



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Section-1

General Information

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Aeration & Mixing | Biological Processes | Filtration | Membranes | Oxidation & Disinfection | Process Control | Aftermarket & Customer Service

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Glossary of Special Terms

The following glossary of special terms and abbreviations are shortened forms of words or expressions which may have been used within this documentation to conserve time and/or space. Abbreviations for chemical elements or compounds will not necessarily agree with the chemical symbols. The same abbreviations shall be used for all tenses and the singular and plural forms of a given word. These abbreviations are originating in and peculiar to Aqua-Aerobic Systems, Inc. and may not be generally used by other organizations.

ABBREVIATIONS

WORD DEFINITION AND/OR COMBINATIONS

AASI	AQUA-AEROBIC SYSTEMS, INC.
ABS	ACRYLONITRILE - BUTADIENE - STYRENE
ACTR	ACTUATOR
AC	ALTERNATING CURRENT
ADAP	ADAPTER
ADHV	ADHESIVE
ADJ	ADJUSTABLE, or ADJUSTING
ADI	ANTI - DEFLECTION INSERT
ADVP	AVOIRDUPOIS
AER	AERATOR
ALRM	ALARM
ALUM	ALUMINUM
AMP	AMPERE
ANCR	ANCHOR
ANGL	ANGLE
AOR	ACTUAL OXYGEN REQUIREMENT
APAK	ARCTIC-PAK
ASSY	ASSEMBLY
AUX	AUXILIARY
AVG	AVERAGE
AWL	AVERAGE WATER LEVEL
BABT	BABBITT
BAFL	BAFFLE
BC	BOLT CIRCLE
B / F	BUTTERFLY VALVE
BHP	BRAKE HORSE POWER
BHMS	BUTTON HEAD MACHINE SCREW
BKNG	BACKING
BRKT	BRACKET
BRKR	BREAKER
BRDG	BRIDGE
BRG	BEARING
BM	BEAM
BOD ₅	BIOLOGICAL OXYGEN DEMAND
BOT	BOTTOM
BSN	BASIN
BSP	BRITISH STANDARD PIPE THREADS

Glossary of Special Terms

ABBREVIATIONS

WORD DEFINITION AND/OR COMBINATIONS

BSPP	BRITISH STANDARD PIPE PARALLEL THREAD (G)
BSPT	BRITISH STANDARD PIPE TAPER THREAD (R)
BRNZ	BRONZE
BKHD	BULKHEAD
BUSH	BUSHING
B/W	BACKWASH
C	CENTIGRADE
CAD	COMPUTER AIDED DESIGN
CAP	CAPACITY
CBL	CABLE
CHN	CHAIN
CHAM	CHAMFER
CHLN	CHLORINE
CHK	CHECK
CHNL	CHANNEL
CI	CAST IRON
CL	CENTERLINE
COD	CHEMICAL OXYGEN DEMAND
COND	CONDUTOR
COTR	COTTER (pin)
CP	CONTROL PANEL
CPLG	COUPLING
CPU	MICROPROCESSOR
CPVC	CHLORINATED POLYVINYL CHLORIDE
Cr	RESIDUAL DISSOLVED OXYGEN
CR	CROSS
CRTG	CARTRIDGE
CSTMID	MID DEPTH DISSOLVED OXYGEN SATURATION POINT CORRECTED FOR DEPTH, WATER TEMPERATURE & BAROMETRIC PRESSURE
CSTMID	MID DEPTH DISSOLVED OXYGEN SATURATION POINT AT STANDARD CONDITIONS
CSNK	COUNTER SINK
CU	COPPER
CU. IN.	CUBIC INCH
CVRG	COVER, or COVERING, COVERAGE
CW	CLOCKWISE
CCW	COUNTER CLOCKWISE
CYCL	CYCLE
CYL	CYLINDER
DCNTR	DECANTER
DEG	DEGREE
DEFL	DEFLECTOR
DETL	DETAIL
DWTRG	DEWATERING

Glossary of Special Terms

ABBREVIATIONS

WORD DEFINITION AND/OR COMBINATIONS

DIA	DIAMETER
DIAPH	DIAPHRAGM
DIFF	DIFFUSER
DGTR	DIGESTER
DC	DIRECT CURRENT
DRTR	DIRECTOR
DISC	DISCHARGE
DSPLY	DISPLAY
DO	DISSOLVED OXYGEN
DPDT	DOUBLE POLE - DOUBLE THROW
DWG	DRAWING
DRV	DRIVE
DRVR	DRIVER
DRVG	DRIVING
DYNC	DYNAMIC
EA	EACH
ECC	ECCENTRIC
EFF	EFFLUENT
EL	ELBOW
ELEC	ELECTRIC, or ELECTRICAL
ELEV	ELEVATION
EMBED	EMBEDMENT
ENCL	ENCLOSURE
EPR	ELECTRIC PRINT REQUEST
EPDM	ETHYLENE-PROPYLENE DIENE TERPOLYMER
EQ	EQUALIZATION
ERSN	EROSION
ETM	ELAPSED TIME METER
EXHT	EXHAUST
EXT	EXTENSION, EXTERIOR, EXTERNAL
EYBLT	EYE BOLT
F	FAHRENHEIT
FAB	FABRICATED, or FABRICATION
FC	FREQUENT CONTACT
FEM	FEMALE
FIG	FIGURE or DETAIL
FPS	FEET PER SECOND
FPM	FEET PER MINUTE
FRP	FIBERGLASS REINFORCED POLYESTER
FL	FLUID
FLG	FLANGE, ED
FOG	FATS - OILS AND GREASE
FPT	FEMALE PIPE THREAD
FRM	FRAME

Glossary of Special Terms

ABBREVIATIONS

WORD DEFINITION AND/OR COMBINATIONS

FS	FLOAT SWITCH
FSS	FIBERGLASS & STAINLESS STEEL
FLWMTR	FLOWMETER
FT	FOOT or FEET
FTTG	FITTING
F:M	RATIO OF FOOD TO MASS
FWD	FORWARD
GA	GAGE or GUAGE
GSKT	GASKET
G/F	GREASE FITTING
GAL	GALLON
GALV	GALVANIZE, ED, ING
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GPD	GALLONS PER DAY
GRAV	GRAVITY
GRSE	GREASE
GRTG	GRATING
H	DISTANCE MEASURED IN FT. FROM THE WATER LEVEL TO THE CENTERLINE OF THE DECANT NOZZLE.
H ₁	DISTANCE MEASURED IN FT. FROM THE HIGH WATER LEVEL TO THE CENTERLINE OF THE DECANT NOZZLE.
H ₂	DISTANCE MEASURED IN FT. FROM THE LOW WATER LEVEL TO THE CENTERLINE OF THE DECANT NOZZLE.
HD	HEAD
HDR	HEADER
HDWR	HARDWARE
HDWL	HANDWHEEL
HNGR	HANGER
HTR	HEATER
HHCS	HEX HEAD CAP SCREW
HHMS	HEX HEAD MACHINE SCREW
HOA	HAND-OFF-AUTO
HORZ	HORIZONTAL
HP	HORSE POWER
Hr	HOUR
HSG	HOUSING
HSSS	HEX SOCKET SET SCREW
HWL	HIGH WATER LEVEL
HZ	HERTZ
ID	INSIDE DIAMETER
IDLR	IDLER
IND	INDICATOR
IMP	IMPELLER

Glossary of Special Terms

ABBREVIATIONS

WORD DEFINITION AND/OR COMBINATIONS

IN	INCHES
INCL	INCLUDE
INF	INFLUENT
ICFM	INLET CUBIC FEET PER MINUTE
INT	INTERNAL
INS	INSERT
INSL	INSULATOR, INSULATION
INSTL	INSTALLATION
INTR	INTERMEDIATE
IS	IMMERSION SERVICE
ISLTN	ISOLATION
IT	INFORMATION TECHNOLOGY
I/O	INPUT / OUTPUT
JBOX	JUNCTION BOX
JCT	JUNCTION
KW	KILOWATT
KELL	KELLUMS
LB	POUNDS
LFTG	LIFTING
LG	LONG or LENGTH
LH	LEFT HAND
LIN	LINEAR
LIQ	LIQUID
LK	LOCK or LOCKING
LKNT	LOCKNUT
LR	LONG RADIUS
L/S	LIMIT SWITCH
LTD	LOW TRAJECTORY DIFFUSER
LWL	LOW WATER LEVEL
MACH	MACHINE, ING
MAIN	MAINTENANCE
MATL	MATERIAL
MAX	MAXIMUM
MBR	MEMBRANE BIOLOGICAL REACTOR
MEK	METHYL ETHYL KETONE
MCC	MASTER CONTROL CENTER
MCB	MASTER CIRCUIT BOARD
MDFY	MODIFY
MF	MIX FILL PHASE
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
MIN	MINIMUM
MIX	MIXER, ING

Glossary of Special Terms

ABBREVIATIONS

WORD DEFINITION AND/OR COMBINATIONS

MNTG	MOUNTING
MLSS	MIXED LIQUOR SUSPENDED SOLIDS
MPT	MALE PIPE THREAD
MRG	MOORING
MLVSS	MIXED LIQUOR VOLATILE SUSPENDED SOLIDS
MO	MASTER ORDER NUMBER
MOD	MODEL
MPT	MALE PIPE THREAD
MTG	MOUNTING
MTR	MOTOR
MTRG	METERING
MRG	MOORING
mg / L	MILLIGRAMS PER LITER
MXR	MIXER
NA	NOT APPLICABLE
NPLT	NAMEPLATE
NO, or #	NUMBER
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NEOP	NEOPRENE
NLK	NY-LOCK (nut or bolt)
NPPL	NIPPLE
NPTF	NATIONAL PIPE THREAD FEMALE
NPTM	NATIONAL PIPE THREAD MALE
NH3-N	AMMONIA
NR	NOT RECOMMENDED
NT	NOT TESTED
OBS	OBSOLETE
O ₂	OXYGEN
OC	OCCASIONAL CONTACT
OD	OUTSIDE DIAMETER
OHCS	OVAL HEAD CARRIAGE SCREW
O&M	OPERATION AND MAINTENANCE MANUAL
OPER	OPERATOR, ING, TIONS
OPRTD	OPERATED
OT	OPERATING TIME
OTR	OUTER
OUR	OXYGEN UPTAKE RATE
Oz	OUNCE
P	PHOSPHORUS
pH	ALKALINITY
PH	PHASE
PHMS	PAN HEAD MACHINE SCREW
P&ID	PROCESS & INSTRUMENTATION DIAGRAM
PKG	PACKAGE

