

AP SERIES DESIGN MANUAL



hydro-action[®]
green from the ground up



Hydro-Action® AP Series Wastewater Treatment Plant Design

Description of AP Series Aerobic Treatment Units (ATU's)

The **Hydro-Action®** AP Series ATU's have a rated capacity of 500-1500 gallons per day (gpd). Model numbers are as follows; AP500 treats 500 gpd, LPA500 same (low profile), AP600, AP750, AP1000, and AP1500 respectively. Plant specifications and drawings are included in each model section. The plant is constructed of fiberglass reinforced plastic (FRP).

The plant achieves treatment by a flow through process. Continuous aeration is provided by a linear air pump via three Teflon diffusers. Settling is accomplished in a cone shaped clarifier set in the middle of the aeration compartment. The electrical controls and air pump are housed in a single polyethylene enclosure referred to as an OPS® (Operations/Control Center). The electrical controls signal alarms for low air pressure and high water level in the plant.

Wastewater enters the pretreatment tank and flows by hydraulic displacement from the pretreatment tank into the aeration compartment of the treatment unit. Wastewater flows by hydraulic displacement from the aeration chamber through a hole in the base of the cone-shaped clarifier, where final settling takes place. The hydraulic roll created by the aeration system helps to draw settled solids out of the base of the clarifier and back into the aeration chamber. Treated wastewater exits the plant by hydraulic displacement through a tee structure located in the center of the clarifier.

Figure 1

AP Series Model	Daily Flow (gpd)	Total Gallons (g)	Aeration Chamber (g)	Clarification Chamber (g)	CBOD ₅ (mg/l)	TSS (mg/l)
AP500	500	836	663	173	290	360
LPA500	500	836	663	173	290	360
AP600	600	1019	800	219	290	360
AP750	750	1275	1002	273	290	360
AP1000	1000	1632	1280	352	290	360
AP1500	1500	2413	1895	518	290	360

Figure 2

AP Series Model	Rotary Comp	Linear Comp	Tank Diameter	Height To Water Line	Total Height w/ OPS
AP500	1/4 HP	HP80	66"	64"	103.5"
LPA500	1/4 HP	HP80	72"	46"	88"
AP600	1/4 HP	HP100	66"	64"	103.5"
AP750	1/4 HP	HP120	72"	64"	103.5"
AP1000	3/4 HP	HP150	66"	70"	109"
AP1500	3/4 HP	HP200	88"	82"	118"

AP Series ATU Design

AP Series ATU Description & Operation

The **Hydro-Action**[®] AP Series ATU's are onsite aerobic wastewater treatment plants for residential & light commercial application. The treatment capacity is 500 gpd – 1500 gpd. Through the use of its aeration compressors it is able to sustain a bacterial colony to treat wastewater strengths of up to 290 mg/l CBOD₅ and 360 mg/l TSS respectively. Refer to **Figure 1** for reference of treatment maximums. The AP500 was the base model for NSF Standard 40 testing and all AP Series Models are scaled per this model.

Tank Construction

The AP Series tanks are all made of Fiberglass Reinforced Plastic (FRP). However, Hydro-Action uses a Wind/Chop method of application to the mold. Fibers are interwoven over solid strands to reinforce the tank further. This makes the tanks stronger compared to competitive model thicknesses. Volume of each tank varies according to capacity of treatment refer to **Figure 1** for specifications. For dimensions please refer to **Figure 2** or the following drawings.

Dome Construction

The AP Series domes are also made of FRP, and on several of our models we utilize Resin Transfer Molding (RTM) method of construction. This method consists of pressurized saturation of the fiberglass mat which completely and evenly coats leaving a smooth and durable part.

Cone Construction

There are two ways we construct our cones. The smaller of the series are roto-molded out of polyethylene and the larger of the models are FRP. Either method allows for a durable structure to allow clarification of solids. Allowing only clear, odorless effluent to escape through the outlet Tee.

Air and Diffusor System

Hydro-Action[®] uses a porous Teflon type diffuser supplied by aeration compressors. Air is diffused through the Teflon diffusers to support bacterial life. With aerobic bacteria Dissolved Oxygen (DO) is necessary for life. Therefore, the proper compressor must be utilized with each AP Series ATU to comply with NSF std. 40 as well as provide a properly working unit. Refer to **Figure 2** for compressor specifications used for each AP Series model.

OPS[®] Construction & Operation

OPS[®] stands for **Hydro-Action**[®] Operational Control System. The OPS[®] controls the ATU's electrical components. Power is connected then distributed out to the; compressor, alarm system, effluent pump, and high water floats. This system warns in the event of a high water condition or a loss of air pressure. Audible and Visual Alarms are vital tools in an early warning system to notify that a plant may not be operating properly.

NSF Compliance

Hydro-Action[®] ATU's are NSF std. 40 approved and care should be taken to comply with certification of this product. This design manual is by no means a complete list of compliance. Refer to **Hydro-Action**[®] Wastewater Technology Report for specifications.

