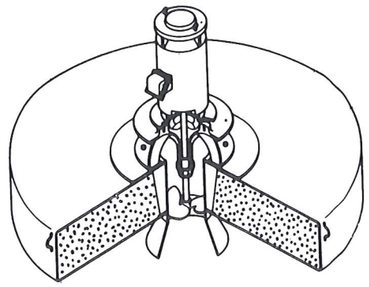
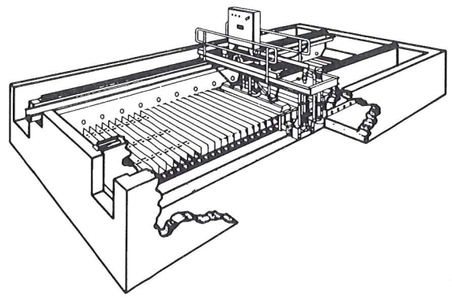
Reliable equipment and solutions to your treatment problems . . .

Aqua-Jet Aerator

The Aqua-Jet, with over 200,000 HP installed, is the leading direct drive aerator, offering reliable, low maintenance operation. Available from 1 to 75 HP in all stainless steel and fiberglass; floating and fixed mounted.



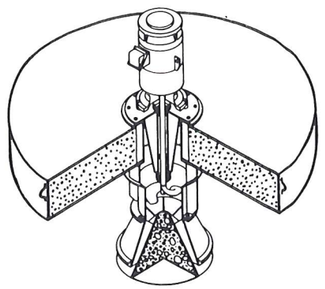


Aqua ATF Filter

Aqua-Aerobic Systems' shallow bed gravity granular media filter normally requires only 1-2% of flow for backwash; operates on a continuous duty cycle, even while backwashing. Packaged steel and built-in-place units available.

Aqua Direct Drive Mixer

The Aqua DDM's rugged stainless steel construction, designed for industrial process mixing and municipal wastewater applications offers lower cost and higher efficiency and reliability than gear reduction or motionless units.



Water and wastewater treatment equipment . . . and systems

AQUA-AEROBIC SYSTEMS, INC

P.O. BOX 2026 • 6306 N. ALPINE ROAD
ROCKFORD, IL 61130
815/654-2501 • TELEX 257-420

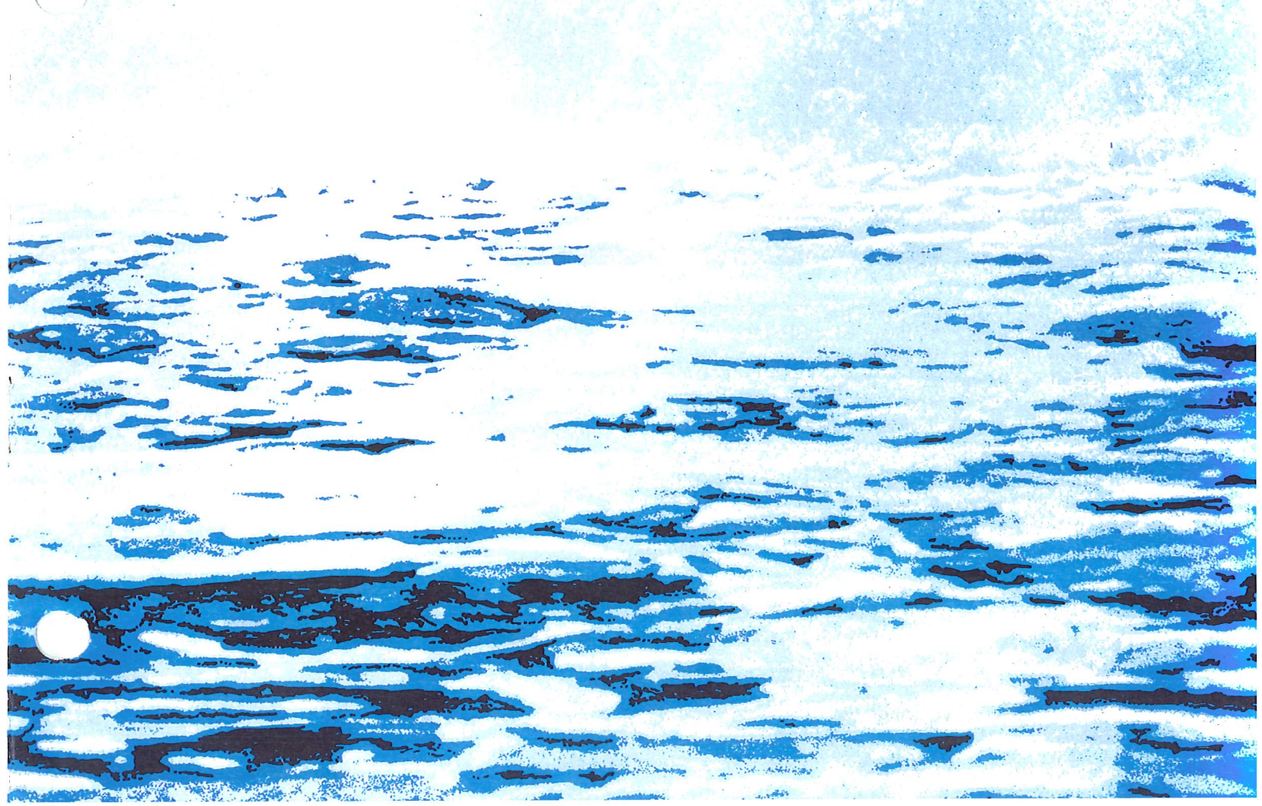
"Professionals Choose Us"

Represented by:

Application details contained herein are for illustration purposes only.

Aerators

AQUA-AEROBIC SYSTEMS, INC.



AQUA-AEROBIC SYSTEMS, INC.

The Aqua-Jet direct drive axial flow aerators have gained broad acceptance for use in advanced wastewater treatment processes for both industry and municipalities. Their availability in a variety of construction materials and a wide range of sizes, from 1 to 75 HP, combined with simplicity of design and proven reliability make the Aqua-Jet the leading aerator in its field.

Our facilities include 55,000 square feet of manufacturing space plus two spacious outdoor test areas where equipment testing and research and development activities are conducted. All Aqua-Jet aerators are subject to strict quality control procedures prior to shipment.

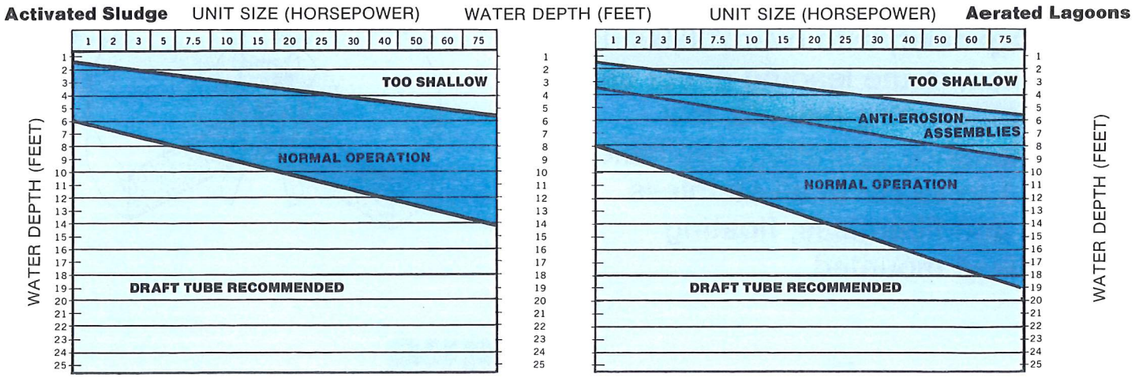
Our customers know we understand water and wastewater treatment problems and the challenges they present to us all. We would appreciate the opportunity to assist you in solving your particular problem and encourage you to write or call for additional information on the Aqua-Jet Aerator and what it can do for you.

6306 NORTH ALPINE ROAD • P.O. BOX 2026
ROCKFORD, ILLINOIS 61130 • 815/654-2501 • TELEX 257-420

Accessories

Draft tube and anti-erosion . . .

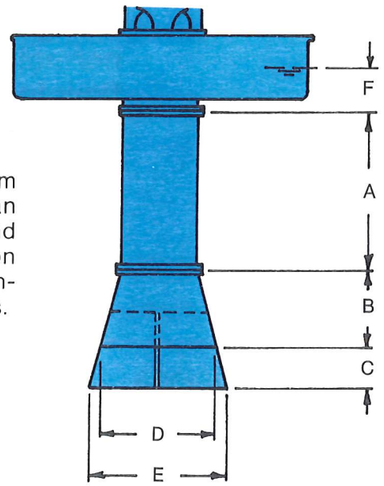
These charts are applicable to all Aqua-Jet Aerators and show lagoon depths versus aerator size.



