Coalescer elements

The circulation of clean, good-quality oil plays a crucial role in the efficiency and service life of a refrigeration compressor, and the plant of which it is a key part.

To help ensure that the refrigerant oil is of the best possible quality, Sabroe has designed special coalescer elements. Their main function is to separate oil from the gas flow, but also serve as filters.

Sabroe coalescer elements provide users with significant financial and environmental benefits, by limiting the amount of oil circulated in the refrigeration plant, and keeping it clean.

Scheduled changes of these elements also reduce power consumption by limiting pressure drop during the service life of the unit.

Significant advantages

- Less oil carried over from compressor to plant.
- Reduced costs and fewer risks associated with draining oil.
- Less oil goes to waste.
- Lower energy consumption.

Customer benefits

- Greater plant efficiency.
- Lower operating and maintenance costs and fewer risks for staff/personnel.
- Lower overall operating costs due to reduced oil costs.
- Lower operating costs, along with reduced environmental impact.
How coalescer elements work
Most of the oil discharged by a refrigeration compressor separates from the gas flow during the first stage of the separation, and ends in the oil charge reservoir.

Some oil, however, is discharged as a mist that remains in the gas flow. This mist continues to the second stage of the oil separation process. This is accomplished using one or more coalescing filter elements. The element coalesces the oil mist into drops that fall to the bottom of the coalescer section of the oil separator so that they can be returned to the suction side of the compressor.

Any particles that collect in the gas and oil over time are collected in the coalescer element. Naturally, these build up in the course of the service life of the unit, gradually resulting in an increase in pressure drop and a fall in filtering efficiency.

The coalescer element should then be replaced, because the amount of oil passed on to the refrigeration plant increases in step with greater pressure drop. This reduces the overall efficiency (COP) of the plant.

Financial benefits
- On-site tests combined with trials at the Sabroe test facilities show that power consumption savings of as much as 7% and not less than 1% can be achieved by changing the coalescer filter in compliance with the schedule below.
- Tests have demonstrated that it is possible to save approx. EUR 3,000 per annum for a refrigeration unit equipped with a 200 kW electric motor, running for 5,000 hours per annum.

Depending on the sizes and numbers of Sabroe coalescer elements fitted, these figures mean that the cost price can be recouped within as little as three months.

<table>
<thead>
<tr>
<th>Type of operation</th>
<th>Service interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-stage</td>
<td>10,000 hours</td>
</tr>
<tr>
<td>Air conditioning</td>
<td>10,000 hours</td>
</tr>
<tr>
<td>Booster</td>
<td>20,000 hours</td>
</tr>
<tr>
<td>Single-stage</td>
<td>30,000 hours</td>
</tr>
</tbody>
</table>

Note: single-stage is typically for use in relatively low temperatures, where Te = -35°C and Ti = 40°C.