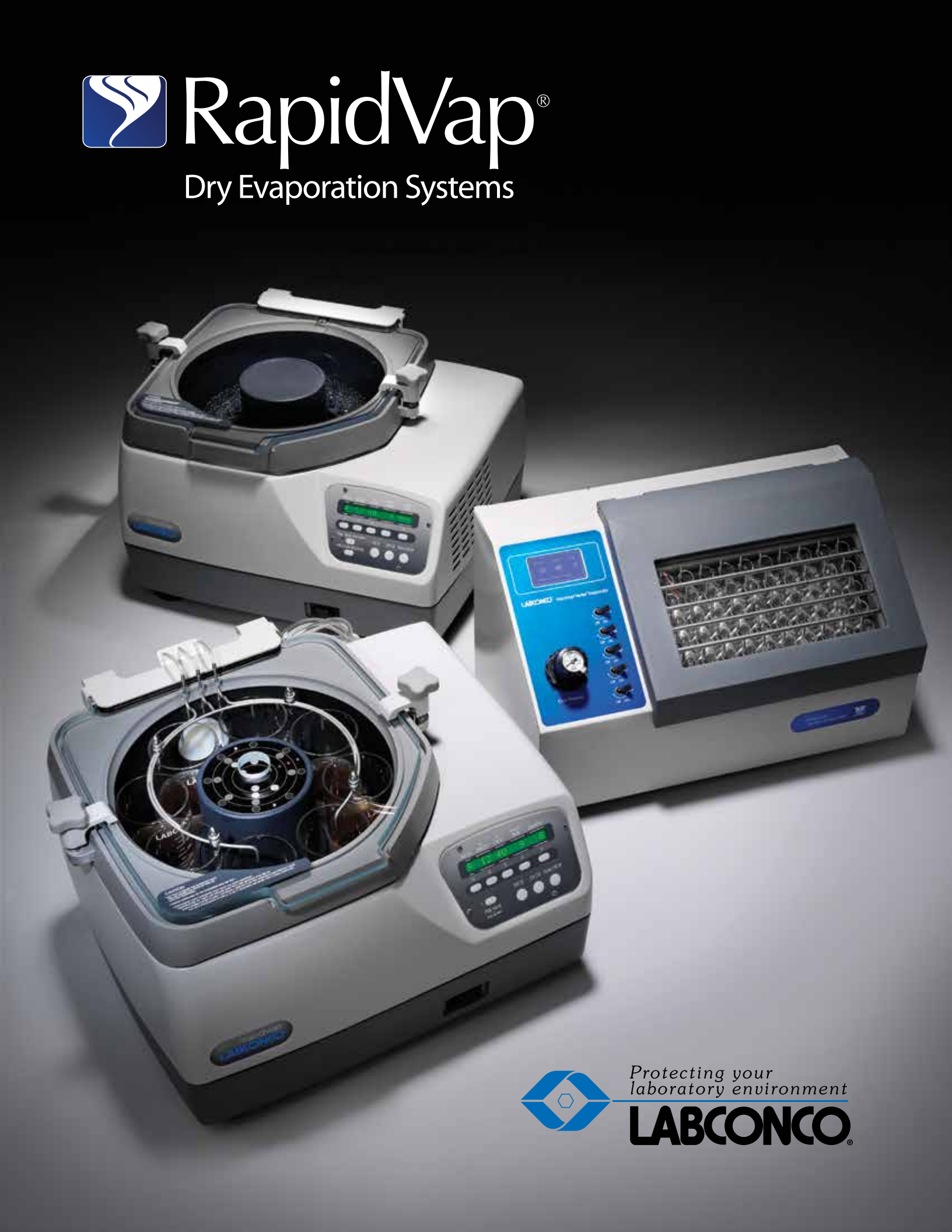
RapidVap®

Dry Evaporation Systems



Protecting your laboratory environment

LABCONCO®

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An Overview

RapidVap Evaporation Systems are multiple-sample evaporators that use a combination of gentle forces to quickly reduce samples to dryness or an end point volume.

RapidVap Systems are built to resist attack from strong chemicals. The chamber and sample block are PTFE-coated and all mechanical components such as bearings are isolated from chemical fumes and vapors. All three RapidVap Systems utilize dry heat, feature robust programmability and have greater throughput when compared to rotary evaporators. Read below for details on each system.

RapidVap Vertex Dry Evaporation Systems

Using dry heat and nitrogen blow down, the RapidVap Vertex Dry Evaporator speeds evaporation of up to 50 samples at the same time. The Vertex accommodates 1.5 milliliter microcentrifuge tubes up to 60ml ASE* vials. A convenient touchpad allows easy programming of time and temperature. Up to ten different programs may be stored in the microprocessor for protocol consistency. Unlike water bath heaters, the dry block heater requires less maintenance, no distilled water or additives, and adds no potential source of contamination.

The RapidVap Vertex Evaporator is ideal for preparation of samples in a variety of applications including drug discovery, clinical analysis, environmental testing, agrochemistry, and forensic evidence processing.

** ASE® is a registered trademark of Dionex, Sunnyvale, California.*

Scan here to watch a video and learn how the RapidVap Vertex quickly evaporates samples using dry heat and nitrogen blow down.

RapidVap Vacuum Dry Evaporation Systems

The RapidVap Vacuum System is ideal for preparation of samples in a variety of applications including drug discovery, agrichemistry, mycology testing and environmental analysis. The system uses vacuum along with heat and vortex motion to help speed evaporation and provides an alternative to traditional centrifugal evaporation methods. A microprocessor provides precise control of the vacuum level so that bumping can be minimized, preventing loss of sample. A port on the back of the RapidVap Vacuum System allows attachment to an accessory diaphragm or rotary vane vacuum pump.

The RapidVap Vacuum System accommodates seven different, interchangeable accessory sample blocks holding sample volumes from just a few milliliters to as large as 450 milliliters. The blocks hold more samples than ever before, offering greater throughput. As many as 110 each 12 or 13 mm tubes may be loaded at once. Additional blocks accommodate various tube types including conical centrifuge tubes and scintillation vials. Custom blocks to fit special glassware configurations such as VOA and ASE* vials are also available.

The RapidVap Vacuum Evaporation System uses vaccum, heat and vortex motion to speed evaporation.

RapidVap N_2 and N_2/4B Evaporation Systems

The RapidVap N_2 and N_2/48 Systems offer a more efficient, automatic alternative to Kuderna-Danish and rotary evaporators. In these systems, a stream of nitrogen or dry gas is directed downward onto the surface of the sample. Nitrogen blow down reduces the partial pressure directly over the liquid to speed evaporation and help remove the solvent as it evaporates. Nitrogen may be programmed for two, four, six or all eight tube locations. On the RapidVap N_2/48, eight clusters of six ports each allow for up to 48 small samples. Various blocks hold different sample sizes, from 4.5 to 26 milliliters.

The block that comes with the RapidVap N_2 holds eight large samples, up to 450 milliliters each, making it efficient for environmental and residue testing. An accessory block that holds eight 170 milliliter tubes is also available. In many of these applications, the samples should not go to dryness. The unique Cool-Zone™ block and tube design significantly reduces the evaporation rate after end point is achieved. The Cool-Zone insulates the samples and allows the researcher adequate time before the samples reach dryness to remove them or to perform solvent exchange procedures. Alarms that signal when timed end point has occurred and when the RapidVap senses that the process is nearing completion allow for unattended operation.

The gentle agitation of the sample tube causes the liquid to form a vortex-like configuration, which increases the sample's surface area and ability to evaporate.

In the RapidVap N_2/48 Evaporation System, nitrogen blow down, heat and vortex motion combine to quickly reduce multiple samples.

Nitrogen pressure regulator

Angled samples

Five rows of 10 nozzles deliver nitrogen to up to 50 samples

LCD display with touchscreen programming

Valves control five rows of 10 nozzles that deliver nitrogen to up to 50 samples

Nine interchangeable blocks are available (sold separately). See page 7. Custom blocks are also available.

Made in U.S.A.

Intertek

Features & Benefits

Evaporate up to 50 samples at once for maximum throughput. Nine blocks available.

Up to 50 samples may be processed at once. Seven blocks are offered that hold 50 sample tubes, with sample sizes from 1 to 30 milliliters. Two additional blocks hold 18 ASE* sample tubes, with sample sizes from 40 to 60 milliliters. Aluminum blocks are interchangeable and sold separately. See page 7.

Dry heat—no water bath is used.

Dry heat has several advantages over water bath heat: less maintenance (no residue built up), no rust, no condensation and no potential source of cross contamination. Microprocessor-controlled heater supplies heat to the block and is programmable from 30° C up to 100° C in 1 degree increments.

Fast evaporation with nitrogen blow down and heat.

Nitrogen blow down reduces the partial pressure directly over the liquid to speed evaporation and help remove the solvent as it evaporates. Heat helps speed the process. See the evaporation rates on page 7. See recovery rates on page 24.

Angled samples increase surface area for faster evaporation, optimized recovery.

The evaporator holds the samples at an angle to maximize surface area where evaporation occurs.

Glass lid.

Provides visibility of samples and is resistant to chemicals. The lid may be lifted during a run to check on, add or remove sample tubes.

Convenient, easy-to-set touchscreen programming and display.

Touching the screen allows parameters of program number, preheat temperature from 30° C to 100° C, and time from 1 to 999 minutes to be easily set. Up to 10 different user-set programs, each with different parameter set points, may be stored in memory. During the run, actual temperature and time elapsed are displayed. At any time during the run, the user may stop the program by pressing “PAUSE,” which shuts off the nitrogen flow and pauses the timer, but keeps the heater active. The user may lift the lid and add or remove samples. Once the lid is closed, the user may resume the program by pressing “RESTART.”

Temperature sensor monitors block or sample temperature.

Sensor fits into a port in the upper left corner of any block to monitor block temperature or may be placed in a sample to monitor sample temperature. Temperature is displayed on the LCD screen.

Five nitrogen control valves with easy on/off switches.

Turn nitrogen flow on or off to the nozzles above the sample vials. Each valve controls a row of 10 nozzles allowing nitrogen to be conserved during partial runs.

Easy-to-access, built-in nitrogen pressure regulator.

Located in easy reach on the front of the evaporator, the regulator controls the pressure of the nitrogen that is delivered to the samples.

Reliability guarantee.

Full one year warranty is provided against defects in materials and workmanship.

Compact benchtop design.

Small footprint fits in tight spaces. When placed on a lab bench, the evaporator’s rear port connects to the exhaust hose for routing into a fume hood.

ETL listed.

Models 7320020 and 7320040 carry the ETL Testing Laboratories seal in the U.S. and carry the ETL-C seal in Canada, signifying it meets or exceeds all requirements of UL Standard 612010A-1 and CAN/CSA C22.2 No. 1010.1.

CE Mark.

Models 7320030, 7320035 and 7320037 conform to the CE (European Community) requirements for electrical safety and electromagnetic compatibility.

** ASE® is a registered trademark of Dionex, Sunnyvale, California.*

Exclusive feature

Specifications

- Powder-coated steel exterior.
- Glass lid.
- 900 watt dry block heating system.
- 50 nitrogen-dispensing nozzles in five horizontal rows of 10.
- 5 nitrogen control valves with on/off switches.
- Front-mounted pressure regulator with analog display of pressure from 0 to 45 psi in 2 psi increments.
- LCD with touchscreen programming and display of program number; set point temperature and actual system and sample/block temperatures in ° C or ° F; set point time and time remaining. Microprocessor-controlled programming includes program number from 1 to 10, temperature of the system from 30° to 100° C (86° to 212° F), and time from 1 to 999 minutes or "ON." Memory stores 1 to 10 programs.
- Temperature sensor probe for monitoring of block or sample temperature.
- Built-in exhaust fan with blower.
- On/off switch.
- 6 feet (183 cm) of 2" (5 cm) ID polyethylene exhaust hose, with clamp.
- 6 feet (183 cm) of flexible polyethylene tubing for nitrogen supply, with push-to-connect fitting.
- 1 year warranty on materials and workmanship.
- ETL and ETL-C listing on models 7320020 and 7320040.
- CE mark on models 7320030, 7320035 and 7320037.
- Overall dimensions with closed lid: 20.4" wide x 13.0" deep x 12.5 high (51.8 x 33.1 x 31.6 cm)
- Overall dimensions with open lid: 20.4" wide x 13.0" deep x 22.7" high (51.8 x 33.1 x 57.7 cm)

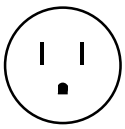
- Actual weight 35.0 lbs. (15.9 kg)
- Shipping weight 45.0 lbs. (20.4 kg)

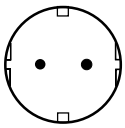
Accessories required (not included)

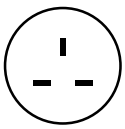
- **Aluminum Block.** See page 7.
- **Sample tubes.** Contact your laboratory supply distributor.
- **Nitrogen source with flow rate of 6.5 CFM/185 LPM minimum.** Nitrogen pressure not to exceed 50 psi. Gas flow with 10 active nozzles is approximately 0.74 SCFM @ 15 psi and 1.0 SCFM @ 24 psi. Gas flow with 50 active nozzles is approximately 4.5 SCFM @ 20 psi and 5.0 SCFM @ 24 psi. A nitrogen generator is recommended. Contact your nitrogen gas supplier.

