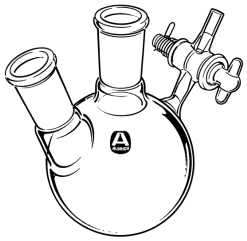
innovative technology inc.

SOLVENT PURIFICATION SYSTEMS & PURIFICATION GRADE SOLVENTS



From INNOVATIVE TECHNOLOGY, INC

For SAFE Processing of DRY, DEOXYGENATED SOLVENTS

Research Teaching Production

WWW.SOLVENTPURIFICATION.COM

Sigma-Aldrich is a distributor of Innovative Technology Solvent Purification Systems.

SOLVENT PURIFICATION SYSTEMS

The removal of water and oxygen from flammable solvents using low-pressure column technology is proven to be a safe and effective alternative to thermal distillation methods that can result in fire or exposure to vapors.

The well-engineered systems from Innovative Technology allow for highly flexible, inherently safer solvent purification for research, teaching, and production.

Specify up to seven different solvents in a single solvent purification system.

Basic System Operation and Specifications:

A Purification Grade solvent is pushed from its storage container under low nitrogen pressure through two stainless steel columns containing activated alumina and copper. Trace amounts of water and oxygen are removed producing dry, deoxygenated solvent. The processed solvent is drained into in a storage flask where it can be dispensed, under nitrogen, using standard syringe techniques.

Dual solvent column design	Two pressure tested stainless steel columns per solvent, either 200L or 400L processing capacity until spent. Columns are supplied fully conditioned, ready for use. Spent columns are replaced with new columns.
Manifolds, vacuum and gas	Internal vacuum and gas manifolds are built into the extruded aluminum frame of the system. Includes a vacuum indicator and gas regulators and pressure relief valves dedicated to each of the solvent flasks to prevent over pressurization of glassware.
Gas connection	All solvents can be dispensed simultaneously using one main inert gas supply. A red colored 2-way Swagelok valve located on the main gas supply allows operator to shut off all pressure to system in an emergency.
Stainless steel tubing	All solvent tubing is ¼ inch stainless steel.
Check valves	Each solvent has it's own in-line check valve to prevent back flow, thus eliminating cross contamination of solvents.
Directional valves	Each solvent includes both 2-way and 3-way Swagelok directional valves to control flow of solvents and inert gas.
Dispensing	Innovative Technology now offers the safest most functional dispensing system available. A 5-Way Swagelok valve promotes correct dispensing procedures and prevents multiple functions from occurring simultaneously, thus causing problems like evacuation of solvent through the vacuum pump. A Swagelok metering valve allows a controlled flow of solvent from a braided stainless steel flex line connected to your desired dispensing joint (24/40 – 29/32 – 14/20 – Luer Lock Needle Valve) . A glass solvent storage flask mounts to the joint for dispensing solvents using standard syringe techniques.

Grounding	The system is grounded and bonded against ESD, enabling the user to make a cold water pipe, or earth ground. Permits grounding a solvent reservoir while filling it away from the system

Specify a *PURE SOLV* System in 4 Easy Steps

STEP 1: Select Solvents

SIGMA-ALDRICH
PURIFICATION GRADE SOLVENTS

A new line of specially prepared and packaged solvents that enhance the performance, safety, and convenience of *PURE SOLV* systems. Specify up to seven different solvents in a single *PURE SOLV* solvent purification system.

- **Low water and oxygen content**
- **Degassed* to save processing time**
- **Extends PURE SOLV column life**
- **Convenient pack sizes**
  *For 18L Pure-Pac container only.

Solvent Container Types

5 Gallon PURE SOLV refillable reservoir – provided by Innovative Technology, including all quick disconnect valves. Perfect for refilling with Sigma Aldrich Glass disposable bottled solvent.

2 Gallon PURE SOLV refillable reservoir – provided by Innovative Technology, including all quick disconnect valves. Perfect for refilling with Sigma Aldrich Glass disposable bottled solvent.

18 liter Pure-Pac returnable container - stainless steel container attaches to PURE SOLV systems with simple quick-connect fittings.

4L Glass disposable bottles – for manually filling 5 gallon (19L) PURE SOLV solvent reservoirs. Bottled solvents are not degassed and must be de-gassed prior to use. Instructions are included with owner's manual.