Glossary of Special Terms

ABBREVIATIONS

WORD DEFINITION AND/OR COMBINATIONS

PLC	PROGRAMMABLE LOGIC CONTROLLER
PLT	PLATE
PLTD	PLATED
PNTD	PAINTED
PPG	PIPING
PO	PURCHASE ORDER
POLYE	POLYETHYLENE
POLYP	POLYPROPYLENE
PORT	PORTABLE
PSI	POUNDS PER SQUARE INCH
PRES	PRESSURE
PVC	POLYVINYL CHLORIDE
PVTL	PIVOTAL
PWRSEC	POWER SECTION
Q_i	INSTANTANEOUS FLOW
Q_A	AVERAGE FLOW
QC	QUALITY CONTROL
QT	QUART
QTR	QUARTER
QTY	QUANTITY
R	RADIUS or REACT PHASE
RD	ROUND
REAC	REACTOR
REQ'D	REQUIRED or REQUESTED
REST	RESTRAINED
REV	REVERSE
RF	REACT FILL PHASE
RIVT	RIVET
RH	RIGHT HAND
RHMS	ROUND HEAD MACHINE SCREW
RADM	RANDOM
RP	ROTATING PRODUCTS
R/L	RANDOM LENGTH
RM	RAW MATERIAL
RPM	REVOLUTIONS PER MINUTE
RTRV	RETRIEVABLE
RTRCT	RETRACTABLE
S	SETTLE PHASE
SBR	SEQUENTIAL BATCH REACTOR
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SCH	SCHEDULE
SCFM	STANDARD CUBIC FEET PER MINUTE
SCFH	STANDARD CUBIC FEET PER HOUR
SCHEM	SCHEMATIC

Glossary of Special Terms

ABBREVIATIONS

WORD DEFINITION AND/OR COMBINATIONS

SDS	SAFETY DATA SHEET
SEC	SECOND
SER#	SERIAL NUMBER
SHCS	SOCKET HEAD CAP SCREW
SHMS	SOCKET HEAD MACHINE SCREW
SHSS	SQUARE HEAD SET SCREW
SHKL	SHACKLE
SHT	SHEET
SLV	SLEEVE
SLNGR	SLINGER
SLDG	SLUDGE
SOC	SOCKET
SOL	SOLVENT
SOR	STANDARD OXYGEN REQUIREMENT
SPCR	SPACER
SPEC	SPECIFICATION
SPDT	SINGLE POLE DOUBLE THROW
SQ	SQUARE
SR	SHORT RADIUS
SS	STAINLESS STEEL
STAB	STABILIZER
STD	STANDARD
STL	STEEL
SUB	SUBMERSIBLE, or SUBSTITUTE
SUPT	SUPPORT
SVI	SLUDGE VOLUME INDEX
SW	SWITCH
SWD	SIDE WATER DEPTH
TBE	THREAD BOTH ENDS
TEFC	TOTALLY ENCLOSED FAN COOLED
TFL	THREADED FULL LENGTH
THD	THREAD, ED
THK	THICK, THICKNESS
THMBL	THIMBLE
THRU	THROUGH
TIN	TOTAL INORGANIC NITROGEN
TIR	TOTAL INDICATOR READING
TKN	TOTAL KJELDAHL NITROGEN
TN	TOTAL NITROGEN
TRGT	TARGET
TNST	TENSION
TOE	THREAD ONE END
TSS	TOTAL SUSPENDED SOLIDS
TSP	TRISODIUM PHOSPHATE
TSTAT	THERMOSTAT
TP	TOTAL PHOSPHORUS

Glossary of Special Terms

ABBREVIATIONS

WORD DEFINITION AND/OR COMBINATIONS

TRANS	TRANSFORMER
TYP	TYPICAL
TRNBKL	TURNBUCKLE
Tw	TEMPERATURE of WATER (20 DEGREES CENTIGRADE)
UBLT	U-BOLT
UN	UNIT NUMBER
UNC	UNIFIED NATIONAL COARSE THREAD
UNF	UNIFIED NATIONAL FINE THREAD
UNIV	UNIVERSAL
URTHN	URETHANE
V	VOLT or VOTAGE
VAC	VACUUM
VERT	VERTICAL
VIBRT	VIBRATION or VIBRATOR
VLV	VALVE
VYNL	VINYL
VOL	VOLUTE
VTRX	VORTEX
VSS	VIOLATILE SUSPENDED SOLIDS
W	WATT
W /	WITH (Another item)
WARN	WARNING
WAS	WASTE ACTIVATED SLUDGE
WDG	WEDGE
WL	WATER LEVEL
WLDMT	WELDMENT
WHL	WHEEL
WIP	WORK IN PROCESS
WSR	WASHER
WT	WEIGHT
WRG	WIRING
W/O	WITHOUT
YD	YARD

TECHNICAL SUPPORT

For Scheduling Equipment Start-Up Services or Technical Support:

For scheduling Customer Service Representatives for service trips and/or start-up services please call:

815-654-2501 and ask for the Project Management Department.

For assistance with any AASI type equipment including **after normal working hours**, weekends, emergencies, and Federal Holidays, please call:

800-940-5008 and ask for the Technical Support.

For Spare or Replacement Parts Contact:

For assistance in quoting replacement parts and/or ordering parts or equipment, please call:

The Customer Service Department toll free at **877-271-9694** and ask for "**Spare Parts and After Market Services**".

Or e-mail Customer Service at customerservice@aqua-aerobic.com

Ordering replacement parts and/or equipment may be done via our Fax number. Please send order via **Fax: 815-654-8623**, to the attention of "**Spare Parts and After Market Services**".

Please provide the

- desired quantity
- part description
- AASI part number
- Project ID Number / MO Number

as listed within your operation and maintenance manual when placing your order.

PRODUCT MANUALS

SPECIAL MESSAGES

Your manual contains special messages to bring attention to potential safety concerns, equipment damage as well as helpful operating and servicing information. Please read all the information carefully to avoid injury and equipment damage.

DANGER

Indicate an immediately hazardous situation which, if not avoided, will result in death or serious injury. Danger is limited to the most extreme situations.

WARNING

Indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. Caution may also be used to alert against unsafe practices.

NOTICE

Indicate a statement of company policy as the message relates directly or indirectly to the safety of personnel or protection of property.

GENERAL SAFETY

Indicate general instructions relative to safe work practices, reminders of proper safety procedures, and the location of safety equipment.

Transport and Handling Aerator and Mixer Equipment

Receiving and Unloading:

Upon receipt of Aqua-Aerobic Systems' equipment, the shipment should be checked to see that no transit damage has occurred. Secondly, all units and accessories (if any) should be checked off against the packing list and Bill of Lading to assure proper contents.

In general, the Aqua-Jet[®] Surface Mechanical Aerators or the AquaDDM Direct-drive Mixers are shipped pre-assembled and will require no additional field assembly. All Aerator and/or Mixer floats, and power sections, that require some assembly prior to installation, are shipped in protective crates and will require special care when lifting and removing them from the transport truck or container. It is always important to rig and control the load being lifted so that stability is achieved.

Should any damage or shortage exist, please notify the factory immediately with the complete details. **Do not** sign any receiving tickets or acceptance papers unless the shipment is in the proper condition and all accessories listed are accounted for. Discrepancies or shortages must be reported in writing within seven (7) days of parts or equipment delivery to obtain credit.

When unloading any size protective crate from the truck or containers, a forklift truck, floor crane, or lift crane with sufficient lifting capacity must be used. The lift forks should extend under the packaging to completely support the unit or crate. The lifting weights of crated motors, power sections, float sub-assemblies, or accessories will be provided within the shipment Bill-of-Lading for review and verification, and that information should be investigated prior to lifting and unloading.

Lift the crated load off the truck vertically and smoothly to prevent shock load. The load once lifted, must be placed on a level and solid foundation for uncrating or storage until needed. The motor or power section should **NOT** be removed from the shipping crate until ready for assembly. Refer to the Short & Long Term Storage procedures if storing the equipment for any length of time.

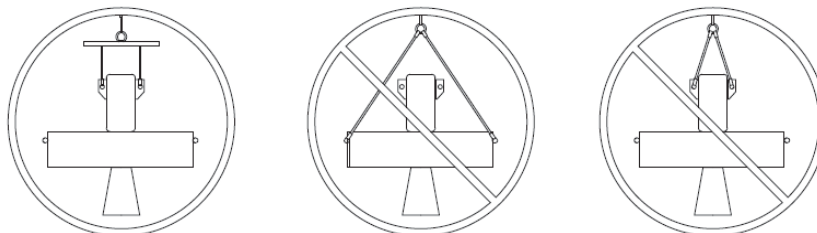
CAUTION

The aerator and/or mixer should remain supported in an upright position throughout the assembly and installation process.

GENERAL SAFETY

Never overload the lifting slings, and verify the work load limit on the identification tags before lifting anything. Persons involved in handling, installing, or maintaining equipment are advised to observe all Warnings, Safety Precautions, along with the Transport & Handling procedures, to ensure their safety.

When handling by the motor lifting eyes, a long lift cable or chain should be used. Optionally, a spreader bar may be used to ensure a vertical pull on the lift eyes. Short cables or chains can put a cross shear on the lift eyes, breaking them off or otherwise damaging the motor. Also, the lift must be equal and level. A separate cable or chain should be attached to each lift eye from the lift hook. When only one lift cable or chain is used, no backup safety exists when a disconnection or break occurs.



Transport and Handling Aerator and Mixer Equipment

Transport and Handling Equipment:

Care must be taken when handling any type of heavy equipment. Careless handling can result in damage to equipment and/or injury to persons involved.

CAUTION

Check that the motor lifting eyes are securely tightened prior to lifting the unit. Do NOT lift the entire assembled unit by any other means other than the motor lifting eyes attached to the sides of the motor.

Persons involved in transporting and handling, or installing the equipment are advised to observe all normal precautions to ensure their safety. In addition, anyone working in or around equipment operating in wastewater treatment facilities should exercise all necessary precautions with regard to personal hygiene and sanitation.

