

The AQAM Series filters are designed to treat wastewater generated by a variety of sources where water needs polishing of petroleum based products prior to discharge to sewer.

The AQAM filter is designed for removal of fuels/oils from a variety of waste streams.

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 fiberglass or steel construction that allows removal and refill of exhausted media.

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.

Any of our separation equipment can be combined with the AQAM filters to provide the needed configuration for any flow rate and contaminant type(s).

Options can be provided to complete the system design, such as oil water separator, pumping systems, GAC filtration, bag or sand filtration, chemical treatment, pH adjustment, metals precipitation/filtration and any of the technologies in our product lineup that may be required.

Customization & modifications to fit your project needs are offered. Typical AQAM performance is 5 ppm or less, 30 micron oil droplet.

Features:

- ◆ AQAM Media
- ◆ Filter Vessel
- ◆ Internal Distributor System
- ◆ Inlet/outlet Fittings
- ◆ Bolt Down Legs/Base
- ◆ Sealed/Gasketed Access
- ◆ Coated Steel Vessels
- ◆ FRP Filter Vessels
- ◆ Schedule 80 PVC Piping
- ◆ High Performance Oil Reduction
- ◆ Compact design

Typical applications:

- ◆ Car/truck wash facilities
- ◆ Forklift wash pads
- ◆ DAF/Clarifier pre/post-treatment
- ◆ Power plant water treatment
- ◆ Refinery process water
- ◆ Aircraft wash racks
- ◆ Military wash racks
- ◆ Tank farm leakage treatment
- ◆ Vehicle washwater treatment
- ◆ R.O. Filter pre-treatment
- ◆ Oil spill recovery
- ◆ Trench water treatment
- ◆ Bilge water treatment
- ◆ Hydraulic fluid tank de-watering



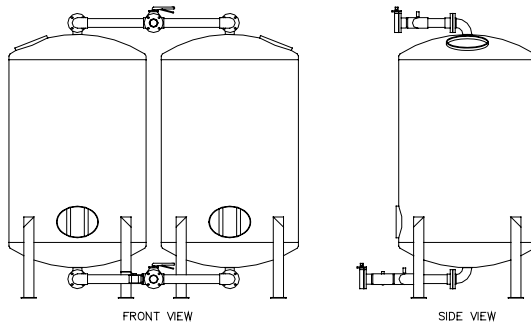
AQAM Filters shown with oil water separator systems



AQAM Function

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 reduction down to non-detect can be attained. PAE recommends sample testing to verify performance and system configuration.

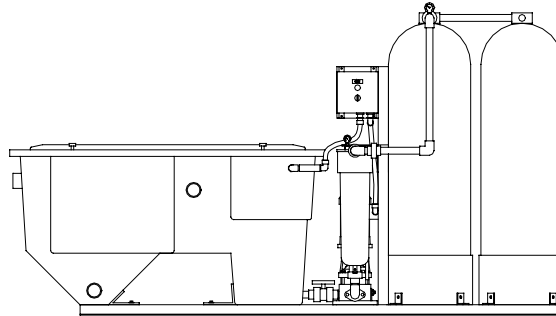


The AQAM filters are offered in single and multiple vessel designs to accommodate the flow rate and contaminant type. Emulsions can be removed by upsizing the vessel and is usually most practical on low flow applications.

Multiple vessels can be plumbed for series or parallel operation. GAC can also be used in combination with the AQAM filters depending on the contaminants in the wastestream.

When treatment for oils, fuels and other petroleum-based products is required typically oil water separation or dissolved air flotation is used. Post treatment with the AQAM filters can further reduce the petroleum products for best possible discharge performance as an insurance policy against discharge and/or as a measure to attain a required discharge.

When discharging to POTWs, rivers or septic/leach fields the AQAM can provide the extra performance increase and another protective barrier between you and high discharge concentrations.



The recommended AQAM installation consists of several components:

- Effluent pumpout system
- Effluent solids filter
- AQAM system

This design is recommended in order to protect the AQAM filters from being blinded by solids. The AQAM requires pressurized feed to get the wastestream through the filter media.

