VELP

UDK
Distillation Units Series
A Full Range of Solutions for Kjeldahl Distillation

LABSOLUTIONS
The distillation unit is used to perform nitrogen and protein content analysis according to the Kjeldahl Method (TKN) in the Food & Feed industries and for several other applications in environmental control (phenols, nitrogen in water, sludge, soil and lubricant), chemical and pharmaceutical industries after having digested the sample accurately. UDk distillation units work in accordance with a variety of Standards (such as AOAC, ISO, EPA, DIN etc.).

VELP Scientifica is pleased to announce its fourth generation of Distillation Units. Unparalleled technology along with premium materials for high-quality products and extremely reliable results in terms of the quantification of nitrogen and protein in different samples.

**Features and Benefits**

- Intuitive
- Extremely Precise
- Versatile
- Eco-friendly
- Compact
- Innovative
- Accurate nitrogen and protein determination in absolute safety.
Patented Steam Generator

- 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.

Patented Titanium Condenser

- 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.
All the UDK Series Distillation Units accept different kinds of test tubes: straight tubes (100, 250, 400 ml and 1 liter) or Kjeldahl balloon (500 ml). Each unit comes ready to use and is supplied with 250 ml test tube, 250 ml collecting flask, pincer, set of inlet and outlet tubes.

**UDK 129 - Distillation Unit**

The UDK 129 is the entry level model for accurate and precise nitrogen and protein determination according to the Kjeldahl Method (TKN). This unit is the ideal solution for basic needs with foregoing the same key components and benefits of the more advanced models.

- Automatic NaOH addition
- Delay time (Devarda alloy analysis)
- Alkali resistant technopolymer housing
- Selectable distillation time
- LCD display
- Safety lever and sensors to protect the user

**Features and Benefits**

**UDK 139 - Semi-Automatic Distillation Unit**

The UDK 139 is the semi-automatic model offering greater automation and a wider range of programming options.

- Automatic NaOH and H₂O addition
- Steam regulation (10-100%)
- Delay time (Devarda alloy analysis)
- 10-program library
- Alkali resistant technopolymer housing
- Reagent level warning
- Selectable distillation time
- Distillation residues removal
- 3.5” color touch screen
- 2 x USB ports
- Language selection
- Safety lever and sensors to protect the user

**Features and Benefits**
**UDK 149 - Automatic Distillation Unit, with Titrator Connection**

The UDK 149 is a more flexible solution for laboratories performing Kjeldahl distillation. Fully automatic, it can be easily connected to a large choice of external titrators.

**Features and Benefits**
- Automatic NaOH, H₂O and H₃BO₃ addition
- Steam regulation (10-100%)
- Delay time (Devarda alloy analysis)
- Automatic titration vessel washing
- Washing
- 20-program library
- Alkali resistant technopolymer housing
- Reagent level warning
- Selectable distillation time
- Distillation and titration residues removal
- Distillation in series
- Archive for on-board data storage
- 3.5" color touch screen
- Ethernet, 2 x USB ports, RS232 and TTL
- Language selection
- Safety lever and sensors to protect the user
- Several external titrators supported

**UDK 159 - Automatic Distillation & Titration System**

The UDK 159 combines all the advantages of a fully automatic distillation with the added benefits of integrated colorimetric titration (AOAC approved) for a high-performance all-in-one system.

**Features and Benefits**
- Automatic NaOH, H₂O and H₃BO₃ addition
- Steam regulation (10-100%)
- Delay time (Devarda alloy analysis)
- Washing and blank analysis
- Automatic titration vessel washing
- 55-program library (31 pre-defined + 24 customizable)
- Alkali resistant technopolymer housing
- Reagent level warning
- Distillation and titration residues removal
- Distillation in series
- Reporting
- Archive for on-board data storage
- 6" color touch screen
- Ethernet, 2 x USB ports and RS232
- Balance connection
- Electronic user guide
- Language selection
- Safety lever and sensors to protect the user
UDK 169 & AutoKjel - Automatic Distillation & Titration System with Kjeldahl Autosampler

The UDK 169 is the top of the range solution to quantify the nitrogen/protein content. A fully automated Kjeldahl analyzer, with an integrated colorimetric titrator for premium performance and continuous operation. It offers the highest sample throughput available when connected to the Autokjel autosampler, for the most productive system available. Just load your sample and walk away: the system will achieve maximum reliability and

Features and Benefits
- Automatic NaOH, H₂O and H₃BO₃ addition
- Steam regulation (10-100%)
- Delay time (Devarda alloy analysis)
- Washing and blank analysis
- Automatic titration vessel washing
- 55-program library (31 pre-defined + 24 customizable)
- Alkali resistant technopolymer housing
- Reagent level warning
- Tanks included with AutoKjel (2x20-liter, 1x10-liter, 1x5-liter)
- Smart reagent consumptions estimation
- Multi-tasking software with full autosampler control
- Distillation and titration residues removal
- Distillation in series
- Instantaneous reporting
- Archive for on-board data storage
- 6” color touch screen
- Ethernet, 2 x USB ports and RS232
- Balance connection
- Electronic user guide
- Language selection
- Safety lever and sensors to protect the user

Automatic Addition of NaOH - H₂O - H₃BO₃ Titrant Solution

21-position carousel, 400 ml tubes (optional)
24-position carousel, 250 ml tubes (standard)
UDK Series complies with many official methods for different applications such as the determination of ammoniacal nitrogen, protein determination, nitrogen content (Kjeldahl or direct alkaline distillation), nitric nitrogen (after reduction/Devarda), phenols, volatile acids, cyanides and alcohol content. A short list of the most common samples with the corresponding reference(s) follows, but many others can be tested according to official methods (AOAC, ISO, DIN, EPA, etc.).

