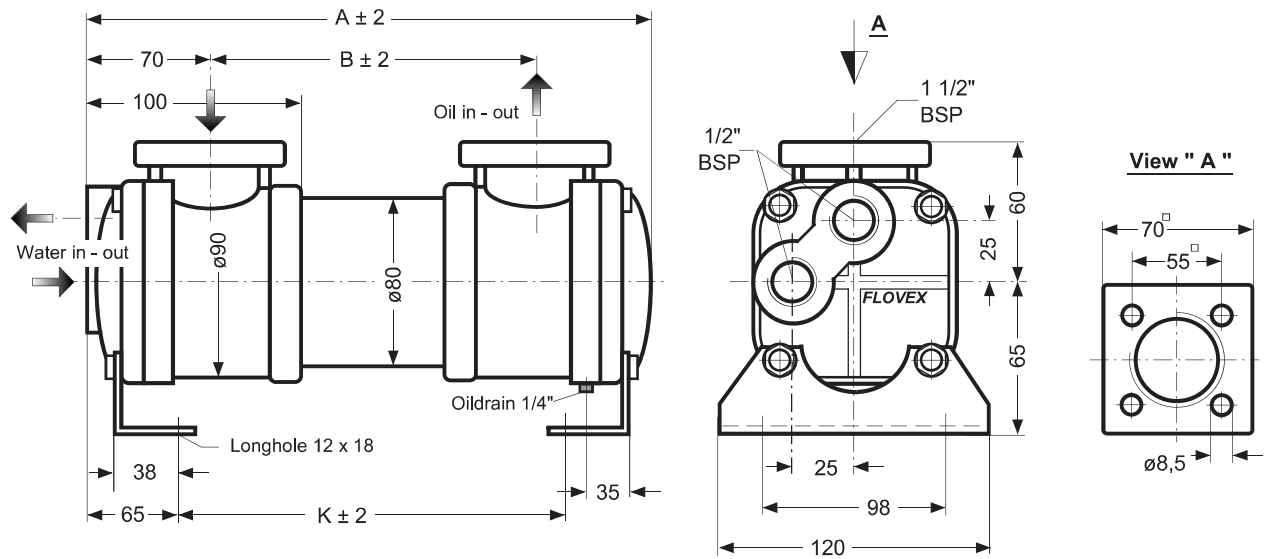


T 80**4-Way-System****FLOVEX**

Wärmetauscher

Sheet 07.A / 12.91



TYPE	A	B	K	Weight		Shell side	Tube side
T 8035	425	285	305	4,5	Operating pressure	16 bar	10 bar
T 8061	680	540	560	6,5	Test pressure	24 bar	15 bar
T 8076	830	692	712	7,5	Bursting pressure	95 bar	36 bar
T 8091	985	845	865	8,0	Bursting pressure (tube)	--	105 bar
T 8106	1140	998	1018	11,0	Operating temperature	100 °C.	100 °C.
T 8120	1290	1152	1172	12,0	Test temperature	150 °C.	150 °C.

Connections

Oil connection standard with 1 1/2" and 70 mm square flange. The oil and water connections can be chosen freely. The counterflow system remains due to the 4-way design.

General

The series T 80 is the result of a continuous adjustment to the demand for efficient small heat exchangers with low water consumption. In addition to this, a heat exchanger is required which eliminates the problems during cleaning of the bundle tubes.

- 4-way system on the water side
- low water consumption
- stainless steel bundle head 1.4435
- sea water design T-OT
- tight diversion baffles on the oil side
- fin tube with 1,25mm wall thickness
- clear tube diameter 10,5 mm
- tubes rolled into the bundle head
- cleaning without dismantling on the water side
- cleaning on the water side during works of plant
- compensates heat tensions in the housing

The installation of these heat exchanger should be made vertically with the water connection at the bottom. This mainly applies for the installation of a continual control in the water inlet. The additional installation of a water filter prevents sedimentation completely.

The oil and water connections can be chosen freely on the inlet and outlet side and can be adjusted to space demand. The counterflow system will remain due to the 4-way system on the water side.

Performances

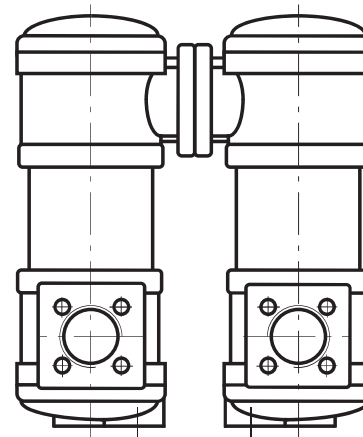
The tables with the performance data for selection of the cooler can be seen on sheet 11.A. The values for conversion are mentioned on sheet 02.A "Example for Calculation" in this catalog.

