

**OPERATING MANUAL**



Dear Customer,

Congratulations on having acquired the SOLVENT WASHER ! You will now be able to clean many contaminated solvents on site using a state-of-the-art distillation process which provides the following benefits:

- { Substantially reduced hazardous waste disposal costs
- { Reduced and simplified regulatory reporting costs
- { Minimized on site storage of hazardous wastes
- { Improved control over hazardous waste liability
- { Reduced need for purchasing new solvents

Our Company prepared this manual to assist you in properly installing and operating the SOLVENT WASHER in order to provide you with long, safe, maintenance-free operation.

We are confident you will be pleased with your unit and stake our reputation on your recommendation.

Best Wishes,

Randy Yearout  
President

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## **1.0 SAFETY INFORMATION**

We have designed and manufactured the Solvent Washer to safely clean various commercial evaporative solvents. However, most such solvents are considered hazardous materials and extreme care should be used in storing, processing, handling, and using such chemicals. The operator should be thoroughly familiar with the contents of this manual and only use the Solvent Washer in strict conformance with the operating instructions included in this manual. Failure to do so could cause fire, explosion, or health hazards.

### **1.1 Read and follow all precautions contained in the MSDS for the solvent.**

The manufacturer of a solvent will provide a Material Safety Data Sheet ("MSDS") that summarizes the physical properties of the solvent, data on reactivity with other chemicals, worker protection and precautions, and fire, explosion, and health hazard information. Prior to attempting to distill any chemical in the Solvent Washer, the operator should carefully read and follow all precautions included in the chemical's MSDS.

### **1.2 Prohibit any ignition source near the machine and operate only where no smoking, sparks, heat or flame exists.**

Solvents are flammable and residual vapors or leakage may be present around the Solvent Washer. Therefore, NEVER permit smoking, sparks, heat or flame near the unit and follow the recommendations of the National Fire Protection Association in NFPA 497A.

Locate the unit away from heaters, switches or electrical apparatus not designed for hazardous locations, and from any tools or equipment that may cause sparks.

### **1.3 Operate the Solvent Washer only in a well ventilated area.**

The area around the Solvent Washer should be well ventilated according to NFPA 91.

### **1.4 Proper electrical connection.**

A qualified electrician should wire the electrical connection in accordance with National Electrical Code Class 1 Group D for hazardous locations.

### **1.5 Follow NFPA 77 for control of static electricity.**

Static electricity should be controlled in the area according to NFPA 77. This includes, but is not limited to, proper grounding of transfer and collection containers.

## **1.6 Proper distillation temperature**

Set the distillation temperature as explained in Section 4.6. Never exceed this temperature or allow the temperature to approach the solvent's autoignition temperature as specified in the MSDS sheet.

## **1.7 Do not process reactive solvents**

Certain chemicals react particularly at elevated temperatures and therefore should not be distilled in the Solvent Washer. Follow all precautions included in the MSDS sheet for the chemical and do not process reactive solvents in the Solvent Washer. Never attempt to process an unknown chemical.

## **1.8 Allow unit to cool before opening lid**

The lid and other parts of the Solvent Washer may become hot during the distillation process and touching them may cause burns. Also, temperatures inside the distillation tank are hot both during and after the distillation process. Hot residual vapors can cause serious burns and may be ignitable. Do not remove the lid insulation cover or open the lid until the unit cools.

## **1.9 Avoid breathing fumes**

Residual vapors from the distillation process may be hot and cause burns or irritation to the eyes or respiratory tract. Since many solvents create health hazards in either liquid or vapor form, avoid breathing any vapors and follow all precautions in the MSDS for the chemical.

## **1.10 Before moving the unit, empty the tank of all solvents**

Before moving the unit, empty the Solvent Washer of solvents and contaminants. In cleaning the unit, use only non sparking tools.

**Warning! Failure to follow any precautions, could cause personal injury or death.**

## **2.0 Summary Operating Checklist**

The Solvent Washer is very easy to operate. The following checklist summarizes how to operate the unit.

