



## Digestion and Distillation Glassware

High quality pays off

With our own manufacturing facilities and decades of experience, the quality of our glass parts has been continuously improved. This allows us to offer the best overall price-performance ratio for the glassware used in routine analysis.



## Glassware made by BUCHI

Benefit from high quality and precision

BUCHI's experience in glass manufacturing results in glassware of outstanding quality. We guarantee the highest safety with increased efficiency due to our exacting standards.

### Benefits of BUCHI glassware



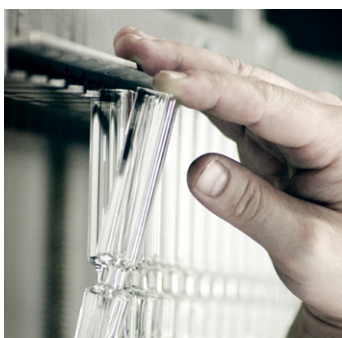
#### High quality materials

- Exclusive use of DURAN® borosilicate glass 3.3
- High chemical resistance against acids, alkalis and organic substances
- Resistant to thermal shocks and high temperatures, combined with low thermal expansion



#### Accuracy

- Constant monitoring of glass wall thickness uniformity
- Optimum heat transmission
- High accuracy with tight sealed joints



#### Expertise

- Unique machines developed in-house to automate repetitive manufacturing processes in order to guarantee a high level of reproducibility
- Many decades of experience guarantee top quality glass parts
- More than 75 years of experience

## Specific glassware for a perfect fit



### Absorption vessel for SO<sub>2</sub> determination

The patented BUCHI SO<sub>2</sub> procedure uses steam distillation into a tailored SO<sub>2</sub> absorption vessel in which the SO<sub>2</sub> reacts with iodine standard solution.



### Specific suction modules

Dedicated suction modules for aqueous samples with a condensate trap or for accelerated digestion using H<sub>2</sub>O<sub>2</sub> with capillary funnels.



### Digestion setups

Setup for reflux digestion using air or water condensers for the determination of:

- hydroxyproline in meat
- COD (chemical oxygen demand) in water and wastewater
- trace metal in environmental applications



### Dedicated splash protectors

The decision to use a specific splash protector depends on factors like application or sample throughput. The glass splash protector allows visible observation of the distillation process whereas the plastic splash protector gives the highest durability and longest lifetime. For specific applications where it is important to prevent foaming into the receiver or efficient direct distillation is needed, BUCHI offers the Devarda splash protector. The slim splash protector is used for direct distillations e.g. for alcohol determination.

## Wide range of high quality BUCHI glassware

### Genuine BUCHI Sample Tubes

Sample tube types	Qty	Order number	Picture
Sample tubes micro (100 mL) For sample volumes up to 3 mL or 0.2 g in weight	4	11057442	①
Sample tubes (300 mL) For sample volumes up to 200 mL or 5 g in weight	4	037377	②
Sample tubes (300 mL) For sample volumes up to 200 mL or 5 g in weight	20	11059690	②
Sample tubes graduated (300 mL) For easy pump calibration of the NaOH and H <sub>2</sub> O pump	4	043049	
Sample tube (500 mL) For sample volumes up to 400 mL in volume or >4 g in weight	1	026128	③
Sample tubes (500 mL) For sample volumes up to 400 mL in volume or >4 g in weight	4	043982	③
Sample tube 750 mL With long suction tubing (for distillation only)	1	11058999	④
Sample tubes with ground joint NS 29/32 For reflux digestion with tap water or air cooling using the SpeedDigester	6	11058697	⑤

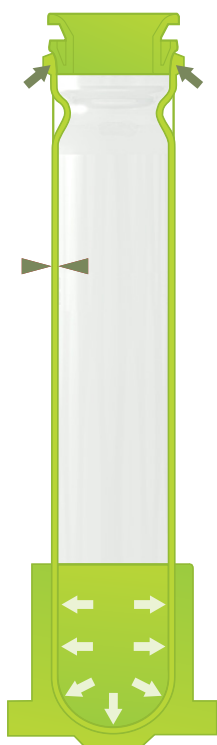
Sample tube related parts	Qty	Order number	Picture
Digestion rods Prevent from boiling delays	10	043087	⑥
Glass caps For unused sample positions in the sample rack	4	040049	⑦



## Digestion and Distillation glassware quality facts

### What's special about the BUCHI Sample Tube shape?

The BUCHI Sample Tube is unique, as it has a wider diameter, constricted condensation zone, a thicker glass wall and can contain bigger volumes than sample tubes from other manufacturers. The advantages of these differences are convincing.



