



Pall Corporation

NEW: AquaSep® XS Coalescers Effectively Separate Liquid/Liquid Dispersions

Introduction

Pall's new AquaSep XS liquid/liquid coalescer system is a lower cost solution to separate emulsions versus competitive cartridge coalescers and other traditional methods. Its cost effectiveness is due to the ability of each coalescer element to process a higher flow while still providing superior effluent quality. For existing cartridge coalescer systems, the AquaSep XS element provides superior removal of slugs of liquid contaminant thereby making it a more reliable solution than competitive offerings. See Figures 1, 2, and 3 below.

Typical Applications

Not all coalescers provide a high quantitative removal of dispersed liquid contaminants and 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 dyne/cm. In contrast, the new 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 including gasoline, diesel, kerosene, and LPG
- Separation of water from hydrocarbon condensates
- Separation of oil from water
- Removal of water from aromatics

Comparative Performance



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

**Effluent Quality- Pall Vs. Competition
5% Water Ingression, 33 dyne/cm,
Vertical Configuration**

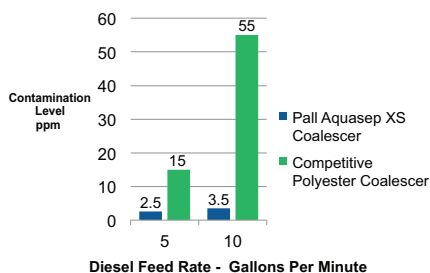


Figure 1

**Effluent Quality- Pall Vs. Competition
0.1% Water Ingression, 18 dyne/cm,
Horizontal Configuration**

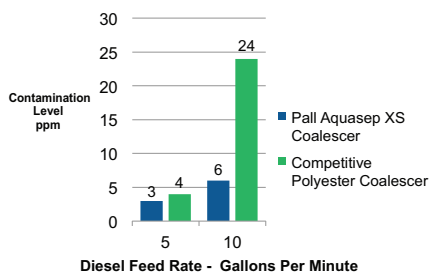


Figure 2

**Effluent Quality – Pall Vs. Competition
0.1% Water Ingression, 33 dyne/cm
Vertical configuration**

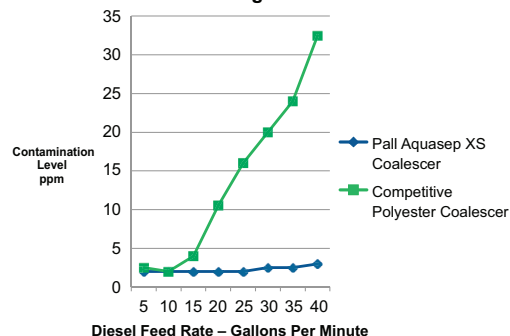


Figure 3

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"> • 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 dyne/cm 	<ul style="list-style-type: none"> • Consistent fluid quality
High Performance Integrated 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. 	<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 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 or two-stage integrated coalescer 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 dyne/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 the IFT > 3 dyne/cm	AquaSep XS coalescer/separator stack in a vertical housing
The dispersed phase fluid is aqueous and the IFT < 3 dyne/cm	AquaSep XS coalescer in a horizontal housing without separator
The dispersed phase fluid is oil and the continuous phase fluid is aqueous	

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.

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.

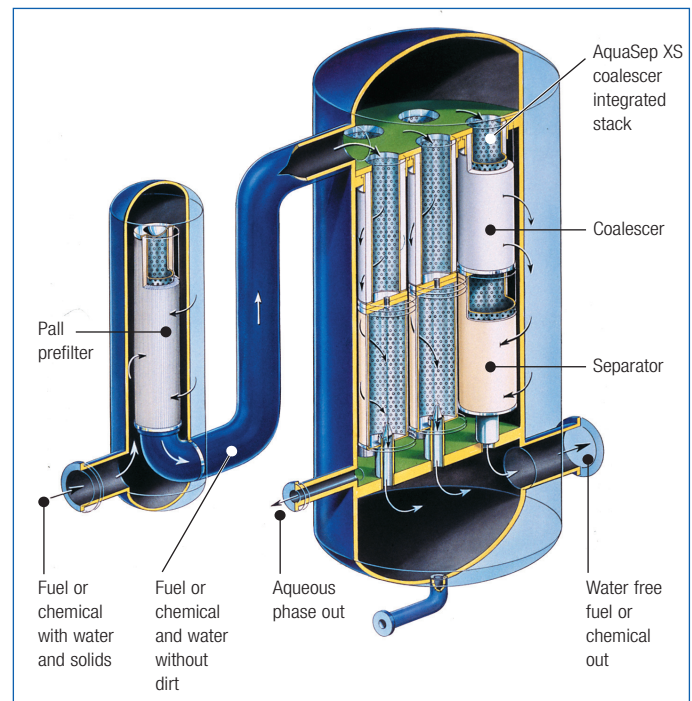


Figure 4: AquaSep XS Liquid/Liquid Separation System with an Integrated Coalescer/Separator Stack in a Vertical Housing with a Prefilter

