K$_L$a Systems, Inc.
PO Box 940 31 Mill Street
Assonet, MA 02702

T 508 644 5555
F 508 644 5550
www.klasystems.com

TROUBLESHOOTING:

In the normal course of operation, the blowers and pumps require routine maintenance to provide long, reliable operation. Detailed maintenance requirements of the rotating equipment can be found in SECTION 6 of the IOM.

The jet aerator or slot injector has no moving parts and therefore should not require any routine maintenance. However, debris entering the basin and clogging nozzles is the most common cause of deteriorated performance. Screening of the basin influent should be provided to keep solids from entering the basin. Stringy or long slender debris can agglomerate and cause blockages. If your installation is at ground level, install preventative measures, such as fences, to keep animals, grasses, trash or other debris from entering the basin.

Condition	Possible Cause	Corrective Measures
Uneven mixing (dead zones)	• Recirculation pumps not pumping properly	• Check for proper pump speed • Check pump suction and discharge pressure against “normal” or “new” pressure (pressure differential) • Check for surface vortices at pump suction
	• Very low air flow	• Increase air flow
	• Debris lodged in aerators	• Flush out aerators, see SECTION 3 in the IOM
Low and no liquid flow conditions	• Air bound impellers or reversed pump rotation	• Shut down pump and blower, bleed off air • Correct pump rotation
	• Pump suction and/or discharge isolation valves partially or fully closed	• Verify valve positions and adjust accordingly
	• Pump shutdown	• Refer to rotating equipment section of this manual
	• Debris lodged in aerators	• Flushout aerators, see SECTION 3 in the IOM
Low oxygen	• Excessive oxygen demand	• Reduce loading and/or increase airflow
	• Antifoam, Defoamer or Polymer inhibiting oxygen transfer	• Reduce chemical usage or investigate alternate chemicals
	• Debris lodged in aerator	• Flushout aerators, see SECTION 3 in the IOM
	• Reduced liquid pumping	• Check for proper pump speed. • Check pump suction and discharge pressure against “normal” pressure (pressure differential)
	• Damaged aerators and/or piping	• Repair or replace
	• Recirculation pumps shut-down or failed	• Refer to rotating equipment SECTION 6, of the IOM
Large boils of air	• Air piping damaged	• Repair or replace damaged equipment
	• Plugged jets or slot injectors	• Flushout aerators, see SECTION 3 in the IOM
	• Excessive air supply	• Reduce air flow
	• Air bound pump	• Shut down pump and blower, bleed off air
	• Recirculation pumps clogged, worn, low speed, shut down or failed	• Refer to rotating equipment SECTION 6, of the IOM
Loss of air to basin/ tank/aerator	• Insufficient air flow	• Increase and balance air flow to system
	• Clog in air supply piping	• Remove clog from piping system
	• Low liquid flow conditions	• See above

CALL KLA SYSTEMS FOR ANY QUESTIONS ABOUT EQUIPMENT RELATED ISSUES: 1-508-644-5555

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QUICK START GUIDE

Read the Installation, Operation and Maintenance manual supplied with this system before offloading, installing or operating this equipment. This guide is intended only to highlight some of the basic points in each section. It is not intended to include all of the information required for proper receiving, installing, operation or maintenance of the supplied equipment.

SHIPPING:

K$_L$a Systems aeration and mixing systems include some combination of; either fiberglass or stainless steel manifold systems, air blowers and recirculation pumps. The aerators or mixers will usually be shipped on exclusive, flatbed trucks. Pumps and blowers are usually shipped on wooden pallets or in wooden crates via common carrier or consolidated with the aerators or mixers.

HANDLING:

Be sure to inspect the equipment when it arrives. Notify the carrier, your contractor, and K$_L$a of any visible shipping damage.

Manifolds range in length from about 10 feet to over 50 feet and may weigh over 2000 pounds. Manifolds are usually provided with wooden frames that protect them from damage during shipping and storage. These should not be used to aid in lifting the equipment.

For fiberglass manifolds over 20 feet in length a spreader bar should be used for lifting. Sling the manifolds per figures 1, 2 and 3. Use caution when moving the manifolds as they may be easily damaged.

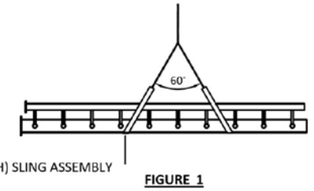

FIGURE 1

FIGURE 3

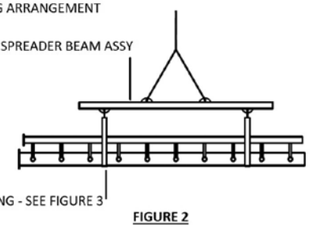

FIGURE 2

Pumps and blower pallets or crates may weigh up to 4000 lbs. Be sure to use appropriate lifting tools.

STORAGE:

Store all equipment in a dry, level area. Do not store in an area subject to flooding. Manifolds and piping should be supported every 8-10 feet to prevent warping prior to installation. Cover all mechanical equipment with tarps or store inside until installation. Cover fiberglass manifolds and pipes with tarps if they will be stored outdoors for more than 2 months. Refer to the IOM for long term storage instructions for blowers and pumps.

Store hardware and gaskets in a secure location. Keep fiberglass joint kits and resin in a cool, dry location.

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INSTALLATION:

The following list includes some of the most often overlooked aspects of the installation process. For more detailed installation information follow the detailed instructions in the IOM.