Extreme care must be taken when uncrating and removing the shipping straps around a motor or a power section as illustrated in Figures 1 and 2 below, so that no damage occurs.

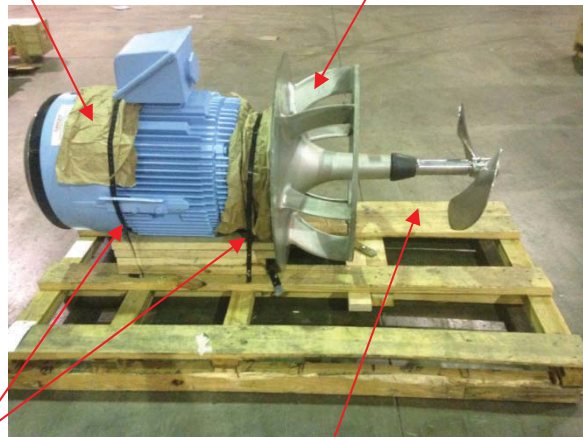
Figure-1 Motor on shipping crate
Plastic Motor strapping



No supporting
under shaft

Metal Motor strapping

Figure-2 - Power Section on shipping crate
Strapping Protection Diffusion Head Strut



No supporting under
shaft or propeller

To lift a motor or power section from its shipping crate, it is recommended that you use equipment such as; Adjustable Hitch Slings, or a Load-Rotor[®] Positioning Sling, that allows the crane operator to adjust the length of one chain sling for raising an uneven load holding it in a level position. This is particularly important for motors having uneven load weight distribution such as long shaft motors resulting in an off-set center of gravity. Check that the bolts holding the motor lifting eyes located on two sides of the motor are tight prior to attempting to lift a motor or power section.

CAUTION

Do not attach a sling or lifting device around the motor shaft or propeller for lifting a motor or power section.

Transport and Handling Aerator and Mixer Equipment

A Load-Rotor® Positioning Sling used with small cranes, floor cranes, or other lifting components, is recommended for lifting the motor or power section horizontally, as this device will allow the one sling to be tilted or turned by the slings hex drive end with a common speed handle and socket. This allows lifting and removal of a motor or power section a snap even in close quarters, and allows the operator to lower the shaft end into a vertical position to place on a stand or support base. This also provides protection from the shaft possibly touching the ground or solid foundation which can result in damage to the motor and shaft. Placing the power section in the vertical position is required to complete the assembly of the unit. **CAUTION:** Do not use a power impact wrench with the Load-Rotor® Positioning Sling as it will damage the hex drive of the sling.



Load-Rotor® Positioning Sling

When using Adjustable Hitch Slings, or Load-Rotor® Positioning Slings, it is recommended that both motor lifting eyes are used with a spreader bar and chain slings so the hooks can have a wide pickup of both motor lifting eyes. The other sling must be attached in one of the motor base flange holes for a mixer, or around one of the curved struts of the diffusion head for an aerator. If the hooks do not fit into the mixer motor base flange holes for a safe lift, it is recommended that an eyebolt with a locking nut be used in the hole for attachment of the lifting hooks.

The operator when lifting a motor or power section from the shipping crate must make certain the load remains horizontal, and is balanced as it's lifted. A power section when lifted must be lifted high enough that when lowering into the vertical position for placing on a stand or support base, the shaft or propeller will not come in contact with anything. Never allow the motor shaft or propeller to touch the crate, ground, or solid foundation as the load is being lifted. The motor weight forces that could be applied to the shaft or propeller during lifting can result in damage to the motor bearings, or possibly bending the motor shaft.

CAUTION

Increased tension is magnified by any change from vertical to horizontal lifting. Increased tension is imposed on the sling leg(s) when the legs are used at angles less than 90°.



WARNING

Never allow the motor shaft or propeller to come in contact with the ground or solid foundation as the load is being lifted, as this could result in damage to the motor bearings, or possibly bending the motor shaft, or may cause injury to persons involved.

Once the unit has been fully assembled it must be handled with care from the vertical lifting eyes on the side of the motor. Refer to the Component Assembly document within Section-2, and the O&M Instructions Manual within Section-3 for assembly instructions and details.

Transport and Handling Aerator and Mixer Equipment

Transport & Handling P-Base Long Shaft Motors for Repair & Service:

If the motor is going to be sent to a motor repair shop for service work, you must remove the propeller and all shaft parts, while the power section is supported in the vertical position. Refer to the disassembly instructions of the Operation & Maintenance Instructions Manual prior to attempting to disassemble the power section and motor.

Once the power section has been disassembled with safety wire cut and removed, and the mounting bolts removed, it must be handled and lifted in the same manner previously mentioned. Then continue lifting the power section up vertically from the float assembly, and place it in a vertical position on a solid stand or support base. It is recommended that the lifting device remain attached to the motor lifting eyes to hold it in place during disassembly of the propeller, shaft parts, and motor mounting base component.

After the propeller and all shaft parts have been removed and with the Load-Rotor[®] Positioning Sling still attached, lift the motor vertically and high enough out from the motor base weldment of a mixer, or from the diffusion head of an aerator. Attach the other sling in one of the motor base mounting flange holes. If the hooks do not fit into the motor base mounting flange holes for a safe lift, it is recommended that an eyebolt with a locking nut be used in the hole for attachment of the lifting hooks. This is particularly important with long shaft motors having an uneven load weight distribution. Lift the motor vertically and slowly out from the mounting base component making sure the shaft clears the solid stand or support base.

With the motor held vertically with the Load-Rotor[®] Positioning Sling and proper clearance underneath, you will need to be able to lower and rotate the motor into the horizontally position, for placing within a shipping crate. Start tilting and turning the motor into the horizontally position by turning the slings hex drive end with a common speed handle and socket. Make sure the shaft does not come in contact with the ground or anything, protecting the motor the shaft at all times.

CAUTION

Do not use a power impact wrench with Load-Rotor[®] Positioning Sling as it will damage the hex drive.

A large crate similar to the one pictured above in Figure 1 must be used for shipping and protecting the motor and shaft during transit. The motor must not be allowed to extend beyond the ends of the crate, and the motor must be blocked up with recommended wood 2x4's to prevent the motor from possibly rocking or rotating during transit.

Lower the motor horizontally to place within the shipping crate, and it is important that the motor be held in place with the lifting device on the shipping crate until it can be blocked on both sides securing it to the shipping crate during transit. Figures 1 and 2 pictured above correctly illustrate the method for strapping and securing a motor or power section to the shipping crate for transit. The motor must also be securely strapped down to the crate and include plastic protection, card board, or some type of non-metallic protection, under any metal strapping to protect the motor and finish paint system. The crated motor or power section will require special care when lifting and placing on the transport truck, and it is always important to rig and control the load being lifted so that stability is achieved.

Transport and Handling Aerator and Mixer Equipment

CAUTION

Do not attach any support structure under or to the motor shaft as it will cause damage to the motor bearings, or possibly bending the motor shaft due to vibrations from transit.

WARNING

Aqua-Aerobic Systems, Inc. will not assume responsible for any motor damage caused from failure to properly secure and protect a motor in a shipping crate, or from inadequate size crate. Additionally, safety precautions must be observed to secure the shipping crate to the transportation vehicle from possible movement during transit.

When loading the crate on the trucks for transporting, a forklift truck with long enough forks to fully extend under the crate to completely support the load, a floor crane, or lift crane with sufficient lifting capacity must be used.

GENERAL SAFETY

Persons involved in installing, or maintaining equipment are advised to observe all Warnings, Safety Precautions, along with the Transport & Handling procedures, to ensure their safety.

Aqua-Aerobic Systems, Inc. will not assume responsible for any motor damage caused from failure to properly secure and protect a motor in a shipping crate, or from inadequate size crate. Additionally, safety precautions must be observed to secure the shipping crate to the transportation vehicle from possible movement during transit.

Aqua-Aerobic Systems, Inc. maintains a competent repair facility to repair or recondition your power section should it become necessary, or we may help you find a certified motor service repair shop in your area. Contact our plant in Loves Park, Illinois to make arrangements by telephoning (815) 654-2501 and asking for Customer Service.

Aqua-Jet[®] Surface Mechanical Aerator WARNINGS

WARNING

The Aqua-Jet[®] Surface Mechanical Aerator has a high velocity upwardly directed hydraulic flow directly below the unit. This flow pattern may, in some instances, cause damage to basin bottoms; thereby creating leaking potential in earthen or lined basins. Aqua-Aerobic Systems, Inc. recommends the use of a concrete pad on the basin bottom directly below the aerator for earthen or lined basins. If the waste is known to degrade concrete, other materials should be investigated. In addition, horizontal surface velocities persist for some distance from the unit. Rip rapping, or similar means of bank protection can protect basin walls.

If basin contains toxic wastes, user is advised to obtain engineering advice as to basin design and construction necessary to prevent possible erosion and leakage.

Aqua-Aerobic Systems, Inc. assumes no liability or responsibility for any damage to basin bottoms or walls, or for any injuries or damages resulting there from.

Personal flotation devices may not be effective in aerated basins.

Disconnect and lockout all power sources to equipment before performing any maintenance.

Do not lift or transport equipment, crates, etc. until all personnel are a safe/approved distance from the work area. Use lifting lugs where provided on the equipment. Only approved rigging should be used. Short cables or chains can put a cross shear on the lift eyes, breaking them off or otherwise damaging the motor or, causing a threat of falling. The lift must be equal and level. A separate cable or chain should be attached to each lift eye from the lift hook. When only one lift cable or chain is used, NO backup safety exists when a disconnection or break occurs.

Read the installation, operation, and maintenance instructions contained within this manual before any work begins.

Read and obey all warnings, and other safety information within this manual and those attached to the equipment.

Keep all warning and safety labels attached to the unit, and make sure they are legible at all times. Contact Aqua-Aerobic Systems for replacement if labels become illegible.

Observe all necessary precautions for ventilation and identification of dangerous gases whenever working in confined spaces.

Do not stack crates as they pose a threat of falling.

Aqua-Jet[®] Surface Mechanical Aerator WARNINGS

WARNING

Do not lift or transport equipment, crates, etc. until all personnel are a safe / approved distance from the work area. Use lifting lugs where provided on the equipment. Only use approved rigging equipment.

Do **not** begin equipment operation until all persons in the area have been notified and they are **not** in the path of operation.

Do not manually operate equipment without knowing the result of such operation.

