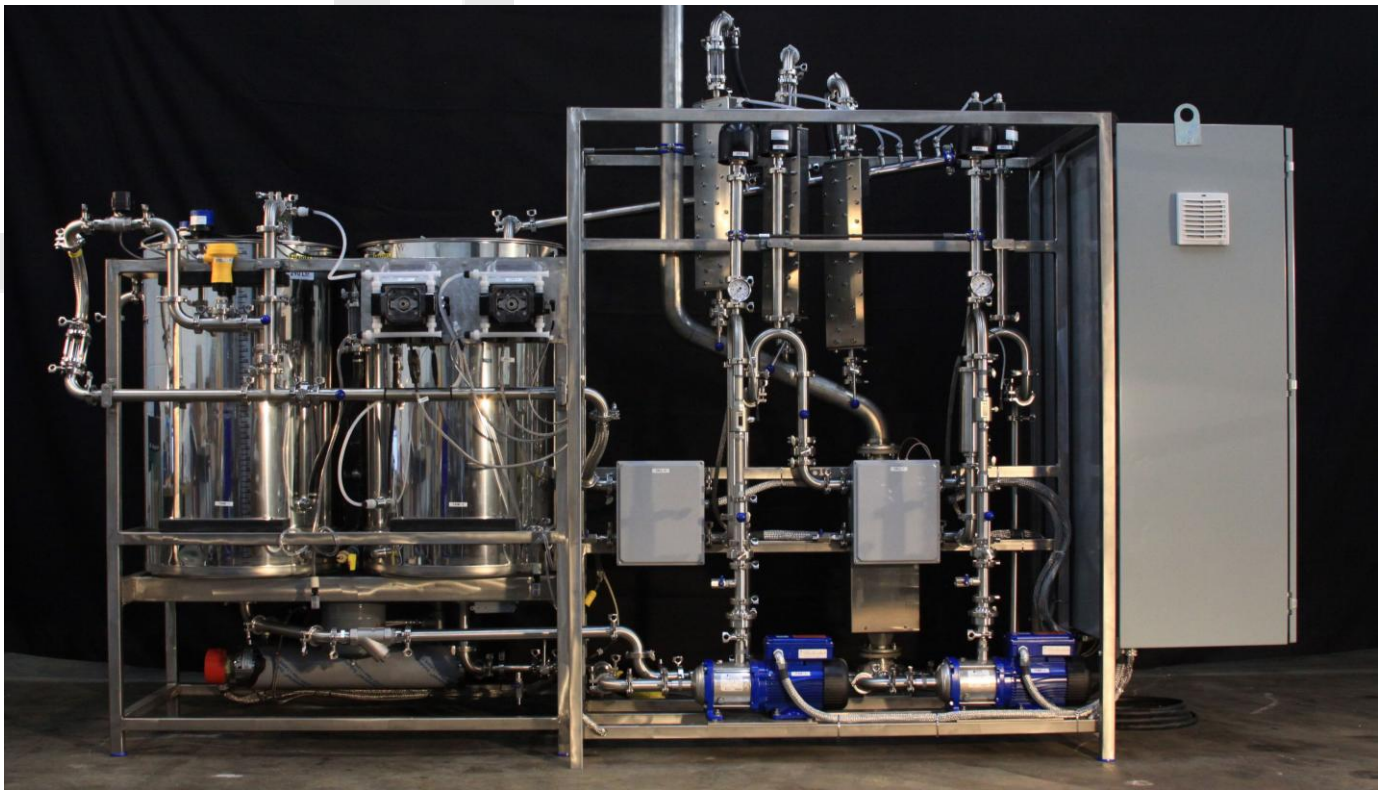
YB TECHNOLOGIES, LLC

PFAS Destruction in Granular Activated Carbon (GAC)

AMEOX® Technology Summary



Overview of AMEOX® TECHNOLOGY:

- PFAS destruction for fluid concentrates, foamate, brines and spent GAC
- Removes GAC foulants/metals & increases adsorption capacity
- Reactivates GAC for re-use

YBT

Technologies for a Cleaner Future

Contact Information: info@ybtechs.com | www.ybtechs.com

AMEOX® is patented/patents-pending in the US and abroad

HOW AMEOX® DESTORYS PFAS

AMEOX® destroys PFAS by circulating a specialized oxidizing fluid through PFAS-laden GAC or concentrate streams, generating powerful in-situ oxidants which break down and mineralize PFAS molecules on contact. By recirculating this reactive fluid through the carbon bed or PFAS liquid treatment option only, AMEOX delivers powerful oxidants directly where PFAS resides—eliminating the compounds, removing fouling metals, and restoring GAC for reuse in a closed fluid loop.

Technology Description

Technology: AMEOX® Technology

Benefits:

- Destroys PFAS in GAC and Re-activates GAC for reuse
- No discharge of AMEOX fluid. Sustainably recycled
- Low Power: 240V/1PH/50A (propane heat); 100A (electric heat)
- Onsite/Insitu Processing
- Portable or fixed applications (Single Unit: 4’ x 12’ footprint)
- Single Unit Treats </= 5000# GAC absorber (10,000#’s w/Dual Unit)
- Removes GAC foulants (iron, calcium, aluminum, etc.)
- ~100oF and <85 psi operating conditions

Fact Sheet:

- >99% destruction increases operating costs if desired
- Electric Power Platform
- Stainless Steel Construction
- <1000 to 5000-10,000+# lb. media absorber reactor processing
- 2 pumps w/VFD per AMEOX Single Unit system (1hp ea.)
- Robust Vortex Mixing (no motors/moving parts)
- Skid-mounted (or trailer/shipping container housing)
- Re-usable AMEOX Fluid (oxidant carrier) with no discharge
- AMEOX equipment is exempt from NSF certification (no contact w/drinking water)

Target Parameters

- 80% target reduction in PFOA and PFOS
- 60-65% PFAS destruction in GAC creates effective capacity in GAC for its reuse
- Beneficial Foulant Removal from SPENT GAC: Iron, Aluminum, Calcium, Manganese and Alkalinity reductions.

