FRP Fans:

FL 30
Performance and Technical Information

VERANTIS
Environmental Solutions Group

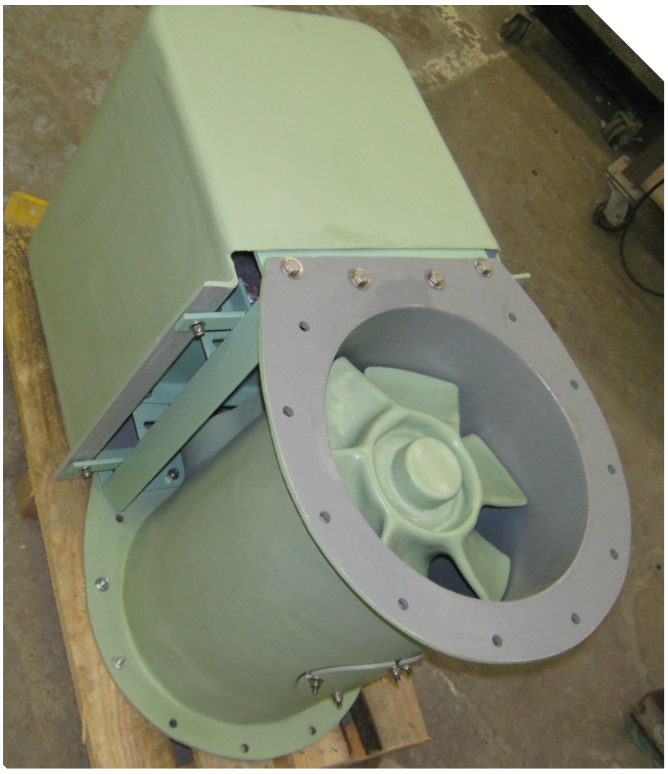
Verantis Environmental Solutions Group provides solutions for most common and complex situations including repair, rebuilding, field balancing, service and installation.

VERANTIS CORPORATION CERTIFIES THAT THE FL 30 SERIES AXIAL FAN SHOWN HEREIN ARE LICENSED TO BEAR THE AMCA SEAL. THE RATINGS SHOWN ARE BASED ON TESTS MADE IN ACCORDANCE WITH AMCA PUBLICATION 211 AND COMPLY WITH THE REQUIREMENTS OF THE AMCA RATINGS PROGRAM.

OTHER VERANTIS FANS INCLUDE:

- **CLUB Centrifugal High Efficiency Low to Medium Pressure**
- **CMHB Centrifugal High Efficiency Low to Medium Pressure**
- **CLM Centrifugal Low to Medium Pressure**
- **CMH Centrifugal Medium to High Pressure**
- **CH/CHP Centrifugal High Pressure**
- **FL/FLR Tube Axial Low Pressure**

FRP
Axial Fan



Verantis FL Series fiberglass fans offer the widest range of performance from any Fiberglass Reinforced Plastic (FRP) fan on the market. For over 40 years, Verantis fans have provided industry leading reliability and service in corrosive environments.

Designed and built to the highest standards.

Housings are made of premium corrosion-resistant, fire retardant vinyl ester resin systems. Impellers are manufactured using premium vinyl ester to assure structural integrity under the intense dynamic forces of rotation. All fiberglass components are fabricated in accordance with ASTM C582 and ASTM 4167 specifications for fiberglass laminates and fiberglass blowers.

All metal parts exposed to the process gasses are fully encapsulated in FRP to assure maximum protection against chemical attack. Fan and motor bases are heavy-gauge steel coated with polyurethane. Other Verantis protective coatings are available for other severe service conditions.

Wide choice of sizes and performance characteristics.

The FL series is available in sizes 12" through 72" providing exhaust volumes up to 76,885 CFM and static pressures up to 10" WG.

Every unit pretested.

Impellers are statically and dynamically balanced prior to assembly. Each fan is factory tested before shipment to ensure proper function and service. Fan performance data is obtained from tests conducted in accordance with AMCA standards.

Using this bulletin.

The following pages include information to select a FL Series fan for most applications. If you require technical assistance, call your Verantis representative or the Verantis Corporate Office. Phone numbers are listed at www.verantis.com.