Aqua-Jet[®] Surface Mechanical Aerator

Safety Precautions

WARNING

Personal flotation devices may not be effective in aerated basins.

Disconnect and lockout all power sources to equipment before performing maintenance.

GENERAL SAFETY

Persons involved in installing, operating or maintaining equipment are advised to observe all normal precautions to insure their safety.

Wear Coast Guard approved personal flotation devices when servicing units in a liquid basin.

As with any electrical machinery; work should be done only by qualified personnel.

Power from all sources should be disconnected and locked out when working on equipment or controls.

The Aqua-Jet[®] Surface Mechanical Aerator operates in liquid filled basins; any work done on aerators when they are in or near a basin should be done only by persons wearing Coast Guard approved personal flotation devices.

No person should work on aerators while alone.

Aerators are not made for the purpose of supporting persons, and work should not be done by a person positioned on the aerator.

It is recommended that any aerator being serviced be first removed to the edge of the basin.

In addition, anyone working in or around equipment operating in wastewater treatment facilities should exercise all necessary precautions with regard to personal hygiene and sanitation.

Electrical Safety Precautions

CAUTION

- **Be aware of electrical hazards:**
 - **Electric shock and burns** – An electric shock occurs when electric current passes through the body. This can happen when touching an energized part.
 - **Arc-flash burns** – An electric arc flash can occur if a conductive object gets too close to a high-amp current source or by equipment failure. The arc flash can cause severe burns by direct heat exposure and by igniting clothing.
 - **Arc-blast impacts** – The heating of air and vaporization of metal during an arc, creates a pressure wave that can damage hearing and cause concussions among other injuries.
 - **Falls** – Electric shocks and arc blasts can cause falls.
- Equipment is automated and operates cyclically.
- Never reach into equipment to actuate a device. Unexpected operation could occur.
- Installation and service of electrical machinery and controls must be completed by qualified personnel only.
- Before proceeding with servicing any electrical equipment, all sources of power to the equipment must be disconnected and securely locked out and tagged out. Refer to the Electrical Lockout / Tag Out Procedures for details.
- Refer to NFPA 70E, Standard for Electrical Safety in the Workplace, for additional guidance.

Minimize the hazards. Discuss potential hazards and procedures with supervisors and other workers before starting any electrical wiring or service repairs. De-energize and lockout / tag out all electrical equipment, and insulate, or isolate exposed live parts so contact cannot be made. If this is impossible, obtain and wear proper Personal Protective Equipment (PPE) and tools.

Refer to the Lockout / Tag Out Procedures before attempting to service any electrical equipment.

Electrical Lockout / Tag Out Procedures

Consult your facility procedure. Each facility should have a written lockout/tag out program and train employees in this program. The typical program should cover planning for locating and labeling energy sources, identifying employees at risk, how and by whom the equipment is de-energized, releasing of stored energy, verifying that the circuit is de-energized and can't be restarted, voltage testing, grounding requirements, shift changes, coordination with other jobs in progress, a procedure for keeping track of all involved personnel, applying and removing lockout/tag out devices, return to service, and temporary re-energizing for testing/positioning. Lockout/tag out procedures should be developed for each machine or piece of equipment that will require servicing.

Lockout / Tag Out Application

Each person who could be exposed to electric energy must be involved in the lockout/tag out process. A typical process is described below.

- After de-energizing, each employee at risk should apply an individual lockout/tag out device to each source of electric energy. Pushbuttons or selector switches cannot be used as the only way to de-energize.
- **Lockout Device:** A lockout device is a key or combination lock with a tag that can be attached to a disconnecting device to prevent the re-energizing of the equipment being worked on without removal of the lock. The lockout device should have a way of identifying the individual who tagged it and the reason why it was tagged. Individual lockout devices with worker's name and picture on them are preferred. That worker must be the only person who has the key or combination for the lockout device they install, and that worker should be the only person to remove the lock after all work has been completed.
- **Tag Out Device:** A tag out device is a tag or means that can be attached to the actual lockout device to notify all workers that this equipment has been locked out. The tag out device must include a way to attach to the lockout device that can withstand at least 50 pounds of force. Tag out devices on electrical power should be used alone only when it is **not** possible to install a lockout device.
- **Lockout Tag:** The tag used in conjunction with a lockout or tag out device must have a warning label prohibiting unauthorized disconnecting or removal of the lockout/tag out device.
- Before beginning work, each involved worker must verify through testing that all energy sources have been de-energized.
- Electric lockout/tag out procedures should be coordinated with all other site procedures for controlling exposure to electric energy and other types of energy sources.
- Complex lockout/tag out procedures are special procedures that are needed when there is more than one energy source, crew, craft, location, employer, way to disconnect, or lockout/tag out procedure or for work that lasts beyond one shift. In any of these cases, one qualified person should be in charge of the lockout/tag out procedure with full responsibility for ensuring all energy sources are under lockout/tag out and to account for all people on the job.

Electrical Lockout / Tag Out Procedures

- **Removal of Lockout/Tag Out devices:** Lockout and tag out devices should be removed only by the person installing them. If work is not completed when the shift changes, workers arriving on shift should apply their locks before departing workers remove their locks.
- **Return to service:** When electrical work has been completed tests and visual inspections must be made to confirm that all tools, mechanical restraints, electric jumpers, shorts, and grounds have been removed. Once work is completed and lockout/tag out devices are removed, tests and visual inspection must confirm that all tools, mechanical restraints, electric jumpers, shorts, and grounds have been removed. Only then is it safe to re-energize and return to service.
- **Temporary release:** If the job requiring lockout/tag out is interrupted for any reason, the steps outlined in Return to Service (above) should be followed before removing the lockout/tag out devices, and placing the equipment back into operation.

WARNING

Electrical Hazards

- **Electric shock and burns:** An electric shock occurs when electric current passes through the body. This can happen when touching an energized part. If the electric current passes across the chest or head, death can result. At high voltages, severe burns can result.
- **Arc-flash burns:** An electric arc flash can occur if a conductive object gets too close to a high-amp current source or by equipment failure (for instance, while opening or closing disconnects). The arc can heat the air to temperatures as high as 35,000° F, and vaporize metal in the equipment. The arc flash can cause severe skin burns by direct heat exposure and by igniting clothing.
- **Arc-blast impacts:** The heating of air and vaporization of metal creates a pressure wave that can damage hearing and cause memory loss (from concussion) and other injuries. Flying metal parts are also a hazard.
- **Falls:** Electric shocks and arc blasts can cause falls, especially from ladders or unguarded scaffolding.

Electric Safety Principles - Energized Condition

- **De-energize whenever possible.**
- **Plan every job.** The approach and step-by-step procedures to complete the work at hand must be discussed and agreed upon between all involved employees before beginning. Write down first-time procedures. Discuss hazards and procedures in a job briefing with supervisors and other workers before starting any job. It is the employer's responsibility to have or develop a checklist system for working on live circuits, if such a scenario arises.
- **Identify the hazards.** Conduct a job hazard analysis. Identify steps that could create electric shock or arc-flash hazards.

Electrical Lockout / Tag Out Procedures

- **Minimize the hazards.** De-energize any equipment, and insulate, or isolate exposed live parts so contact cannot be made. If this is impossible, obtain and wear proper Personal Protective Equipment (PPE) and tools.
- **Anticipate problems.** If it can go wrong, it might. Make sure the proper PPE and tools are immediately available for the worst-case scenario.
- **Obtain training.** Make sure all involved employees are qualified electrical workers with appropriate training for the job.

Working on De-Energized Equipment

Electrically Safe Condition

The most important principle of electrical safety is to **assume all electric circuits are energized unless each involved worker ensures they are not.** Every circuit and conductor must be tested every time work is done on them. Proper PPE must be worn until the equipment is proven to be de-energized.

The National Fire Protection Association (NFPA) lists six steps to ensure conditions for electrically safe work.

1. Identify all sources of power to the equipment. Check applicable up-to-date drawings, diagrams, and identification tags.
2. Remove the load current, and then open the disconnecting devices for each power source.
3. Where possible, visually verify that blades of disconnecting devices are fully open or that drawout-type circuit breakers are fully withdrawn.
4. Apply lockout/tag out devices in accordance with your facilities formal, written policy.
5. Test each phase conductor or circuit part with an adequately rated voltage detector to verify that the equipment is de-energized. Test each phase conductor or circuit part both phase-to-phase and phase-to-ground. Check the voltage detector before and after each test to be sure it is working.
6. Properly ground all possible sources of induced voltage and stored electric energy (such as, capacitors) before touching. If conductors or circuit parts that are being de-energized could contact other exposed conductors or circuit parts, apply ground-connecting devices rated for the available fault current.

The process of de-energizing is "live" work and can result in an arc flash due to equipment failure. When de-energizing, follow the procedures below described in "Working on / or Near Energized Equipment."

Working on / or Near Energized Equipment

Working on live circuits means actually touching energized parts. Working near live circuits means working close enough to energized parts to pose a risk even though work is on de-energized parts. Common tasks where there may be a need to work on or near live circuits include:

- Taking voltage measurements
- Opening and closing disconnects and breakers

Electrical Lockout / Tag Out Procedures

- Racking breakers on and off the bus
- Removing panels and dead fronts
- Opening electric equipment doors for inspection

Facilities should adopt standard written procedures and training for these common tasks. For instance, when opening and closing disconnects, use the **left-hand rule** when possible (stand to the right side of the equipment and operate the disconnect switch with the left hand).

Approach Distances to Exposed Live Parts

The National Fire Protection Association (NFPA) defines three approach boundaries for *shock hazards* and one for *arc flash*.

Shock Hazards

- The *Limited Approach Boundary* is the distance from an exposed live part within which a shock hazard exists.
- The *Restricted Approach Boundary* is the closest distance to exposed live parts a qualified person can approach with or without proper PPE and tools. Inside this boundary, accidental movement can put a part of the body or conductive tools in contact with live parts or inside the prohibited approach boundary. To cross the restricted approach boundary, the qualified person must review and understand Annex C, Limits of Approach, of NFPA 70-E
- The *Prohibited Approach Boundary* is the minimum approach distance to exposed live parts to prevent flashover or arcing. Approaching any closer is comparable to making direct contact with a live part.