### **Starting the Solvent Washer:**

1. Fill distillation tank with up to 8 gallons of contaminated solvent;
2. Connect solvent outlet line to clean solvent drum;
3. Connect water inlet/outlet lines and turn water on;
4. Turn power on;
5. Set distillation temperature and timer;
6. Push "RESET" and "START" buttons;
7. Check unit periodically.

### **Shut Down:**

1. Turn "POWER" switch off;
2. Allow Solvent Washer to cool before opening lid;
3. Remove contaminated residue.

Refer to the Operating Information in Section 4.0 for complete operating instructions.

## 3.0 Unpacking and Initial Setup Procedures

### 3.1 Unpacking

Our Company carefully inspected the Solvent Washer prior to shipment. Before unpacking the Solvent Washer, inspect and report any damage to the freight carrier since damage in transit is the responsibility of the freight handler.

### 3.2 Site Selection

Place the Solvent Washer on firm, level ground with convenient access to proper electrical and water connections (See below). In addition, the area around the unit should be well ventilated according to NFPA 91. Finally, the site should protect the equipment from rain and freezing temperatures.

### 3.3 Electrical Connection

Because of the numerous types of 220-240 volt connections available, we deliver the Solvent Washer without a plug on the power cord. Consult your local codes or a qualified electrician for a plug connection for the following service:

SW 8, SW 30	220-240 volt, single phase, 50/60 Hz, 20 amp
SW 55	220-240 volt, single phase, 50/60 Hz, 30 amp
SW 70	220-240 volt, single phase, 50/60 Hz, 30 amp
	220-240 volt, single phase, 50/60 Hz, 20 amp

All units require 4 wire connections with separate ground and balanced legs.

### 3.4 Water Connection

Water supply temperature should be no more than 80° F. If water is extremely hard, it should be treated to prevent excessive scaling inside the condenser. Minimum water requirements are as follows:

SW 8	1 gallon per minute
SW 30, SW 55	2 gallon per minute

Connect the water inlet/outlet lines to the Solvent Washer. Protect the Solvent Washer from freezing temperatures since the condenser and plumbing might be damaged if water freezes inside.

### **3.5 Vent Lines**

Connect a vent line to the Solvent Washer so that it vents at least five feet from the unit.

### **3.6 Vacuum Recirculating Tank Reservoir (SW 55 and SW 70 Models)**

The Solvent Washer models SW 55 and SW 70 are vacuum assisted units. Fill the vacuum recirculating tank reservoir on these models with 2 gallons of clean solvent.

The clean solvent inside the recirculating tank reservoir will prime, seal, and cool the vacuum pump thus minimizing operator involvement and minimizing maintenance.

When the Solvent Washer starts, the vacuum pump turns on and the continuous feed feature sucks contaminated solvent into the distillation tank. In addition, the vacuum pump lowers the boiling point of the contaminated solvent thus speeding the distillation process. When the solvent boils and vaporizes, it separates from the contaminates. The solvent then condenses into a clean liquid and flows into the vacuum reservoir. Finally, the clean solvent overflows from the recirculating tank reservoir into the solvent outlet line.

In many cases, the same or compatible solvents are processed repeatedly and therefore there is no need to change the solvent in the recirculating tank reservoir. Simply check the solvent level prior to operating the unit to insure adequate solvent in the recirculating tank reservoir is available to prime, seal and cool the vacuum pump.

However, if processing a different incompatible solvent, drain the recirculating tank reservoir and pump as follows:

- a. Open the drain valve on the recirculating tank reservoir and drain into a container. Close the valve.
- b. Open the drain valve on the vacuum pump and drain into a container. Close the valve.
- c. Refill the recirculating tank reservoir with clean compatible solvent until solvent comes out of the solvent outlet.
- d. Replace the refill cap on the vacuum reservoir.