Ordering Information

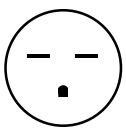
Catalog Number	Electrical Requirements	Power Cord & Plug Type
7320020	115 volts, 60 Hz, 8 amps	NEMA 5-15P
7320030*	230 volts, 50/60 Hz, 4 amps	Schuko
7320035*	230 volts, 50/60 Hz, 4 amps	British (UK)
7320037*	230 volts, 50/60 Hz, 4 amps	China/Australia
7320040	230 volts, 50/60 Hz, 4 amps	North America, 230 Volt


115 volts,15 amps – For 7320020


Schuko – For 7320030


British (UK) – For 7320035

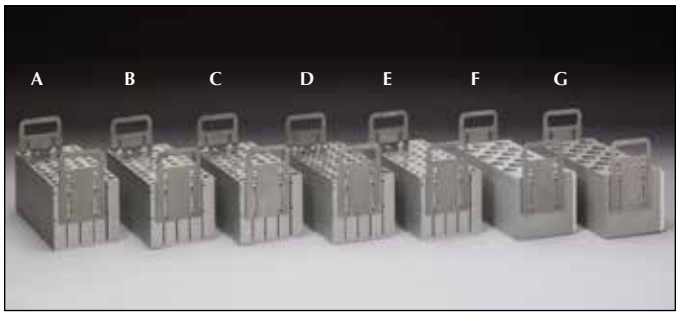
China/Australia – For 7320037


North America, 230 volts – For 7320040

** International electrical configuration*

Evaporation Rates

Solvent	Tube Size (m m)	Number of Samples	Sample Size (ml)	Temperature (° C)	N_2 Pressure (psi)	Avg. Time to Dry (min.)
Acetonitrile	12 x 75	10	2	35	16	< 19
	12 x 75	10	2	45	16	<15
	12 x 75	10	2	60	16	<11
	12 x 75	10	2	80	16	<8
Methanol	12 x 75	10	2	35	24	<12
	12 x 75	10	2	45	24	<10
	12 x 75	10	2	60	24	<7
	12 x 75	10	2	80	24	<6
	12 x 75	50	2	80	24	<6
	20 x 150	10	10	52	37	<42
Water	12 x 75	10	2	45	24	<125
	12 x 75	10	2	60	24	<80
	12 x 75	10	2	80	24	<40
	12 x 75	10	2	100	24	<25
	20 X 150	10	4	100	24	<60
	20 X 150	50	4	100	24	<64
Toluene	12 x 75	10	2	35	16	<24
	12 x 75	10	2	45	16	<18
	12 x 75	10	2	60	16	<13
	12 x 75	10	2	80	16	<9
Methylene Chloride	12 x 75	10	2	35	20	<8
	12 x 75	10	2	45	22	<7
	20 x 150	10	10	38	37	<22
Hexane	20 x 150	10	10	52	37	<11
Ethyl Acetate	20 x 150	10	10	52	37	<22

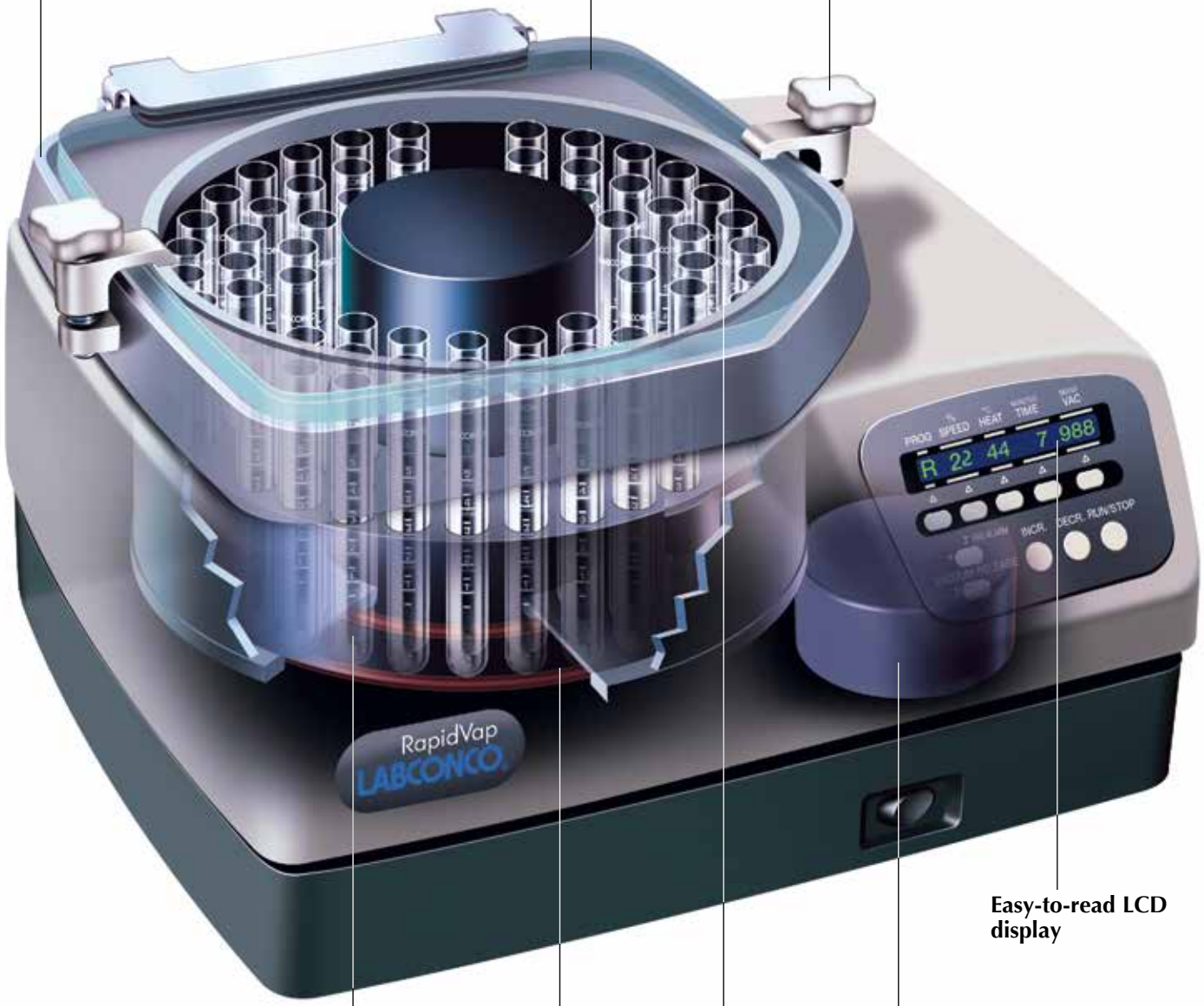


Aluminum Blocks

All RapidVap Vertex Dry Evaporators require a Block (not included). Blocks of solid aluminum include stainless steel handles to lift the block in and out of the evaporator. A 0.21" (0.5 cm) diameter port in the upper left hand corner of the block is provided for insertion of the temperature probe to monitor upper block temperature. Select a block that closely matches the outside diameter of your sample container. Custom blocks to fit special glassware are available upon request. **Glassware is required (not included).**

	Catalog Number	Block Tube Capacity	Sample Tube Size/Description	Sample Volume	Shipping Weight
(A)	**7321200**	50	12 x 75 mm tube	5 ml	26.0 lbs. (11.8 kg)
(B)	**7321300**	50	13 x 100 mm tube	8 ml	24.0 lbs. (10.9 kg)
(C)	**7321600**	50	16 x 125 mm tube	16 ml	21.0 lbs. (9.5 kg)
(D)	**7322000**	50	20 x 150 mm tube	30 ml	14.9 lbs. (6.8 kg)
(E)	**7324100**	50	10 x 75 mm tube	3 ml	26.0 lbs. (11.8 kg)
(F)	**7322800**	18	28 x 95 mm ASE vial	40 ml	22.0 lbs. (10.0 kg)
(G)	**7322801**	18	28 x 140 mm ASE vial	60 ml	19.0 lbs. (8.6 kg)
*	**7324600**	50	1.5 ml microcentrifuge tube	1 ml	33.0 lbs. (15.0 kg)
*	**7321601**	50	16 x 100 mm tube	12 ml	19.0 lbs. (8.6 kg)

** Not shown*



Made in U.S.A.
Intertek

Features and Benefits

Faster evaporation rates, greater throughput.

Vortex action, heat and vacuum combine to accelerate evaporation. Up to 110 samples may be processed at once. See page 10 for evaporation rates. See page 25 for recovery rates.

Microprocessor-controlled vacuum level speeds evaporation.

Microprocessor controls vacuum at a preset level. Rear-mounted 1/2" OD port attaches to a vacuum pump (sold separately).

Automatic vacuum release.

Vacuum is automatically released in the event of power failure.

Microprocessor-controlled 1000-watt dry block heating system.

Speeds evaporation rate by supplying a controlled amount of heat from ambient up to a maximum of 100° C to the sample block. The heater and block move in tandem for more efficient heat transfer. Unlike water baths, the dry heating system adds no potential source of contamination and requires no maintenance.

Microprocessor-controlled vortex motion increases surface area for faster evaporation.

Vortex action continually mixes the sample, helps contain analytes in the solvent, minimizes bumping and maximizes sample recovery. It also performs a time-saving function in resuspension and solvent exchange procedures.

Maintenance-free microprocessor-controlled motor.

Reliable belt-driven system provides smooth variable-speed power to drive the vortex motion up to 1000 rpm. Non-sparking, brushless DC motor ensures safety, control and reproducibility of protocols.

PTFE-coated aluminum chamber.

Conducts heat efficiently and resists corrosion.

PTFE-coated aluminum sample blocks are interchangeable and hold more tubes than ever before.

Blocks are sold separately. See page 12. Custom blocks for other tube configurations are also available.

Durable construction with sleek styling.

The cabinet base is powder-coated cast aluminum. The upper housing is solvent-resistant, smooth acrylic/PVC thermoplastic.

Glass lid with polycarbonate shield.

Provides visibility of samples, is chemical resistant and detaches for cleaning. Polycarbonate shield provides protection from an unlikely glass implosion.

Dual lid clamps.

Two clamps hold the lid securely in place for a vacuum tight seal.

Phenol-free gasket.

Provides complete sealing under vacuum without potential for phenol contamination.

Alarm signals completion of run allowing samples to be left unattended while evaporating to desired end point.

The RapidVap Vacuum System has two means to signal completion of a run. With the first method, the operator sets the end point time and **when set time has expired an audible alarm sounds and the RapidVap automatically turns off all functions**. With the second method, the RapidVap monitors system temperature in the block and in the heater. Once the system senses that end point is near, the alarm sounds every 10 seconds and the PREHEAT/END ALARM indicator light flashes.

Convenient, easy-to-set programming.

Parameters of time, heat, vortex speed and vacuum may be easily set with the touch of a few buttons. Up to 9 different user-set programs, each with different parameter set points, may be stored in memory. In addition, the user may alter parameters while a program is in progress.

Easy-to-read LCD display.

Prompts user to set program parameters and displays program number and actual and set point vortex speeds, temperatures, time remaining and vacuum levels. See details on page 10.

Improved chemical compatibility.

