



## Technical tips – Equipment/Facility Maintenance

As the garment care industry faces off with today's economic challenges many operations have limited their production to two or three days a week. While the situation is not pleasant we can take advantage of the down time to do a little maintenance and cleanup on our equipment and facilities.

- Lighting.
  - Repair or replace any burned out bulbs or fixtures.
  - Install that much needed fixture above the inspection station and/or spotting board.
- Air compressor.
  - While the plant is not operating and is quiet, turn on the compressor and listen for air leaks, locate and repair.
- Water and steam leaks.
  - You can locate the leaks when the machines are operating and make repairs on the days you are closed.
- Insulation.
  - The off days are great time to replace old insulation or insulate pipes that do have any.
- Steam traps.
  - Measure the temperature of the inlet side and the outlet side of the trap.
  - The outlet side should be at least 75 degrees cooler than the inlet side.
  - Replace or repair bad traps.
- Dry cleaning machine.
  - Clean out base tanks. Also clean the sight glasses.
  - Check those spin disk filters.
  - Clean coils.
  - Clean stills and separators. Also clean sight glasses.
  - Have the proper gaskets for the sight glasses and coils.
- Pressing equipment.
  - Lubricate.
  - Clean laundry hot heads.

These are just a few things we can do while we have some down time days. Check the machine manuals for additional maintenance information. Also take some time to CLEAN equipment and facilities. An air hose and a compressor are perfect for cleaning lint off equipment and fixtures.

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# INDUSTRY FOCUS

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FROM THE INTERNATIONAL FABRICARE INSTITUTE

As a drycleaner, you know that maintaining your equipment in the best operating condition possible is extremely important. In order to achieve a quality and trouble-free operation, performing preventative maintenance on your equipment as recommended or required by equipment manufacturers is a must. In fact, doing so will allow you to determine what you can do economically to prevent a breakdown of your equipment and to plan the maintenance that is required.

Although preventative maintenance may have been neglected in the past, today, maintenance of your drycleaning equipment and record keeping are mandatory. This is especially true with the implementation of the National Emission Standards for Hazardous Pollutants (NESHAP), which took effect on September 22, 1996. This regulation sets standards for the reduction of perchloroethylene (perc) emissions from drycleaning operations and requires that owners or operators of perc drycleaning machines and control devices (such as add-on units) follow the manufacturers' instructions for the proper operation and maintenance of their equipment. This includes keeping a copy of any manufacturer specifications or operating and maintenance recommendations. Drycleaners must also keep a record of all maintenance and weekly monitoring of their equipment.

IFI has always stressed the importance of maintenance through its various articles and bulletins. This *Focus* should be viewed as an extension of our efforts to educate drycleaners on the subject of maintenance, monitoring, and record keeping.

We strongly suggest that you use the manufacturers' manuals as a guide, especially for newer drycleaning equipment. Many of these machines have automatic-push button operations for emptying the still, filter maintenance, or other necessary functions.

In the following paragraphs, we have outlined suggested maintenance procedures and schedules for individual parts that are common to most drycleaning equipment in order to make it simple for you to set up a maintenance schedule and stick to it.

We have divided the components of the drycleaning equipment into three categories:

- **Machine Components**

- Machine cylinder
- Heating and condensing coils
- Button trap
- Fans
- Solvent pump
- Lint air filter

- **Auxiliary Equipment**

- Filters
- Stills or muck cooker
- Water separator

## **MAINTENANCE OF PERC DRYCLEANING MACHINES**

- Vapor Exposure Control Devices
  - Add-on refrigerated condenser
  - Carbon adsorber

## MACHINE COMPONENTS

### Machine Cylinder

- Weekly checks for perc vapor leaks are required by the NESHAP guidelines. The NESHAP requires that these inspections be visual, but some states may require that these checks be done with an electronic halogen detector. It is especially important that you check gaskets in the loading door of the machine or the recovery tumbler, as these can be major sources of perc leaks.
- Always use graphite when lubricating bearings in the washer or recovery tumbler. Graphite is conductive and can disperse the electrical charge (resulting from static electricity) throughout the metal parts of the machine. Check the manufacturer's instructions for the frequency of lubrication. Also make sure that the ground wire controlling static electricity in the wheel is not damaged.
- Properly functioning dampers in recovery tumblers are essential to running an efficient drying/recovery operation. If inlet and aerate exhaust dampers are not sealed properly, perc vapors may be able to escape from your reclaimers. Because inlet leaks are often not discovered, inspect damper gasket seals and replace them if necessary. You can also determine if leaks are coming from the inlet and exhaust dampers by checking the linkage and adjusting tension springs with an electronic halogen detector. You can check the exhaust damper for leaks by placing a plastic bag with an elastic neck over the damper outlet and seeing if it inflates during the recovery cycle. You should inspect your inlet and exhaust dampers on a monthly basis.
- Check for pins or other debris that may be tangled into the perforation of the wheel on a daily basis.
- Check and adjust the tension of transmission belts according to manufacturer's instructions on a monthly basis.

