

**LABSOLUTIONS**

FOOD&FEED LINE

**NITROGEN/PROTEIN  
DETERMINATION**

**DUMAS/COMBUSTION  
METHOD**

**KJELDAHL  
METHOD**

**SHELF LIFE  
INVESTIGATION**

**FAT  
EXTRACTION**

**RAW FIBER  
EXTRACTION**

**DIETARY FIBER  
EXTRACTION**



# NITROGEN/PROTEIN DETERMINATION

## NDA 701 DUMAS NITROGEN ANALYZER

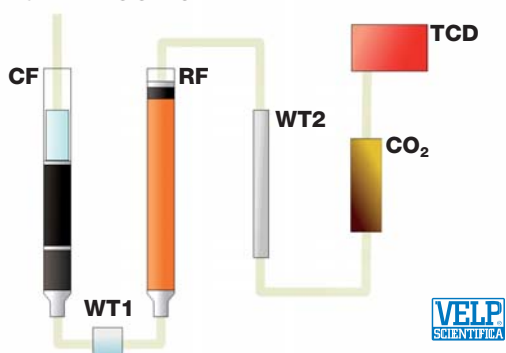
### DUMAS METHOD

The Dumas method is used for the quantitative determination of nitrogen in chemical substances based on a technique first described by Jean-Baptiste Dumas, a French chemist. He introduced the combustion method for nitrogen analysis in 1831, but the original method was not accepted for routine analyses due to various difficulties (inaccurate results, lack of availability of the special gases and catalysts required for the analysis). Since 1831 the original combustion method has been modified and automated to improve the technique. An automated instrumental technique has been developed which is capable of rapidly measuring the total protein concentration of food samples. This method is beginning to compete with the Kjeldahl method as the standard method to determine the protein content of food samples as well as other types of sample. The NDA 701 can be considered as the modern development of the original Dumas technique and thanks to the technology developed by VELP's internal R&D Department, the market now has an innovative solution for protein content determination by combustion of food and feed samples and environmental samples offering interesting results in terms of performance.

### NITROGEN/PROTEIN DETERMINATION IN A FLASH

**NDA 701** is a **powerful Dumas Nitrogen Analyzer**, according to the Dumas combustion analysis, able to hold up to 4 discs of 30 positions each. Performing **precise analysis in a flash**, it is the best solution for **high productivity** and offers unique benefits, being **totally unsupervised**. This means that the NDA does not need to be controlled during its work and is able to **process samples 24/7**. Also under the **environmental aspect** it is a great solution: minimum wastes and residues are produced and the life of consumables is optimized by the software (remaining customizable for any need). Saving on consumables means **saving money**: with a consciousness lab managing, **the cost per analysis will be incredibly low**. NDA 701 is entirely controlled via PC through the **intuitive DUMASoft™** Software. The several pre-installed methods and the numerous calibration curves that can be stored, increase the efficiency of the instrument. The software accepts weight values directly from the balance. Data management appears clear and detailed, thanks to the final reports and the graph. The analyses can be recalled by a database and can be saved in different formats (according to LIMS) on the PC, exported as test reports or printed. NDA 701 offers a **very low detection limit** (0.003 mg N) and an **excellent RSD%** (<0.5% with EDTA standard).

NDA 701 ANALYSIS FLOWPATH



Dumas method starts with an initial combustion to burn the sample, obtaining elemental compounds as water, oxygen, carbon dioxide and nitrogen as well. NDA removes the water in two separate points with two different kinds of trap: the first is positioned after the combustion and is a physical trap (**DriStep™**), while the second is placed after the reduction and it is a chemical trap. Between the two, the elemental substances passed through a reduction furnace, that eliminates oxygen and converts nitrogen oxide into elemental nitrogen. The second water trap removes the water remained (a very few quantity) and the gas reach the auto-regenerative CO<sub>2</sub> adsorbers. After the CO<sub>2</sub> removal, what remains of the gas is just nitrogen, that is detected by the **LoGas™** innovative Thermal Conductivity Detector (TCD) without requiring a reference gas.

Moreover the NDA 701 incorporates **TEMS™ technology** for major **savings in Time, Energy, Money and Space**, pursuing VELP's contribution to environmental protection.

**GLP Good Laboratory Practice**  
**AOAC • AACC • ASBC**  
**ISO • IFFO • OIV**



TIME SAVING:	ENERGY SAVING:	MONEY SAVING:	SPACE SAVING:
UNPARALLELED PRODUCTIVITY, RESULTS IN ONLY 3-4 MINUTES	EXCELLENT ENGINEERING, LOW CONSUMPTION	LIMITED COST PER ANALYSIS, LESS GAS AND REAGENT USED (LOGAS™ AND DRISTEP™)	JUST ONE SLIM UNIT REQUIRED FOR THE WHOLE ANALYSIS

# DUMAS NITROGEN ANALYZER CONSUMABLES



VELP Scientifica offers a wide range of **superior quality consumables** for the day-to-day operation of your NDA 701 including high-quality quartz tubes, crucibles, tin foils, long-life and premium reagents and catalysts, calibration standards, o-rings, seals and fittings. At VEP Scientifica we manufacture most of the consumables we supply in order to ensure the most suitable solution for your NDA 701. VEP offers a great advantage compared to competitors, **instruments and consumables from a single source to optimize the performance** of your analyzer.

## KIT FOR 1000\* ANALYSES

VELP Scientifica also offers a consumables kit that contains all parts and reagents necessary for approximately 1000 analyses: combustion and reduction tubes, reagents and instrument fittings. A **pre-packed solution** to save your time when ordering consumables for your analyzer!

\* 1000 is an estimated value. The effective life of the kit depends on the quantity and the kind of sample.



INSTRUMENT	POWER SUPPLY	CODE No
NDA 701	230 V / 50-60 Hz	F30800070

## ① GENERAL FEATURES AND PERFORMANCE

ANALYSIS TIME	3/4 minutes
DETECTOR	Innovative autocalibrating TCD (no need for a reference gas)
AUTOSAMPLER CAPACITY	Up to 4 discs of 30 positions each
SAMPLE WEIGHT	Up to 1 gram
COMBUSTION TEMPERATURE	1030 °C (1886 °F)
DYNAMIC RANGE	0.1 - 200 mg of nitrogen
DETECTION LIMIT	0.003 mg of nitrogen
RECOVERY	> 99.5%
REPRODUCIBILITY (RSD)	< 0.5% for EDTA standards (9.57%N)
INTERFACE	USB and RS232
HELIUM (He)	2 bar - purity: 99.999% (grade 5.0)
OXYGEN (O <sub>2</sub> )	2.5 bar - purity: 99.999% (grade 5.0)
COMPRESSED AIR OR NITROGEN (N <sub>2</sub> )	3 bar - purity: 99.6% (oil and water free)
POWER	1400 W
DIMENSIONS (WxHxD)	655x510x410 mm (H 690 mm with autosampler) 25.8x20.1x16.1 in (H 27.0 in with autosampler)
WEIGHT	54 Kg (119 lb)

Performance is ensured when NDA 701 works with original VEP consumables.

SUPPLIED WITH	CODE No
Start-up kit for 1000 analyses	A00000193
DUMASoft™ NDA 701 Software	40001504
RS232 cable for balance	10003926
Autosampler with disc 1	40001065
USB cable for PC, 5 mt	40001693

All the accessories for maintenance, connections, reactors and sample preparation are supplied with the instrument

OPTIONAL ACCESSORIES	CODE No
Disc 2 for autosampler	A00000199
Disc 3 for autosampler	A00000200
Disc 4 for autosampler	A00000201
Tin foil cup closing device	A00000217

CONSUMABLES	CODE No
1000 analyses kit for NDA 701	A00000194
Chromosorb, 10 g	A00000148
Quartz wool, 50 g	A00000154
Vcopper™ High Reduction Efficiency, 470 g	A00000240
Copper oxide, 50 g	A00000157
VHT catalyst, 50 g	A00000159
VLT catalyst, 25 g	A00000160
EDTA, 100 g	A00000149
Rice flour, 30 g	A00000235
Tin Foil Cups, 150 pcs	A00000153
Quartz reactor tube	A00000162
Quartz ash insert	A00000161
Ceramic ash insert	A00000198
Anhydrone, 454 g	A00000225
High temperature sealing grease	A00000236
Pre-Packed Combustion Reactor	A00000158
Pre-Packed Reduction Reactor	A00000226
NDA 701 IQ/OQ/PQ Manual	A00000192



**NDA 701** is completely controlled and operated by the **DUMASoft™**, offering all the most important info at a glance in one window!

