

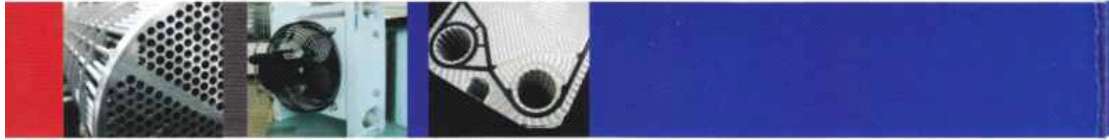
**KAMUI<sub>FS</sub>**®  
Famous Brand of Guangdong Province

# HEAT EXCHANGER



**FOSHAN KAMUI HEAT EXCHANGER CO.,LTD**

[Http://www.kamui.com.cn](http://www.kamui.com.cn) [Http://www.kamui-phe.com](http://www.kamui-phe.com)



## INTRODUCTION



Foshan -KAMUI Heat Exchanger CO.,LTD is a joint venture corporation between Foshan Constant Hydraulic Machinery Co.,LTD (China) and KAMUI Company LTD (Japan) specializing in water-cooled and air-cooled heat exchangers. It was established in July 18<sup>th</sup>, 1994 with a total investment of USD 4.6 Million, covering an area of 25,000 square meters.

With the advanced production equipment and ERP informatized management, it produces the products strictly based on Japanese technique, and they have acquired the authentication of ISO9001 ver.2000. In March 2004, the corporation was granted the permit to produce National Grade A pressure vessels. Various kinds of shell & tube type and plate-fin type heat exchangers produced are well-known for their high efficiency, economy in energy and stable reliable quality. At present, it produces more than 100,000 heat exchangers annually, widely sold throughout the whole country (including Hong Kong and Taiwan districts), receiving warm welcome and acceptance. The products are also exported to Japan, Germany, Italy, America, Australia, Middle East and Southeast Asia, etc, making KAMUI a famous brand in its fields.

Both of the shell & tube type and plate-fin type heat exchangers are widely used in plastic machinery, construction machinery, air-compressor, hydraulic system, air conditioning system, generator equipment and other industries such as petroleum industry, air separation, chemical industry, metallurgy, textile and nuclear devices, foodstuff medicine.

The heat exchangers it produces include shell&tube and plate fin types. The shell& tube types including SL/SLR series, FC/FCY series, BC/BCY series and RC series, and the plate fin types including F-AN series, F-AN-E series, F-AOA-A series, F-ADC series, plate exchangers FKE series and B3 series among which the SL series is the patent product of KAMUI company.

Welcome to contact with us, we have pleasure to provide our superior and thoughtful service for you.

The external motto of Foshan-KAMUI corporation;  
Enterprise, Creation and Contribution

We look forward to cooperating with firms both at home and abroad and achieving mutual development.



*The Development Trocess and Factore Appearance of KAMUI<sub>FS</sub> Co.,LTD*



JAPAN KAMUI CO.,LTD.



FOSHAN CONSTANT HYDRAULIC MACHINERY CO.,LTD.



SHELL AND TUBE HEAT EXCHANGER SUB-FACTORY



PLATE-FIN HEAT EXCHANGER SUB-FACTORY



PLATE HEAT EXCHANGER SUB-FACTORY

- 1994 Foshan KAMUI Heat Exchanger Co.,LTD was established in July 18th.
- 1998 The main economical benefit general index of Foshan KAMUI was at 98th in all Machine & Industry Enterprises of China, and at the tenth in same industries.
- 1999 The main economical benefit general index of Foshan KAMUI was at 50th in all Machine & Industry Enterprises of China, and at the fifth in same industries.
- 2000 Ranted the High & New Technology Enterprise of GuangDong Province in July
- 2001 Granted the Foreign Businessman Investment Vanguard Technology Enterprise of GuangDong Province in February.
- 2003 Acquired the authentication of ISO 9001-2000 in March
- 2003 The amount benefit tax hand in government at before 50th in all enterprise of ChangCheng District Foshan City.
- 2004 The 17908 centiare workshop was founded in the National High & New Technology Exploiture District of Foshan City in March 29th.
- 2004 Granted the permit to produce National Grade A pressure Vessels in May.
- 2004 Increase 18.5 million RMB investment to enlarge the product produce' ability.
- 2004 KAMUI<sub>FS</sub> has become famous brand of GuangDong Province.
- 2005 The Plate-fin Heat Exchanger Sub-factory workshop was finished in March and enter formal produce period.
- 2007 Foshan KAMUI Plate Heat Exchanger Co.,LTD was established in March and invest 10 million RMB for it.





## COOLING & HEATING DEPEND ON [CORE]

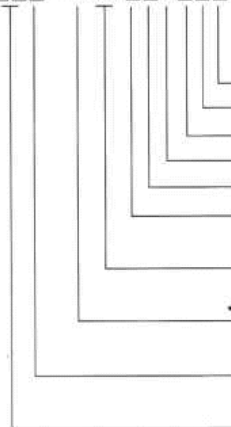
HEAT EXCHANGER OF KAMUI IS NOT ONLY PRODUCT,BUT ALSO WORK OF ART.

Our company produced heat exchangers are widely used in plastic machinery, construction machinery, compressor,hydraulic system, air-conditioning system, generator equipment and other industries such as petroleum industry ,chemical industry, metallurgy, air separation, textile and nuclear devices. Foshan KAMUI have hold abundant experience of heat exchanger design and manufacture. We can design and manufacture the non-standard products based on the parameter and requires provided by customers. And provide high quality products and thoughtful service for customers.

Material	.....	Copper、Brass、Alloy copper
	.....	304、304L、316、316L stainless steel
	.....	steel、Carbon steel
Area	.....	0.1m <sup>2</sup> ~500m <sup>2</sup>
Diameter	.....	89~1000mm
Design Temperature	.....	≤500℃
Design Pressure	.....	0~4.0mpa

### 1、The Model of the Products

□□□ - x x x □□ x □□□



- Special product:T-special one; no showing-standard one
- Types of installation:L-vertical;no showing-horizontal
- Types of connecting shell side:F-flange;no showing-spiral
- Lead of the shell side:1-small flow;2-medium flow; 3-large flow
- Types of connecting tube side:F-flange;no showing-spiral
- Channel of the tube side:W-four channels;U-two channels; no showing - one channel
- The area of heating surface:x.xM3(When the area is larger than 10,it's indicated in 3 digitals)
- Diameter of the shell:Xinch(When it's more than 10, it's indicated in 2 digitals)
- Types of fastening the tube plate:Y-moving tube plate; no showing-fastened tube plate
- The series of oil-coolers:SL-rotational flow type; BC-bare tube type;FC-fin tube type

### 2、The Using Pressure of Product

- 1.Standard products:the maximal pressure of shell side:1.0Mpa,The maximal pressure of tube side:0.5Mpa.
- 2.Special products:Design according to customers' requirement.

