



## Ready for a long voyage at sea

Novenco A/S - Neastved, Denmark

Case story



Favoured by shipbuilders and ship-owners alike, Alfa Laval condensers and liquid receivers are vital for keeping ships cool and their crews comfortable and well-fed.

Compact, reliable, environmentally friendly, and with excellent energy efficiency – these are some of the hallmarks of Alfa Laval condensers.

When Greek ship owner Dynacom received delivery of its newest 76,000 deadweight ton bulk carrier from the Jiangnan Shipyard in Shanghai, China in August 2009, it could rest assured that the cooling and air conditioning systems onboard were the best the market could supply.

“You can’t live or work on a ship without air conditioning,” says Piergiorgio Barbato, Business Development Manager at Alfa Laval. “Cold storage for food is equally important. In addition, the systems have to be 100 percent reliable.”

Alfa Laval and the Novenco Group, a Danish HVAC and refrigeration supplier, are both well-respected brands

in the marine sector. Their systems are also designed, manufactured and tested in accordance with the requirements of all the classification societies. In close cooperation with Alfa Laval, the Novenco Group’s maritime division supplied four condensers and ancillary equipment including valves, filters and controls for the new ship.

Two condensers are used in combination with compressors from a separate manufacturer for air-conditioning purposes, keeping the ship’s living quarters for its 28 crew members at a manageable 27°C. Two other condensers are used for keeping food storage lockers for meat and fish and other victuals at -20°C for long voyages at sea.

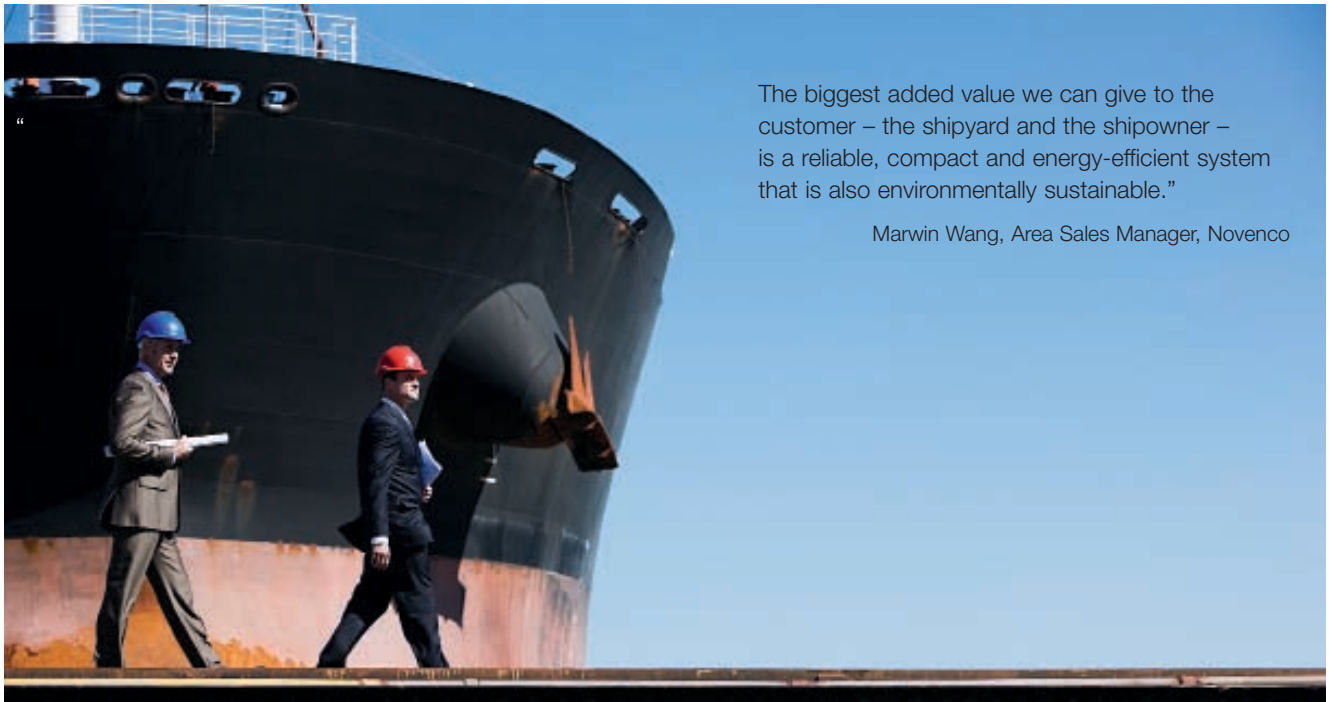
In systems involving heat transfer, a condenser is a device or unit used to condense a refrigerant from its gaseous to its liquid state, typically by cooling it. In so doing, the heat load is released

by the refrigerant and transferred to the condenser coolant (water). Even on a huge Panamax-sized ship such as Dynacom’s new bulk carrier, space is a highly valued and limited commodity.

