



KJELDAHL

Classical and Rapid Kjeldahl, Fat & Crude Fiber Apparatus



*Protecting your
laboratory environment*

LABCONCO[®]

How to Use This Catalog

This catalog contains complete information on Classical and Rapid Kjeldahl Units, Fat Extractors and Crude Fiber Apparatus. The following introduction provides information helpful in determining the right equipment for your application. If you would like technical assistance, please call us at 800-821-5525 or 816-333-8811.

Following the introduction are sections on Labconco's Classical Macro, Micro and Rapid Kjeldahl Units, Fat Extractors and Crude Fiber Apparatus. Within these sections you will find features and benefits, specifications and ordering information, dimensional data and accessories.



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The Kjeldahl Nitrogen Analysis was developed in the late 19th century by the Danish scientist, Johann Kjeldahl. While the analysis is frequently used for the determination of protein in agricultural products, it is also accepted as the method of choice for nitrogen determination in such materials as plant tissues, fertilizers, organic wastes and effluent water.

Nitrogen Determination Products

In 1925, Labconco introduced the first Macro Digestion and Distillation Apparatus for nitrogen determination of feed and grain samples weighing up to five grams. Today, our wide range of Kjeldahl products includes: Hooded Combination Units, Open Combination Units, and separate Digestion and Distillation Units. These are available in three sizes and with a variety of electrical options.

Labconco also offers the Micro Digestor, Rapid Digestors, and RapidStill I and II to further meet the expanding needs for a variety of sample sizes, single sample testing and quick analysis of individual samples.

The Micro Digestor was designed for 10ml to 30ml solution digestions. The RapidStill I was designed as the companion distillation system for the Micro Digestor. Two Rapid Digestors, available in 4- or 25-place models, digest samples faster than Classical Kjeldahl Apparatus. The RapidStill II is a semi-automatic steam distillation unit. It was designed specifically to complement either Rapid Digestor to provide a complete Rapid Kjeldahl System.

Since Labconco's introduction of Kjeldahl Apparatus in 1925, the products in this category have evolved to meet changing requirements for sample size, throughput volume and overall user convenience.

Fat and Crude Fiber Equipment

Labconco provides separate equipment for the determination of Fat and Crude Fiber content. These units are designed for use with AOAC* methods. The Goldfish Fat Extractor provides continuous extraction of fats and oils. The Crude Fiber Apparatus allows for the determination of the insoluble fiber content in a variety of food and feed samples.



2123211 Six-Place Open Combination Kjeldahl Unit

The Macro Open Combination and Hooded Combination Kjeldahl Units are designed to combine digestion and distillation processes for nitrogen determination into one space-saving unit.

The **Open Combination Kjeldahl** is supported by a sturdy, tubular steel framework, with the distillation apparatus located above the digestion unit. Models are available with the capacity to digest and distill up to 12 samples at a time.

The **Hooded Combination Kjeldahl** is designed to enclose the digestion and distillation units, which not only provides operator protection but allows efficient heat removal by venting process heat directly from the laboratory. The hood includes two collars: one for remotely-located exhaust blower connection and the other for an optional auxiliary-air blower inlet connection. Models are available that digest and distill up to 18 samples during one operation.

Both Kjeldahl Units are fully assembled with an acid fume exhaust valve connection. Individual building considerations will dictate which fume exhaust system is best suited to the laboratory.

Features and Benefits

Distillation Apparatus

The distillation manifold is equipped with seamless stainless steel tubes. No fittings or gaskets are required, eliminating a potential leak source. The unique counterflow heat exchanger controls back pressure and maximizes the rate of distillation to assure uniformity of results.

Horizontal-Sliding Sashes

Model Series 21176, 21177, 21178

Tempered safety glass sashes prevent process heat from escaping into the room. A louvered grille allows air to flow through the unit to ensure adequate heat removal regardless of sash position.

Blower Exhaust System

Located on the left side of the unit, the acid fume exhaust duct allows connection to a remotely-located blower. **Remote blower is required (not included).**

Water Temperature Gauge

Cooling water volume can be adjusted to suit individual requirements with the remote-control flow valve. Water temperature is indicated on the easy-to-read temperature gauge located on the water outlet. Water discharged is not contaminated with corrosives so standard drain lines may be used.

Vapor-Proof Lights

Model Series 21176, 21177, 21178

Inside the upper canopy, 100-watt lamps illuminate the hood interior. The vapor-proof light fixtures are sealed against corrosion from acid vapors.

Auxiliary-Air Capabilities

Model Series 21176, 21177, 21178

Heat contained by the Hooded Combination Unit may be exhausted as a conventional-type hood or may be converted to an auxiliary-air hood by connecting an additional blower to the auxiliary-air collar. By supplying outside air to the Hooded Unit, expensive tempered room air is conserved. The unit may be connected at the time of the original installation, or converted at a later date.

Connecting Bulbs *(pictured on page 7)*

The connecting bulb separates liquid from vapors prior to the vapors entering the condenser and effectively traps caustic mist that may carry over to the recovery solution. Bulb construction is one-piece borosilicate glass, equipped with an integral dual-baffle design.

Delivery Tubes *(pictured on page 7)*

The delivery tube features a long neck, round bottom and thick walls to help eliminate pressure fluctuations in the distillation phase. Tube construction is one-piece borosilicate glass.

Flask Connection to Fume Removal Manifold

The fume manifold is manufactured from chemical-resistant, chlorinated polyvinyl chloride (CPVC) fitted with heat-resistant PTFE* nipples which draw chemical fumes from the digestion flasks. The nipple design, extending into the flask neck, eliminates sample loss while efficiently removing fumes.

Electric Heaters

To provide evenly distributed heat and faster processing of samples, the curved ceramic heater follows the round base of the Kjeldahl flask. Heaters accommodate 500 ml and 800 ml flasks, not included.

Hood Construction

Model Series 21176, 21177, 21178

Hooded models exhaust process heat. The hood is fabricated of powder-coated cold rolled steel, reinforced with strong tubular steel. The structure has a highly chemical-resistant powder coating. Lower front panels lift off for access to plumbing and storage. A left side access panel is removable for access to acid exhaust valve. Collars are provided for remotely located heat exhaust and auxiliary-air blowers.

*Polytetrafluoroethylene

Open Combination Kjeldahl Units

Specifications

All models feature:

- Powder-coated, tubular steel frame construction.
- Inlet and outlet water connections are 3/4" NPT and supply line is 1/2" ID minimum.
- Fume manifold of chlorinated polyvinyl chloride (CPVC).
- Acid fume exhaust connection sized for use with 6" nominal (6 5/8" OD) vent duct.
- Acid fume removal exhaust outlet mounted 55 1/2" from floor.
- 6" PVC pipe and flexible coupling with clamps.
- Complete assembly, factory wired to a main circuit breaker panel to specified AC electrical code.

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Six-place units also feature:

- 12 each 600-watt heaters, six for digestion, six for distillation.
- Heaters operated by 12 individual infinite-control knobs with variable input from 20-100% capacity.
- Distillation manifold with six seamless stainless steel tubes and cooling water temperature gauge.
- Six connecting bulbs and six delivery tubes for distillation process.
- Six PTFE* nipples fitted to CPVC fume manifold.
- Dimensions: 44.0" w x 17.0" d x 79.0" h (111.8 x 43.2 x 200.7 cm).

Twelve-place units also feature:

- 24 each 600-watt heaters, 12 for digestion, 12 for distillation.
- Heaters operated by 24 individual infinite-control knobs with variable input from 20-100% capacity.
- Distillation manifold with 12 seamless stainless steel tubes and cooling water temperature gauge.
- 12 connecting bulbs and 12 delivery tubes for distillation process.
- 12 PTFE nipples fitted to CPVC fume manifold.
- Dimensions: 74.0" w x 17.0" d x 79.0" h (188.0 x 43.2 x 200.7 cm).

All units require (not included):

- Remote blower for acid fumes. See page 7.
- Macro Kjeldahl Flasks (800 ml recommended).

