BIO MICROBICS®

BETTER WATER. BETTER WORLD.®

MicroFAST®

Rhode Island

Design

Manual

September 10, 2019

MicroFAST® Rhode Island Design Manual
Revised September 10, 2019

A. Table of Contents

B. Vendor Information

1. Vendor Name: BioMicrobics®
   a. Address: 16002 West 110th Street
      Shawnee, KS 66219
   b. Telephone: 913-422-0707
   c. Web address: www.biomicrobics.com
2. Contact person, telephone and fax numbers:
   Sales and Regulatory Affairs Coordinator, Anna Cline
   Email address: acline@biomicrobics.com
   Office phone: 913-422-0707
   Fax: 913-422-0808

C. Technology Information

The Models 0.5, 0.625, 0.75, 0.9 and 1.5 are certified to NSF Standard 40 and 245 with an average CBOD5 3mg/L; TSS 5 mg/L and total nitrogen (TN) 17 mg/L. The Models 3.0, 4.5 and 9.0 have been reviewed by NSF to show that these Models will provide the same treatment as the NSF 40 and 245 certified Models as shown in a letter dated November 19, 2008 (attached to this document). With this said the MicroFAST® system is capable of achieving effluent concentrations of less than or equal to 19 mg/L total nitrogen (TN) and 30 mg/L for each TSS and BOD.

D. Summary/Description

The System's process is an aerobic fixed-film, activated sludge process that is a combination of the conventional trickling filter and activated sludge processes. The system is designed to be installed within a two-compartment tank where the first compartment provides a primary settling zone for incoming sewage and the second houses the System. The system contains submerged media that provide surfaces for microbial growth. Aeration and circulation are provided by a blower that pumps air into a draft tube that extends down the center of the system. Treated effluent is discharged to a leachfield.

E. Terms and Definitions

1. BioMicrobics

BioMicrobics is the manufacturer of the MicroFAST® system and the company that holds the certification for the MicroFAST® system in Rhode Island.

2. BioMicrobics Official Representative

A BioMicrobics official representative is either BioMicrobics personnel or a designated representative from the Rhode Island BioMicrobics' distributor.

3. Registered Inspector/Service Provider

A registered inspector/service provider is a professional onsite wastewater treatment system service provider who is registered by the New England onsite wastewater training program after passing INSP 200 as a registered operation & maintenance service provider for innovative & alternative septic systems.

4. Owner

Owner means any person who holds legal title to any real property; or has possession or control of any real property through any agent, executor, executrix, administrator, administrator, trustee or guardian of the estate of a holder of a legal title. An owner is a person who owns and occupies a home that is served by a BioMicrobics' MicroFAST® system.

5. Certified Service Provider

A certified service provider is a registered inspector/service provider or licensed RIDEM Class II or III designer who is certified in writing by BioMicrobics to provide the service on a BioMicrobics MicroFAST® system.

6. Owner Certification

Owner certification authorizes a person who has attended and passed a URI onsite wastewater training class: INSP 100 A&B-conventional onsite wastewater system inspection and field training to perform operation and maintenance activities as prescribed by BioMicrobics, for the MicroFAST® system on the owner's property only. Owner certification does not authorize the homeowner to perform repair activities; all repairs must be performed by a BioMicrobics' certified service provider.

7. Residential Strength Wastewater

Residential strength wastewater has influent characteristics less than 350 mg/l BOD and TSS and TKN less than 70 mg/l.

F. Design Criteria

1. Applicable Uses

The MicroFAST® can be used for residential treatment to provide a high quality effluent. The MicroFAST can also be used for commercial projects, but all commercial project designs must be with the direct assistance of BioMicrobics factory personnel. At the completion of the design for all commercial projects, BioMicrobics will provide a design review letter to demonstrate that the design was approved for the application.

FAST is only approved in Rhode Island as a nitrogen-reducing technology for the treatment of residential strength wastewater at design flows less than or equal to 900 gallons per day. The system can reduce nitrogen to ≤ 19 mg/L, BOD to ≤ 30 mg/L, TSS to ≤ 30 mg/L, and O&G to ≤ 5 mg/L.

FAST is approved in Rhode Island to reduce BOD to ≤ 30 mg/L, TSS to ≤ 30 mg/L, and O&G to ≤5 for residential and commercial applications. At a minimum, sampling and testing of the wastewater (or an estimate/projection of wastewater characteristics for applications for new construction) and an assessment by BioMicrobics is required for the proposed use.

2. Table for Design

Table for Design			
Treatment Unit	**Bedrooms (RIDEM) (1)**	**Design Flow (GPD)**	**Residential Strength Wastewater Characteristics Treated**
MicroFAST 0.5	1-4	100-500	N, BOD, TSS, O&G
MicroFAST 0.625	4-5	501-625	N, BOD, TSS, O&G
MicroFAST 0.75	5-6	626-750	N, BOD, TSS, O&G
MicroFAST 0.9	6-7	751-900	N, BOD, TSS, O&G
MicroFAST 1.5	7-11	900-1,500	BOD, TSS, O&G
MicroFAST 3.0	11-22	1500-3000	BOD, TSS, O&G
MicroFAST 4.5	22-33	3000-4500	BOD, TSS, O&G
MicroFAST 9.0	33-66	4500-9000	BOD, TSS, O&G

(1) Based on RI Department of Environmental Management Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems, as amended.

3. Tank Sizing

All settling tanks, whether separate or integral, shall contain the appropriate screening; see section F (Design Criteria) item 8 for effluent filter requirements below. The treatment zone can be incorporated in the same tank as the settling zone with two compartments (settling and aerobic). The baffle wall must have

the proper openings between the two zones as shown on the BioMicrobics drawings on page 2 of 6 (**See Appendix A**).

If the settling tank is in the same tank as the treatment zone, the baffle wall separating the settling zone from the treatment zone, must extend to the top of the tank and be sealed. This is required to assure that the septic odors from this tank are vented through the home as is typical for a septic tank installation.

If the tank is smaller than the minimum dimensional range specified, the MicroFAST® system may not operate properly. The effluent quality could suffer and may not meet site requirements. Please consult BioMicrobics should a smaller settling tank be considered for an installation due to site constraints and a review will be made on a case by case basis.

4. Wastewater Strength

The table for design is to be used only for **Residential strength wastewater** (see section E. terms and definitions; item 7. Residential strength wastewater). All commercial applications must be designed with the supervision of BioMicrobics factory personnel. A design review letter will be issued by BioMicrobics to demonstrate that the design was approved for the application.

5. Vendor Review

For residential installations following this design manual a review by BioMicrobics is not required. Additionally, it is a requirement that 7 bedroom designs, systems greater than 700 gpd and all commercial designs be reviewed by the manufacturer.

6. Anti-flotation & Maximum cover

All BioMicrobics treatment systems are installed into tanks supplied by others. The designer will provide for anti-flotation calculations to prevent floating and the maximum depth of fill cover which must be followed in the design.

7. Restrictions

The blower can be remotely located, but the blower piping is restricted to 100 ft total length with no more than 4 elbows. Blower housing shall be located above flood/standing water and be at an elevation equal to or higher than the inlet into the treatment zone.

8. Effluent Filter

The MicroFAST® system does not require an effluent filter. However should one be specified please adhere to the max flow capacity for the installation.

9. Surge and Emergency Storage Volumes

Surge and emergency storage is not part of the BioMicrobics system. If this is required, it should be included in an effluent pumping tank.

10. Expected Treatment Performance/Typical Effluent Quality

As mentioned above in the technology information section; the MicroFAST® systems are certified to NSF Standard 40 and 245. The expected treatment performance is based on residential strength wastewater. For commercial applications the expected effluent quality will be defined in the design review letter supplied by BioMicrobics.

11. Discharge

The discharge from the MicroFAST® can be fed into a gravity dispersal field. If the dispersal field requires a pumped system for dispersal, a separate pump and pump tank must be provided. This pump tank must be placed as close as possible to the MicroFAST® tank.

12. Control Panel

A description of the MicroFAST® control panel is shown in (**Appendix B).** This control panel provides the operational control for all of the components associated with the BioMicrobics MicroFAST® product. If a pump tank and pump is required for the dispersal of the effluent a separate pump panel and controls (floats) must be specified by the designer and provided by the installer.

13. Cold Climate Restrictions

There are no cold climate restrictions for the MicroFAST® other than those commonly practiced in RI for the protection of the septic systems for freezing.

14. Dimensioned Section and Plan Views

Dimensioned Section and Plan Views are shown in the MicroFAST® drawings in

Appendix A.

15. Non-Corrosive Support System For MicroFAST®

The MicroFAST® should be placed within the tank either by feet or lid installation. Both variations utilize a non-corrosive system.

16. Blower Housing Support

As mentioned in the restriction section the blower housing shall be located above flood/standing water and be at an elevation equal to or higher than the inlet into the treatment zone. The blower housing shall be mounted onto a concrete base (using a precast slab and drilling the required holes). This slab should be depicted on the design plan and the precast option included in the construction note. There are installations that allow for a buried blower or a blower to be located in a shed/enclosure. Sufficient venting should be installed and the installation be parallel to normal blower specifications with the maximum distance and avoidance of flood areas.

17. Design Assistance

For all commercial applications we require that the design be completed with the assistance of BioMicrobics. At the completion of the design for all commercial projects, BioMicrobics will provide a design review letter to demonstrate that the design was approved for the application.

G. Installation Criteria
Reference BioMicrobics FAST® Installation Manual and Control Panel Wiring

1. Overview of the technology and associated components (**Appendix B**)
2. List of equipment provided by BioMicrobics and list of equipment to be provided by the installer (**Appendix C- Installation Manual**)
3. Specific tools required for installation (**Appendix C- Installation Manual**)
4. Directions for preparing all required excavation (Provided by Tank Vendor)
5. Directions for material handling

i. receiving and unloading of MicroFAST® system (**Appendix C- Installation Manual**)

ii. bedding, placing, backfilling, and component connections (Provided by Tank Vendor)

iii. control panel connections (**Appendix B**)

6. Direction for installation of risers is (Provided by riser vendor)

7. Plan and section views
   i. Discharge to leachfield (**Appendix B**)

   ii. Power supply and control panel (**Appendix B**)

8. The blower housing should be placed on a concrete slab. A precast concrete slab can be used by drilling the appropriate holes for the air supply line. There are installations that allow for a buried blower or a blower to be located in a shed/enclosure. Sufficient venting should be installed and the installation be parallel to normal blower specifications with the maximum distance and avoidance of flood areas

9. Checklist for start-up procedure (**Appendix B**)

10. Graphic details, wiring schematics, narrative and guidance for proper installation (**Appendix C- Installation Manual**)

11. Installation assistance

Onsite contractor assistance as well as designer, installer and service provider training by BioMicrobics distributor:

J & R Sales and Services
44 Commercial Street
Raynham, MA 02767

(508) 823-9566

H. Operations and Maintenance/Cost/Monitoring Requirements Reference BioMicrobics Service Manual

1. System overview (**Appendix C- Service Manual**)

2. List of required tools (**Appendix C- Service Manual**)

3. Checklist for start-up O&M procedure (**Appendix C- Service Manual**)

4. Checklist of activities for maintenance schedule (**Appendix C- Service Manual**)

5. Directions for maintenance activities (**Appendix C- Service Manual**)

6. Sample locations (**Appendix C- Service Manual**)

7. Troubleshooting (**Appendix C- Service Manual**)

8. Chain of command and procedure for reporting non-compliance
   Operator will inform both the BioMicrobics and the system owner regarding the non-compliance and steps taken to rectify the issue(s).

I. Training/Qualifications

BioMicrobics or its Representative will provide training for the installation and servicing of the MicroFAST® system. A list of those who have been certified by BioMicrobics can be found in **Appendix D** along with the procedure for the Certification of Service Providers and Homeowners for the Purpose of Operation and Maintenance.

J. Appendix

A. Drawings
B. Inspection checklist, Inspection Protocol and Control Panel
C. Service Manual, Installation Manual and Inspection checklist
D. Training

NSF International

November 19, 2008

Mr. Jim Bell
BioMicrobics, Inc.
8450 Cole Parkway
Shawnee, KS 66227

Dear Mr. Bell,

We have completed a review of the BioMicrobics MicroFAST Models 3.0, 4.5 and 9.0 for expected performance based on the NSF Certified MicroFAST models under NSF/ANSI Standard 40 and 245. Our review focused on comparison of the larger system designs with those of the Certified systems, including media volume, tank volumes (hydraulic retention times and sludge storage) and aeration (oxygen availability for organic stabilization and mixing).

The review was based on drawings and design data provided by BioMicrobics for the MicroFAST series and the three larger models. Dimension data was provided in the attached Table of Required Dimensions and Volumes, aeration data in the attached Air Blower Option table and drawings for Model 3.0 (MicroFAST® with lid, MicroFAST® with feet, MicroFAST® Specifications and MicroFAST® Details), Model 4.5 (MicroFAST® 4.5 F, MicroFAST® 4.5 P, MicroFAST® 4.5 S, and MicroFAST® 4.5 X) and Model 9.0 (MicroFAST® 9.0 F, MicroFAST® 9.0 P, MicroFAST® 9.0 S, and MicroFAST® 9.0 X).

Media Volume

The capacity of the MicroFAST process to treat organic contaminants is directly related to the volume of media in the system. The volume of the media is based on organic loading per cubic foot of the media. The media volume in the MicroFAST series, from the Model 0.5 through the Model 9.0, is directly proportional to the organic/hydraulic loading of the system. The Model 0.5 provides 16 ft^3 of media, while the Model 1.5 provides 48 ft^3 of media, Model 3.0 provides 96 ft^3 of media, Model 4.5 provides 144 ft^3 of media and Model 9.0 provides 288 ft^3 of media.

Tank Volumes

Most of the wastewater treatment in the MicroFAST process is provided in the media, but the volume of the tank the media is placed in is important to provide for solids removal and storage, and to provide hydraulic retention to allow for circulation of the wastewater through the media. The volumes provided in the settling and treatment chambers of Models 3.0, 4.5 and 9.0 are proportional scale-ups, based on hydraulic loading, from the Model 1.5. The settling zone design provides from ½ to 1 times the daily flow volume, which is consistent with the NSF/ANSI Standard 40 and 245 Certified systems.

789 Dixboro Road, Ann Arbor, MI 48105 USA
734-769-8010 1-800-NSF-MARK Fax 734-769-0109
E-Mail: info@nsf.org Web:http://www.nsf.org

The minimum treatment zone volumes, except for the smallest of the NSF Certified systems, are proportional for the model series based on hydraulic capacity.

Aeration

Aeration in the system provides for both oxygen transfer to meet organic loading requirements and mixing within the system. The MicroFAST process utilizes an air-lift design to circulate wastewater through the media. In general, the air volume needed for mixing exceeds that required for oxygen transfer, particularly in the smaller systems. Also, the required air volume for the smaller systems is less than provided by the lower horsepower blowers, resulting in the same size blower for a number of the small systems (Models 0.5 through 0.9). To the extent motor sizes allow the blower volumes provided for the larger MicroFAST systems (Model 1.5 through 9.0) are proportional and appear adequate for the purpose.

Given the design proportionality of the MicroFAST Models 3.0, 4.5 and 9.0 to the NSF/ANSI Standard 40 & 245 Certified systems, we would expect that the larger Models would provide treatment comparable to the NSF Certified Models for residential strength wastewater.

Please let me know if you have any questions regarding this information.

Sincerely,

Thomas G Stevens

Thomas Stevens
Technical Manager

Attachments

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Appendix

A

Table for Design			
Treatment Unit	**Bedrooms (RIDEM) (1)**	**Design Flow (GPD)**	**Residential Strength Wastewater Characteristics Treated**
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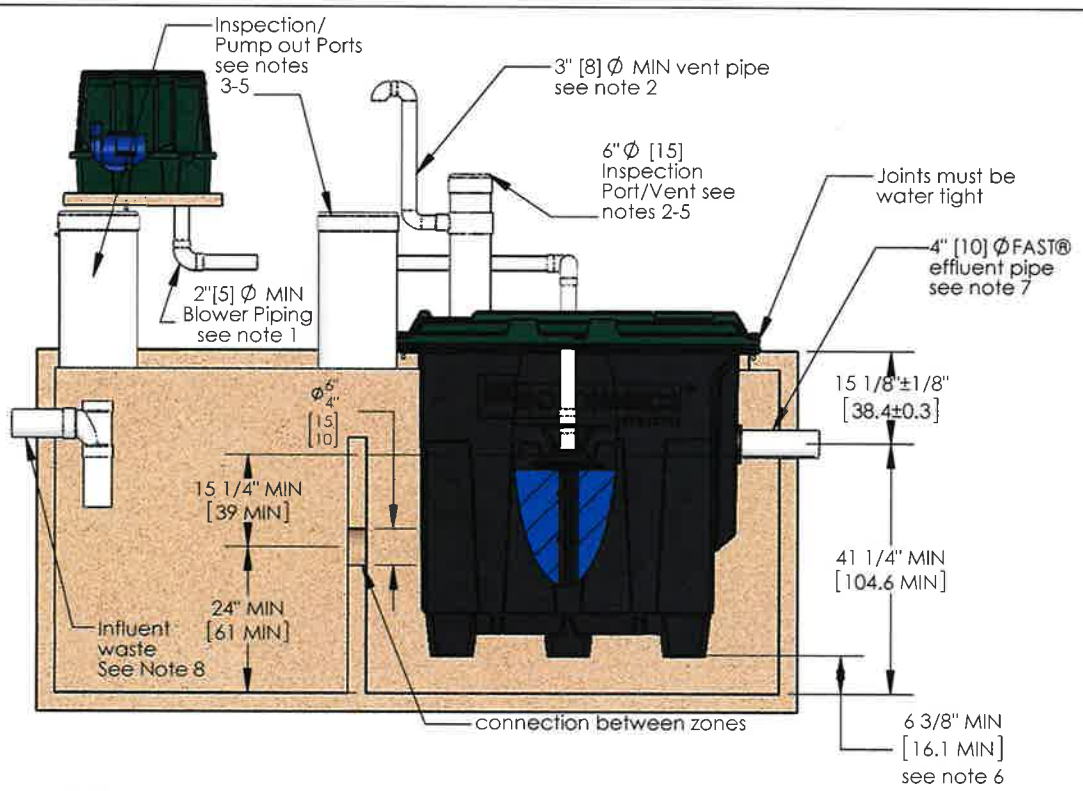
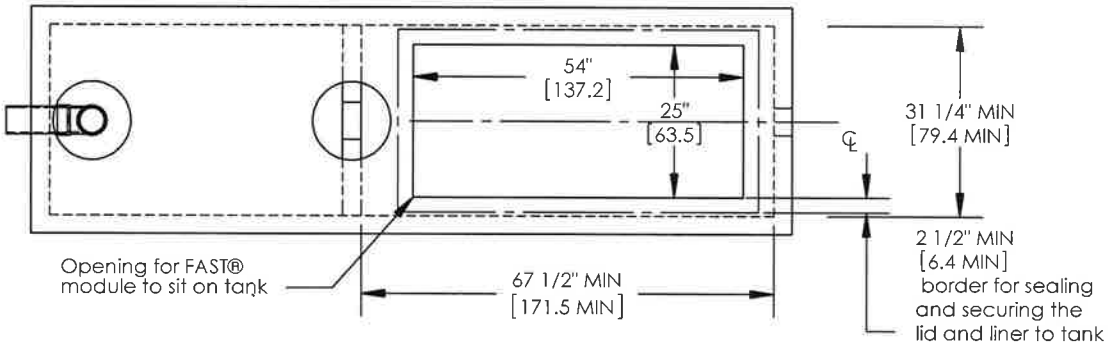
MicroFAST 0.75	5-6	626-750	N, BOD, TSS, O&G
MicroFAST 0.9	6-7	751-900	N, BOD, TSS, O&G
MicroFAST 1.5	7-11	900-1,500	BOD, TSS, O&G
MicroFAST 3.0	11-22	1500-3000	BOD, TSS, O&G
MicroFAST 4.5	22-33	3000-4500	BOD, TSS, O&G
MicroFAST 9.0	33-66	4500-9000	BOD, TSS, O&G

(1) Based on RI Department of Environmental Management Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems, as amended



Settling Zone
350 Gallon MIN [1300 L MIN]

Treatment Zone
450 Gallon MIN [1700 L MIN]



NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 26" X 20" X 2" [65 X 50 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 7 sq in.[45 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. Installations using a FAST® system lid are capable of withstanding AASHTO H-10 equivalent loads. Any installation in which a FAST lid is buried deeper than 3 feet, or where additional loading conditions may occur, a professional engineer should be consulted. FAST® with feet option should be considered. Refer to Installation Manual for more details.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

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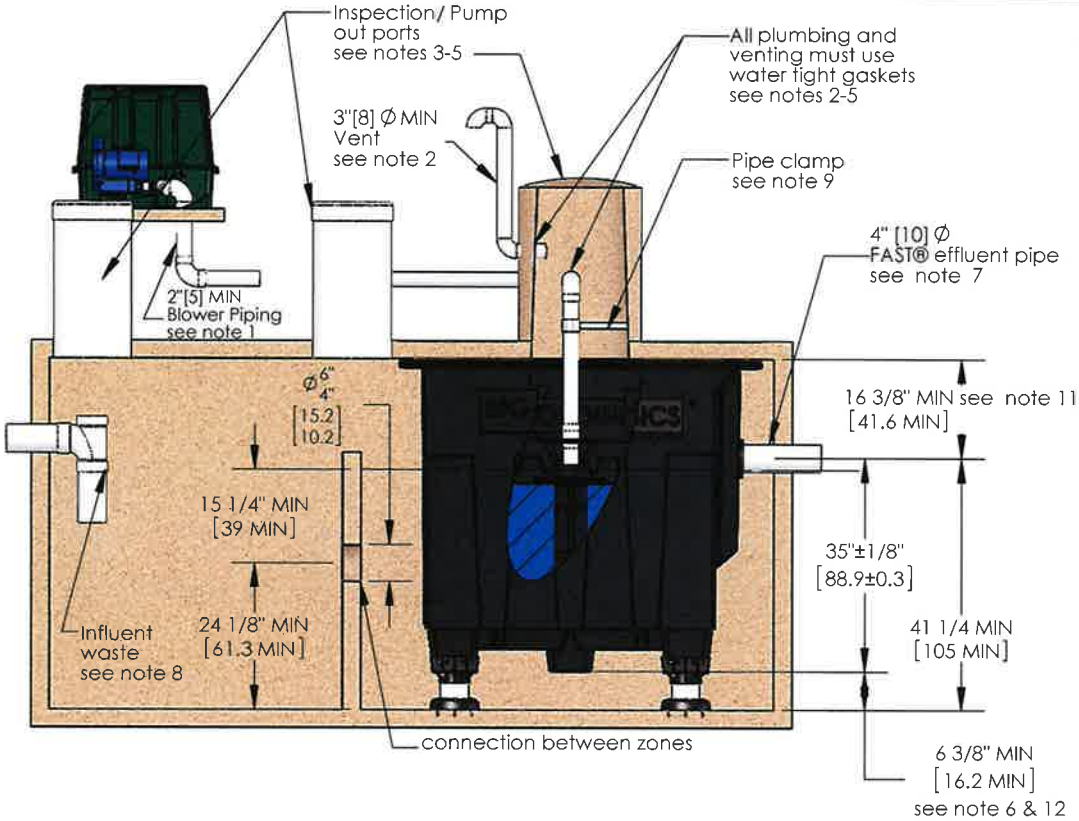
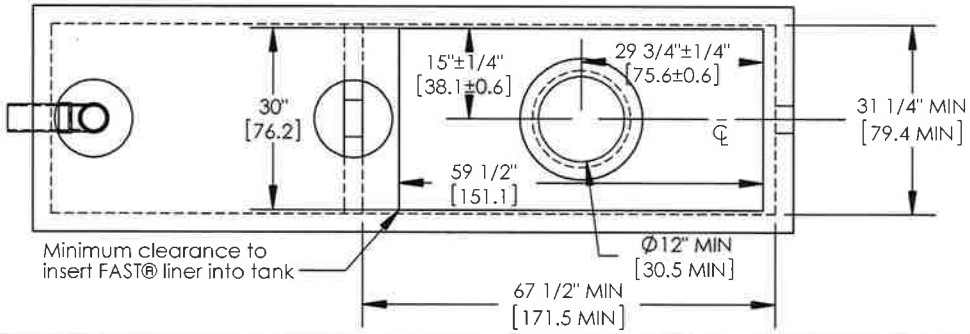
MicroFAST 0.50 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER	SHEET
NAME	DATE	A	MicroFAST® 0.50 with lid	1 OF 4
DRAWN CTC	12/18/2006			
CHECKED PF	9/18/2013	REVISED 9/18/2013	REV. INI-05-V	



Settling Zone
350 Gallon MIN [1300 L MIN]

Treatment Zone
450 Gallon MIN [1700 L MIN]



NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 26" X 20" X 2" [65 X 50 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 7 sq in.[45 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2' min [60 cm]. See alternate air supply option on sheet 4 of 4.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.
11. Min. height may be reduced, consult factor and reference "Low Profile Module Procedure.pdf"
12. Refer to sheet 4 of 4 for leg extensions requirements.

DO NOT SCALE

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MicroFAST 0.50 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
	NAME DATE	A	MicroFAST® 0.50 with feet		2 OF 4
DRAWN	CTC 12/18/2006				
CHECKED	PF 9/18/2013		REVISED 9/18/2013	REV. INI-05-V	

Specifications for MicroFAST 0.50 Wastewater Treatment System

1. GENERAL

The contractor shall furnish and install (1) MicroFAST®0.50 treatment system as manufactured by Bio-Microbics, Inc. The treatment system shall be complete with all needed equipment as shown on the drawings and specified herein.

The principal items of equipment shall include the FAST® system insert, blower assembly, blower controls and leg extensions or lid. All other items will be provided by others. The MicroFAST 0.50 unit shall be situated within a 450 Gallon [1700L] minimum compartment as shown on the drawings. Suggested maximum settling zone is (1) X the daily flow. Tank must provide adequate pump out access and conform to local, state, and all other applicable codes. The contractor shall coordinate the proper fabrication of the tank between the FAST system and tank supplier with regard to fabrication of the tank, installation of the FAST unit, and delivery to the job site.

2. OPERATING CONDITIONS

The MicroFAST 0.50 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from (1) one to (8) eight people and not to exceed 500 US Gallons per day (1800 LPD) provided the waste contains nothing that will interfere with biological treatment. The FAST system is a biological treatment system not meant for non-biodegradable or industrial wastewater.

3. MEDIA

The FAST® media shall be manufactured of rigid PVC, polyethylene, or polypropylene and it shall be supported by the polyethylene insert. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids descend through the media to the bottom of the septic tank.

4. BLOWER

The MicroFAST 0.50 unit shall come equipped with a regenerative type blower capable of delivering 17-25 CFM [31-46 m3/hr]. The blower assembly shall include an inlet filter with metal filter element. The blower shall be mounted outside the tank on a contractor supplied concrete base. Blower piping to the tank shall use non-corrosive material (PVC, Galvanized, or stainless Steel). Do not run galvanized pipe inside the treatment tank. Refer to Installation Manual for further details.

5. REMOTE MOUNTED BLOWER

The blower shall be placed on a contractor supplied concrete base. The blower must not sit in standing water and its elevation must be higher than the tank and normal flood level. A two-piece, rectangular housing shall be provided. The discharge air line from the blower to the MicroFAST® System shall be provided and installed by the contractor.

6. ELECTRICAL

The electrical source should be within 150 feet [45 meters] of the blower consult local codes for longer wiring distances. All wiring must conform to all applicable codes(IEC, NEC, etc.). Wiring distances must prevent significant voltage loss. Input power on 60Hz electrical systems 110/220VAC, 1Ø, 3.5/1.7 FLA, on 50 Hz electrical systems 220VAC, 1Ø, 1.9 FLA. Other voltages and phase are also available. Actual power consumption varies with site conditions. All conduit and wiring shall be supplied by contractor.

7. CONTROLS

The control panel provides power to the blower and contains an alarm system consisting of a visual and audible alarm capable of signaling blower circuit failure and high water conditions. The control panel is equipped with SFR® (Sequencing Fixed Reactor) timed control feature. A manual alarm silence button is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS

All work must be done in accordance with local codes and regulations. Installation of the FAST 0.50 shall be done in accordance with the written instructions provided by the manufacturer. Manuals shall be furnished, which will include a description of system installation, operation, and maintenance procedures.

9. FLOW AND DOSING

FAST® systems have been successfully designed, tested and certified receiving gravity, demand-based influent flow. When influent flow is controlled by pump or other means to help with highly variable flow conditions, then multiple dosing events should be used to maximize performance. The flow rate shall not exceed 5 gpm (19 Lpm) with a maximum hourly flow not to exceed 10% of the design daily flow (50 gph (190 LPH)).

10.WARRANTY

Bio-Microbics, Inc. warrants all new residential FAST® models (MicroFAST® 0.50, 0.625, 0.75, 0.90, and 1.5) against defects in materials and workmanship for a period of two years after installation or three years from date of shipment which ever occurs first. All other FAST® system models are warranted for a period of one year after installation or eighteen months from date of shipment, whichever occurs first. All are subject to the following terms and conditions below:

During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIO-MICROBICS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIO-MICROBICS, INC., ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. Contact your local distributor for parts and service.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

BIO MICROBICS
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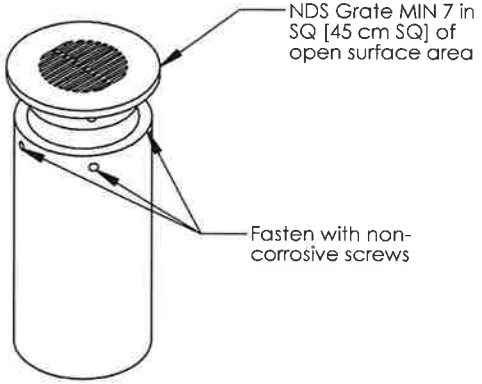
MicroFAST 0.50 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
	NAME DATE	A	MicroFAST® 0.50 Specifications		3 OF 4
DRAWN CTC	12/18/2006				
CHECKED PF	9/18/2013		REVISED 9/18/2013	REV. INI-05-V	

Minimum leg extension assembly see note 1-4

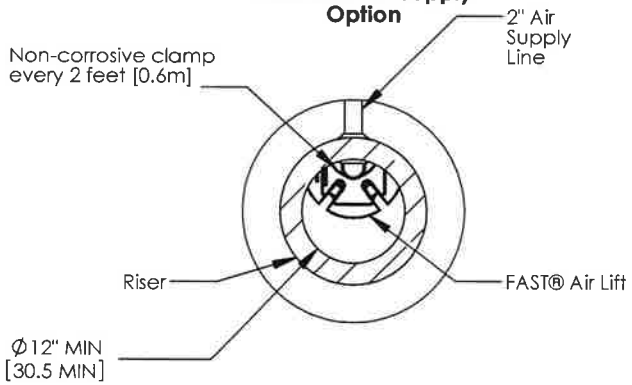
DETAIL
SCALE 1 : 5

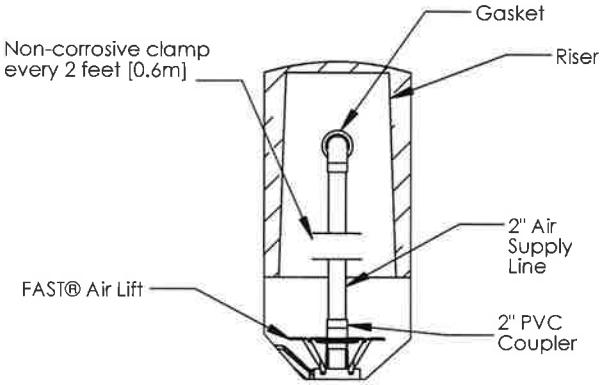
FAST® Vent Option



DETAIL
SCALE 1 : 4

Alternate Air Supply Option





Notes
1. Secure leg extension to the FAST® unit by placing two screws on each side of the leg extension (4 screws per foot are included).
2. Cut 4" schd. 40 PVC pipe (not included) to obtain the desired height. Minimum pipe length of 6 1/8" [15.56cm] will provide minimum clearance of 10". For heights greater than 18" [45.7cm] use schd. 80 PVC pipe (not included). Consult factory for extending leg beyond 36"[90 cm].
3. Anchor the leg extensions to the tank with non-corrosive hardware (not included) at the provided mounting points.
4. If less than the specified minimums are considered necessary, consult factory for guidance.
5. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2ft [0.6m] minimum.
6. Tank, anchors, piping conduit, blower, housing pad and vents are provided by others.

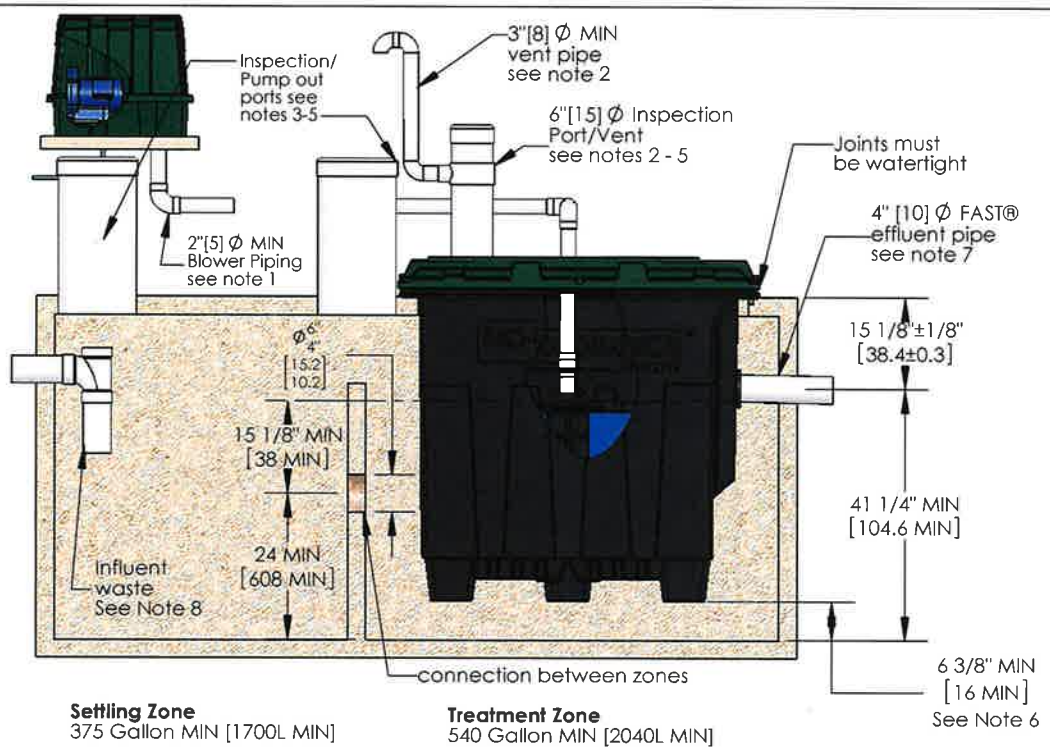
DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

BIO MICROBICS
BETTER WATER. BETTER WORLD.

