Baron·Blakeslee
A Wholly-Owned Subsidiary of Service Filtration Corporation

INSTRUCTION AND OPERATING MANUAL (abbreviated)

FOR

BARON-BLAKESLEE M-LINE SERIES PRECISION VAPOR DEGREASERS

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IMPORTANT INFORMATION

The information presented in this manual and its attachments are intended by Baron Blakeslee SFC, Inc to provide information to install, start up, operate and maintain the equipment described. This manual requires a skill level of its readers and practitioners equivalent to a journeyman status and recognizes that local codes, specifications and other use requirements may be beyond the scope of this manual. The information herein is intended to be accurate, complete and presented in good faith and is not to be construed as guarantees or warranties, express or implied regarding performance, results, comprehensiveness or merchantability nor do they imply any recommendations to infringe any patent or an offer of license under any patent.

No person(s) involved directly or indirectly with the installation, use, or operation of the Baron Blakeslee SFC Inc manufactured equipment shall proceed with installation, use or operation before studying and understanding thoroughly the contents of this publication and all other publications pertaining to the equipment and/or any materials used with or in the equipment, such as material safety data sheets, safety labels and technical data sheets. The purchaser retains all responsibility in regard to Right to Know Laws, OSHA, and EPA Regulations for any contractor or employee involved.

Baron Blakeslee SFC Inc reserves the right to make manufacturing changes, which may not be included in this manual.

THE ENCLOSED OPERATING AND INSTRUCTION MANUAL CONTAINS BARON BLAKESLEE SFC INC PROPRIETARY INFORMATION AND MAY NOT BE USED OR DISCLOSED BY OTHERS FOR ANY PURPOSES OR USED FOR MANUFACTURING PURPOSES WITHOUT PRIOR KNOWLEDGE AND WRITTEN PERMISSION FROM BARON BLAKESLEE SFC INC.

IMPORTANT GUIDELINES FOR VAPOR DEGREASING

(1) No drafts at entrance and exit of equipment. **DRAFTS = SOLVENT LOSS.**

(2) The equipment should be up to temperature (condensation of heated solvent at condensing coils) before processing any work.

(3) Speed of travel for work entering, leaving, or while in vapor zone is 11 feet per minute maximum. The main reasons are minimization of solvent drag-out losses and cleaner parts.

(4) If spray is required, only spray in the vapor zone.

(5) Parts should be racked so that solvent drains off readily and does not collect in recessed areas. Parts can trap solvent and bring solvent vapors out of the Degreaser, creating a possible health hazard and undesired solvent losses.

(6) Never lift part(s) above vapor zone when transferring from one sump to another.

(7) Never let liquid level get below top of heat source. Keep an adequate supply of solvent on hand. The equipment should always be filled to proper operating levels.

(8) Size and type of load to be processed can be critical to efficient operation of the Degreaser. If vapor line lowers rapidly and requires extra time to recover, the load is too great for the machine and should be reduced to the machine's design limits.

(9) Machine maintenance: A clean-out schedule should be established for the removal of contamination (sludge) from the boil sump(s) at regular intervals to eliminate undesired and unsafe conditions and to maintain efficient cleaning operation.

(10) Never locate a Degreaser near open flames, baking ovens, or any arc welding operations.

(11) Never place hands below vapor line! Use hooks or long-handled baskets to place parts in solvent. Do not use absorbent materials such as cloth, wood, rope, etc. to handle work in a Degreaser.

(12) Refrigeration system should remain on at all times to minimize solvent losses. It is our experience that maintaining the "cold barrier" is the most effective means of keeping the solvent from escaping from the degreaser. The refrigeration system will cycle on and off during down times in order to maintain a constant temperature on the cooling coils – this is normal.

SAFETY

1. Any degreaser pit that is more than 2 feet deep should be exhausted at a minimum rate of twice its air volume per minute. Ventilate at least 10 minutes before entering.

2. Allow solvent to cool before draining. Make sure that all solvent and vapor have been removed before entering or welding in/on a degreaser. **DO NOT** enter the machine unless all clean-out doors have been removed. All solvent must be expelled and the unit purged with air by using fan forced or compressed air from above. **ENTER ONLY** with a life-line and NIOSH/MESA approved breathing apparatus, and then **ONLY** when another person similarly equipped is watching you.

3. Do not smoke in the vicinity of a degreaser.

4. **IF SOLVENT GETS INTO EYE,** hold eye open, flush with water for at least 15 minutes, and call a physician. If solvent contacts skin, immediately flush with plenty of water. Consult solvent MSDS for more specific recommendations.

5. **IF SOLVENT SHOULD SOAK CLOTHING,** remove clothing at once and aerate thoroughly. Use soap and water to wash parts of the body that have been wet with solvent, and then apply a lanolin type cream. Remove contaminated shoes. Consult solvent MSDS for more specific recommendations.