The operator may use a broad range of aggressive chemicals. Contact Labconco for specific chemical compatibility.

All mechanical components are isolated from the chemical fumes and vapors for longer life.

ETL listed.

All 115 volt models carry the ETL Testing Laboratories seal in the U.S. and ETL-C seal in Canada, signifying they meet or exceed all minimum requirements of UL Standard 61010-1 and CAN/CSA C22.2 No. 61010.1.

International electrical configurations available.

All 230 volt models conform to the CE (European Community) requirements for electrical safety and electromagnetic compatibility.

Reliability guarantee.

Full one year warranty is provided against defects in materials and workmanship.

Optional Lid Heater improves visibility.

A 40-watt heater is securely bonded to the glass lid, which electrically connects to the RapidVap via a receptacle on the back of the housing. Heating the lid helps eliminate condensation caused by evaporating high boiling point solvents.

Exclusive feature

Control Panel

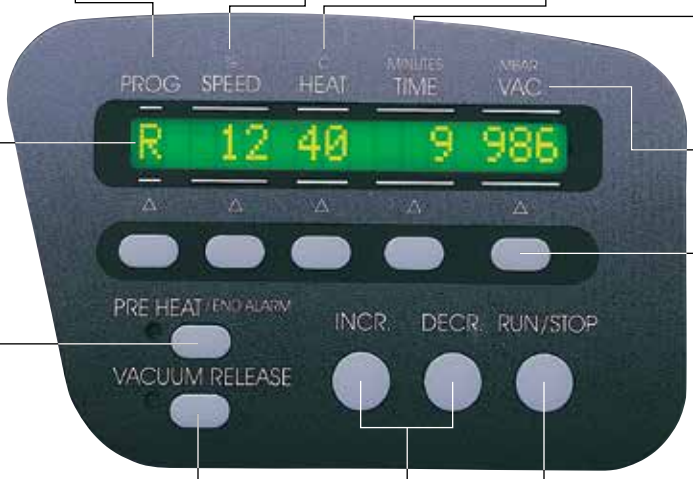
LCD display.
Prompts user to set program parameters and displays program number, actual and set point vortex speed by percentage, actual and set point temperature in ° C, time remaining in minutes, and actual and set point vacuum level in mBar.

Program parameter.
LCD shows program from 1 to 9, R for run, or S for stop.

Speed parameter.
LCD shows speed from 0 to 100%.

Heat parameter.
LCD shows heat from OFF to 99 (°C) or HI (100° C).

Time parameter.
LCD shows time selected from 1 to 999 minutes. During the run, the LCD shows time remaining. If RUN is selected instead of a time period, the RapidVap runs continuously.



Vacuum parameter.
LCD shows vacuum level from 0 to 999 mBar. Above 999 mBar, the display shows HI and the vacuum pump does not operate.

Preheat/End Alarm button with indicator light.
Pressing the button activates the heater to begin elevating the block to set point temperature. When in preheat mode, the operator may monitor actual heat, adding samples and starting program once set point temperature has been reached. During a run, the indicator light flashes when end point has been detected by the temperature sensors. Pressing the button while the light is flashing switches the end point alarm from audible to muted or back to audible.

Set point selection buttons.
To select a parameter to change, press the set point select button directly below the parameter.

Vacuum Release button with indicator light.
Pressing the button momentarily breaks the vacuum to control bumping. Vacuum returns to its preset level once the button is released.

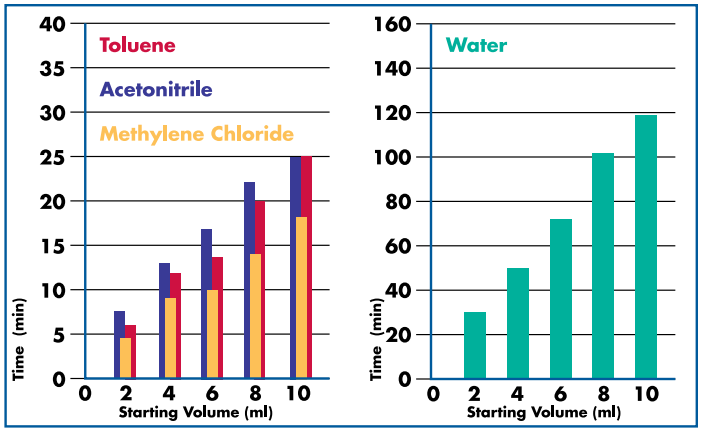
Increase/Decrease buttons.
Used to increase or decrease the last selected set point parameter.

Run/Stop button.
Initiates the start or stop of the selected program.

Evaporation Rates

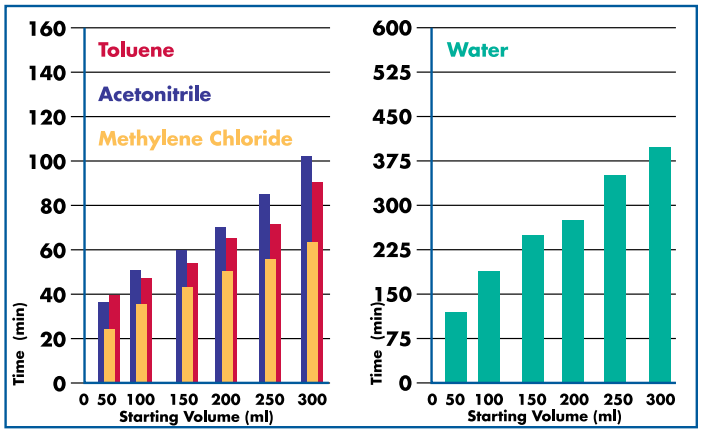
	Solvent	Temp.	Vacuum	Overall Evap. Rate
■	Methylene Chloride	50°C	200 mBar	.56 ml/min./tube
■	Toluene	80°C	200 mBar	.40 ml/min./tube
■	Acetonitrile	75°C	330 mBar	.40 ml/min./tube
■	Water	80°C	133 mBar	.08 ml/min./tube

Number of samples: 69
Tube diameter: 16 mm
Block used: 7491400, 69 tube capacity
Ending volume: dryness
Vortex speed: 95%
Vacuum pump displacement capacity: 88 liters/minute
Maximum attainable vacuum: 31 mBar



	Solvent	Temp.	Vacuum	Overall Evap. Rate
■	Methylene Chloride	50°C	250 mBar	4.8 ml/min./tube
■	Toluene	80°C	133 mBar	3.3 ml/min./tube
■	Acetonitrile	75°C	167 mBar	2.9 ml/min./tube
■	Water	80°C	133 mBar	.75 ml/min./tube

Number of samples: 8
Tube used: 7909200, 600 ml tube, flat bottom, 75 mm diameter
Block used: 7494500, 8 tube capacity
Ending volume: dryness
Vortex speed: 28%
Vacuum pump displacement capacity: 88 liters/minute
Maximum attainable vacuum: 31 mBar



Specifications

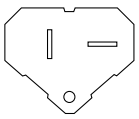
- Powder-coated aluminum base with acrylic/PVC thermoplastic upper housing.
- Glass lid with polycarbonate shield.
- Dual lid clamps.
- Phenol-free gasket.
- PTFE-coated aluminum chamber.
- Rear-mounted 1/2" OD vacuum port, 30" of 1/2" ID vacuum tubing, two tubing clamps and lid heater receptacle.
- 1000-watt dry block heating system.
- Microprocessor-controlled programming for vortex speed from 0 to 100%; heat from OFF to 100° C; time from 1 to 999 minutes; vacuum level from 0 to 999 mBar. Memory stores 1 to 9 programs.
- LCD for display of program number and actual and set point vortex speeds, temperatures, time remaining, and point vacuum level.
- Control panel with RUN/STOP button, PREHEAT/END ALARM button and indicator light, VACUUM RELEASE button and indicator light, set point selection buttons, and increase/decrease programming buttons.
- Belt-driven, non-sparking, brushless DC motor with smooth variable-speed power to drive the vortex motion up to 1000 rpm.
- Audible alarm for timed end point.
- Audible/visual alarm for end point detected by temperature sensors at heater and block.
- Automatic vacuum release in the event of power failure.
- All mechanical components isolated from chemical fumes and vapors.
- 115 volt models include 6 1/2 foot, three-wire electrical cord with 20 amp plug. **A 20 amp minimum circuit breaker is required.**
- 230 volt models include 6 1/2 foot, three-wire electrical cord with 15 amp plug. **A 10 amp minimum circuit breaker is required.**
- ETL and ETL-C listing on all 115 volt, 60 Hz models.
- CE mark on all 230 volt, 50 Hz models.
- Overall dimensions with closed lid: 20.7" wide x 18.4" deep x 13.5" high (52.6 x 46.7 x 34.3 cm).
- Overall dimensions with open lid: 20.7" wide x 21.3" deep x 24.9" high (52.6 x 54.1 x 63.2 cm).
- Actual weight 92 lbs. (42 kg)
- Shipping weight 100 lbs. (45 kg)

Options

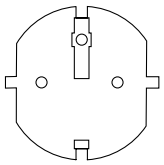
- **Glass lid** with 40-watt heater.
- **RS-232 Link.** RS-232 port, located on the rear of the unit, for 2-way communication at 4800 baud, no parity, 8 bit word, 1 stop bit and 3-wire interface.

Accessories required (not included)

- **Vacuum pump.** See page 13.
- **Sample block.** See page 12.
- **Glassware.** See page 12 or contact your laboratory supply dealer.



115 volt, 20 amp plug



230 volt, 15 amp plug

Ordering Information

Catalog Number	Electrical Specifications	Lid Heater	RS-232 Link
7900000	115 volts, 50/60 Hz, 16 amps***		
7900001†	230 volts, 50/60 Hz, 8 amps††		
7900002	115 volts, 50/60 Hz, 16 amps***	•	
7900003†	230 volts, 50/60 Hz, 8 amps††	•	
7900010	115 volts, 50/60 Hz, 16 amps***		•
7900011†	230 volts, 50/60 Hz, 8 amps††		•
7900012	115 volts, 50/60 Hz, 16 amps***	•	•
7900013†	230 volts, 50/60 Hz, 8 amps††	•	•

† *International electrical configuration*
****Amperage shown includes 8 amp maximum vacuum pump rating.*
†† *Amperage shown includes 4.5 amp maximum vacuum pump rating.*

The RapidVap Vacuum Evaporation System should be located within a fume hood if hazardous or flammable solvents are used. In all cases, regardless of the solvent used, it is recommended that the vacuum pump be vented in a fume hood.

Accessories

PTFE-Coated Aluminum Blocks

A block is required for all RapidVap Vacuum Evaporation Systems. Blocks are interchangeable. Custom blocks to fit special glassware such as VOA vials are available on request. **Glassware is required (not included)**. See below for ordering information on Flat-Bottom Tubes for Blocks 7494500 and 7486400. For glassware for all other Blocks, contact your laboratory supply dealer.

Catalog Number	Block Tube Capacity	Sample Tube Sizes	Sample Volume (ml)	Shipping Weight (lbs. kg)
7491300	110	12 mm OD tubes, up to 6 ml*	4.5**	8/3.6
7485800	110	13 mm OD tubes, up to 10 ml*	7.5**	8/3.6
7491400	69	16 mm OD tubes, up to 23 ml*	17**	7.4/3.4
7496300	69	15 ml conical centrifuge tubes, up to 15ml*	11**	7.8/3.5
7496400	26	28 mm OD scintillation tubes, up to 50 ml*	34**	8.3/3.8
7494500	8	600 ml borosilicate glass tubes	450**	6.4/2.9
7486400	8	170 ml borosilicate glass tubes	125**	8.2/3.7

**Maximum tube height is 150 mm.* ***Actual sample volumes depend on tube shape, height and vortex speed.*

600 ml Flat-Bottom Tube 7909200 and 170 ml Flat-Bottom Tube 7927000

Flat-Bottom Tubes

Borosilicate glass tubes offer better fit and heat transfer for faster evaporation rates.