*Polytetrafluoroethylene

Open Combination Kjeldahl Units				
# of Places	Catalog Number	Electrical Requirements	Amps	Shipping Weight
6	2123211	115 volts, 60 Hz, single phase	66	361 lbs (164 kg)
6	2123212	230 volts, 60 Hz, single phase	35	361 lbs (164 kg)
6	2123213	208/230 volts, 60 Hz, three phase	20	361 lbs (164 kg)
6	2123215	230 volts, 50 Hz, single phase	35	361 lbs (164 kg)
12	2123312	230 volts, 60 Hz, single phase	66	604 lbs (274 kg)
12	2123313	208/230 volts, 60 Hz, three phase	38	604 lbs (274 kg)
12	2123315	230 volts, 50 Hz, single phase	66	604 lbs (274 kg)

Specifications

All models feature:

- Hood constructed of powder-coated formed steel, reinforced by a tubular steel frame.
- Horizontal-sliding sash of tempered glass.
- One left-side access panel and one lower access panel.
- 3/4" NPT distillation manifold inlet and outlet water connections. Supply line of 1/2" ID minimum.
- Chlorinated polyvinyl chloride (CPVC) fume manifold.
- Acid fume exhaust connection sized for use with 6" nominal (6 5/8" OD) vent duct.
- 6" PVC pipe and flexible coupling with clamps.
- Acid fume removal exhaust outlet mounted 55 1/2" from floor.
- Complete assembly, factory wired to a main circuit breaker panel to specified electrical code. **Unit wiring must be installed from hood canopy to circuit box.**

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Six-place units also feature:

- 12 each 600-watt heaters, six for digestion, six for distillation.
- Heaters operated by 12 individual infinite-control knobs with variable input from 20-100% capacity.
- One 100-watt vapor-proof lamp recessed under hood canopy.
- Distillation manifold with six seamless stainless steel tubes and cooling water temperature gauge.
- Six connecting bulbs and six delivery tubes for distillation process.
- Six PTFE nipples fitted to CPVC fume manifold.
- 8 5/8" ID exhaust outlet located on top of hood for connection to remote blower for heat exhaust. 8 5/8" ID auxiliary-air connection also included. (Auxiliary-air remote blower sold separately.)
- Dimensions: 49.75" w x 28.75" d x 88.25" h (126.4 x 73.0 x 224.2 cm).

Twelve-place units also feature:

- 24 each 600-watt heaters, 12 for digestion, 12 for distillation.
- Heaters operated by 24 individual infinite-control knobs with variable input from 20-100% capacity.
- Two 100-watt vapor-proof lamps recessed under hood canopy.
- Distillation manifold with 12 seamless stainless steel tubes and cooling water temperature gauge.
- 12 connecting bulbs and 12 delivery tubes for distillation process.
- 12 PTFE nipples fitted to CPVC fume manifold.
- 10 3/4" ID exhaust outlet located on top of hood for connection to remote blower for heat exhaust. 10 3/4" ID auxiliary-air connection also included. (Auxiliary-air remote blower sold separately.)
- Two lower access panels.
- Dimensions: 80.25" w x 28.75" d x 88.25" h (203.8 x 73.0 x 224.2 cm).

Eighteen-place units also feature:

- 36 each 600-watt heaters, 18 for digestion, 18 for distillation.
- Heaters operated by 36 individual infinite-control knobs with variable input from 20-100% capacity.
- Two 100-watt vapor-proof lamps recessed under hood canopy.
- Distillation manifold with 18 seamless stainless steel tubes and cooling water temperature gauge.
- 18 connecting bulbs and 18 delivery tubes for distillation process.
- 18 PTFE nipples fitted to CPVC fume manifold.
- 10 3/4" ID exhaust outlet located on top of hood for connection to remote blower for heat exhaust. 10 3/4" ID auxiliary-air connection also included. (Auxiliary-air remote blower sold separately.)
- Three lower access panels.
- Dimensions: 110.75" w x 28.75" d x 88.25" h (281.3 x 73.0 x 224.2 cm).

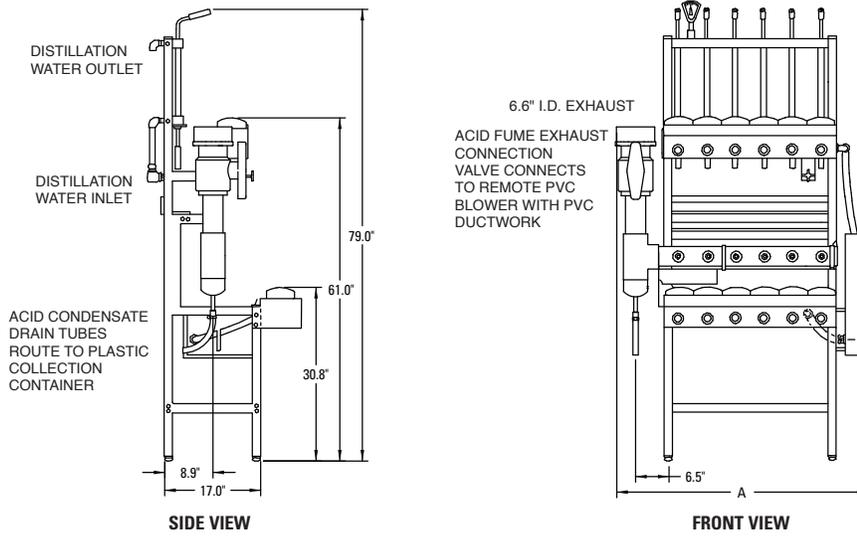
All units require (not included):

- Two remote blowers, one for acid fume removal and one for heat exhaust. See page 7.
- Macro Kjeldahl Flasks (800 ml recommended).

Hooded Combination Kjeldahl Units				
# of Places	Catalog Number	Electrical Requirements	Amps	Shipping Weight
6	2117611	115 volts, 60 Hz, single phase	67	820 lbs (372 kg)
6	2117612	230 volts, 60 Hz, single phase	36	820 lbs (372 kg)
6	2117613	208/230 volts, 60 Hz, three phase	21	820 lbs (372 kg)
12	2117712	230 volts, 60 Hz, single phase	67	1277 lbs (579 kg)
12	2117713	208/230 volts, 60 Hz, three phase	39	1277 lbs (579 kg)
18	2117812	230 volts, 60 Hz, single phase	97	1585 lbs (719 kg)
18	2117813	208/230 volts, 60 Hz, three phase	57	1585 lbs (719 kg)

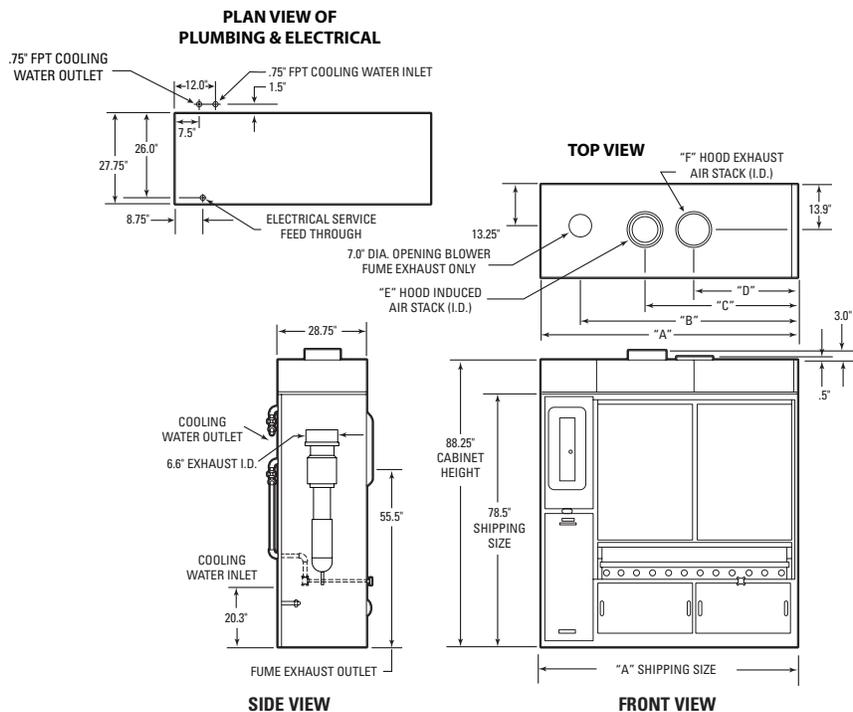
Dimensional Data

Open Combination Kjeldahl Unit



CAPACITY	A	ELECTRIC HEATER MAX KW
6-PLACE	44.0"	7
12-PLACE	74.0"	14

Hooded Combination Kjeldahl Unit



UNIT	EXHAUST CFM	AUX.-AIR CFM	MAX. KW
6	500	335	7
12	700	525	14
18	1000	750	21

UNIT	A	B	C	D	E	F
6	49.75"	38.25"	26.9"	17.0"	8.6"	8.6"
12	80.25"	68.75"	47.5"	32.25"	10.75"	10.75"
18	110.75"	99.25"	70.4"	47.5"	10.75"	10.75"

Accessories

Fume Exhaust



7183000 PVC Blower The exhaust blower for acid fume removal is not included with the Open or Hooded Combination Kjeldahl Unit and is **required for operation**. The PVC Blower provides optimum resistance to acid fumes. Blower is wired for 115 volt, 60 Hz, single phase operation. It is equipped with corrosion-resistant, vacuum-formed unplasticized Type I

polyvinyl chloride housing and injection-molded PVDF impeller. With ½ hp motor, adjustable sheave, V-belt, gravity belt tightener and integral weather cover. Framework is powder-coated steel. With 10" nominal inlet and outlet duct connections to receive rigid PVC ducting material directly. For use with any Open or Hooded Combination Kjeldahl Unit or Six-Place Kjeldahl Digestion Unit. Shipping weight 90 lbs (41 kg).