### Heating and Condensing Coils

Inspecting the heating and condensing coils in the recovery tumblers in dry-to-dry machines requires that you unbolt the plates in order to clean them. Since this operation is not as simple for dry-to-dry machines as for transfer machines, it is important that you follow the manufacturer's instructions.

### Lint

- On a monthly basis, check the fins of the heating and condensing coils for lint. Since the air flows over the condensing coil first, these fins usually catch most of the lint that gets by the lint bag or foam filter. To dislodge the lint, brush the coil with a stiff brush and use an industrial vacuum to rid the coils of any residual lint. If the lint is pressed too heavily into the fins, use compressed air to dislodge the lint, then vacuum the residue. Remember to wear goggles whenever you use compressed air above 30 psi.
- Inspect the fins in recovery tumblers at least once a month.

If your lint bag is not doing its job, the fins may need cleaning at least once or twice a week. If the fins in the dry-to-dry machines have accumulated heavy lint, check your heating coils for lint as well.

- Once or twice a year, you should also make sure that the coils are cleaned thoroughly. This can be accomplished by blowing them with air, or you may use steam if you are close enough to the spotting board to use the steam gun.

### Perc Air Stream Temperature Requirements

- The NESHAP requires that refrigerated condensers in dry-to-dry, no-vent machines be checked on a weekly basis to make sure the temperature of the perc air stream on the outlet side of the refrigerated condenser is equal or less than 450°F. Record the temperature in your Monthly Maintenance and Perchloroethylene Log.

### Button Trap

- The button trap lid and strainer need regular servicing. The strainer should be cleaned daily and the lid should be checked for vapor leaks with an electronic halogen leak detector once a week.
- Remove all accumulated lint in the solvent level sensor on a weekly basis.
- To pick up metallic materials (such as pins) that accumulate in the button trap, you may consider placing a magnet into the button trap strainer.

### Fans

- Fans maintain the proper air flow. On a yearly basis, they should be lubricated and checked for build-up of lint. The blade of the fan should also be checked to make sure it is firmly tightened onto the shaft of the motor.

### Solvent Pump

- If the pump is equipped with a strainer, clean the strainer at least once a week.
- Periodic checks of the pump gasket should be part of your standard maintenance procedure. Replace the gasket when it starts showing signs of wear or if an electronic halogen leak detector indicates a perc vapor leak.
- The impeller should be checked at least once a year for accumulated debris.
- Pumps equipped with a check valve in the suction line should be inspected daily. Repair or replace the check valve if damaged.

### Lint Trap

- The lint trap, or lint filter, which is located in the air flow system, should be brushed on a daily basis. You should also check beyond the front of the filter and into the duct passageway for lint. Lint can build up and restrict the airflow in the duct. It can also absorb and hold moisture, causing a mildew odor on garments.
- The lint filter should be drycleaned weekly. Because you should never run a machine or recovery tumbler without a lint filter, make sure a second lint filter is available.

- Machines with heat sensor probes, which are located under or behind the lint filter, should be checked for lint buildup on the probe on a daily basis.
- The lint filter compartment door should be checked for perc vapor leaks with the electronic halogen leak detector on a weekly basis. This check should be performed during the drying cycle operation.

## AUXILIARY EQUIPMENT

### Filters

There are basically two types of filters: cartridge filters and disc filters (with or without powder).

#### Disc Filters

Maintaining disc-type filters requires that you adhere strictly to the operating manual for spinning intervals. Opening the filter housing is not generally required. Dislodging the sludge from the filters into a still depends on the filter pressure buildup, unless the manufacturer's manual lists a specific number of cleaning cycles. However, the filter housing seals and the drain pipe into the still should be monitored weekly with an electronic halogen leak detector for perc vapor leaks.