### Novenco in brief:

Novenco is a supplier of heating, ventilation, air-conditioning and refrigeration systems for land and marine applications. Novenco’s marine division has selected such partner sub-suppliers as Alfa Laval to complete the product range.

Novenco Hi-Pre Air Handling Equipment (Wuxi) Co., Ltd  
No.28-8 South Changjiang Rd.  
Wuxi, Jiangsu Province  
China



The biggest added value we can give to the customer – the shipyard and the shipowner – is a reliable, compact and energy-efficient system that is also environmentally sustainable.”

Marwin Wang, Area Sales Manager, Novenco

Together with Alfa Laval engineers, Novenco modified the standard condensers’ design to increase their efficiency and added a second outlet to provide extra reliability in performance. The increased efficiency due to Alfa Laval’s designs also meant that the condensers’ dimensions could be reduced by up to 10 percent compared to those of other suppliers. “This is a powerful sales argument,” says Marwin Wang, Area Sales Manager for Novenco A/S in Shanghai. The

condensers were further modified with special supports for the compressors to ease the assembly process, provide a more reliable solution and prevent problems caused by vibrations.

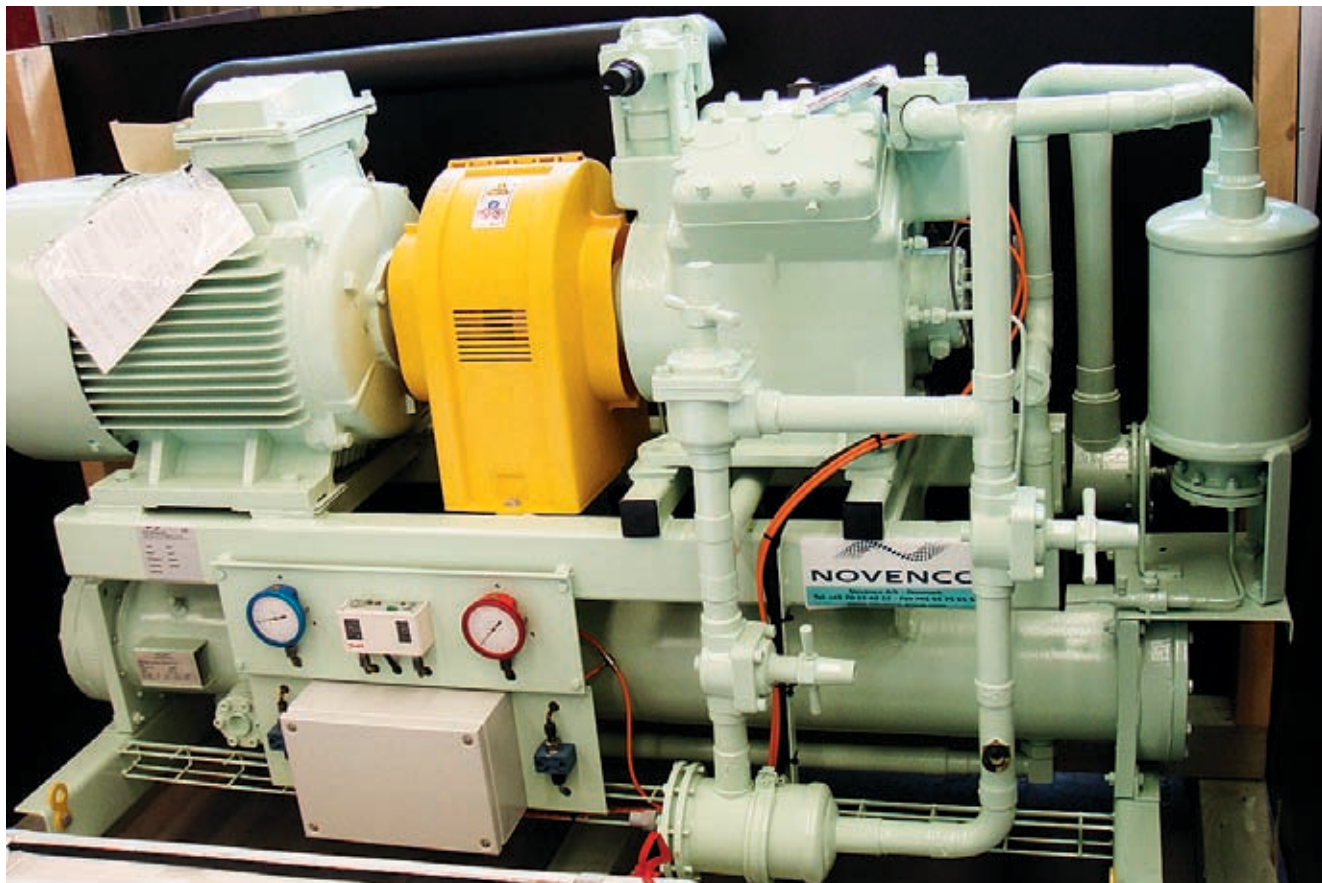
Alfa Laval also provided Novenco with tailor-made liquid receivers. Their use allows for a complete pump-down of the entire cooling system, making system maintenance and repair easy with a minimal time effort. In fact, the liquid receivers combined with the

