



# HydraFlow®

## 4 Channel Cartridge Manifold



**USER MANUAL**

## HydraFlow<sup>®</sup> provides enhanced precision and streamlined sample extractions for large-volume water analysis.

### Features:

- **Liquid Channel Switching** – Patented channel-switching design to ensure the convenient and efficient transition between sample collection and waste discharge. This optimized feature improves the overall user experience and robustness of the manifold by eliminating the need for reopening the vacuum chamber mid-extraction, repeated on/off switching of the vacuum pump, time-consuming venting and relocation of collection bottles, and the cumbersome draining of the waste liquid and voiding of the vacuum chamber.
- **Multi-Sample Processing** – Four channels can be used individually or simultaneously based on the user preference.
- **No Need for Glass Cartridge Adapters** – HydraFlow<sup>®</sup> does not require the use of expensive glass cartridge adapters which too often break with prolonged usage and lead to costly replacement.
- **Precise Flow Control Capabilities** – Featured control valves ensure accurate sample flow rates ranging from 1 mL/min to 45 mL/min and high reproducibility across a wide range of extractions.
- **Rugged Anti-Corrosion Design** – Manifold parts feature PTFE or stainless-steel composition which can resist degradation from prolonged exposure to organic solvents, such as Dichloromethane, and acids. This provides enhanced chemical resistance and long-term durability to the unit.
- **Liquid Level Visualization** – Graduated tick marks on Universal cartridge adapters allow for staged liquid-level visualization during an extraction.
- **Separation of Organic and Aqueous Waste** – Separate channels for aqueous waste collection and organic waste collection contribute to long-term cost savings when it comes to waste disposal.
- **Lightweight and Compact Footprint** – Simple design allows for fume hood setup if desired and easy relocating when necessary, throughout the lab.

# Technical Specifications

**Dimensions:** 520 mm x 290 mm x 440 mm (L x W x H)

**Weight:** 12 Kgs (26 lbs)

**Vacuum Requirements:** 25" Hg (minimum)

**Collection Devices Used:** 40 mL Collection Vials

**Sample Capacity Per Unit:** 1-4 Samples

## Complete Configuration When Ordering



**HYDFLWB**  
1 L wide-mouth organic  
waste collection bottle  
(1/EA)



**HYDFLBADP**  
1 L wide-mouth organic  
waste collection bottle  
adaptor (1/EA)



**HYDFLCV**  
40 mL collection vials  
(4/PACK)



**HYDFLCV-CON**  
Connector for  
collection vials  
(4/PACK)



**HYDFLCLMP**  
Clamps (4/PACK)



**HYDFLCON-T**  
'T' connector (1/EA)



**HYDFLTUBE-8**  
4.5 meter 1/8" PTFE  
tube (1/EA)

1/4" PTFE tubing also included



**HYDFLCON-8**  
1/8" connector union  
(6/PACK)

1/4" connector also included



**HYDFLEXTNR**  
Flange connector  
and gasket (2/PACK)



**HYDFLBFIT**  
3/8" barb fitting  
(4/PACK)



**HYDFLTUBE-WH**  
4.5 meters white  
rubber tube (1/EA)



**HYDFLTOOL**  
Joint locking tool  
(1/EA)

Additional parts and accessories available for purchase. / [Questions? 1\(800\)385-3153](tel:18003853153)



**ECROCKER400**  
Vacuum pump /110 volt  
**ECROCKER400-220**  
Vacuum pump /220 volt



**ECUNIBHD-PP**  
Bottle holder (1/EA)  
**ECUNIJD100-PP**  
Jar holder (1/EA)



**ECUCTRAP20**  
Waste Trap, cap, hoses  
(1/EA)

# HydraFlow® Unit Overview



**4 x Front Flow Path Valves** – These valves control individual channels and are used to switch between Waste Flow, Elution Flow, and OFF position.

**1 x Waste Separator Valve** – Contains 3 varying positions: Aqueous, Waste (OFF) and Organic to segregate and simultaneously collect different solvent classes.

- **Aqueous** – Used when processing water samples. This valve channels all the waste to the 20L Aqueous Waste Collection Container.
- **Waste (OFF)** – Used to turn off the vacuum.
- **Organic** – Used during pre-rinsing and/or pre-conditioning the SPE cartridge. This valve channels all the waste to the 1L Organic Waste Collection Bottle.

**2 x Fine-Tuning Flow Control Knobs** – The front solvent channel switches can be further refined using these independent controls for Waste Flow and Elution Flow.

- **Waste Flow Control Knob** – Allows for the simultaneous flow regulation of all 4 channels when the waste is being collected during pre-conditioning, sample addition and wash procedure. When using this control knob, the Front Flow Path Valve should be set to the “Waste Flow” to begin.
- **Elution Flow Control Knob** – Allows for the simultaneous flow regulation of all 4 channels during the elution step into the sample collection vials. When using this control knob, the Front Flow Path Valve should be set to the “Elution Flow” to begin.

