Mist Eliminator Performance & Maintenance Optimisation
Begg Cousland, Scotland, at the SAIMM Sulphur and Sulphuric Acid 2009 Conference
HQ in Glasgow, Scotland, UK

Personal Service Ethos

Main Production in Europe & China

Founded in 1854

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HQ in Glasgow, Scotland, UK

Founded in 1854

Personal Service Ethos

Main Production in Europe & China

Selected Production in India & USA

Technology and Production

Experience and Expertise

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Knitted Wire Mesh Filters

Mist Eliminator Filters
High Velocity
Brownian Diffusion (Moulded)

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Mist Eliminator Filters
High Velocity
Brownian Diffusion (Moulded)
Brownian Diffusion (Wound)

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Knitted Wire Mesh Filters

Mist Eliminator Filters
- High Velocity
- Brownian Diffusion (Moulded)
- Brownian Diffusion (Wound)

Chevron Vane Filters

Tower Internals

Oleum / SO₃ Tank Vent Systems

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<table>
<thead>
<tr>
<th>Demisters / Mesh Pads</th>
<th>Coalescers / Mesh Pads</th>
<th>Candle Filters / Mist Eliminators</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Droplet Separation</td>
<td>• &gt; 2 micron Separation</td>
<td>• Mist Separation</td>
</tr>
<tr>
<td>• Low Pressure Loss</td>
<td>• Medium Pressure Loss</td>
<td>• Medium-High Pressure Loss</td>
</tr>
<tr>
<td>• Relative Low Cost</td>
<td>• Relative Low Cost</td>
<td>• Higher Cost</td>
</tr>
<tr>
<td>• Mainly Drying Tower</td>
<td>• Drying &amp; Final Tower</td>
<td>• Mainly Absorbing Towers</td>
</tr>
</tbody>
</table>

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### Demister Performance

<table>
<thead>
<tr>
<th>Performance</th>
<th>Materials</th>
<th>Innovations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Velocity</td>
<td>2.0 - 3.5 m/sec</td>
<td></td>
</tr>
<tr>
<td>Design Pressure Loss</td>
<td>25 - 50 mm H$_2$O</td>
<td></td>
</tr>
<tr>
<td>Collection Efficiency</td>
<td>100% &gt; 5 microns</td>
<td></td>
</tr>
<tr>
<td>Average Life</td>
<td>4 years</td>
<td></td>
</tr>
<tr>
<td>Washing / Maintenance Rating</td>
<td>Very Good</td>
<td></td>
</tr>
<tr>
<td>Negatives</td>
<td>Mesh Corrosion / Shrinkage</td>
<td></td>
</tr>
</tbody>
</table>

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Demister Materials  Negatives

316L Stainless Steel  Mesh Corrosion

Alloy 20  Cost

Lewmet / Saramet / SX  Cost / Availability

(PTFE) ETFE =Hostaflon  Heat Shrinkage

(PTFE) ECTFE =Halar  Heat Shrinkage / SO$_3$ Attack

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Demister Innovations

• In situ solids protection / sulphates washing

• Section joint sealing
Demister Innovations

In situ solids protection / sulphates washing

Performance

Materials

Innovations

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Demister Innovations

In situ solids protection / sulphates washing

Performance  Materials  Innovations

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Demister Innovations

Section joint sealing

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Demister Innovations

BRICKWORK STYLE

Section joint sealing

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Demister Innovations

Section joint sealing

Performance Materials Innovations

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Coalescer Performance

Operating Velocity 2.0 - 3.0 m/sec
Design Pressure Loss 80 - 120 mm H₂O
Collection Efficiency 100% > 5 microns; 98-99.5% 2-5 microns
Average Life 4 years
Washing / Maintenance Rating Very Good

