Maine Center for Disease Control and Prevention
An Office of the Department of Health and Human Services
Paul R. LePage, Governor Mary C. Mayhew, Commissioner

Department of Health and Human Services
Maine Center for Disease Control and Prevention
286 Water Street
11 State House Station
Augusta, Maine 04333-0011
Tel.: (207) 287-8016; Fax: (207) 287-9058
TTY Users: Dial 711 (Maine Relay)

Tel. (207) 287-5672 Subsurface Wastewater Unit Fax (207) 287-4172

August 19, 2013

NORWECO, Inc.
Attn.: Annette Simon
220 Republic Street
Norwalk, OH 44857

Subject: Product Registration, NORWECO Hydro-Kinetic Model 600 FEU

Dear Ms. Simon:

The Division of Environmental Health has completed a review of a registration application for the subject products. This information was submitted pursuant to Section 6.HH of the Subsurface Wastewater Disposal Rules for registration for use in Maine.

The NORWECO Hydro-Kinetic Model 600 FEU consists of a recirculating multiple tank system which incorporates primary, anoxic, and aerobic treatment followed by clarification and recirculation. The treatment tanks are followed by a separate tank containing the NORWECO Hydro-Kinetic FEU filter.

According to the information you provided, the NORWECO Hydro-Kinetic Model 600 FEU has been certified by the National Sanitation Foundation (NSF) pursuant to ANSI/NSF Standard 40 for residential wastewater treatment systems and Standard 245 for nitrogen reduction.

On the basis of the information, the Division has determined that the NORWECO Hydro-Kinetic Model 600 FEU is acceptable for use in the State of Maine, provided that it is installed, operated, and maintained in conformance with the manufacturer's directions.

Because installation and owner maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of NORWECO Hydro-Kinetic Model 600 FEU. Further, registration of this product for use in the State of Maine does not represent Division preference or recommendation for this product over similar or competing products.

If you have any questions please feel free to contact me at (207) 287-5695.

Sincerely,

James A. Jacobsen

James A. Jacobsen
Project Manager, Webmaster
Division of Environmental Health
Drinking Water Program
Subsurface Wastewater Unit
e-mail: james.jacobsen@maine.gov

/jaj

xc: Product File

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APPLICATION FOR REGISTRATION OF EXPERIMENTAL SYSTEM/INNOVATIVE TECHNOLOGY OR ONSITE SEWAGE DISPOSAL SYSTEM PRODUCT

RECEIVED
AUG 12 2013

Please complete the following Sections. Please print or type.

Applicant

Company Name: NORWECO, INC.
Contact Person: Ms. Annette Simon
Address: 220 Republic Street
Town/City: Norwalk State/Province: OH Zip Code: 44857
Country: U.S.A.
Telephone: (419) 668-4471 e-mail: asimon@norweco.com

Product

Product Name: Norweco Hydro-Kinetic Model 600 FEU Wastewater Treatment System
Model: Model 600 FEU

Product Classification (choose one)

Primary or Secondary Treatment Unit

[ ] Septic Tank [ ] Extended Aerobic Treatment Unit [x] Recirculating Aerobic Unit

[ ] Aerobic Fixed Film Unit [ ] Other (specify) _____

Effluent Filter

[ ] Septic Tank Outlet Filter [ ] Post-Tank Filter [ ] Other (specify) _____

Disposal Device

[ ] Gravel-less Disposal Pipe [ ] Gravel-less Disposal Bed [ ] Chamber, Plastic

[ ] Chamber, Other [ ] Other (specify) _____

Miscellaneous

[ ] Pipe [ ] Effluent Flow Distribution Device [ ] Other (specify) _____

Claim

Describe the product's features (attach additional sheets if necessary).

The Hydro-Kinetic system features innovative nitrification-denitrification technology. The system quietly, efficiently and automatically pretreats, aerates, flow equalizes and filters all wastewater returning only the purest effluent back to the receiving environment. All treatment processes are managed by reliable components and user friendly controls. The integrity of the treatment process is protected by our patented non-mechanical, demand use flow equalization device, as well as our revolutionary Hydro-Kinetic filter. The Hydro-Kinetic system will reliably protect the residents of Maine, their property and the environment.

Describe the product's performance (attach additional sheets if necessary).

During its successful completion of both NSF/ANSI Standard 40 and 245 tests, the Hydro-Kinetic Model 600 FEU wastewater treatment system became the only NSF/ANSI Standard 40 and 245 certified residential wastewater treatment system to pass two consecutive back-to-back tests without performing routine maintenance for a full 12 months and achieved unmatched effluent results of 2.0 mg/L CBOD, 2.0 mg/L TSS and 7.9 mg/L TN. Based on the product's performance, Norweco, Inc. requests product approval with 12 month service intervals. Enclosed are the NSF reports that document these results.

Has the product received National Sanitation Foundation or Canadian Standards Authority approval?

[ ] No [☑] Yes (If "yes", enclose a copy of the certification.)

IMPORTANT NOTE!

Don't forget to enclose relevant product literature, engineering specifications, studies, and third party certifications with this application.

I, Annette Simon, am the [☑] applicant [ ] agent for the applicant of the subject product.
(print name)

I state that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department to deny registration for use of the product in Maine.

Annette Simon — August 6, 2013

[☑] Signature of Applicant — Date
[ ] Signature of Agent for Applicant

norweco®
Engineering the future of water and wastewater treatment

220 Republic Street
Norwalk, OH, U.S.A. 44857-1156
P 419.668.4471 F 419.663.5440
www.norweco.com

August 6, 2013

Mr. James Jacobsen, Project Manager, Webmaster
Division of Environmental Health, Drinking Water Program
Subsurface Wastewater Unit
286 Water Street
Augusta, ME 04333

Dear Mr. Jacobsen,

Norweco, Inc. is pleased to announce NSF International's listing of the Hydro-Kinetic® Model 600 FEU residential wastewater treatment system under NSF/ANSI Standards 40 and 245. The purpose of this letter is to provide you with information about the Hydro-Kinetic® system, including NSF Standard 40 and 245 test reports. With this information, we request your department's approval for the sale and installation of Hydro-Kinetic® systems throughout the State of Maine.

The Hydro-Kinetic® Model 600 FEU system is a two or three tank treatment unit available in concrete tankage. The treatment train includes pretreatment, anoxic, aeration, clarification and effluent filtration chambers. The system makes use of gravity flow with internal time dosed effluent from the clarification chamber to the anoxic chamber. The effluent recirculation facilitates system denitrification. Air is delivered into the aeration chamber with an air pump, diffuser drop line and diffuser bar. The two tank configuration consists of a four chamber monolithic tank that includes pretreatment, anoxic, aeration and clarification chambers. This tank is followed by a separate Hydro-Kinetic® filter chamber. The three tank configuration includes a separate pretreatment chamber followed by a monolithic tank that includes anoxic, aeration and clarification chambers. This tank is followed by a separate Hydro-Kinetic® filter chamber.

The Hydro-Kinetic® filter tank is the final step in the treatment process. Its design includes an influent chamber and a proprietary filter medium that helps reduce BOD and TSS to very low levels prior to discharge and insures exceptional treatment performance.

The Hydro-Kinetic® treatment system is the only NSF/ANSI Standard 40 and 245 certified residential wastewater treatment system to pass two consecutive back-to-back tests without performing routine maintenance for a full 12 months. If that isn't impressive enough, the Hydro-Kinetic® system also produced incredible effluent results for the entire 12 month period: 2 mg/L CBOD, 2 mg/L TSS and 7.9 mg/L Total Nitrogen. Based on the system performance testing results, we wish to seek approval to service the system every 12 months. Enclosed are the NSF Final and Supplemental Reports that document these results.

Thank you for your time and consideration in evaluating the Hydro-Kinetic® system. We hope that Norweco's new Hydro-Kinetic® system is a valuable new treatment system which will be a benefit to your regulatory efforts and the homeowners in your state. Please contact me if I can provide any further assistance or information.

Sincerely,

Norweco, Inc.
Annette Simon

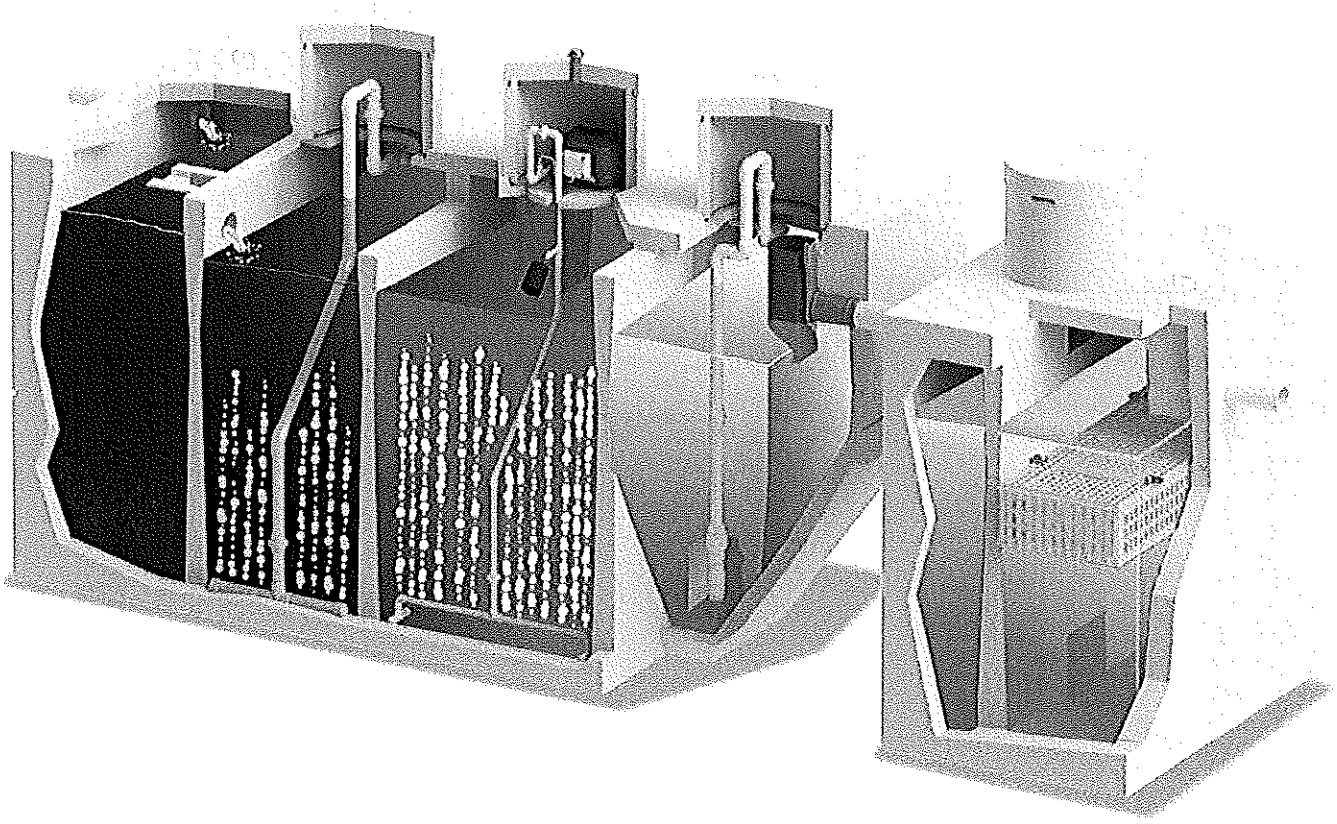
Annette Simon

Enclosures:
- Application for Registration
- Hydro-Kinetic® NSF/ANSI NSF Standard 40 Final Report
- Hydro-Kinetic® NSF/ANSI NSF Standard 40 Supplemental Report, 12-month Evaluation
- Hydro-Kinetic® NSF/ANSI NSF Standard 245 Final Report
- Hydro-Kinetic® NSF/ANSI NSF Standard 245 Supplemental Report, 12-month Evaluation
- Hydro-Kinetic® Owner's Manual
- Hydro-Kinetic® Specifications
- Hydro-Kinetic® Installation and Operation Manual
- Hydro-Kinetic® Drawing
- Hydro-Kinetic® Brochure
- Hydro-Kinetic® Warranty

norweco®

HYDRO-KINETIC®

WASTEWATER TREATMENT SYSTEM
MODEL 600 FEU



INSTALLATION AND OPERATION MANUAL

Hydro-Kinetic® Installation and Operation Instructions

Before You Start

Installation procedures, equipment and personnel should always comply with applicable safety regulations as well as all federal, state and local codes. The Hydro-Kinetic system must be installed according to these instructions to insure safe, reliable and efficient operation. The system must be installed by an authorized representative of Norweco. Carefully unpack and inspect the Hydro-Kinetic system components. Make sure you have received all components in good condition. Read all instructions before beginning installation.

The Hydro-Kinetic system components include:

1. Service Pro Model 801P Control Center
2. Model A100 Air Pump (with power wire junction box)
3. Alarm Float (with alarm wire junction box)
4. Flow Equalization Device
5. Primary Recirculation Assembly
6. Model SD103 Recirculation Pump
7. Intermediate Recirculation Assembly
8. Diffuser
9. Mixing Bar
10. Mixing Bar Drop Pipe Assembly
11. Diffuser Drop Pipe Assembly
12. Primary Air Assembly

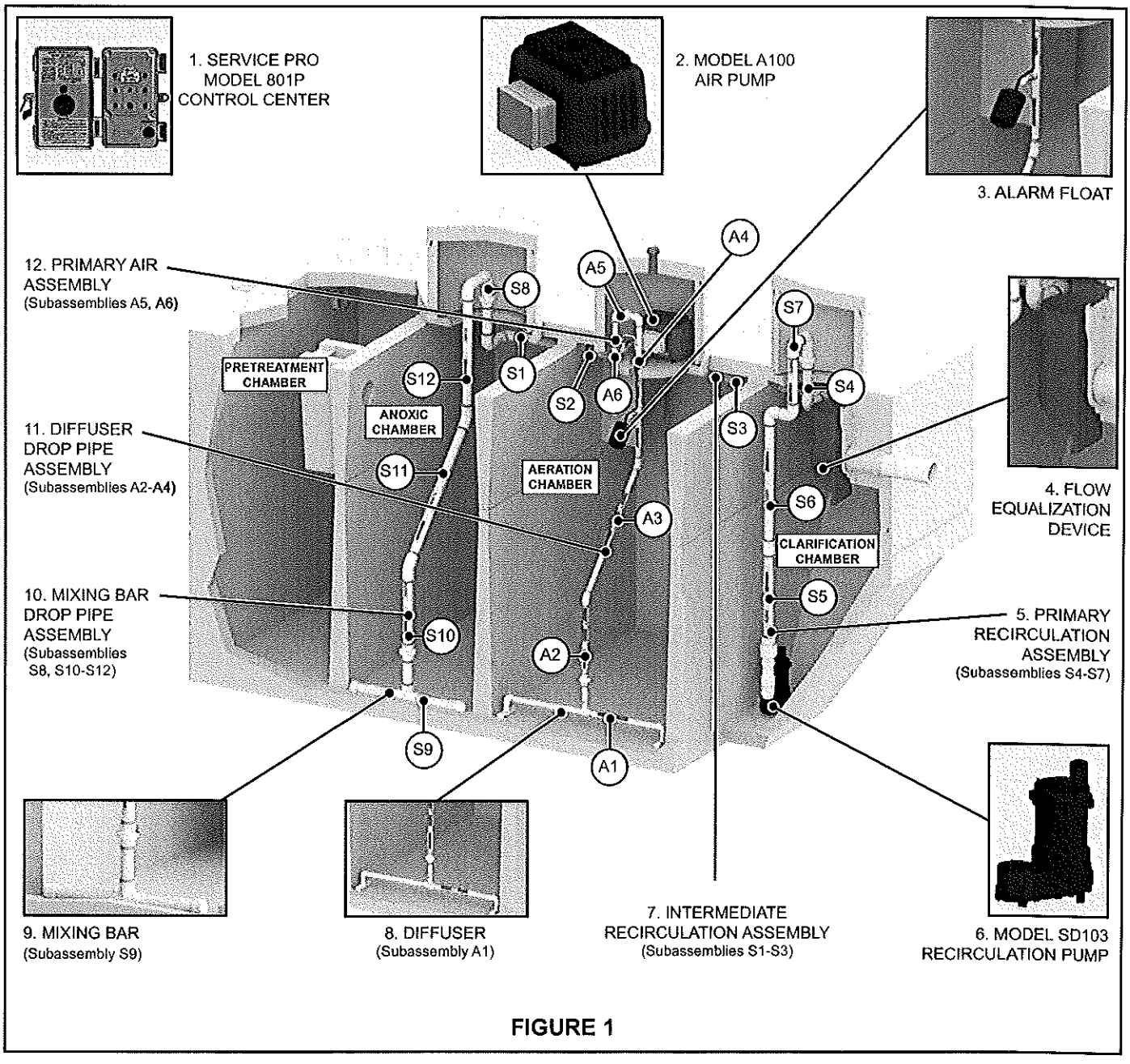


FIGURE 1

Pre-Delivery Tank Preparation

The Hydro-Kinetic tank equipment package contains some components that are cast-in the tank during the manufacturing process, and other components that are installed after the casting process is complete. In the standard two-piece tank, the only component that needs to be installed prior to delivery is the intermediate recirculation assembly. In a one-piece tank, the distributor will need to provide a pretreatment outlet tee, an aeration chamber inlet elbow and a Hydro-Kinetic filter outlet tee. Norweco recommends assembling all of these components, as well as the Kinetic Bio-Film reactors, before the tank is delivered to the installation site. Install components according to the following steps:

1. For a one-piece tank, solvent weld the 4" Schedule 40 PVC pretreatment outlet tee to the coupling that was cast-in the outlet of the pretreatment chamber (distributor to provide). Solvent weld the 4" Schedule 40 PVC aeration chamber transfer elbow into the coupling cast-in the inlet of the aeration chamber (distributor to provide).

