



LEEMIN
黎明液压

GL系列列管式油冷却器 GL TUBE TYPE OIL COOLER SERIES

(一) 简介

本产品是我公司综合国内外先进技术和工艺的基础研制而成。换热管材质采用低肋翅片紫铜管，并采用横向折流板，纵向紊流板结构及机械胀管等先进制造工艺，因而具有结构新颖，体积小，重量轻，换热效果显著等特点。

本产品是一种新型、高效冷却器。它主要用于低粘度液压和润滑系统，将工作油液冷却到规定的温度。因此广泛适用于化工、电力、冶金、矿山、轻工等行业的各种液压设备的冷却，是一种较为理想的冷却装置。

每个冷却器系列有很多规格和型式，以适用于各种不同的用户要求。除说明书介绍的基本产品外，公司还可以根据用户的要求制造各种大型的、特殊的冷却器。

INTRODUCTION

This product is manufactured by our company that combining with the internal and external base of advanced technology and craft. The material of heat-exchange pipe, adopted low-rib finned red copper pipe, used the structure of transverse current breaker board, turbulence board and the advanced manufacture craft of mechanism expanding, has the features of novel structure, small dimension, light weight and well heat-exchanging effect and soon. This product is a new type and high efficiency cooler, mainly used in low-viscosity hydraulic and oil system to cool the work oil to the specified temperature. So it is an ideal cooling facility that can be widely used in cooling the hydraulic equipment in the trade such as chemical industry, electric power, metallurgical industry, mine and light industry and soon.

Each cooler series has many specification and type to suit for each user's requirement. Except the main products introduced in the operation manual, the company also can make all kinds large or special cooler for the customers according to their requirements.

(二) 型号说明 MODEL CODE

GL ☐ ☐ - ☐ ☐ ☐ - ☐

列管式油冷却器 Tube type oil cooler

C: 翅片管 finned tube

L: 裸管 bare pipe

系列序号 Series No.

公称冷却面积 Nominal cooling area: m²

特殊品: B: 壳体不锈钢

H: 适用于冷却水为海水

进出油(水)口尺寸不同请直接标明

其它要求 FB-☐

标准品可省略

安装方式 Install method L: 立式 vertical; (仅对于 GLL 系列)
省略: 卧式 Non-horizontal type

公称压力 Nominal pressure

GLC A=1.6MPa(可省略) A=1.6MPa(omit)

GLL A=1.0MPa(可省略) A=1.0MPa(omit)





