



turning ideas into solutions

mBRAUN

SOLVENT PURIFICATION SYSTEMS

INERTGAS TECHNOLOGY



www.mbraun.com

MBRAUN Solvent Purification Operation:

MBRAUN offers the safest, fastest and easiest way to dispense ultra pure solvents. MBRAUN SPS systems provide laboratories with unique safety features and benefits, specifically designed to meet the needs of the customer.

The MBRAUN Solvent Purification System operates by way of solvent storage vessels being pressurized through an inert gas supply (Typically a nitrogen source of 99.99% purity or better). The solvent rises through the dip tube and flows through a series of two filter columns that absorb moisture from the solvent. Ultra pure solvents are then dispensed into evacuated collection vessels directly at the system and/or into an integrated glovebox system. Exhausted purifier columns are disposed of by the customer and activated replacement columns are provided by MBRAUN.

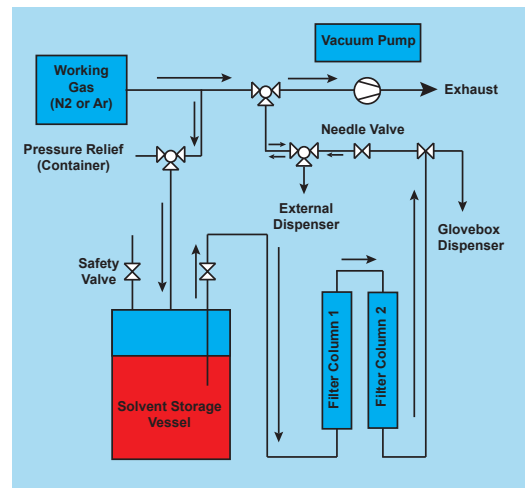


Figure A. Shows the gas and solvent flow throughout the system

MBRAUN Solvent Purification System Features:

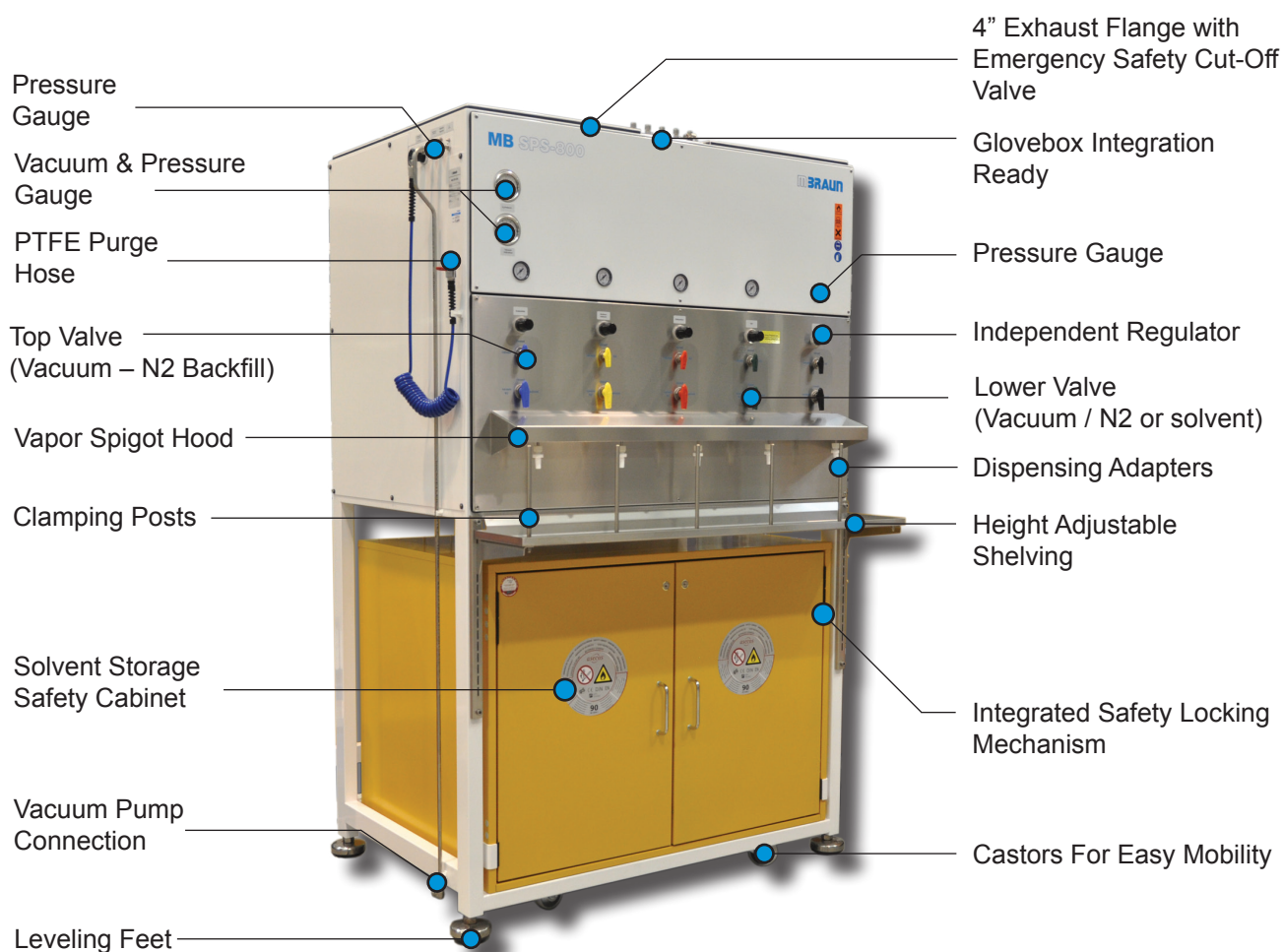


Figure B. Shows the basic system configuration of an MBRAUN SPS-800. System configuration, color and flammable cabinet specification may vary.

MB SPS Compact

The MB SPS Compact is a single solvent purification system specifically designed for customers who demand a compact more economical solution in their solvent purification needs. The compact design and high quality construction allows customers the ability to dispense ultra pure solvents directly from the laboratory bench top.

MB SPS Compact Standard Features:

- *Purifies up to 800 liters of solvent before replacing columns
- Connects directly to any glovebox system
- Ready to operate completely encapsulated system
- Each solvent line includes an independent regulator
- No cross contamination of solvent vapors



MB SPS-800



The MB SPS-800 is designed specifically for laboratories that need a safe, fast and easy method for dispensing ultra pure solvents. Unique features include glovebox integration ready piping, integrated vapor hood with 4 inch ventilation exhaust port, double column filtration, 17 liter solvent reservoir and independent regulators for each solvent line. Up to 7 solvents with US safety cabinet and up to 5 solvents with European safety cabinet.

MB SPS-800 Standard Features:

- *Purifies up to 800 liters of solvent before replacing columns
- Connects directly to any glovebox system
- Ready to operate completely encapsulated system
- Flammable cabinet ensures laboratory safety
- Each solvent line includes an independent regulator
- No cross contamination of solvent vapors

MB SPS-800 Auto

MBRAUN offers the industries first and only automatic solvent purification system. The Auto SPS system helps minimize the process of collecting ultra pure solvents.

MB SPS-800 Auto Standard Features:

- World's first fully automated solvent purifier (US patented)
- Ideal for laboratory or industrial production applications
- Connects directly to any glovebox system
- Minimized process intervention through PLC control
- Each solvent line includes an independent regulator
- *Purifies up to 800 liters of solvent before replacing columns
- No cross contamination of solvent vapors



*Solvent filter column capacity varies according to solvent type and quality of solvent being used.



