Separation Technologies

Capital Markets Day 2010

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Separator Systems
Alfa Laval Separation Technologies

Decanter

Separator

Membrane Filter

Two liquids cannot be separated
Separation efficiency

<table>
<thead>
<tr>
<th>Particle size</th>
<th>Amount of solids</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 µm</td>
<td>40%</td>
</tr>
<tr>
<td>1 µm</td>
<td>30%</td>
</tr>
<tr>
<td>10 µm</td>
<td>20%</td>
</tr>
<tr>
<td>100 µm</td>
<td>10%</td>
</tr>
<tr>
<td>1 mm</td>
<td>0%</td>
</tr>
</tbody>
</table>

- **Decanters**
- **High speed separators**
- **Membrane**

www.alfalaval.com
Decanters

Market value
MEUR 1,000

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Typical applications

- Mud treatment
- Distilleries
- Olive oil
- Soy protein
- Waste water
What makes Alfa Laval decanters better?

- High performance
- Long lifetime
- Low power consumption
- Easy installation
- Options
- Easy operation

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Membrane filters

Market value
MEUR 4-500
Typical applications

Increasingly popular in high-hygiene processes such as:

- Concentration and purification
- Clarification and fractionation
- Extraction
- Product recycling and recovery
- Product and effluent upgrading
High speed separators

Market value
MEUR 1,200
Typical applications
Separators at work

- Marine fuel and lubrication oil cleaning
- Vegetable oil processing
- Production of milk, beer, wine, juice and other beverages
- Biotech & pharmaceutical industries
- Oil & gas production, chemical industry and power stations
Our competitive advantages

Local presence

Installed base

Product range

R&D

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How does it work?

Separation of solids by gravity force in a tank

Gravity force X 10,000 in a rotating chamber
Historic & application development

- 1879: Gustaf de Laval demonstrates the first continuous separator.
- 1916: Alfa Laval sells the first separator for oil purification.
- 1933: Alfa Laval introduces the world’s first hermetic separator at an exhibition in Berlin.
- 1951: Sales of the “self-cleaning” centrifugal separator and decanter centrifuges begins.
- 1982: Technology for biotech
- 2005: Launch of gas separator.

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Research & development

- No 1 tool for profitable growth
- Developing new products and improving existing
- Combines product and application development to capture new markets
- Being the largest and most profitable manufacturer, we can invest more in R&D and business development
- 2.5 percent of sales spent on R&D in 2009

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Competing Technologies

Filters

Separators

Settling tanks

Total market value MEUR 3-4,000
Characteristics

Filters
- Large variety of models
- Static equipment
- Handles only one liquid
- Higher operating cost

Separators
- Highest efficiency of three phase separation
- Fully automatic
- Totally enclosed
- Rotating equipment

Settling tanks
- Low efficiency
- Static equipment
- Large space requirements

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Growth drivers

- Tighter legislation on emissions
- Next generation biofuels
- Need for energy savings
- Advanced drugs
- Fast-growing markets
- Technology conversion
Enablers to capture the growth

- Technological leadership
- Attractive offering
- Being close to the customer