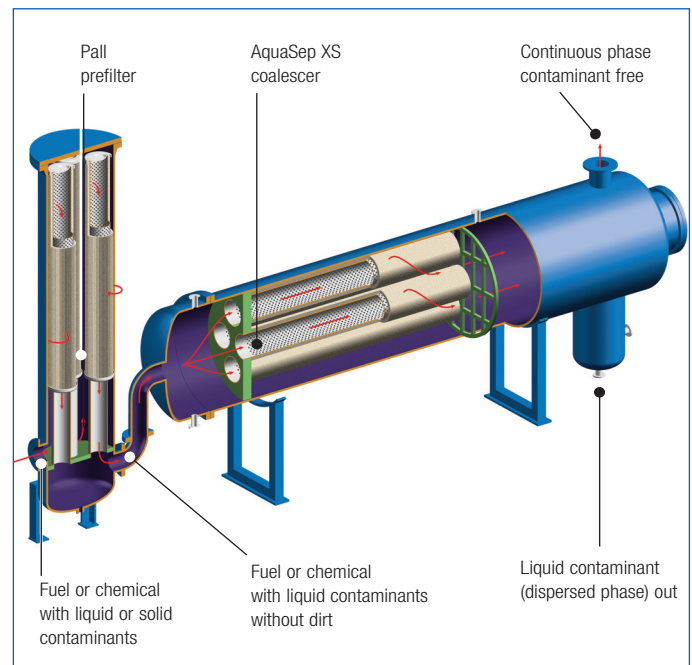


Figure 5: AquaSep XS Liquid/Liquid Separation System with Coalescer in a Horizontal Housing with a Prefilter

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

Initial pressure drop: < 0.14 bard/2 psid

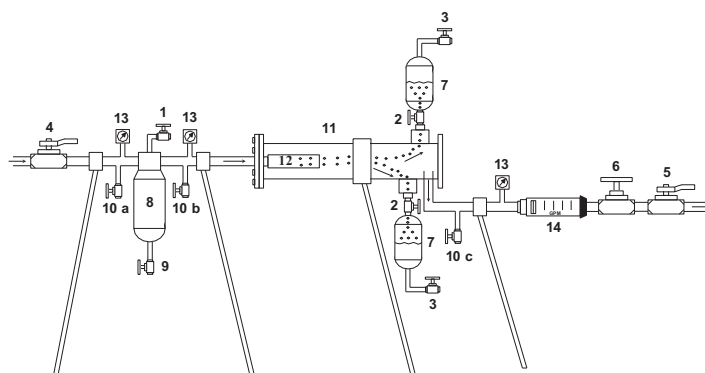
Recommended change-out: 1.0 bard/15 psid at 21°C/70°F

Ordering Information

Part Number	Description	Outer Diameter (mm/in) nominal	Length (mm/in) nominal
LCS06PXSH	AquaSep XS Coalescer	69.9/2.75	152.4/6
LCS2PXSH	AquaSep XS Coalescer	106.7/4.2	508/20
LCS4PXSH	AquaSep XS Coalescer	106.7/4.2	1016/40
LSS2F2H	Separator	9.53/3.75	508/20

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.



- 1) Pre Filter Vent Valve
- 2) Dispersed Phase Reservoir Isolation Valve
- 3) Dispersed Phase Reservoir Drain Valve
- 4) Inlet Isolation Valve
- 5) Outlet Isolation Valve
- 6) Regulating Valve
- 7) Dispersed Phase Reservoirs
- 8) Pre Filter Housing
- 9) Pre Filter Drain Valve
- 10) Sample Ports
- 11) L/L Coalescer Housing
- 12) Test Coalescer
- 13) Pressure Gauges
- 14) Flow Meter

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



Pall Corporation

Fuels and Chemicals

25 Harbor Park Drive
Port Washington, NY 11050
+1 516 484 3600 telephone
+1 888 873 7255 toll free US

Portsmouth - UK
+44 (0)23 9233 8000 telephone
+44 (0)23 9233 8811 fax
industrialeu@pall.com



Better Lives.
Better Planet.™

Visit us on the Web at www.pall.com

Pall Corporation has offices and plants throughout the world. For Pall representatives in your area, please go to www.pall.com/contact

Because of technological developments related to the products, systems, and/or services described herein, the data and procedures are subject to change without notice. Please consult your Pall representative or visit www.pall.com to verify that this information remains valid. Products in this document may be covered by one or more patent numbers. For a complete list of Pall's patents, please visit www.pall.com/main/about-pall/patents.page

© Copyright 2015, Pall Corporation. Pall, (PALL), and AquaSep are trademarks of Pall Corporation. ® indicates a trademark registered in the USA. Filtration. Separation. Solution.™ and BETTER LIVES. BETTER PLANET. are service marks of Pall Corporation.