Results Summary

AMEOX GAC Processing Data

		Treatment Status:	UNTREATED	TREATED	TREATED
		Elapsed Treatment Time (Hrs.):	T = 0	17.3	17.3
		Matrix:	GAC	GAC	GAC
		1000# GAC Bed Depth Sample Location:	Vertical Composite	Top 1/2	Bottom 1/2
PFAS Telomeres	Chemical Name	C Atoms	TOTAL PFAS (ng/Kg - dry wt.)	TOTAL PFAS (ng/Kg - dry wt.)	TOTAL PFAS (ng/Kg - dry wt.)
PFBA	Perfluorobutanoic Acid	C4	**8,000**	**240**	**230**
PFPeA	Perfluoropentanoic Acid	C5	7,300	<120	<210
PFHxA	Perfluorohexanoic Acid	C6	<22,000	<120	<210
PFHpA	Perfluoroheptanoic Acid	C7	<22,000	<120	<210
PFOA	**Perfluorooctanoic Acid**	**C8**	**24,000**	**<25**	**<43**
PFNA	Perfluorononanoic Acid	C9	870	<25	<43
PFDA	Perfluorodecanoic Acid	C10	220	<120	<210
PFUnA	Perfluoroundecanoic Acid	C11	220	<120	<210
PFDoA	Perfluorododenoic Acid	C12	220	<120	<210
PFTriA	Perfluorortridecanoic Acid	C13	**220**	<120	<210
PFTeA	Perfluortetradecanoic Acid	C14	**220**	<120	<210
PFBS	Perfluorobutanesulfonic Acid	C4	**7,300**	**30**	<43
PFPeS	Perfluoropentanesulfonic Acid	C5	**2,900**	<25	<43
PFHxS	Perfluorohexanesulfonic Acid	C6	<22,000	<120	<210
PFHpS	Perfluoroheptanesulfonic Acid	C7	**5,400**	<120	<210
PFOS	**Perfluorooctanesulfonic Acid**	**C8**	**1,600,000**	**<25**	**<43**
PFNS	Perfluorononanesulfonic Acid	C9	**1,000**	<120	<210
PFDS	Perfluorodecanesulfonic Acid	C10	<44	<25	<43
FtSA 4:2	Fluorotelomer Sulfonic Acid 4:2	C6	<220	<120	<210
FtSA 6:2	Fluorotelomer Sulfonic Acid 6:2	C8	**8,400**	<120	<210
FtSA 8:2	Fluorotelomer Sulfonic Acid 8:2	C10	<220	<120	<210
PFOSA	Perfluorooctanesulfonaminde	C8	<44	<25	<43
N-EtFOSSA	N-Ethylperfluorooctranesulfonic	C12	<220	<120	<210
N-MeFOSAA	N-Methylperfluorooctranesulfonice	C11	<220	<120	<210
F-53BMin	11Cl-Pf3OUds	C10	<44	<25	<43
DONA	4,8-Doxa-3H-perfluorononanoic Acid	C8	<44	<25	<43
F-53BMaj	9Cl-PF3ONS	C8	<44	<25	<210
HFPO-DA	Hexafluoropropylene	C3	<220	<120	<210
% Moisture	% Moisture		**45**	**43**	**40**
	Summation of PFOA and PFOS:		**1,624,000**	**ND**	**ND**
	Summation of PFAS Telomeres:		**1,666,270**	**270**	**230**
Lab testing by ALS, Holland, MI				>99%	>99%

Notes: PFOA And PFOS To < DL's

Bed-Depth Treatment Data

Descript table:

The table shows that AMEOX® treatment reduced PFOA and PFOS concentrations in GAC from very high levels in the untreated sample (24,000 ng/kg PFOA and 1,600,000 ng/kg PFOS) to below detection limits in both the top and bottom portions of the treated GAC bed after 17.3 hours. This demonstrates complete removal of the two most regulated PFAS compounds. The overall PFAS load—initially totaling approximately 1.66 million ng/kg—was also reduced to nondetect levels, confirming significant PFAS destruction throughout the entire GAC bed. These results highlight the effectiveness of AMEOX® in achieving deep PFAS reduction and restoring GAC performance.