6. **IF SOLVENT IS SWALLOWED,** induce vomiting by sticking finger down throat or by giving soapy water, or strong salty water to drink (1TBS. per glass). Repeat until vomit is clean. **NEVER** induce vomiting or give anything by mouth to an unconscious person, or a person having convulsions. Call a doctor immediately.

7. **IF A PERSON IS OVERCOME BY EXCESSIVE EXPOSURE,** remove person to fresh air and call a doctor. If breathing stops, give artificial respiration. When patient starts to breathe again, give oxygen. **HIGH VAPOR CONCENTRATION CAN LEAD TO UNCONSCIOUSNESS OR DEATH.**

NOTE TO PHYSICIAN

Overexposure to most chlorinated solvents, especially if accompanied by anoxia, may temporarily increase cardiac irritability. Maintain adequate oxygenation until recovery. Avoid sympathomimetic amines, such as epinephrine, which may precipitate arrhythmias.

8. Stop distillation before heating elements surfaces become exposed. Liquid level should never be lower than the top of the electric heating elements.

9. Never add solvent to hot oil solvent mixtures. Sudden expansion can splash solvent out of the Degreaser and possibly harm the operator.

PERSONAL PROTECTION (From the Occupational Safety and Health Act)

"All employees working in and around open-surface tank operations must be instructed to the hazards of their respective jobs, and in the personal protection and first aid procedures applicable to these hazards."

FILLING

"Whenever there is a danger of splashing, for example, when additions are made manually to the tanks, or when acids and chemicals are removed from the tanks, the employees so engaged shall be required to wear either tight fitting chemical goggles or an effective face shield."

EMERGENCIES

"When, during emergencies, workers must be in areas when concentrations of air contaminants are greater than the threshold limit of solvent, or oxygen concentrations are less than 19.5 percent, they shall be required to wear respirators adequate to reduce their exposure to a level below these limits, or to provide adequate oxygen. Such respirators shall also be provided in marked, quickly accessible storage compartments for the purpose, when there exists the possibility of an accidental release of hazardous concentrations of air contaminants. Respirators shall be approved by the U.S. Bureau of Mines, U.S. Department of the Interior (see 30 CFR Part 11) and shall be selected by a competent industrial hygienist or other technically qualified source. Respirators shall be used in accordance with Section 1910.134 (a), (b), and (c), and persons who may require them shall be trained in their use."

SPLASHING

"Near each tank containing a liquid which may burn, irritate, or otherwise be harmful to the skin if splashed upon the worker's body, there shall be a supply of clean cold water. The water pipe (carrying a pressure not exceeding 25 pounds) shall be provided with a quick opening valve, and at least 48 inches of hose not smaller than ¾", so that no time may be lost in washing off liquids from the skin or clothing. Alternatively, deluge showers and eye flushes shall be provided in cases where harmful chemicals may be splashed on the body."

OPERATION

-- Avoid excessive speed of work in and out of degreaser
-- Prevent liquid drag-out by orientation or parts
-- Avoid contamination of solvent with water and other materials
-- Keep proper heat balance

SPRAY CLEANING AND DEGREASING

In vapor degreasing, spraying takes place in an air-free atmosphere within the vapor blanket so that evaporative losses due to the mixing of solvent and air are negligible. However, care should be taken to always remove parts only when dry.

COVERS

We recommend suitable covers for degreasers to reduce vapor emissions when not operating and/or condenser coils are not functioning. For larger machines, roll top covers or power covers are available to facilitate their use. In addition, secondary freeboard chillers are very effective in minimizing solvent emissions. The principle used in this case is the creation of a heavy, thick, cold air blanket over the solvent vapor by means of refrigeration devices.

WELDING IN VICINITY

“Degreasing or other cleaning operations involving chlorinated hydrocarbons shall be so located that no vapors from these operations will reach or be drawn into the atmosphere surrounding any welding operation. In addition, Trichloroethylene and Perchloroethylene should be kept out of atmospheres penetrated by the ultraviolet radiation of gas shielded welding operations.”

OPERATION

FILLING AND POWER UP PROCEDURE

Before filling the system with solvent, be sure that you have checked for leaks, the refrigeration system is on, all drain valves are closed, and drain plugs are installed. Be sure the cooling media is flowing through the condensing coils. Fill the non-boiling sump to the top of the divider and allow solvent to overflow into the boiling sump until the level is approximately 2" from the top of the divider.

After the machine is turned ON and the spray reservoir fills with clean condensate, additional solvent will need to be added to the boiling sump to bring the level back up. The solvent level in the boiling sump should be maintained at least 2" above the heating elements at all times.

Bleed off water from the water separator daily. While the degreaser is operating, partially open the purge valve and collect the overflow into a container. Since this water contains some solvent, it must be disposed of in accordance with local regulations.

