Introduction
Pall’s new AquaSep EL liquid/liquid coalescer system is a lower cost solution to separate higher solids and medium to coarse emulsions versus competitive cartridge coalescers, mesh pack coalescers, sand beds and electrostatic precipitators (ESPs). Its cost effectiveness is due to the ability of each coalescer element to process a higher flow in a higher solids environment while still providing superior effluent quality. For existing cartridge coalescer systems, the AquaSep EL element provides superior continuous removal of liquid contaminant thereby making it a more reliable solution than competitive offerings. See Figures 1 and 2 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 and mesh pack coalescers made of glass fiber media begin to lose efficiency when the IFT of the emulsion gets below 20 dynes/cm. In contrast, the new AquaSep EL 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:
• Water removal from hydrocarbon condensates before stabilization, fractionation or pipeline transport
• Removal of oil from sour water to protect sour water stripping (SWS) as well as downstream sulfur plant and water treatment operations

Comparative Performance

<table>
<thead>
<tr>
<th>Diesel Feed Rate – Liters Per Minute</th>
<th>Downstream Water Content ppmV</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 28 47 66 85 104 123 142 151</td>
<td>Pall AquaSep EL Coalescer</td>
</tr>
<tr>
<td></td>
<td>Competitive Polymeric Coalescer</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Diesel Feed Rate – Gallons Per Minute</th>
<th>Downstream Water Content ppmV</th>
</tr>
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<tr>
<td>0 5 10 15 20 25 30 35 40</td>
<td>Pall AquaSep EL Coalescer</td>
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<tr>
<td></td>
<td>Competitive Glass Fiber Coalescer</td>
</tr>
</tbody>
</table>

NEW: AquaSep® EL Coalescers Effectively Separate Liquid/Liquid Dispersions on Medium, Coarse, or Higher Solids Emulsions

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

• Water removal from high solids coker fractionates
• Performance upgrades to existing cartridge or mesh pack coalescers, sand beds and ESPs
• General oil/water separation needs across upstream, midstream and downstream processes

Data Sheet
FCAQUAELENa

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

<table>
<thead>
<tr>
<th>Features</th>
<th>Advantages</th>
<th>Benefits</th>
</tr>
</thead>
</table>
| High Performance, Coarse Grade Polymeric Medium | • Up to 60% higher flow per coalescing element  
  • Reduced incidents of off-spec product  
  • Longer service life of coalescer and prefilter elements on higher solids applications  
  • Tolerant to process upsets, can remove slugs of liquids | • 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  
  • Mesh pack coalescers, salt driers, electrostatic separators and sand filters  
  • Fewer cartridge change-outs, reduced maintenance costs and waste disposal costs  |
| Non-disarming Medium | • 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 | • Consistent fluid quality  
  • Eliminates ongoing labor costs to change out disarmed glass fiber coalescer elements or mesh packs  
  • Reliable use of liquid/liquid coalescers on challenging applications such as hydrocarbon condensate, sour water stripping (SWS), coker fractionates, L/L separation upgrades and general high efficiency water/oil separation needs  |
| Availability of a High Performance Integrated Stack Design—Coalescer and Separator | • 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. | • Consistent fluid quality  
  • Smaller, lower cost system |
Description

The AquaSep EL system is a multiple-stage system starting with filtration to remove particulate matter, followed by either a one-stage horizontal coalescer or a two-stage integrated vertical coalescer/separator stack to separate the two liquid phases. AquaSep EL coalescers will remove free water to a level as low as 15 ppmv\(^1\) 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.

Table 1: Coalescer Selection Guide

<table>
<thead>
<tr>
<th>Process Condition</th>
<th>Recommended Product</th>
</tr>
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<tbody>
<tr>
<td>The dispersed phase fluid is aqueous and a horizontal footprint is acceptable</td>
<td>AquaSep EL coalescer in a horizontal housing without separator</td>
</tr>
<tr>
<td>The dispersed phase fluid is oil and the continuous phase fluid is aqueous</td>
<td>AquaSep EL coalescer in a horizontal housing without separator</td>
</tr>
<tr>
<td>The dispersed phase fluid is aqueous and minimal footprint is required</td>
<td>AquaSep EL coalescer/separator stack in a vertical housing</td>
</tr>
</tbody>
</table>

AquaSep EL 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 EL 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 EL 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.

\(^1\) Performance can vary depending on application.
Compatibility

The AquaSep EL coalescer is compatible with hydrocarbon fuels, ethylene glycol, 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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Outer Diameter (cm/in) nominal</th>
<th>Length (cm/in) nominal</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCS06ELBH</td>
<td>AquaSep EL Coalescer</td>
<td>7/2.75</td>
<td>15.2/6</td>
</tr>
<tr>
<td>LCS2ELBH</td>
<td>AquaSep EL Coalescer</td>
<td>10.7/4.2 (flange) 9.53/3.75</td>
<td>50.8/20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(main element)</td>
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</tr>
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<td></td>
<td>(main element)</td>
<td></td>
</tr>
<tr>
<td>LSS2F2H</td>
<td>Separator</td>
<td>9.53/3.75</td>
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</tr>
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</table>

AquaSep EL 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 EL coalescer technology.

Figure 5: Illustration of Pall pilot scale liquid/liquid coalescer test stand

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