

#### Technical data sheet

## KjelMaster K-375 / KjelSampler K-376 / K-377

The automatic distillation unit KjelMaster K-375 is designed for convenient nitrogen and protein analysis. The reduced need for user interaction and an intelligent software save time and costs. Automation and throughput are increased significantly by using the KjelSampler K-376 or K-377.



## Scope of delivery KjelMaster K-375

The KjelMaster K-375 is a ready to use instrument with steam generator, titrator, pumps for dosage of alkali, boric acid, water, automatic aspiration of sample and receiver residues.

	K-375 potentiometric titration	K-375 colorimetric titration
Sample tube (300 mL)	1	1
Pair of glass tongs	1	1
pH electrode	1	
Buffer set pH 4 and pH 7	3 x 20 mL each	
KCl electrolyte, saturated	250 mL	
Colorimetric sensor		1
Protection mesh for colorimetric sensor		1
Indicator according to Sher		100 mL
Bottle (1 L) for titrant solution	1	1
Storage tanks (10 L) for chemicals	2	2
Storage tanks (20 L) for water and waste	2	2
Capacitive level sensors for tanks with o-rings	4	4
Hose connector for waste tank	1	1
Hose for chemical feed	6.0 m	6.0 m
Suction tubes to chemical tanks	3	3
Hose for waste drain	1.8 m	1.8 m
Hose for cooling water feed	1.5 m	1.5 m
Hose for cooling water drain	1.8 m	1.8 m
Connection cable RJ45 (network cable)	2.0 m	2.0 m
Mini gender for changer for balance connection	1	1
Test gauge for sample tube holder	1	1
Connection grommet for Chiller	1	1
Weighing boats	20	20
KjelLink PC software (with 60 days test license)	1	1
Kjeldahl Practice Guide	1	1

## Scope of delivery KjelSampler K-376 and K-377

The K-376 accommodates up to 24 sample tubes of 300 mL capacity. The K-377 allows processing up to 48 samples in 300 mL tubes.

	K-376	K-377
RS232 communication cable	1.5 m	1.5 m
Sample tubes (500 mL)	1	1
Sample tubes (300 mL)	28	52
Rack trays	1	2
Rack for 20 x 300 mL sample tubes	1	2
Express rack for 4 x 300 mL sample tubes	1	2
Test gauge for sample tubes	1	1

## Order code



### KjelMaster K-375

- 0 Without distillation unit
- 1 Potentiometric titration, glass splash protector
- 2 Colorimetric titration, glass splash protector
- 3 Potentiometric titration, plastic splash protector
- 4 Colorimetric titration, plastic splash protector

### KjelSampler K-376 or K-377

- 0 Without auto sampler
- 1 KjelSampler K-376 (24 positions)
- 2 KjelSampler K-377 (48 positions)

## Technical data

### KjelMaster K-375

	K-375
Dimensions (W x D x H)	458 x 431 x 670 mm
Weight	32 kg
Display	8.4 inch color touch
Result memory on instrument	>100'000 results
Result memory with KjelLink PC software	Unlimited
User administration	Administrator and operator level
Titration setup options	Potentiometric (pH), colorimetric and back titration (pH)
Integrated titrator	Yes

**K-375**

Interchangeable burette	Yes, 20 mL and 50 mL burette volume
Online-Titration	Yes
Starting the titration already during the distillation for faster time to results.	
Minimal titrator volume	2 µl / step
Automatic result calculation	Yes
Language	DE, EN, IT, ES, FR, JA, CN, KO, PL, RU
Cooling water control	Saving cooling water by restricting water flow during distillations and closing water valve after distillations.
Pumps for automatic addition	NaOH, H <sub>3</sub> BO <sub>3</sub> , H <sub>2</sub> O
Automatic waste removal	From sample tube and receiver waste with separate waste outlets.
Distillation capacity (100 %)	~ 40 mL / min
Adjustable steam output	30 – 100 %
Measuring range (LOQ - Max. Amount)	0.02 – 220 mg N
Reproducibility (RSD)	<1 %
Recovery	>99.5 %
RS232 ports	2 (balance, KjelSampler)
USB ports	3 (printer, barcode reader, memory stick)
LAN port	1
Power supply	220 - 240 VAC ±10 %
Frequency	50/60 Hz
Power consumption (during distillations)	2400 W
Power consumption (stand-by mode)	34 W
Water consumption	0.7 L/min at 10 °C
(during distillation only)	2.5 L/min at 30 °C
Safety sensors	3 (service door, protecting door, sample tube)