Heat Exhaust and Auxiliary-Air



Fiberglass Blower For Hooded Combination Kjeldahl Units, the exhaust blower for process heat removal is **required for operation**. In addition, the auxiliary-air blower to conserve tempered room air is not included with the Hooded Combination Kjeldahl Apparatus and is offered as an option. The Hooded Combination Unit is

exhausted as a conventional-type hood or may be converted to an auxiliary-air hood by connecting an additional blower to the auxiliary-air collar. The unit may be connected to an auxiliary-air blower at the time of installation or converted at a later time. These Fiberglass Blowers withstand exposure to moderate to highly corrosive conditions. They are wired for 115 volt, 60 Hz, single phase operation. They are equipped with durable molded fiberglass-reinforced polyester housing, molded polypropylene impeller, motor, adjustable sheave, V-belt. Gravity belt tightener and integral weather cover. Framework is powder-coated steel. With 10" nominal inlet and outlet duct connections to receive rigid PVC ducting material directly.

For use with:	6-Place		12-Place		18-Place	
	EXH	A-A	EXH	A-A	EXH	A-A
Catalog #	7180200	7180000	7180600	7180400	7181200	7180600
Blower/Motor	1/4 hp	1/6 hp	1/2 hp	1/3 hp	1/2 hp	1/2 hp
Ship. Weight	92 lbs (42 kg)	92 lbs (42 kg)	88 lbs (40 kg)	86 lbs (39 kg)	96 lbs (44 kg)	88 lbs (40 kg)



Thermoplastic Duct

PVC exhaust duct is lightweight and corrosion-resistant. A Female Duct Coupling is required to join two sections. Connections are simple with solvent cement. This rigid duct may be cut without special tools. Available in 10" lengths.

Catalog #	4708600	4718900	7027200
Nom. Dia.	6"	8"	10"
Actual OD	6.625"	8.625"	10.75"
Actual ID	6.25"	8.25"	10.375"
Ship. Weight	25 lbs (11 kg)	35 lbs (16 kg)	50 lbs (23 kg)



7027300 90° Elbow

PVC elbows are compatible with thermoplastic duct. Designed and engineered for quick installation and minimum pressure losses, they feature belled end connections to receive PVC duct directly. Nominal diameter is 10". Approximate height is 20.4". Equivalent resistance in feet of straight duct is 20. Shipping weight 12 lbs (5 kg).



Female Duct Coupling

PVC coupling makes connection between two sections of thermoplastic duct quick and easy.

Catalog #	4708900	4719200	7027500
Nom. Dia.	6"	8"	10"
Ship. Weight	4 lbs (2 kg)	5 lbs (2 kg)	5 lbs (2 kg)



Thermoplastic Duct Reducer

PVC coupling type reducer is designed for connecting thermoplastic duct of different diameters.

Catalog #	5605900	5606000
Diameter	6" x 8"	8" x 10"
Ship. Weight	2 lbs (1 kg)	5 lbs (2 kg)



2081300 Replacement Connecting Bulbs

Connecting bulbs provide connection between Kjeldahl flask and distillation rack. The double baffle design traps caustic mist. Constructed of one-piece borosilicate glass. Six per package. Shipping weight 4 lbs (2 kg).



2128800 Replacement Delivery Tubes

Delivery tubes feature long necks, round perforated bottoms and thick walls to help eliminate pressure fluctuations in the distillation phase. Constructed of one-piece borosilicate glass. Six per package. Shipping weight 3 lbs (1 kg).



2125611 Six-Place Kjeldahl Digestion Unit



2128401 Two-Place Kjeldahl Digestion Unit

The Kjeldahl Digestion Unit is ideal for laboratories that require separate digestion stations or as an addition to existing Kjeldahl apparatus. The Six-Place Digestion Unit draws fumes through the manifold with a remotely-located PVC blower exhaust system. It may be placed in a well-ventilated room away from laboratory operations or inside a floor-mounted fume hood. The Two-Place

Digestion Unit offers the same rugged construction as larger Kjeldahl models, plus it is portable and may be placed in a fume hood.

The Digestion Unit, operated by infinite control switches, has a sturdy welded steel framework, and is coated to provide corrosion resistance. The 600-watt curved heaters are specifically designed to cradle Kjeldahl flasks and the chlorinated polyvinyl chloride (CPVC) exhaust manifold fitted with PTFE nipples is standard on every unit.

Features and Benefits

Construction

Sturdy steel framework is welded and powder coated.

Electric Heaters

The curved ceramic heaters securely meet the bases of 500 ml or 800 ml Kjeldahl flasks to provide fast, evenly distributed heat. Individual infinite-control knobs provide variable heat input from 20-100% of capacity. The Six-Place Kjeldahl Unit includes a main circuit breaker panel, wired in accordance with the specified electrical code. The Two-Place Kjeldahl Unit includes an electrical cord and plug.

Blower Exhaust System

Six-Place Kjeldahl Digestion Units are available with an acid fume exhaust connection. Located on the left side of the unit, the exhaust system removes the fumes from the digestion flasks.

Remote PVC blower is required (not included).

Flask Connection To Fume Removal System

The fume manifold is constructed from chemical-resistant chlorinated polyvinyl chloride (CPVC) fitted with heat-resistant PTFE nipples designed to prevent leakage.

Specifications

Six-Place Kjeldahl Digestion Unit

- Powder-coated steel frame construction.
- Six 600-watt heaters for digestion.
- Heaters operated by six individual infinite-control knobs with variable input from 20-100% capacity.
- Chlorinated polyvinyl chloride (CPVC) acid fume manifold fitted with six PTFE nipples.
- Acid fume exhaust connection sized for use with 6" nominal (6 5/8" OD) vent duct.
- 6" PVC pipe and flexible coupling with clamps.
- Complete assembly, factory wired to a main circuit breaker panel to specified electrical code.
- Dimensions: 44.0" w x 23.0" d x 62.0" h (111.8 x 58.4 x 157.5 cm).
- **Requires remote PVC blower for fume exhaust (see page 7) and six Macro Kjeldahl Flasks, 800 ml recommended, (not included).**

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2128401 Two-Place Kjeldahl Digestion Unit

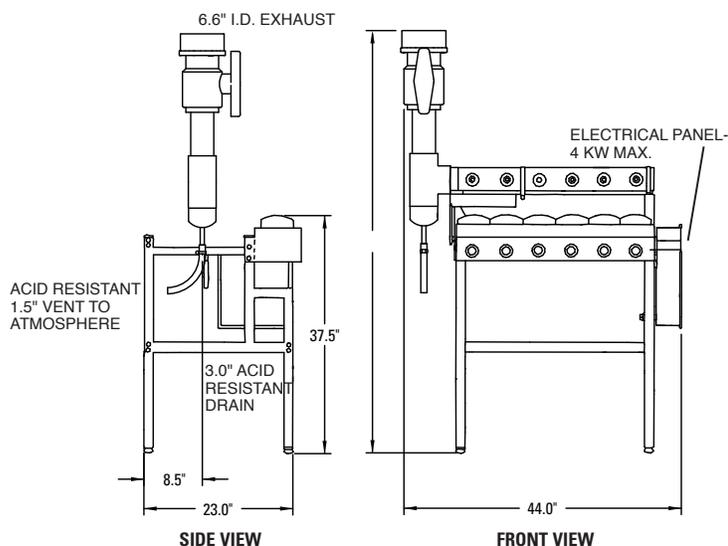
- Powder-coated steel frame construction.
- Two 600-watt heaters for digestion.
- Heaters operated by two individual infinite-control knobs with variable input from 20-100% capacity.
- Chlorinated polyvinyl chloride (CPVC) acid fume manifold fitted with two PTFE nipples. PVC tubing required for connection from the nipple to the water aspirator.
- Includes a 3/8" NPT nipple for connection to a customer-supplied gooseneck faucet with water aspirator.
- Complete assembly, factory wired for 115 volt, 50/60 Hz, 11 amp AC operation. Includes an 8', 3-wire cord and plug.
- Dimensions: 10.4" w x 18.25" d x 16.75" h (26.4 x 46.4 x 42.5 cm).
- **Requires connection to a water aspirator pump for operation and two Macro Kjeldahl Flasks, 800 ml recommended, (not included).**
- Unit should be placed inside a user-supplied fume hood during operation.
- Shipping weight 62 lbs (28 kg).

