

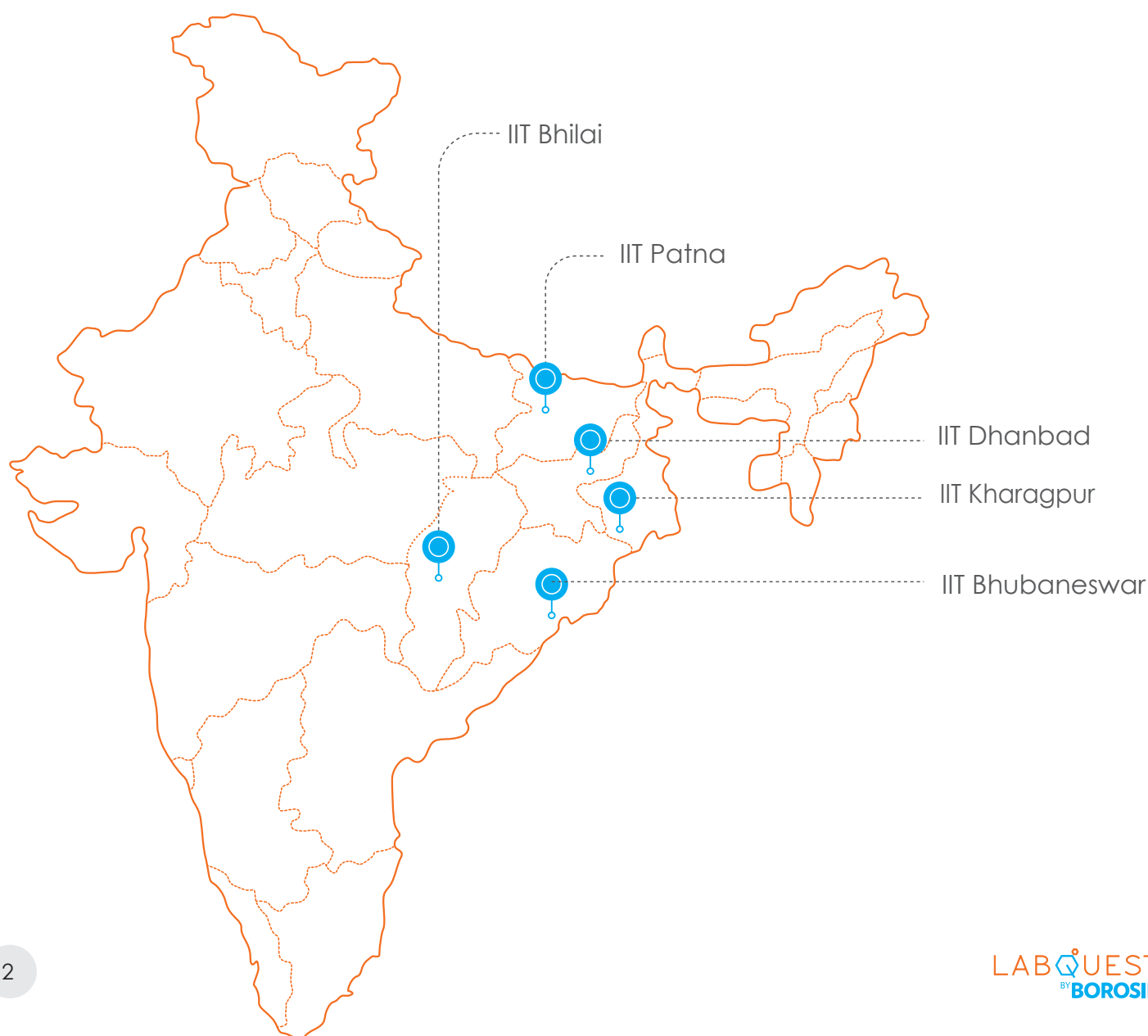


# Automatic Kjeldahl Nitrogen / Protein Analyser

From Traditional to Transformational –  
Turning Manual Methods into Smart Systems

Labquest, the distinguished line of laboratory equipment from Borosil Scientific Limited, stands as the benchmark of precision and innovation in India's scientific landscape for over six decades. Recognized for unparalleled quality, accuracy, and dependability, Labquest has emerged as the preferred choice in laboratories nationwide. Specifically designed for critical proximate analysis parameters such as protein, moisture, fat, and fiber, Labquest caters to the exacting standards of the food and feed industries.