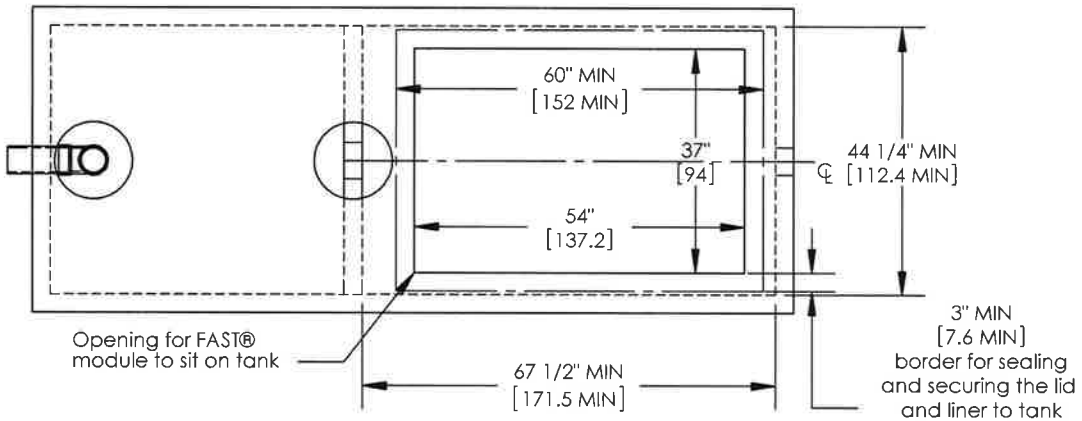
MicroFAST 0.50 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER	SHEET
NAME	DATE	A	MicroFAST® 0.50 Details	4 OF 4
DRAWN CTC	12/18/2006			
CHECKED PF	9/18/2013		REVISED 9/18/2013	REV. INI-05-V



Settling Zone
375 Gallon MIN [1700L MIN]

Treatment Zone
540 Gallon MIN [2040L MIN]



NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 26" X 20" X 2" [65 X 50 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 7 sq in.[45 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. Installations using a FAST® system lid are capable of withstanding AASHTO H-10 equivalent loads. Any installation in which a FAST lid is buried deeper than 3 feet, or where additional loading conditions may occur, a professional engineer should be consulted. FAST® with feet option should be considered. Refer to Installation Manual for more details.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

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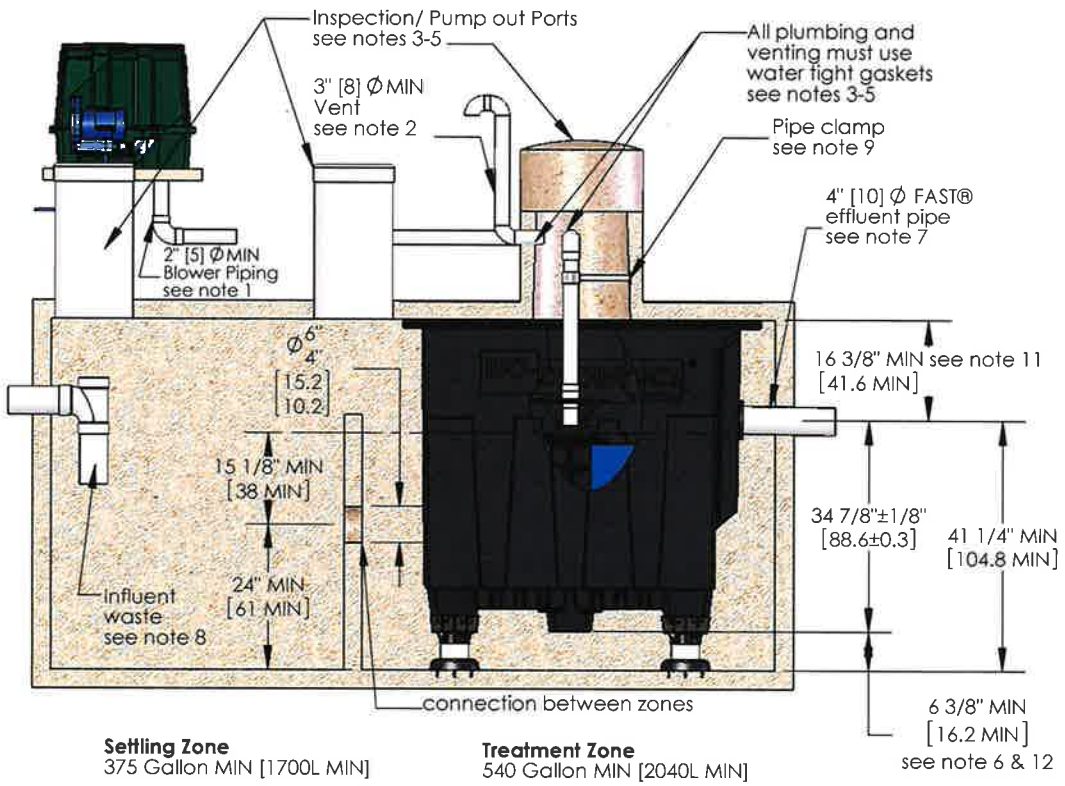
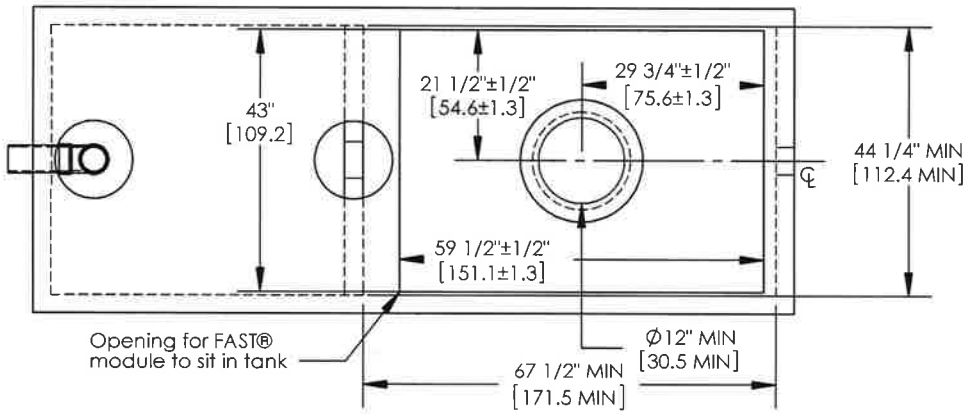
MicroFAST 0.625 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
	NAME DATE	A	MicroFAST® 0.625 with lid		1 OF 4
DRAWN	CTC 12/18/2006				
CHECKED	PF 4/16/2014		REVISED 4/16/2014	REV. INI-07-T	





NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 26" X 20" X 2" [65 X 50 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 7 sq in.[45 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2' min [60 cm]. See alternate air supply option on sheet 4 of 4.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.
11. Min. height may be reduced, consult factor and reference "Low Profile Module Procedure.pdf"
12. Refer to sheet 4 of 4 for leg extensions requirements.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

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MicroFAST 0.625 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER	SHEET
NAME	DATE	A	MicroFAST® 0.625 with feet	2 OF 4
DRAWN CTC	12/18/2006			
CHECKED PF	4/16/2014	REVISED 4/16/2014	REV. INI-07-T	

Specifications for MicroFAST 0.625 Wastewater Treatment System

1. GENERAL

The contractor shall furnish and install (1) MicroFAST®0.625 treatment system as manufactured by Bio-Microbics, Inc. The treatment system shall be complete with all needed equipment as shown on the drawings and specified herein.

The principal items of equipment shall include FAST® system insert, leg extensions, or lid, blower assembly, blower controls and alarms. All other items will be provided by others. The MicroFAST 0.625 unit shall be situated within a 540 Gallon[2040L] minimum compartment as shown on the drawings. Suggested maximum settling zone is the daily flow. Tank must provide adequate pump out access and conform to local, state, and all other applicable codes. The contractor shall coordinate the proper fabrication of the tank between the tank and FAST system suppliers as well as the installation of the FAST unit, and delivery to the job site.

2. OPERATING CONDITIONS

The MicroFAST 0.625 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from (1) one to (10) ten persons and not to exceed 625 US Gallons per day (2400LPD) provided the waste contains nothing that will interfere with biological treatment. The FAST system is a biological treatment system not meant for non-biodegradable or industrial wastewater.

3. MEDIA

The FAST media shall be manufactured of rigid PVC, polyethylene, or polypropylene and it shall be supported by the polyethylene insert. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids descend through the media to the bottom of the septic tank.

4. BLOWER

The MicroFAST 0.625 unit shall come equipped with a regenerative type blower capable of delivering 17-25 CFM [31-46m3/hr]. The blower assembly shall include an inlet filter with metal filter element. The blower shall be mounted outside the tank on a contractor supplied concrete base. Blower piping to the tank shall use non-corrosive material (PVC, Galvanized, or stainless Steel). Do not run galvanized pipe inside the treatment tank. Refer to Installation Manual for further details.

5. REMOTE MOUNTED BLOWER

The blower shall be placed on a contractor supplied concrete base. The blower must not sit in standing water and its elevation must be higher than the tank and normal flood level. A two-piece, rectangular housing shall be provided. The discharge air line from the blower to the MicroFAST® System shall be provided and installed by the contractor.

6. ELECTRICAL

The electrical source should be within 150 feet [45 meters] of the blower, consult local codes for longer wiring distances. All wiring must conform to all applicable codes(IEC, NEC, etc.). Wiring distances must prevent significant voltage loss. Input power on 60Hz electrical systems 110/220VAC, 1Ø, 3.5/1.7 FLA, on 50 Hz electrical systems 220VAC, 1Ø, 1.9 FLA. Other voltages and phase are also available. Actual power consumption varies with site conditions. All conduit and wiring shall be supplied by contractor.

7. CONTROLS

The control panel provides power to the blower with an alarm system consisting of a visual and audible alarm capable of signaling blower circuit failure and high water conditions. The control panel is equipped with SFR® (Sequencing Fixed Reactor) timed control feature. A manual silence button is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS

All work must be done in accordance with local codes and regulations. Installation of the FAST 0.625 shall be done in accordance with the written instructions provided by the manufacturer. Manuals shall be furnished, which will include a description of system installation, operation, and maintenance procedures.

9. FLOW AND DOSING

FAST systems have been successfully designed, tested and certified receiving gravity, demand-based influent flow. When influent flow is controlled by pump or other means to help with highly variable flow conditions, then multiple dosing events should be used to maximize performance. The flow rate shall not exceed 5 gpm (19 Lpm) with a maximum hourly flow not to exceed 10% of the design daily flow (65 gph (240 LPH).

10.WARRANTY

Bio-Microbics, Inc. warrants all new residential FAST® models (MicroFAST® 0.50, 0.625, 0.75, 0.90, and 1.5) against defects in materials and workmanship for a period of two years after installation or three years from date of shipment which ever occurs first. All other FAST® system models are warranted for a period of one year after installation or eighteen months from date of shipment, whichever occurs first. All are subject to the following terms and conditions below:

During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIO-MICROBICS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIO-MICROBICS, INC., ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. Contact your local distributor for parts and service.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

BIO MICROBICS
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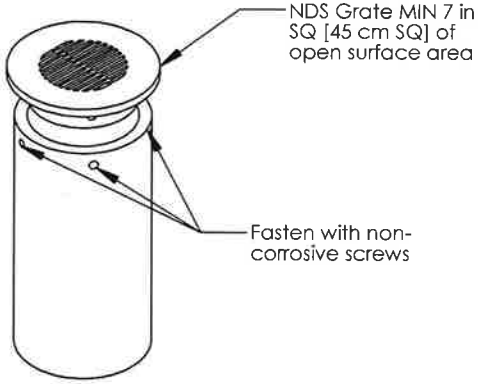
MicroFAST 0.625 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
	NAME / DATE	A	MicroFAST®0.625 Specifications		3 OF 4
DRAWN CTC	12/18/2006				
CHECKED PF	4/16/2014		REVISED 4/16/2014	REV. INI-07-T	

Minimum leg extension assembly see note 1-4

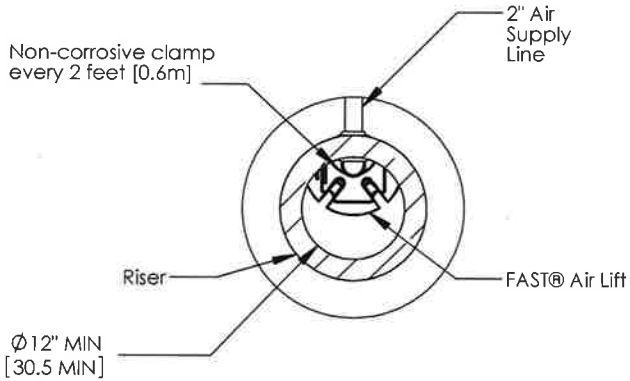
DETAIL
SCALE 1 : 5

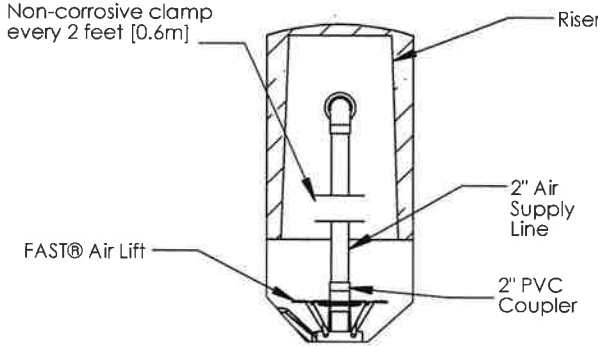
FAST® Vent Option



DETAIL
SCALE 1 : 4

Alternate Air Supply Option





Notes
1. Secure leg extension to the FAST® unit by placing two screws on each side of the leg extension (4 screws per foot are included).
2. Cut 4" schd. 40 PVC pipe (not included) to obtain the desired height. Minimum pipe length of 6 1/8" [15.56cm] will provide minimum clearance of 10". For heights greater than 18" [45.7cm] use schd. 80 PVC pipe (not included). Consult factory for extending leg beyond 36"[90cm].
3. Anchor the leg extensions to the tank with non-corrosive hardware (not included) at the provided mounting points.
4. If less than the specified minimums are considered necessary, consult factory for guidance.
5. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2ft [0.6m] minimum.
6. Tank, anchors, piping conduit, blower, housing pad and vents are provided by others.

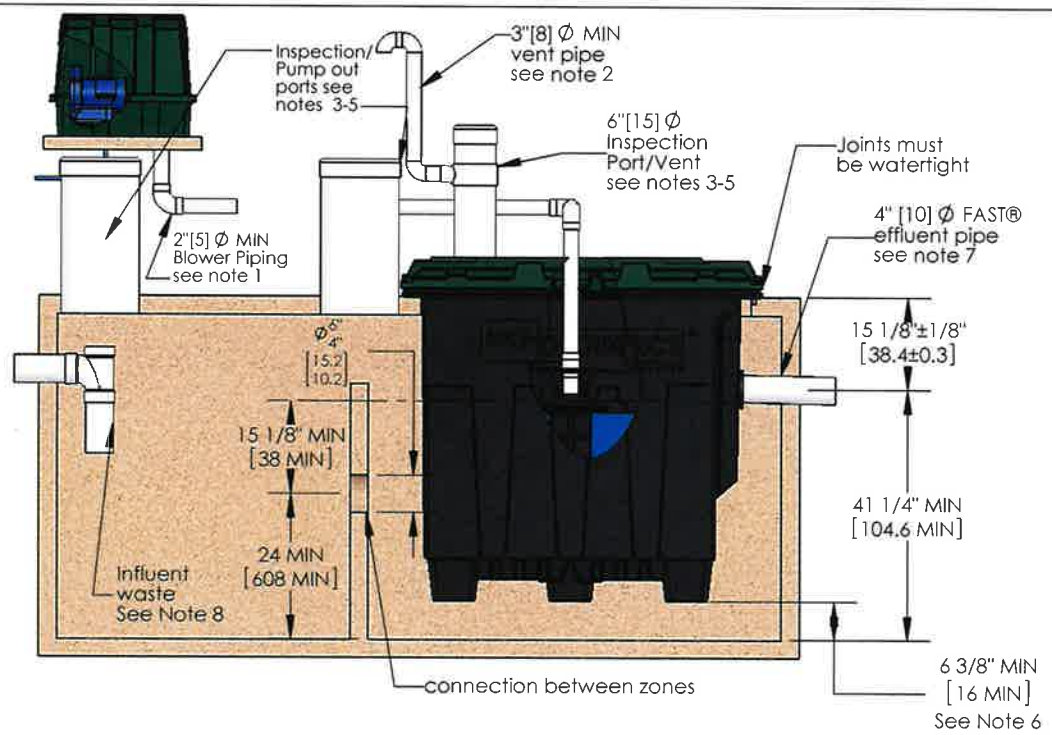
DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

BIO MICROBICS
BETTER WATER. BETTER WORLD.®

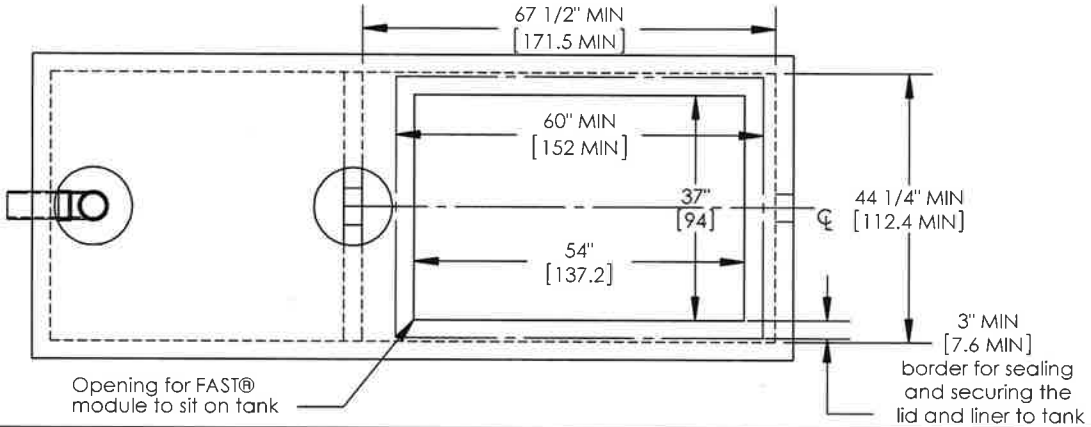
MicroFAST 0.625 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
NAME	DATE	A	MicroFAST® 0.625 Details		4 OF 4
DRAWN CTC	12/18/2006				
CHECKED PF	4/16/2014		REVISED 4/16/2014	REV. INI-10-I	



Settling Zone
375 Gallon MIN [1700L MIN]

Treatment Zone
625 Gallon MIN [2400L MIN]



NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 26" X 20" X 2" [65 X 50 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 7 sq in.[45 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. Installations using a FAST® system lid are capable of withstanding AASHTO H-10 equivalent loads. Any installation in which a FAST lid is buried deeper than 3 feet, or where additional loading conditions may occur, a professional engineer should be consulted. FAST® with feet option should be considered. Refer to Installation Manual for more details.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

BIO MICROBICS
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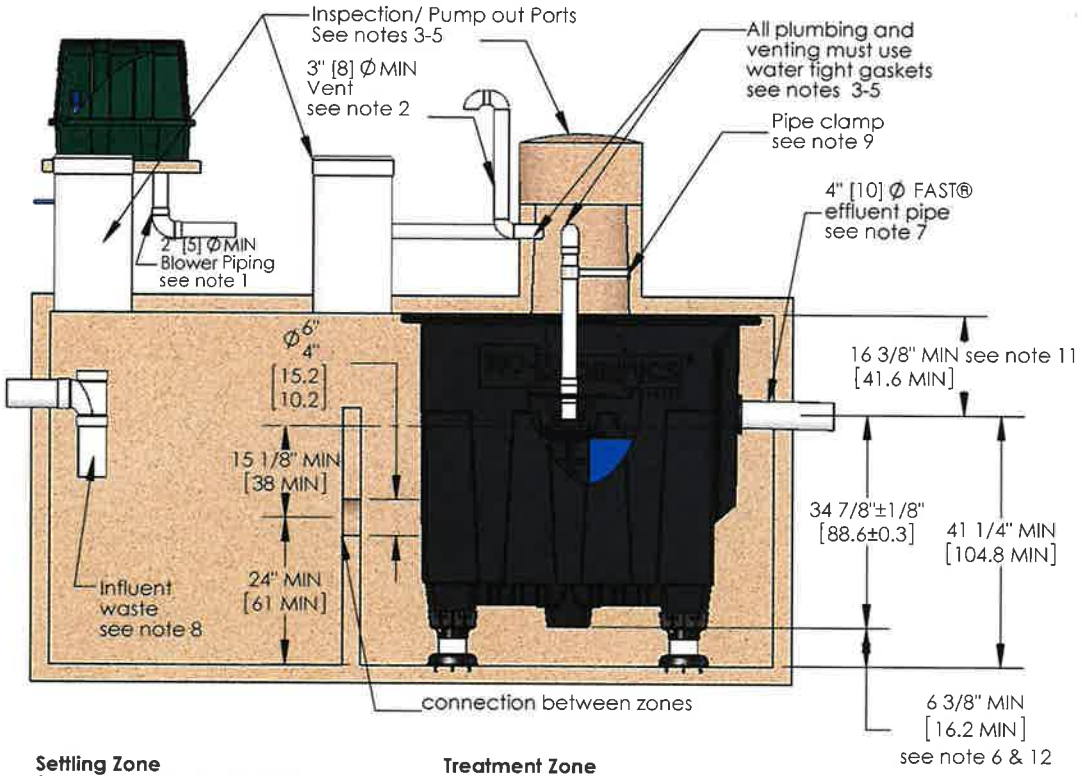
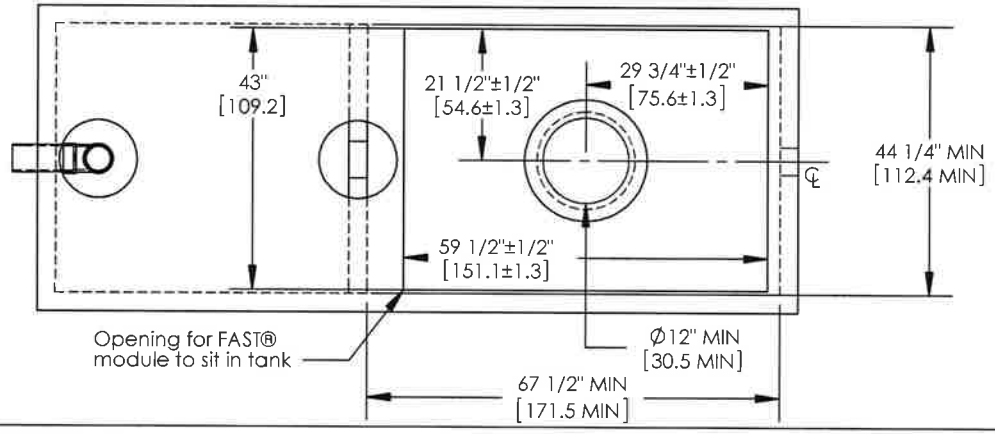
MicroFAST 0.75 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
NAME	DATE	A	MicroFAST® 0.75 with lid		1 OF 4
DRAWN CTC	12/16/2006				
CHECKED PF	9/18/2013	REVISED 9/18/2013		REV. INI-07-D	



Settling Zone
375 Gallon MIN [1700L MIN]

Treatment Zone
625 Gallon MIN [2400L MIN]



NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 26" X 20" X 2" [65 X 50 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 7 sq in.[45 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2' min [60 cm]. See alternate air supply option on sheet 4 of 4.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.
11. Min. height may be reduced, consult factor and reference "Low Profile Module Procedure.pdf"
12. Refer to sheet 4 of 4 for leg extensions requirements.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

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MicroFAST 0.75 FAST Unit

WEIGHT	lb		SIZE	DRAWING NUMBER	SHEET
	NAME	DATE	A	MicroFAST® 0.75 with feet	2 OF 4
DRAWN	CTC	12/18/2006			
CHECKED	PF	9/18/2013	REVISED 9/18/2013	REV. INI-07-D	

Specifications for MicroFAST 0.75 Wastewater Treatment System

1. GENERAL

The contractor shall furnish and install (1) MicroFAST®0.75 treatment system as manufactured by Bio-Microbics, Inc. The treatment system shall be complete with all needed equipment as shown on the drawings and specified herein.

The principal items of equipment shall include FAST® system insert, leg extensions, or lid, blower assembly, blower controls and alarms. All other items will be provided by others. The MicroFAST 0.75 unit shall be situated within a 625 Gallon[2400L] minimum compartment as shown on the drawings. Suggested maximum settling zone is (1X) the daily flow. Tank must provide adequate pump out access and conform to local, state, and all other applicable codes. The contractor shall coordinate the proper fabrication of the tank between the tank and FAST system suppliers as well as the installation of the FAST unit, and delivery to the job site.

2. OPERATING CONDITIONS

The MicroFAST 0.75 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from (1) one to (11) eleven persons and not to exceed 750 US Gallons per day (2800LPD) provided the waste contains nothing that will interfere with biological treatment. The FAST system is a biological treatment system not meant for non-biodegradable or industrial wastewater.

3. MEDIA

The FAST media shall be manufactured of rigid PVC, polyethylene, or polypropylene and it shall be supported by the polyethylene insert. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids descend through the media to the bottom of the septic tank.

4. BLOWER

The MicroFAST 0.75 unit shall come equipped with a regenerative type blower capable of delivering 17-25 CFM [31-46m3/hr]. The blower assembly shall include an inlet filter with metal filter element. The blower shall be mounted outside the tank on a contractor supplied concrete base. Blower piping to the tank shall use non-corrosive material (PVC, Galvanized, or Stainless Steel). Do not run galvanized pipe inside the treatment tank. Refer to Installation Manual for further details.

5. REMOTE MOUNTED BLOWER

The blower must not set in standing water and its elevation must be higher than the normal flood level. A two-piece, rectangular housing shall be provided. The discharge air line from the blower to the MicroFAST System, shall be provided and installed by the contractor.

6. ELECTRICAL

The electrical source should be within 150 feet [45 meters] of the blower, consult local codes for longer wiring distances. All wiring must conform to all applicable codes(IEC, NEC, etc.). Wiring distances must prevent significant voltage loss. Input power on 60Hz electrical systems 110/220VAC, 1Ø, 3.5/1.7 FLA, on 50 Hz electrical systems 220VAC, 1Ø, 1.9 FLA. Other voltages and phase are also available. Actual power consumption varies with site conditions. All conduit and wiring shall be supplied by contractor.

7. CONTROLS

The control panel provides power to the blower with an alarm system consisting of a visual and audible alarm capable of signaling blower circuit failure and high water conditions. The control panel is equipped with SFR® (Sequencing Fixed Reactor) timed control feature. A manual silence button is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS

All work must be done in accordance with local codes and regulations. Installation of the FAST 0.75 shall be done in accordance with the written instructions provided by the manufacturer. Manuals shall be furnished, which will include a description of system installation, operation, and maintenance procedures.

9. FLOW AND DOSING

FAST systems have been successfully designed, tested and certified receiving gravity, demand-based influent flow. When influent flow is controlled by pump or other means to help with highly variable flow conditions, then multiple dosing events should be used to maximize performance. The flow rate shall not exceed 5 gpm (19 Lpm) with a maximum hourly flow not to exceed 10% of the design daily flow (75 gph (280 LPH)).

10.WARRANTY

Bio-Microbics, Inc. warrants all new residential FAST® models (MicroFAST® 0.50, 0.625, 0.75, 0.90, and 1.5) against defects in materials and workmanship for a period of two years after installation or three years from date of shipment which ever occurs first. All other FAST® system models are warranted for a period of one year after installation or eighteen months from date of shipment, whichever occurs first. All are subject to the following terms and conditions below: During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIO-MICROBICS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIO-MICROBICS, INC., ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. Contact your local distributor for parts and service.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

BIO MICROBICS

BETTER WATER. BETTER WORLD.®

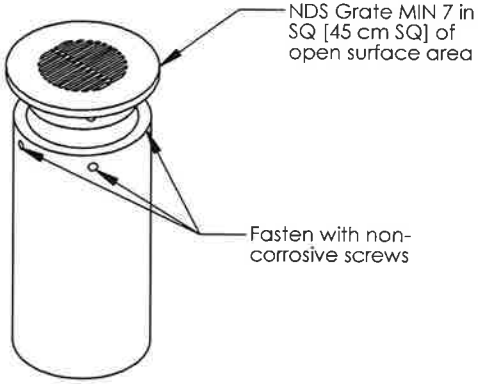
MicroFAST 0.75 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
NAME	DATE	A	MicroFAST® 0.75 Specifications		3 OF 4
DRAWN CTC	12/18/2006				
CHECKED PF	9/18/2013		REVISED 9/18/2013	REV. INI-07-D	

Minimum leg extension assembly see note 1-4

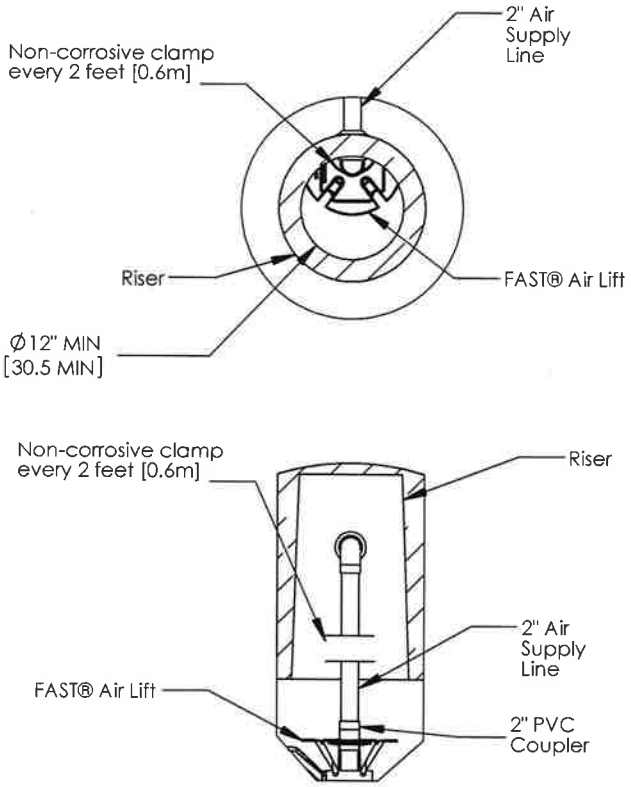
DETAIL
SCALE 1 : 5

FAST® Vent Option



DETAIL
SCALE 1 : 4

Alternate Air Supply Option



Notes
1. Secure leg extension to the FAST® unit by placing two screws on each side of the leg extension (4 screws per foot are included).
2. Cut 4" schd. 40 PVC pipe (not included) to obtain the desired height. Minimum pipe length of 6 1/8" [15.56cm] will provide minimum clearance of 6 3/8 inches [16.2 cm]. For heights greater than 18" [45.7cm] use schd. 80 PVC pipe (not included). Consult factory for extending leg beyond 36"[90cm].
3. Anchor the leg extensions to the tank with non-corrosive hardware (not included) at the provided mounting points.
4. If less than the specified minimums are considered necessary, consult factory for guidance.
5. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2ft [0.6m] minimum.
6. Tank, anchors, piping conduit, blower, housing pad and vents are provided by others.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