MBRAUN Solvent Purification System

MB SPS Compact

Solvent Purification System	• Type	Encapsulated Solvent Purification System
	• External Dimensions	275 mm (W) x 914 mm (H) x 420 mm (D)
	• System Control	Manual
	• Operation	Hand Valves Dispense Solvent
	• Material	Stainless Steel (1.4301 / US 304)
	• Leveling Feet	Yes
	• Manifold	Stainless Steel Piping w/ Three Way Hand Valve
	• Work Shelf	Optional Jack Stand Available
	• Castors For Easy Mobility	No
	• Vacuum Pump	⁽²⁾ Oil Free Diaphragm Pump (Optional)
	• Solvent Flow Rate	<1,000 ml / Minute
	• Electrical Power (Vacuum Pump & PLC Controller)	230V / 50-60Hz, 10 Amps, 115V / 50-60 Hz, 15 Amps
	• Solvent Storage Safety Cabinet	Optional
	• Vapor Removal / Exhaust	Vapor Removal with 4" Connection & Emergency Cut-off Valve
	• Process	Closed Loop System
	• Dispensing	From the SPS System, Inside Glovebox, or Combination of Both
	• Working Gas	Nitrogen or Argon (Typically a Nitrogen Source of 99.99% Purity or Better)
	• Solvent Regulation	Independent Regulator for Each Solvent
• Solvent Line Material	Color Coded Stainless Steel Line (1.4301 / US 304)	
• Inlet Pressure	Inlet Pressure Set Between 4.0 bar and 6.0 bar	
• Working Pressure	Working Pressure Set Between 0.3 bar and 0.5 bar	
Filter Columns	• Filter Type	Double Column Solvent Filtration
	• Filter Column Construction	Two Stainless Steel Columns Per Solvent (1.4301 / US 304)
	• Filter Column Size	4.8L (1 Gallon)
	• Particle Filtration	Filter Columns Equipped w/ Pre-Filters
	• Filter Material	Depends on Solvent Type
	• Filter Column Capacity	⁽³⁾ Up To 800L
	• Filter Column Activation	Columns Activated Before Shipment
	• Attainable Purity	Attainable Purity Varies According to Solvent Type
Solvent Storage Vessels	• Material	Stainless Steel Reservoir (1.4301 / US 304)
	• Capacity	⁽⁴⁾ 17L
	• Features	Double Valve Shutoff, Swagelok Quick Connects, Kevlar Dip Tube, Over Pressure Valve and Fill Port
	• Piping	Stainless Steel 1/4" Piping w/ Swagelok Fittings & 1/4" Stainless Steel Jacket

⁽¹⁾Up to 7 solvents with US safety cabinet and up to 5 solvents with European safety cabinet. ⁽²⁾Alternative pump styles are available upon request.



MB SPS-800



MB SPS-800 Auto

Encapsulated Solvent Purification System w/ Vapor Hood	Encapsulated Solvent Purification System w/ Vapor Hood and PLC
(5 SPS) 1300 mm (W) x 2032 mm (H) x 1070 mm (D) (¹)7 SPS) 1650 mm (W) x 2032 mm (H) x 1070 mm (D)	(5 SPS) 1300 mm (W) x 2032 mm (H) x 1070 mm (D)
Manual	Automatic Through PLC Controller
Hand Valves Dispense Solvent	Auto Dispense Through PLC Controller w/ Touch Screen Monitor
Stainless Steel (1.4301 / US 304)	Stainless Steel (1.4301 / US 304)
Yes	Yes
Stainless Steel Piping w/ Three Way Hand Valve	Stainless Steel Piping w/ Three Way Auto Valve
Adjustable Shelving w/ Vertical Clamping Posts	Adjustable Shelving w/ Vertical Clamping Posts
Yes	Yes
(²) Oil Free Diaphragm Pump (Optional)	(²) Oil Free Diaphragm Pump (Optional)
<1,000 ml / Minute	<1,000 ml / Minute
230V / 50-60Hz, 10 Amps, 115V / 50-60 Hz, 15 Amps	230V / 50-60Hz, 10 Amps, 115V / 50-60 Hz, 15 Amps
Meets EN14470-1 Performance or NFPA Regulation Code 30	Meets EN14470-1 Performance or NFPA Regulation Code 30
Vapor Hood w/ 4" Connection & Emergency Cut-off Valve	Vapor Hood w/ 4" Connection & Emergency Cut-off Valve
Closed Loop System	Closed Loop System
From the SPS System, Inside Glovebox, or Combination of Both	From the SPS System, Inside Glovebox, or Combination of Both
Nitrogen or Argon (Typically a Nitrogen Source of 99.99% Purity or Better)	Nitrogen or Argon (Typically a Nitrogen Source of 99.99% Purity or Better)
Independent Regulator for Each Solvent	Independent Regulator for Each Solvent
Color Coded Stainless Steel Line (1.4301 / US 304)	Color Coded Stainless Steel Line (1.4301 / US 304)
Inlet Pressure Set Between 4.0 bar and 6.0 bar	Inlet Pressure Set Between 4.0 bar and 6.0 bar
Working Pressure Set Between 0.3 bar and 0.5 bar	Working Pressure Set Between 0.3 bar and 0.5 bar
Double Column Solvent Filtration	Double Column Solvent Filtration
Two Stainless Steel Columns Per Solvent (1.4301 / US 304)	Two Stainless Steel Columns Per Solvent (1.4301 / US 304)
4.8L (1 Gallon)	4.8L (1 Gallon)
Filter Columns Equipped w/ Pre-Filters	Filter Columns Equipped w/ Pre-Filters
Depends on Solvent Type	Depends on Solvent Type
(³)Up To 800L	(³)Up To 800L
Columns Activated Before Shipment	Columns Activated Before Shipment
Attainable Purity Varies According to Solvent Type	Attainable Purity Varies According to Solvent Type
Stainless Steel Reservoir (1.4301 / US 304)	Stainless Steel Reservoir (1.4301 / US 304)
(⁴)17L	(⁴)17L
Double Valve Shutoff, Swagelok Quick Connects, Kevlar Dip Tube, Over Pressure Valve and Fill Port	Double Valve Shutoff, Swagelok Quick Connects, Kevlar Dip Tube, Over Pressure Valve and Fill Port
Stainless Steel 1/4" Piping w/ Swagelok Fittings and 1/4" Stainless Steel Jacket	Stainless Steel 1/4" Piping w/ Swagelok Fittings and 1/4" Stainless Steel Jacket