**Materials**

Steam generator housing	Stainless steel
Housing stirrer	Glass fiber reinforced polypropylene
Glass parts	Borosilicate 3.3
Plastic splash protector	Glass fiber reinforced polypropylene
Protective cover	PMMA
Sealing	CSM
NaOH hose	EPDM

## KjelSampler K-376 KjelSampler K-377

	K-376	K-377
Dimensions (W x D x H)	505 x 655 x 750 mm	1015 x 655 x 750 mm
Weight	40 kg	64 kg
Frequency	50/60 Hz	50/60 Hz
Power consumption	150 W	150 W
Power supply	100 – 240 V ± 10 %	100 – 240 V ± 10 %
Min. height for free movement of the sampler arm	1000 mm	1250 mm
Sample positions	24	48
Rack trays	1	2
Express rack	Yes, 4 positions	Yes, 8 positions
For additional blanks and reference samples, can be loaded during runs.		

## PC system requirements for KjelLink software


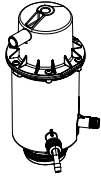

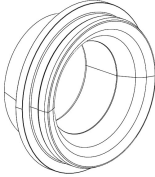
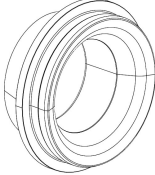
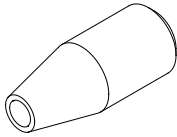
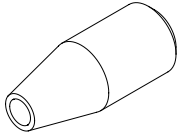
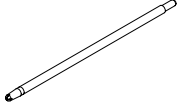
Operating system	Windows 11 (64 Bit), Windows 10, Windows 8.1 Pro (64 Bit), Windows 7 Professional / Enterprise / Ultimate (32-bit / 64-bit, SP1)
Processor	Dual Core 2.4 GHz
Hard disk	>15 GB free memory
RAM	2 GB
Ports	USB 1.1 or higher, Ethernet
Display	1280 x 1024 (minimum 1024 x 768)


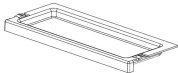
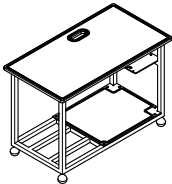
## Software

	Order no.
KjelLink PC software license (USB drive)	11072472
For customers using LIMS, allows accessing sample data from the LIMS and to set up sample lists, methods or sequences which are transferred to the KjelMaster to be used for sample analysis. Determination results imported from the memory of the K-375 can be viewed, printed or recalculated.	
KjelMaster pharma package	11068617
Firmware for CFR 21 Part 11 requirements. With this firmware package the K-375 comes with enhanced instrument security features, three different user-levels with dedicated user rights, extended system event log (audit-trail) and report functions such as electronic signatures.	


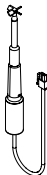
## Spare parts and accessories

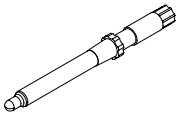
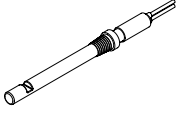

