

ASTORIA • PACIFIC

PARTS AND REAGENTS CATALOG

ASTORIA • PACIFIC



Our Company

Astoria-Pacific is committed to providing superior solutions to meet the specific analytical needs of our customers through building continuous quality relationships.

Astoria-Pacific, Inc. was established on September 26, 1990 with the purpose of maximizing laboratory efficiencies by offering automated analysis solutions. Our objective is to merge automated instrumentation and software with reagents to provide a complete solution to our customers.

We provide analytical results to the Environmental, Wine, Tobacco, Newborn Screening and various markets utilizing a range of platforms including automated segmented flow and discrete analyzers.

Our Market Focus

Astoria-Pacific is dedicated to offering the best in analytical equipment for a variety of laboratories, such as those testing for the:

[Analysis of Water/Waste Water](#)

[Agricultural Analysis of Plant Tissue and Soils](#)

[Analysis of Nutrients in Oceanographic Samples](#)

[Analysis of Wine](#)

[Analysis of Beer](#)

[Analysis of Pharmaceutical applications](#)

[Analysis of Fertilizer](#)

[Analysis of Tobacco Leaf and Products](#)

[Analysis of Biofuels](#)

[Analyses in Newborn Screening](#)

Our Team

Astoria-Pacific employs a dynamic team of skilled scientists, R&D and field service engineers, technical support specialists, QC personnel, production experts, and customer support personnel. We are focused and dedicated to our customers and are very proud of our outstanding reputation for customer service and technical support.

PARTS AND SUPPLIES CATALOG

This Parts and Supplies Catalog is presented in modular form to assist you in locating the exact supplies you need. Most consumable items are listed under the Analytical Cartridge section. Please note that the most common supplies are listed. Please contact us if the part you are looking for is not listed.

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ORDERING INFORMATION

How to place an order: Orders may be placed by phone, fax or email.

Order by phone:

Please call our toll-free number 1-800-536-3111 in the U.S.A., between the hours of 8:00 a.m. and 4:00 p.m. Pacific time, Monday through Friday. Orders may be placed in voice mail after hours. International customers, please call 503-657-3010.

Order by fax:

Orders may be placed to our 24 hour fax number 503-655-7367.

Order by email:

Please address orders to orders@astoria-pacific.com

Order by mail (really? seriously?):

Please address orders to Astoria-Pacific, P.O. Box 830, Clackamas, Oregon 97015-0830

Please include the following information on all purchase orders:

- Purchase order number
- Bill to address
- Ship to address
- Urgency
- Method of shipment
- Product part number
- Product name
- Quantity of each item

PURCHASING INFORMATION AND TERMS

All prices are in U.S. dollars and are subject to change without notice. Normal terms are net 30 days on approved credit and written purchase order. Astoria-Pacific will also accept Visa, MasterCard, Discover or American Express credit cards for any purchase or for a first purchase when establishing an account. International orders are shipped against an irrevocable Letter of Credit, favor Astoria-Pacific or other agreed to terms.

SHIPPING INFORMATION

Domestic orders are shipped F.O.B. SHIPPING POINT with freight PREPAID AND ADDED TO THE INVOICE. Normal shipments are via surface carrier. Non-hazardous products will be shipped via air upon request. Two-Day Air, Three Day Air, and/or Overnight shipments can be made on request.

International orders are shipped F.O.B. Portland, Oregon, U.S.A., via air freight or courier. Shipping charges should be included in Letter of Credit.

WARRANTY INFORMATION

Astoria-Pacific warrants all consumables to be free of defects in material and workmanship at the time of shipment. For warranty returns, all claims must be made within 10 days of delivery. Replacement parts are warranted for 120 days from date of shipment.

API warrants reagents and biological products carrying an expiration date to be free from defects in material and workmanship until such expiration date, provided the product is stored and handled in accordance with instructions displayed on the product label and/or product insert.

API's obligation under any warranty is limited to, and Buyer's exclusive remedy hereunder shall be repair and replacement of any defective parts, when returned to API by Buyer, transportation prepaid, which API determines to be factory defective and requests the item returned. The warranty is in lieu of any other warranty expressed or implied.

ABBREVIATIONS

The following abbreviations are used throughout this catalog and often used in methodologies, operating manuals and flow diagrams.

AAll	AutoAnalyzer II	M	Thousand
AC	Alternating Current	min	Minute
API	Astoria-Pacific International	mL	Milliliter
Assy	Assembly	mm	Millimeter
Blk	Black	nm	Nanometer (wavelength)
Blu	Blue	OD	Outside Diameter
C	Centigrade	Orn	Orange
CCW	Counter Clockwise	OTCR	Open Tube Cadmium Reactor
cm	Centimeter	oz	Ounce
CW	Clockwise	PCB	Printed Circuit Board
DC	Direct Current	PE	Polyethylene
EVA	EthyleneVinylAcetate	PKG	Package
F	Fahrenheit	PMT	Photo Multiplier Tube
F/C	Flowcell	Pur	Purple
ft	Feet	PVC	Poly Vinyl Chloride
Grn	Green	rl	Roll
Gry	Gray	S/S	Stainless Steel
Hr	Hour	Sec	Second
Hz	Hertz (cycles per second)	T	Turn
ID	Internal Diameter	UV	Ultra Violet
in.,"	Inch	w/	With
L	Liter	w/o	Without
lb	Pound	Wht	White
LCD	Liquid Crystal Display	Yel	Yellow
LED	Light Emitting Diode	µL	Microliter

ACKNOWLEDGMENTS

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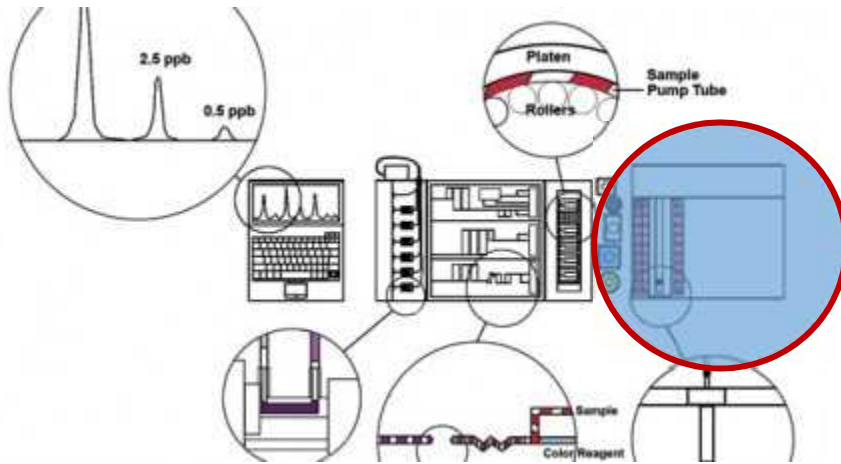
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SAMPLERS (411S, 411L, 311)



SAMPLE CUPS, TEST TUBES, SPLITTERS

DESCRIPTION

Sample Cup, 2 mL
 Sample Cup, 4 mL
 Splitter, Sample Stream, 3 port
 Splitter, Sample Stream, 4 port
 Test Tube, 16x100mm, PKG/20

PART NUMBER

301-1090P01
 301-1018P01
 303-0110-00
 303-0111-00
 311-0116P01

UNIT

PKG/1000
 PKG/1000
 EACH
 EACH
 PKG/20



SAMPLER 411S, 411L AND 412 DILUTER

DESCRIPTION

Nut 1/428x1/16" ID, Tetzl Blk (holds probe)
 Pwr Supply, 19V/3.7A, CntTop,411S/411L
 Probe, Sample, 6", 200 uL
 PumpHead,2mm ID,Blue, 411S/L (Wash)
 PumpHead, 3mm ID, Red, 411L (Waste)
 Rack, Standards, 24PL,411L
 Sample/Stds Tray Assy, 411S

PART NUMBER

355-0060
 140-0024
 310-0099
 170-0012
 170-0013
 400-0174
 700-0033

UNIT

EACH
 EACH
 EACH
 EACH
 EACH
 EACH
 EACH

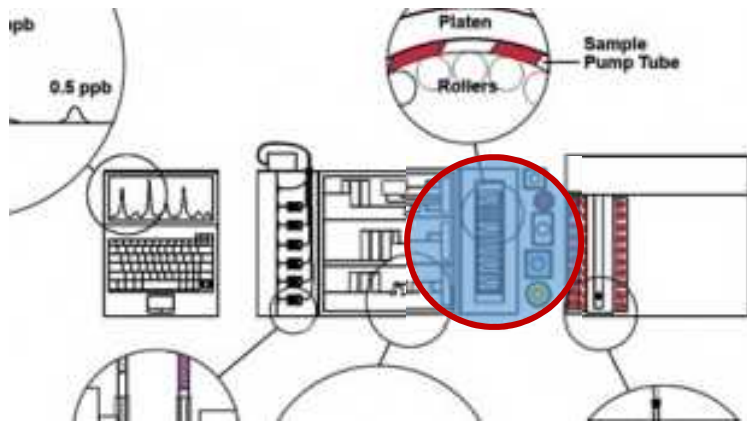
DESCRIPTION	PART NUMBER	UNIT
Sample Rack, 60 Pos, wPlate, 411S	411-1837P00	EACH
Sample Rack, 90 Pos, wPlate, 411S	411-1850P00	EACH
Sample Line, 0.34ID, PE, 6Ft (411S)	411-B120-00	EACH
Sample Line, 0.34ID,PE, 10Ft (411L)	411-B210-00	EACH
Sample Rack, 60 Position, w/Plate	311-1837P00	PKG/3
Tubing, PVC, Drain, 5/16x1/2" OD, 7ft	303-2207P07	EACH
Tubing Assy w/Wash Head, 411L	411-B200-00	EACH
Tubing Assy w/Waste Head, 411L	411-B201-00	EACH
Tubing Assy, 412 Dil/Std PKG	412-B001-00	EACH
Traveling Wash Pot, 411L, Comp	411-B220-00	EACH
Tubing Assy/Wash Station, 411S	411-B110-00	EACH
Wash Station w/Tubing, 411S (includes station)	411-B100-00	EACH

SAMPLER 311, 322 AUX Pump, and 312 Diluter



DESCRIPTION	PART NUMBER	UNIT
Communication Cables	(Please call Service)	
Collar, 311 Probe Guide	311-2735-00	EACH
Probe Guide, 152 mm	311-0085-00	EACH
Probe, Open End, 0.033" ID	311-B005-01	EACH
Probe Guide, 205 mm (for diluter)	311-0085-01	EACH
Probe, Open End, 0.033" ID, Long (for diluter)	311-B005-02	EACH
Rack, Sample, 60 position	311-1837P00	PKG/3
Rack, Sample, 90 position	311-1835P00	PKG/3
Rack, Standards, 20 place	311-6501-00	EACH
Rack, Standards, 28 place	311-6502-00	EACH
Sample Line, Coiled	311-2034-00	EACH
Sample Line, Coiled 5 ml (for diluter)	312-5034-00	EACH
Screw, Nylon, probe guide, 3 mm	311-9321-00	EACH
Micropump Tube, Pur/Yel, 322	322-3748P14	PKG/12
Micropump Tube, Red/Grn 322	322-3748P19	PKG/12
Tubing Assembly, Wash Pot, Poly Flow	311-B002-01	EACH
Tubing Assy, 312 Dil/Standards Prep (for diluter)	312-B003-00	EACH
Wash Pot, Traveling with Tubing	311-B006-00	EACH
Wash Pot, Traveling, Std. Prep (for diluter)	311-B010-00	EACH
Syringe, 312	(Please call Service)	

MICROPUMPS

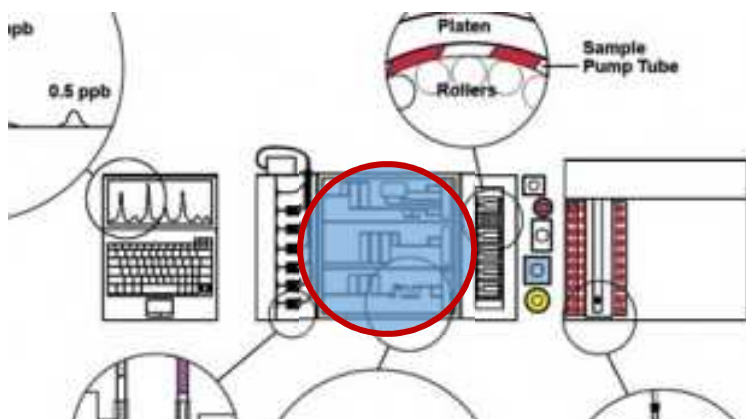


MICROPUMP 302A, 302D, Astoria2 module

Micropump 302, 302A Parts. Pump tubing is listed in the Analytical Cartridge section.

DESCRIPTION	PART NUMBER	UNIT
AIM 0.015"ID, w/Nipples (Small)	302-1015P01	PKG/4
AIM 0.015"ID, w/o Nipples (Small)	302-1015P00	PKG/4
AIM 0.034"ID, w/Nipples (Large)	302-1034P01	PKG/4
AIM 0.034"ID, w/o Nipples (Large)	302-1034P00	PKG/4
Cable, Power, Universal AC	381-4000-00	EACH
Fuse, 1.5 Amp Slo-Blo	381-3000-00	EACH
Fuse, 3 Amp Slo-Blo	381-3012 -00	EACH
Fuse, 5 Amp Slo-Blo	381-3002-00	EACH
Platen, Micropump	302-0211-02	EACH

CARTRIDGE BASE MODULE 303A, ASTORIA2 MODULE, AND ANALYTICAL CARTRIDGES



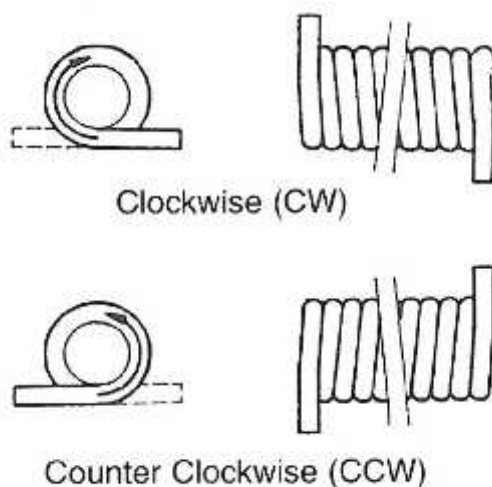
The Analytical Cartridge rests in the 303A Cartridge Base. The Analytical Cartridge is the only module on the system that is configured differently for each test performed. The combination of coils, fittings, tubing and other components have been established on proven flow diagrams after years of research. Please review the Tubing Connection Guide and/or your System Manual if you have questions about specific connections and fittings. For additional questions, please contact Astoria-Pacific Service/Technical Support.

COILS, COLUMNS

DESCRIPTION	PART NUMBER	UNIT
Coil, CCW, 5 Turns	303-0305-00	EACH
Coil, CCW, 10 Turns	303-0310-00	EACH
Coil, CCW, 15 Turns	303-0315-00	EACH
Coil, CCW, 25 Turns	303-0325-00	EACH
Coil, Jacketed Cooling, 15 Turns, 1mm ID	303-0901-02	EACH
Coil, CW, 5 Turns	303-0205-00	EACH
Coil, CW, 10 Turns	303-0210-00	EACH
Coil, CW, 15 Turns	303-0215-00	EACH
Coil, CW, 25 Turns	303-0225-00	EACH

DESCRIPTION	PART NUMBER	UNIT
Column, Cadmium Reduction	303-B511-00	EACH
Column, Ion Exchange	303-B510-00	EACH
Open Tube Cd Reactor (OTCR) 12 in.	303-0500-12	EACH
Open Tube Cd Reactor (OTCR) 24 in.	303-0500-24	EACH
Nitrogen Pillow	303-1075-00	EACH

Glass Coils. The glass coils are designed for mixing and time delay. As a reminder for orders, they are available in 5, 10, 15, and 25 turns, clockwise (CW) and counter-clockwise (CCW) directional wrapping.



FITTINGS AND SPLITTERS

DESCRIPTION	PART NUMBER	UNIT
Connector Block, Manifold Input	303-B039-00	EACH
Fitting, Debubbler	303-0103-00	EACH
Fitting, Debubbler, Rebubble	303-0104-03	EACH
Fitting, Debubbler, C-3A	303-0121-03	EACH
Injection Fitting, Single, 0.8 mm ID	303-0100-01	EACH
Injection Fitting, Single, 1.0 mm ID	303-0108-00	EACH
Injection Fitting, Double, 0.8 mm ID	303-0101-01	EACH
Injection Fitting, Double, 1.0 mm ID	303-0107-00	EACH
Splitter, Sample Stream, 3 Port	303-0110-00	EACH
Splitter, Sample Stream, 4 Port	303-0111-00	EACH
Splitter, Stream, 3 Port, 0.023" ID	303-0112-00	EACH
Splitter, Stream, 3 Port, 0.033" ID	303-0114-00	EACH
Splitter, Stream, 4 Port, 0.023" ID	303-0113-00	EACH
Splitter, Stream, 4 Port, 0.033" ID	303-0115-00	EACH
Tee, Glass	303-0105-00	EACH
Tee, Reagent Addition, Large, PE	303-0109-00	EACH
Tee, Reagent Addition	303-0102-00	EACH

DESCRIPTION

Tee, Resample Injection, 0.5 mm ID
Tube, Connector
Tube, Connector
Tube, Connector, Heat bath
Tube, "L" Long
Tube, "L" Short

PART NUMBER

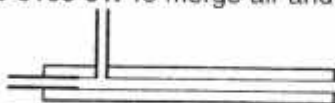
303-0106-00
303-0116-01
303-0117-01
303-0118-01
303-0120-01
303-0119-01

UNIT

EACH
EACH
EACH
EACH
EACH
EACH

Injection Fitting, Single, 0.8 mm ID

303-0100-01. To merge air and carrier stream.

**Injection Fitting, Single, 1 mm ID**

303-0108-00. To merge air and carrier stream at higher flow rates.

**Injection Fitting, Double, 0.8 mm ID**

303-0101-01. To merge air with sample and carrier streams.

**Injection Fitting, Double, 1 mm ID**

303-0107-00. To merge air, sample stream and carrier stream at higher flow rates.

**Reagent Tee Connector, 303-0102-00.**

Designed to add reagent downstream (between mixing coils). For flow rate equal or less than 226 mL/min.



Resample Injection Tee, 303-0106-00. Used as a resample fitting.



NIPPLES AND STRAWS

Nipples are available in four stainless steel sizes and two plastic sizes. Generally, API uses the 0.96mm Polypropylene Straw for reagent lines.

DESCRIPTION	PART NUMBER	UNIT
Filter, polypropylene reagent straw, in-line	303-0013P00	PKG/6
Nipple, N1, 0.4 mm ID x 2 cm (.016" ID/N-12)	303-0040PN1	PKG/6
Nipple, N2, 0.6 mm ID x 2 cm (.023" ID/N-13)	303-0060PN2	PKG/6
Nipple, N3, 0.76 mm ID x 2.5 cm (.030" ID)	303-0076PN3	PKG/6
Nipple, N4, 0.96 mm ID x 2.5 cm(.040" ID)	303-0096PN4	PKG/6
Nipple, N7, Plastic	303-0005P01	PKG/6
Nipple, N8, Plastic	303-0003P01	PKG/6
Nipple, N13 (see N2 above)	303-0060PN2	PKG/6
Straw, Reagent, PEEK,0.76 mm ID (green)	303-0008P00	PKG/6
Straw, Reagent, Polypropylene, 0.96 mm ID	303-0012P00	PKG/6

PUMP TUBING

Micropump Tubes are made of PVC. Color coded shoulders indicate the internal diameter and are specified below. The indicated flowrates represent nominal flow volume when used on a Micropump 302A, 302D and Astoria2. Other pumps may yield a different flowrate.

DESCRIPTION	PART NUMBER	UNIT
PVC Micropump Tube,Orn/Blu	178-3748P03	PKG/12
PVC Micropump Tube,Orn/Grn	178-3748P04	PKG/12
PVC Micropump Tube,Orn/Yel	178-3748P05	PKG/12
PVC Micropump Tube,Orn/Wht	178-3748P06	PKG/12
PVC Micropump Tube,Blk/Blk	178-3748P07	PKG/12
PVC Micropump Tube,Orn/Orn	178-3748P08	PKG/12
PVC Micropump Tube,Wht/Wht	178-3748P09	PKG/12
PVC Micropump Tube,Red/Red	178-3748P10	PKG/12
PVC Micropump Tube,Gry/Gry	178-3748P11	PKG/12
PVC Micropump Tube,Yel/Yel	178-3748P12	PKG/12
PVC Micropump Tube,Yel/Blu	178-3748P19	PKG/12
PVC Micropump Tube,Blu/Blu	178-3748P13	PKG/12
PVC Micropump Tube,Grn/Grn	178-3748P14	PKG/12
PVC Micropump Tube,Pur/Pur	178-3748P15	PKG/12
PVC Micropump Tube,Pur/Blk	178-3748P16	PKG/12
PVC Micropump Tube,Pur/Wht	178-3748P18	PKG/12

TUBING, GENERAL

Tubing is available in different materials and sizes. The following tubing is recommended for use on micro flow systems.

PVC Tubing

PVC tubing is used for various connections on the Astoria and Astoria2 analyzer.