BIO MICROBICS
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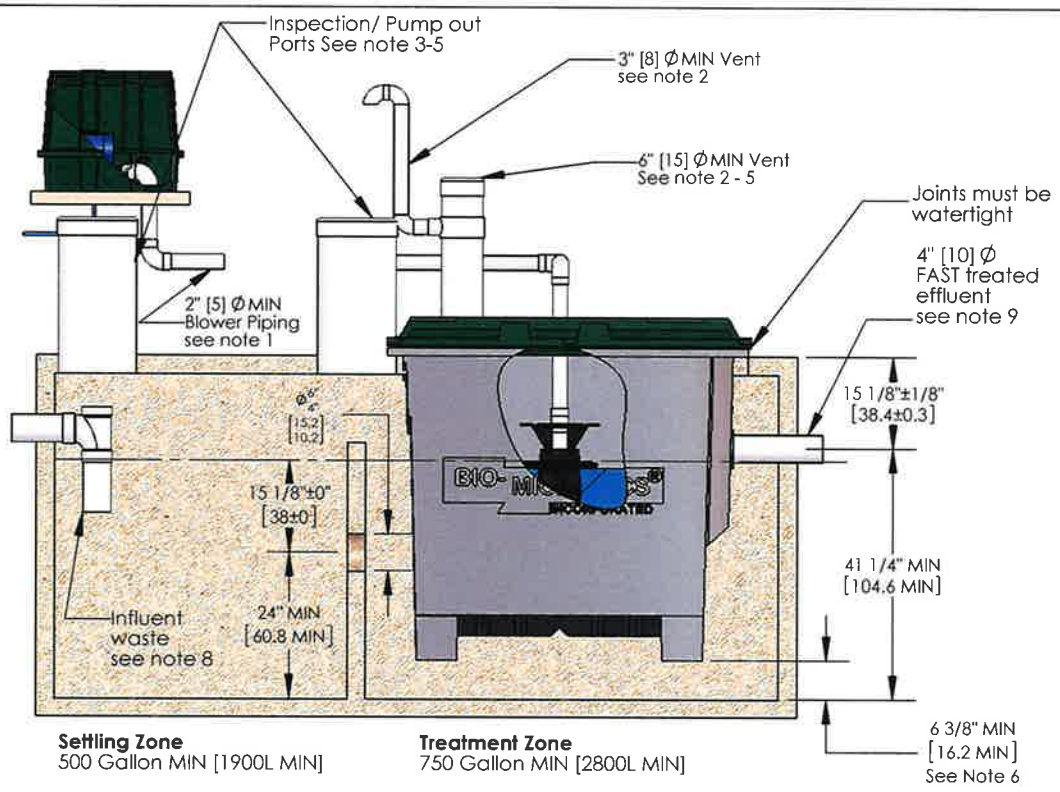
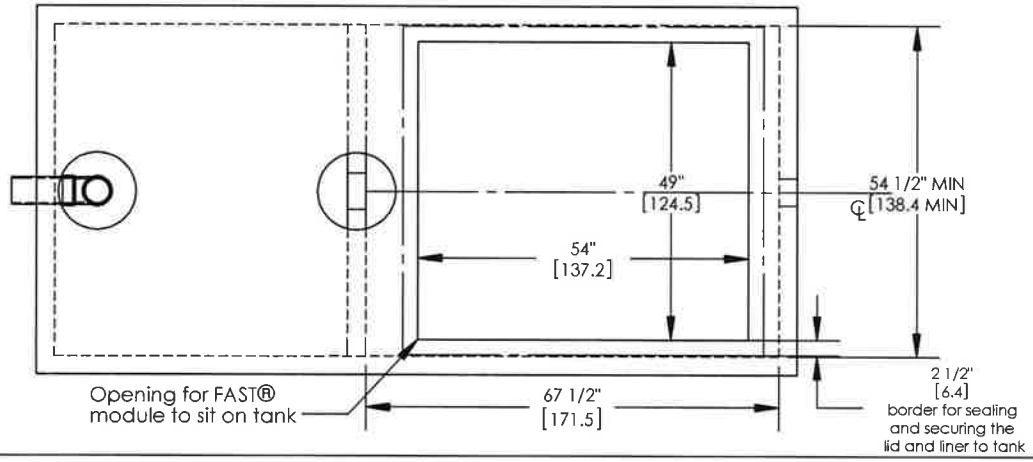
MicroFAST 0.75 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER	SHEET
NAME	DATE	A	MicroFAST® 0.75 Details	4 OF 4
DRAWN CTC	12/18/2006			
CHECKED PF	9/18/2013	REVISED 9/18/2013	REV. INI-09-X	





NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system.For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 26" X 20" X 2" [65 X 50 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 7 sq in.[45 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. Installations using a FAST® system lid are capable of withstanding AASHTO H-10 equivalent loads. Any installation in which a FAST lid is buried deeper than 3 feet, or where additional loading conditions may occur, a professional engineer should be consulted. FAST® with feet option should be considered. Refer to Installation Manual for more details.
10. Specialized treatment levels may require specific features to be incorporated into the tank design. Consult factory for guidance.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

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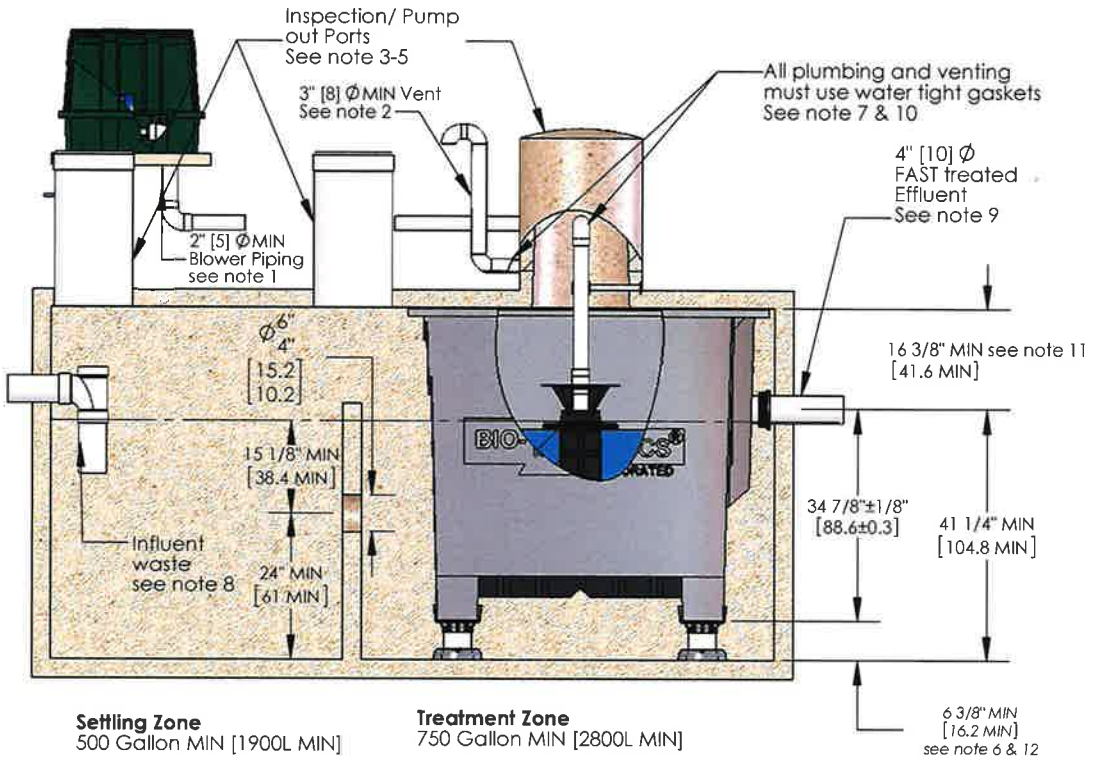
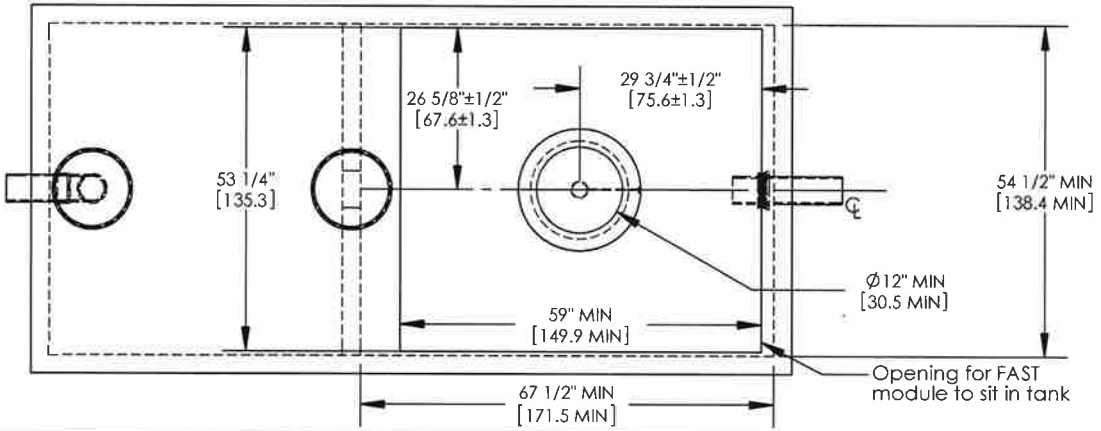
MicroFAST 0.90 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER	SHEET
NAME	DATE	A	MicroFAST® 0.90 with lid	1 OF 4
DRAWN CTC	12/18/2006			
CHECKED PF	10/11/2013	REVISED 10/11/2013	REV. INI-03-U	





NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 26" X 20" X 2" [65 X 50 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 7 sq in.[45 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2' min [60 cm]. See alternate air supply option on sheet 4 of 4.
10. Specialized treatment levels may require specific features to be incorporated into the tank design. Consult factory for guidance.
11. Min. height may be reduced, consult factor and reference "Low Profile Module Procedure.pdf"
12. Refer to sheet 4 of 4 for leg extensions requirements.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

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MicroFAST 0.90 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER	SHEET
NAME	DATE	A	MicroFAST® 0.90 with feet	2 OF 4
DRAWN CTC	12/18/2006			
CHECKED PF	10/11/2013	REVISED 10/11/2013	REV. INI-03-U	

Specifications for MicroFAST 0.90 Wastewater Treatment System

1. GENERAL

The contractor shall furnish and install (1) MicroFAST®0.90 treatment system as manufactured by Bio-Microbics, Inc. The treatment system shall be complete with all needed equipment as shown on the drawings and specified herein.

The principal items of equipment shall include FAST® system insert, leg extensions, or lid, blower assembly, blower controls and alarms. All other items will be provided by others. The MicroFAST 0.90 unit shall be situated within a 750 Gallon[2800L] minimum compartment as shown on the drawings. Suggested maximum settling zone is (1X) the daily flow. Tank must provide adequate pump out access and conform to local, state, and all other applicable codes. The contractor shall coordinate the proper fabrication of the tank between the tank and FAST system suppliers as well as the installation of the FAST unit, and delivery to the job site.

2. OPERATING CONDITIONS

The MicroFAST 0.90 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from (1) one to (11) eleven persons and not to exceed 900 US Gallons per day (3400LPD) provided the waste contains nothing that will interfere with biological treatment. The FAST system is a biological treatment system not meant for non-biodegradable or industrial wastewater.

3. MEDIA

The FAST media shall be manufactured of rigid PVC, polyethylene, or polypropylene and it shall be supported by the polyethylene insert. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids descend through the media to the bottom of the septic tank.

4. BLOWER

The MicroFAST 0.90 unit shall come equipped with a regenerative type blower capable of delivering 17-25 CFM [31-46m3/hr]. The blower assembly shall include an inlet filter with metal filter element. The blower shall be mounted outside the tank on a contractor supplied concrete base. Blower piping to the tank shall use non-corrosive material (PVC, Galvanized, or Stainless Steel). Do not run galvanized pipe inside the treatment tank. Refer to Installation Manual for further details.

5. REMOTE MOUNTED BLOWER

The blower must not set in standing water and its elevation must be higher than the normal flood level. A two-piece, rectangular housing shall be provided. The discharge air line from the blower to the MicroFAST System, shall be provided and installed by the contractor.

6. ELECTRICAL

The electrical source should be within 150 feet [45 meters] of the blower, consult local codes for longer wiring distances. All wiring must conform to all applicable codes(IEC, NEC, etc.). Wiring distances must prevent significant voltage loss. Input power on 60Hz electrical systems 110/220VAC, 1Ø, 3.5/1.7 FLA, on 50 Hz electrical systems 220VAC, 1Ø, 1.9 FLA. Other voltages and phase are also available. Actual power consumption varies with site conditions. All conduit and wiring shall be supplied by contractor.

7. CONTROLS

The control panel provides power to the blower with an alarm system consisting of a visual and audible alarm capable of signaling blower circuit failure and high water conditions. The control panel is equipped with SFR® (Sequencing Fixed Reactor) timed control feature. A manual silence button is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS

All work must be done in accordance with local codes and regulations. Installation of the FAST 0.90 shall be done in accordance with the written instructions provided by the manufacturer. Manuals shall be furnished, which will include a description of system installation, operation, and maintenance procedures.

9. FLOW AND DOSING

FAST systems have been successfully designed, tested and certified receiving gravity, demand-based influent flow. When influent flow is controlled by pump or other means to help with highly variable flow conditions, then multiple dosing events should be used to maximize performance. The flow rate shall not exceed 5 gpm (19 Lpm) with a maximum hourly flow not to exceed 10% of the design daily flow (90 gph (340 LPH)).

10.WARRANTY

Bio-Microbics, Inc. warrants all new residential FAST® models (MicroFAST® 0.50, 0.625, 0.75, 0.90, and 1.5) against defects in materials and workmanship for a period of two years after installation or three years from date of shipment which ever occurs first. All other FAST® system models are warranted for a period of one year after installation or eighteen months from date of shipment, whichever occurs first. All are subject to the following terms and conditions below: During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIO-MICROBICS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIO-MICROBICS, INC., ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. Contact your local distributor for parts and service.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

BIO MICROBICS
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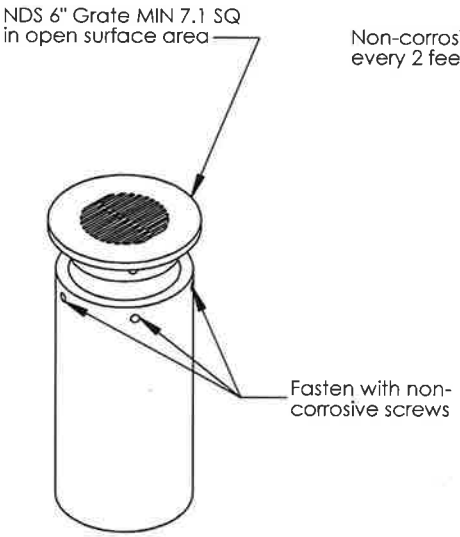
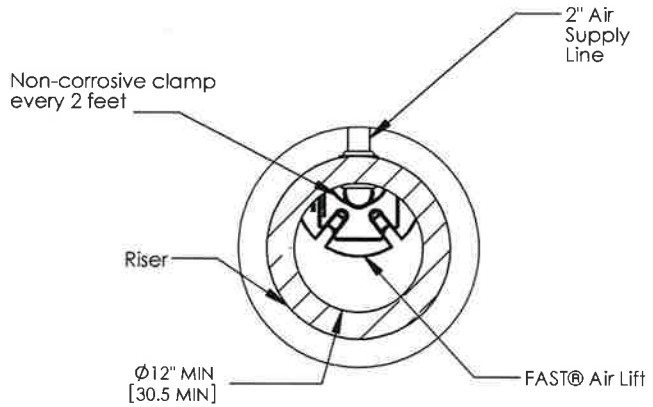
MicroFAST 0.90 FAST Unit

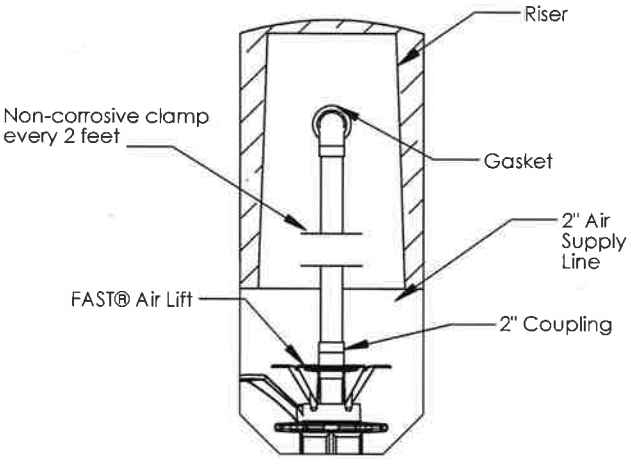
WEIGHT	lb	SIZE	DRAWING NUMBER	SHEET
NAME	DATE	A	MicroFAST® 0.90 Specifications	3 OF 4
DRAWN CTC	12/18/2006			
CHECKED PF	10/11/2013	REVISED 10/11/2013	REV. INI-07-T	

Minimum leg extension assembly see note 4



FAST® Lid Vent Option





Alternate Air Supply Option

Notes
1. Secure leg extension to the FAST® unit by placing two screws on each side of the leg extension (4 screws per foot are included).
2. Cut 4" schd. 40 PVC pipe (not included) to obtain the desired height. Minimum pipe length of 6 1/8" [15.56cm] will provide minimum clearance of 6 3/8 inches [16.2 cm]. For heights greater than 18" [45.7cm] use schd. 80 PVC pipe (not included). Consult factory for extending leg beyond 36"[90cm].
3. Anchor the leg extensions to the tank with non-corrosive hardware (not included) at the provided mounting points.
4. If less than the specified minimums are considered necessary, consult factory for guidance.
5. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2ft [0.6m] minimum.
6. Tank, anchors, piping conduit, blower, housing pad and vents are provided by others.

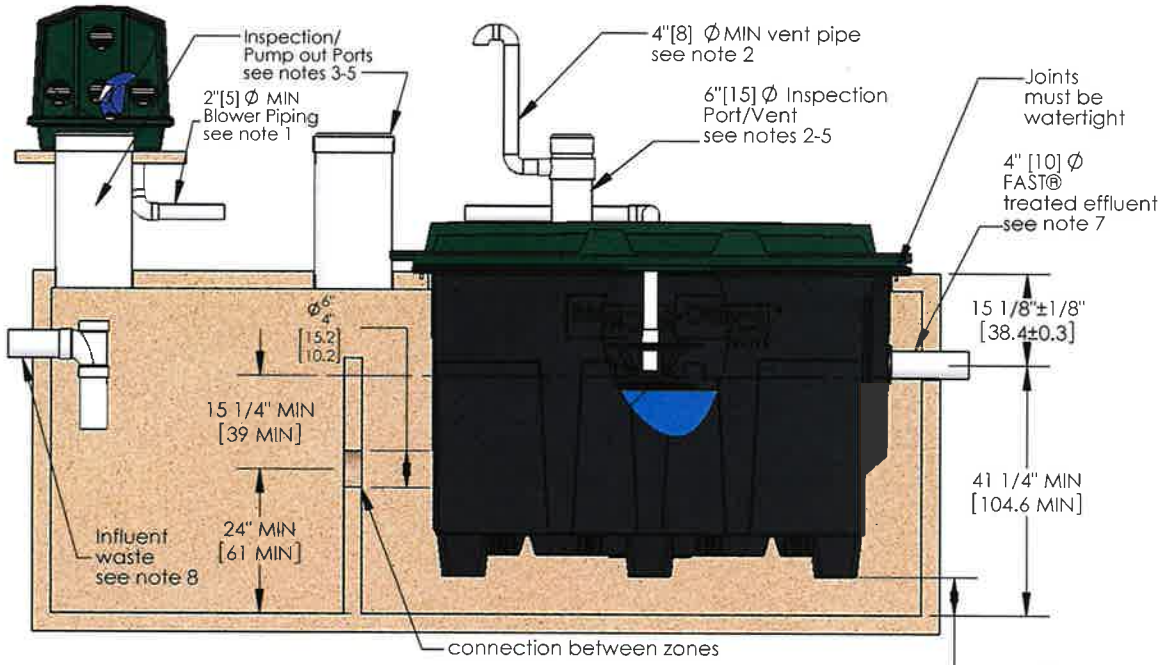
DO NOT SCALE

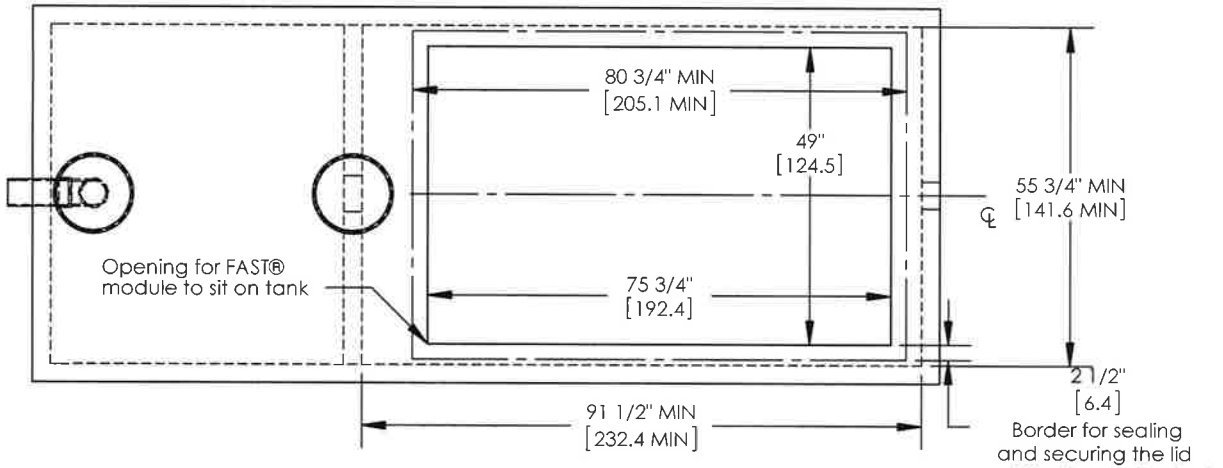
UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

BIO MICROBICS
BETTER WATER. BETTER WORLD.

MicroFAST 0.90 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
	NAME DATE	A	MicroFAST® 0.90 Details		4 OF 4
DRAWN CTC	12/18/2006				
CHECKED PF	10/11/2013		REVISED 10/11/2013	REV. INI-07-T	





NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 42" X 28" X 2" [105 X 70 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 9 sq in. [58 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid, and treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. Installations using a FAST® system lid are capable of withstanding AASHTO H-10 equivalent loads. Any installation in which a FAST lid is buried deeper than 3 feet, or where additional loading conditions may occur, a professional engineer should be consulted. FAST® with feet option should be considered. Refer to Installation Manual for more details.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.

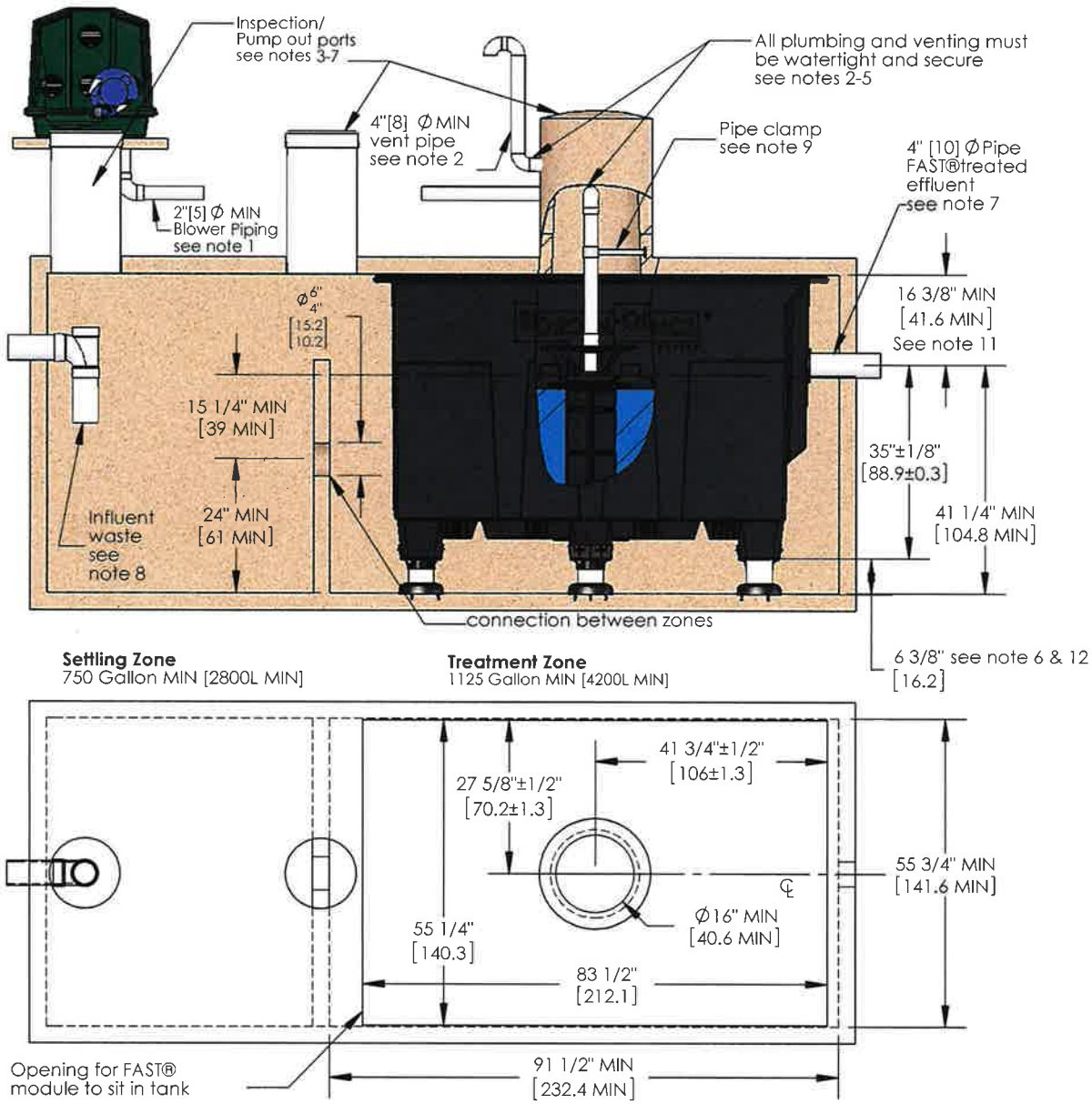
DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

BIO MICROBICS
BETTER WATER, BETTER WORLD.

MicroFAST 1.50 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
	NAME DATE	A	MicroFAST® 1.50 with lid		1 OF 4
DRAWN	CTC 12/18/2006				
CHECKED	PF 9/18/2013		REVISED 9/18/2013	REV. INI-03-M	



NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 42" X 28" X 2" [105 X 70 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 9 sq in.[60 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2' min [60 cm]. See alternate air supply option on sheet 4 of 4.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.
11. Min. height may be reduced, consult factor and reference "Low Profile Module Procedure.pdf"
12. Refer to sheet 4 of 4 for leg extensions requirements.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

BIO MICROBICS
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MicroFAST 1.50 FAST Unit

WEIGHT lb		SIZE	DRAWING NUMBER		SHEET 2 OF 4
NAME	DATE	A	MicroFAST® 1.50 with feet		
DRAWN CTC	12/18/2006				
CHECKED PF	9/18/2013	REVISED 9/18/2013		REV. INI-03-M	

Specifications for MicroFAST 1.50 Wastewater Treatment System

1. GENERAL

The contractor shall furnish and install (1) MicroFAST®1.50 treatment system as manufactured by Bio-Microbics, Inc. The treatment system shall be complete with all needed equipment as shown on the drawings and specified herein.

The principal items of equipment shall include FAST® system insert, leg extensions, or lid, blower assembly, blower controls and alarms. All other items will be provided by others. The MicroFAST 1.50 unit shall be situated within a 1125 gallon [4200 L] minimum compartment as shown on the drawings. Suggested maximum settling zone is (1)X the daily flow. Tank must provide adequate pump out access and conform to local, state, and all other applicable codes. The contractor shall coordinate the proper fabrication of the tank between the tank and FAST system suppliers as well as the installation of the FAST unit, and delivery to the job site.

2. OPERATING CONDITIONS

The MicroFAST 1.50 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from (6) six to (21) twenty-one people and not to exceed 1500 US Gallons per day (5600 LPD) provided the waste contains nothing that will interfere with biological treatment. The FAST system is a biological treatment system not meant for non-biodegradable or industrial wastewater.

3. MEDIA

The FAST media shall be manufactured of rigid PVC, polyethylene, or polypropylene and it shall be supported by the polyethylene insert. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids descend through the media to the bottom of the septic tank.

4. BLOWER

The MicroFAST 1.50 unit shall come equipped with a regenerative type blower capable of delivering 20-45 CFM [38-85 m3/hr]. The blower assembly shall include an inlet filter with metal filter element. The blower shall be mounted outside the tank on a contractor supplied concrete base. Blower piping to the tank shall use non-corrosive material (PVC, Galvanized, or Stainless Steel). Do not run galvanized pipe inside the treatment tank. Refer to Installation Manual for further details.

5. REMOTE MOUNTED BLOWER

The blower must not set in standing water and its elevation must be higher than the normal flood level. A two-piece, rectangular housing shall be provided. The discharge air line from the blower to the MicroFAST System, shall be provided and installed by the contractor.

6. ELECTRICAL

The electrical source should be within 150 feet [45 meters] of the blower, consult local codes for longer wiring distances. All wiring must conform to all applicable codes(IEC, NEC, etc.). Wiring distances must prevent significant voltage loss. Input power on 60Hz electrical systems 110/220VAC, 1Ø, 5/2.5 FLA, on 50 Hz electrical systems 220VAC, 1Ø, 5.7 FLA. Other voltages and phase are also available. Actual power consumption varies with site conditions. All conduit and wiring shall be supplied by contractor.

7. CONTROLS

The control panel provides power to the blower with an alarm system consisting of a visual and audible alarm capable of signaling blower circuit failure and high water conditions. The control panel is equipped with SFR® (Sequencing Fixed Reactor) timed control feature. A manual silence button is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS

All work must be done in accordance with local codes and regulations. Installation of the FAST 1.5 shall be done in accordance with the written instructions provided by the manufacturer. Manuals shall be furnished, which will include a description of system installation, operation, and maintenance procedures.

9. FLOW AND DOSING

FAST systems have been successfully designed, tested and certified receiving gravity, demand-based influent flow. When influent flow is controlled by pump or other means to help with highly variable flow conditions, then multiple dosing events should be used to maximize performance. The flow rate shall not exceed 7.8 gpm (28 Lpm) with a maximum hourly flow not to exceed 10% of the design daily flow (150 gph (570 LPH)).

10.WARRANTY

Bio-Microbics, Inc. warrants all new residential FAST® models (MicroFAST® 0.50, 0.625, 0.75, 0.90, and 1.5) against defects in materials and workmanship for a period of two years after installation or three years from date of shipment which ever occurs first. All other FAST® system models are warranted for a period of one year after installation or eighteen months from date of shipment, whichever occurs first. All are subject to the following terms and conditions below:

During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIO-MICROBICS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIO-MICROBICS, INC., ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. Contact your local distributor for parts and service.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

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MicroFAST 1.50 FAST Unit

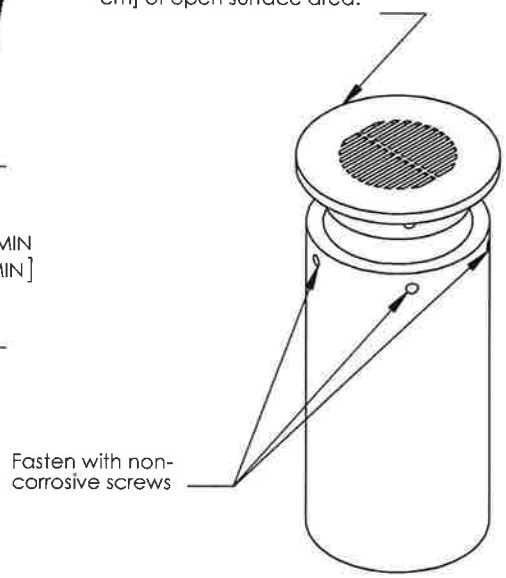
	NAME	DATE
WEIGHT lb		
DRAWN		12/18/2006
CHECKED PF		9/18/2013

SIZE A | DRAWING NUMBER MicroFAST® 1.50 Specifications | REVISED 9/18/2013 | REV.