## 4.0 Operating Information

### 4.1 Selecting Solvents

The Solvent Washer can process a variety of commercially available organic solvents. Before processing any product, read the MSDS and thoroughly evaluate the composition to insure that a distillation is safe for the chemical. **The Solvent Washer is not designed for chemicals that are reactive or are not stable when heated such as acids, chlorinated solvents, nitrocellulose and caustic chemicals.**

Because of the variety of solvents and operating temperatures, the operator must verify that the seals and o rings supplied with the unit are compatible with the solvent to be processed. In most cases, seals and o rings which are compatible with the solvent can be obtained. In any event, the operator should inspect and replace any seals and o rings that are incompatible with the solvent or those that have been damaged prior to using the unit.

For the vacuum assisted models, SW 55 and SW 70, it may be necessary to inspect or replace the clean solvent in the recirculating tank reservoir. See section 3.6 for instructions on replacing the solvent in the vacuum recirculating tank reservoir.

### 4.2 Filling Distillation Tank

- a. Remove the insulating lid cover and open the lid to the distillation tank. Verify that the distillation tank is clean.
- b. If using a high temperature collecting bag, insert the bag into the tank insuring that the bag is smooth against the walls and bottom of the tank. Place the retaining ring inside the bag and secure below the vapor outlet port. Fold the top of the bag over the retaining ring and smooth the top to the sides of the tank.
- c. Fill the distillation tank with up to 8 gallons of contaminated solvent as follows:

Batch mode only: Pour up to 8 gallons of contaminated solvent into the distillation tank and close the solvent inlet valve.

Continuous feed feature: The SW 30, SW 55, and SW 70 models have a continuous feed feature to allow continuous refilling of the distillation tank during operation. The continuous feed feature also has a quick disconnect for easy cleaning of the distillation tank. To fill the tank using the continuous feed feature, insert the float valve securely into the quick disconnect making sure that the float moves freely. Open the solvent inlet valve. The model SW30 uses gravity to feed the distillation tank whereas, on the models SW55 and SW70, the vacuum pump will suck the contaminated fluid into the tank.

- d. Inspect the lid o ring and place the o ring in the groove at the top of the tank. Close the lid and tighten the lid securely.

### **4.3 Connecting Solvent Outlet Line**

Securely attach the solvent outlet line to a properly vented clean solvent drum. The clean solvent drum must be able to hold all the clean solvent that is to be produced. This is particularly important for units with the continuous feed feature in order to avoid overflow of the clean solvent drum.

All receiving and filling containers must be metal and properly grounded to avoid static buildup.

Do not restrict the solvent outlet line while the unit is operating or before the distillation tank has cooled. Residual heat in the tank may cause pressure to build unless the solvent outlet line is unrestricted.

### **4.4 Connecting Water Inlet/Outlet Lines**

Connect the water inlet/outlet lines and turn the water on. The flow rate should be one gallon per minute for the SW 8 model and two gallons per minute for the SW 30 and SW 55 models.

The SW 70 model uses a refrigeration unit to cool water moving to the Solvent Washer. Turn on the water pump and refrigeration unit.

### **4.5 Turning Power On**

Turn the power switch on. After 5 seconds, the temperature of the tank is displayed.

### **4.6 Setting Temperature and Timer**

- a. Determine the proper set temperature:

SW 8 and SW 30- Set the temperature at the solvent's boiling point PLUS 50 degrees Fahrenheit. Never set the temperature above 425 degrees Fahrenheit. If the boiling point of the solvent exceeds 375 degrees Fahrenheit, a vacuum system is recommended.

SW 55 and SW 70- The vacuum assist feature of these models lowers the solvent's boiling point. The set temperature is a function of the boiling point of the solvent and the amount of vacuum achieved (expressed as inches of mercury). Never set the temperature above 375 degrees Fahrenheit.

ALL MODELS- Always set the temperature well BELOW the autoignition temperature of the solvent as specified in the MSDS supplied by the solvent's manufacturer.

