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The company reserves the right to make alteration from time to time and equipment differ from that detailed in this brochure.

TMC/TTMC 立式筒袋泵

TMC/TTMC VERTICAL BARREL PUMP



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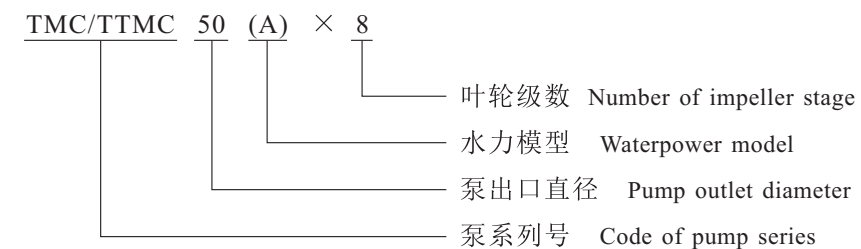
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概 述 Outline

TMC/TTMC系列泵为立式、径向剖分、多级单吸式离心泵。产品设计符合《石油、重化学和天然气工业用离心泵》ANSI/API 610-2004第十版和GB/T3215-2007《石油、重化学和天然气工业用离心泵》国家标准。其中TMC为API标准中VS1型泵;TTMC为VS6型泵。该系列泵可输送各种清洁、低温和高温的易燃、易爆、腐蚀性介质。主要应用于炼油厂、石油化工、发电厂、管线加压、低温工程、液化气工程等。

TMC/TTMC series pumps are vertical radially split multi-stage single-suction centrifugal pumps. Design of this pump conforms to the requirements in the eighth version of ANSI/API610-2004 《Centrifugal pumps used for petroleum, heavy chemical and natural gas industries》 and GB3215-2007 《Centrifugal pumps used for petroleum, heavy chemical and natural gas industries》, of which TMC comes as type VS1 pump and TTMC as type VS6 one of API. Pumps of this series can be used for refineries, petrochemical industry, power plants, pipeline booster, cryogenic engineering, liquefied gas engineering etc. to transport various clean, cryogenic and high-temperature combustible, explosive and corrosive media.

型号意义 Model meaning



运行参数 Running data

规格: DN40-200 (出口管径)

流量: Q 可达800 m³/h

扬程: H 可达800 m

压力: P 最大10.0 MPa

温度: T -180℃ ~ +180℃

Specification: DN40-200 (outlet pipeline diameter)

Flow: Q up to 800 m³/h

Head: H up to 800 m

Pressure: P Max. 10.0 MPa

Temperature: T -180℃ ~ +180℃

适用范围 Rangle of application

适于输送清洁的或稍有污染的低温的或高温的、化学中性或有腐蚀性的液体。

- ◇ 精炼厂
- ◇ 炼油厂
- ◇ 低温工程
- ◇ 海上采油平台
- ◇ 发电厂
- ◇ 石油化工厂
- ◇ 管线加压
- ◇ 液化气工程

Applicable for transporting clean, or slightly polluted, low or high temperature neutral or corrosive chemical liquids.

- ◇ Refiners
- ◇ Refineries
- ◇ Cryogenic engineering
- ◇ Off-shore oil platform
- ◇ Power plants
- ◇ Petrochemical plants
- ◇ Pipeline booster
- ◇ Liquefied gas engineering

结构特点 Characteristics of structure

◇立式筒袋泵为多级径向剖分泵。叶轮型式为单吸径向式，并配有单级壳体。首级叶轮一般是吸入式叶轮。轴向力由向心推力球轴承承受。压差较大的情况下，由平衡鼓装置平衡轴向力。外壳仅承受入口压力，外壳的长度以及泵的安装深度取决于对NPSH汽蚀性能的要求。泵若安装在容器上或于管道法兰连接，可不装外壳(即TMC型式)。轴承箱体中的向心推力球轴承依靠润滑油进行润滑，带有独立的内循环自动润滑系统。流体动力径向滑动轴承位于泵的入口端。泵在一定安装深度情况下，泵轴带有中间支承，其支承用液体润滑。轴封采用的型式有单端面机械密封，串联式机械密封。并带有冷却、冲洗或密封液系统。