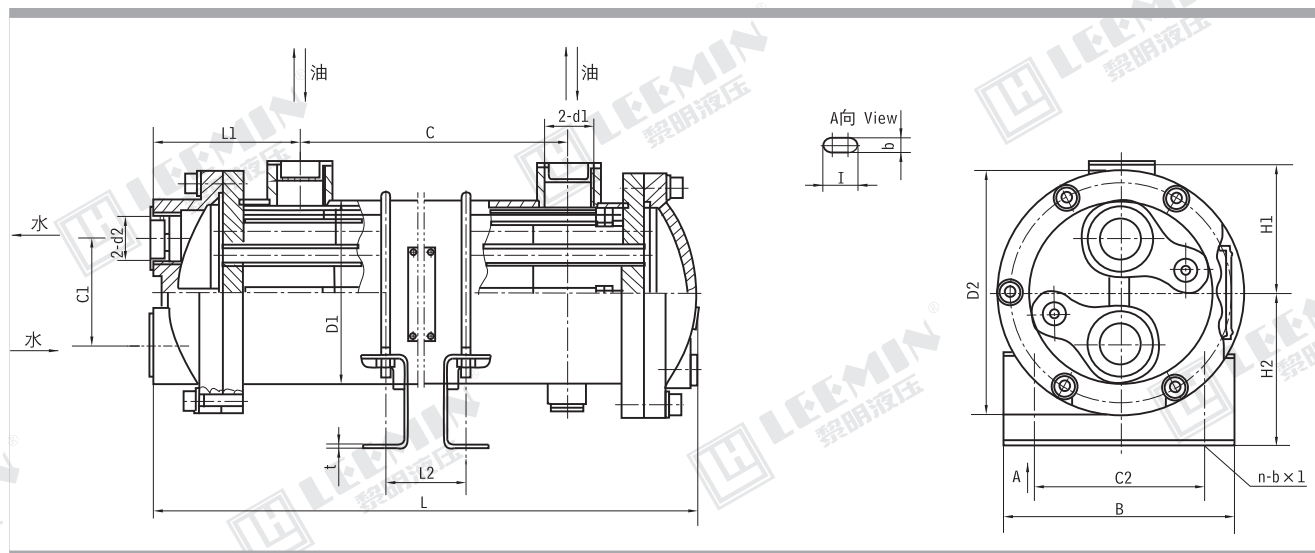
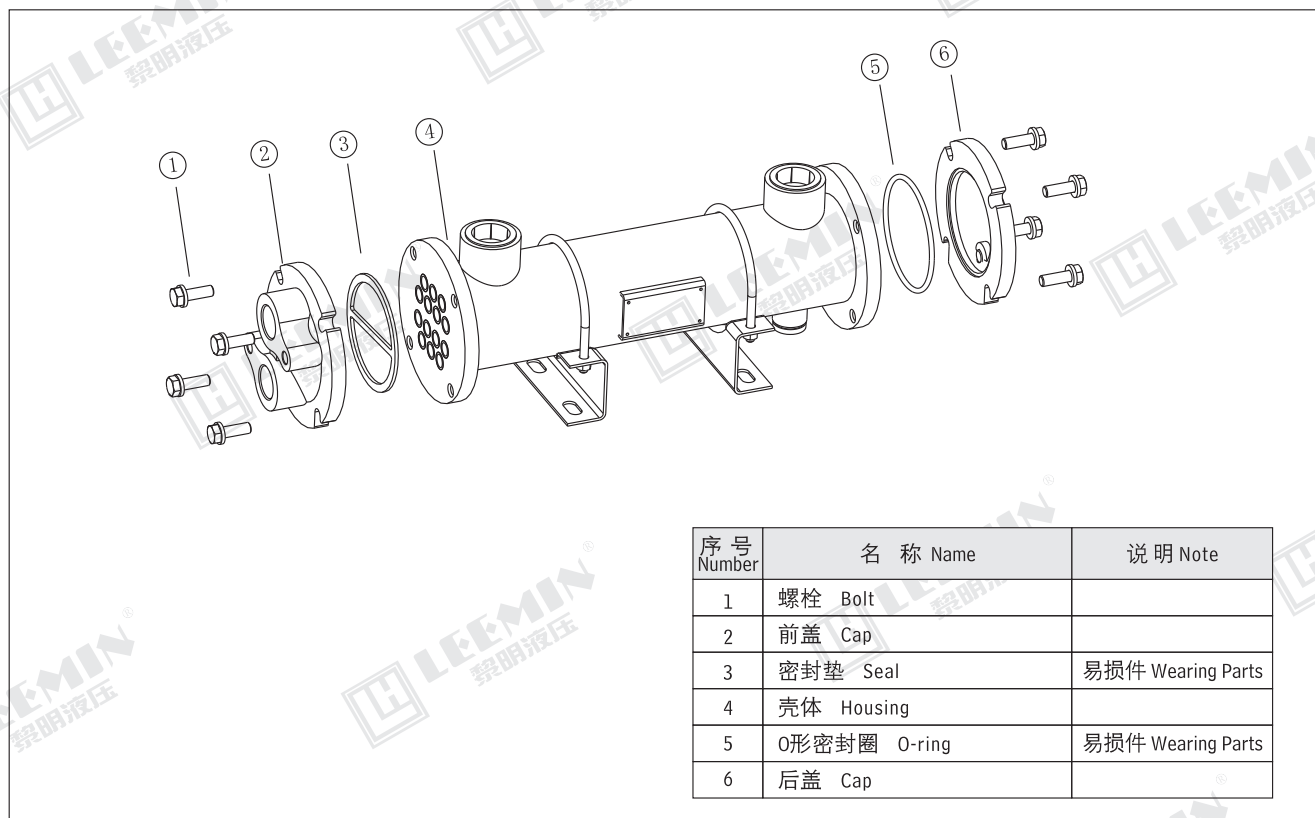
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(三) GLC型冷却器性能参数和外形结构尺寸

1、性能参数 TECHNICAL DATA

介质粘度 Medium viscosity	进油温度℃ Inlet-oil temperature	进水温度℃ Inlet-water temperature	油降温℃ Oil cooling	压力损失(MPa) Pressure lose		油水流量比 Flow-ratio of oil to water	热交换系数 W/M ² ·℃ Heat-exchange factor
				油侧 Oil side	水侧 Water side		
N68	55 ± 1	≤ 30	≥ 8	≤ 0.1	< 0.05	1:1	≥ 350