Catalog Number	Sample Tube Size (ml)	Sample Volume (ml)	For Block	Quantity per Package	Shipping Weight
7909200	600	450	7494500	1	1 lb. (0.4 kg)
7913408	600	450	7494500	8	4 lbs. (1.8 kg)
7927000	170	125	7486400	1	1 lb. (0.4 kg)
7927108	170	125	7486400	8	4 lbs. (1.8 kg)

Eight-Place Stainless Steel Racks 7487600 and 7486300

Eight-Place Stainless Steel Racks

Catalog Number	Sample Tube Size (ml)	Shipping Weight
7487600	600 ml Tubes	2 lbs. (0.9 kg)
7486300	170 ml Tubes	2 lbs. (0.9 kg)

Glass Lid with Heater 7484300

If your application involves water or other high boiling point solvents, a Lid Heater improves visibility and eliminates solvent condensation on the inside of the lid. The glass lid, with 40-watt heater bonded to it, plugs into the electrical receptacle located on the back of the RapidVap. For 115 or 230 volt operation.

Accessories

Diaphragm Vacuum Pump 7393000

Diaphragm Vacuum Pumps

The wetted parts of these pumps are PTFE-coated for corrosion resistance. Vacuum outlet is 1/2" OD.

Catalog Number	Electrical Specifications	Vacuum mBar	Displacement Capacity (liters/minute)	Explosion-Proof	Shipping Weight (lbs./kg)
7393000	115V, 60 Hz, 3.5 amps	1.5	63	No	40/18.1
7393001*	230V, 50/60 Hz, 2.0 amps	1.5	57/63**	No	40/18.1

** International electrical configuration. Power cord has reverse IEC plug.*
*** Displacement at 50/60 Hz*

Liquid Trap 7873400

Liquid Trap 7873400

Prevents liquid from entering the pump. Made of borosilicate glass. Trapping capacity is 2550 milliliters. **Required accessory for diaphragm pump when using high boiling point solvents.** Shipping weight 4 lbs. (1.8 kg).

Dry Ice Vacuum Trap 7538200

Dry Ice Vacuum Traps

When dry ice and solvent are added to the well, these secondary traps cool to approximately -75° C (-103° F). Inlet and outlet vacuum connections are 1/2" OD.

Catalog Number	Dimensions (h x dia.)	Well Volume of ice and alcohol (liters)	Ice trapping capacity (ml)	Liquid trapping capacity (liters)	Shipping Weight (lbs./kg)
7538200	9 3/4" x 7 7/8" (24.8 cm x 20 cm)	2.85	900	2	9/4.1
7538400	7 7/8" x 6 5/8" (20 cm x 16.8 cm)	1.8	200	1	5/2.3

Clear Canister 7815300 with Solvent Trap Insert 7815200

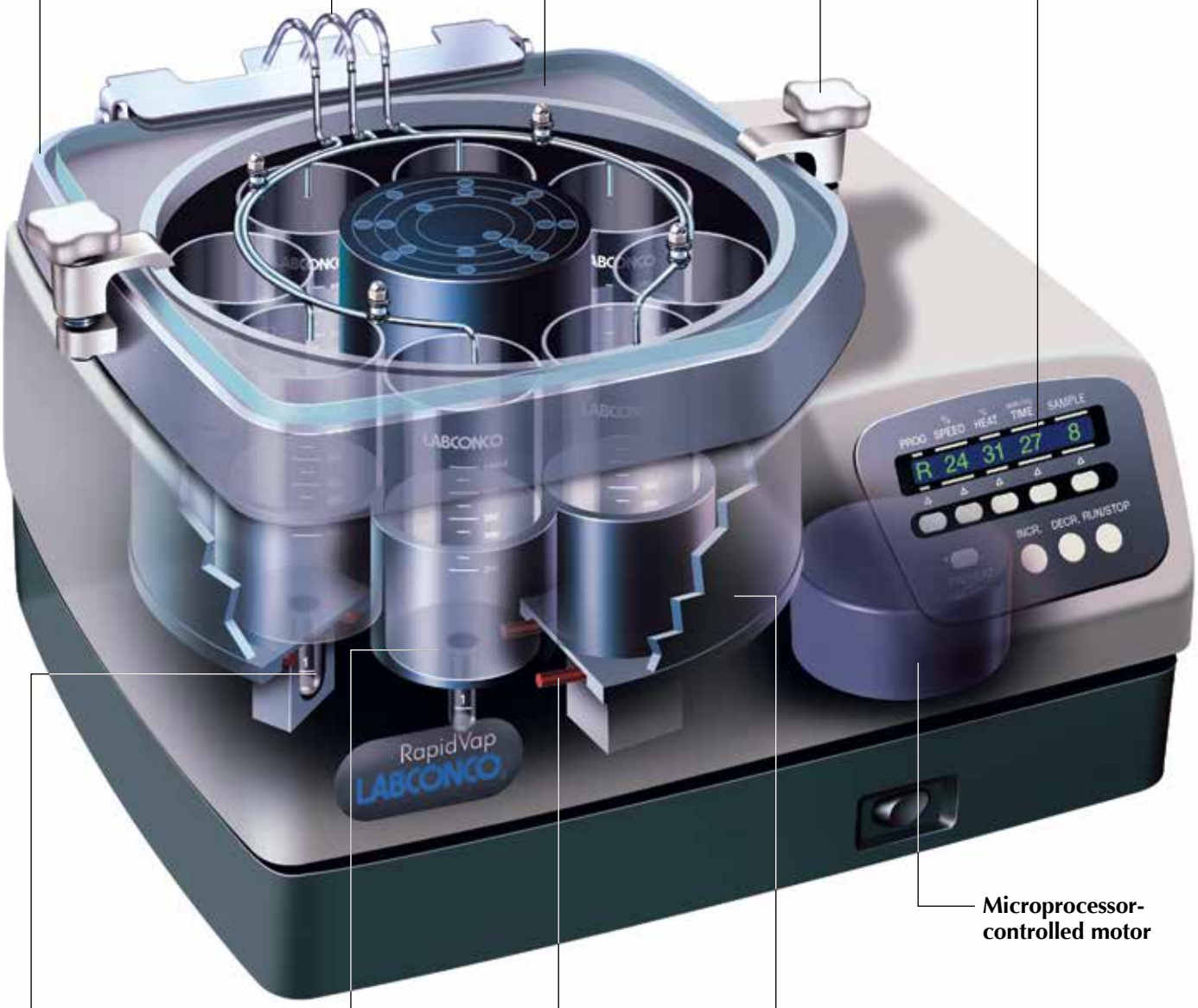
Chemical Traps

Connect between the accessory vacuum trap and vane pump to provide additional protection to the pump.

Catalog Number	Trap Insert	Description	Shipping Weight (lbs./kg)
7815300	**Clear Acrylic Canister with stand accommodates any trap insert listed below**		5/2.3
7814800	Acid	Acid neutralizing desiccant	4/1.8
7814900	Moisture	Desiccant	4/1.8
7815000	Radioisotope	Molecular sieve	4/1.8
7815200	Solvent	Activated carbon	4/1.8
7995600	Ammonia	Impregnated carbon	4/1.8

Vacuum Tubing Kit 7814500

For use when connecting accessory traps to a vacuum system. Includes two each 1/2" ID vacuum tubing, 48" length, and 4 tubing clamps. Shipping weight 6 lbs. (2.7 kg).



Nitrogen blow down cluster on RapidVap N_2/48 models

Made in U.S.A.

Intertek

Features and Benefits

Fast evaporation rates, greater throughput.
Vortex action, heat and nitrogen blow down combine to speed evaporation. Eight samples with volumes up to 450 ml each may be processed at once in the RapidVap N_2 and up to 48 samples with volumes up to 26 ml each in the RapidVap N_2/48. See page 18 for evaporation rates. See pages 26-27 for recovery rates.

Microprocessor-controlled nitrogen blow down manifold.
Allows user to introduce nitrogen to 2, 4, 6 or 8 individual sample tubes on the RapidVap N_2 or clusters of 6 on the RapidVap N_2/48, conserving nitrogen when less than a full load is being processed. Nitrogen blown onto the surface of the sample helps facilitate the phase change from liquid to gas.

Microprocessor-controlled 1000-watt dry block heating system.
Speeds evaporation rate by supplying a controlled amount of heat from ambient up to a maximum of 100° C to the sample block. The heater and block move in tandem for more efficient heat transfer. Unlike water baths, the dry heating system adds no potential source of contamination and requires no maintenance.

Microprocessor-controlled vortex motion increases surface area for faster evaporation.
Vortex action continually mixes the sample, helps contain analytes in the solvent by constantly rinsing the tube walls, and maximizes sample recovery.

Maintenance-free microprocessor-controlled motor.
Reliable belt-driven system provides smooth variable-speed power to drive the vortex motion up to 500 rpm. Non-sparking, brushless DC motor ensures safety, control and reproducibility for protocols.

PTFE-coated aluminum sample block.
Provides efficient heat transfer, low maintenance and corrosion resistance. Block is easy to remove for cleaning or replacement. One 8-place block that holds 600 ml tubes is included with RapidVap N_2 models. Four accessory blocks holding 48 samples of various volumes are offered for the RapidVap N_2/48 models.

PTFE-coated aluminum chamber.
Conducts heat efficiently and resists corrosion.

Durable construction with sleek styling.
The cabinet base is powder-coated cast aluminum. The upper housing is solvent-resistant, smooth acrylic/PVC thermoplastic.

Glass lid.
Provides visibility of samples, is chemical resistant and detaches for cleaning.

Dual lid clamps.
Two clamps hold the lid securely in place.

Phenol-free gasket.
Provides a positive seal without potential for phenol contamination.

Improved chemical compatibility.
The operator may use a broad range of aggressive chemicals. Contact Labconco for specific chemical compatibility.

Unique Cool-Zone on RapidVap N_2.
Insulates sample remaining in glassware stem to permit processing to a desired end point. See page 17 for more information.

Alarm signals completion of run allowing samples to be left unattended while evaporating to desired end point.
The RapidVap N_2 and N_2/48 have two means to signal completion of a run. With the first method, the operator sets the end point time and **when set time has expired an audible alarm sounds and the RapidVap automatically turns off all functions.** With the second method, the RapidVap monitors system temperature in the block and in the heater. During operation, evaporative cooling of the solvent creates a differential between the block and heater temperatures. Once evaporation is nearly complete, the two temperatures equalize indicating end point is near. The alarm sounds and the PREHEAT/END ALARM indicator light flashes.

Convenient, easy-to-set programming.
Parameters of time, heat, vortex speed and number of samples may be easily set with the touch of a few buttons. Up to 9 different user-set programs, each with different parameter set points, may be stored in memory. The user may alter parameters while a program is in progress.

Easy-to-read LCD display.
Prompts user to set program parameters and displays program number, number of active nitrogen positions, and actual and set point vortex speeds, temperatures, and time remaining. See details on page 16.

All mechanical components are isolated from chemical fumes and vapors for longer life.

ETL listed.
All 115 volt models carry the ETL Testing Laboratories seal in the U.S. and ETL-C seal in Canada, signifying they meet or exceed all minimum requirements of UL Standard 61010-1 and CAN/CSA C22.2 No. 61010.1.

International electrical configurations available.
All 230 volt models conform to the CE (European Community) requirements for electrical safety and electromagnetic compatibility.

Reliability guarantee.
Full one year warranty is provided against defects in materials and workmanship.

Exclusive feature

Control Panel

Program parameter.
LCD shows program from 1 to 9, R for run, or S for stop.

Speed parameter.
LCD shows vortex speed from 0 to 100%.

Heat parameter.
LCD shows heat from OFF to 99 (°C) or HI (100° C).

Time parameter.
LCD shows time selected from 1 to 999 minutes. During the run, the LCD shows time remaining. If RUN is selected instead of a time period, the RapidVap runs continuously.

Sample parameter.
LCD shows number of samples or clusters of samples selected to receive nitrogen blow down; 2, 4, 6 or 8 may be selected.

Set point selection buttons.
To select a parameter to change, press the set point select button directly below the parameter.

LCD display.
Prompts user to set program parameters and displays program number, actual and set point vortex speed by percentage, actual and set point temperature in ° C, time remaining in minutes, and number of active nitrogen positions.

