

**VEW Series Vehicle/Equipment Wash Water Treatment System Engineering Specification
VEW-2 through VEW-16**

Section 1.0 Equipment Design & Construction

Recycling Use

The VEW systems can be used as a single pass and discharge system or as a recycle system depending on the project needs. The VEWs are designed to remove oils, fuels, suspended solids and other contaminants as detailed in this specification. Where rigorous removal of dissolved minerals and metals are required additional treatment may be needed.

As with all recycle systems the materials that are separated must be removed from the system and disposed of according to local and state guidelines (consult the local POTW authority or state EPA guidelines). Water loss will be experienced due to evaporation and overspray in the wash area due to atomization. Water replacement will be required in your storage tank to accommodate water losses. Ultimately, the entire water volume in the recycle system will have to be disposed of and completely replaced as the water cannot be reused indefinitely. As the initial water volume us used dissolved materials may accumulate such as: metals, minerals, soaps and other miscible contaminants.

PAE recommends the use of quick break detergents to limit or stop the passage of chemically induced, stable oil-in-water emulsions requiring more treatment than that provided by the VEW systems to be removed. Being that the water largely absorbs most soaps and detergents the VEW may remove only a small fraction of the soaps. To some degree quick break soaps may combine with the oils they remove and may exit the system when you dispose of the separated oils and fuels. PAE recommends the use of our GAC carbon filter for removal of dissolved VOCs, light pesticide loads, solvents and other organics in projects where your clientele or business might expect to find these materials.

Implementation

PAE recommends use of a washpad, collection trough and a collection sump prior to the VEW system in order to drop out heavy solids loads and large particulates. This design will reduce the solids load to the VEW leading to less maintenance and less possibility of overloading the oil and solids removal systems within the VEW system.

Performance

The Pan America Environmental VEW Series washwater treatment systems are designed to produce an effluent concentration of 10 mg/l or less of oil droplets 30 micron and larger of non-emulsified, free and dispersed oils at the influent. By virtue of our Flopak coalescing media and tank design readily settleable solids are also removed. All filterable solids are removed down to 15-micron particle sizing (nominal). Removal of free and trace hydrocarbons, dispersed oils, sheens, slightly soluble chlorinated hydrocarbons and high molecular weight organics is also provided.

1.01 System Components

The VEW system shall consist of the following components:

OS Series Oil/Water Separator, Retpak Secondary Coalescer, Effluent Transfer Pump & Nema 4 Control Panel
Effluent Solids Filter, AQAM Polishing Filter, Flow Meter, Carbon Steel Skid. The VEW-A systems incorporate the AQAM filter.

1.02 Oil/Water Separator Design

The OS series oil/water separator will be designed and fabricated per the following specifications. Rectangular tankage with features and components as described designed per API #421 Design & Operation of Oil/Water Separators Manual, February 1990 and stokes law. The design will incorporate flexible flow rating capability based on application parameters.

1.03 Influent Chamber

Influent flow enters the clog proof influent diffuser pipe and is immediately spreadout across the depth and width of the chamber. Any readily settleable solids drop to the bottom of the V-shaped solids hopper located directly under the coalescing media pack.

1.04 Oil/Water Separation Chamber

The separation chamber is to be packed with Flopak cross-fluted coalescing media. The media pack will be designed to create a quiescent zone, a laminar flow pattern to facilitate the impingement of oil on the media, and will provide numerous impact sites and changes of flow direction. The media shall have a 60-degree cross-flute angle.

1.05 Cylindrical Oil Skimmer

The separator shall be provided with an adjustable cylindrical oil skimmer that allows the skim head to be readily removed or adjusted without tools. The skim head rotation collar will be provided with Buna-N seal. The oil skimmer is to be located at the effluent end of the separation chamber. The skimmer shall not require lubrication for operation.

1.06 Solids Hopper

The separator shall have a V-shaped solids hopper located under the coalescing media. This chamber will provide temporary solids storage. The hopper walls are to be pitched at 45 degrees to assure simple and thorough solids removal. Dual outlet ports will be provided for sludge removal.