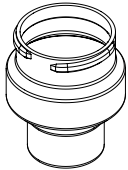
### Accessories for KjelMaster K-375

	Order no.	Image
Glass Splash Protector For visible distillation processes.	043332	
Plastic Splash Protector The most durable splash protector.	043590	
Glass splash protector Devarda Prevents from foaming into the condenser.	043335	
Sealing (CSM) with ring Rubber sealing between splash protector and sample.	11057035	
Sealing (CSM) with ring 4 pcs.	11085446	
Connecting piece (CSM) Rubber piece between splash protector and steam outlet tube, alkali-resistant.	019002	
Connecting piece (CSM) 4 pcs.	11085449	
Adapter set for 3rd party sample tubes Contains all required parts to convert the K-375 for the use of 3rd party sample tubes.	11058410	
Dip tube with cross-slot for soil samples prevents stones to be aspirated from sample tube	047845	

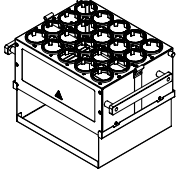
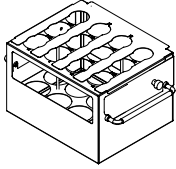
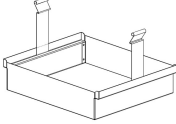
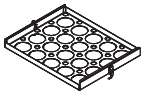
	Order no.	Image
Sample tube insert for soil samples prevents stones to be aspirated from sample tube	048638	
Removable drip tray To collect spilled liquids.	11057428	
Instrument trolley For KjelMaster K-375 with KjelSampler K-376 with space for storage tanks and recirculating chiller, (W x D x H) = 1300 x 700 x 900 mm	11081856	

## Titration related parts

	Order no.	Image
Receiving vessel 420 mL	043390	
Receiving vessel 340 mL	043333	
Stirrer For the receiving vessel.	11056590	
Temperature sensor for distillate With cable for the titrator.	11056851	
Dosing unit for back titration (20 mL)	11056836	
Dosing unit with 50 mL capacity	11067417	
Driving motor for dosing unit	11056835	

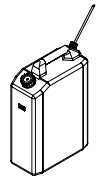
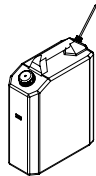
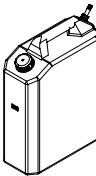
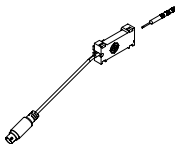
	Order no.	Image
pH Electrode gel, maintenance-free For potentiometric titrations.	11056842	
pH Electrode glass, refillable For potentiometric titrations.	11065834	
Kit colorimetric titration (Optrode) Includes all Optrode accessories (w/o Optrode sensor and receiving vessel).	11068260	
Colorimetric sensor (Optrode) For colorimetric titrations.	11066601	
Protection mesh for colorimetric sensor for colorimetric titration Prevents air bubbles in solution from giving false signals for the colorimetric sensor.	11061562	
Receiving vessel (Optrode) For colorimetric titrations with Optrode sensor.	11068263	

## Racks and rack parts

	Order no.	Image
Rack with 20 positions for 300 mL tubes	11059831	
Rack with 12 positions for 500 mL tubes	043970	
Stand for rack Protects the sample tubes from smashing, as well as other damage.	11058659	
Retaining plate Holds the tubes firmly in the rack when it is placed into the dish- washer for cleaning.	038559	

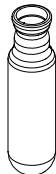
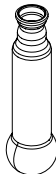
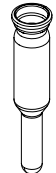
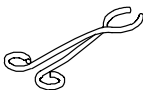


## Storage tanks and level sensors

	Order no.	Image
Storage tank (10 L) for chemicals	043468	
Storage tank (20 L) for chemicals	043469	
Storage tank (20 L) for waste	043471	
Capacitive switch For tank level sensor.	11055914	

## Sample tubes and holders

	Order no.	Image
Sample tubes 300 mL For sample volumes up to 200 mL or 5 g in weight 4 pcs.	037377	
Sample tubes 300 mL 20 pcs.	11059690	
Sample tubes graduated 300 mL 4 pcs.	043049	
Sample tube 500 mL	026128	

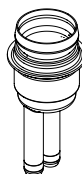
	Order no.	Image
Sample tubes 500 mL 4 pcs.	043982	
Set sample tube 750 mL with long suction tubing	11058999	
Sample tubes micro (100 mL) 4 pcs.	11057442	
Pair of glass tongs	002004	