2、外形结构尺寸 MOUNTING SIZE





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型 号 Model	L	C	L1	H1	H2	D1	D2	C1	C2	B	L2	t	n-b × I	d1	d2	油流量 L/min	重量 Weight (Kg)
GLC1-0.4	390	240									145					20	7
GLC1-0.6	555	405									310					30	9
GLC1-0.8	685	532	80	64	75	80	120	50	65	105	435	2	4-10 × 20	G1	G3/4	40	10
GLC1-1	815	665									570					45	12
GLC1-1.2	955	805									715					50	14
GLC2-1.3	555	375									225					52	17
GLC2-1.7	680	500									350					57	20
GLC2-2.1	815	635									485					62	24
GLC2-2.6	955	775	94	85	100	121	160	70	110	150	630	2	4-10 × 20	G1	G1	70	28
GLC2-3	1105	925									780					80	33
GLC2-3.5	1265	1085									935					85	37
GLC3-4	820	570									380					75	45
GLC3-5	970	720									530			G11/2	G11/4	100	51
GLC3-6	1120	870									680					125	57
GLC3-7	1290	1040									850					150	64
GLC3-8	1450	1200	132	115	151	162	220	100	160	205	1010	3	4-15 × 25			175	70
GLC3-9	1610	1360									1170			G2	G11/2	200	76
GLC3-10	1780	1530									1340					225	83
GLC3-11	1960	1710									1520					250	90
GLC4-13	1355	985									745					230	132
GLC4-15	1515	1145									905					260	142
GLC4-17	1675	1305									1065					300	153
GLC4-19	1845	1475									1235					330	165
GLC4-21	2025	1655	197	160	180	219	310	120	200	280	1415	8.5	4-22 × 30	G2	G2	360	177
GLC4-23	2195	1825									1585					400	188
GLC4-25	2375	2005									1765					430	200
GLC4-27	2545	2175									1935					470	212

(四) GLL型冷却器性能参数和外形结构尺寸

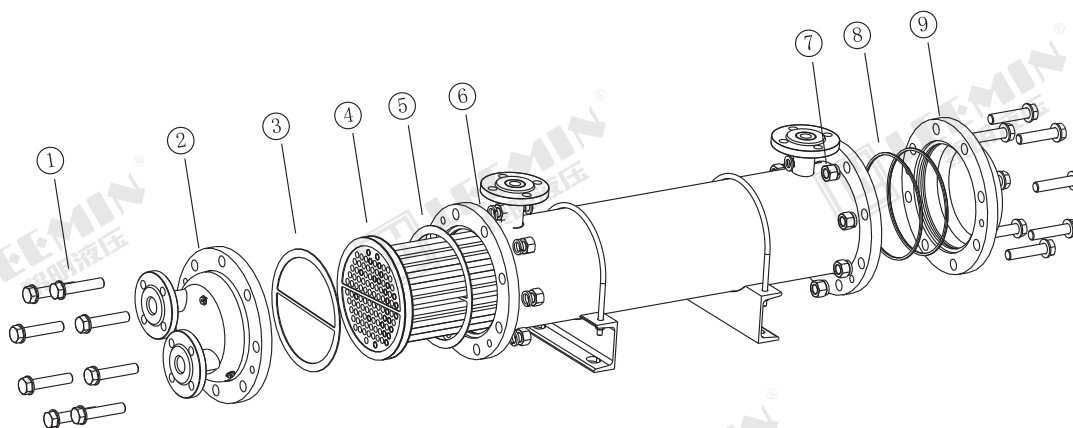
1、性能参数 TECHNICAL DATA

介质粘度 Medium viscosity	进油温度℃ Inlet-oil temperature	进水温度℃ Inlet-water temperature	油降温℃ Oil cooling	压力损失(MPa) Pressure lose		油水流量比 Flow-ratio of oil to water	热交换系数 W/M ² · °C Heat-exchange factor
				油侧 Oil side	水侧 Water side		
N68	50 ± 1	≤30	≥8	≤0.1	< 0.05	1:1.5	≥230

