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PURE SOLV™

Manual

Solvent Purification System

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Installation

Required Materials:

The table below describes the materials required for the installation of a standard system.
 Note: Individual systems may vary.

Item	Material	Comment/Description
1	Inert Gas Supply	Nitrogen, Argon, Helium (High Purity)
2	Regeneration Gas (7% H ₂ / 93% N ₂)	If system has copper catalyst.
3	Dual Stage Pressure Regulators	Two required
4	Tubing	Teflon or Stainless Steel
5	Wrenches	7/16", 1/2", 9/16", and 5/8"

Connecting Fittings:

The table below describes the steps required to connect fittings.

STEP	ACTION						
1	Unpack solvent reservoirs/kegs from stand. Note: Refer to existing labeling for valve assembly placement. Tighten Swagelok connection as per standard directions.						
2	Attach solvent reservoir head pressure regulators to the 1/4" Teflon line.						
3	Attach dispensing lines to metering valve. If system has Schlenk manifold, then attach to 1/4" swage tee at the bottom of valve bracket.						
4	Connect solvent reservoirs/kegs to solvent purification system. Note: Each reservoir/keg is dedicated to a row of cylinders on the system. Color designation is used to aid in the connection process.						
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">If the system...</th> <th style="width: 50%;">Then...</th> </tr> </thead> <tbody> <tr> <td>Does not include the optional fire cabinet</td> <td>Connection is made directly to the column.</td> </tr> <tr> <td>Does include the optional fire cabinet</td> <td>Connection is made through the designated fitting designed into the cabinet. See "<i>Fire Cabinet Port Configuration</i>" representation.</td> </tr> </tbody> </table>	If the system...	Then...	Does not include the optional fire cabinet	Connection is made directly to the column.	Does include the optional fire cabinet	Connection is made through the designated fitting designed into the cabinet. See " <i>Fire Cabinet Port Configuration</i> " representation.
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Does not include the optional fire cabinet	Connection is made directly to the column.						
Does include the optional fire cabinet	Connection is made through the designated fitting designed into the cabinet. See " <i>Fire Cabinet Port Configuration</i> " representation.						
5	Attach regulator to cylinder of inert gas.						
6	Attach a 1/4" inch line from regulator to "Red" Swagelok valve. Note: "Red" valve is the main shut-off and gas supply.						
7	The process of "Connecting the Fittings" is complete.						

Installation

Pressure Testing:

The table below describes the steps required to pressure test the reservoir/keg:

STEP	ACTION						
1	Set inert gas source regulator. Note: System equipped with pressure relief valve set to 70 PSIG. <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Minimum</th> <th style="width: 33%;">Nominal</th> <th style="width: 33%;">Maximum</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">45 PSIG</td> <td style="text-align: center;">53 PSIG</td> <td style="text-align: center;">60 PSIG</td> </tr> </tbody> </table>	Minimum	Nominal	Maximum	45 PSIG	53 PSIG	60 PSIG
Minimum	Nominal	Maximum					
45 PSIG	53 PSIG	60 PSIG					
2	Set each solvent reservoir/keg regulator to 25 PSIG.						
3	Ensure all valves on reservoir/keg are in closed position.						
4	Connect solvent reservoir/keg regulator to Port #1 by inserting male quick disconnect stem into female disconnect body. <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%; text-align: center;"> <p style="text-align: right; font-weight: bold; border: 1px solid black; padding: 2px;">Port Designation</p> </div>						
5	Allow reservoir/kegs to remain pressurized for >5 minutes. After pressurization period, close the main inert gas supply Swagelok valve -- "Red Valve."						
6	Allow the solvent purification system set for an hour after main shut off valve is closed.						
7	Check system for leaks (pressure is held). <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">If the system...</th> <th style="width: 50%;">Then...</th> </tr> </thead> <tbody> <tr> <td>Is holding pressure</td> <td>Leak check is complete.</td> </tr> <tr> <td>Looses pressure</td> <td>Leak-check all fittings (Swagelok snoop or soapy water) and repeat pressure test.</td> </tr> </tbody> </table>	If the system...	Then...	Is holding pressure	Leak check is complete.	Looses pressure	Leak-check all fittings (Swagelok snoop or soapy water) and repeat pressure test.
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Is holding pressure	Leak check is complete.						
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Sparging of Solvent