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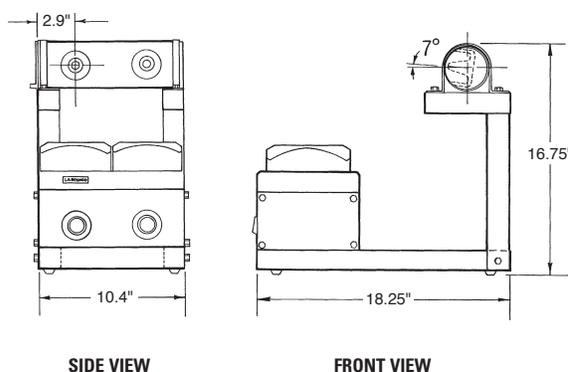
Six-Place Kjeldahl Digestion Units			
Catalog Number	Electrical Requirements	Amps	Shipping Weight
2125611	115 volts, 60 Hz, single phase	35	361 lbs (164 kg)
2125612	230 volts, 60 Hz, single phase	19	361 lbs (164 kg)
2125613	208/230 volts, 60 Hz, three phase	11	361 lbs (164 kg)

Dimensional Data

Six-Place Kjeldahl Digestion Unit



Two-Place Kjeldahl Digestion Unit





2127601 Six-Place Kjeldahl Distillation Unit

The Kjeldahl Distillation Apparatus is designed for mounting on a base cabinet or table and provides a durable unit for laboratories that require a separate distillation station. The versatile Distillation Apparatus features models with two or six heaters.



2128501 Two-Place Kjeldahl Distillation Unit

The Distillation Apparatus has a sturdy welded framework, and is powder coated to provide corrosion resistance. The Six-Place Unit is mounted on a molded powder resin base. It accommodates 500 or 800 ml flasks. The 600-watt curved heater elements specifically designed to cradle Kjeldahl flasks and the stainless steel distillation tubes are standard on every unit.

Features and Benefits

Construction

Sturdy steel framework is welded and powder-coated.

Distillation Apparatus

The distillation manifold is equipped with seamless stainless steel tubes. No fittings or gaskets are required, eliminating a source for leaks. On 6-Place Unit, the unique counterflow heat exchanger controls back pressure and maximizes the rate of distillation to assure uniformity of results. Cooling water volume may be adjusted to suit individual requirements with the remote-control flow valve. Water temperature is indicated on the easy-to-read temperature gauge located on the water outlet. Water discharged is not contaminated with corrosives so standard drain lines may be used.

Electric Heaters

The curved ceramic heaters securely meet the bases of 500 ml or 800 ml Kjeldahl flasks to provide fast, evenly distributed heat.

Individual infinite control knobs direct the variable input from 20-100% of capacity. A main circuit breaker panel, wired in accordance with the specified electrical code, is provided only on the 6-Place Unit. The 2-Place unit includes power cord and plug.

Connecting Bulbs

The connecting bulb separates liquid from vapors prior to the vapors entering the condenser and effectively traps caustic mist that may carry over to the recovery solution. The bulb has a dual baffle built into the cylindrical bulb that provides double protection against liquid caustic leakage. Because the baffles are not fused to the glass, the bulb is long lasting.

Delivery Tubes

The delivery tube features a long neck, round perforated bottom and thick walls to help eliminate pressure fluctuations in the distillation phase. Tube construction is one-piece borosilicate glass.

Specifications

Six-Place Kjeldahl Distillation Unit

- Powder-coated steel construction frame mounted on a molded epoxy resin base.
- Six 600-watt heaters for distillation.
- Heaters operated by six individual infinite-control knobs with variable input from 20-100% capacity.
- Distillation manifold with six seamless stainless steel tubes and cooling water temperature gauge and remote control flow valve.
- 3/4" NPT minimum inlet and outlet water connections.
- 1/2" ID minimum supply line.
- Includes six connecting bulbs and six delivery tubes for distillation process.
- Complete assembly, factory wired to a main circuit breaker panel to specified electrical codes.
- Dimensions: 30.9" w x 15.0" d x 41.0" h (78.5 x 38.1 x 104.1 cm).
- **Requires six Macro Kjeldahl Flasks, 800 ml recommended, (not included).**

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2128501 Two-Place Kjeldahl Distillation Unit

- Powder-coated steel construction frame.
- Two 600-watt heaters for distillation.
- Heaters operated by two individual infinite-control knobs with variable input from 20-100% capacity.
- Distillation manifold with two seamless stainless steel tubes.
- 3/8" NPT inlet and outlet water connections.
- Requires connection to a water aspirator with tubing and fittings.
- Complete assembly, factory wired for 115 volt, 50/60 Hz, 11 amp AC operation. Includes an 8', 3-wire cord and plug.
- Dimensions: 10.4" w x 18.25" d x 30.1" h (26.4 x 46.4 x 76.5 cm).
- **Requires two Macro Kjeldahl Flasks, 800 ml recommended, (not included).**
- Shipping weight 80 lbs (36 kg).

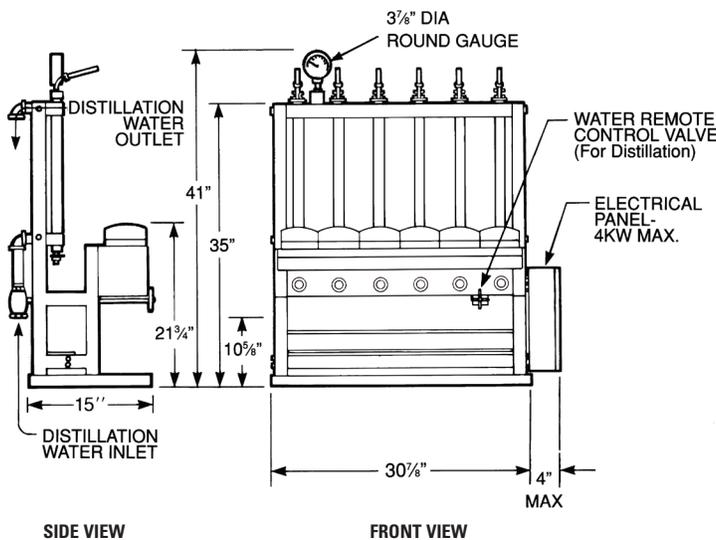
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Six-Place Kjeldahl Distillation Units

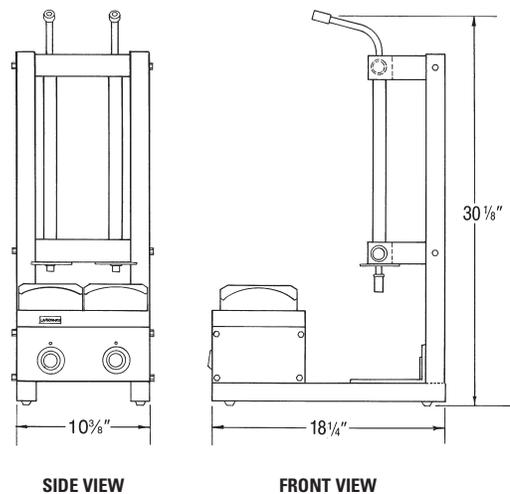
Catalog Number	Electrical Requirements	Amps	Shipping Weight
2127601	115 volts, 50/60 Hz, single phase	32	217 lbs (98 kg)
2127602	230 volts, 50/60 Hz, single phase	16	217 lbs (98 kg)
2127603	208/230 volts, 50/60 Hz, three phase	9	217 lbs (98 kg)

Dimensional Data

Six-Place Kjeldahl Distillation Unit



Two-Place Kjeldahl Distillation Unit



The Micro Digestor provides accurate results for Kjeldahl digestions using 100 ml flasks. Each heater has an individual infinite heat control to provide precise heat to each sample. These 200-watt heaters are recessed into the top of the unit to help minimize accidental contact with the hot heater.



6030000 Micro Digestor

The Micro Digestor is fully assembled including a glass manifold and 3-wire cord and plug. Simply plug into a suitable electrical receptacle and connect to a water aspirator or use in a fume hood.

The RapidStill I is the distillation companion for the Micro Digestor.
See pages 13 and 14 for information.

Features and Benefits

Glass Manifold

Fumes are removed through a glass manifold with six flask ports and a serrated tip for connection to a simple water aspirator.

Infinite Heat Control

Each heater element has an individual heat control and pilot light. The infinite heat controls have variable input from 20-100% of capacity.

Heat and Corrosion-Resistant Cabinet

The cabinet is powder-coated aluminum. The top is 1 1/2-inch thick insulating board to protect wiring and controls from heat and corrosion.

Heater Element

Each flask station has an individual 200-watt heater assembly that consists of a tubular heater element and stainless steel cup.

Adjustable Height

Two rear brackets provide adjustable mounting for the glass manifold.

Glassware Included

Six 100 ml flasks are included with each unit.



A companion to the Micro Digester, the RapidStill I is designed for labs that are determining micro quantities of protein/nitrogen. It may also be used to perform only one or two macro determinations per day by simply diluting and aliquoting the sample.

The one-piece borosilicate glass still is mounted on a chemical-resistant console that contains all operating controls. Each distillation takes only five minutes. Unit accepts digested samples up to 4 ml (maximum) and gives reproducible results in ranges as low as 1 mg/L Kjeldahl nitrogen.

6500000 RapidStill I

Features and Benefits

Built-in glass aspirator allows you to purge spent samples after determination. The water used for cooling this condenser is also used for aspirating. A twist of the stopcock draws the sample and rinse water down the drain.