- b. To adjust the Temperature Set, push the "SET" button to display the Temperature Set. You can raise or lower the Temperature Set by pushing the "up" or "down" buttons. After 5 seconds, the Temperature Set display reverts to displaying the actual temperature of the heating oil used to heat the distillation tank. NOTE: If you push the "SET" button and the controller displays "d1", you have entered programming mode. Remove your finger and let the display return to the temperature. Do NOT change the program.
- c. Set the Timer- The Time Set controls the length of the distillation cycle. At the end of the distillation cycle, the unit shuts off automatically. Note that if the unit is stopped and restarted for any reason, the timer is also restarted.

#### **4.7 Pushing "Reset" and 'Start'**

To start the unit, first push the Reset button. The Reset button enables the Solvent Washer to perform a self diagnostic evaluation of certain temperature and pressure conditions. If the conditions are within prescribed tolerance, the green light will come on. If the green light fails to light, the temperature or pressure conditions are outside prescribed tolerances. See "Troubleshooting Tips" in Section 5.0 for suggested remedies.

When the green Reset light comes on, push the Start button. The red light next to the Start button indicates the distillation process has begun.

#### **4.8 Checking Unit Periodically**

The Solvent Washer is easy to operate and requires minimal operator involvement. The unit will even shut the heater off automatically. The operator should check the unit periodically to insure that it is operating properly and that there are no leaks. For continuous feed operations, the operator should close the solvent inlet valve when the contaminated drum is empty.

#### **4.9 Shutdown**

The Solvent Washer turns the heater off automatically when the programmed distillation cycle is completed. Turn the water supply off after production ceases. Allow the unit to cool to ambient temperature before removing the insulated lid cover and opening the lid. Also, the operator should wear proper protective clothing ( gloves, goggles, respiratory equipment, etc. ) as recommended by the MSDS before opening the lid.

After opening the lid, remove the residue and clean the tank. Use of the high temperature collecting bag facilitates this process. For units with the continuous feed feature, a quick disconnect allows easy removal of the float valve.

## 5.0 Troubleshooting Tips

Tip	Malfunction	Possible Cause	Suggested Remedy
1	No light on unit	a. Now power b. Power switch off	a. Check voltage to power cord b. Turn power switch on
2	The "Reset" green light will not come on	a. Over temperature shutdown  b. Over pressure shutdown	a. 1. Verify water condenser is on a.2. Check for clogged condenser a.3. Replace temperature sensor  b.1 Open vacuum valve b.2. Check for clogged condenser b.3. Replace pressure switch
3	The "Start" red light will not come on	a. Timer set too low  b. Reset switch off	a. Increase Time Set - See Section 4.6  b. Push Reset switch and see Tip 2.
4	Product not completely distilled	a. Temperature set too low  b. Timer set too low	a. Increase Temperature Set - See Section 4.6  b. Increase Time Set - See Section 4.6
5	Distilled product not clean	a. Distillation tank overfilled  b. Excessive boiling  c. Water Contamination	a. Reduce fluid level in processing tank  b.1 Reduce Temperature Set - See Section 4.6 b.2. Reduce vacuum valve. See note 1 b.3. Use water separator
6	No production	a. No solvent in processing tank  b. Temperature Set too low	a. Remove contaminants from tank and add solvent b. Increase Temperature Set - See Section 4.6

Note 1. The Model SW55 and SW70 are vacuum assisted. If there is excessive boiling, reduce the amount of vacuum by opening the vacuum relief valve. Also, the ball valve on the vapor line going from the condenser regulates production rates. It is normally set at two turns. To increase production rate, slightly open it. If there is excessive boiling, slightly close it. NEVER shut completely.

## **6.0 Limited Warranty**

Solvent Waste Management, Inc. guarantees to the original purchaser that products it manufactures will be free of defects in material and workmanship for a period of one year from the date of invoice. Solvent Waste Management, Inc. will repair or replace, at its option, any part returned to us on an FOB destination basis, following satisfactory proof of defect at time of sale. No warranty of any kind is made with respect to any part or equipment (1) which has been subject to misuse, negligence, acts of God, or (2) which has been altered or repaired outside of Solvent Waste Management Inc.'s factory in a manner which, in our judgment, affects performance or reliability.

THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WE WILL NOT BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES OF ANY NATURE.