2. For all systems, begin in the anoxic chamber and solvent weld subassembly S1 into the coupling that was cast-in the wall between the anoxic and aeration chambers. The elbow should be oriented as shown in Figure 2, with the short stub of pipe parallel to the floor and ceiling of the tank.

3. Solvent weld subassembly S2 into the aeration chamber side of the same cast-in coupling. See Figure 2.

4. Starting in the aeration chamber, pass subassembly S3 through the wall into the clarification chamber. Solvent weld the coupling on subassembly S2 to subassembly S3. See Figure 2.

5. Place both Kinetic Bio-Film reactors into the Hydro-Kinetic filter. They will rest on the support rib cast into the outlet chamber. The Kinetic Bio-Film reactors should be installed with the media service hatch oriented toward the middle of the tank and facing up. See Figure 3.

6. Using the universal tool, rotate the two round lugs clockwise on each Kinetic Bio-Film reactor so that they lock into the recesses cast into the tank.

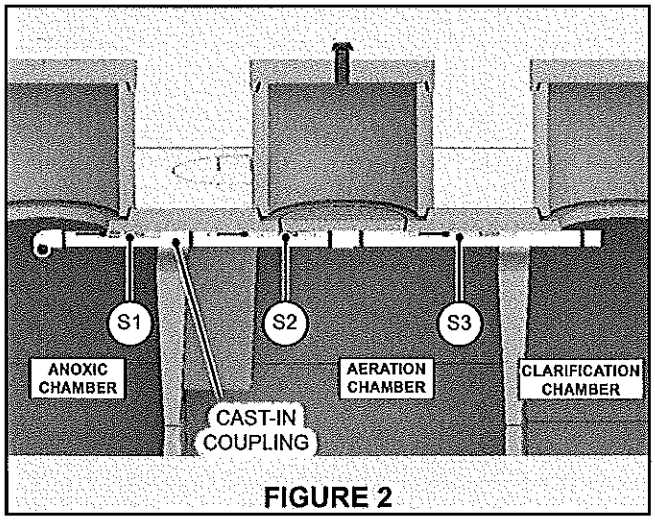


FIGURE 2

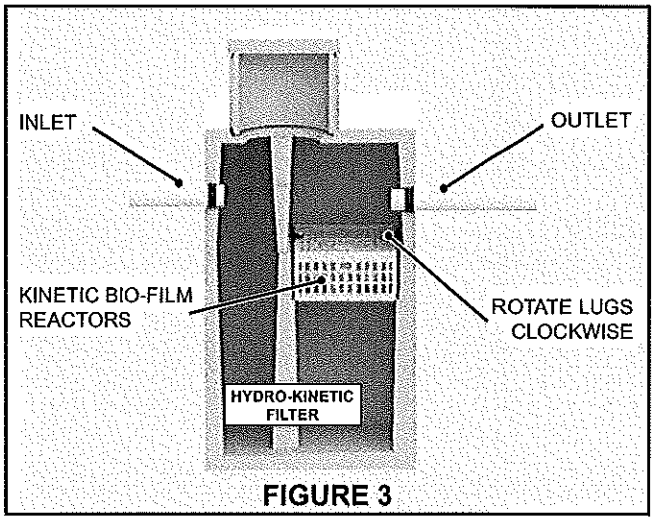


FIGURE 3

Tank Delivery and Setting

1. When installing a Hydro-Kinetic system, first check the length, width and depth of the excavation. If installing a Model 600 FEU system, insure the excavation is long enough to allow at least 2' between the treatment tank and the Hydro-Kinetic filter for installation of the interconnect plumbing and backfill between the tanks. Cut a 4" Schedule 40 PVC pipe (distributor to provide) 6" longer than the distance between the tanks for the interconnect plumbing. Insert the interconnect pipe into the inlet of the Hydro-Kinetic filter prior to tank placement. This allows the interconnect pipe to be backed straight out, and solvent welded into the cast-in outlet coupling of the clarification chamber when the tank is set. The excavation should have sufficient overdig to allow for a minimum of 6" clearance around the entire perimeter of the system. Additional overdig will be required on deep installations or where unstable soil conditions exist. Safe working conditions must be established and maintained during the entire installation procedure.

2. Prepare the excavation to the appropriate depth based on the elevation of the building sewer line. Allow ⅛" of fall per foot from the building to the system. Fall through the Model 600 system is 4" from inlet invert to outlet invert. In the Model 600 FEU that includes the Hydro-Kinetic filter, fall through the system is 5" from inlet invert to outlet invert. Therefore, the outlet line from the system must be installed either 4" or 5" lower than the inlet sewer line. The bottom of the excavation must be level and smooth. A 4" layer of gravel, sand or fine crushed stone should be installed and leveled to within ¼" from side to side and end to end.

3. Using extreme caution, place the treatment tank into the excavation. If installing a Model 600 FEU system, place the Hydro-Kinetic filter in the excavation allowing at least 2' between the treatment tank and the Hydro-Kinetic filter. Insure tanks are installed square and level.

4. Connect the building sewer line to the pretreatment chamber inlet. The inlet line must be laid continuously and unspliced from the tank to undisturbed earth beyond the limits of the tank excavation.

5. If installing a Model 600, connect the discharge sewer line to the tank outlet coupling continuously and unspliced from the tank to undisturbed earth beyond the limits of the tank excavation. Solvent weld the discharge sewer line to the tank outlet coupling.

6. If installing a Model 600 FEU, back the interconnect pipe out of the Hydro-Kinetic filter and solvent weld the pipe to the outlet coupling of the clarification chamber. Then, connect the discharge sewer line to the Hydro-Kinetic filter outlet continuously and unspliced from the tank to undisturbed earth beyond the limits of the tank excavation. If using a one-piece tank, insert discharge sewer line through tank outlet seal, leaving 4" to 6" protruding inside the tank. Solvent weld the 4" Schedule 40 PVC outlet tee (distributor to provide) to the discharge sewer line.

7. Install risers as required to bring the access covers to grade.

Plant Wiring and Control Center Installation

1. Electrical work must be performed in accordance with the latest edition of the National Electrical Code as well as applicable local codes.

2. All electrical service cable used with the Hydro-Kinetic system must be UL and CSA approved, type UF, #14/2 AWG minimum and must have a full-size center ground. Larger cable is required if the length of the underground service is greater than 80 feet. Consult your electrician for details.

3. An approved cable must be installed from the air pump to the junction box provided for connection to the control center. If installing the air pump in a location other than the aeration chamber riser, insure the air line is no more than 75' in length and the air pump is protected from the elements in a clean, dry, well-ventilated area and proceed to step 6.

4. Inspect the power cable entrance in the side of the aeration riser. Remove any sharp edges or flash. Insert the free end of the power cable through a pre-formed ½" conduit ell (2' by 1'), then into the power cable entrance of the aeration riser. Guide the power cable into the riser. Pull enough cable through the riser to reach 36" above the riser top. Coil and secure the cable in the aeration riser so that it will not hang down into the tank.

5. Lay the conduit ell with cable directly across the top and down the tank side. Do not allow the power cable to be laid across the end of the tank or any removable access cover. Seal the connection between the conduit and the aeration riser with mortar or approved sealant.

6. A second underground cable must be installed unspliced from the Service Pro control center into the clarification chamber riser to supply power to the recirculation pump.

7. Inspect the power cable entrance in the side of the concrete clarification riser. Remove any sharp edges or flash. Insert the free end of the power cable through a pre-formed ½" conduit ell (2' by 1'), then into the power cable entrance of the clarification riser. Guide the power cable into the riser. Pull enough cable through the riser to reach 36" above the riser top. Coil and secure the cable in the clarification riser so that it will not hang down into the tank.

8. Lay the conduit ell with cable directly across the top and down the tank side. Do not allow the power cable to be laid across the end of the tank or any removable access cover. Seal the connection between the conduit and the clarification riser with mortar or approved sealant.

9. Two alarm leads must be installed from the air pump pressure switch to the Service Pro control center. The alarm leads should be #16 AWG minimum and installed in conduit where contact with concrete may occur. IMPORTANT: Alarm leads and power leads must always be installed in separate conduits.

10. Two alarm leads must be installed from the high water float switch to the Service Pro control center. The alarm leads should be #16 AWG minimum and installed in conduit where contact with concrete may occur. IMPORTANT: Alarm leads and power leads must always be installed in separate conduits. If the air pump will be installed in the aeration riser, the high water and air pump alarm leads should be installed in the same conduit. Properly seal the conduit opening in the riser with mortar or approved sealant.

11. Check the excavation and sewer line trenches to be sure they are free of debris, rocks, and any sharp or abrasive objects that could damage electrical cables or alarm leads during backfill or settling.

12. Uncoil the electrical service cables and alarm leads into the excavation and influent sewer line trench. Leave sufficient slack in the cables so they will not be stressed or pulled tight during backfill or settling.

13. Always encase the electrical cables and alarm leads in conduit any time they are above finished grade. Route the conduits and cables as directly as possible to the control center mounting location.

Required Prior to Backfilling

1. For installations where the air pump will not be located in the aeration riser, install a ¾" Schedule 40 PVC air line from the air pump to the system. The air line should be buried in a trench at a recommended depth of at least 12 inches. Protect the air line in a casing pipe if heavy loading is anticipated. The air line must be run into the aeration riser and the opening in the riser sealed with mortar or approved sealant.

2. On the Kinetic Bio-Film reactors, use the universal tool to insure each of the round, black locking lugs is rotated to the furthest extension point possible. Only rotate the lugs clockwise.

Backfilling

1. The system should be backfilled immediately after sewer lines and underground electrical cables are installed. Fine, loose earth should be used to backfill the tank excavation and sewer line trenches. Be sure it is completely free of rocks, large clumps of earth and construction debris. Use fine granular material when backfilling around electrical cables and conduits. The underground electrical cables should have at least 2' of earth cover. If the proposed finished grade will not permit this coverage, the cables should be installed in approved conduit from the tank to the building foundation. Backfill evenly around the entire perimeter of the tank rather than all at once on each side. Take care to completely fill in the cavity beneath the slanted clarifier end wall.

2. Final grading should be 6" below the top of each access cover and should slope away from the tank so surface runoff will drain away from the treatment system. Use extreme care in backfilling. Do not allow dirt or mud to enter any part of the treatment system or sewer lines. If dirt or mud enters any portion of the system, it must be removed to insure proper system operation. Removing the dirt or mud may require repeated flushing and tank pumping.

3. Immediately after backfilling, fill each chamber of the treatment system with water to the outlet invert. The water must be free of leaves, mud, grit or any other materials that might interfere with system operation.

Air Pump and Piping Installation

1. Remove the contents from red mesh bag with components labeled "AIR". Attach diffuser bar A1 to subassembly A2 at union as shown in Figure 4. Securely tighten union by hand.

2. Solvent weld subassembly A2 to subassembly A3 as shown in Figure 4. Insure red arrows are aligned.

3. Solvent weld subassembly A3 to subassembly A4 as shown in Figure 4. Insure blue arrows are aligned.

4. Install this entire assembly into aeration chamber by bending the flexible tubing. Lower assembly into the tank until the diffuser bar contacts both the floor and side wall of the tank as shown in Figure 4.

5. Remove air pump and components from carton. If the air pump will be installed in the aeration chamber riser, solvent weld subassembly A5 to subassembly A6 as shown in Figure 5. Insure yellow arrows are aligned. Install concrete support base for air pump.

6. Install the air pump in the aeration chamber riser on the support base (or in a clean, dry, well-ventilated area protected from the elements no more than 75' from the tank). Attach subassembly A4 to subassembly A5 at union as shown in Figure 4. Securely tighten union by hand.

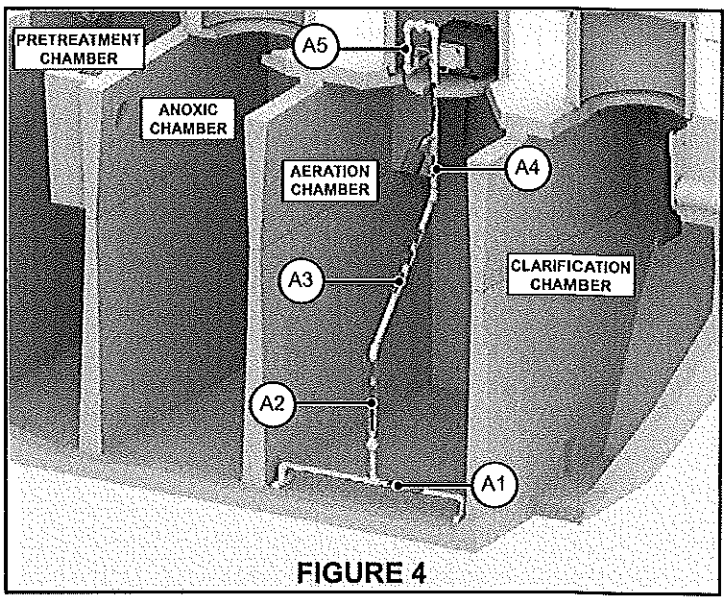


FIGURE 4

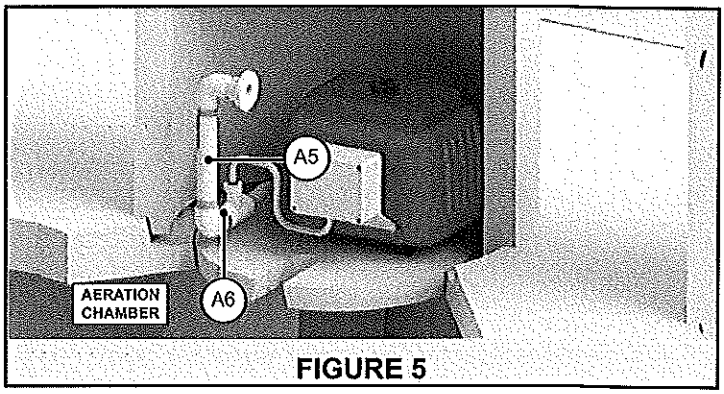


FIGURE 5

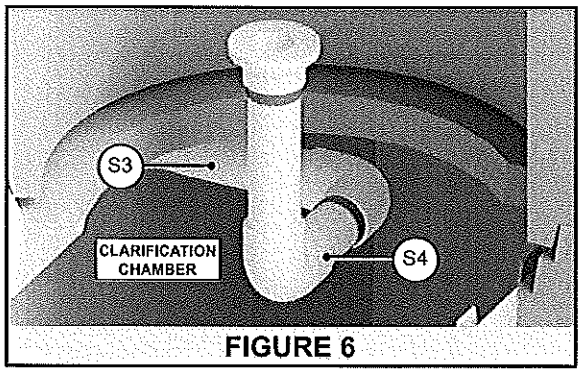


FIGURE 6

7. To wire the air pump female electrical connector, unscrew the three captive stainless steel screws from the face of the female connector. They will stay in the body of the receptacle. Lift out the rigid internal receptacle body. Unscrew the compression nut on the strain relief connector. Insert the electrical service cable through the compression nut, compression ring and neoprene grommet. Strip the outer insulation back 1¼" on the underground electrical service cable and expose the three individual leads. Use extreme care to be sure the insulation jackets on the individual black and white leads are not scarred or damaged while stripping the outer jacket.