#### Save money

- Extended lifetime due to the unique high-quality extra thick glass (see page 14)
- Corrosion protection as a result of precise glass joint dimensions

#### Increase safety

- Good sealing safeguards against hazardous fumes
- Tube design eliminates hot spots and glass breakages

#### Improve results

- High accuracy with tightly sealed joints
- Reliability from automated sample processing without glass breakage

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*“Since we use genuine BUCHI Sample Tubes for Kjeldahl analysis leaks are no longer an issue and accurate results are guaranteed. All this is attributed to the fact that only BUCHI meets the highest demands in glass quality and precision. In addition, the unique thickness of the glass walls results in an increased tube lifetime and this reduces replacement costs.”*

Ms. Rawiwan Mahakusol, Betagro Science Service Center, Bangkok

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## Wide range of high quality BUCHI glassware

### Distillation related parts

KjelMaster K-375

KjelFlex K-360

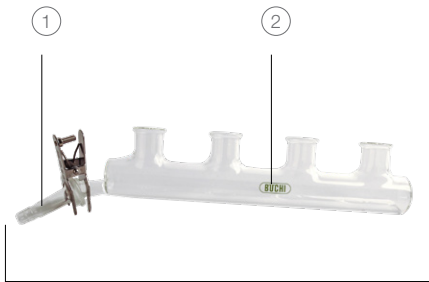
Distillation Unit K-350 / K-355

	Qty	Order number	Picture
Splash protector, plastic The most durable splash protector	1	043590	①
Splash protector, glass For visible processes	1	043332	②
Splash protector, Devarda Prevents carryover into the receiver	1	043335	③
Splash protector, slim Without alkali inlet, for direct distillations	1	11061393	④
Receiving vessel, 420 mL For K-360 and K-375	1	043390	⑤
Receiving vessel, 340 mL For K-360 and K-375	1	043333	⑥
SO <sub>2</sub> absorption vessel For the determination of SO <sub>2</sub> using the K-355 or K-360	1	048680	⑦
Laboratory vessel Supply vessel for titration solutions	1	053203	⑧
Condenser	1	043320	⑨



## KjelDigester K-446 / K-449

	Qty	Order number	Picture
Hose connector Ball joint (S19) connector for the suction module	1	11057159	①
Fume collection tube with ball joint Collects the digestion fumes from the four suction modules	1	11058825	②
Set fume collection tube with ball joint Including a fume collection tube, a ball joint connector and a clamp	1	11059983	③
Suction tube, standard Suitable for most applications	1	11058651	④
Suction tube with condensate trap For aqueous samples, prevents backflow of condensate into the sample tube and accelerates the digestion process of liquid samples	1	11058827	⑤



### Kjeldahl digestion

SpeedDigester K-425 / K-436 / K-439	Qty	Order number	Picture
Suction module, standard For 300 mL sample tubes, suitable for most applications	1	11055849	①
Suction module, with condensate trap For 500 mL sample tubes, prevents backflow of condensate into the sample tube and accelerates the digestion process of liquid samples	1	11055851	②
Suction module, for accelerated H <sub>2</sub> O <sub>2</sub> digestion For 300 mL sample tubes, including capillary funnels and rubber gaskets	1	11055853	③
Capillary funnels for accelerated H <sub>2</sub> O <sub>2</sub> digestion	6	11056273	④
Suction module, for accelerated H <sub>2</sub> O <sub>2</sub> digestion For 300 mL sample tubes, without funnels	1	11055852	⑤
Suction module, 3 <sup>rd</sup> party For 3 <sup>rd</sup> party sample tubes	1	11055850	
Suction module, with condensate trap For 300 mL sample tubes, prevents backflow of condensate into the sample tube and accelerates the digestion process of liquid samples	1	11055865	