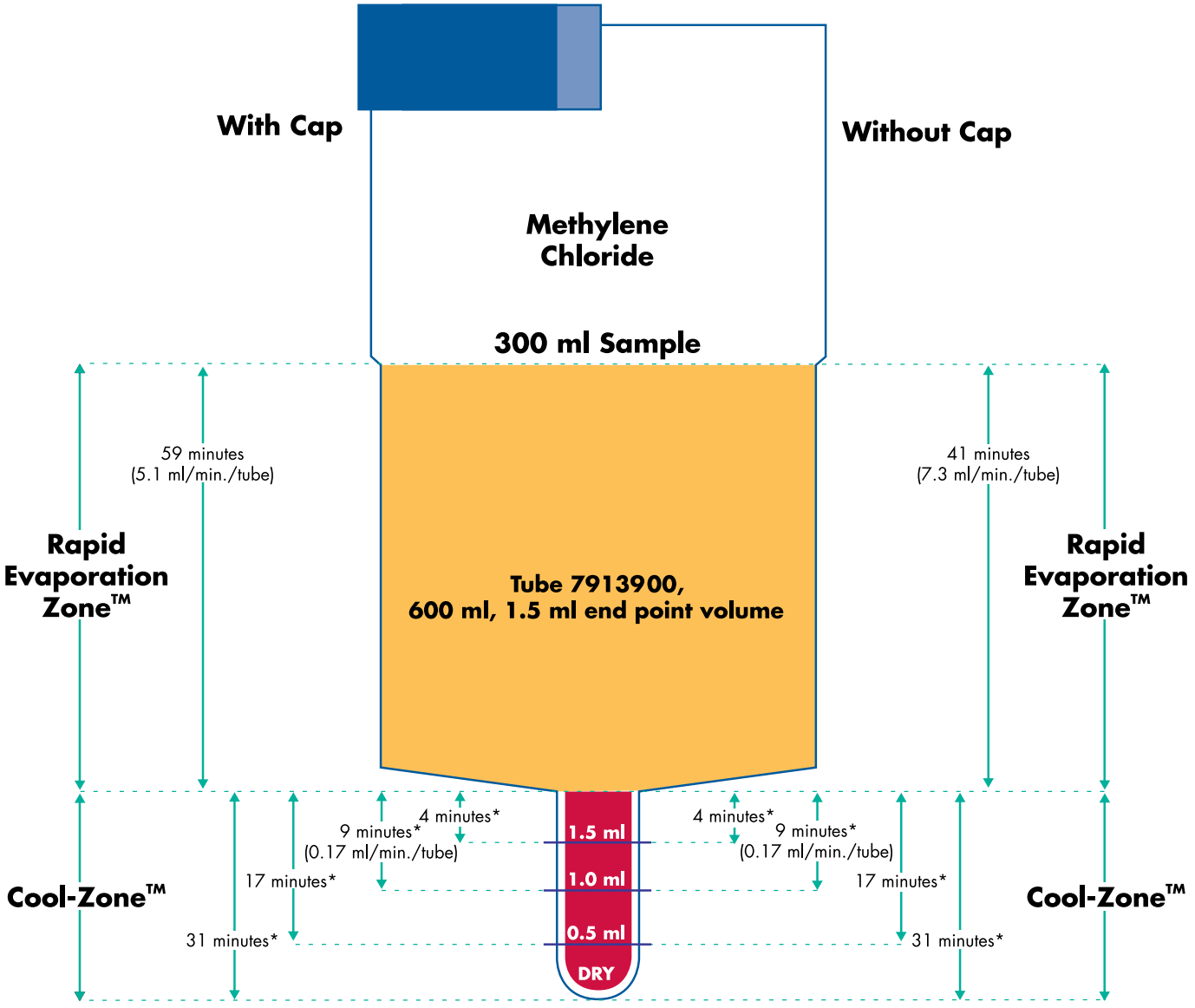
Preheat/End Alarm button with indicator light.
Pressing the button activates the heater to begin elevating the block to set point temperature. When in preheat mode, the operator may monitor actual heat, adding samples and starting program once set point temperature has been reached. In addition, the indicator light flashes when end point has been detected by the temperature sensors. Pressing the button while the light is flashing switches the end point alarm from audible to muted or back to audible.

Increase/Decrease buttons.
Used to increase or decrease the last selected set point parameter.

Run/Stop button.
Initiates the start or stop of the selected program.

Rapid Evaporation Zone™ and Cool Zone™

This illustration demonstrates the effectiveness of the Rapid Evaporation Zone and the Cool-Zone in RapidVap N_2 models. In the Rapid Evaporation Zone, a 300 ml sample of methylene chloride is evaporated in 41 minutes at approximately 7.3 ml/minute/tube (without cap). In the Cool-Zone with vortex motion, heat and nitrogen blow down still applied, methylene chloride is evaporated to a 1.0 ml end point in 9 minutes at a much slower rate, approximately 0.11 ml/minute/tube. If the RapidVap is programmed for timed end point, all functions automatically turnoff when time expires drastically slowing the evaporation rate. While samples are in the Cool-Zone, the user has ample time to retrieve samples or to perform solvent exchange procedures.



Number of samples:	8
Nitrogen pressure:	10 psi
Vortex speed:	70%
Temperature:	40°C

**Time shown is with nitrogen blow down, vortex motion and heat still applied. Time would be longer if all functions were turned off.*

Evaporation Rates

The charts on this page indicate the evaporation times for the Rapid Evaporation Zone and the Cool-Zone. Times were determined with and without Glassware Caps over the sample tubes. Placing Glassware Caps over the sample tubes prevents contamination and prevents moisture from condensing in low boiling point solvents. The use of caps increases overall evaporation time 10 to 80 percent. See page 23 for Glassware Caps.

RapidVap Evaporation Zone Rate Summary

Solvent	Evaporation Rate with cap	Evaporation Rate without cap
Water	.79 ml/min./tube	1.1 ml/min./tube
Methylene Chloride	5.1 ml/min./tube	7.3 ml/min./tube
Ethyl Acetate	6.3 ml/min./tube	8.6 ml/min./tube
Hexanes	10.3 ml/min./tube	14.3 ml/min./tube
Acetone	5.6 ml/min./tube	6.4 ml/min./tube
Toluene	5.0 ml/min./tube	6.7 ml/min./tube

Number of samples: 8

Tube used: 7913900, 600 ml tube with 1.5 ml end point stem, 1.37" (3.5 cm) long

Starting volume: 300 ml

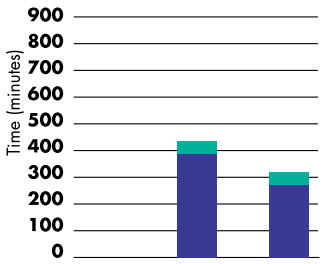
Ending volume: 1.0 ml

Nitrogen pressure: 10 psi

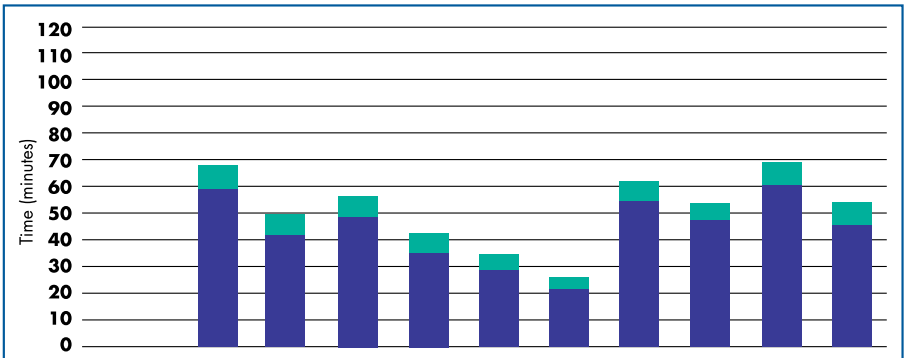
Vortex speed: 70% of maximum setting

Rapid Evaporation Zone

Cool-Zone



Cap	with	without
Solvent	**Water**	
Block Set Point Temperature	**95° C**	
Rapid Evaporation Zone Time (min.)	379	266
Cool-Zone Time (min.)		
1.5 ml*	23	23
1.0 ml*	**43**	**43**
0.5 ml*	75	75
Dry*	120	120



Cap	with	without	with	without	with	without	with	without	with	without
Solvent	**Methylene Chloride**		**Ethyl Acetate**		**Hexanes**		**Acetone**		**Toluene**	
Block Set Point Temperature	**40° C**		**75° C**		**70° C**		**55° C**		**100° C**	
Rapid Evaporation Zone Time (min.)	59	41	48	35	29	21	54	47	60	45
Cool-Zone Time (min.)										
1.5 ml*	4	4	4	4	2	2	3	3	5	5
1.0 ml*	**9**	**9**	**7**	**7**	**5**	**5**	**7**	**7**	**9**	**9**
0.5 ml*	17	17	13	13	8	8	12	12	15	15
Dry*	31	31	24	24	16	16	22	22	26	26

**End point volume*

Specifications

- Powder-coated aluminum base with acrylic/PVC thermoplastic upper housing.
- Glass lid.
- Dual lid clamps.
- Phenol-free gasket.
- PTFE-coated aluminum chamber.
- PTFE-coated aluminum sample block capable of holding 8 each 600 ml tubes. Glassware sold separately.
- 1000-watt dry block heating system.
- Microprocessor-controlled programming for vortex speed from 0 to 100%; heat from OFF to 100° C; time from 1 to 999 minutes; and number of active nitrogen positions, 2, 4, 6 or 8. Memory stores 1 to 9 programs.
- LCD for display of program number, actual and set point vortex speed, actual and set point temperature, time remaining, and number of active nitrogen positions. Memory stores 1 to 9 programs.
- Control panel with RUN/STOP button, PREHEAT/END ALARM button and indicator light, set point selection buttons, and increase/decrease programming buttons.
- Belt-driven, non-sparking, brushless DC motor with smooth variable-speed power to drive the vortex motion up to 500 rpm.
- Audible alarm with automatic shut down for timed end point.
- Audible/visual alarm for end point detected by temperature sensors at heater and block.
- Nitrogen inlet port supplied with a 1/4" male NPT thread.
- All mechanical components isolated from chemical fumes and vapors.
- Includes 8 polyethylene glassware caps, 6 feet of 2" dia. exhaust tubing, 78" of tubing for nitrogen supply and one tubing clamp.
- 115 volt models include 6 1/2 foot, three-wire electrical cord with 20 amp plug. A 15 amp minimum circuit breaker is required.
- 230 volt models include 6 1/2 foot, three-wire electrical cord with 15 amp plug. An 8 amp minimum circuit breaker is required.
- ETL and ETL-C listing on all 115 volt, 60 Hz models.
- CE mark on all 230 volt, 50 Hz models.
- Overall dimensions with closed lid: 21.7" wide x 19" deep x 13.5" high (55.1 x 48.3 x 34.3 cm).
- Overall dimensions with open lid: 21.7" wide x 21.3" deep x 24.9" high (55.1 x 54.1 x 63.2 cm).
- Actual weight 99 lbs. (45 kg)
- Shipping weight 107 lbs. (49 kg)

Ordering Information

Catalog Number	Electrical Specifications	RS-232 Link
7910000	115 volts, 50/60 Hz, 9 amps	
7910001*	230 volts, 50/60 Hz, 4.5 amps	
7910010	115 volts, 50/60 Hz, 9 amps	•
7910011*	230 volts, 50/60 Hz, 4.5 amps	•

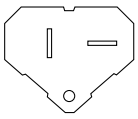
** International electrical configuration.*

Option

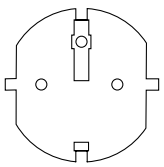
- **Glass lid** with 40-watt heater.
- **RS-232 Link.** RS-232 port, located on the rear of the unit, for 2-way communication at 4800 baud, no parity, 8 bit word, 1 stop bit and 3-wire interface.

Accessories required (not included)

- **Glassware**. See page 22.
- **Nitrogen source with flow rate of 0.6 CFM/17 LPM minimum.** Contact your nitrogen gas supplier.
- **Gas pressure regulator. Pressure of 5-10 psi is typical.** Pressure must not exceed 20 psi. Contact a local supplier.