Our commitment is evident with our specialized services to premier institutions like the Indian Institutes of Technology (IITs). These esteemed academic establishments, renowned for their rigorous research and academic excellence, are our premium customers. Labquest's cutting-edge technologies and indigenously manufactured equipment align seamlessly with the high standards set by IITs, reinforcing our commitment to supporting their scientific endeavors.





# Proven experts for Nitrogen Estimation



Food/Feed/ Dairy

Nitrogen is present in the form of Protein in food products like dairy, vegetables, fruits, meat, fish. Protein perform basic functions of the body such as growth and maintenance, production of enzymes that help in digestion, energy production, blood clotting, muscle contraction. Some proteins are hormones, which are chemical messengers that aid communication between cells, tissues and organs



Agriculture/ Soil/  
Fertilizer

Nitrates in the soil are used by plants to prepare food. Nitrogen in air can be converted into useful nitrate compounds by bacteria, algae, and even lightning. Once in the soil, nitrogen becomes biologically accessible. This is a major component of chlorophyll, the compound by which plants use sunlight energy to produce sugars from water and carbon dioxide (i.e., photosynthesis).



Wastewater/Sludge

Large amounts of Nitrogen in wastewater utilizes the oxygen released from oxidation of organic waste to form inorganic nitrates. These inorganic nitrates cause marine death. Hence an adequate level of nitrogen is desired in wastewater and the same is detected during wastewater treatment.

## Others



Breweries

Nitrogen is an essential element required for yeast growth. Individual amino acids, small peptides and some ammonium ions produced from the proteolysis of proteins in barley malt are the main nitrogen sources for yeast metabolism in wort (the liquid extracted from the mashing process during the brewing of alcoholic beverages).

Peptides, enzymes, hormones are all forms of protein that are important constituents for human growth and development.

Peptides are necessary to achieve homeostasis and maintain health, Enzymes are biological catalysts used to speed up reactions involved in many processes like digestion of food, production of energy and synthesis of cellular components and Hormones are involved in blood glucose regulation, appetite regulation



Pharmaceuticals



Rubber/ Dyes

# Digesters

Safe, Simple & Efficient Digestion systems  
for every kind of application



# Kjeldahl Oracle Digesters



Reproducible digestion due to refined thermal homogeneity.

Printer portal for documentation of sample time, temperature and other process parameters with print and PC data transfer ports.

Delayed scrubber start ensures safe unattended operation and complete fume evacuation.

Cooling stations increase throughput by decreasing the cooling time post digestion.



# Kjeldahl Magnus Digesters

Automatic Kjeldahl digestion unit with 8 / 12 / 20 heating positions of aluminum heating block offers excellent thermal homogeneity and stability

The digesters are easy to use and perform where the user can prepare the samples and leave them unattended after setting the temperature and time. Sulfuric acid used for digestion helps in breaking the bonds of nitrogen. An adequate concentration of catalysts and salt is added to speed up the digestion process. The scrubber system removes the sulfur dioxide fumes keeping the salt : acid ratio undisturbed. Bumping or foaming of samples in tubes is nature dependent and can be avoided by the addition of glass beads or a few drops of hydrogen peroxide.



250 ml straight sample tube provided with the unit is used for sample preparation



Load the manifold for evacuation of digestion fumes



Select the preferred program from data library



Cooled samples are ready for distillation process



Magnus block digester takes over the documentation process from you.



The tube rack with manifold is automatically lowered into the digester and can be lifted automatically in between to check the completion of digestion

The digestion process involves release of pungent sulfur dioxide fumes. Hence the digester is recommended to the use with a fume scrubber only.

