

HYDRO → FLO

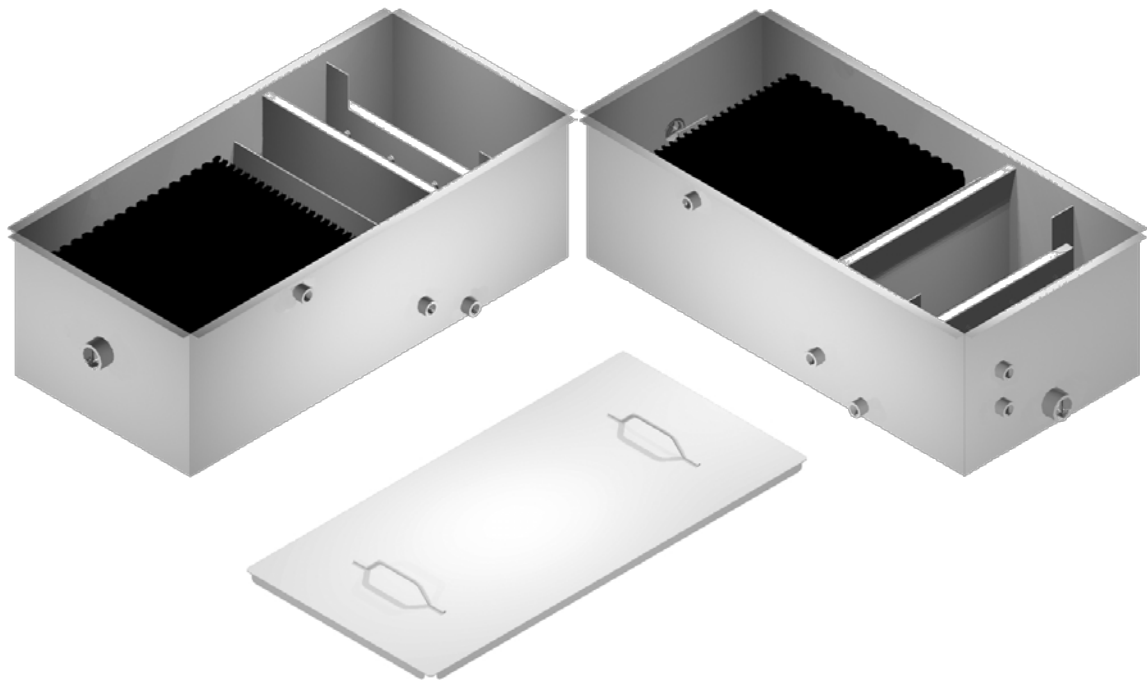
TECHNOLOGIES, INC.

— THE ART & SCIENCE OF WASTEWATER TREATMENT —

Installation, Operation & Maintenance Manual

EconoSep™ (ES) Series

Stainless Steel Oil/Water Separator



Revised 9/2015

TABLE OF CONTENTS

1.0 PREFACE	3
1.1 BACK CHARGE POLICY.....	3
1.2 INSPECTION	3
1.3 STORAGE.....	3
1.4 ADDITIONAL INFORMATION.....	3
1.5 TOOLS REQUIRED FOR INSTALLATION	3
2.0 PLACEMENT OF EQUIPMENT	4
3.0 PLUMBING	4
3.1 CONNECT THE EFFLUENT PLUMBING.....	4
3.2 CONNECT THE INFLUENT PLUMBING	4
3.3 CONNECT THE OIL OUTLET PLUMBING.....	4
3.4 CONNECT THE SLUDGE OUTLET PLUMBING	4
3.5 CONNECT THE DRAIN PLUMBING	4
3.6 CONNECT THE VENT.....	5
4.0 ADJUSTABLE EFFLUENT WEIR INSTALLATION	5
4.1 WEIR PLATE INSTALLATION	5
5.0 START-UP INSTRUCTIONS	5
5.1 EFFLUENT WEIR PLATE ADJUSTMENT	5
5.2 ALTERNATIVE “WET SET UP”	5
5.3 WATER TEST.....	6
6.0 SLUDGE REMOVAL	6
7.0 MAINTENANCE - EFFLUENT QUALITY	6
8.0 ANNUAL MAINTENANCE	7
9.0 PERFORMANCE GUARANTEE	7
10.0 CALCULATED DISCHARGE HEAD TABLES	8
10.1 CALCULATED DISCHARGE HEAD TABLE: ES002, ES004, ES008	8
10.2 CALCULATED DISCHARGE HEAD TABLE: ES012	9
10.3 CALCULATED DISCHARGE HEAD TABLE: ES016, ES024, ES036	10

