



OPERATIONS AND MAINTENANCE INSTRUCTIONS FOR UNDERGROUND OIL/WATER SEPARATORS

Containment Solutions manufactures Oil/Water Separator (OWS) tanks with internal coalescing plates. These units are available in single or double-wall vessels constructed to UL standards. The OWS can handle a variety of flow rates and achieve effluent concentrations of 10 mg/L (ppm). Lower effluents require special design. Contact OWS Technical Support (800-777-2823).

As with any OWS, proper maintenance is an important factor to ensure optimal performance of the unit. The manual provides the information necessary to maintain the OWS.

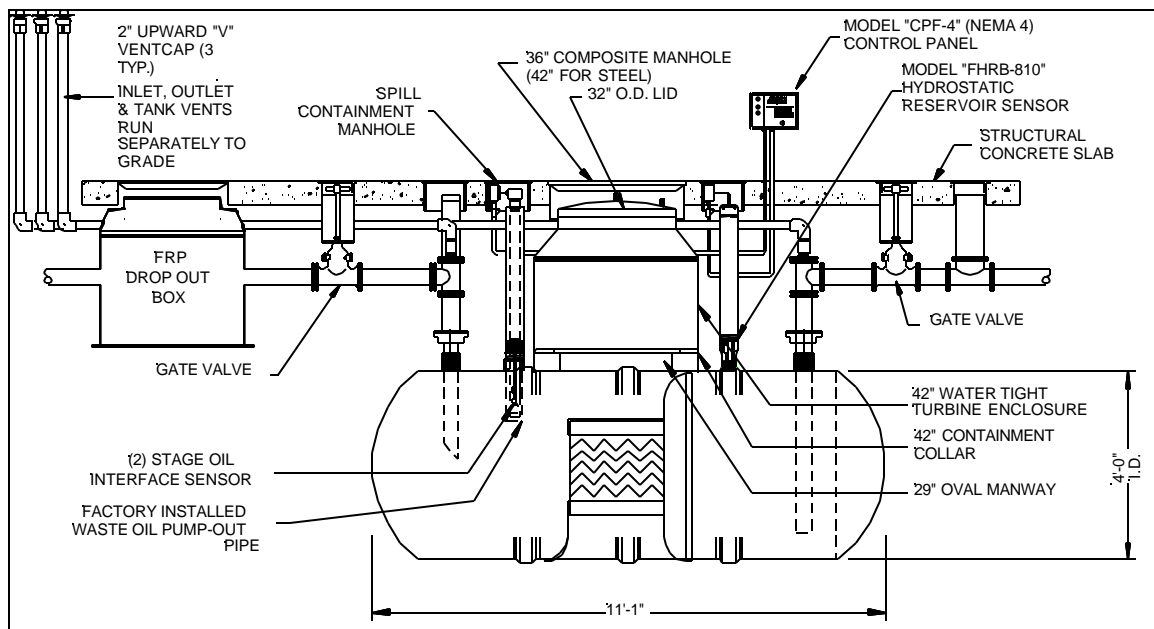
WHAT IS COVERED IN THIS MANUAL

- I. Operating Instructions for Oil/Water Separator Tanks
- II. Maintenance Instructions for Oil/Water Separator Tanks

WHY IS THIS INFORMATION IMPORTANT?

PROPER INSTALLATION AND OPERATION OF EACH OWS TANK IS ESSENTIAL:

- To ensure the safety of all individuals involved in the OWS tank installation, operation, and maintenance
- To prevent OWS tank damage and/or failure, which could lead to environmental contamination
- To prevent the release of higher concentrations of oil than allowed
- To validate the OWS tank warranty



I. OPERATING INSTRUCTIONS FOR OIL/WATER SEPARATOR TANKS



LIQUID OIL AND VAPORS ARE FLAMMABLE OR COMBUSTIBLE.

