

# Shell & tube heat exchangers

Marine & industrial applications



## Application areas

- Power plants
- Steel factories
- Transformer stations
- Gas processing plants
- Chemical plants
- Cargo/chemical tanker ships
- Cruise ships
- Engines
- Steam and gas turbines
- Etc.

**BLOKSMA** HEAT EXCHANGERS

[www.bloksma.net](http://www.bloksma.net)



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## Custom build

Cooling or heating problems for which Bloksma does not have a standardized heat exchanger, can be solved in a custom build shell & tube heat exchanger (at Bloksma known as the N-type). The welded construction allows for a flexible design. These special heat exchangers are produced by using as much standardized components as possible.

Bloksma uses small diameter tubes (10 mm) in most special heat exchangers, which means that a large heat exchanging surface can be obtained, at relatively small dimensions of the heat exchanger. Of course, larger tube sizes (like 16 mm) are also possible.

The N-type heat exchangers can be designed according to most design codes (for instance TEMA, ASME (incl. U-stamp), API, CE), and are accepted by all main marine classification societies.

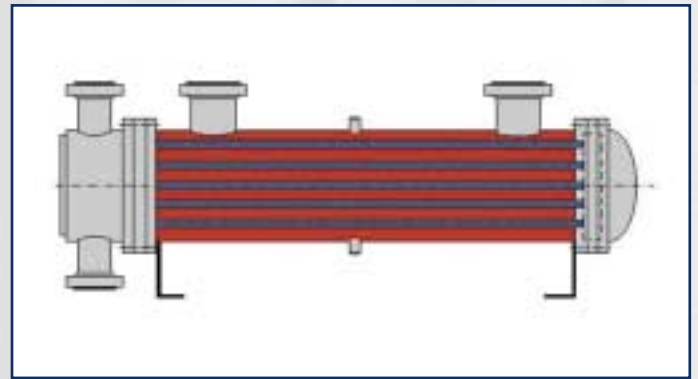
The tubes are roller expanded (cold-forming) into the tube sheets, which results in excellent connections, as for strength as well as for sealing. Bloksma special shell and tube heat exchangers are build in three main types, shown on the right side of this page.

## Double-tube

A special model of the BEW and BEM types is the double-tube (safety) heat exchanger, which is applied when it is absolutely unacceptable that both media in the heat exchanger mix in case of leakages (for instance transformer oil and water), or when leakage to the environment should be prevented at all costs.

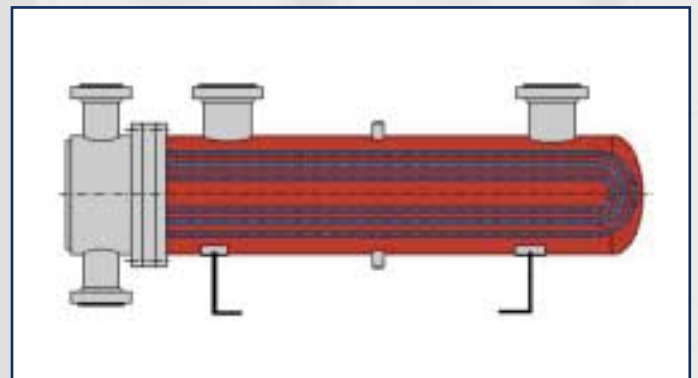
Depending on the application, the double-tube heat exchanger can be equipped with externally finned outer tubes (to enlarge the heat exchanging area) or with plain outer tubes. Inside these tubes are normal plain tubes. Early detection of leakage in case one of the tubes becomes defective, is provided by the grooves between the outer and the inner tubes.

Well before any harm should occur, the leak detection has become active.



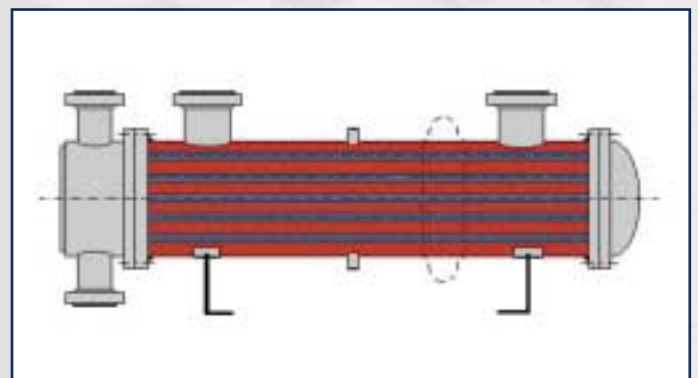
### BEW/AEW

One fixed tube sheet with flat gaskets and one floating tube sheet with O-rings; removable tube bundle. Free thermal expansion of tubes possible. 1- or 2-passes on tube side.



### BEU/AEU

Bundle with U-tubes; removable tube bundle; flat gaskets. Free thermal expansion of tubes possible. 2- or 4 passes on tube side.



### BEM/AEM

Fixed tubesheets; non-removable tube bundle; flat gaskets. Construction with expansion bellows in shell to compensate for thermal expansion, depending on operating and design conditions. 1-, 2- or 4-passes on tube side.