### 1...BEFORE THE ANALYSIS

Simply position the capsule in the autosampler, enter sample name, type and weight and select the method and the calibration curve. Automatically, the software will set the analytical conditions according to the entered data. The dosing of gases is optimized by the software, in order to achieve complete combustion of the sample with minimum consumption. Create and save calibration curves using standards, pure test substances with a well-known nitrogen content. No need to create a new calibration curve every day. Recall it before starting the analysis. A good calibration curve requires 5-6 points. These should represent different standard quantities (in mg) to create a range (in mg of nitrogen) that will then contain the nitrogen content of the analyzed sample. The more that the content of mg of nitrogen is centered in the range, the greater are the accuracy and precision of the analysis.

### 2...DURING THE ANALYSIS

In the main window the user can continuously check the instrument status, controlling the flow rate and the reactor temperatures on the right side of the page. Beneath, the user can also read suggestions about the maintenance, monitoring the number of analyses that can be performed before the next replacement. The real time graph shows the progress of the analysis, creating the peak as soon as the nitrogen starts reaching the Thermal Conductivity Detector (TCD).

### 3...AFTER THE ANALYSIS

Once the analysis is completed, the operator will find all the test information in the main window, with a real-time graph, info about the method and results in different formats (nitrogen mg, nitrogen % and protein %). All analysis data are stored into databases and can be exported in .xls, .txt and .csv format to PC or LIMS. The operator can also create test reports for a single test or multiple analyses for a better interpretation of the data. Results can be also recalculated using different calibration curves, without performing a new test, but only selecting the new curve. A particularly useful additional function can be the reintegration of the peak area. Results can be output to a printer.



1



2



3

### LEAK SPOT IDENTIFICATION

Prior to analysis, particularly following replacement of reagents, it is possible to carry out a leak test to ensure that no time is wasted producing unusable results. Leak testing is fully automated, it even identifies in which zone a leak might be present. Indeed, it is possible to check specific areas only or the entire system:

- Test 1: autosampler, combustion reactor and water trap 1
- Test 2: Test 1 + reduction reactor
- Test 3: Test 2 + water trap 2 and CO<sub>2</sub> adsorbers
- Complete Test: on the whole system

Tests by zone are extremely useful when replacing parts and reagents; as the user is informed exactly where the leak is occurring. In addition, the time required for a test by zone is shorter compared to the complete test.

### STAND-BY and HELIUM SAVING MODE

Right from the start of the analysis, the user can configure the NDA 701 so that it switches automatically to standby mode or helium saving mode. Standby configuration involves reactor temperatures, carrier flow and valves, whilst helium saving mode affects only the carrier flow reducing the consumption of helium.

### AUTOMATIC WEIGHING

The weight of samples prepared can be automatically transmitted by a balance: fast, easy and accurate data transfer. In fact, an interface with an electronic balance eliminates any errors in data transfer. The NDA 701 can be connected to several analytical balances with a resolution in grams of from 0.1 mg to 0.01 mg. Alternatively, the user can enter the sample weight manually in the relative database column.

### UNLIMITED LIBRARY

The pre-installed methods and the possibility to create new programs or modify the existing ones allows the user to customize the instrument according to the most diverse requirements. Unlimited calibration curves can be created, saved and recalled at any time for an easy and fast recalculation of the result, without the need of repeating the analysis.

# NITROGEN/PROTEIN DETERMINATION

## DK AND DKL DIGESTION UNITS



### KJELDAHL METHOD

Johan Kjeldahl was a Danish chemist who while studying the changes of protein content during the transformation of barley into malt process developed the method for determining nitrogen, which then took its name from him. Because of its high degree of precision, reproducibility and versatility, the Kjeldahl method is used today to determine the content of nitrogen and proteins according to the official methods (AOAC, EPA, DIN, ISO). The Kjeldahl method is the official method for determining nitrogen and protein contents in:

- Foods (raw materials and finished products)
- Animal feeds
- Soils, fertilizers, etc.
- Wastewater, sludge, etc.
- Lubricants, fuel oils, etc.

VELP Scientifica offers a complete package for Kjeldahl analysis, made up of a mineralization unit, aspiration and fume neutralization systems followed by distillation/titration units.

VELP digesters are suitable for a variety applications in food&feed, beverage (nitrogen, protein, Total Kjeldahl Nitrogen), environmental (COD, Total Kjeldahl Nitrogen), chemical and pharmaceutical (organic nitrogen) industries.

Choose the best solution according to your needs between DK and DKL Series!

#### CONSUMABLES

#### CODE No

CONSUMABLES	CODE No
Catalyst Tablets W 4.875 g Na <sub>2</sub> SO <sub>4</sub> , 0.075 g CuSO <sub>4</sub> x 5H <sub>2</sub> O, 0.050 g Se, 5 g	CT0006613*
Catalyst Tablets ST 3.5 g K <sub>2</sub> SO <sub>4</sub> , 3.5 mg Se	CT0006609*
Catalyst Tablets TCT 3.5 g K <sub>2</sub> SO <sub>4</sub> , 0.105 g CuSO <sub>4</sub> x 5H <sub>2</sub> O, 0.105 g TiO <sub>2</sub>	CT0006621*
Catalyst Tablets CM 3.5 g K <sub>2</sub> SO <sub>4</sub> , 0.1 g CuSO <sub>4</sub> x 5H <sub>2</sub> O	CT0006650*
Antifoam S - 0.97 g Na <sub>2</sub> SO <sub>4</sub> , 0.03 g silicone	CT0006600*
Nitrogen-free weighing boats, 58x10x10 mm, 100 pcs/box	CM0486000
Nitrogen-free weighing boats, 70x23x15 mm, 100 pcs/box	CM0486001

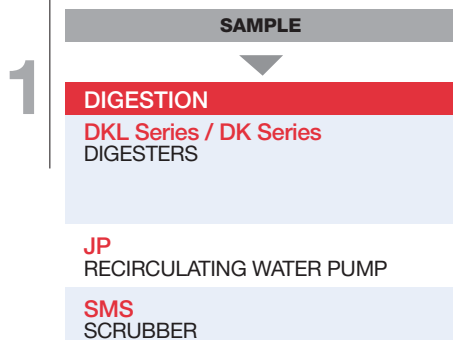
\* 1000 pcs/box

**GLP** Good Laboratory Practice  
AOAC • DIN • EPA • ISO



#### 1) DIGESTION

The sample is heated to a high temperature after being mixed with concentrated sulfuric acid and other reagents. An ammonium sulfate solution is obtained from this reaction.



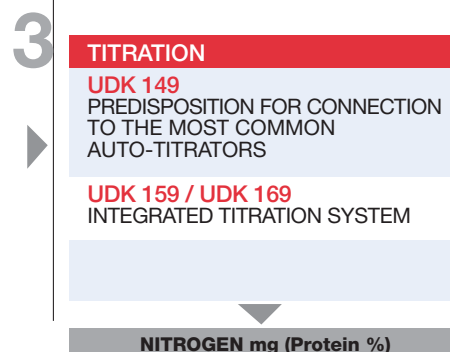
#### 2) DISTILLATION

The sulfuric acid used for digestion is neutralized by a concentrated sodium hydrate solution. By adding an excess of alkali, the balance is shifted from ammonium ions to free ammonia (NH<sub>3</sub>). The free ammonia is isolated during steam distillation and transferred to a receiver solution.



#### 3) TITRATION

The ammonia produced can be quantitatively determined by means of acid base titration (colorimetric, potentiometric, etc.) or other methods. It is then possible to calculate the quantity of nitrogen (% proteins).



# DK SERIES

The **DK Series** is made of an aluminum heating block, that needs to be combined with a support system, sample rack (with heat shields), suction cap and test tubes.

The heating block offers an **excellent thermal homogeneity, precision and accuracy** and its temperature is controlled by a dedicated microprocessor. A graphic display shows up to 20 programs with 4 temperature ramps for each program, completely user-programmable. DK digestion units have a **very compact size** aimed to meet the most demanding laboratories needs in terms of space saving.

INSTRUMENT	POWER SUPPLY	CODE No
DK 6	230 V / 50-60 Hz	F30100182
DK 6	115 V / 50-60 Hz	F30110182
DK 6/48	230 V / 50-60 Hz	F30100188
DK 6/48	115 V / 50-60 Hz	F30110188
DK 8	230 V / 50-60 Hz	F30100020
DK 8	115 V / 50-60 Hz	F30110020
DK 20	230 V / 50-60 Hz	F30100350
DK 20/26	230 V / 50-60 Hz	F30100185
DK 20/26	115 V / 50-60 Hz	F30110185
DK 42/26	230 V / 50-60 Hz	F30100360

\*The "Operating Accessories" indicated below are necessary for the correct functioning of the DK Series.