NOTE: These charts are intended for approximation purposes only. Requirements are dependent on basin geometry, etc., and the factory should be contacted for specific applications.

Draft tube and intake cone . . .

Anti-erosion assemblies prevent bottom scour. The draft tube consists of an extension to permit a deeper intake and is available in the lengths indicated on the chart. The factory should be contacted regarding specific applications.



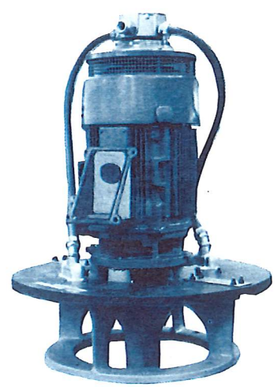
Draft tube & intake cone data

HP.	A	B	C	D	E	F
1-2	24	6	—	9.5	—	7
	48	6	—	9.5	—	7
3, 5, 7.5	36	6	6	12.25	15	7
	72	6	6	12.25	15	7
10, 15	36	8	6	16.25	19	9
	72	8	6	16.25	19	9
20, 25	36	12	9	25.75	26.5	11
	72	12	9	25.75	26.5	11
30, 40	36	14	12	24.5	30	13
	72	14	12	24.5	30	13
50, 60, 75	36	20	12	30.75	36	16
	72	20	12	30.75	36	16

Arctic - pak . . .

The Arctic-Pak ring contains thermal resistance heaters to minimize the chance of icing on the surface areas of the heat ring and the cast diffuser head (exposed surfaces).

The Arctic-Pak comes complete with its own junction box (mounted on the aerator motor fan cover) and its own automatic controls and control panel. The Arctic-Pak is controlled by an ambient temperature thermostat. The Arctic-Pak is available in 230-460 volts. Drawings and wiring diagrams available on request. Arctic-Pak can also be used on fixed-mounted Aqua-Jet Aerators.



Arctic-Pak power data

HP.	WATTS @-20°F	230 VOLT FUSE SIZE
1-2		AMP
3-5-7.5	200	2.0 AMP
10-15	265	2.0 AMP
20-25	310	3.0 AMP
30-40	400	3.5 AMP
50-60-75	450	4.0 AMP

Aqua-Jet dual speed

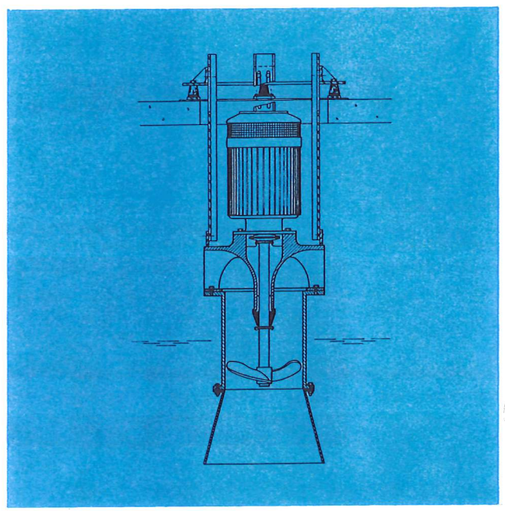
Few waste treatment systems are evenly loaded at all times. Consequently, aerators sized to handle peak loads have excess capacity during periods of light loading. They produce an excessive dissolved oxygen residual and expend expensive power. Aqua-Aerobic Systems' Dual Speed versions reduce speed, power consumption, and operating costs during periods of light system loading. Control options available to provide manual, timed automatic, or completely automatic operation in any system.

Fixed mounted

The Aqua-Aerobic Systems Aerator can also be utilized as a fixed-mounted version which includes pier, column, platform and post moored installation or is adaptable to most existing platforms or structures. These units are available in a size range of 3 to 75 HP. The 25 HP unit weighs approximately 1,200 lbs. with a normal downward thrust of less than 270 lbs. and a combined thrust load of less than 1,470 lbs. This unit produces 113 ft. lbs. of torque with a stall torque of 255 ft. lbs.

The 75 HP unit weighs approximately 3,000 lbs, with a normal downward thrust of less than 1,650 lbs. and a combined thrustload of less than 4,650 lbs. This unit produces 333 ft. lbs. of torque with a stall torque of 666 ft. lbs.

The factory should be contacted regarding specific applications.



Aqua-Jet surface aerators

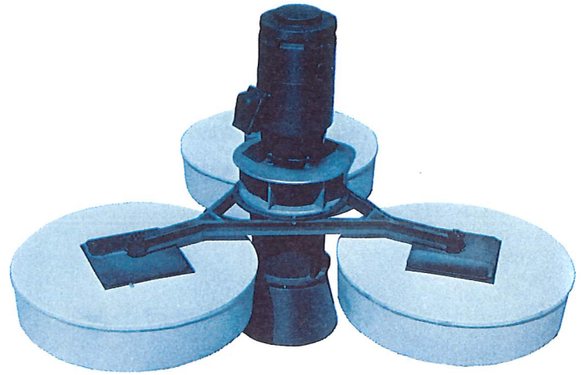
Over fourteen years of reliable service experience

The Aqua-Jet aerator offers an economical approach to wastewater treatment where a supplementary source of oxygen is required to maintain the biological treatment reaction.

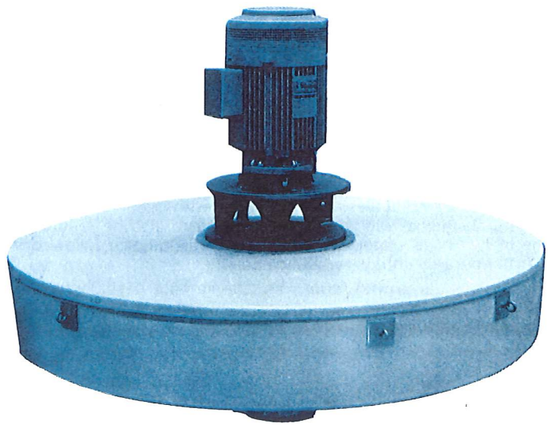
Aqua-Jet aerators are designed for use in industrial and municipal wastewater treatment. Major applications of the Aqua-Jet aerator include activated sludge processes, extended aeration, aerated lagoons, sludge digester conversion, volatile gas stripping, mixing or blending ponds and tanks, algae control and fish farm pond aeration.

The proper selection of an aerator is based primarily on the unit's efficiency in terms of oxygen transfer, mixing capability, and flexibility. Operational flexibility allows the equipment to handle wide fluctuations in hydraulic loads, and the variables encountered in the composition and concentration of untreated wastewater.

The Aqua-Jet aerator incorporates design features which optimize mixing, oxygen transfer, and hydraulic efficiency. The diffusion head design changes the direction of the fluid, flowing at a high velocity, from vertical to horizontal with minimum friction loss, providing proper balance of velocity and volume, with the low profile discharge transferring maximum kinetic energy. This feature of the Aqua-Jet aerator dilutes and blends influent wastewater with partially treated material and maintains uniform dispersion of microorganisms in biological treatment.



In addition these aerators can be used to up-grade existing municipal diffused aeration treatment plants by providing a supplementary oxygen source. Mixing efficiency increases as the power to volume ratio of the aeration basin is increased. By selectively locating the aerators in each basin, the wastewater is sufficiently reduced by taking advantage of tapered aeration. Another good example of the economy and versatility of the Aqua-Jet aerator.



Typical installations

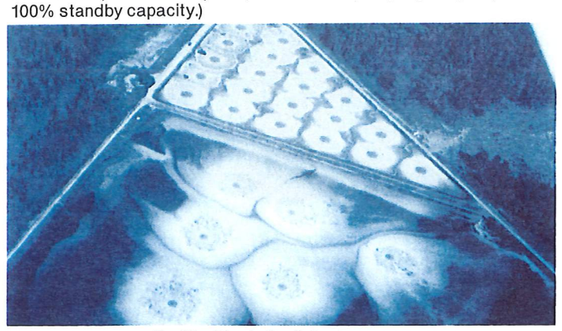
TEXTILE-CHEMICAL
Spartanburg, South Carolina

BOD REMOVAL: 80% (Better BOD removal could be obtained, but since this is a pretreatment system, it is not necessary).
TYPE OF WASTE: Chemical, dye from textile mill
TYPE OF SYSTEM: Extended aeration, pretreatment system
SIZE AND NUMBER OF UNITS: 3-50 HP TFNI Aerators and 1 Clarifier

This industrial plant produces a chemical waste with a flow of 500,000 gallons/day and a fairly high BOD, which must be pretreated before dumping into the city system.

