for highest level of confidence**

Receive comprehensive qualifications with all of your BUCHI products. We perform qualification services on a level that can only be achieved by the manufacturer. [www.buchi.com/exact](http://www.buchi.com/exact)

«OQ»

- Our one-time OQ service will provide you with all the necessary documents and certificates.
- The service team will remind you about the option for a follow-up OQ before the certificates expire.

«OQ Circle»

Buying an OQ package will grant you an additional discount on the documents and offer you priority service with automated visit scheduling.

### **BUCHI CARE – Unbeatable Reliability**

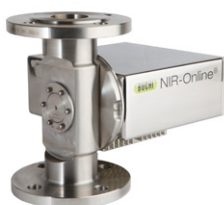
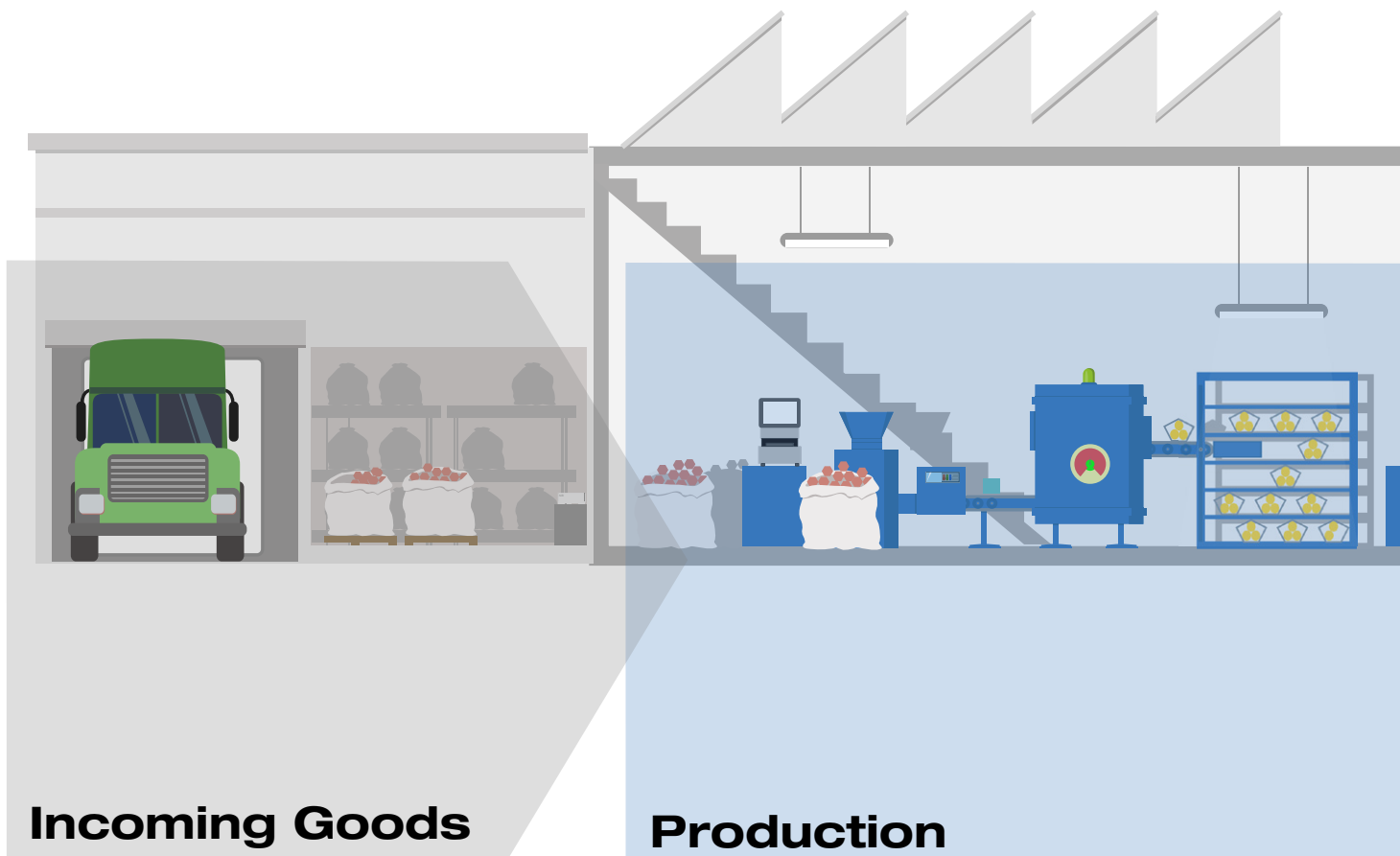
Maintaining a heavily used device requires different parts and inspection frequencies than units that are operated occasionally. Our approach takes factors like these into consideration to provide you with an optimal yet cost-efficient solution. [www.buchi.com/care](http://www.buchi.com/care)

### **BUCHI ACADEMY – Increase your know-how, get the edge over your competition**

Expert know-how is provided by the application chemists in our competence centers in Flawil, Beijing and Mumbai and the locally available experts at our market organizations. Our scientific support offers pre-sales feasibility studies, tailored solution offers, after sales onsite support, regular basic to advanced courses and on demand customized training.