OPERATING ACCESSORIES	CODE No
DK 6 Sample rack with heat shields	A00001111
DK 6 Suction cap	A00001096
DK 6 Support system	A00001206
DK 6/48 Sample rack with heat shields	A00001113
DK 6/48 Suction cap	A00001101
DK 6/48 Support system	A00001206
DK 8 Sample rack with heat shields	A00000063
DK 8 Suction cap	A00000065
DK 8 Support system	A00000064
DK 20/26 Sample rack with heat shields	A00001110
DK 20/26 Suction cap	A00109626
DK 20/26 Support system	A00001206
DK 20 Sample rack	A00000168
DK 20 Suction cap and drip tray	A00000169
DK 20 Support system	A00000190
DK 42/26 Sample rack	A00000180
DK 42/26 Suction cap and drip tray	A00000179
DK 42/26 Support system	A00000190
DK 6 / DK 8 / DK 20 Test tubes Ø 42x300 mm, 250 ml, 3 pcs/box	A00000144
DK 6/48 Test tube Ø 48x260 mm, 300 ml, 1 pcs/box	A00001088
DK 20/26 / DK 42/26 Test tubes Ø 26x300 mm, 100 ml, 6 pcs/box	A00000146



DK 6



DK 6/48



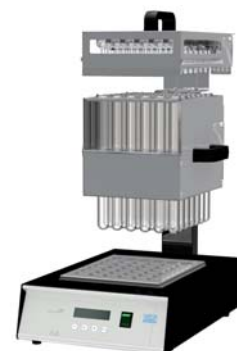
DK 8



DK 20/26



DK 20



DK 42/26

OPTIONAL ACCESSORIES	CODE No
DK 6, 8, 20 Glass cap	A00000243
DK 6 / DK 6/48 Drip tray	A00001200
DK 20 Drip tray	A00001202
DK 6 / DK 6/48 / DK 20/26 Stand for sample rack	A00001097
DK 8 Stand for sample rack	A00000067
DK 20 Stainless steel stand for sample rack	A00000182
DK 42/26 Stainless steel stand for sample rack	A00000182
Printer	A00001009
Null modem connector for printer	A00000010
Serial cable	A00000005
IQ/OQ Manual for DK Series	A00000075

ACCESSORIES FOR COD ANALYSIS *	CODE No
COD Test tubes Ø 42x200 mm, 200 ml, 3 pcs/box	A00000145
DK 6 COD Sample rack	A00001049
DK 20 COD Sample rack	A00000237
Air refrigerator with ground cone	A00001041
Antisplash bell	A00001045
PTFE sheat for 29/32 cone	A00001042

\* with DK 6 and DK 20 only

# DKL FULLY AUTOMATIC SERIES



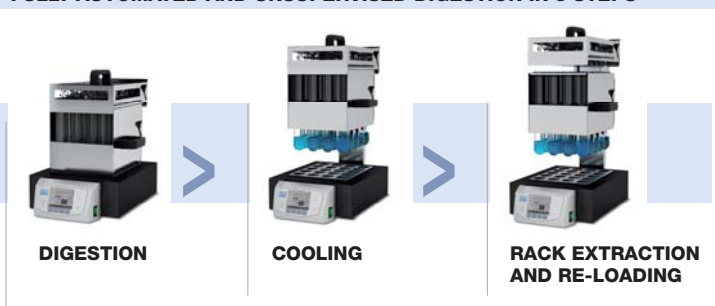
The **fully auto DKL Series** is composed of an aluminum heating block offering **excellent temperature homogeneity, precision and accuracy**; an auto lift and an auto suction cap and is supplied as a complete package including test tubes, sample rack and drip tray.

**High-tech but simple to use**, a microprocessor controls the block temperature whilst an electronic auto-calibration system ensures **excellent reliability and repeatability of analysis**. A practical interface with LCD graphic display allows access to all the data including the multi-language library and the 54 programs available, 24 of which are user-programmable. DKL digestion units are **extremely compact** with a narrow footprint for optimum use of space on the lab bench. Data can be printed or stored in a PC.

INSTRUMENT	POWER SUPPLY	CODE No
DKL 8 *	230 V / 50-60 Hz	S30100200
DKL 8 *	115 V / 50-60 Hz	S30110200
DKL 12 *	230 V / 50-60 Hz	S30100190
DKL 12 *	115 V / 50-60 Hz	S30110190
DKL 20 *	230 V / 50-60 Hz	S30100210
DKL 42/26 *	230 V / 50-60 Hz	S30100180

\* DKL Series comes including lift, suction cap, sample rack and test tubes

## FULLY AUTOMATED AND UNSUPERVISED DIGESTION IN 3 STEPS



DKL Series incorporates VELP's revolutionary **TEMS™ technology** for unprecedented **savings in terms of Time, Energy - as much as 35%, Money and Space**.



<b>TIME SAVING:</b> FROM AMBIENT TO 420 °C IN ONLY 22 MINUTES, WITH FAST PROGRAMMING	<b>ENERGY SAVING:</b> 35% REDUCTION IN ENERGY CONSUMPTION, CUTTING CO <sub>2</sub> EMISSION	<b>MONEY SAVING:</b> HUGE COST REDUCTION FOR EACH ANALYSIS	<b>SPACE SAVING:</b> REDUCE UNNECESSARY USE OF SPACE
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ACCESSORIES FOR COD ANALYSIS *	CODE No
COD Test tubes Ø 42x200 mm, 200 ml, 3 pcs/box	A00000145
DKL 20 COD Sample rack	A00000237
Air refrigerator with ground cone	A00001041
Antisplash bell	A00001045
PTFE sheat for 29/32 cone	A00001042

\* DKL 20 only



SUPPLIED WITH	CODE No
DKL 8 Sample rack	A00000173
DKL 8 Suction cap and drip tray	A00000175
DKL 8 / DKL 12 / DKL 20 Test tube Ø 42x300 mm, 250 ml, 3 pcs/box	A00000144
DKL 12 Sample rack	A00000172
DKL 12 Suction cap and drip tray	A00000174
DKL 20 Sample rack	A00000168
DKL 20 Suction cap and drip tray	A00000169
DKL 42/26 Sample rack	A00000180
DKL 42/26 Suction cap and drip tray	A00000179
DKL 42/26 Test tube Ø 26x300 mm, 100 ml, 6 pcs/box	A00000146

OPTIONAL ACCESSORIES	CODE No
DKL 8, 12, 20 Glass cap	A00000243
DKL 42/26 Test tube Ø 26x300 mm, 100 ml, 6 pcs/box	A00000146
DKL 8 / DKL 12 / DKL 20 Test tube Ø 42x300 mm, 250 ml, 3 pcs/box	A00000144
DKL 12 Test tube Ø 50x300 mm, 400 ml, 1 pcs/box	A00000185
DKL 8 Sample rack	A00000173
DKL 12 Sample rack	A00000172
DKL 12 Sample rack for 400 ml test tubes	A00000181
DKL 20 Sample rack	A00000168
DKL 42/26 Sample rack	A00000180
DKL 8 Stand for sample rack	A00000184
DKL 12 Stand for sample rack	A00000183
DKL 20 / DKL 42/26 Stand for sample rack	A00000182
USB cable A/B, 1.8 mt	10003134
IQ/OQ Manual for DKL Series	A00000205