condensers permit the stocking of liquid refrigerant inside these two components, allowing Novenco to maintain the evaporators easily.

“But the biggest added value we can give to the customer – the shipyard and the shipowner – is a reliable, compact and energy-efficient system that is also environmentally sustainable. That has been the biggest development in the past ten years,” says Wang.

#### Technical facts:

- The CFC, CPS, and CDEW Shell and Tube condenser series are designed to operate with fresh water. The CFC/M and McDEW series are dedicated to seawater applications thanks to material selection and correct sizing which prevent fouling and corrosion.
- Alfa Laval optimized Shell and Tube condensers in order to ensure the highest performances with the most commonly used HFC refrigerants.
- All condensers can be opened for inspection and main-tenance purposes.
- Shell and Tube condensers are manufactured in accordance with ISO 9001.
- Each unit undergoes an individual pressure and leak test as specified by the relevant authority and in accordance with Alfa Laval internal quality procedures.
- Shell and Tube condensers are available with five certification types.
- Models designed for fresh water applications use the following components:
  - Shell: carbon steel
  - Tube sheets: carbon steel
  - Tubes: integrally finned thick-wall copper tubing
  - Covers: carbon steel
  - Gasket: thermo-polymer compound
  - Baffles: teflon
- Alfa Laval can also supply seawater condensers for all installations where it is possible to use the sea as natural source of cooling water.
- Marine models are equipped with the following components:
  - Shell: carbon steel
  - Tube sheets: AISI 316 stainless steel
  - Tubes: integrally finned Cu/Ni tubing
  - Covers: AISI 316 stainless steel
  - Gasket: thermo-polymer compound
  - Baffles: carbon steel
- Marine units are provided with interchangeable anodes made of mild iron in order to prevent galvanic corrosion and to give the condensers a long working life.



Novenco's air-conditioning and cooling systems are now with Alfa Laval condensers to keep food cool during the long voyage at sea.

### About condensers and liquid receivers:

Shell and tube condensers and liquid receivers are tailor-made for Novenco to match the company's needs. Alfa Laval supplied:

- Two Alfa Laval CDEW165 fresh water condensers for air-conditioning purposes retrofitted with two outlets to increase efficiency and therefore diminish size. The header configuration allows a water design pressure of 10 bar.
- Design pressure for the refrigerant side is 30 bar, test pressure 45 bar.
- Dimensions of the condensers: 1.8 meters long, 219 mm in diameter.
- The welded refrigerant connections were carefully designed in order to prevent issues related to vibrations.
- Two Alfa Laval CPS35 fresh water condensers for cold storage retrofitted with two outlets to increase efficiency and diminish size. The condensers are tailor-made for Novenco in order to maximize the water flow.
- The header configuration allows a water design pressure of 10 bar.
- Design pressure for the refrigerant side is 30 bar, test pressure 45 bar.
- Dimensions of the condensers: 800 mm long, 168 mm in diameter.
- Cooling capacity of the total system: 240 kW

Alfa Laval also provided Novenco with tailor-made liquid receivers.

- The liquid receivers have the same shape as the condensers in order to create a modular system.
- All liquid refrigerants can be stocked inside these two components.
- The sight-glass installed both on the condensers and the liquid receivers allows for easy checking of the refrigerant liquid level.

All the condensers and liquid receivers are compliant with Germanischer Lloyd's rules.

ERC00267EN 1002

#### How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at [www.alfalaval.com](http://www.alfalaval.com)