Material

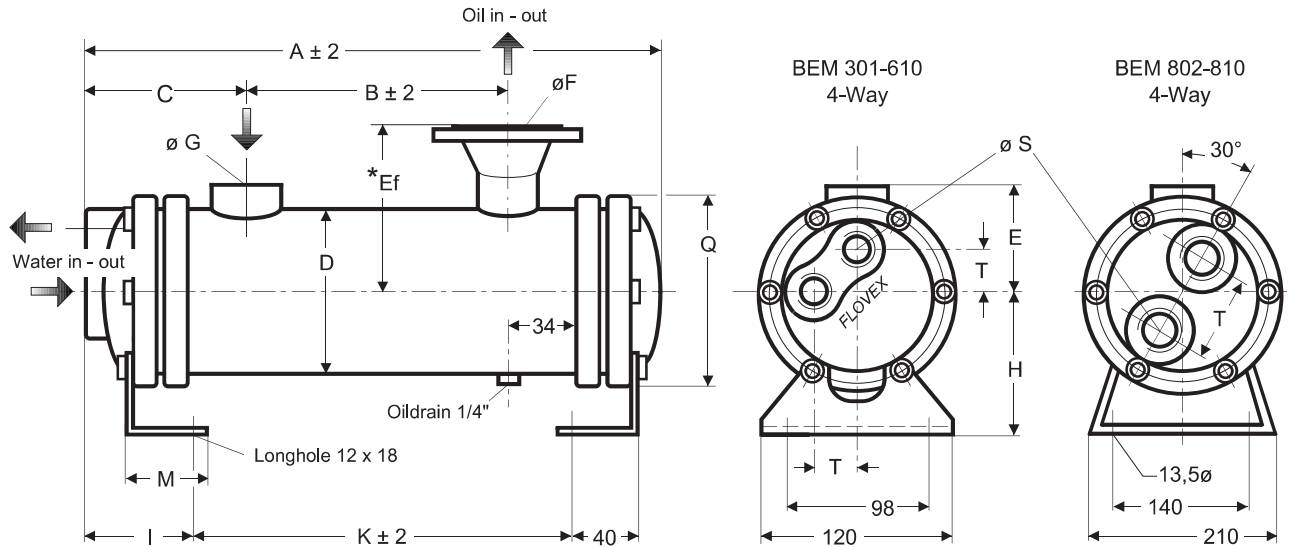
Housing	Aluminium
Cover	Radilon-A-RV- 50, fiber-glass reinforced
Cover thread	Cadmium-plated, the threads 1/2" are a continuous steel insert
Bundle head	Aluminium diecasting stainless steel 1.4435 plated
O-rings	Oil- and water side in Nitril
Bundle	T = SF-Cu-normal water T/OT = CuZn20Al2 for brackish- and sea-water with zink anodes in the cover

Design

This series can be supplied with connections in reverse order, by 90°, in every direction. If the oil is very stringy, with small quantities it might be possible to use a double heat exchanger, in order to prevent pockets in the diversions. The oil connection of the heat exchangers can thus be made via the



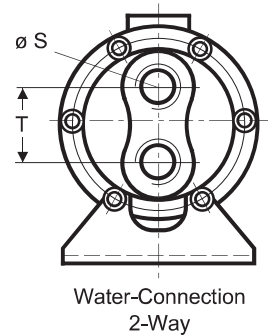
flange without an additional tube connection. The position of the connections must be stated when the order is placed. Attention! Heat exchangers with connection heads in reverse order of the series T 80 have a delivery time of 2-3 weeks. For vertical installation you can use our console K.01.0102.



The oil and water connections can be chosen freely. The counterflow system remains due to our 4-way system. Standard connection on the oil side with BSP thread. DIN and SAE flange can be supplied upon request. Oil connections can be arranged laterally in reverse order upon request. The dimensions "C" and "B" cannot be changed.

Connections

Size	ø F - DIN	ø F - SAE-3000	Meas. "T" - 4-Weg	Meas. "T" - 2-Weg
BEM 3...	DN 25-40 / PN 16	1 1/2 "	25	50
BEM 5...	DN 40-50 / PN 16	1 1/2 "	45	76
BEM 6...	DN 50-65 / PN 16	2 "	50	86
BEM 8...	DN 65-80 / PN 16	3 "	140	130