DESCRIPTION	PART NUMBER	UNIT
Tubing, PVC, 0.025" ID	303-2225P01	PKG/10 ft
Tubing, PVC, 0.030" ID	303-2230P01	PKG/10 ft
Tubing, PVC, 0.035" ID	303-2235P01	PKG/10 ft
Tubing, PVC, 0.040" ID	303-2240P01	PKG/10 ft
Tubing, PVC, 0.065" ID	303-2265P01	PKG/10 ft
Tubing, PVC, 0.090" ID	303-2290P01	PKG/10 ft
Tubing, PVC, 0.100" ID	303-2291P01	PKG/10 ft
Tubing, PVC, 0.110" ID	303-2292P01	PKG/10 ft
Tubing, PVC, 3/8" ID x 1/2" OD, Waste Line (303A)	303-2205P06	PKG/6 ft
Tubing, PVC, 1/4" ID x 3/8" OD, Misc.	303-2204-01	FT
Tubing, PVC, 1/8" ID x 1/4" OD, Sleeve	303-2203-01	FT
Tubing, PVC, 5/16" x 1/2" OD, Waste Line (Astoria2)	303-2207P07	PKG/7 ft

Silicone Tubing

Heat resistant, soft and flexible; for use on heat bath connections.

DESCRIPTION	PART NUMBER	UNIT
Tubing, Silicone, .020" ID	303-2320-01	FT
Tubing, Silicone, .030" ID	303-2330-01	FT
Tubing, Silicone, .073" ID	303-2373-01	FT

Poly Flow Tubing

Poly Flow is often used on the debubbler line off of the flowcell. It is sometimes used as a sample line on the 311 for system in Wineries.

DESCRIPTION	PART NUMBER	UNIT
Tubing, Poly Flow, .031" ID	303-2674P10	PKG/10

Teflon Tubing

Non-wetable; used in non-bubble locations. Please specific length of tubing required.

DESCRIPTION	PART NUMBER	UNIT
Tubing, Teflon, .3 mm ID	306-0224-07	FT
Tubing, Teflon, .5 mm ID	303-2741-01	FT
Tubing, Teflon, .8 mm ID	303-2730-01	FT

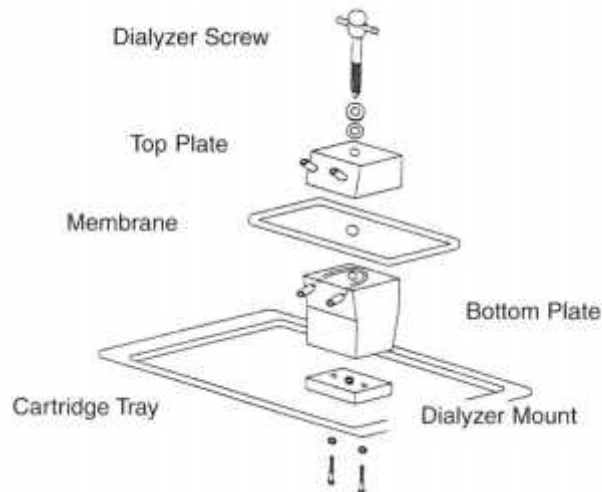
Polyethylene (PE) Transmission Tubing

All tubing which is not pump tubing is defined as general transmission tubing. Polyethylene tubing is used for its flexibility, wetability and chemically inert properties. Two sizes of polyethylene tubing are used:

1. 0.034" ID Used for reagent lines for large (>226 µL/min) pump tubing and general transmission tubing for segmented streams. It is also used for inlet and outlet tubing for flowcells, heating baths and dialyzers.
2. 0.015" ID Used for reagent lines for small (226 µL/min or less) pump tubing and air valve inlet and outlet.

DESCRIPTION	PART NUMBER	UNIT
Tubing, PE, .015" ID	303-2515P01	PKG/10 ft
Tubing, PE, .030" ID	303-2530P01	PKG/10 ft
Tubing, PE, .034" ID	303-2534P01	PKG/10 ft

DIALYZERS, MEMBRANES, HARDWARE AND TOOLS



Dialyzer Assembly

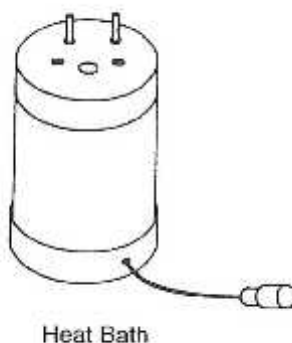
DESCRIPTION	PART NUMBER	UNIT
Dialysis Membrane, Premount C	303-0806P00	PKG/12
Dialysis Membrane, Premount H	303-0807P00	PKG/12
Dialysis Membrane, Premount T, 6 in.	303-0837-00	PKG/12
Dialysis Membrane, Premount T, 12 in.	303-0839-00	PKG/12
Dialyzer Assembly, 1 in.	303-0802-00	EACH

DESCRIPTION	PART NUMBER	UNIT
Dialyzer Assembly, 4.3 in.	303-0803-00	EACH
Dialyzer Assembly, 6 in.	303-0804-00	EACH
Dialyzer Assembly, 12 in.	303-0805-00	EACH
Dialyzer Mount, Lg. w/ screws	303-0711-01	EACH
Dialyzer Mount, Sh. w/ screws	303-0710-01	EACH
Dialyzer Screw Assembly	303-B842-00	EACH
Wrench, Torque, 25 in.lb	303-0715-00	EACH

NOTE: Premount T (Teflon) membranes are pre-cut and holed-punched for a specific size of dialyzer assembly. For example, Premount T, 6 in, P/N 303-0837-00, fits Dialyzer Assembly, 6 in, P/N 303-0804-00.

HEATING BATHS

For 303A current production models. Heating Bath has 7 pin plug. Make sure to specify if your system is 110V or 220V



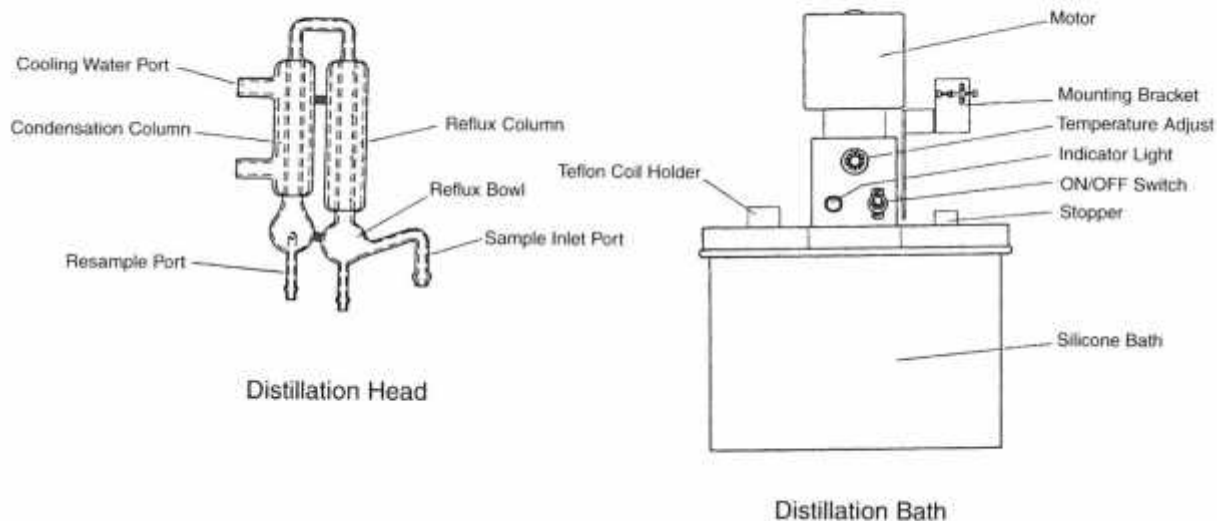
DESCRIPTION	PART NUMBER	UNIT
Heating Bath, 2.0 mL 110V	303-A020-110	EACH
Heating Bath, 2.0 mL 220V	303-A020-220	EACH
Heating Bath, 4.0 mL 110V	303-A040-110	EACH
Heating Bath, 4.0 mL 220V	303-A040-220	EACH

CLIPS, TIES AND HARDWARE AND OTHER MISCELLANEOUS

DESCRIPTION	PART NUMBER	UNIT
Bottle, Reagent, 500 mL	303-0830P00	PKG/10
Clip, Coil	303-0708P00	PKG/10
Clip, Fitting	303-0709-00	EACH
Clip, Press-on	381-8005P00	PKG/10
Clip, Pump Tube	383-0308-00	EACH
Clip, Thermometer	303-0716-00	EACH
Cover, Cartridge, Plexiglass	303-0706-01	EACH
Cover, Cartridge, Plexiglass, long	303-0736-02	EACH
Fuse, 1 AMP, Fast Blow, 5x20mm	381-3004-00	EACH

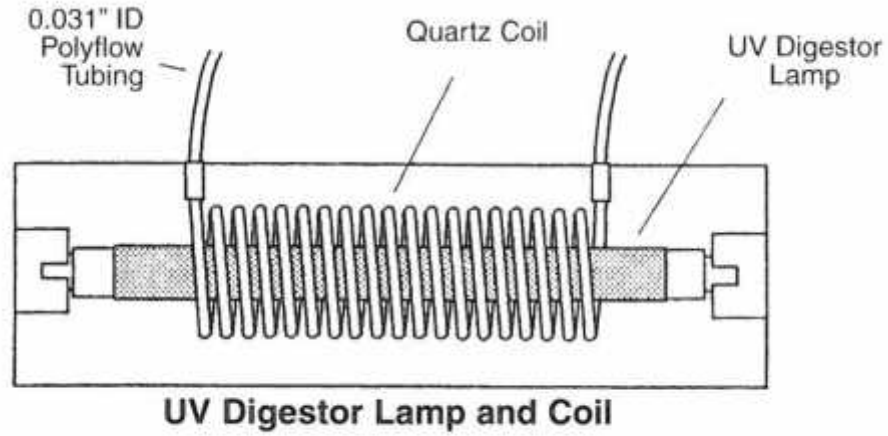
Nitrogen Pillow	303-1075-00	EACH
Straw, Reagent, PEEK,0.76 mm ID	303-0008P00	PKG/6
Straw, Reagent, Polypropylene,0.96 mmID	303-0012P00	PKG/6
Tie Strap, 4 inch	381-8040P01	PKG/100
Tie Strap, 7.5 inch	381-8075P01	PKG/100
Tie Strap, 11 inch	381-8110P01	PKG/50
Tool KIT, general hardware	384-B100-01	KIT
Waste Bottle, 2.5 Gal w/Fitting	460-0142	EACH
Wrenches, Allen	383-B900-01	SET

DISTILLATION MODULE



DESCRIPTION	PART NUMBER	UNIT
Bracket, Distillation Head (361/362 only)	303-B361-00	EACH
Coil, Distillation, 3 Turns	303-0823-02	EACH
Coil, Distillation, 14 Turns	303-0810-00	EACH
Coil, Distillation, Teflon, w/Top Plate	303-B737-00	EACH
Coil Holder, Teflon	303-0726-00	EACH
Coil, Teflon w/Support, Fluoride	303-B736-00	EACH
Distillation Head	303-0809-04	EACH
Silicone Oil	333-0003-01	GAL
Thermometer (Distillation Bath)	303-0820-00	EACH

UV DIGESTOR MODULE



DESCRIPTION

Coil, UV Digestor, 30T Quartz
 Coil, UV Digestor, 75T Quartz (TDN)
 Fuse, 1.5 Amp, Slo-Blo
 Lamp, UV Digestor, 8W
 Tubing, Poly Flow, .031" ID

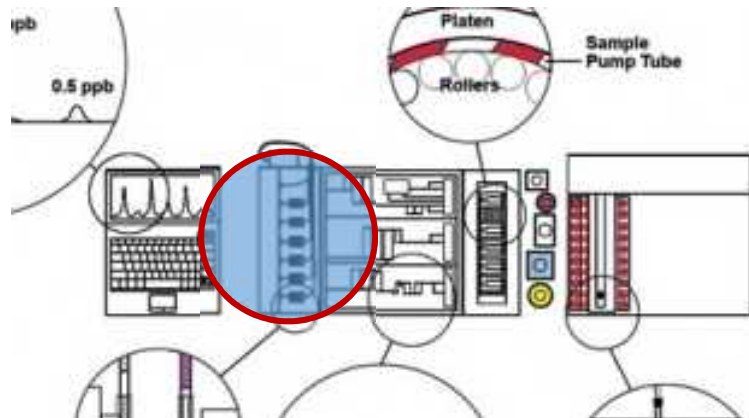
PART NUMBER

303-0512-01
 303-0513-00
 381-3000-00
 381-0052-00
 303-2674-01

UNIT

EACH
 EACH
 EACH
 EACH
 FT

DETECTORS



307-P, ASTORIA2, 305D DETECTORS

The 307 Photometer Configuration (307-P), Astoria2 and 305D use the same digital detector, and therefore, use the same filters, filter holders and flowcell holders.

Lamp Source:

DESCRIPTION	PART NUMBER	UNIT
Lamp Source, Digital Detector	381-0051-00	EACH

Flowcells And Flowcell Holders

Flowcells are available in different sizes. The standard flowcells for the 305D, Astoria2 and 307, are 315-0106-00 and 315-0115-00. Special methods use 305-0115-01 and 305-0120-01.

The Flowcell KIT, Low Level, 50mm, PN 340-B007-00, is a Liquid Waveguide Capillary Cell for ultra-low-level application. It increases sensitivity by 5X – 10X depending on the application.

DESCRIPTION	PART NUMBER	UNIT
Flowcell, 6 mm x 1.5 mm ID	315-0106-00	EACH
Flowcell, 10 mm x 1.5 mm ID	315-0115-00	EACH
Flowcell, 15 mm x 0.5 mm ID	305-0115-01	EACH
Flowcell, 20 mm x 0.5 mm ID	305-0120-01	EACH
Flowcell Holder w/Thumbscrew, Digital Detector	305-6704-00	EACH
Flowcell KIT,Low Level,50mm	340-B007-00	EACH
Tubing KIT, Low Level Flowcell	340-B100-00	EACH

Interference Filters

Interference filters are provided either individually or mounted in a holder for protection and operating convenience. Filters should be stored in a cool, dry place to prevent delamination. Avoid touching filter surface. Clean with optic cloth and optical cleaner.

DESCRIPTION	PART NUMBER	UNIT
Filter, 405 nm	305-1405-00	EACH
Filter, 410 nm	305-1410-00	EACH
Filter, 420 nm	305-1420-00	EACH
Filter, 440 nm	305-1440-00	EACH
Filter, 450 nm	305-1450-00	EACH
Filter, 460 nm	305-1460-00	EACH
Filter, 480 nm	305-1480-00	EACH
Filter, 505 nm	305-1505-00	EACH
Filter, 520 nm	305-1520-00	EACH
Filter, 530 nm	305-1530-00	EACH
Filter, 540 nm	305-1540-00	EACH
Filter, 550 nm	305-1550-00	EACH
Filter, 560 nm	305-1560-00	EACH
Filter, 570 nm	305-1570-00	EACH
Filter, 580 nm	305-1580-00	EACH
Filter, 590 nm	305-1590-00	EACH
Filter, 600 nm	305-1600-00	EACH
Filter, 610 nm	305-1610-00	EACH
Filter, 620 nm	305-1620-00	EACH
Filter, 630 nm	305-1630-00	EACH
Filter, 640 nm	305-1640-00	EACH
Filter, 660 nm	305-1660-00	EACH
Filter, 690 nm	305-1690-00	EACH
Filter, 750 nm	305-1750-00	EACH

DESCRIPTION	PART NUMBER	UNIT
Filter, 810 nm	305-1810-00	EACH
Filter, 820 nm	305-1820-00	EACH
Filter, 880 nm	305-1880-00	EACH
Filter Holder, Reference Channel	305-6706-00	EACH
Filter Holder, Sample Channel, Digital Detector	305-6705-00	EACH
Filter, Neutral Density, 30x	305-6710-00	EACH
Filter, Neutral Density, 400x (for Ref. Ch)	305-6713-00	EACH
Filter, Neutral Density, 60x	305-6711-00	EACH
Filter, Neutral Density, 90x	305-6712-00	EACH
Filter, Neutral Density, 130x	305-6718-00	EACH
Filter, Neutral Density, 200x	305-6714-00	EACH

307 FLUOROMETER



The 307 Fluorometer Configuration (307-F) uses an Interference Filter for its emission wavelength—i.e. Fluorometric Ammonia can use a 430 nm, 450 nm or 470 nm Interference Filter, and it can also use a 430-470nm bypass filter, PN 306-0954-42. The 307 F uses a LED of a specific wavelength for that specific test—i.e. Fluorometric Ammonia uses a 360 nm LED in the Fluorometric Module. Please contact Customer Care or Service for LED replacement.

306A/321 FLUOROMETER

We still have several 306A and 321 Fluorometers in the field and therefore provide the following:

DESCRIPTION	PART NUMBER	UNIT
Disc, Aperture, Large	306-0907-04	EACH
Disc, Aperture, Small	306-0907-03	EACH
Filter, Fluorometer, 305-395 nm	306-0953-12	EACH
Filter, Fluorometer, 310-410 nm	306-0953-16	EACH
Filter, Fluorometer, 430-470 nm	306-0954-42	EACH
Filter, Fluorometer, 435-650 nm	306-0954-46	EACH
Filter, Fluorometer, 475-650 nm	306-0954-52	EACH
Filter, Fluorometer, 510-650 nm	306-0955-64	EACH
Filter, Fluorometer, 530-570 nm	306-0955-68	EACH
Filter, Fluorometer, 360 nm	306-0963-60	EACH
Filter, Fluorometer, 430 nm	306-0964-30	EACH
Filter, Fluorometer, 450 nm	306-0964-50	EACH
Filter, Fluorometer, 550 nm	306-0965-50	EACH
Flowcell, Fluorometer, 0.6 µL	306-0206-00	EACH
Flowcell, Fluorometer, 9 µL	306-0203-00	EACH
Housing, Detector w/PMT	306-B201-00	EACH
KIT, Fluorometer Tubing	306-B225-00	EACH
Lamp, Quartz Halogen, 50W	381-0050-00	EACH
Lens, Excitation	306-0205-00	EACH
O-ring, Filter, Excitation	306-0908-00	EACH
Tubing, Teflon, 0.3 mm ID	306-0224-07	FT

DISCRETE ANALYZER PARTS AND SUPPLIES

Discrete analyzers are designed to accommodate various sample types and workloads. Astoria-Pacific currently offers the rAPID-T System. We also support the Astoria Discrete, which was the rAPID-T's predecessor.

COMMON PARTS USED BY BOTH SYSTEMS:

DESCRIPTION	PART NUMBER	UNIT
Sample Cup, 4mL, PKG/1000	301-1018P01	PKG/1000
Vial, Amber Serum, 10mL, PKG/4	400-0010P04	PKG/4
Bottle, Clear, HDPE, 15mL, PKG/12	400-0085P12	PKG/12
Bottle, Clear, HDPE, 30 mL, PKG/12	400-0086P12	PKG/12

rAPID-T SYSTEM



The rAPID-T System is Astoria-Pacific's current discrete analyzer.

DESCRIPTION	PART NUMBER	UNIT
Chemwash Cleaning Solution, 8oz	80-0005-250	EACH
Grease Pkt, LeadScrew, (for Syringe lead screw)	310-0093	EACH
Cuvettes, Box/100	400-B500-00	EACH
Lamp, Halogen, 10W (Lamp only)	310-0095	EACH
Lubrication Oil (for all other lead screws)	310-0094	EACH
Photometer Lamp Assy (lamp premounted in assy)	310-0126	EACH
Premium Probe Tip	310-0106	EACH
Rack, Sample/Reagent, rAPID-T	400-0300-00	EACH
Syringe, 0.5mL	310-0091	EACH

ASTORIA DISCRETE

The Astoria Discrete system was Astoria-Pacific's previous discrete analyzer.

DESCRIPTION	PART NUMBER	UNIT
Bottle KIT, Waste/Wash	400-B110-00	EACH
Discrete Blank Solution, 30mL	80-0401-30	EACH
Discrete Wash Conc., 100mL	80-402-100	EACH
Discrete PNP Self-Test Soln	80-403-00	EACH
Disk, Filter, Aerosol, Discrete	400-0330-00	EACH
Nitrate Wash Conc., 100mL	80-0413-100	EACH
Plate, Reaction	400-0360-00	EACH
Plate, Reduction, Complete (NO ₃ +NO ₂ Method)	400-B360-00	EACH
Probe Brace, Sample	310-0053	EACH
Rack, Reagent	400-0350-00	EACH
Rack, 60 Place (Sample)	400-0380-00	EACH
Rack, 96 Place (Sample)	400-0390-00	EACH
O-Ring, Insert Mandrel	310-0073	EACH
O-Ring, Probe, Orange	310-0057	EACH
Strips, Microwell, PKG/320	400-0320P00	PKG/320
Syringe, 50uL	310-0059	EACH
Syringe, 2.5mL	310-0060	EACH
Test Tube, 12X75mm, PKG/250	311-0118P250	PKG/250
Tool KIT	400-B100-00	EACH
Tubing, Pinch Valve, Discrete, PKG/5	400-0400-00	PKG/5
Wash Head, 8 Probe	310-0053	EACH
Wells, Reduction, Complete (NO ₃ +NO ₂ Method)	400-B200-00	PKG/4



REAGENTS, SURFACTANTS AND REAGENT KITS

Astoria-Pacific offers a variety of reagents for methods, wetting agents (surfactants), and cleaning.