#### Cartridge Filters

- It is imperative that you check the filter pressure daily to make sure that it does not exceed the manufacturer's recommendations.
- The standard-sized cartridges should be changed after approximately 1,000 pounds of cleaning per cartridge, depending on the filter pressure. Adsorptive cartridges should be changed after 2,000 pounds of cleaning. Protective gear, such as an organic vapor respirator, goggles, and gloves, must be worn during this process. The cartridges should be drained overnight and hung at a time when no other plant personnel are present.
- When changing cartridges, make sure you don't misplace gaskets between the cartridge canisters and that gaskets are seated properly. Damaged or worn gaskets can allow soil to leak out.
- This should be an early morning routine (before the machine is started). This will allow the air to be bled from the filter housings. Many filters have a built-in system for this function.

### Still or Muck Cooker

Both stills and muck cookers provide the same function—distillation. Since distillation is conducted at high temperatures, the potential for perc vapor escaping into the plant atmosphere is great. On a weekly basis, check for perc vapor leaks with an electronic halogen leak detector, especially around the seals and gaskets of the distillation equipment. It may be a good idea to have a spare still or cooker opening door gasket handy.

### Stills With Exposed Heating Coils

- Stills with exposed heating coils should be checked for lint buildup at least twice a year. Dirt and lint can build up on the condensing coil and retain moisture, which may become acidic and cause tiny pin holes to form in the coil.

- To clean the coils, remove the still cover and rinse with water. Make sure the water is drained completely before distilling. Some light brushing may be required if dirt and lint buildup have hardened on the coils.
- Some boilovers may be caused by a leaky coil dripping water back into the still. You can check for leaks by cleaning the coil and turning on the inlet water valve and closing the outlet water valve.

### All Stills

Steam coils, unexposed still coils, and electric heated stills should be cleaned whenever the rate of distillation slows down or stops due to lack of heat transfer from the heat source to the solvent. Because these stills vaporize the solvent, they can leave behind oils, dyes, and other constituents.

### Water Separator

Each of these pieces of equipment has a water separator as the collection point for the solvent/water flowing from the machine, reclaiming tumblers, dry-to-dry units, stills, muck cookers, and most vapor adsorbers. The purpose of the water separator is to separate perc from water. The heavier perc will settle on the bottom, and the water, which is much lighter than perc, will float on top.

Basically, there are two types of water separators: the open top unit and the sealed unit. While the open top unit is more accessible for cleaning and maintenance than the sealed unit, the internal working parts of both units are essentially the same. Water separators consist of a water separator (container), an atmospheric vent to release pressure, three pipe connections, one or two inside baffles, and no moving parts.

Regular inspection and cleaning is extremely important. Neglect can cause the water separator to malfunction, resulting in cloudy solvent, fungus growth, and corrosion. You should also check for perc vapor leaks with an electronic halogen leak detector on a weekly basis.

To check for unwanted materials in your water separator, follow this process:

- 1) Drain the solvent and water by removing the drain plug, which is located on the bottom of most separators. If your separator has a removable top, you can look directly inside for any buildup on the base.
- 2) Flush the separator with water. Before flushing, be sure to lock the drain line that goes to your base by using a cork or other stopper.
- 3) Use a bent coat hanger or something similar to see if there is any lint accumulation in either the solvent or water drain lines.
- 4) Check the vent lines for blockage. If you have a sealed unit, you will have to do all of your work from the outside.
- 5) Flush the separator with water to remove any sediment lying on the bottom. Be sure to block off your solvent return line to the base tank.
- 6) After cleaning, pour enough solvent into the separator so it will be even with the level of the solvent outlet line going to the base of the tank, along with a small amount of water. Be sure to pour the water into the middle of the separator—not between the solvent outlet line and the baffle closest to it.

## VAPOR EXPOSURE CONTROL DEVICES

### Add-On Refrigerated Condensers

In addition to the temperature monitoring requirements of the NESHAP, all gaskets and seals should be checked for leaks on a weekly leak detection and repair program. All lint filters in the duct work associated with refrigerated condensers should also be cleaned on a daily basis.

Refrigerant coils should be cleaned once a year, according to the manufacturer's specifications, by a trained technician.