[www.buchi.com/academy](http://www.buchi.com/academy)

# Complete your portfolio



## NIR-Online

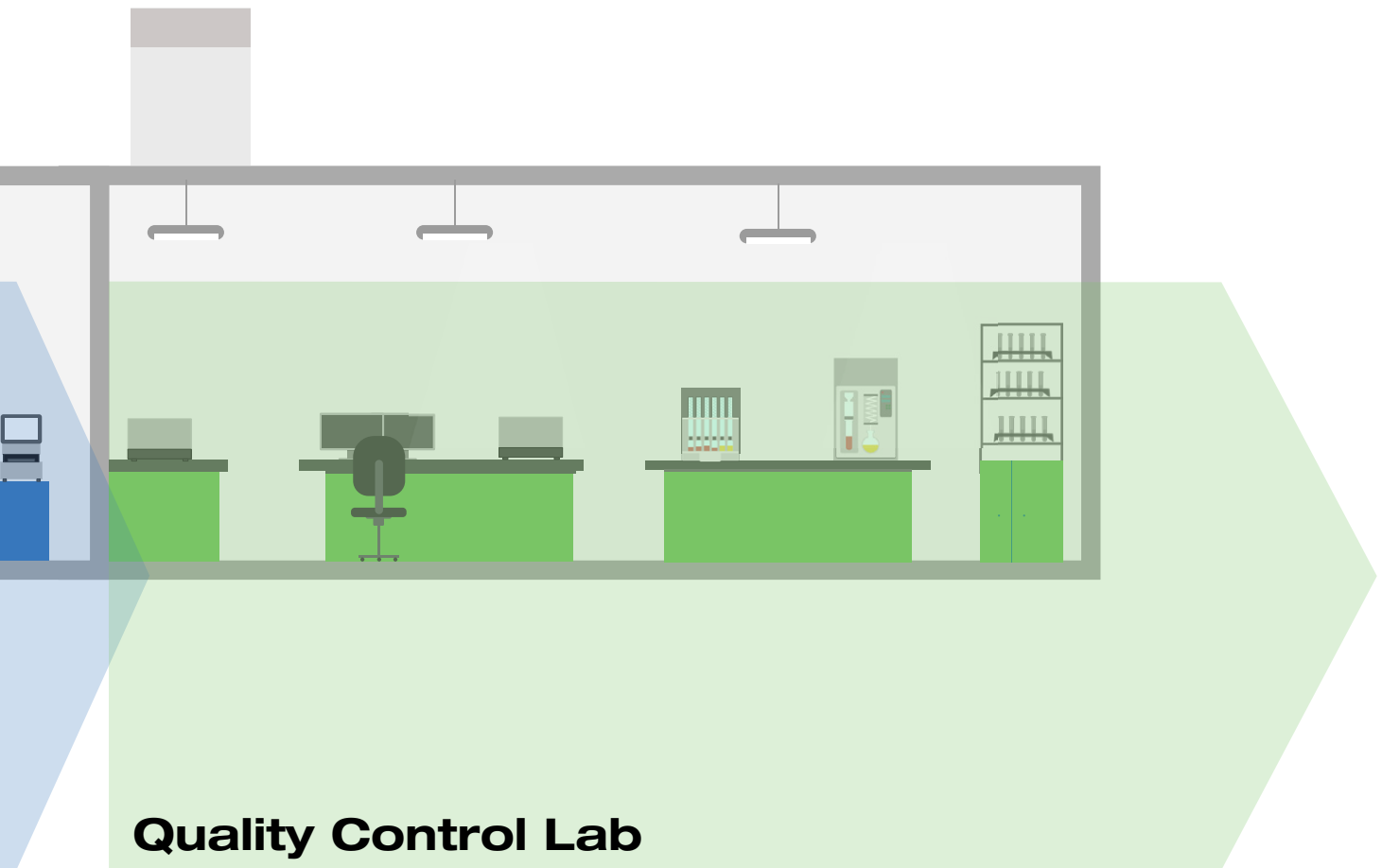
Closely monitoring key parameters such as moisture, fat or protein is crucial in correcting deviations that may occur during any manufacturing process. BUCHI NIR-Online® analyzers continuously provide accurate measurements within seconds to guarantee maximum production efficiency.



## NIR

During production, it is important to be able to control quality efficiently and quickly at each step of the process, from raw materials to finished products. The BUCHI NIR Solutions are easy to use by any operator and provide reliable results even in harsh production environments.





## Quality Control Lab



### Kjeldahl

In the most demanding of quality control environments, for high throughput, the KjelMaster K-375 automates the measurement of nitrogen and protein. First-in-class in usability, automation, user administration and advanced data management. For both potentiometric and colorimetric titration methods.



### Extraction

Extraction is not only sample preparation, it is a crucial step for an accurate and reliable result. Whether it is to simply measure fat, or the most demanding residue and contaminants in different matrices, our solutions cover the whole range of automated extraction methods; from Soxhlet, to hot extraction and pressurized solvent extraction.

# Core messages to our customers

## BUCHI creates added value

«Quality in your hands» is the guiding principle that shapes our philosophy and our actions. It challenges us to provide outstanding services that are precisely tailored to your needs. This means that we must stay in close contact with our customers. That is why we keep in touch and continue to work very hard to understand you and your business even better.

We help you by providing high-quality products, systems, solutions, applications and services that offer you added value. This allows you to focus entirely on your processes and your work.



### Competent

We have the technological expertise and decades of experience needed to provide competent support and work with you to continually improve our services.



### Reliable

We guarantee the quality and functionality of our equipment and will continue to help you quickly and efficiently whenever something does not operate to your satisfaction.



### Safe

By collaborating closely with you, we do everything in our power to make our products, systems, solutions, applications and services as safe as possible for people and the environment.



### Cost-effective

We strive to create a high level of economic benefit and maximum added value for you.



### Global

As an international family-owned business with own subsidiaries and qualified distributors, we have a presence wherever you are located.



### Easy

We support you by providing carefully designed solutions as well as instruments and systems that are easy to operate.



### Sustainable

We support environmentally friendly processes and manufacture products that have a long service life. We utilize advanced technologies to leave the smallest environmental footprint possible.

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Quality in your hands