ASTORIA AND ASTORIA2 REAGENTS

DESCRIPTION	PART NUMBER	UNIT
Chloramine-T,12g	80-6020-61	EACH
Potassium Cyanide,1g	80-6025-72T	EACH
Ammonium Acetate,100g;Makes 2L	80-6030-250	EACH
Sulfanilic Acid,20g;Makes 2L	80-6035-61	EACH
Potassium Phosphate,27.22g;Mak	80-6045-61	EACH
Nicotine Salicylate,0.463g	80-6060-72T	EACH
PAHBAH,30g;Makes 500mL	80-7030-60	EACH
Citric Acid,10.5g;Makes 500mL	80-7035-61	EACH
Calcium Chloride,0.338g	80-7040-72	EACH
Invertase,200mg	80-7050-61K	EACH
Glucose,1g;Makes 500mL	80-7061-72	EACH
Fructose,1g;Makes 500mL	80-7062-72	EACH
Sucrose,1g;Makes 500mL	80-7063-72	EACH
Sulfite A465, DTNB Reagent, 0.38g, makes 500mL	70-9471-500	EACH
Sulfite A464/A465, Hydrochloric Acid,125m	80-9010-04C	EACH
Sulfuric Acid A464, 0.4N,125mL	80-9020-04	EACH
Sulfite A464, Formaldehyde Solution,	80-9030-73	EACH
Sulfite A464, Rosaniline Prepared Re	80-9050-500	EACH
Sulfite A464/A465, Stock Standard Sodium	80-9060-72	EACH
Sulfite A464/A465, Standard Stabilizing B	80-9061-61	EACH
Sulfite A465, Tris, 1L	80-0002-1L	EACH
Volatile Acid A470, Sulfuric Acid,12	80-9110-04C	EACH
Volatile Acid A470, Sodium Acetate,2	80-9120-73	EACH
Volatile Acid A470, Color Reagent,10	80-9150-04	EACH
Vol.Acid A470, Stock Std,1.2 g/100mL	80-9160-76	EACH
Ammonia A023, Complex Reagent Conc.,	80-9201-500	EACH
Ammonia A023, Sodium Hydroxide 3.4N,	80-9202-04C	EACH
Ammonia A023, Phenol,60%,10mL	80-9203-72T	EACH
Ammonia A023, Nitroferri CN,250mg	80-9204-72	EACH
Ammonia A023, Hypochlorite,30mL	80-9205-01C	EACH
Ammonia A023, Stock Std,1000mg/L(60m	80-9206-02	EACH
Phosphate A203, Sulfuric Acid,5N,400	80-9211-500C	EACH
Phosphate A203, Antimony Potassium Tartrate	80-9212-08	EACH
Phosphate A203, Ammonium Molybdate,4	80-9213-01	EACH
Phosphate A203, Ascorbic Acid,1.44g;	80-9214-72	EACH
Phosphate A203, Stock Std,1000mg/L,6	80-9215-02	EACH
NO ₃ /NO ₂ A173, Ammonium Chloride,500mL	80-9221-500	EACH
NO ₃ /NO ₂ A173, Phosphoric Acid,25mL	80-9222-01C	EACH
NO ₃ /NO ₂ A173, Sulfanilamide,10g	80-9223-61	EACH
NO ₃ /NO ₂ A173, N-E-D,500mg	80-9224-72	EACH
NO ₃ /NO ₂ A173, Nitrate Standard,60mL	80-9225-02	EACH
NO ₃ /NO ₂ A173, Copper Sulfate,2%,250mL	80-9226-08	EACH
NO ₃ /NO ₂ A173, Nitrite Standard,60mL	80-9227-02	EACH

DESCRIPTION	PART NUMBER	UNIT
Alcohol Enzyme Reagent,100mL	80-9231-72K	EACH
Tetrazolium Conc.in DMSO,40mL	80-9234-75	EACH
NADP,200mg	80-9235-72K	EACH
Tetrazolium,Conc./Ethanol 40mL	80-9236-75F	EACH
Glucose (HK),Makes 125mL	80-9245-72K	EACH

SURFACTANTS, CLEANING REAGENTS AND OTHER

DESCRIPTION	PART NUMBER	UNIT
Aerosol-22, 4oz (125mL)	90-0701-04	EACH
Antifoam-B,1oz.	90-0703-01	EACH
Brij-35, 30%, 4oz	90-0710-04	EACH
Brij-35, 30%, 32oz	90-0710-32	EACH
Chemwash Cleaning Solution,8oz	80-0005-250C	EACH
Chemwash Cleaning Solution,32o	80-0005-32C	EACH
Contrad®NF Cleaning Solution,4	80-0007-04C	EACH
Contrad®NF Cleaning Solution,3	80-0007-32C	EACH
Dowfax 2A1, 4oz	90-0720-04	EACH
Dowfax 2A1, 32oz	90-0720-32	EACH
Neutrad® Cleaning Solution,4oz	80-0006-04	EACH
Silicone Oil,1 GAL	333-0003-01	EACH
Silicone Oil,32 oz.	333-0003-32	EACH
Sodium Lauryl Sulfate,15%,4oz	90-0740-04	EACH
Sodium Lauryl Sulfate,15%,32oz	90-0740-32	EACH
Detergent TX-10, 4oz	90-0760-04	EACH
Detergent TX-10, 32oz	90-0760-32	EACH
Triton X-100, 4oz	90-0770-04	EACH
Triton X-100, 32oz	90-0770-32	EACH
Tween-20, 4oz	90-0774-04	EACH
Ethomid,20% Solution,4 oz.	90-0792-04	EACH

rAPID-T AND DISCRETE ANALYZER REAGENTS, APPLICATION/METHOD KITS, AND STANDARDS

DESCRIPTION	PART NUMBER	UNIT
a-AMINO N (NOPA) Stk Std,300mg (for MG & SG)	70-9506-13K	EACH
Acetic Acid Std.,1g/Liter,15mL (for MG & SG)	70-9426-15K	EACH
Acetic Acid,Enzymatic Rgt KIT (MG)	70-9420-13K	KIT
Acetic Acid,SG,Reagent KIT	70-9502-13K	KIT
Amino Nitro (NOPA),SG,Rgt KIT	70-9503-13K	KIT
Ammonia Nitrogen,SG,Rgt KIT	70-9504-13K	KIT
Ammonia Rgt KIT, Enzymatic (MG*)	70-9440-13K	KIT
Ammonia Stk Std,1000mg/L ,15mL (for MG & SG)	70-9442-15K	EACH
Discrete Blank Solution,30mL	80-0401-30	EACH
Discrete PNP Self-Test Soln	80-0403-00	EACH
Discrete Wash Conc.,100mL	80-0402-100	EACH
DTNB Reagent,0.38g, makes 500mL (Total SO ₂)	70-9471-500	EACH

DESCRIPTION	PART NUMBER	UNIT
Glu + Fru Reagent KIT (MG)	70-9400-13K	KIT
Glucose Stock Standard,12 g/L (for MG & SG)	70-9409-15K	EACH
Glucose+Fructose,SG,Rgt KIT	70-9501-13K	KIT
Hydrochloric Acid,0.2N,250mL (for NO ₃ /NO ₂ Cd)	80-0414-08	EACH
L-Malic ACID,SG,Reagent KIT	70-9505-13K	KIT
L-Malic Reagent KIT (MG)	70-9410-13K	KIT
L-Malic Stock Std.,3g/L,15mL (for MG & SG)	70-9416-15K	EACH
Nitrate Wash Conc.,100mL (for NO ₃ /NO ₂ Cd)	80-0413-100	EACH
Primary Amino Nitrogen (NOPA) (MG)	70-9430-13K	KIT
Tris Buffer, makes 1L (for Total SO ₂)	80-0002-1L	EACH

***NOTE: MG = Megazyme Kit | SG = Steroglass Kit**

TUBING AND CONNECTIONS GUIDE

The intent of this section is to highlight some of the techniques in making fitting connections that can lead to the best performance of the Astoria2 cartridges. The importance of good connections throughout the Astoria2 system cannot be overstated. Gaps in tubing connections, or worse, in glass-to-glass connections, can cause increased carryover and decreased precision, adversely affecting the quality of your data. By carefully following the guidelines below, you can greatly reduce the possibility of hydraulic problems in your analysis. Some tips also are provided for improving peak shape

TRIMMING LENGTHS OF TUBING

In most other cases, excess tubing can be trimmed away. In general, the only cases in which the length of the tubing is critical are

- Incubation Bath tubing
- Anything attached to a sample or resample line

A NOTE ON DEBUBBLER FITTINGS

There are a variety of debubbler fittings used on the Astoria2, and to some extent they can be interchangeable.

THE 303-0122-00 DEBUBBLER

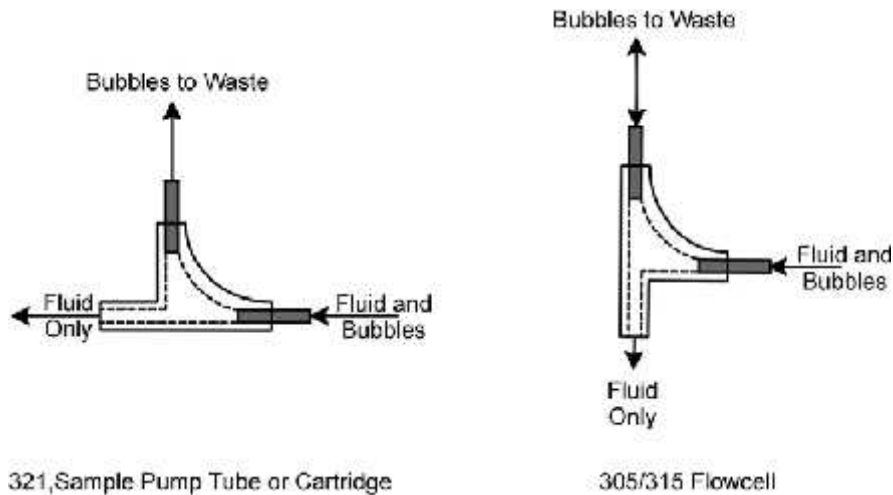


Diagram 1

303-0122-00 Debubbler Fitting

The 303-0122-00 Debubbler is the most commonly used debubbler on the Astoria2. The diagram above shows two ways of using the 303-0122-00. When the fluid stream is horizontal as shown on the left, the debubbler can be attached to a sample pump tube before the pump or an ion exchange column on the cartridge. When the fluid stream is vertical as shown on the right, the debubbler can be attached to a flowcell for the Astoria2. The two platinum nipples on the 303-0122-00 debubbler connect directly to the 0.034" ID PE tubing that is used as general transmission tubing on the Astoria2.

THE 303-0103-00 DEBUBBLER

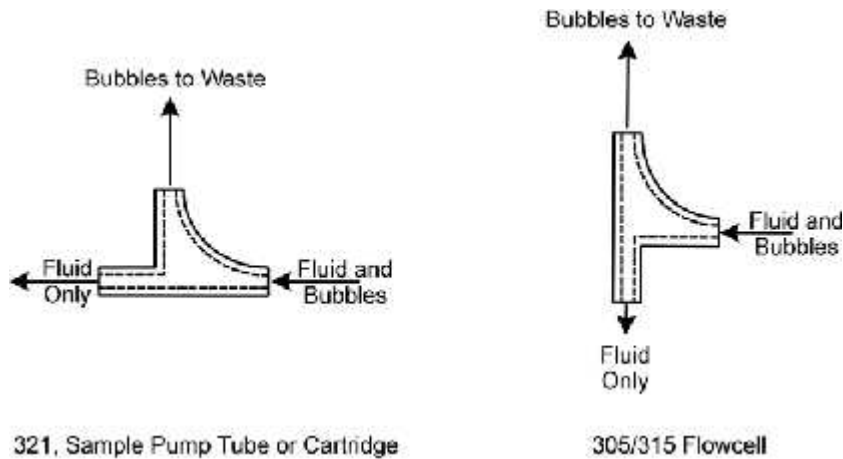


Diagram 2

303-0103-00 Debubbler Fitting

The 303-0103-00 debubbler is very similar to the 303-0122-00 except that it has no connection nipples. Therefore, it can be used where more than one Glass to Glass connection is needed. To use the 303-0103-00 in place of the 303-0122-00 debubbler, attach Component Connections on the "Bubbles to Waste" and "Fluid and Bubbles" ports. N3 nipples (API p/n 303-0076PN3) may be used in conjunction with Component Connections as needed.

THE 303-0121-03 DEBUBBLER

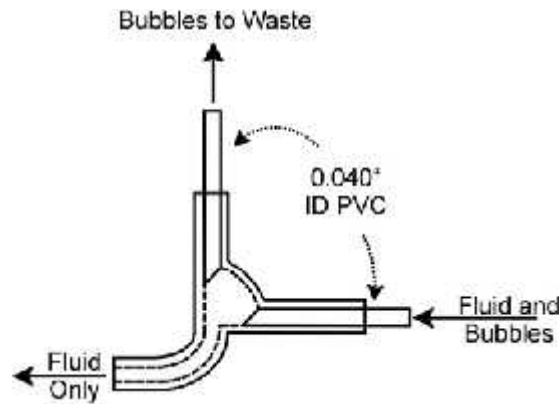


Diagram 3

303-0121-03 Debubbler Fitting

The 303-0121-03 Debubbler (also known as the C3A Debubbler) is primarily used as the resample debubbler after a distillation step in the cartridge. It has a slightly larger internal volume than the 303-0122-00 or the 303-0103-00 debubblers, so it should not be used in places where a smaller debubbler is indicated. Two pieces of 0.040" ID PVC tubing (or two pieces of wht/wht pump tubing), cut at a 45° angle, provide the connection for the inlet and waste ports of the 303-0121-03 Debubbler. Refer to Debubble/Resample After Distillation for instructions on configuring the 303-0121-03 Debubbler.

PUMP TUBING

Micropump tubing is specifically designed for use on a peristaltic pump. It has a precisely manufactured internal diameter to insure proper and consistent flowrates. Flowrate of a given pump tube is determined by the internal diameter of the tube, speed of the pump and degree of compression of the tube. The flowrates listed below are the normal Astoria2 flowrates with the Micropump speed set at 42.

Each size of pump tube is identified by the color(s) of the shoulders. The table below is a cross-reference guide between 303-XXXX-PXX and 178-XXXPXX tubing:

MICROPUMP TUBE COLOR CODE

Table 1: MICROPUMP TUBE COLOR CODE

Old Part No.	Description	New Part No.	Description
303-1010P01	Micropump Tube,37uL/min,Orn/Blu	178-3748P03	PVC Micropump Tube,Orn/Blu
303-1015P01	Micropump Tube,74uL/min,Orn/Grn	178-3748P04	PVC Micropump Tube,Orn/Grn
303-1020P01	Micropump Tube,118uL/min,Orn/Yel	178-3748P05	PVC Micropump Tube,Orn/Yel
303-1025P01	Micropump Tube,166uL/min,Orn/Wht	178-3748P06	PVC Micropump Tube,Orn/Wht
303-1030P01	Micropump Tube,226uL/min,Blk/Blk	178-3748P07	PVC Micropump Tube,Blk/Blk
303-1035P01	Micropump Tube,287uL/min,Orn/Orn	178-3748P08	PVC Micropump Tube,Orn/Orn
303-1040P01	Micropump Tube,385uL/min,Wht/Wht	178-3748P09	PVC Micropump Tube,Wht/Wht
303-1045P01	Micropump Tube,482uL/min,Red/Red	178-3748P10	PVC Micropump Tube,Red/Red
303-1051P01	Micropump Tube,568uL/min,Gry/Gry	178-3748P11	PVC Micropump Tube,Gry/Gry
303-1056P01	Micropump Tube,642uL/min,Yel/Yel	178-3748P12	PVC Micropump Tube,Yel/Yel
303-1060P01	Micropump Tube,722uL/min,Yel/Blu	178-3748P19	PVC Micropump Tube,Yel/Blu
303-1065P01	Micropump Tube,745uL/min,Blu/Blu	178-3748P13	PVC Micropump Tube,Blu/Blu
303-1073P01	Micropump Tube,947uL/min,Grn/Grn	178-3748P14	PVC Micropump Tube,Grn/Grn
303-1081P01	Micropump Tube,1035uL/min,Pur/Pur	178-3748P15	PVC Micropump Tube,Pur/Pur
303-1090P01	Micropump Tube,1200uL/min,Pur/Blk	178-3748P16	PVC Micropump Tube,Pur/Blk
303-1100P01	Micropump Tube,Pur/Orn,0.100"ID	Discontinued	(When old stock is gone)
303-1110P01	Micropump Tube,Pur/Wht,0.110"ID	178-3748P18	PVC Micropump Tube,Pur/Wht

SAMPLER WASH LINES

311 XYZ SAMPLER W/O 322 AUXILIARY PUMP

TABLE 2: 311 SAMPLER WASH PUMP TUBES

If your total sample flowrate ¹ is:	Use this as the feed for the wash pot	Use this as the waste pull-off
Up to 500 µl/min	YEL/BLU (722 µl/min)	GRN/GRN (942 µl/min)
500 - 700 µl/min	PUR/PUR (1035 µl/min)	2 x YEL/YEL ² (1284 µl/min)
700 - 1200 µl/min	2 x YEL/BLU (1444 µl/min)	BLU/BLU + GRN/GRN ² (1687 µl/min)

- ¹ To calculate the total sample flowrate, add up the flowrates of the individual sample pump tubes for the cartridges being run. Don't forget to include sample debubbler waste tubes and helper lines.
- ² Connect two pump tubes with a three-port stream splitter (API p/n 303-0114-00). If necessary, connect three pump tubes with a four-port stream splitter (API p/n 303-0115-00).

The flowrate of the inlet pump tube into the 311 XYZ Sampler Wash Pot must exceed the total sample flowrate by enough to provide efficient rinsing of the sample probe as well as enough wash solution between sample draws.

For the inlet pump tube, provide at least 200 - 300 µl/min more than the total sample flowrate. Two steps up in shoulder colors is usually enough; refer to **Table 1** for pump tube colors and flowrates. For the outlet pump tube, use a pump tube (or a combination of pump tubes) that is two more sizes larger than the inlet pump tube or at least 200 - 300 µl/min more than the inlet flowrate. Pump tubes can be combined as necessary to achieve the necessary flowrate.

To Wash Pot Inlet

Use an N8 nipple (API p/n 303-0003P01) to connect the inlet pump tube to 0.5" of 0.040" ID PVC tubing (API p/n 303-2240P01). Connect the 0.040" ID PVC tubing to the 0.034" ID PE inlet tubing on the 311 Wash Pot. See the instructions in Reagent Lines - Wht/Wht to Grn/Grn for guidelines on connecting the other end to a Wash line for the Sampler Wash.

From Wash Pot Outlet

Use an N8 nipple (API p/n 303-0003P01) and 1/2" of 0.040" ID PVC tubing (API p/n 303-2240P01) to connect the outlet pump tube to the outlet tubing on the 311 Wash Pot. Connect the other end of the pump tube to the Input Connector Block, and direct the liquid stream to waste with 0.034" ID PE tubing (API p/n 303-2534P01).

NOTE: You can substitute 0.031" ID Poly Flow tubing (API p/n 303-2674-01) for the 0.034" ID PE and 0.040" ID PVC tubings on the Wash Pot Outlet to eliminate any drips from the Wash Pot due to surging.

301D SAMPLER (LEGACY SYSTEMS)

WASH Station Pump Tube volume recommendations

TABLE 3: 301D SAMPLER WASH PUMP TUBES

If your total sample flowrate¹ is:	Use this as the feed for the wash pot
less than 500 µl/min	grn/grn (942 µl/min)
500 - 600 µl/min	pur/pur (1,035 µl/min)
600 - 700 µl/min	pur/blk (1,200 µl/min)

¹ To calculate the total sample flowrate, add up the flowrates of the individual sample pump tubes for the cartridges being run. Don't forget to include sample debubbler waste tubes and helper lines.

The flowrate of the pump tube into the 301D sampler reservoir must be at least twice that of the total sample flowrate.

To Sampler Reservoir

Connect the pump tube to an appropriate length (usually 2 - 3', depending on the placement of your 301D) of 0.040" ID PVC tubing with an N8 nipple.

Connect the 0.040" ID PVC tubing to the Luer lock cap on the reservoir inlet.

111 XYZ SAMPLER (LEGACY SYSTEMS)

If your 111 XYZ Sampler uses a 322 Auxiliary Pump, please refer to the connections in the 322 Manual. If your 111 XYZ Sampler uses a 302D or Astoria2 micropump, consult your System Manual for suggested flow rates.

411S/411L SAMPLERS

The 411S/L Samplers have built-in Wash and/Waste Pump Stations and do not use the 302A, 302D or Astoria2 micropump.

ON THE PUMP

SAMPLE PUMP TUBES

The Astoria and Astoria2 Analyzers use different sample pump tube sizes depending on the application and/or calibration range. Follow the instructions for creating these different tubing connections below.

Sample Pump Tubes - Orn/Grn To Blk/Blk

NOTE: When running a single chemistry, it may be necessary to use a Helper Line with the 301D Sampler. Refer to Helper Line on page later in this section for details.

NOTE: Always use a Helper Line with Orn/Grn to Blk/Blk pump tubes when using a 311 XYZ Sampler.

