

# Installation, Operation & Maintenance Manual

## “MAXISEP” Series

### Carbon & Stainless Steel Oil/Water Separator



Revised 10/28/2021

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## **1.0 General Description**

HydroFlo Tech. "MAXISEP" separators are gravity type - rectangular channel oil/water separators. This type of separator is excellent at removing gross free oil or similar floating products from wastewater streams. All HydroFlo Tech. "MAXISEP" Separators are suitably designed as end of pipe treatment or to protect other down stream treatment equipment.

## **2.0 Theory of Operation**

The basic concept used by most manufacturers of gravity type oil/water separators is that materials of different specific gravity will rise and settle at predictable rates. By using basic formulas as outlined in Stokes Law, we can predict the retention time necessary to separate oil of any specific gravity and droplet size from any given waste stream at the desired flow rate.

Given the proper Schamber dimensions these droplets break free and rapidly rise to the surface where they are skimmed or decanted.

## **3.0 Equipment Features**

### **3.1 Influent Diffusion Chamber**

The flow enters the separator submerged through an influent diffusion chamber. Dispersion across the depth and width of the "MAXISEP" is achieved through the use of a non-clog diffuser tube. Heavy solids that readily fall out of suspension are channeled to the sludge collection chamber.

### **3.2 Separation Chamber**

The separation chamber is sized per API-421 specifications and allows for adequate space before and after the chamber to prevent short circuiting.

### **3.3 Sludge Collection Chamber**

The sludge collection chamber is located directly beneath the separation chamber and provides ample storage capacity for the settled sludge. The sides of the chamber are sloped to insure easy and complete removal of the settled sludge.

### **3.4 Recovered Product Reservoir (Oil Trough)**

The recovered product storage reservoir (oil trough) is located adjacent to the oil skimming weir inside the separation chamber. Product removed from the waste stream collects in his trough for disposal.

### **3.5 Oil Skimming Weir**

The oil weir is located at the leading end of the oil trough and incorporates an adjustable oil skimming weir.

### **3.6 Effluent Chamber**

The aqueous phase leaving the separation chamber passes under the oil retention baffle and up over the effluent weir, which maintains the liquid level throughout the separator.

### **3.7 Removable Lids**

The entire separator is covered with a removable lid(s).

## 4.0 Performance Guarantee

The "MAXISEP" oil/water separator, has been designed for the possible expansion and inclusion of a coalescing media pak in the event that discharge limits and demands change. HYDROFLO TECH. guarantees that with the inclusion of the properly sized coalescing media that the effluent of its oil/water separator will contain less than 10 mg/l of oil droplets larger in diameter than stated in your formal proposal (usually 20 to 30 microns) when the following conditions are met:

1. The separator is installed, operated and maintained as specified in the HYDROFLO TECH. Installation, Operation and Maintenance Manual.
2. The designed influent flow rate is not exceeded.
3. The operating temperature is not lower than that specified in your formal proposal.
4. The specific gravity of the "water" is not lower than that specified in your formal proposal.
5. The specific gravity of the "oil" is not greater than that specified in your formal proposal.
6. No chemically or mechanically stable emulsions, chemical solutions or surfactants are introduced into the separator.
7. No oleophilic suspended solids are present that would cling to the oil droplets and carry them through the separator (i.e., solids with a specific gravity similar to that of water with oil attracting properties).
8. The sludge is removed on a regular basis in order to prevent the accumulated sludge from migrating up into the coalescing media and blinding out the pack.
9. The separated oil is removed on a regular basis and not allowed to accumulate in the separation chamber so as to reduce the coalescing area.

## 5.0 Warranty

HYDROFLO TECH. warrants its products to be free of defects in material or workmanship for a period of twelve months from shipment, when these products are operated in accordance with our written instructions and when installed properly. Equipment or accessories not manufactured by HYDROFLO TECH., but supplied by us, carry a full warranty supplied by the manufacturer. We will repair or replace any item which fails within the warranty period when it is returned freight prepaid to our nearest authorized service facility. All repaired or replacement equipment will be returned FOB factory. Damage, vibration, or excess wear caused by contact with foreign objects, highly corrosive, highly abrasive or high temperature solutions, or solutions with high levels of large suspended solids is not covered. This warranty is exclusive and in lieu of all other warranties, whether expressed or implied including any warranty of merchantability or fitness for a particular application. In no event will HYDROFLO TECH. be liable for any consequential, incidental, or other types of damages.

## 5.1 Return Policy

When a product must be returned, Hydro-Flo Technologies, Inc will issue a Return Authorization Form on which an authorized HydroFlo Tech. signature will appear. This form will be mailed, faxed or emailed to the customer and must accompany the returned item. No returns will be accepted without a completed Return Authorization Form.

A description of the reason for the return with a contact name and telephone number must be enclosed with the item.