## Reflux digestion

SpeedDigester K-425 / K-436 / K-439

Qty

Order number

Picture

Air reflux condensers  
Length 700 mm, NS 29/32

6

11058300

①

Absorption vessel NS 29/32  
For water reflux setup

1

11058377

②

Water condenser NS 29/32  
For water reflux setup, length 290 mm

1

11058692

③

Sample tubes with ground joint NS 29/32  
For reflux digestion

6

11058697

④

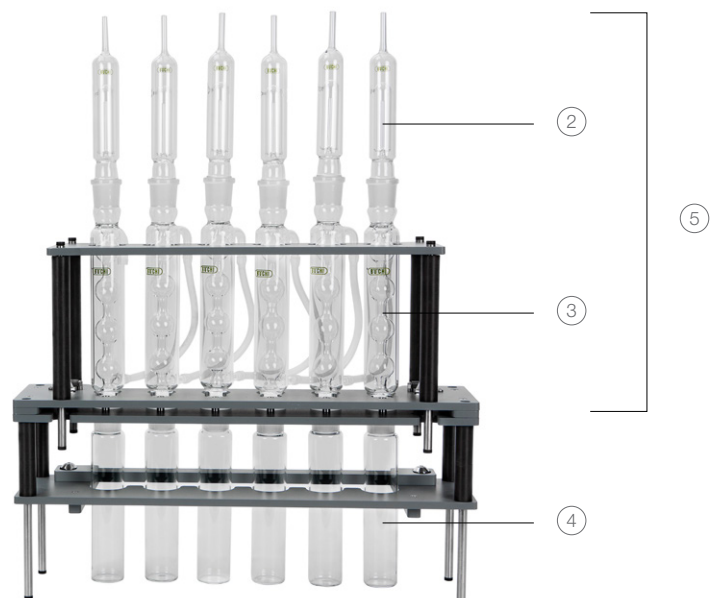
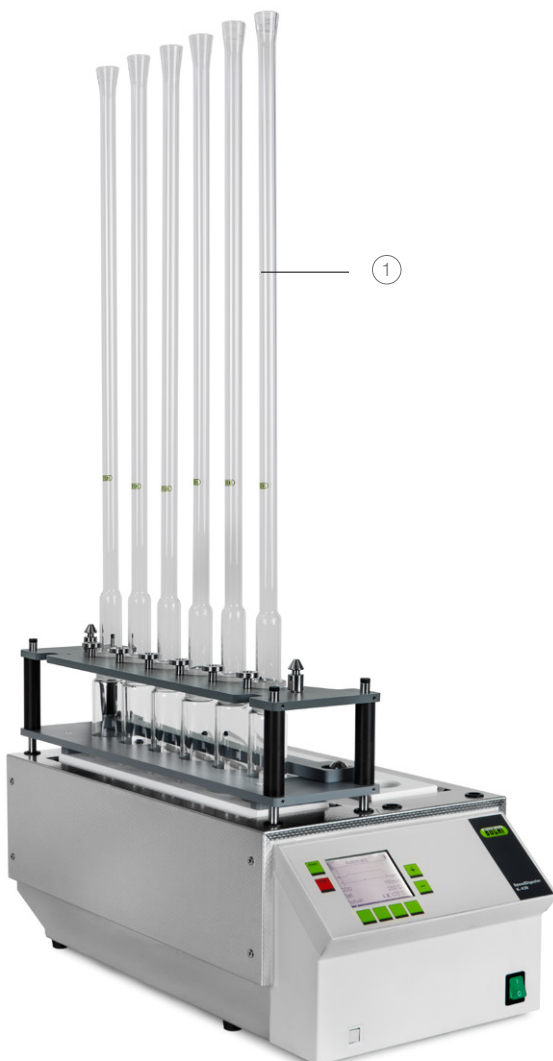
Water reflux setup