1.0 Preface

The information found in this manual is based on years of experience with the installation, operation and maintenance of this type of equipment and is intended only as a guide. The methods that are available to you may require other, more appropriate procedures. The final responsibility for the installation, operation and maintenance of this equipment is held by you, the customer, and not by HYDRO-FLO TECHNOLOGIES, Inc.

1.1 Back Charge Policy

HYDRO-FLO TECHNOLOGIES, Inc. will not accept any back charges for changing, adjusting, servicing or any other work that has not received advanced written authorization. HYDRO-FLO TECHNOLOGIES, Inc. 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.

1.2 Inspection

Thoroughly inspect all equipment upon arrival. If any items are missing or damaged, note this on the shipping papers and contact HYDRO-FLO TECHNOLOGIES, Inc. immediately.

1.3 Storage

If you are not ready to install the equipment upon arrival, store it in an area away from traffic. 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.

1.4 Additional Information

For additional information on specific installation details contact your local HYDRO-FLO TECHNOLOGIES representative or contact HYDRO-FLO TECHNOLOGIES, Inc. directly.

1.5 Tools Required for Installation

1. Standard socket set or wrench set for 5/16" hardware for the installation and adjustment of the effluent weir.
2. Carpenter's level for the leveling of the adjustable effluent weir.
3. Caulking gun for the caulking of the adjustable effluent weir (OPTIONAL).

2.0 Placement of Equipment

Study the drawings and make yourself familiar with all aspects of the installation, operation and maintenance of this equipment. Steps for installation of the equipment are as follows:

1. Make sure that the ground is free of any sharp objects that might damage the tank.
2. Set the tank in position on a level floor or pad.
3. Verify piping runs and locations for pipe supports.

3.0 Plumbing

When making connections to the tank, do not use the equipment as a pipe support. All plumbing connections should stand on their own if disconnected from the equipment.

HYDRO-FLO TECHNOLOGIES, Inc. will not be held responsible for damage caused to this equipment by using it to support your plumbing. Connections do not have to be made in the order listed below. Review your situation and make the plumbing connections in the most logical order for your installation

3.1 Connect the Effluent Plumbing

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.

3.2 Connect the Influent Plumbing

The influent plumbing must be the same size as the nozzle size on the equipment for a minimum of 20 pipe diameters. Do not reduce the size of the influent piping as this might cause mechanical emulsification of the oil/water mixture before it enters the separator. Also, try to run the inlet 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.

3.3 Connect the Oil Outlet Plumbing

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

3.4 Connect the Sludge Outlet Plumbing

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

3.5 Connect the Drain Plumbing

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

3.6 Connect the Vent

Utilize the vent fitting on the sidewall of the tank for a system vent.

4.0 Adjustable Effluent Weir Installation

4.1 Weir Plate Installation

- Step 1. Remove separator lid.
- Step 2. Install the weir plate on the weir wall with the provided hardware (5/16" stainless steel).
- Step 3. Install 4" x 4" weir plate washers on weir plate side of tank.
- Step 4. Install 5/16" washers and nuts. Hand tighten nuts only.
- Step 5. If all plumbing is connected adjust weir plates or reinstall separator lid until weir plates can be adjusted.

5.0 Start-Up Instructions

5.1 Effluent Weir Plate Adjustment

- 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 (Located at the back of this manual).
- Step 4. Set the top surface of the effluent weir plate such that it is the distance of the calculated discharge head (see section 10) + 1/4", **below** the oil weir plate. The weir plate must be level from end to end $\pm 1/16"$.
- Step 5. Tighten weir plate nuts.