1.07 Clean Water Effluent Chamber

The cleansed water will flow under the oil baffle, over the water weir and into the effluent chamber. The effluent transfer pump will draw flow from a suction fitting in this chamber.

1.08 Separator Cover

The separator is to have a single piece cover that provides complete closure of the tank. The separator cover will be mounted to the tank via quick release hardware and vapor sealed with an industrial grade closed cell, compressible PVC gasket.

1.09 Tank Vent

The oil outlet can be used as tank vent by plumbing in a PVC tee. If separate vent fitting is required PAE can provide an individual coupling located wherever desired.

1.10 Fittings

All wetted fittings must be fiberglass constructed, integrally bonded via fiberglass bond to the tank for permanent, leak proof fitting seal. Tank penetrating, gasketed bulkhead fittings or couplings are not to be used.

Section 2.0 Materials of Construction

2.01 Fiberglass Construction

Tank shell, baffles and cover shall be molded of premium grade DION 6694/95 corrosion proof resin with a minimum of 25% chopped fiberglass fiber to resin mix. An ultraviolet stabilized white gel coat shall be used to coat external surfaces 16-20 mils dft.

2.02 Piping

Internal piping to be schedule 40 PVC / external piping shall be type 1, grade 1 PVC, schedule 80.

2.03 Coalescing Media

Cross-fluted, oleophilic, PVC Flopak coalescing media shall be provided as manufactured by Pan America Environmental.

2.04 Cover Gasketing

Closed cell, industrial grade PVC constructed vapor sealed cover gasketing shall be provided. No neoprene shall be permitted.

Section 3.0 System Components

3.01 Retpak Secondary Coalescing Media

A Retpak, reticulated, polyurethane secondary coalescing media shall be included to provide increased coalescing surface area in the oil/water separator to remove smaller oil and fuel droplets.

3.02 Effluent Pump and Control Panel

The treated wastestream is pumped out of the oil/water separator via an automatic/manual pumpout system. The pump will be a centrifugal design with TEFC motor. The pump is to be controlled via a Nema 4-control panel with HOA operation. When in the automatic mode the pump on/off function is to be controlled by a dual, level switch assembly located in the oil/water separator effluent chamber. A flowmeter will be provided to accurately indicate system flow rate. The entire pumpout system will be mounted, plumbed and wired to the VEW system skid and plumbed via ASTM, D-1784, schedule 80 PVC. Power disconnect optional. Power required: 115V/1ph/60Hz.

3.03 Effluent Solids Filter

A filter housing assembly shall be provided mounted to the pump discharge piping to facilitate removal of all the filterable solids down to the 15-micron (nominal) size level. Filter housing, housing cap, internal bag basket and replaceable filter bags are to be of polypropylene construction. Cap housing seal is Buna-N. A pressure gauge is provided to indicate bag changeout pressures.

3.04 AQAM Polishing Filter (provided with the VEW-A system)

The AQAM polishing filter is designed for the selective adsorption of free, dispersed oils, sheens, slightly soluble chlorinated hydrocarbons and high molecular weight organics. The AQAM media is an Alkyl Quaternary Ammonium Montmorillonite (AQAM) material distributed in a support bed of anthracite coal. The filter housing may be polyethylene or fiberglass construction that allows removal and refill of exhausted media. The type of vessel provided is determined by PAE according to flow rate and application requirements. The vessel is provided with internal distributors that distribute and collect the flow evenly throughout the media bed to avoid channeling and incomplete exposure of the AQAM media to the waste flow.

3.04.1 AQAM Standard Filter Cell Construction

The AQAM filter cell construction shall be of continuous, filament wound fiberglass design, NSF, UL approved WQA standard S-100. The cell base will be of compression molded fiberglass. Filter cell is designed for operating pressures up to 100 psi.