Including 6 water condensers, 6 absorption vessels and silicone hose with quick coupling

1

11058227

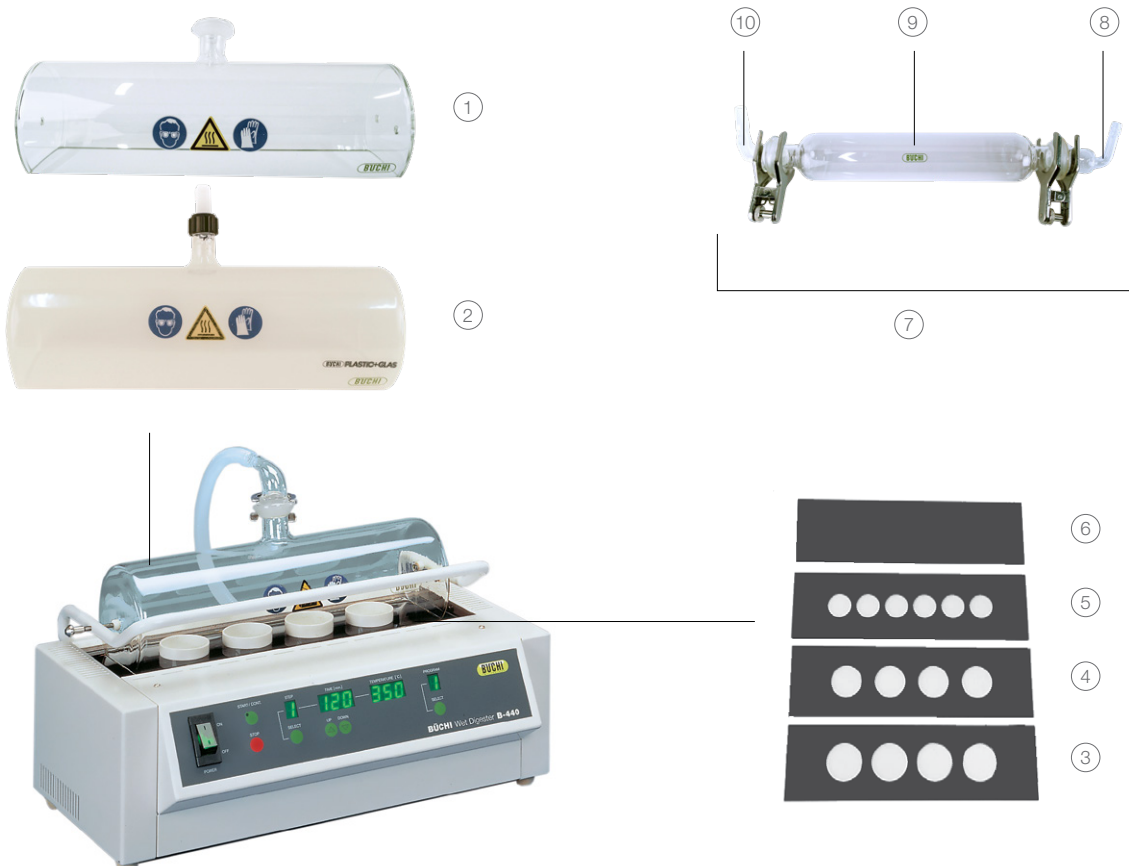
⑤



## Wide range of high quality BUCHI glassware

### Pre-incineration and scrubbing related parts

Wet Digester B-440	Qty	Order number	Picture
Glass hood	1	036081	①
Glass hood P+G coated Plastic coated glass hood with SVL 22 connector	1	11057429	②
Vitrified ceramic plate with 4 holes, ø 56 mm	1	026663	③
Vitrified ceramic plate with 4 holes, ø 48 mm	1	036676	④
Vitrified ceramic plate with 6 holes, ø 39 mm	1	026661	⑤
Vitrified ceramic plate without holes	1	026982	⑥
Condensate trap Complete with connectors	1	036119	⑦
Connector with hose barb 10 mm To connect the condensate trap to the Scrubber	1	036077	⑧
Condensate trap Glass tube without connectors	1	036080	⑨
Connector with hose barb 15 mm To connect the condensate trap with the glass hood	1	036076	⑩