One-piece borosilicate glass still features chemically-inert PTFE stopcocks. There are no rubber or plastic tubing connections to crack, corrode or leak. The still comes complete with a pivoting receiving flask stand to hold the receiving flask at the proper level.

Durable console is constructed of powder-coated steel. Fits on any countertop.

Variable heat control switch allows complete control of the steam. It directs the electrical input to the immersion heater for fast efficient heat. Steam generation starts rapidly from a cold start.



6500000 RapidStill I

Specifications

6030000 Micro Kjeldahl Digestor

- Powder-coated aluminum construction cabinet with 1 1/2" thick insulating board top.
- Two rear adjustable brackets accommodate 100 ml flasks.
- Six 200-watt heater assemblies, each consisting of a tubular steel heater element and a stainless steel cup.
- Heater elements have individual heat control and pilot lights and variable input from 20-100% of capacity.
- Glass manifold with six flask ports and a serrated tip for connection to a water aspirator.
- Six 100 ml borosilicate glass Micro Kjeldahl Flasks included.
- Wired for 115 volt, 50/60 Hz, 12 amp AC operation. Includes 6', 3-wire cord and plug.
- Dimensions: 22.6" w x 9.0" d x 14.0" h (57.4 x 22.9 x 35.6 cm).
- **Requires a water aspirator (not included).**
- Shipping weight 17 lbs (8 kg).

6030001 Micro Kjeldahl Digestor

Specifications are the same as 6030000 except for the following.

- Wired for 230 volt, 50/60 Hz, 6 amp AC operation. Includes 6', 3-wire cord.
- **Plug is required (not included).**

6500000 RapidStill I

- Powder-coated steel console.
- One-piece borosilicate glass still with PTFE stopcocks.
- 115 volt immersion heater located inside the water reservoir.
- Variable heater control knob and lighted power switch.
- Built-in glass aspirator.
- Fill valve for filling the boiling flask.
- Rear cooling water connections through the back of the housing.
- Adjustable height shelf to support the receiving flask.
- Includes water bottle for introducing distilled water to the boiling flask via the fill valve, one large "U" clamp and two small "U" clamps to secure glassware.
- Wired for 115 volt, 60 Hz, 2.4 amp operation. Includes 8', 3-wire cord and plug.
- Accepts digested samples up to 4 ml (maximum) and gives reproducible results in ranges as low as 1 mg/L nitrogen.
- Dimensions: 14.5" w x 9.8" d x 24.4" h (36.8 x 24.9 x 62.0 cm).
- Shipping weight 23 lbs (10 kg).

Accessories



6037500 Micro Kjeldahl Flasks

100 ml flasks for use with the Micro Digestion Unit. They feature long necks, round bottoms and thick walls. Manufactured of borosilicate glass. Package of six. Shipping weight 2 lbs (1 kg).



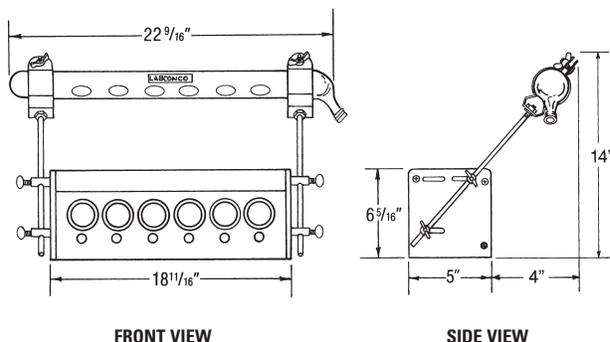
6505000 Micro Kjeldahl Flask Carrier

Reduces breakage and helps prevent sample spillage. The carrier will hold 12 flasks upright at a 29° angle or 16 flasks inverted for drying at the same time. Constructed of corrosion-resistant, vinyl-coated steel, the Flask

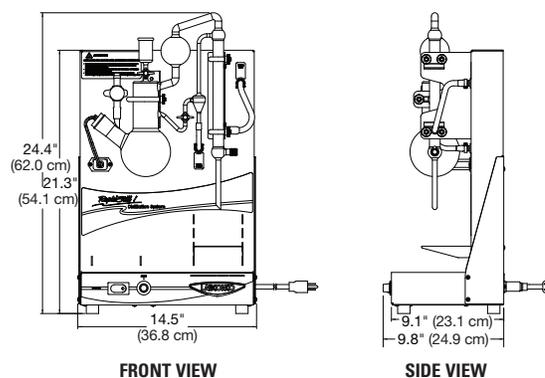
Carrier has a ball-bearing base plate that remains stationary while the carrier turns 360° for easy loading. Shipping weight 4 lbs (2 kg).

Dimensional Data

Micro Digestor



RapidStill I





2301200 Rapid Digestor-25

Available in 4- or 25-place models, the Rapid Digestors were developed in a working laboratory environment following extensive interviews with Kjeldahl users. Only Labconco's Rapid Digestors provide an individual ceramic heater module for each tube to provide efficient, uniform heat transfer. Unlike aluminum block designs, Labconco's ceramic modules have virtually the same coefficient of heat expansion as the digestion tube. This means more rapid destruction of organic material resulting in faster digestions. Digestion time is normally 45 minutes depending on the sample type and catalyst.

Each ceramic heater is insulated on all four sides as well as the bottom. This prevents heat loss and assures low energy consumption while maintaining reduced external housing temperatures.

Accessory fume removal manifolds and digestion tubes are offered to complete the digestion system. The RapidStill II provides the ideal companion for the Rapid Digestors. See page 18 for complete information.

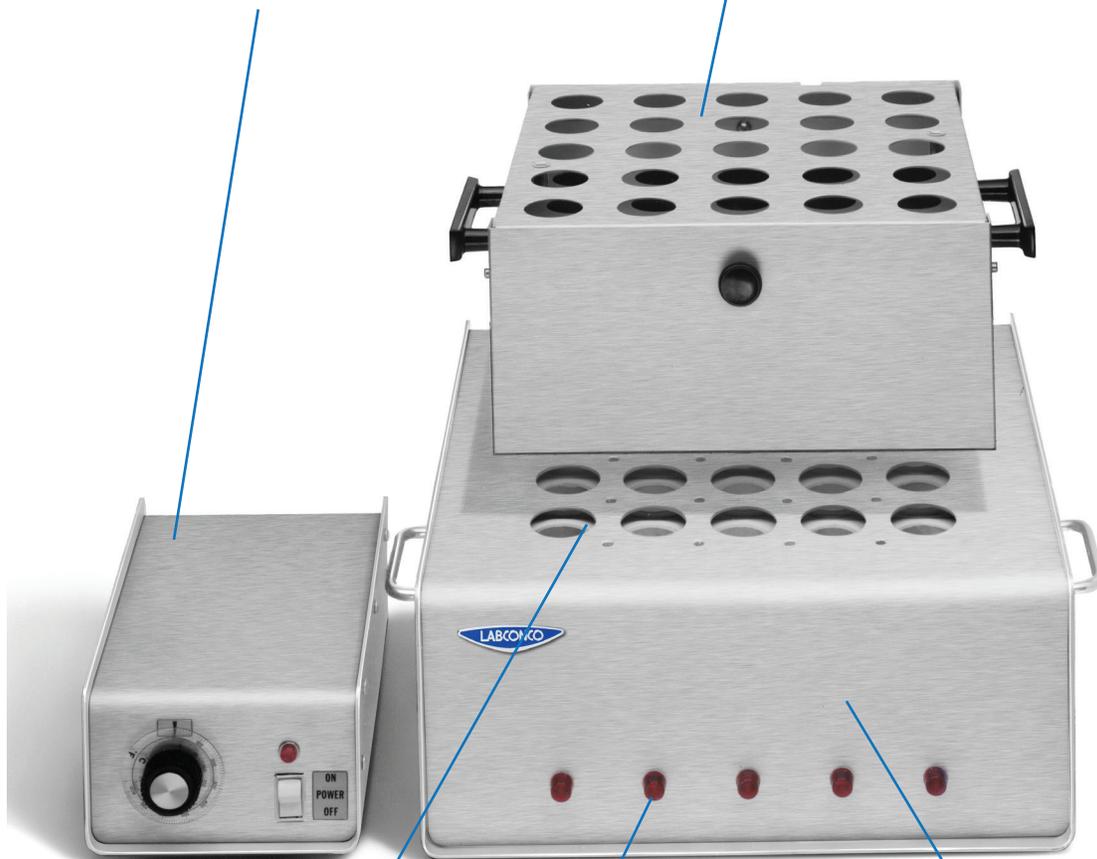


2308000 Rapid Digestor-4

Features and Benefits

Solid-State Controller is factory-calibrated with stepless temperature control from ambient to 450° C. Triac control maintains specific temperatures to $\pm 0.5\%$ over entire operating range even with line-voltage fluctuations of 10% and ambient temperature range of 10° to 40° C.

