

AquaSep® XS Coalescers

Effectively Separate Liquid/Liquid Dispersions



FCAQUAXSENb

Introduction

Pall's AquaSep XS liquid/liquid coalescer system is a lower cost solution to separate emulsions versus competitive cartridge coalescers, sand beds and electrostatic precipitators (ESPs). Its cost effectiveness is due to the ability of each coalescer element to process a higher flow while still providing superior effluent quality. Up to 60% more flow per element is now achievable, resulting in significantly lower capex, smaller footprint and volume, and as well as reduced weight. Outlet quality is superior to competitive offerings. See Figures 1, 2, and 3 below.

Typical Applications

Not all coalescers provide a high quantitative removal of dispersed liquid contaminants nor can handle emulsions with low interfacial tensions (IFTs). For example, conventional cartridge coalescers made of glass fiber media begin to lose efficiency when the IFT of the emulsion gets below 20 dynes/cm. In contrast, the AquaSep XS coalescer from Pall is constructed of a high-efficiency, polymeric medium, making it well suited for numerous liquid/liquid separation applications with very low IFTs including:

- Removal of water from refined products with or without additive package, including gasoline, diesel, jet, and LPG
- Separation of water from hydrocarbon condensates, refinery intermediates, naphtha, propane and propylene
- Separation of oil from water



AquaSep XS Liquid/Liquid Coalescers available in 6, 20, and 40 inch lengths

Comparative Performance

Figure 1: Effluent Quality – Pall vs. Competition 0.1% Water Ingression, 18 dynes/cm, Horizontal Configuration

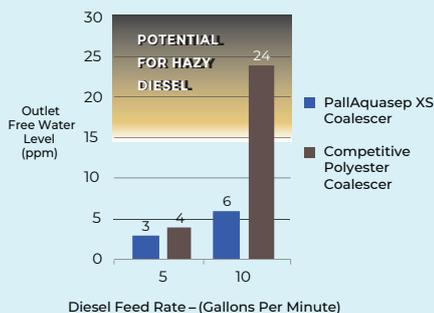


Figure 2: Effluent Quality – Pall vs. Competition 5% Water Ingression, 33 dynes/cm, Vertical Configuration

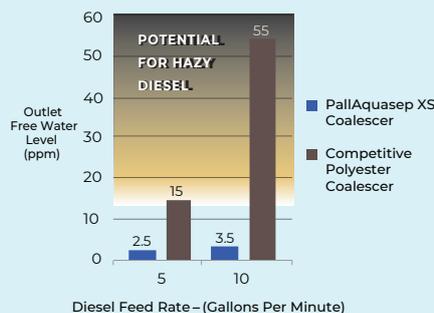
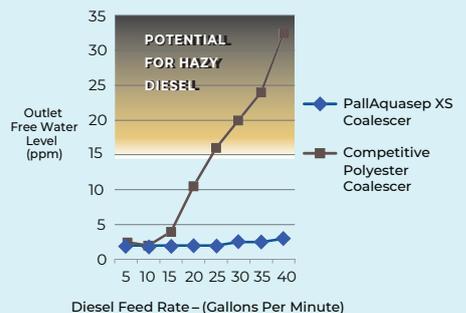


Figure 3: Effluent Quality – Pall vs. Competition 0.1% Water Ingression, 33 dynes/cm, Vertical Configuration



NOTE: Comparison tests were performed in a Pall laboratory with a limited number of 20 inch elements that were purchased through standard commercial channels. Lab results may not be identical to test results with actual process fluid under field conditions.

Product Benefits

Features	Advantages	Benefits
High Performance Polymeric Medium	<ul style="list-style-type: none"> Up to 60% higher flow per coalescing element Reduced incidents of off-spec product Longer service life of coalescer and prefilter elements Tolerant to process upsets, can remove slugs of liquids 	<ul style="list-style-type: none"> Smaller, lower cost system Eliminates reprocessing, product degradation, and transportation costs Reduces costly corrosion problems in downstream equipment Prevents catalyst deactivation in downstream processes Lower operating costs versus less efficient alternative solutions <ul style="list-style-type: none"> Salt driers, electrostatic separators, and sand filters Fewer cartridge change-outs, reduced maintenance costs, and waste disposal costs Consistent fluid quality
Non-disarming Medium	<ul style="list-style-type: none"> The medium does not disarm in the presence of surfactants. Disarming occurs when surfactants (either natural or additives) "coat" the surface of the medium Ability to separate emulsions with IFTs lower than 20 dynes/cm 	<ul style="list-style-type: none"> Consistent fluid quality Eliminates ongoing labor costs to change out disarmed glass fiber coalescers Reliable use of liquid/liquid coalescers on challenging applications such as final fuels with additive package, refinery intermediate streams, hydrocarbon condensate, stabilization, naphtha feed in ethylene plants
Availability of a High Performance Integrated Vertical Stack Design - Coalescer and Separator	<ul style="list-style-type: none"> Higher flow per cartridge because of even flow distribution. In conventional two-stage systems, the separators are located at different distances from the coalescers. This causes poor flow distribution and the potential to re-atomize droplets that can bypass the separators. 	<ul style="list-style-type: none"> Consistent fluid quality Smaller, lower cost system