Minimum leg extension assembly see note 1-4

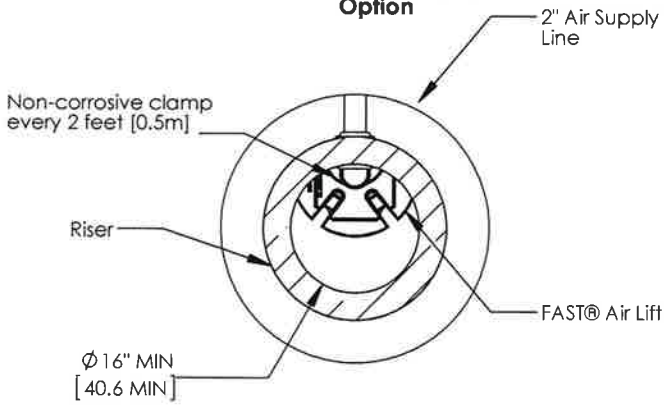
DETAIL
SCALE 1 : 5

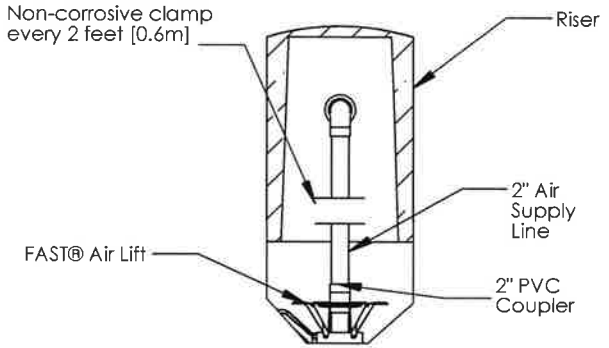
FAST® Lid Vent Option



DETAIL
SCALE 1 : 4

Alternate Air Supply Option





Notes
1. Secure leg extension to the FAST® unit by placing two screws on each side of the leg extension (4 screws per foot are included).
2. Cut 4" schd. 40 PVC pipe (not included) to obtain the desired height. Minimum pipe length of 6 1/8" [15.56cm] will provide minimum clearance of 10". For heights greater than 18" [45.7cm] use schd. 80 PVC pipe (not included). Consult factory for extending leg beyond 36"[90cm].
3. Anchor the leg extensions to the tank with non-corrosive hardware (not included) at the provided mounting points.
4. If less than the specified minimums are considered necessary, consult factory for guidance.
5. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2ft [0.6m] minimum.
6. Tank, anchors, piping conduit, blower, housing pad and vents are provided by others.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

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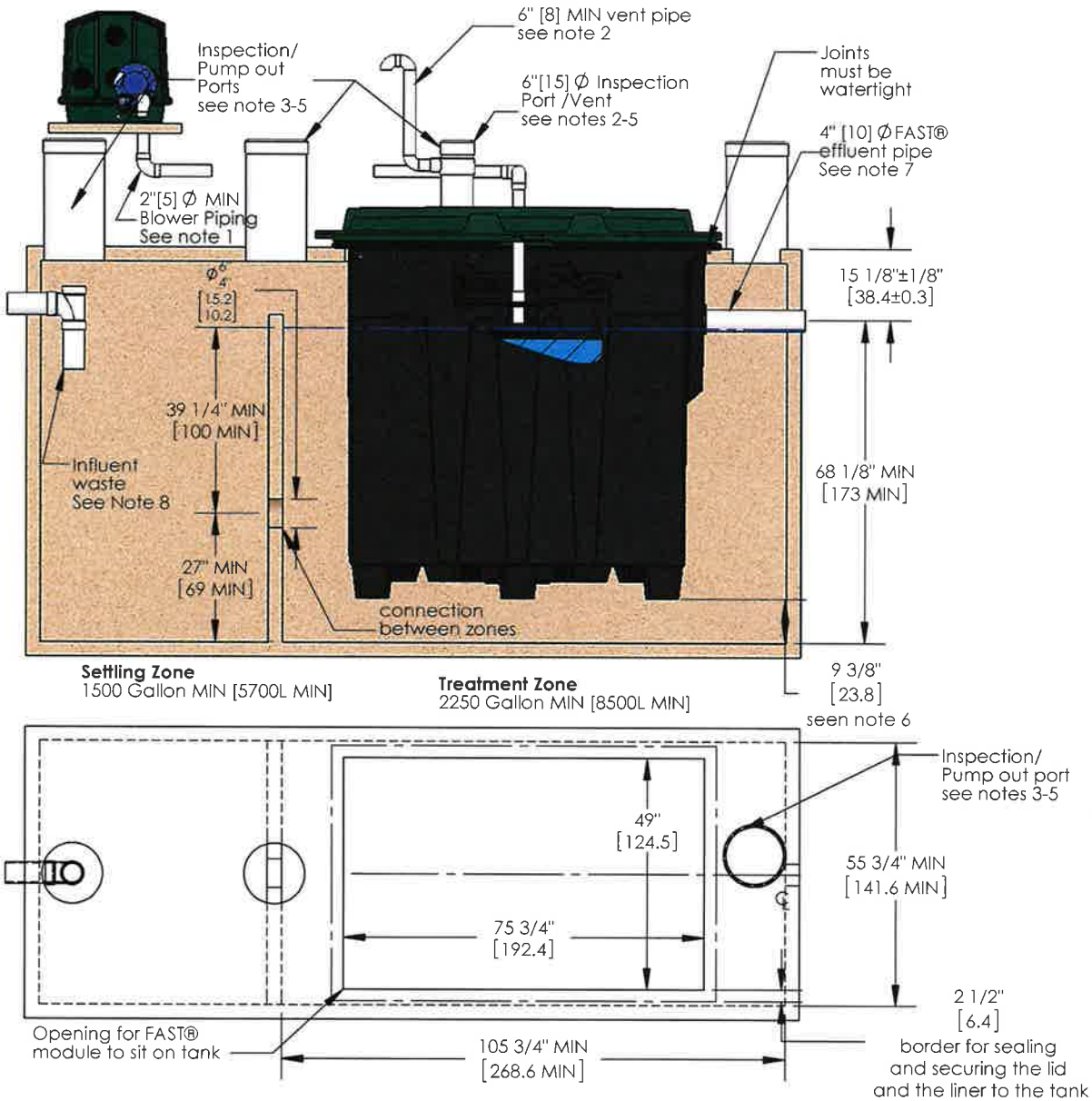
MicroFAST 1.50 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
NAME	DATE	A	MicroFAST® 1.50 Details		4 OF 4
DRAWN CTC	12/18/2006				
CHECKED PF	9/18/2013	REVISED 9/18/2013		REV. INI-09-X	



NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 42" X 28" X 2" [105 X 70 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 20 sq in. [125 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede nor restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid, and treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. Installations using a FAST® system lid are capable of withstanding AASHTO H-10 equivalent loads. Any installation in which a FAST lid is buried deeper than 3 feet, or where additional loading conditions may occur, a professional engineer should be consulted. FAST® with feet option should be considered. Refer to Installation Manual for more details.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

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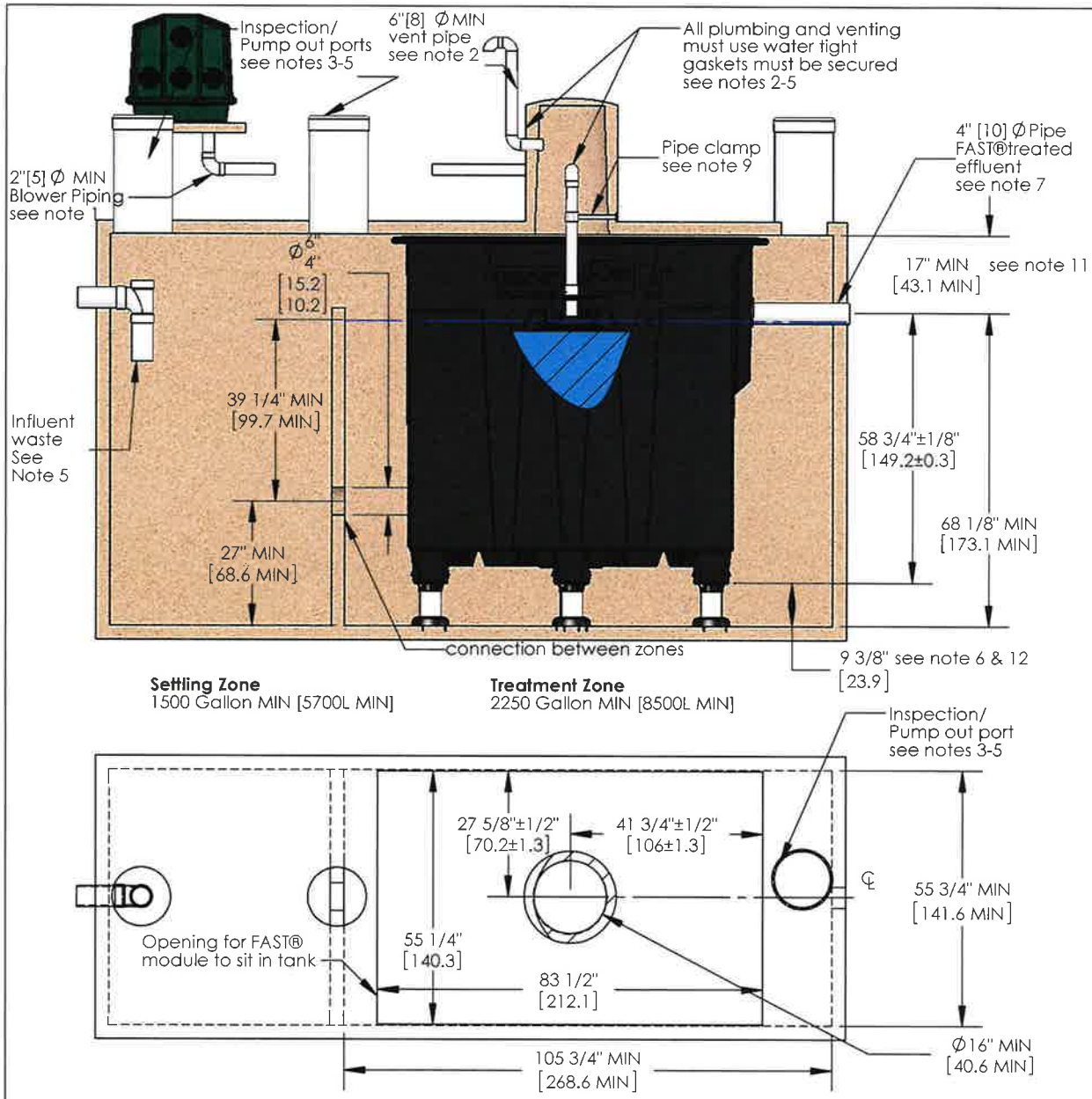
MicroFAST 3.00 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
NAME	DATE	A	MicroFAST® 3.00 with lid		1 OF 4
DRAWN CTC	12/18/2006				
CHECKED PF	9/19/2013		REVISED 9/19/2013	REV. INI-03-Y	



NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 42" X 28" X 2" [105 X 70 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 20 sq in.[125 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede nor restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2' min [60 cm]. See alternate air supply option on sheet 4 of 4.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.
11. Min. height may be reduced, consult factor and reference "Low Profile Module Procedure.pdf"
12. Refer to sheet 4 of 4 for leg extensions requirements.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

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MicroFAST 3.00 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET 2 OF 4
NAME	DATE	A	MicroFAST® 3.00 with feet		
DRAWN CTC	12/18/2006				
CHECKED PF	9/19/2013	REVISED 9/19/2013		REV. INI-03-Y	

Specifications for MicroFAST 3.00 Wastewater Treatment System

1. GENERAL

The contractor shall furnish and install (1) MicroFAST® 3.00 treatment system as manufactured by Bio-Microbics, Inc. The treatment system shall be complete with all needed equipment as shown on the drawings and specified herein.

The principal items of equipment shall include FAST® system insert, leg extensions, or lid, blower assembly, blower controls and alarms. All other items will be provided by others. The MicroFAST 3.00 unit shall be situated within a 2250 gallon [8500 L] minimum compartment as shown on the drawings. Suggested maximum settling zone is (1X) the daily flow. Tank must provide adequate pump out access and conform to local, state, and all other applicable codes. The contractor shall provide coordination between the FAST system and tank supplier with regard to fabrication of the tank, installation of the FAST unit and delivery to the job site.

2. OPERATING CONDITIONS

The MicroFAST 3.00 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from (10) ten to (42) forty-two people and not to exceed 3000 US Gallons per day (11400 LPD) provided the waste contains nothing that will interfere with biological treatment. The FAST system is a biological treatment system not meant for non-biodegradable or industrial wastewater.

3. MEDIA

The FAST media shall be manufactured of rigid PVC, polyethylene, or polypropylene and it shall be supported by the polyethylene insert. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids descend through the media to the bottom of the septic tank.

4. BLOWER

The MicroFAST 3.00 unit shall come equipped with a regenerative type blower capable of delivering 44-85 CFM [68-90 m3/hr] The blower assembly shall include an inlet filter with metal filter element. Blower piping to the tank shall use non-corrosive material (PVC, Galvanized, or Stainless Steel). Do not run galvanized pipe inside the treatment tank. Refer to Installation Manual for further details.

5. REMOTE MOUNTED BLOWER

The blower must not set in standing water and its elevation must be higher than the normal flood level. A two-piece, rectangular housing shall be provided. The discharge air line from the blower to the MicroFAST System, shall be provided and installed by the contractor.

6. ELECTRICAL

The electrical source should be within 150 feet [45 meters] of the blower, consult local codes for longer wiring distances. All wiring must conform to all applicable codes(IEC, NEC, etc.). Wiring distances must prevent significant voltage loss. Input power on 60Hz electrical systems 220VAC, 1Ø, 10.6 FLA, 220/460VAC, 3Ø, 4.9/2.5 FLA on 50 Hz electrical systems 220VAC, 1Ø, 12 FLA, 230/380VAC, 3Ø, 6.1/3.5 FLA. Other voltages and phase are also available. Actual power consumption varies with site conditions. All conduit and wiring shall be supplied by contractor.

7. CONTROLS

The control panel provides power to the blower with an alarm system consisting of a visual and audible alarm capable of signaling blower circuit failure and high water conditions. The control panel is equipped with SFR® (Sequencing Fixed Reactor) timed control feature. A manual silence button is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS

All work must be done in accordance with local codes and regulations. Installation of the MicroFAST 3.00 shall be done in accordance with the written instructions provided by the manufacturer. Manuals shall be furnished, which will include a description of system installation, operation, and maintenance procedures.

9. FLOW AND DOSING

FAST systems have been successfully designed, tested and certified receiving gravity, demand-based influent flow. When influent flow is controlled by pump or other means to help with highly variable flow conditions, then multiple dosing events should be used to maximize performance. The flow rate shall not exceed 15 gpm (57 Lpm) with a maximum hourly flow not to exceed 10% of the design daily flow (450 gph (1700LPH)).

10.WARRANTY

Bio-Microbics, Inc. warrants all new MicroFAST® models (MicroFAST® 3.0, 4.5, and 9.0) against defects in materials and workmanship for a period of one year after installation or eighteen (18 months) from the date of shipment which ever occurs first, subject to the following terms and conditions: All are subject to the following terms and conditions below:

During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIO-MICROBICS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIO-MICROBICS, INC., ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. Contact your local distributor for parts and service.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

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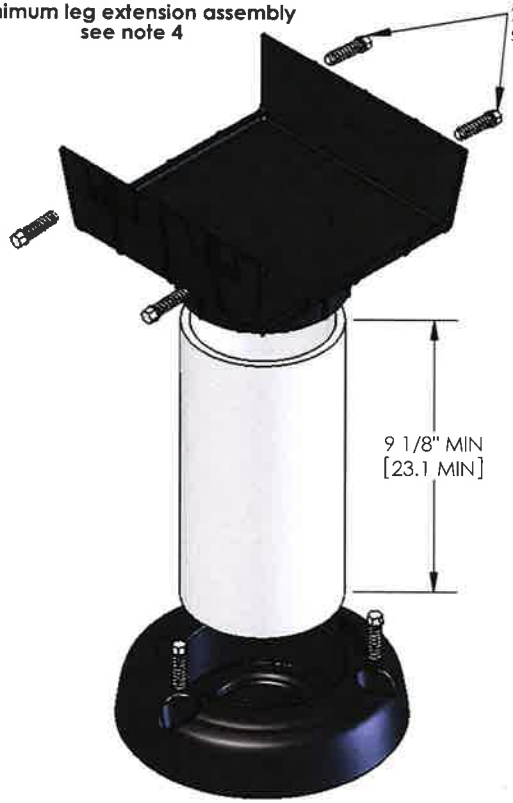
MicroFAST 3.00 FAST Unit

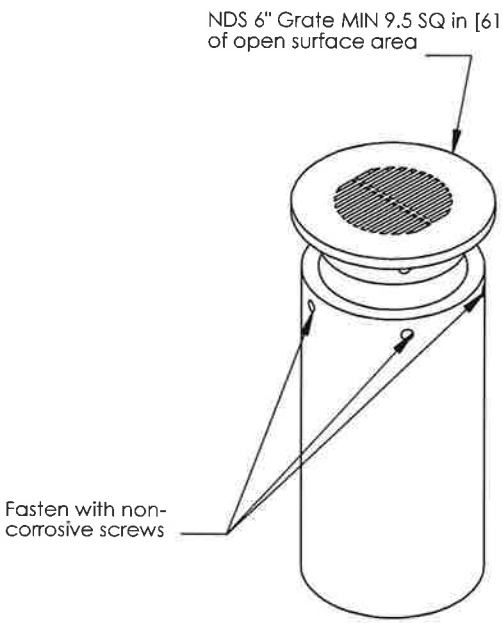
WEIGHT	lb	SIZE	DRAWING NUMBER	SHEET
	NAME / DATE	A	MicroFAST® 3.00 Specifications	3 OF 4
DRAWN CTC	12/18/2006			
CHECKED PF	9/19/2013		REVISED 9/19/2013 REV. INI-03-Y	

Minimum leg extension assembly see note 4



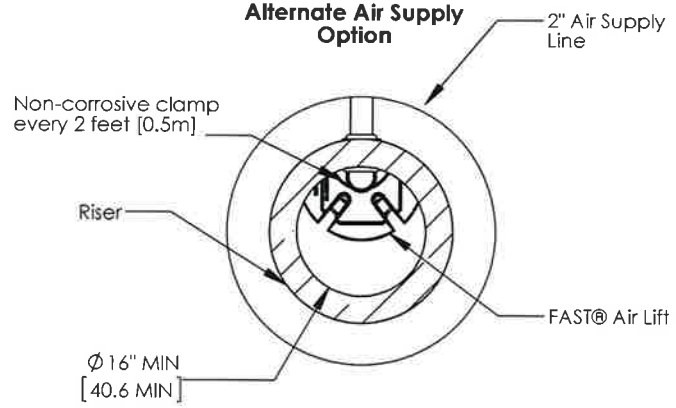
DETAIL
SCALE 1 : 5

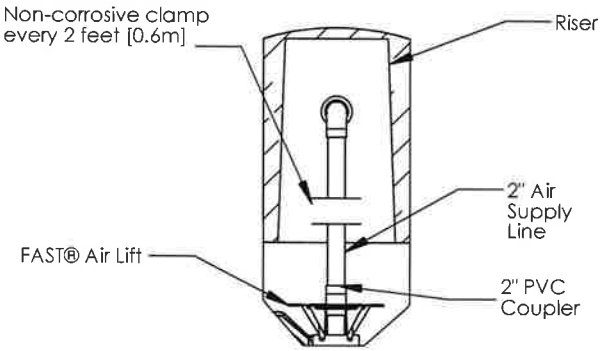
FAST® Lid Vent Option



DETAIL
SCALE 1 : 4

Alternate Air Supply Option





Notes

1. Secure leg extension to the FAST® unit by placing two screws on each side of the leg extension (4 screws per foot are included).
2. Cut 4" schd. 40 PVC pipe (not included) to obtain the desired height. Minimum pipe length of 9 3/8" [24cm]. For heights greater than 18" [45.7cm] use schd. 80 PVC pipe (not included). Consult factory for extending leg beyond 36"[90cm].
3. Anchor the leg extensions to the tank with non-corrosive hardware (not included) at the provided mounting points.
4. If less than the specified minimums are considered necessary, consult factory for guidance.
5. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2ft [0.6m] minimum.
6. Tank, anchors, piping conduit, blower, housing pad and vents are provided by others.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

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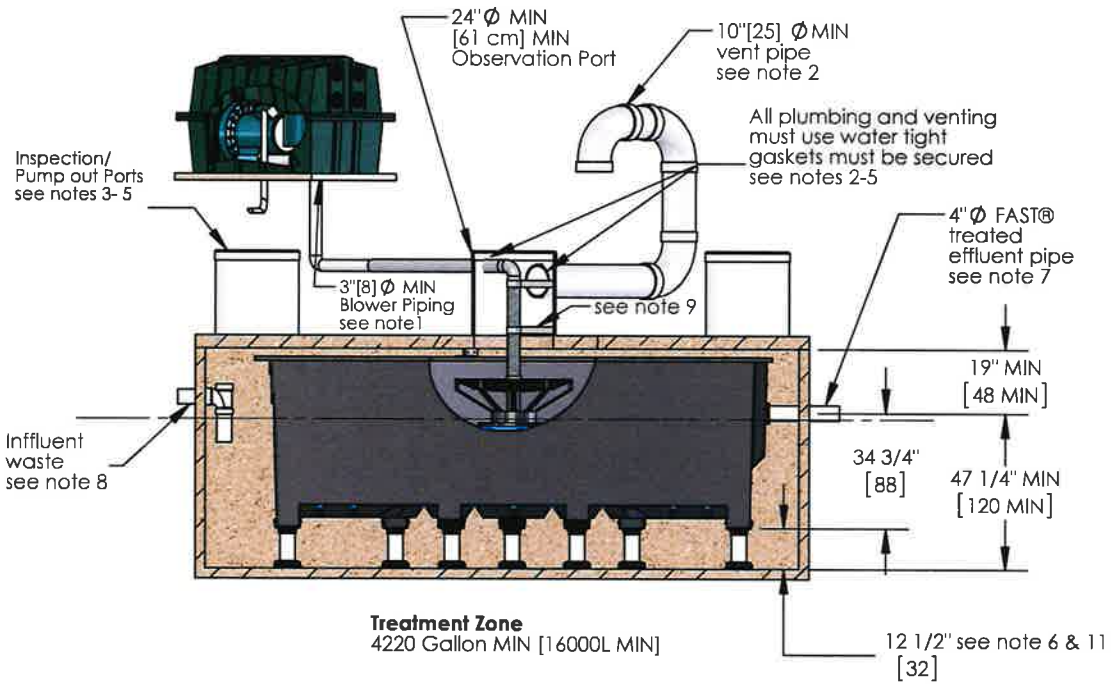
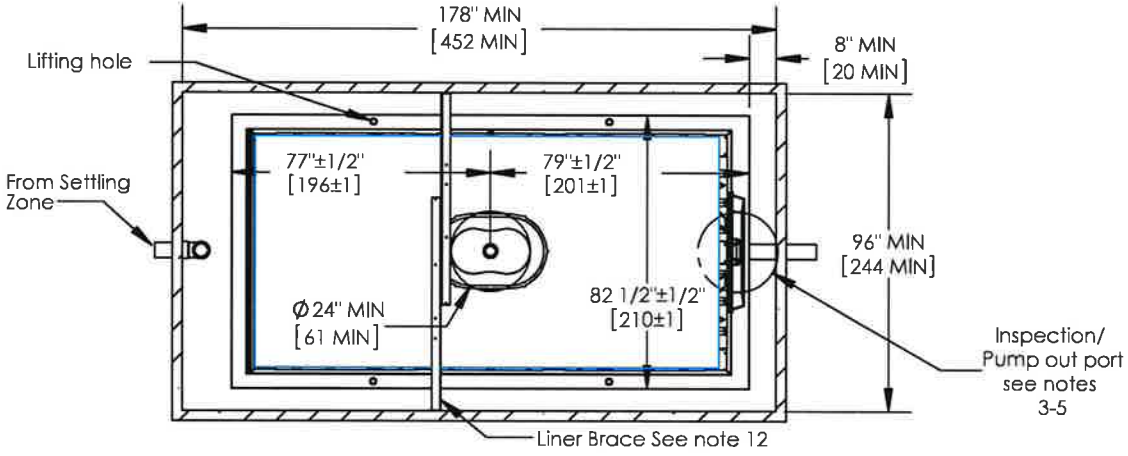
MicroFAST 3.00 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
NAME	DATE	A	MicroFAST® 3.00 Details		4 OF 4
DRAWN CTC	12/18/2006				
CHECKED PF	9/19/2013		REVISED 9/19/2013	REV. INI-03-Y	





NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 57" X 36" X 2.5" [150 X 90 X 7cm] minimum.
2. Vent to desired location and cover opening with a vent grate with at least 20 sq in.[125 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 3 of 3).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2' min [60 cm]. See alternate air supply option on sheet 3 of 3.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.
11. Refer to sheet 3 of 3 for leg extensions requirements.
12. Secure provided support braces to prevent movement.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS] TOLERANCES ± 0.02 IN/IN [± 0.05 CM/CM]

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MicroFAST 4.5 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
NAME	DATE	A	MicroFAST 4.5 with feet		1 OF 3
DRAWN CTC	5/10/2006				
CHECKED PF	12/18/2014	REVISED 12/18/2014		REV. INI-07-W	

Specifications for MicroFAST 4.5 Wastewater Treatment System

1. GENERAL
The contractor shall furnish and install (1) MicroFAST 4.5 treatment system as manufactured by Bio-Microbics, Inc. The treatment system shall be complete with all needed equipment as shown on the drawings and specified herein.
The principal items of equipment shall include FAST System insert, leg extensions, blower assembly, blower controls and alarms. The MicroFAST 4.5 unit shall be situated within a 4,220 Gallon (16,000 L) minimum tank, as shown on the plans. Suggested maximum settling tank(s) equaling ½ to 1 x daily flow must be used prior to FAST. Tank must provide adequate pump out access and conform to local, state, and all other applicable codes. The contractor shall provide coordination between the FAST system and tank supplier with regard to fabrication of the tank, installation of the FAST unit and delivery to the job site.

2. OPERATING CONDITIONS
The MicroFAST 4.5 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from (18) eighteen to (63) sixty-three persons and not to exceed 4,500 US Gallons per day (17,000 LPD) provided the waste contains nothing that will interfere with biological treatment. The FAST system is a biological treatment system not meant for non-biodegradable or industrial wastewater.

3. MEDIA
The FAST media shall be manufactured of rigid PVC, polyethylene, or polypropylene and it shall be supported by the polyethylene insert. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids descend through the media to the bottom of the septic tank.

4. BLOWER
The MicroFAST 4.5 unit shall come equipped with a regenerative type blower capable of delivering 90-140 CFM [185-238m3/hr]. The blower assembly shall include an inlet filter with metal filter element. Blower piping to the tank shall use non-corrosive material (Galvanized, or Stainless Steel). Do not run galvanized pipe inside the treatment tank. Refer to Installation Manual for further details.

5. REMOTE MOUNTED BLOWER
The blower elevation must be higher than the normal flood level. A two-piece, rectangular housing shall be provided with tamper-proof screws. The discharge air line from the blower to the MicroFAST shall be provided and installed by the contractor.

6. ELECTRICAL
The electrical source should be within 150 feet [45 meters] of the blower. Consult local codes for longer wiring distances. All wiring must conform to code. Input power on 60Hz electrical systems 220/460VAC, 3Ø, 6.4/3.3 FLA, on 50 Hz electrical systems 230/380VAC, 3Ø, 6.1/3.5 FLA. Other voltages and phase are also available. Actual power consumption varies with site conditions. All conduit and wiring shall be supplied by contractor.

7. ALARMS
The alarm system shall consist of a visual and audible alarm to indicate loss of power to the blower. A manual silence switch is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS
All work must be done in accordance with local codes and regulations. Installation of the MicroFAST 4.50 shall be done in accordance with the written instructions provided by the manufacturer.
An operation and maintenance manual shall be furnished, which will include a description of system installation, operation, and maintenance procedures.

Treatement unit weighs approximately 1600 pounds [726kg]. Four holes for lifting the FAST liner are supplied. Spreader bars are to be used in lifting the unit. Place spreader bars between lifting holes.

9. FLOW & PIPE SIZING
Each FAST module is provided with a standard (4) four inch effluent pipe hole and gasket. An optional (6) six inch hole and gasket can be utilized consult factory for guidance.

FAST systems have been successfully designed, tested and certified receiving gravity, demand-based influent flow. When influent flow is controlled by pump or other means to help with highly variable flow conditions, then multiple dosing events should be used to maximize performance. The flow rate shall not exceed 15 gpm (57 Lpm) with a maximum hourly flow not to exceed 10% of the design daily flow (450 gph (1700 LPH)).

10. WARRANTY
Bio-Microbics, Inc. warrants all new residential FAST® models (MicroFAST® 3.0, 4.5, and 9.0) against defects in materials and workmanship for a period of one year after installation or eighteen (18 months) from the date of shipment which ever occurs first. All other FAST® system models are warranted for a period of one year after installation or eighteen months from date of shipment, whichever occurs first. All are subject to the following terms and conditions below:

During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIO-MICROBICS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIO-MICROBICS, INC., ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. Contact your local distributor for parts and service.

DO NOT SCALE

UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

BIO MICROBICS
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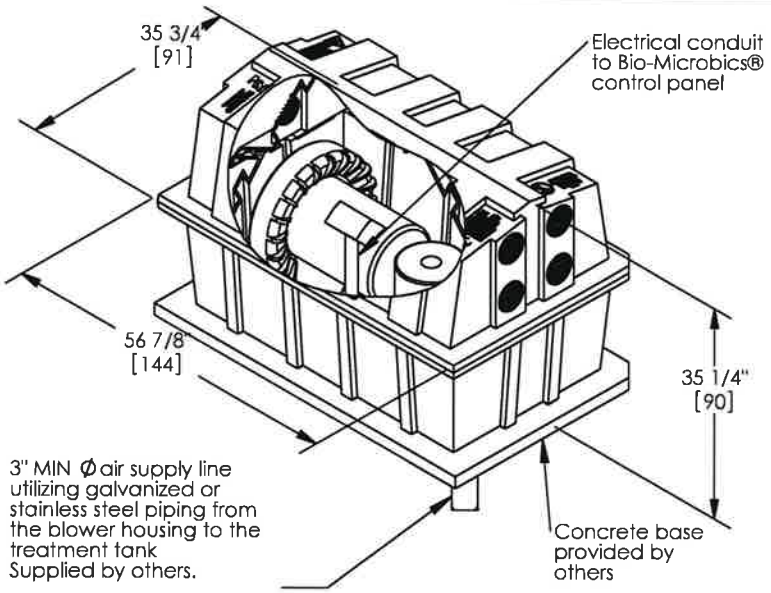
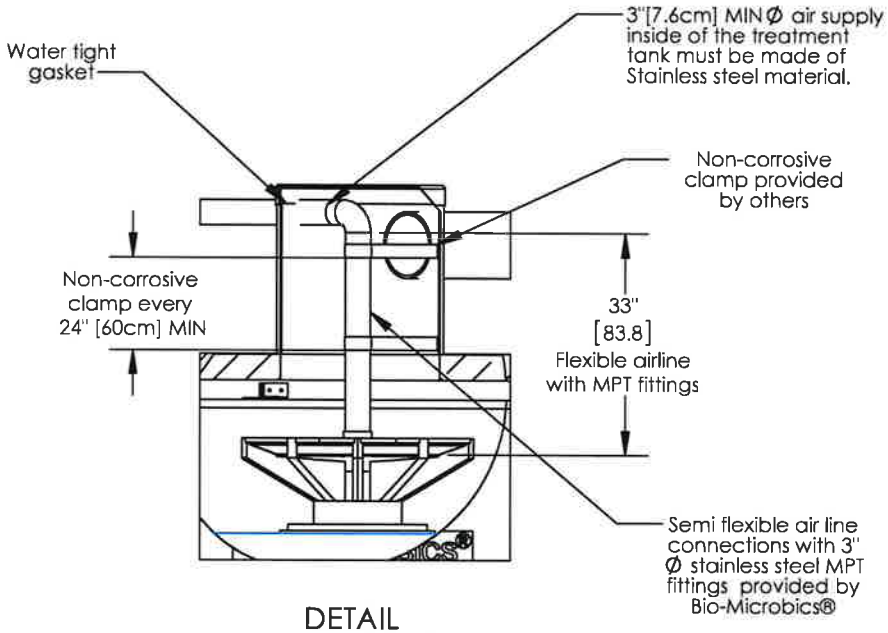
MicroFAST 4.5 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
	NAME / DATE	A	MicroFAST 4.5 Specifications		2 OF 3
DRAWN	5/10/2006				
CHECKED PF	12/18/2014		REVISED 12/18/2014	REV.	





DETAIL
SCALE 2 : 55

Minimum leg
extension assembly
see notes 1-4

Notes

1. Secure leg extension to the FAST® unit by placing two screws on each side of the leg extension (4 screws per foot are included).
2. Cut 4" schd. 40 PVC pipe (not included) to obtain the desired height. Minimum pipe length of 11 3/4" [29.7cm]. For heights greater than 18" [45.7cm] use schd. 80 PVC pipe (not included). Consult factory for extending leg beyond 36"[90 cm].
3. Anchor the leg extensions to the tank with non-corrosive hardware (not included) at the provided mounting points.
4. If less than the specified minimums are considered necessary, consult factory for guidance.
5. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2ft [0.6m] minimum. The unit is supplied with 3"Ø semi-flexible airline connections with stainless steel MPT fittings and sample U-shape pipe clamps.
6. Tank, anchors, liner brace, piping conduit, blower, housing pad and vents are provided by others.

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TOLERANCES
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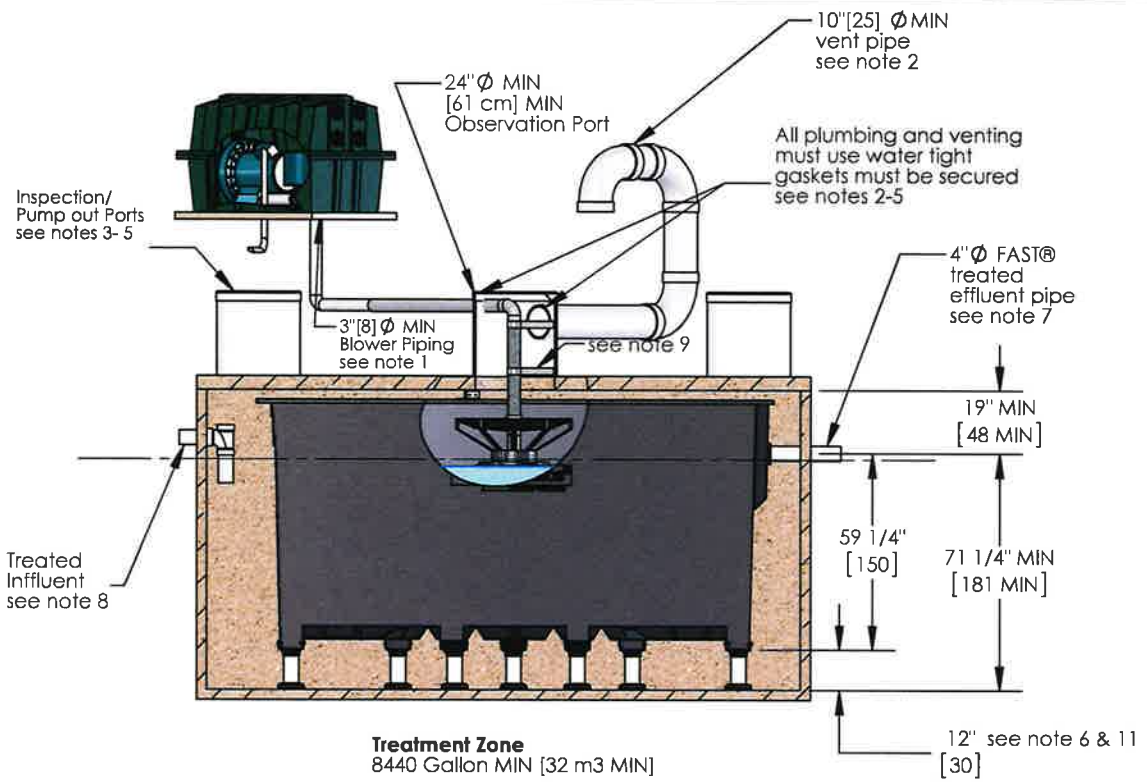
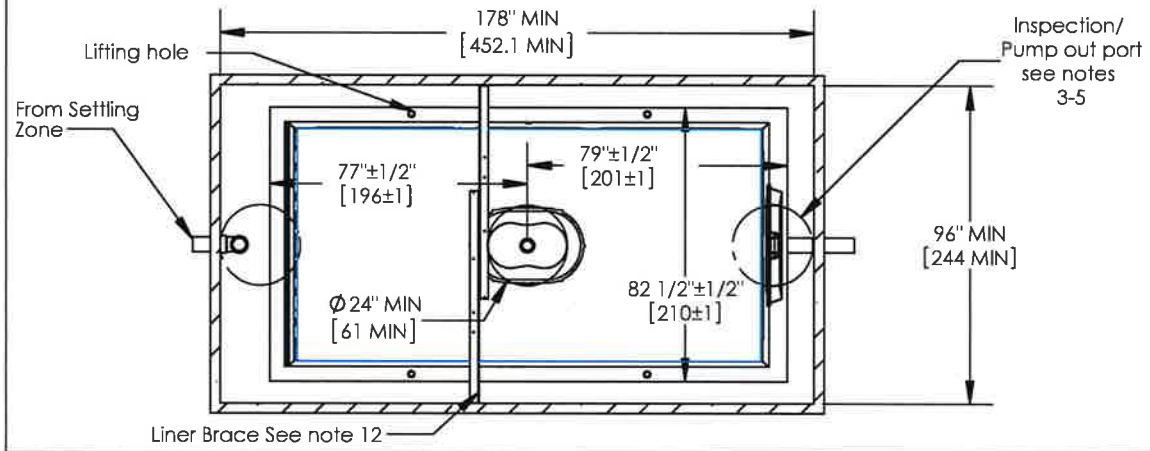
MicroFAST 4.5 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
	NAME / DATE	A	MicroFAST 4.5 Details		3 OF 3
DRAWN CTC	5/10/2006				
CHECKED PF	12/18/2014		REVISED 12/18/2014	REV. INI-07-W	



Treatment Zone
8440 Gallon MIN [32 m3 MIN]



NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 58" X 36" X 2.5" [150 X 90X 7cm] minimum.
2. Vent to desired location and cover opening with a vent grate with at least 39 sq in.[252 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 3 of 3).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2' min [60 cm]. See alternate air supply option on sheet 3 of 3.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.
11. Refer to sheet 3 of 3 for leg extensions requirements.
12. The supplied liner braces must be installed so as to connect the liner to the side of the tank at each end of the tank as shown, thereby preventing lateral movement of the liner. Use only non-corrosive anchor bolts (provided by others).