Engineering Features

- Low noise
- Lower operating speeds for increased service life
- Oversized shafts
- Optimized impeller and housing designs for greater efficiency
- Robust base design

FL (Tube Axial) Series Fans

Fan Size	A	B	C	D	Shaft Dia.	C/L to Motor base	Flanges		Weight in lbs (No Motor-No Drive)		Maximum* Motor Frame
							No.	Dia.	Fan	Shipping	
FL-12	12	15	16 ¼	20	1	9±1	12	7/16	65	105	184T
FL-14	14	17	18 3/8	20	1	9 1/8 ±1	12	7/16	75	115	184T
FL-18	18	21	22 3/8	22	1	12 ¾ ±1	16	7/16	90	130	184T
FL-24	24	27	28 ½	24	1 3/16	16 ±1	20	7/16	120	170	215T
FL-30	30	33	34 ½	28	1 7/16	19 3/8 ±13/8	28	7/16	160	225	215T
FL-36	36	39	40 ¾	32	1 7/16	22 ¾ ±1 3/8	32	7/16	215	290	254T
FL-42	42	45	48	36	1 11/16	26 ¼ ±1 5/8	36	7/16	300	390	284T
FL-48	48	52	54 3/8	36	1 11/16	29 7/8±1 5/8	44	9/16	340	450	284T
FL-54	54	58	61	40	1 11/16	33±1 5/8	44	9/16	390	520	286T
FL-60	60	64	67	40	1 15/16	35±1 5/8	52	9/16	450	600	324T
FL-72	72	76	81	48	2 3/16	417/8 ±1 5/8	60	9/16	500	650	326T