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## Glandsteam condenser for steam turbines

Condensing steam (steam on the shell side) is one of the common applications in an N-type. Bloksma is specialised in the design and production of glandsteam condensers. Mounted on top of these condensers is a fan, which provides a pressure in the heat exchanger that is slightly under-atmospheric. The condensate outlet is at the bottom, while the fan extracts at the non-condensables at the top by suction.

## Materials

Depending on the design code, the application and on customer request, different materials are being applied. The shell and the waterboxes are in general made from carbon steel. When there is a corrosive medium on the tube side, the waterboxes are coated on the inside, and anodes are mounted. Bloksma has very good experiences with coated waterboxes. In addition these waterboxes are more economical than for instance cast bronze waterboxes (which can also be made upon request). Another possibility is a complete stainless steel (AISI 316L) version of a heat exchanger.

Among the most frequently used materials for tubes and tube sheets are:

### Tubes

- Carbon steel (St 35.8)
- Aluminium brass (CuZn20Al2)
- CuNi 90/10 (CuNi10Fe1Mn)
- CuNi 70/30 (CuNi30Fe1Mn)
- AISI 316L (X2CrNiMo 17.13.2)
- Titanium

### Tube sheets

- Carbon steel (H-II)
- Muntz metal (CuZn38SnAl)
- CuNi 90/10 (CuNi10Fe1Mn)
- CuNi 70/30 (CuNi30Fe1Mn)
- AISI 316L (X2CrNiMo 17.13.2)
- Titanium



Glandsteam condenser

The tubes are roller expanded into the tube sheets. In case of for instance thermal oil, the tubes are additionally seal-welded. This limits the material combinations of tubes and tube sheets. In case of strong corrosive media, it is possible to apply a coating to the inside of the tube bundle (with of course a negative effect on the heat exchange).

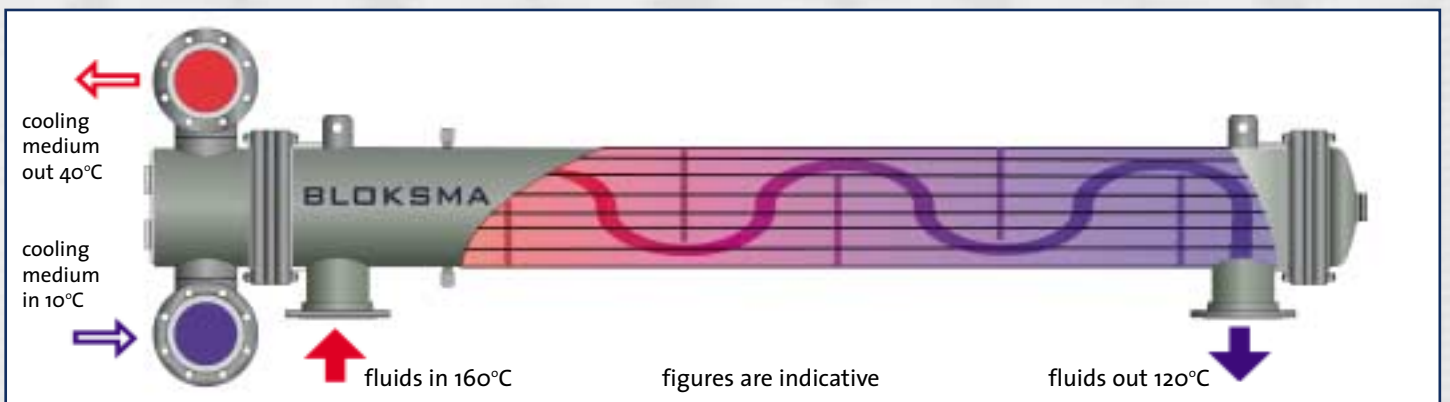
## Design

Flanges: DIN 86030 / PN 16 (when necessary PN 40 or higher). Depending on the design code and on customer request, it is also possible to use other flanges like ANSI or JIS. Design pressure 1 barg up to max. appr. 50 barg. Design temperature max. appr. 400 °C.

## Functions

You will find Bloksma shell & tube heat exchangers in, on or at for instance:

- Oil cooling or heating
- Water cooling
- Butterworth heater
- Intermediate heater
- Dump cooler / condenser
- Glandsteam condenser
- Environmental (double-tube)
- Safety (double-tube)
- Air or Gas cooling





Bloksma The Netherlands

## Bloksma Heat Exchangers

Bloksma is known all over the world as an innovative, dedicated and reliable heat exchanger partner. For more than 80 years Bloksma's success is based upon quality products, broad experience, research & development and long-term relationships with customers.

### Sales support offices:

- Bloksma-Fryer, France
- Bloksma-Asia, Singapore
- Bloksma International, The Netherlands
- Bloksma worldwide agent network

Bloksma designs and manufactures its products to the highest standards to ensure a long operational lifetime and durability. If required, the products can be quality-assured by all main certification societies. Bloksma provides a complete after sales service from supply of spare parts to inspection, maintenance and repair.

N-type, BEW, Condenser



**BLOKSMA** HEAT EXCHANGERS

## Bloksma product range:

- Compact plate fin oil cooler
- Charge-air cooler
- Box cooler
- Oil & water heater
- Water cooler
- Steam condenser
- Dump cooler
- Compressor cooler
- Repair service
- Service and spare parts

For additional information visit our website:

[www.bloksma.net](http://www.bloksma.net)

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