3.04.2 Filter Cell Piping

Filter cell external piping shall be schedule 80, ASTM, D1785 PVC. Internal distributor and pickup pipe shall be schedule 80, ASTM, D1785 PVC.

950 Rand Rd. Unit 120 Wauconda, IL 60084 USA
847-487-9166 Fax: 847-487-9218

www.panamenv.com panam@panamenv.com

3.04.3 Mounting Hardware

The AQAM filter will be mounted to the system skid via 304 stainless steel brackets and attaching hardware.

3.04.4 AQAM Performance

The AQAM media functions by absorbing contaminant(s). The media will remove as much as 50% of its own weight in contaminant. Due to its modified nature AQAM media is hydrophobic and organophilic (oil attracting). These characteristics allow it to remove contaminant while minimizing water absorption. Oil removal of 5 mg/L or less can be attained.

3.05 System Skid

The system will be provided mounted, plumbed and wired to a forkliftable skid constructed of A-36 carbon steel. The external surfaces shall be prepared to an SSPC-SP6 finish followed by a prime coat and industrial grade epoxy coating (6-dft min.) (Standard color is Rain Forest Green).

3.06 Manufacturer

The manufacturer of preference shall be: Pan America Environmental
950 Rand Rd. Unit 120 Wauconda, IL 60084

3.07 Warranty

Pan America Environmental warrants its products to be free of defect in materials and workmanship for a period of one year from the date of shipment.

Section 4.0 System Operational Details

4.01 Maintenance and Operation

The VEW systems contain two consumable products. 1. Filter bags (solids filtration) 2. AQAM filter media. The life expectancy of each is determined by influent loadings put into them. PAE can estimate the life expectancy of the AQAM media by computer calculation. To do this we will need: flow rate, hours per day system is used, days per week system is used and contaminants in wastestream. The system requires 115V/1pH/60Hz, 15 amp electrical to operate the control panel and effluent pump system. Usually one or two standard control switches on the control panel are all that is required to operate (exclusive of any system customization).

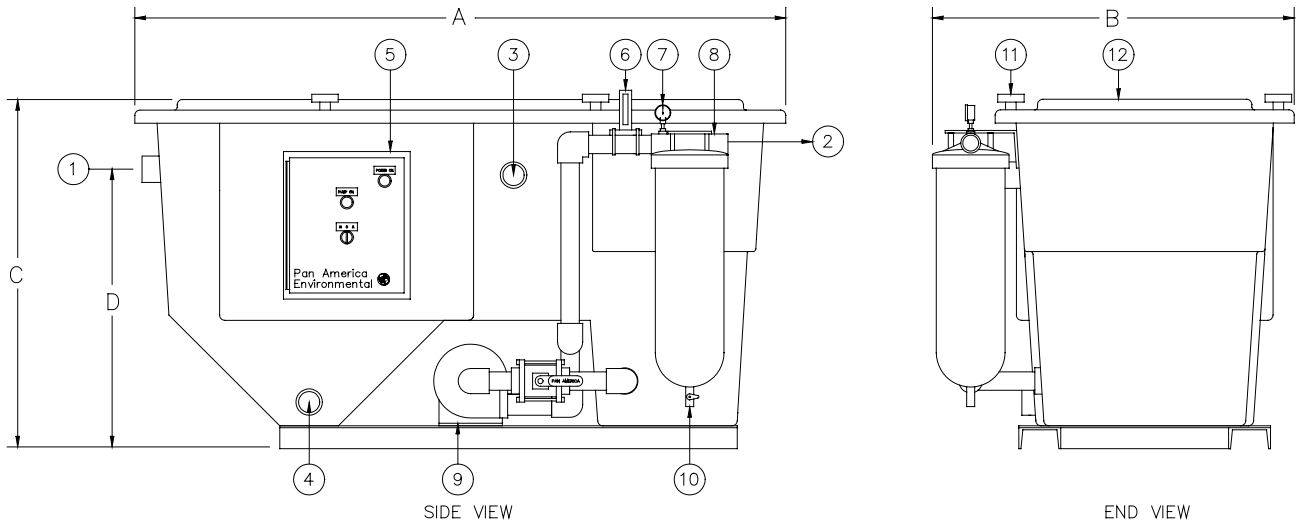
To maintain the system you must:

1. Remove oils from external storage drum/tank,
2. Remove solids from oil/water separator hopper and solids filter
3. Clean out Flopak & Retpak media (if needed)
4. Check overall system for proper operation.