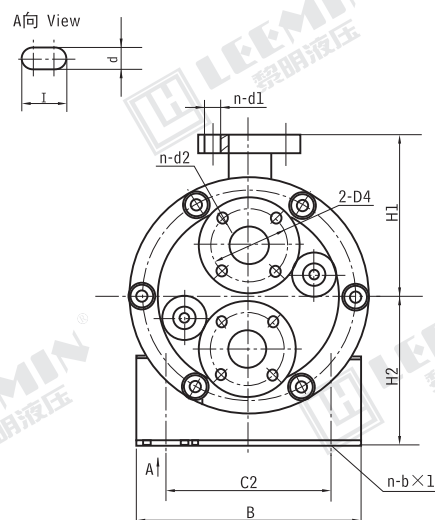
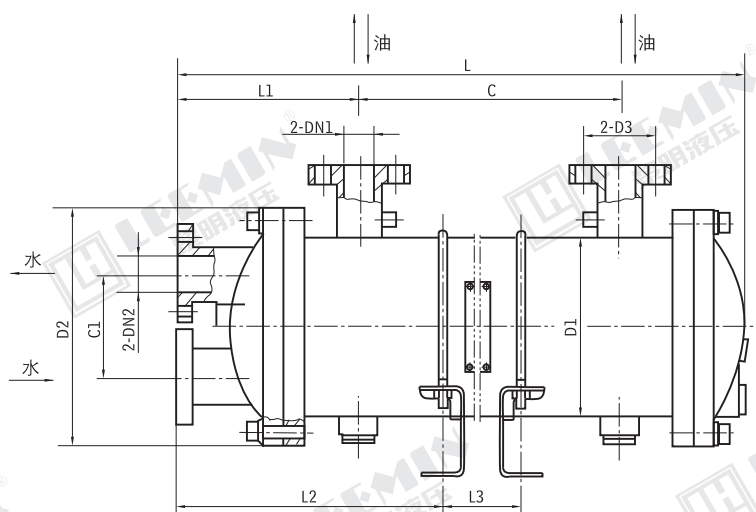


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2、外形结构尺寸 MOUNTING SIZE



序号 Number	名称 Name	说明 Note
1	螺栓 Bolt	
2	前盖 Cap	
3	密封垫 Seal	易损件 Wearing Parts
4	管束部件 Heat exchange parts	
5	密封垫 Seal	易损件 Wearing Parts
6	壳体 Housing	
7	螺母 Nut	
8	密封垫 Seal	易损件 Wearing Parts
9	后盖 Cap	