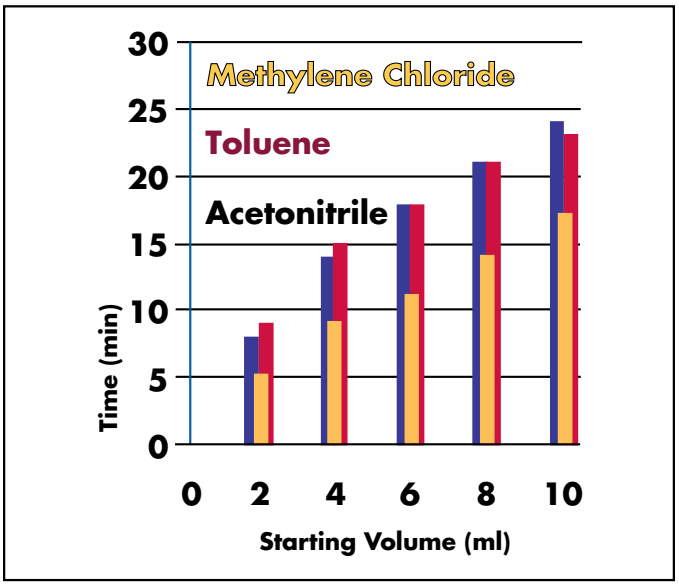
115 volt, 20 amp plug

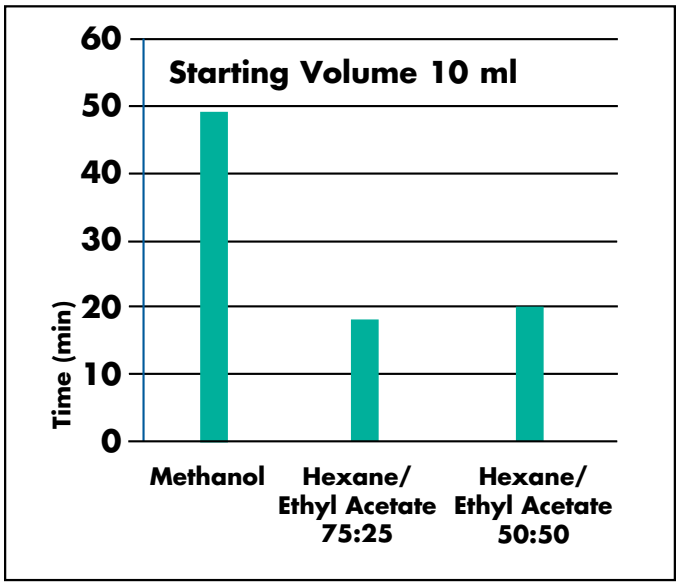


230 volt, 15 amp plug

The RapidVap N_2 Evaporation System should be located within a fume hood if hazardous or flammable solvents are used. In all cases, regardless of the solvent used, it is recommended that the exhaust hose be vented into a fume hood or other laboratory ventilation device.

Evaporation Rates





Number of samples: 48

Tube size: 20 mm

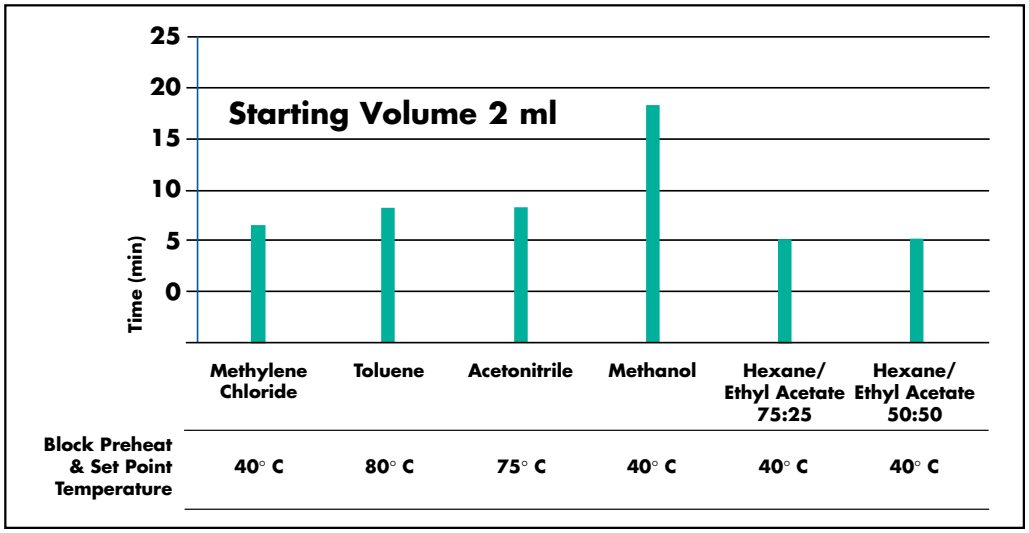
Block used: 7482400

Ending volume: dryness

Nitrogen pressure: 20 psi

Vortex speed: 100%

Solvent	Temperature	Overall Evaporation Rate
Methylene Chloride	50° C	.59 ml/min./tube
Toluene	80° C	.43 ml/min./tube
Acetonitrile	75° C	.42 ml/min./tube
Methanol	40° C	.20 ml/min./tube
Hexane/Ethyl Acetate 75:25	40° C	.56 ml/min./tube
Hexane/Ethyl Acetate 50:50	40° C	.50 ml/min./tube



Number of samples: 48

Tube size: 12 mm

Block used: 7482100

Ending volume: dryness

Nitrogen pressure: 8 psi

Vortex speed: 100%

Solvent	Temperature	Overall Evaporation Rate
Methylene Chloride	40° C	.33 ml/min./tube
Toluene	80° C	.25 ml/min./tube
Acetonitrile	75° C	.25 ml/min./tube
Methanol	40° C	.11 ml/min./tube
Hexane/Ethyl Acetate 75:25	40° C	.40 ml/min./tube
Hexane/Ethyl Acetate 50:50	40° C	.40 ml/min./tube

Specifications

- Powder-coated aluminum base with acrylic/PVC thermo-plastic upper housing.
- Glass lid.
- Dual lid clamps.
- Phenol-free gasket.
- PTFE-coated aluminum chamber.
- 1000-watt dry block heating system.
- Microprocessor-controlled programming for vortex speed from 0 to 100%; heat from OFF to 100° C; time from 1 to 999 minutes; and number of active nitrogen clusters, 2, 4, 6 or 8. Memory stores 1 to 9 programs.
- LCD for display of program number, actual and set point vortex speed, actual and set point temperature, time remaining, and number of active nitrogen clusters.
- Control panel with RUN/STOP button, PREHEAT/END ALARM button and indicator light, set point selection buttons, and increase/decrease programming buttons.
- Belt-driven, non-sparking, brushless DC motor with smooth variable-speed power to drive the vortex motion up to 500 rpm.
- Audible alarm with automatic shut down for timed end point.
- Audible/visual alarm for end point detected by temperature sensors at heater and block.
- Nitrogen inlet hose, 1/4" ID.
- All mechanical components isolated from chemical fumes and vapors.
- Includes 6 feet of 2" dia. exhaust tubing, 78" of tubing for nitrogen supply and one tubing clamp.
- 115 volt models include 6 1/2 foot, three-wire electrical cord with 20 amp plug. A 15 amp minimum circuit breaker is required.
- 230 volt models include 6 1/2 foot, three-wire electrical cord with 15 amp plug. An 8 amp minimum circuit breaker is required.
- ETL and ETL-C listing on all 115 volt, 60 Hz models.
- CE mark on all 230 volt, 50 Hz models.
- Overall dimensions with closed lid: 21.7" wide x 19.0" deep x 13.5" high (55.1 x 48.3 x 34.3 cm).
- Overall dimensions with open lid: 21.7" wide x 21.3" deep x 24.9" high (55.1 x 54.1 x 63.2 cm).
- Actual weight 92 lbs. (42 kg)
- Shipping weight 100 lbs. (45 kg)

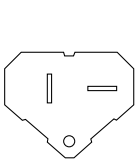
The RapidVap N_2/48 Evaporation System should be located within a fume hood if hazardous or flammable solvents are used. In all cases, regardless of the solvent used, it is recommended that the exhaust hose be vented into a fume hood or other laboratory ventilation device.

Option

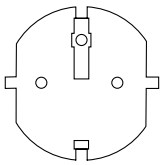
- **RS-232 Link.** RS-232 port, located on the rear of the unit, for 2-way communication at 4800 baud, no parity, 8 bit word, 1 stop bit and 3-wire interface.

Accessories required (not included)

- **Sample block**. See page 22.
- **Glassware**. Contact your laboratory supply distributor.
- **Nitrogen with flow rate of 3.5 CFM/100 LPM minimum.** Contact your nitrogen gas supplier.
- **Gas pressure regulator. Pressure of 5-10 psi is typical.** Pressure must not exceed 20 psi. Contact a local supplier.



115 volt, 20 amp plug



230 volt, 15 amp plug

Ordering Information

Catalog Number	Electrical Specifications	RS-232 Link
7910012	115 volts, 50/60 Hz, 9 amps	
7910013*	230 volts, 50/60 Hz, 4.5 amps	
7910014	115 volts, 50/60 Hz, 9 amps	•
7910015*	230 volts, 50/60 Hz, 4.5 amps	•

** International electrical configuration.*

Accessories

PTFE-Coated Aluminum Blocks

All RapidVap N_2 Evaporation Systems include an 8-Place PTFE-Coated Aluminum Block 7494500. Additional Blocks may be purchased for standby use. **All RapidVap N_2/48 Evaporation Systems require a Block (not included).** Custom blocks to fit special glassware such as VOA vials are available upon request. **Glassware is required (not included).**

Catalog Number	Block Tube Capacity	Sample Tube Size	Sample Volume (ml)	For Use with N_2	For Use with N_2/48	Shipping Weight (lbs./kg)
7494500	8	600 ml borosilicate glass tubes, up to 600 ml	450**	•	•	6.4/2.9
7486400	8	170 ml borosilicate glass tubes, up to 170 ml	125**	•		8.2/3.7
7482100	48	12 x 75 mm OD tubes, up to 6 ml	4.5**		•	8.0/3.6
7482200	48	13 x 100 mm OD tubes, up to 10 ml	7.5**		•	8.0/3.6
7482300	48	16 x 150 mm OD tubes, up to 23 ml	17**		•	7.4/3.4
7482400	48	20 x 150 mm OD tubes, up to 35 ml	26**		•	7.8/3.5

**Maximum tube height is 150 mm.* ***Actual sample volumes depend on tube shape, height and vortex speed.*

600 ml Tubes with Stems

Borosilicate Glass Tubes

For use with RapidVap N_2 Evaporation Systems only. The ground glass tubes offer better fit and heat transfer for faster evaporation rates. The stems are designed for use with Cool-Zone timed end point determinations. To minimize evaporation time, the tube with the correct end point stem should be used. For example, if an end point of 1.5 ml is desired, selecting Tube 7913500 with a maximum 3.0 ml end point volume would result in an unnecessarily long period required to evaporate the final 1.5 milliliters in the stem. Flat-bottom tubes are for use in applications when samples are taken to dryness. Use the chart below to select the correct tube for your sample volume size and desired end point volume.

Sample Volume	Desired End Point Volume	Tube Recommendations
up to 125 ml	Dryness	7927000, 7927108
up to 125 ml	≤1.5 ml	7926600, 7926908
up to 450 ml	Dryness	7909200, 7913408
up to 450 ml	≤1.5 ml	7925900, 7926008
up to 450 ml	0.6-1.5 ml	7913900, 7914000
up to 450 ml	1.6-2.0 ml	7913700, 7913808
up to 450 ml	2.1-3.0 ml	7913500, 7913608

600 ml Tubes with Stems for Block 7494500

Each graduated 600 ml tube has a sample capacity of up to 450 ml when vortexing.

Catalog Number	End Point Volume	Calibration Markings	Quantity per Package	Shipping Weight
7925900**	0.5 ml	0.5 ml	1	1 lb. (0.4 kg)
7926008**	0.5 ml	0.5 ml	8	4 lbs. (1.8 kg)
7913900**	1.5 ml	1.5 ml, 1.0 and 0.5 ml	1	1 lb. (0.4 kg)
7914008**	1.5 ml	1.5 ml, 1.0 and 0.5 ml	8	4 lbs. (1.8 kg)
7913700**	2.0 ml	2.0 and 1.0 ml	1	1 lb. (0.4 kg)
7913808**	2.0 ml	2.0 and 1.0 ml	8	4 lbs. (1.8 kg)
7913500**	3.0 ml	3.0, 2.0 and 1.0 ml	1	1 lb. (0.4 kg)
7913608**	3.0 ml	3.0, 2.0 and 1.0 ml	8	4 lbs. (1.8 kg)

***For use with RapidVap N_2 Evaporation Systems only.*

Accessories

170 ml Tube with Stem

170 ml Tubes with Stems for Accessory Block 7486400

Each graduated 170 ml tube has a sample capacity of up to 125 ml when vortexing.