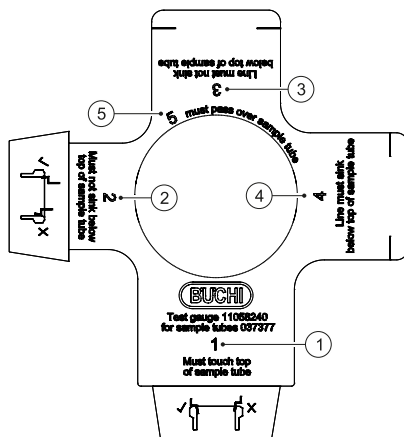


## Scrubber K-415

	Qty	Order number	Picture
Condensation step (for DuoScrub)	1	11058460	①
Receiving vessel with stopcock (TKN-set)	1	11056979	②
Collection vessel for condensate	1	11057153	③
Neutralisation vessel P+G coated	1	11057138	④
Adsorption vessel	1	037774	⑤
Condenser with ball joint S35	1	11057152	⑥
Reaction vessel, 1.0 L	1	037797	⑦
Introduction tube assembly For reaction step	1	037778	⑧
Reaction step (for DuoScrub & TripleScrub)	1	11058461	⑨
Condensate bottle (secondary)	1	025100	⑩
Hose connection S19 (ball joint)	1	⑪	
TKN set Easy collection and drain of condensate, including drain cock, hose and hose clamp	1	11057333	



#### How can I make sure that the samples tubes are still in good condition?



Inspecting the BUCHI Sample Tubes with the test gauge to ensure functionality.

Sample tubes are subject to wear and tear, especially due to the impact of NaOH and by cleaning in a dishwasher. To avoid leaks during distillations it is recommended to check each tube with the supplied test gauge and discard the ones that do not pass all the criteria.

Follow the instructions given on the test gauge and perform all five tests:

- ① Must touch top of sample tube
- ② Must not sink below top of sample tube
- ③ Line must not sink below top of sample tube
- ④ Line must sink below top of sample tube
- ⑤ Must pass over sample tube

#### What is the best sample tube type for my needs?

Sample tube type	100 mL	300 mL	500 mL
Sample weight	< 0.2 g	0.1 - 5 g	> 4 g
Sample volume	2 - 3 mL	< 200 mL	< 400 mL
H <sub>2</sub> SO <sub>4</sub>	2 - 5 mL	5 - 30 mL	> 10 mL
Kjeldahl Tablets	1	2	2
Recommendation	Homogeneous samples high in nitrogen/protein	Standard tube for most applications	Especially for high sample volumes or strongly foaming samples
Benefit	Reduction of chemicals by 80 % compared to 300 mL tubes	All round sample tube	Problem free digestion of strongly foaming samples

## What is the advantage of BUCHI Sample Tubes?

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Original sample tubes from BUCHI guarantee safety, precision and durability that customers can rely on.

- Precise joint: ensures leak tightness
- Constricted condensation zone: no splashing
- Wider diameter: reduced foaming
- Thicker glass wall: longer lifetime



Sample tube type	BUCHI	3 <sup>rd</sup> party
Length [mm]	260	300
Glass wall thickness [mm]	2.3	1.8 to 2.2
Robustness	+	-
Diameter [mm]	48	42
Volume [mL]	300	250
Constricted condensation zone	Yes	No
Lifetime (number of determinations)	4500	500