Arc Flash Hazard

- The Flash Protection Boundary is the approach limit at a distance from exposed live parts within which a person could receive a second degree burn if an electrical arc flash were to occur. For systems of 600 volts and less, the flash protection boundary is 4 feet (1.2m), based on an available bolted fault current of 50 kA and a clearing time of 6 cycles for the circuit breaker to act, or any combination of fault currents and clearing times not exceeding 300 kA cycles.

Approach Boundaries to Live Parts for Shock Protection

(All dimensions are distance from live part to worker)

Nominal system voltage range, phase to phase	Limited approach boundary			Restricted approach boundary (allowing for accidental movement)	Prohibited approach boundary
	Exposed movable conductor	Exposed fixed-circuit part			
0 to 50 volts	Not specified	Not specified		Not specified	Not specified
51 to 300 volts	10 ft. 0 in. (3.0m)	3 ft. 6 in. (1.1m)		Avoid contact	Avoid contact
301 to 750 volts	10 ft. 0 in. (3.0m)	3 ft. 6 in. (1.1m)		1 ft. 0 in. (0.3m)	0 ft. 1 in. (25.4mm)
751 to 15 KV KV	10 ft. 0 in. (3.0m)	5 ft. 0 in. 1.5m)		2 ft. 2 in. (0.7m)	0 ft. 7 in. (177.8mm)

Source: Excerpted from table 130.2(C), “Approach Boundaries to Live Parts for Shock

Electrical Lockout / Tag Out Procedures

Protection” (NFPA 70-E Standard for Electrical Safety Requirements for Employee Workplaces, 2004 edition).

Wet or Damp Locations

Work in wet or damp work locations (i.e., areas surrounded or near water or other liquids) should not be performed unless it is absolutely critical. Electrical work should be postponed until the liquid can be cleaned up. The following special precautions must be incorporated while performing work in wet or damp locations:

- Only use electrical cords that have Ground Fault Circuit Interrupters (GFCIs);
- Place a dry barrier over any wet or damp work surface;
- Remove standing water before beginning work. Work is prohibited in areas where there is standing water;
- Do not use electrical extension cords in wet or damp locations; and
- Keep electrical cords away from standing water.

Other Precautions

When working on de-energized parts, but still inside the flash protection boundary for nearby live exposed parts:

- If the parts cannot be de-energized, barriers such as insulated blankets must be used to protect against accidental contact or PPE must be worn.
- Do not reach blindly into areas that might contain exposed live parts.
- Do not enter spaces containing live parts unless illumination is provided that allows the work to be performed safely.
- Conductive articles of jewelry and clothing shall not be worn where they present an electrical contact hazard with exposed live parts.
- Conductive materials, tools, and equipment that are in contact with any part of the body shall be handled in a manner that prevents accidental contact with live parts.

References

- NFPA 70-E, “Standard for Electrical Safety Requirements for Employee Workplaces”, 2004 edition.

Introduction to Storage

The following documents summarize the short-term and special long-term storage procedures required for the equipment. The phrase “**short-term storage**” is recognized herein as *storage of equipment for three months or less*. The initial short-term storage procedure is meant to cover from offloading, the post-field delivery, and the pre-installation time span, to provide safe and proper storage and maintenance requirements. This short-term storage period is necessary for the protection of the motors, and products due to exposure to the elements after being delivered to site, and all other storage periods thereafter, of three months or less.

The phrase “**long-term storage**” is recognized herein as *storage of equipment for periods greater than three (3) months*. In some rare occurrences, the initial storage period may fall under this long-term storage requirements depending upon the time span from offloading to the start-up date. The long-term storage procedure is meant to cover the all work and maintenance requirements for the equipment when not in operation. Anytime where the equipment has been removed from service for any reason, and/or taken out of service or stopped and stored in place for any length of time, would require following the storage requirements.

NOTICE

The following storage documents list the appropriate procedures required during short-term and long-term storage periods. Failure to comply with these recommended storage procedures will void the warranty and possibly reduce the life of your equipment.

AquaDDM[®] Direct-drive Mixer, and Aqua-Jet[®] Surface Mechanical Aerator Short & Long Term Storage Procedures

Improper storage of electric motors will result in seriously reduced reliability of that equipment. A motor exposed to the elements such as: normally humid or extreme changes in atmospheric conditions that does not experience regular usage, is likely to encounter rust in the bearings. The Power Section Assemblies are to be left within their original shipping crates upon arrival and until they are ready to assemble.

Short Term Storage:

The motor and/or the power section assembly should be stored indoors or in a warehouse area free from extremes in temperature, humidity and corrosive atmosphere and must be placed in a vertical position. Indoor storage in a controlled temperature environment is preferable for at least the motor at a minimum, and it must be placed in a vertical position with no weight resting on the motor shaft. If this is not possible, a good canvas or heavy gauge plastic sheathing or tarp should be securely fastened around each motor. This type of protective covering must allow good ventilation to prevent condensation under the covering material. All motor breathers and drains are to be operable to allow breathing during the storage period. The moisture drain plugs must be removed, and the motors must be stored so the drain is at the lowest point.

After offloading or post-field delivery the unit float and any other accessories should be stored in their original shipping crates, outside until ready for assembly.

Long Term Storage:

The units and/or the power section assembly should be stored, in a vertical position, indoors or in a climate controlled building free from extremes in temperature, humidity, and corrosive atmosphere. Indoor storage in a controlled temperature environment is recommended for at least the motor at a minimum, and it must be placed in a vertical position with no weight resting on the motor shaft. If this is not possible, the unit should be left fully assembled with a good canvas or heavy gauge plastic sheathing or tarp securely fastened around each motor. This type of protective covering must allow good ventilation to prevent condensation under the covering material. The motor breathers and drains are to be checked to make sure they are operable to allow breathing during the storage period. The moisture drain plugs must be removed, and the motors must be stored so the drain is at the lowest point.

Every three months, the motor shaft must be rotated at least 15 revolutions to redistribute the grease within the bearings. This may be accomplished by rotating the impeller from the underside of the float. This routine procedure must be followed as long as the motor remains in storage, and each maintenance task must be logged / documented with complete description of task, and date, and signed by each person performing the maintenance.

After the initial three (3) years of operation, all Endura[®] Series motors placed in storage must be re-lubricated with the Chevron Black Pearl EP 2 grease. The Maintenance Schedule must be followed for this routine lubrication and frequency during the entire storage period.

AquaDDM[®] Direct-drive Mixer, and Aqua-Jet[®] Surface Mechanical Aerator Short & Long Term Storage Procedures

For extended storage periods in a location where it is possible for changes in the ambient temperature, it is recommended that some method of space heating be utilized to prevent condensation of moisture on the windings when the motors are not running. Motor space heaters if available are to stay connected and energized during the storage period. If space heaters were not included within the motor, the motor windings can be protected from condensation by applying low voltage single phase power to the line leads during the storage period, once the motor has been turned off and locked out. If stored in a climate controlled building, space heaters will not be required. Units, still in temporary service and floating, will require an extra two-conductor cable out to the unit to carry the space heater current.

To protect the windings from condensation by applying low voltage single-phase power to the line leads, the motor leads must be disconnected from the normal starting device. A qualified electrician must complete this electrical work. Transformer sizing can be obtained by using the following information:

	Motor Voltage Connection	Transformer Voltage
Thru 40 HP (29.8 KW) 6 & 8-pole motors	220 or 230	16V single phase
	380, 400 or 415	24V single phase
	460	32V single phase

Single phase current on low voltage space heating will be approximately 25% of rated full load current, and the power factor will be approximately 25%. When the motor is turned off, low voltage single-phase power can be automatically applied to the motor line leads by suitable control. This maintains the temperature of the windings above ambient conditions and prevents condensation of moisture on the windings. Space heating should be utilized at all times when the motors are not operating. In addition to the storage procedures listed herein you should call your local motor service center for storage suggestions due to your climate and regional conditions.

NOTICE

Any motor being returned to service following 90 days or more shutdown / storage should have the insulation resistance of the stator windings checked with a megohmmeter before applying power. All motors with the exception of the Endura[®] Series motor must also be re-greased by thoroughly flushing the old grease from both motor bearings until bright new grease appears at the open relief port. Endura[®] Series motors may be returned to service within the three-year no maintenance lubrication period without additional greasing, as long as the motor shaft has been rotated regularly as stated below to redistribute the grease. Failure to comply with this recommendation may result in warranty cancellation.



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Safety Data Sheets SDS

Aeration & Mixing | Biological Processes | Filtration | Membranes | Oxidation & Disinfection | Process Control | Aftermarket & Customer Service

6306 N. Alpine Rd. Loves Park, IL 61111-7655 **p** 815.654.2501 **f** 815.654.2508 www.aqua-aerobic.com

Chemical Handling and Storage Precautions

Follow basic safety practices to minimize risk when handling chemicals. Pay attention to the hazards of the materials you use. Keep the following general points in mind:

- Know the chemicals you will be handling. Review and understand the SDS located in section 1 of this O&M **before** you handle any chemicals.
 - In addition to SDSs, read labels on chemical containers before you open them.
 - Know the locations of all safety showers and eyewash stations, and make sure they are functional.
 - Know the phone number of the local poison control center.
 - Let coworkers know you'll be handling chemicals and make sure they have read the SDS as well.

- When handling or storing chemicals, separate them in a secure location according to compatibility. Review section 7 of the SDS for specific instructions.
 - Always wear appropriate personal protective equipment (PPE), such as gloves, goggles, long sleeved clothing, boots, respirators, and any other recommended PPE.
 - Maintain an orderly facility. Keep the work area clean and free from hazards.
 - Label chemicals clearly.
 - Select compatible container materials.
 - Work in a well ventilated area.
 - Keep containers capped when not in use.
 - Wash your hands after handling chemicals.

- When disposing of chemicals or chemical byproducts, be sure to follow any considerations in section 13 of the SDS, as well as any local guidelines.

**If you have any concern over working with a chemical, do not proceed.
Ask for help from a knowledgeable supervisor.**

SDS Sheet Reading Guide

OSHA's Hazard Communication Standard (HCS) specifies certain information must be included on Safety Data sheets (SDSs) to communicate the hazards of hazardous chemical products, (see regulations standards - 29 CFR 1910.1200 (g)(2)). In order to promote consistent presentation of information, OSHA recommends that all SDSs follow the 16-section format established by the American National Standards Institute (ANSI) standard for preparation of SDSs (Z400.1).