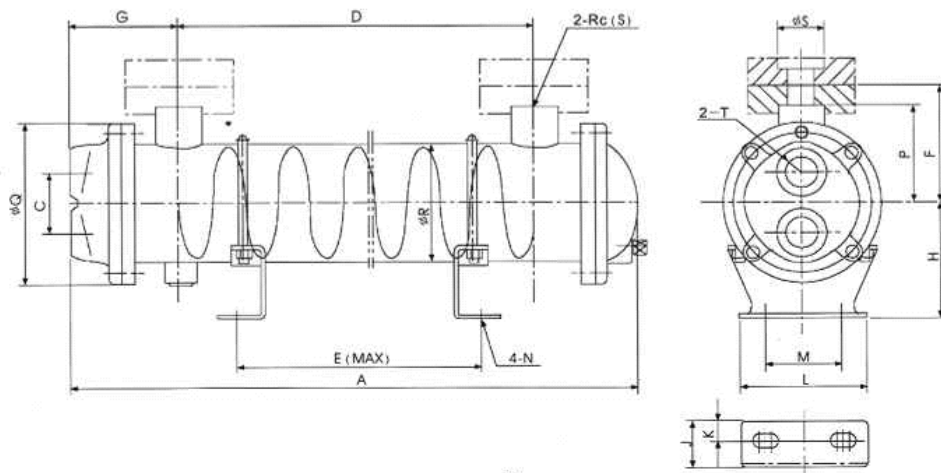
## SL/SLR Series



### ■ SL/SLR Main Characteristic

1. Screw-guide plate lead oil to flow in spiral type, in succession and well-distributed. It overcomes "the dead comer" of heat exchanging which is made by traditional deflector, so the efficiency of heat transfer is high, the loss of pressure is low.
2. The cooling tube is made of copper to roll fin outside. The product have bigger heating surface but little size and weight.
3. There are 2 or 4 channels in water side, but large quantity of flow (large lead of guide plate) and small quantity of flow (small lead of guide plate) in oil side, Various heat exchangers can meet customers' requirements.
4. Manufacture according to technology and production management style of KAMUI JAPAN, The quality of KAMUIFS' heat exchanger is reliable and stable.
5. SL series shell & tube type heat exchanger is a new-type one, which is produced according to most advanced process introduced from JAPAN. It has been registered the patent already in CHINA, JAPAN, USA, and TAIWAN area.

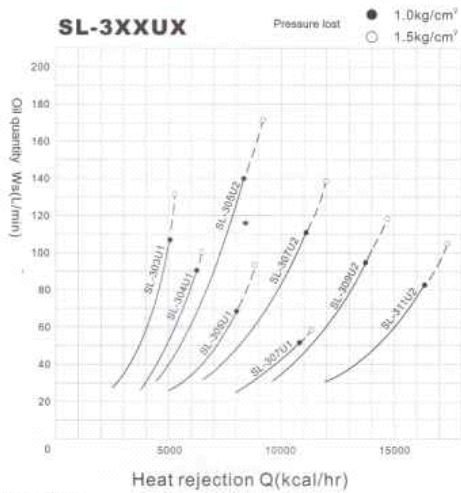
### 1. The Construction Scheme of the Water-cooled Heat Exchanger of SL/SLR series





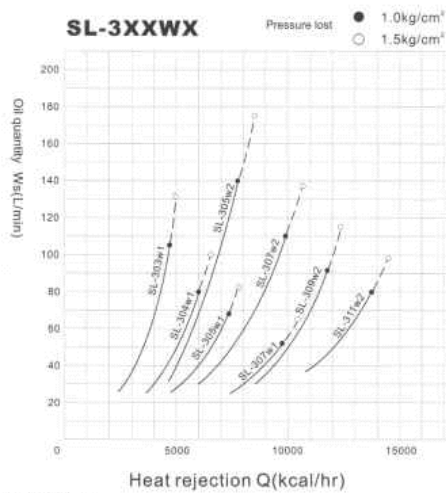
Model	A	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
SL-303	309		152	107													
304	381		224	179													
305	453		296	251													
307	597		440	395													
309	741	45	584	539	85	81	87	35	15	95	58	11x20	62	120	89	Rc3/4	Rc3/4
311	885		728	683												φ28.5 (DN20)	
313	1030		872	827													
315	1172		1015	970													
SL-408	469		284	240													
411	613		428	384													
415	757		572	528													
418	901	60	716	672	110	95	125	50	20	160	110	18x22	87	150	114	Rc1 1/4	Rc3/4
421	1045		860	816												φ43 (DN32)	
424	1188		1003	959													
428	1261		1076	1032													
SL-509	494		262	198													
518	638		406	342													
526	854		622	558													
534	1070	70	838	774	130	121	160	50	20	180	120	18x25	105	180	139	Rc1 1/2	Rc1
542	1286		1054	990												φ52 (DN40)	
549	1501		1269	1205													
554	1612		1380	1316													

## 2. The Function Curve of SL series products



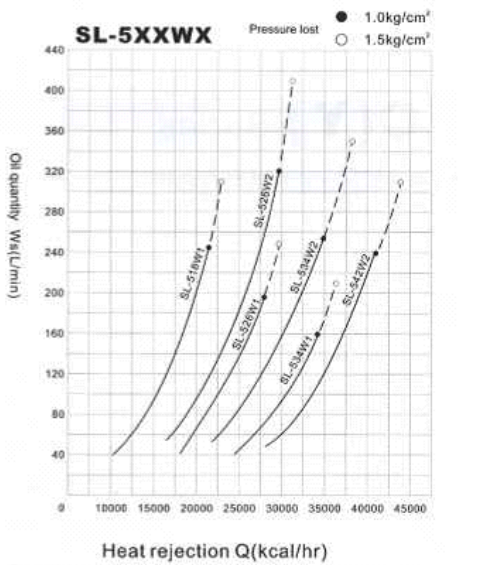
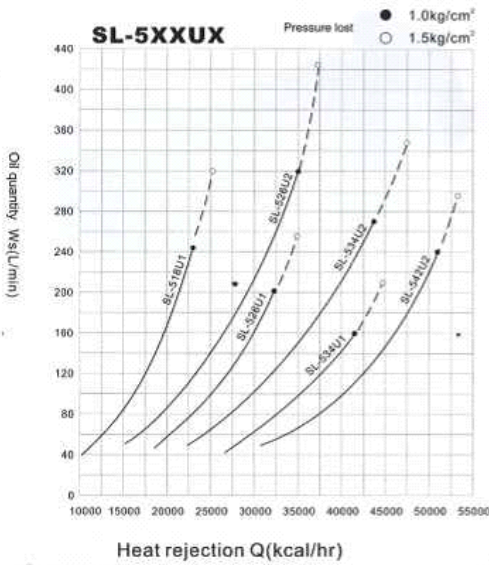
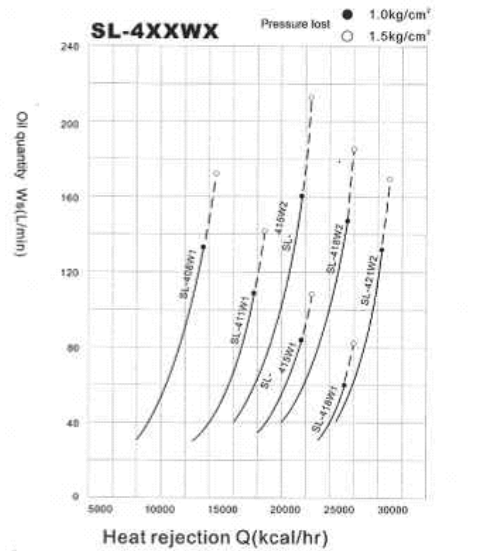
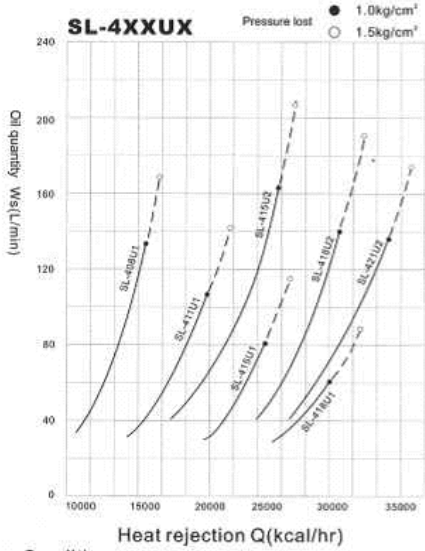
Condition