### Carbon Adsorber

If carbon adsorbers are not desorbed properly, perc vapor in the air stream will not be able to be adsorbed. The frequency of desorption depends greatly upon the amount of drycleaning performed and the concentration of perc in the air stream. Owners/operators should determine the maximum capacity of perc that the carbon adsorber can hold, and desorb the carbon adsorber daily. The frequency may be less, depending on whether the daily return of perc from the carbon adsorber is less than 50 percent of its capacity.

One way to determine a carbon adsorber's maximum capacity is by checking the carbon adsorber exhaust with a calorimetric detector tube. Once the exhaust reads over 100 parts per million of perc, the carbon adsorber is considered saturated according to NESHAP standards. The saturated carbon adsorber should then be completely desorbed by steam desorption for one hour, fol-

lowed by aeration for at least 20 minutes. The amount of perc returned from this desorption will be the carbon adsorber's maximum capacity.

A carbon adsorber's maximum holding capacity can diminish substantially over time, depending on how the carbon is used. It is recommended that owners replace or reactivate the activated carbon every five years, or performance may degrade to the point where the carbon adsorber will allow perc to "break through" in the carbon adsorber exhaust past the 100 ppm limit before the next desorption. The recommended five-year interval for replacing or reactivating the activated carbon may be more or less, depending on the type of use the activated carbon sees.

The NESHAP also requires that all lint filters and screens be cleaned and monitored on a weekly basis, as well as all gaskets and duct work.

## CONCLUSION

Needless to say, preventative maintenance is important. In fact, national averages show that downtime on machinery is reduced by 86 percent when preventive maintenance programs are completed on a routine basis. Of course, the NESHAP guidelines now make preventative maintenance mandatory. Since exposure levels tend to be lower with the scheduled maintenance and housekeeping, the U. S. Environmental Protection Agency (EPA) made mailing and maintenance a mandatory requirement in the NESHAP regulations. □

### MAINTENANCE SCHEDULE GUIDE FOR OLD & NEW MACHINES

FREQUENCY	MAINTENANCE PROCEDURE	COMPONENT
Daily  (or before saturation)	Remove tangled pins or other debris. Check filter pressure, bleed air from filter housing Check the refrigerant sight-glass for bubbles. Clean air filters in air stream Check appearance of perc and water layers. Clean strainer. Check valves (if any). Clean Desorb. Clean air flow filter	Cylinder Filters Add-on Refrigerated Condenser Water Separator Button Trap Pump Lint Filters Carbon Absorber
Weekly	Check for leaks in door gaskets. Check for vapor leaks. Clean solvent level sensor. Clean strainer. Dryclean lint filter or bag. Check perc vapor leaks. Check perc vapor leaks during distillation. Clean water separator. Check perc vapor leaks. Measure temperature of exhaust from condenser coil. Measure perc concentration in air exhaust duct.	Cylinder Button Trap Pump Lint Filter Filters Still or Cooker Water Separator Add-on Refrigerated Condenser Carbon Absorber
Monthly	Check recovery unit dampers. If needed, adjust transmission belt tension and check for condition. Check fins for lint (in recovery tumbler units). Inspect impeller. Check condensing coils. Check vents for clogs. Check refrigerant coil for lint build up. Check for leaks in gaskets and duct work.	Cylinder  Heating & Cooling coils Pump Still or Cooker Water Separator Add-on Refrigerated Condenser Carbon Absorber
Annually	Clean heating and cooling coils and fins by steam or compressed air. Lubricate and check for lint build up. Clean heating and condensing coils and check for leakage. Clean refrigerant coils.	Heating & Cooling coils Fans Still or Cooker Add-on Refrigerated Condenser

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**MAINTENANCE OF  
PETROLEUM MACHINES**

It is not uncommon for people to neglect the maintenance of the drycleaning machine. Many only do maintenance when absolutely necessary. These are the very same people who complain about high repair bills and poor cleaning quality. Technology today has made operating petroleum drycleaning machines easier than ever, but some aspects of operation still require a personal touch. When these factors are ignored, problems occur that can leave you pulling your hair out and wondering what to do. Your petroleum machine is like most other machines; it will only treat you as well as you treat it. The following bulletin outlines some basic parts of all petroleum drycleaning machines and a recommended maintenance schedule. To find more information relating specifically to your machine consult your machine manufacturer or operating manual.