By following this recommended format, the information of greatest concern to workers is featured at the beginning of the data sheets, including information on chemical composition and first aid measures. More technical information that addresses topics such as the physical and chemical properties of the material and toxicological data appears later in the document. While some of this information (such as ecological information) is not required by the HCS, the 16-section SDS is becoming the international norm. The 16 sections are:

- Section-1, Identification
- Section-2, Hazard(s) identification
- Section-3, Composition / information on ingredients
- Section-4, First-aid measures
- Section-5, Fire-fighting measures
- Section-6, Accidental release measures
- Section-7, Handling and storage
- Section-8, Exposure controls / personal protection
- Section-9, Physical and chemical properties
- Section-10, Stability and reactivity
- Section-11, Toxicological information
- Section-12, Ecological information
- Section-13, Disposal considerations
- Section-14, Transport information
- Section-15, Regulatory information
- Section-16, Other information

In 1985, OSHA established a voluntary format for SDSs (OSHA Form 174) to assist manufacturers and importers who desired guidance on organizing SDSs information. When completed correctly, an SDSs prepared using Form 174 contains all of the information required by OSHA. However, Form 174 does not use the more organized and comprehensive 16-section format.

OSHA believes that use of a consistent format will improve the effectiveness of SDSs by making information easier for the reader to find, regardless of the supplier of the SDSs. Because the 16-section format is accepted by consensus as the most appropriate format, OSHA no longer endorses that Form 174 be used for the preparation of SDSs. Use of Form 174, however, is still acceptable under the HCS if it is completed correctly.

Safety Data Sheet



AASI: 2608275
EP-50237-001

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Black Pearl Grease EP NLGI 0, 1, 2

Product Use: Grease
Product Number(s): 254590, 254591, 254592
Company Identification
Chevron Products Company
a division of Chevron U.S.A. Inc.
6001 Bollinger Canyon Rd.
San Ramon, CA 94583
United States of America
www.chevronlubricants.com

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887

Health Emergency
Chevron Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623

Product Information
email : lubemsds@chevron.com
Product Information: 1 (800) 582-3835, LUBETEK@chevron.com

SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION: Not classified as hazardous according to 29 CFR 1910.1200 (2012).

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Highly refined mineral oil (C15 - C50)	Mixture	70 - 99 %weight

SECTION 4 FIRST AID MEASURES

Description of first aid measures
Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.
Skin: No specific first aid measures are required. As a precaution, remove clothing and shoes if

contaminated. To remove the material from skin, apply a waterless hand cleaner, mineral oil, or petroleum jelly. Then wash with soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.

Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.

Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

Most important symptoms and effects, both acute and delayed

IMMEDIATE SYMPTOMS AND HEALTH EFFECTS

Eye: Not expected to cause prolonged or significant eye irritation.

Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin. High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.

Ingestion: Not expected to be harmful if swallowed.

Inhalation: Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

DELAYED OR OTHER SYMPTOMS AND HEALTH EFFECTS: Not classified.

Indication of any immediate medical attention and special treatment needed

Note to Physicians: In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

PROTECTION OF FIRE FIGHTERS:

Fire Fighting Instructions: This material will burn although it is not easily ignited. See Section 7 for proper handling and storage. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.

Spill Management: Clean up spills immediately, observing precautions in Exposure Controls/Personal Protection section. Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with

applicable regulations.

Reporting: Report spills to local authorities as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:

Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:

Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT

Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.

Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: Neoprene, Nitrile Rubber, Silver Shield, Viton.

Respiratory Protection: No respiratory protection is normally required.

If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge. Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Agency	TWA	STEL	Ceiling	Notation
-----------	--------	-----	------	---------	----------

Highly refined mineral oil (C15 - C50)	ACGIH	5 mg/m3	10 mg/m3	--	--
Highly refined mineral oil (C15 - C50)	OSHA Z-1	5 mg/m3	--	--	--

Consult local authorities for appropriate values.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Black

Physical State: Semi-solid

Odor: Petroleum odor

Odor Threshold: No data available

pH: Not Applicable

Vapor Pressure: <0.01 mmHg Maximum @ 40 °C (104 °F)

Vapor Density (Air = 1): >1 Minimum

Initial Boiling Point: 315°C (599°F)

Solubility: Soluble in hydrocarbons; insoluble in water

Melting Point: 205°C (401°F) Minimum

Specific Gravity: 0.9 @ 15.6°C (60.1°F)

Density: No data available

Viscosity: 13.5 mm²/s @ 100°C (212°F) Minimum

Decomposition temperature: No Data Available

Octanol/Water Partition Coefficient: No data available

FLAMMABLE PROPERTIES:

Flammability (solid, gas): No Data Available

Flashpoint: (Cleveland Open Cup) 246 °C (475 °F) (Estimated)

Autoignition: No data available

Flammability (Explosive) Limits (% by volume in air): Lower: Not Applicable Upper: Not Applicable

SECTION 10 STABILITY AND REACTIVITY

Reactivity: This material is not expected to react.

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Incompatibility With Other Materials: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

Hazardous Decomposition Products: None known (None expected)

Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Serious Eye Damage/Irritation: The eye irritation hazard is based on evaluation of data for similar materials.

Skin Corrosion/Irritation: The skin irritation hazard is based on evaluation of data for similar materials.

Skin Sensitization: The skin sensitization hazard is based on evaluation of data for similar materials.

Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for similar materials.

Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for similar materials.

Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for product components.

Acute Toxicity Estimate: Not Determined

Germ Cell Mutagenicity: The hazard evaluation is based on data for components or a similar material.

Carcinogenicity: The hazard evaluation is based on data for components or a similar material.

Reproductive Toxicity: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Single Exposure: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Repeated Exposure: The hazard evaluation is based on data for components or a similar material.

ADDITIONAL TOXICOLOGY INFORMATION:

This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydrocracking, or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B). These oils have not been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as: confirmed human carcinogen (A1), suspected human carcinogen (A2), or confirmed animal carcinogen with unknown relevance to humans (A3).

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY

This material is not expected to be harmful to aquatic organisms. The ecotoxicity hazard is based on an evaluation of data for the components or a similar material. The product has not been tested. The statement has been derived from the properties of the individual components.

MOBILITY

No data available.

PERSISTENCE AND DEGRADABILITY

This material is not expected to be readily biodegradable. The biodegradability of this material is based on an evaluation of data for the components or a similar material. The product has not been tested. The statement has been derived from products of a similar structure and composition.

POTENTIAL TO BIOACCUMULATE

Bioconcentration Factor: No data available.

Octanol/Water Partition Coefficient: No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Description: PETROLEUM LUBRICATING GREASE; NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR

IMO/IMDG Shipping Description: PETROLEUM LUBRICATING GREASE; NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER THE IMDG CODE

ICAO/IATA Shipping Description: PETROLEUM LUBRICATING GREASE; NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER ICAO

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code:
Not applicable

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES:	1. Immediate (Acute) Health Effects:	NO
	2. Delayed (Chronic) Health Effects:	NO
	3. Fire Hazard:	NO
	4. Sudden Release of Pressure Hazard:	NO
	5. Reactivity Hazard:	NO

REGULATORY LISTS SEARCHED:

- | | |
|---------------------|----------------------|
| 01-1=IARC Group 1 | 03=EPCRA 313 |
| 01-2A=IARC Group 2A | 04=CA Proposition 65 |
| 01-2B=IARC Group 2B | 05=MA RTK |
| 02=NTP Carcinogen | 06=NJ RTK |
| | 07=PA RTK |

No components of this material were found on the regulatory lists above.

CHEMICAL INVENTORIES:

All components comply with the following chemical inventory requirements: DSL (Canada), EINECS (European Union), ENCS (Japan), IECSC (China), KECI (Korea), TSCA (United States).

One or more components does not comply with the following chemical inventory requirements: AICS (Australia), PICCS (Philippines).

NEW JERSEY RTK CLASSIFICATION:

Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be identified as follows: PETROLEUM OIL (Grease)

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

HMIS RATINGS: Health: 0 Flammability: 1 Reactivity: 0
 (0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

LABEL RECOMMENDATION:
 Label Category : GREASE 1 - GRS1

REVISION STATEMENT: This revision updates the following sections of this Safety Data Sheet:
Revision Date: APRIL 15, 2014

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
GHS - Globally Harmonized System	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Governmental Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	SDS - Safety Data Sheet
HMIS - Hazardous Materials Information System	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration
NCEL - New Chemical Exposure Limit	EPA - Environmental Protection Agency
SCBA - Self-Contained Breathing Apparatus	

Prepared according to the 29 CFR 1910.1200 (2012) by Chevron Energy Technology Company, 6001 Bollinger Canyon Road San Ramon, CA 94583.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

SAFETY DATA SHEET

I PRODUCT IDENTIFICATION

Trade Name: Stainless Steel

Synonyms: Nickel-Iron Alloys

II HAZARDOUS INGREDIENTS

Ingredient	CAS #	Form	OSHA/PEL (mg/m³)	ACGIH/TLV (mg/m³)
Aluminum	7429-90-5	Dust, fumes	--	10.00, 5.00
Carbon	1333-86-4	As carbon black	3.50	3.50
Chromium	7440-47-3		1.00	.50
Cobalt	7440-48-4		.10	.10
Copper	7440-50-8	Dust, fumes	1.00, .10	1.00, .20
Iron	1309-37-1	Pel-iron, oxide fumes	10.00	5.00 (TLV-as Fe)
Manganese	7439-96-5	Dust, fumes	5.00, --	5.00, 1.00
Molybdenum	7439-98-7	Insol. compd.	15.00	10.00
Nickel	7440-02-0		1.00	1.00
Niobium	7440-03-1		5.00	5.00
Phosphor	7723-14-0	Yellow	.10	.10
Silicon	7440-21-3	Respirable dust	--	5.00
Sulfur	7446-09-5	As sulfur dioxide	--	5.00
Tin	7440-31-5		2.00	2.00
Titanium	13463-67-7	As titanium dioxide	15.00	5.00
Tungsten	7440-33-7	Insol. compd.	--	5.00
Vanadium	1314-62-1	Dust, fumes (as vanadium pentoxide)	.50, .10	.05, .05

III PHYSICAL DATA

Boiling Point: High

Specific Gravity: 7.5 - 8.5

Melting Point: 2400 - 2800 °F

Appearance and Odor: Solid, odorless metal

Vapor Density: Nil

Vapor Pressure: Nil

Solubility: Insoluble

IV FIRE AND EXPLOSION HAZARDS DATA

Flashpoint: N/A

Autoignition: N/A

Flammable Limits in Air: Lower: N/A Upper: N/A

Extinguishing Media: N/A

Special Firefighting Procedures: N/A

Fire and Explosion Hazards: N/A

V HEALTH HAZARD INFORMATION

Acute Effects: Welding and high temperature cutting may produce dust and fumes. Short-term exposure may cause nausea, fever, irritation of eyes, nose, throat, skin; metallic taste.

