

SKIMSTER® OWS

Oil/Water Separator System

OPERATION MANUAL

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Carefully read and follow the instructions in this booklet for optimal performance.

Thank you for purchasing the **SKIMSTER® OWS** from HOH Corporation. Please don't hesitate to call HOH with any questions you may have regarding the operation of the system or the need for replacement parts. Our contact information:

HOH Corporation

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System Applications:

- **Marine**
 - Coast Guard facilities
 - Marine Terminals
 - Marinas
 - Boatyards/Shipyards
 - Bilge Oil/Water Separation
 - Off Shore Fuel Spills
- **Environmental Remediation**
 - Emergency Response
 - Oil/Water separation from ponds/lakes after spills
 - Lagoon oil/water separation
 - Groundwater Remediation
 - Facility "Decon" closures
 - UST (Underground Storage Tank) removal
 - Excavation site oil/water separation
 - Pit/Sump oil/water separation
- **Storm-water Runoff**
 - Industrial facilities
 - Transportation facilities
 - Parking Lots
 - Airports
- **Utilities**
 - Compressor condensate and oily wastewater from diked areas at Sub-Stations
- **Wastewater and Water Treatment Facilities**
 - Oil/Water separation in water basins
- **Vehicle Maintenance and Vehicle Washing Facilities**
 - Oil/Water separation in wash-water trench drains, catch basins
- **Power-washing wastewater**
 - Collection of wastewater prior to releasing to sewer/storm-water

- **Industry**
 - Chemical Processing
 - Machine Coolant oil removal
 - Metal processing
 - Petrochemical (refueling depot runoff, oil field sites)
 - Plastic Manufacturing
 - Steel Mills
 - Food Processing (floating light liquids in wastewater)
 - Shipyards
 - Recycling facilities
- **Transportation**
 - Airports (run-off & spills)
 - Railroad facilities (run-off & spills)
- **Municipal Facilities (City/County/State/Federal)**
 - Maintenance facilities/garages/terminals/storm-water

System Overview:

The **SKIMSTER® OWS** is a mobile system built to respond to oil/fuel spills in and around coastal areas, marinas, boatyard, shipyards, remediation cleanup site, and industrial sites. The **SKIMSTER® OWS** can also be used as a fixed/permanent Oil/Water Separator System for industrial sites requiring effluent (oil-in-water) <15PPM. The system is skid mounted on a 7'x16' tandem axle trailer (optional). It is powered by either the 115V electrical panel or for areas without a power supply a commercial portable generator (optional).

The system includes the following:

- (1) 7'x16' Tandem Axle Trailer (3500 lb. each) – optional
- (1) Trailer tongue storage tool box – optional
- (1) 6'x10' powder-coated carbon steel skid (with forklift pockets)
- (1) 10GPM HOH Oil/Water Separator
 - Carbon steel construction (polypropylene construction available)
 - Powder-coated
 - Aluminum lid
 - 50-gal. poly oil storage tank
 - The CUBE® Coalescing Media (HOH's patented OWS media pack)
 - Note: The System is supplied with 4X the coalescing media for the required retention time needed for spill response.
- (1) Standard Size **SKIMSTER®** Floating Oil Skimmer rated at ~5GPM
 - 100 ft. of ¾" floatable hose
- (1) Large Size **SKIMSTER®** Floating Oil Skimmer rated at ~20GPM
 - 100 ft. of 1" floatable hose
- (1) EDSON® Model 2500 ¾ HP Double Diaphragm Pump (electric powered up to 25GPM)

- (1) GOULD® ½” Effluent Pump
- (1) PENTEK® 20” Basket Strainer (90 PSI Maximum load)
- (2) CENTEK® BilgeKleen Hydrocarbon Polishing Canisters
 - (2) Replacement Filters
- (1) 115V Electrical Panel
- (1) 4000W Commercial Portable Generator – optional
- (1) River Trace® “Smart Cell” Oil Content Monitor
- (1) Little Giant® 115V Utility Pump (Oil Content Monitor Cleaning Flush Pump)
- (1) Hedland® FlowMeter
- (1) Chemtrol® Globe-Valve, Y-Pattern
- (1) Fill-Rite Mechanical FlowMeter (5-20GPM)
- Miscellaneous heavy-duty hose and stainless steel adaptors
- (4) Bilge Daddy™ OWS Effluent Chamber Absorbent Pillows (to absorb sheen in the Effluent Chamber)

System Inspection:

Inspect all equipment upon arrival. If any items are missing or damaged, make note of this on the shipping papers. Also, notify HOH Corporation immediately at 336 727 4644.