- Waste oils should not be intentionally drained into the OWS tank. Filling the OWS tank with waste oils reduces the capacity of the OWS tank to separate oil from runoff flow. Waste oils may contain chemicals which could damage the OWS tank, piping and/or internal components.
- Any and all oil recovered and removed from the OWS tank should be recycled or disposed of in accordance with federal, state and local codes and regulations.
- Dropout boxes, catch basins or interceptors should be installed prior to the OWS to minimize the amount of sand, dirt, rags, leaves, gravel, etc. entering the OWS tank to maintain effective oil/water separation and to minimize maintenance. It is important to frequently clean the dropout boxes, catch basins or interceptors which are installed upstream of the OWS tank.

1. Normal Operation

Important: The OWS tank should be filled with water at all times for proper operation.

Oil level should be checked after every rainstorm or in accordance with local codes. The oil level can be checked two ways:

1. Optional Electronic Interface Sensor - OWS tanks with the electronic Interface Sensors oil pump-out alarm require oil removal when the alarm is activated.
 - Remove the oil.
 - Refill OWS tank with clean water (See OWS Start-Up Instructions, Pub. No. OWS 2013, Section III).

2. Manual Stick Gauging

OWS tanks without oil pump-out alarm require oil to be checked by using gauge stick with oil/water sensing paste.

- Determine oil level with gauge stick.
- If oil/water interface level is below that shown in the Interface Level Chart (see page 3) for your capacity OWS tank, oil needs to be removed.
- Remove the oil.
- Refill OWS tank with clean water (See Start-Up Instructions, Pub. No. OWS 2013).

2. Oil Level Sensors (optional)

There are two types of sensors: double-float and single-float. For double-float, these are the alarm sensors (single float has only the oil pump out alarm):

1) Oil Level Alarm

- This alarm warns that the OWS tank is almost full of the oil storage capacity level and the oil will need to be removed soon.

2) Oil Pump-out Alarm

- The pump-out alarm alerts the operator that the oil must be removed immediately.

Note: If the oil is not pumped out, the effluent concentration may exceed the desired levels if more oily water enters the OWS tank. Oil should only be removed during non-flow conditions to insure pure oil draw-off.

For details and schematics, request tech sheet "Oil Interface Float Switch Models 40U and 50U B&S".

3. Oil Recovery Instructions

- To minimize water contamination of the oil, connect oil suction hose to the 4" OIL DRAW fitting/coupling.
- Suction out the oil.
- Refill with clean water.

Note: For OWS with Electronic Interface Sensors, the alarms will not deactivate until the tank has been refilled and clean water has caused them to float.

4. Major Oil Spill Response Instructions

Note: A major oil spill is a spill, which exceeds the normal oil storage capacity of the OWS tank.

- After a major oil spill the OWS tank should always be emptied and refilled with clean water.

- In the event of a major spill, notify proper authorities as required by federal, state and local laws.

A. Oil Spill Recovery Instructions (with optional oil level sensors)

- To minimize water contamination of the oil, connect the oil suction hose to the 4" OIL OUT fitting/ coupling.
- Suction out the oil.
- Refill OWS tank with clean water (See Start-Up Instructions, Pub. No. OWS 2013).

Note: Be sure the pump-out alarm is activated due to a FULL OIL condition or an oily-water mix will be removed.

- If the pump-out alarm is still on, suction out a second oil load and refill with clean water.
- Continue this sequence until alarms deactivate.

B. Oil Spill Recovery Instructions (without oil level sensors)

- To minimize water contamination of the oil, connect the oil suction hose to the 4" OIL OUT fitting coupling.
- Suction out the oil.
- Refill OWS tank with clean water (See Start-Up Instructions, Pub. No. OWS 2013).
- Apply oil/water sensing paste to a gauge stick.
- Place gauge stick into the OWS tank through the 4" GAUGE fitting to determine the oil/water interface location.

If the oil/water interface level is below that shown in the Interface Level Chart for you model OWS tank, more oil needs to be removed.

- Suction out second load of oil.
- Refill OWS tank with clean water (See Start-Up Instructions, Pub. No. OWS 2013).
- Continue this sequence until oil/water interface is higher or above that shown in the Interface Level your model OWS tank.