GENERAL FEATURES	DK SERIES		DKL FULLY AUTO SERIES		
	CONSTRUCTION MATERIAL	Epoxy painted stainless steel structure		Stainless steel with chemical resistant coating	
NUMBER OF POSITIONS	DK 6: 6 pos. x 250 ml • DK 6/48: 6 pos. x 300 ml DK 8: 8 pos. x 250 ml • DK 20: 20 pos. x 250 ml DK 20/26: 20 pos. x 100 ml • DK 42/26: 42 pos. x 100 ml		DKL 8: 8 pos. x 250 ml • DKL 12: 12 pos. x 250/400 ml DKL 20: 20 pos. x 250 ml • DKL 42/26: 42 pos. x 100 ml		
SET TEMPERATURE	Digital readout in °C or °F		Digital readout in °C or °F or K		
TEMPERATURE RANGE	Ambient to 450 °C (842 °F)		Ambient to 450 °C (842 °F)		
COUNTDOWN	Digital readout		Digital readout		
LANGUAGES	UK, I, E, F, D, T		UK, I, E, F, RUS, CN + Additional Customizable (downloadable)		
INTERFACE	RS232		USB		
POWER	DK 6: 1100 W • DK 6/48: 1100 W • DK 8: 1350 W DK 20: 2300 W • DK 20/26: 1100 W • DK 42/26: 2300 W		DKL 8: 1150 W • DKL 12: 1500 W DKL 20: 2300 W • DKL 42/26: 2300 W		
OVERALL DIMENSIONS (WxHxD) (including lift / support system)	DK 6: 295x462x549 mm (11.6x18x13.3 in) DK 6/48: 295x462x546 mm (11.6x18.2x13.3 in) DK 8: 235x566x587 mm (9.2x22.3x23.1 in) DK 20: 328x702x585 mm (12.9x27.6x23 in) DK 20/26: 295x462x546 mm (11.6x18x13.3 in) DK 42/26: 328x702x585mm (12.9x27.6x23 in)		DKL 8: 210x690x540 mm (8.3x27.2x21.3 in) DKL 12: 266x690x540 mm (10.5x27.2x21.3 in) DKL 20: 322x690x584 mm (12.7x27.2x23.0 in) DKL 42/26: 322x690x584 mm (12.7x27.2x23.0 in)		
OVERALL WEIGHT (including lift / support system)	DK 6: 16.2 kg (35.7 lb) • DK 6/48: 15.6 kg (34.4 lb) DK 8: 21.9 kg (48.3 lb) • DK 20: 20.0 kg (44.1 lb) DK 20/26: 18.8 kg (41.4 lb) • DK 42/26: 20.7 kg (45.6 lb)		DKL 8: 19.7 kg (43.5 lb) • DKL 12: 23.3 kg (51.4 lb) DKL 20: 30.8 kg (68.0 lb) • DKL 42/26: 33.5 kg (74.0 lb)		
PERFORMANCE	PROGRAM LIBRARY	20 user-programmable programs		54 programs (30 standard + 24 user-programmable)	
	SELECTABLE RAMPS	Up to 4 ramps per program		Up to 4 ramps per program	
	DIGESTION TIME RANGE	From 1 to 999 minutes		From 1 to 999 minutes	
	TIME SELECTION	1 minute steps		1 minute steps	
	STABILITY AND PRECISION OF HEATING BLOCK TEMPERATURE	± 0.5 °C		± 0.5 °C	
SAFETY	OVERTEMPERATURE	Thermostat		Thermostat	
	DAMAGED TEMPERATURE PROBE	Automatic detection and alarm message		Automatic detection and alarm message	
	LIFT MOVEMENT	-		Automatic	

## SMS SCRUBBER



	POWER SUPPLY	CODE No
SMS	-	F307C0199

### SMS SCRUBBER

SMS Scrubber is designed for the **neutralization of toxic and corrosive fumes**. Its working process is generally composed by 3 stages:

- Condensation
- Neutralization with acids and bases
- Absorption with activated carbon (optional)

Thanks to the elevated surface of contact between gas and liquid, SMS prevents hazardous emission into the laboratory and environment.

## JP RECIRCULATING WATER PUMP



	POWER SUPPLY	CODE No
JP	230 V / 50 HZ	F30620198
JP	230 V / 60 HZ	F30630198
JP	115 V / 60 HZ	F30640198

### JP RECIRCULATING WATER PUMP

JP Recirculating Water Pump is the innovative solution for **aspirating toxic fumes**. JP provides a **considerable water saving** thanks to the principle of water recirculation in its tank. VELP Recirculating Water Pump is made with high-quality materials and equipped with special features. JP is **designed to last** and to offer **high performance** in terms of efficiency (up to 35 l/min flow rate).

	SMS
CONSTRUCTION MATERIAL	Epoxy painted stainless steel structure
POWER	-
DIMENSIONS (WxHxD)	300x500x190 mm (11.8x19.7x7.5 in)
WEIGHT	3.5 kg (7.7 lb)

	JP
CONSTRUCTION MATERIAL	ABS
POWER	160 W
DIMENSIONS (WxHxD)	250x400x370 mm (9.8x15.7x14.6 in)
WEIGHT	8.4 kg (18.5 lb)





# NITROGEN/PROTEIN DETERMINATION

## UDK 129 DISTILLATION UNIT



### UDK DISTILLATION UNITS

VELP Scientifica distillation units are the ideal solution for performing analyses concerning different applications such as determining ammoniacal nitrogen, protein nitrogen, (Kjeldahl or direct alkaline distillation), nitric nitrogen (after reduction), phenols, volatile acids, cyanides, alcohol content, sulphur dioxide, TVBN and Devarda nitrogen determination.

VELP Scientifica offers a wide choice with its 4-model series for performing efficient and reliable steam distillations, according to the different needs of the users.

All the units support the most advanced technology, consisting in a unique patented steam generator and an outstanding efficient patent pending titanium condenser that are wisely combined with a technopolymer splash head.

Designed with a strong and chemical-resistant structure made of technopolymer, UDK Series has been designed to last in time and to perform reliable analysis for many years.

Different safety features have been assembled on the units to improve the safety level of our users:

- safety lever avoids contact with soiled surfaces
- protective door with sensor shields test tube and prevents spills; completely closed
- service door + automatic electrical shutdown for extraordinary maintenance
- cooling water flow-rate detector activates low flow-rate warning signal
- test tube sensor ensures the presence of the test tube
- drip tray collects any drops

UDK Series supports different sizes of test tubes, from straight tubes (100, 250, 300, 400 ml and 1liter) to Kjeldahl flasks (500 ml).

UDK 139, 149 and 159 software can be easily upgraded.

UDK Series also incorporates **TEMS™ technology** for major **savings in Time, Energy, Money and Space** pursuing VELP's contribution to environmental protection.

**GLP Good Laboratory Practice**  
AOAC • DIN • EPA • ISO



**TIME SAVING:**  
FAST AND FREQUENT ANALYSES; NO HEATING DELAY BETWEEN RUNS

**ENERGY SAVING:**  
COOLING WATER CONSUMPTION STARTING FROM ONLY 0.5 L/MIN; EXCELLENT INSULATION OF INTERNAL PARTS

**MONEY SAVING:**  
COST REDUCTION IS SUBSTANTIAL, IN LINE WITH REDUCED POWER CONSUMPTION

**SPACE SAVING:**  
THE EXTREMELY COMPACT FOOTPRINT SAVES USEFUL LABORATORY BENCH SPACE

The **UDK 129** runs **automatically**, after setting **sodium hydroxide addition** and **distillation time** using the LCD display in order to get reliable and accurate results. The **high-precision pumps** ensure constant accurate dosing of reagents and the cooling water is automatically stopped during pauses, thus cutting down on its consumption.

The new UDK 129 incorporates **the same high level of technology as the top of the range**, with the VELP **patented steam generator** that offers **high performance, safety** (no pressure inside) and is **maintenance-free**. Another unique VELP component is the **titanium condenser** offering **reduced water consumption**, ensuring that distillate temperature always remains below the threshold value. The unit works with a **technopolymer splash head** that ensures **durability** to protect your investment and requires **no maintenance**. The **technopolymer housing** ensures **high resistance** to chemicals and **long life**.



INSTRUMENT	POWER SUPPLY	CODE No
UDK 129	230 V / 50-60 Hz	F30200120
UDK 129	115 V / 50-60 Hz	F30210120

The UDK 129 has numerous safety features in order to provide maximum protection for the user. Continuous monitoring indicates incorrect tube and handle positioning; the cooling water flow detector provides a **high level of safety**. With a novel design, a lever is used to displace the tube support enabling sample tubes to be inserted without any effort and clamped in place securely.

**Technologically advanced**, the UDK 129 includes many features that ensure efficient and reliable distillation, far beyond expectations of an ordinary entry level unit.

## UDK 139 SEMI-AUTOMATIC DISTILLATION UNIT

The **UDK 139** runs **automatically**, after setting **distillation time**, **water** and **sodium hydroxide addition** and **steam generation output** level between 10 and 100% using the innovative **3.5" color touch screen**. The **high-precision pumps** ensure constant accurate dosing of reagents. Accessing the 10 customizable methods available in 6 different languages is simple and intuitive. The new UDK 139 incorporates a considerably **high level of technology**, with the VELP **patented steam generator** that offers **high performance**, **safety** (no pressure inside) and is **maintenance-free**. Another unique VELP component is the **titanium condenser** offering **reduced water consumption**, ensuring that distillate temperature always remains below the threshold value.



## UDK 149 AUTOMATIC DISTILLATION UNIT WITH TITRATOR CONNECTION

The **UDK 149** operates **automatically**, after setting on the multi-function **3.5" color touch screen water**, **boric acid** and **sodium hydroxide addition**, **distillation time** and the **steam generation output** level between 10 and 100%. **Different automatic titrator models** can be connected to the UDK 149 for direct output of the final result and offering choice and **versatility** to the user. The **high-precision pumps** ensure constant accurate dosing of reagents. All the parameters concerning distillation and titration phase are easily programmable. **Simple, time-saving** and **intuitive** operation is assured by direct access to the 20 customizable methods available in 6 different languages (additional languages are also available). The UDK 149 offers **powerful archiving features**. The interfaces enable results to be downloaded to a pen drive or directly to a PC. The .xls format permits operators to use well-known software for extracting reports with maximum **flexibility**.