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MicroFAST 9.0 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER	SHEET
NAME	DATE	A	MicroFAST 9.0 with feet	1 OF 3
DRAWN CTC	5/10/2006			
CHECKED PF	12/17/2014	REVISED 12/17/2014	REV. INI-07-V	

Specifications for MicroFAST 9.0 Wastewater Treatment System

1. GENERAL
The contractor shall furnish and install (1) MicroFAST 9.0 treatment system as manufactured by Bio-Microbics, Inc. The treatment system shall be complete with all needed equipment as shown on the drawings and specified herein.
The principal items of equipment shall include FAST System insert, leg extensions, blower assembly, blower controls and alarms. The MicroFAST 9.0 unit shall be situated within a 8,440 Gallon (31900L) minimum tank, as shown on the drawing. Settling tank(s) equaling ½ to 1 x daily flow must be used prior to FAST. Tank must provide adequate pump out access and conform to local, state, and all other applicable codes. The contractor shall provide coordination between the FAST system and tank supplier with regard to fabrication of the tank, installation of the FAST unit and delivery to the job site.

2. OPERATING CONDITIONS
The MicroFAST 9.0 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from (30) thirty to (126) one hundred twenty-six persons and not to exceed 9,000 US Gallons per day (34000 LPD) provided the waste contains nothing that will interfere with biological treatment. The FAST system is a biological treatment system not meant for non-biodegradable or industrial wastewater.

3. MEDIA
The FAST media shall be manufactured of rigid PVC, polyethylene, or polypropylene and it shall be supported by the polyethylene insert. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids descend through the media to the bottom of the septic tank.

4. BLOWER
The MicroFAST 9.0 unit shall come equipped with a regenerative type blower capable of delivering 155-200 CFM [38-85m3/hr]. The blower assembly shall include an inlet filter with metal filter element. Blower piping to the tank shall use non-corrosive material (Galvanized or Stainless Steel). Do not run galvanized pipe inside the treatment tank. Refer to Installation Manual for further details.

5. REMOTE MOUNTED BLOWER
The blower elevation must be higher than the normal flood level. A two-piece, rectangular housing shall be provided with tamper-proof screws. The discharge air line from the blower to the MicroFAST System, shall be provided and installed by the contractor.

6. ELECTRICAL
The electrical source should be within 150 feet [45.7 meters] of the blower, consult local codes for longer wiring distances. All wiring must conform to code. Input power on 60Hz electrical systems 220/460VAC, 3Ø, 11.2/5.9 FLA, on 50 Hz electrical systems 190/380VAC, 3Ø, 17.6/8.8 FLA. Other voltages and phase are also available. Actual power consumption varies with site conditions. All conduit and wiring shall be supplied by contractor.

7. ALARMS
The alarm system shall consist of a visual and audible alarm to indicate loss of power to the blower. A manual silence switch is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS
All work must be done in accordance with local codes and regulations. Installation of the FAST 9.0 shall be done in accordance with the written instructions provided by the manufacturer.
Manuals shall be furnished, which will include a description of system installation, operation, and maintenance procedures.

Treatement unit weighs approximately 2300 pounds [1044 kg]. Four holes for lifting the FAST liner are supplied. Spreader bars are to be used in lifting the unit. Place spreader bars between lifting holes.

9. FLOW & PIPE SIZING
Each FAST module is provided with a standard (4) four inch effluent pipe hole and gasket. An optional (6) six inch hole and gasket can be utilized consult factory for guidance.

FAST systems have been successfully designed, tested and certified receiving gravity, demand-based influent flow.When influent flow is controlled by pump or other means to help with highly variable flow conditions, then multiple dosing events should be used to maximize performance. The flow rate shall not exceed 30 gpm (114 Lpm) with a maximum hourly flow not to exceed 10% of the design daily flow (900 gph (3400LPH)).

10. WARRANTY
Bio-Microbics, Inc. warrants all new residential FAST® models (MicroFAST® 3.0, 4.5 and 9.0) against defects in materials and workmanship for a period of one year after installation or eighteen months from date of shipment, whichever occurs first. All are subject to the following terms and conditions below:

During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIO-MICROBICS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIO-MICROBICS, INC., ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. Contact your local distributor for parts and service.

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TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

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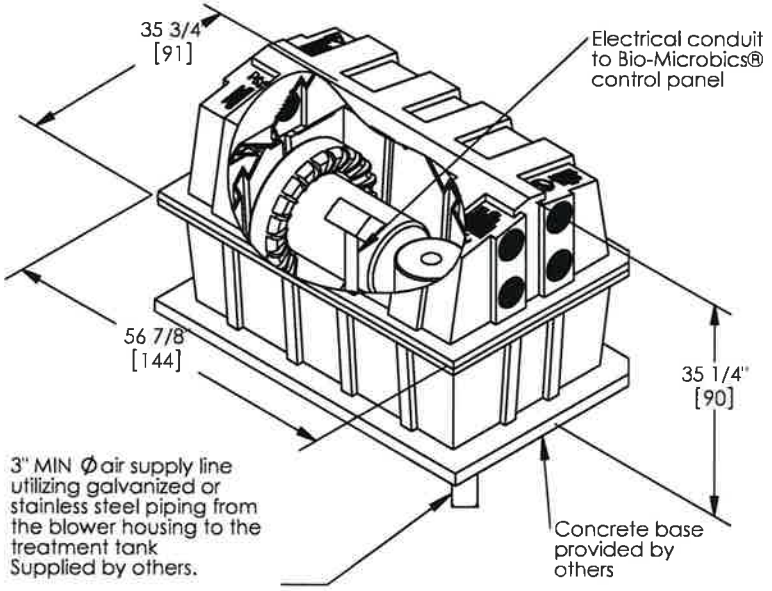
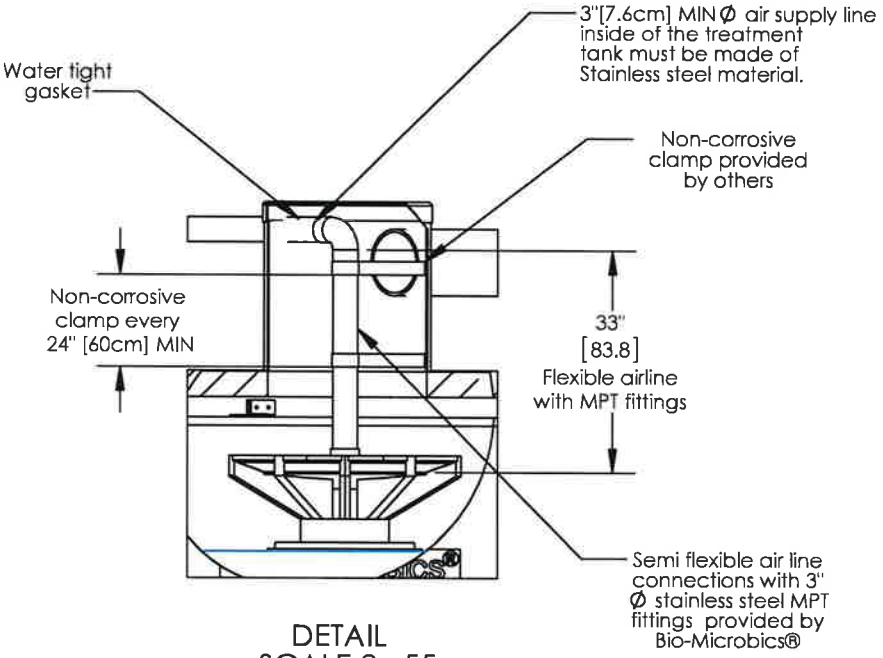
MicroFAST 9.0 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
NAME	DATE	A	MicroFAST 9.0 Specifications		2 OF 3
DRAWN	5/10/2006				
CHECKED PF	12/17/2014		REVISED 12/17/2014	REV.	





DETAIL
SCALE 2 : 55

Minimum leg
extension assembly
see notes 1-4

Notes
1. Secure leg extension to the FAST® unit by placing two screws on each side of the leg extension (4 screws per foot are included).
2. Cut 4" schd. 40 PVC pipe (not included) to obtain the desired height. Minimum pipe length of 11 3/4" [29.7cm]. For heights greater than 18" [45.7cm] use schd. 80 PVC pipe (not included). Consult factory for extending leg beyond 36"[90 cm].
3. Anchor the leg extensions to the tank with non-corrosive hardware (not included) at the provided mounting points.
4. If less than the specified minimums are considered necessary, consult factory for guidance.
5. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2ft [0.6m] minimum. The unit is supplied with 3"Ø semi-flexible airline connections with stainless steel MPT fittings and sample U-shape pipe clamps.
6. Tank, anchors, liner brace, piping conduit, blower, housing pad and vents are provided by others.

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[CENTIMETERS]
TOLERANCES
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MicroFAST 9.0 FAST Unit

WEIGHT	lb	SIZE	DRAWING NUMBER		SHEET
	NAME / DATE	A	MicroFAST 9.0 Details		3 OF 3
DRAWN	CTC 5/10/2006				
CHECKED	PF 12/17/2014		REVISED 12/17/2014	REV. INI-07-V	

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Appendix B

FAST® INSTALLATION STEPS
September 10, 2019 Version

This installation checklist is designed to be used in conjunction with the FAST® Installation Manual and engineering drawings & plans. All work must be done in compliance with all applicable regulations.

Materials & tools for install

Refer to the BioMicrobics Installation Manual for information on the materials and tools needed for installation.

Pre-FAST® install

- ☐ Tank is on the approved list
- ☐ FAST® tank is level on all axes.
- ☐ FAST® tank meets the minimum dimensions and layout as shown on the MicroFAST® Drawings (manhole location, inlet/outlet placement).
- ☐ FAST® unit has no visible damage from shipping.

The FAST® system insert can be installed using two independent techniques: "Hanging from the tank lid" OR "Standing on feet".

- ☐ Lid Mount (See details in BioMicrobics Installation Manual)
- ☐ Foot Mount (See details in BioMicrobics Installation Manual)

Installation for Hanging From the Tank Lid

- ☐ Run bead of supplied sealant (or equal) around FAST® insert hole in lid of tank so that a water tight seal is formed between FAST® liner and tank.
- ☐ Hang FAST® insert on tank lid being sure that FAST® outlet and tank outlet line up. **The tank outlet must NOT be higher than the FAST® outlet.**
- ☐ Install 4" schd 40 PVC outlet pipe into FAST® insert until pipe hits stops on the FAST® baffle plate. **IMPORTANT:** DO NOT attempt to insert pipe further than stops allow.
- ☐ Run bead of supplied sealant (or equal) around top of FAST® insert lip so that when lid is placed on the insert a water tight seal is formed.
- ☐ Set FAST® lid in place. 2" airline hole MUST be between 6" inspection port hole and outlet. DO NOT PERMANENTLY SECURE.
- ☐ Drill (hammer drill is preferred) and bolt non-corrosive anchors through FAST® lid (at pre-formed holes), liner and into tank. Each preformed hole in the FAST® lid must have an anchor.

- ☐ Install 2" airline through FAST® lid and supplied 2" rubber gasket and down to supplied airlift PVC coupling connection. Solvent weld airline to supplied PVC coupling so that coupling rests on top of airlift. **Bring the airline to the airlift coupling. DO NOT bring the airlift coupling up to meet the airline. The supplied PVC coupling MUST rest on top of the airlift splash plate.**
- ☐ Run the 2" air line to desired blower location (**within 100' of FAST® unit & using no more than 4 elbows**). Solvent weld all piping.
- ☐ Install 6" observation port to desired height (at least finished grade) through the provided rubber gasket and into the FAST® lid. FAST® lid has built-in stops to prevent 6" pipe from going into treatment area.

Installation for Standing on Feet

- ☐ Carefully measure the length of leg extension needed to install the FAST® unit into the tank. **IMPORTANT: Make sure the outlet hole in the tank will not be higher than the FAST® outlet hole.**
- ☐ Cut PVC schd 40 pipe for legs to desired length. Solvent weld PVC pipe to foot top (crown) and foot bottom (base). Use provided stainless steel self tapping screws to attach foot to FAST® unit.
- ☐ Stand FAST® unit in tank and check to make sure tank outlet is **not higher than the** FAST® outlet AND that the FAST® airlift is accessible from the manhole in tank lid.
- ☐ Fasten FAST® unit to tank using non-corrosive anchors at the feet or with a piece angle stock (non-corrosive) at the top lip of the insert.
- ☐ Install 4" schd 40 PVC outlet pipe into FAST® insert until pipe hits stops on the FAST® baffle plate.
- ☐ Place tank lid on tank using tank manufacturer's directions. Be sure "center" manhole is directly over FAST® airlift.
- ☐ Install the airline. Solvent weld a 2" diam. Schd 40 PVC line into the PVC coupling at the top of the airlift for MICROFAST Models 0.5, 0.75, 0.9, 1.5 & 3.0. **Bring the airline to the airlift coupling. DO NOT bring the airlift coupling up to meet the airline. The supplied PVC coupling MUST rest on top of the airlift splash plate.** With any size unit installed using leg extensions the airline inside the tank **MUST** be non-corrosive and hard fastened to the tank at least every 2 feet using non-corrosive fasteners. See Installation Manual and Drawings for airline sizes and material for FAST® Models 4.5 & 9.0.
- ☐ Make the airline penetration through the riser watertight using a gasket or other suitable sealant. See the drawing in Installation Manual. Run the 2" air line to desired blower location. See Installation Manual "Air Line Sizing" Table page 6 and Drawings for airline sizes and material for FAST® Models 4.5 & 9.0.
- ☐ Solvent weld all piping.

Venting

- ☐ Locate the vent pipe in area of low human activity and where vigorous winds are present.
- ☐ Check the size of the vent pipe. Refer to the "Required Vent Size" chart in the Installation Manual page 7 for the different vent pipe sizes that are required for the different FAST® models:

  Diameter of pipe used for vent_____inches

There are two primary styles of venting that can be used with any FAST® system: Direct or Remote.

(1) **Direct venting**

- ☐ Run the appropriate sized pipe from the FAST® reaction chamber straight up above finished grade.
- ☐ Install an appropriate cap on the pipe making sure to secure it with tamper resistant fasteners. NOTE – Any FAST® unit that uses the BioMicrobics plastic lid can use the 6" observation port for this vent. Landscape grates for 6" pipe are common at most hardware stores and are well suited as vent caps.

(2) **Remote venting**

- ☐ Run the appropriate sized pipe from the FAST® 6" inspection port or airlift access riser to a location above finished grade. Do not use any more than four elbows. Typically the remote vent is "branched" off of the 6" inspection port, or the riser over the FAST® reaction chamber.
- ☐ Install an appropriate cap on the pipe making sure to secure it with tamper resistant fasteners.
- ☐ Assure all vents drain moisture that will collect in the vent line.
  This is accomplished by either sloping the vent line back to the FAST® tank, or drilling a weep hole in the lowest point of the vent line.

Blower (non-electrical)

- ☐ Locate blower in a suitable proximity to the power supply to prevent excessive voltage drop.
- ☐ DO NOT locate blower in an area of possible standing water.
- ☐ Permanently mount the blower housing on a contractor supplied concrete surface (AC pads are typical) or other permanently stable structure. Setting the housing on bare ground is NOT recommended.
- ☐ Fasten the blower to the blower housing using 4 of the supplied 1", self tapping stainless steel screws.
- ☐ Attach supplied galvanized piping to blower inlet and outlet using the longer pipe length and elbow for inlet side. Attach PVC reducer bushing to outlet piping after the galvanized pipe length.
- ☐ Attach blower inlet filter assembly (element will come pre-installed inside assembly) to the inlet galvanized piping. The filter assembly need not be in an upright position.
- ☐ Connect air line piping and solvent weld to FAST® unit with blower outlet piping so that the piping exits the bottom of the blower housing and therefore through the concrete pad.

Salcor 3G UV (If Required)

- ☐ Locate the Salcor 3G UV following the FAST®.
- ☐ Installation and wiring to be according to the Salcor 3G UV installation manual. (See Salcor Installation Manual, pages 3-8)

Wiring

All electrical work should be performed by a qualified electrician and per all applicable codes. Failure to do so may result in severe bodily injury or death.

Control Panel

- ☐ Mount the control panel at a suitable location (factor in possible voltage drop from master breaker panel).
- ☐ Install the correct size wire and conduit from master breaker panel to control panel and from control panel to blower per local electrical code.
- ☐ Wire the incoming and outgoing wires inside the panel. See wiring details in Installation Manual.
- ☐ If UV is required wire the power to the UV from the BioMicrobics panel and wire the alarm from the UV to the alarm input of the BioMicrobics panel.

Blower

- ☐ Connect the power wires from the control panel to the blower according the diagram on the side of the cardboard blower box or Installation Manual (there are also diagrams inside the blower junction box, low voltage=110VAC, high voltage=220VAC).

Finish Up

- ☐ Fill the FAST® tanks up to its operating volume.
- ☐ Check for any leaks of the pipe connections into the tanks. Repair any leaking pipe connections by replacing the seals on the pipe connectors.
- ☐ Check for the correct water levels in both the FAST®. For FAST® the water level should be greater than 1 ½ inches and less than 2 ½ inches of water over the media.
  Water level over FAST® media_____inches
- ☐ Turn the blower on. Check for air leaks using a soapy water solution. Fix any aeration pipe leaks by solvent welding new pipe in place of the leaking pipe connections.
- ☐ Turn the blower off and wait for the alarm to sound. If the alarm does not sound after 30 seconds, then review the electrical installation procedures in the Installation Manual.
- ☐ If UV is required, turn the UV light on and check the green LED light on the side of the UV junction box. If LED light is on, unit is functioning properly. If the BioMicrobics goes into an alarm condition when the UV is first turned on, reverse the alarm output of the Salcor panel (See Salcor UV Installation Manual, page 11-12)
- ☐ Back fill the excavation after approval by the local authorities.

Consult BioMicrobics, Inc. should you have any questions or concerns with the above checklist at onsite@biomicrobics.com or (913) 422-0707 or 1-800-753-FAST (3278).

16002 W. 110th St., Lenexa, KS 66227 ▪ Phone: 913-422-0707 ▪ Fax: 913-422-0808
E-mail: onsite@biomicrobics.com ▪ www.biomicrobics.com ▪ 800-753-FAST (3278)

Suggested Protocol for Inspection of FAST® Wastewater Treatment Systems
September 10, 2019

Prior to backfilling a FAST® system installation, Bio-Microbics strongly recommends that the installation is inspected by a trained, onsite-system inspector. This document details the specific protocols that should be used when inspecting the installation of a FAST system. If questions arise during the inspection process, please call Bio-Microbics at 1-800-753-3278.

Before the Unit is Backfilled:

1. Check with the Designer for any anti-flotation provisions. If there are anti-flotation provisions make sure that they are addressed prior to backfilling.

2. Fill the tank to the normal operating level. It is the responsibility of the installer to fill the septic tank to its normal operating level. If the tank is not filled, heavy rains after backfilling could cause the tank to float and damage the surrounding grounds.

3. Check for leaks in all water-tight seals.

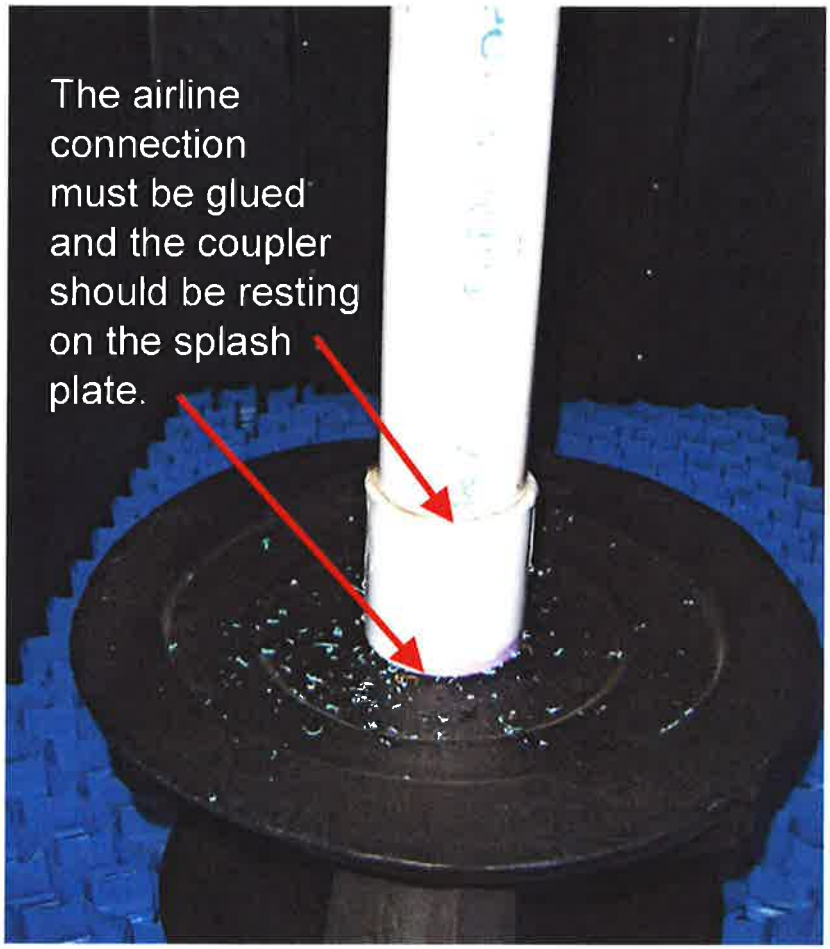
4. Ensure that the air line is properly installed and permanently connected to the tank and blower.

5. Turn on the blower and observe the operation of the airlift through the observation port. A robust splash should be present.

6. Replace the observation port lid and take note of any excessive back pressure. To determine if excessive back pressure is present, first check all access points in the entire treatment system. If air is escaping through any of these access points, review the venting configuration and make the necessary modifications. You can also remove the observation port lid and check for a gush of air. If you do feel a gush when the lid is

removed, then the surface area of the venting may need to be modified. Check to make sure the vent does not retain water.

7. Check for proper water level over the media. The normal water line should be ~2" over the media. This level can be checked by finding a dry stick, lowering it down the observation port to the top of the media surface, and then checking the length of the wet mark on the stick.



8. Check for proper alarm function. Turn off the blower circuit breaker on the front of the Bio-Microbics alarm panel and wait for the alarm to sound. If the alarm does not sound after 30 seconds, then review the electrical installation procedures.

9. Check airlift coupler connection. It is very important that there is a permanent, glued connection between the airlift and airline. Use a telescoping mirror or digital camera to double check this connection through the observation port. Additionally, the airlift coupler should be resting on the splash plate.

10. If the unit is level, has no leaks, has even-flow dispersion of the water and no back pressure is evident, then backfill the excavation.

11. Lastly, make sure that the unit serial number has been recorded on the front face of the control panel and the label inside the blower housing.

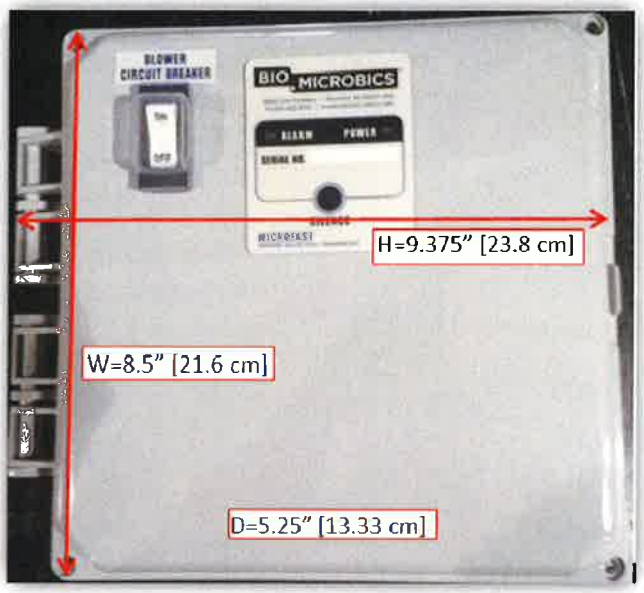
Evaluation of System Performance

The following basic checks in conjunction with an experienced service person's knowledge should provide a reasonable indication of the process quality.

Sounds	During normal operation, a uniform humming sound emanates from the system. If unusual noises are heard, it is possible the blower could need maintenance or repairs. Inspection of the treatment chamber should reveal a vigorous splashing sound within the chamber.

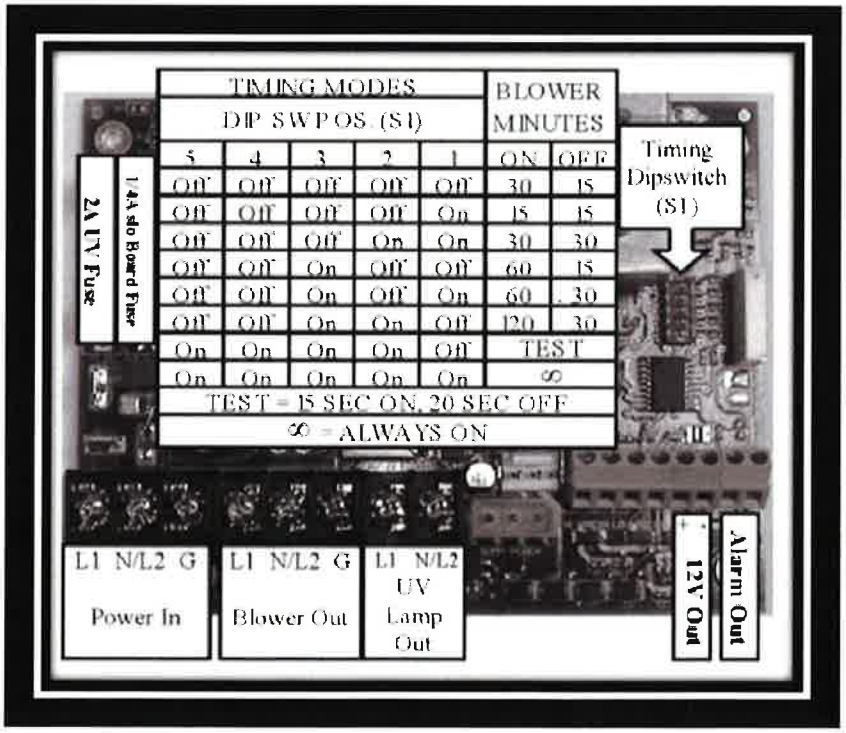
Smell	The FAST® System is an aerobic system. During normal operation, the system has an earthy smell like that of a well-maintained compost pile. If other odors are noticed, the aeration process may not be operating or the system may be overloaded. Check the blower for proper operation and make sure the airlift is operating by viewing through the observation port.
Sight	Normally, the effluent is reasonably clear, colorless and odorless. If the effluent becomes turbid, the treatment process has developed a problem. Turbid effluent will be present with a septic odor.

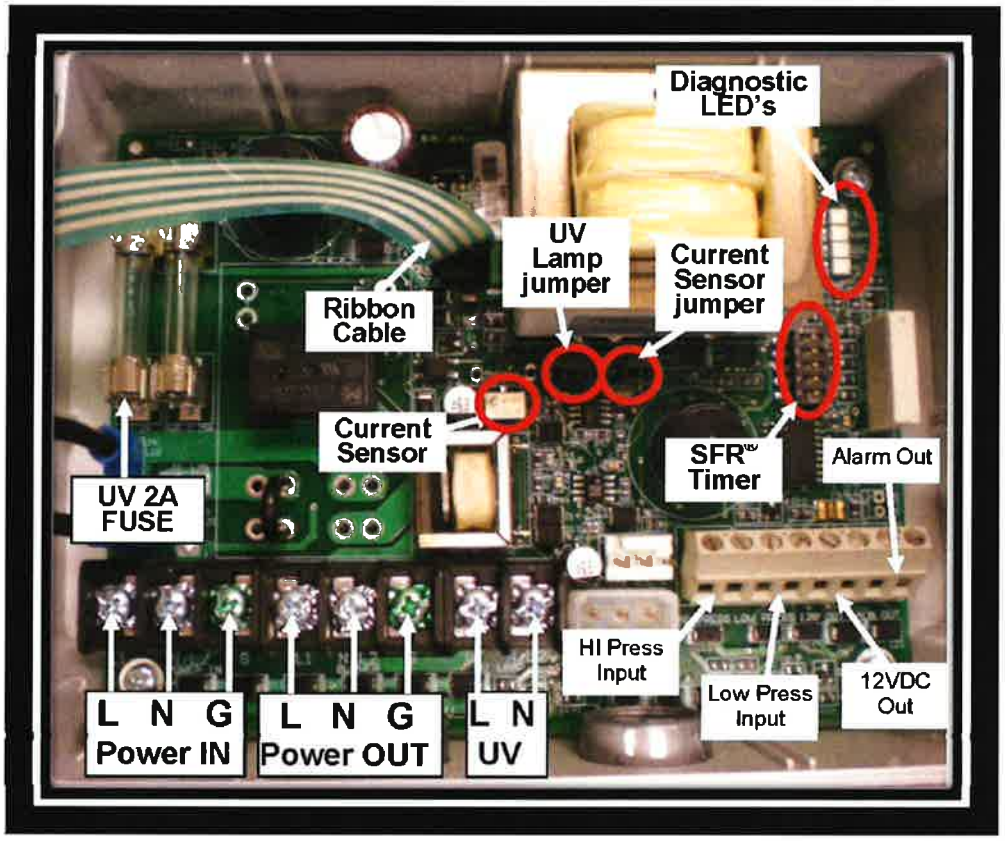
FAST® CONTROL PANEL



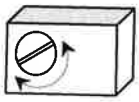
This panel replaces the old 110V, 220V 10 amp (A) & 220V 20 A control panels. This control panel has a greater utility and versatility than previous versions. This panel uses only one circuit board but uses a group of wires referred to as a ribbon cable to communicate with the membrane (label) on the front face of the panel. Please be careful when working with the ribbon cable. It does purposely disconnect from the circuit board but can also break. The following is a description of the main features of this new panel:

- A digital picture wiring diagram & SFR® timer schedule appears on the inside front half of the panel:





➢ **Blower Current Sensor:** Current sensor technology is now built into the board for detecting high and low blower amp draw. This feature is designed to replace the high water alarm/pressure switch that is currently used to meet NSF certification requirements (international installations do not require this feature). The low end current sensor is preset at 0.5 A and non–adjustable. The high end current sensor can be adjusted according to the specific blower that is being used, and can go up to 15 A. The default sensor setting is ~ 3 A, turning the screw on the sensor **clockwise** will increase the current required to activate the alarm. This requires a very small slotted screwdriver.



○ **Blower current sensor jumper**: The current sensor jumper allows you to activate (use) or de-activate (not use) the Blower Current Sensor. You may find a pair of needle nose pliers useful when moving the jumper.

- To activate the current sensor, connect the jumper to the 2 left pins
- To de-activate the current sensor, connect the jumper to the 2 right pins

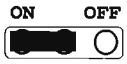
Activated

De-activated

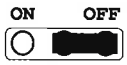
- **High Pressure & Low pressure Inputs:** The High Pressure input is a normally open (N.O.) terminal designed for use with the high water alarm/pressure switch that is currently used to meet NSF certification requirements (international installations do not the require this feature). The Low Pressure input is a normally open (N.O.) terminal that may have future use.

- **UV Lamp & Sensor:** This feature is designed to power a small ultraviolet light disinfection system (up to 2 A) with 110VAC. It also has a non-adjustable low current sensor built in that will activate the alarm when ≤ .005 A is drawn by the UV light. Most UV systems will activate this alarm when the bulb totally stops, but the ballast still works. **ALL** panels will have this feature standard.

  - **UV Lamp jumper** The UV Lamp jumper allows you to activate (use) or de-activate (not use) the UV Lamp & Sensor . You may find a pair of needle nose pliers useful when moving the jumper.
    - To activate the UV alarm sensor, connect the jumper to the 2 left pins.
    - To de-activate the UV alarm sensor, connect the jumper to the 2 right pins.



Activated



De-activated

♦**NOTE:** UV lamp jumper **DOES NOT** disconnect the power from the UV lugs (to disconnect UV power, please take the UV-2A glass fuse out)

- **12VDC out** This feature provides output power of 12VDC and up to 250 mA. This will be used to power the TRACK® auto dialer system.
- **Alarm Out:** This is a communication feature that allows the FAST panel to tell another device that the FAST system is in alarm. Typically this would be used with the TRACK auto dialer system. This is a normally open (N.O.) dry contact that can tolerate up to 220VAC or 30VDC.

- **Diagnostics LED's** : These are red lights that will assist in determining the source of an alarm.