Oil/Water Interface Level Chart

Important: If the oil/water interface is below the following levels, the waste oil should be pumped out of the OWS tank. The oil/water interface is defined as the point where the oil is detected above the water. Oil will always be floating on the water.

Tank Diameter Models ULCSI-10 CSI-10 & 15 UCCSI-10 & 15	Oil/Water Interface Pump Out Level (measured from bottom of OWS tank thru oilout fitting)
38"	21"
42"	31"
48"	34"
64"	47"
72"	52"
92"	66"
96"	72"
120"	88"
126"	94"

5. Mixed Oil and Water Recovery Instructions:

Place a 2" or smaller suction hose inside the OWS tank through either the 4" GAUGE fitting or through the manway.

- The suction hose nozzle should be 24" above the OWS tank bottom or higher.

If nozzle extends closer to the bottom, sludge may be inadvertently removed and oil carry over into the OWS tank effluent water may occur upon start-up.

- Refill with clean water (See Start-Up Instructions Pub. No. OWS 2013).

II. MAINTENANCE INSTRUCTIONS OIL/WATER SEPARATOR TANKS

LIQUID OIL AND VAPORS ARE FLAMMABLE OR COMBUSTIBLE.



EXPLOSION



FIRE

Never Enter An OWS Tank Or Enclosed Space Under Any Condition Without Proper Training And O.S.H.A. Approved Equipment (Consult OSHA guidelines 29 CFR, Part 1910 "Permit Required Confined Spaces")

- Entering an UST without the use of a self-contained oxygen supply may result in the inhalation of hazardous fumes resulting in headache, dizziness, nausea, loss of consciousness and death. Proper methods must be used to ventilate all enclosed spaces prior to entry to avoid ignition of flammable materials or vapors.
- Close inlet and effluent pipe valves before entering OWS tank.
- Disconnect/disable all power sources including air source to any pump(s) and power to any accessories.



All interior surfaces of the OWS tank will be slippery.

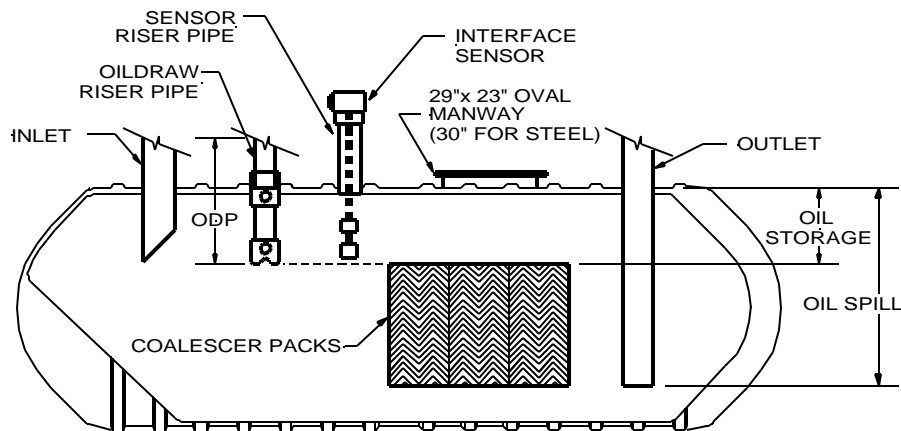
Do not use picks, axes, hammers or other heavy objects to break the sludge apart.

Note: Any and all oil recovered and removed from the OWS tank should be recycled or disposed of in accordance with federal, state and local codes and regulations.

Important Reminders:

- Be sure to inspect and replace gaskets as necessary when the OWS tank is shutdown for maintenance.
- Coalescer plate pack removal is optional under normal operating conditions. Plate pack may be cleaned in place or removed from the separator for cleaning.
- Mechanical lifting equipment is required to remove the coalescer packs.
- All liquid must be removed from the OWS tank prior to entry.

If an emulsifying detergent is used in separator cleaning, removal of all remaining detergent is required and flushing with clean water is recommended. The use of CSI cleaner is recommended for this procedure. Consult your CSI representative for information regarding CSI cleaner.