8. Strip off the insulation jackets 7/16" from the ends of the individual black and white leads. Insert the black lead into the hole adjacent to the brass-colored screw and tighten the screw securely. Insert the white lead into the hole adjacent to the silver-colored screw and tighten the screw securely. Insert the bare copper ground lead into the hole that is adjacent to the green-colored screw and tighten the screw securely. Align the insert key on the receptacle body with the keyway molded into the rubber sleeve. Press the receptacle body into the sleeve and tighten the three stainless steel screws on the face of the connector. Press the grommet into the electrical connector and tighten the compression nut.

Recirculation Pump and Piping Installation

In the clarification chamber:

1. Remove the contents from black mesh bag with components labeled "SLUDGE". Solvent weld subassembly S3 to subassembly S4 in the clarification chamber (S3 was installed with the Tank Equipment Package). Be sure the union is facing up as shown in Figure 6.

2. Thread subassembly S5 into the pump discharge as shown in Figure 7.

3. Solvent weld the coupling on subassembly S5 to subassembly S6. See Figure 7.

4. Solvent weld subassembly S6 to subassembly S7 as shown in Figure 7.

5. Attach pump cord to pump discharge assembly (S5-S7) using cable ties provided.

6. Use discharge assembly to lower pump into the clarification chamber until pump rests on the floor of the hopper as shown in Figure 7. Attach subassembly S4 to subassembly S7 at union. Securely tighten union by hand.

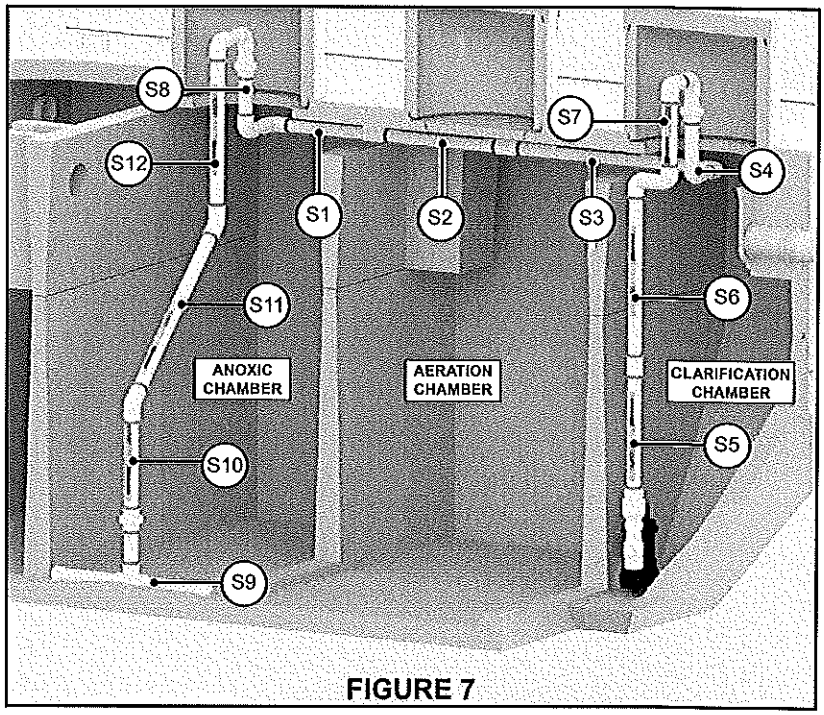


FIGURE 7

In the anoxic chamber:

7. Solvent weld subassembly S1 to subassembly S8 (S1 was installed with the Tank Equipment Package) with union facing up as shown in Figure 8.

8. Attach subassembly S9 to subassembly S10 at union as shown in Figure 7. Securely tighten union by hand.

9. Solvent weld subassembly S10 to subassembly S11 as shown in Figure 7. Insure yellow arrows are aligned.

10. Solvent weld subassembly S11 to subassembly S12 as shown in Figure 7. Insure green arrows are aligned.

11. Bend mixing bar assembly at flexible tubing and lower into anoxic chamber until mixing bar is positioned as shown in Figure 7. Attach subassembly S12 to subassembly S8 at union. Securely tighten union by hand.

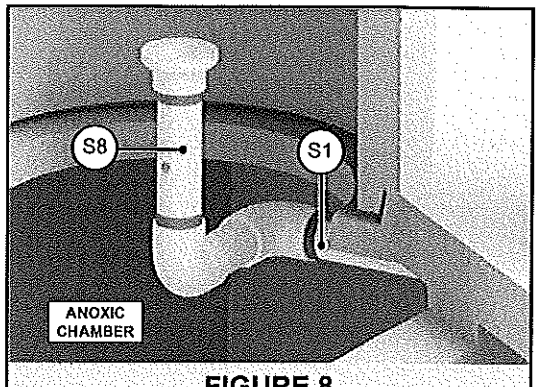


FIGURE 8

12. Wire the recirculation pump female electrical connector. Unscrew the three captive stainless steel screws from the face of the female connector. They will stay in the body of the receptacle. Lift out the rigid internal receptacle body. Unscrew the compression nut on the strain relief connector. Insert the electrical service cable through the compression nut, compression ring and neoprene grommet. Strip the outer insulation back 1¼" on the underground electrical service cable and expose the three individual leads. Use extreme care to insure the insulation jackets on the individual black and white leads are not scarred or damaged while stripping the outer jacket.

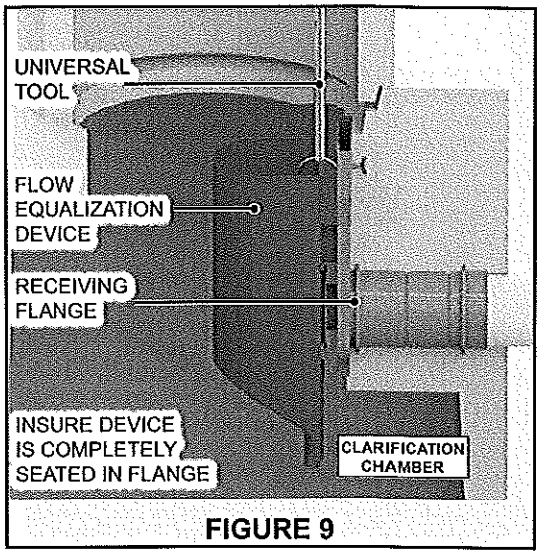


FIGURE 9

13. Strip off the insulation jackets 7/16" from the ends of the individual black and white leads. Insert the black lead into the hole adjacent to the brass-colored screw and tighten the screw securely. Insert the white lead into the hole adjacent to the silver-colored screw and tighten the screw securely. Insert the bare copper ground lead into the hole that is adjacent to the green-colored screw and tighten the screw securely. Align the insert key on the receptacle body with the keyway molded into the rubber sleeve. Press the receptacle body into the sleeve and tighten the three stainless steel screws on the face of the connector. Press the neoprene grommet into the electrical connector and tighten the compression nut.

14. Plug the male connector on the recirculation pump power cord into the female connector.

15. Install the flow equalization device by sliding it into the tank receiving flange in the clarification chamber as shown in Figure 9. Use the universal tool to insure the device is completely seated in the flange.

Completing the Installation

1. The control center should be wired for operation when the tank and underground electrical cables are installed. The control center should be located so that the red warning light can be seen and the audible alarm heard. The mounting location should minimize exposure to direct sunlight, freezing rain or conditions that might prevent routine inspection or access. The control center should always be mounted out of the reach of children.

2. Remove the cover from the alarm wire junction box connected to the float switch. Solvent weld the junction box to the conduit containing the alarm leads, located in the aeration chamber riser.

3. Reference Figure 10 for all wiring instructions. The black and white alarm wires contained in the junction box are provided to connect the float switch to the control center. Connect the black wire in the junction box to either alarm lead from the panel, and secure with a wire nut connector. Connect the white wire in the junction box to the remaining alarm lead from the panel, and secure with a wire nut connector.

4. If the air pump is installed in the aeration chamber riser, solvent weld the conduit connection for the pressure switch alarm cable to the junction box. Connect the black wire in the pressure switch cable to either alarm lead from the panel, and secure with a wire nut connector. Connect the white wire in the pressure switch cable to the remaining alarm lead from the panel, and secure with a wire nut connector.

5. Reinstall and secure the cover on the alarm wire junction box. Plug any unused junction box openings.

6. Proceed to the control center. Detach the cover from the control center enclosure and remove the insert from the mounting posts. Set the control center insert aside. Remove the knockouts in the bottom of the enclosure and install a sealed conduit connector (distributor to provide) in each opening. Exposed wiring to or from the control center should always be encased in conduit. Mount the control center securely using masonry nails, wood screws or common nails as appropriate.

7. Use a dedicated 115 VAC, single-phase circuit at the main electrical service panel. A 15 amp circuit breaker is recommended (10 amp minimum). **CAUTION: MAKE SURE THIS CIRCUIT IS DE-ENERGIZED. CHECK IT WITH AN ELECTRICIAN'S TEST LIGHT BEFORE PROCEEDING. REMEMBER THAT OTHER CIRCUITS IN THE SERVICE PANEL MAY REMAIN ENERGIZED AS YOU ARE WORKING. USE ONLY TOOLS WITH INSULATED HANDLES, STAND IN A DRY LOCATION AND WORK WITH EXTREME CARE.**

8. Open the black electrical insulator on the back of the control center insert for access to power and alarm wiring connections.

9. Install a #14/2 AWG minimum cable with full-size center ground from the control center to the power wire junction box provided for connection to the control center.

10. Wire from the dedicated circuit breaker in the main service panel to the power wire junction box. Use at least #14 AWG black copper wire. Connect the black wire from the main service panel to the black wire in the air pump power cable and the black wire to the control center. Secure with a wire nut connector.

11. Wire from the neutral in the main service panel to the junction box. Use at least #14 AWG white copper wire. Connect the white wire from the main service panel to the white wire from the air pump power cable and the white wire to the control center. Secure with a wire nut connector.

12. Connect the ground wire from the main electrical service panel to the non-insulated ground lead from the air pump and the ground wire to the control center. Secure with a wire nut connector. IMPORTANT: Never allow the white neutral leads and the ground leads to be spliced together.

13. Install the cover on the junction box and proceed to the control center.

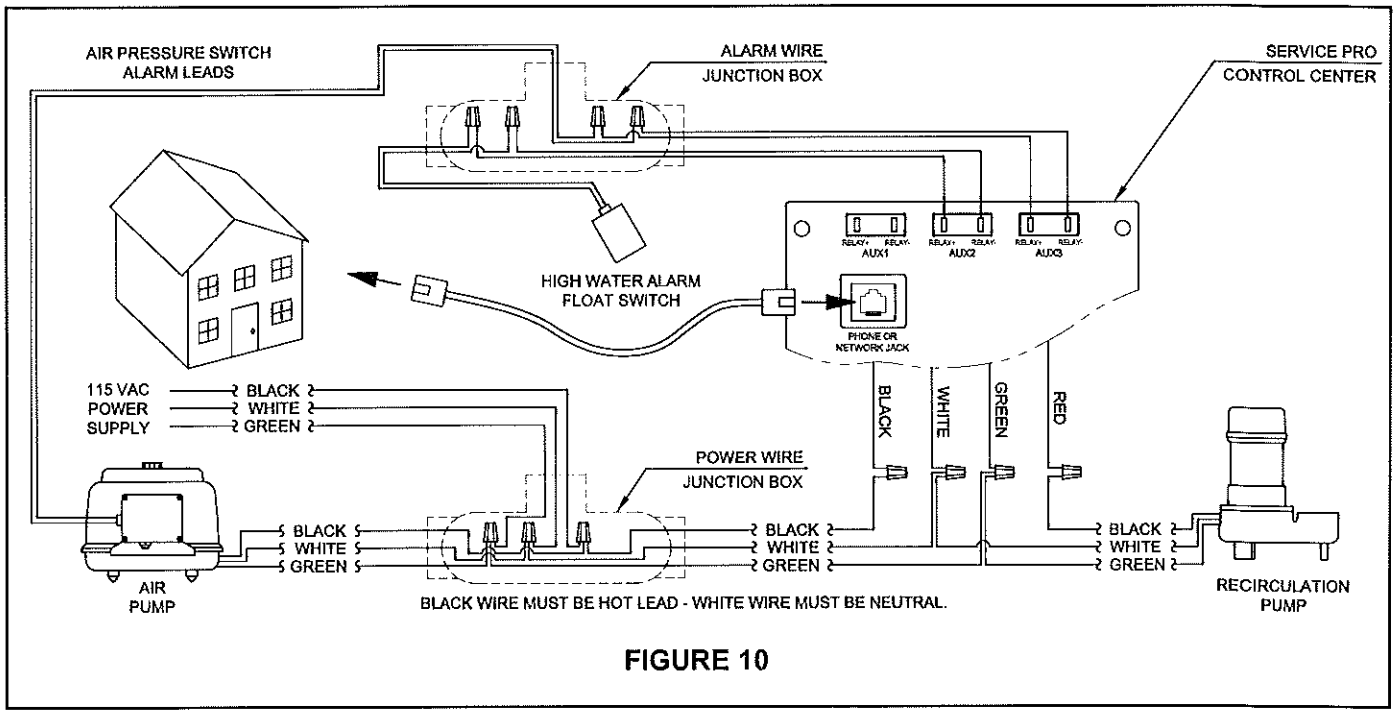


FIGURE 10

14. Connect the black wire from the junction box to the black wire on the control center. Secure with a wire nut connector.

15. Connect the black lead of the underground electrical cable from the recirculation pump to the red wire on the control center. Secure with a wire nut connector.

16. Connect the white wire from the junction box to the white wire from the recirculation pump and white wire on the control center. Secure with a wire nut connector.

17. Connect the ground wire from the junction box to the non-insulated ground lead from the recirculation pump and the green wire on the control center. Secure with a wire nut connector. IMPORTANT: Never allow the white neutral leads and the ground leads to be spliced together.

18. An auxiliary alarm input (AUX1) is available for connection of optional equipment such as an ultraviolet disinfection system, chemical detection system or effluent pump system. Refer to the Alarm Input section in the Service Pro Model 801P Installation and Operation Instructions for details regarding the connection of auxiliary equipment.

19. Connect the alarm leads from the high water float switch to the AUX2 RELAY terminals on the control center.

20. Connect the alarm leads from the air pump pressure switch to the AUX3 RELAY terminals on the control center.

21. If the remote monitoring features of the control center will be utilized, run the telephone or network cable to the bottom of the control center enclosure. IMPORTANT: Never install the communication cable in a conduit with power lines.

22. Place the communication cable in the electrical grommet provided. The grommet snaps into the control center enclosure. Crimp the appropriate phone or network connector on the end of the communication cable. Plug the connector into the jack on the control center insert. Connect the other end to the telephone or network system.

23. Carefully form all wiring neatly into the lower part of the control center. Do not allow the wires to make contact with other electrical components in the control center. The conduit openings in the enclosure must now be sealed using expanding foam sealant (available from Norweco).

24. Close the black electrical insulator and snap the control center insert into position. Reinstall and close the control center cover. Secure it with the Norweco tamper evident seal.

25. Clearly label the dedicated circuit used for the Hydro-Kinetic system on the door of the main service panel. Replace the service panel deadfront and enclosure cover.

Final Check and System Startup

1. Place the dedicated circuit breaker for the Hydro-Kinetic system in the main service panel in the "on" position.

2. To commission the telemetry system, first insure the phone/network cable is properly installed. Place the control center power switch in the "off" position. While holding in the reset button, place the power switch in the "on" position. Continue to hold the reset button for 5 seconds. Release the reset button and allow the telemetry system up to 60 seconds to call out and complete the commissioning process. The phone/network light will illuminate during the call out process. If commissioning is successful, the alarm light will flash 5 short flashes and stop as verification. If commissioning is unsuccessful, refer to the Service Pro Model 801P Installation and Operation Instructions.

3. If no telemetry system is installed, press and hold the RESET button on the control center for 5 seconds. The audible alarm should sound and the alarm light should illuminate.

4. The system is operational once all installation and startup steps have been completed to this point. It will take 2 to 6 weeks for the system to reach biological maturity, depending upon system loading.

Routine Maintenance

The following should be performed every 12 months (or as required by your local governing regulations) by a qualified service technician:

1. If applicable, inspect the effluent discharge point to make sure there are no restrictions to the effluent flow. If restrictions are present, perform service as needed.

2. If effluent sampling is required, it is recommended that a proper sampling port be installed downstream of the Hydro-Kinetic system.