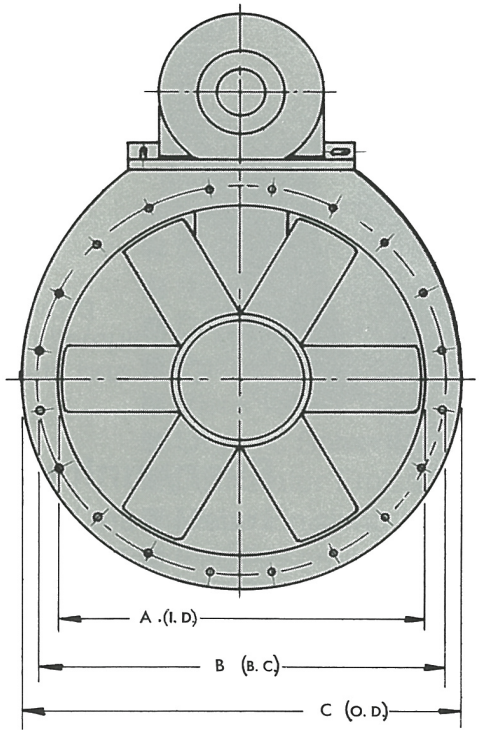
FLR (Axial Roof Ventilator) Series Fans

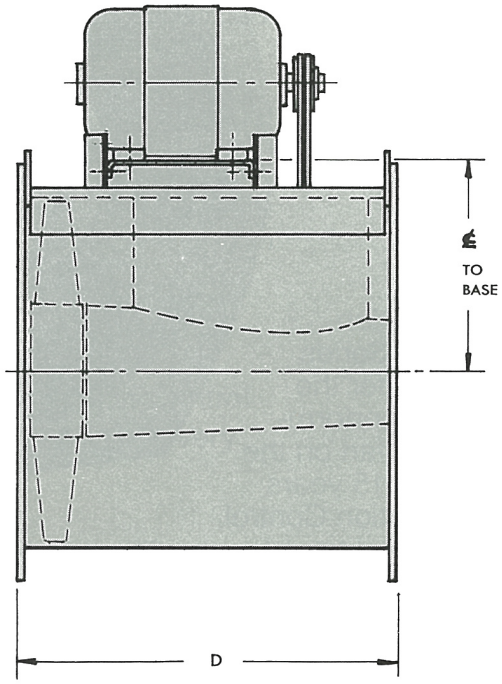
Fan Size	A	B	C	D	E	G	Shaft Dia.	C/L to Motor base	Weight in lbs. (No Motor-No Drive)			Maximum* Motor Frame
									Fan	Shipping	Stack Cap	
FL-12	12	15	16 ¼	20	24	9	1	9±1	70	135	11	184T
FL-14	14	17	18 3/8	20	26	10	1	9 1/8 ±1	80	150	13	184T
FL-18	18	21	22 3/8	22	30	12	1	12 ¾ ±1	100	165	15	184T
FL-24	24	27	28 ½	24	36	15	1 3/16	16 ±1	150	225	30	215T
FL-30	30	33	34 ½	28	42	18	1 7/16	19 3/8 ±13/8	185	270	45	215T
FL-36	36	39	40 ¾	32	48	22	1 7/16	22 ¾ ±1 3/8	242	342	60	254T
FL-42	42	45	48	36	54	25	1 11/16	26 ¼ ±1 5/8	336	450	72	284T
FL-48	48	52	54 3/8	36	60	28	1 11/16	29 7/8±1 5/8	375	500	85	284T
FL-54	54	58	61	40	70	31	1 11/16	33±1 5/8	414	550	100	286T
FL-60	60	64	67	40	76	35	1 15/16	35±1 5/8	453	600	115	324T
FL-72	72	76	81	48	88	40	2 3/16	417/8 ±1 5/8	503	650	145	326T

*Alterations can be made to use larger frames.

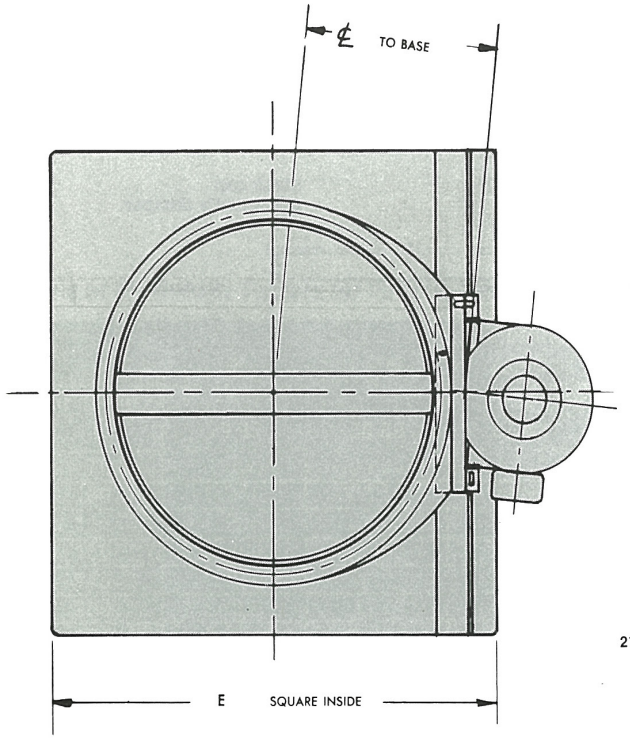
Arrangement
Versatility

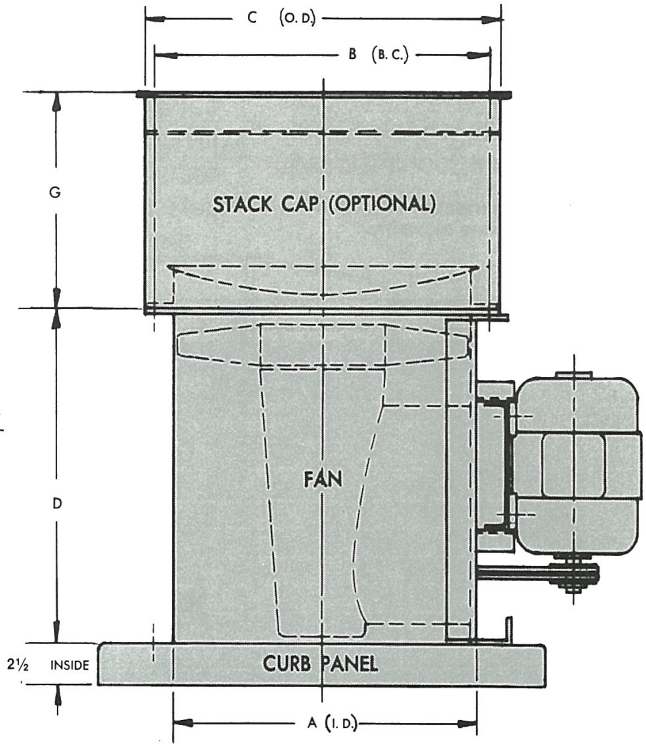
FL (Tube Axial) Series Fans





FLR (Axial Roof Ventilator) Series Fans





Features Available
for Design Flexibility

Carbon gel coating.