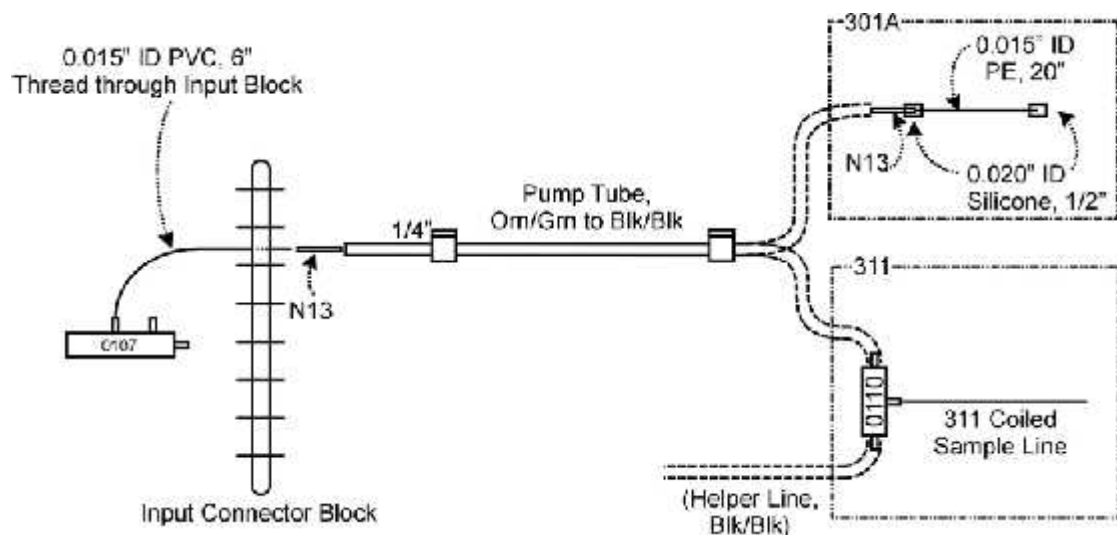


Diagram 4

SAMPLE PUMP TUBES - ORN/GRN TO BLK/BLK

MATERIALS:

PART NUMBER	DESCRIPTION
303-2215P01	0.015" ID PVC tubing (or orn/grn pump tube as substitute)
303-0060PN2	N13 Nipples
303-2320-01	0.020" ID silicone tubing
303-2515P01	0.015" ID PE tubing

PROCEDURE:

- 1 Cut the sample pump tube to 1/4" from the shoulder.
- 2 Use an N13 nipple to connect the pump tube to 6" of 0.015" ID PVC.
- 3 Thread the PVC tubing through the Input Connector Block, and attach it to the sample port of the Double Injection Fitting (API p/n 303-0107-00). Refer to the method's flow diagram.

- 4 311: Sleeve the pump tube directly to a side port of a Sample Stream Splitter (API p/n 303-0110-00). See Helper Line instructions for details.
- 5 301D: Insert an N13 nipple into the other end of the pump tube. Use 1/2" of 0.020" ID silicone to attach 20" of 0.015" ID PE to the N13 nipple on the pump tube. Use another 1/2" of 0.020" ID silicone to attach the 0.015" ID PE to the sample probe.

Sample Pump Tubes - Orn/Orn

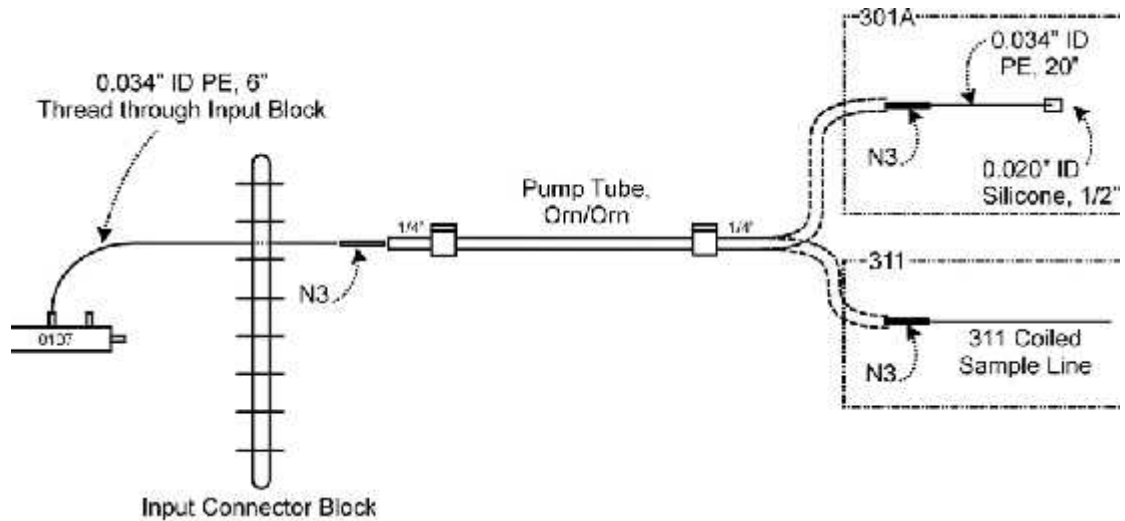


Diagram 5

SAMPLE PUMP TUBES - ORN/ORN

MATERIALS:

PART NUMBER	DESCRIPTION
303-2534P02	0.034" ID PE tubing
303-0076PN3	N3 Nipples
303-2320-01	0.020" ID silicone tubing

PROCEDURE:

- 1 Cut the sample pump tube 1/4" from shoulders on both ends.
- 2 Insert an N3 nipple, and attach 6" of 0.034" ID PE tubing to the nipple. Thread the 0.034" ID PE tubing through the Input Connector Block, and attach it to the sample port of the Double Injection Fitting. Refer to the method's flow diagram.

(ALTERNATIVE for orn/orn pump tubes: Insert the 0.034" ID PE directly into the pump tube.)
- 3 Attach another N3 nipple to the other end of the pump tube, and attach to the appropriate sample line coming from the sampler.

Sample Pump Tubes - Wht/Wht To Grn/Grn

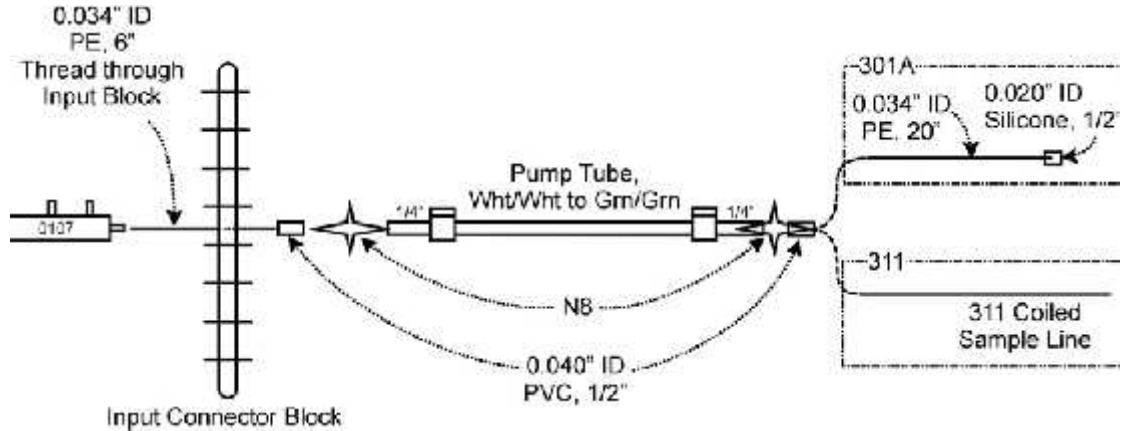


Diagram 6

SAMPLE PUMP TUBE TO PROBE - WHT/WHT TO GRN/GRN

MATERIALS:

PART NUMBER	DESCRIPTION
303-2534P02	0.034" ID PE Tubing
303-2240P01	0.040" ID PVC tubing (or wht/wht pump tube as substitute)
303-0003P01	N8 Nipples
303-2320-01	0.020" ID silicone tubing

PROCEDURE:

- 1) Cut the sample pump tube 1/4" from shoulders on both ends.
NOTE: In the following steps, make sure the 0.034" ID PE comes as close as possible to the N8 nipple.
- 2) Use an N8 nipple to attach 1/2" of 0.040" ID PVC to the pump tube. Sleeve 6" of 0.034" ID PE tubing directly into the 0.040" ID PVC. Thread the 0.034" ID PE tubing through the Input Connector Block, and attach it to the sample port of the Injection Fitting on the cartridge. Refer to the method's flow diagram.
- 3) Attach 1/2" of 0.040" ID PVC tubing to the other end of the pump tube using another N8 nipple. Attach the 0.040" ID PVC tubing to the appropriate sample line coming from the sampler.

(ALTERNATIVE for wht/wht to gry/gry pump tubes: Insert the 0.034" ID PE directly into the pump tube.)

DEBUBBLING THE SAMPLE LINE BEFORE THE PUMP

On cartridges that specify a debubbler on the sample line before the pump, it is very important that the connections be made as shown in the diagrams below to avoid carryover and reproducibility problems. Avoid gaps in the connections.

NOTE: If you are having severe ISAC problems, adding this fitting to your cartridge will cure it.

NOTE: It is usually necessary to debubble the sample line.

CAUTION: Do not use three stop tubing when debubbling a sample line. The sample pump tube must be as short as possible.

Debubbling Sample Pump Tubes - Orn/Grn To Orn/Orn

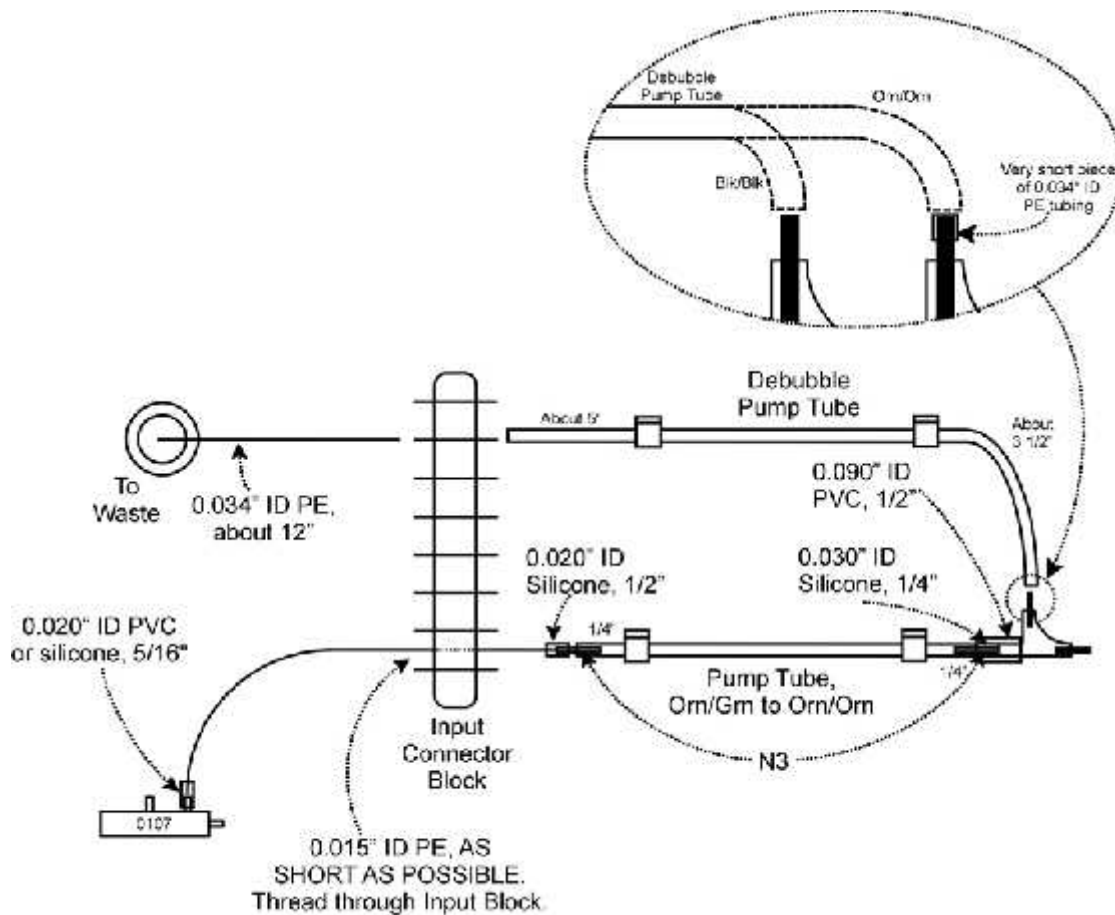


Diagram 7

Debubbling Sample Pump Tubes - Orn/Grn to Orn/Orn

MATERIALS:

PART NUMBER	DESCRIPTION
303-2320-0101	0.020" ID silicone tubing OR 303-2220P01, 0.020" ID PVC tubing
303-2515P01	0.015" ID PE tubing
303-0076PN3	N3 Nipple
303-2330-01	0.030" ID silicone tubing
303-2290P01	0.090" ID PVC tubing
303-0122-00	Debubbler, Double Nipple
303-2534P01	0.034" ID PE tubing

Refer to the method's flow diagram for the appropriate Debubble Pump Tube size

PROCEDURE:

- 1) Assemble the sample pump tube.
 - a) Cut the sample pump tube 1/4" from shoulders on both ends.
 - b) To make a Component Connection on the outlet port of the debubbler, insert 1/4" of 0.030" ID silicone tubing into 1/2" of 0.090" ID PVC tubing. Get the outer edges of the tubings as close to even as possible. The 0.030" ID silicone tubing must be cut straight and even.
 - c) Slide the Component Connection onto the outlet port of the debubbler fitting. Make sure there are no gaps.

CAUTION: Be sure there are no gaps between the inner sleeve (0.030" ID silicone tubing) and the glass. Gaps may adversely affect the quality of your data.
 - d) Use an N3 nipple to attach the pump tube to the Component Connection on the debubbler.
 - e) Insert another N3 into the other end of the pump tube. Use 1/2" of 0.020" ID PVC tubing to connect the N3 to the 0.015" ID PE tubing. Thread the 0.015" ID PE tubing through the Input Connector Block, and trim it to as short a length as will reasonably reach the sample port of the Injection Fitting on the cartridge. Refer to the method's flow diagram.

NOTE: To minimize carryover, the PE tubing must be as short as possible. It should not be longer than 6".

- f) Attach the 0.015" ID PE to the Injection Fitting using 5/16" of 0.020" ID silicone tubing. Refer to the method's flow diagram.
- 2) Assemble and attach the waste pump tube.
 - a) Attach 12" of 0.034" ID PE to the cartridge side of the Input Connector Block, and direct the outlet to waste. Refer to the diagram above.
 - b) Attach the debubble waste pump tube to the other side of the Input Connector Block. Trim away any excess tubing.
 - c) Trim the other end of the pump tube to about 3 1/2".

If the Waste pump tube is blk/blk: Attach the pump tube directly to the Waste port of the 303-0122-00 Debubbler.

If the Waste pump tube is orn/orn: Attach 0.034" ID PE tubing to the Waste port of the 303-0122 Debubbler. Trim the 0.034" ID PE at the end of the Waste port nipple. Attach the pump tube over the 0.034" ID PE tubing on the Waste port of the 303-0122-00 Debubbler.

NOTE: Refer to 303-0103-00 Debubbler Fitting on page 8-4 for information on using the 103 Debubbler.

Debubbling Sample Pump Tubes - Wht/Wht To Gry/Gry

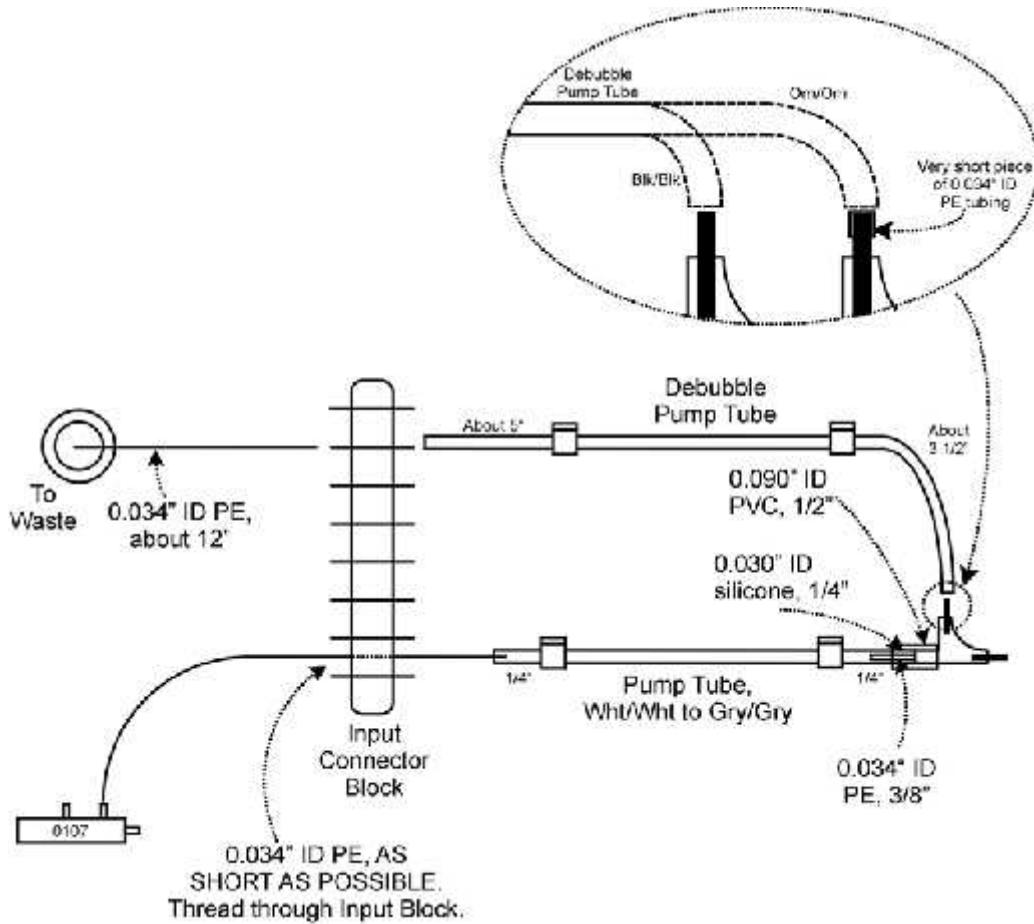


Diagram 8

Debubbling Sample Pump Tubes - Wht/Wht to Gry/Gry

Materials:

PART NUMBER	DESCRIPTION
303-2534P01	0.034" ID PE tubing
303-2330-01	0.030" ID silicone tubing
303-2290P01	0.090" ID PVC tubing
303-0122-00	Debubbler, Double Nipple

Refer to the method's flow diagram for the appropriate Debubble Pump Tube size

PROCEDURE:

- 1) Assemble and attach the sample pump tube
 - a) Cut the sample pump tube 1/4" from shoulders on both ends.
 - b) Insert 3/8" of 0.034" ID PE tubing approximately 1/4" into the 0.030" ID silicone tubing.
 - c) Cut the 0.030" ID silicone tubing at the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and the 0.030" ID tubing ends are flush and the cut is straight and even.
 - d) Insert the 0.030" ID tubing assembly into 1/2" of 0.090" ID PVC tubing.
 - e) Slide the assembly onto the outlet port of the debubbler fitting. Make sure there are no gaps.

CAUTION: Be sure there are no gaps between the inner sleeve and the glass. Gaps may adversely affect the quality of your data.
 - f) Insert the 0.034" ID PVC tubing on the debubbler assembly into the pump tube.
 - g) Insert 0.034" ID PE tubing directly into the other end of the pump tube. Thread the 0.034" ID PE tubing through the Input Connector Block, and trim it to as short a length as will reasonably reach the sample port of the Injection Fitting on the cartridge. Refer to the method's flow diagram.

NOTE: To minimize carryover, the PE tubing must be as short as possible. It should not be longer than about 6".
 - h) Attach the 0.034" ID PE directly to the sample port of the Double Injection Fitting. Refer to the method's flow diagram.
- 2) Assemble and attach the waste pump tube.
 - a) Attach about 12" of 0.034" ID PE tubing to the cartridge side of the Input Connector Block, and direct the outlet to waste. Refer to the diagram above.
 - b) Attach the debubble waste pump tube to the other side of the Input Connector Block. Trim away any excess tubing.
 - c) Trim the other end of the pump tube to about 3 1/2".
 - d) If the Waste pump tube is blk/blk: Attach the pump tube directly to the Waste port of the 303-0122-00 Debubbler.
 - (i) If the Waste pump tube is orn/orn: Attach 0.034" ID PE tubing to the Waste

port of the 303-0122 Debubbler. Trim the 0.034" ID PE at the end of the Waste port nipple. Attach the pump tube over the 0.034" ID PE tubing on the Waste port of the 303-0122-00 Debubbler.