3. Inspect the vent cap, perimeter vent and air pump for objects, plants, insects or debris that could impede the air intake. Remove these items if present.

4. Check the air pump for proper operation. Check the air filter and clean or replace as required. Check the aeration chamber for odor. A musty odor indicates the presence of aerobic conditions essential for proper treatment. A septic odor indicates inadequate aeration, suggesting that the delivery of air into the aeration chamber has been restricted.

5. Check the aeration chamber and insure the diffuser assembly is creating a rolling motion of the chamber contents. If a rolling motion is not visible, verify air pump operation. Remove and clean diffuser assembly if necessary.

6. Check the anoxic chamber and insure the mixing bar is operational. The recirculation pump operates on a pre-programmed on/off cycle, so press the reset button if necessary to verify operation.

7. Inspect the flow equalization device. Rinse the design flow, sustained flow and peak flow ports with a garden hose and insure they are free of debris. Clean the flow ports with a brush if necessary.

8. Use the hopper scraping tool to gently scrape all surfaces of the clarification chamber hopper.

9. On Model 600 FEU systems, the settled solids should be pumped from the Hydro-Kinetic filter to the pretreatment chamber. With the flow equalization device securely in place, install the outlet blocking tool into the clarifier outlet coupling prior to pumping. Place the intake of the service pump at the bottom of the influent chamber. Pump the contents from the bottom of the Hydro-Kinetic filter until the accumulated solids are withdrawn and the water level is below the bottom of the Kinetic Bio-Film reactors. Approximately 150 gallons will be removed during service. Rinse the media with a hose during tank pumping. After pumping, remove the outlet blocking tool and allow the Hydro-Kinetic filter to refill to normal operating level. Never leave the Hydro-Kinetic filter empty after pumping.

10. Inspect the system to determine if complete pumping may be required. See "System Pumping" section of this document.

11. Upon completion of the inspection, insure that all access covers are properly reinstalled. Any missing or damaged access covers should be immediately replaced. **CAUTION: MAKE SURE ALL ACCESS COVERS ARE REINSTALLED AND IN GOOD CONDITION.**

12. Approved replacement parts are available from the authorized system dealer listed on the control center cover.

System Pumping

1. The Hydro-Kinetic system is a biological treatment device and will not require pumping as often as a septic tank. Pumping of the system will likely be required at 3 to 5 year intervals depending upon system usage, loading, and treatment requirements. If pumping is required more frequently than every 2 years, there is an operational problem with the system and it should be evaluated in greater detail.

2. If the service technician suspects that the system may require pumping, a settleable solids test should be performed on a sample from the aeration chamber. The air pump must be removed from the aeration chamber riser to perform this test.

3. Immediately after removing air pump, dip a graduated cone or other clear container into the aeration chamber to a depth of 2½ feet. Set the container on a level surface and then allow the solids to settle for 30 minutes while you complete the service inspection. Do not disturb the container during the test.

4. After 30 minutes, read the level of solids and compare it with the total liquid volume in the container. Calculate the percentage of settled solids volume (i.e. ½ full of solids equals 50%). If the settled material contains large pockets of clear liquid, estimate the volume of these pockets and reduce the settled solids reading by that amount. A settled solids reading of up to 80% indicates no adjustments are necessary. A settled solids level greater than 80% in the aeration chamber indicates excessive solids and that the system should be pumped.

5. If it is determined that pumping is required, contact a tank pumping service licensed by the local regulatory agency. The septage or biosolids from the system must be removed and disposed of in a manner consistent with federal, state and local regulations. Advise the pumping service that they will be pumping approximately 1,250 gallons for the Model 600 or approximately 1,500 gallons for the Model 600 FEU.

6. Turn off the air pump and recirculation pump before tank pumping.

7. Remove the access cover from the aeration and clarification chambers. Unplug the air pump and disassemble the union located on the primary air connection. Remove the air pump, primary air connection and support base from the aeration riser. Use the universal tool to bend flexible diffuser tubing and remove the diffuser drop pipe assembly. Connect the suction hose to the pump being used to evacuate the chamber.

8. Activate the pump and remove the aeration chamber contents. Pump the aeration chamber from the top down, to remove biologically inactive material. Feed the hose down as the liquid is being evacuated from the aeration chamber. It is not necessary to wash down the sidewalls or tank bottom. Pump only 75% of the volume out of the aeration chamber to facilitate plant re-start. Replace the diffuser drop pipe assembly. Reinstall the support base, primary air connection and air pump. Reassemble the union in the primary air connection and plug in the air pump. Replace the access cover.

9. If a Hydro-Kinetic filter is installed, it should be pumped after the aeration chamber. Remove the Hydro-Kinetic filter access cover. Lower the hose into the influent chamber until it contacts the bottom of the tank. Withdraw the hose approximately 2 inches. Completely pump 100% of the contents from the chamber and rinse the media with a hose during tank pumping. Replace the Hydro-Kinetic filter access cover.

10. Next, pump the anoxic chamber. Remove the anoxic chamber access cover. Use the universal tool to bend flexible mixing bar tubing and remove the mixing bar drop pipe to allow access for the suction hose. Lower the hose until it contacts the bottom of the tank. Withdraw the hose approximately 2 inches. Completely pump 100% of the contents from the chamber. Reinstall the mixing bar drop pipe assembly and replace the access cover.

11. The final chamber to pump is the pretreatment chamber. Remove the pretreatment chamber access cover. Break up the scum mat to facilitate pumping. Lower the hose until it contacts the bottom of the tank. Withdraw the hose approximately 2 inches. Activate the pump and remove 100% of the chamber contents. It is not necessary to wash down the sidewalls or tank bottom. If solids are so concentrated that the suction hose cannot withdraw them, tank contents may be backflushed to break up the solid matter. Replace the pretreatment chamber access cover.

12. After pumping, refill all chambers to capacity with clean water. Return all plumbing and equipment to its proper installed location. Replace any access covers that were removed. Turn on power to the air pump and the recirculation pump. Check for proper operation of all equipment.

Troubleshooting

This troubleshooting section provides efficient solutions to the most common problems encountered in the operation of the Hydro-Kinetic system.

Control Center Alarming

1. **Liquid in tank at level of high water alarm float:** system is flooded due to an obstruction in the flow equalization device, outlet, effluent line or disposal field. Determine cause and remove obstruction, or make repairs as required. Be sure to check effluent disposal system for proper operation.

2. **No rolling action in aeration chamber:**
   - Air pump is pumping air but there is an obstruction in the line between the air pump and diffuser: disassemble air line and remove obstruction.
   - Diffuser is plugged: remove and clean diffuser.
   - Air pump is not running: check power supply to air pump.
   - Air is escaping through a leak in the plumbing assembly between air pump and diffuser: identify and repair air leak. If necessary, remove the diffuser, diffuser drop pipe assembly, and primary air assembly from the aeration chamber and use a soapy water solution to thoroughly coat the plumbing and check for bubbles. Repair any leaking air pipe or fitting and retest.

3. **Air pump is running but does not pump air:** clean or replace air filter. Internal components are worn and the air pump is failing. Rebuild or replace the air pump. Contact the authorized Norweco representative for replacement components.

4. **No mixing action in anoxic chamber:**
   - Recirculation pump is operating but there is an obstruction in the line between the recirculation pump and mixing bar: disassemble mixing bar plumbing and remove obstruction.
   - Mixing bar is plugged: remove and clean mixing bar.
   - Check valve is stuck in closed position: repair or replace check valve.

Septic Odor from System

1. **No power to air pump:** check air pump for proper operation. Insure the breaker is in the "on" position, the air pump is plugged in and power is present (check with test light from Tool Kaddy).

2. **Insufficient air delivery to aeration chamber:** see "Control Center Alarming".

3. **Incomplete treatment due to hydraulic overloading:** see "Hydraulic Overloading of System".

4. **Water softener backwash discharging into system:** notify owner to remove backwash line from system.

5. **Excessive solids in aeration chamber:** evaluate chamber and pump if necessary.

6. **Excessive solids in anoxic chamber:** evaluate chamber and pump if necessary.

Hydraulic Overloading of System

1. **Ground water entering tank through defective inlet or outlet seal:** excavate and repair seal.

2. **Ground water entering system through crack in tank:** excavate and repair crack with hydraulic cement.

3. **Ground water entering system through joint between riser and tank:** excavate and reseal joint with non-shrink grout or mastic.

4. **Roofing down spouts, footer drains or floor drains tied into system:** notify owner to relocate connection downstream of system.

5. **Check valve is stuck in closed position:** repair or replace check valve.

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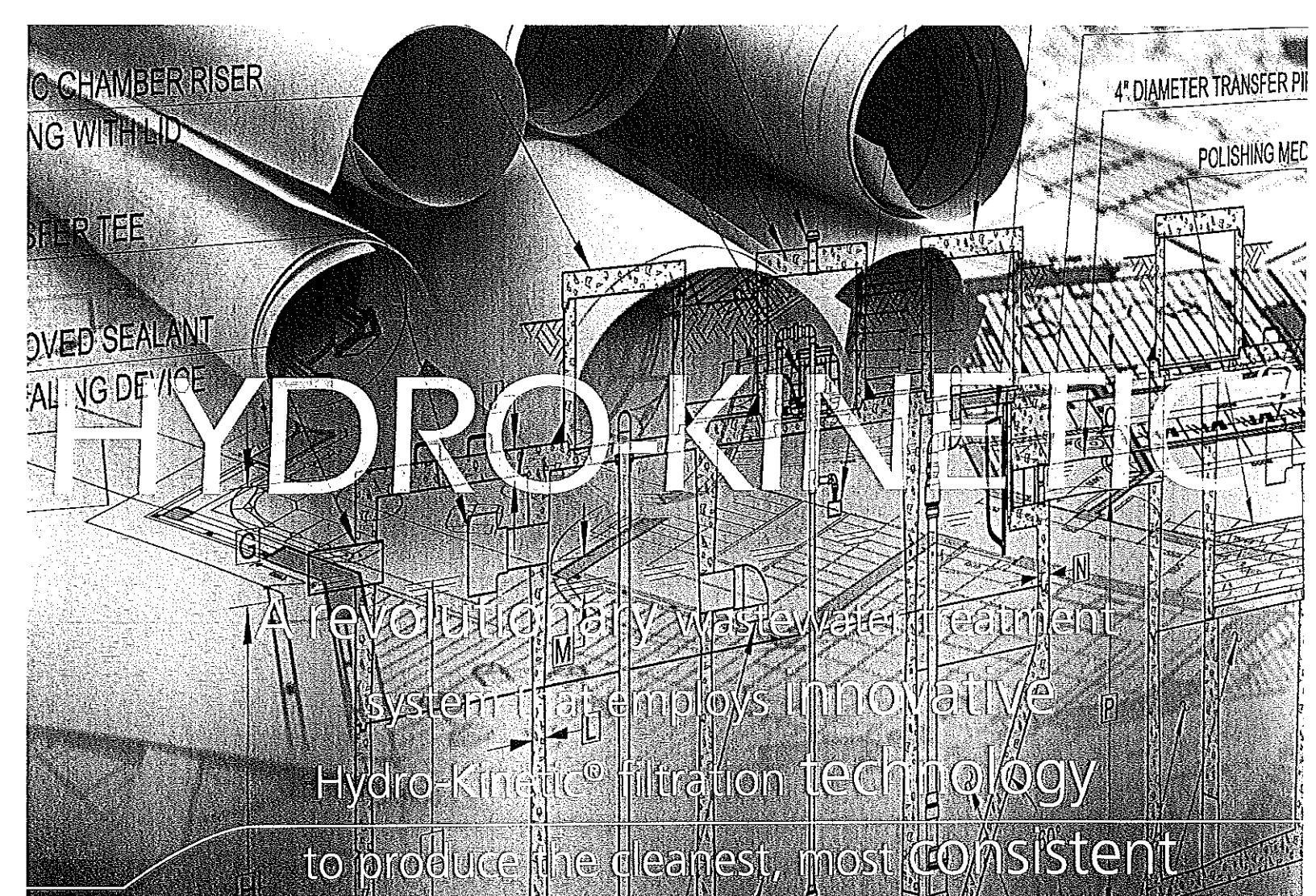


HYDRO-KINETIC®

A revolutionary wastewater treatment system that employs innovative Hydro-Kinetic® filtration technology to produce the cleanest, most consistent effluent quality available.

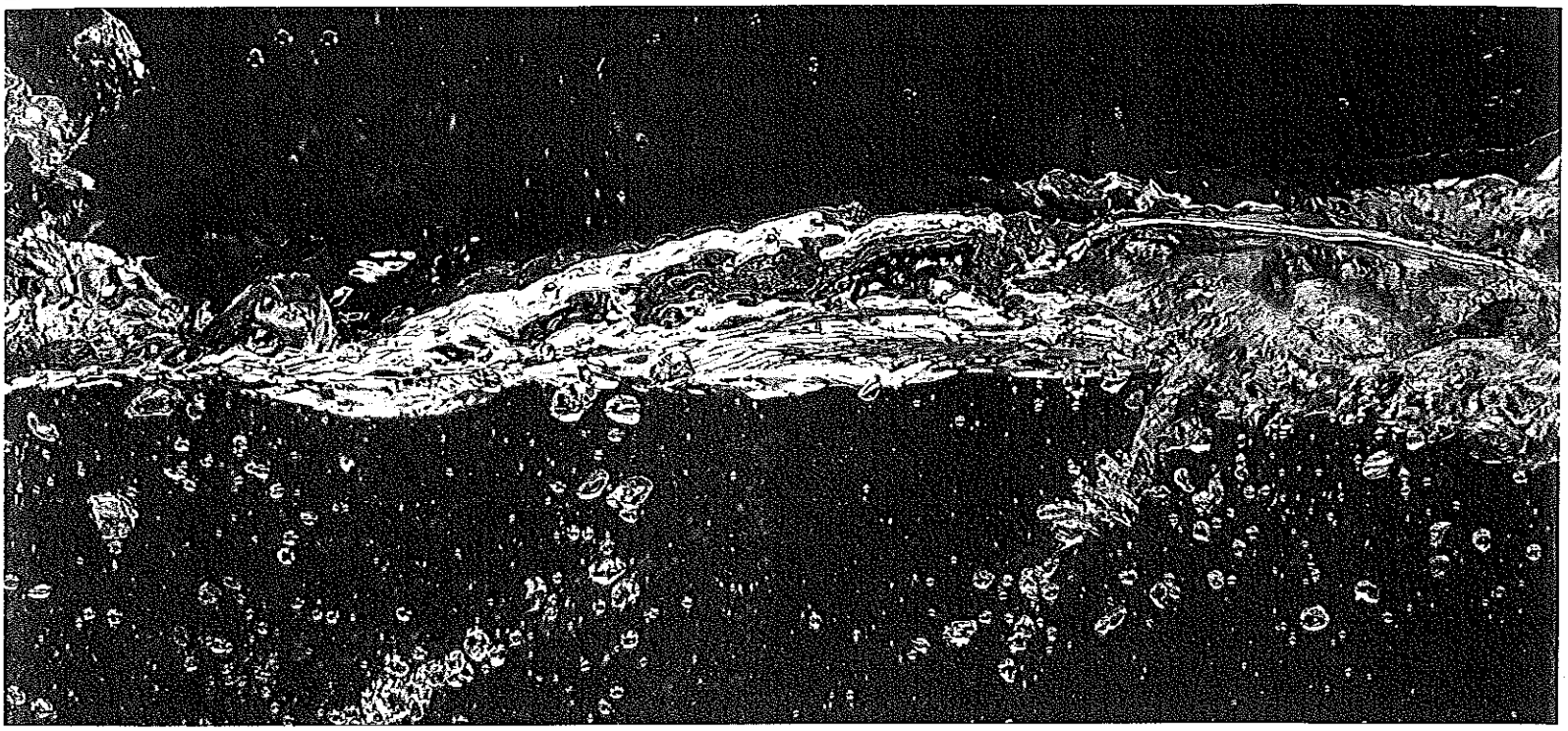
During its successful completion of both NSF/ANSI Standard 40 and 245 tests, the Hydro-Kinetic FEU system:

- Became the only NSF/ANSI Standard 40 and 245 certified residential wastewater treatment system to pass two consecutive back-to-back tests without performing routine maintenance for a full 12 months.
- Achieved unmatched effluent results of 2.1 mg/L CBOD (Carbonaceous Biochemical Oxygen Demand), 1.8 mg/L TSS (Total Suspended Solids) and 7.95 mg/L TN (Total Nitrogen).