**PARTS OF THE MACHINE****Wheel/Drum**

- ❑ The wheel or drum is the perforated cylinder where the clothes are cleaned and dried. Pins and trash can become lodged in the perforations and damage garments while tumbling. To avoid damage check the perforations after each load.
- ❑ The transmission belts should be checked according to the manufacturer's instructions. Loose belts will not properly turn the wheel, resulting in poor extraction. Excess solvent left in garments after extraction will increase drying times, decrease solvent reclamation, and leave residual solvent odors in drycleaned items.

**Button Trap**

- ❑ The button trap will catch debris (buttons, pins, lint, etc.) that falls from the wheel. Without the button trap the debris would damage the pump motor. Also, a dirty button trap can cause solvent to back up and, in some machines, overflow onto the floor. Button traps should be cleaned at least once a day, but IFI recommends cleaning it every 3-4 loads.

**Pump**

- ❑ The pump circulates the solvent throughout the machine. If the pump is equipped with a strainer, clean the strainer at least once a day.

**Fans**

- ❑ Fans maintain the proper air flow. On a yearly

basis, they should be lubricated and checked for lint build-up.

**Cartridge/Disc Filter**

- ❑ The purpose of the filter is to remove soil from the solvent. It is important that you regularly check the filter pressure to be certain it does not go above the manufacturer's recommendations. The standard-sized cartridge filters should be changed after approximately 1,000 pounds of cleaning per cartridge, depending on the filter pressure. Adsorptive cartridges should be changed after 2,000 pounds of cleaning. The cartridges should be drained overnight before removing them from the filter housing.
- ❑ Maintaining disc filters requires spinning or regenerating them at regular intervals. Most operating manuals will list a regeneration schedule. In any case, do not allow the pressure on disc filters to exceed 20 psi.

**Lint Filter**

- ❑ The lint filter will trap any lint that is released from the load. If lint is allowed to build up it can fall back down the airshaft and redeposit on to the garments. Excessive lint can also absorb moisture and block airflow causing strong odors in the load. The lint should be removed from the bag or screen every 3-4 loads. Once a week the lint bag or foam filter should be removed and cleaned. It would be beneficial to have a second lint filter available to use while the first filter is being cleaned.

**Still/Muck Cooker**

- ❑ The still and muck cooker both clean the solvent by distillation. Some petroleum machines use a vacuum still. The vacuum lowers the air pressure in the still.

This decrease in pressure is essential for two reasons. The first is that it lowers the boiling temperature of petroleum solvents. If petroleum solvents were allowed to boil at their normal temperatures they would breakdown and create objectionable odors. The second reason is for safety. The removal of air prevents the fire hazard associated with petroleum solvents.

Before distillation begins check the vacuum pressure by examining the gauges. Be certain the vacuum is operating at the manufacturer's specifications. A vacuum of 26 to 28 inches is usually acceptable for most petroleum machines. An insufficient vacuum will allow petroleum solvents to distill at high temperatures causing odors. In any case, the residue should be



A dirty still will reduce distillation efficiency and effectiveness.

removed after every distillation. If this is not possible the still floor and wall should be scraped and cleaned once a week. Still residue can build up and slow down distillation and reduce the amount of solvent recovered.

### Nitrogen Injection

- Another safety design in some petroleum drycleaning machines is the addition of nitrogen gas to the wheel. The nitrogen pushes oxygen out of the wheel until the oxygen concentration reaches the factory specified levels (consult your machine manufacturer for levels specific to your machine). This reduction in oxygen will eliminate the risk of a fire.

Check to make sure there is a sufficient amount of nitrogen in the storage tank at the beginning of each day. When there is not enough nitrogen to replace the oxygen, the cleaning machine will not operate until proper nitrogen levels have been reached. A delay of this sort can significantly set back production.

### Water Separator

- The water separator will separate water from petroleum solvent. Since water is heavier than petroleum solvent it settles on the bottom of the separator while the petroleum solvent floats on top of the water. Regular maintenance is extremely important to prevent solvent contamination and fungus growth. Many odor problems in cleaning can be traced back to a poorly maintained water separator.

Basically, there are two types of water separators: the open-top unit and the sealed unit. While the open-top unit is more accessible for cleaning and maintenance than the sealed unit, the internal working parts of

both units are essentially the same.

On open-top units, prime the separator by adding a small amount of fresh water to it daily. Completely drain both open-top and sealed separators once a week. Wipe down the separator with a clean cloth and then pour in enough water to reach the water outlet line.