# Magnus & Oracle Digester

## Technical Specifications

| Model Name                        | KBD083                                  | KBD123                 | KBD203                 | KBD062                 | KBD082                 | KBD122                 |
|-----------------------------------|-----------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| No. of positions                  | 6                                       | 12                     | 20                     | 6                      | 8                      | 12                     |
| Tube capacity (ml)                | 250                                     |                        |                        |                        |                        |                        |
| Temperature Range                 | Ambient to 470°C                        |                        |                        |                        |                        |                        |
| Timer Range                       | 1-300 mins                              |                        |                        |                        |                        |                        |
| Temperature Precision             | ±1°C                                    |                        |                        |                        |                        |                        |
| Ramp and Hold                     | upto 4                                  |                        |                        |                        |                        |                        |
| Presets                           | upto 50                                 |                        |                        |                        |                        |                        |
| Auto scrubber ON/OFF              | Yes                                     |                        |                        |                        |                        |                        |
| PID Autolift                      | Yes                                     |                        |                        | No                     |                        |                        |
| Auto OFF after achieving set time | Yes                                     |                        |                        |                        |                        |                        |
| Temperature Calibration           | Yes, single and two point               |                        |                        |                        |                        |                        |
| PC & Printer Connectivity         | Yes                                     |                        |                        |                        |                        |                        |
| Display                           | Graphical LCD                           |                        |                        |                        |                        |                        |
| Body                              | Stainless steel with GRP control pannel |                        |                        |                        |                        |                        |
| Current                           | 6A                                      | 8A                     | 12A                    | 6A                     | 6A                     | 8A                     |
| Power rating                      | 1400W                                   | 1600W                  | 2800W                  | 1400W                  | 1400W                  | 1600W                  |
| Dimensions (W × D × H)            | 427 x 490 x 665                         | 415 x 560 x 700        | 415 x 635 x 740        | 427 x 490 x 665        |                        | 415 x 635 x 740        |
| Ordering Code                     | BLFAKBD083<br>00000000                  | BLFAKBD123<br>00000000 | BLFAKBD203<br>00000000 | BLFAKBD062<br>00000000 | BLFAKBD082<br>00000000 | BLFAKBD122<br>00000000 |

Kjeldahl

# Magnus Distillation System



Steam distillation compatible for Nitrogen estimation with sophisticated features makes distillation easy. Easy step by step user modification helps to determine Nitrogen content in the sample.

Soft controls allow the user to manage addition of alkali, boric acid, distilled water and steam with all the other processes being monitored automatically.

Traditionally done using an Allihn's condenser mounted with a Kjeldahl trap, leads to insufficient cooling and extraction of nitrogen and subsequent protein.

The steam distillation using a Friedrichs condenser provides more surface area for cooling.

Steam purged into the sample allows thorough mixing for complete nitrogen extraction.

# Kjeldahl

## Magnus Distillation System

Smart distillation systems for labs. Excellent value for money with high reliability and advance performance.

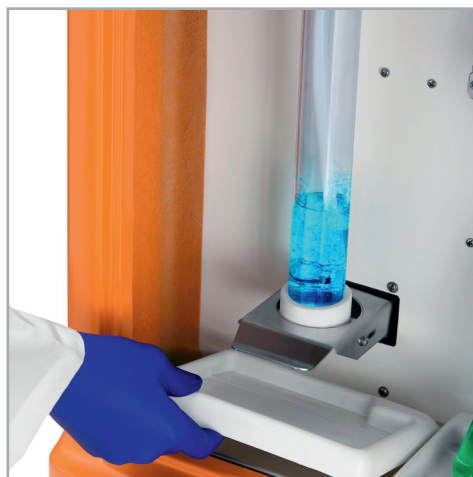
- Sophisticated construction protects against involuntary contact with hazards acids and chemicals.



- Easy and quick Kjeldahl distillation  
Automated addition of chemicals, distillation time, steam output with a soft start



- Safety a top priority with tube reader, boiler reagent and door level sensor



- A drip tray that protects unit interior



Kjeldahl

# Oracle Distillation System

Smart, efficient distillation systems primarily for kjeldahl analysis with simple and reliable features.



\*Accessories in the image may not be part of the stranded equipment



# Kjeldahl Oracle Distillation System

Single knob control function. ➤

Single press precise addition of alkali  
anytime during the distillation cycle. ➤



Detachable bottom drip tray for extra  
protection against acidic attack during  
sample loading. ➤



▶ Tube sensor that enables safe operating  
conditions in event of tube damage.