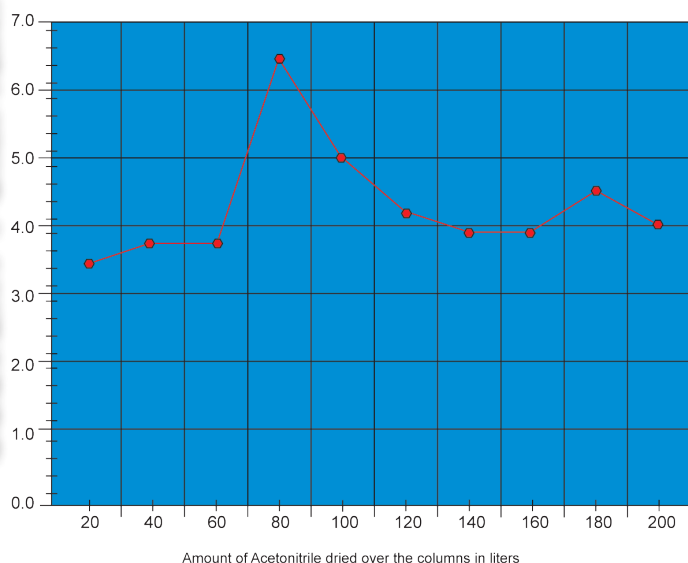
(³)Solvent type and solvent quality may affect overall capacity of the filter columns. (⁴)Optional size solvent storage vessels available upon request.

MBRAUN SPS Test Results:

Please Note: Test Results May Vary

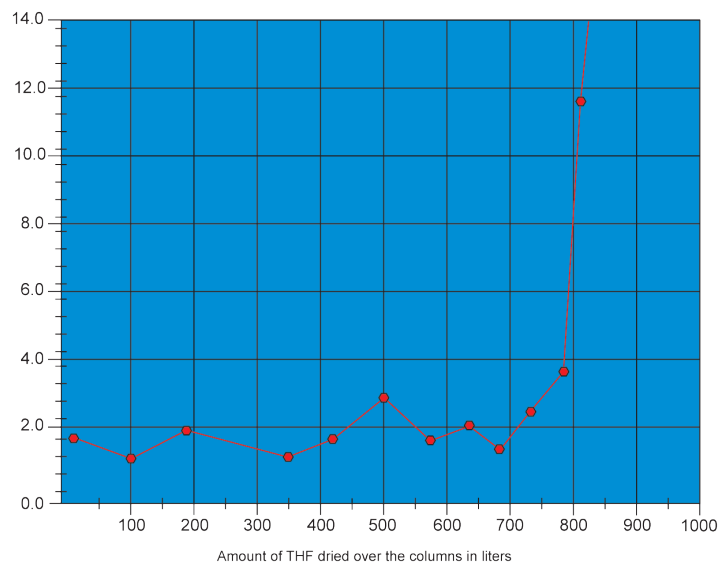
Test Results for Acetonitrile

(start concentration of water in Acetonitrile: 653 ppm)