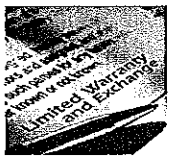
It quietly, efficiently and automatically pretreats, aerates, flow equalizes and filters all wastewater returning only the purest effluent back to the receiving environment. Better yet, all treatment processes are managed by reliable components and user friendly controls. The integrity of the treatment process is protected by our patented non-mechanical, demand use flow equalization device, as well as our revolutionary Hydro-Kinetic filter.

solutions in wastewater treatment

Today's Answer for the Protection of Tomorrow's Environment



comprehensive protection, guaranteed



The Hydro-Kinetic Wastewater Treatment System, Service Pro Control Center, and all Norweco components are warranted against defects in material and workmanship under normal use and service by our comprehensive 2 year Limited Warranty. A Warranty Registration Card and Owner's Manual are included with purchase. Warranty information is detailed on the back page of the Hydro-Kinetic System Owner's Manual.

Other Products

Singulair® Wastewater Treatment Plants
FOR RESIDENTIAL APPLICATIONS

Modulair® Wastewater Treatment Plants
FOR SEMI-COMMERCIAL APPLICATIONS

Travalair® Wastewater Treatment Plants
FEATURING AUTO SLUDGE AND SKIMMER SYSTEM

norweco®

Engineering the future of water and wastewater treatment

220 Republic Street
Norwalk, Ohio, U.S.A. 44857-1156
PH: 419.668.4471
FAX: 419.663.5440
www.norweco.com

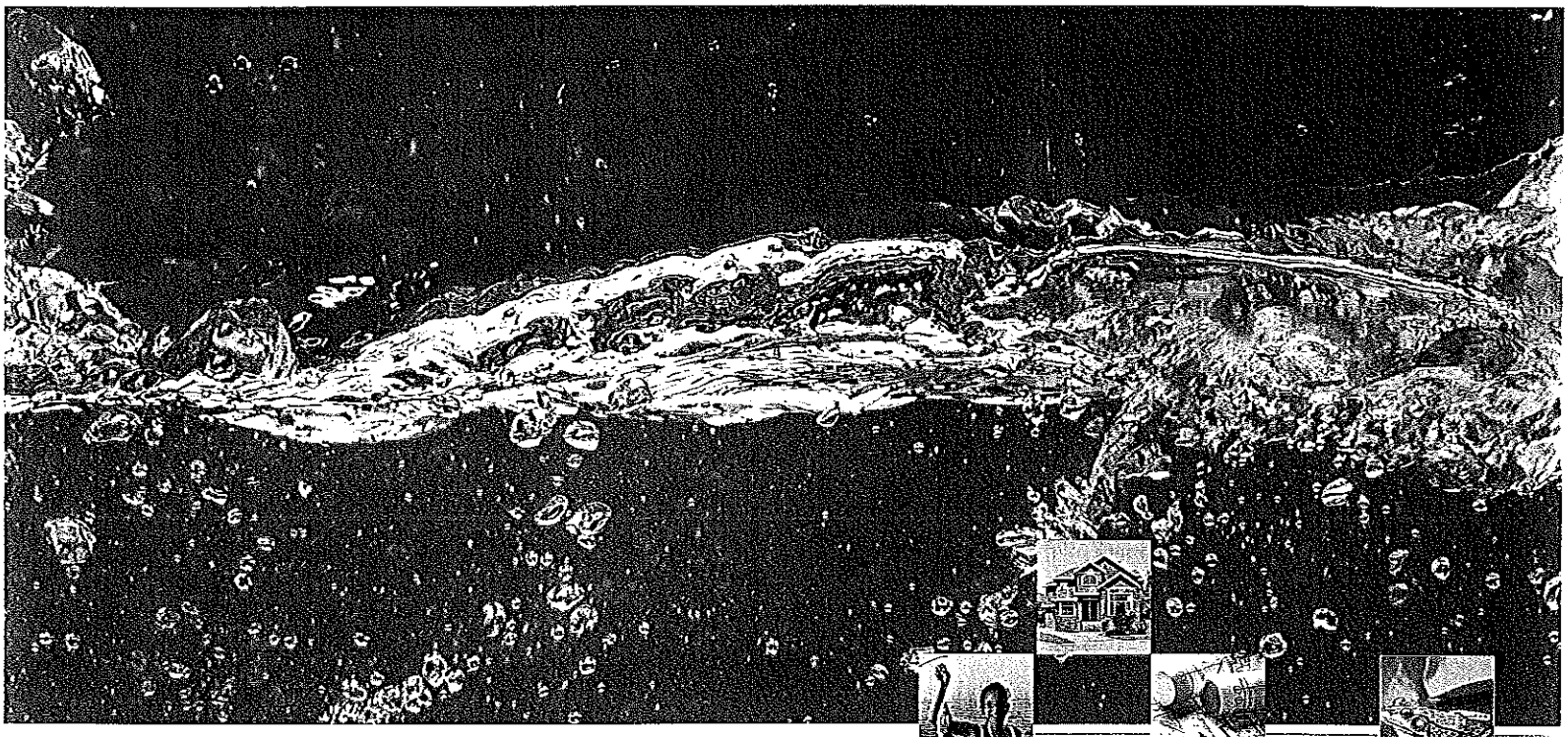
The Hydro-Kinetic System components are listed, licensed, and/or certified by each of the following agencies/organizations.

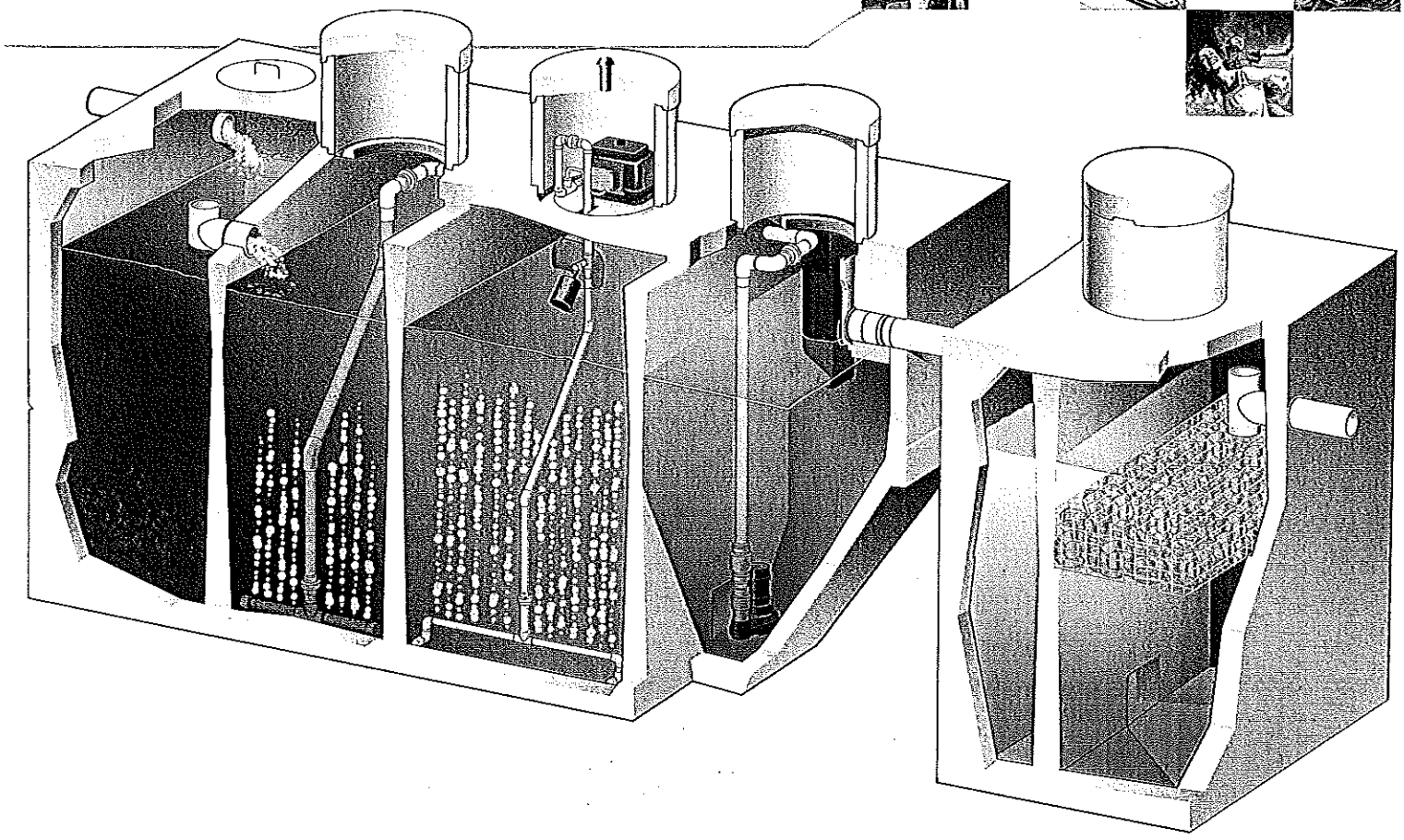
Progress Through Service Since 1906

We engineer, manufacture, install, and maintain advanced water and wastewater treatment technologies for residential properties, communities, and commercial properties that are not connected to sewer lines. Norweco treatment systems are in service all over the world.

Norweco®, Norweco.com®, Singulair®, Modulair®, Travalair®, Singulair Green®, Ribbit Rivet®, Hydro-Kinetic®, Lift-Rail®, Microsonic®, Bio-Dynamic®, Bio-Sanitizer®, Bio-Neutralizer®, Bio-Kinetic®, Bio-Static®, Bio-Gem®, Bio-Max®, Bio-Regeneration®, Bio-Perc®, Blue Crystal®, ClearCheck®, ChemCheck®, Tri-Max®, Hydra-Max®, Service Pro®, MCD®, TNT®, Grease Buster® and "BUSTER" logo are all registered trademarks of Norwalk Wastewater Equipment Company, Inc.

HYDRO-KINETIC® FEU

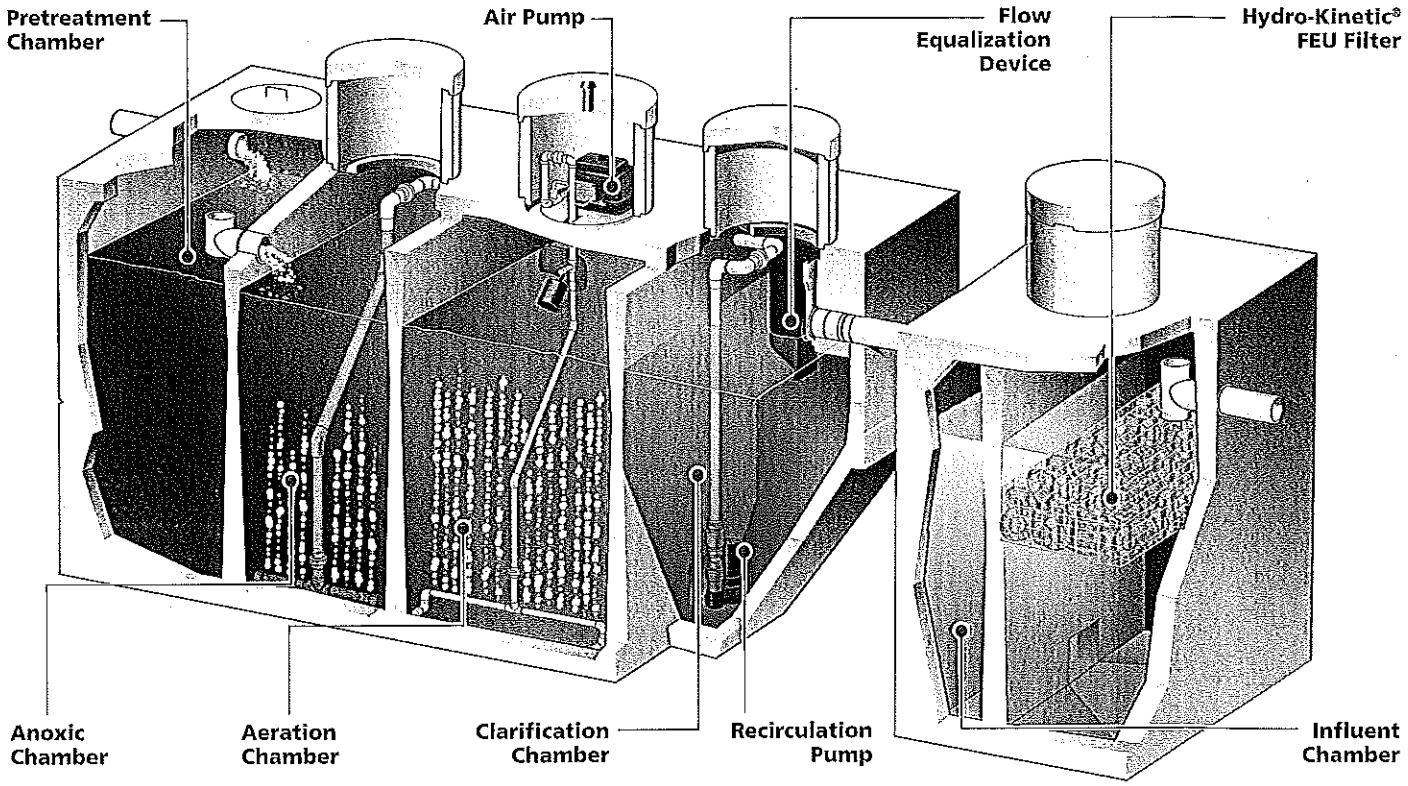




norweco®

Engineering the future of water and wastewater treatment

Revolutionary in design, unparalleled in performance



Pretreatment Chamber
Anaerobic bacteria and gravity precondition the wastewater here to protect the integrity of downstream treatment processes.

Anoxic Chamber
Pretreatment Chamber effluent is mixed with nitrified liquid recirculated from the clarifier in measured doses, via a mixing bar in this chamber. Under carefully controlled conditions, bacteria remove nitrogen by consuming nitrate-bound oxygen during their respiratory process.

Aeration Chamber
Here, safe, living aerobic bacteria convert the wastewater into stable substances. Flow equalization maximizes this biological oxidation and assures proper retention and treatment.

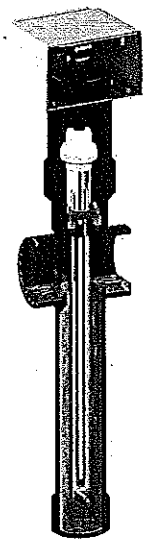
Model A100 Air Pump
Our exclusive Model A100 air pump is a precision engineered electro-mechanical device that has been specifically designed for use in the system. It can be installed below grade or remotely located up to 75 feet from the system.

Clarification Chamber
Flow equalization enhances the settling of biologically active substances inside the Clarification Chamber. Pretreated, aerated wastewater has now been converted to clarified liquids for discharge from this chamber.

Model SD103 Recirculation Pump
This highly efficient recirculation pump is installed at the bottom of the Clarification Chamber and is used to transfer nitrified liquid back to the Anoxic Chamber for denitrification.

Flow Equalization Device
Controls flow through the treatment process and regulates the velocity of treated effluent that can leave the system, enhancing the efficiency of the attached growth filtration media in the Hydro-Kinetic system.

Hydro-Kinetic® FEU Filter
Flow equalized liquid from the clarifier enters the Hydro-Kinetic filter where it flows downward and is evenly distributed beneath our exclusive Hydro-Kinetic filtration media. The liquid then travels through the proprietary attached growth filtration media where the final treatment takes place.