### Condensing Coils

- The condensing coils cool solvent vapors and return them to liquid form. They should be checked and cleaned monthly if at all possible. (Because of their construction, on some machines the condensing coils may not be accessible.) Inspecting the condensing coils in a dry-to-dry machine requires that you unbolt the plates in order to clean them. Since this operation is not as simple for dry-to-dry machines as it is for transfer machines, it is important that you follow the manufacturer's instructions.

### Sight Glasses

- Sight glasses allow you to monitor the operations of the machine. They should be wiped clean when film or debris has collected on them. Discolored or dirty sight glasses can lead to false readings. Some sight glasses will require removing the glass, cleaning it, and then replacing the glass.

### CONCLUSION

Performing routine maintenance keeps your machine and your drycleaning plant running efficiently. Since most operating manuals list maintenance instructions, developing a maintenance schedule should be a relatively simple task. You will find that creating a maintenance schedule is very important to the operation of the plant. But sticking to the schedule is even more important. □

### MAINTENANCE SCHEDULE

Part	Maintenance
1. Wheel/drum	Check perforations for debris after each load
2. Button trap	Clean daily or every 3-4 loads
3. Pump	Clean strainer daily
4. Fan	Clean and lubricate once a year
5. Cartridge/Disc Filters	Change per pounds cleaned or filter pressure
6. Lint Filter	Clean daily or every 3-4 loads
7. Still/Muck Cooker	After distillation scrape the floor and walls to remove residue
8. Vacuum Still	Check pressure before each distillation
9. Nitrogen Storage Tank	Check levels daily
10. Water Separator	Prime daily by adding fresh water, clean weekly
11. Condensing Coil	Inspect and clean monthly if possible
12. Sight Glasses	Clean as needed

## Maintenance of Water Separators

The water separator is the one common component of the following pieces of drycleaning equipment: reclaiming tumblers, stills, muck cookers, and most vapor adsorbers. Each of these pieces of equipment has a water separator as the collection point for the solvent/water flowing from the machine. The purpose of the water separator is to allow the water/solvent mixture leaving the condenser to flow into the separator and settle, so that pure solvent may be returned to the base tank of the drycleaning machine for reuse, and the water drained to a collecting point.

Basically, there are two types of water separators—the open top unit and the sealed unit. The advantage of the open top unit is accessibility for cleaning and maintenance. The internal working parts of both units are essentially the same. Water separators are simple devices consisting of a water separator (container), with an atmospheric vent, three pipe connections, one or two inside baffles, and no moving parts.

Figure 1 is a typical water separator used for perchloroethylene or fluorocarbon. (Fluorocarbon is a sealed unit.) In both cases, the water/solvent mixture leaves the condenser and flows into the separator where the lighter liquid (water) floats to the top before running through the upper pipe to the water collecting point. The heavier liquid (solvent) drains off the bottom through the pipe to the base tank of the drycleaning machine. The water separator works on the difference of the specific gravity of the solvent and water. To operate correctly, the vent line must be free of obstructions.

New or just cleaned water separators are put into operation by filling the separator with solvent to the solvent drain level. Then, a small amount of water is poured into the *middle* of the separator (container) and not between the solvent outlet line and the baffle closest to it. This procedure is called priming.

If the solvent from the water separator is cloudy, a rag filter is often added to the system to remove excess water. The rag filter would be added to the system in the solvent line between the water separator and the base tank of the drycleaning machine.

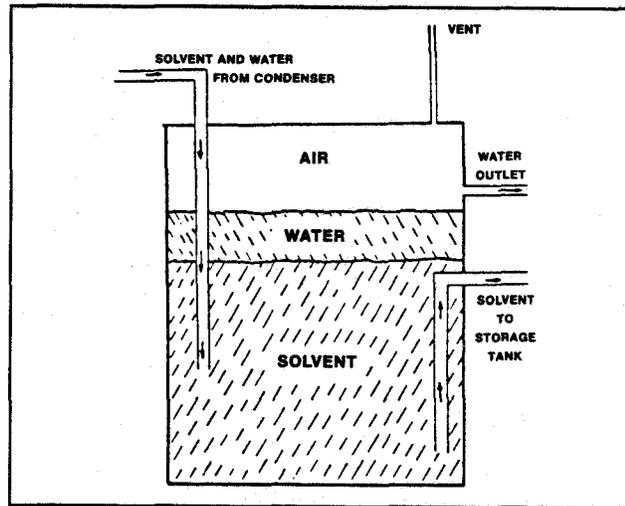


Figure 1. Diagram of a Water Separator

Petroleum machines do not have water separators. The still does have a moisture absorber to remove the water from the petroleum. The moisture absorber consists of a rag filter (container) filled with cotton fabric. The distilled solvent is pumped from the petroleum still to the clean solvent storage tank via the rag filter. The water is drained from the bottom of the container to the collecting point and the petroleum goes to the solvent storage tank from the top.