INSTRUMENT	POWER SUPPLY	CODE No
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UDK 139	230 V / 50-60 Hz	F30200130
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The unit works with a **technopolymer splash head** ensures **durability** to protect your investment requires **no maintenance**. A **technopolymer housing** ensures **high resistance** to chemicals used during the operation. The UDK 139 is specially conceived to provide **absolute user protection**. Non-stop monitoring indicates incorrect tube and handle positioning; the cooling water flow detector and reagent level alarms provide a high level of safety. With a novel design, a lever is used to displace the tube support enabling sample tubes to be inserted without any effort and clamped in place securely. The instrument can be connected to a printer in order to print the data concerning the tests in progress and ensure traceability for the samples and system. The UDK 139 combines **excellent value-for-money** with **high reliability** and **advanced performance**.

INSTRUMENT	POWER SUPPLY	CODE No
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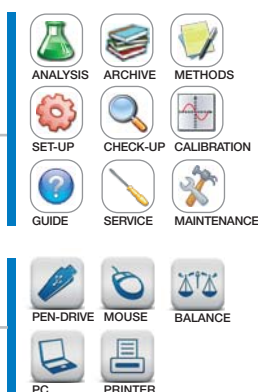
UDK 149	230 V / 50-60 Hz	F30200140
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The new UDK 149 incorporates the **latest technology**. The VELP **patented steam generator** is maintenance-free and offers **high performance** and an **outstanding level of safety** (no pressure inside). Also unique from VELP is the **titanium condenser** offering **reduced water consumption**, a high resistance to breakage and the guarantee that distillate temperature always remains below the safe threshold value to retain total nitrogen. A **technopolymer splash head** significantly increases the life expectancy and requires **no maintenance**. All chemical reagents used during the process are resisted by the **technopolymer housing**. **Full user protection** is top of the benefits of the UDK 149. Incorrect tube and handle positioning are continuously monitored and high safety levels are provided by the cooling water flow detector and reagent level. A range of sample tube sizes can be inserted without any effort using a lever to displace the tube support and clamping the tube in place securely because of the innovative design. The **versatility** of the UDK 149 is underlined by input from a titrator and data output to PC, pen drive and printer, in a common format, via USB, Ethernet and RS232 plus an **on-board archive** for sample data storage. Offering an upgrade pathway to combine distillation and titration, the UDK 149 will be instrument of choice for many laboratories.

# UDK 159 AUTOMATIC DISTILLATION & TITRATION SYSTEM



The **UDK 159** runs **automatically**, after setting **distillation time** and **water, boric acid** and **sodium hydroxide addition**, the **steam generation output** from 10 to 100% using the innovative **6" color touch screen**. The **high-precision pumps and burette** ensure constant accurate dosing of reagents and with the **integrated colorimetric titrator (AOAC recommended)** you will have reliable results concerning your determinations. **Automatic titration vessel cleaning** provides significant advantages including **reducing maintenance to a minimum**. A 54-program library (30 predefined + 24 customizable) covers the needs of any laboratory and the reporting system is comprehensive.



The UDK 159 offers **powerful archiving features**. In compliance with GLP (Good Laboratory Practice), the interfaces enable results to be downloaded to a pen drive or directly to a PC. The .csv format permits operators to use well-known software for extracting reports with maximum flexibility. **Full understanding** and **ease of use** are ensured the choice of preferred language. 6 languages are supplied as standard; others are downloadable from VELP. The new UDK 159 incorporates a considerably **high-tech level**, with the VELP **patented steam generator** that offers **high performance, safety** (no pressure inside) and is **maintenance-free**. Another unique VELP component is the **titanium condenser**, offering **reduced water consumption**, ensuring that distillate temperature always remains below the threshold value. The unit works with a **technopolymer splash head** to increase the life expectancy substantially and ensures **no maintenance**. A **technopolymer housing** provides **high chemical resistance** against all the reagents used during the process. The UDK 159 is specifically designed to provide **full protection of the user**. Continuous monitoring indicates incorrect tube and handle positioning; the cooling water flow detector and reagent level alarms provide a high level of safety. Thanks to an innovative system, sample tubes are inserted without any effort using a lever to displace the tube support and clamping the tube in place securely. **On-board archive** for data storage sample data, input from a balance and output to PC, pen drive and printer, in a common format, via Ethernet, USB and RS232 confirm the **versatility** of the UDK 159.

INSTRUMENT	POWER SUPPLY	CODE No
UDK 159	230 V / 50-60 Hz	F30200150

## MULTITASKING SOFTWARE

Improved communication leads to improved efficiency.

The display enables the operator to set all the parameters for a fully automatic control of the distillation and titration processes.

- Excellent usability
- Flexible, versatile and multi-language
- Intuitive data entry and programming
- Unlimited library with all the analyses
- Data export in .xls, .txt, .csv (according to LIMS) also on USB key
- Direct access to the archive from remote PC in real time without any download

## UNPARALLELED PERFORMANCE WITH COLORIMETRIC TITRATION

VELP Scientifica state-of-the-art Kjeldahl solution includes **on-board colorimetric titration system** for outstanding performance. Based on precise chemical reaction, this technique offers superior reliability, being the preferred method used and suggested by the main International bodies and organization (AOAC just to name one). With VELP Scientifica solutions, the benefits go even further: **shorter analysis time, maintenance-free, automatic vessel cleaning** and **no need for frequent calibration** make the colorimetric titration the most appreciated on the market.



# UDK 169 & AUTOKJEL AUTOMATIC KJELDAHL ANALYZER WITH AUTOSAMPLER

VELP response for maximum productivity is the completely automated UDK 169 combined with the **AutoKjel**, for fully unsupervised operation.

The **UDK 169** provides the same **premium technology and advanced performance** of UDK 159, including the colorimetric titration, but in addition it offers the possibility to be connected with AutoKjel autosampler.

The **AutoKjel** ensures high throughput and synchronizes all the procedures for achieving **accurate and reliable nitrogen and protein determination, unattended**. Tubes are directly transferred into the UDK 169 for further processing, preventing any sample transfer. Once the analysis is completed, the AutoKjel lowers the empty tube and automatically moves the next one in the correct position.

Two different sizes of test tubes are supported, with a standard rack of **24 positions (250 ml tubes)** or an optional one for 21 samples in 400 ml tubes, improving the **flexibility**.

**Robust and reliable**, AutoKjel comes complete with all the accessories required for the connection to UDK 169 and dedicated tanks for NaOH, H<sub>2</sub>O, H<sub>3</sub>BO<sub>3</sub> and waste.

The system has been designed for the highest productivity available when using Kjeldahl method, significantly **reducing operator time and efforts** as just the sample loading into the AutoKjel is required.



INSTRUMENT	POWER SUPPLY	CODE No
UDK 169	230 V / 50-60 Hz	F30200160
AutoKjel	230 V / 50-60 Hz	F30200430
UDK 169 with AutoKjel	230 V / 50-60 Hz	S30200160



	UDK 129	UDK 139	UDK 149	UDK 159	UDK 169	
<b>PERFORMANCE</b>	ANALYSIS TIME	5 min (for 100 ml)	4 min (for 100 ml)	3 min (for 100 ml)	from 4 min (titration included)	from 4 min (titration included)
	REPRODUCIBILITY (RSD)	≤ 1%	≤ 1%	≤ 1%	≤ 1%	≤ 1%
	RECOVERY (at nitrogen level between 1-200 mg)	≥ 99.5%	≥ 99.5%	≥ 99.5%	≥ 99.5%	≥ 99.5%
	DETECTION LIMIT	≥ 0.1 mg N	≥ 0.1 mg N	≥ 0.1 mg N	≥ 0.1 mg N	≥ 0.1 mg N
	AUTOMATIC SODIUM HYDROXIDE ADDITION	•	•	•	•	•
	AUTOMATIC DILUTION WATER ADDITION	•	•	•	•	•
	AUTOMATIC BORIC ACID ADDITION	•	•	•	•	•
	SELECTABLE DISTILLATION TIME	•	•	•	not necessary with titration	not necessary with titration
	DISTILLATION RESIDUES REMOVAL	•	•	•	•	•
	STEAM FLOW REGULATION (10-100%)	•	•	•	•	•
	DELAY TIME (DEVARDA ALLOY ANALYSIS)	•	•	•	•	•
	DISTILLATION IN SERIES	•	•	•	•	•
	LIMITED WATER CONSUMPTION	•	•	•	•	•
	DISPLAY	LCD	3.5" touch screen	3.5" touch screen	6" touch screen	6" touch screen
	PROGRAMS	1	10	20	54	54
	LANGUAGE SELECTION	•	•	•	•	•
	ARCHIVE (on-board data storage)	•	•	•	•	•
PASSWORD (user/super user)	•	•	•	•	•	
<b>TITRATION</b>	TITRATION RESIDUES REMOVAL	•	•	•	•	
	AUTOMATIC TITRATION VESSEL WASHING	•	•	•	•	
<b>CONNECTION</b>	MOUSE	•	•	•	•	
	PRINTER	•	•	•	•	
	PC (for data storage)	•	•	•	•	
	PEN DRIVE (for data transfer)	•	•	•	•	
	BALANCE	•	•	•	•	
AUTOSAMPLER	•	•	•	•	•	
<b>GENERAL FEATURES</b>	OVERALL DIMENSIONS IN MM (in) (WxHxD)	385x780x416 (15.2x30.7x16.4)	385x780x416 (15.2x30.7x16.4)	385x780x416 (15.2x30.7x16.4)	385x780x416 (15.2x30.7x16.4)	385x780x416 (15.2x30.7x16.4)
	OVERALL WEIGHT IN KG (lb)	24 (52.9)	26 (57.3)	27 (59.5)	31 (68.3)	31 (68.3)
	POWER SUPPLY	230 V / 115 V	230 V	230 V	230 V	230 V
	POWER	2100 W / 1700 W	2100 W	2100 W	2200 W	2200 W