The pretreatment system is the extended aeration modification of the activated sludge process. The system consists of three 50 HP TFNI Aqua-Jet aerators in the aeration basin followed by an Aqua-Aerobic secondary vacuum clarifier, 103′ x 30′ at the water surface, with a 6′ depth, sidewalls having a 2:1 slope, making it 6′ wide at the bottom.

Advantages of this type of clarifier are (1) it will save forming costs since it is poured in place concrete, and reinforcing can be eliminated since the sidewalls are slanted; (2) vacuum collection is ideal for a light floc, such as found in the chemical industry; and (3) all mechanical parts are easily serviceable from the bridge which carries the traveling mechanism, the control panel, and the two pumps. (One pump for the 100% standby capacity.)



Textile Plant, Carlisle, SC — 20-40 HP & 6-10 HP

MUNICIPAL
Combined Industrial-Municipal, Muskegon, Michigan

BOD REMOVAL: 99+%
TYPE OF WASTE: Municipal
TYPE SYSTEM: Aerated Lagoon
SIZE AND NUMBER OF UNITS: 36-60 HP TFNI Aerators

This county's wastewater irrigation system goes beyond conventional secondary treatment, which leaves viruses, phosphates and other chemicals in the treated water that is returned to lakes and streams. Their goal was to achieve a third level of treatment, removing 98-100% of all pollutants in industrial and domestic wastewater.

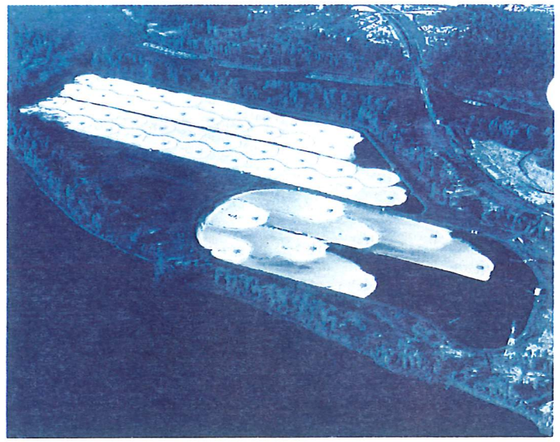
The county's sewage is collected from 14 municipalities, with approximately 140,000 residents and 200 industries. The wastewater is treated by two independent subsystems.

In the metropolitan area, water is collected from the existing sewer lines by a 13-mile interceptor system. It is then pumped 11 miles inland to the major treatment site, which covers an area of 10,000 acres. At the site, the raw wastes are given the equivalent of conventional secondary treatment—three days of aeration and mixing in open air biological treatment cells.

The effluent from the cells may take either of two routes. Usually it goes into a settling basin where solids settle out and the process of natural stabilization takes place. But it can also be routed into one of two huge storage lagoons—each an 850-acre lake—to be held temporarily until irrigation takes place.

When the liquid is withdrawn from the settling basin or storage lagoon, it is disinfected by chlorination. Then, it is pumped out to the fields and spray irrigated over 6,000 acres of sandy, formerly unproductive land.

After irrigation and filtration through the soil, the water is collected in underground drainage pipes, monitored to check its quality, and discharged to the surface waters of the county. The drainage system prevents waterlogging on the site, which might make the soil unfit for cultivation. It also provides quality control by allowing groundwater to leave the management area only at specified points after careful monitoring.



Paper Mill, Camas, WA — 56-75 HP

FOOD PROCESSING
Potato Processor, Presque Isle, Maine

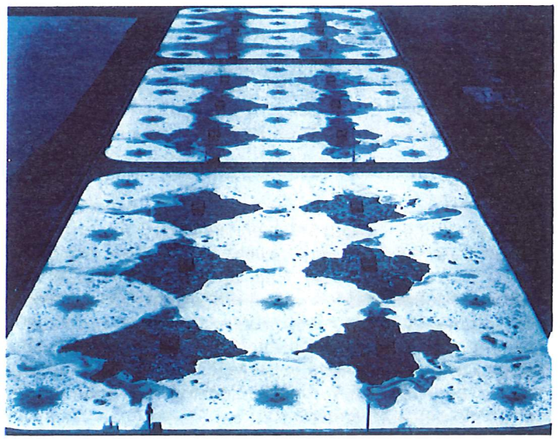
BOD REMOVAL: 98%
TYPE OF WASTE: Potato Processing
TYPE SYSTEM: Activated Sludge
SIZE AND NUMBER OF UNITS: 20-75 HP and 2-40′ pump clarifiers

This processor of prepared potato products was faced with a pollution problem stemming from the discharge of high BOD wastewater. Stringent discharge requirements were established by state and federal EPAs and the firm was under close scrutiny to assure complete compliance.

An activated sludge system with aerobic digestion of the excess sludge including 20-75 HP Aqua-Jet aerators and 2 rectangular clarifiers by Aqua-Aerobic Systems was found to be the most effective and economical system for this type of waste.

A statement issued by the Department of Environmental Protection in Presque Isle summarizes the system's overall performance:

> "Completion of the Potato Service, Inc. treatment system has brought this plant's effluent quality well within its State and Federal license limitations. Process water volume now averages 1-2 MGD at BOD, settleable solids and suspended solids levels of 51 ppm, 0.1 ml/l and 42 ppm respectively over a six months' average. The resulting loading to the receiving waters — less than 1.0 lb. of BOD per ton of raw product — speaks well of the system's continuing viability."



Mona Lake Project, Muskegon, MI — 36-60 HP

O_2 solubility and temperature correction factor charts

TEMPERATURE				ELEVATION						TEMPERATURE	
°F	°C	$(1.024)^{T-20}$	$(1.075)^{T-20}$	0	1000′	2000′	3000′	4000′	5000′	°C	°F
32.0	0	.621		14.6	14.1	13.6	13.1	12.6	12.1	0	32.0
35.6	2	.653	0.27206	13.8	13.3	12.8	12.4	11.9	11.5	2	35.6
39.2	4	.684	0.31440	13.1	12.6	12.2	11.8	11.4	10.9	4	39.2
42.8	6	.717	0.36332	12.5	12.0	11.6	11.2	10.8	10.4	6	42.8
46.4	8	.752	0.41986	11.9	11.4	11.0	10.6	10.2	9.9	8	46.4
50.0	10	.789	0.48316	11.3	10.9	10.5	10.1	9.8	9.4	10	50.0
53.6	12	.827	0.56071	10.8	10.4	10.1	9.7	9.4	9.0	12	53.6
57.2	14	.867	0.64797	10.4	10.0	9.6	9.3	8.9	8.6	14	57.2
60.8	16	.909	0.74880	10.0	9.6	9.2	8.9	8.6	8.3	16	60.8
64.4	18	.954	0.86533	9.5	9.2	8.9	8.5	8.2	7.9	18	64.4
68.0	20	1.000	1.00	9.2	8.8	8.5	8.2	7.9	7.6	20	68.0
71.6	22	1.049	1.15562	8.8	8.5	8.2	7.9	7.6	7.3	22	71.6
75.2	24	1.100	1.33546	8.5	8.2	7.9	7.6	7.3	7.1	24	75.2
78.8	26	1.153	1.54328	8.2	7.9	7.6	7.3	7.1	6.8	26	78.8
82.4	28	1.209	1.78344	7.9	7.6	7.4	7.1	6.8	6.6	28	82.4
86.0	30	1.268	2.06097	7.6	7.4	7.1	6.9	6.6	6.4	30	86.0
89.6	32	1.329	2.38170	7.4	7.1	6.9	6.6	6.4	6.2	32	89.6
93.2	34	1.394	2.73254	7.2	6.9	6.7	6.4	6.2	6.0	34	93.2
96.8	36	1.460	3.18066	7.0	6.7	6.5	6.3	6.0	5.8	36	96.8
100.4	38	1.532	3.67564	6.8	6.6	6.3	6.1	5.9	5.6	38	100.4
104.0	40	1.600	Limit	6.6	6.4	6.1	5.9	5.7	5.5	40	104.0

Power cost . . . dollars per year

For aeration on a continuous basis — 365 days/yr. — 90% motor efficiency

MOTOR SIZE (HP)	POWER COSTS = CENTS/KWH						
	2.0	3.0	4.0	5.0	6.0	8.0	10.0
1	144	216	288	360	432	576	720
5	720	1,080	1,440	1,800	2,160	2,880	3,600
25	3,600	5,400	7,200	9,000	10,800	14,400	18,000
75	10,800	16,200	21,600	27,000	32,400	43,200	54,000

Conversion of clean water transfer rates to field transfer rates

Nearly all manufacturers of aeration equipment rate efficiency of their product on the number of pounds of oxygen their unit will transfer per horsepower per hour of operation, at standard conditions of zero dissolved oxygen and 20° Centigrade. This number is usually expressed as pounds of oxygen transferred per delivered brake horsepower per hour. This delivered brake horsepower is measured at the extreme output shaft, e.g., for direct drive units, such as the AQUA-JET. The brake horsepower is measured at the motor shaft. For units that employ a gearbox, the brake horsepower is measured at the output shaft of the gearbox.

