



# Pinnacle Environmental Technologies Inc.

Mailing Address

P. O. Box 12112  
Langley, B.C. V3A 9J5  
WebSite: [www.peti.ca](http://www.peti.ca)

Location Address

22765-A Fraser Hwy.  
Langley, BC.  
Email: [info@peti.ca](mailto:info@peti.ca)

Contact Numbers

Ph: 604-514-7555  
Toll Free 866-514-7555  
Fx: 604-514-7595

---

# FAST®

## SEWAGE WASTEWATER TREATMENT SYSTEM

## PERFORMANCE TEST DATA



The **National Sanitation Foundation *International*** is a world class recognized independent agency for testing the performance capabilities of water and wastewater treatment equipment technologies. They have specific standards that these technologies must meet in order to be certified by NSF *International*.

For the sewage wastewater technologies, NSF *International* has several standards. The standard that has the toughest effluent quality criteria is Standard 40, Class 1.

The FAST® technology was submitted to the NSF *International* for testing to determine whether it met the Standard 40, Class 1. The testing period is for at least 6 months. The FAST® was tested during the months from November to June in Ann Harbour, Michigan that is an area in cold winter climate conditions.

The following is a summary of the test results. The FAST® is listed and certified as meeting this standard. A copy of the full report is available to professional engineers and government regulators on request.

<b>SUMMARY OF NSF TEST RESULTS OF THE MicroFAST SEWAGE TREATMENT PLANT</b>						
	Average	Std. Dev.	Minimum	Maximum	Median	Interquartile Range
BOD <sub>5</sub> (mg/l)						
Influent	144	34	89	280	140	120 - 160
Effluent	9	4	<5	24	8	6 - 11
Suspended Solids (mg/l)						
Influent	197	85	85	740	180	150 - 220
Effluent	7	3	<5	27	5	5 - 8
Volatile Suspended Solids (mg/l)						
Influent	159	54	68	430	150	130 - 180
Effluent	6	3	<5	29	<5	<5 - 7
pH						
Influent	-	-	7.3	7.7	7.5	7.5 - 7.5
Effluent	-	-	7.5	8.2	7.8	7.8 - 7.9
Temperature (°C)						
Influent	12	2	10	17	12	11 - 13
Effluent	11	4	6	21	10	8 - 13
Dissolved Oxygen (mg/l)						
Effluent	6.8	1.4	2.8	9.9	6.9	6.2 - 7.8

**Notes:** The median is the point where half of the values are greater and half are less.

The interquartile range is the range of values about the median between the upper and lower 25 percent of all values.

This information found in TABLE 1 Summary of Analytical Results, Page 10 of the NSF Test Results of the MicroFAST MODEL .5, dated July 1997.



**Other independent testing agencies** and groups, working on behalf of either governments or onsite sewage treatment system owners, have conducted testing of systems in service as required by their regulation or a government lead study.

When and where these test results are submitted back to BioMicrobics Incorporated in Kansas, USA, they are additional confirmation of the capabilities and performance capabilities of the FAST® unit.

The following is a summary of a collection of these submitted results.

Site Details: Florida Owners Project Phase 1: Actual residences of several single family homes.										
Date	BOD <sub>5</sub>		CBOD		TSS		TKN		Total Phosphorus	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
11/20/96	137.00	3.26	176.00	2.48	60.00	no data	19.20	1.23	4.32	3.22
12/18/96	148.00	7.75	136.00	8.85	86.00	no data	46.90	1.77	7.09	4.21
1/29/97	299.00	10.00	215.00	9.01	345.00	4.00	62.50	1.82	11.00	4.52
2/26/97	139.00	10.00	183.00	6.00	70.00	4.00	37.40	0.64	7.07	5.22
4/2/97	170.00	2.20	150.00	1.00	17.00	1.00	32.00	1.60	6.60	5.60
4/23/97	210.00	1.40	200.00	1.00	203.00	1.00	46.00	1.10	7.80	5.60
5/8/97 (1)	230.00	1.70	220.00	1.00	170.00	2.50	39.00	1.10	7.10	5.40
5/21/97	62.00	2.70	59.00	1.00	162.00	1.00	33.00	1.60	5.80	5.30
5/29/97 (2)	240.00	1.00	130.00	1.00	80.00	1.00	44.00	1.60	26.00	5.80
6/11/97	100.00	1.40	67.00	1.00	123.00	1.00	36.00	0.83	5.80	7.10
7/17/97	150.00	1.00	130.00	1.00	74.00	3.00	33.00	1.10	7.10	4.50
8/28/97	100.00	1.00	71.00	1.00	20.00	1.00	32.00	0.81	5.00	4.20
Average	165.42	3.62	144.75	2.86	117.50	1.95	38.42	1.27	8.39	5.06
Reduction	97.8%		98%		98.3%		96.7%		39.7%	
(1) sample collected after vacation stress test simulation										
(2) sample collected after wash day stress test simulation										

