CLARITY
RESOURCES GROUP
Oxygenation & Aeration Specialists

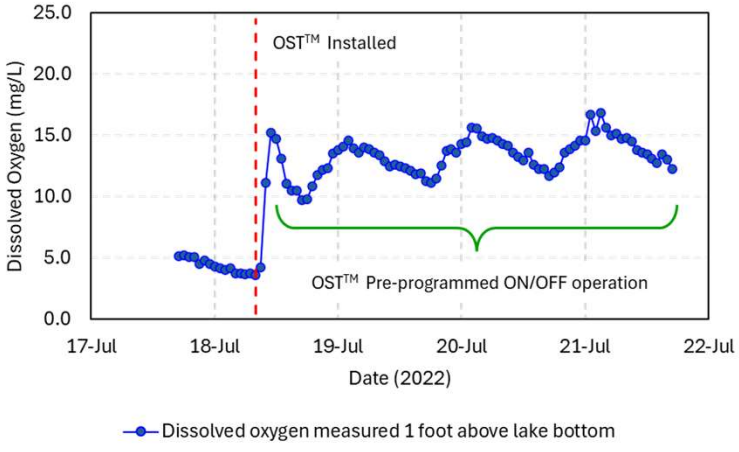
OXYGEN SATURATION TECHNOLOGY (OST ™)

Oxygen Saturation Technology (OST™) is the next generation aeration system. The goal of the OST is to improve water quality. The patented design adds on shore generated oxygen to water being circulated at the bottom of the lake/pond. The OST design eliminates bubbles, which eliminates turbulence, sediment resuspension, and undesirable mixing and creates an oxygen blanket over the sediment.

Example of OST Operation

Sample data from a 23 ft deep trout pond near Lake Geneva, WI showing:

- DO < 5 mg/L prior to OST operation
- DO increasing from < 5 to 15 mg/L after OST installation
- Cycling On (DO ≤ 10 mg/L) and Off (DO ≥ 15 mg/L)



Key Features and Benefits

- Achieve DO levels 5x's > than traditional aeration
- No bubbles / No induced mixing
- Preserves Stratification / Cold water habitat
- Prevents HABs / Reduces Muck
- Improves water clarity and health
- Grow bigger, healthier fish!

Contact Information

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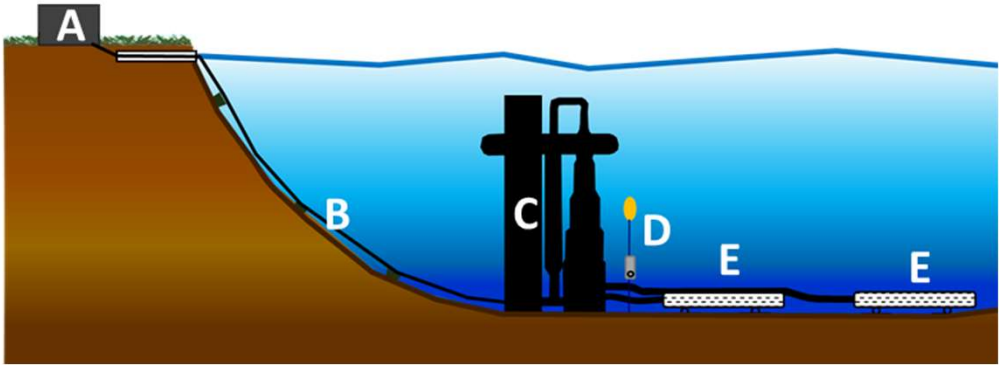
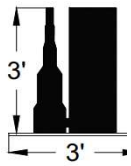
OST™ Components and Relative Position



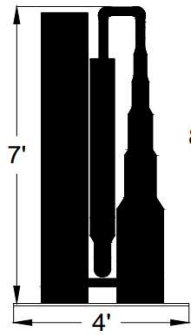
A) Onshore oxygen supply
B) Umbilical – O_2 supply and pump power supply
C) OST™ unit – pump & O_2 contact chambers
D) Automation – DO Sensor
E) Suction & discharge headers

Oxygen Saturation Technology (OST™) Single Unit Models

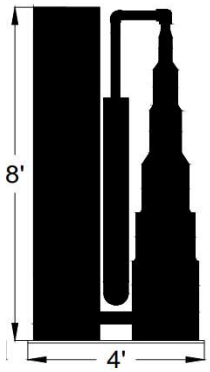
Model	D-8	S-12	S-18
Oxygen Delivery Capacity			
Oxygen delivery (kg/d)	8	10	20
Surface area (acres)	2	5	10
Pumping Parameters			
Water Flow Rate (GPM)	40	40	75
Pressure (PSIG)	35 - 40	35 - 40	35 - 40
Oxygen Supply			
Oxygen Generator	Topaz	Reliant	Centrox
Oxygen Delivery (lpm)	6	8	15
Electrical			
Power (Hp)	1	1	2
Oxygen Supply (Hp)	0.5	1	1.5
Single Phase Voltage (VAC)	115	230	230
Current (amps)	10 - 12	14 - 20	25 - 30
Dimensions			
On-shore Enclosure (Oxygen supply), minimum			
Length x Width x Height (ft)	3 x 3 x 3	3 x 3 x 4	4 x 4 x 5
Weight (lb)	200	175	375
Chambers			
Height (ft)	Inclusive (shore based unit)	7	8
Width (ft)		3	4
Length (ft)		3	4
Dry Weight (lb)		400	650
Suction/Discharge Header			
Active Header Length each (ft)	5	5	10
Minimum Assembled Length (ft)	50	50	60



D-8



S-12



S-18

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OST™ Operational Guidelines

Onshore Equipment Requirements

Compressed Air Supply

The onshore components of the OST™ consist of a compressed air supply, an on-site oxygen generator and added components to the compressors to ensure a supply of clean dry air to the oxygen generator. To ensure proper operation of the oxygen generators three key items must be maintained: ambient temperatures, ventilation, and timer drains.