The following equation is usually employed to convert the clean water transfer rate (supplied by the equipment manufacturer) to the actual transfer rate that can be expected to be produced under actual in-plant operational conditions.

$$FTR = \frac{CWTR\,[(C_{DC})\ (BETA) - (C_R)]\ (1.024)^{T-20}\ (ALPHA)}{C_{SC}}$$

FTR=Field Transfer Rate. (#/HP/HR)

CWTR=Clean Water Transfer Rate—Supplied by equipment manufacturer. (#/HP/HR)

C_{DC}=Saturation Concentration of Oxygen at design temperature and altitude. (Mg/l)

C_R =Residual Concentration of dissolved oxygen desired during normal operation. (Mg/l)

C_{SC}=Saturation Concentration of Oxygen at sea level elevation at 20°C=9.20 (Mg/l)

T=Temperature at design condition (°C)

BETA=Saturation Conc. of D.O. in Waste / Saturation Conc. of D.O. in Clean H_2O

ALPHA=Rate of Transfer of Oxygen into Waste / Rate of Transfer of Oxygen into Clean H_2O

EXAMPLE:

GIVEN: CWTR of 3.0#/HP/HR
Design Temperature of 30°C
Elevation 2,000 feet.
Alpha=.85 (Varies from waste type to waste type.)
Beta=.95 (Values shown are typical for domestic sewage)
DO to be maintained in basin=1.0 ppm.

$$FTR = \frac{(3.0)\,[(7.1)\,(.95) - 1.0]\ (1.024)^{30-20}\ (.85)}{9.17}$$

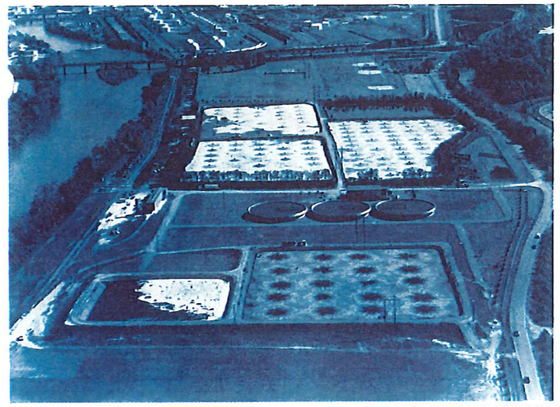
$$FTR = \frac{3.0\ (5.75)\ (1.268)\ (.85)}{9.20} = 2.02\ \#/HP/HR.$$

Knowing the field transfer rate, and the pounds of BOD exerted per hour, one can compute the horsepower required to do the job.

Assume in the above example that the BOD_5 is 4800#/Day =200#/HR.

HP Req'd=

$\frac{200\#/HR.}{2.02\ \#HP/HR.} = 99$ HP—Recommended installation of 100 HP.



Tennessee Chemical Plant — 78–75 HP

CHEMICAL
Chemical Plant, Lugoff, South Carolina

BOD REMOVAL: 95%
TYPE WASTE: Chemical
TYPE SYSTEM: Activated Sludge
SIZE AND NUMBER OF UNITS: 2 - 60 HP, 12 - 75 HP, 3 - 50 HP

Equalization Basin:
As in most petrochemical, chemical and textile wastes, the activated sludge system is preceded by an equalization basin.

The equalization basin at this plant has a capacity of 2,300,000 gallons with dimensions of 138′ x 248′ x 12′ with a 1:1 sideslope. The tank has a freeboard of 3′ and is concrete lined. The liquid temperature in the basin ranges from 22° C. in the winter to a high f 34° C. in the summer.

The design requirements for this basin are that the mechanical aerators provide aeration and blending. The blending must be such that the basin has a one-hour turnover time. The two 60 HP Aqua-Jet aerators are arranged so as to accomplish the desired blending. The aerators' pumping capacity is such that the basin has a turnover time of 61 minutes.

Aeration Basin:
The two aeration basins are also constructed with a 1:1 sideslope and are concrete lined. The basin dimensions are 108′ x 118′ x 12′ with a four foot freeboard. The capacity of each basin is 780,000 gallons and each has a MLSS of 2500-3000 mg/l. Sludge volume indices have ranged from 78-143, and solids settling characteristics have been excellent. An important design consideration was that the mixed liquor suspended solids level not vary more than 10% from the mean.

Chemical waste plants are plagued with high BOD loadings, and this plant is no exception. The total oxygen requirements in the aeration basins are 20,200 #/day. The alpha and beta values are .6 and .9 respectively, which raises an interesting problem for the transfer of oxygen to the system. The oxygen is supplied by 12-75 HP Aqua-Jet aerators placed four in each basin.

Aerobic digester:
The aerobic digester is a basin very similar in design to the other basins. The basin size is 118′ x 148′ x 12′, and it is concrete lined with a 1:1 sideslope. The volume is 920,000 gallons.

Design characteristics are summer temperature of 34° C. and winter temperature of 10° C. with oxygen requirements of 3400#/day and design alpha and beta values of .6 and .9 respectively.

The aeration and mixing is supplied by three (3) 50 HP Aqua-Jet aerators with mixing again a very important consideration to assure satisfactory operation of the digester. Mixed liquor suspended solids has averaged 10,000 mg/l with highs of 14,500 and lows of 500 mg/l.

This plant was installed for approximately 1/3 the capital expenditure of a typical diffused aeration plant. The use of direct drive floating Aqua-Jet aerators has also eliminated platform cost and maintenance cost of the gear boxes on the low-speed aerators which this company had used in their plants previous to these.

TEXTILE
Textile Plant, Carlisle, South Carolina

BOD REMOVAL: 95% - 98%
TYPE OF WASTE: Textile
TYPE SYSTEM: Aerated Lagoon
SIZE AND NUMBER OF UNITS: 20 - 40 HP and 6 - 10 HP Aerators

The upper lagoon is a 40 million gallon basin with twenty (20) 40 HP aerators. The bottom basin is a 60 million gallon polishing pond with six (6) 10 HP aerators. This is a good example of how the zone of influence is affected by the closeness of other units.

There is 14 days retention time in the total system. The textile waste is 800 mg/l BOD_5 with a pH of 11-12.

Paper Mill, Savannah, GA — 36–75 HP

PULP AND PAPER
Paper Mill, Everett, Washington

BOD REMOVAL: 89% - 94%
TYPE WASTE: Bleach kraft
TYPE SYSTEM: Aerated Lagoon
SIZE AND NUMBER OF UNITS: 27-40 HP stainless steel aerators

At this installation, there are sixteen (16) units running at all times. They are on time-clocks, alternating the units that are running. The flow into the lagoon is approximately 28,000,000 gallons/day. The flow first goes into a primary settling pond, with less than a 1/2 day retention. It then goes into the aerated section, which has 5.3 days of aeration time. The flow then follows through into the final settling lagoon, which again is approximately 1/2 day retention. The total retention time throughout the system is 6.45 days. The total area is 66 acres.

The influent of this system has approximately 25,000 lbs./day of BOD. The effluent out of this system is anywhere from 1600 to 2000 lbs./day of BOD. The average BOD removal is 89% with 94% being the highest achieved BOD reduction.

Standards for effluent flow into a stream in this region is 30 ppm of BOD and 30 ppm of suspended solids. Their average effluent has 18-20 ppm of suspended solids and 22-26 ppm of BOD_5.

Aqua-Jet features . . .

Aqua-Jet aerators are all direct drive units. The major causes of costly downtime and maintenance such as couplings, gear boxes, and reducers have been eliminated thru the use of a one-piece high strength stainless steel shaft. A free-running anti-deflection ring not only provides support for the shaft, but for the motor bearings as well.