Single Family Residence				
EFFLUENT ONLY RESULTS REPORTED				
Date	BOD	TSS	TKN	Total Phosphorus
04/06/99	<3.0	2.0		
04/18/99	<3.0	2.0	<1.6	2.80
04/23/99	3.0	2.0		
04/28/99	3.0	2.0	1.8	2.60
05/13/99	<3.0	2.0	1.5	2.78
05/20/99	<3.0	3.0		
06/03/99	<3.0	3.0	1.8	2.26



**High Strength Sewage Wastewater** is typically considered to be where the influent BOD and TSS exceeds 250 mg/l respectively. The FAST® product is available in a design specially constructed to handle high strength wastewater. Each project is considered on its own particular needs and the appropriate FAST® high strength wastewater treatment model is selected.

Test results from systems in place are available upon the submission of the data to BioMicrobics which is not mandatory and provided voluntarily by the system user.

Site Details: Elementary school in the eastern USA. School has cafeteria to service the students and teachers. The total daily flow is 4,000 imp gals (18 cu. m.)				
Date	CBOD		TSS	
	Influent	Effluent	Influent	Effluent
01/18/01	894.00	10.40	216.00	11.50
01/24/01	707.00	4.70	243.00	2.00
02/01/01	740.00	1.98	232.20	3.00
02/06/01	623.00	1.67	467.40	3.70
02/14/01	416.00	4.87	154.70	4.70
03/07/01	662.00	1.61	96.00	5.00
03/14/01	514.70	1.13	149.50	6.30
03/21/01	578.00	1.97	103.00	7.70
03/28/01	596.00	5.20	153.00	5.00
04/04/01	738.00	2.90	241.00	6.00
04/11/01	789.00	4.40	98.70	3.70
04/18/01	427.60	2.00	255.00	5.30
04/25/01	523.00	3.10	117.50	4.00
05/16/01	579.70	4.30	116.00	5.00
Average	627.71	3.59	188.79	5.21
Reduction	99.4%		97.2%	

The following test results from single-family homes in Massachusetts, USA are further examples of the FAST® Systems capabilities. These reports were prepared by laboratories independent of BioMicrobics Incorporated and supplied to them on request.



Mass, USA	SAMPLE		Start Date	SAMPLE TYPE	BOD OUT	TSS OUT
TOWN	DATE	TYPE				
Barnstable	08/10/01	RES	05/18/00	GRAB	4.4	4.8
	10/30/01	RES	05/18/00	GRAB	2	<10
	02/20/02	RES	05/18/00	GRAB	5.6	28
	05/17/02	RES	05/18/00	GRAB	<2	12
Barnstable	12/19/01	RES	09/03/99	GRAB	9	19
	06/28/02	RES	09/03/99	GRAB	4	<10
Chatham	07/12/01	RES	04/26/01	GRAB	9.1	14.5
	10/23/01	RES	04/26/01	GRAB	6.4	8.3
	11/30/01	RES	04/26/01	GRAB	27	51
	01/16/02	RES	04/26/01	GRAB	11	12
	04/29/02	RES	04/26/01	GRAB	19	<10
Chatham	11/26/01	RES	08/03/01	GRAB	9.2	14.3
	05/16/02	RES	08/03/01	GRAB	4	17
Chatham	04/17/02	RES	01/10/02	GRAB	2	<10
	08/05/02	RES	01/10/02	GRAB	10.6	<4
Dennis	04/29/02	RES	10/15/01	GRAB	<2	<10
Dover	09/25/01	RES	12/22/99	GRAB	9.7	4
	09/25/01	RES	12/22/99	GRAB	5.8	<2
	10/04/01	RES	12/22/99	GRAB	11	11
	10/04/01	RES	12/22/99	GRAB	7	<10
	10/18/01	RES	12/22/99	GRAB	12	<10
	10/30/01	RES	12/22/99	GRAB	11	11
	06/26/02	RES	12/22/99	GRAB	8	7.7
Dracut	08/14/02	RES	12/17/01	GRAB	7	<10
Duxbury	08/14/01	RES	05/04/00	GRAB	<4	6.5
	10/04/01	RES	05/04/00	GRAB	4.1	<2
	02/15/02	RES	05/04/00	GRAB	<4	<2
	05/13/02	RES	05/04/00	GRAB	5	<10
Eastham	10/17/01	RES	06/18/01	GRAB	7	<10
	02/13/02	RES	06/18/01	GRAB	<4	<2
	07/29/02	RES	06/18/01	GRAB	5.6	<4
Eastham	08/05/02	RES	04/11/02	GRAB	<4	4.3
Eastham	07/31/01	RES	06/29/00	GRAB	<4.0	<2.0
	08/29/01	RES	06/29/00	GRAB	<4.0	<2.0
	09/25/01	RES	06/29/00	GRAB	7.3	<2.0
	10/03/01	RES	06/29/00	GRAB	<2	<10
	03/25/02	RES	06/29/00	GRAB	4	<10
	06/20/02	RES	06/29/00	GRAB	5	13
	07/29/02	RES	06/29/00	GRAB	<4	<4