▶ Process kill switch to halt the process  
in case of accidental door opening.



▶ Reagent refill level sensor to avert  
reagent dry out.

▶ Acid and alkali pump calibration for  
accurate reagent dosing.

▶ Documentation of no. of cycles and  
hours of usage with auto service and  
maintenance alerts.

# Magnus & Oracle Distillation

## Technical Specifications

| Feature/ Model                            | KDI050                                       | KDI040               |
|-------------------------------------------|----------------------------------------------|----------------------|
| Steam addition                            | Automatic                                    |                      |
| Distilled water addition                  | Automatic                                    |                      |
| Alkali addition                           | Automatic                                    |                      |
| Boric acid addition                       | Automatic                                    |                      |
| Tube Drain                                | Automatic                                    | NA                   |
| Display                                   | 7'' colored touch screen                     | LCD                  |
| Tube Capacity (ml)                        | 250 / 400ml                                  |                      |
| Steam power (Adjustable)                  | 25-100%                                      | 10-100%              |
| Minimum distillation time (mins)          | 5                                            |                      |
| Reagent level sensor                      | Yes                                          |                      |
| Anytime alkali addition                   | Yes                                          |                      |
| Tube error detection                      | Yes                                          |                      |
| Door open sensor                          | Yes                                          |                      |
| Process resume from stop                  | Yes                                          |                      |
| One point alkali and distilled water      | Yes                                          |                      |
| Two point calibration for acid pump       | Yes                                          |                      |
| Real time monitoring of process parameter | Yes                                          |                      |
| SELV protection                           | Yes                                          |                      |
| Programs                                  | pre set as well as user editable             |                      |
| PC Connectivity                           | 40 preset, 30 user editable                  | >99.5%               |
| Nitrogen recovery                         | >99.5%                                       |                      |
| Nitrogen reproducibility                  | ±1 %                                         |                      |
| RSD                                       | <1%                                          |                      |
| LOD                                       | 1-200mg with of $\approx 0.1$ mg of Nitrogen |                      |
| Current                                   | 10A                                          | 5.5A                 |
| Power rating                              | 1500 W                                       | 1000 W               |
| Dimension (L × B × H) mm                  | (480 × 470 × 820) mm                         | (650 × 350 × 725) mm |
| Ordering Code                             | BLFAKDI05000000000                           | BLFAKDI04000000000   |

# Fume Scrubber

Safe, zero exposure & high capacity  
fume scrubber for Kjeldahl digestion systems





### SAFE

- Practically zero exposure of harmful sulfur dioxide fumes to user
- Maximum safety with a self-contained design
- High capacity pump for oil free vacuum pump for larger capacity digesters

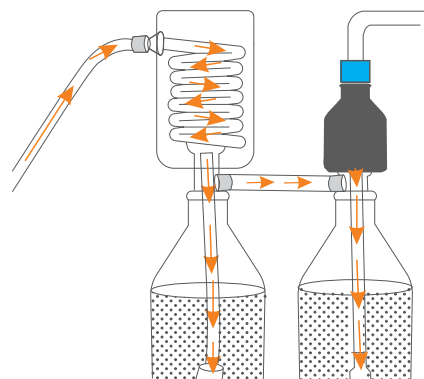


### EFFICIENT

- Full control of the Scrubber via the digester
- Maximal neutralization efficiency by the vacuum pump
- Easy compatibility with all digesters

### Neutralization steps

- Stage 1 : Fume extraction and condensation
- Stage 2 : Neutralization by distilled water
- Stage 3 : Neutralization by alkali
- Stage 4 : Neutralization by carbon filter



| Model Name          | KSC010             | KSC020             |
|---------------------|--------------------|--------------------|
| Current Consumption | 1A                 | 1A                 |
| Pump delivery Rate  | 28 Ltr/Min         | 45 Ltr/Min         |
| Dimensions (WxDxH)  | 365 X 375 X 480 mm | 365 X 375 X 480 mm |
| Ordering Code       | BLFAKSC01000000000 | BLFAKSC02000000000 |
| HSN Code            | 84141000           |                    |