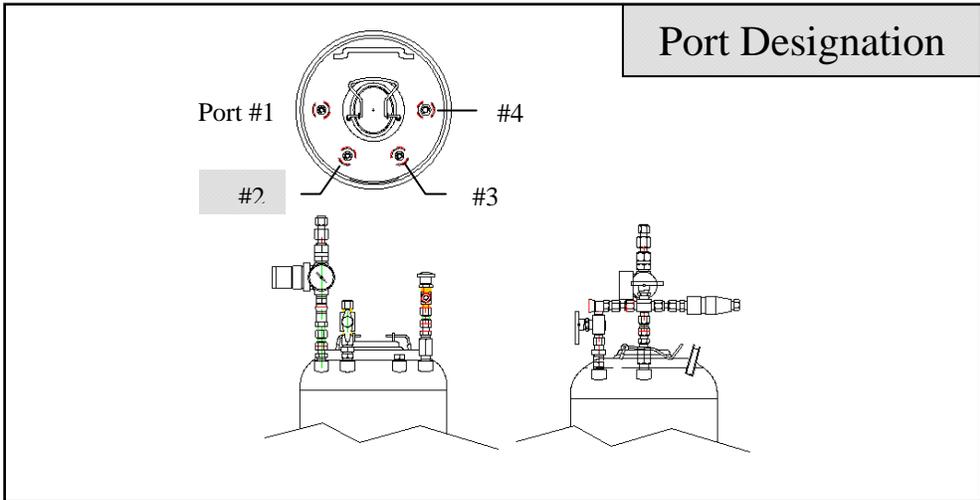
IMPORTANT	ALL SOLVENT PLACED IN SOLVENT RESERVOIR/KEGS SHOULD BE SPARGED (BUBBLE DE-GASSED) TO REMOVE OXYGEN BEFORE RUNNING THROUGH SOLVENT PURIFICATION SYSTEM.
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IMPORTANT	RESERVOIR/KEG SHOULD BE GROUNDED WHEN FILLING.
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IMPORTANT	THF MUST <u>NOT</u> CONTAIN THE INHIBITOR "BHT."
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Procedure:

The table below describes the steps for Sparging of solvents.

STEP	ACTION
1	Disconnect solvent reservoir/keg from solvent purification system.
2	Connect a ¼ inch line to Port #2 (Bubble De-gas outlet) Swagelok two-way valve and run line to vent hood. <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <div style="text-align: right; background-color: #cccccc; padding: 5px; display: inline-block;">Port Designation</div>  </div>
3	Pull reservoir/keg out and depressurize it by turning Swagelok two-way valve (Port #2) to open position.
4	Clamp ground cable/wire to reservoir/keg ground.

Continue...

Sparging of Solvent

Procedure (continued):

The table below describes the steps for Sparging of solvents.

STEP	ACTION												
5	Remove lid and fill with solvent. Replace lid once reservoir/keg has been filled.												
6	Connect regulator to Port #4 (Bubble De-gas inlet). <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: right; border: 1px solid black; padding: 2px; display: inline-block;">Port Designation</p> </div>												
7	Turn handle on three-way valve toward bubble de-gas inlet.												
8	Sparge solvent following durations specified in the table below. <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Reservoir Capacity (gallons)</th> <th style="padding: 5px;">Minimum Sparging Time (minutes)</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">One (1)</td> <td style="padding: 5px;">15</td> </tr> <tr> <td style="padding: 5px;">Two (2)</td> <td style="padding: 5px;">30</td> </tr> <tr> <td style="padding: 5px;">Three (3)</td> <td style="padding: 5px;">45</td> </tr> <tr> <td style="padding: 5px;">Four (4)</td> <td style="padding: 5px;">45</td> </tr> <tr> <td style="padding: 5px;">Five (5)</td> <td style="padding: 5px;">60</td> </tr> </tbody> </table>	Reservoir Capacity (gallons)	Minimum Sparging Time (minutes)	One (1)	15	Two (2)	30	Three (3)	45	Four (4)	45	Five (5)	60
Reservoir Capacity (gallons)	Minimum Sparging Time (minutes)												
One (1)	15												
Two (2)	30												
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Four (4)	45												
Five (5)	60												
9	After sparging solvent, turn inlet & outlet valves on reservoir/keg to their closed position.												
10	Disconnect regulator from Port #4 (bubble de-gas inlet) and reconnect to Port #1 (head pressure inlet).												
11	Re-secure reservoir/keg in the solvent purification system.												
12	Repeat steps 1-11 on the rest of solvent reservoir/kegs.												

