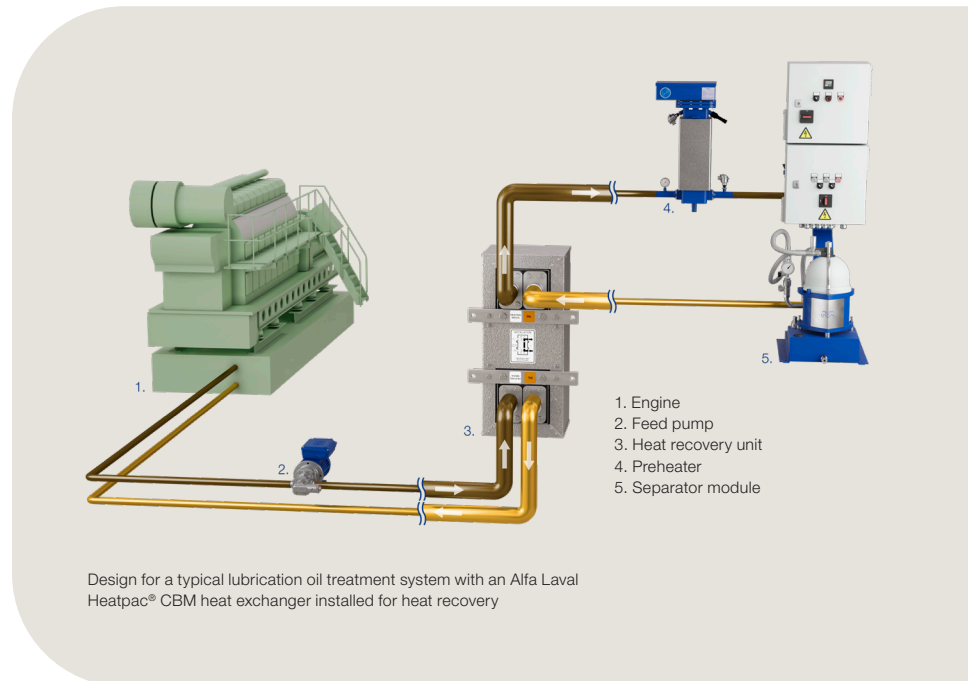


Heat recovery for lubrication oil treatment systems

Alfa Laval Heatpac® CBM for easy energy savings

Energy efficiency strongly influences a vessel's cost effectiveness and its environmental footprint. Improving energy efficiency lowers fuel consumption and related cost. In addition, it makes the operation more environmentally friendly.

Lubrication oil treatment is one application in which improved energy efficiency can have a major impact. In a conventional lubrication oil treatment system, oil is heated upstream of the separator to ensure an adequate cleaning process. After the separator's clean oil outlet, the hot oil flows back to the engine sump tank where it is cooled by the engine cooling system.



By installing an Alfa Laval Heatpac® CBM heat exchanger, it is possible to recover excess heat energy downstream of the separator, re-purposing it to heat the oil prior to separation. The system thereby reduces the load on the separator preheater and the cooling system. This, in turn, optimizes the heat balance of the engine room, reducing both operational costs and the vessel's overall environmental footprint.

Design

The Alfa Laval Heatpac CBM range of brazed plate heat exchangers is type-approved for marine applications. Designed for high throughput and excellent thermal performance, Heatpac CBM heat exchangers provide an ideal solution for onboard heat recovery duties. Their lightweight components and small footprint makes onsite assembly easy, even in extremely narrow spaces. They are therefore well suited for installation on both retrofits and newbuilds.

Heatpac CBM heat exchangers also enable simple service and maintenance, thanks to easily accessibility for inspection and compatibility with CIP.

Application

- Lubrication oil separation

Compatible with MIB, MAB, MMB, P605/615, S805/815 separators

Ask your Alfa Laval sales company about use in:

- Fuel oil separation
- Hydraulic oil separation

Benefits

- Reduced OPEX
- Improved energy efficiency
- Easy installation
- Easy maintenance

Scope of supply

Alfa Laval Heatpac CBM heat exchangers are configured according to your requirements and adapted to your separation system or module. They are also available and easy to retrofit for existing installations. For lubrication oil heat recovery duties, the Heatpac CBM heat exchanger is available in two models, the CBM 30 and CBM 110, which are each delivered with 100 heat transfer plates.

Working principle

Systems for lubrication oil separation typically include a feed pump, a preheater and a separator. In order to ensure an adequate cleaning process, the oil must be heated to normal separation temperature of 90-98°C before separation.