All replacement parts will be treated as sales and an invoice will be issued to the customer. Upon our inspection of the return and our determination that the part is in fact defective, a credit will be issued. Should it be determined that the part failed due to improper handling by the customer, the customer will be liable for the cost of both the original and the replacement parts.

All shipping costs are the responsibility of the customer.

## 5.2 Back Charge Policy

HYDROFLO TECH. will not accept any back charges for changing, adjusting, servicing or any other work that has not received advanced written authorization. HYDROFLO TECH. will grant authorization for the changing, adjusting or servicing of this equipment only upon receiving proof that the equipment was not supplied as outlined by the quotation/submittal package.

## 5.3 Inspection

Thoroughly inspect all equipment upon arrival. If any items are missing or damaged, note this on the shipping papers and contact HYDROFLO TECH. immediately.

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## 5.4 Coatings

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The supplied unit is fabricated of 304 Stainless Steel and requires no additional coating.

## 6.0 Storage

If you are not ready to install the equipment upon arrival, store it in an area away from traffic. The ground should be level and free of any sharp objects that might damage the coatings. Store the equipment with all factory packing intact until ready for installation. Store the equipment indoors. If this is not possible make sure the equipment does not fill with water and debris. We recommend you cover the equipment with a tarp. Also, store any pumps and other buy-out items according to their manufacturer's recommendations.

## 7.0 Additional Information

For additional information on specific installation details contact your local HYDROFLO TECH. representative or contact HYDROFLO TECH. directly.

HydroFlo Tech.  
2560 Foxfield Rd. Suite 350  
St. Charles, IL 60174  
Phone: (630) 762-0380

## 8.0 Installation

Study the general arrangement drawing and make yourself familiar with all aspects of the installation, operation and maintenance of this equipment.

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## 8.1 Tools Required for Installation

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1. Masonry drill with masonry bit set for the installation of the equipment anchors (if applicable).
2. Standard socket set, wrench set and miscellaneous drift pins for the installation and adjustment of the effluent weir and removable lid sections (if applicable).
3. Carpenter's level for leveling width of separator.
4. OPTIONAL - Clear 3/8" or 1/2" tubing for leveling length of separator and weir plates.
5. OPTIONAL - Caulking gun for the caulking of the adjustable oil weir.

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## 8.2 Lifting the Separator

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Warning: Separator must be empty (no water) when lifted!

### ***DO NOT USE THE LUGS ON THE LID TO LIFT THE SEPARATOR***

All separators are designed to be lifted vertically and moved into place. Always lift the separator with the removable lid(s) bolted in place.

Attach lifting cables directly to all lifting eyes on the unit. Check load balance and readjust if required.

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## 8.2 Anchoring and Leveling of Equipment

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For the separator to operate correctly the unit must be level. Steps for anchoring and leveling of the equipment are as follows:

- Step 1. Make sure that the ground is free of any sharp objects that might damage the coating.
- Step 2. Set the tank in position on a level floor or pad. If the floor or pad is not level, use a good quality machinery grout to level the unit after drilling and installing the anchor bolts. Follow the grout manufacturer's instructions for shimming and grouting when leveling the separator.
- Step 3. Mark the anchor bolt locations.
- Step 4. Move the equipment aside and drill holes for the anchors of your choice. Install the anchor bolts per the manufacturer's recommendations. We recommend using, as a minimum, 3/4" diameter x 4" to 6" long embedment type anchor bolt. HYDROFLO TECH. does not supply the anchor bolts.  
  
Note: If grouting is required, the height the anchor bolts extends above the surface must be increased to compensate for the thickness of the grout layer.
- Step 5. Set the separator back in place.
- Step 6. Level the separator from side to side by placing a good quality level on top of the fixed effluent weir wall.
- Step 7. Level the separator from influent end to effluent end by using the clear tubing filled with water. Level the separator so that the water in the clear tubing on both ends is at the top of the flange radius. Check level at several points on each end.
- Step 8. Securely tighten anchor bolt nuts.

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## 8.3 Installation of Dyna-Pak Media Packs (OPTIONAL)

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The supplied "MAXISEP" oil/water separator requires no media.

In the event that discharge limits and demands change it may be desired to add coalescing media.

In such an event, follow these proper steps.

- Step 1. Remove separator lid(s).
- Step 2. Lower Dyna-Pak media pack(s) into place between pack positioning plates.
- Step 3. Repair any damaged coating. (Not applicable on stainless steel units)
- Step 4. Re-install separator lid(s) after installing and adjusting both weirs and water testing the installation.

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## 9.0 Plumbing

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When making plumbing connections to the separator, the plumbing must be properly supported to carry the weight of the plumbing when full of water. Damage caused to this equipment by improperly supported plumbing will void the warranty.