# Operational Instructions

## Installation

### Collection Vial assembly

- Attach the glass adapters to each of the 4 designated positions on the unit. Use the blue clamps to secure the adapters. Each of these clamps has a smaller and a larger diameter. When installed properly, the smaller diameter stays on top.
- Tightly connect the glass collection bottles to the glass adapters.  
(Note: Even when not using all 4 channels simultaneously, it is still necessary to connect all 4 collection bottles with the glass adapters)

## Connecting the main unit, waste bottles and vacuum pump

Back of the unit - There are three positions on the back of the unit labelled as Aqueous Waste, Organic Solvent Waste & Elution Vacuum. A 3/8" barb fitting is attached to the Aqueous Waste position. To the remaining two channels, attach a 1/8" connector of the connector union.

Organic waste bottle adapter - Attach two 1/8" connectors (of connector union) to any of the two spots on the bottle cap. Cut & insert a small fragment of the PTFE tube into the blue extender piece. Then attach this extender piece to another 1/8" connector. This assembly is finally installed onto the remaining spot on the bottle adapter. This line will be used to empty the organic solvent waste.

'T' Connector - On the 'T' connector, attach two 3/8" barb fittings and one 1/8" connector (of connector union).

PTFE tubing - Cut 4.5 meters 1/8" PTFE tube into 3 pieces of the desired lengths. Using a compression nut (of 1/8" connector union), attach one end of the 1/8" PTFE tube to the 'Organic Solvent Waste' connector on the back of the unit and the other end of the tube to the connector holding the extender piece on the cap of the organic waste solvent bottle. Using another piece of PTFE tube, connect the 'Elution Vacuum' outlet with either of the two available spots on the organic waste bottle adapter. Finally, attach one end of the third PTFE tube to the remaining spot on the bottle adapter and connect the other end to the 'T' connector.

Rubber tubing - Cut 4.5 meters white rubber tube into 3 pieces of the desired lengths. Attach one end of a rubber tube to the 'Aqueous Waste' barb fitting located on the back of the unit and connect the other end to the cap of the Aqueous waste trap. Another piece of rubber tube is used to connect one of the two barb fittings on the 'T' connector with the remaining spot on the cap of the waste trap. Connect the 'T' connector to the vacuum pump with the final piece of the rubber tube.

*For optimal usage, HydraFlow® should be operated in a well-ventilated area, preferably a fume hood.*

# Operational Instructions

## SPE Extraction

### Pre-Conditioning

1. Ensure all four Front Flow Path Valves are preset to "Waste Flow" control.
2. Preset the side Waste Separator Valve to "Organic".
  - This triggers waste to be funneled to the 1L Organic Waste collection bottle.
3. Add pre-wash and/or pre-conditioning solvent as outlined in the corresponding SPE procedure.
4. Turn on the Vacuum pump.
5. Use the Waste Flow fine control knob to adjust the flow rate to the desired setting.
  - It is suggested to start with the knob turned to the off position and slowly open the knob until the desired flow rate is obtained. This will prevent the solvent from being pulled through the sorbent at too high of a flow rate, resulting in inadequate conditioning of the sorbent.
6. Once pre-conditioning is completed, turn the side Waste Separator Valve to Waste (OFF).
  - This will prevent the sorbent from running dry. It will also prevent the aqueous sample from being diverted to the 1L Organic Waste collection bottle.

### Sample Loading

1. Set the four Front Flow Path Valves to "OFF".
  - This will prevent the samples from being pulled through the sorbent at a high flow rate, potentially compromising recovery from loss of analyte(s).
2. Turn the side Waste Separator Valve to "Aqueous".
  - This triggers waste to be funneled to the 20L Aqueous waste trap.
3. Begin optimizing the four Front Flow Path Valves to obtain the desired flow rate.
  - It is recommended to begin at the "Low" setting and then further refine with the Waste Flow fine control knob. These controls should be used tandemly until the overall optimum flow rate is achieved.

### Washing

1. Add the washing solution to the cartridges. Switch the Front Flow Path Valve to the "Waste Flow" position to drain the washing solution.
2. Adjust the Waste Separator Valve according to the type of each wash solution i.e., Aqueous & Organic.
3. Use the Waste Flow fine control knob to control the flow rate.

### Sample Drying

1. Set the four Front Flow Path Valves to "Waste Flow" control high or fully open if not already at this setting.
2. Dry the SPE cartridges by applying a full vacuum for the desired length of time as outlined in the corresponding SPE procedure.
3. Turn off the Vacuum pump.
4. Remove each Universal SPE cartridge from its holder and tap or shake it to remove any residual water that may have collected at the bottom of the cartridge.
  - This will prevent excess water from collecting in the elution solvent in the subsequent step.