## STEAM GENERATOR

PATENTED

### - Safe Working Conditions

A thermostat ensures the correct functioning of the steam generator, a safety thermostat eliminates risks for the operator

### - Non-Pressurized

No chance of leaks occurring even after an intensive use, completely maintenance-free

### - Extremely Reliable

The high level of precision and accuracy ensure correct and detailed results

### - Deionized Water

The use of deionized water prevents misleading results (no nitrogen in deionized water) and the formation of limescale

## TITANIUM CONDENSER

PATENT PENDING



### - Efficient Thermal Exchange

Distillate temperature always below the threshold value

### - Limited Water Consumption

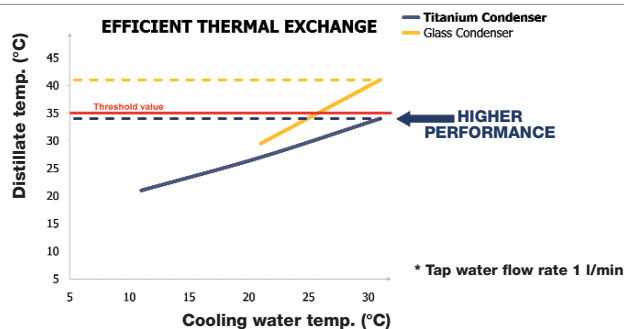
From only 0.5 l/min at 15 °C (1 l/min. at 30 °C)

### - No Nitrogen Loss, Precise Results

Cost reduction thanks to high performance, minimal consumption and no external chiller

### - Minimal Maintenance

Easy to disassemble and clean



## TECHNOPOLYMER SPLASH HEAD

### - Long-Life

The best and most durable solution when a large number of samples are processed

### - High Chemical Resistance

Highly resistant to alkaling and chemical solutions, used during steam distillation

### - No Risk of Breakage

Ensures safe working conditions in the laboratory

### - Maintenance-free and Easy to Replace

No maintenance required, extremely easy to replace when necessary

## TECHNOPOLYMER HOUSING

### - High Durability

Unique structure able to resist to chemical attacks for unprecedented resistance

### - Long-Life

Extremely compact and robust, designed to last

### - Space Saving

Narrow footprint for optimum use of the lab bench

### - Safety Lever, Protective Door and Service Door

Improved safety and comfort

## UDK ACCESSORIES

SUPPLIED WITH	CODE No
Test tube Ø 42x300 mm, 250 ml	A00001080
Collecting flask, 250 ml	10001106
Pincer for test tubes	10000247
Touch pen (for UDK 139, 149, 159)	10004936

OPTIONAL ACCESSORIES	CODE No
Test tube Ø 26x300 mm, 100 ml, 6 pcs/box	A00000146
Test tube Ø 42x300 mm, 250 ml, 3 pcs/box	A00000144
Test tube Ø 48x260 mm, 300 ml	A00001088
Test tube Ø 50x300 mm, 400 ml	A00000185
Test tube Ø 80x300 mm, 1 liter	A00001083

OPTIONAL ACCESSORIES	CODE No
Spacer for test tube Ø 48x260 mm	A00000206
Test tube connection Ø 26 mm, Ø 48 mm and 500 ml Kjeldahl balloon	A00000043
Printer (UDK 139, 149 and 159)	A00001009
Printer Adapter (UDK 139, 149 and 159)	A00000195
IQ/OQ/PQ UDK 129 Manual	A00000205
IQ/OQ/PQ UDK 139 Manual	A00000204
IQ/OQ/PQ UDK 149 Manual	A00000203
IQ/OQ/PQ UDK 159 Manual	A00000202
Waterproof mouse (for UDK 139, 149, 159)	A00000215
USB cable	10003134
Titration Titroline Easy K for UDK 149	R30800194
Acid resistant pump kit	A00000220

# SHELF LIFE INVESTIGATION

## OXITEST OXIDATION TEST REACTOR

### SHELF LIFE STUDIES

The **Oxitest** is an innovative solution, entirely controlled by the powerful **OXISoft™**, able to provide high added-value information concerning fat oxidation processes in foods, oils and fats.

**The Oxitest works directly on the whole sample** without the need for preliminary fat separation, and is suitable for the determination of the quality and the state of preservation of the food sample.

An **extremely simple** and **intuitive** instrument equipped with two separate titanium chambers in order to analyze the same sample in duplicate or different samples at the same time and under the same conditions. The stability of the sample is evaluated by accelerating the oxidation process using high temperatures (from 20 to 110 °C) and a pre-determined oxygen pressure. Oxygen is consumed during fat oxidation and it is this decrease in oxygen pressure that enables us to obtain useful information concerning the food sample. The **intuitive software** controls the entire process in a **user friendly** way and the operator can record data in a database, compare tests, export the data to an Excel file, filter and order the data quickly and simply.

The Oxitest is the versatile VELP solution suitable for a wide range of applications, including:

- Prediction of the oxidation stability during shelf-life studies, by analyzing the product at defined time intervals and building an experimental curve;
- Evaluation of the adequacy of storage conditions;
- Evaluation of the best packaging solution;
- Comparison of the oxidation stability of different formulas for food preparations;
- Evaluation of the oxidative stability of vegetable oils of different botanical origin;
- Evaluation of the effectiveness of antioxidants;
- Information on product oxidation when the oxidation flex is not visible, especially for products with a low fat content (4-5%). In this case, product oxidation can be achieved by combining the Oxitest with the gas chromatographic technique.

INSTRUMENT	POWER SUPPLY	CODE No
OXITEST	230 V / 50-60 Hz	F30900248

#### GENERAL FEATURES AND PERFORMANCE

CONSTRUCTION MATERIAL	Epoxy painted stainless steel structure and anodized aluminum
NUMBER OF OXIDATION CHAMBERS	2
CAPACITY OF SINGLE CHAMBER	Up to 100 ml
TEMPERATURE RANGE	Ambient to 110 °C
PRESSURE RANGE	0 - 8 bar
OVERPRESSURE	Safety valve
OUT-RANGE TEMPERATURE	Visual warning
DAMAGED PROBE	Visual warning
INTERFACE	USB
POWER	900 W
DIMENSIONS (WxHxD)	365x190x485 mm (14.6x7.6x19.4 in)
WEIGHT	16.5 Kg (36.3 lb)



### GLP Good Laboratory Practice

#### SUPPLIED WITH

#### CODE No

OXISoft™ OXITEST Software	10002948
USB cable	10003134
Sample holder	10001985*
Spacer	10001984*
High temperature sealing grease	A00000236
IQ/OQ Oxitest	A00000242

\*the unit comes with 6 sample holders and 4 spacers

#### REPEATABILITY TEST



a series of tests run on the same sample or standard to verify its IP period, to calculate accuracy and repeatability of the data

#### FRESHNESS TEST



to verify the quality of different lots, and compare them

#### FORMULAS COMPARISON



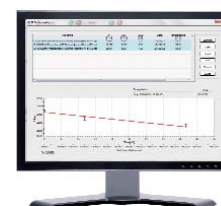
what is required to identify the most stable formula of a finished product, under the same conditions

#### PACKAGING COMPARISON



particularly useful for testing which packaging maintains the product in the freshest condition

#### IP DURING AGEING



same samples are tested at different times to fix the linear equation and the decreasing of the Induction Period with the going by of the time

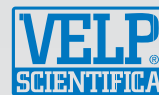
#### ESTIMATED SHELF LIFE TEST



it shows a prediction of the oxidation stability during the shelf life

# FAT EXTRACTION

## SER 148 SOLVENT EXTRACTOR



### FAT EXTRACTION USING SOLVENTS

Solvent extraction is used to determine the quantity of various components contained in agricultural, industrial or environmental samples. Soxhlet extraction is one of the most widely used analytical techniques. Adaptations of the technique have been introduced over time in order to reduce lengthy extraction times, for example by increasing the temperature of the solvent used. The modifications introduced by the American chemist Edward L. Randall are some of the most effective for this purpose. VELP Scientifica solvent extractors operate according to the **Randall technique**.