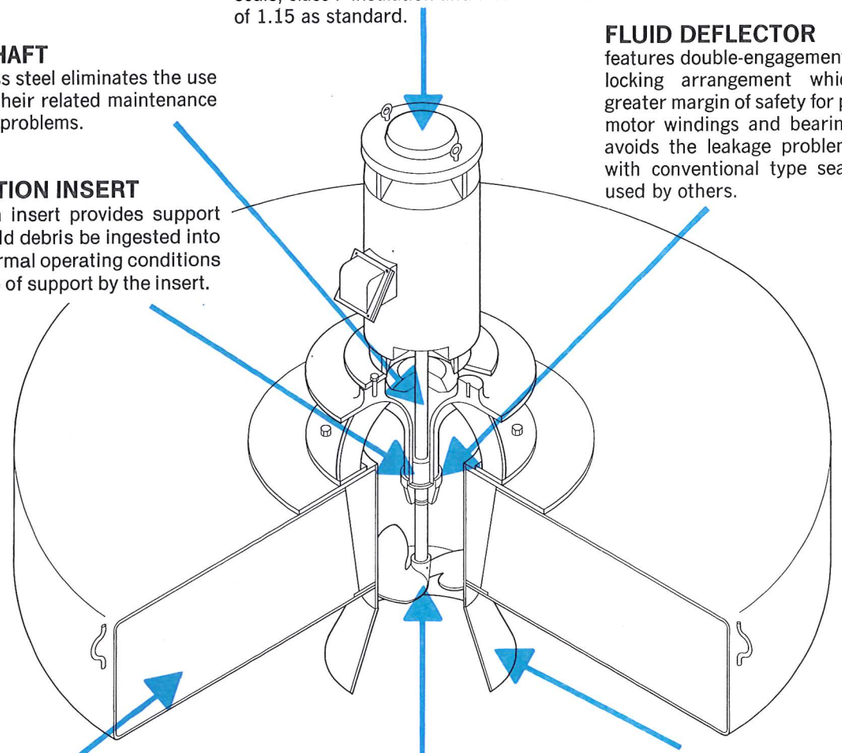
Proven successful design assures you reliability

MOTORS
are totally enclosed fan cooled (TEFC) and rated for severe duty. Designed to meet the most stringent operational requirements the motors feature heavy duty bearings and seals, class F insulation and a service factor of 1.15 as standard.

ONE PIECE SHAFT
of 17-4PH stainless steel eliminates the use of couplings and their related maintenance and replacement problems.

ANTI-DEFLECTION INSERT
An anti-deflection insert provides support for the shaft should debris be ingested into the unit. Under normal operating conditions the shaft runs free of support by the insert.

FLUID DEFLECTOR
features double-engagement plus a positive locking arrangement which provides a greater margin of safety for protection of the motor windings and bearings. This design avoids the leakage problems encountered with conventional type seals and slingers used by others.



FLOAT
is filled with a closed cell polyurethane foam that adds structural stability to the unit and prevents the possibility of sinking if damage to the float exterior should occur.

PROPELLER
is a two bladed design, of 316 stainless steel, with 180° trailback feature for non-clog operation and greater operational efficiency factor.

DRAFT TUBES AND ANTI-EROSION ASSEMBLIES
are available for most units. Information regarding application and dimensions is found on page 19.

Aqua-Jet aerators are subject to strict quality control procedures during manufacture. Every Aqua-Jet is performance proven and ready to provide efficient and reliable service. All of these advanced design features are yours . . . when you specify AQUA-JET.

Selection of electrical service cable

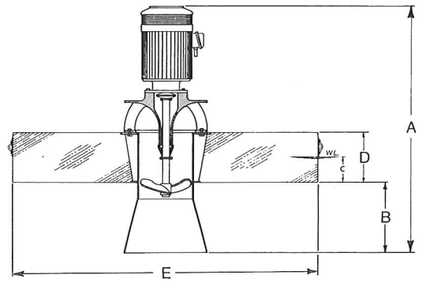
Based on 5% Voltage Drop and a 90% P.F.

	HP	FULL-LOAD AMPS	AWG CABLE SIZE 12-4	10-4	8-4	6-4	4-4	2-4	0-4	00-4	000-4
230 VOLTS	1	3.4	880	1240							
	2	6.6	540	930	1420						
	3	9	300	640	1000	1550					
	5	15	200	380	600	930	1420				
	7.5	22		260	410	635	970	1530			
	10	27			330	510	790	1250			
	15	40				350	530	840	1270		
	20	52					410	650	980	1200	
	25	64						525	790	975	
	30	78						440	650	800	975
	40	104	MAXIMUM CABLE LENGTH						490	600	730
	50	125	IN FEET							500	600
460 VOLTS	1	1.7	2550								
	2	3.3	2100								
	3	4.5	1620								
	5	7.5	970	1535							
	7.5	11	665	1047	1635						
	10	14	520	820	1280	2000					
	15	20		575	900	1400	2120				
	20	26			690	1070	1635				
	25	32			560	875	1325	2250			
	30	39				715	1090	1860	2610		
	40	52					815	1390	1955		
	50	63						1150	1615	1984	
	60	75						965	1355	1660	2000
	75	93							1090	1340	1600
575 VOLTS	1	1.4	3180								
	2	2.6	2770								
	3	4	2330								
	5	6	1540	2440							
	7.5	9	1030	1630	2550						
	10	11	840	1330	2080						
	15	16		970	1430	2230					
	20	21		700	1090	1700					
	25	26			880	1370	2080				
	30	31			740	1150	1740				
	40	41				870	1320	2090			
	50	50				710	1080	1720			
	60	60					900	1430			
	75	74					800	1250			

DIAMETER	STRAND	MATERIAL	UNIT SIZE
3/16"	7x19	304 Stainless	1 — 30 HP
1/4"	7x19	304 Stainless	40 — 75 HP

Selection of anchor cable

Aerator dimensions



STAINLESS STEEL SERIES—SS AND CSS

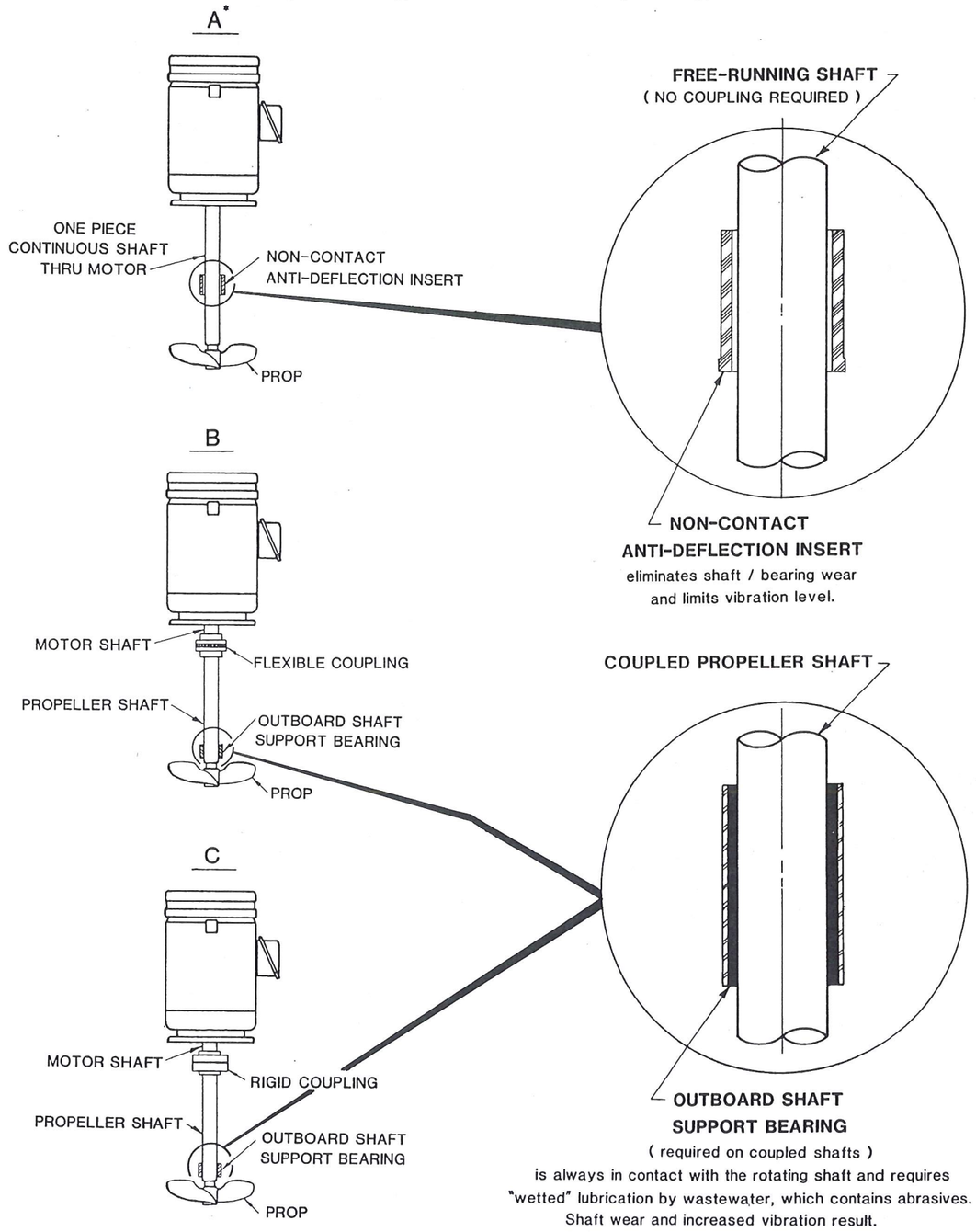
SS MODEL	CSS MODEL	APPROX. HP	SHIPPING WT.	DIMENSIONS A	B	C	D	E	SHAFT DIA.	MOORING CABLE DIA.
3900111	—	1	200	32.75	10	3	6.125	46.75	.875	
3900211	—	2	200	33.75	10	3	6.125	46.75	.875	
3900311	3900317	3	335	41.312	9	4	11.0	59.500	1.250	
3900310	3900337		410	42.312	9	4.5	11.0	59.500	1.250	
3900511	3900517	5	410	42.312	9	4.5	11.0	59.500	1.250	
3900510	3900537		470	51	9	5	11.0	59.500	1.250	
3900711	3900717	7.5	470	51	9	5	11.0	59.500	1.250	
3900710	3900737		780	56.187	9	6	11.0	59.500	1.250	
3901011	3901017	10	820	56.187	11	6	12	70.250	1.750	3/16
3901010	3901037		860	53.500	11	7	12	70.250	1.750	
3901511	3901517	15	900	53.500	11	7	12	70.250	1.750	
3901510	3901537		1,190	58.250	11	8	12	70.250	1.750	
3902011	3902017	20	1,280	65	15.6	6	13.500	83.375	2.125	
3902010	3902037		1,350	66	15.6	6	16	83.375	2.125	
3902511	3902517	25	1,440	64	15.6	7	13.500	83.375	2.125	
3902510	3902537		1,650	66	15.6	7	16	94.500	2.125	
3903011	3903017	30	1,730	73.687	19	7	15	94.500	2.125	
3903010	3903037		1,850	75.937	19	8	15	94.500	2.125	
3904011	3904017	40	1,930	75.937	19	8	15	94.500	2.500	1/4
3904010	3904037		2,600	83.25	23	6	15	114.625	2.500	
3905011	3905017	50	2,800	89	29	7	15	114.625	2.500	
3905010	3905037		2,980	93.562	27	7	17	114.625	2.500	
3906011	3906017	60	3,100	93.562	29	8	15	114.625	2.500	
3906010	3906037		3,700	97	27	10	17	114.625	2.500	
3907511	3907517	75	3,300	97	29	9	15	114.625	2.703	
3907510	3907537		3,900	112.500	27	8	17	114.625	2.703	