AT NO TIME SHOULD OIL OR OIL/WATER MIXTURE BE INTRODUCED INTO AN EMPTY OWS UNIT. THE OWS TANK MUST FIRST BE FILLED WITH CLEAN WATER. IF IT IS DRAINED FOR ANY REASON, IT MUST AGAIN BE REFILLED WITH CLEAN WATER BEFORE EQUIPMENT IS PLACED BACK IN SERVICE.

THE SKIMSTER® OWS IS A MOBILE UNIT, WHEN MOVING TO NEW SPILL LOCATIONS THE UNIT MUST BE LEVEL FOR THE OWS TO OPERATE SUCCESSFULLY. SHOULD SKID BE PLACED ON A TRAILER FOR MOBILE OIL SPILL RESPONSE, THE TRAILER MUST BE LEVEL.

System Start-Up:

Before placing the **SKIMSTER® OWS** in service, it is suggested that a “Dry Run” is made using clean water. This will ensure that the factory set rotary oil skimmer in the OWS has not rotated out of position, the Diaphragm Pump/**SKIMSTER® Floating Oil Skimmer** is operating at required GPM, the water is flowing freely through the Globe Valve/FlowMeter, Hydrocarbon Filtering Canisters and River Trace Oil Content Monitor. ***The “Dry Run” will demonstrate the principle of operation of the SKIMSTER® OWS.***

Dry Run

1. Level the Unit
2. Fill OWS with clean water until it freely flows over the OWS Effluent Weir.

3. Place the **SKIMSTER® Floating Oil Skimmer** in a body of clean water (*Note: SKIMSTER® Floating Oil Skimmer requires at least 1 ft. of water to operate*). Connect the floatable hose to the **SKIMSTER® Floating Oil Skimmer** and to the EDSON Pump.
4. Make sure the OWS Influent Valve is in **open** position and OWS Effluent Valve is in **open** position.
5. Connect the electrical cords from the EDSON Pump and River Trace to the electrical outlets.
6. Power up the **SKIMSTER® OWS** with either a supplied electric outlet or with a portable generator.
7. Power on the EDSON® Double Diaphragm Pump. Set the Variable Speed Drive on the EDSON Pump to approximately 25-30 Cycles per Minute.
8. Power on the River Trace
9. Note: Gould Effluent Pump is wired directly to panel (*no plug in required*).
10. The Clean Water Effluent (clean water running freely through the OWS) should be discharged back into the body of water you are skimming from (where the **SKIMSTER® Floating Oil Skimmer** is located).
11. With the unit set level, filled with clean water and now operating at rated flow of approximately ~5-8 GPM, the **Rotary Oil Skimmer** device should be level with the water. The **“open slots”** on the Rotary Skimmer Pipe should be adjusted to ¼” to ½” **above** the water level. Adjust the oil skimmer by rotating it if necessary.

Note: During actually “Start Up” when introducing oil into the system the oil will float above the original water in proportion to the difference between its specific gravity and the specific gravity of water. This means oil will automatically accumulate and spill over into the Rotary Skimmer. If the above steps are followed, minimal water will spill into Rotary Skimmer.

Now that the “Dry Run” is complete and the water is running freely through the unit, the SKIMSTER® OWS is ready to work for you at a spill location. The following is a *step-by-step (Typical Setup Operation)* of the SKIMSTER® OWS at a small to medium oil/fuel spill.

System Operation (Typical Setup):

1. **Contain the oil/fuel spill with containment boom(s).**
2. **Place the SKIMSTER® Floating Oil Skimmer inside the spill (*boomed*) containment area.** *Note: Should the contaminate (oil/fuel) be >2” thick in the containment area, HOH recommends pumping directly (using the SKIMSTER® Floating Oil Skimmer and the EDSON Diaphragm Pump) to a recovery container (i.e. pail, drum, tote), thus by-passing the OWS. Gravity feed Oil/Water Separators (like the one on the SKIMSTER® OWS) require a water/oil mixture of approximately 80% water / 20% oil/fuel to operate successfully. Pumping more than the 20% oil into the separator will “overload” the unit with oil. We have made it simple to redirect the oil/fuel to a recovery container. The 3-way SS Influent Valve should be placed in the **“Closed”** position (in the closed position the oil/fuel will not enter the OWS). When the level of oil/fuel has*

been brought down to an acceptable level, **“Open”** the 3-Way Influent Valve to allow the oil/fuel/water mixture to enter the OWS.