  - (**CB, SUM, UV, LAMP**) LED will turn on if the blower switch on front face is OFF or if nothing is connected to the UV power out when UV lamp jumper is in the activated position.
  - (**CURRENT**) LED will turn on if the blower draws too many amps, or too few amps.
  - (**PRESS SW**) LED will turn on if the panel gets a signal from either HI Press input or Low Press inputs.
  - (**OL**) This is for future use on large FAST panels.

If you have any questions please feel free to contact Bio-Microbics, Inc. at 1-800-753-3278 or by email at onsite@biomicrobics.com

BIO MICROBICS®

BETTER WATER. BETTER WORLD.®

Appendix C

16002 W. 110th Street • Lenexa, KS 66219 • Phone: 913-422-0707 • Fax: 913-422-0808
e-mail: onsite@biomicrobics.com • www.biomicrobics.com • 800-753-FAST (3278)

MicroFAST®

FIELD INSPECTION & SERVICE REPORT

FAST® Wastewater Treatment Systems

INSTALLATION	AUTHORIZED SERVICE PROVIDER
Installation Address:	Name:
Owner Name:	Street:
Mail Address:	Mail Address:
City State Zip	City State Zip
Phone Fax e-mail	Phone Fax e-mail

INSTALLATION INFORMATION

Model No.	Blower Brand and Size	Serial No.	Date of Installation	Date of last pump-out

EQUIPMENT OPERATION	YES	NO	DETAILED COMMENTS OF SITE AND DRAINFIELD CONDITIONS – MAINTENANCE PERFORMED OR REQUIRED
Electrical Panel(s)			
Visual Alarm Operating			
Audio Alarm Operating			
Blower(s):			
Air Inlet Filter Clean			
Blower Hood Vents Clear			
Excessive Noise			
Excessive Vibration			
Blower <100 ft from Unit			
Airline less than 4 – 90's			
Wiring < 150 ft from source			
Treatment Unit(s):			
Unusual Odor			
System Vent			
Pumpout Required:			
Primary Settling Zone			Scum <12 in & Sludge < 18 in.
Aerobic Treatment Zone			Sludge < See Page 5&6 of FAST® Service Manual
EFFLUENT:	**LIMIT**	**RESULT**	
Estimated Daily Flow			
pH (Standard Units)	6-9 S.U.		
Color	Clear		
Temperature			
Dissolved Oxygen (effluent)	2 mg/L		
Odor Slightly, Musty odor (not septic)			

OWNER SIGNATURE	TECHNICIAN SIGNATURE	SERVICE DATE

Please FAX back to 913-422-0808

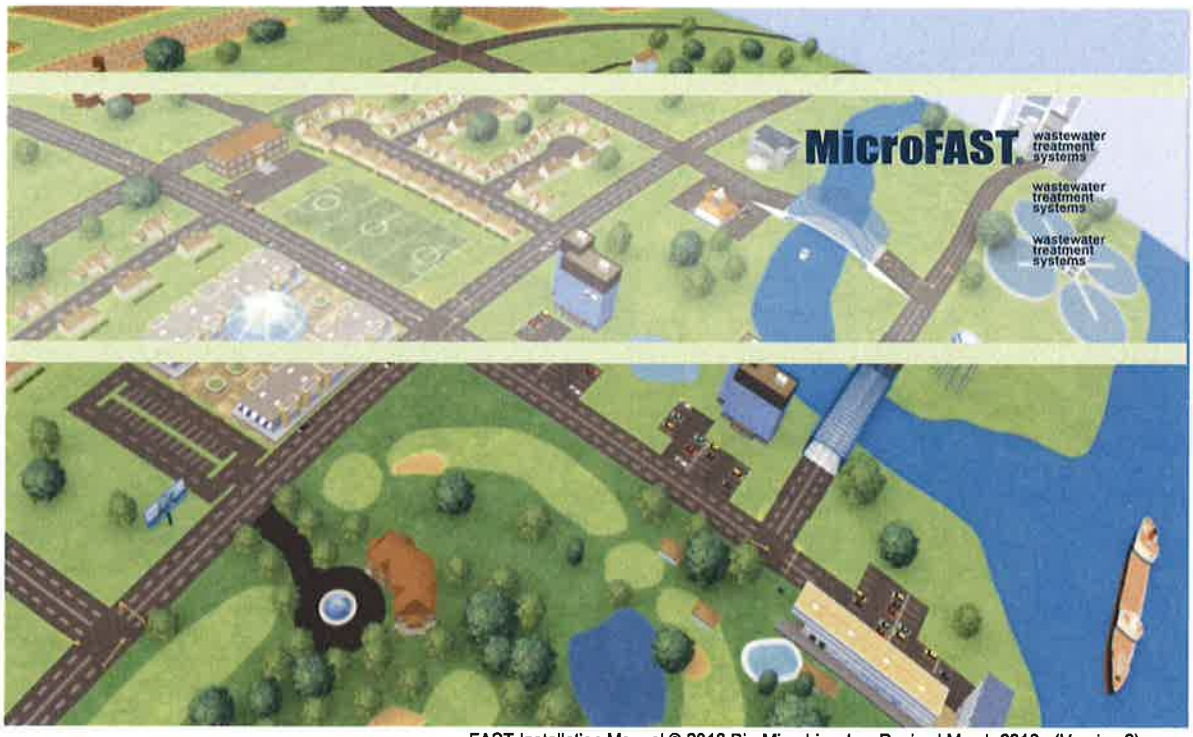
BIO MICROBICS
BETTER WATER. BETTER WORLD.®

FAST® Installation Manual

FOR USE WITH

(NSF/ANSI Std 40 & 245) **MicroFAST® 0.5, 0.625, 0.75, 0.9, 1.5**
(non-NSF certified) **MicroFAST® 3.0, 4.5, 9.0**

September 10, 2019



INSTALLATION MANUAL

GENERAL INFORMATION

All FAST® products are ETL certified for safety (electrical, environmental, etc.). One or more of the following patents protects this process: 3,966,599; 3,966,608; 3,972,965; 5,156,742. Certified by NSF International, the MicroFAST® 0.5, 0.625, 0.75, 0.9 and 1.5 systems meets NSF/ANSI Standard 40, Class 1 and Standard 245 certifications for wastewater treatment devices. If you have questions regarding any Bio-Microbics products, please contact us:

1-800-753-FAST (3278) or +1- (913) 422-0707

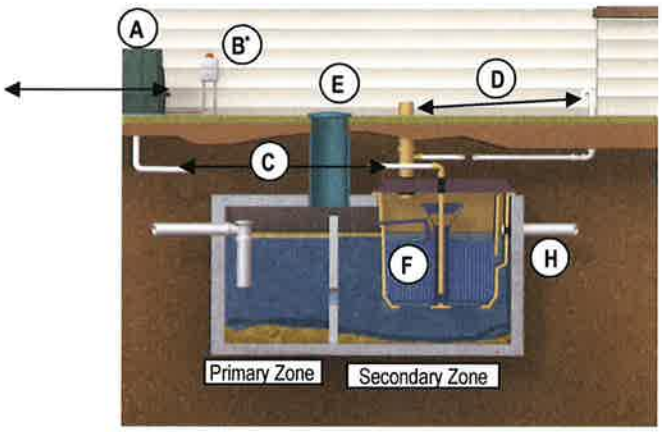
e-mail: onsite@biomicrobics.com

About FAST®: The FAST® (Fixed Activated Sludge Treatment) system uses naturally occurring bacteria (biomass) to treat sewage for dispersal into the environment. This continuous process provides the biomass with waste (food) and air in a suitable environment. Dead bacteria and non-biodegradable waste settle and accumulate in the bottom of the tank for periodic removal.

The FAST® process consists of the treatment module and blower. The blower provides air to the system via the air supply pipe. The air supply pipe and draft tube create an air lift. The air lift mixes oxygen and waste throughout the media inside the tank. Bacteria grows on the media and digests the waste. A vent pipe expels harmless vapors created by the process.

GENERAL LAYOUT

- **A. Blower and Housing**
- **B. Control Panel**
- **C. Air Line Piping**
- **D. Vent(s) and Observation Port**
- **E. Access**
- **F. FAST® Unit**
- **G. Tank**
- **H. Outlet to Drain field**



***PLEASE NOTE:** Adequate pump out must be provided for primary and secondary zones. There may be ancillary equipment associated with your system: pump(s) (before and/or after the FAST® unit), a distribution box, a disinfection system, an irrigation system, a remote alarm, or auto dialer, etc.*

⚠ WARNING *Only qualified service personnel should open access ports and/or covers to a septic tank. Infectious organisms exist in a septic tank. If any contact with wastewater occurs, immediately wash and disinfect all exposed areas and contact personal physician. Failure to do so could result in severe sickness or death. DO NOT use an open flame or cause a spark near a septic tank's access points. Gases emanating from septic tanks can explode if ignited or deadly if inhaled.*

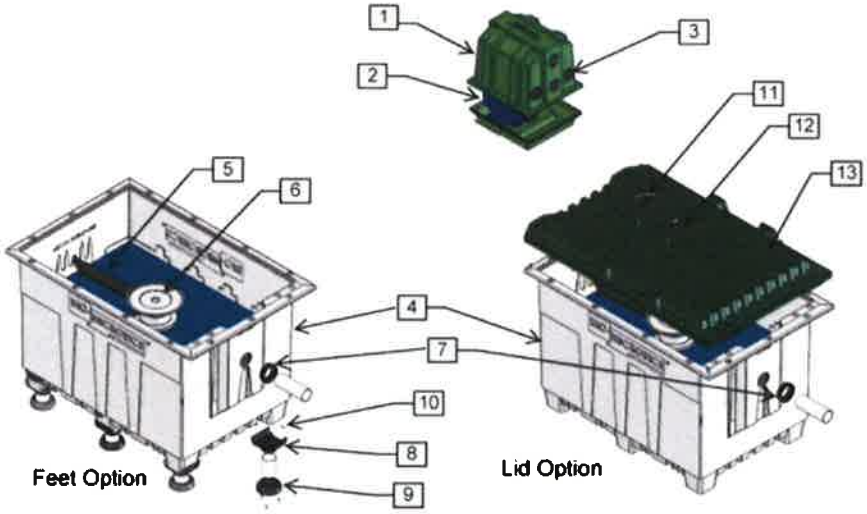
LOCATION

⚠CAUTION *Always have all utility lines and equipment marked by a locating service prior to performing any work. Failure to do so could result in severe bodily injury or death.*

FAST® systems may be located in the same position relative to the house and water supply as any conventional septic system. However, some basic guidelines should be followed:

1. The FAST® system lid is designed to withstand a burial depth of up to 3 feet (0.9 meters). Do not place the tank in a location where it could be subjected to traffic or additional weight. A professional engineer should be consulted if additional loading conditions are expected. FAST® with feet option should be considered.
2. The FAST® system must be located so that sufficient slope (≥2%, ¼ inch/foot) is provided for the influent and effluent lines.
3. Excessive back pressure must not be placed on the blower. Follow all installation guidelines.
4. The method and arrangement for effluent discharge must not interfere with the treatment plant's operation.

SYSTEM COMPONENTS



OPTIONAL EQUIPMENT		
8	Foot Top	010-FT
9	Foot Bottom	010-FB
10	Foot Screws	085-SSD141

SUPPLIED EQUIPMENT		
	COMMON NAME	**PART NUMBER**
1	Blower housing	Depending on model
2	Blower	Depending on model
	Blower I/O Piping, Inlet Filter Assembly, Screws	Depending on model
	Inlet Filter Element	Depending on model
3	Louver	390-LVR4
4	Liner	Depending on model
5	Recirculation Trough	Depending on model
6	Air Lift	Depending on model
7	4" Outlet Gasket	412.1-GSKTM4
11	6" Obs. Port Gasket	412.1-GSKTDT6
12	2" Air Line Gasket	412.1-GSKTD2
13	Lid (Not available with MCF 4.5 & 9.0)	Depending on model

⚠ WARNING *Persons coming in contact with wastewater, must immediately wash all exposed areas with disinfecting cleaner and contact your personal physician. Failure to do so could result in severe sickness or death.*

⚠ WARNING *Hazards exist in confined spaces such as a septic tank. All confined space precautions must be followed if entering a tank. Always keep tank openings covered during storage and installation*

Before installation may begin, check the tank to ensure it is level within ±1/2" [12 mm].

MATERIALS REQUIRED FOR INSTALLATION

Note: other tools may be needed to complete installation.

1. Septic tank that meets all applicable requirements & standards
2. Safe lifting mechanism
3. Anchor bolts for securing FAST® unit to the tank and blower housing to the concrete base.
4. Piping for observation/vent port, air lines, and vent lines (check installation procedures, specs, and plans to determine the size and type of pipes needed).
5. PVC saw
6. Pipe lubricant/soap
7. PVC primer and glue (weather appropriate)
8. Concrete base for blower assembly
9. Mounting screws for control panel
10. Electrical conduit, fittings and specified wires
11. Hammer drill and masonry bits

MODULE INSTALLATION

There are two options available for mounting the FAST® module into a tank.

Option A uses FAST's plastic lid and hangs the module from the concrete tank.
Option B uses leg extensions to stand the unit up on the bottom of tank.

MODULE WEIGHTS						
MODULE SIZE	MCF 0.5	MCF 0.75, 0.9, 1.0	MCF 1.5	MCF 3.0	MCF 4.5	MCF 9.0
WEIGHT (lbs)	165	220	505	690	1500	2200

⚠ CAUTION *Use safe lifting techniques to set module in tank. Be sure all lifting equipment is clear of obstructions such as power lines and trees.*

OPTION A: LID INSTALLATION (not available on any 4.5 or 9.0 unit)

1. Hang module liner from the opening in top of tank. Place FAST® lid on top of liner. Carefully line up the airline hole in the lid with coupling at top of air lift inside insert. Make sure the airline pipe is not leaning and stands perpendicular to the lid.

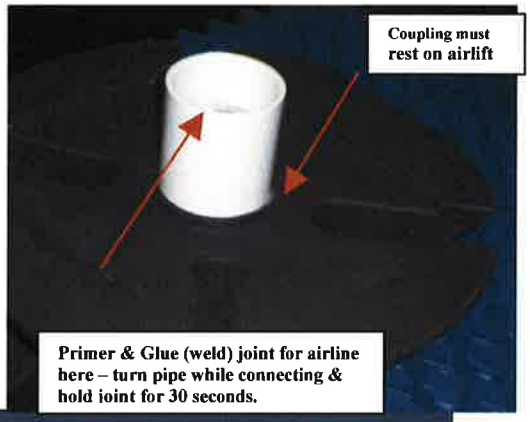
2. Use hammer drill to drill holes for anchoring module to the tank using pre-formed holes in the module lid as guides.

3. Apply sealant to surface between liner and tank, and module lid.

4. Place module lid on top of liner and secure using holes drilled in step 2 and non-corrosive 3/8" anchor bolts.

5. **AIR LINE** Insert cut length of air supply pipe (see AIR LINE SIZING table) through factory provided airline gasket in module lid. Use 6" hole in the lid for access to connect and glue air supply to air lift coupling. Run the airline to the desired blower location using required piping. Be sure airline is properly bedded when installed. Air line piping to FAST® may not exceed 100 ft [30.5 m] total length with ≤ 4 elbows.

ALL CONNECTIONS MUST BE AIR/WATER-TIGHT AND PERMANENT.



AIR LINE SIZING			
MODEL	PIPE SIZE (O.D.)		MATERIAL
0.5, 0.625, 0.75, 0.9. 1.0, 1.5. 3.0	2" (2.375")	51mm (60.3 mm)	PVC
4.5, 9.0	3" (3.516")	78.5mm (90mm)	Steel (stainless inside FAST® Tank

6. **OBSERVATION / VENT PORT** (o/v port) Insert desired length of 6" pipe into factory provided gasket then into access hole in lid. Insert pipe until it stops.

⚠CAUTION

DO NOT PUSH PIPE TO MEDIA SURFACE!

OPTION B: LEG INSTALLATION

1. **BUILD LEGS** using 4" [101 mm] Sch 40 pipe cut to your desired length. Glue the pipe to the bottom and top leg pieces. Attach the leg extensions to the module using supplied self-tapping screws. Creating lateral stability for the FAST system is also recommended by use of non-corrosive materials.

NOTE: If legs are > 18" [45.7 cm] tall then Sch 80 PVC or stronger pipe must be used. Consult factory to extend legs > 36" [90 cm].

2. **ATTACH LINER TO TANK** Attach leg extensions to the base of the tank with stainless steel anchor bolts (not provided).

Two anchor bolts are required per leg extension. Place the anchor bolts in the corners opposite each other.

3. **SECURE FAST® LINER TO TANK** (4.5 & 9.0 Units Only) Use the supplied stainless steel braces to secure the top of the FAST® liner to the tank at the proper locations.
   a. Use at least three (3) sets of stainless steel hardware (bolts, matching nuts, lock washers and flat washers) to secure each cross brace to the FAST® liner.
   b. Use stainless steel anchor bolts to secure each cross brace to the tank sidewall.

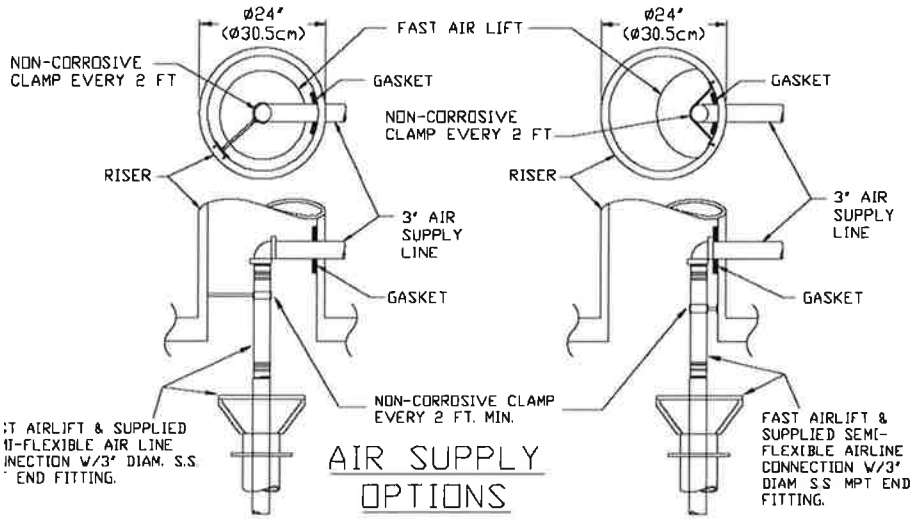
4. **AIR LINE** Join the air supply line to the air lift connection using required piping (see AIR LINE SIZING table). Blower piping to FAST® may not exceed 100 ft [30.5 m] total length with ≤ 4 elbows.

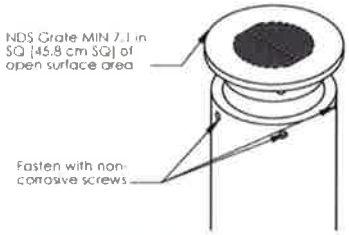
AIR LINE SIZING			
MODEL	PIPE SIZE (O.D.)		MATERIAL
0.5, 0.625, 0.75, 0.9. 1.0, 1.5. 3.0	2" (2.375")	51mm (60.3 mm)	PVC
4.5, 9.0	3" (3.516")	78.5mm (90mm)	Steel (stainless inside FAST® Tank

The air supply line inside the tank must be secured with non-corrosive clamps every 2 ft [0.6 m] to prevent breaking.

OUTLET INSTALLATION

Insert 4" Sch 40 PVC pipe for use as an effluent line. Insert through tank wall and into 4" outlet gasket in the liner. Push pipe to baffle stops.

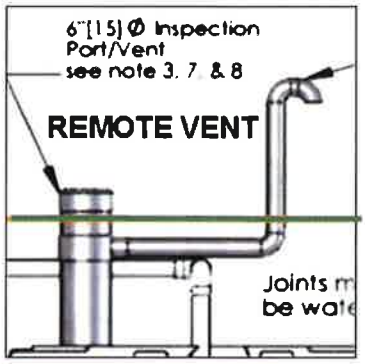




VENTING

Numerous options exist for proper venting. Three of the most common are mentioned here. The vent system must be sized properly to avoid excessive back pressure in the system (see table below). It also must not allow surface water to enter the system and must allow internal condensation to drain.

DIRECT VENT: The 6" o/v port can have holes drilled in it or a slotted cap put on it. Any cap must be fastened with screws to prevent unauthorized access. The opening(s) should prevent foreign material from entering the system.



REMOTE VENT: Branch off of the 6" o/v port or manhole below grade. Run the vent pipe to the desired location and terminate above grade. Cover opening with #4 mesh screen or similar. Water accumulating in the vent piping MUST be drained to prevent back pressure. **NOTE: The vent should not exceed 100 ft. [30.5m] in total length.**

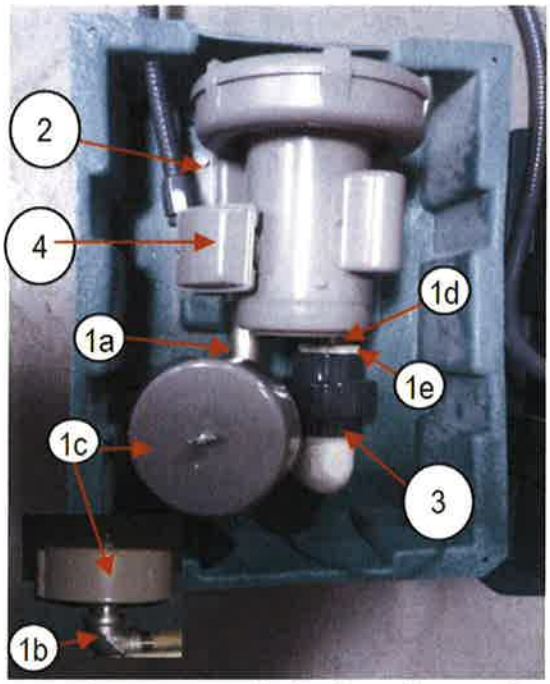
BIOFILTER: Please contact Bio-Microbics for guidance on how to build this buried vent. **NOTE: A biofilter vent must not allow moisture back into the treatment system.**

REQUIRED VENT SIZES		
MODEL	MIN VENT DIAM in/mm	Vent Opening in in^2/cm^2
All 0.5, 0.625, 0.75, 0.9.	3 / 76	7.0 / 45
All 1.5	4 / 102	9.1 / 59
All 3.0	6 / 152	19.5 / 126
All 4.5, 9.0	10 / 254	39 / 251

BLOWER INSTALLATION

CAUTION *Always have all utility lines and equipment marked by a locating service prior to performing any work.*

WARNING *All electrical work shall be properly performed by a qualified electrician per all applicable codes. Failure to do so may result in severe bodily injury or death.*



The blower and blower housing must be mounted on a solid base such as concrete to avoid settling. All conduit/piping should pass through the concrete slab from below.

1. CONNECT SUPPLIED INITIAL PIECES (See picture to the right)
   a. Longest pipe
   b. Elbow (See Inset)
   c. Air filter assembly
   d. Shortest pipe
   e. Reducer bushing

NOTE: ALL PIPE CONNECTIONS MUST BE AIR/WATER TIGHT.

2. SECURE BLOWER assembly to housing base using four supplied #14 x 1½" self-tapping screws. Drill screws directly into blower base.

3. CONNECT AIR LINE from FAST® unit to blower outlet using required piping (see chart). A "quick disconnect" is highly recommended to be installed at this location. Blower piping to FAST® may not exceed 100 ft [30.5 m] total length and have ≤ 4 elbows. Keep all debris out of air line.

ALL CONNECTIONS MUST BE AIR/WATER-TIGHT.

4. CONNECT INCOMING POWER to the blower at the blower junction box. Be sure to follow the supplied wiring diagram for the voltage at your specific location. All blowers are dual voltage and must be connected according to the proper diagram. Blower diagrams can be found on the blower's shipping box and/or at the end of this manual.

CONTROL PANEL INSTALLATION

CAUTION *Always have all utility lines and equipment marked by a locating service prior to performing any work.*

WARNING *All electrical work shall be properly performed by a qualified electrician per all applicable codes. Failure to do so may result in severe bodily injury or death.*

All FAST® system electrical parts are ETL (UL equivalent) certified for safety. The control panel meets NEMA4X standards for all weather use (not explosive or submerged environments).

1. Examine wiring directions inside the supplied FAST® control panel
2. A dedicated breaker is required in the building's master electrical panel. Make connections between the master panel and FAST® control panel.
3. Make connections between blower and FAST® control panel per the electrical diagram.

Bio-Microbics manufactures control panels that control UV systems and sewage pumps. The TRACK system (or other auto-dialer) can also be connected to the panel.

FINAL INSPECTION & START UP

It is the responsibility of the installer to ensure that the tank will not float due to hydraulic conditions at the site.

Your local FAST® Systems distributor may provide installation inspection services. If you have questions, call Bio-Microbics at 800-753-FAST (3278) or (913) 422-0707.

⚠ WARNING *Always secure all access covers to prevent unauthorized people from entering the tank. Only qualified service personnel should open access ports and/or covers. Infectious organisms exist in a septic tank. If any contact with wastewater occurs, immediately wash and disinfect all exposed areas and contact personal physician. Failure to do so could result in severe sickness or death. DO NOT use an open flame or cause a spark near a septic tank's access points. Gases emanating from septic tanks can explode if ignited or deadly if inhaled.*

BEFORE THE UNIT IS BACKFILLED:

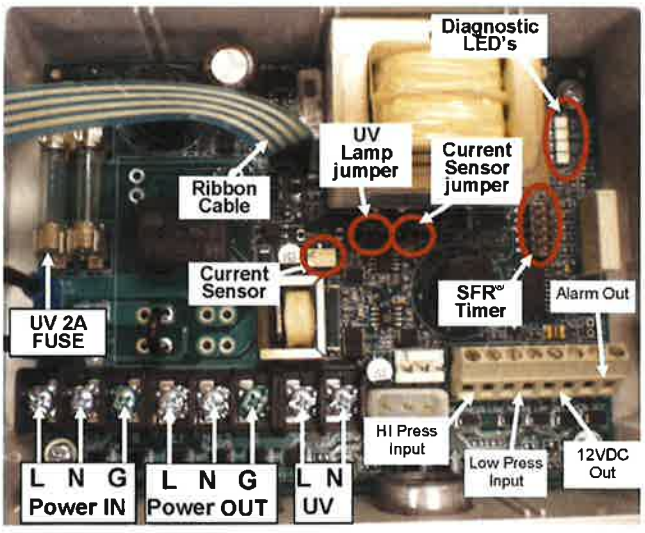
A. Fill the tank to the normal operating level.
B. Check for leaks in all water-tight seals.
C. Turn the blower ON and observe the operation of the airlift. A robust splash should be present.
D. Check for excessive back pressure: Seal all access covers, place hand about 8 inches [20 cm] from FAST® vent, if air flow is felt then excessive back pressure exists and the system's vent must be upgraded.
E. Check for proper water level over the media. The normal water line should be ~2" [5 cm] over the media.
F. Check for proper alarm function. Turn OFF the blower circuit breaker and wait for the alarm to sound. If the alarm does not sound after 30 seconds, then review the electrical installation procedures.
G. Turn the blower back ON.
H. Backfill the excavation.
I. Lastly, record the FAST® unit's serial number in the Service Manual.

ELECTRICAL WIRING DIAGRAMS

Only the MicroFAST® 0.5, 0.625, 0.75, and 0.9 system diagrams are displayed here. Information for larger FAST® systems accompanies those units and can be obtained from Bio-Microbics.

TIMING MODES DIP SWP OS. (S1)					BLOWER MINUTES	
5	4	3	2	1	ON	OFF
Off	Off	Off	Off	Off	30	15
Off	Off	Off	Off	On	15	15
Off	Off	Off	On	On	30	30
Off	Off	On	Off	Off	60	15
Off	Off	On	Off	On	60	30
Off	Off	On	On	Off	120	30
On	On	On	On	Off	TEST	
On	On	On	On	On	∞	
TEST = 15 SEC ON, 20 SEC OFF						
∞ = ALWAYS ON						

AMI 110/220 PANEL

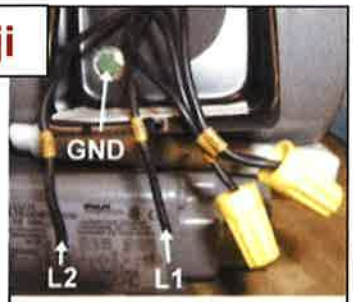


BLOWER DIAGRAMS

ATTENTION: Please refer to side of shipping box for correct Blower.

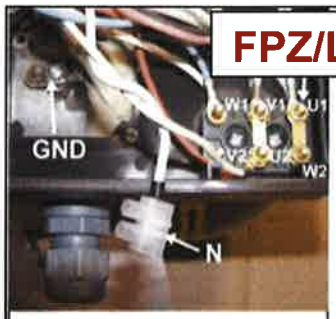
Fuji

Model: FUJI VFC 209, 100P, 300P
Power: 110VAC
- **L1 to P1**
- **N to T2, T4**
- **T1 & T3, cap together**

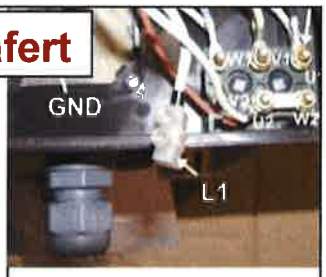


Model: FUJI VFC 209, 100P, 300P
Power: 220V 1ø
- **L1 to P1**
- **L2 to T4**
- **T2 & T3, cap together**
- **T1, cap off**

FPZ/Lafert

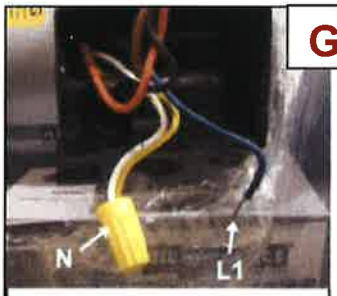


Model: FPZ SCL06
Power: 110VAC
- **Jumper U2 to V1**
- **Jumper W2 to U1**
- **L1 to "terminal block"**
- **N to white connector**

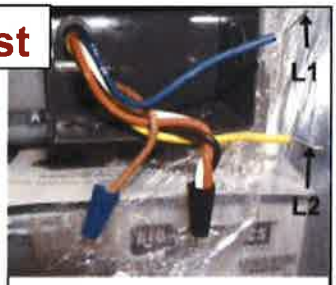


Model: FPZ SCL06
Power: 220VAC, 1ø
- **L1 to "terminal block"**
- **L2 to V1**
- **Jumper W2 to U2**

Gast



Model: GAST R2103, R4P115, R1102
Power: 110VAC
- **L1 to P1**
- **N to 2,4**
- **P2,5,3 cap together**



Model: GAST R2103, R4P115, R1102
Power: 220VAC 1ø
- **L1 to P1**
- **L2 to 4**
- **5, 3 and 2, cap together**
- **P2 cap off**

LIMITED WARRANTY

Bio-Microbics, Inc. warrants every new residential FAST® system against defects in materials and workmanship for a period of two years after installation or three years from date of shipment, subject to the following terms and conditions, (Commercial FAST system for a period of one year after installation or eighteen months from date of shipment, whichever occurs first, subject to the following terms and conditions):

During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIO-MICROBICS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIO-MICROBICS, INC., ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS.

Contact your local distributor for parts and service.

Keep for Your Records

FAST® System Serial Number: _____

System Designer Name: _____

Designer Phone: _____

Health Official Name: _____

Health Official Phone: _____

Manufacturer Name: Bio-Microbics, Inc.

Manufacturer Phone: 1-800-753-FAST (3278)

Installed By: _____

Installer Phone: _____

Maintenance Provider Name: _____

Maintenance Provider Phone: _____

BIO MICROBICS
BETTER WATER. BETTER WORLD.

16002 W. 110th Street
Lenexa, KS 66219 • USA
Ph: 913-422-0707
Fax: 913-422-0808
800-753-FAST (3278)
www.biomicrobics.com

SALCOR INC

P. O. Box 1090
Fallbrook, CA 92088-1090
Telephone: (760) 731-0745
Fax: (760) 731-2405
jscruver@aol.com

INSTALLATION, OPERATION & MAINTENANCE MANUAL

Made With Pride in the USA

c UL us

UV DISINFECTION UNIT MODEL 3G

TWENTY-ONE SALCOR UV MODEL 3G 6-MONTH TESTS

Since 1997*, Manufacturers of 21 Treatment Units Have Partnered with the Salcor 3G UV Unit. Each Used the *NSF Standard 40* and the *Washington State* Fecal Coliform Reduction Protocol for 26 weeks. *Salcor's 3G UV Effluent Fecal Coliform Count Ranged From 2 to 35 per 100 ml. (Geometric Mean).

The following is a list of the partnered manufacturers

Aero-Tech
AK Industries, Hydro Action
ANUA (Bord na Mona)
AquaKlear
Bio-Microbics, FAST
Clearstream
Consolidated Treatment Systems, EnviroGUARD
Consolidated Treatment Systems, MULTI-FLO
Consolidated Treatment Systems, NYADIC
Delta Environmental (Pentair), Whitewater
Delta Environmental (Pentair), ECOPOD
Ecological Tanks
Enviro-Flo (NuWater)
Fuji Clean USA
Hoot Aerobic Systems
Jet
Lowridge On Site Technologies
Norweco
Orenco Systems
Quanics
Solar Air

I. INSTALLATION INSTRUCTIONS

WARNING! Improper Connection of the APPLIANCE GROUNDING CONDUCTOR Can Result in the Risk of an Electric Shock.

Check with a qualified electrician or service representative if you are in doubt about whether the appliance is properly grounded.

Open and carefully unpack the shipping carton. Check for any damage that may have occurred in shipping. If there are any problems, call **SALCOR INC.** at 760-731-0745 or Fax to **SALCOR INC.** at 760-731-2405 and explain the problem(s).

The following list describes the components that are contained in the shipping carton.