Installation measures

Typ	*											Typ - A -		Typ - B -		4-Way		2-Way		Weight
	A	B	C	D	E	Ef	H	K	I	M	Q	ø G	ø G	ø S	ø S					
BEM 301.2	435	250	90	80	60	130	65	305	65	55	108	1"	1 1/2"	3/4"	1"	6,5				
BEM 302	695	500						560								10				
BEM 302.6	842	652						712								11,8				
BEM 303	990	805						865								13,5				
BEM 303.6	1148	957						1017								16,8				
BEM 304	1295	1110						1170								19,5				
BEM 501.2	455	240	115	140	95	155	105	310	75	55	180	1 1/2"	2"	1"	1 1/2"	22				
BEM 502	710	490						565								24,3				
BEM 502.6	857	642						717								28,5				
BEM 503	1015	795						870								32,5				
BEM 503.6	1162	947						1022								35,5				
BEM 504	1320	1100						1175								38,5				
BEM 602	750	470	145	168	110	170	125	570	95	55	210	2"	2"	1 1/2"	2"	32,5				
BEM 602.6	902	622						722								38				
BEM 603	1055	775						875								43,5				
BEM 603.6	1207	927						1027								48,5				
BEM 604	1360	1080						1180								53				
BEM 605	1665	1385						1485								70				
BEM 802	785	435	175	219	150	200	180	400	250	50	265	3"	3"	2"	3"	80				
BEM 802.6	937	587						500								85				
BEM 803	1090	740						600								90				
BEM 803.6	1292	892						700								100				
BEM 804	1395	1045						800	300							110				
BEM 805	1700	1350						1000	350							130				
BEM 806	2005	1655						1200	400							160				

* For usage of DIN-Flanges the measure "Ef" extended by 20 mm

General

Up to the size of BEM 304 this series is identical in performance with the series T 80. This inside construction conforms with series T 80. As from BEM 502 this series covers a performance range up to approx. 2500 kW.

The standard version will be supplied in five different materials. However depending on the requirement of the medium, all kinds of material can be used for production.

The material for housing and bundles can thus be exactly adjusted to the demand. If stainless steel is requested on the water side, please ask for our special information!

The heat exchangers will be manufactured with inspections according to R.I.N.A., LLOYD'S Register, ABS and NORSKE VERITAS for the ship building. The factory's production standard is A.S.M.E. and T.E.M.A.

The series is available with 25 and 50 bar within the normal delivery time. If required, an operating pressure of up to 420 bar can be produced.

In case of high temperatures up to 800 °C, the series BEW should be used. The series BEW has ductile bundle. This bundle design can take up length extensions and prevent tensions in the housing. The bundle of the series BEW has a double sealing. A mixture of the agents between housing and bundle will thus be eliminated.

The series BP has a bundle with a firm and loose bundle head. It is therefore possible to compensate the lengths at temperatures, however the bundle is not ductile, contrary to the series BEW. Please ask for a detailed description of series BEW + BP. Beyond it all types and designs are available according T.E.M.A. (Tubular Exchanger Manufacturers Ass.) Please ask for single drawings and offers.

Construction of the Cooler

The construction of this series conforms with the system of series T 80 The bundle tubes have a clear diameter of 10,5 mm. The wall thickness is 1,25 mm without fin. The cooling water will be diverted in the cover.

A later modification to a 2- or 1-way design on the water side is possible without dismantling of the heat exchanger. On the oil side the heat exchanger will be designed by arrangement and size of the diversion baffles to the oil quantity. The adjustment is necessary when using very stringy oil or large oil flows.

As standard design this series is a 4-way system. Depending on the design, however, also the 2-way design will be applied.

With our system of cooling water diversion in the covers, a later modification from 4- to 2- or 1-way diversion on the water side is possible. The oil side diversions cannot be changed afterwards.

Design

Depending on the oil circulating quantity, design A or B will be applied

- A - oil quantity 16,6 - 300,0 l/min
- B - oil quantity 133,3 - 3000,0 l/min

Please read our information " Construction System " on sheet 04 of this catalog. The inside construction of the cooler is described here in detail.

Cooling performance data sheet 11.A... 13.A.

Pressure and Temperature

	Operating pressure	Test pressure
Housing side	16 bar	24 bar
Tube side	10 bar	15 bar

	Operating temperature	Maximum temperature
Housing side	100 °C.	150 °C.
Tube side	100 °C.	150 °C.

Material

Housing	C-steel or stainless steel
Cover	cast iron or bronze
Bundle head	C-steel or stainless steel
Bundle	SF-Cu normal water
	CuZn20Al2 sea water or brackish water
	1.4435 only for special
	1.4571 use

When operating the heat exchangers with a cooling agent " water ", stainless steel should not be used. There is danger of localized corrosion, if a certain water quality will not be kept. The coolers with tubes of CuZn20Al2 are being equipped with zinc protection anode.

Information of Installation

By using the 2-and 4-way system on the water side, the cooler is independent of the inlet and outlet of both agents. This applies to the housing as well as to the bundles.

The inlet and outlet can thus be chosen freely according to the requirements and the constructive space conditions. The counter-flow system will be kept in any case.