◇吸入管和排出管的位置在安装法兰的上部，互成180度，其它的布局方式也是可以的。

◇法兰标准执行DIN、ANSI、GB。辅助管路的连接螺纹用G或RC/R。电动机通过金属膜片联轴器驱动泵运转。

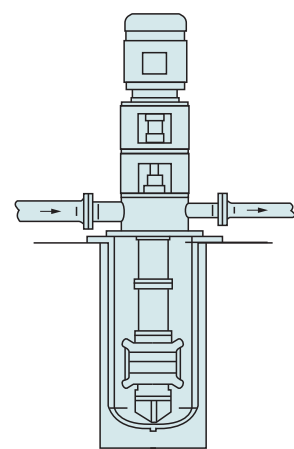
◇从驱动端看，泵逆时针旋转。

◇The vertical barrel pump comes as a multi-stage radially-split pump. The impeller comes as a single-suction radial type and is fitted with a single-stage casing. Usually the first stage impeller is in suck-in type. The axial force is borne by a radial thrust ball bearing and, in case of a greater pressure difference, will be balanced by a balancing drum. The casing only bears the entrance pressure and its length and the pump installation depth will be decided upon the required NPSH performance. The casing can not be mounted on the pump (that is the TMC type), if the pump is mounted on a vessel or connected to a pipeline flange. The radial thrust ball bearing in the bearing tank is lubricated with lubricating oil and set with an independent inter-cycling automatic-lubricating system. The fluid dynamic radial sliding bearing is set at the pump entrance. A mediate support is set with the pump axis, when the pump is installed in a certain depth, and the support is lubricated with liquid. A single end-face or an in-series mechanical seal can be used as the axis seal, with which a cooling, flushing or sealing liquid system is available.

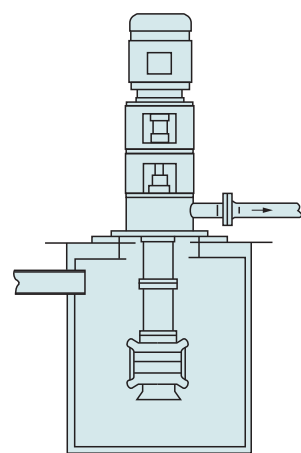
◇Both suck-in and drain-out pipes are located on the top of the installation flange and at an angle of 180° to each other. Other ways of layout are also workable.

◇Standards DIN, ANSI, GB are the executive standards for the flanges. Use G or RC/R connection thread for the auxiliary pipeline. The motor drives the pump to move via a metal membrane coupler.

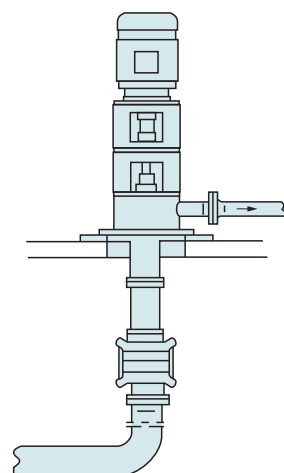
◇Viewing from the drive end, the pump move counter-clockwise.



标准结构
Standard structure (TMC)



安装在容器上
Installed on a vessel (TMC)

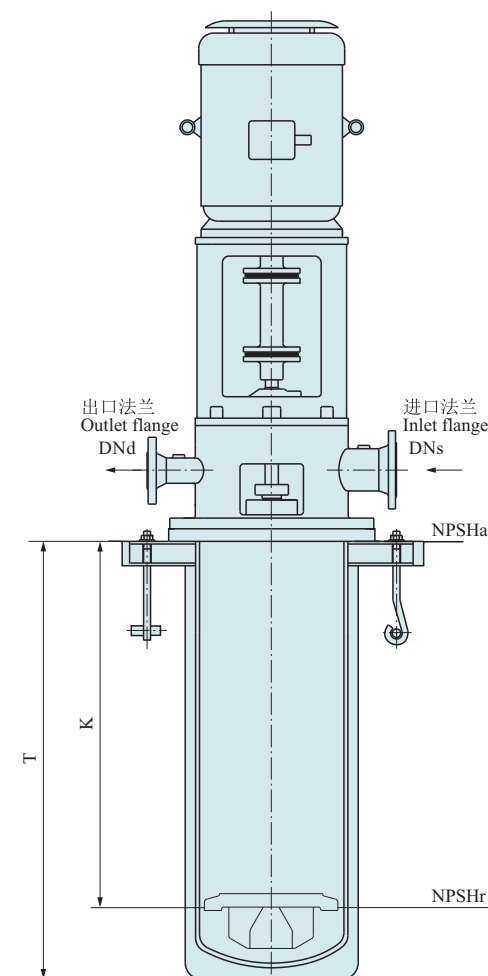


带连接法兰
With a connecting flange (TMC)

由于TTMC系列立式筒袋泵的设计原因，有一些计算与卧式泵不同。当填写数据单时应注意。

◇NPSH

Please take care at filling up the data sheet, as some calculations are different from those of the horizontal pump, this is because of the design with TTMC series vertical barrel pumps.



NPSHa

$$X(m)+K(m)=Y(m)$$

X(m): 用户提供的装置汽蚀余量

the NPSHr of the device provided by the user

K(m): 安装基础面到首级叶片最低点

the lowest point from the installation basis plane to the first-stage impeller

Y(m): 首级叶轮入口有效汽蚀余量

NPSHr is available at the entrance of the first-stage impeller

NPSHr: 查曲线 look up the curve =Z(m)