4.02 System Electrical Requirements

Electrical supply: 115V/1ph/60Hz
Amp load: 15-35A

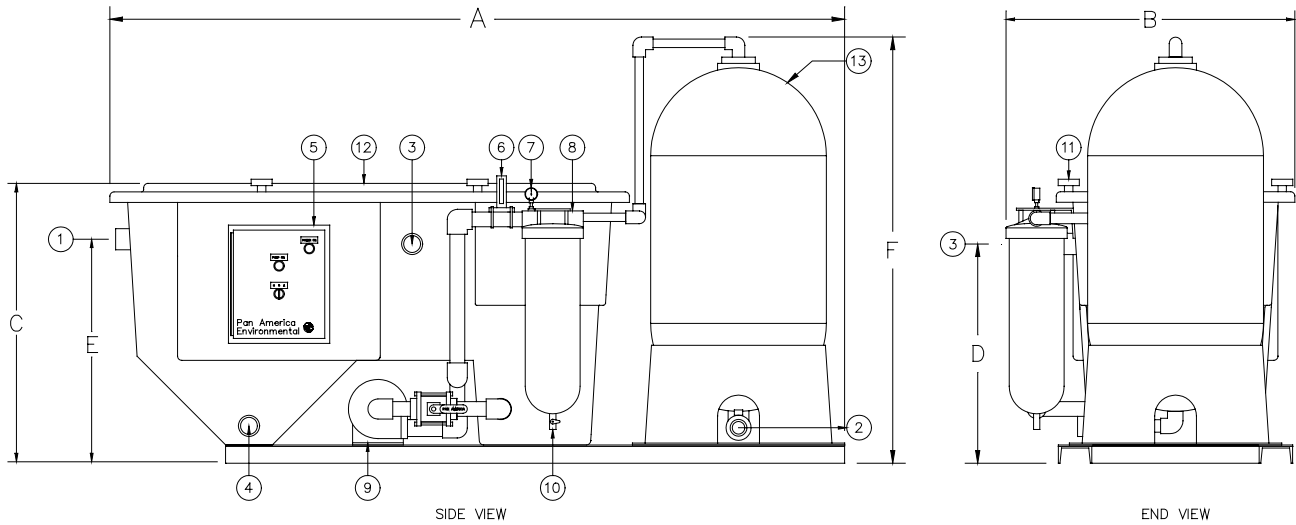
VEW-2 through VEW-16



Model	Dimensions				Fitting Sizes				Weights(lbs)		Sludge	Flow
	A	B	C	D	inlet	outlet	oil	sludge	Empty	Operating	Gal.	GPM
VEW-2	7'-0"	2'-0"	5'-6"	2'-3"	2"	1"	2"	2"	550	1425	6.5	3 - 5
VEW-4	7'-7"	2'-3"	6'-3"	2'-3"	2"	1.5"	2"	2"	680	2350	13	5 - 10
VEW-8	8'-6"	2'-6"	6'-10"	3'-3"	2"	1.5"	2"	2"	975	3700	13	10 - 20
VEW-12	9'-0"	4'-0"	6'-10"	3'-3"	3"	2"	3"	3"	1700	5900	25	20 - 30
VEW-16	9'-6"	5'-6"	6'-10"	3'-3"	3"	2"	3"	3"	2300	8900	37	30 - 45

Information not for construction. Dimensions and design subject to change.
 AQAM filter height may vary depending on amount of media required for your application.