Specify Pure Solve Solvents

Solvent Type:	Expected Titration Results	Alumina	Sieves	De-Gas	Copper
Acetonitrile	15 ppm	*		+	
Benzene	4 ppm	*		+	#
Chloroform	2 ppm	*		+	
Dichloromethane	2 ppm	*		+	
DME	30 ppm	*		+	
DMF	30 ppm		*	+	
Ether - Inhibitor-free	8 ppm	*		+	
Heptane	2 ppm	*		+	#
Hexane	2 ppm	*		+	#
Hexanes	2 ppm	*		+	#
Methanol	40 ppm	*		+	
Pentane	2 ppm	*		+	#
Chlorobenzene	6 ppm	*		+	
THF - Inhibitor-free	7 ppm	*		+	
Toluene	2 ppm	*		+	#

* = Solvent will be dried using identified material.

+ = All Solvents must be de-gassed for oxygen removal using inert gas. De-gas times are located in Manual.

= Identified solvents may be passed through Copper Catalyst for optimum oxygen scrubbing.

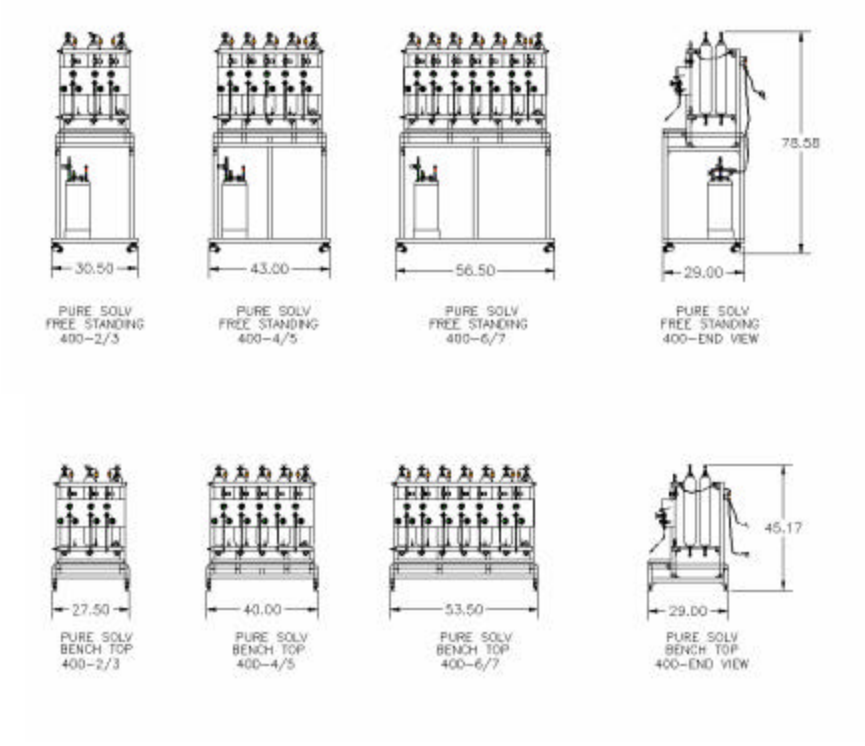
STEP 2: Select Column Processing Capacity

The processing capacity of PS-400 Systems is 400L per solvent, PS-200 Systems is 200L per solvent. Spent columns may be discarded and replaced with new fully conditioned columns.

Description	PS-400 Systems	PS-200 Systems
One Solvent System	PS-400-1	PS-200-1
Two Solvent System	PS-400-2	PS-200-2
Three Solvent System	PS-400-3	PS-200-3
Four Solvent System	PS-400-4	PS-200-4
Five Solvent System	PS-400-5	PS-200-5
Six Solvent System	PS-400-6	PS-200-6
Seven Solvent System	PS-400-7	PS-200-7

STEP 3: Select System Configuration

Select a free standing or bench top system.



STEP 4: Select System Accessories.

Select a Diaphragm Pump for evacuation of Glassware prior to dispensing solvent.

DRYFAST ULTRA * PTFE Vacuum Pumps

Corrosion resistant PTFE Diaphragm Pump
Small foot print and compact
Steady reliable vacuum
Gas ballast inhibits gas vapor condensation
Quiet

Select a Flammable Safety Cabinet.

Select Glove Box Integration.

Dispensing Options.

Please ask us about our custom air free dispensing solutions .

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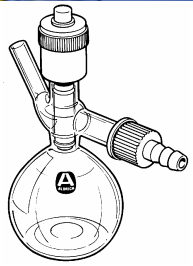
Select Solvent Storage Flasks.