MANIFOLDS

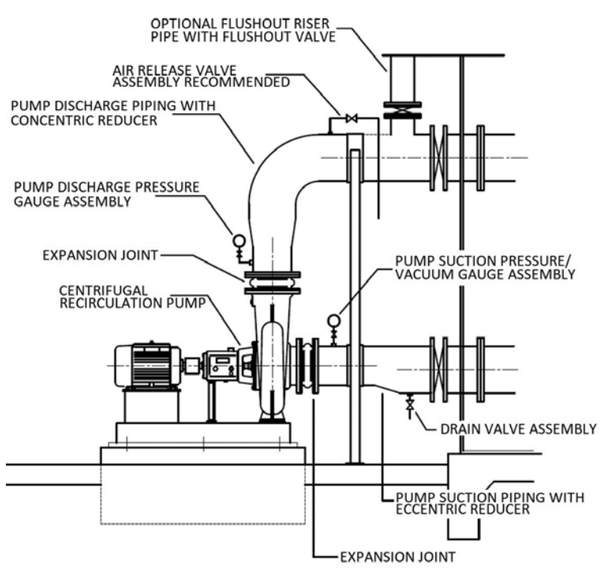
- Check manifolds, pipe, fittings and nozzles for any impact damage.
- Be sure that all debris, tools etc. are removed from the manifolds and piping before connecting pipe sections.
- Place the manifold supports in the proper location per the project engineering drawings.
- Level all manifolds to within +/-½" (1" total tolerance). Do not assume that the tank/basin floor is level.
- Fiberglass field joint procedures are detailed in the IOM, SECTION 3.
- Use only full-face gaskets on fiberglass flanges.
- Do not use raised face flanges against fiberglass flanges.

SUPPORTS

- Be sure that each hardware set is complete with 2 flat washers and 1 lock washer.
- Install anchor bolts to proper embedment and torque. Use 1 flat and 1 lock washer.
- All hardware should be torqued to proper values. Do not over torque with impact tools. See IOM SECTION 3.
- Be sure that rubber saddle/clamp liners are in place. Tighten pipe saddles and clamps so that there is the same gap on either side of the pipe.

PUMPS AND BLOWERS - SEE IOM SECTION 6

- Grout the pump base per manufacturer's specifications.
- Confirm proper motor rotation without the belts/coupling installed.
- Re-check pump and blower alignment per the respective section in the IOM.
- Fill pumps and blowers with oil per manufacturer's instructions.
- Tension all drive belts or install flexible coupling per manufacturer's specifications.
- Confirm that there is no pipe strain on the pumps, blower or fiberglass piping and manifolds.
- Install pump suction and discharge pressure gauges, air pipe gauge, vent and bleed valves and anti siphon valve per K$_L$a drawings.
- Never operate the pump(s) without a properly flooded pump suction.



Install isolation bellows or expansion joints, where required, to prevent pipe strain on the equipment.

Clean the basin/tank/lagoon of all debris. Any debris left in the basin could be ingested into the pump and result in mechanical and/or process failure that is not covered under warranty.

Complete the INSTALLATION CHECK LIST in the IOM, SECTION 3. If you do not have a copy of this list, call K$_L$a Systems at 508-644-5555 and we will email, text or fax one to you.

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OPERATION:

During start-up and operation of the system, it is critical to follow some simple steps to assure long term, reliable operation.

- Be sure that the basin is filled at least to the minimum depth specified in the drawings and air is purged from the liquid recirculation piping before operating the pump. In no case should the pump be operated if the suction is drawing in air from surface vortices.
- Blower(s) must not be operated without the recirculation pump pumping water except during backflush. This should be ensured with electrical interlocks. Note that an operating pump is not necessarily pumping water.
- Always start the pump before the blower. If the blower has been running without the pump running (backflush), shut down the blower and bleed trapped air from the pump discharge piping before restarting the pump, then start the blower.
- Record static pump suction and discharge pressures. While operating at design liquid and airflow, record "new" operating pressures on the pump suction and discharge, and the blower. Photograph and/or video the surface pattern. This will provide the baseline data for any future trouble shooting.
- Observe operating pressures, the surface pattern and liquid depth daily. Significant changes may indicate pump, blower, aerator or process changes that may need to be addressed.
- Follow recommended blower and pump maintenance recommendations in the IOM. See SECTION 6.
- Do not operate the system with the backflush valve open and the pump running. The reduced back pressure on the system may damage the pump.

BACKFLUSH PROCEDURE

- The Backflush System is used to dislodge debris that may have become lodged in the jet aeration nozzles. The principle of operation is that of an airlift pump. The typical flushout system consists of a riser pipe, flushout valve, return elbow and supports. The riser pipe is attached at a high point of the aerator's liquid manifold and typically extends 1-3 feet above the top water level.
- The flushout procedure is started by shutting off the pump, shutting the isolation valve on the suction side of the recirculation pump and slowly opening the flushout control valve. Continue to feed air to the aerator until an air/liquid mixture begins to flow from the flushout return elbow. The air flow may have to be increased to get the flushout operation started. It may take a couple of minutes to get the flushout operation started. Once the flushout operation has started, the airflow to the aerator should be reduced for optimum effectiveness, as illustrated by a constant discharge. This will typically be between 5 and 10% of the design (aeration) airflow rate.
- Once started, the flushout riser acts as an airlift pump, drawing process water and air through the inner aeration nozzles in a reverse direction. This scouring action will dislodge debris that may be lodged inside the jets/injectors. The debris will then be carried up the flushout riser and discharged through the return elbow.
- There is no recommended "standard" flushout frequency. The frequency of flushout required is mostly dependent on the ability to keep trash and debris out of the aeration basin. A typical flushout operation takes about 5 minutes. After completing the flushout procedure, stop the airflow to the aerator, open the pump isolation valve, and close the flushout valve. Release air from the pump piping. Restart the recirculation pump and allow it to develop full flow then return the airflow to the previous (aeration) setting.

For examples of proper backflush operation and expected visual cues please visit our YouTube page at:
www.youtube.com/user/KLaSystems

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