Kingston	09/24/01	RES	03/30/01	GRAB	7.1	5.3
	10/18/01	RES	03/30/01	GRAB	3	16
	12/19/01	RES	03/30/01	GRAB	5	12

Oak Bluffs	08/30/01	RES	12/28/99	GRAB	6.5	7.3
	03/28/02	RES	12/28/99	GRAB	4	<10

Oak Bluffs	05/30/02	RES	07/06/99	GRAB	5	<10
------------	----------	-----	----------	------	---	-----

Plymouth	09/27/01	RES	06/03/99	GRAB	11.6	6
	10/04/01	RES	06/03/99	GRAB	<9	11
	03/21/02	RES	06/03/99	GRAB	8	10
	07/02/02	RES	06/03/99	GRAB	13	<10

Sandwich	05/23/02	RES	11/06/01	GRAB	<10	82
Mass, USA	08/05/02	RES	11/06/01	GRAB	13	16

Truro	08/29/01	RES	01/23/01	GRAB	<4.0	<2.0
Mass, USA	09/11/01	RES	01/23/01	GRAB	5	<10
	10/24/01	RES	01/23/01	GRAB	11.5	4.3
	12/20/01	RES	01/23/01	GRAB	9	10
	01/16/02	RES	01/23/01	GRAB	3	11
	02/22/02	RES	01/23/01	GRAB	8.6	<2
	05/16/02	RES	01/23/01	GRAB	<2	<10
	07/29/02	RES	01/23/01	GRAB	10.3	5

Walpole	06/29/01	RES	03/09/00	GRAB	4.1	<2.0
	11/30/01	RES	03/09/00	GRAB	6	<10
	04/03/02	RES	03/09/00	GRAB	<2	<2
	06/28/02	RES	03/09/00	GRAB	<2	<10
	08/12/02	RES	03/09/00	GRAB	<4	<4

Wayland	07/19/01	RES	07/30/98	GRAB	9.2	30.3
	04/23/02	RES	07/30/98	GRAB	12	<10
	08/12/02	RES	07/30/98	GRAB	4.5	4.5

Wayland	08/12/02	RES	07/15/99	GRAB	<4	<4
Mass, USA						
	04/23/02	RES	07/12/99	GRAB	8	26
	08/12/02	RES	04/12/99	GRAB	<4	7

Wrentham	08/12/02	RES	07/12/01	GRAB	6.7	12.2
----------	----------	-----	----------	------	-----	------

Yarmouth	06/28/02	RES	12/20/01	GRAB	10	<10
	08/05/02	RES	12/20/01	GRAB	<4	18.8

Sandwich	12/29/00	COM	11/01/00	GRAB	9.6	8.8
	4/26/01	COM	11/01/00	GRAB	5.6	<2
	7/31/01	COM	11/01/00	GRAB	10.6	3
	10/26/01	COM	11/01/00	GRAB	5.6	<2
	2/28/02	COM	11/01/00	GRAB	7.9	4.5