For Storage and dispensing air-sensitive solvents. With 24/40 ground glass joints and septum inlet PTFE stopcock. Custom designs also available

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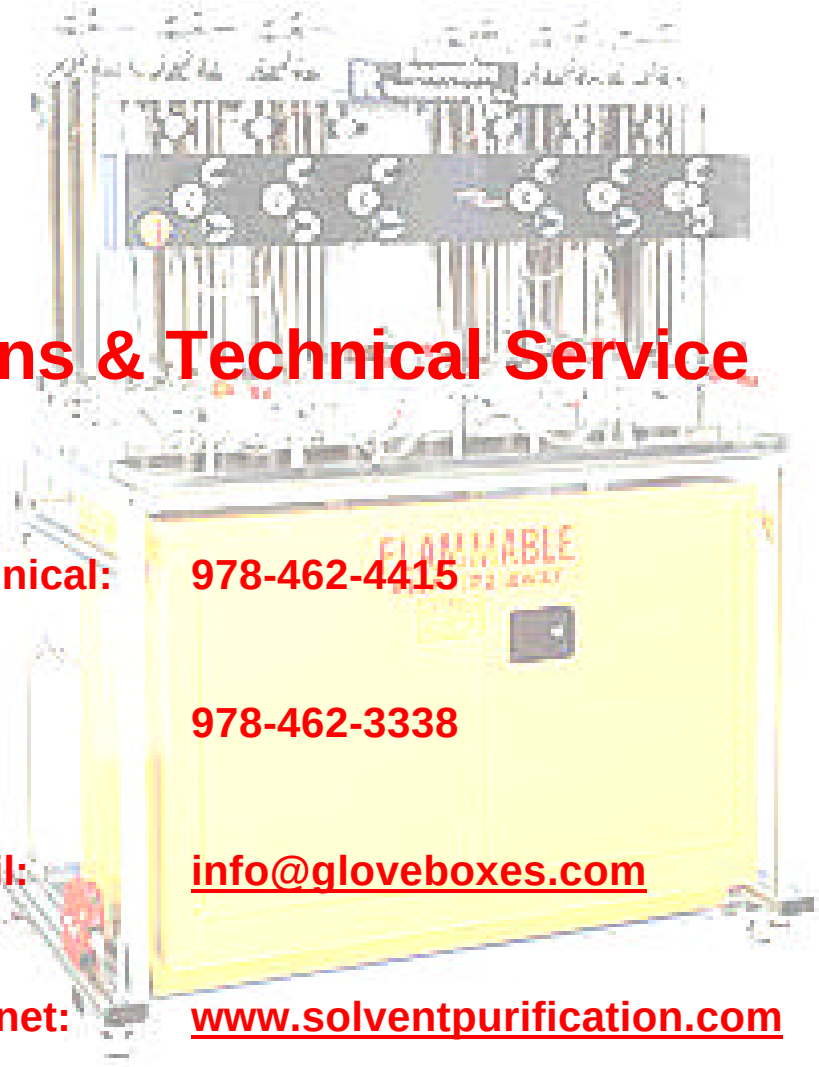

Quotations & Technical Service

Technical: 978-462-4415

FAX: 978-462-3338

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www.gloveboxes.com

KEEP AWAY FROM HEAT, SPARKS and **OPEN FLAME**. **DO NOT INHALE VAPOR**. How many times have you seen one or both of these injunctions? Yet, every time you perform a thermal distillation on a flammable solvent, you violate the former, and possibly the latter. And to complicate matters, our colleges and universities are still teaching thermal distillation. There is a better way - solvent purification systems using pressure column technology[1]. The method is proven to be effective and is clearly safer[2]. The well-engineered systems from Innovative Technology allow for highly flexible, inherently safer solvent purification for research, teaching, and production.

These devices can be home built. The University of California System is adopting a design and safety guideline[3]. However; these commercial units make financial and technical sense. The systems use proven engineering, with high quality control standards. They are backed by the integrity and reputation of the manufacturer. And, they are available for use immediately upon installation. All of these advantages outweigh any savings of "do-it yourself."

I cannot decide if YOU need a pressure column purification system. I can only point out that the cost of a single fire is many times the cost of a purification system. If you continue to violate the above-stated injunction, you will have a fire.

Neal Langerman Ph.D.
Advanced Chemical Safety
7563 Convoy CT
San Diego, CA 92111

[1] Pangborn, A.B., Giardello, M.A., Grubbs, R.H., et al; *Organometallics*, **15**(5), 1518-1520, 1996.

[2] Alaimo, Peter J.; Peters, David W.; Arnold, John; Bergman, Robert G.; *J. of Chem. Ed.* **2001** *78* 64.

[3] University of California "Push-Still" Design Guides. D. Decker, personal communication (for more information, contact dmdecker@scarlet.ucdavis.edu)