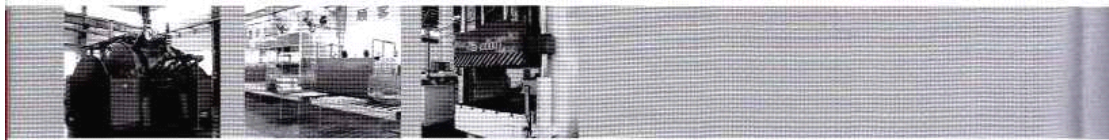
fluid: equal to ISO VG-32 temperature of water inlet: 30° C  
temperature of water inlet: 50° C quantity of cooling water: MAX. 40 l/min



Condition

fluid: equal to ISO VG-32 temperature of water inlet: 30° C  
temperature of water inlet: 50° C quantity of cooling water: MAX. 20 l/min





### 3、 Method of Selecting and defining Heat Exchanger

1. Calculate heat rejection needed  $Q(\text{kcal/hr})$

(1) calculate it according to temperature and quantity of oil requirement  $Q=C \rho q(T_1-T_2)$

In the formula:  $C$ --Special heat of oil  $\rho$ --Density of the oil  $q$ --Quantity of oil  $T_1$ --Inlet temperature of the oil  
 $T_2$ --outlet temperature of the oil

(2)calculate according to the systematic caloric value of hydraulic pressure  $Q=Pr-Pc-Phc$

in the formula: $Pr$ ---Input power systematic in hydraulic pressure  $Pc$ ---Output the effective power  
 $Phc$ ---Fuel tank . pipeline distribute the thermal power

2.Choose the type of cooler

Check the performance curve based on calculated heat rejection and quantity.The type of curve in the right of cross is needed cooler.

3.Additional instruction

There may be difference of condition between actual use and performance testing.Select towards small type cooler,when the viscosity of oil is small,the flow of water is large and  $\Delta T$  between oil and water is large also.

Otherwise,select towards big one.We can serve for you in selecting cooler, in case that you still have something unclear about,welcome to contact with sales department of KAMUITS.

### 4、 Notice

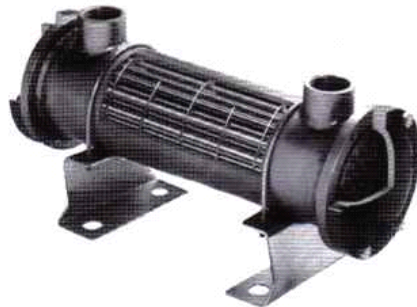
1.The stand type products is only suitable for fresh water.

2.Operating pressure of oil is 1.0Mpa,Operating pressure of water is 0.5Mpa.

3.During freezing season for cooling water,you should discharge the fresh water from the heat exchanger when the system offwork.

4.Clean the inside of heat tube(water side) per half of year,in order to keep a better cooling effect.

## FC(Y) Series Heat Exchanger



### ■ Main Characteristic of FC(Y) Series

FC series water-cooled heat exchanger is a fin-tube one,which adopt the traditional structure,and it is designed by advanced technique from abroad. Small-scale product is the immovable type of the tube-plate,the model is FC.The model FCY are medium-large products,which are moving tube-plate type.

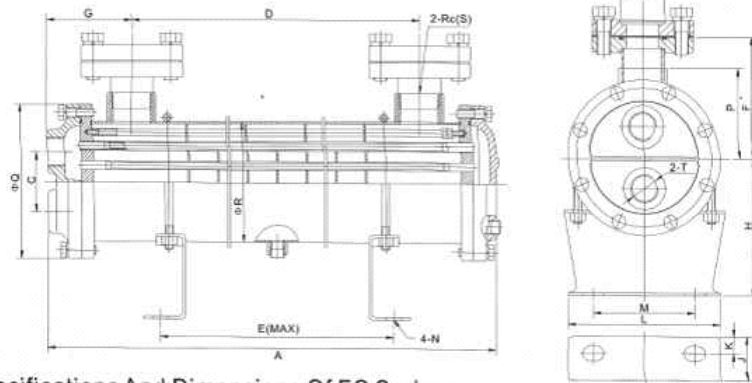
The heat tube is made of copper to roll fin outside. The product has bigger heating surfaces but little size Suitable for cooling of cleaner fluid in lower viscosity. It can be applied to such industry as plastic machinery,hydraulic equipment,compressor,lubricating system of thin oil,fluid power coincidence implement and electric device,ect.

Because the model FCY of FC series adopts the moving tube-plate,the core of the tube can be dismantled to clean and repair.

The FC series products cover market more widely,widely.We can design and manufacture various coolers,from small to big size,according to customers' requirements.



1、 The Construction Scheme of the Water-cooled Heat Exchanger of FC Series



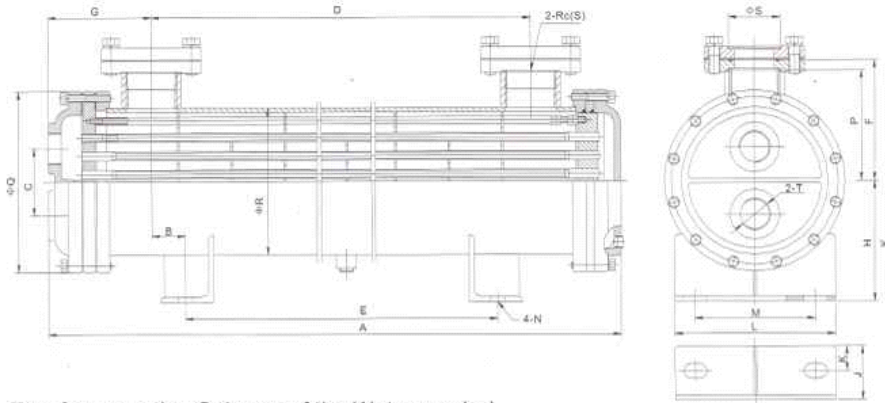
2、 The Specifications And Dimensions Of FC Series Products (immovable type of tube plate)

(MM)

Model	A	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
FC-303	309	45	152	107	85	81	87	35	15	95	58	11x20	62	120	89	Rc3/4	Rc3/4
304	381		224	179													
306	453		296	251													
307	531		374	329													
308	597		440	395													
310	741		584	539													
311	813		656	611													
312	885		728	683													
FC-410	469	60	284	240	110	95	125	50	20	160	110	18x22	87	150	114	Rc1 1/2	Rc3/4
413	547		362	318													
415	613		428	384													
419	757		572	528													
422	829		644	600													
424	901		716	672													
428	1045		860	816													
FC-519	530	70	340	276	140	101	160	50	20	180	120	18x25	105	180	139	Rc1 1/2	Rc1
522	596		406	342													
529	740		550	486													
532	812		622	558													
535	884		694	630													
542	1028		838	774													
549	1171		981	917													
554	1281		1091	1027													
FC-635	820	70	574	500	160	127	180	67	30	220	140	18x30	122	210	165	Rc2	Rc1
640	890		646	570													
645	1035		790	715													
650	1180		933	860													
660	1290		1043	970													
665	1380		1133	1060													
670	1490		1243	1170													
675	1600		1353	1280													
680	1680		1433	1360													