Debubbling Sample Pump Tubes - Yel/Yel To Grn/Grn

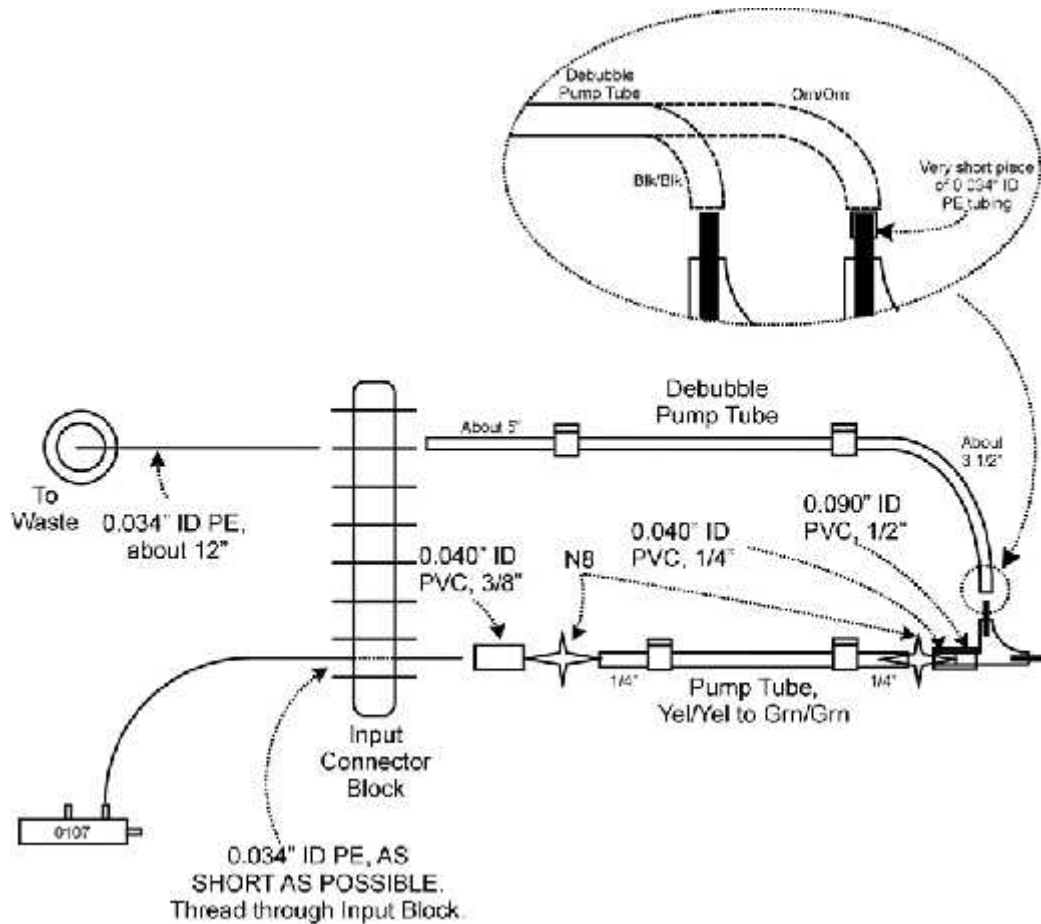


Diagram 9

Debubbling Sample Pump Tube - Yel/Yel to Grn/Grn

MATERIALS:

PART NUMBER	DESCRIPTION
303-2534P01	0.034" ID PE tubing
303-2240P01	0.040" ID PVC tubing (or wht/wht pump tube as substitute)
303-0003P01	N8 Nipples
303-2290P01	0.090" ID PVC tubing
303-0122-00	Debubbler, Double Nipple

Refer to the method's flow diagram for the appropriate Debubble Pump Tube size

PROCEDURE:

- 1) Assemble and attach the sample pump tube
- 2) Cut the sample pump tube 1/4" from shoulders on both ends.
 - a) Attach 0.034" ID PE tubing to an N8 Nipple with 3/8" of 0.040" ID PVC. Attach the N8 Nipple to the pump tube. Thread the 0.034" ID PE tubing through the Input Connector Block, and trim it to as short a length as will reasonably reach the sample port of the Injection Fitting on the cartridge. Refer to the method's flow diagram.

NOTE: To minimize carryover, the PE tubing must be as short as possible. It should not be longer than about 6".

- b) Attach the 0.034" ID PE to the Double Injection fitting. Refer to the method's flow diagram.
 - c) To make a Component Connection on the outlet port of the debubbler, insert 1/4" of 0.040" ID PVC tubing into 1/2" of 0.090" ID PVC tubing. Get the outer edges of the tubings as close to even as possible. The 0.040" ID PVC must cut straight and even.
 - d) Slide the assembly onto the outlet port of the debubbler fitting. Make sure there is no gap.

CAUTION: Be sure there are no gaps between the inner sleeve (0.040 ID PVC) and the glass. Gaps may adversely affect the quality of your data.

- e) Use an N8 nipple to attach the pump tube to the Component Connection on the debubbler.
- 3) Assemble and attach the waste pump tube.
 - a) Attach about 12" of 0.034" ID PE to the cartridge side of the Input Connector Block, and direct the outlet to waste. Refer to the diagram above.
 - b) Attach the debubble waste pump tube to the other side of the Input Connector Block. Trim away any excess tubing. Trim the other end of the pump tube to about 3 1/2".
 - c) If the Waste pump tube is blk/blk: Attach the pump tube directly to the Waste port of the 303-0122-00 Debubbler.
 - d) If the Waste pump tube is orn/orn: Attach 0.034" ID PE tubing to the Waste port of the 303-0122 Debubbler. Trim the 0.034" ID PE at the end of the Waste port nipple. Attach the pump tube over the 0.034" ID PE tubing on the Waste port of the 303-0122-00 Debubbler.

NOTE: If you would like to make things more difficult, refer to **Diagram 3** for information on using a 103 Debubbler.

HELPER LINES

When running a single cartridge with a small (orn/grn to blk/blk) sample pump tube, there may be a problem with the inter-sample bubble(s) that travel from the sample probe across the pump and into the cartridge. If at any time the bubble(s) do not move smoothly along this path (such as breaking into small pieces, sticking to the walls and not moving, getting "lost" when passing through fitting connections), it is likely that problems will occur in the analysis. This could be observed as poor precision, erratic washout between peaks, inconsistent ISAC artifacts or irregular peak shape. See CHARACTERISTICS OF GOOD PEAKS in your System Manual.

Adding a helper pump tube minimizes these problems by increasing the flow of sample through the sample probe and sample line. Adding a helper line does NOT change the amount of sample added to the cartridge or affect the chemistry in any way. With the 311 XYZ Sampler, a helper pump tube is always recommended for sample pump tubes from orn/grn to blk/blk.

NOTE: If the sample line is debubbled before the pump, a helper line is not needed. The debubbler waste line will also act as a helper line.

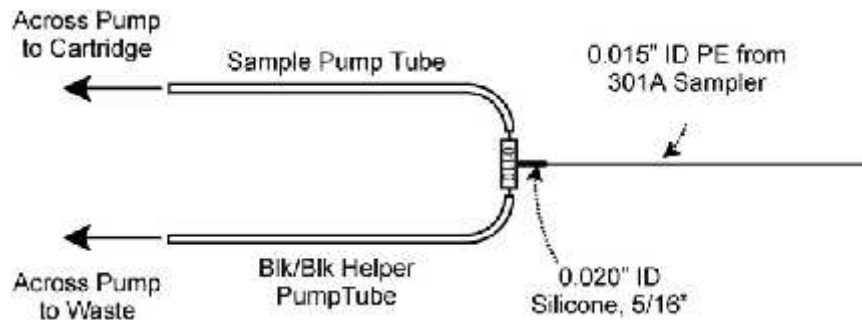


Diagram 10

301D Helper Line Assembly

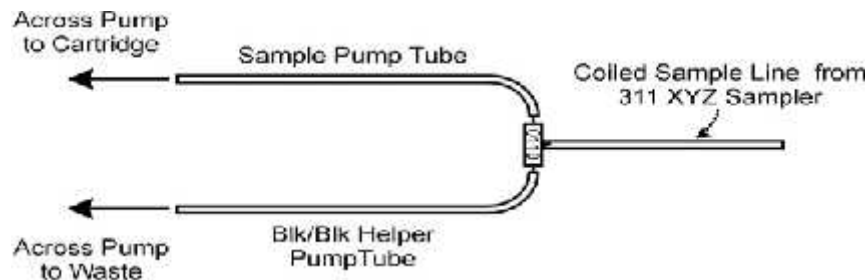


Diagram 11

311 Helper Line Assembly

MATERIALS

PART NUMBER	DESCRIPTION
303-0110-00	3-port sampler stream splitter
303-1030P01	Blk/Blk pump tube
303-2320-01	0.020" ID silicone

PROCEDURE

- 1) Mount the blk/blk helper pump tube on the pump as close to the sample pump tube as possible.
- 2) Cut the inlet end of both the helper and the sample pump tubes 1 1/2 to 2" from the shoulders.
- 3) Connect the helper and sample pump tubes directly to the side ports of the splitter.
- 4) Sleeve the sample line (from the sample probe)
 - **301D:** Sleeve the 0.015" ID PE to the middle port of the Sample Stream Splitter using 5/16" of 0.020" silicone tubing.
 - **311:** Attach the 0.034" ID Coiled Sample Line to the middle port of the Sample Stream Splitter.
- 5) Connect the outlet end of the sample pump tube to the cartridge. Refer to Sample Pump Tubes - Orn/Grn to Blk/Blk instruction earlier in this guide.
- 6) Attach the outlet of the helper pump tube to the Input Connector Block. Attach about 11 1/2" of 0.034" ID PE tubing to the other end of the port, and direct the outlet to waste.
- 7) Begin pumping, and verify that the inter-sample bubble(s) split smoothly resulting in an intact bubble for both the sample line and the helper line.

MULTIPLE CARTRIDGES

When running more than one cartridge simultaneously, you must split the sample flow to each individual cartridge. This does not change the amount of sample added to the individual cartridges and no adjustment to pump tube sizes is necessary.

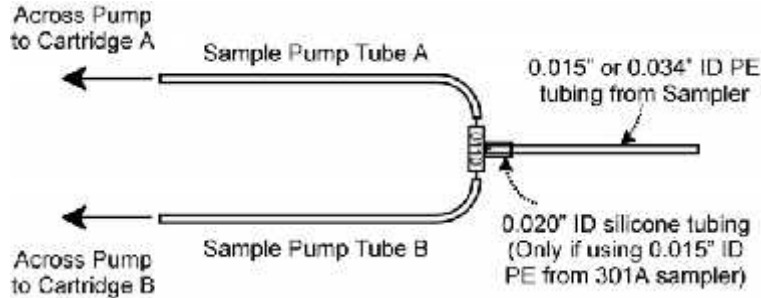


Diagram 12

2 Cartridge Stream Splitter Assembly

MATERIALS

Refer to the appropriate diagram for the exact number of each part required. The part numbers for possible parts are shown below:

PART NUMBER	DESCRIPTION
303-0110-00	Sample Stream Splitter, 3 Port
303-2515P01	0.015" ID PE tubing
303-2534P02	Intramedic tubing, 0.034" ID
303-2320-01	0.020" ID silicone tubing
303-2330-01	0.030" ID silicone tubing
303-2240P01	0.040" ID PVC tubing
303-0003P01	N8 Nipple
303-0060PN2	N13 Nipple
303-0076PN3	N3 Nipple

PROCEDURE (REFER TO THE DIAGRAM ABOVE AS NEEDED)

Add the flowrates of the sample lines and sample debubble lines (if applicable) together. Refer to Micropump Tube Color Code for the flowrates of the individual pump tubes or your method's flow diagram.

- 1) If the total flowrate of sample is about 500 μ l/min or less:

301D: Use 0.015" ID PE from the sample probe to the stream splitter. Sleeve the tubing to both the probe and the splitter using 5/16" of 0.020" ID silicone. Fit the PE tubing tightly against the probe and the splitter port.

OR

311: Use the Coiled Sample Line. Attach the Coiled Sample Line directly to the splitter. Use 1/2" of 0.030" ID silicone to sleeve the Coiled Sample Line to the sample probe.

- 2) If the sample pump tube is orn/grn to blk/blk, cut the inlet end 1 1/2 - 2" from the shoulder and attach it directly to the side port of the splitter. Connect the outlet end of the sample pump tube to the cartridge. Keep the tubing as short as possible.
- 3) If the sample tube is orn/orn, cut BOTH ends of the tube 3/16" from the shoulders. Attach 1 1/2 - 2" of 0.034" ID PE tubing to the pump tube with an N3 nipple. Attach the 0.034" ID PE tubing to the sample splitter.

Attach 6" of 0.034" ID PE to the other end of the pump tube with an N3 nipple (refer to Diagram 8-5 as needed). Thread the 0.034" ID PE through the Input connector block, and trim to a length that will reasonably reach the Double Injection Fitting on the cartridge. Refer to the method's flow diagram.

- 4) If the total flowrate is greater than about 500 µl/min:

301D: Use 0.034" ID PE from the sample probe to the stream splitter. Sleeve the tubing to the probe with 1/2" of 0.020" ID silicone. Attach the other end directly to the splitter.

OR

311: Use the Coiled Sample Line. Attach the Coiled Sample Line directly to the splitter. Use 1/2" of 0.030" ID silicone to sleeve the Coiled Sample Line to the sample probe.

- 5) If the sample pump tube is orn/grn to blk/blk, cut the inlet end 1 1/2 - 2" from the shoulder and attach it directly to the side port of the splitter. Connect the outlet end of the sample pump tube to the cartridge. Refer to Diagram 4 as needed. Keep the tubing as short as possible.
- 6) If the sample tube is orn/orn, cut BOTH ends of the tube 3/16" from the shoulders. Attach 1 1/2 - 2" of 0.034" ID PE tubing to the pump tube with an N3 nipple. Attach the 0.034" ID PE tubing to the sample splitter.
- 7) Attach 6" of 0.034" ID PE to the other end of the pump tube with an N3 nipple (refer to Diagram 5 as needed). Thread the 0.034" ID PE through the Input Connector Block, and trim to a length that will reasonably reach the Double Injection Fitting on the cartridge. Refer to the method's flow diagram.

NOTE: In the following steps, make sure the 0.034" ID PE tubing comes as close as possible to the N8 nipple.

- 8) If a sample pump tube is wht/wht or larger, cut BOTH ends of the pump tube 3/16" from the shoulders. Insert an N8 nipple into each end of the pump tube. Using 1/2" of 0.040 ID PVC, attach 1 1/2 - 2" of 0.034" ID PE tubing to one N8 nipple, and attach the 0.034" ID PE to the sample splitter.

Using 1/2" of 0.040" ID PVC tubing, attach 6" of 0.034" ID PE tubing to the other N8 nipple. Thread the 0.034" ID PE through the Input Connector Block, and trim it to a length that will reasonably reach the Double Injection fitting on the cartridge. Refer to the method's flow diagram.

- 9) If the cartridges to be run require one or more sample debubblers: Use the appropriate guidelines and diagrams for assembling the sample lines earlier in this section. The inlet port of the 303-0122-00 debubbler(s) is connected to the sample stream splitter(s) with short lengths of 0.034" ID PE tubing.

REAGENT LINES

REAGENT LINES - ORN/BLU

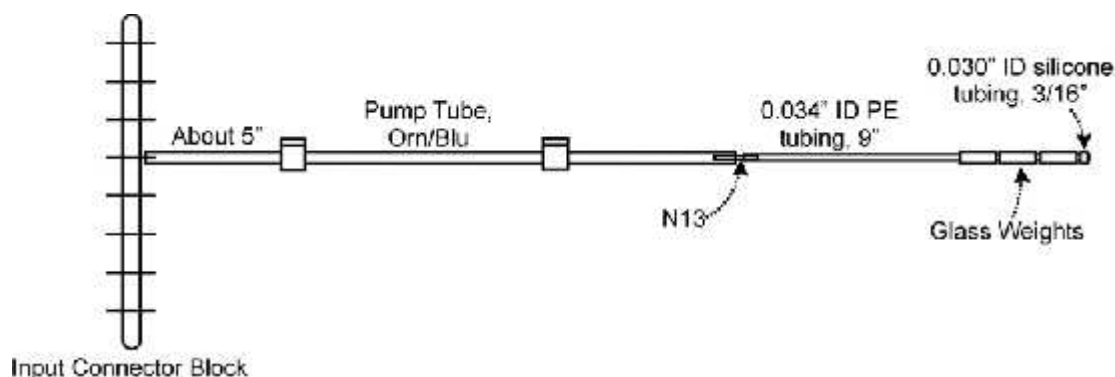


Diagram 13

Orange/Blue Pump Tube to Reagent

MATERIALS:

PART NUMBER	DESCRIPTION
303-0060PN2	N13 nipple
303-2534P01	0.034" ID PE tubing
303-0811P00	3 glass weights
303-2330-01	0.030" ID silicone tubing

PROCEDURE:

- 1) Cut one end of the pump tube about 5" from shoulder.
- 2) Attach the short end of the pump tube to the Input Connector Block.
- 3) Use an N13 nipple pump tube to attach the long end of the pump tube to 9" of 0.034" ID PE tubing.
- 4) Slide three glass weights onto the PE tubing, and secure with 3/16" of 0.030" ID silicone tubing.

REAGENT LINES - ORN/GRN TO BLK/BLK

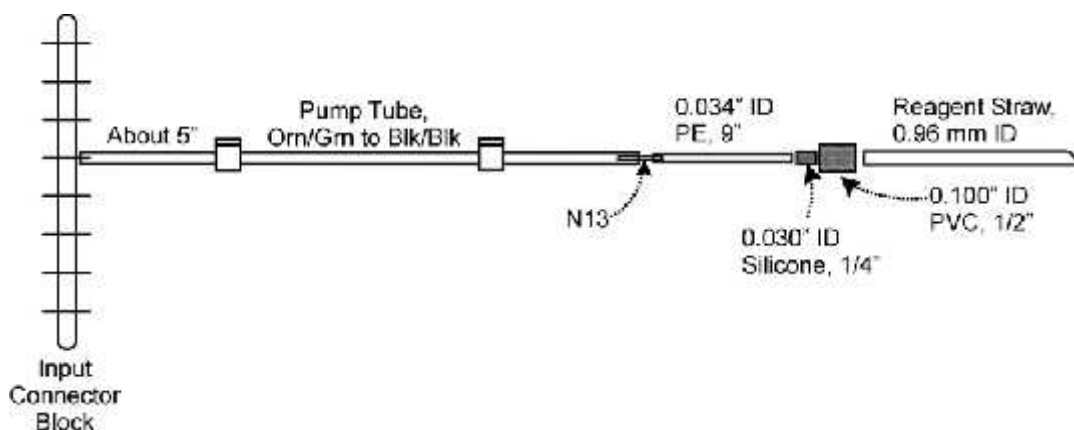


Diagram 14

Small Pump Tube to Reagent

MATERIALS:

PART NUMBER	DESCRIPTION
303-0060PN2	N13 nipple
303-2534P01	0.034" ID PE tubing
303-2330-01	0.030" ID silicone tubing
303-2291-01	0.100" ID PVC tubing
303-0012P00	Reagent Straw, 0.96 mm ID

PROCEDURE:

- 1) Cut one end of the pump tube about 5" from shoulder.
- 2) Attach the short end of the pump tube to the Input Connector Block.
- 3) Use an N13 nipple pump tube to attach the long end of the pump tube to 9" of 0.034" ID PE tubing.
- 4) Insert the other end of the 0.034" ID PE tubing approximately 1/4" into the 0.030" ID silicone tubing.
- 5) Cut the 0.030" ID silicone tubing at the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and the 0.030" ID tubing ends are flush and the cut is straight and even.
- 6) Insert the 0.030" ID tubing assembly into 1/2" of 0.100" ID PVC tubing.
- 7) Slide the assembly onto the Reagent straw.

REAGENT LINES - ORN/ORN

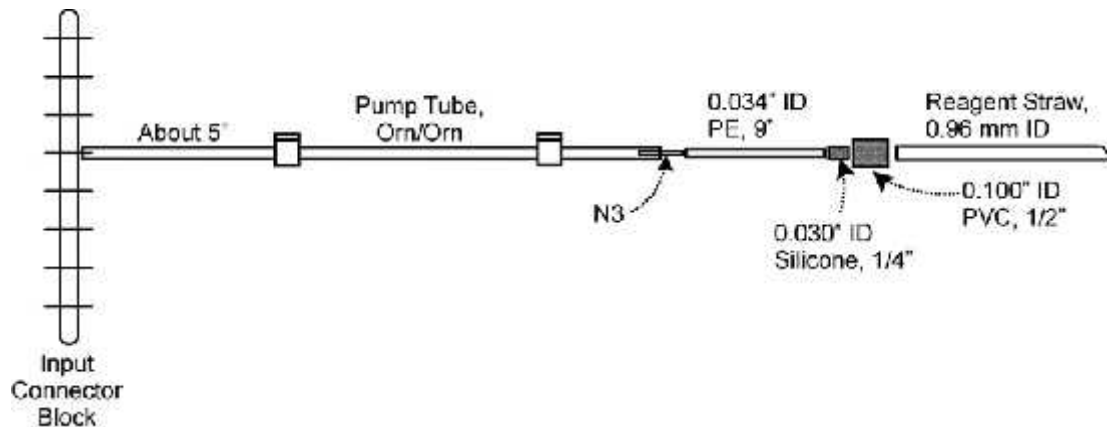


Diagram 15

Orn/Orn Pump Tube to Reagent

MATERIALS:

PART NUMBER	DESCRIPTION
303-0076PN3	N3 nipple
303-2534P01	0.034" ID PE tubing
303-2330-01	0.030" ID silicone tubing
303-2291-01	0.100" ID PVC tubing
303-0012P00	Reagent Straw, 0.96 mm ID

PROCEDURE:

- 1) Cut one end of the pump tube 5" from shoulder.
- 2) Attach the short end of the pump tube to the Input Connector Block.
- 3) Use an N3 nipple to attach the long end of the pump tube to 9" of 0.034" ID PE tubing.
(ALTERNATIVE for orn/orn pump tubes: Insert the 0.034" ID PE directly into the pump tube.)
- 4) Insert the other end of the 0.034" ID PE tubing approximately 1/4" into the 0.030" ID silicone tubing.
- 5) Cut the 0.030" ID silicone tubing at the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and the 0.030" ID tubing ends are flush and the cut is straight and even.
- 6) Insert the 0.030" ID tubing assembly into 1/2" of 0.100" ID PVC tubing.
- 7) Slide the assembly onto the Reagent straw.