### Kjeldahl Protein/Nitrogen on Food & Feed Samples

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>METHODS (main reference, many others are complied)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Feed and Pet Food</td>
<td>AOAC 984.13</td>
</tr>
<tr>
<td>Beer (and its ingredients: barley, malt, wort)</td>
<td>AOAC 920.53, AOAC 960.09</td>
</tr>
<tr>
<td>Bread and Baked Products</td>
<td>AOAC 960.36</td>
</tr>
<tr>
<td>Cereals and Grains (wheat, oats, barley, corn, rice, rye, soy beans, lupins, etc.)</td>
<td>AOAC 979.09</td>
</tr>
<tr>
<td>Malt</td>
<td>AOAC 950.09</td>
</tr>
<tr>
<td>Meat and Derived Products (bacon, ham, salami, sausage, liver pate, etc.)</td>
<td>AOAC 981.10</td>
</tr>
<tr>
<td>Nuts and Nut Products (almonds, coconuts, peanuts, etc.)</td>
<td>AOAC 950.48</td>
</tr>
<tr>
<td>Pasta (e.g. macaroni, etc.)</td>
<td>AOAC 930.25</td>
</tr>
<tr>
<td>Plants (vegetables, forage, straw, seeds, tea, etc.)</td>
<td>AOAC 978.04</td>
</tr>
<tr>
<td>Yeast</td>
<td>AOAC 962.10</td>
</tr>
<tr>
<td>...and many others</td>
<td></td>
</tr>
</tbody>
</table>

### Kjeldahl Nitrogen on Other Samples

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>METHODS (main reference, many others are complied)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>ISO 333:1996</td>
</tr>
<tr>
<td>Fertilizers</td>
<td>AOAC 920.03</td>
</tr>
<tr>
<td>Lubricating Oils and Fuel Oils</td>
<td>ASTM D3228-96</td>
</tr>
<tr>
<td>Paper and Paperboard (gelatin, casein)</td>
<td>TAPPI STD T418-05-61</td>
</tr>
<tr>
<td>Rubber, Raw Natural, and Rubber Latex</td>
<td>ISO 1656:1996</td>
</tr>
<tr>
<td>Soil</td>
<td>“Method of soil analysis” part 2 – Chemical and microbiological properties, 2 ed.</td>
</tr>
<tr>
<td>Urea</td>
<td>ISO 1592:1977</td>
</tr>
<tr>
<td>Water</td>
<td>AOAC 973.48</td>
</tr>
<tr>
<td>...and many others</td>
<td></td>
</tr>
</tbody>
</table>

### Other Applications

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>METHODS (main reference, many others are complied)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Determination</td>
<td>Reg. (CEE) 2870/2000, EBC 9.2.1</td>
</tr>
<tr>
<td>Cyanides in Waste Water</td>
<td>EPA 9010C</td>
</tr>
<tr>
<td>Nitric Nitrogen on Water after Reduction (Devarda Method)</td>
<td>ISO 10048:1991</td>
</tr>
<tr>
<td>Phenols in Water, Saline Water, Domestic and Industrial Wastes</td>
<td>EPA 9065; APAT CNR IRSA 5070</td>
</tr>
<tr>
<td>Total Volatile Basic Nitrogen (TVBN) in Fresh/Frozen Fish</td>
<td>Conway &amp; Byrne Method (1933)</td>
</tr>
<tr>
<td>Urea and Ammoniacal Nitrogen in Animal Feed</td>
<td>AOAC 941.04</td>
</tr>
<tr>
<td>Volatile Acidity of Tomato Paste</td>
<td>Reg. (CEE) 1764/86</td>
</tr>
<tr>
<td>Volatile Acidity of Wines</td>
<td>Reg. (CEE) 286/90</td>
</tr>
<tr>
<td>Sulphur</td>
<td>AOAC 962.16, AOAC 990.28</td>
</tr>
<tr>
<td>...and many others</td>
<td></td>
</tr>
</tbody>
</table>

### Fields of Application

- **Food, feed and beverage industry**
- **Environmental industry**
- **Pharmaceutical and chemical industry**
Supplied with:

- Test tube Ø 42x300 mm
- Collecting flask 250 ml
- Prinicer for test tubes
- Touch pen (for UDK 129, 149, 159, 169)

Inlet tube, discharge tube and protective film for touch screen are supplied with the instrument.