Our AQAM product can be used to effectively remove oil and other hydrocarbons from water where additional treatment is required due to oil specific gravity, low influent concentration or discharge limits dictate higher performance. The product does not absorb hydrocarbons, but rather adsorbs them, which leaves no byproduct from the process. In the adsorption process, the quaternary amines create organic "pillars" between the clay platelets that increase the interlamellar distance and facilitate the formation of a hydrocarbon partition. Testing has confirmed AQAM's ability to clean produced water from oil well drilling operations, with reductions in high concentrations of Total Petroleum Hydrocarbons and Oil & Grease to non-detectable levels. Soluble BTEX hydrocarbons were reduced to less than 3 ppb with AQAM alone and to below detectable limits after exposure to a combination of AQAM and Granular Activated Carbon (GAC)

Optimizing treatment with polishing

For treatment of hydrocarbons and other organic contaminants, the optimal solution is AQAM for primary filtration, followed by carbon for final polishing. Granular carbon adsorbs contaminants through surface porosity. While this mechanism is suitable for removal of low molecular weight organics such as BTEX, the pore structure of carbon becomes obstructed when exposed to high molecular weight organics such as oil and grease.

AQAM possesses several advantages over granular carbon:

- It offers much higher adsorption and can adsorb up to 60- 70% more contaminants by weight.
- It is most efficient in removing insoluble and dispersed hydrocarbons that contribute to Total Petroleum Hydrocarbon (TPH) and Oil & Grease measurements.
- It tolerates concentration spikes that result from separator or treater upsets and accidental oil carry-over from storage tanks.
- Adsorbed hydrocarbons do not desorb. Spent media would likely be classified in the United States as a nonhazardous waste.

Because AQAM adsorbs contaminants through a platelet partitioning mechanism, it is not subject to pore blinding. The product's high adsorption capacity - up to 70% of its weight in several organic compounds - makes it the best available technology for primary filtration, in terms of both performance and cost. AQAM not only extends the life of carbon, it also enables carbon to do what it does best - remove trace amounts of light molecular weight objects. When AQAM is used in combination with GAC adsorption it provides high removal efficiency and excellent reliability in treating contaminated wastewaters.

AQAM Industrial Water Treatment Results

Constituent	Before (mg/L)	After (mg/L)	% Reduction	Application
Acenaphthene	5,580,000.0000	BDL	99.99%	Creosote Plant
	0.1500	0.0005	99.67%	Wood Processing
Acenaphthylene	0.0067	ND	99.99%	Wood Processing
Ammonia Nitrogen	245.0000	21.00	91.43%	Paper Mill
2 Anthracene	3.9580	ND	99.99%	Carbon Black Plant
	3,650,000.000	BDL	99.99%	Creosote Plant
	0.0134	ND	99.99%	Wood Processing
Arsenic	2.6200	0.1220	95.34%	Oil Production
	0.2130	0.0130	93.90%	Creosote Plant
Benzo (a) Anthracene	1,170,000.0000	BDL	99.99%	Creosote Plant
	0.0001	ND	99.99%	Wood Processing
Benzo (b) Fluoranthene	0.0001	ND	99.99%	Wood Processing
Benzo (a) Pyrene	0.0360	ND	99.99%	Carbon Black Plant
Benzo (g,h,i) Perylene	0.0380	ND	99.99%	Carbon Black Plant
BOD's	244.0000	11.00	95.49%	Firefighting Academy
	1,100.0000	9.00	99.18%	Laundry Service
	211,000.0000	533.0	99.75%	Paper Mill
	3 113,400.00	849.00	99.25%	Creosote Plant
	23,689.0000	2,133.00	91.00%	Paper Mill
BTEX	1.0000	0.0270	97.30%	Shipyards
	20.4900	ND	99.99%	Firefighting Academy
Cadmium	0.0220	BDL	99.99%	Laundry Service
4-Chloro-3-Methylphenol	26.0000	ND	99.99%	Process Coolant
Chromium	0.0780	ND	99.99%	Laundry Service
	2.0200	0.0080	99.60%	Creosote Plant
	24.8000	4.3100	82.62%	Braking Systems
Chrysene	1,070,000.0000	BDL	99.99%	Creosote Plant
	0.0001	ND	99.99%	Wood Processing
COD's	3,340.0000	113.00	96.62%	Firefighting Academy
	>23,000.0000	458.00	98.01%	Paper Mill
	3 87,200.0000	949.00	98.91%	Paper Mill
2 Copper	4.0000	0.0220	99.45%	Shipyards
	1 0.2520	BDL	99.99%	Laundry Service
	1.5600	0.0530	96.60%	Creosote Plant
1,1 Dichloroethane	0.0150	ND	99.99%	Groundwater
	0.0094	ND	99.99%	Groundwater
1,2 Dichloroethene	1.5000	ND	99.99%	Groundwater
1,4 Dioxane	726.5000	126.00	82.66%	Plastics Mfr
Fluoranthene	4.3930	ND	99.99%	Carbon Black Plant
	9,540,000.0	BDL	99.99%	Creosote Plant
	0.0057	0.0001	97.44%	Wood Processing
Fluorene	5,990,000.0	BDL	99.99%	Creosote Plant
	0.0789	ND	99.99%	Wood Processing
Gasoline Range Hydr ocarbons	1.8800	ND	99.99%	Process Coolant
Lead	2.0000	0.0110	99.45%	Shipyards
	14.1800	BDL	99.99%	Laundry Service
Mercury	0.0018	ND	99.99%	Oil Production
2-Methylnaphthalene	6.1000	ND	99.99%	Creosote Plant
Motor Oil	310.0000	ND	99.99%	Process Coolant
Naphthalene	1.0000	ND	99.99%	Shipyards