5.2 Alternative "Wet Set Up"

- Step 1. Set the effluent weir at its 1/2 way point. Make it level to the horizon with a bubble level to be sure the water flows evenly over its entire length.
- Step 2. Pump water thru the OWS at the intended process flow rate. This will establish the operating water level.
- Step 3. Now, with the separator operating at the actual operating water level adjust the effluent weir so that the level in the separation chamber is ~1/4" below the fixed oil weir.
- Step 4. Let the separator operate. Oil will gather on the surface and spill into the oil trough.

5.3 Water Test

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

6.0 Sludge Removal

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 HYDRO-FLO TECHNOLOGIES, Inc. 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 unmaintained, the sludge level will rise to a point where it will interfere with the operation of the Dyna-Pak. Any settled sludge should be drawn off at the beginning or end of each shift. This will prevent any major sludge related maintenance problems

7.0 Maintenance - Effluent Quality

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. 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 whipping the oil into a mechanically stable emulsion?

Contact HYDRO-FLO TECHNOLOGIES, Inc. for any additional information.

8.0 Annual Maintenance

NOTE: Drain the separator annually and give it a thorough inspection inside and out. Maintenance guidelines:

TASK	RECOMMENDED MAINTENANCE SCHEDULE
Screen accumulated sludge (rag layer) from surface of separation chamber	DAILY
Remove accumulated sludge from beneath the media pack and the bottom of the tank	AS REQUIRED. Visually check the tank for accumulated sludge.
Remove accumulated oil from surface of separator	DAILY

9.0 Performance Guarantee

HYDRO-FLO TECHNOLOGIES, Inc. guarantees that the effluent of its DYNA-PAK coalescing type oil/water separator will contain less than 10 mg/l of oil droplets larger in diameter than stated in our 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 HYDRO-FLO TECHNOLOGIES, Inc. 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.

10.0 Calculated Discharge Head Tables

10.1 Calculated Discharge Head Table: ES002, ES004, ES008

CALCULATED DISCHARGE HEAD TABLE									
Effluent weir length:		18.00		(Inches)					
GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head
0	0.000"	39	0.805"	78	1.278"	117	1.674"	156	2.028"
1	0.070"	40	0.819"	79	1.289"	118	1.684"	157	2.037"
2	0.111"	41	0.832"	80	1.300"	119	1.693"	158	2.046"
3	0.146"	42	0.846"	81	1.310"	120	1.703"	159	2.054"
4	0.176"	43	0.859"	82	1.321"	121	1.712"	160	2.063"
5	0.205"	44	0.872"	83	1.332"	122	1.722"	161	2.071"
6	0.231"	45	0.886"	84	1.343"	123	1.731"	162	2.080"
7	0.256"	46	0.899"	85	1.353"	124	1.741"	163	2.089"
8	0.280"	47	0.912"	86	1.364"	125	1.750"	164	2.097"
9	0.303"	48	0.924"	87	1.374"	126	1.759"	165	2.106"
10	0.325"	49	0.937"	88	1.385"	127	1.768"	166	2.114"
11	0.346"	50	0.950"	89	1.395"	128	1.778"	167	2.123"
12	0.367"	51	0.963"	90	1.406"	129	1.787"	168	2.131"
13	0.387"	52	0.975"	91	1.416"	130	1.796"	169	2.140"
14	0.407"	53	0.988"	92	1.426"	131	1.805"	170	2.148"
15	0.426"	54	1.000"	93	1.437"	132	1.815"	171	2.156"
16	0.444"	55	1.012"	94	1.447"	133	1.824"	172	2.165"
17	0.463"	56	1.025"	95	1.457"	134	1.833"	173	2.173"
18	0.481"	57	1.037"	96	1.468"	135	1.842"	174	2.182"
19	0.498"	58	1.049"	97	1.478"	136	1.851"	175	2.190"
20	0.516"	59	1.061"	98	1.488"	137	1.860"	176	2.198"
21	0.533"	60	1.073"	99	1.498"	138	1.869"	177	2.207"
22	0.550"	61	1.085"	100	1.508"	139	1.878"	178	2.215"
23	0.566"	62	1.096"	101	1.518"	140	1.887"	179	2.223"
24	0.582"	63	1.108"	102	1.528"	141	1.896"	180	2.231"
25	0.598"	64	1.120"	103	1.538"	142	1.905"	181	2.240"
26	0.614"	65	1.132"	104	1.548"	143	1.914"	182	2.248"
27	0.630"	66	1.143"	105	1.558"	144	1.923"	183	2.256"
28	0.645"	67	1.155"	106	1.568"	145	1.932"	184	2.264"
29	0.661"	68	1.166"	107	1.578"	146	1.941"	185	2.273"
30	0.676"	69	1.178"	108	1.587"	147	1.950"	186	2.281"
31	0.691"	70	1.189"	109	1.597"	148	1.958"	187	2.289"
32	0.706"	71	1.200"	110	1.607"	149	1.967"	188	2.297"
33	0.720"	72	1.211"	111	1.617"	150	1.976"	189	2.305"
34	0.735"	73	1.223"	112	1.626"	151	1.985"	190	2.313"
35	0.749"	74	1.234"	113	1.636"	152	1.994"	191	2.321"
36	0.763"	75	1.245"	114	1.646"	153	2.002"	192	2.330"
37	0.777"	76	1.256"	115	1.655"	154	2.011"	193	2.338"
38	0.791"	77	1.267"	116	1.665"	155	2.020"	194	2.346"