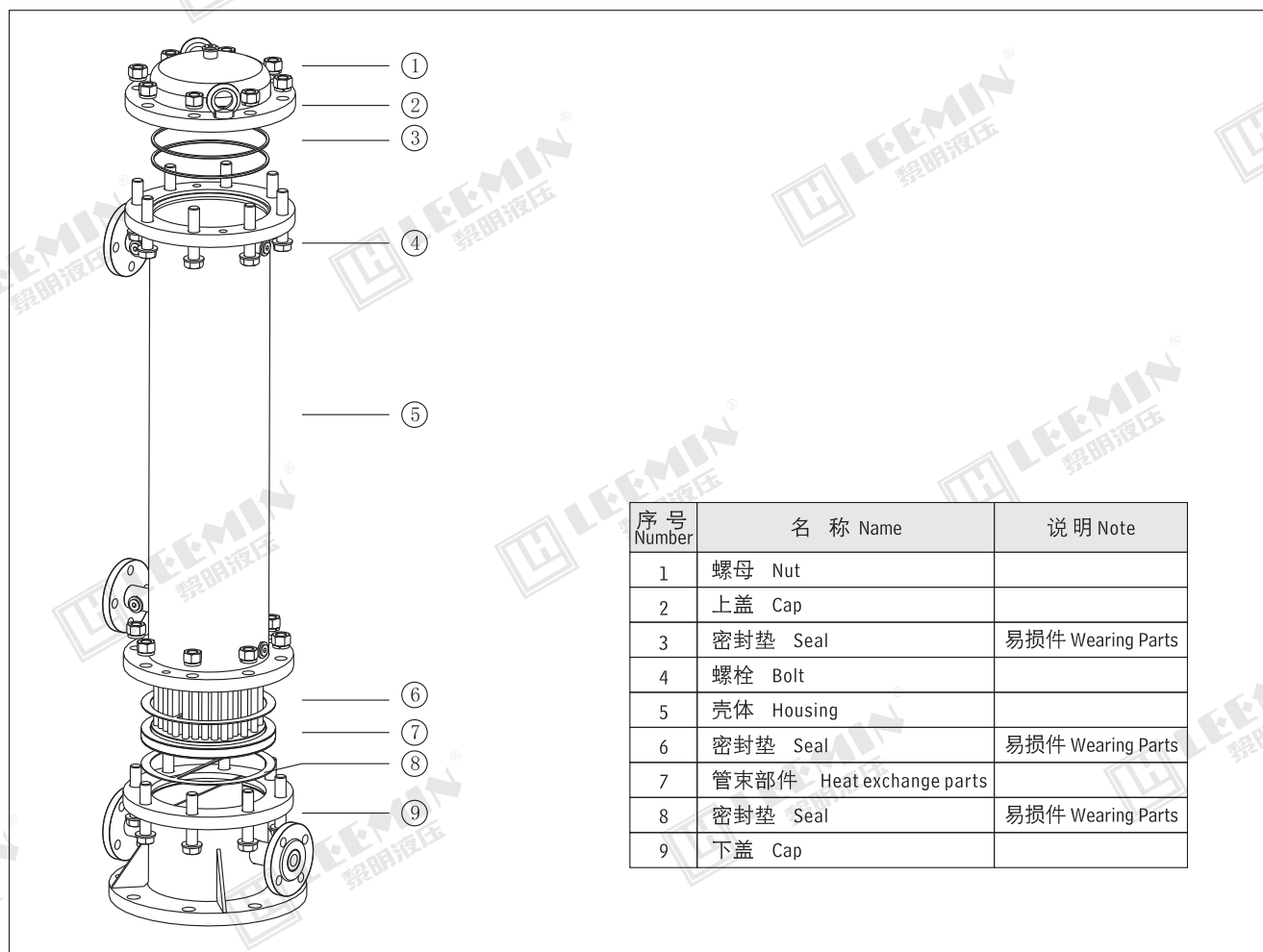


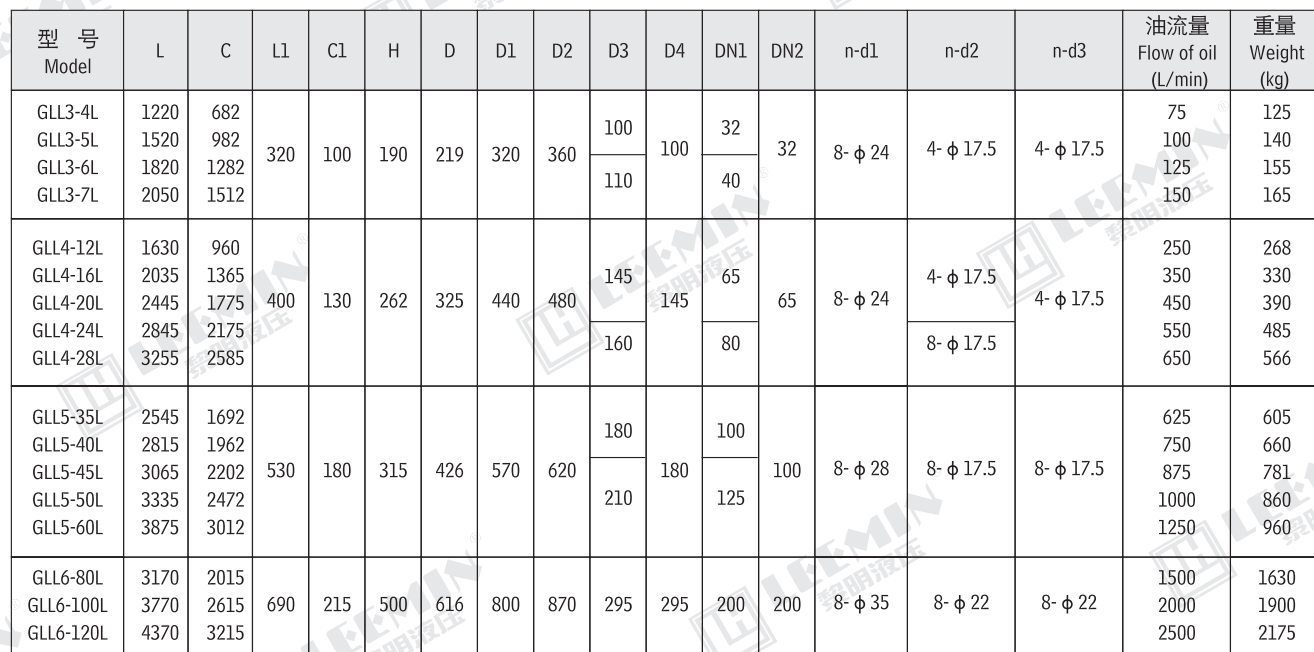


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型 号 Model	L	C	L1	H1	H2	D1	D2	C1	C2	B	L2	L3	D3	D4	n-d1	n-d2	n-b × I	DN1	DN2	油流量 Flow of oil (L/min)	重量 Weight (Kg)					
GLL3-4	1150	682	265	190	180	219	310	140	200	280	367	485	100	100	4- φ 17.5	4- φ 17.5	4-22 × 30	32	32	75	108					
GLL3-5	1450	982										785								100	123					
GLL3-6	1750	1282										1085	110					125		138						
GLL3-7	1980	1512										1385									150	150				
GLL4-12	1555	960	345	262	232	325	435	200	300	370	497	660	145	145	4- φ 17.5	4- φ 17.5	4-22 × 30	65	65	250	238					
GLL4-16	1960	1365										1065								350	300					
GLL4-20	2370	1775										1475	160							450	360					
GLL4-24	2770	2175										1885								550	455					
GLL4-28	3180	2585										2295	650		536											
GLL5-35	2480	1692	500	315	293	426	535	235	400	500	730	1232	180	180	8- φ 17.5	8- φ 17.5	4-22 × 30	100	100	625	570					
GLL5-40	2750	1962										1502								750	640					
GLL5-45	2990	2202										1772	210							875	745					
GLL5-50	3260	2472										2042								1000	825					
GLL5-60	3800	3012										2582	1250					955								
GLL6-80	3160	2015	700	500	408	616	780	360	550	700	935	1555	295	295	8- φ 22	8- φ 22	4-25 × 32	200	200	1500	1617					
GLL6-100	3760	2615										2155								2000	1890					
GLL6-120	4360	3215										2755								2500	2163					