Catalog Number	End Point Volume	Calibration Markings	Quantity per Package	Shipping Weight
7926600*	0.5 ml	1.5 ml	1	1 lb. (0.4 kg)
7926908*	0.5 ml	1.5 ml	8	4 lbs. (1.8 kg)

**For use with RapidVap N_2 Evaporation Systems only.*

600 ml Flat-Bottom Tube 7909200 and 170 m,l Flat-Bottom Tube 7927000

Flat-Bottom Tubes

Borosilicate glass tubes offer better fit and heat transfer for faster evaporation rates.

Catalog Number	Sample Tube Size (ml)	Sample Volume (ml)	For Block	Quantity per Package	Shipping Weight
7909200	600	450	7494500	1	1 lb. (0.4 kg)
7913408	600	450	7494500	8	4 lbs. (1.8 kg)
7927000*	170	125	7486400	1	1 lb. (0.4 kg)
7927108*	170	125	7486400	8	4 lbs. (1.8 kg)

**For use with RapidVap N_2 Evaporation Systems only.*

Eight-Place Stainless Steel Racks 7487600 and 7486300

Eight-Place Stainless Steel Racks

Catalog Number	Holds	Shipping Weight
7487600	600 ml Tubes	2 lbs. (0.9 kg)
7486300	170 ml Tubes	2 lbs. (0.9 kg)

Polyethylene caps

Glassware Caps

Caps fit over Tubes described on page 18. Placing Caps on Tubes helps prevent cross contamination and moisture from condensing when using low boiling point solvents. Eight Polyethylene Glassware Caps are included with each RapidVap N_2 Evaporation System.

Catalog Number	Material	Description	Quantity per Package	Shipping Weight
7925500*	Polyethylene	Fits 600 ml Tube	1	0.5 lb. (0.2 kg)
7925408*	PTFE	Fits 600 ml Tube	8	0.5 lb. (0.2 kg)
7926808*	PTFE	Fits 170 ml Tube	8	0.5 lb. (0.2 kg)

**For use with RapidVap N_2 Evaporation Systems only.*

Test results show that the **RapidVap Vertex Evaporation System** produces excellent recoveries of a wide range of compounds.

Procedure: A 15 milliliter sample consisting of a combination of several of the compounds listed below was prepared in duplicate along with a method blank of pure solvent and each sample or blank was added to a 20 x 150 mm tube and placed in Block 7322000. BNA mixtures were added to Methylene Chloride and run at 40° C and 12 psi nitrogen for approximately 30 minutes. A second set of samples was run at 40° C and 24 psi nitrogen for approximately 22 minutes. All other compound mixtures were added to Hexane and run at 70° C and 12 psi nitrogen for approximately 15 minutes. A second set of samples was run at 24 psi nitrogen for approximately 12 minutes. Ending volumes for all samples were approximately 1 milliliter. Recovery rates for the two samples were averaged and are shown below.

BNAs (EPA 8270 method)

	@ 12 psi % Recovery	@ 24 psi % Recovery
N-Nitrosodimethylamine	111	107
Phenol	94	96
Aniline	116	118
Bis(2-Chloroethyl) Ether	97	97
2-Chlorophenol	92	93
1,3-Dichlorobenzene	85	89
1,4-Dichlorobenzene	85	88
Benzyl Alcohol	90	100
1,2-Dichlorobenzene	83	87
2-Methylphenol	93	99
Bis(2-Chloroisopropyl) Ether	94	99
n-Nitroso-di-n-propylamine	90	103
(3 & 4)-Methylphenol	92	94
Hexachloroethane	92	96
Nitrobenzene	96	100
Isophorone	98	100
2-Nitrophenol	90	96
2,4-Dimethylphenol	95	94
Bis(2-Chloroethoxy)Methane	85	102
2,4-Dichlorophenol	94	102
1,2,4-Trichlorobenzene	90	92
Naphthalene	90	99
4-Chloroaniline	109	111
Hexachlorobutadiene	83	90
4-Chloro-3-methylphenol	89	90
2-Methylnaphthalene	96	107
Hexachlorocyclopentadiene	65	76
2,4,6-Trichlorophenol	85	92
2,4,5-Trichlorophenol	74	79
2-Chloronaphthalene	92	96
2-Nitroaniline	92	91
Dimethylphthalate	92	103
Acenaphthylene	92	98
2,6-Dinitrotoluene	99	106
3-Nitroaniline	96	108
Acenaphthene	87	89
2,4-Dinitrophenol	89	89
Dibenzofuran	88	91
2,4-Dinitrotoluene	93	90
4-Nitrophenol	90	89
Diethyl Phthalate	95	93
Fluorene	90	100
4-Chlorophenyl Phenyl Ether	78	85
4-Nitroaniline	103	110
4,6-Dinitro-2-methylphenol	90	103
N-Nitrosodiphenylamine	92	100
Azobenzene	89	102
4-Bromophenyl Phenyl Ether	97	102
Hexachlorobenzene	89	94
Pentachlorophenol	77	89
Phenanthrene	100	105
Anthracene	92	100
Di-n-butyl Phthalate	88	103
Fluoranthene	90	99
Pyrene	103	103
Butyl Benzyl Phthalate	102	97
Benzo[a]anthracene	104	100
Chrysene	104	102
Bis[2-Ethylhexyl] Phthalate	101	100
Di-n-octyl Phthalate	96	102
Indeno[1,2,3-cd]Pyrene	95	99
Benzo[b]Fluoranthene	94	100
Benzo[k]Fluoranthene	97	100
Benzo[a]Pyrene	96	99
Dibenz[a,h]anthracene	92	93
Benzo(ghi)perylene	90	93

Organochlorine Insecticides & Metabolites (EPA 8081 method)

	@ 12 psi % Recovery	@ 24 psi % Recovery
alpha-Chlordane	104	105
gamma-Chlordane	103	102
alpha-BHC	103	106
gamma-BHC (Lindane)	103	106
beta-BHC	105	107
Heptachlor	108	109
delta-BHC	107	110
Aldrin	102	103
Heptachlor Epoxide	105	107
Endosulfan I	107	108
4,4´-DDE	104	104
Dieldrin	107	109
Endrin	104	106
4,4´-DDD	112	115
Endosulfan II	106	106
4,4´-DDT	112	112
Endrin Aldehyde	106	108
Endosulfan Sulfate	116	114
Methoxychlor	106	106
Endrin ketone	114	127
Hexachlorobenzene	103	104

Organophosphorus Insecticides (EPA 8141 method)

	@ 12 psi % Recovery	@ 24 psi % Recovery
Naled	93	105
Dichlorvos	105	100
Mevinphos	107	107
Ethoprop	92	104
Phorate	98	104
Demeton, O & S	96	102
Diazinon	99	103
Disulfoton	93	101
Dimethoate	99	99
Ronnel	105	106
Chlorpyrifos	107	108
Methyl Parathion	110	110
Fenthion	106	106
Malathion	108	108
Merphos	100	98
Tokuthion (Prothiofos)	110	110
Bolstar	107	106
Fensulfothion	110	107
Methyl Azinphos	108	108
Coumaphos	97	99
EPN	102	99
Ethyl parathion	104	104
Sulfotepp	103	108
Tetrachlorvinphos	109	110

Nitrogen/Phosphorus Herbicides & Insecticides (EPA 8141 method)

	@ 12 psi % Recovery	@ 24 psi % Recovery
EPTC	103	101
Butylate	104	104
Propachlor	105	104
Trifluralin	98	93
Terbufos	97	97
Atrazine	103	100
Simazine	106	101
Alachlor	105	102
Metribuzin	101	100
Metolachlor	101	104
Pendimethalin	103	100
Butachlor	105	100
Cyanazine	92	90
Acetochlor	96	100

Chlorinated Phenoxy Herbicides (EPA 8151 method)

	@ 12 psi % Recovery	@ 24 psi % Recovery
Dalapon	69	70
3,5-Dichlorobenzoic acid	102	103
Dicamba	98	101
Dichlorprop	104	104
2,4-D	104	104
Pentachlorophenol	100	101
2,4,5-TP (Silvex)	102	103
Chloramben	106	109
2,4,5-T	104	104
2,4-DB	105	105
Bentazon	105	106
Picloram	113	114
Dinoseb	104	104
DCPA	104	104
Acifluorfen	112	114

Test results show that the **RapidVap Vacuum Evaporation System** produces excellent recoveries of a wide range of compounds.

Procedure: Samples consisting of a combination of several of the compounds listed below were prepared and each of the resulting compound mixtures was added to a separate 600 milliliter flat-bottom sample tube and placed in Sample Block 7494500 in the RapidVap 7900000. The following parameters were set: heat at 50° C, vortex speed at 28% of maximum, and vacuum of 250 mBar. The RapidVap was allowed to run continuously until the sample volume was reduced to 1 ml. A mass spectrometer was used to compare original compound amounts to the amounts detected in the reduced sample. Duplicates of the compound mixtures were tested and the percentages averaged.

BNAs

Compound	% Recovery
Acenaphthene	79
Acenaphthylene	80
Aniline	64
Anthracene	86
Azobenzene	84
Benzo(a)anthracene	82
Benzo(a)Pyrene	85
Benzo(b)Fluoranthene	84
Benzo(g,h,i)perylene	86
Benzo(k)Fluoranthene	87
Benzoic Acid	70
Benzyl Alcohol	73
Bis(2-Chloroethoxy) Methane	75
Bis(2-Chloroethyl) Ether	67
Bis(2-Chloroisopropyl) Ether	67
Bis(2-ethylhexyl)Phthalate	88
4-Bromophenyl Phenyl Ether	76
Butyl Benzyl Phthalate	85
4-Chloro-3-methylphenol	78
4-Chloroaniline	90
2-Chloronaphthalene	75
2-Chlorophenol	64
4-Chlorophenyl Phenyl Ether	80
Chrysene	86
Dalapon	58
Di-n-butyl Phthalate	86
Di-n-octyl Phthalate	89
Dibenzo(a,h)anthracene	84
Dibenzofuran	82
1,2-Dichlorobenzene	63
1,3-Dichlorobenzene	62
1,4-Dichlorobenzene	62
3,3'-Dichlorobenzidine	86
2,4-Dichlorophenol	72
Diethyl Phthalate	82
2,4-Dimethylphenol	68
Dimethylphthalate	79
4,6-Dinitro-2-methylphenol	81
2,4-Dinitrophenol	70
2,4-Dinitrotoluene	80
2,6-Dinitrotoluene	83
Fluoranthene	85
Fluorene	83
2-Fluorobiphenyl (SURR)	75
2-Fluorophenol (SURR)	46
Hexachlorobenzene	84
Hexachlorobutadiene	67
Hexachlorocyclopentadiene	58
Hexachloroethane	62
Indeno(1,2,3-cd)Pyrene	84
Isophorone	76
(3 & 4)-Methylphenol	73
2-Methylnaphthalene	78
2-Methylphenol	69
n-Nitroso-di-n-propylamine	90

BNAs (continued)

Compound	% Recovery
N-Nitrosodimethylamine	63
N-Nitrosodiphenylamine	82
Naphthalene	71
2-Nitroaniline	79
3-Nitroaniline	86
4-Nitroaniline	82
Nitrobenzene	67
Nitrobenzene-d5 (SURR)	62
2-Nitrophenol	69
4-Nitrophenol	87
p-Terphenyl-d14 (SURR)	84
Pentachlorophenol	71
Phenanthrene	86
Phenol	69
Phenol-d6 (SURR)	64
Pyrene	81
Pyridine	59
1,2,4-Trichlorobenzene	69
2,4,5-Trichlorophenol	75
2,4,6-Tribromophenol (SURR)	74
2,4,6-Trichlorophenol	76

Chlorinated Herbicides (Phenoxys)

Analyte	% Recovery
Bentazon	95
Chloramben	116
2,4-D	94
2,4-DB	99
Dicamba	100
3,5-Dichlorobenzoic Acid	91
Dichlorprop	89
MCPA	80
MCPP	86
Pentachlorophenol	68
Picloram	106
2,4,5-T	118
2,4,5-TP (Silvex)	92
Tetrachloroterephthalic Acid	90

Organophosphorus Pesticides

Analyte	% Recovery
Bolstar	85
Chlorpyrifos	83
Coumaphos	90
Demeton, O & S	107
Diazinon	86
Dichlorvos	86
Dimethoate	123
Disulfoton	71
EPN	87
Ethoprofos	89
Ethoprop	81
Ethyl Parathion	91
Fensulfothion	94

Organophosphorus Pesticides (continued)

Compound	% Recovery
Fenthion	77
Malathion	87
Merphos	84
Methyl Azinphos	92
Methyl Parathion	85
Mevinphos	110
Monocrotophos	99
Naled	78
Phorate	75
Ronnel	79
Sulfotepp	82
TEPP	95
Tokuthion*	79
Trichloronate	80

Semivolatile Organic Pesticides

Analyte	% Recovery
Aldrin	83
alpha-BHC	88
beta-BHC	100
4,4'-DDD	87
4,4'-DDE	83
4,4'-DDT	93
delta-BHC	96
Dieldrin	83
Endosulfan I	75
Endosulfan II	84
Endosulfan sulfate	93
Endrin	90
Endrin Ketone	96
gamma-BHC (Lindane)	100
Heptachlor	83
Heptachlor epoxide	79
Methoxychlor	97

Testing conducted by
Keystone Laboratories, Inc.
Newton, Iowa

Test results show that the **RapidVap N_2 Evaporation System** produces excellent recoveries of a wide range of compounds.