All FRP surfaces exposed to the gas stream are coated with a graphite-impregnated layer to eliminate static buildup. Grounding connectors are located externally.

Access doors.

Stud-mounted bolted access doors available on all sizes.

Flanges.

Standard and custom available for inlet or outlet. Drilled or undrilled.

Shaft seals.

Neoprene® is standard.

Guards.

All guards are FRP constructed and can be supplied as full canopy covering motor, drive and shaft; belt drive only and shaft only. All types can be made available OSHA rated.

Flexible connectors.

Standard connectors are EPDM sleeve type with stainless steel draw bands. Flanged flex connectors are also available.

Shafts.

Carbon steel is standard. Stainless steel, Titanium and other alloys and coatings are available as options.

Vibration Isolators.

Rubber vibration isolators, spring vibration isolators or other seismic restraints are available as needs dictate.

Bearings.

Heavy-duty flanged bearings are standard. Sealed pillow block bearings are available.

Removable Bearings.

Unique design permits quick removal of bearing shaft and impeller for in-shop maintenance.

Roof Mounting.

The inlet flange is fabricated as an integral curb base for easy mounting on the roof.

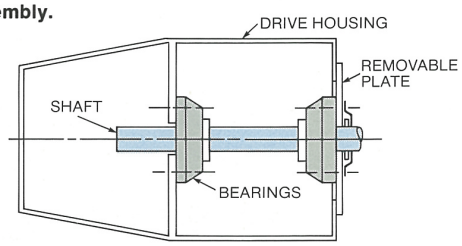
Stack Cap.

Gravity damper prevents rain from entering building when fan is off.

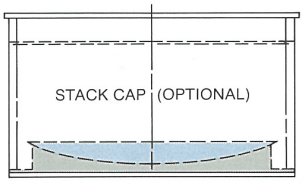
Miscellaneous.

Bird screens, vibration monitors, disconnects, zero speed switches, speed controls, dampers and temperature monitoring.

Removable bearing assembly.



Stack cap with gravity damper.



Class Construction

Verantis fans are designed and fabricated to provide safe and reliable performance throughout the full range listed in the tables. In order to assure an adequate safety factor, we have established the following maximum speeds at 70˚F. For recommendations on applications above 180˚F please contact your Verantis representative.

	CL-I	CL-II
SFPM	12,600	15,000

How to Select
a FL Series Fan

Rating table information

Performance ratings shown in the tables for FL Series fans are based on:

1. Standard air at the fan inlet, with a density of 0.075 pounds per cubic foot. This corresponds to 70°F and 29.92 inches barometric pressure at sea level.
2. Excluding V-belt drive losses.

Effect of temperature and altitude

For selection of fans handling other than standard air, temperature and altitude must be taken into consideration. Since a fan is a constant volume machine, it will deliver the same volume regardless of the air density. The fan static pressure developed and horsepower required will vary directly with the density.

The density of air is inversely proportional to the absolute temperature (rise in temperature gives a lower density) and directly proportional to the absolute pressure (rise in pressure gives a higher density). For example: The ratio to standard conditions for air at 3,000 ft. altitude (26.81" Hg) and at 250°F would be 0.669.

The temperature-pressure relationship is tabulated below. For gases other than air, the gas density, in relationship to standard air density of 0.075 pound per cubic foot, must also be taken into consideration.