REAGENT LINES - WHT/WHT TO GRN/GRN

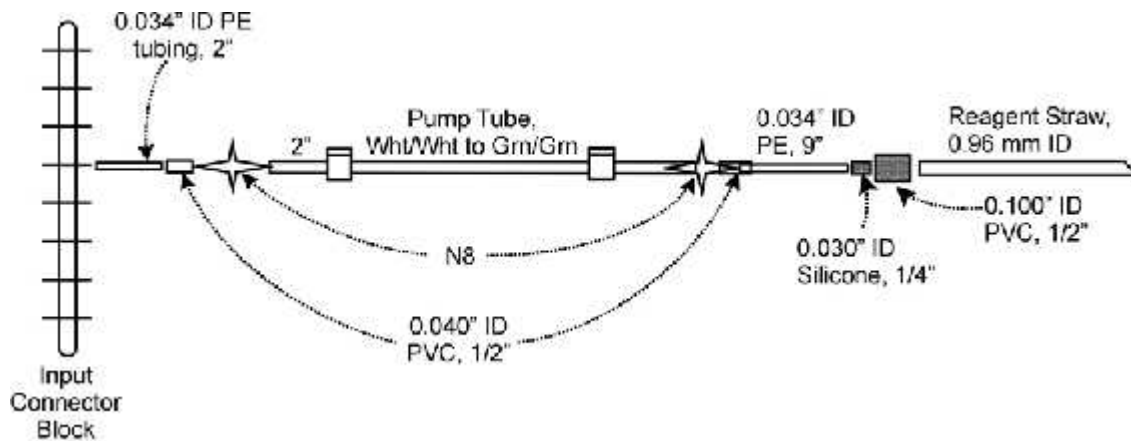


Diagram 16

Large Pump Tube to Reagent

MATERIALS:

PART NUMBER	DESCRIPTION
303-2534P01	0.034" ID PE tubing
303-2240P01	0.040" ID PVC tubing
303-0003P01	N8 nipples
303-2330-01	0.030" ID silicone tubing
303-2291-01	0.100" ID PVC tubing
303-0012P00	Reagent Straw, 0.96 mm ID

PROCEDURE:

- 1) Insert N8 nipple into one end of the pump tube.
- 2) Use 1/2" of 0.040" ID PVC to sleeve 9" of 0.034" ID PE tubing to the N8 nipple.
(ALTERNATIVE for wht/wht to gry/gry pump tubes: Insert the 0.034" ID PE directly into the pump tube.)
- 3) Insert the other end of the 0.034" ID PE tubing approximately 1/4" into the 0.030" ID silicone tubing.
- 4) Cut the 0.030" ID silicone tubing at the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and the 0.030" ID tubing ends are flush and the cut is straight and even.
- 5) Insert the 0.030" ID tubing assembly into 1/2" of 0.100" ID PVC tubing.
- 6) Slide the assembly onto the Reagent straw.
- 7) Trim pump tube 2" from shoulder on the other end.
- 8) Insert another N8 nipple into the other end of the pump tube.
- 9) Use 1/2" of 0.040" ID PVC to sleeve 2" of 0.034" ID PE tubing to the N8 nipple.

(ALTERNATIVE for wht/wht to gry/gry pump tubes: Insert the 0.034" ID PE directly into the pump tube.)

- 10) Attach the 0.034" ID PE tubing to the Input Connector Block.

SOLVENT REAGENT LINES

Solvent-bearing reagents can shorten PVC pump tube life dramatically. To cut down on this effect, use solvent resistant pump tubes. Follow the guidelines below when assembling pump tubes for reagents containing organic solvents.

SOLVENT REAGENT LINES - ORN/BLU TO BLK/BLK

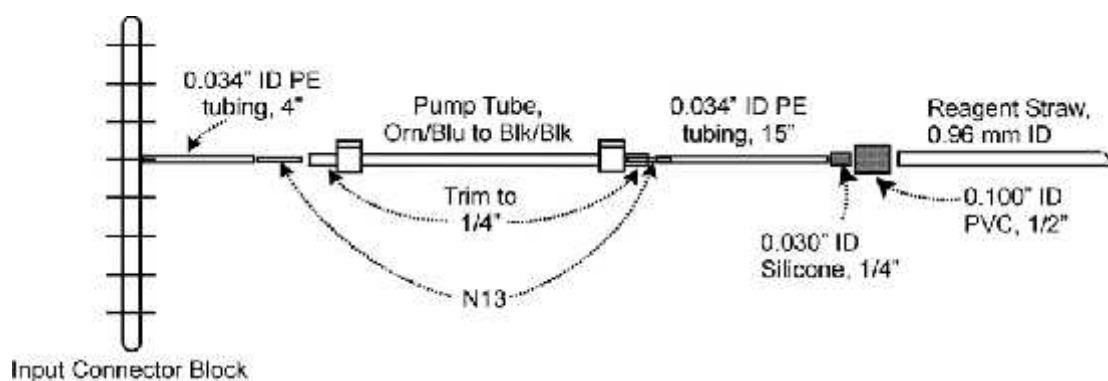


Diagram 17

Solvent Reagent Pump Tube - Orn/Blu to Blk/Blk

MATERIALS:

PART NUMBER	DESCRIPTION
303-2534P01	0.034" ID PE tubing
303-0060PN2	N13 nipples
303-2330-01	0.030" ID silicone tubing
303-2291-01	0.100" ID PVC tubing
303-0012P00	Reagent Straw, 0.96 mm ID

PROCEDURE:

- 1) Cut pump tube 1/4" from shoulder on both ends.
- 2) Use an N13 nipple to connect the pump tube to 15" of 0.034" ID PE tubing.
- 3) Insert the other end of the 0.034" ID PE tubing approximately 1/4" into the 0.030" ID silicone tubing.
- 4) Cut the 0.030" ID silicone tubing at the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and the 0.030" ID tubing ends are flush and the cut is straight and

even.

- 5) Insert the 0.030" ID tubing assembly into 1/2" of 0.100" ID PVC tubing.
- 6) Slide the assembly onto the Reagent straw.
- 7) Use another N13 nipple to connect the pump tube to 4" of 0.034" ID PE tubing. Attach the 0.034" ID PE tubing to the Input Connector Block.

SOLVENT REAGENT LINES - ORN/ORN

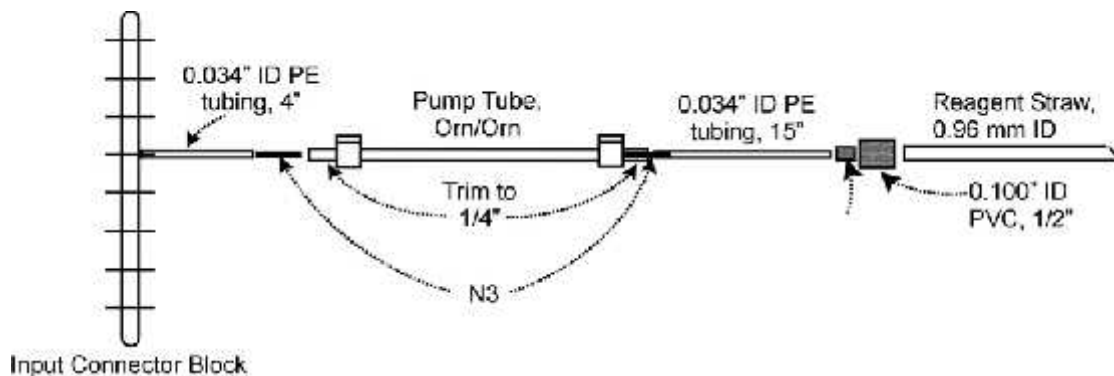


Diagram 18

Solvent Reagent Pump Tube - Orn/Orn

MATERIALS:

PART NUMBER	DESCRIPTION
303-2534P01	0.034" ID PE tubing
303-0076PN3	N3 nipples
303-2330-01	0.030" ID silicone tubing
303-2291-01	0.100" ID PVC tubing
303-0012P00	Reagent Straw, 0.96 mm ID

PROCEDURE:

- 1) Cut pump tube 1/4" from shoulder on both ends.
- 2) Use an N13 nipple to connect the pump tube to 15" of 0.034" ID PE tubing.
(ALTERNATIVE for orn/orn pump tubes: Insert the 0.034" ID PE directly into the pump tube.)
- 3) Insert the other end of the 0.034" ID PE tubing approximately 1/4" into the 0.030" ID silicone tubing.
- 4) Cut the 0.030" ID silicone tubing at the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and the 0.030" ID tubing ends are flush and the cut is straight and even.
- 5) Insert the 0.030" ID tubing assembly into 1/2" of 0.100" ID PVC tubing.

- 6) Slide the assembly onto the Reagent straw.
- 7) Use another N3 nipple to connect the pump tube to 4" of 0.034" ID PE tubing. Attach the 0.034" ID PE tubing to the Input Connector Block.

SOLVENT REAGENT LINES - WHT/WHT TO GRN/GRN

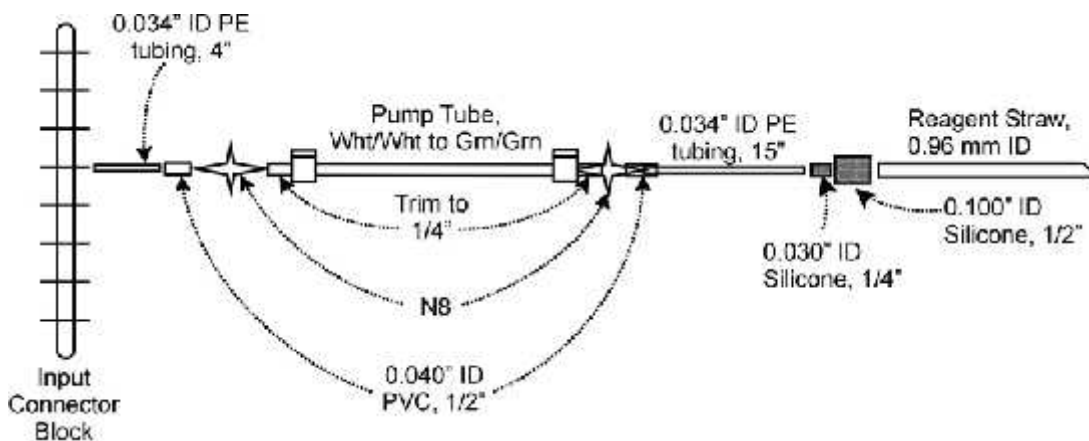


Diagram 19

Solvent Reagent Pump Tube - Wht/Wht to Grn/Grn

MATERIALS:

PART NUMBER	DESCRIPTION
303-2534P01	0.034" ID PE tubing
303-2240P01	0.040" ID PVC tubing
303-0003P01	N8 nipples
303-2330-01	0.030" ID silicone tubing
303-2291-01	0.100" ID PVC tubing
303-0012P00	Reagent Straw, 0.96 mm ID

PROCEDURE:

- 1) Cut pump tube 1/4" from shoulder on both ends.
- 2) Use an N8 nipple and 1/2" of 0.040" ID PVC tubing to connect the pump tube to 20" of 0.034" ID PE tubing.
(ALTERNATIVE for wht/wht to gry/gry pump tubes: Insert the 0.034" ID PE directly into the pump tube.)
- 3) Insert the other end of the 0.034" ID PE tubing approximately 1/4" into the 0.030" ID silicone tubing.
- 4) Cut the 0.030" ID silicone tubing at the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and the 0.030" ID tubing ends are flush and the cut is straight and even.
- 5) Insert the 0.030" ID tubing assembly into 1/2" of 0.100" ID PVC tubing.

- 6) Slide the assembly onto the Reagent straw.
- 7) Use another N8 nipple and 1/2" of 0.040" ID PVC tubing to connect the pump tube to 4" of 0.034" ID PE tubing. Attach the 0.034" ID PE tubing to the Input Connector Block.

ON THE CARTRIDGE:

INPUT CONNECTOR BLOCK CONNECTIONS

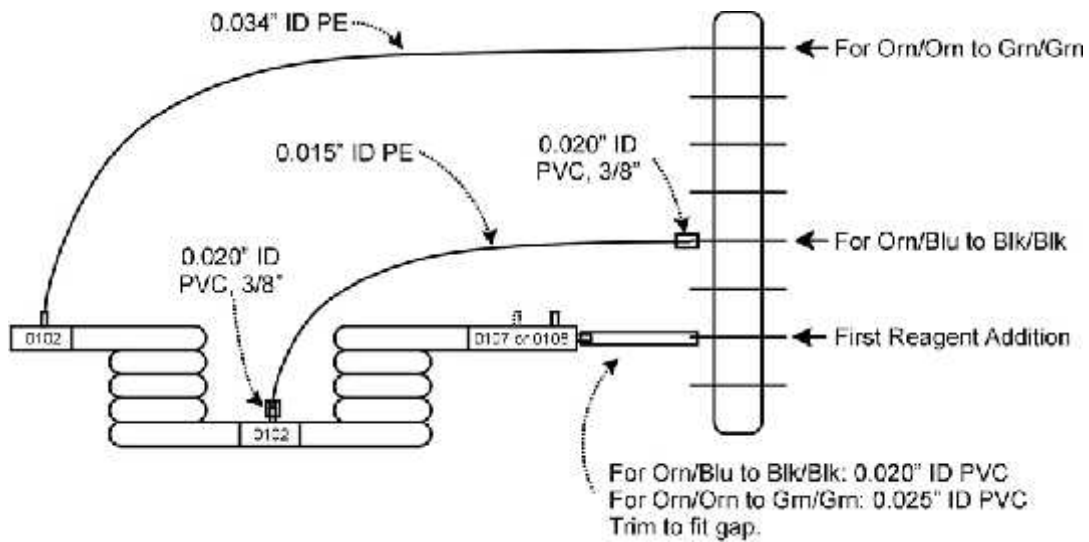


Diagram 20

Input Connector Block Connections

Input Connector Block Connections - Orn/Blu To Blk/Blk

MATERIALS:

PART NUMBER	DESCRIPTION
303-2515P01	0.015" ID PE tubing
303-2220P01	0.020" ID PVC tubing

PROCEDURE:

- 1) First Reagent Addition
 - a. Cut an appropriate length of 0.020" ID PVC tubing to reach from the port on the Input Connector Block to the side connector on the Double or Single Injection Fitting on the cartridge.
 - b. Attach the appropriate port on the Input Connector Block to the Injection Fitting with the 0.020" ID PVC tubing. Refer to the method's flow

diagram.

2) Subsequent Reagent Additions

- a. Cut an appropriate length of 0.015" ID PE tubing to reach from the port on the Input Connector block to the nipple on the glass fitting on the cartridge.
- b. Attach the 0.015" ID PE tubing to the Input Connector Block with 3/8" of 0.020" ID PVC tubing.
- c. Attach the other end of the 0.015" ID PE to the nipple on the cartridge with 3/8" of 0.020" ID PVC tubing.

Input Connector Block Connections - Orn/Orn To Grn/Grn

MATERIALS:

PART NUMBER	DESCRIPTION
303-2225-01	0.025" ID PVC tubing
303-2534P01	0.034" ID PE tubing

PROCEDURE:

1) First Reagent Addition

- a. Cut an appropriate length of 0.025" ID PVC tubing to reach from the port on the Input Connector Block to the side connector on the Double Injection Fitting on the cartridge.
- b. Attach the appropriate port on the Input Connector Block to the Double Injection Fitting with the 0.025" ID PVC tubing.

2) Subsequent Reagent Additions

- a. Cut an appropriate length of 0.034" ID PE tubing to reach from the port on the Input Connector Block to the nipple on the glass fitting on the cartridge.
- b. Secure the 0.034" ID PE tubing directly onto the appropriate reagent port on the Input Connector Block and the cartridge.

GLASS TO GLASS CONNECTIONS

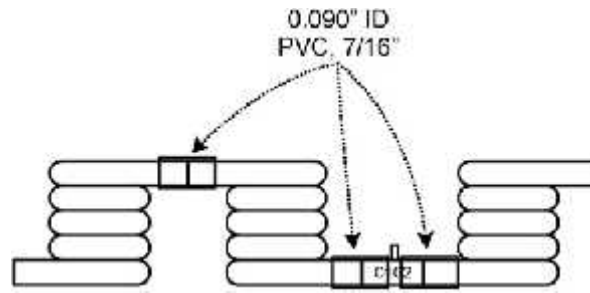


Diagram 21

Glass to Glass Connection

7/16" of 0.090" ID PVC tubing (or 0.081" ID silicone tubing for heat baths or flowcells) may be used to sleeve glass components together. Verify that the ends of the glass pieces are touching with no gaps.

CAUTION: It is critical that the connection between the glass pieces is tight. Be sure that there are no gaps. Gaps may adversely affect the quality of your data.

COMPONENT CONNECTIONS

Component connections are used to connect transmission tubing to larger tubing such as glass coils, glass fittings or dialyzers. This connection is used when joining the following combinations:

- Dialyzer to Dialyzer
- Dialyzer to Glass Coil
- Dialyzer to Glass Fitting
- Glass Coil to Glass Coil (not adjacent)
- Glass Coil to Glass Fitting (not adjacent)
- 303-0103-00 Debubbler to Waste connection (single-ended)
- 303-0103-00 Debubbler from Reagent Stream (single-ended)

NOTE: 0.034" ID PE tubing is used as general cartridge transmission tubing.

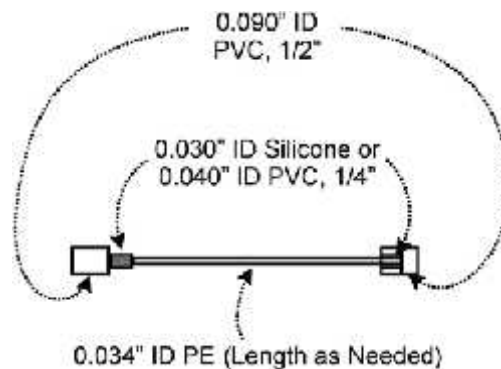


Diagram 22

Double-Ended Component Connection

MATERIALS:

PART NUMBER	DESCRIPTION
303-2290P01	0.090" ID PVC tubing
303-2330-01	0.030" ID silicone tubing
303-2534P01	0.034" ID PE tubing

PROCEDURE:

- 1) Insert the 0.034" ID PE tubing approximately 1/4" into the 0.030" ID silicone tubing.
- 2) Cut the 0.030" ID silicone tubing at the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and the 0.030" ID tubing ends are flush and the cut is straight and even.
- 3) Determine the length of 0.034" ID PE tubing needed, and cut the other end to that length. Repeat steps 1) and 2) if a double-ended Component Connection is needed.
- 4) Insert the 0.030" ID tubing assembly into 1/2" of 0.090" ID PVC tubing or 0.081" ID silicone tubing.
- 5) Slide the assembly onto the component.

CAUTION: Be sure there are no gaps between the inner sleeve and the component or between the 0.034" ID PE tubing and the component. Gaps may adversely affect the quality of your data.

NOTE: We have sometimes found it useful to "pull" the tubing onto the component rather than "push" it. Use your thumbnails to dig into the tubing slightly, and "pull" the end of the outer sleeve onto the component.

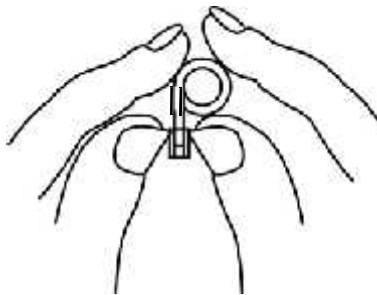


Diagram 23

“Pulling” PVC onto a glass fitting

CAUTION: The glass components are fragile. Use care when tightening or replacing fittings.

HEAT BATH CONNECTIONS

Connections to heat baths use silicone tubing instead of PVC. Silicone is more stable and durable at elevated temperatures providing a more reliable connection on heated components.

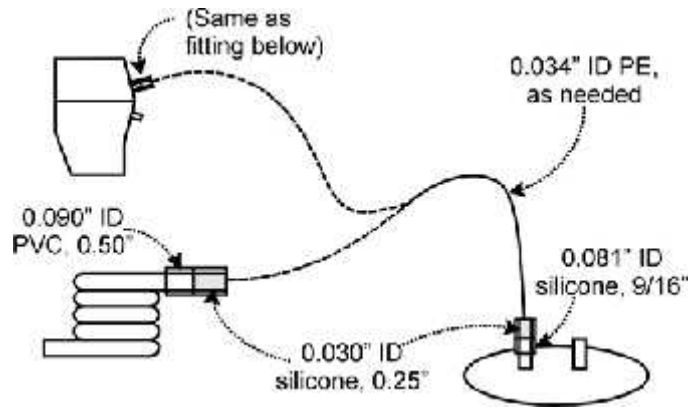


Diagram 24

Heat Bath Connections

MATERIALS:

PART NUMBER	DESCRIPTION
303-2290P01	0.090" ID PVC tubing
303-2330-01	0.030" ID silicone tubing
303-2534P01	0.034" ID PE tubing
303-2381-01	0.081" ID silicone tubing

PROCEDURE:

- 1) Insert the 0.034" ID PE tubing approximately 1/4" into the 0.030" ID silicone tubing.
- 2) Cut the 0.030" ID silicone tubing at the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and 0.030" ID tubing ends are flush and the cut is straight and even.
- 3) Determine the length of 0.034" ID PE tubing needed, and cut the other end to that length. Repeat steps 1) and 2) for the other end of the 0.034" ID tubing.
- 4) Insert one end of the 0.030" ID tubing assembly into 1/2" of 0.090" ID PVC tubing for the end connected to dialyzers or glass coils. Insert the other end of the 0.030" ID tubing assembly into 9/16" of 0.081" ID silicone tubing for the end connected to heat baths.
- 5) Slide the assembly onto the glass or dialyzer.

CAUTION: Be sure there are no gaps between the inner sleeve and the component or between the 0.034" ID PE tubing and the component. Gaps may adversely affect the quality of your data.

CAUTION: The glass components are fragile. Use care when tightening or replacing fittings. A knife must be used to remove silicone tubing for the glass connections on the heat baths.

NOTE: We have sometimes found it useful to "pull" the tubing onto the component rather than "push" it. Use your thumbnails to dig into the tubing slightly, and "pull" the end of the outer sleeve onto the component. Refer to Diagram 8-23.

DIALYZER WASTE

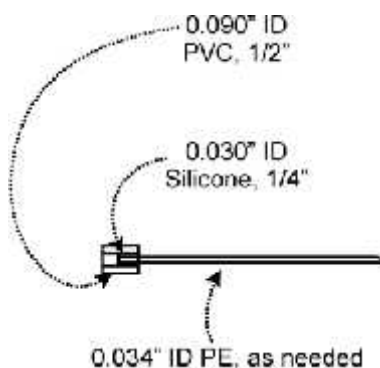


Diagram 25

Dialyzer Waste Line

MATERIALS:

PART NUMBER	DESCRIPTION
303-2290P01	0.090" ID PVC tubing
303-2330-01	0.030" ID silicone tubing
303-2534P01	0.034" ID PE tubing

PROCEDURE:

- 1) Insert the 0.034" ID PE tubing approximately 1/4" into the 0.030" ID silicone tubing.
- 2) Cut the end of the 0.030" ID silicone flush with the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and the 0.030" ID tubing ends are flush and the cut is straight and even.
- 3) Insert the 0.030" ID tubing assembly into 1/2" of 0.090" ID PVC tubing.
- 4) Slide the assembly onto the outlet port of the dialyzer. Refer to the method's flow diagram.
- 5) Trim the 0.034" ID PE tubing to an appropriate length to reach the waste port on the cartridge.