The oil connection will be equipped with any required thread, DIN or SAE flange. The standard design of the cooler have BSP tube threads.

The housing connections can be supplied in reverse order by 90 °C in every chosen direction. (not suppliable ex stock)

Type Codes

The types mark the individual tables with the performance data.

Example :

BEM 502 - A - 4

BEM = series

502 = 5 = diameter

02 = total length

A = Number of diversions on the oil side . (A oder B) depending on oil flow quantity

4 = water side diversion 4- or 2-Way System. 1-Way-System for special cases

Installation

If possible and the space is sufficient, the installation of the heat exchangers should be made vertically. Thus possible impurities will be washed out in the bundle even with small water quantities.

The sedimentation of impurities can thus be prevented to a great extent. Furthermore all bundle tubes are equally filled with water. The use of a water filter prevents sedimentation of impurities completely.

Special information has to be observed, if the cooler is being operated with well water. We do not mention this here, as well water is rarely used these days.

- In case of well water please contact us!

The coolers of series T 80 have a very low weight because they are made of Aluminium. The coolers mounted with flanges on the oil side, can easily be attached to the pipeline. Even in case of small tank surfaces, it is not necessary to look for installation space. The cooler can practically be hung next to the tank.

- The water and oil connections can be chosen freely because of the double counterflow system, and they can be adjusted to the pipelines and the space demand.
- The series T 80 compensates length extensions in case of very high temperatures in the housing.

Remarks

In order to obtain a cost saving and good use of the cooler capacity, the water filtration and the kind of the water regulation must be adjusted to each case.

This should therefore be considered, if 2- or 3-point regulation should be applied. The material of the bundle tubes is a priority for this decision.

- Special kinds of brass of the CuNi group have to be observed specially, as there is a danger of localized corrosion at water speeds up to 0,9 m/s. This range can only be excluded by an electric 2-point regulation. When using such OPEN-CLOSED regulation, however, the above maximum admissible flow speed must be taken into consideration.
- Because of the bundle material of the FLOVEX coolers, the undesired range in the water speed of 0 - 0,9 m/s can be disregarded, and the inexpensive 3-point regulation can be applied without auxiliary energy. The top limitation will be made automatically, and the low speed does not matter with the material used by us. FLOVEX coolers were designed for a water speed of maximum 2,7 m/s. The limit to be observed is safely at 6,0 m/s.

Inspection and Cleaning

Due to the kind of the bundle, the inside diameter of the bundle tubes and the entire construction of the cooler, the inspection and the cleaning are very simple. The bundle can be inspected after taking off the rear cover, i. e. after loosening some screws and closing of the water inlet.

The bundle tubes have an inside diameter of 10,5 mm. These tubes can easily be cleaned if necessary. It would be best to put a 10 mm thread bar through the tubes, if necessary with light blows of the hammer.

The possible lime layer will come off immediately because the surface of the inner side of the tubes is smooth.

- A cleaning with chemical agents is not possible

The fin tubes with a wall thickness of 1,25 mm (measured without fin) are very solid.

Due to the large inside diameter of 10,5 mm of the bundle tubes, larger impurity particles do not disturb the operation, as they are normally washed out.

Contrary to the heat exchangers with 4 + 6 mm tubes, the use of dirt

taps is not necessary for tubes with a large inside diameter.

If a chemical cleaning is necessary, this should only be made as follows:

- Clean the cooler approx. 2 hours with 5% HCl in the water, wash and soak it in a closed basin (do not use in a closed rooms).
- Then the cooler should be washed for 2 hours with 5 % NaOH in the water for neutralisation of the acid used before.
- This procedure is very extensive and must be made very carefully so that no aggressive remainders stay in the bundle tubes.

With our system of large-dimensioned tubes, a mechanical cleaning with thread bars or a brush is sufficient. The heat exchanger does not even have to be dismantled.

If the dismantling of the cooler becomes necessary, this can be made without removing the pipeline.

By simple loosening of the cover on the water side, the flanges on the oil side or screws, as well as the fixing screws at the consoles, the entire cooler can be pulled aside. The space required for this, beside or behind the cooler, is identical with the basic space of the cooler.

For systems, which have been heavily stressed by impurities, we supply special design with bundle tubes of 14 mm Ø. (In this coherence please notice the design according T.E.M.A.).

These heat exchangers are often being used for heat recovery from tall oil baths. These coolers have free access on both tube ends without those tubes disturbing during cleaning and without having to dismantle connections for the cleaning procedure (for example the series AEW).

Guarantee

In the frame of our " General conditions for sale and delivery " we assume no guarantee for corrsions damages or impurities, falling out and defects by reason of wrong maintenance and installation spaces. The time of guarantee is 12 months after erection, but not longer than 18 months after dispatch of the heat exchanger.