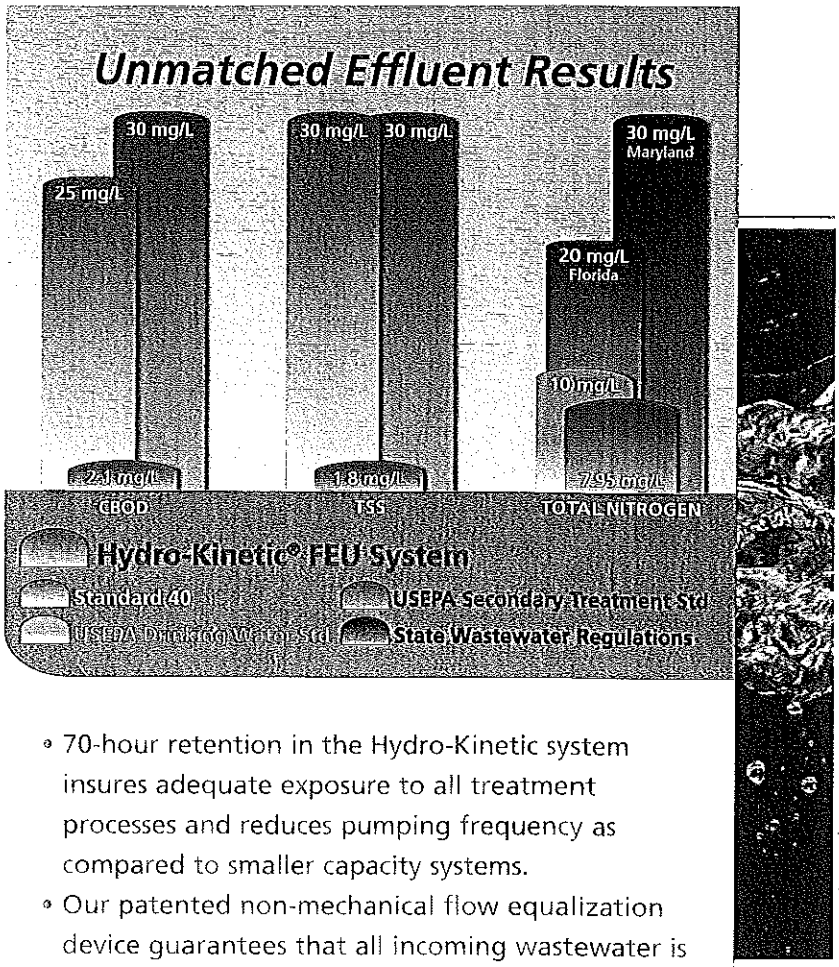
Precast Concrete Tank
Every tank is constructed of high quality, non-corrosive materials under rigid quality control standards. The tank, access risers and covers are reinforced precast concrete manufactured locally by your licensed Norweco distributor.

AT 1500 Ultraviolet Disinfection System

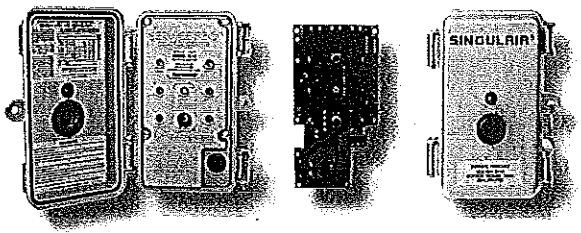
CAPABLE OF MEETING EVEN THE MOST STRINGENT ENVIRONMENTAL REQUIREMENTS, THE MODEL AT 1500 UV DISINFECTION SYSTEM REDUCES BACTERIA LEVELS FROM SECONDARY EFFLUENT TO MEET STRICT WATER QUALITY STANDARDS. THE AT 1500 IS THE ONLY UV TREATMENT SYSTEM LISTED BY UNDERWRITERS LABORATORIES FOR RESIDENTIAL APPLICATIONS.

Consider the facts:

- The Hydro-Kinetic FEU system meets or exceeds regulatory standards and is performance certified and listed by NSF International to Standards 40 and 245. The system achieved an astounding effluent quality of 2.1 mg/L CBOD, 1.8 mg/L TSS and 7.95 mg/L TN.
- The system produced these unmatched effluent results while being tested for 12 continuous months without service. The Hydro-Kinetic system passed two consecutive 6 month tests with flying colors, including duplicate multi-stress sequences.
- We have engineered the Model A100 air pump to maximize operational efficiency and increase service life. It requires minimal electricity to operate and utilizes a standard 115V power connection. Multiple air pump mounting locations are available.
- The Model SD103 recirculation pump features a ⅓ horsepower electric motor that is securely mounted in an oil-filled, watertight, corrosion resistant housing with lubricated ball bearings to assure long life. The recirculation pump features a 2" discharge connection.
- The Hydro-Kinetic FEU filter provides final treatment of the wastewater to a near pristine state. As liquid flows up through our proprietary attached growth filtration media, final polishing takes place insuring only the highest quality effluent is safely returned to the environment.

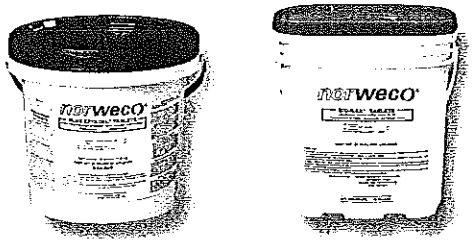


- 70-hour retention in the Hydro-Kinetic system insures adequate exposure to all treatment processes and reduces pumping frequency as compared to smaller capacity systems.
- Our patented non-mechanical flow equalization device guarantees that all incoming wastewater is fully treated, regardless of heavy use periods.
- All flow is equalized an average of 50% at the NSF Standard 40/245 600 GPD (gallons per day) design loading pattern.
- Durable, reliable components are safely installed out-of-sight below grade. No exposed power cords or air lines that are above ground.
- Your local licensed Norweco distributor sells, installs and services your Hydro-Kinetic system with pride. You'll find their name and contact info conveniently posted on the system's control center.



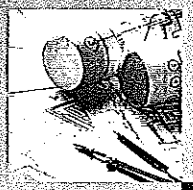
SERVICE PRO® Model 801P

EVERY SYSTEM COMES WITH THE SERVICE PRO MODEL 801P CONTROL CENTER THAT USES MCD TECHNOLOGY TO PROVIDE MONITORING, COMPLIANCE AND DIAGNOSTIC FUNCTIONS FOR THE TREATMENT SYSTEM. EACH CONTROL CENTER INCLUDES A TIME CLOCK, ALARM LIGHT, RESET BUTTON, POWER SWITCH, POWER LIGHT, PHONE/NETWORK LIGHT, RECIRCULATION PUMP ALARM, AIR PUMP ALARM, HIGH WATER ALARM AND ADDITIONAL AUXILIARY COMPONENT INPUT.



Blue Crystal® Residential Disinfecting Tablets and Bio-Max® Dechlorination Tablets

PURE CALCIUM HYPOCHLORITE TABLETS FORMULATED FOR USE IN RESIDENTIAL SYSTEMS, BLUE CRYSTAL TABLETS CONTAIN 70% AVAILABLE CHLORINE TO PROVIDE EFFICIENT, RELIABLE DISINFECTION. BIO-MAX TABLETS PROVIDE A CONVENIENT SOURCE TO INSTANTLY REMOVE CHLORINE FROM WASTEWATER, POTABLE WATER AND PROCESS WATER. EACH TABLET CONTAINS 92% SODIUM SULFITE.



Norweco distributors are located throughout the United States and much of the rest of the world. Research, product development, manufacturing, marketing and sales support are conducted inside our offices and factory in Norwalk, Ohio USA. Everyone at Norweco is committed to shaping the future of our industry.

engineering the future

of water and wastewater treat

Specify Hydro-Kinetic®

As a designer, choosing to incorporate the Hydro-Kinetic system in your project will insure that you achieve successful treatment while offering outstanding quality and reliability. At the same time, the reputation of your company will be protected for years to come. Your local Norweco distributor is fully trained to assist you in the design, installation and operation of a Norweco Hydro-Kinetic FEU (Flow Equalized Upflow) system.

As a homeowner, getting the highest quality product is essential. The Hydro-Kinetic system arrives to the jobsite complete, including delivery, tank setting, equipment installation, plant start-up and service. A series of service and adjustment inspections are prescheduled for the first two years of operation at the time your system is installed. These inspections are included in the sale so that your system continues to perform at the highest level to protect you and your investment. Extended service contracts are also available from your local Norweco distributor.

norweco®

HYDRO-KINETIC®

WASTEWATER TREATMENT SYSTEM WITH SERVICE PRO® CONTROL CENTER

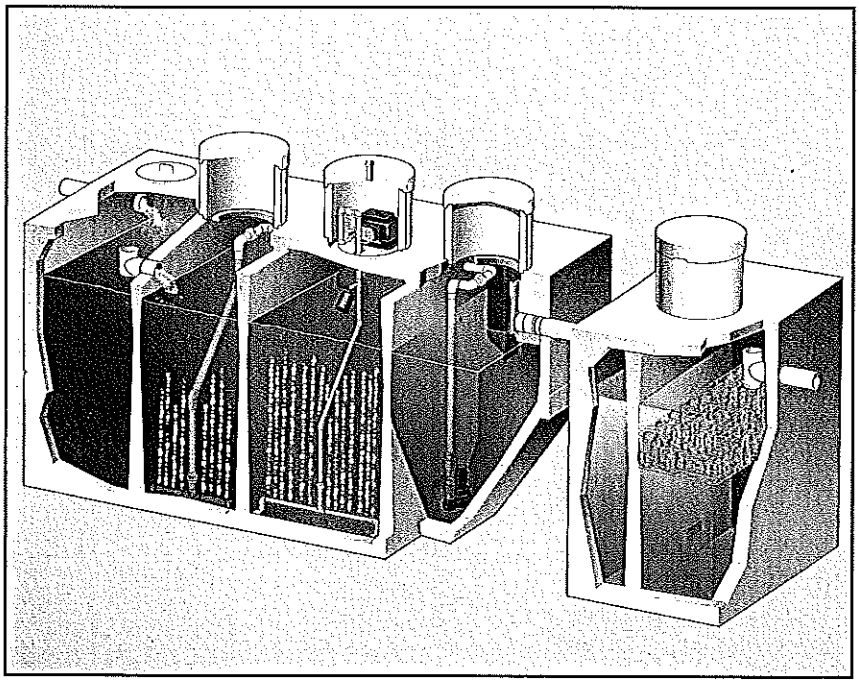
MODELS 600 AND 600 FEU OWNER'S MANUAL

INTRODUCTION

The Hydro-Kinetic system is the finest wastewater treatment technology available. It is a sound investment that protects you and the environment. Please take the time to familiarize yourself with the contents of this manual.

HOW THE SYSTEM WORKS

Developed to serve homes and small businesses outside of city sewers, the Hydro-Kinetic system uses the extended aeration process to treat wastewater and features innovative nitrification-denitrification technology.



Wastewater enters the pretreatment chamber where gravity combines with anaerobic bacterial action to precondition the waste before it flows into the anoxic chamber. Once in the anoxic chamber, facultative anaerobes digest organic matter. Flow then enters the aeration chamber where aerobic bacteria biologically convert the waste into stable substances and oxidize ammonia into nitrite and nitrate. Following aeration, liquids flow to the clarification chamber where gravity settles out biologically active material. A recirculation pump in the clarifier transfers a portion of the wastewater back to the anoxic chamber where nitrogen compounds are converted to harmless nitrogen gas which escapes into the atmosphere. From the clarifier, treated liquids pass through the flow equalization device and into the disposal system. In the Model 600 FEU, effluent passes through the Hydro-Kinetic filter, treating the liquid to a near pristine state. As a result, complete pretreatment, aeration, clarification, denitrification and effluent polishing are assured. The Hydro-Kinetic system reliably protects you, your property and the environment.

FEATURES AND ADVANTAGES

All Hydro-Kinetic tanks are constructed of reinforced precast concrete or high-density polyethylene (HDPE). Internal walls and baffles are cast-in-place or integrally molded to insure uniformity and strength. Risers and covers are either precast concrete, HDPE or heavy duty, glass-filled polypropylene. All components that will contact the wastewater are constructed entirely of molded plastic, stainless steel, cast iron or rubber.

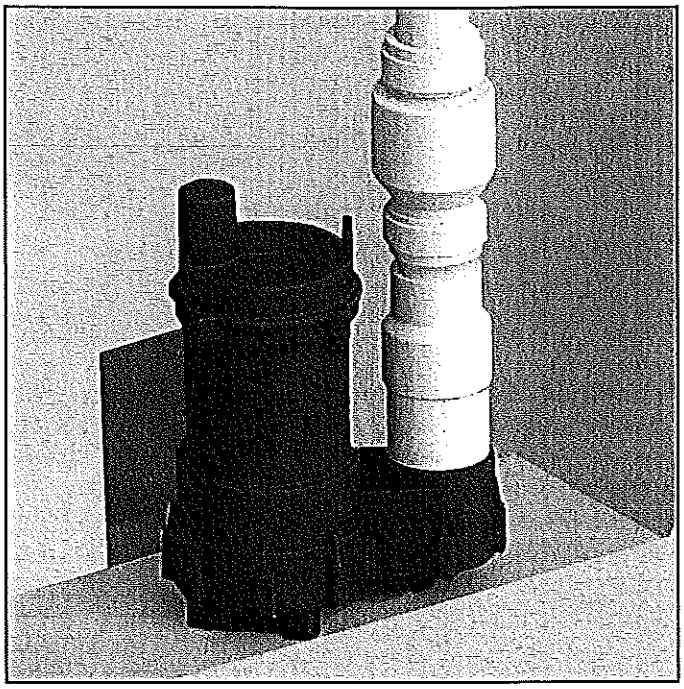
The Model A100 air pump has been designed specifically for the Hydro-Kinetic system. Delivering a continuous supply of air to insure proper mixing and oxidation of the organic material, this 100 watt air pump uses 50% to 78% less energy than most major appliances. The recirculation pump operates on a preset run cycle to assure proper system operation.

The treatment system is supplied with a prewired electrical control center contained in a NEMA rated enclosure. The control center contains a power switch and factory programmed logic to monitor and control air pump and recirculation pump operation. The local distributor's name, address and telephone number are displayed on the control center cover. All system controls and necessary owner information are conveniently located at your fingertips.

Non-mechanical flow equalization is provided in the clarifier by the patented flow equalization device. Effluent polishing, ultraviolet disinfection and chemical treatment are available options. All Hydro-Kinetic components work together to assure complete pretreatment, aeration, clarification, denitrification and effluent polishing.

MODEL SD103 RECIRCULATION PUMP

The Model SD103 recirculation pump includes a durable electric motor and corrosion resistant pump housing. The pump features a 2" discharge connection and is capable of handling up to ¾" solids. Permanently lubricated ball bearings insure quiet operation and long life. The recirculation pump is installed in the bottom of the clarification chamber and delivers liquid to the anoxic chamber through a prefabricated mixing bar assembly. Each Model SD103 pump is a precision engineered electro-mechanical device. Do not remove it from its installed position. Do not attempt any type of repair. Contact your Hydro-Kinetic distributor if service is needed. Unauthorized tampering or repair of the recirculation pump will void important provisions of the two year limited warranty.

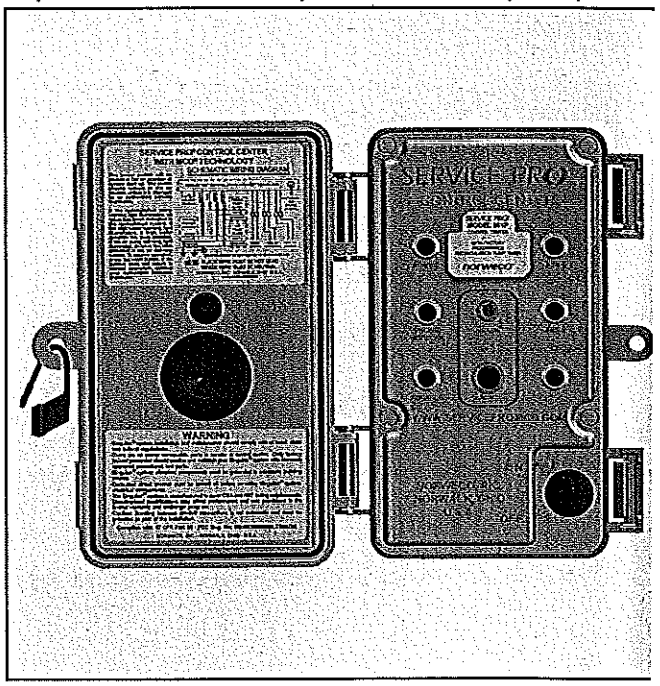


SERVICE PRO® MODEL 801P CONTROL CENTER

The system includes a prewired Service Pro Model 801P control center with MCD technology to permit fully automatic operation. The control center is UL listed and provides MONITORING, COMPLIANCE and DIAGNOSTIC functions complete with telemetry, cellular transmission or network connection to communicate with the Service Pro remote monitoring center. If recirculation pump operation has been interrupted, the Model 801P control center will activate the visual alarm and attempt to restart the pump every five minutes for two hours. If the pump does not restart after two hours, the audible alarm will sound. If an air pump, high water or auxillary alarm condition occurs, both visual and audible alarms will activate. When the system is covered by a Service Pro monitoring agreement, the distributor will be automatically notified and the alarm condition will be displayed on the monitoring center website, **www.servicepromcd.com**. Each control center is factory preset to run the recirculation pump at the proper interval. This programmed time cycle insures that the correct dose is delivered to the anoxic chamber for denitrification.