## ACCESSORIES

| Description                              | Product Code       |
|------------------------------------------|--------------------|
| KSC010 Condenser V2 ASM                  | BLMAFUTV2KSCCD2932 |
| KSC010 Carbon Bottle ASM                 | BLM0BGW25012200211 |
| BL 2L Clear Bottle 34/35 Ground Neck ASM | BLA0BGW10001500030 |
| Viton Rubber Tube - 10 mm ID x 14 mm OD  | BLA0VRT10D0014DBLK |



The sulfur dioxide fumes, a by-product of digestion, causes environmental pollution and is a health hazard if disposed of ineffectively. The need for a fume hood can be nullified by the fume scrubber system by LabQuest Borosil.



The easy to assemble construction makes all components easily accessible

The protective front shield gives extra protection to the scrubber body



The scrubber helps neutralizing toxic fumes by its 4 stage mechanism

Stage 1 : Condensation via condenser

Stage 2 : Neutralization by distilled water

Stage 3 : Neutralization by Alkali

Stage 4 : Neutralization by carbon filter

### Technical Data & Ordering Info

| Model Name         | KSC010               | KSC020             |
|--------------------|----------------------|--------------------|
| Current            | 1A                   | 1A                 |
| Pump delivery Rate | 28 Ltr/Min           | 45 Ltr/Min         |
| Dimensions (WxDxH) | (445 × 375 × 460) mm |                    |
| Ordering Code      | BLFAKSC01000000000   | BLFAKSC02000000000 |

### Accessories

| Description                             | Product Code       |
|-----------------------------------------|--------------------|
| Silicon Transt Tube-8MMIDx10MMOD - 1Mtr | BLA0STT8D00012TRNP |
| Viton Rubber Tube-10MMIDx14MMOD - 1Mtr  | BLA0VRT10D0014DBLK |
| KSC Condenser V2 ASM                    | BLAAFUTV2KSCCD2932 |
| KSC Carbon Bottle ASM                   | BLAACRB02020018000 |
| 2L Reagent bottle - 1500030 ASM         | BLA0BGW10001500030 |

# Application Center

Navigating the ever-evolving terrain of scientific exploration, our Application Development Center, strategically located at our manufacturing hub in Maharashtra, serves as a dedicated resource ready to assist you. Our center offers comprehensive support in method validation, method development, sample testing, and all other aspects of application or technical needs.

Our dedicated team at the Application Development Center understands the unique challenges faced by IITs and stands ready to collaborate with you. Whether it's refining existing methodologies or developing new ones, we aim to enhance your speed, efficiency, and productivity in the laboratory. By providing tailored solutions, we ensure that your evolving needs are met, setting the stage for optimal performance and success.

Partner with us at the forefront of innovation, where the collaborative spirit of our Application Development Center meets the pioneering efforts of IITs. Together, let's navigate the frontiers of scientific exploration and achieve new heights of excellence in research and discovery.