AMEOX® Process Data- Reverse Osmosis Reject Concentrate Results

			Source:	AMEOX® Technology Viability Study for PFAS Destruction: Minnesota Landfill Leachate VSEP RO 90% Recovery Reject Concentrate		
Processed Fluid			Sample Type:	Untreated RO Reject (90%)	AMEOX Treated RO Reject (90%)	
VSEP Concentrate			Analytes:	PFAS Totals/ Metals	PFAS Totals/ Metals	
7/5/23			Matrix:	RO Concentrate Liquid	RO Concentrate Liquid	
90% Recovery			Treatability Phase:	CHARACTERIZATION	AMEOX Treated	
~20 gallons			Elapsed Hours Treated:	T = 0	T = 16	
			Sample Source:	AMEOX Reactor	AMEOX Reactor	
			Sample ID:	02092024-RO-90%	02102024-RO-90%	
			Lab:	ALS	ALS	
			Method(s):	E-537 Mod / SW3015A	E-537 Mod / SW3015A	
			Units (unless noted):	(ng/L)	(ng/L)	% Reduction
Telomere	**Chemical Name**	**CAS No.**	**C Atoms**	**Result**	**Result**	
FtSA 6:2	Fluorotelomer Sulfonic Acid 6:2	27619-97-2	C8	910	35	-96.2%
PFBS	Perfluorobutanesulfonic Acid	375-73-5	C4	6,700	3,900	-41.8%
PFBA	Perfluorobutanoic Acid	375-22-4	C4	11,000	9,000	-18.2%
PFHpA	Perfluoroheptanoic Acid	375-85-9	C7	5,900	500	-91.5%
PFHxS	Perfluorohexanesulfonic Acid	355-46-4	C6	4,200	240	-94.3%
PFHxA	Perfluorohexanoic Acid	307-24-4	C6	22,000	17,000	-22.7%
PFNA	Perfluorononanoic Acid	375-95-1	C9	270	<25	-90.7%
PFOS	Perfluorooctanesulfonic Acid	1763-23-1	C8	580	<25	-95.7%
PFOA	Perfluorooctanoic Acid	335-67-1	C8	7,500	210	-97.2%
PFPeS	Perfluoropentanesulfonic Acid	2706-91-4	C5	250	120	-52.0%
PFPeA	Perfluoropentanoic Acid	2706-90-3	C5	11,000	9,200	-16.4%
HFPO-DA	Hexafluoropropylene oxide dimer acid	13252-13-6	C6	<99	<25	
PFecHS	Perfluoro-4-ethylcyclohexanesulfonic Acid	646-83-3	C8	140	<25	-82.1%
PFBSA	Perfluorobutylsulfonamide	30334-69-1	C4	300	190	-36.7%
			Summation of PFOA and PFOS:	8,080	210	97.4%
			* Summation of PFOA, PFOS, PFNA, PFHxS, PFBS, HFPO-DA (GenX):	19,250	4,350	77.4%
			Summation of PFAS Telomere Totals:	70,750	40,437	42.8%

NOTES:

a) * March 14, 2023 - Proposed PFAS National Primary Drinking Water Regulation - (6) PFAS: https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas

b) VSEP Concentrate - 90% Recovery Landfill Leachate RO concentrate was processed February 9-10, 2024 using an AMEOX Single Unit

c) AMEOX processing followed a generic treatment regime design for PFOA + PFOS and using data provided by customer for Total PFAS of up to 10ug/L

d) Data indicate AMEOX processing conditions and RO fluid characteristics caused dissolution of metal oxide deposits accumulated on internal surfaces of AMEOX equipment from previous GAC processing.

e) PFAS cross-over contamination not evaluated. No equipment blank was tested as fluid run through system was RO concentrate (vs. clean water) and any carryover from piping surfaces would be insignificant for this viability study.

f) Viability data confirms the AMEOX technology is able to reduce the level of PFAS in 90% RO concentrate and indicates process optimization is feasible.

Viability Study Preformed by YBT: Data shows RO-90% fluid concentrate is suitable for FULL-SCALE OPTIMIZATION with 97.4% reduction in PFOA and PFOS

Conclusion:

AMEOX® Technology offers a compelling and cost-effective solution for clients seeking reliable PFAS destruction and GAC reuse, eliminating the need for expensive offsite regeneration or incineration. By generating powerful in-situ oxidants within a closed-loop system, AMEOX® directly destroys PFAS where it resides in the GAC while simultaneously removing fouling metals, restoring performance, and extending the service life of the media. Its moderate operating conditions, low power requirements, and portable or fixed configurations make it practical for onsite deployment with minimal operational disruption. With demonstrated PFAS reduction targets—up to 80% for PFOA/PFOS and 60–65% PFAS destruction within GAC—the system delivers measurable treatment results while reducing waste, lowering long-term operating costs, and supporting sustainable environmental compliance. For facilities facing increasing PFAS liability, disposal costs, and regulatory pressure, AMEOX® provides a proven, efficient, and environmentally responsible treatment strategy.

Single Unit Mobile Systems

Fabrication to Readiness Testing

Dual Unit- 20’ Shipping Container

2 x 10,000# trailered GAC and Absorbers

Inside Connex

1,000 GAC # Absorber Reactor

Dual AMEOX Reactor Arrays