3. The **SKIMSTER® Floating Oil Skimmer** is equipped with 100 ft. of floatable hose. One end connected to the **SKIMSTER® Floating Oil Skimmer** and the other to the EDSON pump. The EDSON will now begin feeding the wastewater through the Pentek Screen Filter basket (to screen out debris) then on to the OWS.
4. **The OWS is equipped with a Non-Clog diffuser across the width and depth of the Cube® Media Pack (HOH has installed 4X the coalescing media for added retention time).** Any solids that have made it pass the Pentek Screen Filter Basket will drop out into the V-Bottom Sludge Chamber of the OWS.
5. **The CUBE® ribbed plates are arranged vertical in the direction of flow with a series of 5/16” holes spaced ½” apart.** As the plates are stacked and overlapped, it will cause the flow of the oily wastewater to zigzag around the 90° corners throughout the CUBE® media pack, causing resistance to flow, collection of the oil droplets 2-microns and larger which will enhance the coalescence (the coalesced oil/fuel has the least restricted path to exit the waste stream and will rise to the surface).
6. **The separated oil/fuel accumulates at the surface of the separation chamber where it displaces the water.** As the oil/fuel layer increases, the oil/fuel spill over into the adjustable Rotary Pipe Skimmer where it flows (by gravity) to the 50-gallon oil storage container (placed beneath the OWS). *Note: See “Trouble-Shooting/Maintenance” section on the pumping “emptying” of the storage container.*
7. **The separated/clean water leaving the CUBE® passes under an oil retention baffle and into the effluent or clean water chamber.** From there, the clean water passes over a weir which maintains the water level in the OWS. The clean water chamber is equipped with automated level-floats which will power up the Gould ½” Centrifugal pump to begin discharging the clean water to the CENTEK BilgeKleen Hydrocarbon Filtration Canisters. *Note: The discharge piping from the Gould pump is equipped with an in-line Globe Valve and Flow-meter. Turning the Globe Valve “Clockwise” will slow the flow; “Counterclockwise” will increase the flow. HOH recommends a flow-rate of ~5-8GPM for optimal performance of the system. An easy check of the GPM can be achieved by a quick view of the equipped FILL-RITE Mechanical Flow-Meter.*
8. **The clean water will now enter the Hydrocarbon Filtering System.** To achieve the required <15PPM level of hydrocarbon (oil in water) set by the USCG, the **SKIMSTER® OWS** is equipped with a Hydrocarbon Polishing System manufactured by CENTEK Industries. The system consists of two (2) filter canisters. Both canisters have the patented MYCELX filters. The MYCELX filters will instantly bond all hydrocarbons to make them hydrophobic (repellant to water) and viscoelastic (thickened) thus removing them from the polluted water. The single pass efficiency through both MYCELX filters is 99.9% with almost no (0.5psi) pressure increase across the filters – all the way to saturation. *Note: HOH has supplied VITON seals to assure the water entering the canisters has a “tight” seal thus eliminating any possible “by-pass” of water entering the filters correctly. When replacing the MYCELX filters “after filter(s) is depleted”, make sure there is a “tight” seal between the filter(s) and the canisters (top and bottom of the canister(s)/filter(s). A faulty seal of the filter(s) and canister(s) may cause the filter(s) to deplete faster.*

9. **A sampling of the effluent water is now entering the River Trace® "Smart-Cell" Oil-Content-Monitor (OCM).** *The OCM meets the requirements of MEPC 107 (49) for monitoring of three (3) types of oil types: Fuel, Diesel and Emulsions).* By utilizing the "Smart Cell" Detector Array Technology developed by River Trace®, the OCM analyses all three oil types simultaneously without the need for recalibration. The PPM reading on the OCM can be monitored by viewing the OCM Digital Reader. *Note: Place the OCM "discharge plastic tube" (clean water from the OCM) so the water empties into the OWS Clean Water Chamber, please make sure there is no flow restriction and water is flowing freely back into the OWS (don't place end of tube in the clean water chamber, place approximately 2-3 inches from the surface of the water).*
10. **Before attempting any / and each oil spill cleanup, the OCM must be flushed with clean water.** HOH has equipped the **SKIMSTER® OWS** with a small stainless steel 115V pump. Follow the directions in the "River Trace" Instruction Manual for "Cleaning/Flushing" OCM.

During the operation of the SKIMSTER® OWS the operator should continually monitor the entire system, noting change in flow, oil/water mixture, possible solids entering system, storage container levels, and oil- in- water PPM levels (RiverTrace OCM).