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Although the OWS tank is designed for long-term trouble free operation, it still requires the following clean-out maintenance:

- Periodic inspection of any inlet strainers or dropout boxes.
- Periodic internal inspection to check for sand, trash, sludge and oil buildup.
- Effluent water inspection during or immediately after a heavy rainfall to check for oils or other contaminants.

Important: Inspection and Maintenance is recommended at the following times (whichever occurs first):

- Once per year.
- When the OWS tank bottom sludge is 12" deep.
- When the water contains high contaminant levels.

1. Liquid Removal

Oil Recovery Instructions (with optional oil level sensors)

- Minimize water contamination of the oil by connecting the oil suction hose to the tank 4" OIL OUT fitting.
- Suction out the oil.

Note: Be sure the pump-out alarm is activated due to a FULL OIL condition or an oily-water mix will be removed.

2. Oil Recovery Instructions (without optional oil level sensors)

- Determine where the oil/water interface is located using a gauge stick and oil/water sensing paste.
 - ? If the oil/water interface is below the published level in the Interface Level Chart (see page 3) for your diameter OWS tank, relatively clean oil will be removed first (following the instructions detailed above).
 - ? If the oil/water interface is above the published level in the Interface Level Chart, only an oily-water mix will be removed (following the instructions detailed above).
- Suction the oil by connecting the oil suction hose to the 4" OIL OUT fitting.

3. For Inlet Chamber Cleaning:

Never enter an OWS tank or enclosed space under any condition without proper training and O.S.H.A. approved equipment (Consult OSHA guidelines 29 CFR, Part 1910 "Permit Required Confined Spaces")



EXPLOSION

FIRE

Entering an UST without the use of a self contained oxygen supply may result in the inhalation of hazardous fumes resulting in headache, dizziness, nausea, loss of consciousness and death. Proper methods must be used to ventilate all enclosed spaces prior to entry to avoid ignition of flammable materials or vapors.

- Suction or squeegee out sludge and debris across the entire tank bottom
- Using a standard garden hose at normal pressure (40-70 psig), or a pressure washer with or without spray nozzle, loosen any caked oily solids.
- Direct the water stream to the OWS tank wall side, top and bottom (use of hot water is helpful).
- Suction or squeegee out the resultant slurry.
- Repeat as necessary until water appears relatively clean.

Note: Check the (optional) oil/water sensor for movement freedom. If the floats do not slide on the stem easily or have sludge on them, remove and clean the oil/water sensor.

4. Coalescer Pack Cleaning:

Important: The coalescer packs MAY BE removed for cleaning. Mechanical lifting equipment should be used to remove the coalescer packs.

- Undo bolts.
- Remove the manway lid.

WARNING: If your OWS has a steel manway lid, use mechanical lifting equipment to move lid.

- Remove compressor panels by sliding them out (cross flow models only). Disconnect take

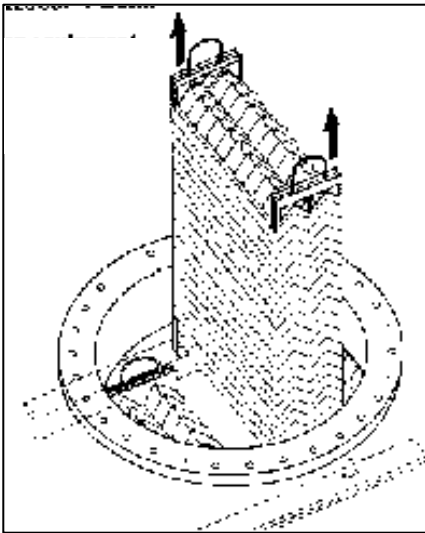
4. Coalescer Pack Cleaning (continued):

up turnbuckle assembly (on steel tanks unscrew rear lifting rod), tilt pack back away from bulkhead and lift (straight flow models).

- Remove the coalescer pack directly below the manway.

Important: Pay particular attention as to how the packs are installed / removed as they must be re-installed the same way.