Table of Air Density Factors for Various Temperatures and Altitudes

	Altitude in Feet Above Sea Level							
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
Air Temp	Barometric Pressure in inches of Mercury							
°F	29.29	28.86	27.82	26.82	25.84	24.90	23.98	23.09
70	1.000	0.0964	0.0930	0.0896	0.864	0.832	0.801	0.772
100	0.946	0.912	0.880	0.848	0.818	0.787	0.758	0.730
125	0.908	0.875	0.846	0.809	0.784	0.755	0.721	0.700
150	0.869	0.838	0.808	0.770	0.751	0.723	0.696	0.671
175	0.836	0.806	0.777	0.745	0.722	0.695	0.669	0.645
200	0.803	0.774	0.747	0.720	0.694	0.668	0.643	0.620
225	0.775	0.747	0.721	0.694	0.669	0.645	0.620	0.598
250*	0.747	0.720	0.720	0.669	0.645	0.622	0.598	0.576

***Maximum allowable operating temperature for FRP construction.**

Fan selection

The cold static method is the most common system for fan selection. This method is based on the assumption that, at constant CFM and RPM, the static pressure and BHP vary inversely as the absolute temperature and directly as the air density.

Example:

An axial fan to be mounted on the roof with a stack cap is required to exhaust 3,000 ACFM against ¼" SP at 70°F and 3,000 ft. altitude.

1. Add stack cap loss to operating conditions. Hence the roof ventilator must be capable of exhausting 3,000 ACFM against ¼" + 0.062" or 0.312" SPWG.
2. Density factor from Table 1 = 0.896.
3. Convert SP to standard: 0.312 ÷ .896 = 0.35".
4. Using the fan performance curves (which are available for your specific requirement) we select an FLR 18 fan, see figure and speed of 1,560 RPM and 0.4 BHP.
5. Correct BHP to actual conditions 0.4 × .896 = 0.36 BHP

Therefore we would select a FLR 18 fan to deliver 3,000 ACFM at ¼" SP rotating at 1,560 RPM using 0.36 BHP. A ½" HP motor must be supplied.

FL 30 Ratings

	0.25" WG		0.5" WG		0.75" WG		1" WG		1.25" WG		1.5" WG	
VOL CFM	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,500	715	0.42	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5,000	737	0.46	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5,500	767	0.51	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6,000	802	0.57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6,500	840	0.65	1,017	1.21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7,000	880	0.73	1,039	1.29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7,500	922	0.82	1,067	1.39	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8,000	965	0.92	1,099	1.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8,500	1,008	1.03	1,135	1.63	1,269	2.35	N/A	N/A	N/A	N/A	N/A	N/A
9,000	1,053	1.15	1,173	1.77	1,296	2.49	N/A	N/A	N/A	N/A	N/A	N/A
9,500	1,099	1.29	1,212	1.92	1,327	2.65	N/A	N/A	N/A	N/A	N/A	N/A
10,000	1,145	1.44	1,252	2.09	1,360	2.82	1,475	3.69	N/A	N/A	N/A	N/A
10,500	1,193	1.61	1,294	2.27	1,397	3.03	1,493	3.81	N/A	N/A	N/A	N/A
11,000	1,242	1.80	1,337	2.47	1,435	3.24	1,534	4.09	1,640	5.07	N/A	N/A
11,500	1,288	1.98	1,380	2.68	1,474	3.47	1,568	4.33	1,666	5.30	N/A	N/A
12,000	1,334	2.18	1,424	2.91	1,514	3.71	1,604	4.59	1,696	5.55	1,794	6.64
12,500	1,381	2.38	1,463	3.13	1,555	3.97	1,642	4.88	1,728	5.83	1,820	6.91
13,000	1,427	2.60	1,514	3.41	1,597	4.26	1,680	5.17	1,763	6.14	1,849	7.20
13,500	1,474	2.83	1,560	3.69	1,640	4.56	1,719	5.48	1,799	6.47	1,880	7.53
14,000	1,520	3.07	1,606	3.99	1,683	4.87	1,759	5.81	1,837	6.83	1,914	7.88
14,500	1,567	3.32	1,654	4.31	1,727	5.20	1,801	6.17	1,875	7.20	1,950	8.27
15,000	1,613	3.59	1,702	4.66	1,771	5.56	1,843	6.54	1,915	7.58	N/A	N/A
15,500	1,660	3.88	1,750	5.04	1,816	5.93	1,886	6.95	1,955	7.99	N/A	N/A
16,000	1,706	4.17	1,797	5.41	1,861	6.32	1,929	7.36	N/A	N/A	N/A	N/A

Performance certified is for installation Type B: Free inlet, Ducted outlet. Power rating (BHP) does not include transmission losses.
Performance ratings do not include the effect of appurtenances (accessories).