System Trouble- Shooting / Maintenance:

1. **SKIMSTER® Floating Oil Skimmer is not skimming oil/water mixture from the containment area.**
 - Check for obstructions (debris) around the sliding "white" weir on the **SKIMSTER®**
 - Check for obstructions (debris) in the diaphragms of the EDSON pump.
 - Check for obstructions (debris) in Pentek Strainer Filtration canister.
2. **Oil/Fuel buildup in OWS "Clean Water" Chamber**
 - **It should be noted that a slight sheen on the surface of the water in the "Clean Water Chamber" is normal.** Gravity feed OWS (like the one equipped with the **SKIMSTER® OWS**) will separate the oil/water down to approximately 20-30PPM, thus leaving a small amount of hydrocarbon floating on the surface of the water. The MYCELX filters will capture/absorb the hydrocarbons down to <15PPM.
 - **Adjust the Rotary Skimmer to the correct level – ¼" to ½" above the oil surface.** Remember the maximum ratio of the OWS is 20% oil and 80% water. As the oil approaches the water % (i.e. 50% oil to 50% water), eventually the oil will displace all of the water in the OWS, thus making the oil flow-thru the outlet of the OWS. Should this occur, adjust the Rotary Skimmer device down to remove the buildup of oil. Once oil layer has been removed, clean water must be added to the OWS before starting up with spill recovery again.
 - **Another possible reason for oil to be in the "Clean Water" Chamber is that the contaminant (Oil/Fuel/Water) is "Emulsified".** The OWS supplied with the **SKIMSTER® OWS** will not separate emulsified mixtures. The MYCELX filters will deplete at a much quicker rate in this situation. For very small spills of emulsified oily

wastewater, utilizing the **SKIMSTER® OWS** may well be your best option. For the larger emulsified oily mixtures, it may be cost prohibited.

- **The CUBE® Media Pack may be clogged** – Depending on the hours of operation, % of oil content, temperature of water, solids collected, etc may have clogged the media pack. HOH recommends pressure washing the CUBE® Media Pack as well as the OWS chambers on a regular basis.
3. **Poor Effluent Quality** – Regularly monitor the quality of the effluent leaving the OWS. If any loss in effluent quality is observed, the following steps should be taken to correct the problem immediately. Some things to check if effluent quality has deteriorated (OCM reading above >15PPM):
- **Have you exceeded the OWS rated flow?** The rated flow for the **SKIMSTER® OWS** is between 5-8 GPM. Check the Fill-Rite Flow-Meter for the GPM flow, adjust accordingly.
 - **Have you allowed the sludge to accumulate to a point where it has started to affect the performance of the CUBE® Media Pack.** If so, the OWS should be drained and the coalescing media flushed out. If the media cannot be flushed out sufficiently from above the OWS, remove the Media Pack (each cube is equipped with a handle for ease of removal). If you determine the media pack has become permanently fouled and requires replacement, call HOH for a replacement.
 - **Utilizing another type pump (other than the EDSON Diaphragm pump supplied with the SKIMSTER® OWS).** If you are utilizing a pump other than a “Diaphragm Pump” you well may be “emulsifying” the influent (oil/fuel/water) mixture. A simple test to see if you are emulsifying the mixture, simply take a sample from both ends of the pump (influent / effluent), there should be no difference between the two samples. HOH recommends a diaphragm pump (either electric or air).
 - **Check to see if the oil is freely draining from the OWS (through the Rotary Pipe Skimmer).** If the outlet becomes plugged, the oil will flood the separation chamber and oil will pass through the effluent chamber.
 - **Contaminates:** Certain detergents are emulsifiers, eliminate all emulsifying detergents prior to entering the OWS. Coolants, solvents, paint waste will not be separated successfully to achieve the <15PPM limit.
 - **MYCELX Filters have depleted** - Longevity of the MYCELX filters of course depends on the amount of oil/fuel captured during oil spill projects you are performing. A MYCELX filter will absorb approximately .9 gallons of oil/fuel. Testing on the **SKIMSTER® OWS** at HOH’s facility, it has been determined that approximately 2500-3000 gallons of oil/water mixture can be processed before the MYCLEX Filters had to be replaced. HOH would recommend replacing filters before each oil spill project you undertake.
 - *Note: What do you do with the depleted MYCELX Filters? - Since the filters have absorbed oil/fuel the filters are an excellent candidate for “Fuels Blending”. Ask your Waste Management Disposal Company for disposal options. Oil/Fuel depleted MYCELX Filters are regulated as a “Non-Hazardous Waste” by EPA Guidelines.*