3、GLL-L型立式冷却器外形结构尺寸 MOUNTING SIZE







(五) 选用冷却器的方法

1、计算法:

(1) 所需换热的面积A(m²)

$$A = \frac{Q}{\Delta \tau m \cdot K}$$

Q=热交换量(kca l/h)
k=传热系数(kca l/m²h°C)

Δτm = 平均温差(°C)

(2) 热交换量: Q(kca l/h)

$$Q = (T_1 - T_2)CW = (t_2 - t_1)C'W'$$

其中:
T₁=进口油温°C
t₂=出口水温°C
W=油的流量(kg/h)

T₂=出口油温°C
C=油的比热(kca l/kg°C)
W'=水的流量(kg/h)

t₁=进口水温°C
C'=水的比热(kca l/kg°C)

(3) 平均温差 Δτm(°C)

$$T_1 - T_2 = \Delta \tau_1$$

$$t_2 - t_1 = \Delta \tau_2$$

$$\text{当 } \frac{\Delta \tau_1}{\Delta \tau_2} \leq 2 \text{ 时}$$

$$\Delta \tau m = \frac{(T_1 + T_2) - (t_1 + t_2)}{2}$$

$$\text{当 } \frac{\Delta \tau_1}{\Delta \tau_2} > 2 \text{ 时}$$

$$\Delta \tau m = \frac{(T_1 - T_2) - (t_1 - t_2)}{2}$$

(4) 传热系数: K(kca l/m²h°C)

a) 冷却水流量小, 工作油粘度高时取K=200;

b) 一般工作油时取K=250;

c) 冷却水流量大, 工作油粘度低时取K=350~400;

2、估算法

电机功率 kw	7.5-10	10-15	15-20	20-30	30-40	40-75	75-100	100-120	120-150	150-200
选择冷却 面积(m ²)	0.4 0.6	0.8 1.0	1.2 1.3	1.7 2.1	2.6 3	3.5 4	5 6	7 8	8 9	10 11



使用须知和清洗方法

APPLIANCE NOTES & CLEANNESS

(一) 使用须知

1、操作规程:

- (1)启动前检查所有附件与仪表并查看各连接处是否紧密。
- (2)拧下处于冷却器出油口外的螺塞(用户配), 然后缓缓开启进油阀(此时排油)阀处于关闭状态。当油溢出时, 关闭进油阀, 拧上螺塞。
- (3)拧开冷却器管路中排气阀, 然后缓缓开启进水阀(此时排水阀处于关闭状态)。当水充满后, 关闭进水阀和排气阀, 此时水和油均成静止状态, 经热交换后, 温差逐渐变小。
- (4)当水温升高5-10℃后, 打开冷却水和油的排出阀, 再逐渐打开冷却水和油的进入阀, 使冷却水和油均处于流动状态。然后调整冷却水的流量, 使之出油温度保持在正常工作状态。
- (5)冷却器因故障或正常停止工作时, 其操作步骤先关闭油和冷却水的进入阀, 然后关闭油和冷却水的排出阀, 再拧下排水、排油接口上的螺塞, 排尽积于冷却器内的冷却水与油。