*******WARNING*******

DO NOT ADD WATER TO A DESICCANT DRYER SYSTEM.

This tank contains a dryer media that absorbs water from the distillate solvent.

Adding water to this tank defeats its purpose.

Until the heat switch is turned ON, the refrigeration system will cycle to maintain an air temperature of approximately 50°F in the freeboard area above the solvent. After turning the heat on, the solvent vapors will rise, and the refrigeration system will run continuously to maintain a constant vapor height.

Cleaning may begin as soon as the boiling sump starts boiling, and the condensed vapors are dripping off the condensing coil. For ease of handling, large parts may be placed in the cleaning tank directly with long handled hooks or tongs, while small parts are best placed in a basket. Stainless steel baskets are recommended. If a basket is used, rack the parts for maximum drainage and minimum solvent entrapment. Best cleaning will result when the number of parts being cleaned at one time is kept at a minimum.

Lower the work into the boiling sump slowly, at a rate not to exceed 11 feet per minute, a greater rate will disturb the vapors and cause excessive solvent loss. Allow parts to sit in the vapors until condensation off the parts ceases. The exact time will depend on the kind and amount of contamination and the size and construction of the part, and is best determined experimentally.

Transfer the work slowly into the clean solvent sump to rinse for several minutes. While moving the part(s) from sump to sump, never bring work above the vapor line. If the clean solvent tank is equipped with ultrasonics, additional surface cleaning will take

place. The work can then be raised into the solvent vapor for a spray rinse, if desired, and a final vapor rinse.

After completing the cleaning operation, the stainless steel cover should be moved into place to conserve solvent whether the boiling sump is ON or OFF.

MAINTENANCE

REFRIGERATION SYSTEM

At weekly intervals, or sooner if operating conditions demand, the refrigeration condensing unit heat exchanger should be thoroughly cleaned with compressed air or a vacuum cleaner to remove all dirt, dust or other material that would reduce the heat transfer effectiveness. If the dirt and dust is not removed, the compressor discharge pressure will become too high and result in overheating of the compressor motor. Safety controls in the form of a high pressure and thermal overload switch are incorporated in the machine to protect it. A sight glass is included in the high pressure refrigeration liquid line. Under normal operating conditions, the sight glass will be clear, without the presence of bubbles. In the event the sight glass contains bubbles, or no liquid refrigerant, the refrigeration system is operating incorrectly due to a dirty condenser, defective expansion valve or low refrigerant level as a result of a leak. Under these conditions, the system should not be operated until the faults are corrected.

SAFETY VAPOR CONTROL

At least once a month, check the operation of the safety vapor thermostat. This can be done by bringing the unit up to boiling temperature (vapor condensing on cooling coils). Open the disconnect switch. Wait until vapors are at the top of the cooling coils and close the disconnect switch. Refrigeration will start immediately. Heating elements should not be turned ON, due to the SVC turning off the heating system.

After vapors drop below the cooling coils (none or very little vapor condensing on cooling coils) turn heat switch OFF. Reset Safety Vapor Control and turn the heat switch to the ON position. Heating elements should energize.

Bad calibration, improper setting or a defective control can cause a malfunction of the Safety Vapor Control.

CLEANING TANK

The system requires very little maintenance other than an occasional draining and cleaning. Turning ON the heat and draining the clean condensate from the reservoir tank as it is produced can clean the boiling sump. As soon as the solvent level is down to the heaters, the heat switch must be turned OFF. The dirt and sludge should be removed through the drain valve or the clean-out door before refilling with clean solvent.

Mild non-scratching abrasives in powder form and soap can be used to clean the stainless steel tank. Steel brushes and sponges should not be used to clean the stainless steel as they may leave particles embedded in the stainless steel surface, which would lead to rusting.

SOLVENT MAINTENANCE

Most solvents can be recycled almost indefinitely with proper care in distillation and water removal. The solvent should be periodically checked for proper pH levels, acid acceptance or the contamination introduced into the solvent and water in system (either by condensation or by parts).

The degreaser removes oil, chips, and most organic soils. Solvent normally flows from the condensing coils to gravity water separator, to spray reservoir, to rinse sump, to boil sump. The solvent flows opposite the path of work travel to provide the purest solvent for rinsing.

*******WARNING*******

Contaminated solvents can become flammable, depending on the nature and level of contamination.

The degree of contamination governs the degree of part cleanliness. Briefly, a "CLEAN DEGREASER" produces "CLEAN PARTS". Oil contamination increases the boiling temperature of a solvent. When the boiling temperature is exceeded by 7-10°F, the machine should be cleaned out. Aluminum or magnesium fines or trimmings can cause accelerated solvent breakdown. With these materials, a stricter maintenance schedule to monitor solvent acidity or acid acceptance levels is recommended.