SERVICE PRO® MONITORING CENTER

When connected to a telephone line, cellular transmissi device or network cable, the control center will automatica notify the Service Pro monitoring center of any servi required to the treatment system or accessory component



The monitoring center automatically records the time a date of any alarm condition, as well as service performe and posts this information to your system's history reco accessible at **www.servicepromcd.com**. All informati regarding your system is available to you on the secur password protected Service Pro website. Contact yo Hydro-Kinetic distributor for your user name and passwor

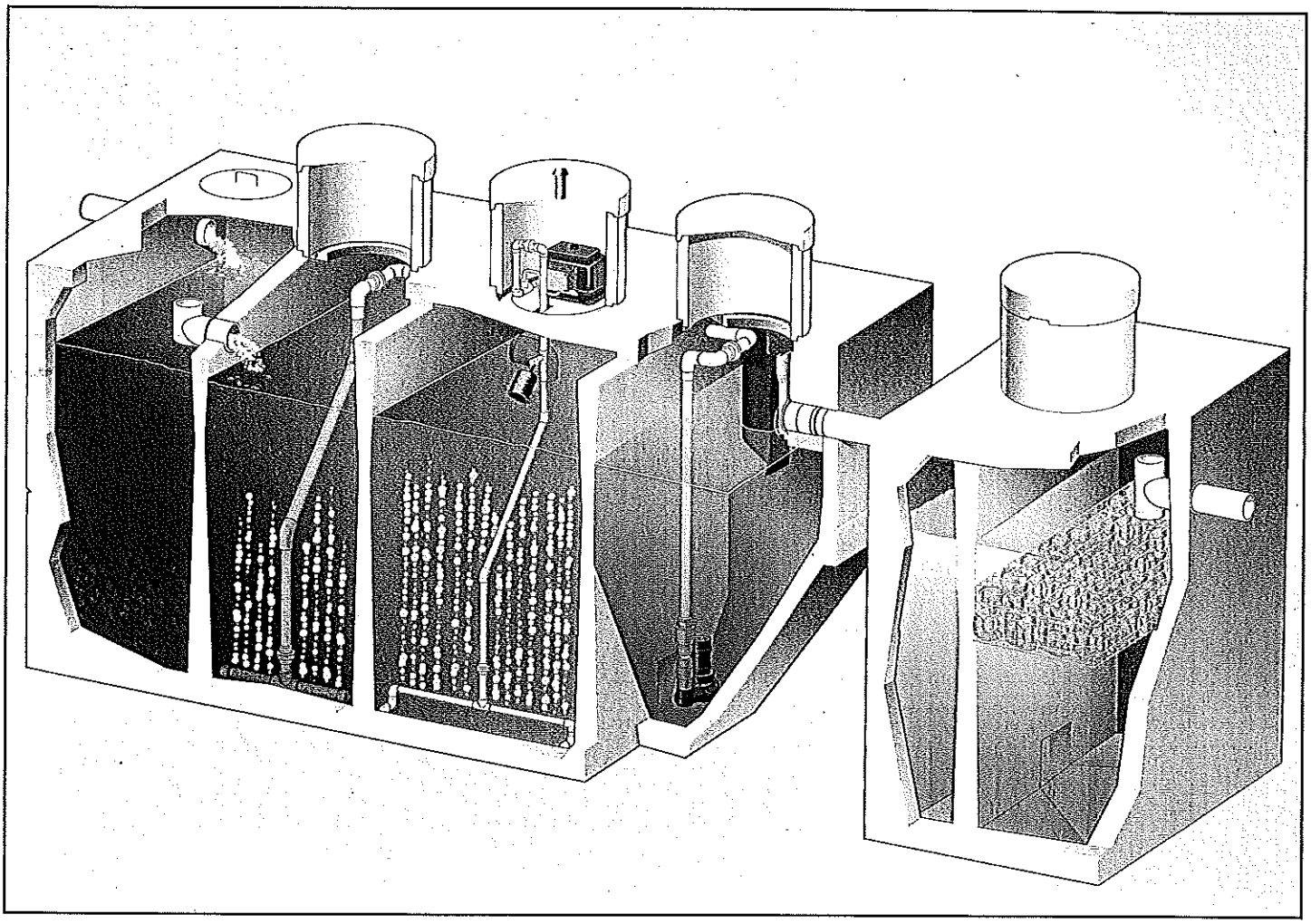
NOTE: If using a telephone line, the control center regula communicates with the monitoring center via a toll fr number. If the control center is using the line when y attempt to place a call, a high pitched digital communicati signal will be heard. Hang up all telephones sharing the li and wait a few seconds. This will automatically disconne the control center and make the line available for use.

NON-MECHANICAL FLOW EQUALIZATION

The Hydro-Kinetic system provides non-mechanical flo equalization for the treatment process. Equalizati reduces hydraulic surges (e.g. typical shower of 10 minut duration, bathtub discharge of 5 minutes duration, cloth washer discharge of 2 minutes duration and dishwash discharge of 2 minutes duration) throughout the syste The flow equalization causes wastewater to be he upstream of the final outlet during hydraulic surges, whi preserves treatment integrity and enhances syste operation. The actual rate of equalization varies a depends upon specific loading patterns and the durati of each flow surge. At the Standard 40/245 design loadi pattern, the system equalizes all flow an average of 50 As a result, hydraulic surges and periods of high flow a automatically reduced on a demand use, as needed, bas

HYDRO-KINETIC® SERVICE PROGRAM

Semi-annual service inspections, at six month intervals for the first two years of system operation, are provided by your local Norweco distributor and are included in the original purchase price of the Hydro-Kinetic system. Costs for travel and labor are not charged to the owner. During an inspection, the Model A100 air pump, Model SD103 recirculation pump and other plant components are serviced as outlined in the Hydro-Kinetic Service Instructions. After the initial two year service program is completed, the local service provider will offer continued service at the owner's option. In many areas, this continuing service agreement is required by the local regulatory agency. The service program should be renewed by the owner to insure maximum system performance.



Ask your Hydro-Kinetic service provider about a renewable service contract. If you allow service coverage to expire, you can still obtain the professional assistance of a local service provider. However, these special service calls will be performed on a time and materials basis. Professional service is important to proper system operation and should not be allowed to lapse. Be sure to consider the advantages of a renewable service contract.

The Hydro-Kinetic service provider will perform the following services during each service inspection:

- ✓ Inspect pretreatment chamber
- ✓ Check air pump operation
- ✓ Check air pump power consumption
- ✓ Check air pump diaphragms
- ✓ Check air pump intake filter
- ✓ Check diffuser
- ✓ Clean fresh air vent in aeration cover
- ✓ Check recirculation pump operation
- ✓ Check recirculation pump power consumption
- ✓ Check mixing bar
- ✓ Check operation of control center
- ✓ Scrape the clarification chamber
- ✓ Clean flow equalization device
- ✓ Inspect effluent quality
- ✓ Inspect all transfer ports
- ✓ Inspect outlet line
- ✓ Inspect optional Hydro-Kinetic filter
- ✓ Check optional disinfection system
- ✓ Inspect ground water relief point
- ✓ Inspect effluent disposal system
- ✓ Complete 3-part service record
- ✓ Hang owner's record on front door
- ✓ Enter record into **www.servicepromcd.com**
- ✓ Mail health department notification

HYDRO-KINETIC® FILTER

A Hydro-Kinetic filter is included with the Model 600 FEU system. Proven in a 12 month NSF/ANSI Standard 40/245 evaluation, this innovative, non-mechanical device reduces CBOD and TSS by up to 75%. Flow equalized liquid from the clarifier enters the influent chamber, travels down and is evenly distributed beneath the filtration media. As liquid travels up through the proprietary attached growth media, further reduction of the organic matter takes place. After passing through the bio-film reactor for final polishing, the highly treated liquid flows into the final effluent zone before exiting the Hydro-Kinetic filter and being safely returned to the environment.

AT 1500 ULTRAVIOLET DISINFECTION SYSTEM

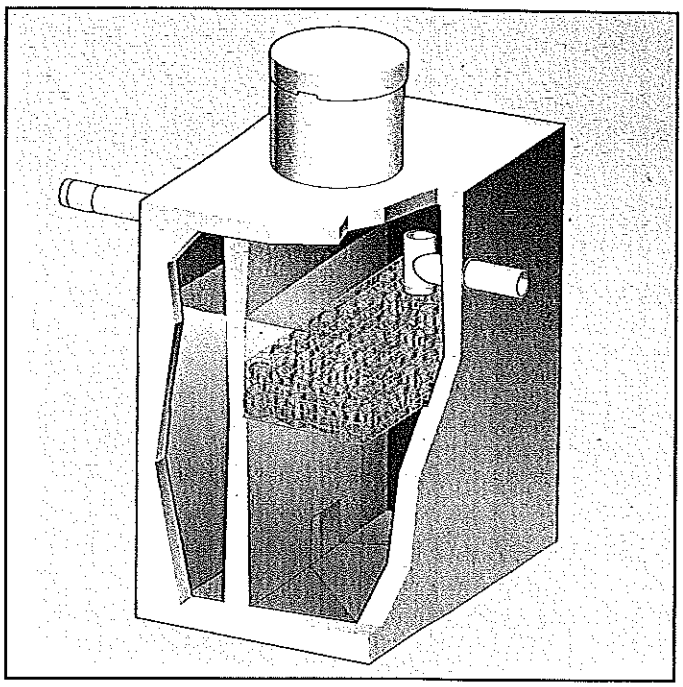
If local regulations require, the AT 1500 ultraviolet (UV) disinfection system can be installed to meet strict water quality standards. The Model AT 1500 is the only UV treatment system listed by Underwriters Laboratories to Standard UL 979 for residential applications. All electrical components are contained in a NEMA 4X weatherproof enclosure which incorporates a built-in safety interlock switch to disable power and prevent UV exposure. The dual-pass contact chamber design insures treatment integrity, rendering pathogens completely harmless by the reliable performance of the AT 1500 system.

CAUTION: Ultraviolet rays can cause permanent eye and skin damage. UV blocking safety glasses and protective clothing must be worn during installation, service or any time the bulb may be illuminated. Do not modify or bypass the safety interlock switch. Disconnect power prior to service.

BLUE CRYSTAL® DISINFECTING TABLETS

If local regulations require, Blue Crystal disinfecting tablets can be used with a Bio-Dynamic tablet feeder for effluent chlorination. Specifically formulated for use in residential treatment systems, Blue Crystal disinfecting tablets provide efficient and reliable disinfection. Manufactured from calcium hypochlorite, Blue Crystal disinfecting tablets provide effective, economical bacteria killing power. A fully charged feed tube will last an average of three to six months. During each service inspection, the technician will check system operation, the rate of tablet consumption and install tablets to insure maximum system performance.

CAUTION: The improper handling of Blue Crystal tablets may cause personal injury or property damage. Keep out of the reach of children and do not allow tablets or feed tubes to contact skin, eyes or clothing. Tablets may be fatal if swallowed and tablet dust is irritating to the eyes, nose and throat. Do not handle the tablets or feed tubes without first carefully reading the container label, MSDS information and the handling and storage instructions. Mixing chemicals may cause a violent reaction leading to fire or explosion.



BIO-MAX® DECHLORINATION TABLETS

Bio-Max tablets are formulated to remove chlorine residual to non-detectable levels for the protection of sensitive receiving environments. Containing 92% sodium sulfite as the active ingredient, the tablets neutralize both free and combined chlorine. A fully charged feed tube will last an average of three to six months. During each service inspection, the technician will check system operation, the rate of tablet consumption and install tablets to insure maximum system performance.

CAUTION: Bio-Max tablets should not be mixed with Blue Crystal tablets. Do not handle tablets or feed tubes without first reading the container label, MSDS information and the handling and storage instructions.

NO OWNER MAINTENANCE

The Hydro-Kinetic system should be inspected and serviced by a qualified service provider, therefore, no owner maintenance is required during the warranty period. How often pumping is necessary depends on system use. The local distributor will inspect the system during the warranty period to determine if pumping is required. Pumping will normally be required at three to five year intervals. Contact your local distributor prior to pumping for complete instructions. A properly licensed tank pumping service must be used for removal and disposal of tank contents. The tank pumper should consult with local authorities to determine the proper disposal method. **NOTE: Make sure the system is refilled to capacity with clean water after pumping.**

If a period of intermittent use or an extended period of non-use of the system is anticipated, contact your service provider for instructions. Your service provider has comprehensive system service instructions and troubleshooting procedures.

WARRANTY REGISTRATION

A Warranty Registration Card for the Hydro-Kinetic system was attached to the Model A100 air pump before it was shipped from the factory. If this card has not been returned to Norweco, complete and mail it immediately. If it is not returned within thirty days of the installation date, the two year limited warranty will begin on the date of component shipment from the factory.

Remove the Hydro-Kinetic system record card and store it in a safe location with this Owner's Manual for future reference. If it is necessary to call your service provider for service, make note of the information on the control center data plate and the air pump serial number before calling. Warranty and service records are cross-indexed by owner name, air pump serial number or control center serial number. Supplying the air pump serial number and control center serial number with the service request will give the service provider a ready reference so that changes in system ownership will not delay service.

TWO YEAR LIMITED WARRANTY

The Hydro-Kinetic system components are backed by a two year limited warranty. Each Model A100 air pump, Model SD103 submersible recirculation pump, Service Pro Model 801P control center and any other components manufactured by Norweco, are warranted to be free from defects in material and workmanship, under normal use and service, for a period of two years from the date of purchase. The two year limited warranty is included in the original purchase price of every Hydro-Kinetic system. If the air pump, recirculation pump or Service Pro control center fails, do not use or dismantle the unit. Do not remove it from its installed position. Do not attempt any type of repair. Unauthorized tampering or repair will void important provisions of the limited warranty. The local, licensed Hydro-Kinetic dealer or service center has detailed warranty information and should be contacted for service or replacement instructions.

SERVICE PRO® SECURITY LOG IN

For your convenience, record your **www.servicepromcd.com** access information here:

User name:	Password:

SUPPLEMENTAL SERVICE RECORD

For your reference, please document service performed on the following chart:

DATE	DESCRIPTION

norweco®

Engineering the future of water and wastewater treatment

DISTRIBUTED LOCALLY BY:

220 REPUBLIC STREET
NORWALK, OHIO, USA 44857-1156
TELEPHONE (419) 668-4471
FAX (419) 663-5440
www.norweco.com

Norweco®, Norweco.com®, Singulair®, Modulair®, Travalair®, Singulair Green®, Ribbit Rivet®, Hydro-Kinetic®, Lift-Rail®, Microsonic®, Bio-Dynamic®, Bio-Sanitizer®, Bio-Neutralizer®, Bio-Kinetic®, Bio-Static®, Bio-Gem®, Bio-Regeneration®, Bio-Perc®, Bio-Max®, Blue Crystal®, ClearCheck®, ChemCheck®, Tri-Max®, Hydra-Max®, Service Pro®, MCD®, TNT®, Grease Buster® and "BUSTER" logo® are registered trademarks of Norwalk Wastewater Equipment Company, Inc.

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SYSTEM PERFORMANCE

The Hydro-Kinetic treatment system is the first and only wastewater treatment technology to complete two consecutive NSF/ANSI Standard 40 and 245 certifications without routine service. The Model 600 is rated Class I, averaging effluent of 4.0 mg/L CBOD, 7.1 mg/L TSS and 10.47 mg/L TN for the first 6 month evaluation. The second 6 month averages are 3.8 mg/L CBOD, 7.4 mg/L TSS and 8.51 mg/L TN, for an overall 12 month test average of 3.9 mg/L CBOD, 7.2 mg/L TSS and 9.95 mg/L TN.

In ecologically sensitive areas, the most stringent effluent standards are 10 mg/L CBOD, 10 mg/L TSS and 10 mg/L TN. The Model 600 FEU system with Hydro-Kinetic filter is also rated Class I, averaging of 2.3 mg/L CBOD, 2.1 mg/L TSS and 8.71 mg/L TN for the first 6 month evaluation. The second 6 month averages are 1.8 mg/L CBOD, 1.6 mg/L TSS and 7.05 mg/L TN, for an overall 12 month test average of 2.1 mg/L CBOD, 1.8 mg/L TSS and 7.95 mg/L TN.