DISTILLATION CONNECTIONS

Mixing Coil To Distillation Coil

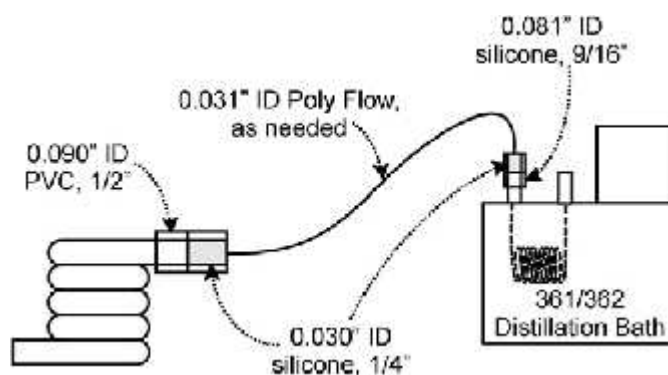


Diagram 26

Cartridge to Distillation Bath Connection

MATERIALS:

PART NUMBER	DESCRIPTION
303-2674P01	0.031" ID Poly Flow tubing
303-2330-01	0.030" ID silicone tubing
303-2290P01	0.090" ID PVC tubing
303-2381-01	0.081" ID silicone

PROCEDURE:

- 1) Insert the 0.031" ID Poly Flow tubing approximately 1/4" into the 0.030" ID silicone tubing.
- 2) Cut the 0.030" ID silicone tubing at the end of the 0.031" ID Poly Flow tubing. Be certain both the Poly Flow and 0.030" ID tubing ends are flush and the cut is straight and even.
- 3) Determine the length of 0.031" ID Poly Flow tubing needed and cut it to that length. Repeat the two steps above for the other end of the Poly Flow tubing.

NOTE: The Poly Flow tubing only needs to be long enough to reach the distillation coil. Excess tubing should be trimmed away.

- 4) Insert one end of the 0.030" ID tubing assembly into 1/2" of 0.090" ID PVC tubing for the end connected to the glass coil on the cartridge. Insert the other end of the 0.030" ID assembly into 9/16" of 0.081" ID silicone tubing for the distillation bath connection.
- 5) Carefully slide the assembly onto the glass.

CAUTION: Be sure there are no gaps between the inner sleeve and the glass or between the 0.031" ID Poly Flow tubing and the glass. Gaps may adversely affect the quality of your data.

CAUTION: The glass components are fragile. Use care when tightening or replacing fittings. A knife must be used to remove silicone tubing for the glass connections on the heat baths.

NOTE: We have sometimes found it useful to "pull" the tubing onto the component rather than "push" it. Use your thumbnails to dig into the tubing slightly, and "pull" the end of the outer sleeve onto the component.

Distillation Coil To Distillation Head

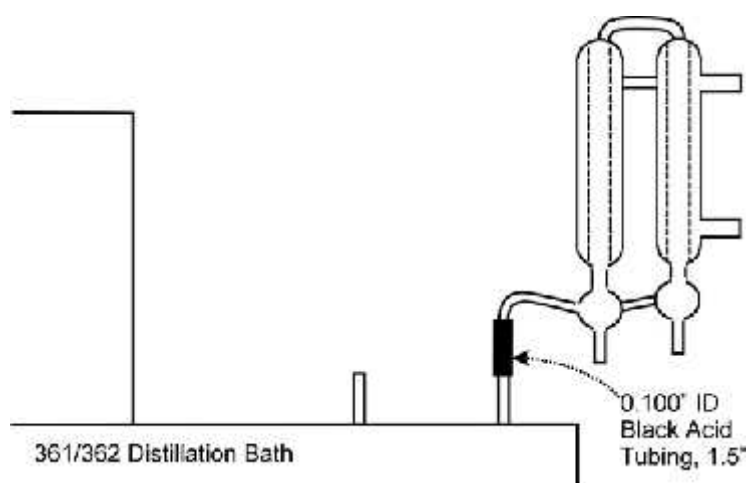


Diagram 27

Distillation Head to Distillation Bath

MATERIALS:

PART NUMBER	DESCRIPTION
116-0538-17	0.100" ID Black Acid tubing

PROCEDURE:

- 1) Attach the inlet port of the Distillation Head to the outlet port of the Distillation Coil using 1 1/2" of 0.100" ID Black Acid tubing.

NOTE: It is sometimes easier to first securely fasten the parts together and then adjust the height of the distillation head mounting clamp on the 361/362 Distillation Bath. Refer to Installation of Distillation Head on page 361/362D-3 if necessary.

Non-Volatile Waste

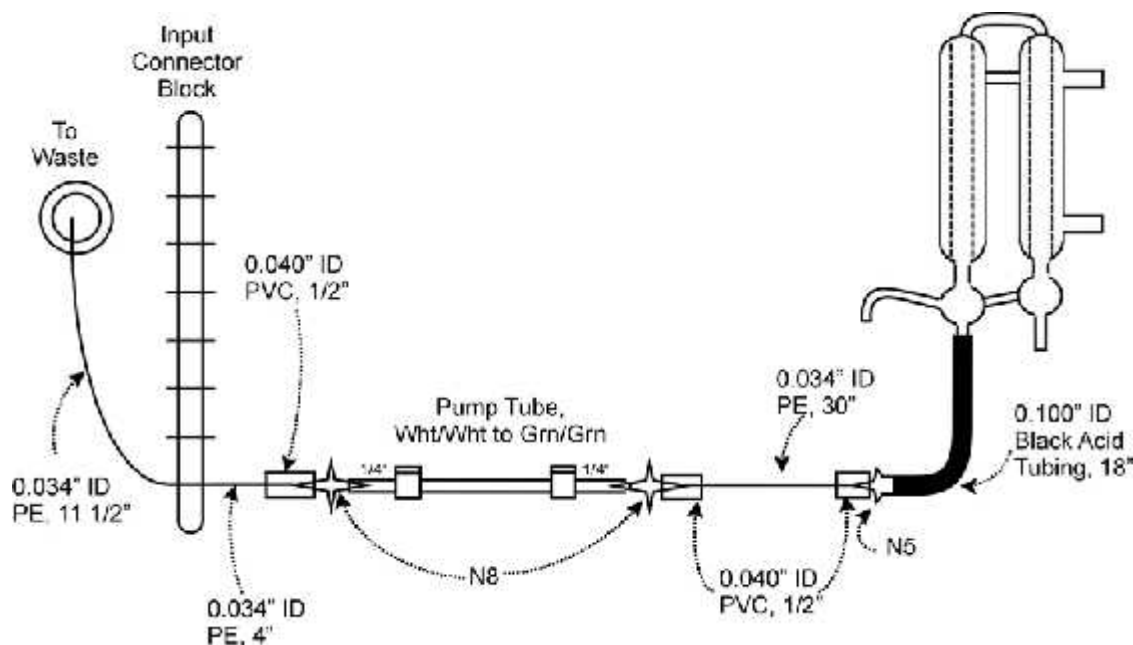


Diagram 28

Non-Volatile Waste Connections

MATERIALS:

PART NUMBER	DESCRIPTION
303-2534P01	0.034" ID PE tubing
303-2240P01	0.040" ID PVC tubing
303-0003P01	N8 Nipples
116-0002P01	N5 Nipple
116-0538-17	0.100" ID Black Acid tubing

Procedure:

- 1) Trim the pump tube to 1/4" on both ends.
 - 2) Attach 18" of 0.100" ID Black Acid tubing to the bottom outlet port of the Distillation Head.
 - 3) Insert the thick end of an N5 nipple into the Black Acid tubing.
 - 4) Attach 30" of 0.034" ID PE tubing to the N5 nipple using 1/2" of 0.040" ID PVC tubing.
- NOTE:** When making a connection to a plastic nipple, 0.040" ID PVC tubing must be used as the sleeve instead of silicone tubing.
- 5) Using 1/2" of 0.40" ID PVC, attach the other end of the 0.034" ID PE to an N8 Nipple. Insert the nipple into the pump tube.
 - 6) Using another N8, 1/2" of 0.040" ID PVC and 4" of 0.034" ID PE, attach the pump tube to the Input Connector Block.

- 7) Attach 11 1/2" of 0.034" ID PE tubing to the corresponding port on the other side of the Input Connector Block, and direct the other end to waste.

Debubble/Resample After Distillation

On cartridges that incorporate on-line distillation, the connections for the C-3 debubbler and the resample pump tube are very important and should be made as shown in the diagram below.

NOTE: 0.040" ID PVC tubing is the same size as a wht/wht pump tube.

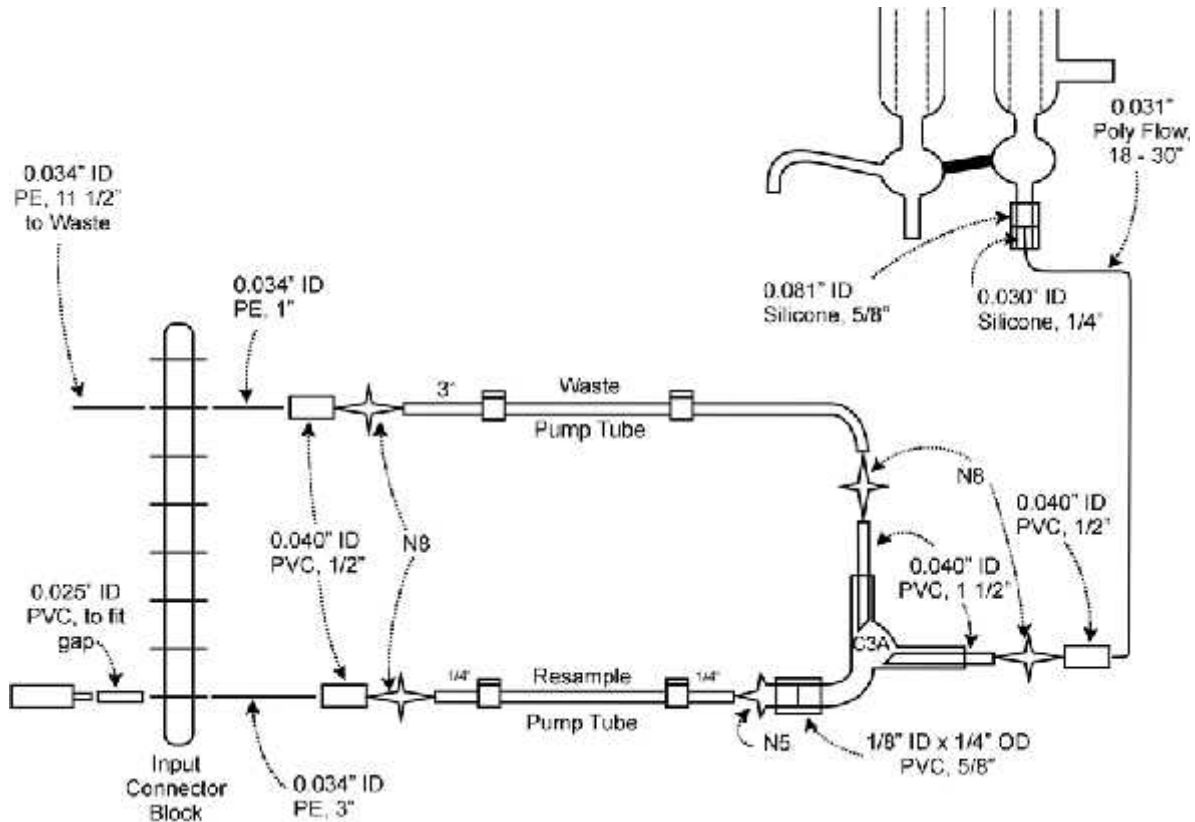


Diagram 29

Resample After Distillation Connections

MATERIALS:

PART NUMBER	DESCRIPTION
303-0121-03	C3A Debubbler
303-2534P01	0.034" ID PE tubing
303-2240P01	0.040" ID PVC tubing
303-0003P01	N8 Nipples
116-0002P01	N5 Nipple
303-2203-01	1/8" ID x 1/4" OD PVC tubing
303-2674-01	0.031" Poly Flow tubing
303-2330-01	0.030" ID silicone tubing
303-2381-01	0.081" ID silicone tubing

PROCEDURE:

1) C3A Debubbler assembly

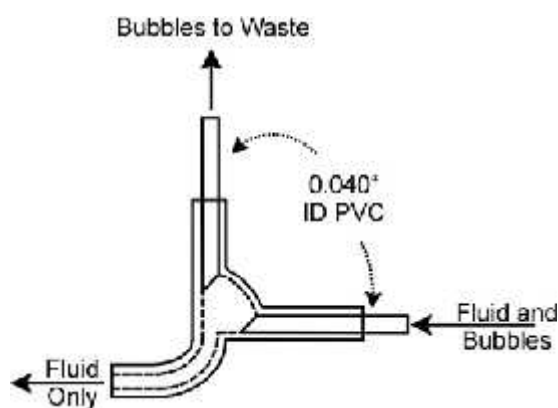


Diagram 30

C3A Debubbler Assembly

- a. Cut two pieces of 0.040" ID PVC tubing to 1 1/2". Cut one end of each at a 45° angle. Refer to the diagram above.
- b. Insert one piece each into the inlet and waste ports of the C3A debubbler so that the angled ends become boundaries of the inner chamber. Refer to the diagram above. Applying a tiny amount of Brij-35 and twisting the tubing back and forth during insertion can aid this process.
- c. Attach an N5 nipple to the outlet port of the C3A debubbler (refer to Diagram 8-29). Connect the thick end of the N5 to the port using 1/2" of 0.100" ID PVC.

CAUTION: Be sure there are no gaps between the nipple and the port. Gaps may adversely affect the quality of your data.

2) Attach Poly Flow tubing to the Condensation Outlet.

- a. Insert Poly Flow tubing approximately 1/4" into 0.030" ID silicone tubing.
- b. Cut the 0.030" ID silicone tubing at the end of the PolyFlow tubing. Be certain both the Poly Flow and 0.030" ID tubing ends are flush and the cut is straight.
- c. Insert the 0.030" ID tubing assembly into 5/8" of 0.081" ID silicone tubing.
- d. Slide the assembly onto the outlet port of the condensation column of the Distillation Head (refer to Diagram 29).

CAUTION: Be sure there are no gaps between the inner sleeve and the glass or between the Poly Flow tubing and the glass. Gaps may adversely affect the quality of your data.

- e. Trim the Poly Flow tubing to an appropriate length to reach the C3A debubbler on the Micropump. Use the shortest practical length.
- f. Use an N8 nipple and 1/2" of 0.040" ID PVC to connect the Poly Flow tubing

to the 0.040" ID PVC tubing on the inletport of the C3A debubbler.

- 3) Attach the C3A debubbler to the resample pump tube assembly.
 - a. Trim the resample pump tube to 1/4" from the shoulders on both ends.
 - b. Attach the resample pump tube to the N5 nipple on the outlet port of the C3A debubbler.
 - c. Insert an N8 into the other end of the pump tube, and attach 3" of 0.034" ID PE tubing to it with 1/2" of 0.040" ID PVC.
 - d. Attach the 0.034" ID PE tubing to the Input Connector Block.
 - e. On the other side of the Input Connector Block, attach only enough 0.034" ID PE tubing to reach the sample additionport on the cartridge. Attach the 0.034" ID PE to the appropriate fitting on the cartridge. Refer to the method's flow diagram.

CAUTION: Excess 0.034" ID PE tubing or not trimming the pump tube to 3/16" from the shoulders will cause increased carryover. The amount of tubing from the C3A debubbler to the cartridge must be minimized.

- 4) Attach the waste tubing.
 - a. Use an N8 nipple to attach the 0.040" ID PVC tubing on the waste port of the C3A debubbler to the debubble waste pump tube. Attach the pump tube to the Input Connector Block with an N8 nipple, 1/2" of 0.040" ID PVC and 1" of 0.034" ID PE.
 - b. Attach 11 1/2" of 0.034" ID PE to the other side of the Input Connector Block, and run the tubing to waste.

SPECIAL CASES

Predilution Loop

This assembly can be added to an existing cartridge to extend the upper concentration range of the analysis. It will dilute both the calibrants and samples by a uniform ratio.

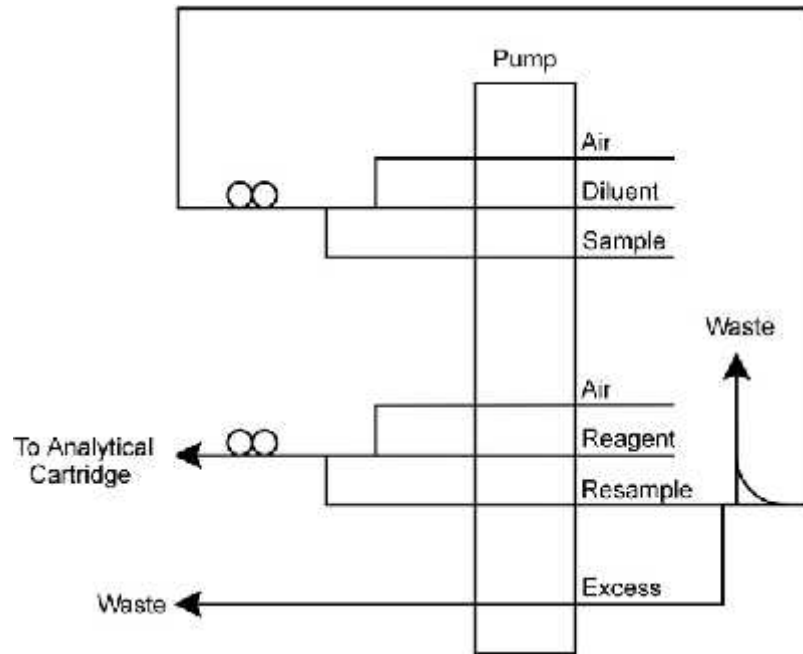


Diagram 31

General Layout Of A Dilution Loop

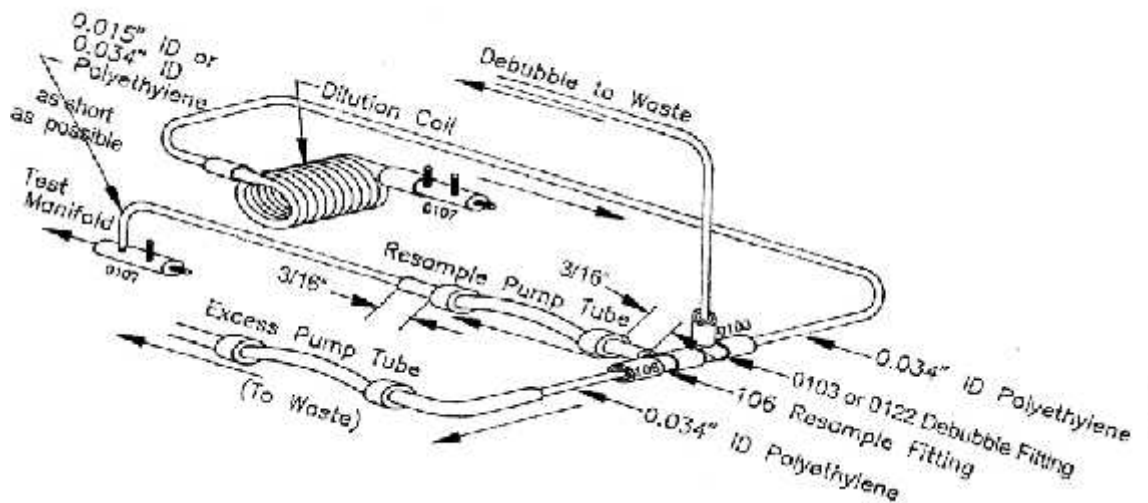


Diagram 32

Orientation of Fittings in a Dilution Loop

If your cartridge has a dilution loop, or you have added a dilution loop to a cartridge, the connections in the diagrams above must be followed carefully to avoid problems with carryover. Be sure that there are no gaps at any of the connections.

Note that the resample pump tube is cut to 3/16" from the shoulders.

If the resample pump tube is larger than blk/blk (orn/orn to red/red), the connection to the 106 resample fitting will have to be made with a VERY SHORT piece of 0.034" ID polyethylene tubing.