Discard solvent with high acidity and completely clean and flush equipment with a solution of water and soda ash (2 oz. per gallon). **Caution: NEVER USE CAUSTIC SODA.** Flush and rinse with water, dry completely and refill with fresh solvent.

Set up a routine schedule for equipment and solvent maintenance as soon as experience with the system allows. Factors that determine the frequency of maintenance include: amount of time the equipment is used, amount of work processed (pounds, pieces, etc.) and the quantity and type of contamination introduced. Observe the parts for acceptable cleanliness. As solvent becomes contaminated, it becomes a less effective cleaner.

When required, perform a thorough clean out. Don't just drain the solvent. Remove the clean out door(s) and clean sludge from the sump bottom and tank walls. Don't forget to clean the heating elements. Even with a distillation system, you need to clean the degreaser periodically. Clean the still more frequently to prevent solvent decomposition.

Periodically test the solvent for its normal characteristics. These tests indicate if the solvent is suitable for continued use in the system. An acidic solvent can form violent reactions that may be hazardous to the equipment and to personnel. Acid acceptance testing will monitor the solvent's ability to neutralize acid residues and correlates directly with useful life of the solvent.

Note that in the early phases of acidic solvent, test results may indicate in the satisfactory range. Discoloration of the cleaner and parts may occur before the solvent tests show the solvent to be unacceptable. We recommend that you perform these tests on a weekly basis, until you establish the normal readings for the application. Update

chart whenever production level changes, clean out is performed, etc. Once the normal reading curve is established, you can perform the tests less frequently (either monthly or as determined by your application). Also, perform the tests if you notice a change in the solvent appearance, or part cleanliness. Schedule your clean out routine to occur before test results sharply deviate from the normal curve. If using EnSolv, follow the guidelines in the EnSolv Acid Acceptance Test Kit Procedure.

SCHEDULE GUIDELINES

The following are some guidelines that should be helpful in determining your maintenance schedule for machine clean out. Refer specific questions regarding the solvents not answered here to your solvent supplier.

CONTAMINATION

Contaminants, such as oils, metal chips, detergents, flux, etc., are usually carried into the cleaner on the work. A build-up of contaminants in the boil sump causes an increase in the solvent boil temperature. As the solvent temperature approaches 7°F over the boiling point of solvent, begin to consider clean out. The procedure includes distillation of the solvent, shut down of the unit, draining/cleaning the boil sump, and adding fresh distilled solvent.

Most contaminants are transferred and collected in the still (if included). The still returns clean distillate solvent back to the degreaser. Therefore, the degreaser will require clean out less frequently. The degreaser can continue operation while the still is shut down and cleaned out.

SOLVENT IMBALANCE

Imbalance can appear as a gain or loss of alcohol. A gain in alcohol occurs in the boil sump. Solvent vapors have 2-3% less alcohol than the liquid. The remaining alcohol stays in the boil sump. As this builds up, it will affect the temperature in the same way as contaminants. Density of the solvent also indicates the alcohol content. Refer specific questions regarding testing to the solvent supplier.

*******WARNING*******

DO NOT OVERRIDE SAFETY CONTROLS OR FAIL TO MONITOR SOLVENT BALANCE. EXCESSIVELY HIGH LEVELS OF ALCOHOL MAY CREATE A HAZARDOUS CONDITION.

You will see loss of alcohol at the water separator and/or dryer tank. The function of the water separator/dryer lowers the alcohol content. Water and alcohol will mix. Water

removed from the solvent and expelled from the system will take a small amount of alcohol with it. The degreaser will automatically remix the high and low solutions to a certain extent. The weaker solution in the dryer/water separator returns to the unit rinse/clean sump. It passes through the unit and returns to mix with higher concentrated solvent in the vapor/boil sump.

Monitor the density of the solvent in the water separator/dryer reservoirs to determine solvent balance. If the alcohol is low, the cleaning operation may be affected. Experience will determine the proper interval.

EXCESSIVE WATER

When quantities of water are introduced into the system faster than the water separator/dryer can remove it. Excess water can cause the solvent to decompose (i.e. go acid). This can result in damage to the equipment and parts being cleaned.

The first sign of excessive water in the solvent is water vapor (fog or cloud) in the solvent vapor. Solvent vapor is normally colorless. When water vapor is present, it causes the vapor to have a dense, white, foggy appearance. This water vapor will deposit on the part, leaving watermarks and some contamination.

As soon as experience with the system allows, develop a schedule to replace the desiccant dryer media in the dryer tank and/or bleed off water from the water separator tank before fogging ever appears.

A more serious result of high amounts of water is the possibility of solvent decomposition. This can occur when the water mixes with contamination in the solvent. This decomposed solvent can damage the equipment and surrounding metals. Periodically test the solvent condition. Should solvent begin to decompose, immediately shut off heat to the unit and follow the procedures for solvent decomposition.

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