# Do's and Don'ts

## For Nitrogen estimation system

| Do's                                                                                                                          | Don'ts                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Digester</b>                                                                                                               |                                                                                                                                                                                          |
| Unit should be operated by trained personnel only                                                                             | Do not touch the hot top surface while it is working and immediately after completion of digestion                                                                                       |
| It is ideal to use an adequately weighed and pre mixed mixture of catalyst and salts                                          | No blank tubes to be used. If fewer samples are to be processed, other tubes are to be operated with blank                                                                               |
| Check the power supply with proper earthing                                                                                   | Do not operate the unit beyond below mention load/ day<br>6 position : 18 samples/ day<br>8 position : 24 samples/ day<br>12 position : 36 samples/ day<br>20 position : 60 samples/ day |
| Clean the suction end of every day after use                                                                                  | While process do not remove fume extractor tray                                                                                                                                          |
| Clean the suction hose from manifold to condenser end of every day after use                                                  |                                                                                                                                                                                          |
| Keep all test tube with test tube tray                                                                                        |                                                                                                                                                                                          |
| Making sure the tabs provided in the fume extractor tray gets fitted into the slot provided on the test tube tray.            |                                                                                                                                                                                          |
| <b>Scrubber</b>                                                                                                               |                                                                                                                                                                                          |
| Distilled water should replace the solution after every digestion cycle.                                                      | Do not operate the unit without NaOH solution or fully neutralized solution. This may damage the pump diaphragm.                                                                         |
| While process open the condenser inlet water                                                                                  | End of the day close the tap water                                                                                                                                                       |
| NaOH in the scrubber should be changed once it turns muddy black or after checking the acidity with phenolphthalein indicator | Do not stop scrubbing for at least 15 mins post completion of digestion time                                                                                                             |
| <b>Distillation unit</b>                                                                                                      |                                                                                                                                                                                          |
| Unit should be operated by trained people only                                                                                | Do not open the door while in the distillation process                                                                                                                                   |
| Press the knob / touch the screen gently while using the unit                                                                 | Do not try to open the back door of the unit                                                                                                                                             |
| Check the power supply with proper earthing                                                                                   | Do not interchange the reagent tubes                                                                                                                                                     |
| Always check the distilled water TDS before preparing chemicals                                                               | Do not operate the unit beyond 60 samples in a 8 hrs shift day                                                                                                                           |
| Dip sensors properly in the reagent bottles                                                                                   | Do not touch the hot surface wherever written on the unit                                                                                                                                |
| Gently open the door of the unit                                                                                              | Do not try to remove control knob from the unit                                                                                                                                          |
| Always check the water supply and pressure of the water tap                                                                   |                                                                                                                                                                                          |
| All the inlet pipes should be connected properly                                                                              |                                                                                                                                                                                          |
| Always clean the NaOH pipe & instrument after analysis                                                                        |                                                                                                                                                                                          |
| Priming the pumps and hoses with the distilled water everyday before commencing analysis                                      |                                                                                                                                                                                          |
| Exchange acids and alkalis for distilled water when not in use                                                                |                                                                                                                                                                                          |



# Service capabilities

At Borosil Scientific Limited, we understand that for premier institutions like the Indian Institutes of Technology (IITs), seamless laboratory operations are paramount.

Our proactive approach ensures that your Labquest instrument enjoys an extended lifespan with minimal maintenance and service expenses throughout its entire lifecycle. A dedicated team of engineers stationed in Kolkata and Guwahati stands ready to provide swift and seamless support, addressing any issues promptly.

To further enhance your experience, our strategically stocked spare inventory at the regional warehouse in Kolkata guarantees part availability in less than 48 hours. This ensures that your laboratory operations at IITs remain uninterrupted, minimizing downtime and optimizing efficiency.

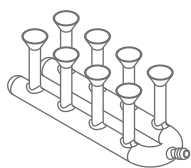
With Borosil Scientific, your Labquest instrument transcends being just a purchase; it becomes a strategic investment backed by our unwavering commitment to lasting performance and unparalleled service.