OPERATIONAL REQUIREMENTS

The Hydro-Kinetic system is designed to treat only domestic wastewater. Domestic wastewater is defined as the waste generated from a typical residence. This includes flows originating from: bathtubs, clothes washers, dishwashers, drinking fountains, water coolers, food grinders, kitchen sinks, lavatories, mop basins, service sinks, shower stalls, sinks, wash sinks, water closets and whirlpool baths. While the use of bio-degradable detergents is recommended, the Hydro-Kinetic system has been designed to handle any reasonable amount of bathroom, kitchen or laundry waste. However, some care should be exercised to insure that non-biodegradable and/or toxic materials are not disposed of via the domestic wastewater plumbing. Do not use the plumbing system for disposal of lint, cooking grease, scouring pads, diapers, sanitary napkins, cotton balls, cotton swabs, cleaning rags, dental floss, strings, cigarette filters, rubber or plastic products, paints and thinning agents, gasoline, motor oil, drain cleaners or other harsh chemicals. These items could plug portions of the plumbing and/or adversely affect system performance. Never connect roofing down spouts, footer drains, sump pump piping, garage and basement floor drains or water softener backwash to the domestic wastewater plumbing or the treatment system. Water softener backwash will interfere with biological treatment and must be disposed of separately.

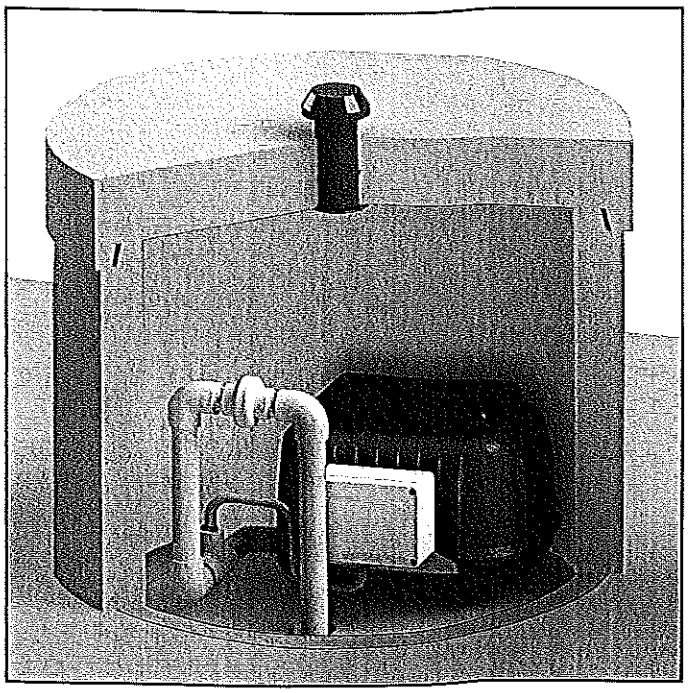
ELECTRICAL REQUIREMENTS

Each Hydro-Kinetic system must be wired to a dedicated 115 volt, single phase circuit at the main electrical service panel. A 15 amp circuit is recommended (10 amp minimum). A pictorial wiring diagram is provided inside the control center enclosure. All electrical work must be performed in accordance with the requirements of the National Electrical Code and all applicable local codes. Electrical connections should be made only by a qualified electrician following proper procedures and using safe tools.

CAUTION: Any time service is required, first shut off the dedicated circuit breaker in the main electrical service panel. Next, shut off the power switch in the Service Pro control center. Failure to do so could result in personal injury or equipment damage.

MODEL A100 AIR PUMP

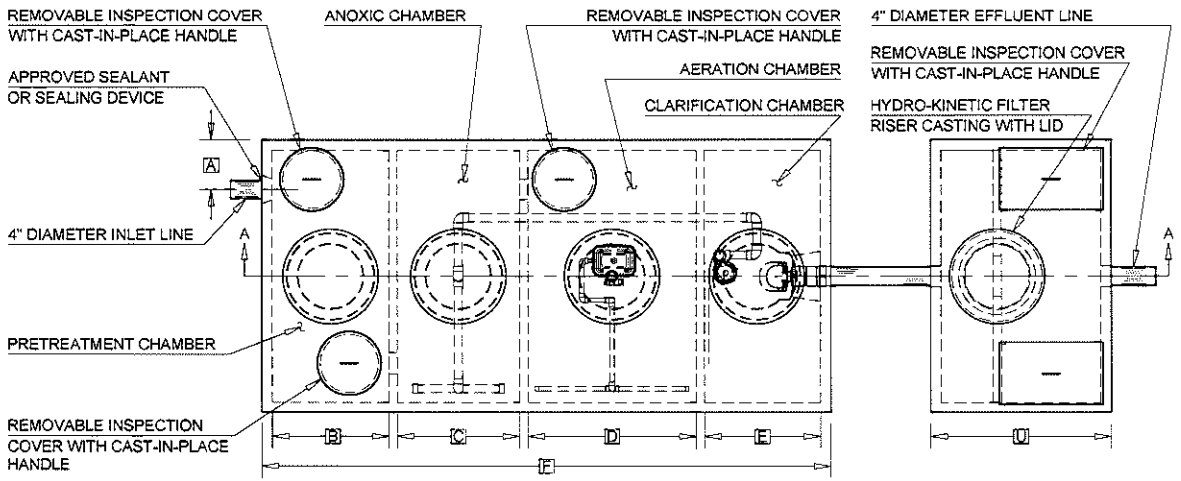
The Model A100 air pump has been specifically designed for use in the Hydro-Kinetic treatment system and includes impact-resistant rubber diaphragms and valves to prolong air pump life. The unique design provides excellent cooling and quiet operation. The Model A100 air pump can be remotely mounted or installed in the access riser above the aeration chamber. Fresh air enters the air pump through a filter located under the cover of the pump housing. The air is introduced below the liquid surface through a prefabricated diffuser assembly. Only the plastic diffuser assembly and the air piping are submerged. Each Model



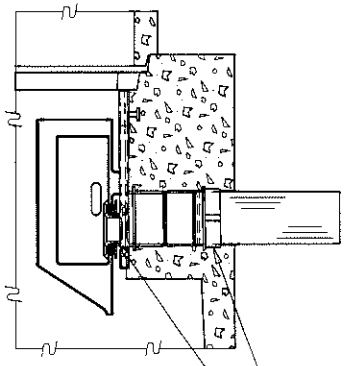
A100 air pump is a precision engineered electro-mechanical device. Do not remove it from its installed position. Do not attempt any type of repair. Contact your local Hydro-Kinetic distributor if service is needed. Unauthorized tampering or repair of the air pump will void important provisions of the two year limited warranty.

FRESH AIR VENTING SYSTEM

A fresh air vent assembly is cast into the concrete access cover above each air pump, or designed into the perimeter of the polypropylene lid. The perimeter vent or assembly supplies fresh air to the air pump, which is delivered through the diffuser assembly and into the wastewater. Finished landscaping should be maintained six inches below the top of the vented access cover and graded to drain runoff away from the cover. Do not allow plants, shrubbery, mulch or landscaping of any type to restrict the flow of air to the vent assembly or obstruct the access cover.



PLAN VIEW



FLOW EQUALIZATION DEVICE DETAIL

GENERAL NOTES:

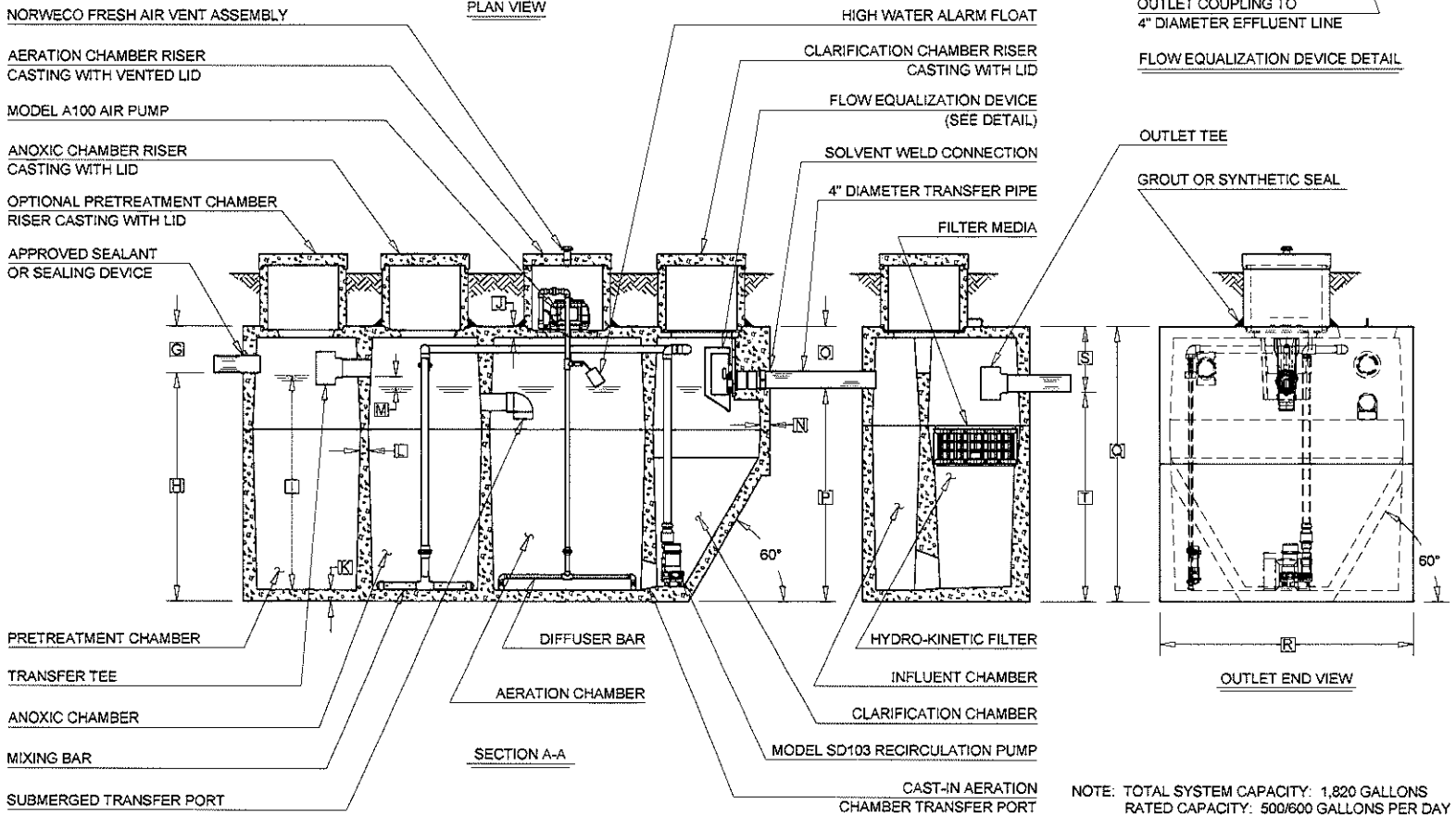
① FALL THROUGH THE HYDRO-KINETIC PLANT FROM INLET INVERT TO OUTLET INVERT IS FIVE INCHES. INLET INVERT IS TWELVE INCHES BELOW TANK TOP.

② ON DEEPER INSTALLATIONS, PRECAST RISERS MUST BE USED TO EXTEND CASTINGS TO GRADE. INSPECTION COVERS MUST BE DEVELOPED TO WITH TWELVE INCHES OF GRADE.

③ TANK REINFORCED PER ACI STD. 318.

④ REMOVABLE COVERS ON RISERS WEIGH IN EXCESS OF SEVENTY-FIVE POUNDS EACH TO PREVENT UNAUTHORIZED ACCESS.

⑤ CONTACT THE LOCAL, LICENSED HYDRO-KINETIC® DISTRIBUTOR FOR ELECTRICAL REQUIREMENTS.



SECTION A-A

OUTLET END VIEW

NOTE: TOTAL SYSTEM CAPACITY: 1,820 GALLONS
RATED CAPACITY: 500/600 GALLONS PER DAY

PROJECT ENGINEER'S APPROVAL:
I (WE) HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.

DATE: _____

NAME: _____

CONTRACTOR'S CERTIFICATION:
I (WE) HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.

DATE: _____

NAME: _____

CRITICAL DIMENSIONS

A	1'- 0"	N	0'- 2 1/2"
B	2'- 4"	O	1'- 4"
C	2'- 5 1/2"	P	4'- 8"
D	3'- 4 1/2"	Q	6'- 0"
E	2'- 4"	R	5'- 6"
F	11'- 5"	S	1'- 5"
G	1'- 0"	T	4'- 7"
H	5'- 0"	U	3'- 7 1/2"
I	4'- 8"	V	
J	0'- 3"	W	
K	0'- 3"	X	
L	0'- 2"	Y	
M	0'- 3"	Z	

U.S. AND FOREIGN PATENTS PENDING

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norweco

HYDRO-KINETIC® MODEL 600 FEU WASTEWATER TREATMENT SYSTEM

02/13/13	C
JMM	
VPE	
10-16-2012	
NTS	
PC-5-1001	

HYDRO-KINETIC®

TWO YEAR LIMITED WARRANTY

Norweco, Inc. warrants every new air pump, recirculation pump, control center, Kinetic Bio-Film reactor and any other Hydro-Kinetic component manufactured by Norweco to be free from defects in material and workmanship under normal use and service for a period of two years from the date of installation, as provided herein. Norweco will repair or replace the warranted component which in the sole judgement of Norweco shows evidence of manufacturing defect, provided that the defective component is returned to the factory, freight prepaid, by a licensed Hydro-Kinetic distributor, licensed service center or authorized dealer. This limited warranty shall be recognized in effect for two years from the date of Hydro-Kinetic system installation, if a warranty registration card has been properly registered with the factory, according to the terms of this warranty. If the warranty registration card has not been registered upon installation of the Hydro-Kinetic system, the limited warranty shall be recognized in effect for two years from the date the warranted component was shipped from the factory.

Norweco reserves the right to revise, change or modify the construction or design of the Hydro-Kinetic system or component parts without incurring any obligation to make such changes or modifications in earlier model components. Norweco reserves the right to furnish new or rebuilt component parts which, in Norweco's judgement, are the equivalent of the parts being replaced.

Service may occasionally be required for the Hydro-Kinetic system due to damage resulting from accident, improper use, voltage fluctuations greater than ±5% of the component nameplate rating, abuse, tampering, act of God, improper installation, vandalism or failure to follow operating procedures. As this damage has not resulted from defects in workmanship or material, it shall not be covered by this warranty. Service charges incurred in these cases, including parts and labor, shall not be assumed by Norweco and shall be the responsibility of the customer.

This Hydro-Kinetic two year limited warranty does not include any portion of the customer's wiring, plumbing, drainage, disposal system, or tankage not manufactured by Norweco, nor does it include freight charges (round trip) required to return the warranted component for factory replacement. Norweco shall not be responsible for damages of any kind or character resulting from or caused directly or indirectly by any defective component, inaccuracy, weakness, failure or delay. The warranty shall not apply to any missing components or to any items which have been disassembled, repaired, altered or tampered with, prior to their return to the factory. Therefore, if a Hydro-Kinetic component part fails to meet Norweco's manufacturing standards or product representations stated herein, do not use or dismantle it, contact the local licensed Hydro-Kinetic distributor, licensed service center or authorized dealer. The distributor, service center or dealer will arrange to have the component part returned to Norweco. Norweco's liability is limited solely to the replacement of the defective component part. Norweco shall not be liable for any labor involved during the removal or replacement of equipment, nor for charges for equipment, freight, transportation, inspection or handling of any component part. In no case will Norweco be liable for loss incurred because of interruption of service or for consequential damages, contingent liabilities or other similar expenses.

This limited warranty is, and the owner agrees that it shall be, in lieu of all other warranties whether expressed or implied. No distributor, service center, dealer or person is authorized or permitted to make any contract or assume any other obligations or liabilities for Norweco. Laws governing limited warranties vary in some states and although this warranty gives the owner specific legal rights there may be additional rights not contained herein.

norweco®

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Norwalk, OH, U.S.A. 44857-1156
Telephone (419) 668-4471
Fax (419) 663-5440

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WASTEWATER TECHNOLOGY

NSF/ANSI Standard 40 - *Residential Wastewater Treatment Systems*
12 Month Testing

Supplemental Report:

Norweco, Inc
Hydro-Kinetic Model 600
11/04/055/0030

NSF International
789 N. Dixboro Road
PO Box 130140
Ann Arbor, Michigan 48113-0140 USA

WASTEWATER TECHNOLOGY

NSF/ANSI Standard 245 - *Wastewater Treatment Systems – Nitrogen Reduction*

Final Report:

Norweco, Inc
Hydro-Kinetic Model 600 FEU
11/04/055/0030

NSF International
789 N. Dixboro Road
PO Box 130140
Ann Arbor, Michigan 48113-0140 USA