10.2 Calculated Discharge Head Table: ES012

CALCULATED DISCHARGE HEAD TABLE									
Effluent weir length:		30.00		(Inches)					
GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head
0	0.000"	39	0.573"	78	0.909"	117	1.191"	156	1.443"
1	0.050"	40	0.582"	79	0.917"	118	1.198"	157	1.449"
2	0.079"	41	0.592"	80	0.924"	119	1.205"	158	1.455"
3	0.104"	42	0.602"	81	0.932"	120	1.211"	159	1.461"
4	0.125"	43	0.611"	82	0.940"	121	1.218"	160	1.468"
5	0.146"	44	0.621"	83	0.947"	122	1.225"	161	1.474"
6	0.164"	45	0.630"	84	0.955"	123	1.232"	162	1.480"
7	0.182"	46	0.639"	85	0.963"	124	1.238"	163	1.486"
8	0.199"	47	0.648"	86	0.970"	125	1.245"	164	1.492"
9	0.215"	48	0.658"	87	0.978"	126	1.251"	165	1.498"
10	0.231"	49	0.667"	88	0.985"	127	1.258"	166	1.504"
11	0.246"	50	0.676"	89	0.993"	128	1.265"	167	1.510"
12	0.261"	51	0.685"	90	1.000"	129	1.271"	168	1.516"
13	0.275"	52	0.694"	91	1.007"	130	1.278"	169	1.522"
14	0.289"	53	0.703"	92	1.015"	131	1.284"	170	1.528"
15	0.303"	54	0.711"	93	1.022"	132	1.291"	171	1.534"
16	0.316"	55	0.720"	94	1.029"	133	1.297"	172	1.540"
17	0.329"	56	0.729"	95	1.037"	134	1.304"	173	1.546"
18	0.342"	57	0.737"	96	1.044"	135	1.310"	174	1.552"
19	0.355"	58	0.746"	97	1.051"	136	1.317"	175	1.558"
20	0.367"	59	0.755"	98	1.058"	137	1.323"	176	1.564"
21	0.379"	60	0.763"	99	1.066"	138	1.330"	177	1.570"
22	0.391"	61	0.772"	100	1.073"	139	1.336"	178	1.576"
23	0.403"	62	0.780"	101	1.080"	140	1.343"	179	1.582"
24	0.414"	63	0.788"	102	1.087"	141	1.349"	180	1.587"
25	0.426"	64	0.797"	103	1.094"	142	1.355"	181	1.593"
26	0.437"	65	0.805"	104	1.101"	143	1.362"	182	1.599"
27	0.448"	66	0.813"	105	1.108"	144	1.368"	183	1.605"
28	0.459"	67	0.821"	106	1.115"	145	1.374"	184	1.611"
29	0.470"	68	0.830"	107	1.122"	146	1.381"	185	1.617"
30	0.481"	69	0.838"	108	1.129"	147	1.387"	186	1.622"
31	0.491"	70	0.846"	109	1.136"	148	1.393"	187	1.628"
32	0.502"	71	0.854"	110	1.143"	149	1.399"	188	1.634"
33	0.512"	72	0.862"	111	1.150"	150	1.406"	189	1.640"
34	0.523"	73	0.870"	112	1.157"	151	1.412"	190	1.646"
35	0.533"	74	0.878"	113	1.164"	152	1.418"	191	1.651"
36	0.543"	75	0.886"	114	1.171"	153	1.424"	192	1.657"
37	0.553"	76	0.893"	115	1.178"	154	1.431"	193	1.663"
38	0.563"	77	0.901"	116	1.184"	155	1.437"	194	1.669"