DUAL SPEED

COMPARISON OF AERATOR MOTOR AND PROPELLER SHAFT DRIVES

(Shown without motor base (diffusion head)

A = Aqua-Aerobic Type B + C = Competitive Types



COMPARE AERATOR CONSTRUCTION
DO IT RIGHT THE FIRST TIME

STANDARD AQUA-JET AERATOR
MOTOR BASE/VOLUTE CONNECTION
ALL 304 S.S. Construction

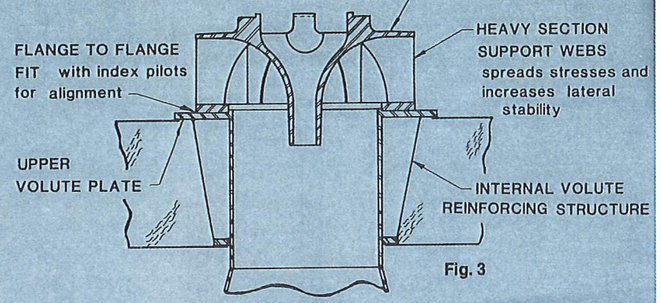


Fig. 3

Aqua-Aerobic Systems, Inc. aerators are constructed of the best quality materials available. The volute (prop pumping chamber) is heavy-wall stainless steel that resists abrasion and corrosion. The reinforced structural design (Fig. 3) fastens the upper plate to the volute tube and provides a solid foundation to support the massive cast diffusion head. The upper volute flange is machined smooth and uses an "index pilot" to align the diffusion head to keep the propeller concentric within the volute. The "flange to flange" fit of the volute and diffusion head distributes the static and dynamic loads. No point stress loads are present to fatigue materials or loosen connections. This provides a solid foundation on which the motor rests and all vibration and shock from the high velocity discharge water flow is absorbed. Fourteen years of continuous service has proven this design to be the best in aerator history. See pages 6 and 7 to view the entire assembly for further detail.

Many competitive aerators (Typical Fig. 4) are constructed with lighter weight and lower quality materials. Worse yet, they use shoulder bolts that cause "point loaded" connections without uniform distribution of static and dynamic loads. Vibration from imbalance of rotating parts and/or shock and vibration from high velocity discharge flow mass will soon overstress these lightweight materials and poor connections. To compound a bad problem to a further degree, some aerators have plastic or fiberglass materials in the flow passageways where abrasive solids are continually pumped past their locations. A thought-provoking comparison is to note that the family car would (at 40 mph) have to go 4,204,800 miles to equal a 12-year continuous-duty life cycle of an aerator. Quality materials, heavy duty construction, and vibration-controlled aerator design is the only way an aerator can make the same trip, without high maintenance costs.

TYPICAL COMPETITION
MOTOR BASE/VOLUTE CONNECTION

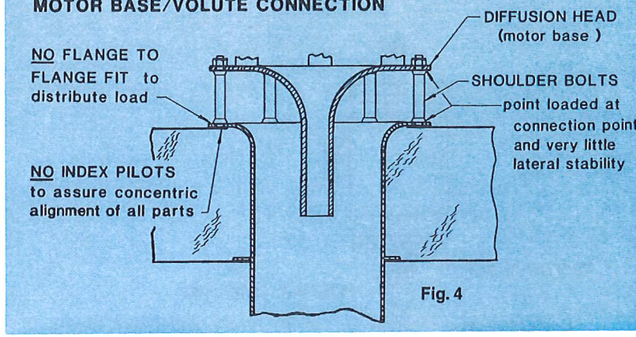
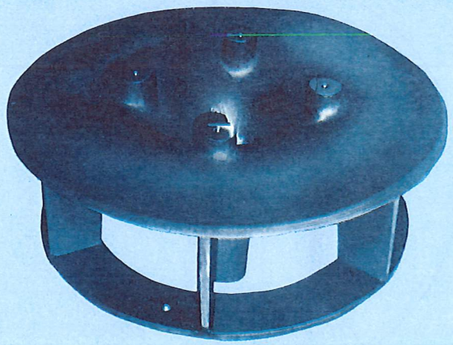


Fig. 4

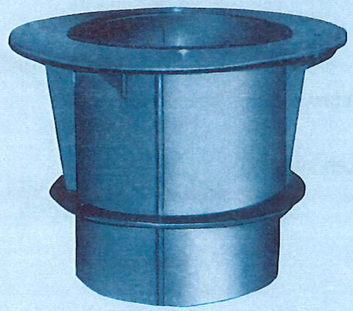


The above photo shows the actual cast diffusion head used in the Aqua-Aerobic aerator—***no*** other aerator uses such a massive casting, *period!* You get what you pay for—which brings up the point:

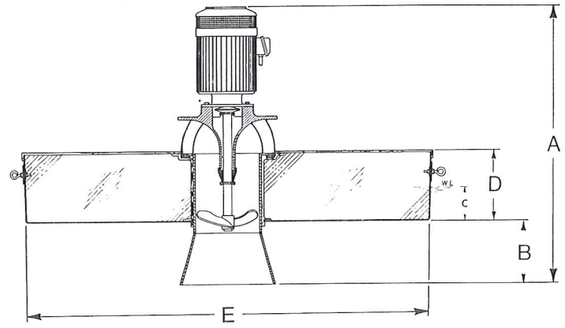
> "If there is time and money available to do it over, there should be ample time and money available to do it right the first time."

The comments above, and on this page, are the way to do it right. Fourteen years of unwillingness to cheapen the Aqua-Aerobic quality is the reason that the Aqua-Jet aerator is the number one choice world wide. Why not put this cost-saving experience to work for you?