3. The Construction Scheme of the Water-cooled Heat Exchanger of FCY Series:

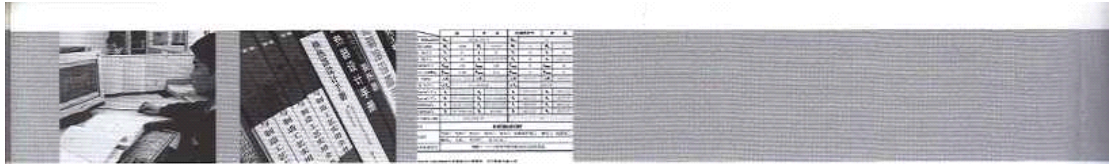


4. The Construction Scheme of the Water-cooled Heat Exchanger of FCY Series:

(单位: MM)

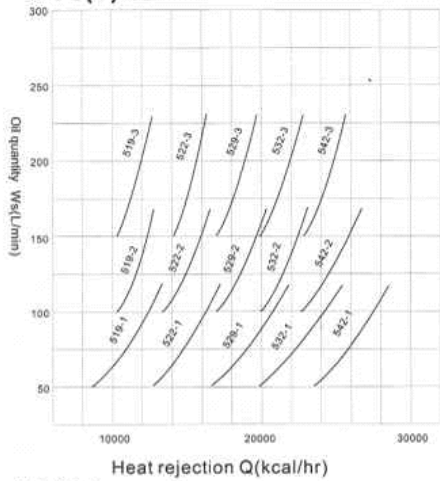
Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
FCY-519	527			317	253													
522	593			383	319													
529	737			527	463													
532	809	32	70	599	535	140	121	160	50	20	180	120	18x25	105	180	139	Rc1½ φ 52 (DN40)	Rc1
535	881			671	607													
542	1025			815	751													
549	1168			958	894													
554	1278			1068	1004													
FCY-635	810			551	476													
640	882			623	548													
645	1026			767	692													
650	1169			910	835													
660	1279	37.5	70	1020	945	160	145	180	67	30	220	140	18x30	122	210	165	Rc2 φ 65 (DN50)	Rc1
665	1369			1110	1035													
670	1479			1220	1145													
675	1589			1330	1255													
680	1669			1410	1335													
FCY-860	830			541	441													
870	905			613	513													
885	1050			757	657													
8100	1190			900	800													
8110	1300			1010	910													
8120	1390	50	100	1100	1000	180	155	180	80	37	240	180	22x35	165	270	219	Rc2½ φ 77 (DN65)	Rc1½
8130	1500			1210	1110													
8145	1610			1320	1220													
8160	1780			1490	1390													
8170	1900			1610	1510													

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
FCY-10150	1210			880	760													
10165	1320			990	870													
10180	1410			1080	960													
10200	1520			1190	1070													
10210	1630			1300	1180													
10225	1710	60	120	1380	1260	220	174	220	80	37	280	200	22x35	200	340	273	Rc3 φ 92 (DN80)	Rc1½
10240	1800			1470	1350													
10260	1920			1590	1470													
10280	2040			1710	1590													
10300	2180			1850	1730													
FCY-12260	1495	55		1060	950													
12280	1605	85		1170	1000													
12300	1715	90		1280	1100													
12320	1795	105		1360	1150													
12340	1885	150		1450	1150													
12360	2005	185	150	1570	1200	280	236	280	100	45	350	250	22x40	226	445	324	Rc3 φ 92 (DN80)	Rc2
12400	2125	245		1690	1200													
12420	2265	290		1830	1250													
12440	2355	335		1920	1250													
12480	2445	355		2010	1300													
12480	2535	375		2100	1350													
FCY-14450	1866	80		1310	1150													
14470	1956	100		1400	1200													
14510	2076	160		1520	1200													
14550	2196	220		1640	1200													
14590	2336	240	220	1780	1300	280	334	280	100	40	400	300	24x50	242	470	357	Rc3 φ 92 (DN80)	φ 77.5 (DN65)
14620	2426	235		1870	1400													
14645	2518	280		1960	1400													
14670	2606	325		2050	1500													
14700	2706	325		2150	1500													
14730	2796	320		2240	1600													
FCY-16640	2156	190		1480	1100													
16680	2276	200		1600	1200													
16730	2416	270		1740	1200													
16770	2506	285		1830	1300													
16800	2596	310	240	1920	1300	350	394	350	110	40	400	300	26x50		560	407	φ 116 (DN100)	φ 90.5 (DN80)
16840	2686	305		2010	1400													
16870	2786	355		2110	1400													
16910	2876	350		2200	1500													
16940	2966	345		2290	1600													
16980	3056	390		2380	1600													
FCY-18850	2268	90		1580	1400													
18920	2408	135		1720	1450													
18960	2498	155		1810	1500													
181000	2588	200		1900	1500													
181040	2678	195		1990	1600													
181090	2778	245	310	2090	1600	380	400	380	145	60	450	300	26x50		620	457	φ 116 (DN100)	φ 90.5 (DN80)
181130	2868	240		2180	1700													
181170	2958	285		2270	1700													
181220	3048	280		2360	1800													
181260	3138	275		2450	1900													
181300	3228	270		2540	2000													



### 5. The Function Curve of FC(Y) series products

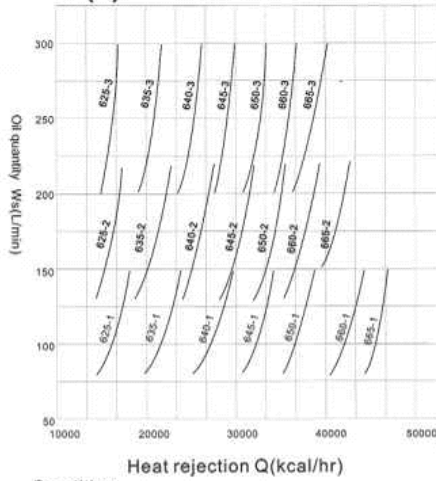
**FC(Y)-5B**



Condition

fluid: equal to ISO VG-32      temperature of water inlet: 28° C  
 temperature of water inlet: 50° C      quantity of cooling water: MAX. 50 l/min

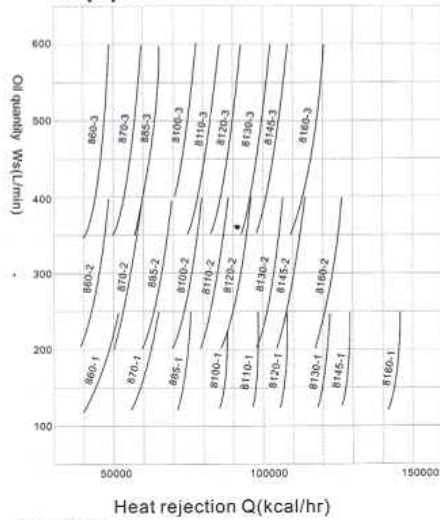
**FC(Y)-6B**



Condition

fluid: equal to ISO VG-32      temperature of water inlet: 28° C  
 temperature of water inlet: 50° C      quantity of cooling water: MAX. 60 l/min

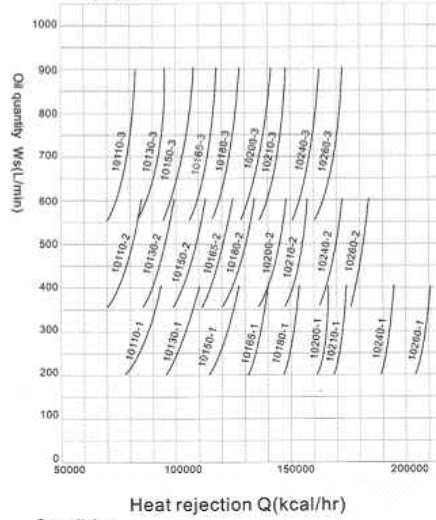
**FC(Y)-8B**



Condition

fluid: equal to ISO VG-32      temperature of water inlet: 28° C  
 temperature of water inlet: 50° C      quantity of cooling water: MAX. 150 l/min