Connections do not have to be made in the order listed below. Review you situation and make the plumbing connections in the most logical order for your installation.

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## 9.1 Connect the Effluent Plumbing (Recommended Methods)

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Ideally, the influent plumbing should be the same size as the inlet nozzle size on the equipment with a straight run equal in length to a minimum of 5X the inlet nozzle diameter. As an alternative to the ideal inlet conditions you could alternatively provide inlet piping not less than 2 pipe sizes smaller than the inlet nozzle while using a concentric reducer (not an orifice type reducer) again for a minimum length of 5X pipe diameters. Use straight run inlets and avoid using elbows located directly in front of an oil water separator inlet as this might cause mechanical emulsification of the oil/water mixture before it enters the separator. Stream straighteners can be used if it's necessary to use elbows near the inlet nozzle. Other inlet conditions can be developed if required, contact Hydro-Flo Technologies, Inc. for further details on how to best design your inlet configuration.

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## 9.2 Connect the Effluent Plumbing

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The effluent plumbing must be the same size or larger than the nozzle size on the equipment. Do not reduce the size of the effluent piping as this might cause hydraulic overloading of the equipment. Also, try to run the discharge piping as short a distance as possible, through as few changes of direction as possible and at a pitch of not less than 1/16" per foot.

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## 9.3 Connect the Sludge Outlet Plumbing

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Connect a valve to the sludge draw-off flange and run a short length of pipe to a place where the sludge can be periodically decanted. When selecting a valve make sure that it is suitable for use with the type of sludge collected in your separator.

Plumb up all sludge draw off nozzles for best evacuation of accumulated sludge.

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## 9.4 Connect the Oil Outlet Plumbing

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Connect a valve to the oil outlet and run a short length of pipe to a place where the oil can be periodically decanted.

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## 9.5 Connect the Vent Plumbing

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Connect vent line to separator vent coupling(s). The vent removes any accumulated gases and/or odors from inside the separator.

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## 10.0 Start-Up Instructions

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### 10.1 Oil Weir Plate Adjustment

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- Step 1. Loosen all weir plate nuts.
- Step 2. Adjust the top surface of oil skimming weir plate approximately 1/4" above the top of the media pack. The weir plate must be level from end to end  $\pm 1/16"$ .
- Step 3. Tighten all weir plate nuts.
- Step 4. OPTIONAL - Apply bead of silicon sealant to top edge of weir plate wall where it contacts the adjustable weir plate.

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### 10.2 Effluent Weir Plate Adjustment

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- Step 1. Loosen weir plate nuts.
- Step 2. Establish the average maximum flow rate through the separator.
- Step 3. Look up the calculated effluent discharge head in the attached table.
- Step 4. Set the top surface of the effluent weir plate by adding 1/4" to the calculated discharge head (Section XX) and setting the height that distance BELOW the oil weir plate. The weir plate must be level from end to end  $\pm 1/16"$ .
- Step 5. Tighten weir plate nuts.

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## 10.3 Water Test

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- Step 1. Fill the tank with clean water until it begins to flow out of the effluent pipe.
- Step 2. REMOVED 5/1/17
- Step 3. Check for leaks at all piping connections.
- Step 4. Check the effluent weir making sure it is level with the water. Re-adjust if it is not within +/- 1/16" to the water level.
- Step 5. Allow the maximum rated flow to pass through the separator.
- Step 6. Check the water level at the oil weir during maximum flow. The water level should be 1/8" minimum to 1/4" maximum BELOW the weir top. Adjust the weir plate if required.
- Step 7. The separator is now ready for operation.

## 11.0 Shut-Down Instructions

- Step 1. Shutoff influent flow.
- Step 2. Drain sludge and water.
- Step 3. (If Supplied) Remove and clean Dyna-Pak media pack(s).
- Step 4. Clean and inspect interior of unit.
- Step 5. (If Supplied) Re-install Dyna-Pak media pack(s).

## 12.0 Maintenance

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### 12.1 Effluent Quality

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Regularly check the effluent quality of your separator. If you notice any loss in effluent quality, take steps to correct the situation immediately. Some areas to check if your effluent quality has deteriorated are:

- 1. Have you exceeded the separator's rated flow?
- 2. Has the operating temperature dropped below or risen above the specified limits?
- 3. Has the oil you are separating been changed to a different type?
- 4. Have any different chemicals or surfactants been added to the process that might be forming a chemically stable emulsion?
- 5. (If Supplied) Has the sludge collected to the point where it has begun to blind out the DYNA-PAK coalescing media?
- 6. Have you introduced an oil attracting suspended solid into the waste stream?
- 7. Are you pumping into the separator with a pump that is shearing the oil into a mechanical emulsion?
- 8. Contact HYDROFLO TECH. for any additional information.