End cap configurations of Pall's separator (left) and coalescer (right)

Pall's coalescer (top) and separator (bottom) shown in an integrated vertical stack design

Description

The AquaSep XS system is a multiple-stage system starting with filtration to remove particulate matter, followed by either a one-stage horizontal coalescer or two-stage integrated vertical coalescer/separator stack to separate the two liquid phases. AquaSep XS coalescers will remove free water to a level as low as 15 ppmv¹ and be effective over a wide range of conditions such as inlet liquid contaminant concentration as high as 10% and interfacial tension less than 20 dynes/cm.

The AquaSep XS coalescer system is available in two different housing configurations. Both configurations begin with a filtration stage to remove solid contaminants.

Table 1: Coalescer Selection Guide

Process Condition	Recommended Product
The dispersed phase fluid is aqueous and a horizontal vessel footprint is acceptable	AquaSep XS coalescer in a horizontal housing without separator
The dispersed phase fluid is oil and the continuous phase fluid is aqueous	
The dispersed phase fluid is aqueous and minimal footprint is required	AquaSep XS coalescer separator stack in a vertical housing

AquaSep XS Coalescer - Horizontal Housing Configuration

In a horizontal housing, the liquid/liquid mixture enters the coalescing element and flows inside-to-outside. Small liquid dispersed phase droplets suspended in the continuous phase come together, or coalesce, as the mixture moves through the AquaSep XS coalescer. The large coalesced droplets of the dispersed phase separate by gravity in the horizontal housing and are removed. The size of the housing is a function of the flow rate, IFT, viscosity, and specific gravity of the liquids.

AquaSep XS Coalescer/Separator Stack - Vertical Housing Configuration

The liquid/liquid mixture enters the coalescing element and flows inside-to-outside. Small liquid droplets suspended in the continuous phase come together, or coalesce, as the mixture moves through the coalescer medium.

Contaminant-free liquid and large droplets of the dispersed phase flow toward the separator located directly below the coalescer stage. The flow is outside-to-inside. The separator medium is hydrophobic preventing the aqueous phase from entering the separator. Only the non-aqueous continuous phase fluid flows through the separator. The two liquids are removed by separate drain connections.

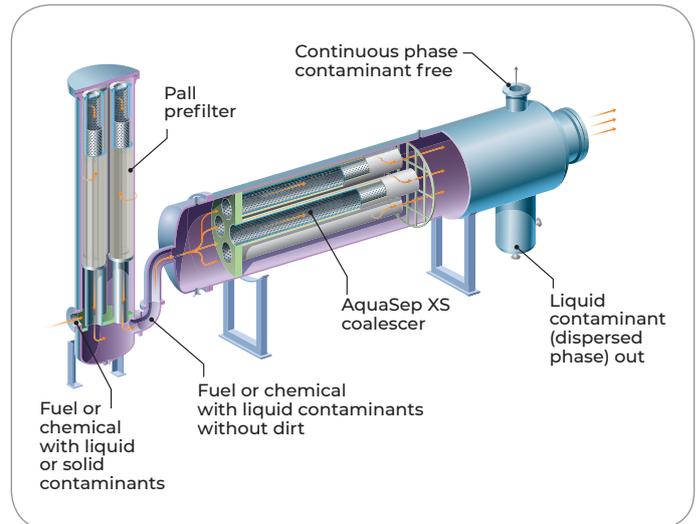


Figure 4: AquaSep XS Liquid/Liquid Separation System with Coalescer in a Horizontal Housing with a Prefilter