Convenient carrier rack of corrosion-resistant aluminum alloy holds glassware in place for easy handling, loading and washing. The rack includes removable heat shields that prevent heat loss when in place and aid in rapid cooling when removed.



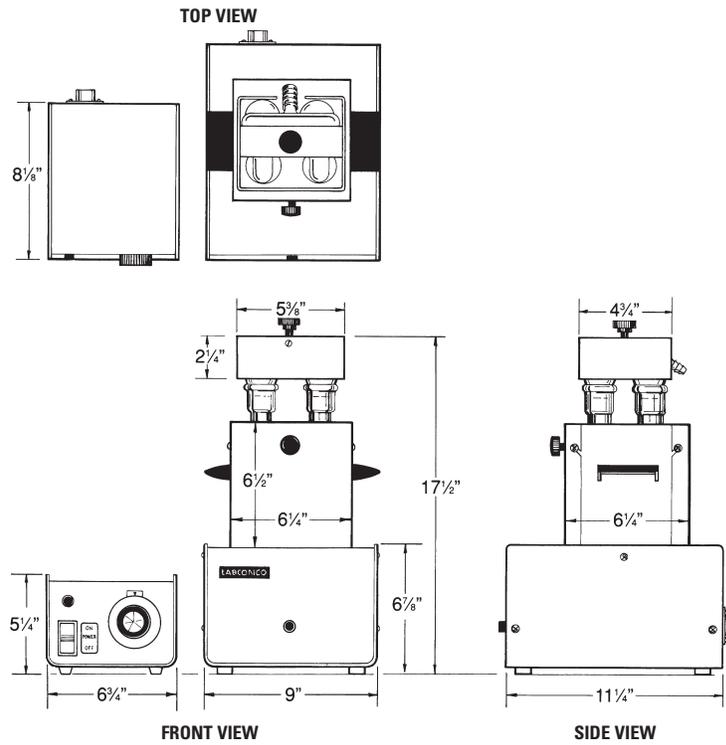
Individual ceramic heater modules are molded for precise fit and maximum direct heat transfer to digestion tubes. An RTD platinum sensor encased in ceramic detects internal temperature, signaling the controller for uniform temperature control.

Monitoring system has red lights that blink when the Rapid Digester reaches preset temperature. The lights also help pinpoint malfunctions. The Rapid Digester-4 has one light. The Rapid Digester-25 has five lights — one for each bank of five heaters.

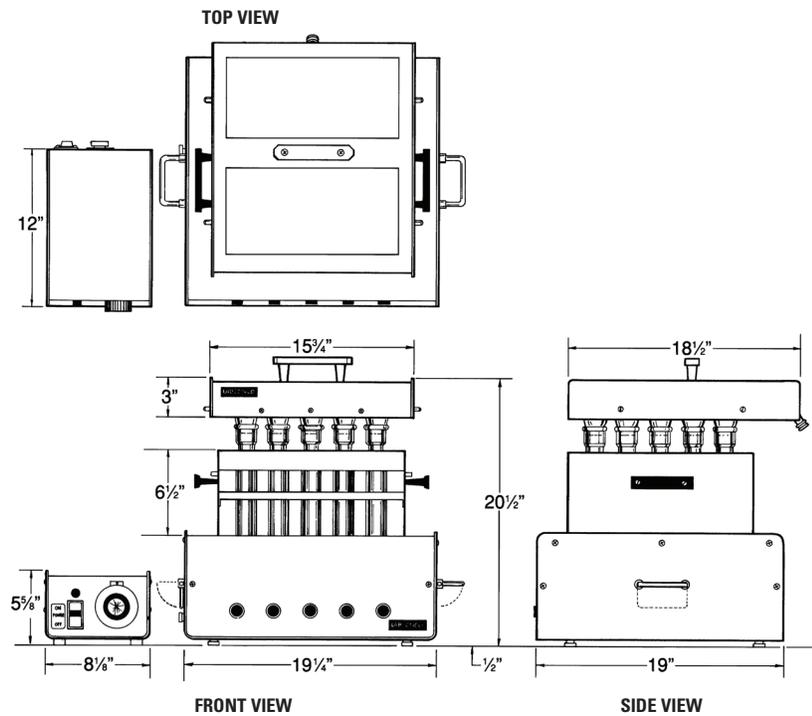
Designed for energy efficiency, the individual ceramic heaters are surrounded by 1" thick insulation board.

Dimensional Data

Rapid Digestor-4 with 4-Place Fume Removal System



Rapid Digestor-25 with 25-Place Fume Removal System



Specifications

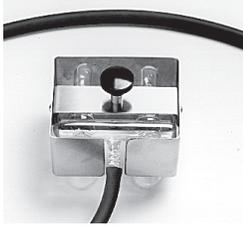
2308000 Rapid Digestor-4

- 4 individual ceramic heaters surrounded by a 1" thick insulation board, housed in chemically-etched aluminum.
- Heaters molded for precise fit to a 250 ml digestion tube.
- RTD platinum temperature sensor sends signals to the control unit.
- Automatic monitoring system illuminates red light when digestor reaches preset temperature.
- Heats to 410° C in less than one hour.
- Control unit with power switch and solid-state stepless temperature control knob, factory-calibrated from ambient to 450° C.
- Triac control maintains specified temperature to ±0.5% over entire operating range.
- Aluminum alloy carrier rack with two plastic handles and two removable heat shields holds up to four digestion tubes. Rack is 6.25" w x 6.25" d x 6.5" h (15.9 x 15.9 x 16.5 cm).
- 115 volt, 50/60 Hz, 7 amp AC operation. Includes 6' cord, plug and electrical lines between controller and digestion unit.
- Dimensions (Digestion unit): 9.0" w x 11.25" d x 6.9" h (22.9 x 28.6 x 17.5 cm).
- Dimensions (Control unit): 6.75" w x 8.1" d x 5.25" h (17.1 x 20.6 x 13.3 cm).
- **Digestion tubes and fume removal system are required (not included).**
- **Operation inside a fume hood is required.**
- Shipping weight 30 lbs (14 kg).

2301200 Rapid Digestor-25

- 25 individual ceramic heaters surrounded by 1" thick insulation board, housed in chemically-etched aluminum casing with two fold-down handles.
- Heaters molded for precise fit to a 250 ml digestion tube.
- Five RTD platinum temperature sensors encased in the ceramic send signals to the control unit.
- Automatic monitoring system illuminates red light when digestor reaches preset temperature.
- Heats to 410° C in less than one hour.
- Control unit with power switch and solid-state stepless temperature control knob, factory-calibrated from ambient to 450° C.
- Triac control maintains specified temperature to ±0.5% over entire operating range.
- Aluminum alloy carrier rack with two plastic handles and two removable heat shields holds up to 25 digestion tubes. Rack is 14.5" w x 14.5" d x 6.5" h (36.8 x 36.8 x 16.5 cm).
- 208/230 volt, 50/60 Hz, 16 amp AC operation. Includes 6' cord and 7' electrical cord to connect controller to digestion unit. **Electrical plug is required.**
- Dimensions (Digestion unit): 19.25" w x 19.0" d x 8.25" h (48.9 x 48.3 x 21.0 cm).
- Dimensions (Control unit): 8.1" w x 13.25" d x 5.6" h (20.6 x 33.7 x 14.2 cm).
- **Digestion tubes and fume removal system are required (not included).**
- **Operation inside a fume hood is required.**
- Shipping weight 79 lbs (36 kg).

Accessories



2354000 4-Place Fume Removal System

4.75" w x 5.4" d x 4.0" h
(12.1 x 13.7 x 10.2 cm).

For Rapid Digestor-4. Consists of borosilicate glass manifold with 4 bulb eductors precisely aligned to rest atop the digestion tubes.

Manifold is encased in aluminum housing with plastic handle. A 5' rubber connecting hose is supplied for connecting to a user-supplied water aspirator. **Water aspirator is required (not included).** Shipping weight 4 lbs (2 kg).



2350025 25-Place Fume Removal System

16.5" w x 18.5" d x 4.0" h
(41.9 x 47.0 x 10.2 cm).

For Rapid Digestor-25. Consists of borosilicate glass manifold with 25 bulb eductors precisely aligned to rest atop the digestion tubes.

Manifold is encased in aluminum housing with plastic handle. A 2' rubber connecting hose is supplied for connecting to a water aspirator. A water aspirator for use with 40 psi water pressure is provided. Unit includes an aluminum support stand and drip pan. Average water consumption shall be 2.5 gpm. Shipping weight 28 lbs (13 kg).

Digestion Tubes

Designed for uniform wall thickness and impact strength. Made of borosilicate glass with heavy-duty retention lip and contoured bottom for optimum heat transfer and minimal thermal shock. Volumetric Tubes have an easy-to-read calibration mark for accurate dilutions and a built-in constriction for maximum refluxing and digestion speed.