## Digester Accessories

## Cooling stations for faster sample cooling and increased sample throughput



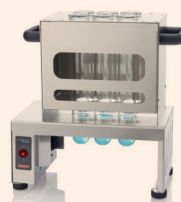
BLG0FUTKBD  
080D2510  
Fume Extractor



BLGAFUT  
100PTFE1651  
Teflon Cap



BLGATTB0  
1041250001  
Digestion Tube



6 POSITION



20 POSITION

| Description                              | Product Code       | Description                                    | Product Code       |
|------------------------------------------|--------------------|------------------------------------------------|--------------------|
| Viton Rubber Tube - 10MMIDx14MMOD - 1Mtr | BLA0VRT10D0014DBLK | KBD123 Cooling Tray Asm Accs                   | BLAAKBD12350000000 |
| Teflon Fume Cap Accs ( Case Lot -01 No)  | BLAAFUT100PTFE1651 | KBD203 Cooling Tray Asm Accs                   | BLAAKBD20350000000 |
| KBD062 Test Tube Holder Accs             | BLAAKBD06220000000 | KBD083 Test Tube Holder Accs (Autolift)        | BLAAKBD08320000000 |
| KBD082 Test Tube Holder Accs             | BLAAKBD08220000000 | KBD123 Test Tube Holder Accs (Autolift)        | BLAAKBD12320000000 |
| KBD122 Test Tube Holder Accs             | BLAAKBD12220000000 | KBD203 Test Tube Holder Accs (Autolift)        | BLAAKBD20320000000 |
| KBD062 Fume Extractor Accs               | BLAAKBD06230000000 | KBD083 Fume Extractor Accs (Autolift)          | BLAAKBD08330000000 |
| KBD082 Fume Extractor Accs               | BLAAKBD08230000000 | KBD123 Fume Extractor Accs (Autolift)          | BLAAKBD12330000000 |
| KBD122 Fume Extractor Accs               | BLAAKBD12230000000 | KBD 203 Fume Extractor Accs (Autolift)         | BLAAKBD20330000000 |
| KBD060 Fume Extractor Glass Accs         | BLA0FUTKBD060D2510 | KBD200 Fume Extractor Glass Accs               | BLA0FUTKBD200D2510 |
| KBD080 Fume Extractor Glass Accs         | BLA0FUTKBD080D2510 | 250 ml Borosilicate Test Tube ASM (Case lot-5) | BLMATTB01041250000 |
| KBD062 Cooling Tray Asm Accs             | BLAAKBD06170000000 | Quartz Test Tube 250ml ASM (Case lot-2)        | BLGATTQ01041250000 |
| KBD082 Cooling Tray Asm Accs             | BLAAKBD08250000000 | 400 ml Borosilicate Test Tube ASM (Case lot-5) | BLAATTB01050400001 |

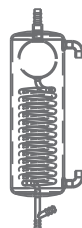
## Combine digester with a Bottle top dispenser for safe acid dispensing

## Distillation Accessories



Bottle Top Dispensers offer simple solution for safe dispensing of reagents & chemicals in desired volume.

PP Jerry Can



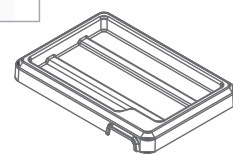
Condensor



Dosing head



Over Mitts



Drip Tray

| Description                               | Product Code       |
|-------------------------------------------|--------------------|
| Silicon Transt Tube - 8MMIDx10MMOD - 1Mtr | BLA0STT8D00012TRNP |
| Clear Braided PVC Hose Pipe ACCS - 1Mtr   | BLA0PIPPVC0HOS00CB |
| KDI PTFE Tube - 10mm OD X 08mm ID - 1Mtr  | BLA0TUB000PTFE1008 |
| Dosing head                               | BLG0DOH050KJV2DIST |
| Condensor                                 | BLG0CON050KJV2DIST |
| KDI Flow Switch ASM ACCS                  | BLAAKDI05010000001 |
| KDI Drip Tray ASM                         | BLA0KDI000DRP0TRAY |
| Oven Mittes - KDI ASM                     | BLA0OVM000KDI00000 |
| KDI PP Jerry Can ACCS                     | BLA0JCNP00000005L  |

# Care and maintenance

## Of Nitrogen estimation system

Follow the change time interval of consumables as given below (to be changed by service engineer only)

|    | Component                              | Change Time Interval        |
|----|----------------------------------------|-----------------------------|
| 1  | Silicon Tube                           | 6 months                    |
| 2  | Silicon Tube for Peristaltic Pump      | 3-6 Months condition based. |
| 3  | Viton Tube                             | 3-6 Months condition based. |
| 4  | Braided Hose                           | Yearly                      |
| 5  | Teflon Pipe                            | Yearly                      |
| 6  | GL connectors                          | Yearly                      |
| 7  | Glass parts ( Dosing Head /Condenser ) | Yearly                      |
| 8  | NRV                                    | Condition based             |
| 9  | Solenoid valves                        | Condition based             |
| 10 | Heaters                                | Condition based             |
| 11 | Drain Valves                           | Condition based             |
| 12 | Limit / Flow switches                  | Condition based             |
| 13 | Level Sensors                          | Condition based             |
| 14 | PT100 Temperature Sensor               | Condition based             |
| 15 | Dosing head holder                     | 6 Months condition based.   |
| 16 | Pumps                                  | Condition based             |

**BOROSIL®**  
Scientific

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