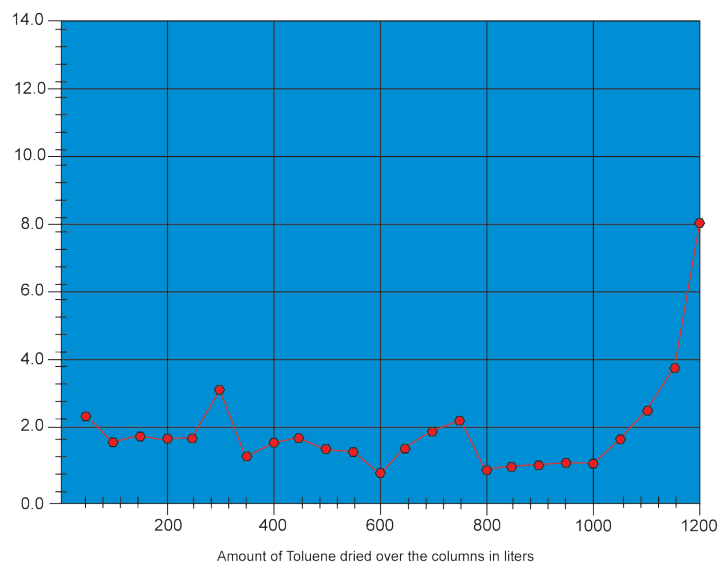
Test Results for THF

(start concentration of water in THF: 569 ppm)



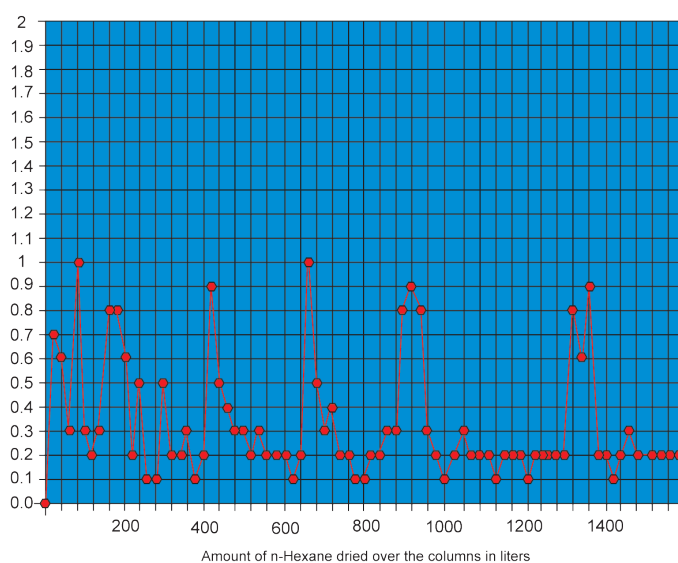
Test Results for Toluene

(start concentration of water in Toluene: 302 ppm)



Test Results for n-Hexane

(start concentration of water in n-Hexane: 53 ppm)



List of Solvents Purified:

Acetic Acid	Diisopropylamine (DIPA)	N,N-Methylpyrrolidone
Acetic Anhydride	Diisopropyl Ether	Nitromethan
Acetic Acid Ethyl Ester, Ethyl Acetate	Dimethylbenzene	Pentane
Acetic Acid Methyl Ester	N,N-Dimethylformamide (DMF)	Petroleum Ether
Acetone	Dimethyl Sulfoxide (DMSO)	1-Propanol
Acetonitrile	1,4-Dioxane	2-Propanol
Benzene	Dipropylamine	1,2 Propylene Carbonate
i-Butanol	Dipropyl Ether	Pyridine
1-Butanol	Ethanol	Tetrachloromethane
2-Butanol	N-Ethyl-diisopropylamine	Tetrahydrofuran*
tert-Butanol	Ethylene Glycol Dimethyl Ether	Tetramethylethanediamine
t-Butyl Methyl Ether	Formic Acid	Toluene
Chlorobenzene	Formic Acid Ethyl Ester	Trichloromethane
Chloromethane	n-Heptane	Triethylamine
Dichloromethane	n-Hexane	Xylene
Diethyl Ether	2-Methoxyethanol	
Diethylene Glycol Dimethyl Ether	Methylcyclohexane	*Special THF (not activated)