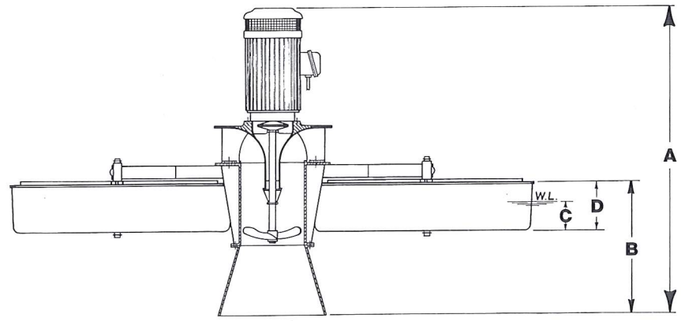
The photo below shows the actual volute used in the Aqua-Aerobic aerator (Fig. 3), which is the only one of its kind in the aerator industry. After fourteen years of continuous duty in corrosive, abrasive and high velocity propeller-induced flow, most original volutes are still in operational service. Similar duty would have destroyed plastic materials and cheaply constructed competitive aerator volutes—when volutes fail, the entire flotation assembly must be replaced in most aerators. Aqua-Aerobic aerators are worth more than twice the cost of a cheap, lightweight aerator.



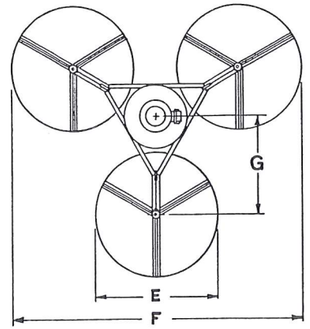
CFSS SERIES **FSS SERIES**



TFNI SERIES



TFNI TOP VIEW



TFNI SERIES

MODEL	HP	APPROX. SHIPPING WT.	DIMENSIONS A	B	C	D	E	F	G	SHAFT DIA.	MOORING CABLE DIA.
3705011	50	3100	90.00	23.87	5.5	14	66	157	52.6	2.5	1/4
3705010		3450	98.00	21.25	9	16.125	70.75	161.75	52.6	2.5	
3706011	60	3410	94.56	21.25	5.75	16.125	70.75	161.75	52.6	2.5	1/4
3706010		4570	98.00	21.25	10	16.125	70.75	161.75	52.6	2.5	
3707511	75	3630	98.00	21.25	6.12	16.125	70.75	161.75	52.6	2.703	1/4
3707510		5260	98.00	21.25	9	16	84	194	63.50	2.703	

DUAL SPEED

Aerator dimensions

CFSS SERIES

MODEL	HP	APPROX. SHIPPING WT.	DIMENSIONS A	B	C	D	E	SHAFT DIA.	MOORING CABLE DIA.
4200317	3	450	41.312	9.25	4	11	64	1.250	3/16
4200337		550	41.312	9.25	5.25	11	64	1.250	
4200517	5	550	41.312	9.25	5.25	11	64	1.250	
4200537		575	51.000	9.25	6	11	64	1.250	
4200717	7.5	575	41.312	9.25	6	11	64	1.250	
4200737		850	52.312	9.25	6.5	11	64	1.250	
4201017	10	875	56.312	11	5.5	12	71	1.75	
4201037		900	53.625	11	6	12	71	1.75	
4201517	15	900	53.625	11	6	12	71	1.75	
4201537		1,300	58.25	11	7	12	71	1.75	
4202017	20	1,260	55	15.6	7	14	84	2.125	
4202037		1,325	56	15.6	8	14	84	2.125	
4202517	25	1,325	56	15.6	8	14	84	2.125	
4202537		1,535	57	15.6	9	14	84	2.125	
4203017	30	1,655	72.93	17.75	6.25	15.5	94.5	2.125	
4203037		1,875	75.188	17.75	7.25	15.5	94.5	2.125	
4204017	40	1,875	75.188	17.75	6.25	15.5	94.5	2.5	
4205017	50	1,975	78.438	17.75	6.50	15.5	94.5	2.5	

DUAL SPEED

FSS SERIES

MODEL	HP	APPROX. SHIPPING WT.	DIMENSIONS A	B	C	D	E	SHAFT DIA.	MOORING CABLE DIA.
420011	1	275	33.125	9	3.25	7	46.75	1.250	3/16
4200211	2	275	34.125	9	3.25	7	46.75	1.250	
4200311	3	450	41.312	9.25	4	11	64	1.250	
4200331		550	41.312	9.25	5.25	11	64	1.250	
4200511	5	550	41.312	9.25	5.25	11	64	1.250	
4200531		575	51.000	9.25	6	11	64	1.250	
4200711	7.5	575	41.312	9.25	6	11	64	1.250	
4200731		850	52.312	9.25	6.5	11	64	1.250	
4201011	10	875	56.312	11	5.5	12	71	1.75	
4201031		900	53.625	11	6	12	71	1.75	
4201511	15	900	53.625	11	6	12	71	1.75	
4201531		1,200	58.25	11	7	12	71	1.75	
4202011	20	1,260	55	15.6	7	14	84	2.125	
4202031		1,325	56	15.6	8	14	84	2.125	
4202511	25	1,325	56	15.6	8	14	84	2.125	
4202531		1,535	57	15.6	9	14	84	2.125	
4203011	30	1,655	72.93	17.75	6.25	15.5	94.5	2.125	
4203031		1,875	75.188	17.75	7.25	15.5	94.5	2.125	
4204011	40	1,875	75.188	17.75	6.25	15.5	94.5	2.5	
4205011	50	1,975	78.438	17.75	6.50	15.5	94.5	2.5	

DUAL SPEED

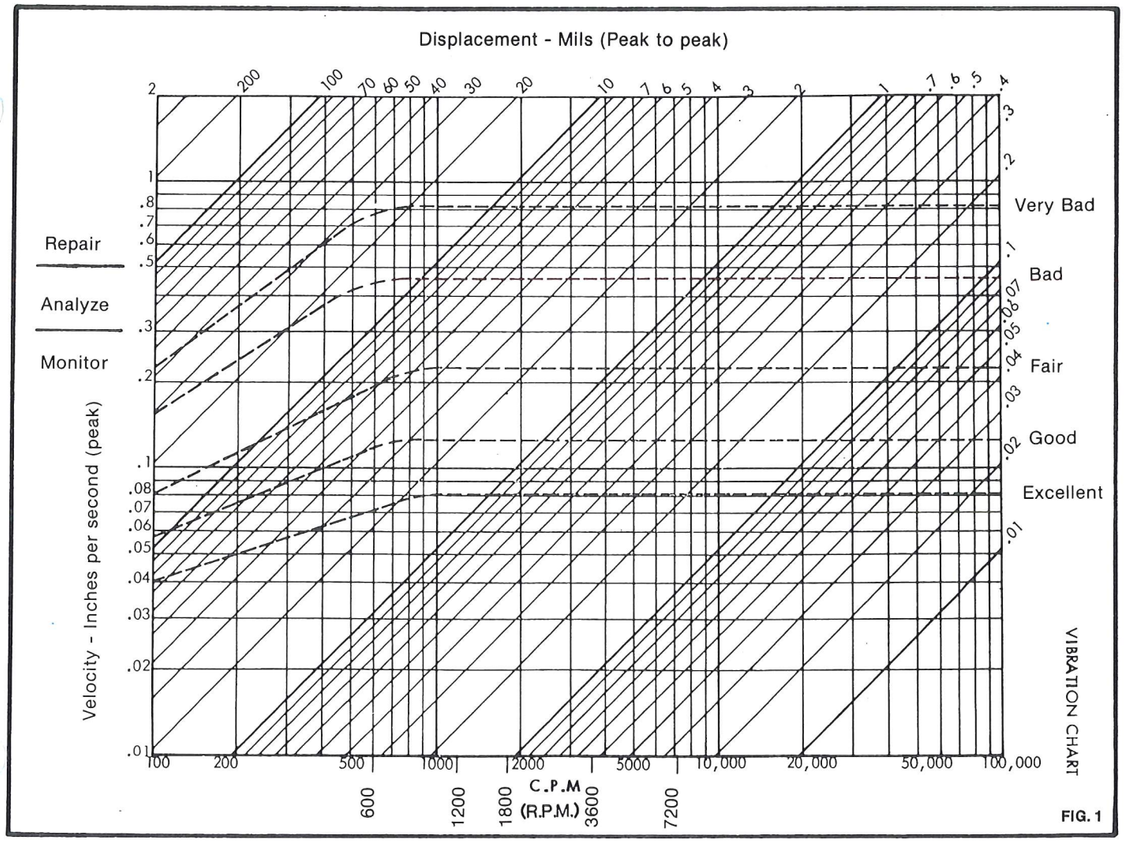


FIG. 1

VIBRATION CONTROLLED DESIGN

The continuous operation of rotating equipment demands vibration-limiting design that will assure smooth running of the aerators long after they have been installed into service.

The peak-to-peak amplitude (deflection in mils) must be controlled to 2.0 mils or less, and the velocity (inches/second) must be controlled to 0.3 in/sec or less, or early machine failure will occur. The unnecessary high maintenance cost of some aeration equipment is primarily related to vibration problems. This need not be the case if proper design and durable materials are used in the manufacture of the equipment. Field experience confirms this fact.