1. Disinfection chamber: 3-inch diameter ABS pipe with 4-inch inlet and outlet hubs.
2. Disinfection sub-assembly consisting of an anodized aluminum frame supporting a Teflon® sheath containing a pure fused quartz tube. This complete item is packed inside of the above listed 3-inch disinfection chamber.
3. Riser pipe: 4-inch diameter ABS pipe.
4. 1-inch white PVC handle which is used for inserting and removing the disinfection sub-assembly. It is bubble-wrapped inside of the above listed 4-inch riser pipe.
5. The Long Life UV lamp is bubble-wrapped and packed inside of the 1-inch white PVC handle.
6. Electrical sub-assembly junction box (rated NEMA 6P) with pre-wired alarm board, electronic ballast, and the lamp cable supplying power to the UV lamp.
7. Two 4-inch Schedule 40 ABS pipe couplings.
8. Watertight connection for bringing the power and alarm wires into the junction box. Flexible ***Watertight*** conduit should be used to connect to this fitting.
9. Dielectric Grease, to be used on the inside of the boot on the UV lamp socket.

There will be some additional items to be supplied by the installer

1. Teflon® tape for sealing PVC and Watertight connectors
2. ABS cement (also multipurpose cement if bonding to PVC pipe)
3. Isopropyl (rubbing) alcohol for cleaning the subassembly unit before installing
4. Glycerin (available from drug stores) for lubricating the gaskets of the subassembly
5. Power and Alarm Wires. Wire all circuits with insulation rated 600 VAC min.
6. Power and Alarm Wire Watertight Flexible Conduit for connecting to the Junction Box watertight connector
7. Irrigation Valve Box if the 3G Unit is to be installed at or above ground
8. Silicon Adhesive Sealant, also called RTV

WARNING! This Device Produces Potentially Harmful UV Light.
Always Protect Your Eyes and Skin From Exposure to UV Light.
***Disconnect Power Before* Replacing or Servicing the 3G Unit/Lamp.**

Salcor 3G Disinfection Unit

NOTE: Not all dimensions to scale

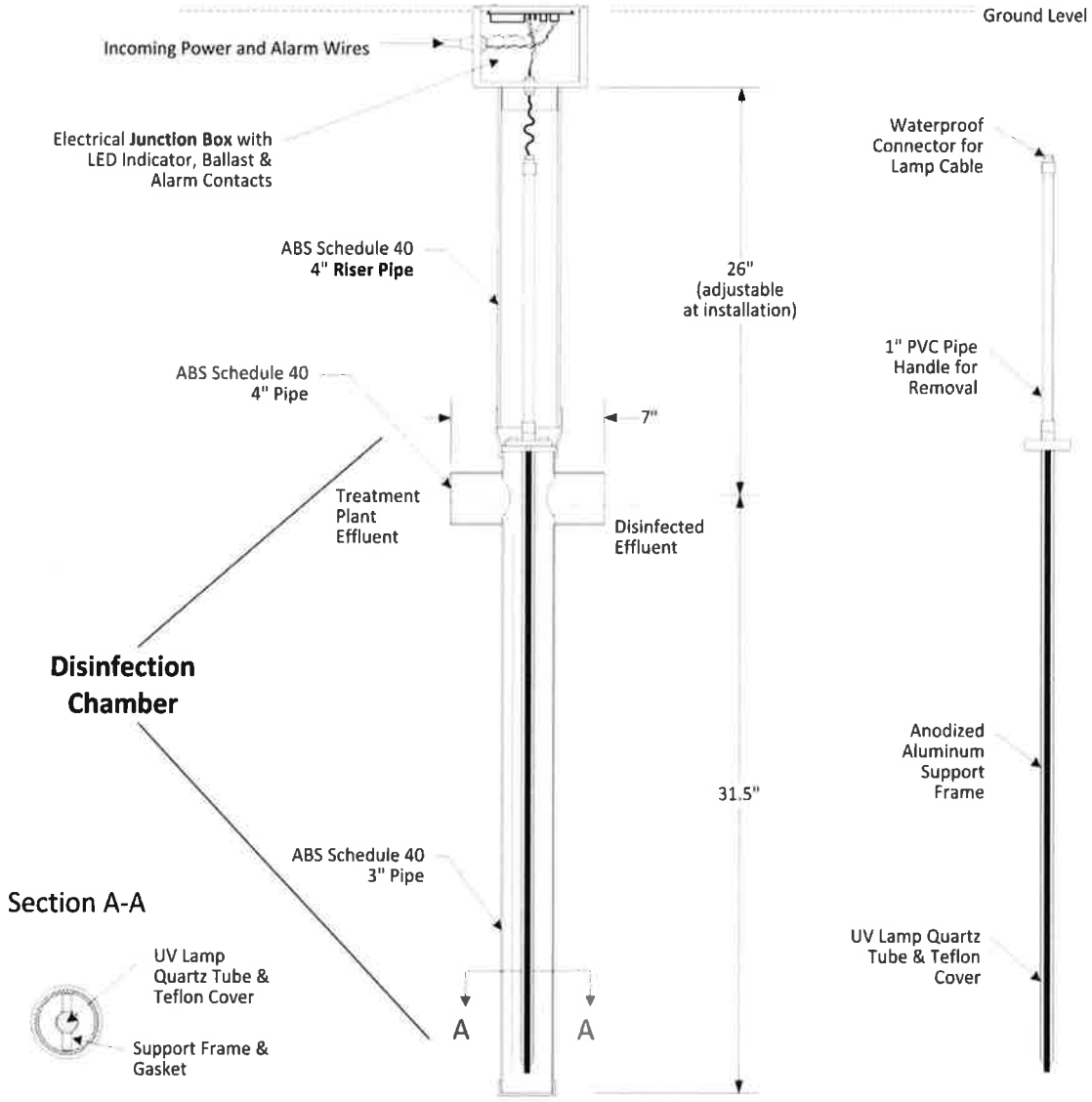


Figure 1

II. TWO INSTALLATION OPTIONS

1. In the Ground Installation: Couple the 4-inch inlet pipe to the exit pipe of the pretreatment unit, and couple the 4-inch outlet pipe to the drain field pipe. See ***Figure 2*** (Page 5).
2. In a Pump Tank Installation: Couple the UV Unit inlet pipe to the pretreatment unit exit pipe at the entrance of the pump tank. See ***Figure 3*** (Page 5).

Note: ***Figure 2*** (page 5) indicates that the electrical junction box should be placed at ground level. The junction box could be placed below grade in an irrigation valve box. The Junction box is rated NEMA 6P. However, for safe continuous operation, the junction box should be protected from flooding.
For in-pump tank installations, special care should be taken to prevent flooding of the junction box.

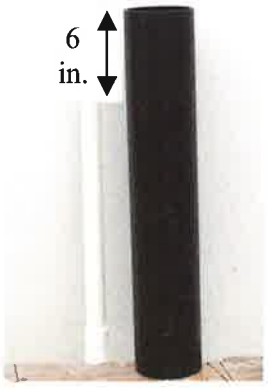
III. DETAILED INSTALLATION STEPS

1. Install the 3-inch disinfection chamber in place at the site.
   a. Position the disinfection chamber in the ground or in the tank.
   b. Connect the hubs to the inlet and outlet pipes.

3-Inch Disinfection Chamber

2. Cut the 4-inch riser pipe to meet the job needs. The 1-inch lamp handle may be cut to length after cutting the riser pipe.
   a. Use the 4-inch ABS inlet pipe connection to the pretreatment unit as a reference point.
   See ***Figure 1*** (page 3).
   b. The lamp handle upper end should be cut so it will be approximately 6 inches from the top of the riser pipe.
   c. Bond the 4-inch riser pipe to the chamber sub-assembly.
   d. Bond the second PVC white threaded female adapter to the top or plain end of the white PVC pipe handle.

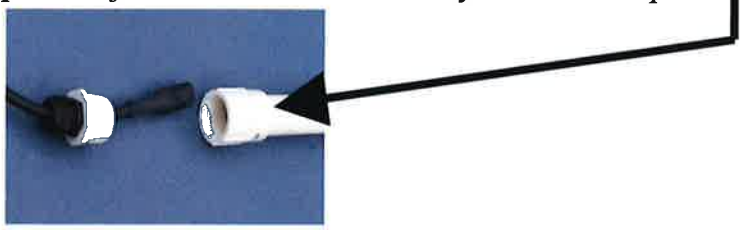
Riser Pipe & Lamp Handle



White PVC Handle and 4-inch Riser Pipe

3. Carefully slide the lamp cable through the top of the white 1-inch PVC pipe handle. The lamp cable wire with the 4-pin lamp socket connector should extend out about 6 inches past the bottom end of the 1-inch white PVC handle which has a threaded female pipe adapter already bonded to it.

Top End of PVC Handle with newly bonded adapter

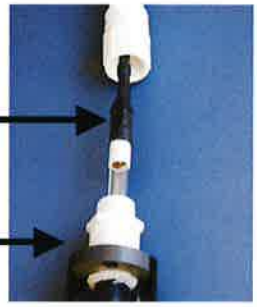


Threaded Bottom End of PVC Handle

4. Carefully connect the 4-pin socket connector of the lamp cable to the UV lamp pins. Note: the pins are not arranged in a square formation.
    a. Apply Dielectric Grease to the inside of the boot.
    b. Push the 4-pin socket onto the pins on the UV lamp end. Make sure that the 4-pin socket connector is fully connected onto the pins. The socket to lamp pins connection is electrically critical to maintain the proper operation of the lamp. It is extremely important that there is a fully mated complete connection between the socket and the UV lamp pins.

Lamp connector Pins are not Arranged in a square shape

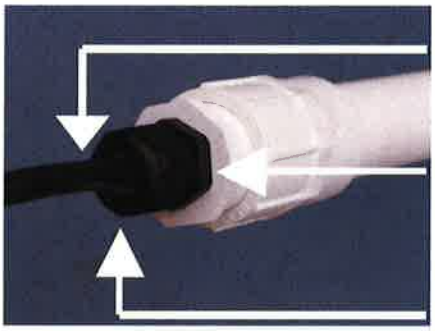
Apply Dielectric Grease to the inside of the boot.
Lamp Cord Connected and Lamp Inserted into the Aluminum Frame.



CAUTION!! The UV Lamp, the Quartz Tube, and the Teflon® Sheath Covering *ARE ALL VERY FRAGILE*, So Handle Them With Care.

5. Carefully slide the UV lamp into the quartz tube in the frame assembly. Make sure that the UV lamp has BOTTOMED OUT in the Quartz Tube, that is, that the UV lamp is FULLY SEATED in the Quartz Tube. Do not force the UV lamp into the Quartz Tube, as UV Lamp may break the bottom of the Quartz Tube. Make sure that the UV Lamp is completely enclosed in the Quartz Tube.

6. Wrap both ends of the threaded white PVC 1-inch lamp handle pipe pieces with Teflon® tape.
   a. First, screw the bottom threaded end of the 1-inch lamp handle onto the top end of the aluminum frame assembly.



Top of the Aluminum Frame Assembly

   b. Second, screw the black threaded reducer into the top end of the handle pipe. It is important that Teflon ® tape is used to seal all of the threads to maintain waterproof operation of the lamp.
   c. Pull Any Extra Cable up Through the Gland Nut.
   d. Tighten the gland nut to approximately 22 in/lb to make the UV lamp chamber watertight. **CAUTION!! <u>DO NOT OVER TIGHTEN!</u>**
7. Inspect the Teflon® sheath.
   a. If necessary, use a clean soft cloth and isopropyl (rubbing) alcohol to clean and remove any fingerprints from the Teflon® sheath.
   b. Lubricate the rubber gaskets with either water or glycerin.

Note: Do not use silicone or petroleum based lubricants on the gaskets.

PVC handle on the anodized aluminum frame assembly

8. Gently insert the entire frame/handle assembly into the riser/chamber assembly using the white PVC handle. Make sure that the wide part of the sub-assembly is at right angles to the inlet and outlet pipes. The correct rotational orientation of the frame in the disinfection chamber is required for successful UV Unit operation. The frame must be at a right angle to the incoming effluent.

9. Tuck the extra lamp cord wire into the top of the riser pipe.
10. Place the round coupling on the bottom of the junction box into the top of the 4-inch riser pipe, and secure it with the setscrew.

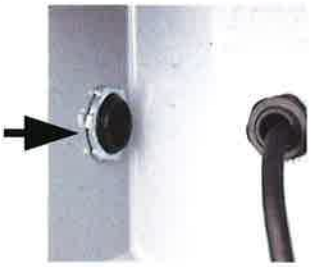
11. Install the Watertight Conduit connector to the side of the Junction Box and secure it with the nut on the inside. Use a little Silicone Adhesive Sealant, also called RTV, on the O-ring of the watertight conduit connector to assist in waterproofing.

Installing Watertight Conduit Connector

12. Attention Installers!! The SALCOR Model 3G Unit **requires a <u>specific separate independent 10-15-amp circuit breaker</u> on the main electrical panel.** ***The Salcor UV Unit circuit breaker should be separate from the circuit breakers for the pumps, etc.***
No other electrical unit should be connected to the Salcor 3G Unit circuit breaker.

13. The UV Unit operates on 120 VAC single-phase (50 or 60 Hz) power and consumes 40 watts.

14. Bring the power wires and alarm wires into the junction box via the waterproof conduit connection. Seal the outside of the flexible conduit pipe to the waterproof connector with Silicone Adhesive Sealant. The ***installer*** is responsible for ensuring that the external flexible wire conduit connection(s) containing the power and/or alarm wires to the junction box are ***<u>WATERTIGHT!!</u>***



Watertight Conduit Connector Nut Inside of the Junction Box

15. Attach the power and alarm wires to the appropriate terminal block connections on the alarm board. See ***<u>Figure 4</u>*** (Page 10). The alarm contacts are compatible with external alarm circuit units furnished by others that use either normally open (N/O) or normally closed (N/C) contacts. Note: N/O means the contacts are ***OPEN*** when there is ***NO POWER*** to the alarm board relay. The contacts are rated for up to 240 volts and up to 2 Amps. Select the common connection terminal screw and then use either the N/C or N/O connection terminal screw that complies with the external receiving alarm circuit requirement.
16. Attach the lid to the junction box with 4 screws.
17. Allow the effluent to start flowing through the 3G Unit.
18. Turn on the circuit breaker at the main electrical control panel. The Green Indicator Light on the junction box lid should now be shining, indicating that the 3G Unit is operating properly. **The installation is now complete.**

IV. <u>MAINTENANCE AND SERVICE</u>

It is recommended that the disinfection sub-assembly be removed and serviced (cleaned) a minimum of once per year to insure proper effluent disinfection.

The Salcor Model 3G UV disinfection Unit is designed **to provide a long service life; It is recommended that the UV lamp be replaced every 2 years to insure proper disinfection.**

UV LAMP REPLACEMENT PROCEDURE

1. Turn off the dedicated circuit breaker located on the main electrical control panel that supplies power to the UV Unit.
2. Remove the electrical junction box from the 4-inch riser pipe by loosening the junction box to riser pipe setscrew. Then carefully set the junction box aside.
3. Using the white PVC handle connected to the disinfection sub-assembly, lift the sub-assembly out of the disinfection chamber/riser pipe and set it aside.
4. After pulling out the sub-assembly, check the disinfection chamber to make sure there is no mud, debris, or other flow-impeding non-liquid material present at the bottom of the disinfection chamber.
5. If there is non-liquid material present in the bottom of the disinfection chamber, use a shop vacuum cleaner to vacuum out the excess material. Do not let the material flow downstream.
6. Loosen the lamp cable cord grip at the top of the white PVC handle so that the lamp cable can move through the cable grip and thus allow the handle to move away from the top of the aluminum frame assembly.
7. Unscrew the bottom threaded end of the 1-inch white PVC handle from the upper end of the aluminum frame assembly. Separate the handle from the assembly.
8. Disconnect the four pin socket connector attaching the lamp cable to the UV lamp. Remove the old UV lamp.
9. Use dielectric grease on the boot of the connector. Connect the 4-pin socket connector to the new lamp.

Apply Dielectric Grease to the inside of the boot.

Lamp Cord Connected

Lamp Inserted into the Aluminum Frame

Make sure that the connector mates **COMPLETELY** onto the UV lamp pins.

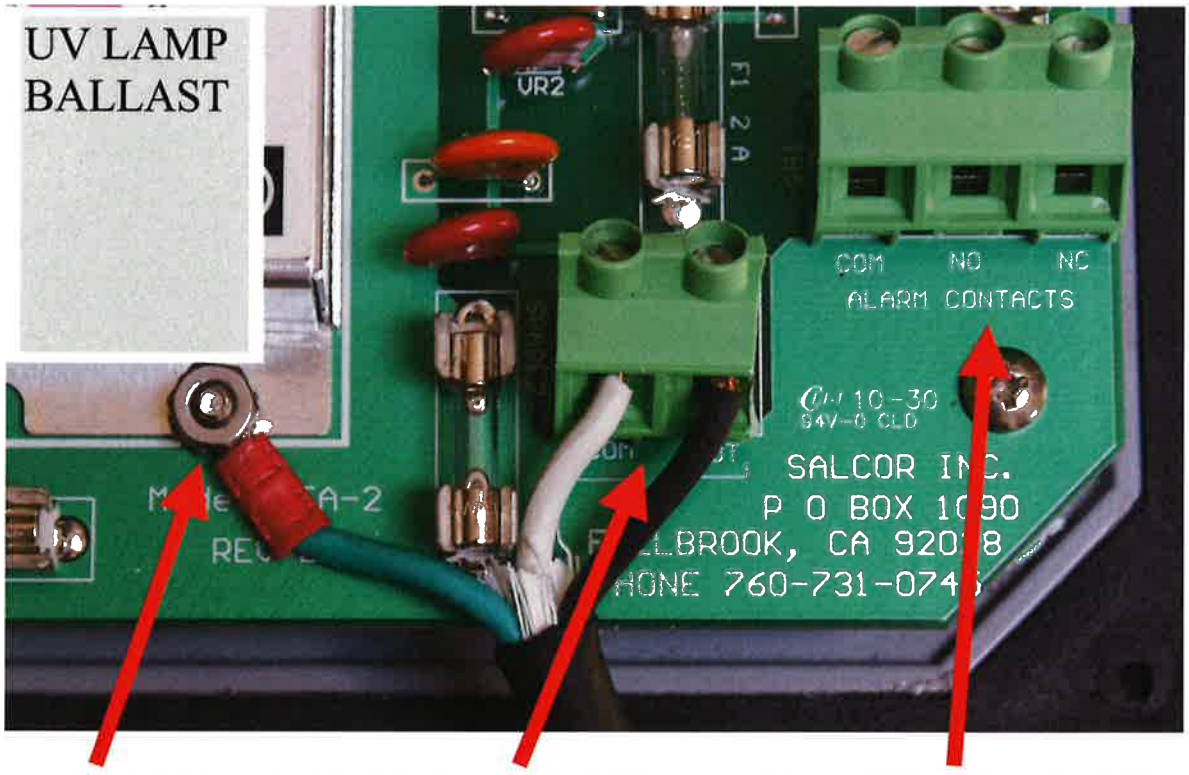
10. Lower the new UV lamp into the quartz tube of the UV sub-assembly, making sure it bottoms out in the quartz tube. Do not use force that would break the quartz tube.
11. Screw the bottom threaded end of the 1-inch lamp handle onto the upper end of the aluminum frame assembly. Use Teflon® tape to ensure a waterproof connection.

12. Using the white PVC handle, gently insert the entire frame/handle assembly into the riser/chamber assembly. Make sure that the wide part of the sub-assembly is at right angles to the inlet and outlet pipes.
13. Tuck the remaining lamp cable into the top of the riser pipe. Tighten all cord grips.
14. Put the junction box back onto the riser pipe. Tighten the setscrew.
15. Turn on the power to the UV Unit.
16. Check the green indicator light on the lid of the junction box for proper operation.
17. If the green indicator light is on, the installation procedure is finished.

TO CLEAN THE TEFLON® SHEATH AND DISINFECTION SUB-ASSEMBLY

1. Use a soft sponge and detergent to clean the surfaces, especially the Teflon® sheath. Be careful when cleaning the Teflon® sheath, as it is ***Very Fragile***.
2. Use a soft cloth with isopropyl alcohol to remove difficult stains such as finger prints or other films from the Teflon® sheath.

V. ELECTRICAL CONNECTIONS ON THE ALARM BOARD



Grounding Post **Power Inlet Terminal Block** **Alarm Wire Terminal Block**

Figure 4

The Printed Circuit Alarm Board is permanently mounted on the Junction Box Lid. The power and alarm terminal blocks are mounted on the Printed Circuit Alarm Board. The ballast is mounted on the Printed Circuit Board. When necessary, an inoperative ballast may be replaced by qualified maintenance personnel.

Note: N/O or N/C describes the contact configuration when there is ***NO POWER*** APPLIED to the relay.

Another way of designating the N/O or N/C condition is that the relay contacts are Normally Open or are Normally Closed when the relay is: ***NOT ENERGIZED!***

1. Connect the alarm wires as needed for your specific alarm circuit requirements to Alarm Board TB5
2. Connect the power wires to the Power Inlet Terminal Block, TB4. The Terminal Block is labeled with connection points for the com and hot wires. The ground wire connects to the ground stud on the ballast.

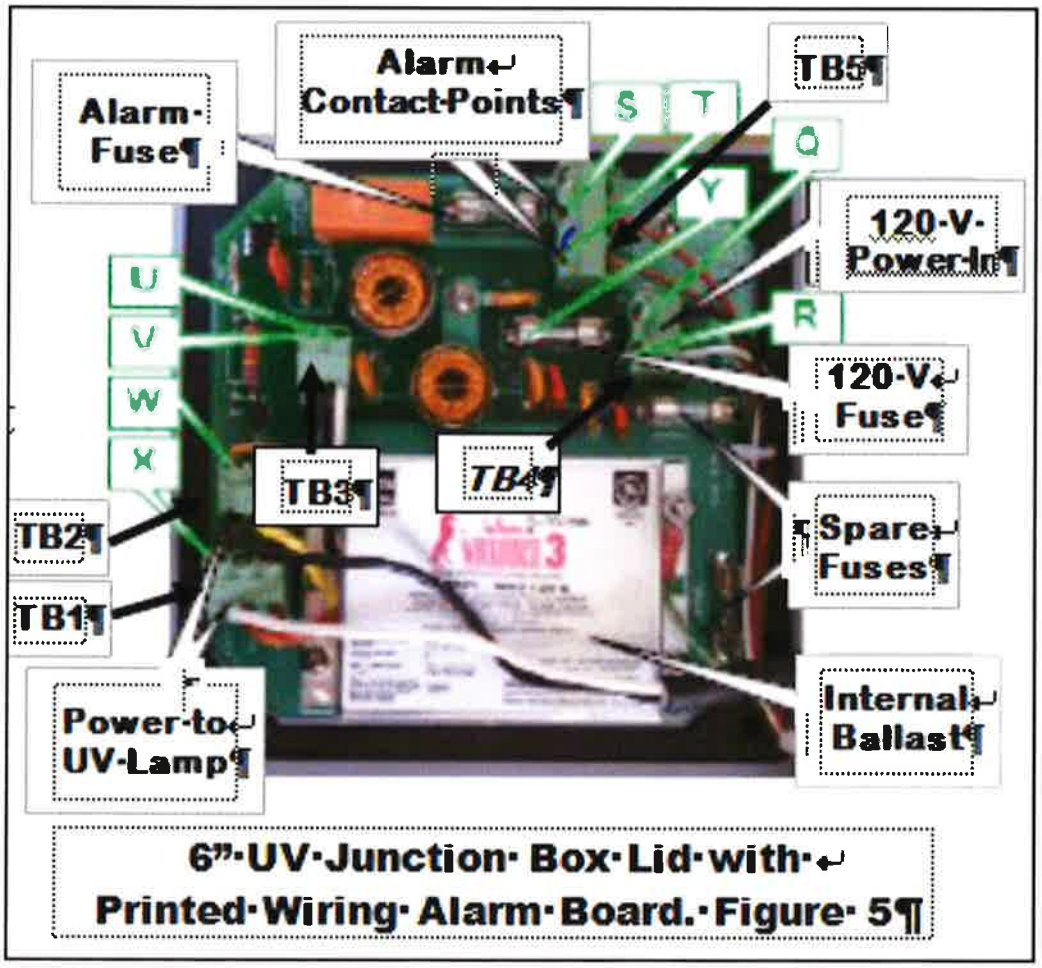
VI. DECLARATION OF CONFORMITY

Salcor Inc. declares that the Salcor Model 3G UV Disinfection Unit conforms to the applicable provisions of the Code of Federal Regulations (CFR) requirements including, Title 21, Chapter 1, Subchapter J, Radiological Health.

VII. PARTS LIST FOR SALCOR MODEL 3G UV UNIT

Part No.	Part Description
1010	New Electrical Subassembly: Includes NEMA 6P Junction Box with Printed Wiring Alarm Board and Ballast Mounted on the NEMA 6P Junction Box Lid, a Lamp Cable, and a UL Waterproof Electrical Conduit Fitting
1011	UV Lamp Ballast
1012	Lamp Cable
1014	Anodized Aluminum Frame Divider with a Quartz Tube and its Teflon Cover
1014 R	Frame Divider Rebuild: Replacement of the Quartz Tube and Teflon Cover within an Existing Anodized Aluminum Frame
1015	ABS Plastic Disinfection Chamber
1016	Long Life (Two Year) UV Lamp
1020	Lamp Ballast Test Unit for Onsite Ballast Testing. Includes Test Cable, Small Non-UV Test Lamp. Lamp Will Connect to Presently Installed Lamp Cable.

VIII. DESCRIPTION OF THE FUNCTIONAL OPERATION OF THE SALCOR MODEL 3G UNIT ALARM BOARD



6" UV Junction Box Lid with Printed Wiring Alarm Board. Figure 5

The 120 VAC power is fed into the junction box and connected to the Printed Wiring Alarm Board at points Q & R of terminal block ***TB4.*** The power is then routed through the fuse at point Y and on to points U and V of terminal block TB3. The ballast wires are connected to points U and V of terminal block TB3. The ballast establishes proper power operation for the UV lamp. The regulated output power from the UV ballast is then routed through the alarm board circuitry for monitoring and then on to the UV lamp via the UV lamp cable connected to points W & X of terminal blocks TB1 and TB2 on the printed circuit alarm board.

The Green Indicator light indicates when there is correct lamp current.

The alarm relay contact terminal block TB5 is shown as having connection points S & T.

SALCOR INC

P.O. Box 1090 Fallbrook, CA 92088-1090
Telephone: 760-731-0745
Fax: 760-731-2405
E-mail: jscruver@aol.com

LIMITED WARRANTY
SALCOR MODEL 3G UV DISINFECTION UNIT

This warranty is given by SALCOR Inc. for the benefit of the first purchaser of the product to which the warranty applies. The warranty applies only to those parts which are manufactured and delivered by SALCOR Inc.

The warranty is that the parts manufactured and delivered by SALCOR Inc. will be free from defects in the material or workmanship under normal use and service according to the Installation and Operating Instructions for the time specified below.

In the event of a failure of a part due to such a covered defect, SALCOR Inc. will repair or replace, at its option, the defective part at its factory located at 447 Ammunition Road, Suite E, Fallbrook, CA 92028. At the option of SALCOR Inc, repairs or replacement may be made at the site of equipment installation.

The part must be returned to the factory at the expense of the person claiming the benefit of the warranty unless SALCOR Inc. elects to repair or replace the defective part at the installed site.

The warranty shall be for a period of twenty four (24) months after the date of delivery of the product, or the specified service life of the product, whichever period is the shortest. All products for which warranty claims are filed must be returned as provided above to the factory within thirty (30) days from the date of the claimed malfunction in order for this warranty to be effective. The only entity authorized to do any warranty repairs is SALCOR Inc.

The repairs or replacement by SALCOR Inc. will be accomplished within twenty (20) days from receipt of the defective parts at the factory.

This warranty is expressed in lieu of all other warranties, expressed or implied, including the implied warranty of fitness for a particular purpose, and of all other obligations or liabilities on the part of SALCOR Inc., and it neither assumes nor authorizes any other persons to assume for SALCOR Inc. any other liabilities in connection with the sale of the products.

This warranty does not cover parts of products made by others, or products or any part thereof which have been repaired or altered, except by SALCOR Inc., which shall have been subjected to misuses, negligence, or accident.

SALCOR Inc. shall not be liable for damage or delay suffered by the purchaser regardless of whether such damages are general, special, or consequential in nature whether caused by defective material or workmanship, or otherwise, or whether caused by SALCOR Inc. negligence, regardless of degree.

BIO MICROBICS
BETTER WATER. BETTER WORLD.®

FAST® Service Manual

FOR USE WITH

(NSF Std 40 & 245) **MicroFAST® 0.5, 0.625, 0.75, 0.9, 1.5**
(non-NSF certified) **MicroFAST® 3.0, 4.5, 9.0**

September 10, 2019

SERVICE MANUAL

FOR USE WITH FAST® SYSTEMS:

(NSF® Std 40/245 cert.) **MicroFAST® 0.5, 0.625, 0.75, 0.9, 1.5**
(Non-NSF cert.) **MicroFAST® 3.0, 4.5, 9.0**

GENERAL INFORMATION

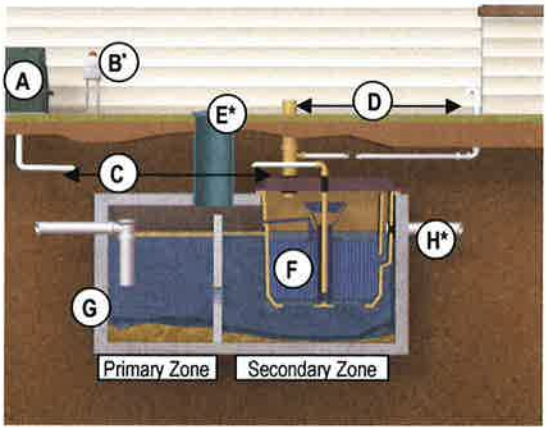
All FAST® products are ETL certified for safety (electrical, environmental, etc.). One or more of the following patents protects this process: 3,966,599; 3,966,608; 3,972,965; 5,156,742. Certified by NSF International, the MicroFAST® 0.5, 0.625, 0.75, 0.9 and 1.5 systems meets NSF Standard 40, Class 1 and Standard 245 certifications for wastewater treatment devices. If you have questions regarding any Bio-Microbics products, please contact us:

800-753-FAST (3278) or (913) 422-0707
e-mail: onsite@biomicrobics.com

About FAST®: The FAST® (Fixed Activated Sludge Treatment) system uses naturally occurring bacteria (biomass) to treat sewage for dispersal into the environment. This continuous process provides the biomass with waste (food) and air in a suitable environment. Dead bacteria and non-biodegradable waste settle and accumulate in the bottom of the tank for periodic removal.

The FAST® process consists of the treatment module and blower. The blower provides air to the system via the air supply pipe. The air supply pipe and draft tube create an air lift. The air lift mixes oxygen and waste throughout the media inside the tank. Bacteria grows on the media and digests the waste. A vent pipe expels harmless vapors created by the process.

- **A. Blower and Housing**
- **B. Control Panel**
- **C. Air Line Piping**
- **D. Vent(s) and Observation Port**
- **E. Access**
- **F. FAST® Unit**
- **G. Tank**
- **H. Outlet to Drain field**

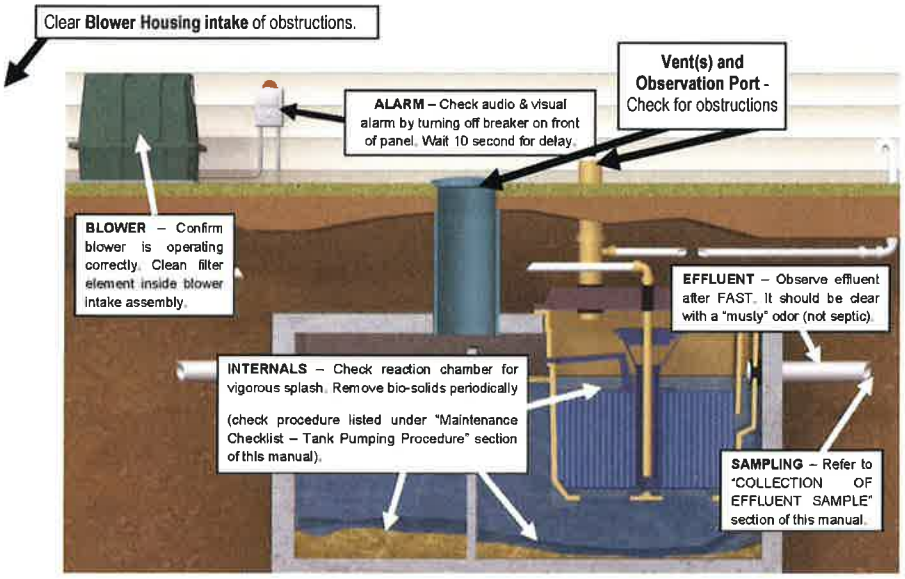


GENERAL LAYOUT

***PLEASE NOTE**: Adequate pump out must be provided for primary and secondary zones. There may be ancillary equipment associated with your system: pump(s) (before and/or after the FAST® unit), a distribution box, a disinfection system, an irrigation system, a remote alarm, or auto dialer, etc.*

REGULAR SERVICE MAINTENANCE

⚠ WARNING *Always secure all access covers to prevent unauthorized people from entering the tank. Only qualified service personnel should open access ports and/or covers. Infectious organisms exist in a septic tank. If any contact with wastewater occurs, immediately wash and disinfect all exposed areas and contact personal physician. Failure to do so could result in severe sickness or death. DO NOT use an open flame or cause a spark near a septic tank's access points. Gases emanating from septic tanks can explode if ignited or deadly if inhaled.*

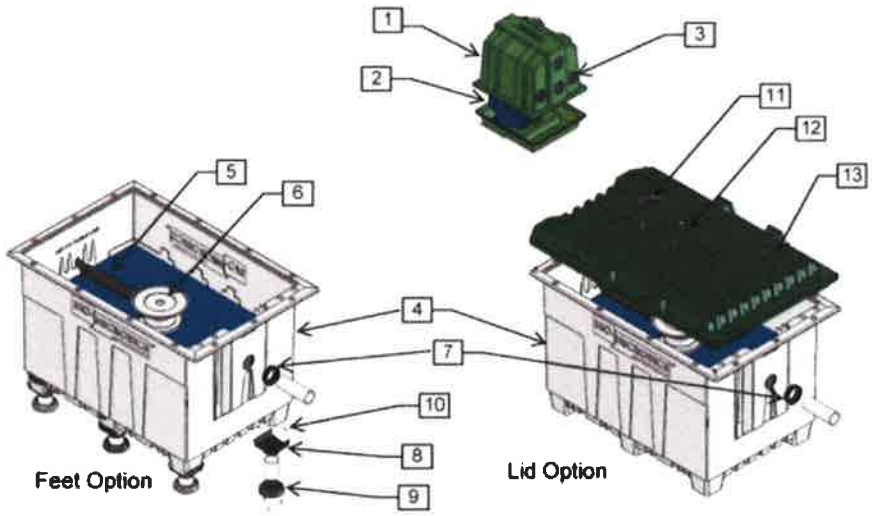


SYSTEM COMPONENTS

SUPPLIED EQUIPMENT

Please refer to the Installation Manual for a list of your system's original supplied parts. Picture shown is the MicroFAST® standard parts diagram.