Negatives Mesh Corrosion / Shrinkage Solids Blockage
Coalescer Materials

316L Stainless Steel + Glass Fibre

Mesh Corrosion / HF Attack

Lewmet / Saramet / SX / Alloy 20 + Teflon Fibre

Cost

(PTFE) ETFE = Hostaflon + Teflon Fibre

Heat Shrinkage

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Coalescer Innovations

• Single stage combinations
• Horizontal fitting
• Candle filter style coalescers
Coalescer Innovations

Performance

Materials

Innovations

Single stage combinations

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Coalescer Innovations           Horizontal fitting

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Coalescer Innovations

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Begg Cousland, Scotland, at the SAIMM Sulphur and Sulphuric Acid 2009 Conference
### Candle Filter Performance - High Velocity Types

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Velocity</strong></td>
<td>1.0 - 2.5 m/sec</td>
</tr>
<tr>
<td><strong>Design Pressure Loss</strong></td>
<td>80 - 200 mm H₂O</td>
</tr>
<tr>
<td><strong>Collection Efficiency</strong></td>
<td>100% &gt; 3 microns; 98-99.5% 2-5 microns</td>
</tr>
<tr>
<td><strong>Average Life</strong></td>
<td>4 years</td>
</tr>
<tr>
<td><strong>Washing / Maintenance Rating</strong></td>
<td>Average</td>
</tr>
<tr>
<td><strong>Negatives</strong></td>
<td>Solids Blockage / Limited Range</td>
</tr>
</tbody>
</table>

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## Candle Filter Performance - High Efficiency Types

<table>
<thead>
<tr>
<th>Performance Metric</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Velocity</td>
<td>0.05 - 0.25 m/sec</td>
</tr>
<tr>
<td>Design Pressure Loss</td>
<td>80 - 300 mm H₂O</td>
</tr>
<tr>
<td>Collection Efficiency</td>
<td>100% &gt; 3 microns; 99% &lt; 3 microns</td>
</tr>
<tr>
<td></td>
<td>100% &gt; 1 micron; 98% &lt; 1 micron</td>
</tr>
<tr>
<td>Average Life</td>
<td>10 years</td>
</tr>
<tr>
<td>Washing / Maintenance Rating</td>
<td>Good</td>
</tr>
<tr>
<td>Negatives</td>
<td>Quantity / Space / Cost</td>
</tr>
</tbody>
</table>

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Candle Filter Materials

- Glass fibre diameter
- Fibre bed density
- Structure in Alloy materials
- Carbon Fibre for HF corrosion resistance

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Candle Filter Innovations  Carbon Fibre for HF corrosion resistance

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Begg Cousland, Scotland, at the SAIMM Sulphur and Sulphuric Acid 2009 Conference
Candle Filter Innovations  Carbon Fibre for HF corrosion resistance

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Candle Filter Innovations

• STAR rings for very high mist loads
• Raised tubesheet flange designs
• Concentric bi-flow designs
Candle Filter Innovations  STAR rings for very high mist loads

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Candle Filter Innovations  Exit meshpad for very high mist loads
Materials Innovations

Candle Filter Innovations

Raised tubesheet flange designs

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Candle Filter Innovations  
Raised tubesheet flange designs

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Candle Filter Innovations

Raisestubesheet flange designs

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Candle Filter Innovations

Raised tubesheet flange designs

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Begg Cousland, Scotland, at the SAIMM Sulphur and Sulphuric Acid 2009 Conference
Candle Filter Innovations  
Raised tubesheet flange designs

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Begg Cousland, Scotland, at the SAIMM Sulphur and Sulphuric Acid 2009 Conference
Candle Filter Innovations

Raised tubesheet flange designs

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Begg Cousland, Scotland, at the SAIMM Sulphur and Sulphuric Acid 2009 Conference
Candle Filter Innovations

Concentric bi-flow designs

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Begg Cousland, Scotland, at the SAIMM Sulphur and Sulphuric Acid 2009 Conference
Candle Filter Innovations

Concentric bi-flow designs

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Performance  Materials  Innovations

Candle Filter Innovations  Concentric bi-flow designs + Carbon Fibre

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