### Problems

As with all equipment, regular inspection and cleaning is extremely important. Neglect can cause the water separator to malfunction, and numerous problems can result. Some of the common problems are:

**Bad Solvent Odor:** Fungus growth can occur in the water layer, causing the water drain to clog and produce a bad odor. Excess dirt and lint from the condenser may also pass to the separator, causing a clogged outlet and odor. To correct this problem, clean the condensing coils, the separator, and the clogged outlet.

**Solvent in the Sewer:** Help prevent this by keeping the bottom of the water separator clean and free of rust and scale. If the bottom of the separator is raised with debris, the level of the solvent may raise to the point that solvent goes out the "water outlet" pipe. A solvent detector is available that sounds an alarm when the water leaving the separator contains a high amount of perc. An easy test to see if your water separator is working effectively is to collect some of the wastewater in a clear glass jar. If any perc settles to the bottom after standing overnight, the separator needs maintenance. Flush out the debris with water and then blow out and dry with an air hose.

**Water in the Storage Tank:** Water may go to the base tank if the solvent level gets below the "solvent to storage" pipe. To prevent clogging, clean all pipes and the vent.

**Solvent/water Will Not Flow Into Separator:** Blockage of the solvent line from the condenser is usually the problem. Clean the lint and dirt from the line and the condensing coils.

**Excess Water in the Water Separator:** Check the condensing coils for leaks (usually pinhole in size).

**Solvent Coming From Separator Is Hot:** The solvent was hot before entering the water separator. Check the machine the separator is connected with for overheating.

**Boil Over From Still:** Residue from the still comes over with the solvent/water mixture in any boil over. Stop distillation and clean out the water separator. This will prevent corrosion in the water separator and contamination of the solvent in the base tank of the drycleaning machine.

## Warnings About Water Separators

Some of the following problems with water separators have been repeatedly called to our attention. The listed problems may not only affect your water separator, but the entire operation of your drycleaning machinery.

- No detergent or oil should ever be put in the water separator.
- After a boil over from the still, immediately clean the separator. This will prevent corrosion and possible contamination of the solvent in the drycleaning machine tank.
- Remove any buildup of corrosion and scale.
- Follow the manual for specific cleaning and maintenance instructions for your machinery.

The above problems can only be corrected by routine inspection and cleaning.

## Maintenance

Check your machinery manual to establish a maintenance schedule for each of the pieces of drycleaning equipment having a water separator. The maintenance of each separator in your plant should then be on a schedule. Following is an example of an inspection and cleaning schedule for a water separator.

### Maintenance Schedule

#### Water Separator (Perc and Fluorocarbon):

- Daily: Inspect for any problems.  
Pour small amount of water (open top unit) into center of separator container—just enough water to run out of line to collecting point.
- Monthly: Inspect and clean vent, any clogged line, bottom of container.  
Check for solvent coming over with the water. Use the glass jar method to check for solvent settling.
- Bi-Yearly: Completely flush, dry with air hose, replace solvent and water layers, Ream all lint, dirt, and/or rust from the vent or lines.  
After maintenance, check separator for performance.

#### Moisture Absorber (Petroleum):

- Daily: Inspect and clean after each use.  
Launder and dry rag filters.  
Store rags in closed, dry container.
- Monthly: Inspect drain.  
Inspect pipe to distilled solvent tank.  
Inspect laundered, filter rags for wear and odor.  
Check for odors.  
Check for solvent leaks.

## Summary

The water separator is one of the simplest units in your plant, but it may frequently fail to perform properly if poorly maintained.

IFI's recommendation is that disposing of separator water to the sewer is the least environmentally sound method. For further information and alternative methods of disposal, with pros and cons, refer to Hazardous Waste bulletin, #11 (HW-11).

This bulletin was written by Elke Cary, Assistant Research Chemist; and Lorraine Phillips, IFI Instructor.

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