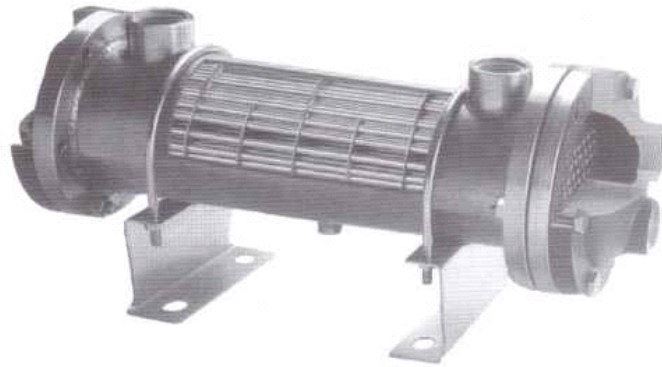
**FC(Y)-10B**



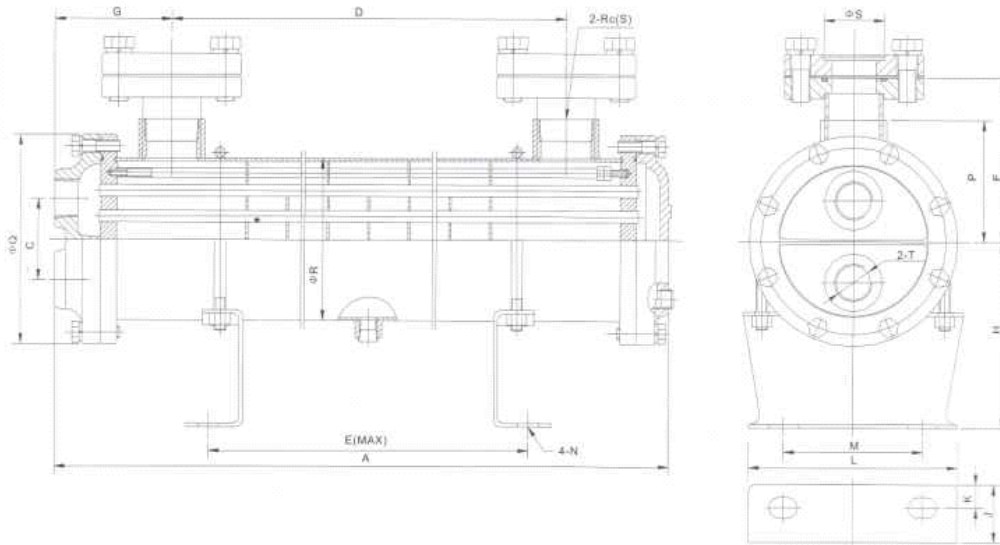
Condition

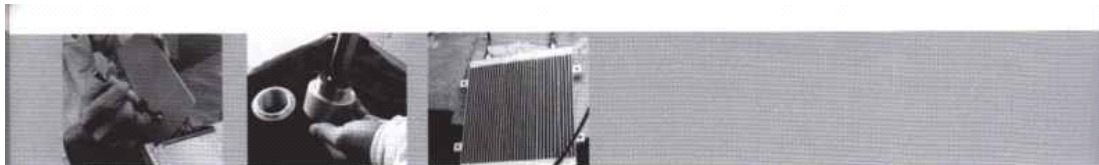
fluid: equal to ISO VG-32      temperature of water inlet: 28° C  
 temperature of water inlet: 50° C      quantity of cooling water: MAX. 200 l/min

# BC(Y) Series Heat Exchanger



## 1、The Construction Scheme of Water-cooled Heat Exchanger of BC Series





### ■ Main Characteristic of BC(Y)Series

BC(Y)series water-cooled heat exchanger is a bare-tube one(without rolling fin outside),of traditional structure.The small-size product is the immovable type of the tube-plate,the model is BC, The model BCY are medium-large products,which are the moving tube-plate type.

The heat tube is made of bare one (without rolling fin outside),which have high heat coefficient of membrane outside flow and better ability to resist pollution.suitable for cooling of dirtier fluid and higher viscosity, heat exchanging of water to water and water to air.

We can select stainless steel or other special alloy for BC(Y) series according to customer's requirements.They are suitable for heat exchanging ing chemical industry,high-temperature medium and sea water,etc. Because the model BC(Y) of BC series adopt the moving tube-plate,the core of the tube can be dismantled to clean and repair.

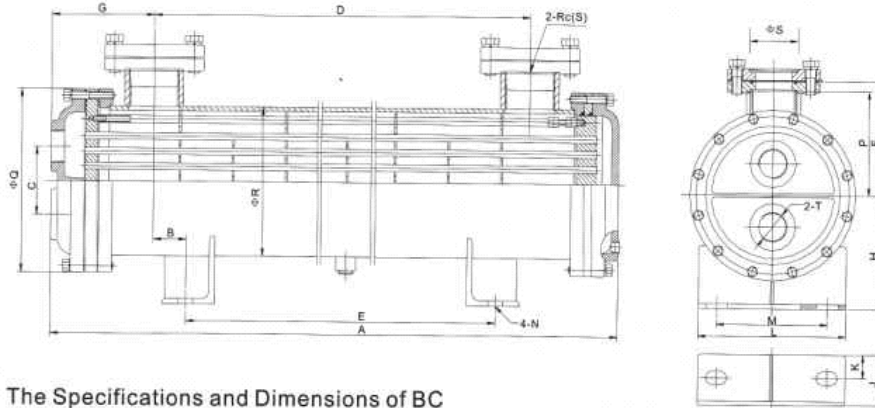
The BC series products cover market more widely.We can design and manufacture various coolers, from small to big size according to customers' requirements.

### 2. The Specifications and Dimensions of BC Series Products(immovable type of tube-plate)

(MM)

Model	A	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
BC-302	309		152	107													
303	381		224	179													
304	531		374	329												Rc3/4	
305	597	45	440	395	85	81	87	35	15	95	58	11x20	62	120	89	φ28.5 (DN20)	Rc3/4
306	741		584	539													
307	813		656	611													
308	885		728	683													
BC-406	469		284	240													
407	547		362	318													
408	613		428	384													
410	757	60	572	526	110	95	125	50	20	160	110	18x22	87	150	114	Rc1 1/2 φ43 (DN32)	Rc3/4
412	829		644	600													
413	901		716	672													
415	1045		860	816													
417	1188		1003	959													
BC-510	530		340	276													
512	596		406	342													
515	740		550	486													
517	812	70	622	558	140	101	160	50	20	180	120	18x25	105	180	139	Rc1 1/2 φ52 (DN40)	Rc1
519	884		694	630													
522	1028		838	774													
526	1171		981	917													
528	1281		1091	1027													
BC-621	746		502	427													
623	782		538	463													
627	916		672	597													
631	1034		790	715													
634	1128	70	884	809	160	127	180	160	50	30	210	18x30	122	210	165	Rc2 φ65 (DN50)	Rc1
637	1212		968	893													
640	1332		1088	1013													
643	1402		1158	1083													
645	1487		1243	1168													