How to operate the SPS

IMPORTANT	100ML OF SOLVENT MUST BE DISPENSED OUT OF THE THREWAY VALVES OPEN-PORT ON THE TOP OF ALL CYLINDERS. THIS WILL ALLOW ANY PARTICULATE TO GET FLUSHED OUT.
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Valve Operation (Prime System):

The table below describes the valve operating direction. Follow in sequence and repeat per row of cylinders:

Valve	Operation
Reservoir/Keg	Turn the handle on the three-way valve so that handle is pointing to line running to the back cylinder.
Back Cylinder (Bottom)	Turn handle toward line running from reservoir/keg.
* Back Cylinder (Top)	“Open Port” Turn handle to open port position and dispense minimum 100ml solvent or until solvent appears clean.
Back Cylinder (Top)	Turn toward line that connects back cylinder to bottom of front cylinder.
Front Cylinder (Bottom)	Turn handle toward line running from top of back cylinder to bottom of front cylinder.
* Front Cylinder (Top)	“Open Port” Turn handle to open port position and dispense minimum 100ml solvent or until solvent appears clean.
Front Cylinder (Top)	Turn handle to line to valve bracket system.

* = **“Open Port”** Operation only necessary when the cylinder is not yet primed (dry).

How to operate the SPS

Schlenk manifold (gas and vacuum):

The table below describes the steps required to operate the SPS equipped with the Schlenk manifold.

Step	Action
1	Set regulators off gas manifold to <5 psi . Note: System equipped with pressure relief valve set to 7 psi.
2	Check that the vacuum source is connected to vacuum manifold and that it is turned on with exhaust line running to vent hood.
3	Attach flask to the dispensing connection.
4	Support the flask and connection.
5	Turn valve on valve bracket (in line with connection) to "Evacuate Position."
6	When flask has been evacuated, turn the same valve to its "Refill Position."
7	Repeat steps 5 and 6 a total of three times ending with evacuation.
8	Evacuate once more, turn valve to "dispense position" and leave flask under vacuum condition.

Dispensing of Solvent:

IMPORTANT	FOR SAFETY, NEVER FILL THE FLASK MORE THAN 2/3 OF THE WAY FULL.
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The table below describes the steps to dispense solvent.

Step	Action
1	Complete requirement stated in "Important" above. Complete preparation steps described in Schlenk manifold section.
2	Slowly open metering valve allowing solvent to dispense into flask at the desired rate.
3	When dispensing is complete turn the Swagelok valve to refill in order to back fill collection flask with inert gas, also clearing dispensing line of solvent preventing dripping of solvent
4	Turn valve to closed position.
5	Remove flask from the dispensing connection

Materials

Standard:

The table below describes the materials included with the “standard” Solvent Purification System.