Volumetric Tubes, 250 ml

Catalog #	2303005	2303025
Quantity	5/package	25/package
Ship. Weight	3 lbs (1 kg)	16 lbs (7 kg)

Straight Tubes, 250 ml

Catalog #	2304005	2304025
Quantity	5/package	25/package
Ship. Weight	3 lbs (1 kg)	16 lbs (7 kg)



6520000 RapidStill II

The RapidStill II is a semi-automatic steam distillation unit designed specifically for macro Kjeldahl nitrogen determinations. It serves as a companion to the Rapid Digester-4 and Rapid Digester-25. Once samples have cooled from the digestion process, simply dilute with water and place one sample tube on the RapidStill II. Then add the sodium hydroxide by depressing a built-in dispenser switch and start the distillation process by activating the timer. Each distillation takes five to ten minutes.

Features and Benefits

Compact design conveniently fits on a countertop.

Boiler heater switch activates the boiler heating element.

Boiler water switch fills the boiler with water. It is interlocked to prevent its operation during the heating of the boiler.

Built-in sodium hydroxide switch allows you to safely control the amount of caustic to be added. The switch is interlocked to operate only when the boiler heater is on.

Corrosion-resistant inlet tubes for sodium hydroxide and steam are made of chemically-inert PTFE for long life.

Distribution head acts as a junction for the steam and NaOH delivery tubes and serves as a trap preventing the NaOH from entering the receiving flask.

Condenser is a combination Allihn and spiral condenser for efficient recovery of the distillate.

Condenser ventilation valve prevents siphoning of distillate back into the condenser chamber.

Flow restrictor prevents the cooling water flow rate to the condenser from exceeding 1 gallon per minute.

Digestion tube retainer is spring loaded to securely hold the tube during distillation.

Distillation timer switch is infinitely adjustable from 0-15 minutes to control the dispensing of steam into the digestion tube. It is interlocked to function only when the boiler heater is on. The NaOH cannot be dispensed into the digestion tube when the timer is in operation. Automatically shuts off the distillation process.

Sight gauge lets you monitor water level in the boiler.

Safety cover protects the condenser.

Safety door surrounds the digestion tube and protects the operator from digestion tube breakage.

An 1100-watt heater surrounding a 1000 ml flask generates steam.

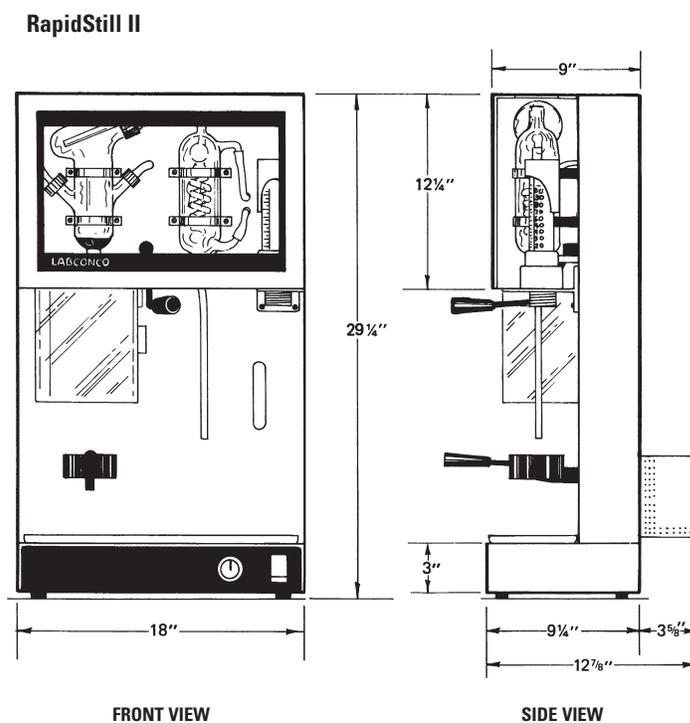
Molded tray catches spills and speeds clean up.

Specifications

6520000 RapidStill II

- Powder-coated steel frame construction.
- Spring-loaded digestion tube retainer.
- PTFE sodium hydroxide and steam inlet tubes.
- Built-in peristaltic pump for sodium hydroxide dispensing.
- Borosilicate glass condenser with ventilation valve.
- 0-15 minute adjustable audible timer.
- Steam generator water level sight gauge.
- Molded plastic spillage tray.
- 1100-watt heater surrounds 1000 ml flask to generate steam.
- Flow restrictor regulates condenser flow rate to 1 gallon (3.8 liters) per minute.
- 115 volt, 60 Hz, 15 amps operation.
- 8', 3-wire cord and plug included.
- Dimensions: 18.0" w x 12.75" d x 29.75" h (45.7 x 32.4 x 75.6 cm).
- Shipping weight 50 lbs (23 kg).

Dimensional Data





3500100 Goldfish Fat Extractor

The Goldfish Fat Extractor has long been recognized by the AOAC as an accepted means of determining fat and oil content in samples and is listed in AOAC methods. Thousands of Goldfish Extractors are in use today in industry, government and university laboratories worldwide.

The Fat Extractor reduces extraction time from 16 hours to about four hours through its efficient refluxing system. The operation is accomplished by using a single beaker as the solvent chamber. The procedure involves placing samples between a boiling solvent and a cold surface. As boiling continues, the solvent vaporizes, condenses on the cold surface, and washes down through the samples into the boiling solvent below.*

Features and Benefits

Construction

Sturdy anodized aluminum framework supports manifold.

Electric Heaters

Six 100-watt, spring-loaded heaters raise and lower into position for easy, one-hand operation. Following the extraction process, support stirrups hold beakers at a slight angle above the heaters to dry the extract. Three infinite control knobs direct the variable heat input from 20-100% of capacity.

Condensers

Metal condensers with stainless steel heads are cone-shaped and have crown-like points over the samples to eliminate solvent channeling and ensure complete extraction. Automatic pressure-relief valves relieve pressure build-up in the condensers, then reset themselves to create a closed system of extraction.

Glassware and Accessories

All of the following components are included: 12 each 100 ml beakers manufactured of thick-wall borosilicate glass with flanged and grounded tops to facilitate connection to condenser; six each alundum extraction thimbles, heat covers, beaker seals, beaker rings, upper condenser gaskets, borosilicate glass sample tubes and reclaiming tubes. No additional hot plates, glassware, condensers, rubber hoses, clamps or support rods are necessary.

Connections

The Goldfish Fat Extractor is completely factory assembled. The only connections required for operation are to a water source and an electrical receptacle.

Basic Steps

The Goldfish Fat Extractor is recommended for use in the determination of fat and oil content, using solvents with boiling ranges not exceeding 85° C (185° F). The following basic steps are used:

1. The empty beaker is weighed.
2. The sample is placed in an alundum cup. This container is inserted in a spring clip that holds it in the condenser and aligns it for best flow of condensate.
3. Solvent is placed in the beaker. The beaker has a flanged and grounded top that locks into the condenser with a lock-ring and gasket.
4. Heat is applied by sliding the heater housing upward to meet the beaker.
5. The condenser head channels condensate directly to the top of the sample container, then distributes the flow to all sides of the container.
6. When extraction is complete, the sample container is removed and replaced with a reclaiming tube, leaving oil in the beaker.
7. A special stirrup support holds the beaker at a slight angle above the heater to dry the extract. When only a few milliliters of solvent remain, the beaker is placed in a drying oven.
8. The beaker is weighed and compared with the weight of the empty beaker. The increase in weight is an absolute measure of the amount of fat or oil extracted.

**Caution: The Goldfish Fat Extractor should always be operated inside a properly ventilated fume hood to exhaust the vapors from flammable solvents used during normal operation. The fume hood should be equipped with a fire suppression device.*

Specifications

3500100 Goldfish Fat Extractor

- Anodized aluminum construction frame.
- Six 100-watt heater elements operated by three infinite-control knobs with variable heat input from 20-100% capacity.
- Six stirrup supports included.
- Six cone-shaped metal condensers with Type 304 stainless steel heads and crown-like points.
- Six automatic pressure release valves included.
- Includes the following components: 12 100 ml beakers; six each alundum extraction thimbles, heat covers, beaker seals, beaker rings, upper condenser gaskets, sample tubes and reclaiming tubes.
- 3/8" IPS control valve is located on upper left side for connection to cold water supply.
- 3/8" IPS water outlet located on upper right side for connection to open drain 3/4" IPS or larger.
- Pilot light illuminates red to indicate unit is on.
- Completely assembled and factory-wired for 115 volt, 50/60 Hz, 5.2 amp AC operation.
- On/off switch and 6', 3-wire cord and plug included.
- Dimensions: 35.75" w x 9.0" d x 26.9" h (90.8 x 22.9 x 68.3 cm).
- Shipping weight 144 lbs (65 kg).