## Consumables

	Order no.
2% boric acid pH 4.65 +/- 0.15 with Sher indicator, 5 L	11064972
4% boric acid pH 4.65 +/- 0.15 with Sher indicator, 5 L	11064973
4% boric acid pH 4.65 +/- 0.15 with bromocresol green / methly red mixed indicator, 5 L	11064976
Sher indicator 100 mL Color indicator for colorimetric titrations.	003512
KCl electrolyte, saturated	11064978
Electrode storage solution, 250 mL	
Buffer solution pH 4.00 ± 0.01 twin-neck bottle, 250 mL	11064974
Buffer solution pH 7 ± 0.01 twin-neck bottle, 250 mL	11064975
Ammonium phosphate monobasic, 25 g Reference substance for the verification and OQ of the Kjeldahl distillation units.	045527
Weighing boats Nitrogen-free weighing paper 58 x 10 x 10 mm, 100 pcs.	11060522
Kjeldahl Tablets Titanium For efficient digestions, 1000 tablets (3.5 g K <sub>2</sub> SO <sub>4</sub> / 0.105 g CuSO <sub>4</sub> * 5 H <sub>2</sub> O / 0.105 g TiO <sub>2</sub> )	11072627
Kjeldahl Tablets Titanium Micro For small sample sizes, 1000 tablets (1.5 g K <sub>2</sub> SO <sub>4</sub> / 0.045 g CuSO <sub>4</sub> * 5 H <sub>2</sub> O / 0.045 g TiO <sub>2</sub> )	11072628
Kjeldahl Tablets Missouri For efficient digestions without Titanium, 1000 tablets (4.98 g K <sub>2</sub> SO <sub>4</sub> / 0.02 g CuSO <sub>4</sub> * 5 H <sub>2</sub> O)	11072629

	Order no.
Kjeldahl Tablets ECO	11072630
For eco-friendly digestions with minimum amount of copper, 1000 tablets (3.998 g K <sub>2</sub> SO <sub>4</sub> / 0.002 CuSO <sub>4</sub> * 5 H <sub>2</sub> O)	
Kjeldahl Tablets Antifoam	11072631
For foaming samples in digestions to avoid cross contamination due to foaming, 1000 tablets (0.97 g Na <sub>2</sub> -SO <sub>4</sub> / 0.03 g Silicone)	
Kjeldahl Tablets Copper Micro	11072632
For small sample sizes without Titanium, 1000 tablets (1.5 g K <sub>2</sub> SO <sub>4</sub> / 0.15 g CuSO <sub>4</sub> * 5 H <sub>2</sub> O)	

## Maintenance

Specification	Order no.	Image
Kit Customer K-375	11062609	
Includes suction tube inside, gasket, seal with ring and connecting piece.		
K-376 / K-377 Sealing cap	11058840	
Sealing for the K-376 / K-377 autosampler head.		

## Documentation

	Order no.
Kjeldahl Knowledge Base (EN)	11595478
Comprehensive guide covering all aspects of the theoretical and practical know-how.	
Kjeldahl Practice Guide (EN)	11592548
Provides theoretical background information, useful hints and calculation tables for daily routine work	
Kjeldahl Practice Guide (DE)	11592547
Kjeldahl Practice Guide (CN)	11592549
IQ/OQ set K-375 (EN)	11058677
IQ/OQ set K-375 / K-376 / K-377 (EN)	11058678
Repeating OQ K-375 (EN)	11058679
Repeating OQ K-375 / K-376 / K-377 (EN)	11058680

## Description of function

The combination of the KjelMaster K-375 with the KjelSampler K-376 or K-377 uses a unique and very effective method of transferring samples and carrying out distillations. Steam overpressure is used to transfer the digested sample from a sample tube in the autosampler to the distillation unit. During the distillation, steam continuously purges the sample tube of the KjelSampler, thus minimizing the need for cleaning and extending the lifetime of the tubes.