3. The Construction Scheme of Water-cooled Heat Exchanger of BCY Series



4. The Specifications and Dimensions of BC Series Products(movable tube-plate)

(MM)

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
BCY-510	528	32	70	317	253	140	121	160	50	20	180	120	18x25	105	180	139	Rc1 <sup>1/2</sup>	Rc1
512	594			383	319													
515	738			527	463													
517	810			599	535													
519	882			671	607													
522	1026			815	751													
526	1169			958	894													
528	1279			1068	1004													
BCY-621	738	37.5	70	479	404	160	145	180	50	20	210	140	18x30	122	210	165	Rc2	Rc1
623	774			515	440													
627	908			649	574													
631	1026			767	692													
634	1120			861	786													
637	1204			945	870													
640	1324			1065	990													
643	1394			1135	1060													
645	1479	1220	1145															
BCY-842	905	50	100	613	513	180	155	180	80	37	240	180	22x35	165	270	219	Rc2 <sup>1/2</sup>	Rc1 <sup>1/2</sup>
850	1050			757	657													
858	1190			900	800													
864	1300			1010	910													
869	1390			1100	1000													
877	1500			1210	1110													
881	1610			1320	1220													
890	1780			1490	1390													
896	1900	1610	1510															

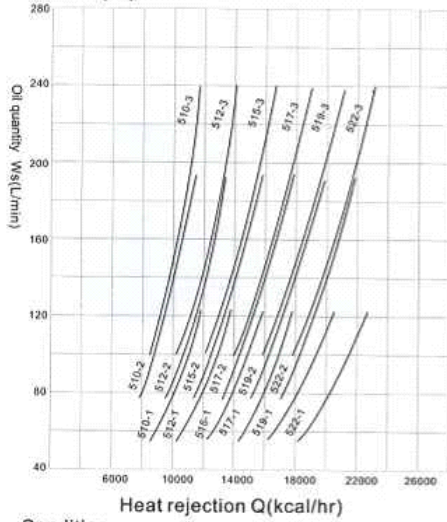


Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
BCY-1085	1210			880	760													
1095	1320			990	870													
10100	1410			1080	960													
10110	1520			1190	1070													
10120	1630	60	120	1300	1180	220	174	220	80	37	280	200	22X35	200	340	273	Rc3 φ92 (DN80)	Rc1',
10127	1710			1380	1260													
10134	1800			1470	1350													
10144	1920			1590	1470													
10154	2040			1710	1590													
10165	2180			1850	1730													
BCY-12140	1495	55		1060	950													
12150	1605	85		1170	1000													
12165	1715	95		1280	1100													
12178	1795	105		1360	1150													
12186	1885	150	150	1450	1150	280	237	280	100	40	350	250	22X40	226	445	324	Rc3 φ92 (DN80)	Rc2
12200	2005	185		1570	1200													
12214	2125	245		1690	1200													
12229	2265	290		1830	1250													
12240	2355	335		1920	1250													
12250	2445	355		2010	1300													
12260	2535	375		2100	1350													
BCY-14250	1866	105		1310	1100													
14270	1956	150		1400	1100													
14290	2076	160		1520	1200													
14310	2196	220		1640	1200													
14333	2336	240	220	1780	1300	280	334	280	100	40	400	300	22X50	243	470	357	Rc3 φ92 (DN80)	φ77.5 (DN65)
14348	2426	235		1870	1400													
14363	2516	280		1960	1400													
14378	2606	325		2050	1400													
14395	2706	325		2150	1500													
14409	2796	370		2240	1500													
BCY-16335	2156	190		1480	1200													
16360	2276	200		1600	1200													
16385	2416	270		1740	1300													
16400	2506	265		1830	1300													
16420	2596	310	240	1920	1300	350	394	350	110	40	400	300	22X50	-	560	407	φ116 (DN100)	φ90.5 (DN80)
16435	2686	305		2010	1400													
16455	2786	355		2110	1400													
16470	2876	350		2200	1500													
16485	2966	345		2290	1600													
16505	3056	390		2380	1600													
BCY-18540	2268	90		1580	1500													
18580	2408	135		1720	1500													
18605	2498	155		1810	1550													
18632	2588	200		1900	1550													
18658	2678	195		1990	1600													
18687	2778	245	310	2090	1600	380	400	380	100	40	450	350	26X50	-	620	457	φ116 (DN100)	φ90.5 (DN80)
18713	2868	240		2180	1700													
18739	2958	285		2270	1700													
18765	3048	280		2360	1800													
18791	3138	275		2450	1900													
18817	3228	270		2540	2000													



5. The Function Curve of BC(Y) series products

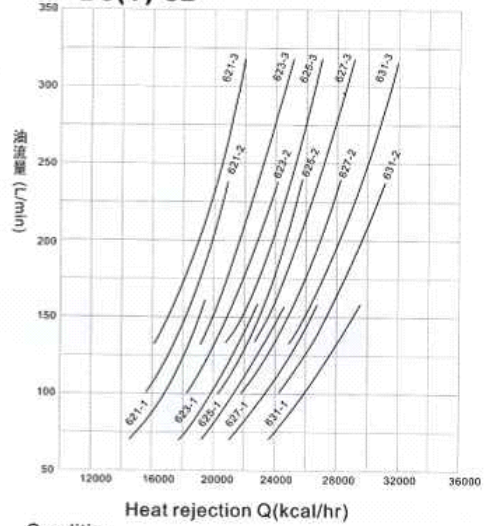
**BC(Y)-5B**



Condition

fluid: equal to ISO VG-32      temperature of water inlet: 28° C  
 temperature of water inlet: 50° C      quantity of cooling water: MAX. 50 l/min

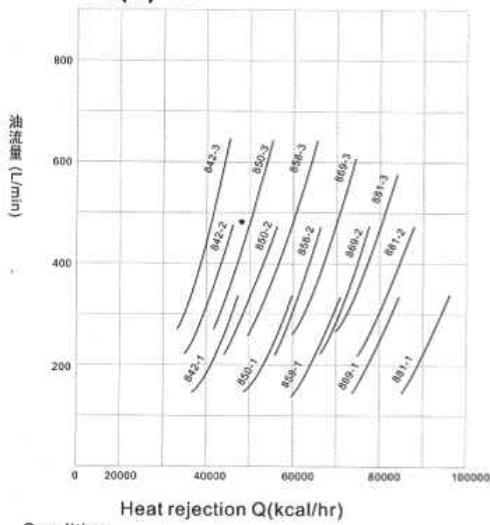
**BC(Y)-6B**



Condition

fluid: equal to ISO VG-32      temperature of water inlet: 28° C  
 temperature of water inlet: 50° C      quantity of cooling water: MAX. 80 l/min

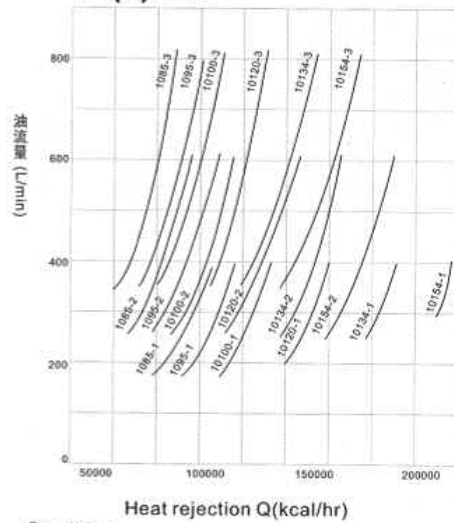
**BC(Y)-8B**



Condition

fluid: equal to ISO VG-32      temperature of water inlet: 28° C  
 temperature of water inlet: 50° C      quantity of cooling water: MAX. 150 l/min

**BC(Y)-10B**



Condition

fluid: equal to ISO VG-32      temperature of water inlet: 28° C  
 temperature of water inlet: 50° C      quantity of cooling water: MAX. 250 l/min



## SHELL AND TUBE HEAT EXCHANGER



### 1、 Summarize:

Shell & tube type heat exchanger is suitable for cooling of cleaner fluid in lower viscosity;it can be applied mainly to such industry as plastic machinery,hydraulic pressure equipment ,air compressor,system of thin oil and lubricating oil,fluid power coincidence impiement , electric device,etc.