- Slide the next coalescer pack over and remove. (This may require tank entry)
- Continue until all coalescer packs have been removed and are above grade.



Important: Do not disassemble coalescer packs

(In some cases, cleaning may be performed with coalescer packs in place using a spray wand)

- Using a standard garden hose at normal pressure (40-70 psig), or pressure washer with or without a spray nozzle, loosen any caked oil solids.
- Flush the coalescer packs from both sides.
- Attach a 1/4" to 1/2" diameter, 8' long-nozzled spray wand to the hose and insert in coalescer pack vertical holes and flush out any sludge.

Note: The coalescer packs must be cleaned of all sludge. A coating of oil does not affect their performance.

5. Effluent Chamber:

- Suction or squeegee out sludge and debris across entire tank bottom.

- Using a standard garden hose at normal pressure (40-70 psig), or pressure washer with or without a spray nozzle, loosen any caked oil solids.
- Direct the water stream to the OWS tank wall side, top and bottom (use of hot water is helpful).
- Suction or shovel out the resultant slurry. The use of steel/sharp objects inside tanks should be done with care not to damage the tank coating.
- Visually inspect the OWS tank interior, walls and components, inlet, separation and effluent chambers for any damage.

Note: If any visual damage exists, contact Containment Solutions Field Service for further instruction. (800-822-1997)

- Reinstall the coalescer packs.
- The coalescer packs MUST BE installed sitting on top of the bottom fiberglass or steel supports.

Note: Failure to properly install the coalescer packs may result in discharge water contamination.

Make sure all corrugated fiberglass expansion panels, flow bypass prevention tubing, and place pack take up turnbuckles are installed properly.

- Reattach the manway lid(s). Ensure the gasket(s) is damage free.

Refer to OWS Start-Up Instructions Pub. No. OWS 2013, for proper techniques for refilling and restarting the OWS tank.



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TROUBLESHOOTING GUIDE

Poor effluent quality or operating problems can be the result of many factors. The following is a guide to the most common problems, their possible causes and the suggested remedies.

PROBLEM	POSSIBLE CAUSE	REMEDY
Excessive oil concentration in discharge (effluent).	<p>Inlet flow pumped with centrifugal pump.</p> <p>Flow rates exceeding rated gallons per minute (causing oil droplets to emulsify more into the clean water).</p> <p>Presence of detergents or surfactants (causing chemical emulsification).</p> <p>Oil levels are greater than the rated storage capacity allowing separated oil to carry-over.</p> <p>Excessive fluid turbulence into OWS tank (causing more mechanical emulsifications).</p> <p>Presence of dissolved hydro-carbons.</p> <p>Presence of excessive solids into OWS tank, inside OWS tank or in effluent.</p> <p>Higher specific gravity oils than OWS tank was specified for, preventing oil droplets from coalescing in the plates.</p> <p>pH of clean water greater than 10 or less than 4 (causing chemical emulsifications).</p>	<p>Change to gravity flow or positive displacement type pump.</p> <p>Decrease flow to no greater than rated gpm.</p> <p>Clean and flush OWS, remove source of detergents. Use CSI cleaner in place of detergents.</p> <p>Remove oil. Refill with clean fresh water. Consider adding oil level sensor system to OWS.</p> <p>Check for trash in inlet piping. Completely open inlet piping valves.</p> <p>Remove source of dissolved hydro-carbon. Install secondary treatment.</p> <p>Remove source of solids from storm water drainage area and clean OWS tank.</p> <p>Decrease flow rate and/or remove source of high specific gravity oil.</p> <p>Remove sources of materials with pH under 4 or over 10.</p>
High suspended solids content in clean water effluent.	Excessive sludge or debris build-up.	Clean out separator.
Inlet piping vapor lock/inadequate system venting.	Closed inlet or effluent piping valves.	Open piping valves completely. Check to ensure inlet tee vent is properly vented.
Storm water back-up in drainage area.	Excessive solids in storm water drainage area.	Clean drop-out box inlet piping and water effluent piping.