Placed between the pump and the preheater, a Heatpac CBM heat exchanger recovers excess energy. The clean, hot oil from the separator outlet passes through the heat exchanger when flowing back to the sump tank. Heat energy is transferred to the cold oil upstream of the separator. Consequently, the energy required from the separator preheater is reduced.

Energy savings

Using a Heatpac CBM heat exchanger for heat recovery reduces preheating energy cost by 60-90%, depending on the amount of heat exchanger surface. A larger surface area translates to higher degree of recovery.

Below are two energy saving cases for Heatpac CBM30 and CBM110 with 100 plates, respectively.

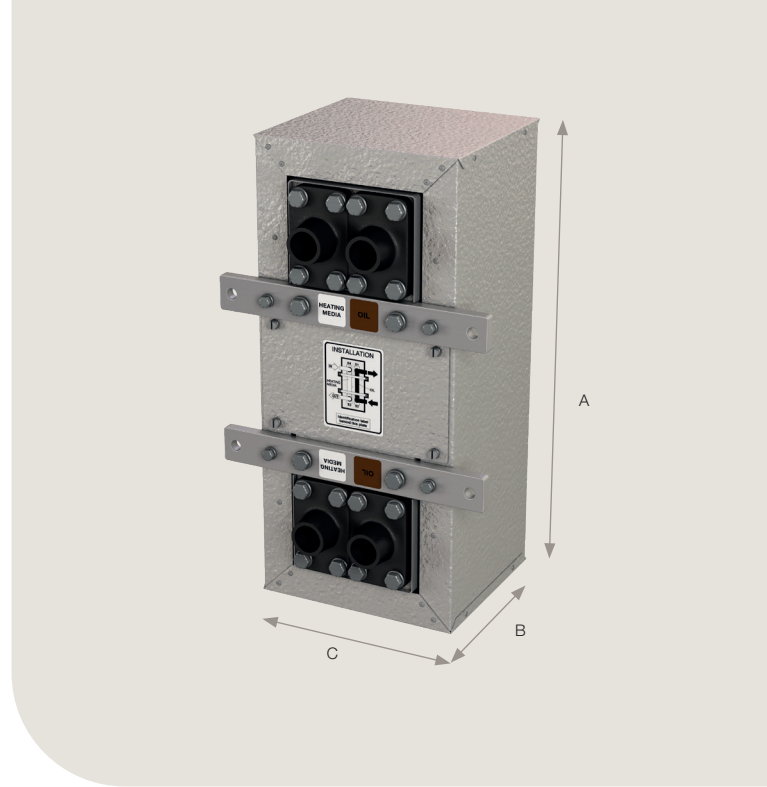
The cases are based on typical duty using lubrication oil SAE 30 at the maximum recommended capacity for MIB503 and P605 separators. Based on a normal working temperature, the regeneration degree, η_{reg} is set to 65%.

| Separator model | MIB503 | P605 |
|---------------------|-----------|------------|
| Oil type | SAE30 | SAE30 |
| MRC | 300/h | 1150/h |
| η_{reg} | 65% | 65% |
| Heat exchanger type | CBM30-100 | CBM110-100 |
| Total heat load | 5,1kW | 19,51kW |
| Energy saved | 3,3kW | 12,7kW |

Cost savings

Cost saving is affected by the type of heat generation for preheating, for example:

- Diesel-generated electricity for heating of engine lubrication oil (0.18 USD/kWh)
- Separator running 8000 hours/year



The resulting energy cost savings for preheating are:

| Yearly energy cost saving (USD) | |
|---------------------------------|----------|
| MIB503 | \$4780 |
| P605 | \$18,288 |

Equivalent savings can also be made depending on the type of engine cooling system.

Return of investment (ROI)

A Heatpac CBM heat exchanger offers a rapid return on the investment. For newbuild and retrofit installations, the payback time is typically less than six months, and in some cases as low as two months.

Technical data

| Technical data | |
|---------------------|--------------------------|
| Working temperature | max. 225°C |
| Working pressure | max. 16 bar |
| Plate material | stainless steel AISI 316 |
| Connection material | stainless steel SS 1430 |
| Brazing material | copper |

| Dimensions | | | | | | |
|-------------|-----------------|-----|-----|-------------|--------|-------------|
| Type | Dimensions (mm) | | | Connections | | Weight (kg) |
| | A | B | C | (mm) | (inch) | |
| CBM 30-100 | 400 | 310 | 240 | 25 | 1 | 19 |
| CBM 110-100 | 700 | 370 | 320 | 40 | 1½ | 55 |

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