How to Specify
FRP Fans

The following construction details can be used as a guide when writing specifications which demand the highest quality equipment. These specifications are in compliance with accepted design standards.

Fan performance to be certified by the manufacturer that it meets AMCA Standards Handbook 99, Test Code for Air Moving Devices 210 and Certified Ratings Program for Air Moving Devices 211.

Design Criteria Sizing.

Axial and centrifugal fans shall be sized so an increase in speed of 10% will not exceed the maximum RPM of that class of fan.

Performance and Sound Data Provided.

- Design RPM
- Max RPM
- Static Efficiency
- Overall Sound
- Sound Power
- Fan Performance Curve
- Static Efficiency Curve
- Horse Power Curve

Rating.

The size and the capacity rating for each fan quoted shall be furnished.

Laminate.

Fan housings shall be constructed of FRP laminate consisting of an appropriate fire-retardant resin and the proper fiberglass or synthetic reinforcement capable of resisting continuous fume temperatures of 180°F for standard resins. Other options available up to 230°F.

Fire-retardant qualities which equal or exceed the ASTME-84 Tunnel Test Rating of less than 25. For optimum structural integrity, the impeller shall be constructed of vinyl ester resin.

All interior surfaces exposed to the corrosive air stream shall be resin rich and contain not more than 20% of the appropriate surface veil, such as “C” grade fiberglass veil for most service conditions and Nexus surface veil when fluorides are present.

All surfaces exposed to the atmosphere shall be resin rich of a paraffinated resin stabilized against ultraviolet degradation and include a reinforcement not to exceed more than 20% of “C” grade fiberglass, to serve as protection against weathering, fumes, spillage and ultraviolet attack.

Immediately beneath the surfacing veil of the interior and exterior surfaces, the laminate shall be layers of chopped strand mat of Type E glass.

When conductivity is required, the interior of the fan housing and the impeller shall have a carbon gel coat that has a surface conductivity range of 0-30,000 ohms resistance. A grounding lug shall be provided to facilitate the discharging of static electricity to an external ground.

Metal Parts.

No metal parts shall be exposed to the corrosive air stream.

Shaft.

The shaft shall be of such design and size so as to operate below its first critical speed.

Bearings.

Fan to be equipped with heavy-duty bearings, rated for a L-10 life of 100,000 hours, grease packed and sealed against dust and moisture.

Belt drives.

Fan to be equipped with belt drives using matched “deep V” type V-belts sized to handle 1.5 times the rated brake horsepower of the fan motor and incorporating industrial type companion sheaves.

Balancing.

Fan shall be statically and dynamically balanced at its rated operating speed and a certificate of compliance supplied at the time of delivery.

Guards & Canopies.

Provide OSHA approved FRP belt, shaft, and bearing guards, properly ventilated for drive belt and bearing cooling for Arrangement 9. Provide OSHA approved one piece FRP Canopy for Arrangement 10. FRP guards to be supplied with UV resistant top coat.

Impeller.

The fan impeller shall be constructed of premium-grade vinyl ester resin in accordance with ASTM D4167 and the laminate shall meet or exceed the requirements for defects per ASTM D2563 Level II. Customer inspections are available to ensure compliance. The fan impellers shall be made using a non-fire retardant vinyl ester resin chosen for strength characteristics. Resin for the fan impellers is to be DION 9800 or approved equal. Steel impeller hub shall be encapsulated in FRP to ensure corrosion resistant integrity and constructed so that the shaft remains outside of the airstream. Metal-constructed impellers coated with FRP, or impellers permanently bonded to shaft are not acceptable.

Hardware.

- All hardware to be Type 316 Stainless Steel.

VERANTIS
Environmental Solutions Group

Contact Verantis

www.verantis.com
sales@verantis.com