VEW-2-A through VEW-16-A

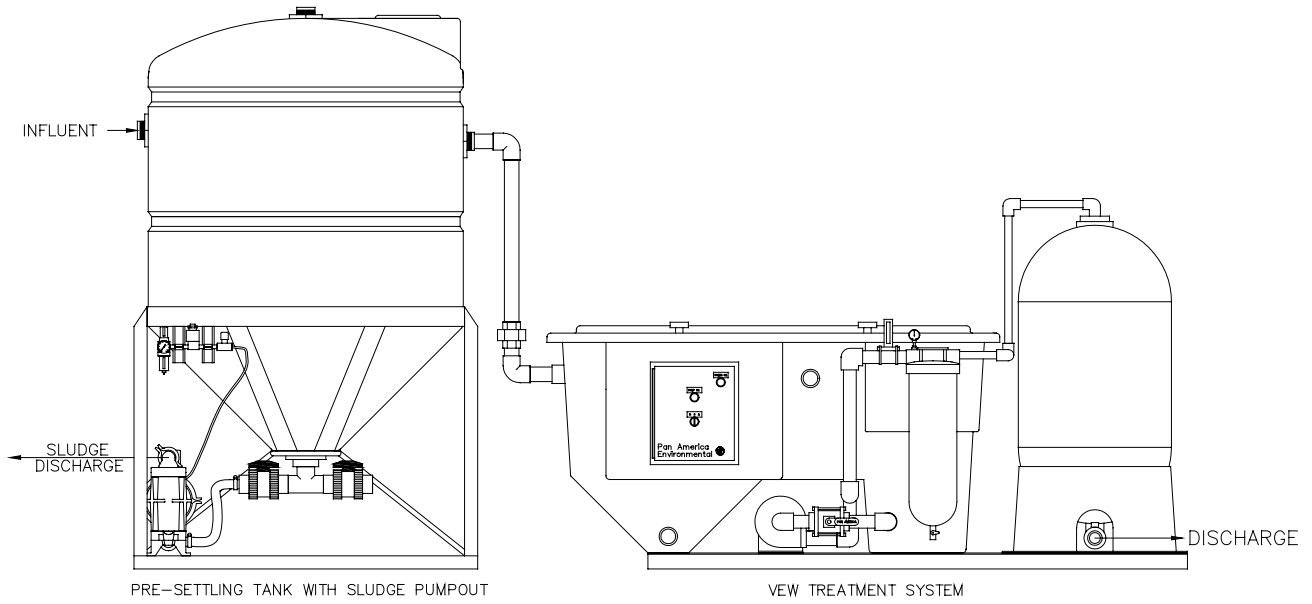


Model	Dimensions					Fitting Sizes				Weights(lbs)		Sludge	Flow
	A	B	C	D	E	inlet	outlet	oil	sludge	Empty	Operating	Gal.	GPM
VEW-2	7'-0"	2'-0"	5'-6"	2'-2"	2'-3"	2"	1"	2"	2"	775	1655	6.5	3-5
VEW-4	7'-7"	2'-3"	6'-3"	2'-2"	2'-3"	2"	1.5"	2"	2"	1105	2775	13	5 - 10
VEW-8	8'-6"	2'-6"	6'-10"	3'-3"	3'-3"	2"	1.5"	2"	2"	1525	4250	13	10 - 20
VEW-12	9'-0"	4'-0"	6'-10"	3'-3"	3'-3"	3"	2"	3"	3"	2375	6575	25	20 - 30
VEW-16	9'-6"	5'-6"	6'-10"	3'-3"	3'-3"	3"	2"	3"	3"	3300	10000	37	30 - 45

Information not for construction. Dimensions and design subject to change.
 AQAM filter height may vary depending on amount of media required for your application.

VEW Installation Configurations

When the VEW system is entirely above grade use of a pre-separation/settling tank is recommended.



When used in conjunction with a wash water collection sump the VEW should be configured with a feed system.