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## 12.2 Maintenance Guidelines

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TASK	RECOMMENDED MAINTENANCE SCHEDULE
Screen accumulated sludge (rag layer) from surface of separation chamber	As needed.
(If Supplied) Remove and Clean Dyna-Pak media pack(s)	As needed or every 6 months.
Drain the separator and give it a thorough inspection inside and out. Repair any damaged coatings per the manufacturer's recommendations.	As needed or every 12 months.
Remove accumulated sludge from the sludge collection hoppers	As needed. Check the sludge sample ports frequently for accumulated sludge.

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## 12.3 Sludge Removal

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Please consult your local city and state regulatory agency regarding specific requirements on the proper disposal of the sludge generated in your process.

If you need help with the disposal or treatment of the collected sludge, please contact your local HYDROFLO TECH. representative.

Sludge removal is very important to the proper operation of your separator. Draw off the settled sludge regularly. Do not allow it to accumulate.

If left un-maintained, the sludge level will rise to a point where it will interfere with the operation of the "MAXISEP". Any settled sludge should be checked frequently and drawn off as required. This will prevent any major sludge related maintenance problems.

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## 12.4 Coating Maintenance

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NOT APPLICABLE ON STAINLESS STEEL UNITS

## 13.0 Calculated Discharge Head Tables

CALCULATED DISCHARGE HEAD TABLE									
Effluent weir length: 66.00 (Inches)									
GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head
0	0.000"	156	0.853"	312	1.354"	468	1.774"	624	2.150"
4	0.074"	160	0.868"	316	1.366"	472	1.784"	628	2.159"
8	0.118"	164	0.882"	320	1.377"	476	1.795"	632	2.168"
12	0.154"	168	0.896"	324	1.389"	480	1.805"	636	2.177"
16	0.187"	172	0.910"	328	1.400"	484	1.815"	640	2.186"
20	0.217"	176	0.924"	332	1.411"	488	1.825"	644	2.195"
24	0.245"	180	0.938"	336	1.423"	492	1.835"	648	2.204"
28	0.271"	184	0.952"	340	1.434"	496	1.844"	652	2.213"
32	0.297"	188	0.966"	344	1.445"	500	1.854"	656	2.222"
36	0.321"	192	0.980"	348	1.456"	504	1.864"	660	2.231"
40	0.344"	196	0.993"	352	1.468"	508	1.874"	664	2.240"
44	0.367"	200	1.007"	356	1.479"	512	1.884"	668	2.249"
48	0.389"	204	1.020"	360	1.490"	516	1.894"	672	2.258"
52	0.410"	208	1.033"	364	1.501"	520	1.904"	676	2.267"
56	0.431"	212	1.047"	368	1.512"	524	1.913"	680	2.276"
60	0.451"	216	1.060"	372	1.523"	528	1.923"	684	2.285"
64	0.471"	220	1.073"	376	1.533"	532	1.933"	688	2.294"
68	0.490"	224	1.086"	380	1.544"	536	1.942"	692	2.303"
72	0.509"	228	1.099"	384	1.555"	540	1.952"	696	2.312"
76	0.528"	232	1.111"	388	1.566"	544	1.962"	700	2.321"
80	0.547"	236	1.124"	392	1.577"	548	1.971"	704	2.330"
84	0.565"	240	1.137"	396	1.587"	552	1.981"	708	2.338"
88	0.582"	244	1.149"	400	1.598"	556	1.990"	712	2.347"
92	0.600"	248	1.162"	404	1.609"	560	2.000"	716	2.356"
96	0.617"	252	1.174"	408	1.619"	564	2.009"	720	2.365"
100	0.634"	256	1.187"	412	1.630"	568	2.019"	724	2.373"
104	0.651"	260	1.199"	416	1.640"	572	2.028"	728	2.382"
108	0.668"	264	1.211"	420	1.651"	576	2.038"	732	2.391"
112	0.684"	268	1.224"	424	1.661"	580	2.047"	736	2.400"
116	0.700"	272	1.236"	428	1.672"	584	2.057"	740	2.408"
120	0.716"	276	1.248"	432	1.682"	588	2.066"	744	2.417"
124	0.732"	280	1.260"	436	1.693"	592	2.075"	748	2.426"
128	0.748"	284	1.272"	440	1.703"	596	2.085"	752	2.434"
132	0.763"	288	1.284"	444	1.713"	600	2.094"	756	2.443"
136	0.778"	292	1.296"	448	1.723"	604	2.103"	760	2.451"
140	0.794"	296	1.307"	452	1.734"	608	2.113"	764	2.460"
144	0.809"	300	1.319"	456	1.744"	612	2.122"	768	2.469"
148	0.824"	304	1.331"	460	1.754"	616	2.131"	772	2.477"
152	0.838"	308	1.343"	464	1.764"	620	2.140"	776	2.486"