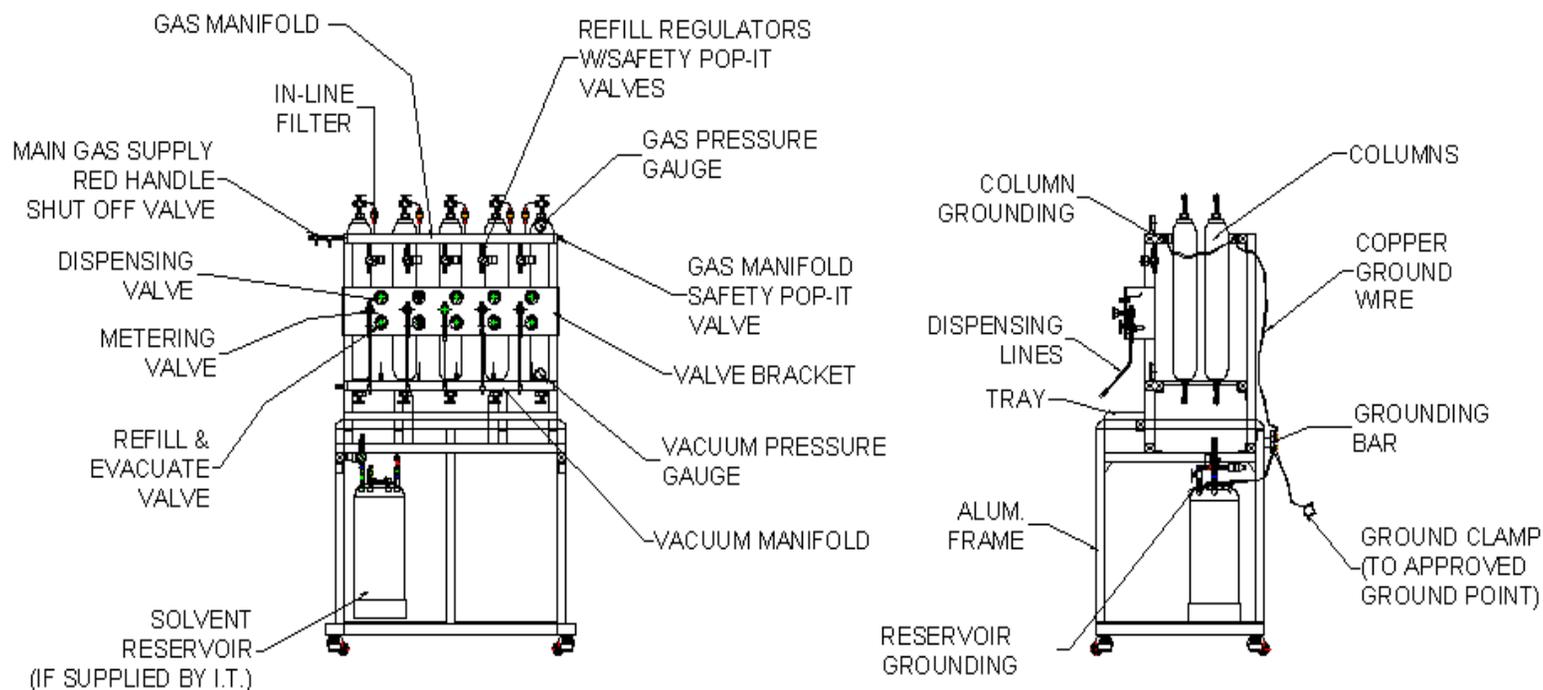
Item	Description												
1	Frame (shelf, table-top and wall mount stand)												
2	Cylinders: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Item</th> <th>Type</th> <th>Purpose</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Activated Alumina</td> <td>Remove H₂O</td> </tr> <tr> <td>2</td> <td>Copper Catalysts</td> <td>Remove O₂</td> </tr> <tr> <td>3</td> <td>Molecular Sieves</td> <td>Remove H₂O</td> </tr> </tbody> </table>	Item	Type	Purpose	1	Activated Alumina	Remove H ₂ O	2	Copper Catalysts	Remove O ₂	3	Molecular Sieves	Remove H ₂ O
Item	Type	Purpose											
1	Activated Alumina	Remove H ₂ O											
2	Copper Catalysts	Remove O ₂											
3	Molecular Sieves	Remove H ₂ O											
3	Swagelok fittings												
4	SS Tubing												
5	Casters with Leveling Feet												
6	Dispensing solvent connection (24/40 - 29/32 - 14/20 - Luer lock Needle Valve)												
7	Vacuum and Gas Manifold												
8	Pressure Regulators												
9	Check Valves												
10	Pressure Relief Valves												

Optional:

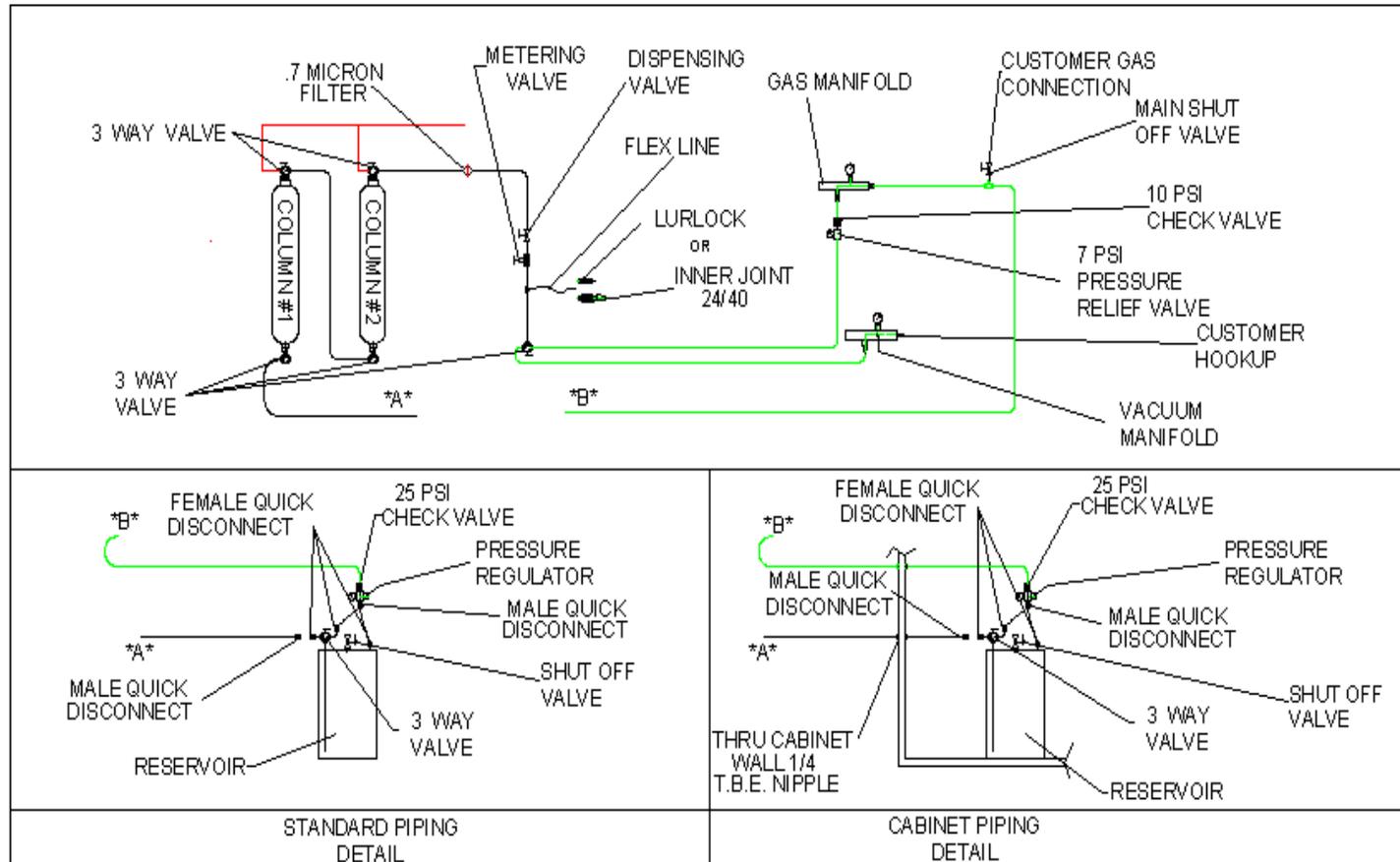
The table below describes the available “optional” materials for use with the Solvent Purification System.

Item	Description
1	Solvent Reservoirs/Kegs
2	Replacement Column's
3	Heating Mantle
4	Heater controller or thermocouple reader
5	Dry Vacuum pump
6	Solvent Trap
7	Flammable Cabinets
8	Vacuum Gauges
9	Thermocouple (K Type)
10	Spill tray with clamping post

Solvent Purification System Diagram



Solvent Purification System, Schematic



Fire Cabinet Port Configuration