AP Series OPS® Design

AP Series OPS® Description

The OPS® in the **Hydro-Action®** system controls all aspects of the system. Different Model of OPS® are for varying discharge methods and uses. The main two series are the EC & CP Series OPS®. EC are attached to the system and the CP Series are utilized for remote application. Then there are four models of each; -11, -20, -30, and -32. See samples and chart below for description of each. **Hydro-Action®** OPS® is manufactured to UL specs as per NSF std. 40 certification policies.

Samples

Model Number of OPS®: HA-EC50-20-RV-.25 (Mounted OPS® using a Rotary Vane Compressor)

HA -EC50 -20 -RV -.25
 {Hydro-Action} {Mounted OPS®} {ON-Demand} {Rotary Vane} {1/4 HP}

Model Number of OPS®: HA-CP50-11-L-80 (Remote OPS® using a Linear Compressor)

HA -CP50 -11 -L -80
 {Hydro-Action} {Remote OPS®} {Gravity} {Linear} {HP80}

OPS® Model Numbers

AP Series Model	-11 Leech/Chamber Gravity	-20 Floats On-Demand	-30 Spray Irrigation 24HR Timer	-32 Drip Irrigation Micro-Dose
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OPS® Mounted using Linear Compressors				
AP500	HA-EC50-11-L-80	HA-EC50-20-L-80	HA-EC50-30-L-80	HA-EC50-32-L-80
LPA500	HA-EC50-11-L-80	HA-EC50-20-L-80	HA-EC50-30-L-80	HA-EC50-32-L-80
AP600	HA-EC50-11-L-100	HA-EC50-20-L-100	HA-EC50-30-L-100	HA-EC50-32-L-100
AP750	HA-EC50-11-L-120	HA-EC50-20-L-120	HA-EC50-30-L-120	HA-EC50-32-L-120
AP1000	HA-EC50-11-L-150	HA-EC50-20-L-150	HA-EC50-30-L-150	HA-EC50-32-L-150
AP1500	HA-EC50-11-L-200	HA-EC50-20-L-200	HA-EC50-30-L-200	HA-EC50-32-L-200

OPS® Mounted using Rotary Vane Compressors				
AP500	HA-EC50-11-RV-.25	HA-EC50-20-RV-.25	HA-EC50-30-RV-.25	HA-EC50-32-RV-.25
LPA500	HA-EC50-11-RV-.25	HA-EC50-20-RV-.25	HA-EC50-30-RV-.25	HA-EC50-32-RV-.25
AP600	HA-EC50-11-RV-.25	HA-EC50-20-RV-.25	HA-EC50-30-RV-.25	HA-EC50-32-RV-.25
AP750	HA-EC50-11-RV-.25	HA-EC50-20-RV-.25	HA-EC50-30-RV-.25	HA-EC50-32-RV-.25
AP1000	HA-EC50-11-RV-.75	HA-EC50-20-RV-.75	HA-EC50-30-RV-.75	HA-EC50-32-RV-.75
AP1500	HA-EC50-11-RV-.75	HA-EC50-20-RV-.75	HA-EC50-30-RV-.75	HA-EC50-32-RV-.75

OPS® Remote using Linear Compressors				
AP500	HA-CP50-11-L-80	HA-CP50-20-L-80	HA-CP50-30-L-80	HA-CP50-32-L-80
LPA500	HA-CP50-11-L-80	HA-CP50-20-L-80	HA-CP50-30-L-80	HA-CP50-32-L-80
AP600	HA-CP50-11-L-100	HA-CP50-20-L-100	HA-CP50-30-L-100	HA-CP50-32-L-100
AP750	HA-CP50-11-L-120	HA-CP50-20-L-120	HA-CP50-30-L-120	HA-CP50-32-L-120
AP1000	HA-CP50-11-L-150	HA-CP50-20-L-150	HA-CP50-30-L-150	HA-CP50-32-L-150
AP1500	HA-CP50-11-L-200	HA-CP50-20-L-200	HA-CP50-30-L-200	HA-CP50-32-L-200

OPS® Remote using Rotary Vane Compressors				
AP500	HA-CP50-11-RV-.25	HA-CP50-20-RV-.25	HA-CP50-30-RV-.25	HA-CP50-32-RV-.25
LPA500	HA-CP50-11-RV-.25	HA-CP50-20-RV-.25	HA-CP50-30-RV-.25	HA-CP50-32-RV-.25
AP600	HA-CP50-11-RV-.25	HA-CP50-20-RV-.25	HA-CP50-30-RV-.25	HA-CP50-32-RV-.25
AP750	HA-CP50-11-RV-.25	HA-CP50-20-RV-.25	HA-CP50-30-RV-.25	HA-CP50-32-RV-.25
AP1000	HA-CP50-11-RV-.75	HA-CP50-20-RV-.75	HA-CP50-30-RV-.75	HA-CP50-32-RV-.75
AP1500	HA-CP50-11-RV-.75	HA-CP50-20-RV-.75	HA-CP50-30-RV-.75	HA-CP50-32-RV-.75



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