Figures 1 and 2 provide illustrations that show the design and operation limits that are necessary (and possible) when responsible aerator manufacturers commit attention to controlling vibration.

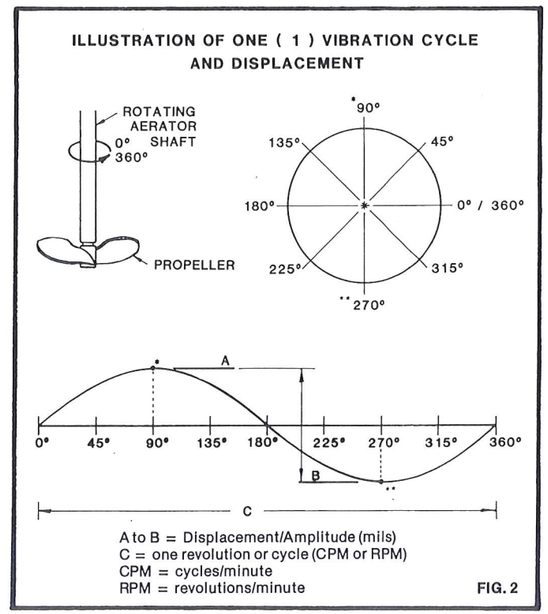


FIG. 2

WHY SHOULD YOU USE AQUA-AEROBIC AERATORS?

SIMPLY SPEAKING: Aqua-Aerobic Aerators are the lowest cost alternatives—more BOD reduction per $$$$. Fourteen (14) years of successful history proves it!

In Lieu of "Slow-Speed"/Gear Reduced Aerators—
- Lower Initial Cost
- Lower Maintenance Cost
- Easier to Handle Physically
- Unaffected by Water Level Fluctuations
- Lowest Life Cycle Cost
- Equal Performance in Most Applications
- Less Operational Downtime
- Lower Starting and Operating Torque
- Less Vibration-Related Trouble

In Lieu of "Coupled Shaft" Aerators Similar to Aqua-Aerobic Aerators—
- Direct Drive One-Piece Shaft (No Coupling—No Lower Shaft Support Bearing)
- Less Vibration Related Trouble
- Longer Service Life
- Better Construction Materials
- Less Maintenance Cost
- Longest "Experience" Record in Industry
- Lower Life Cycle Cost

In Lieu of "Static Tube" Type Aerators—
- Lower Initial Cost
- Better Performance/Lower Operating Cost
- Simpler to Install
- More Flexible to Operate
- Easier to Maintain (Nothing Submerged)
- Longer Service Life
- Lower Life Cycle Cost

In Lieu of "Jet" Type Aerators—
- Lower Initial Cost
- Lower Maintenance Cost
- Easier to Handle Physically
- No Nozzles to Clog
- Lower Life Cycle Cost
- Equal Performance in Most Applications
- Less Operational Downtime
- Longer Service Life
- No Submerged Maintenance Items
- Better Mixing

In Lieu of "Propeller" or "Turbine Type Aspirator" Aerators—
- Lower Initial Cost
- Less Maintenance
- Easier to Handle Physically
- Lower Life Cycle Cost
- Better Performance/Less Operating Cost
- No Submerged Parts to Service or Clog
- Longer Service Life

In Lieu of Conventional "Diffused Air" Aeration—

Course Bubble Type
- Lower Initial Cost
- Less Maintenance
- Lower Life Cycle Cost
- Equal or Better Performance
- Longer Service Life
- No Submerged Parts to Clog
- No Blower Housing Cost

Fine Bubble Type
- Lower Initial Cost
- Less Maintenance
- Equal Performance (Except in Deep Tank Activated Sludge)
- No Submerged Parts to Clog
- No Blower Housing Cost
- No Blower Intake Filter Maintenance
- Compatible Life Cycle Cost in Most Applications

Aqua-Jet models

STAINLESS STEEL models are available in a size range of 1 to 75 HP in the standard configuration. Dual Speed versions are also available. These units are designed and constructed for use in corrosive applications.
Construction Materials:
Motor Shaft—One-piece 17-4 stainless steel
Propeller—316 stainless steel, dynamically balanced
Diffuser Head—304 stainless steel, monolithic casting
Float—14 ga. 304 stainless steel skin filled with closed cell polyurethane foam
Volute/Intake Cone—304 stainless steel

CSS models are available in a size range of 3 to 75 HP in standard versions. Dual speed versions are also available. These units are designed and constructed for municipal and industrial applications.
Construction Materials:
Motor Shaft—One-piece 17-4 stainless steel
Propeller—316 stainless steel, dynamically balanced
Diffuser Head—Gray iron, epoxy coated monolithic casting
Float—14 ga. 304 stainless steel skin filled with closed cell polyurethane foam
Volute/Intake Cone—304 stainless steel

FSS models are available in a size range of 1 to 50 HP in standard versions. Dual Speed versions are also available. These units are designed and constructed for municipal and industrial applications.
Construction Materials:
Motor Shaft—One-piece 17-4 stainless steel
Propeller—316 stainless steel, dynamically balanced
Diffuser Head—304 stainless steel, monolithic casting
Float—Fiber reinforced polyester skin (FRP) filled with closed cell polyurethane foam
Volute/Intake Cone—304 stainless steel

CFSS models are available in a size range of 3 to 50 HP in standard versions. Dual Speed versions are also available. Application—Municipal or Industrial where permitted or as an owner selected option.
Construction Materials:
Motor Shaft—One-piece 17-4 stainless steel
Propeller—316 stainless steel, dynamically balanced
Diffuser Head—Gray iron, epoxy coated monolithic casting
Float—Fiber reinforced polyester skin (FRP) filled with closed cell polyurethane foam
Volute/Intake Cone—304 stainless steel

TFNI models are available in a size range of 50 to 75 HP in standard versions. Dual Speed versions are also available.
Application—Municipal or Industrial.
Construction Materials:
Motor Shaft—One-piece 17-4 stainless steel
Propeller—316 stainless steel, dynamically balanced
Diffuser Head—Gray iron, epoxy ocated monolithic casting
Float—(3) Fiber reinforced polyester skin (FRP) filled with closed cell polyurethane foam
Volute/Intake Cone—Casting and fabrication (materials optional)

MODEL SERIES					UNIT SIZE HP	RPM	Nc	Zcm* (FEET)	D (FEET)	ZOD* (FEET)	IMPINGE-MENT (FT)
STAINLESS	CSS	FSS	CFSS	TFNI							
3900111	—	4200111	—	—	1	1800	3.4	20	6	65	6.5
3900211	—	4200211	—	—	2	1800	3.8	28		90	7.0
3900311	3900317	4200311	4200317	—	3	1800		40		145	14
3900310	3900337	4200331	4200337	—	1.2	1200		27		87	
3900511	3900517	4200511	4200517	—	5	1800		45		150	15
3900510	3900537	4200531	4200537	—	2.1	1200		29		97	
3900711	3900717	4200711	4200717	—	7.5	1800	3.6	50	8	160	18
3900710	3900737	4200731	4200737	—	3.1	1200		32		104	
3901011	3901017	4201011	4201017	—	10	1800	3.4	51	10	172	18
3901010	3901037	4201031	4201037	—	4.2	1200		33		92	
3901511	3901517	4201511	4201517	—	15	1800	3.5	62		200	20
3901510	3901537	4201531	4201537	—	6.2	1200		39		129	
3902011	3902017	4202011	4202017	—	20	1200	3.2	72		230	20
3902010	3902037	4202031	4202037	—	8.3	900		46		149	
3902511	3902517	4202511	4202517	—	25	1200	3.4	80		255	24
3902510	3902537	4202531	4202537	—	10.4	900		52		165	
3903011	3903017	4203011	4203017	—	30	1200	3.5	88		280	24
3903010	3903037	4203031	4203037	—	13.3	900		59		181	
3904011	3904017	4204011	4204017	—	40	1200	3.8	102		325	26
3904010	3904037	4204031	4204037	—	17.7	900		68		216	
3905011	3905017	4205011	4205017	3705011	50	1200	3.5	105	12	330	26
3905010	3905037	4205031	4205037	3705010	22.2	900		70		220	
3906011	3906017	—	—	3706011	60	1200		115		350	27
3906010	3906037	—	—	3706010	26.6	900		76		233	
3907511	3907517	—	—	3707511	75	1200	3.0	130		380	30
3907510	3907537	—	—	3707510	33.2	900		86		253	

Nc = Relative transfer rate: lb. of oxygen/brake hp/hour @ standard conditions
D = Nominal operating depth in which ZOD, Zcm and Q hold true
* = Diameters

Zcm = Zone of complete mix
ZOD = Zone of complete oxygen dispersion
DUAL SPEED MODEL AVAILABLE