2、注意事项:

- (1)在启动冷却器工作时, 切忌快速打开进水阀门, 因冷却水大量流过冷却器时, 会使换热管表面形成一层导热性很差的“过冷层”, 即使以后水量很大, 也起不到最佳的冷却作用。
- (2)如果水侧发生电化作用的腐蚀, 可以在进出水盖的指定位置(预留孔内)自行安装防电化的锌棒。
- (3)冷却水通常采用净化的淡水, 使用江河水时在进水口须配置滤水器。
- (4)为提高热交换性能, 防止水垢形成, 冷却水温度尽可能要低些, 水流量要大些。
- (5)冷却器的油侧压力应大于水侧压力。
- (6)在寒冷季节, 且冷却器不工作的情况下, 必须将水放尽, 以免冻裂。

(二) 清洗方法

冷却器长期工作时, 管壁表面逐渐积垢, 热交换性能下降, 以至不能保证冷却要求, 此时必须停用清洗, 清洗周期视水质情况而定, 一般每5-10个月应进行一次内部的检查和清洗。其方法如下:

1、水侧清洗:

用软管引洁净水高速冲洗前盖, 后盖内壁和换热管内表面, 同时用清洗通条进行洗刷, 洗毕后用压缩空气吹干。

2、油侧清洗:

(1)用三氯乙烯溶液进行冲洗, 使清洗液在冷却器内循环流动, 溶液压力不大于0.6MPa, 溶液的流向最好与冷却器油流方向相反, 清洗时间视污垢情况而定, 然后再将清水灌入冷却器内清洗, 直至流出的水清洁为止。

(2)用浸泡法将溶液灌入冷却器。历时15-20分钟后查看溶液颜色, 若混蚀不堪, 则更换新溶液, 重新浸泡, 直至清洁为止, 然后用清水冲净。(若采用四氯化碳清洗时, 应在良好的通风环境下进行, 以免中毒)

(3)清洗后进行液压试验, 也可用0.7MPa气压试验替代, 然后装到系统上使用。

APPLIANCE NOTES

1.Operation Standards

- (1).Before operation, check all the parts and instruments, and check each joint is sealed or not.
- (2).Screw down the plug screw at the oil outlet of the cooler, then slowly start the oil inlet valve (at this time, the oil drain valve is in the closed state). When the oil flow out, closed the oil inlet valve, and tighten the plug screw.
- (3).Rive the exhaust valve of the cooler pipeline, then slowly start the water inlet valve(at this time, the water exhaust valve is in closed state). When the water is enough, close the water inlet valve and the exhaust to valve, and this time, both the water and oil is in the state of rest, and the range of temperature is lessened after heat exchange.
- (4).When the water temperature raised to 5-10℃, open the oil and cooling water exhaust valve, and then slowly open the cooling water and oil inlet valve to make the oil and water in the state of flowing. Then regulate the flow of the cooling water to keep the oil temperature in the nominal working state.
- (5).The cooler is stopped runing whether because of the fault or normal stop. Its operation step is that firstly close the oil and cooling water inlet valve, next close the oil and cooling water exhaust valve, and then screw down the plug screw at the nozzle of the oil outlet and water outlet to exhaust the ooling water and oil which store up in the cooler.

2.notes:

- (1).When start the cooler to work, do not open the water inlet valve quickly, for if large quantity cooling water flow through which with the cooler result to a "surfusion"?formed on the surface of the heat-exchange pipe, and then the cooling effective is not optimum even with large water yield.
- (2).If electrochemical corrosion happened, install an antielectrochemical Zinc club in the appointed place on the water inlet and outlet cover.
- (3).Normally uses the purified fresh water as cooling water. If use the water of river, must install a water filter at the water inlet.
- (4).To raise the heat-exchange unction and avoid of forming the water shouldscale, the cooling water temperature should be lower and the water yield be larger.
- (5).The pressure in oil side of cooler should be larger than the water side.
- (6). In cold season and the cooler does not work, do exhaust out the water to avoid of frost crack.