	121,400,000.0	BDL	99.99%	Creosote Plant
	0.6830	0.0008	99.89%	Wood Processing
Nickel	2.0000	0.1600	92.00%	Shipyards
	10.0200	ND	99.99%	Oil Production
	0.0840	BDL	99.99%	Laundry Service
Oil and Grease	200.0000	ND	99.99%	Shipyards
	1 488.0000	ND	99.99%	Tank Cleaning
	289,000.0000	3.4600	99.99%	Laundry Service
	147,000.0000	3.4600	99.99%	Paper Mill
	3 68,800.0000	BDL	99.95%	Creosote Plant
	3,360.0000	1.6600	97.78%	Paper Mill
	1 2,050.0000	45.6000	99.99%	Braking Systems
	1.0000	ND	99.99%	Wood Processing
Pentachlorophenol ,PCP	4,630.0000	BDL	99.99%	Creosote Plant
	2.4500	0.1300	94.69%	Wood Processing
Phenanthrene	15,900,000.0000	BDL	99.99%	Creosote Plant
	0.0888	0.0001	99.90%	Wood Processing
Phenolics (recoverable)	2.0000	0.1550	92.25%	Shipyards
1 Pyrene	16.1570	ND	99.99%	Carbon Black Plant
	4,270,000.0000	BDL	99.99%	Creosote Plant
	0.0028	0.0001	96.19%	Wood Processing
TCE (Trichloroethene)	0.1800	BDL	99.99%	Landfill Groundwater
	2.80	ND	99.99%	Groundwater
TCE (Trichloroethylene)	250.0000	2.2000	99.12%	Pesticide Mfr.
TOC (Total Organic Compounds)	86,000.0000	1,370.0000	98.41%	Paper Mill
TPH	50.0000	ND	99.99%	Firefighting Academy
Total Phosphorous	132.0000	3.2000	97.58%	Paper Mill
TSS's	93.0000	10.0000	89.25%	Firefighting Academy
	500.0000	9.0000	98.20%	Laundry Service
	27,400.0000	43.0000	99.84%	Paper Mill
	2 57,250.0000	58.0000	99.90%	Creosote Plant
Vinyl Chloride	0.2600	ND	99.99%	Groundwater
Zinc	4.0000	0.7430	81.43%	Shipyards
	1 0.0460	0.0150	67.39%	Oil Production
	1.5500	BDL	99.99%	Laundry Service