The **SER 148/3** and **SER 148/6** can be used to separate a substance or a group of elements (e.g. fat) from solid and semi-solid samples according to the **Randall technique** (consisting of immersion, washing and solvent recovery). This technique has three great benefits over the traditional Soxhlet technique:

- up to 5 times faster than Soxhlet (hot solvent vs. cold solvent)
- low solvent consumption (solvent recovery)
- limited cost per analysis

In addition, the SER 148 offers **full operator safety** in compliance with IP55. The main field of application is the determination of the content of soluble products such as fats, detergents, plasticizers and pesticides in food, animal feeds, detergents, rubber and plastic formulas, pharmaceutical products, soil, etc.

**GLP Good Laboratory Practice**  
**AOAC • TAPPI • UNI • EPA**  
**ASTM • APHA • AWWA • WEF**

SER 148/6



SER 148/3



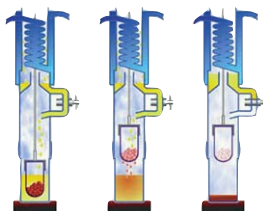
#### SOXHLET TECHNIQUE

The solubilization of extractable components is performed by a cold solvent dropping from a reflux condenser. Consequently a complete extraction lasts many hours.



#### RANDALL TECHNIQUE

The first phase of extraction is performed by immersing a sample - containing thimble in boiling solvent followed by a washing with cold refluxing solvent. The fast solubilization achieved by the hot solvent results in a sharp reduction of extraction time.



#### SUPPLIED WITH

#### CODE No

SER 148/3 Extraction cup, 3 pcs/box	A00001141
SER 148/3 Heat shield	40000210
SER 148/6 Extraction cup, 6 pcs/box	A00000142
SER 148/6 Heat shield	40000220
Extraction thimbles 33x80 mm, 25 pcs/box	CM0111148
Extraction thimbles holder	A00001142
Inlet tube	10000280
Viton seal	10000008
Butyl seal	10000009

#### OPTIONAL ACCESSORIES

#### CODE No

Printer	A00001009
Serial cable	A00000011
Thimbles weighing cup	A00001146
Thimbles stand	A00001149 *
Handling device for extraction cups	A00001145 *
Pincer for weighing cups	A00001147 *
Extraction cup, 6 pcs/box	A00000142
Vafon seal	A00000061
IQ/OQ/PQ Manual for SER 148	A00000073

#### CONSUMABLES

#### CODE No

Extraction thimbles 33x80 mm, 25 pcs/box **CM0111148**



\* only for SER 148/6

# HU 6 HYDROLYSIS UNIT

INSTRUMENT	POWER SUPPLY	CODE No
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SER 148/3	230 V / 50-60 Hz	F30300240
SER 148/3	115 V / 50-60 Hz	F30310240
SER 148/6	230 V / 50-60 Hz	F30300242
SER 148/6	115 V / 50-60 Hz	F30310242

## ① GENERAL FEATURES AND PERFORMANCE

CONSTRUCTION MATERIAL	Epoxy painted stainless steel structure
NUMBER OF SAMPLES	3 (SER 148/3) or 6 (SER 148/6)
MAX VOLUME EXTRACTION CUP	150 ml
DISPLAY	Working temperature / settable parameters
WORKING TEMPERATURE	From 100 to 260 °C
IMMERSION TIME	From 0 to 999 minutes
WASHING TIME	From 0 to 999 minutes
RECOVERY TIME	From 0 to 999 minutes
SAMPLE QUANTITY	From 0.5 to 15 g (generally 2-3 g)
SOLVENT RECOVERY	From 50 to 75%
REPRODUCIBILITY (RSD)	≤ 1%
INTERFACE	RS232
POWER	500 W (SER 148/3) or 950 W (SER 148/6)
DIMENSIONS (WxHxD)	480x620x390 mm (18.9x24.4x15.4 in) (SER 148/3) 700x620x390 mm (27.6x24.4x15.4 in) (SER 148/6)
WEIGHT	30 Kg (66 lb) (SER 148/3) 40 Kg (88 lb) (SER 148/6)

The **HU 6** offers the optimum solution for the acid hydrolysis of food and feed samples prior to solvent extraction for total fat analysis. Very often the samples to be analyzed have a high fat content and need to be prepared for fat extraction. The HU 6 is a 6-position hydrolysis unit that combines **safety** with **performance, reducing manual handling** to the minimum. Hydrolysis is carried out with hydrochloric acid for approximately one hour at a temperature of 170 °C. The hydrolyzed sample is then filtered in a glass crucible and washed with warm de-ionized water in order to eliminate the residues of hydrochloric acid. The sample is now ready to be processed using the SER 148. The HU 6 is suitable for both acid and basic hydrolysis.



INSTRUMENT	POWER SUPPLY	CODE No
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HU 6	230 V / 50-60 Hz	F30300110
HU 6	115 V / 50-60 Hz	F30310110

## ① GENERAL FEATURES AND PERFORMANCE

CONSTRUCTION MATERIAL	Epoxy painted stainless steel structure
NUMBER OF SAMPLES	6 samples
SET TEMPERATURE AND COUNTDOWN	Digital readout
DISPLAY	LCD
PROGRAM LIBRARY	20 programs
LANGUAGES	I, F, UK, E, D, T
TEMPERATURE RANGE	Ambient to 200 °C
TEMPERATURE PRECISION, STABILITY AND HOMOGENEITY	± 0.5 °C
POWER	1350 W
DIMENSIONS (WxHxD)	355x590x450 mm (14.0x23.2x17.7 in)
WEIGHT	14.5 Kg (32.0 lb)

SUPPLIED WITH	CODE No
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Celite, 1 Kg	A00000097
Glass sand, 2 Kg	A00000089
EDPM tube Ø 6.4x11.2 mm	10002412

OPERATING ACCESSORIES	CODE No
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Glassware kit 3 positions for HU 6	A00000085
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OPTIONAL ACCESSORIES	CODE No
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Celite, 1 Kg	A00000097
Glass sand, 2 Kg	A00000089
Glass crucibles P1, 6 pcs/box	A00000086
Glass crucibles P3, 6 pcs/box	A00000087
Glass bottle for waste collection	A00000088
Test tubes Ø 42x300 mm, 250 ml, 3 pcs/box	A00000144



# RAW FIBER EXTRACTION

## FIWE RAW FIBER EXTRACTOR



### RAW FIBER EXTRACTION

Vegetables and derived products are made up of substances belonging to different categories:

- carbohydrates, proteins, fats, mineral salts;
- a non-digestible component consisting of polymers (lignin, cellulose, hemicellulose, pectin) called "fiber".

There are many reasons why it is very important to determine the fiber content including nutritional, economic and legal reasons.

The **FIWE 3** and **FIWE 6** are suitable for raw fiber determination, conventionally known as an indigestible residue. **Rapid analysis, reliable results and high reproducibility** are some of the most relevant benefits of these units which are ideal for the following applications:

- total raw fiber determination (according to Weende)
- neutral detergent fiber and acid detergent fiber determination (NDF and ADF according to Van Soest)
- acid detergent lignin determination (ADL according to Van Soest)
- different fractions of fiber (cellulose, hemicellulose and pectin)

Raw fiber determination is useful for nutritional, economic and legislative aspects. FIWE performs single or sequential extraction including boiling, rinsing and filtration.

### AOAC • AACC

### CRUCIBLE

Crucibles are consumables and their lifetime is closely tied to correct use and proper cleaning. The average lifetime is 20-30 analyses. Crucibles have class 2 porosity according to Jena's definition, with 45 μm (40 – 60 μm) (ASTM) holes, class C in the USA.

The correct use of crucibles in the muffle furnace for analyzing ashes and proper cleaning in accordance with the recommendations in the operating manual are crucial.