If replacement parts are needed please have the serial number ready and call the local distributor listed on the control panel or Bio-Microbics.



COMMON NAME

1. Blower Housing
2. Blower (with blower I/O piping, Inlet Filter Assembly, blower and housing screws not shown)
3. Louver
4. Liner
5. Recirculation Trough
6. Air Lift
7. 4" Outlet Gasket
8. Foot Top (foot option)
9. Foot Bottom (foot option)
10. Foot Screws (foot option)
11. 6" Observation Port Gasket (lid option)
12. 2" Air Line Gasket (lid option)
13. Lid ***(Optional)*** (Not with MCF 4.5 or 9.0)

DO'S & DON'TS.....*What can I put down the drain?*

Please refer to the list below for important info on how to keep your treatment system performing as it should.

⚠CAUTION *Introducing harmful or damaging substances into the FAST system may void the warranty.*

DO NOT PUT THESE ITEMS DOWN THE DRAIN:

FOOD WASTES	ANIMAL BONES / COFFEE GROUNDS / CORN COBS / EGG SHELLS / SKIN / FRUIT PEELS / MELON RINDS / HOME BREWERY WASTE
PERSONAL PRODUCTS	BANDAGES / CONDOMS / SANITARY NAPKINS / WET WIPES / DISPOSABLE DIAPERS
CHEMICALS/ TOXINS	AUTOMOTIVE FLUIDS / CAUSTIC CLEANERS / DRUGS / FLOOR STRIPPER HARSH DETERGENTS / HERBICIDES / MEDICATIONS / PAINTS (OIL-BASE / PESTICIDES / AMMONIUM CHLORIDE CLEANERS / SOLVENTS / THINNE
OTHER PRODUCTS	CAT LITTER / CIGARETTE BUTTS / CLOTH TOWELS / FILM DEVELOPING WASTE / METAL OBJECTS / MODELING CLAY / PAPER TOWELS / SCRAPS / PLASTIC BAGS / PLASTIC OBJECTS / RAGS / RV WASTE

RECORD KEEPING

Keep copies of all system drawings/plans of the site/installed equipment/service records with all other home appliance documents. Record all applicable information.

LAUNDRY

Spread wash loads throughout the week. Instead of liquid fabric softener, dryer sheets should be used. Use low-suds, biodegradable and low phosphate detergents, like Mighty Mike® from Scienco/FAST (www.sciencofast.com).

LEAKY FIXTURES

Large quantities of water are added to your wastewater system when you have leaking fixtures. Timely detection and repair can help to maximize the life of your system, especially the drain field.

WATER SOFTENERS

The FAST® process may tolerate discharge from properly operating softeners that backwash as needed based on water usage (DIR) vs. timer operated systems, if allowed by your local regulatory authority. However, these discharges can possibly damage other parts of the septic system.

FOOD WASTES

Garbage disposal waste is acceptable - if allowed by your local regulatory authority. However, it may lead to more frequent removal of solids from your septic tank. Please dispose of large quantities of food in the garbage.

FATS, OILS & GREASE

Too much grease (i.e. animal fats, vegetable oils, lard, etc) put down the drain may overload the system and prevent the bacteria from fully breaking down the waste.

DISINFECTANTS/CLEANERS

Use citric acid, chlorine, or biodegradable cleaners according to the manufacturer's recommendations. Products containing ammonium chloride compounds or pine oil-based cleaners should not be used. Use drain cleaners as a last resort to unclog pipes.

GARAGE & WORKROOM

Drains from work areas should be diverted away from your system; petroleum-based products and saw dust should not enter the septic system.

MEDICATIONS

DO NOT FLUSH UNUSED MEDICATIONS DOWN THE DRAIN. Please dispose properly by returning unused medication to the pharmacy/doctor.

NOTE: The human body absorbs ≤20% of typical medications, please notify service provider of medications taken frequently or used intermittently in the house; this could ease disruption of service for your system.

SEPTIC ADDITIVES/ENZYMES

The wastewater in the system typically contains all the required bacteria for proper operation. Commercial additives are most often unnecessary; and may do more harm than good.

PAPER PRODUCTS

Use single- or double-ply, non-quilted, white toilet paper products. Some color dyes in the paper cannot be eaten by natural bacteria. Non-bleached paper (brown in color) takes longer to break down and can therefore increase the pump out frequency of your tank. Avoid flushing paper towels, napkins, wipes, or other thick paper material.

MAINTENANCE CHECKLIST

WARNING *Always secure all access covers to prevent unauthorized people from entering the tank. Only qualified service personnel should open access ports and/or covers. Infectious organisms exist in a septic tank. If any contact with wastewater occurs, immediately wash and disinfect all exposed areas and contact personal physician. Failure to do so could result in severe sickness or death.*

WARNING *DO NOT use an open flame or cause a spark near a septic tank access points. Gases emanating from septic tanks can explode if ignited or deadly if inhaled*

NORMAL OPERATING CONDITIONS	
SOUND	The FAST® system's blower makes a constant humming noise, much like a household refrigerator. Under normal conditions, the blower should last 5+ years without need for replacement. If an unusual noise is heard, refer to the **Trouble-Shooting Guide.**
ODOR	A musty, earthy-type of odor is normal. However, if a sewage odor (rotten egg smell) is detected, refer to the **Trouble-Shooting Guide**.
SIGHT	A properly loaded and operated FAST® system will produce effluent that looks like tap water. If the effluent is turbid, opaque, or suddenly changes, refer to the **Trouble-Shooting Guide**.

☐ **TRAFFIC** Ensure that the FAST® system has not been damaged due to excessive weight loading (>1,750 lb. point load.) Only normal yard traffic (lawn mowers, etc.) is acceptable. Traffic bearing (H-20) tanks can be made for use with FAST® (w/ feet). Consult local distributor or the factory for guidance.

☐ **BLOWER OPERATION** DO NOT turn off the blower (unless testing alarm). Treatment quality and drain field life could be reduced. Check the blower for proper function. Clean the blower's inlet air filter element. The blower can be operated by a timer in certain situations. Contact your local Bio-Microbics distributor for more information. If the blower is malfunctioning please refer to the "Troubleshooting Guide" or Blower Replacement Section located in this manual.

☐ **ALARM PANEL AND ALARM SOUNDS** The alarm has a ~10 second built-in delay. Test the audible alarm by turning the blower OFF. To silence the alarm, use the "Silence" button on the panel's front. If the alarm is activated for an unknown reason, please refer to the "Troubleshooting Guide" located in this manual.

☐ **VENTS, ODORS, AND INTAKES** Clear the vent(s) and blower housing intakes of any obstructions. Please refer to the "Troubleshooting Guide" located in this manual if you detect septic odors coming from the FAST® vent as this may indicate a problem with the system.

☐ **WATER QUALITY** effluent should be clear and odorless. All FAST® systems are capable of exceeding the USEPA standard for secondary wastewater treatment (40CFR, part 133.102) depending on how they are applied, sized, installed and operated. If samples are required please refer to the "Collection of Effluent Sample" section below.

☐ **BIO-SOLIDS (SLUDGE) LEVELS** Scheduling sludge removal depends on the size and design of the septic tank. Check the sludge levels in both tanks/compartments by inserting a sludge-measuring instrument and taking measurements in multiple locations in each compartment of the tank(s). Pump both compartments/tanks if the sludge is:

1. 18" deep in the primary settling tank or is within 6" of the connection point between the settling tank and the secondary/treatment zone; and/or
2. Within 3"-4" of the bottom of the FAST® unit in the treatment tank.

To determine the proper measurement for #2 above, measure the total liquid depth of the treatment tank (containing the FAST® unit) using a sludge-measuring instrument. Take that value and subtract the height of the FAST® product (in the table below). The result is the total sludge storage height available in the tank.

FAST® Models	Module Height
FAST® Models 0.5, 0.625, 0.75, 0.9, 1.5, & 4.5	31" [79 cm]
FAST® models 3.0 & 9.0	55" [140cm]

All stricter, applicable regulations supersede these operational directions.
Always pump out both zones, even if only one zone may require it.

TROUBLESHOOTING GUIDE

Contact factory or local distributor for all other issues: (913) 422-0707

PROBLEM	SITUATION	POSSIBLE CAUSE / SOLUTION
Alarm is activated (sounding)	**Blower is NOT running** *Please check the following. If problem persists, call service provider*	➢ **Breaker has tripped** – turn blower switch ON. If the switch will not stay ON, *see next steps...*
		➢ **Breaker trips after 2-3 seconds** – blower is over amping – electrician needs to check blower wiring.
		➢ **Breaker trips immediately** – electrical system has a short – electrician must investigate
		➢ **Blower is seized** – cooling fan will not spin freely with power OFF – replace blower – call service provider
	Blower is running *Please check the following. If problem persists, call service provider*	➢ **Water Level is high** – check the water level in the unit. Water level should be 2-3 inches above the media. Water level high? **YES:** consult distributor **NO:** Go to next step.
		➢ **Liquid Level Switch Present – NO:** Go to next step. **YES:** Check if wired in the same conduit as 90 VAC or higher wires (a violation of electric code NEC/IEC). **If YES:** Wires will need to be separated.) – **If NO:** Switch may need adjusting. Turn switch's Allen screw clockwise, wait ~10 seconds for alarm to "catch up".
		➢ **Current Sensor Present – YES:** Open panel and find "Diagnostic LED's" in the upper right hand corner. Note which light is lit and consult the distributor. **NO:** Consult distributor
		➢ **Vent is undersized or Vent(s) or airline is blocked or broken** – Check specifications for vent sizing requirements. Remove blockage or repair vent(s) or airline.
Waste is backing up from tank	Blockage in pipe network.	➢ **Check all piping for blockage,** including all interior tank piping and effluent piping.
	Mechanical failure of ancillary equipment	➢ **Pump is not running** – have qualified person check pumping system for mechanical and/or electrical failures.
		➢ **Pump's Level Controls** are improperly set, have failed, or pump too much volume per dose. Have service provider check/adjust pumping system.
System emits odor (rotten egg smell)	Mechanical failure/ Air line break	➢ **Blower operating** – **NO:** check "blower is not running" above, **YES:** *see next step*
		➢ **Proper splash** in reaction chamber – **NO:** air line is broken, **YES:** *see next steps*
	Multiple issues can contribute; the cause is usually due to oversized settling tank. Multiple solutions possible.	➢ **Decrease settling tank volume** – easiest done with a pumping system which can then pump the tank
		➢ **Move vent** – re-locate the vent to a location where the prevailing winds will catch odor.
		➢ **Place a carbon filter** on the end of the vent pipe – only use a filter that will create less than 0.1 psi of back pressure.
		➢ **Create bio-filter vent** - create a remote vent by placing a well perforated vent line in a trench with shredded bark mulch - contact local installer
Blower runs backwards	**3-Phase** installed incorrectly power out of phase or	➢ **Switch any two** "hot legs" at the panel or blower AFTER turning OFF the power. Only a QUALIFIED electrician can do this work. After rewiring, it may be necessary to dry the blower's internal parts.
	Single-Phase (which can run counter-clockwise) installed incorrectly	➢ **Some blowers** have wires numbered "5" and "8". After turning OFF the power, switch these two wires. Only a QUALIFIED electrician can do this work. After re-wiring, it may be necessary to dry the blower's internal parts.
Blower is noisy	Blower noise is an annoyance at site	➢ **Blower housing** can be supplemented with additional sound reducing measures, contact your service provider.
		➢ **Blower may be re-located** from its current location and can be placed up to 100 ft away from unit.
	Blower is shaking or makes a loud, whiny noise	➢ **Vibration between** the blower & housing–tighten or place rubber washers in mounting screws between blower & housing
		➢ **Blower bearings** are going bad - replace blower now or wait for it to seize up
Effluent is dirty	Many solids detected in effluent	➢ **Toxic substance** in system, check for even growth in reaction chamber
		➢ **Pump out required** – refer to "Bio-Solids Levels" under "Maintenance Checklist" section
		➢ **Other** – call service provider
Water in blower/ housing	Water entry from outside	➢ **Move blower** above flood level
	Blower is siphoning	➢ **Check blower rotation** – see "Blower runs backwards" section above
		➢ **Move blower** to location higher than the FAST® system

TANK PUMPING PROCEDURE:

⚠ WARNING *Only qualified service personnel should open access ports/covers. If any contact is made with wastewater, immediately wash and disinfect all exposed areas and contact personal physician. Failure to do so could result in severe sickness or death.*

⚠ CAUTION *Avoid pumping down after periods of heavy rain or when the ground water is likely to be above the bottom of the concrete tank. Emptying the tank under these conditions could cause the tank to float up and become dislodged.*

1. Open the access ports/cover(s) and insert the hose. Always pump out both settling and treatment chambers of the system, even if only one side requires it.
2. Once the unit has been pumped out, immediately refill the tank with clean water to reduce the risk of the tank floating and to minimize the impact on treatment. Close the access ports/cover(s) making sure it is watertight.
3. Properly dispose of the solids removed in compliance with local and state regulations.

COLLECTION OF EFFLUENT SAMPLE

Please contact your local distributor or Bio-Microbics for a copy of the **"Testing Protocol"** document. ***Important:*** All samples must be collected, stored, transported and tested according to the "Testing Protocol" document by Bio-Microbics and the most current version of **Standard Methods**.

OTHER SYSTEM COMPONENTS (if applicable)

☐ Check LIXOR® PRE-AERATION DEVICE blower, inlet filter, blower housing, and air delivery system for proper function.

☐ Check INFLUENT BIOSTEP® PUMP(S) for proper function. Clean the screening device by using built in swab or other method.

☐ Check SANITEE® EFFLUENT SCREEN (FILTER) or other screening device. Clean by using the built in swab or other method.

☐ DISPERSAL SYSTEM (not by Bio-Microbics) Follow manufacturer's recommendation.

SEASONAL/INTERMITTENT USE PROPERTIES

The FAST® System will function normally even if there is no wastewater flowing during short periods of vacancy. Examples of seasonal/intermittent use and suggested operational procedures:

- **Summer use property** (shut down all winter) - blower should be turned off at end of summer and restarted at least a week before returning. Please contact your local service provider to restart the system and check with local regulations.
- **Weekend property** (used at least once every three weekends) - maintain normal operation or utilize FAST's SFR® blower timer feature on control panel.

Important: Consult your service provider and local regulations prior to any system changes.

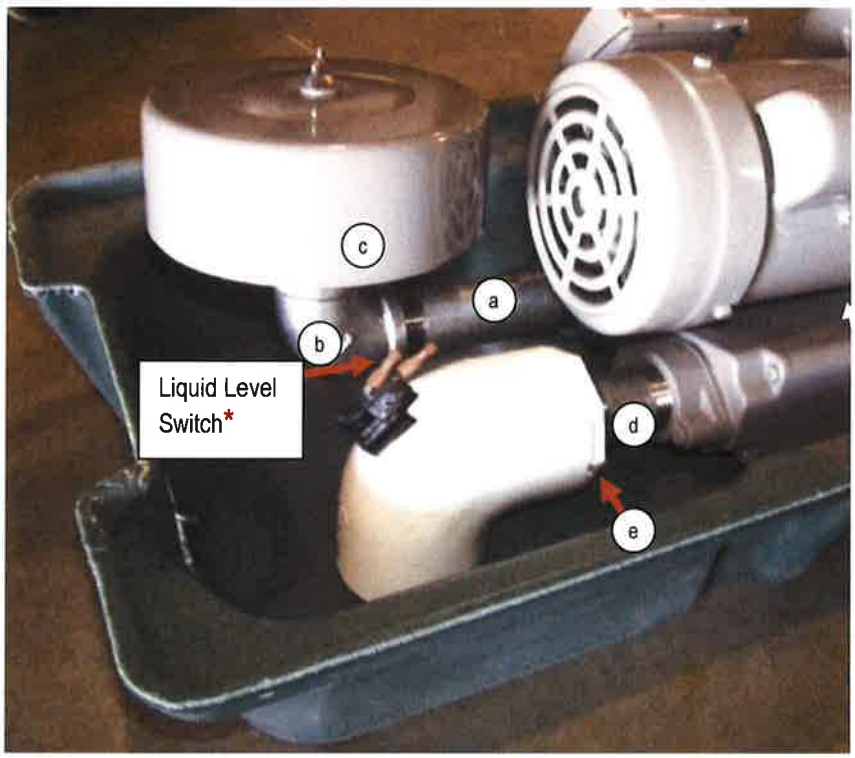
BLOWER REPLACEMENT

⚠ WARNING *All electrical work shall be properly performed by a qualified electrician per all applicable codes. Failure to do so may result in severe bodily injury or death.*

⚠ WARNING *Hazards exist in confined spaces such as a septic tank. All confined space precautions must be followed if entering a tank. Always keep tank openings covered during storage and installation*

When replacing a blower follow the steps below. If relocating the blower run the electrical supply conduit from the control panel to the desired blower location. Air line piping from the blower to the FAST® unit may NOT exceed 100 ft [30.5m] in total length and must have ≤ 4 elbows. The total electrical supply should NOT exceed 150 ft [45 m]. The blower and blower housing must be mounted on a solid base such as concrete to avoid settling.

CONNECT SUPPLIED PIECES (refer to picture below)



a. Longest steel pipe
b. Steel elbow
c. Air filter assembly
d. Shortest steel pipe
e. PVC reducer bushing

SECURE BLOWER ASSEMBLY to housing base using four supplied #14 x 1½" self-tapping screws. Drill screws directly into blower base.

RECONNECT AIR LINE from FAST® unit to blower outlet using required piping. **A "quick disconnect" is highly recommended to be installed in this location if it is not currently in place.**

NOTE: ALL CONNECTIONS MUST BE AIR AND WATER TIGHT

CONNECT INCOMING POWER to the blower at junction box. Follow the **FAST® Installation Manual** for further instruction. Common wiring diagrams are located at the end of this manual.

***(OPTIONAL) LIQUID LEVEL SWITCH** – NOT required for most new systems. AMI control panel with current sensor replaces this switch. To replace this switch:

a) Drill a $^{3}/_{8}$" hole in the blower outlet pipe.
b) ***IMPORTANT:*** Connect low voltage wires to switch before mounting in pipe.
c) Insert the switch into the $^{3}/_{8}$" hole (nipple first), then glue into place with PVC glue.
d) Install low voltage pressure switch wiring back to the control panel according to applicable codes (must not be inside high voltage blower wiring).

CONTROL PANEL REPLACEMENT

CAUTION *Always have all utility lines and equipment marked by a locating service prior to performing any work.*

WARNING *All electrical work shall be properly performed by a qualified electrician per all applicable codes. Failure to do so may result in severe bodily injury or death.*

The FAST® systems, including all electrical parts, are ETL (UL equivalent) certified for electrical safety. The control panel meets NEMA4X standards for all weather use (not explosive or submerged environments). The total electrical supply should NOT exceed 150 ft [45m].

Bio-Microbics also manufactures control panels that can control other systems, such as UV and sewage pumps. Call your distributor or Bio-Microbics for more information.

When replacing a panel follow the steps below. If relocating the panel run the electrical supply conduit from the control panel to the blower location. Keep in mind the electrical supply line should NOT exceed 150 ft [45 m] total.

1. Turn all Power OFF.
2. Examine wiring directions inside the supplied FAST® control panel (also found at the end of this Manual).
3. A dedicated breaker is required in the building's master electrical panel. Make connections between the master panel and FAST® control panel.
4. Make connections between the blower and FAST® control panel per the electrical diagram.
5. For systems requiring the Liquid Level Switch- connect the switch to the control panel terminals labeled "FLOAT" or "HI Press Input". The newest AMI control panel with current sensor can be used to replace this switch.

CERTIFICATIONS

WARNING *Only authorized service personnel should service a septic system and its components. Deadly hazards such as lethal gases and high voltage electricity are associated with the system.*

MicroFAST® 0.5, 0.625, 0.75, 0.9, and 1.5 systems are tested and certified to NSF®/ANSI® Standards 40 (Class I) and 245

NSF

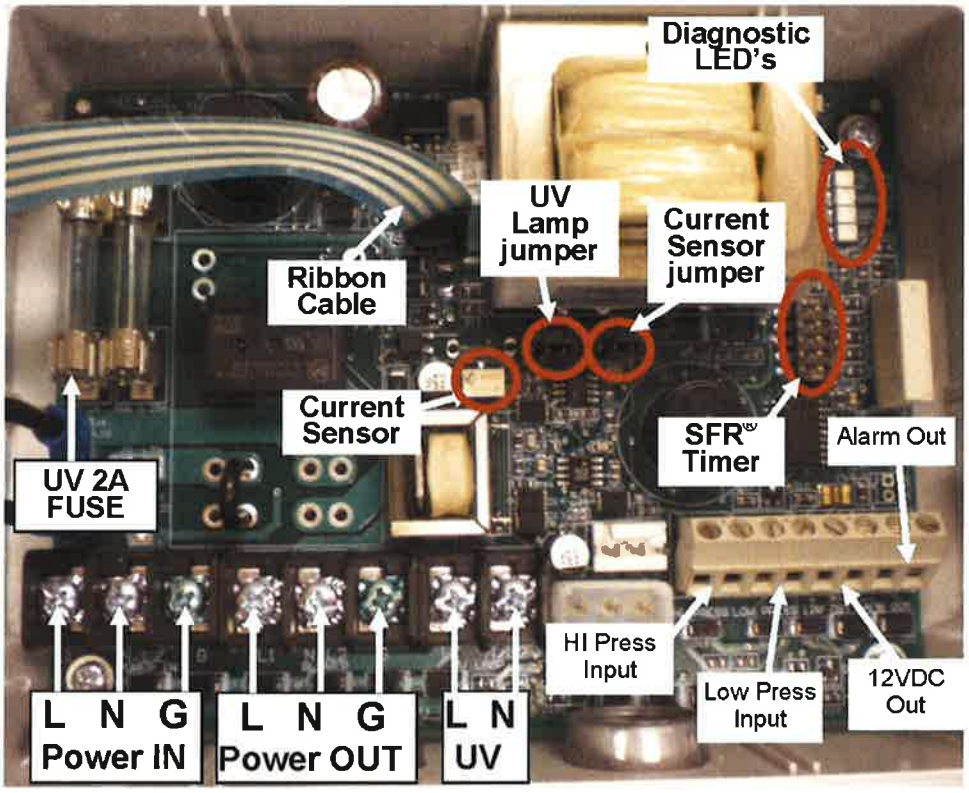
Certified to NSF/ANSI Standard 40

PARAMETER		LIMIT
CBOD5	30 day avg.	25 mg/L
	7 day avg.	40 mg/L
TSS	30 day avg.	30 mg/L
	7 day avg.	45 mg/L
pH		6-9 s.u.
Total Nitrogen		50% reduction of influent

ELECTRICAL WIRING DIAGRAMS

Only the MicroFAST® 0.5, 0.625, 0.75, and 0.9 system diagrams are displayed here. Information for larger FAST® systems accompanies those units and can be obtained from Bio-Microbics.

AMI 110/220 PANEL

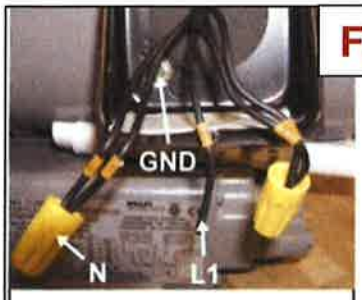


TIMING MODES DIP SWP OS. (S1)					BLOWER MINUTES	
5	4	3	2	1	ON	OFF
Off	Off	Off	Off	Off	30	15
Off	Off	Off	Off	On	15	15
Off	Off	Off	On	On	30	30
Off	Off	On	Off	Off	60	15
Off	Off	On	Off	On	60	30
Off	Off	On	On	Off	120	30
On	On	On	On	Off	TEST	
On	On	On	On	On	∞	
TEST = 15 SEC ON, 20 SEC OFF						
∞ = ALWAYS ON						

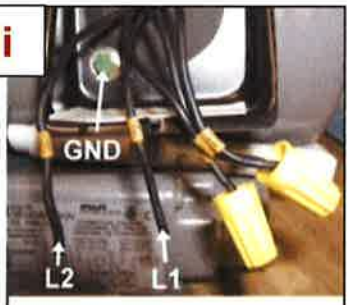
BLOWER DIAGRAMS

ATTENTION: Please refer to side of shipping box for correct Blower.

Fuji



Model: FUJI VFC 209, 100P, 300P
Power: 110VAC
- L1 to P1
- N to T2, T4
- T1 & T3, cap together



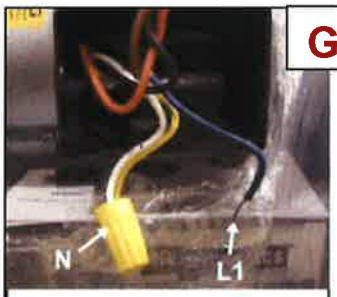
Model: FUJI VFC 209, 100P, 300P
Power: 220V 1ø
- L1 to P1
- L2 to T4
- T2 & T3, cap together
- T1, cap off

FPZ/Lafert

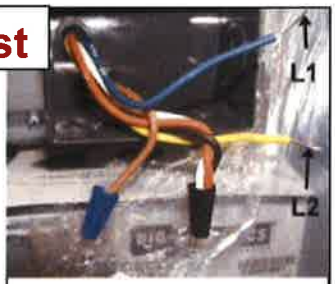
Model: FPZ SCL06
Power: 110VAC
- Jumper U2 to V1
- Jumper W2 to U1
- L1 to "terminal block"
- N to white connector

Model: FPZ SCL06
Power: 220VAC, 1ø
- L1 to "terminal block"
- L2 to V1
- Jumper W2 to U2

Gast



Model: GAST R2103, R4P116, R1102
Power: 110VAC
- L1 to P1
- N to 2,4
- P2,5,3 cap together



Model: GAST R2103, R4P116, R1102
Power: 220VAC 1ø
- L1 to P1
- L2 to 4
- 5, 3 and 2, cap together
- P2 cap off

LIMITED WARRANTY

Bio-Microbics, Inc. warrants every new residential FAST® system against defects in materials and workmanship for a period of two years after installation or three years from date of shipment, subject to the following terms and conditions, (Commercial FAST system for a period of one year after installation or eighteen months from date of shipment, whichever occurs first, subject to the following terms and conditions):

During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIO-MICROBICS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIO-MICROBICS, INC., ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS.

Contact your local distributor for parts and service.

Keep for Your Records

FAST® System Serial Number: _____

System Designer Name: _____

Designer Phone: _____

Health Official Name: _____

Health Official Phone: _____

Manufacturer Name: Bio-Microbics, Inc.

Manufacturer Phone: 1-800-753-FAST (3278)

Installed By: _____

Installer Phone: _____

Maintenance Provider Name: _____

Maintenance Provider Phone: _____

BIO MICROBICS
BETTER WATER. BETTER WORLD.

16002 W. 110th Street
Lenexa, KS 66219 • USA
Ph: 913-422-0707
Fax: 913-422-0808
800-753-FAST (3278)
www.biomicrobics.com

BIO MICROBICS®

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Appendix D

BioMicrobics MicroFAST® Systems
Procedure for the
Certification of Service Providers and Homeowners for the Purpose of Operation and Maintenance

Purpose:
This shall act as the governing document for the certification of professional onsite wastewater treatment system service providers and homeowners who are interested in becoming a Certified Service Provider on the BioMicrobics MicroFAST ® systems within the State of Rhode Island. This procedure may be revised at any time.

Definitions:

1. BioMicrobics

   BioMicrobics is the MicroFAST ® system manufacturer and is the company that holds the certification for the MicroFAST ® system in Rhode Island.

2. BioMicrobics Official Representative

   A BioMicrobics Official Representative is either BioMicrobics personnel or a designated representative from the Rhode Island BioMicrobics' distributor.

3. Registered Inspector/Service Provider

   A registered inspector/service provider is a professional onsite wastewater treatment system service provider who is registered by the New England Onsite Wastewater Training Program after passing INSP 200 as a Registered Operation & Maintenance Service Provider for Innovative & Alternative Septic Systems.

4. Homeowner

   A homeowner is a person who owns and occupies a home that is served by a BioMicrobics' MicroFAST ® system and who has attended and passed a University of Rhode Island Onsite Wastewater Training Class: INSP 100 A&B – Conventional Onsite Wastewater Systems Inspection and Field Training.

5. Certified Service Provider

   A certified service provider is a registered inspector/service provider or licensed RIDEM Class II or III designer who is certified in writing by BioMicrobics to provide the service on a BioMicrobics MicroFAST® system.

6. Homeowner Certification

   Homeowner certification authorizes a person to perform operation and maintenance activities as prescribed by BioMicrobics, only on the MicroFAST ® system serving this person's owner-occupied residence. Homeowner certification does not authorize the homeowner to perform repair activities; all repairs must be performed by a BioMicrobics' Certified Service Provider.

BioMicrobics' Mandatory Classes:

Parties required to attend must pay for a local training class provided by BioMicrobics, Inc. on the inspection and local requirements of the BioMicrobics MicroFAST® systems. A test will be given to demonstrate that the attendees have a basic understanding of the operation and maintenance required of a BioMicrobics MicroFAST ® system. BioMicrobics reserves the right to implement a processing or tracking fee for certification processing, system contract and inspection tracking, and service provider inspection spot checks.

General Requirements: (Applies to Homeowner Certification & Certified Service Providers)

1. Interested service providers are to submit a letter of interest and must include at a minimum: name, address, license number (if applicable), experience, and history. Upon review you will be contacted for scheduling and details of the authorized classes.

2. Certification will be good for three years, expiring December 31st of the third year after the BioMicrobics mandatory service provider certification program class has been taken.

3. Applications for recertification will be evaluated based upon performance over the three-year certification with emphasis on the most recent issues. A performance grading system will be applied to evaluate record keeping, timely paperwork submittal, MicroFAST ® system product knowledge, in-field procedures, and customer complaints.

3. Anyone certified must agree to submit to spot checks on any system for improper operation and a review of paperwork submitted.

4. BioMicrobics reserves the right to revoke any certification for any discrepancies found or lack of paperwork submitted.

5. Attend a continuing education class every three (3) years for recertification. The class must be specific to the MicroFAST ® technology. Notices will be sent out to certified service providers advising of these continuing education classes. (Attending three (3) system inspections will not be required for recertification.)

6. The required system measuring and troubleshooting equipment that all certified service providers must have in addition to basic hand tools are: a scum and solids measuring device, a pH meter, thermometer, and a dissolved oxygen (DO) meter.

7. Use inspection forms included in the RIDEM approved MicroFAST ® design and installation manual. Submit required inspection forms to BioMicrobics within 48 hours of the inspection and submit inspections forms to the Homeowner/RIDEM as per the required permit conditions.

8. Sign a Memorandum of Understanding for Authorized Service Providers.

Homeowner Certification:

A homeowner who wishes to be the certified service provider for the system located at their own, owner-occupied residence must meet the following conditions:

1. Attend and pass the University of Rhode Island's Onsite Wastewater Training Class: INSP 100A &B – Conventional Onsite Wastewater System Inspection and Field Training.

2. Attend and pay for a local training class provided by BioMicrobics on the inspection and local requirements of the BioMicrobics MicroFAST® systems, and pass a test to demonstrate that they understand the basic operation and maintenance criteria of the BioMicrobics MicroFAST® systems.

3. Attend a system orientation meeting at their own property with a BioMicrobics official representative to review the site specific requirements for their advanced treatment system.

4. Agree not to perform any repairs or treatment system component replacement. Only a Certified Service Provider is allowed to provide such repairs or treatment system component replacement.

Certified Service Providers:

A Registered Inspector/Service Provider or Licensed Class II or III RIDEM Designer who wishes to be a Certified Service Provider must meet the following conditions:

1. Maintain registration with the New England Onsite Wastewater Training Program as a Registered Inspector/Service Provider on the URI Onsite Wastewater Training Center List or be listed as a Class II or Class III Designer on the RI DEM Licensed OWTS Designers and Soil Evaluators List.

2 Attend and pay for a local training class provided by BioMicrobics on the inspection and local requirements of the BioMicrobics MicroFAST® systems.

3 Attend three system inspections of any BioMicrobics MicroFAST® system within their service area with BioMicrobics or their official representative prior to final authorization to become a Certified Service Provider. (Not required for recertification)

4 Send a copy of all service provider contracts to BioMicrobics identifying contract start and expiration, property identification, location, and service being provided.

5 Use certified BioMicrobics parts. NO After Market Parts will be permitted for any reason.

6 Maintain an inventory of standard replacement parts in their possession during the inspection to enable onsite repairs that are authorized by their certification category with a "one trip" style service. (i.e. blower, control panel, vent piping)

Rhode Island MicroFAST® Service Provider Training 2017

FIRST	LAST	PHONE	COMPANY NAME	ADDRESS	CITY	STATE	License
Michael	Moreau	508-823-9566	Wastewater Treatment Services, Inc.	44 Commercial St.	Raynham	MA 02767	10291
John	Medeiros	508-823-9566	Wastewater Treatment Services, Inc.	44 Commercial St.	Raynham	MA 02767	17549
Michael	Stewart	401-667-7463 X 116	NE Water Solutions Inc.	567 S. County Trail	Exetor	RI 02822	F100585T
Lauren	Usilton	508-823-9566	Wastewater Treatment Services, Inc.	44 Commercial St.	Raynham	MA 02767	12527
Kevin	Usilton	508-823-9566	Wastewater Treatment Services, Inc.	44 Commercial St.	Raynham	MA 02767	12530
Jared	Kelly	774-482-0917	Private Contractor	302 Sutton St.	Northbridge	MA 02767	16387