Foshan Kamui heat exchanger Co., Ltd.specializes in various kinds of shell & tube type coolers. The products which the company produce have 3 major series atpresent:BC(Y)series,FC(Y)series.FC(Y)series, Sleries,BC(Y)series me mbrane outside flow and better ability to resist pollution,suitable for cooling of dirier fluid and higher viscosity;FC(Y) series exchanger is a fin-tube exchanger.The product have bigger heating surfaces but small size and high efficiency , suitable for the cooling of the general fluid;SL series heat exchanger adopt spiral water consrvancy diversion board and wing slice which is in charge of conducting heat . It has the advantage of high efficiency in changing thermal,and little loss of pressure and small volume and so on.

Each of heat exchanger series has a lot of designs of specifications and types,in order to meet all kinds of users requirements. Besides basic products,the company can make various dinds of large-scale,special heat exchanger according to the request of users.

### 2、 Conformation

Shell & tube type heat exchanger is composed of water cover,tube board ,receptacle,heattube,baffle board,airproof gasket and foot rest,etc,as Fig.1 shows.The space the component surrounds is called SHELL SIDE which is in charge of surface and socket; The communicating space inside of the heat tube is called TUBE SIDE which managed to conduct heating.SHELL SIDE fluid exchange heat with TUBE SIDE through the heat tube. makes temperature of the high-temperature fluid drop,achieve the goal of cooling.

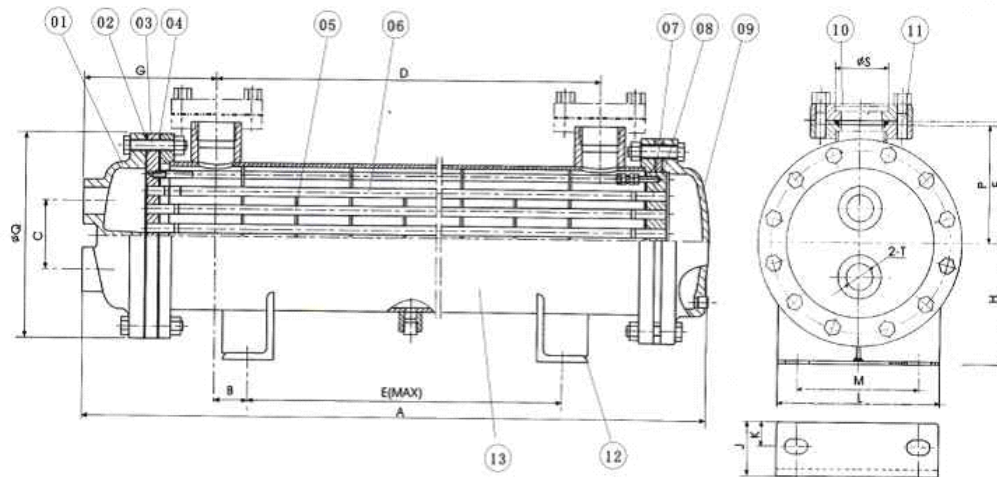


Fig1. Structure of shell & tube type heat exchanger

01-enter water cover 02-airproof gasket 03-immovable tube board  
 04-airproof gasket II 05-airproof gasket III 06-heat tube  
 07-swarm move tube board 08-"O" type rubber loop 09-return water cover  
 10-flange in the middle of oil mouth 11-airproof gasket III 12-foot rest  
 13-receptacle discreteness

### 3、 Installation

- 3.1 While carrying and installing the product, please use the machinery of hoisting, so as not to hurt anyone's body and damage the products. Using the soft rope that will not scratch the paint.
- 3.2 Piping of this product has two ways: screw thread to connect and connect with the flanging. when adopt screw thread way of connecting one, should select the size suitable for moving handing, and make the moving position that hand one close to the screw thread junction. Adopt "O" type rubber loop seal way of flange connecting, should piping weld after taking of the "O" type rubber loop.
- 3.3 Before joining the pipeline one, should remove the foreign matter and dirt in the pipeline.
- 3.4 Air exhaust opening and discharge port should be set on the pipeline.
- 3.5 The foot shelf of the product should be installed firmly on the ground of use.
- 3.6 The fluid which will enter the product can not have strong pulsate.

### 4、 Use and Maintenance

- 4.1 While using the product, it can't exceed the pressure and temperature of use indicated on product's data plate and "acceptance certificate of the products".
- 4.2 This products can only use the fresh water as the cooling medium except products of special order. See forms 1 in demand for the water quality of the fresh water :



Table: The cooling water quality standard

Item		Cooling water	Fresh water
PH value(25°C)		<6.5-8.0	<6.0-8.0
Conductivity(25°C)	μ S/cm	<800	<200
Total [ca <sup>2+</sup> mg <sup>2+</sup> ]	Mg/l	<200	<50
Acid wastage(caco <sub>3</sub> )	Mg/l	<100	<50
Cl <sup>-</sup>	Mg/l	<200	<50
SO <sub>4</sub> <sup>2-</sup>	Mg/l	<200	<50
Fe	Mg/l	<1.0	<0.3
SiO <sub>2</sub>	Mg/l	<50	<30
S <sup>2-</sup>	Mg/l	0	0
NH <sub>4</sub> <sup>+</sup>	Mg/l	<1.0	<0.2

#### 4.3 Procedure of starting this product

While starting this product , one should let the low-temperature fluid flow first , and then let the high-temperature fluid flow. The operation order of the valve is:

- 4.3.1 Open the valve of the fluid export side pipeline of totally;
- 4.3.2 The valve of the fluid entrance of the products is in totally closed state;
- 4.3.3 The fluid enters the entrance side pipeline of the products;
- 4.3.4 Open the valve that the fluid entrance side pipeline of the product slowly.

#### 4.4 Procedure of stopping this product

When this product first work,should stop the high-temperature fluid flow, and then stop the low-temperature fluid flow.The operation produce of the valve is:

- 4.4.1 The valve of the fluid export side pipeline of the products is in totally open state;
- 4.4.2 Slowly close the fluid entry side pipeline totally;
- 4.4.3 The fluid enters the entrance side pipeline of the products;
- 4.5 After the product is started,please check whether this product leak in its every sealed place or not, namely whether the fluid is oozed out or two kinds of fluids interflow.
- 4.6 When not use for a long time , please emit the fluid in this product; When the fluid may be frozen , please emit the fluid in this product after this product stop working.
- 4.7 Implement washing to this product every half a year at least.When the more water dirt remains inside of the heat tube ,please sook it with purifying agent of dissolving water dirt, then rinse it well with the pure water and soft brush. Pay special attention that not to leave the purifying agent in the heat exchanger.