- *Note: What are the small pillows in the Effluent Chamber? HOH has supplied the **SKIMSTER® OWS** with small 12"x12" Hydrocarbon Absorbent Pillows to absorb possible sheens in the Effluent Chamber. These pillows are made up of a similar polymer technology as the MYCELX filters. These absorbent pillows (like the MYCELX) can be fuels blended. HOH recommends replacing the pillows at each oil/fuel spill project.*
 - **OCM needs cleaning** – High PPM readings on the OCM may indicate that the OCM may need a “Manual Clean” performed. Please read River Trace® manual for recommending cleaning of the OCM.
 - **OCM sampling tubes cleaning** – tubes may be clogged or dirty, again check River Trace® Manual for cleaning OCM. (*Note: It is important to keep the River Trace “Inlet Tube” higher than the “Monitor”, to make sure the tube is always filled with water. False readings will appear on the “Monitor” if the “Inlet Tube” and the measuring cell is empty.*)
- System is not level** – if the **SKIMSTER® OWS** is not level the oil layer will not drain into the Rotary Skimmer device in the OWS, thus passing through to the effluent chamber.
4. **Effluent Chamber not emptying fast enough** – Synchronize influent flow rate with the effluent discharge. During testing on the **SKIMSTER® OWS** HOH has determined the Variable Speed Drive on the EDSON Electric Diaphragm Pump should be set at approximately 25-30 Cycles Per Minute (please see EDSON instruction manual). By adjusting the Globe Valve on the Effluent side of the OWS, you can synchronize the pumps to achieve optimal emptying of Effluent Chamber. Remember the **SKIMSTER® OWS** recommended GPM is ~5-8GPM.
 5. **50-Gallon Storage Container is full** – How do I empty it? HOH has made it simple to empty the Oil Storage Container (sitting beneath the OWS). Utilizing the EDSON Pump to empty the container, disconnect the “Quick-Connect” hose from the **SKIMSTER® Floating Oil Skimmer** then connect to the Oil Storage Container “Quick-Connect” fitting. Disconnect the “Quick-Connect” from the Pentek Filter Strainer Canister, then connect hose to your Oil Recovery Tank or Container.

Please refer to the System Drawing and Parts Listing for ordering replacement parts.

Should you have any questions or concerns regarding the operation of the **SKIMSTER® OWS** please don't hesitate to call HOH Corporation at (336) 727-4644. We will try our best to answer any question you may have.

Thank you again for purchasing our **SKIMSTER® OWS** System, we look forward to working with you on all your Oil & Water Separation needs in the future!

SKIMSTER® OWS Part Listing:

- R-001 - System Skid 6'x10'
- R-002 - HOH Model CA-10M Oil/Water Separator
- R-003 - CUBE Media Pack
- R-004 - SS 3-Way Influent Valve
- R-005 - SS 3-Way Effluent Valve
- R-006 - Influent Non-Clog Diffuser Pipe
- R-007 - Rotary Pipe Skimmer
- R-008 - Effluent Floats
- R-009 - 50-gallon Oil Storage Container
- R-010 - Standard Size **SKIMSTER** Floating Oil Skimmer
- R-011 - Large Size **SKIMSTER** Floating Oil Skimmer
- R-012 - ¾" Floatable Hose
- R-013 - 1" Floatable Hose
- R-014 - *EDSON* Electric Diaphragm Pump Model 2500
- R-015 - *PENTEK* 20" Strainer Filter Canister
- R-016 - *GOULD* ½ HP Effluent Pump
- R-017 - *CENTEK* BilgeKleen Canister (2)
- R-018 - *MYCELX* Filter (2)
- R-019 - *River Trace* "Smart Cell" Oil-Content-Monitor
- R-020 - *Hedland* In-Line Flow-Meter
- R-021 - *CHEMTROL* Globe Valve
- R-022 - 115V Electrical Panel Box
- R-023 - FILL-RITE Mechanical Flow-Meter
- R-024 - *Little Giant* Utility Pump SS 115V (*River Trace Clean Water Flush Pump*)
- R-025 - *Bilge Daddy* Effluent Sheen Absorbents (12"x12" pillows)
- R-026 - *VITON* Seals (*for MYCELX Filters*)
- R-027 - Trailer Tongue Tool Box
- R-028 - 7' x 16' Axle Trailer
- R-029 - 7' x 16' Cargo V-Nose Trailer
- R-030 - *Aeroquip* Hose (*EDSON* pump to OWS)
- R-031 - 30AMP Y Adapter Cord (*1-30AMP Male plug in / 2-15AMP Female plug in*)
- R-032 - 30AMP Extension Cord (*Dockside Plug In*)