Accessories



3505300 Goldfish Fat Extractor Replacement Beakers

100 ml beakers specifically designed for use with Labconco Goldfish Fat Extractor. Manufactured of thick-wall borosilicate glass with flanged and ground tops to facilitate connection to condenser. Package of 6. Shipping weight 2 lbs (1 kg).

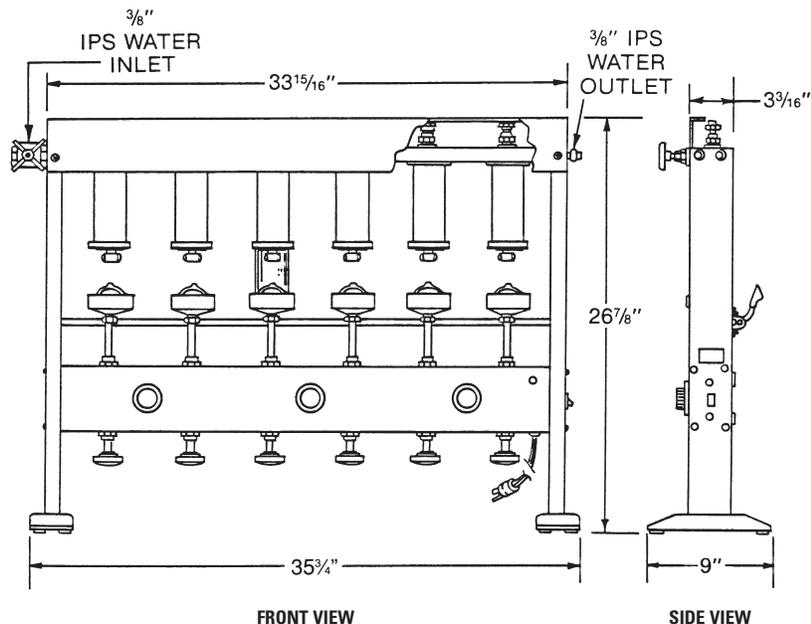
1315600 Transformer

For use with 230 volt, 50/60 Hz, 1000-watt operation. Shipping weight 21 lbs (10 kg).

- 3505900 Alundum Thimble**, 22 x 80 mm, pkg./6
- 3505300 Beaker**, glass, 100 cc. 3 1/4" high, pkg./6
- 3519100 Wave Washer Beaker Seal**, Type 301 stainless steel
- 3516000 Gasket**, condenser, upper, pkg./6
- 3506200 Reclaiming Tube**, glass, pkg./6
- 3505400 Beaker Ring**
- 3506100 Sample Tube Container** (thimble holder) glass, pkg./6
- 3518500 Heat Cover**

Dimensional Data

Goldfish Fat Extractor





3000100 Crude Fiber Apparatus

The Crude Fiber Apparatus is used in the determination of crude fiber in feed, food and other agricultural products. The Apparatus is a reflux condenser designed to operate with speed and accuracy. This apparatus is widely used by state, federal and industrial control labs and is listed by the AOAC.

The procedure involves subjecting a sample to the simulated action of the digestion system. Samples are boiled in acid and washed and then boiled in alkalis and washed again. Remaining solids are isolated and termed insoluble fiber or crude fiber — the indigestible parts of agricultural products such as cellulose and other materials.

Features and Benefits

Construction

Sturdy anodized aluminum framework supports manifold.

Electric Heaters

Six 350-watt heaters are provided. Six infinite control knobs direct the variable heat input from 20-100% of capacity. The spring compression connection between the beaker and condenser element holds the beaker in place, preventing bumping and possible breakage when boiling begins. The tight seal keeps acid and alkalis at constant volumes during the boiling stages, yet is readily disengaged by lowering the heater assembly.

Condensers

The stainless steel condenser has an inverted cone base. This cone directs the condensate back toward the sides of the beaker, which helps wash down froth and fiber that may adhere to the beaker sides.

Glassware

Twelve tall-form, straight-sided 600 ml beakers, manufactured of durable thick-wall borosilicate glass, are provided.

Plumbing Connections

The Crude Fiber Apparatus is completely factory assembled. The only connections required for operation are to a water source and an electrical receptacle.

Basic Steps

The Crude Fiber Apparatus is recommended for use in the determination of crude fiber content. The following basic steps are used:

1. Samples and reagent are placed in the 600 ml beaker.
2. The beaker is placed on the heater, which is raised until a spring compression connection is made between the beaker and condenser.
3. Heat is applied. As the temperature increases, the boiling solution reaches the condenser, and the process of refluxing begins.
4. An infinite heat control is supplied for each heater that allows stepless heat control to obtain the proper boiling and refluxing rate.
5. After the specified period, the contents of the beaker are filtered, then washed in boiling water repeatedly.
6. Residue on filter is boiled with caustic reagents and filtered again.
7. The remaining residue is dried, cooled, weighed and recorded as crude fiber.

Specifications

3000100 Crude Fiber Apparatus

- Anodized aluminum frame construction mounted on fiber cement board base.
- Six 350-watt heaters operated by six individual infinite-control knobs with variable input from 20-100% capacity and individual pilot lights.
- Six Type 304 stainless steel condensers with inverted cone bases.
- Twelve thick-wall borosilicate glass tall-form, straight-sided 600 ml beakers.
- 3/8" IPS control valve located on upper left side for connection to cold water supply.
- 3/8" IPS water outlet located on upper right side for connection to open drain line 1/2" IPS or larger.
- Completely assembled and pre-wired to on/off switch for 115 volt, 50/60 Hz, 18.3 amp AC operation.
- **Power cord and plug are required (not included).**
- Dimensions: 35.7" w x 9.0" d x 27.2" h (90.7 x 22.9 x 69.1 cm).
- Shipping weight 137 lbs (62 kg).

3000200 Crude Fiber Apparatus

Specifications are the same as 3000100 except for the following.

- Completely assembled and pre-wired to on/off switch for 230 volt, 50/60 Hz, 9.1 amp AC operation. On/off switch provided.
- **Power cord and plug are required (not included).**

Accessories



5510000 California Büchner Funnel

This stainless polyethylene, two-piece Büchner Funnel is modified by the addition of a 200-mesh stainless steel screen which is firmly heat sealed into the bottom of the upper section.

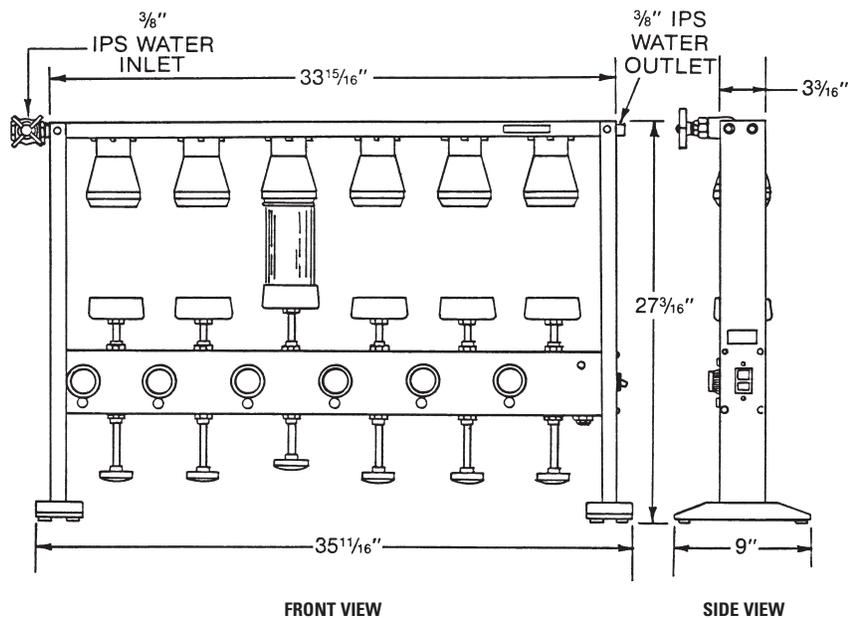


3004300 Crude Fiber Replacement Beakers

600 ml tall form beakers for use with Labconco Crude Fiber Apparatus. Manufactured of durable thick-wall borosilicate glass. With graduated volumetric markings to 600 ml. Package of 6. Shipping weight 3 lbs (1 kg).

Dimensional Data

Crude Fiber Apparatus



Since 1925, the Labconco name has stood for quality workmanship and exceptional service. This commitment to excellence is fostered throughout our company — from the men and women who design our products, to the conscientious craftsmen who manufacture them, to the sales representatives who tailor them to your needs. Contact Labconco at 800-821-5525 or 816-333-8811 for information about the products shown.



Chemical Fume Hoods



Ductless Enclosures



Biosafety Cabinets



Clean Benches and PCR Enclosures



Nanotechnology Enclosures



Protector Glove Boxes



Multiple Sample Evaporation Systems



Vacuum Concentrators and Cold Traps



Precise Glove Boxes



Freeze Dry Systems



Glassware Washers



Water Purification Systems



Laboratory Carts and Benches



Vacuum Desiccator



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