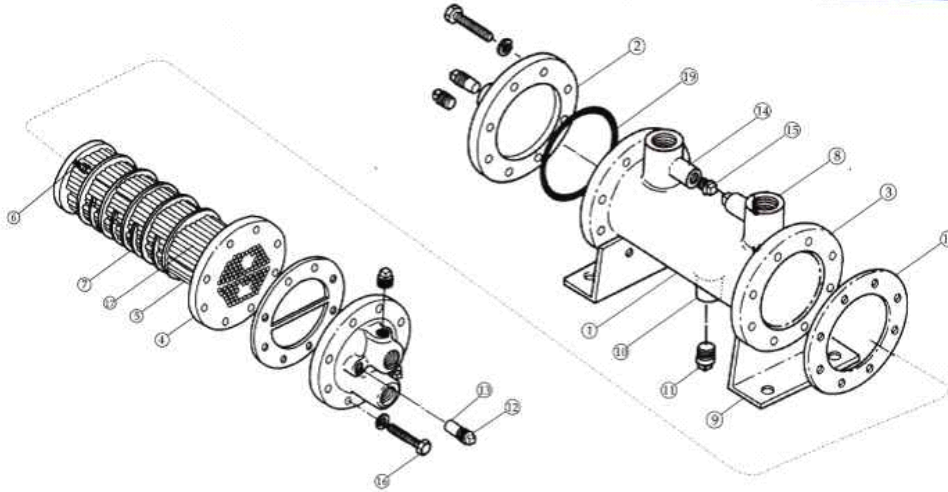


Fig2. Resolving figure of shell &amp; tube type heat exchanger

No .	Name	No .	Name	No .	Name	No .	Name
1	Shell	6	Tie rod	11	Vent plug	16	Bolt
2	Bonnet	7	Baffle	12	Plug	17	Spacer
3	Flange	8	Oil joint	13	Antiseptis zn plug	18	Gasket
4	Tubesheet	9	Saddle	14	Measure temp joint	19	"O" Ring
5	Tube	10	Vent	15	Plug		

## 5. The resolving of the heat exchanger

Please consult Fig. 2 , resolve in following order :

- 5.1.1 Totally close the entrances and exits of two kinds of fluids, prevent it from flowing;
- 5.1.2 Discharge two kinds of fluids inside the heat exchanger and its the connecting pipe cleanly;
- 5.1.3 Remove the outer part of the heat exchanger, make it in a state that can be decomposed;
- 5.1.4 Please do well the mark (especially the regular position of tube plate ) before decomposing, making it easy to assemble when used;
- 5.1.5 Pulling out cover of return water,take out "O" type rubber loop;
- 5.1.6 Pulling out cover of entered water,take out the sealed cushion;
- 5.1.7 Pull out whole tube bundle gently from receptacle(Vertical installation and dismantle can avoid putting blow wounded to board seal of the tube plate swarmed about ). So far , the resolving is over.
- 5.2 Assemble the heat exchanger
 

The assemble order of the heat exchanger and the order of decomposing are just conversely Should pay special attention to :

  - 5.2.1 While enclose the tube bundle into receptacle,the swarm about tube board can touch step in the flange of receptacle.Insert several suitable diameter round sticks to inside of the swarm about tube board (of inserting should not depth exceed to 30MM ) and uplit the tube bundle at this moment, pack it into receptacle gently;
  - 5.2.2 "O" type rubber loop seal and the sealed cushion should be changed ;
  - 5.2.3 Water overlaying should be tightenned with the connection bolt of the flange symmetrically, evenly.



## 6. Sealing Experiment

Sealing inspection should be carried out after the cooler is assembled and finished. Sealing inspection always uses the atmospheric pressure. It seals the SHELL SIDE's export of cooler with a plug screw, SHELL SIDE entrance inlet compresses air (or nitrogen air). Protecting and pressing for 30 minutes, there should not be a phenomenon of leaking in mouth that water that water came in and go out. And flange junction in the cooler. The inspection pressure should conform to the pressure parameter that the data plate of the products or the acceptance certificate of the products indicates.

When seal at the experiment, should especially take care. The speed of pressurizing should be slow; There should not be anyone in the direction of the spiral shell and the overlay of the water; Should release the pressure in the cooler before dismantled to spiral shell and other cooler spare parts Fig. 3, for the sealing experimental sketch map.

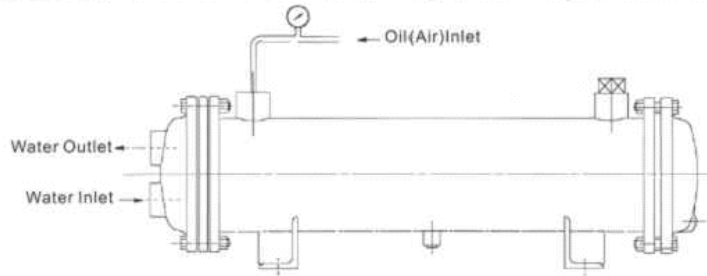


Fig3:sealing experiment sketch map

## 7. Other notes

1. If heat exchanger occur quality malfunction in a year at right use and well-balanced maintain, our company will afford quality guarantee services for it.
2. Only a part standard products listed in this book, Our product types will be increasing. When the dimension or the contents changed, not inform specially otherwise. If you need complementary datum, please contact our company.

## 8. Common malfunction and countermeasure

Trouble State	Position	Cause Analysis	Countermeasure
Leak out	The sealed place of the fixed side and moving side of the product	The fastened screw has not been tightened	Tighten the fastened screw
		"O" type rubber loop or airproof gasket is damaged	Replace "O" type rubber loop or airproof gasket for a new one
	The piping flange place	Sealing surface in touch with airproof gasket or "O" type rubber loop is damaged	Repair the sealed surface or change the spare part
		Fastened screw has not been tightened	Tighten the fastened screw
		The middle flange slopes	The middle flange is adjusted well in front of the flange that is joint
	The place preserving water or oil	Screw plug has not been tightened	Tighten screw plug
The screw plug has not been twined with the adhesive tape		Twine the adhesive tape to the screw plug again	
Interflow of two kinds of fluids	Every position of the products	Crack	Confirm the position of the crack, contact our company
		Moving side in the sealed place of the product	Sealing surface in the is damaged
	Expand tube place	Sealing surface in the is the "O" type rubber loop is damaged	Repair the sealed surface or change the spare part
		Heat transmitting tube	Expand tube is not sealed well
Can not reach the design temperature		Heat tube is ruptured(erode, freezing, etc)	Contact our company
		The flow of fluid can not reach the design value	Increase the flow of the fluid to the design value
		High-temperature fluid temperature is higher than the design value	Contact our company
		Low-temperature fluid temperature is higher than the design value	Contact our company
		There are too much dirt in both sides of the heat transmitting tube	Clean the heat transmitting tube

The applied domain of our products



Attach table:the cooler's parameter

Customer:			Linkman:	
Company address:			Postcode:	
Tel:			Fax:	
	Hot	medium	Cool	medium
Medium *				
Heat exchange power(Kcal/hr)	Q=			
Flow rate (L/min)	W <sub>g</sub> =		W <sub>l</sub> =	
Outlet temp (°C)	T <sub>1</sub> =		t <sub>1</sub> =	
Inlet temp (°C)	T <sub>2</sub> =		t <sub>2</sub> =	
Allow pressure drop (mpa)	ΔP <sub>g</sub> =		ΔP <sub>l</sub> =	
Max work pressure (mpa)	P <sub>max</sub> =		P <sub>max</sub> =	
Max work temp (°C)	T <sub>max</sub> =		T <sub>max</sub> =	
The overage temp difference(°C)	ΔT <sub>o</sub> =			
The total coefficient (Kcal/m <sup>2</sup> ·hr)	K=			
The cooler type				
The customer equipment type				



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