Chronic Effects: Long-term exposure to welding fumes, gases or dust may result in skin sensitization, neurological damage and respiratory disease.

Symptoms of Exposure: Metallic taste, fever, loss of consciousness due to welding gases.

Routes of Exposure:

Inhalation: Inhalation of excessive fume or dust concentrations may result in respiratory tract irritation.

Eyes: Mechanical irritation may result from an accumulation of dust particles in the eye.

Skin: Some skin irritation may result from exposure to dust.

Ingestion: Some constituents may be harmful if swallowed.

Carcinogenicity: Chromium, nickel and chromium-cobalt alloys have been identified by the international agency for research on cancer as potential cancer-causing agents.

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Move person to fresh air until recovered.

SKIN: Wash with water and a mild detergent.

EYES: Flush thoroughly with water.

INGESTION: While ingestion of large enough quantities to cause health effects is unlikely, consult a physician if it occurs.

VI REACTIVITY DATA

Stability: Stable

Incompatibility (Material to Avoid): Reacts with strong acids to produce hydrogen gas.

Hazardous Decomposition Products: Metallic dust or fumes may be produced during welding, burning, grinding and possibly machining.

VII SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled: No potential for spill or leak as delivered. Gather dust and residue from machining.

Waste Disposal: In accordance with state, federal and local regulations.

VIII SPECIAL PROTECTION INFORMATION

Ventilation: Use adequate ventilation to keep fume or dust concentration below the occupational exposure limits shown in section II.

Respiratory Protection: If your process causes a release of dust or fume in excess of PEL, NIOSH approved respirators should be worn in accordance with 29CFR 1910.134.

Protective Equipment: If your process causes a release of dust or fume, approved safety glasses or goggles should be worn.

Prepared by: S. Dierks

Dated: March 1996

ALLOYING ELEMENTS

7439-96-5	7440-44-0	7723-14-0	7704-34-9	7740-21-3	7740-47-3	7740-02-0	7782-49-2	7440-25-7	7440-03-1	7440-50-8	7440-62-2	7439-98-7	7727-37-9	7440-32
Manganese	Carbon	Phosphorus	Sulfur	Silicon	Chromium	Nickel	Selenium	Columbium	Tantalum	Copper	Vanadium	Molybdenum	Nitrogen	Titanium
< 8.0	<0.2	<0.1	<0.1	<1.0	<18.0	< 5.5								
<10.0	<0.2	<0.1	<0.1	<1.0	<19.0	< 8.0							<0.1	
< 8.5	<0.1	<0.1	<0.4	<1.0	<18.0	< 6.5							<0.1	
< 2.0	<0.2	<0.1	<0.1	<1.0	<18.0	< 8.0				<2.3		<0.5		
< 2.0	<0.2	<0.1	<0.1	<1.0	<19.0	<10.0								
> 2.0	<0.2	<0.2	<0.1	<1.0	<19.0	<10.0								
< 2.0	<0.2	<0.2	<0.1	<1.0	<19.0	<10.0								
< 2.0	<0.1	<0.1	<0.1	<1.0	<20.0	<10.5	<0.3					<0.1		
< 2.0	<0.1	<0.1	<0.1	<1.0	<20.0	<12.0							<0.1	
< 2.0	<0.1	<0.1	<0.1	<1.0	<19.0	<13.0							<0.1	
< 2.0	<0.2	<0.1	<0.1	<1.0	<24.0	<15.0								
< 2.0	<0.1	<0.1	<0.1	<1.0	<24.0	<15.0								
< 2.0	<0.3	<0.1	<0.1	<1.0	<26.0	<22.0								
< 2.0	<0.1	<0.1	<0.1	<1.0	<26.0	<22.0								
< 2.0	<0.1	<0.1	<0.1	<1.0	<18.0	<14.0								
< 2.0	<0.1	<0.1	<0.1	<1.0	<18.0	<14.0						<3.0	<0.1	
< 2.0	<0.1	<0.1	<0.1	<1.0	<20.0	<15.0						<3.0	<0.1	
< 2.0	<0.1	<0.1	<0.1	<1.0	<20.0	<15.0						<4.0		
< 2.0	<0.1	<0.1	<0.1	<1.0	<19.0	<12.0						<4.0		
< 2.0	<0.2	<0.1	<0.1	<1.5	<17.0	<37.0								
< 2.0	<0.1	<0.1	<0.1	<1.0	<19.0	<13.0								
< 1.0	<0.1	<0.1	<0.1	<1.0	<13.5			<0.3	<0.3					
< 1.0	<0.1	<0.1	<0.1	<1.0	<13.5									
< 1.0	<0.1	<0.1	<0.1	<1.0	<13.5	< 2.5								
< 1.5	<0.1	<0.1	<1.0	<1.0	<14.0							<0.6		
< 1.5	<0.1	<0.1	<0.1	<1.0	<14.0		<0.3							
< 1.0	<0.2	<0.1	<0.1	<1.0	<14.0									
< 1.0	<0.3	<0.1	<0.1	<1.0	<14.0	< 1.0					<0.5	<1.3		
< 1.0	<0.2	<0.1	<0.1	<1.0	<17.0	< 2.5								
< 1.0	<0.8	<0.1	<0.1	<1.0	<18.0							<0.8		
< 1.0	<1.0	<0.1	<0.1	<1.0	<18.0							<0.8		
< 1.0	<1.2	<0.1	<0.1	<1.0	<18.0							<0.8		
< 1.3	<1.2	<0.1	<1.0	<1.0	<18.0							<0.8		
< 1.3	<1.2	<0.1	<0.1	<1.0	<18.0		<0.3							
< 1.0	<0.3	<0.1	<0.1	<1.0	< 6.0							<0.7		
< 1.0	<0.1	<0.1	<0.1	<1.0	<11.8	< 0.5								<0.8
< 1.0	<0.2	<0.1	<0.1	<1.0	<18.0									
< 1.3	<0.2	<0.1	<1.0	<1.0	<18.0							<0.6		
< 8.0	<0.1	<0.1	<0.1	<1.0	<23.5	<13.5		<0.3			<0.3		<0.5	
< 9.0	<0.1	<0.1	<0.1	<4.5	<18.0	< 9.0							<0.2	
< 1.0	<0.1	<0.1	<0.1	<1.0	<15.5	< 5.5		<0.5	<0.5	<4.5		<0.5		
< 1.0	<0.1	<0.1	<0.1	<1.0	<17.0	< 5.0		<0.5	<0.5				<0.1	
< 0.1	<0.1	<0.1	<0.1	<0.1	<13.3	< 8.5						<2.5	<0.1	

Carbon	Chromium	Columbium	Copper	Iron	Manganese	Molybdenum	Nickel	Phosphorus	Selenium	Silicon	Sulfur	Tantalum	Titanium	Tungsten
Not Listed	As Soluble Cr Salts 0.5 0.5(VI) As Metal and Insoluble Cr Salts 1 0.5	Not Listed	As Copper Dust 1 1 As Copper Fume 0.1 0.2	As Iron Oxide Fume 10 As Fe 5	As Manganese S(c) S(c) As Manganese Fume S(c) 1	As Soluble Mo Compounds 5 5 As Insoluble Mo Compounds 15 10	As Metal Ni 1 1 As soluble Ni Compounds 1 1	As Phosphorus (yellow) 0.1 0.1	As Metal Se .2	As Nuisance Dust 15 10	As Sulfur Dioxide 13 5	As Metal Ta 5.0	As Ti, Titanium Dioxide 15 10	As Tungsten Dust

Aqua-Jet[®] Surface Mechanical Aerator and Aqua-Jet II[®] Contained Flow Aerator Applicable Standards

The following are applicable standards for an Aqua-Jet[®] and Aqua-Jet II[®]

- NEMA MG-1 (for the motor)
- American Welding Standard (AWS) D1.1 Structural Welding Code
- UL-62 (for the electrical cable)

Notes on Replacement Parts

Aqua-Aerobic Systems is proud to offer its SpareCare[®] Parts Replacement Program. The SpareCare[®] program eliminates the hassle of finding replacement parts elsewhere for Aqua-Aerobic Systems equipment, because your order comes directly from our factory in Rockford, Illinois. We are your partner for life and will do our best to uphold this promise by offering exceptional service that only a leader in the wastewater treatment industry can provide. We are proud to say that no recommended replacement parts are required for the first five (5) years of operation, and NO parts should be considered for stocking as spares due to the time span and shelf life.

Confidentiality Notice: This Replacement Parts note page and any accompanying pages may contain information which is confidential and privileged, and is for the sole use of the intended recipient. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of the contents is prohibited.

It is very difficult to determine an estimated reliability or cycle life of equipment, as every application is different. The equipment selected and provided was designed for years of trouble-free maintenance when applied and maintained in accordance to Aqua-Aerobic Systems and/or the Manufacturer's operation and maintenance recommendations listed herein.

Prices and delivery schedules for all replacement parts will be available upon request. All State and/or local taxes will be added unless we receive a valid resale / exemption certificate at time of order. Quoted prices **WILL NOT** include shipping costs unless specifically stated.

Aqua-Aerobic Systems, Inc. (AASI) has a minimum order billing policy of fifty dollars (US \$50.00) or more, unless parts have been ordered with the original equipment purchase order.

To order any replacement parts, contact the AASI Aftermarket Services, P.O. Box 2026, Rockford, IL. 61130-0026, by Phone (800) 940-5008, or Fax (815) 654-8247. To contact the Customer Service Department please call (815) 654-2501, or (800) 940-5008, or Fax (815) 654-8623.

For qualifying Next Day shipments via UPS or FedEx[®], the order **must** be received before 12:00 p.m. CST.