Incubation Coil

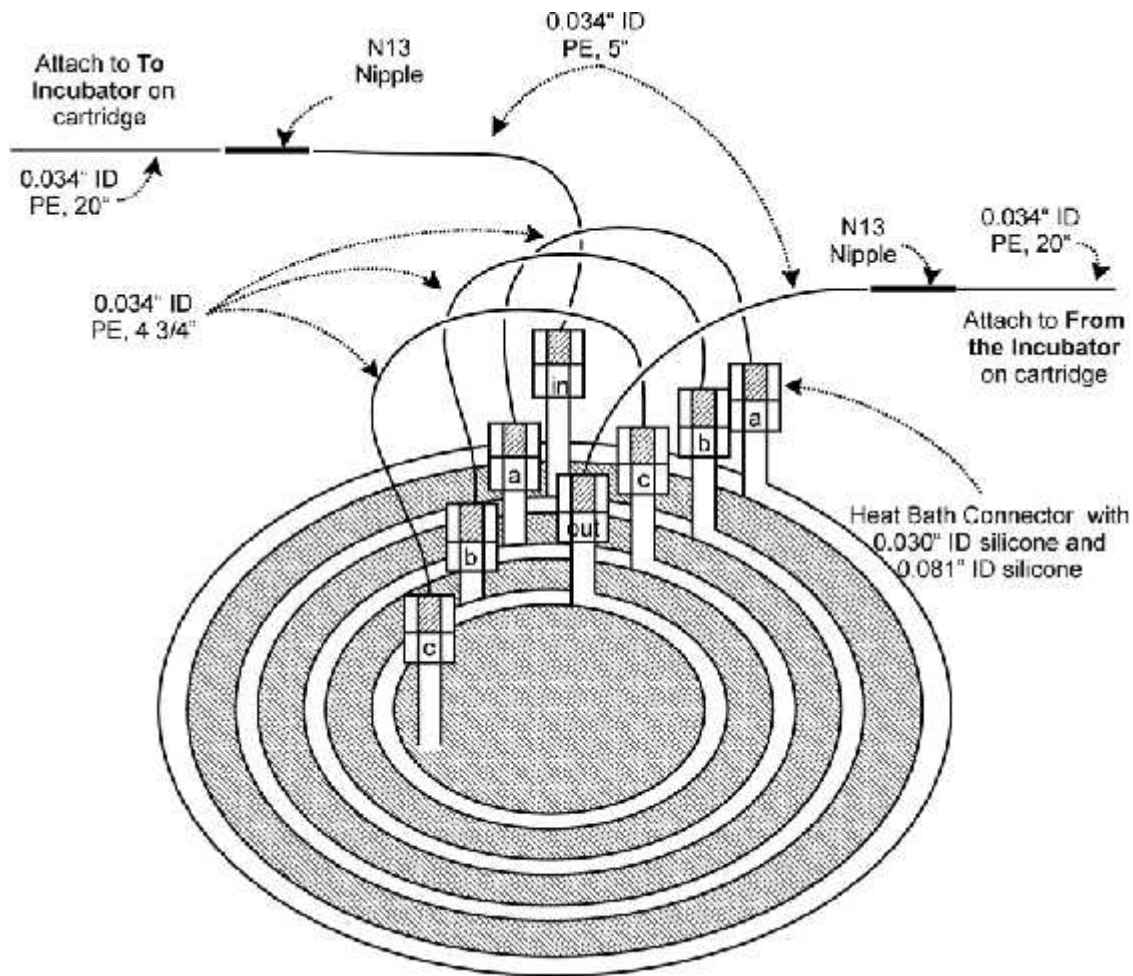


Diagram 33

Incubation Bath Connections

NOTE: There may be either three or four glass coils, depending on the needs of the method. The instructions below are written for four coils. If the system only has three coils, only two double-ended Heat Bath Connections are required, and the top port of the third, innermost coil goes to the dialyzer on the cartridge.

MATERIALS:

PART NUMBER	DESCRIPTION
303-2534P01	0.034" ID PE tubing
303-0060PN2	N13 Nipples
303-2330-01	0.030" ID silicone tubing
303-2381-01	0.081" ID silicone tubing

PROCEDURE:

- 1) Make three double-ended Heat Bath Connections.
 - a) Insert the 0.034" ID PE tubing approximately 1/4" into 0.030" ID silicone tubing.
 - b) Cut the 0.030" ID silicone tubing at end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and 0.030" ID tubing ends are flush and the cut is straight and even.
 - c) Insert the 0.030" ID tubing assembly into 0.081" ID silicone tubing. Trim the 0.081" ID silicone to 1/2".
 - d) Trim the 0.034" ID PE tubing to 4.75".
 - e) Repeat, adding 0.030" ID silicone and 0.081" ID silicone on the other end of the 0.034" ID PE tubing.
 - f) Repeat for the other tubing assemblies.
- 2) Make two tubing assemblies for the inlet and outlet.
 - a) Insert 0.034" ID PE tubing approximately 1/4" into 0.030" ID silicone tubing.
 - b) Cut the 0.030" ID silicone tubing at end of the 0.034" ID PE tubing. Be certain both 0.034" ID and 0.030" ID tubing ends are flush and the cut is straight.
 - c) Insert the 0.030" ID tubing assembly into 0.081" ID silicone tubing. Trim the 0.081" ID silicone to 1/2".
 - d) Trim the 0.034" ID PE tubing to 5".
 - e) Connect 20" of 0.034" ID PE tubing to the 5" of 0.034" ID PE tubing with an N13 nipple.
 - f) Repeat for the other tubing assembly.
- 3) Attach the tubing assemblies to the coil. The ports that go directly to the bottom of the coil are inlets; the ports that fold directly off the top of the coil are outlets.

CAUTION: The Incubation Coil is extremely fragile. Use great care when tightening or replacing fittings.

CAUTION: Be sure there are no gaps between the inner sleeve and the glass or between the 0.034" ID PE tubing and the glass. Gaps may adversely affect the quality of your data.

- a) Attach a double-ended Heat Bath Connection to the port on the outermost coil that folds directly off the top. Attach the other end to the port on the next coil that goes directly to the bottom.
- b) Attach a double-ended Heat Bath Connection to the port on the second coil that folds directly off the top. Attach the other end to the port on the next coil that goes directly to the bottom.
- c) Attach a double-ended Heat Bath Connection to the port on the third coil that folds directly off the top. Attach the other end to the port on the innermost coil

that goes directly to the bottom.

- d) Attach one of the longer assemblies to the port on the outermost coil that goes directly to the bottom.
- e) Attach the other longer assembly to the port on the innermost coil that folds directly off the top.

NOTE: If more incubation time is required, add 0.034" ID PE tubing to the outlet of the innermost coil and completely submerge the excess into the center of the coils.

Ion Exchange Column

Please refer to your method for instructions on the use of these assemblies on the Sulfate Cartridge.

NOTE: Also inquire with Customer Care/Service for Pre-Made Ion Exchange Columns.

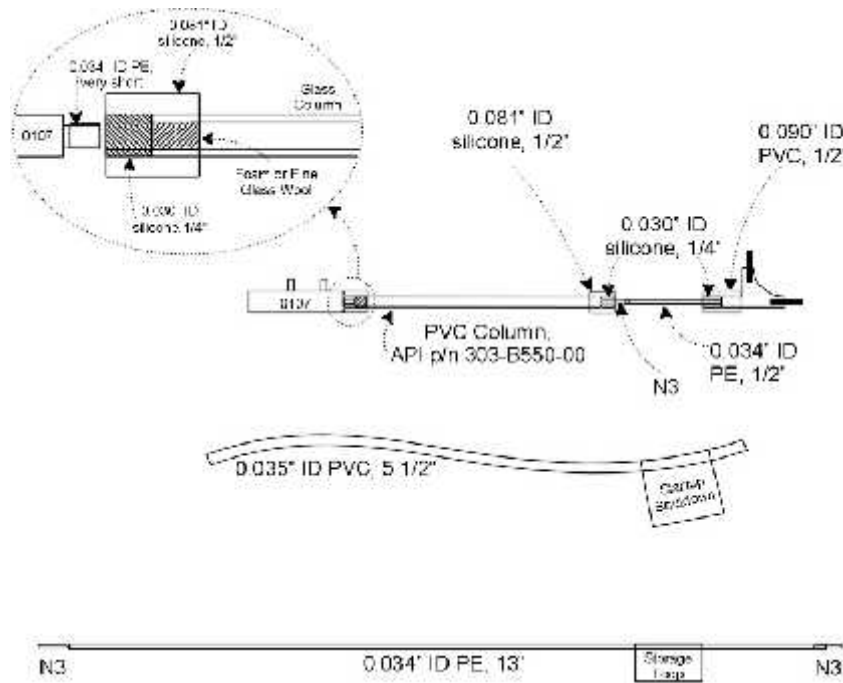


Diagram 34

Connections and Components for the Ion Exchange Column

MATERIALS:

PART NUMBER	DESCRIPTION
303-2534P01	0.034" ID PE tubing
303-2330-01	0.030" ID silicone tubing
303-2381-01	0.081" ID silicone tubing
Foam or Glass Wool	Contact your distributor or Astoria-Pacific Intl.
303-B550-00	Ion Exchange Column
303-0076PN3	N3 Nipple
303-2235P01	0.035" ID PVC tubing

PROCEDURE FOR REPLACING THE CONNECTIONS ON THE ION EXCHANGE COLUMN:

- 1) Assemble the Glass Column.
 - a) Carefully insert a very small bit of fine Glass Wool or Foam (Contact your distributor or Astoria-Pacific) into one end of a cleaned Glass Column (API p/n 303-B510-00). Use a very small stylus if necessary, to insert it. It will act as a filter to prevent resin particles from passing into the cartridge.

CAUTION: If too much glass wool or foam is used, flow may be restricted causing excess backpressure. This will adversely affect the quality of your data.
 - b) Insert 1/4" of 0.030" ID silicone tubing into 1/2" of 0.081" ID silicone tubing.
 - c) Carefully slide the assembly onto the Glass Column over the foam/glass wool end.

CAUTION: The glass components are fragile. Use care when tightening or replacing fittings.

CAUTION: Be sure there is no gap between the silicone tubing and the glass. Gaps may adversely affect the quality of your data.
 - d) Insert 1/4" of 0.030" ID silicone tubing into 1/2" of 0.090" ID PVC tubing again. Attach this connection to the other end of the Glass Column.
- 2) Assemble the connection from the Debubbler on the Sulfate cartridge.
 - a) Insert 1/2" of 0.034" ID PE tubing approximately 1/4" into the 0.030" ID silicone tubing.
 - b) Cut the 0.030" ID silicone tubing at the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and the 0.030" ID tubing ends are flush and the cut is straight and even.
 - c) Insert the 0.030" ID tubing assembly into 1/2" of 0.081" ID silicone tubing.
 - d) Slide the assembly onto the outlet port of the Debubbler on the Sulfate Cartridge.
 - e) Attach an N3 nipple to the other end of the 0.034" ID PE tubing.
- 3) Create the Storage Loop and Startup/Shutdown Bypass.
 - a) Attach an N3 nipple to each end of 13" of 0.034" ID PE tubing for the Storage Loop.
 - b) Cut a length of 0.035" ID PVC tubing to 5 1/2" for the Startup/Shutdown Bypass. A piece of an orn/orn pump tube can be used as a substitute.

DETECTOR CONNECTIONS:

DEBUBBLING AT THE FLOWCELL

The detector is always debubbled at the flowcell.

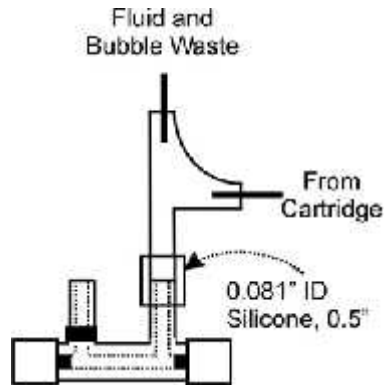


Diagram 35

Debubbling at the flowcell

1) Attach the Debubbler to the Flowcell

Use 1/2" of 0.081" ID silicone tubing (API p/n 303-2381-01) or, for a tighter connection, 0.090" ID PVC tubing (API p/n 303-2290P01) to attach a 303-0122-00 Debubbler to the flowcell as in the diagram above. Make sure there are no gaps at any of the connections. **Diagram 35** is an example of a 10mm x 1.5mm flowcell. Please note that the Input and Output ports of the 6mm x 1.5mm flowcell are on opposite sides of each other, but the flow path is the same as the 10mm flowcell, so the Output port will still be nearest to the filter holder.

2) Attach the Debubler to the Cartridge

Refer to Component Connections for the cartridge to debubbler connection. A single-ended Component Connection is required for the 303-0122-00 Debubbler. A double-ended connection is required for the 303-0103-00 Debubbler (if you like to make extra tubing connections ... no judgment here).

FLOWCELL DEBUBBLER WASTE

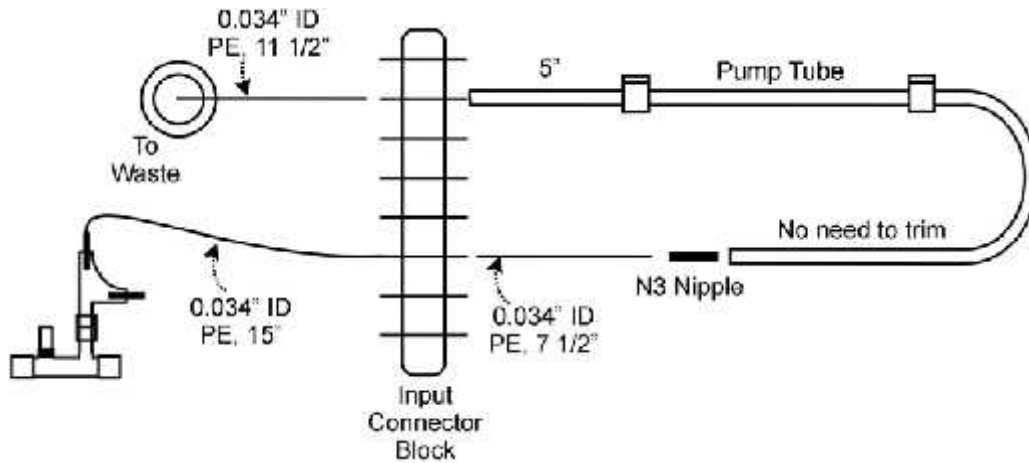


Diagram 36

Flowcell Debubbler Waste Pump Tube

MATERIALS:

PART NUMBER	DESCRIPTION
303-2534P01	0.034" ID PE tubing
303-0076PN3	N3 Nipple

PROCEDURE:

- 1) Attach 15" of 0.034" ID PE tubing to the waste port of the 303-0122-00 Debubbler. Attach the other end to the Input Connector Block.
- 2) Attach 7 1/2" of 0.034" ID PE tubing to the other side of the Input Connector Block. Use an N3 Nipple to attach the 0.034" ID PE to the Debubbler Waste pump tube. Refer to the diagram above.
- 3) Attach the other end of the debubbler pump tube to the Input Connector Block.
- 4) On the other side of the Input Connector Block, attach 11 1/2" of 0.034" ID PE tubing. Direct the outlet to waste.

FLOWCELL WASTE

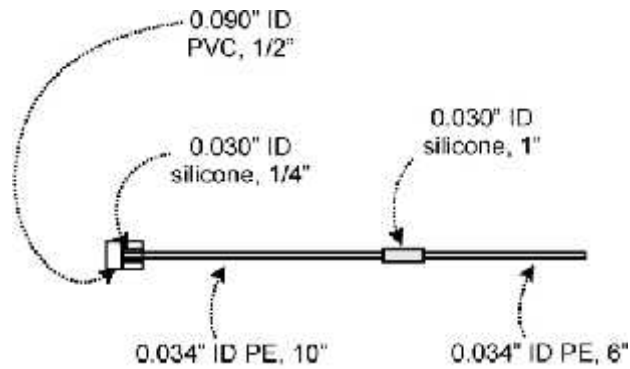


Diagram 37

Flowcell Waste Line

MATERIALS:

PART NUMBER	DESCRIPTION
303-2290P01	0.090" ID PVC tubing
303-2330-01	0.030" ID silicone tubing
303-2534P01	0.034" ID PE tubing

PROCEDURE:

- 1) Insert 10" of 0.034" ID PE tubing approximately 1/4" into 0.030" ID silicone tubing.
- 2) Cut the 0.030" ID silicone tubing at the end of the 0.034" ID PE tubing. Be certain both the 0.034" ID and 0.030" ID tubing ends are flush and the cut is straight.
- 3) Insert the 0.030" ID tubing assembly into 1/2" of 0.090" ID PVC tubing.
- 4) Attach the assembly to the outlet port on the Flowcell.
- 5) Using 1" of 0.030" ID silicone tubing, attach the 10" of 0.034" ID PE to 6" of 0.034" ID PE tubing. Trim either piece of 0.034" ID PE tubing to an appropriate length. It only needs to be long enough to reach the waste port on the cartridge. Direct the end of the tubing assembly to waste.

PROBLEM SOLVERS:

Do you have bubbles ... but not the “right” bubbles? Keep in mind that a uniform “perfect” bubble pattern isn’t completely necessary, as long as you still have good peak shapes and that “errant” bubbles are not causing baseline issues (e.g. drift and/or baseline shifts. Please consult the Operators Manual for additional Trouble Shooting). Here are some possible solutions to common bubble breakups (no “Dear John” letter necessary):

A. BUBBLE BREAK UP AT THE FIRST STREAM ADDITION

If bubbles are being broken under the injection port of a 303-0107-00 fitting, and the problem cannot be corrected by normal troubleshooting, try one of the options shown below.

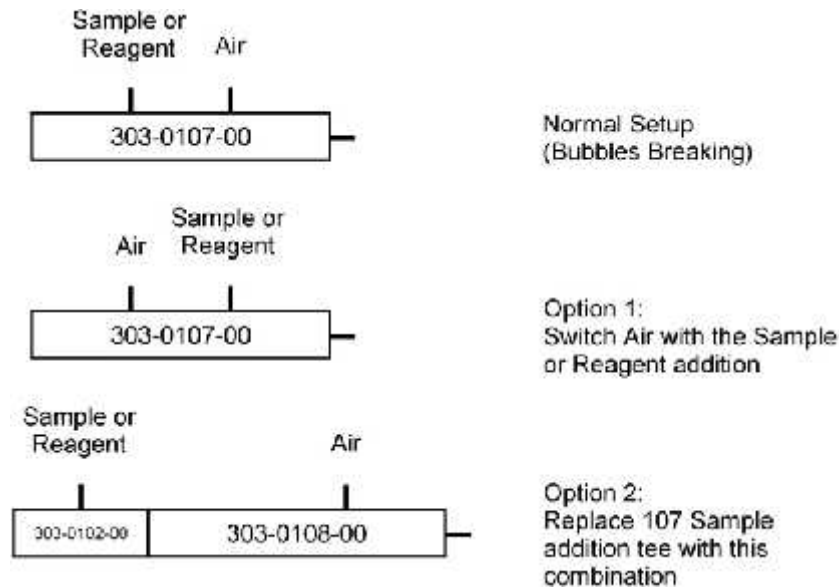


Diagram 38

Rearranging A Sample or Reagent Addition

B. BUBBLE BREAK UP ON REAGENT ADDITION: PUMP TUBES LARGER THAN BLK/BLK

When a large pump tube is adding a reagent to the reagent stream, the "push and pull" of the peristaltic pump can break up bubbles as they pass under the reagent addition tee.

1) ADD A PULSE SUPPRESSOR

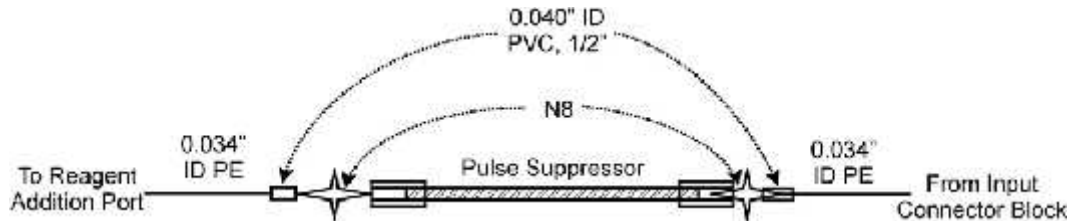


Diagram 39

0.015" Pulse Suppressor

By putting some backpressure on the addition, the compression pulses from the Micropump can be partially evened out. Pulse Suppressors are available with internal diameters of 0.005" (API p/n 303-B044P01) and 0.015" (API p/n 303-B044P02). The 0.015" ID Pulse Suppressor is the most commonly used variety. Insert the Pulse Suppressor into the reagent line between the Input Connector Block and the reagent addition fitting on the cartridge.

2) SPLIT THE REAGENT ADDITION

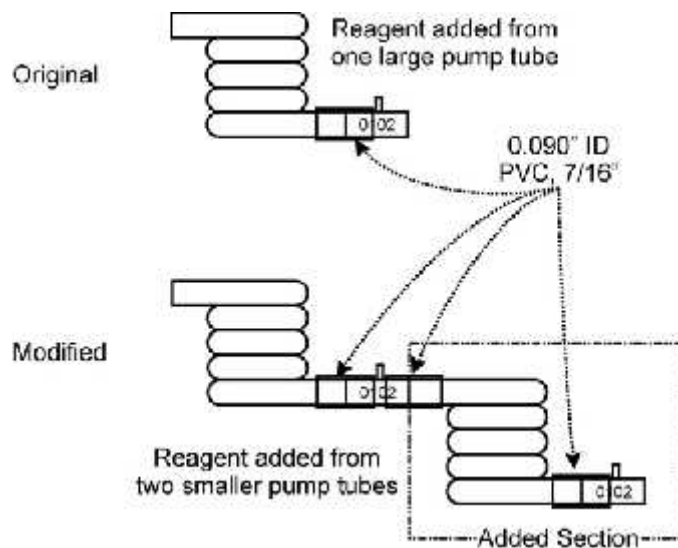


Diagram 40

Splitting a Reagent Addition

This can be overcome by inserting another 303-0102-00 fitting and a five turn coil in the system, and adding the reagent in two portions. Divide the original flowrate into two portions that will be approximately equivalent. See the diagram above as well as the table below. Refer to Micropump Tube Color Code on page 8-5 for pump tube flowrates.

Table 4: Flowrate Examples

If the original pump tube was:	You can replace it with:
Wht/Wht (385 ml/min)	Orn/Wht (166 ml/min) + Blk/Blk (226 ml/min)
Red/Red (482 ml/min)	Blk/Blk (226 ml/min) + Blk/Blk (226 ml/min)
Orn/Orn (287 ml/min)	Orn/Yel (118 ml/min) + Orn/Wht (166 ml/min)

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