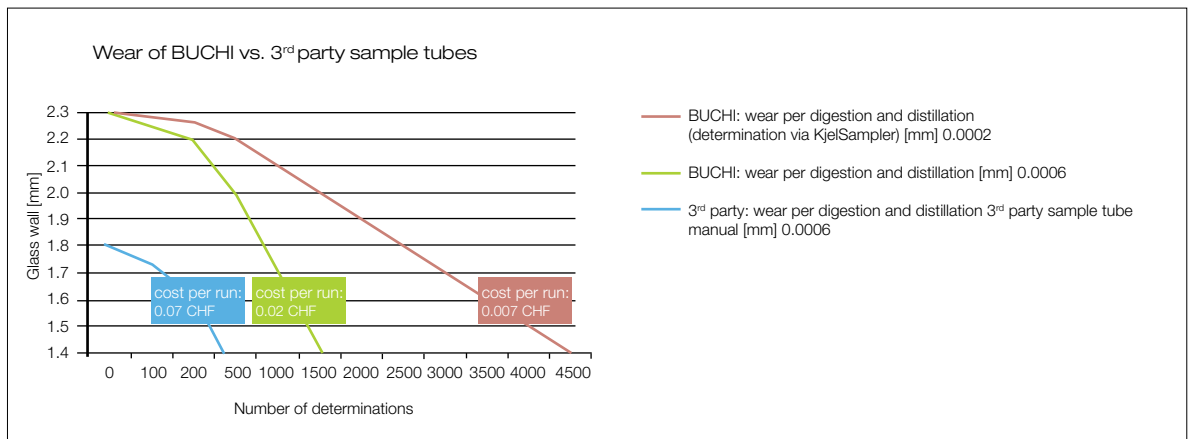
## How do BUCHI Sample Tubes influence the running cost?

### Longer lifetime

The extra thick glass wall of the sample tube as well as the patented sample transfer using steam without alkali contact guarantees longer lifetime which has a direct impact on the running costs.

Benefit from:

- shorter time-to-results as sample tube cleaning as an intermediate step is now redundant
- reduced maintenance costs as no sample tubes are transferred during processing
- longest glass lifetime due to short exposure to chemicals



This shows that the BUCHI Sample Tubes can be used for up to 4500 determinations (with the Kjel-Sampler) whereas the 3<sup>rd</sup> party sample tubes need to be replaced after about 500 determinations.

The running costs are dramatically reduced as the thicker glass wall of the BUCHI tubes allows for more manual determinations. Using the fully automated KjelMaster System with the patented sample transfer principle using steam the tubes do not get in touch with alkali which prolongs the tube lifetime even more.

## Digestion - why are BUCHI Sample Tubes the better choice?

### Compared to BUCHI shape copied tubes

Design and manufacturing flaws are often found in lower quality glass which causes negative effects during the workflow:

Flaw	Effect
1. Imprecise rim and neck	Fume emission from leaks: <ul style="list-style-type: none"> <li>· health hazards, corrosion</li> <li>· low nitrogen recoveries</li> </ul>
2. Poor glass quality	Air bubbles in the glass cause: <ul style="list-style-type: none"> <li>· glass breakage and cracks</li> <li>· reduced sample tube lifetime</li> </ul>
3. Imprecise round bottom shape	Physical tension: <ul style="list-style-type: none"> <li>· glass breakage from poor fit and hot spots</li> <li>· contamination of the digester after glass breakage</li> <li>· hot spots and boiling delay causing cross-contamination</li> </ul>



## Distillation – only BUCHI tubes ensure complete reliability

### Compared to BUCHI shape copied tubes

Design and manufacturing flaws are often found in lower quality glass which causes negative effects during the workflow:

1. Imprecise rim and neck design	Leakage results in: <ul style="list-style-type: none"> <li>· low nitrogen recoveries</li> <li>· malfunction in tube detection stops the process</li> </ul>
2. Incorrect tube length	Tube too long: <ul style="list-style-type: none"> <li>· K-376 dip tube cannot reach the bottom of the tube, sample is not transferred</li> </ul> Tube too short: <ul style="list-style-type: none"> <li>· K-376 dip tube cannot be accommodated in the tube, a protection error will occur</li> </ul>
3. Imprecise rim	Too narrow: <ul style="list-style-type: none"> <li>· leakage and low nitrogen recoveries</li> </ul> Too wide: <ul style="list-style-type: none"> <li>· damage to the tube holder</li> </ul>



## Quality in your hands

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