CLEANNESS

After a long period operation, the surface of pipe-wall of the cooler begri me continually with heat-exchange function falling which results in unuring the cooling quality. At this time the cooler must be stoped to clean. The clean circle is defined according to the water quality, normally carry out internal checking and cleanness once per 5-10 months. The step is as follows:

1.Water side cleanness:

Guide the clean water with soft pipe to wash the in wall of the front and back cover and the surface of the heat-exchange pipe with high speed. And at the same time, scrub with detergent. After washing, dry it with compressed air.

2.Oil side cleanness

(1).Wash with chlorine there solution to make the cleaning solution circular flowing in the cooler with the pressure less than 0.6Mpa. The flow direction of the solution had better be adverse to that of the oil in the cooler. The leanness time defied is defied according to the condition of the dirt. Then pour water into the cooler to wash untill the water flow out is clean.

(2).Use the soak method and pour the solution into the cooler about after 15-20 minutes to see the color of the solution, if it is muddy, replace the so lution with new one to soak again untill the it is clean. Then wash the cooler with water. (If wash with carbon tetrachloride, please operate at the environment with fine air to avoid of poisoning.)

(3).After wash, carry out hydraulic test or it can be replaced by 0.7Mpa gas pressure test. Then install it to the system to use.



(三) 常见故障及消除方法 TROUBLES AND SHOOTINGS

故障原因	Reasons	消除方法	Methods
换热性能下降 Heat-exchange function fal	冷却水量不足 The cooling water yield is not enough.	(1)开大进水阀 (2)检查管路、阀门、滤网、换热管是否被阻塞，如有应排除。 (1)Open the water inlet valve larger. (2)Check the pipeline, valve, filter net and heat-exchange pipe. if it is block or not. If it is, shoot it.	
	换热管内或管间积气 The gas stores up inside or between the heat-exchange pipe.	拧下螺塞予以排气 Screw down the plug screw to exhaust the gas.	
	换热管内或管外表面积垢，流阻增大 The dirt store up inside or outside the heat-exchange pipe that result increasing the flowing resistance	消除换热管内外表面污垢 Remove the dirt inside or at the surface of the pipe.	
在回水盖(前盖)放水时，发现水和油混合现象 resistance increased. Find the water and oil mixed when drawing off the water return co(front cover).		(1)换热管破损引起泄漏时，用管塞堵死，但管子堵数不应超过总数的10% (2)换热管与管板密封不良，应予以焊补或胀紧牢。 (1)The heat-exchange pipe damage with will result in leakage. Block the leakage with pipe screw but the screw number should be no more than 10% of the total. (2)If the heat-exchange pipe and the pipe board are not well sealed. Weld it	
法兰螺钉连接处发生泄漏 The outer joint of the flange screw is leakage.		(1)拧紧法兰上的紧固件和更换密封垫。 (2)冷却器一经拆装，尽可能使用新的密封垫 (1)Tighten the fixing part on the flange and replace the sealing gasket. (2)Once the cooler is disconnected, please use new sealing gasket.	
固定管板和浮动管板以及换热管被腐蚀，造成冷却器失去密封性 The fixing board, the floating pipe boards and heat-exchange pipe is corroded that the cooler loses the sealing function		更换管束 Replace the pipe bundle.	

(四) 标志、包装、运输

- 油冷却器出厂时附有出厂合格证，使用说明书
- 油冷却器应在壳体的显著部位固定一块标牌，牌上注明以下内容：
 - (1) 注册商标
 - (2) 产品名称
 - (3) 产品型号
 - (4) 冷却面积
 - (5) 公称压力
 - (6) 重量
 - (7) 工作温度
 - (8) 出厂编号
 - (9) 制造厂名称
- 油冷却器包装，运输按JB/T7356-1994的规定进行。
- 油冷却器如确认有质量问题，本公司实行“三包”。

MARKS、PACKAGE AND TRANSPORTATION

- Oil cooler is enclosed with delivery leaving factory certification and operation manual in delivery.
- Fixing a label on the notable place of the oil cooler shell. In the label remark the followings:
 - (1) registered trademark
 - (2) product name
 - (3) model
 - (4) cooling area
 - (5) nominal pressure
 - (6) weight
 - (7) working temperature
 - (8) leaving factory No.
 - (9) Name of manufacturer
- Carry out the package and transportation of the oil cooler according to the provision JB/T7356-1994
- Our company has “three guarantees” for the oil cooler if it is defined with quality defect.