FIWE 6



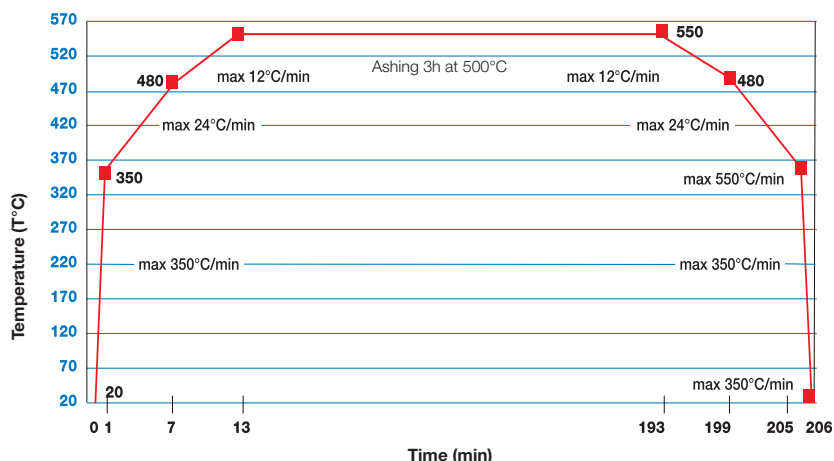
FIWE 3

#### TIPS FOR CRUCIBLE TREATMENT IN A MUFFLE FURNACE

The heating and cooling of glass crucibles for determining ash content requires special care in order to prevent breakages. Thermal shock can lead to breakage, particularly in stressed areas such as the junction between the crucible body and the filter disk. A temperature of 550 °C corresponds to the beginning of glass's plastic state and should not be exceeded.

Maximum rates recommended for heating and cooling glass crucibles are follows:

Heating °C	Cooling °C	Rate °C/min	Required time min
20 to 350	350 to 20	350	1
350 to 480	480 to 350	24	6
480 to 550	550 to 480	12	6



# COEX COLD EXTRACTOR

INSTRUMENT	POWER SUPPLY	CODE No
FIWE 3	230 V / 50 Hz	F30520201
FIWE 3	230 V / 60 Hz	F30530201
FIWE 3	115 V / 60 Hz	F30540201
FIWE 6	230 V / 50 Hz	F30520200
FIWE 6	230 V / 60 Hz	F30530200
FIWE 6	115 V / 60 Hz	F30540200

## i GENERAL FEATURES AND PERFORMANCE

CONSTRUCTION MATERIAL	Epoxy painted stainless steel structure
NUMBER OF SAMPLES	3 (FIWE 3) or 6 (FIWE 6)
DIGITAL TIMER	0 - 99 minutes with acoustic signal at the end of the cycle
TYPE OF EXTRACTIONS	Hot and cold
SAMPLE REMOVAL	Air pump
REAGENT DISCHARGE	Peristaltic pump
TEMPERATURE	Electronic regulation
REAGENTS AND COOLING WATER	Separated outlets
SAMPLES	Individually processed
SAMPLE QUANTITY	From 0.5 to 3 g
REPRODUCIBILITY (RSD)	± 1%
POWER	900 W (FIWE 3) or 1200 W (FIWE 6)
DIMENSIONS (WxHxD)	530x620x390 mm (20.9x24.4x15.4 in) (FIWE 3) 760x620x390 mm (29.5x24.4x15.4 in) (FIWE 6)
WEIGHT	35 Kg (77 lb) (FIWE 3) 46 Kg (101.2 lb) (FIWE 6)

In order to perform a reliable raw fiber determination test, the sample must have a low fat content (<1%). For those samples that exceed this value, **preliminary fat extraction** is required using acetone, hexane or petroleum. The **COEX** performs **rapid fat extraction directly in the same glass crucibles** that are used by the FIWE 3 and FIWE 6. A great benefit as the user can start raw fiber extraction **immediately** after completing fat extraction.

INSTRUMENT	POWER SUPPLY	CODE No
COEX	230 V / 50 Hz	F30520204
COEX	230 V / 60 Hz	F30530204
COEX	115 V / 60 Hz	F30540204

## AOAC • AACC



## SUPPLIED WITH

## CODE No

Heat shield (FIWE 3)	40000167
Heat shield (FIWE 6)	40000161
Glass crucible P2, 1 pcs/box (3 boxes with FIWE 3)	A00001140
Glass crucibles P2, 6 pcs/box (FIWE 6)	A00000140
Holder for 3 crucibles	40000166
Holder for 6 crucibles	40000160
PVC tube, 2 mt	10001086
2-place hot plate, RC2 type	F20700172
Reagent glass bottles	10001112
Pincer for crucibles	10000247
Inlet tube	10000280

## OPTIONAL ACCESSORIES

## CODE No

Glass crucibles P2, 6 pcs/box	A00000140
Water spray device	A00001135
Vafion seal (Scharer method)	A00000099
IQ/OQ Manual FIWE	A00000074

## i GENERAL FEATURES AND PERFORMANCE

CONSTRUCTION MATERIAL	Epoxy painted stainless steel structure
TYPE OF EXTRACTION	Cold
REAGENT DISCHARGE	Peristaltic pump
POWER	120 W
DIMENSIONS (WxHxD)	730x300x380 mm (29.5x11.0x15.0 in)
WEIGHT	19 Kg (41.8 lb)

## SUPPLIED WITH

## CODE No

Glass crucibles P2, 6 pcs/box	A00000140
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## OPTIONAL ACCESSORIES

## CODE No

Glass crucibles P2, 6 pcs/box	A00000140
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# DIETARY FIBER EXTRACTION



## DIETARY FIBER EXTRACTION

The procedure for determining dietary fiber exposes the sample to a series of enzymatic digestions that simulate the real digestive process which takes place in the human and animal digestive tract, calculating the undigested residue remaining at the end of the analysis. Generally speaking, dietary fiber analysis is carried out on foods intended for human consumption whereas raw fiber analysis is carried out on animal feeds or on raw materials of vegetable origin, e.g. cereals.

### GDE

The **GDE** performs enzymatic digestion, a delicate phase where samples are immersed in a thermostatic water bath and stirred. **Continuous and constant sample mixing** is necessary in order to prevent the sample from overheating. The unit consists of an immersion heating head, a transparent tank and a VELP 6-place magnetic stirrer to ensure **excellent thermoregulation and precision**.

INSTRUMENT	POWER SUPPLY	CODE No
GDE	230 V / 50-60 Hz	F30400209
GDE	115 V / 50-60 Hz	F30410209



### CSF 6

The **CSF 6** filtration unit carries out the final filtration and washing phase foreseen by the enzymatic method for dietary fiber determination. The CSF 6 used in combination with the GDE is suitable for the determination of total dietary fiber and **reduces the time required** compared to manual procedures considerably. The glass funnels facilitate the introduction of the digested sample and solvents into the instrument. The filtering and final washing stages are **speeded-up** thanks to the vacuum function.

Temperature: up to 550 °C

INSTRUMENT	POWER SUPPLY	CODE No
CSF 6	230 V / 50 Hz	F30420210
CSF 6	230 V / 60 Hz	F30430210
CSF 6	115 V / 60 Hz	F30440210



### GENERAL FEATURES AND PERFORMANCE

TEMPERATURE RANGE	Ambient to 105 °C
POWER	900 W
DIMENSIONS (WxHxD)	413x295x410 mm (16.2x11.6x16.1 in)
WEIGHT	6.2 Kg (13.66 lb)

#### OPTIONAL ACCESSORIES

	CODE No
Beaker, 400 ml	A00000999
Stirring bar, 6x35 mm	A00001056
Pool balls 800 pcs/box	A00000241
IQ/OQ Manual for GDE	A00000249

### AOAC

### GENERAL FEATURES AND PERFORMANCE

CONSTRUCTION MATERIAL	Epoxy painted stainless steel structure
PERISTALTIC PUMP	High suction capacity
RESIDUES COLLECTING	Separate
COUNTERPRESSURE	Electronic setting
FILTRATION TIME	Shortening
POWER	220 W
DIMENSIONS (WxHxD)	750x420x380 mm (28.7x16.5x15.0 in)
WEIGHT	28 Kg (61.6 lb)

#### SUPPLIED WITH

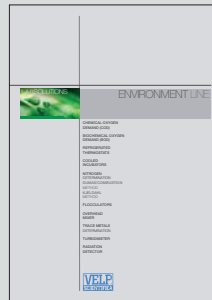
Glass crucibles P2, 6 pcs/box	A00000140
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#### OPTIONAL ACCESSORIES

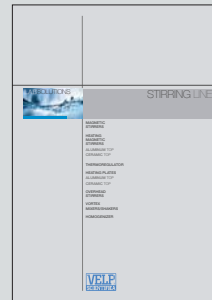
Glass crucibles P2, 6 pcs/box	A00000140
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