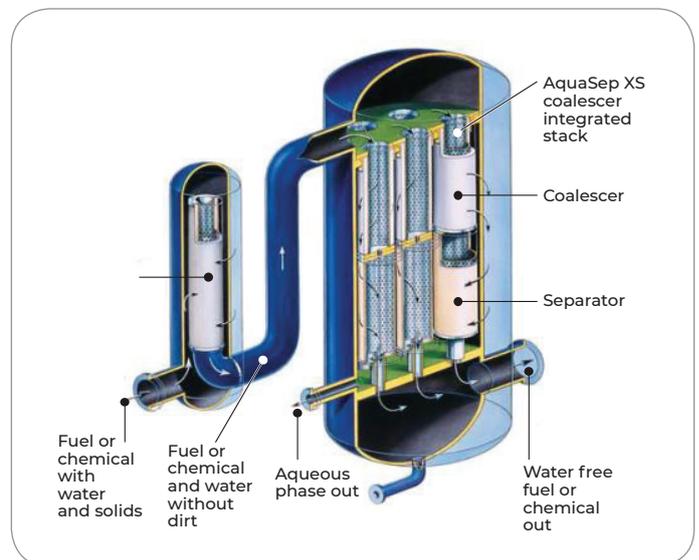


Figure 5: AquaSep XS Liquid/Liquid Separation System with an Integrated Coalescer/Separator Stack in a Vertical Housing with a Prefilter

¹ Performance can vary depending on application.

Compatibility

The AquaSep XS coalescer is compatible with hydrocarbon fuels, trace amounts of IPA and methanol, and water in the pH range of 4 - 8.5. For compatibility information with a specific chemical, please contact your Pall representative or distributor.

Product Specifications

Maximum operating temperature:	60°C/140°F
Maximum differential pressure:	3.4 bard/50 psid at 21°C/70°F
Recommended change-out:	1.0 bard/15 psid at 21°C/70°F

Ordering Information

Part Number	Description	Outer Diameter (cm/ in) nominal	Length (cm/ in) nominal
LCS06PXSH	AquaSep XS Coalescer	7/2.75	15.2/6
LCS2PXSH	AquaSep XS Coalescer	10.7/ 4.2 (flange) 9.53/3.75 (main element)	50.8/20
LCS4PXSH	AquaSep XS Coalescer	10.7/ 4.2 (flange) 9.53/3.75 (main element)	101.6/40
LSS2F2H	Separator	9.53/3.75	50.8/20

AquaSep XS Coalescer Reduces Costs

Begin reducing your capital and operating costs today. Contact your local Pall distributor or call Pall directly to arrange for a budgetary quotation and pilot test of the AquaSep XS coalescer technology.

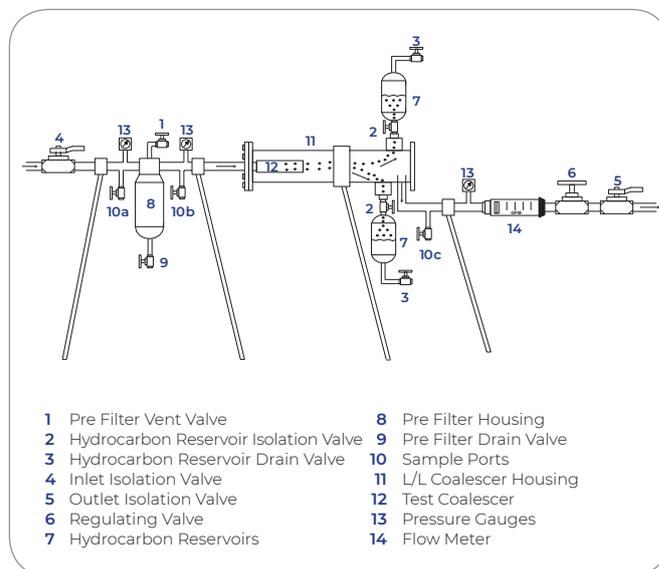


Figure 6: Illustration of Pall pilot scale liquid/liquid coalescer test stand



PALL CORPORATION

Corporate Headquarters

Port Washington, NY, USA
+1-800-717-7255 toll free (USA)
+1-516-484-5400 phone

European Headquarters

Fribourg, Switzerland
+41 (0)26 350 53 00 phone

Asia-Pacific Headquarters

Singapore
+65 6389 6500 phone

Visit us on the Web at www.pall.com/industry

Contact us at www.pall.com/contact

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