**ANALYSIS TIME**

- UDK 129: 5 min (for 100 ml) 4 min (for 100 ml) 3 min (for 100 ml) from 4 min (titration included)
- UDK 139: 4 min (for 100 ml) 3 min (for 100 ml) 2 min (for 100 ml) from 2 min (titration included)
- UDK 149: 3 min (for 100 ml) 2 min (for 100 ml) 1 min (for 100 ml) from 1 min (titration included)
- UDK 159: 2 min (for 100 ml) 1 min (for 100 ml) 0 min (for 100 ml) from 0 min (titration included)
- UDK 169: 1 min (for 100 ml) 0 min (for 100 ml) 0 min (for 100 ml) from 0 min (titration included)

**REPRODUCIBILITY (RSD)**

- ≤ 1%

**RECOVERY (at nitrogen level between 1-200 mg)**

- ≥ 99.5%

**DETECTION LIMIT**

- ≥ 0.1 mg N

**PERFORMANCE**

- **AUTOMATIC SODIUM HYDROXIDE ADDITION**: • • • •
- **AUTOMATIC DILUTION WATER ADDITION**: • • • •
- **AUTOMATIC BORIC ACID ADDITION**: • • •
- **SELECTABLE DISTILLATION TIME**: • • •
- **DISTILLATION RESIDUES REMOVAL**: • • • •
- **STEAM FLOW REGULATION (10-100%)**: • • • •
- **LIMITED WATER CONSUMPTION**: • • • •
- **DISPLAY**: LCD 3.5” touch screen 3.5” touch screen 6” touch screen 6” touch screen
- **PROGRAMS**: 1 10 20 55 55
- **LANGUAGE SELECTION**: • • • •
- **ARCHIVE (on-board data storage)**: • • • •
- **PASSWORD (user/super user)**: • • • •
- **TITRATION RESIDUES REMOVAL**: • • • •
- **AUTOMATIC TITRATION VESSEL WASHING**: • • • •
- **MOUSE**: • • • •
- **PRINTER**: • • • •
- **PC (for data storage)**: • • • •
- **PEN DRIVE (for data transfer)**: • • • •
- **BALANCE**: • • • •
- **AUTOSAMPLER**: • • • •

**GENERAL FEATURES**

- **OVERALL DIMENSIONS IN MM (in) (WxHxD)**
  - UDK 129: 385x780x416 (15.2x30.7x16.4)
  - UDK 139: 385x780x416 (15.2x30.7x16.4)
  - UDK 149: 385x780x416 (15.2x30.7x16.4)
  - UDK 159: 385x780x416 (15.2x30.7x16.4)
  - UDK 169: 385x780x416 (15.2x30.7x16.4)

- **OVERALL WEIGHT IN KG (lb)**
  - 24.59 (54)

- **POWER SUPPLY**
  - 230 V / 115 V
  - 230 V
  - 230 V
  - 230 V

- **POWER**
  - 2100 W / 1700 W
  - 2100 W
  - 2200 W
  - 2200 W

---

**OPTIONAL ACCESSORIES**

- **Spacer for test tube Ø 48x200 mm**: A00000206
- **Test tube connection Ø 26 mm, Ø 48 mm and 500 ml Kjeldahl balloon**: A0000043
- **Printer (UDK 129, 149, 159, 169)**: A00000109
- **Printer Adapter (UDK 129, 149, 159, 169)**: A00000195
- **UDK 129 IQ/OQ/PQ Manual**: A00000205
- **UDK 139 IQ/OQ/PQ Manual**: A00000204
- **UDK 149 IQ/OQ/PQ Manual**: A00000203
- **UDK 159 IQ/OQ/PQ Manual**: A00000202
- **UDK 169 IQ/OQ/PQ Manual**: A00000254
- **AutoKJel IQ/OQ Manual**: A00000256
- **Waterproof mouse (for UDK 129, 139, 159, 169)**: A00000215
- **USB cable**: 10003134
- **Titrator Titrino Easy K for UDK 149**: R38000194
- **Acid resistant pump kit**: A00000220

---

**INSTRUMENT** | **POWER SUPPLY** | **CODE No**
--- | --- | ---
UDK 129 | 230 V / 50-60 Hz | F30200120
UDK 129 | 115 V / 50-60 Hz | F30210120
UDK 139 | 230 V / 50-60 Hz | F30200130
UDK 149 | 230 V / 50-60 Hz | F30200140
UDK 159 | 230 V / 50-60 Hz | F30200150
UDK 169 | 230 V / 50-60 Hz | F30200160
AutoKJel | 230 V / 50-60 Hz | F30200430
UDK 169 & AutoKJel | 230 V / 50-60 Hz | S30200160

---

**Your authorized agent:**

We reserve the right to make technical alterations.
We do not assume liability for errors in printing, typing or transmission.

---

VELP Scientifica srl
Via Stazione 16
20865 Usmate (MB) Italy
Tel. +39 039 628811
Fax +39 039 6288120
velpitalia@velp.com
www.velp.com

VELP Scientific, Inc.
155 Keyland Court, Bohemia
NY 11716 - U.S.
Tel. +1 631 573 6002
Fax +1 631 573 6003
velpusa@velp.com
www.velp.com