MBRAUN Solvent Purification Glossary:

- **Dispensing** - Dispensing solvent is performed using a three step process. The first step involves evacuating the collection vessel to create an anaerobic environment. The second step is the actual dispensing. Step three clears the line, so solvent does not remain stored in the dispensing line while the system is not in use.

- **Solvent Storage Reservoir** - MBRAUN includes a 17 liter solvent storage reservoir per solvent line along with your SPS system. (Optional size solvent storage vessels are available) Each storage vessel allows for the easy transfer of solvents with connections for bubble degassing procedure. MBRAUN solvent reservoirs include a over pressure valve, solvent supply line, nitrogen push line and a dip tube assembly with clamp. MBRAUN SPS systems can also hook up directly to any third party solvent keg system.



- **Working Gas** - MBRAUN SPS Systems are pressurized by an inert working gas (Typically a nitrogen source of 99.99% purity or better) with a minimum working pressure of 5 psi.

- **Filter Column** - MBRAUN utilizes a double filter column per solvent. The filter column is designed to absorb the moisture from organic solvents and is equipped with pre-filters and a quick connection for easy replacement once the column is fully saturated. Filter columns can be purchased from MBRAUN.

- **Exhaust** - The SPS system is equipped with two connections for exhaust (Located at the top of the SPS system and at the rear side of the solvent storage safety cabinet) connection with customer's ventilation system.

- **PTFE-Purge Hose** - The PTFE-Purge Hose is located on the left side wall of the system and is connected to the working gas. The purge hose is equipped with an adapter and a manual valve. The purpose of the purge hose is to clear the solvent line after dispensing.

- **Vacuum Pump** - MBRAUN provides an oil free diaphragm pump as an optional item on all SPS systems. Customers may utilize other vacuum systems as well, including facilities vacuum system.

- **Pressure Reducing Valve** - The pressure reducing valve is utilized to adjust the secondary pressure for pressurizing the solvent reservoirs. The pressure depends upon the viscosity of the solvent being used as well as the intended flow rate during dispensing. The permitted pressure range is 0.3 to 0.5 bar (30 to 50 kPa).

- **The Top Valve** - The top valve opens/closes the connection to the vacuum pump and the working gas (N₂ or Ar) which is used to purge out and back fill the collection vessel.

- **The Lower Valve** - The lower valve dispenses ultra pure solvents into collection vessels that have been purged with the working gas via the top valve.

- **Degassing** - The degassing process removes dissolved air from solvents by purging with inert gas (Nitrogen). Degassing is performed after installing the solvent reservoir inside the safety cabinet. The exhaust of the safety cabinet should be connected to the laboratory ventilation system during degassing, so that any solvent vapor released during purging is safely removed.

- **Clamping Posts and Shelving** - Stainless steel clamping posts and shelving are standard features on the SPS-800 and the SPS-800 Auto. Clamping posts are used to secure the collection vessels for dispensing solvents. The stainless steel work shelf offers a height adjustable work space in which the clamping post are connected to.

- **Vapor Spigot Hood** - MBRAUN offers an integrated vapor hood that connects directly to customers supplied HVAC system via 4 inch port located at the top of the system.



- **Solvent Collection Vessel (Glassware)** - Glassware is used to dispense ultra pure solvents into. Specially designed glassware for the MBRAUN SPS system are available.

- **Dispensing Adapters** - MBRAUN offers NS 29/32 6 mm ground neck-Fitting made from fluorocarbon polymer and/or glass, for connection to piping with an outer diameter of Ø 6 mm, with screw nut made from polypropylene (PP).

- **Glovebox Integration** - All MBRAUN SPS systems have the option to dispense ultra pure solvents directly at the system or into an existing glovebox. Optional items include piping solvent lines directly through the glovebox or coming through the KF 40 vacuum feedthrough.

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