### Sample Elution

1. To begin, set the four Front Flow Path Valves to "Elution Flow" control low.
  - This diverts the elution solvent to the collection vials.
2. Turn on the Vacuum pump.
3. Use the Elution Flow fine control knob to adjust the flow rate to the desired setting.
  - It is suggested to start with the knob turned to the off position followed by slowly opening until the desired flow rate is obtained. This will prevent the solvent from being pulled through the sorbent at too high of a flow rate, resulting in inadequate analyte elution.
4. Upon visualization of all solvent passing into the collection vials, open the Elution Flow fine control knob all the way to ensure all solvent has been eluted from the sorbent.
5. Remove the collection vials for drying and evaporation.

# HydraFlow® Maintenance & Troubleshooting

## General Maintenance

Wipe off water from the unit surface to minimize the possibility of sheet metal corrosion following each usage. If there is water spilling over the unit, open the back panel and dry the inside surfaces of the unit to avoid damage. If the samples are ultra-dirty, it is recommended to use 200 mL water to rinse off the whole tubing system to avoid the possible accumulation of residual, unwanted substances.

## Troubleshooting

### *Sample flow through the cartridge is slower than normal*

Samples containing high concentrations of particulate matter may clog cartridges causing potential clogging and/or flow rate to slow. Check that the Elution or Waste Fine-Tuning Valves are completely open. If the valves are completely open, check that the collection vials, cartridge, and bottle adapters are properly attached. If slow flow persists, check all vacuum attachments at the back of the HydraFlow® and to both waste containers.

### *Sample is leaking at the collection vials cartridge, and/or bottle adapters*

Check that the collection vials, cartridge and bottle adapters are properly attached. Remove and reattach if necessary.

### *Clogging of "T" connectors & system tubes*

Due to highly dirty samples and accumulation of residual particles over time, the flow path can become obstructed noted by a reduction in the overall flow rate. To fix this, the end-user should regularly clean the T-connectors and flow path tubes as a form of preventative maintenance on the unit. For ultra-dirty samples, it is recommended to use 200 mL of water to clean the flow path after each usage.

### *Wear & tear on glass adapters*

With prolonged usage, the glass adapters for the collection vials can irreversibly stick on the plastic collection heads and be hard to remove. For optimal performance, these should be removed and cleaned following each usage. If compromised, an end-user should replace them with all new glass adapters.

### *Ruggedness of HydraFlow® and overall solvent resistance with time*

The waste and universal cartridge holding trays are PTFE coated. In addition, the other components such as the coating of the sheet metal, including the colored marks, can withstand mild solvent spills following internal testing. In regard to other raw materials used on the unit, the valves are stainless steel, the adapters are aluminum, all tubing is PEEK, and the connectors are high-density polyethylene (HDPE).

# HydraFlow® User Manual

## PRICES AND TERMS

Our prices are subject to change without notice. The price in effect when we receive your order will apply. All prices are in US Dollars and are F.O.B. Lewistown, PA 17044. Terms of payment are net 30 days.

## MINIMUM ORDERS

We welcome all orders, therefore, we do not have a minimum order requirement. When ordering, please include your purchase order number, complete "Ship To" and "Bill To" address, catalog number, quantity, and description of product(s). Also include your name and a phone number where you can be reached should we have any questions concerning your order.

## SHIPMENTS

Normal processing is within 24 hours after receipt of an order. Unless special shipping requests have been made, our trained staff will send all orders by UPS Ground service. The appropriate shipping charges (freight & insurance costs) will be added to the invoice, unless otherwise instructed by the customer.

## SPECIAL PRICING

We offer special pricing for volume purchases and standing orders. These discounts apply to bonded phase extraction column purchases only. Please call a sales representative for more information on special pricing qualifications.

## RETURN POLICY

Our Quality Manager will handle all returns. Before returning merchandise, please call to obtain a return authorization number from the quality manager. We will need to know the reason for the return, date of purchase, purchase order number and invoice number in order to issue a return authorization number. Return merchandise must be received before a credit can be issued. Returns will not be accepted after 90 days. A restocking fee of 25% of the price paid, or a minimum of \$25.00 (whichever is greater) will be charged on all returns.

## WARRANTY

All products manufactured by UCT are guaranteed against defects in materials and workmanship for a period of 90 days after shipment. UCT will replace any items that prove to be defective during this time period. The exclusive remedy requires the end user to first advise UCT of the defective product by phone or in writing and must include order number, the lot number and the shipping date.

To initiate this action, photographs of the product, including packaging and labeling of the containers, must be submitted to the UCT Representative for approval. With approval a return authorization can be initiated, and must be received within 30 days. Once the materials arrive at UCT a further inspection of the materials must be completed and accepted by our Quality Manager prior to further action of credits or replacement. UCT's total liability is limited to the replacement cost of UCT products.

This warranty does not apply to damage resulting from misuse.

## Placing An Order

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