10.3 Calculated Discharge Head Table: ES016, ES024, ES036

CALCULATED DISCHARGE HEAD TABLE									
Effluent weir length:		42.00		(Inches)					
GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head	GPM	Calculated Head
0	0.000"	39	0.458"	78	0.726"	117	0.952"	156	1.153"
1	0.040"	40	0.465"	79	0.733"	118	0.957"	157	1.158"
2	0.063"	41	0.473"	80	0.739"	119	0.963"	158	1.163"
3	0.083"	42	0.481"	81	0.745"	120	0.968"	159	1.168"
4	0.100"	43	0.488"	82	0.751"	121	0.973"	160	1.173"
5	0.116"	44	0.496"	83	0.757"	122	0.979"	161	1.178"
6	0.131"	45	0.503"	84	0.763"	123	0.984"	162	1.182"
7	0.146"	46	0.511"	85	0.769"	124	0.989"	163	1.187"
8	0.159"	47	0.518"	86	0.775"	125	0.995"	164	1.192"
9	0.172"	48	0.526"	87	0.781"	126	1.000"	165	1.197"
10	0.185"	49	0.533"	88	0.787"	127	1.005"	166	1.202"
11	0.197"	50	0.540"	89	0.793"	128	1.011"	167	1.207"
12	0.209"	51	0.547"	90	0.799"	129	1.016"	168	1.211"
13	0.220"	52	0.554"	91	0.805"	130	1.021"	169	1.216"
14	0.231"	53	0.561"	92	0.811"	131	1.026"	170	1.221"
15	0.242"	54	0.568"	93	0.817"	132	1.031"	171	1.226"
16	0.253"	55	0.575"	94	0.823"	133	1.037"	172	1.231"
17	0.263"	56	0.582"	95	0.828"	134	1.042"	173	1.235"
18	0.273"	57	0.589"	96	0.834"	135	1.047"	174	1.240"
19	0.283"	58	0.596"	97	0.840"	136	1.052"	175	1.245"
20	0.293"	59	0.603"	98	0.846"	137	1.057"	176	1.250"
21	0.303"	60	0.610"	99	0.851"	138	1.063"	177	1.254"
22	0.312"	61	0.617"	100	0.857"	139	1.068"	178	1.259"
23	0.322"	62	0.623"	101	0.863"	140	1.073"	179	1.264"
24	0.331"	63	0.630"	102	0.869"	141	1.078"	180	1.268"
25	0.340"	64	0.637"	103	0.874"	142	1.083"	181	1.273"
26	0.349"	65	0.643"	104	0.880"	143	1.088"	182	1.278"
27	0.358"	66	0.650"	105	0.886"	144	1.093"	183	1.282"
28	0.367"	67	0.656"	106	0.891"	145	1.098"	184	1.287"
29	0.376"	68	0.663"	107	0.897"	146	1.103"	185	1.292"
30	0.384"	69	0.669"	108	0.902"	147	1.108"	186	1.296"
31	0.393"	70	0.676"	109	0.908"	148	1.113"	187	1.301"
32	0.401"	71	0.682"	110	0.913"	149	1.118"	188	1.306"
33	0.409"	72	0.689"	111	0.919"	150	1.123"	189	1.310"
34	0.418"	73	0.695"	112	0.924"	151	1.128"	190	1.315"
35	0.426"	74	0.701"	113	0.930"	152	1.133"	191	1.320"
36	0.434"	75	0.708"	114	0.935"	153	1.138"	192	1.324"
37	0.442"	76	0.714"	115	0.941"	154	1.143"	193	1.329"
38	0.450"	77	0.720"	116	0.946"	155	1.148"	194	1.333"