Procedure: Samples consisting of a combination of several of the compounds listed below were prepared and each of the resulting compound mixtures was added to a separate 600 milliliter sample tube with 1.5 milliliter stems containing 300 ml methylene chloride and placed in the RapidVap 7910000. Sample tubes were not capped. The following parameters were set: heat at 40° C, vortex speed at 60% of maximum, and nitrogen pressure of 10 psi. The RapidVap was allowed to run continuously until the sample volumes were reduced to 1 ml. A mass spectrometer was used to compare original compound amounts to the amounts detected in the reduced samples. Duplicates of the compound mixtures were tested and the percentages averaged.

BNAs

Analyte	% Recovery
Acenaphthene	97
Acenaphthylene	92
Aniline	87
Anthracene	91
Azobenzene	83
Benzo(a)anthracene	97
Benzo(a)Pyrene	91
Benzo(b)Fluoranthene	96
Benzo(g,h,i)perylene	82
Benzo(k)Fluoranthene	100
Benzoic Acid	100
Benzyl Alcohol	80
Bis(2-Chloroethoxy) Methane	81
Bis(2-Chloroethyl) Ether	76
Bis(2-Chloroisopropyl) Ether	67
Bis(2-ethylhexyl)Phthalate	93
4-Bromophenyl Phenyl Ether	86
Butyl Benzyl Phthalate	94
4-Chloro-3-methylphenol	91
4-Chloroaniline	99
2-Chloronaphthalene	76
2-Chlorophenol	95
4-Chlorophenyl Phenyl Ether	82
Chrysene	96
Di-n-butyl Phthalate	87
Di-n-octyl Phthalate	90
Dibenzo(a,h)anthracene	92
Dibenzofuran	78
1,2-Dichlorobenzene	78
1,3-Dichlorobenzene	75
1,4-Dichlorobenzene	75
3,3′-Dichlorobenzidine	97
2,4-Dichlorophenol	97
Diethyl Phthalate	85
2,4-Dimethylphenol	100
Dimethylphthalate	80
4,6-Dinitro-2-methylphenol	100
2,4-Dinitrophenol	100
2,4-Dinitrotoluene	82
2,6-Dinitrotoluene	83
Fluoranthene	100
Fluorene	97
2-Fluorobiphenyl (SURR)	79
2-Fluorophenol (SURR)	77
Hexachlorobenzene	84
Hexachlorobutadiene	78
Hexachlorocyclopentadiene	73
Hexachloroethane	71
Indeno(1,2,3-cd)Pyrene	86
Isophorone	77
2-Methylnaphthalene	83
(3 & 4)-Methylphenol	100
2-Methylphenol	100
n-Nitroso-di-n-propylamine	73
N-Nitrosodimethylamine	83

BNAs (continued)

Analyte	% Recovery
N-Nitrosodiphenylamine	85
Naphthalene	94
2-Nitroaniline	85
3-Nitroaniline	92
4-Nitroaniline	95
Nitrobenzene	77
Nitrobenzene-d5 (SURR)	77
2-Nitrophenol	98
4-Nitrophenol	100
p-Terphenyl-d14 (SURR)	87
Pentachlorophenol	100
Phenanthrene	91
Phenol	95
Phenol-d6 (SURR)	76
Pyrene	96
Pyridine	6
2,4,6-Tribromophenol (SURR)	79
2,4,5-Trichlorophenol	94
2,4,6-Trichlorophenol	96

Chlorinated Herbicides (Phenoxys)

Analyte	% Recovery
Acifluorfen	100
Bentazon	93
Chloramben	46
2,4-D	100
2,4-DB	93
Dicamba	87
3,5-Dichlorobenzoic Acid	83
Dichlorprop	82
4-Nitrophenol	100
MCPA	80
MCPP	78
Pentachlorophenol	82
2,4,5-T	78
2,4,5-TP (Silvex)	85

Organophosphorous Pesticides

Analyte	% Recovery
Bolstar	89
Chlorpyrifos	86
Coumaphos	98
Demeton, O & S	82
Diazinon	89
Dichlorvos	83
Disulfoton	72
EPN	88
Ethoprop	88
Ethyl Parathion	86
Fensulfothion	100
Fenthion	89
Malathion	92
Merphos	93
Methyl Azinphos	99
Methyl Parathion	84

Organophosphorus Pesticides (continued)

Analyte	% Recovery
Mevinphos	88
Monocrotophos	82
Naled	83
Phorate	79
Ronnel	85
TEPP	59
Tokuthion	88
Trichloronate	85

Semivolatile Organic Pesticides

Analyte	% Recovery
Aldrin	84
alpha-BHC	88
beta-BHC	86
4,4′-DDD	90
4,4′-DDE	86
4,4′-DDT	96
delta-BHC	92
Dieldrin	87
Endosulfan I	92
Endosulfan II	93
Endosulfan sulfate	87
Endrin	92
gamma-BHC (Lindane)	84
Heptachlor	84
Heptachlor epoxide	92
Methoxychlor	96

Testing conducted by
Keystone Laboratories, Inc.
Newton, Iowa

Tests results show that the **RapidVap N_2/48 Evaporation System** produces excellent recoveries of a wide range of analytes. Carryover from one tube to another was not detectable.

Procedure: Samples consisting of a combination of several of the analytes listed below were prepared and each of the resulting analyte mixtures was added to a separate 20 mm sample tube containing 10 ml methylene chloride and placed in the RapidVap N_2/48 7910012. The following parameters were set: heat at 40° C, vortex speed at 100% of maximum, and nitrogen pressure of 15 psi. The RapidVap was allowed to run continuously until the sample volumes were reduced to 1 ml. A mass spectrometer was used to compare original compound amounts to the amounts detected in the reduced samples. Duplicates of the analyte mixtures were tested and the percentages averaged.

BNAs

Analyte	% Recovery
1,2,4-Trichlorobenzene	86.3
1,2-Dichlorobenzene	78.7
1,3-Dichlorobenzene	78.2
1,4-Dichlorobenzene	78.6
2,4,5-Trichlorophenol	95.5
2,4,6-Tribromophenol (SURR)	92.6
2,4,6-Trichlorophenol	92.5
2,4-Dichlorophenol	89.1
2,4-Dimethylphenol	89.6
2,4-Dinitrophenol	89.3
2,4-Dinitrotoluene	96.7
2,6-Dinitrotoluene	96.9
2-Chloronaphthalene	94.1
2-Chlorophenol	82.2
2-Fluorobiphenyl (SURR)	93.5
2-Fluorophenol (SURR)	78.1
2-Methylnaphthalene	92.6
2-Methylphenol	88.9
2-Nitroaniline	95.5
2-Nitrophenol	87.9
3 & 4-Methylphenol	88.5
3,3-Dichlorobenzidine	100.0
3-Nitroaniline	100.0
4,6-Dinitro-2-Methylphenol	94.4
4-Bromophenyl Phenyl Ether	96.4
4-Chloro-3-Methylphenol	95.5
4-Chloroaniline	98.7
4-Chlorophenyl-Phenyl Ether	96.3
4-Nitroaniline	100.0
4-Nitrophenol	95.5
Acenaphthene	95.6
Acenaphthylene	96.8
Aniline	88.8
Anthracene	96.1
Azobenzene	94.2
Benzidine	96.0
Benzo(a) Pyrene	95.1
Benzo(a) Anthracene	97.7
Benzo(b) Fluoranthene	96.4
Benzo(g,h,i) Perylene	88.3
Benzo(k) Fluoranthene	95.8
Benzoic Acid	87.2
Benzyl Alcohol	91.5
Bis-(2-Chloroethoxy) Methane	92.5
Bis(2-Chloroethyl) Ether	83.2
Bis(2-Chloroisopropyl) Ether	84.6
Bis(2-Ethylhexyl) Phthalate	97.8
Butyl Benzyl Phthalate	97.7
Carbazole	100.0
Chrysene	99.0
Dibenzo(a,h) Anthracene	88.2

BNAs (continued)

Analyte	% Recovery
Dibenzofuran	95.0
Diethyl Phthalate	96.7
Dimethyl Phthalate	96.5
Di-n-butyl Phthalate	98.4
Di-n-octyl Phthalate	95.9
Fluoranthene	98.1
Fluorene	96.7
Hexachlorobenzene	95.9
Hexachlorobutadiene	84.0
Hexachlorocyclopentadiene	90.3
Hexachloroethane	80.2
Indeno(1,2,3-cd) Pyrene	87.9
Isophorone	94.7
Naphthalene	88.7
Nitrobenzene	87.9
Nitrobenzene-d5 (SURR)	87.8
N-Nitrosodimethylamine	75.9
N-Nitroso-Di-n-propylamine	91.7
N-Nitrosodiphenylamine	100.0
Pentachlorophenol	93.7
Phenanthrene	96.9
Phenol	84.5
Phenol-d6 (SURR)	87.3
p-Terphenyl-d14 (SURR)	98.1
Pyrene	96.9
Pyridine	74.5

Chlorinated Herbicides (Phenoxys)

Analyte	% Recovery
2,4,5-T	100
2,4-D	100
2,4-DB	53
3,5-Dichlorobenzoic Acid	100
4-Nitrophenol	70
Acifluorfen	100
Bentazon	100
Chloramben	100
Dalapon	89
Dicamba	100
Dichloroprop	100
Dinoseb	100
MCPA	100
MCPP	100
Pentachlorophenol	100
Picloram	96
Silvex	100

Organophosphorous Pesticides

Analyte	% Recovery
Chlorpyrifos	98.6
Coumaphos	99.8
Demeton	90.7
Diazinon	97.4
Dichlorvos	94.2
Disulfoton	99.9
EPN	94.8
Ethoprop	98.8
Fensulfothion	75.9
Fenthion	97.8
Malathion	89.2
Merphos	95.5
Methyl Parathion	100.0
Mevinphos	94.8
Monocrotophos	87.9
Naled	99.9
Phorate	98.4
Ronnel	98.0
TEPP	63.4
Tokuthion	100.0
Trichloronate	98.1

Semivolatile Organic Pesticides

Analyte	% Recovery
4,4-DDD	95.7
4,4-DDE	97.3
4,4-DDT	99.7
Aldrin	97.9
alpha-BHC	97.4
beta-BHC	98.1
delta-BHC	96.8
Dieldrin	96.3
Endosulfan I	97.0
Endosulfan II	98.7
Endosulfan Sulfate	99.6
Endrin	99.0
Endrin Aldehyde	97.0
Endrin Ketone	98.0
gamma-BHC	96.1
Heptachlor	97.5
Heptachlor Epoxide	99.4
Methoxychlor	96.6

Testing conducted by
Keystone Laboratories, Inc.
Newton, Iowa

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