Manufacturer Contacts

24/7 Technical Support & Customer Service: (877) 271-9694
Aftermarket Services, M-F 8:00AM-5:00PM CST: (800) 940-5008
Visit us online at <http://www.aqua-aerobic.com>

75 HP Aqua-Jet® Aerator

Unit Parts List- 60 HZ

Power Section Assembly				
Part Number	Item Number	Part Descriptions	Qty. Required.	Notes:
	1	Motor, TEFC, with one-piece shaft	1	1
2500092	2	Diffusion Head – Stainless Steel	1	1
2600036	3	Labyrinth Seal Guard - EPDM	1	1, 2, 3
2603277	4	Hose Clamp Upper – Stainless Steel	1	1, 2, 3
2603278		Hose Clamp Lower – Stainless Steel	1	
2600032	5	Anti Deflection Insert – Delrin	1	1, 2, 3
2600033	6	Thrust Washer – UHMW	1	1, 2, 3
2600030	7	Fluid Deflector - EPDM	1	1, 2, 3
2500372	8	Motor Flange Bolt, with drilled head, SS	4	1, 4
2600011	9	Safety Wire – Stainless Steel	8 ft.	1, 3
2500372	10	Diffusion Head Bolt, with drilled head, SS	4	1, 4
2600037-LX0	11	Propeller – Stainless Steel	1	1, 3, 5
2500554	12	Propeller Pin – Stainless Steel	1	1, 3, 6
2600237	13	Set Screw – Stainless Steel	2	1, 3

UNIT ASSEMBLY				
Part Number	Item Number	Part Descriptions	Qty. Required.	Notes:
	14	Float / Intake Flange Assembly	1	
2901380	15	*Flanged Intake Cone / Cross Assembly, 304SS	1	
2500372	16	* Intake Cone bolt, Stainless Steel	12	
2600517	17	*Intake Cone Nut, Stainless Steel	12	
2600234	18	* Intake Cone Jam Nut, Stainless Steel	12	

*Note: These items apply only to 30 HP through 75 HP units. 1 HP through 25 HP units has their Intake Cones welded to the Aerator Volute within the Float Assembly, and units 1 HP through 15 HP do not have Anti-Vortex Crosses.

NOTES:

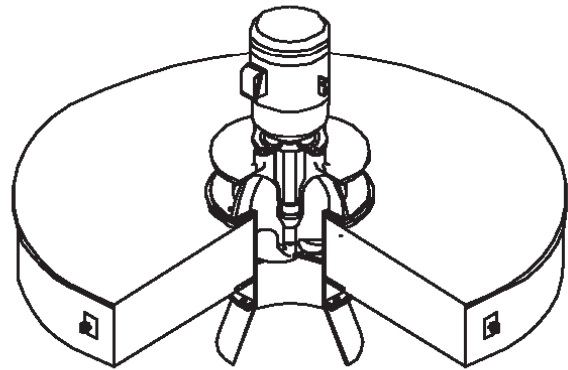
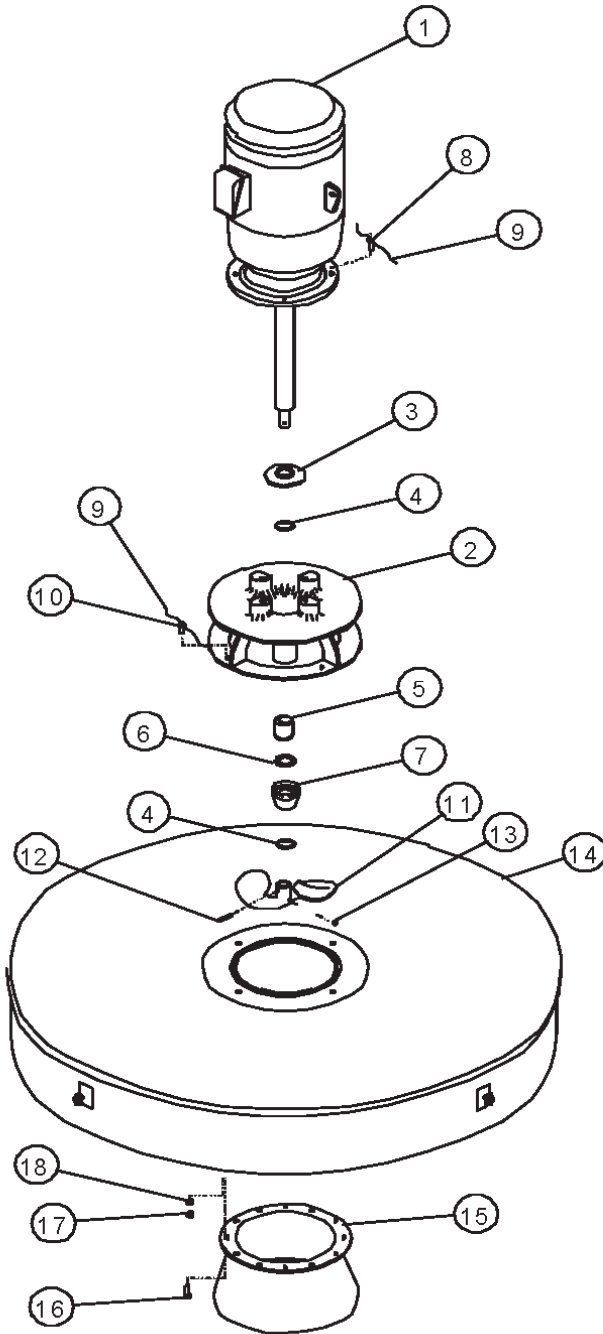
It is very difficult to determine an estimated reliability or cycle life of equipment components, as every application is different. The Aqua-Jet® Aerator equipment provided was designed for many years of trouble-free maintenance when applied, and maintained in accordance with Aqua-Aerobic Systems Operation and Maintenance recommendations listed herein. Contact AASI Customer Service Department at 1-877-869-1906 for prices and delivery.

1. Part is found in complete Power Section Assembly.
2. Recommended replacement part with estimated requirement after the first five (5) years to eight (8) years of operation. These parts should be checked when repairing or replacing a motor, and replaced if it becomes worn or has been damaged in any way.
3. Recommended replacement part if repairing or replacing the motor.
4. The drilled motor flange bolts or the diffusion head bolts should be checked every time the motor has been removed for repair or replacement. If any portion of the bolt threads show any sign of damage they should be replaced immediately to prevent gulling.

75 HP Aqua-Jet® Aerator

Unit Parts List- 60 HZ

5. Propeller Kit (#P2600037-LX0) is available as a replacement part and includes: propeller, and propeller pin kit.
6. A Propeller Pin Kit (AASI # 2962510) is available for re-installation of an existing propeller in good condition. The Propeller Pin Kit includes: propeller pin, Loctite® # 660 Quick Metal (6ml), Loctite® # 271 Threadlocker (.5ml), set screws, and the propeller installation manual.



ASSEMBLED UNIT

Special Tools

NO SPECIAL TOOLS ARE REQUIRED FOR OPERATING AND/OR ROUTINE MAINTENANCE OF THIS EQUIPMENT.

Predicted Life of Parts

The predicted life of parts is primarily dependent upon whether:

1. The Equipment and/or parts are in operation (i.e., installed and operating) or in storage.
2. The environment in which they are located whether in operation or storage.

In operation, the life of the parts could be estimated to be 20 years (or more) when the parts are located in a non-harsh environment and the system is maintained on a regularly scheduled basis. The life of operating parts, however, could be greatly shortened if the parts are located in a harsh (such as a chemical or abrasive) environment and the system is not maintained. Likewise, parts that are not in operation and are stored in a non-harsh environment (such as in a dry location and stored on shelves where moisture is not able to attack them) could have an undeterminably long life. Parts not stored in such manner, however, could have a shortened lifespan.

Items typically affected by shelf-life restrictions are plastic items that are exposed to sunlight, paint, lubricants, and bearings.

Therefore, the keys to obtaining long lifespan of parts are:

- Use or store any equipment and/or spare parts in a non-harsh environment, if at all possible.
- Maintain equipment on a regular / scheduled basis to obtain the longest possible life from all parts and components.
- Store spare parts in a dry location, such as on shelves where moisture and water cannot attack them and where air can circulate to help drive away any moisture.
- Refer to the equipment storage recommendations within the O&M Manual to help extend the life of your equipment.



AQUA-AEROBIC SYSTEMS, INC.

Manufactured Products & Trademarks

Aeration and Mixing

- Aqua-Jet®
- Aqua-Jet II®
- AquaDDM®
- Endura® Series
- OxyMix®
- Fold-a-Float™

Biological Processes

- Aqua EnduraTube®
- Aqua EnduraDisc®
- Aqua CB-24®
- AquaCAM-D®
- Aqua MixAir®
- AquaSBR®
- Aqua MSBR®
- AquaPASS®
- Aqua BioMax™
- AquaEnsure®

Filtration

- AquaDisk®
- AquaDiamond®
- AquaDrum®
- Aqua MiniDisk®
- OptiFiber®
- OptiFiber PES-13®
- OptiFiber PA2-13®
- OptiFiber ACR-13®
- OptiFiber PES-14®
- Trust the Tag®
- AquaABF®
- Turbilitel®

Membranes

- AquaMB Process®
- Aqua-Aerobic® MBR
- Aqua Ultrafiltration™
- Aqua MultiBore®

Controls and Monitoring

- IntelliPro®

Aftermarket

- SpareCare®

Surface Mechanical Aerators

- Contained Flow Aerator
- Direct-drive Mixer
- Limited Maintenance Product
- Pure Oxygen Mixer
- Self-deploying Segmented Float

Fine-bubble Tube Diffuser

- Fine-bubble Disc Diffuser
- Coarse-bubble Diffuser
- Combination Aerator/Mixer/Decanter Aeration System
- Sequencing Batch Reactor
- Modified Sequencing Batch Reactor
- Phased Activated Sludge System
- Dual Treatment System
- Ballast Decanter

Cloth Media Filter

- Cloth Media Filter
- Cloth Media Filter
- Cloth Media Filter
- Cloth Media Filter
- Cloth Filtration Media
- Cloth Filtration Media
- Cloth Filtration Media
- Cloth Filtration Media
- Cloth Filtration Media
- Cloth Filtration Media
- OptiFiber® Service Mark
- Automatic Backwash Filter
- Backwash System

Multiple Barrier Membrane System

- Membrane Bioreactor System
- Membrane System
- Ultrafiltration Membranes

Monitoring & Control System

- Parts Replacement Program

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