On-Site Oxygen Generator

Ambient Temperatures

To ensure proper operation, it is recommended to maintain the ambient air temperature between 4°C (40°F) and 40°C (104°F) to prevent damage.

Ventilation

Adequate ventilation is paramount to proper system operation. Inadequate ventilation will result in premature compressor failure, which is not covered under warranty. It is recommended to circulate 1800 SCFM per OST unit, which includes an unobstructed opening (~ 12" x 12"), one fan providing forced air directly on the compressors, and a second exhaust fan positioned at the highest point of the enclosure.

Example fans showing forced air fan for compressor (left) and an exhaust fan (right).

Timer Drains

A key factor in protecting the oxygen generator is removing moisture from the feed air. This is accomplished with a small air surge tank and a moisture separator, both of which have a timer drain to expel accumulated moisture. It is recommended to verify proper timer drain operation at every site visit.

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OST™ Operational Guidelines (Continued)

Preventative Maintenance (PM) Overview

There are two levels of preventative maintenance (PM) for the OST™, regular site visits to visually inspect the onshore equipment and long-term maintenance of the in-lake and on-shore components.

Regular Site Visits / Equipment Inspection

It is recommended to inspect the onshore mechanical equipment bi-weekly and record key system parameters listed on the "OST Check Sheet."

Long-term Maintenance

Long-term maintenance on the OST mainly consists of proper inspection and cleaning of the intake and discharge headers and regular maintenance on the compressed air supply and oxygen generator.

Headers

The OST™ headers are designed to minimize clogging by having feet to position them above the sediment, maintain velocities < 0.1 ft/sec, and have copper screen to provide passive anti-fouling. Even with all these measures in place, the headers can still clog. The following table provides recommended inspection/cleaning intervals based on trophic status.

Trophic State	Inspection / Cleaning interval (months)
Oligotrophic	24 - 36
Mesotrophic	12 - 24
Eutrophic	6 - 12
Hypereutrophic	3 - 6

Oxygen generator / compressed air supply

In general, the compressed air and oxygen generator should be serviced according to the following table. For more details, see the OST™ manual.

Duration (years)	Action
1	Coalescing filter
1 - 2	Compressor (rebuild/replace)
4	Solenoid valves rebuild

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OST™ Operational Guidelines (Continued)

General Overview of Operation

The OST™ can be operated manually or on automation.

Manual operation

During manual operation, the unit will run continuously unless someone turns it off. Manual operation can be used for testing/evaluation or for short periods of time if the assurance that upper oxygen limits, DO throughout the hypolimnion exceeding 25 mg/L, are not exceeded.

Automated operation

OST™ is designed to operate based on DO feedback from the pond/lake. This is accomplished with the use of a DO probe positioned about 1 ½ ft (½ meter) above the bottom. The data logger is programmed to cycle the unit on at a low DO set point and off at a high DO setpoint. This is the preferred method of operation, which ensures DO will remain below upper limits that can cause excessive stress on aquatic life and can reduce operating cost.

Recommended Tools and Equipment

During regular site visits the following items are recommended:

- Laptop with Clarity Resources Master software (to communicate with the data logger)
- Crescent wrenches (re-tighten any leaking fittings)
- 5/64 allen wrench (to adjust pressure switch if necessary)
- Flat head screwdriver (#2)
- Phillips head screwdriver (#0 and #2)
- Bottle of soapy water (to test for gas leaks)
- Oxygen purity meter (to test oxygen purity, such as this one from maxtec)

In-lake Maintenance Recommended Equipment:

Portable compressor to float the system to the surface

2" trash pump to re-deploy the system

- Scrub brush to clean the headers
- Rope to secure the OST in place and to re-deploy. Distance/length is site dependent
- At least one boat, preferably 2 and 3 team members.

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OST™ Check Sheet

Date (mm/dd/yy)	Initials	Green lights illuminated on SSR Relays (Y/N)	Air Receiver Pressure (**Max 80 psi**)	Pressure Switch operational (Y/N)	Exercise timer drains	Oxygen generator hours	Feed Pressure (**70 psi max**)	Product Pressure (**60 - 63 psi**)	Oxygen flow rate	Activate Modem Program	Comments

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Warranty Coverage Summary

- Clarity Resources Group, LLC provides a limited warranty on work performed in connection with OST units to be free from all defects in material and workmanship for periods outlined in the table below from the install date.
- The terms "defects" shall not be construed as embracing damage arising from misuse, negligence, Acts of God, normal wear and tear or failure to follow maintenance or operating instructions.

Parts Included in Warranty

OST Chamber Assembly

Oxygen Supply

Automation/ Telemetry

Dissolved Oxygen Probe

Umbilical

Submersible pump assembly

Equipment/Part	Year 1	2	5
OST Chamber Assembly			X
Oxygen Supply - Oxygen generator and air supply	X		
Automation/Telemetry	X		
Dissolved Oxygen Probe			X
Umbilical			X
Submersible pump assembly			
Grundfos 35S and 70S submersible pump		X	
Franklin 1 and 2 HP submersible motors	X		

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