满足气蚀条件 Meet with the cavitation condition:

$$(Y-Z=\text{安全裕量 safe margin}) \geq 0.5m$$

确定扬程时不必考虑筒袋的插入深度，因为在正常工作状态下筒袋是完全充满的。因此入口压力中相当于(K)值的那部分对于泵来说也是有效的。

圆柱管中的水力损失和滑动轴承处的机械损失同插入深度相比很小。因此在考虑额定扬程和效率时不需要考虑。

随着泵的流量增加，泵的NPSHr增加，出现汽蚀现象的可能性也随即增加，同因轴功率上升很快，泵还有过载的可能。因此一般不允许泵在最佳效率点流量的120%以上操作。要求泵的最大极限流量为：

$$[Q_{max}] \leq 120\%Q_N$$

同时泵的最小流量保证在不超过标准规定的噪声和振动限度下能够正常工作。

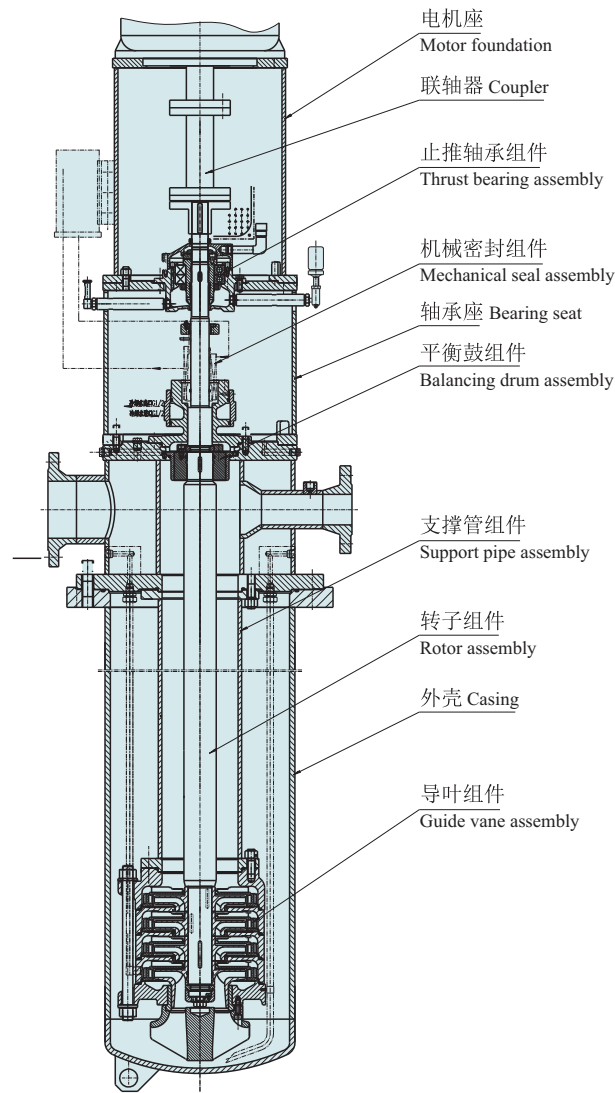
It is unnecessary to think of the barrel inserted depth at the time to decide the head, because the barrel is fully filled under the normal working state, therefore that part in the entrance pressure equivalent to (K) value is also effective to the pump.

Compared with the inserted depth, the waterpower loss in the cylindrical tube and the mechanical loss on the sliding bearing are very small, so need not to be considered when to confirm the rated head and efficiency.

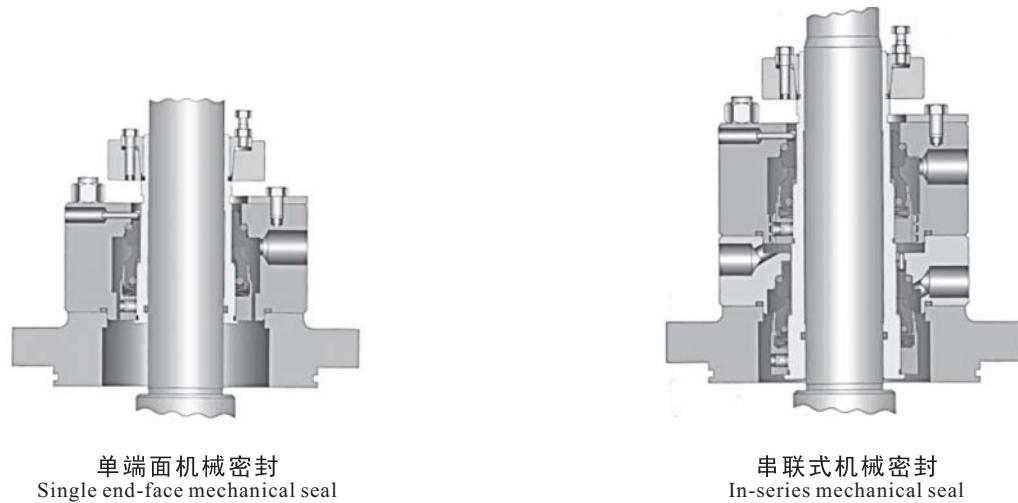
Along with the increased flow of the pump, its NPSHr is increased and the possibility for the cavitation to occur is also increased and, because the axial power is raised quickly, the pump overload will also become possible. So it is required not to let the pump operated at the point over 120% of the flow at the best efficiency point and to have the maximum limit flow of the pump as: $[Q_{max}] \leq 120\%Q_N$.

At the same time, the minimum flow of the pump shall ensure it to work normally under the noise and vibration not over the limits set in the standard.

剖面图
Sectional drawing



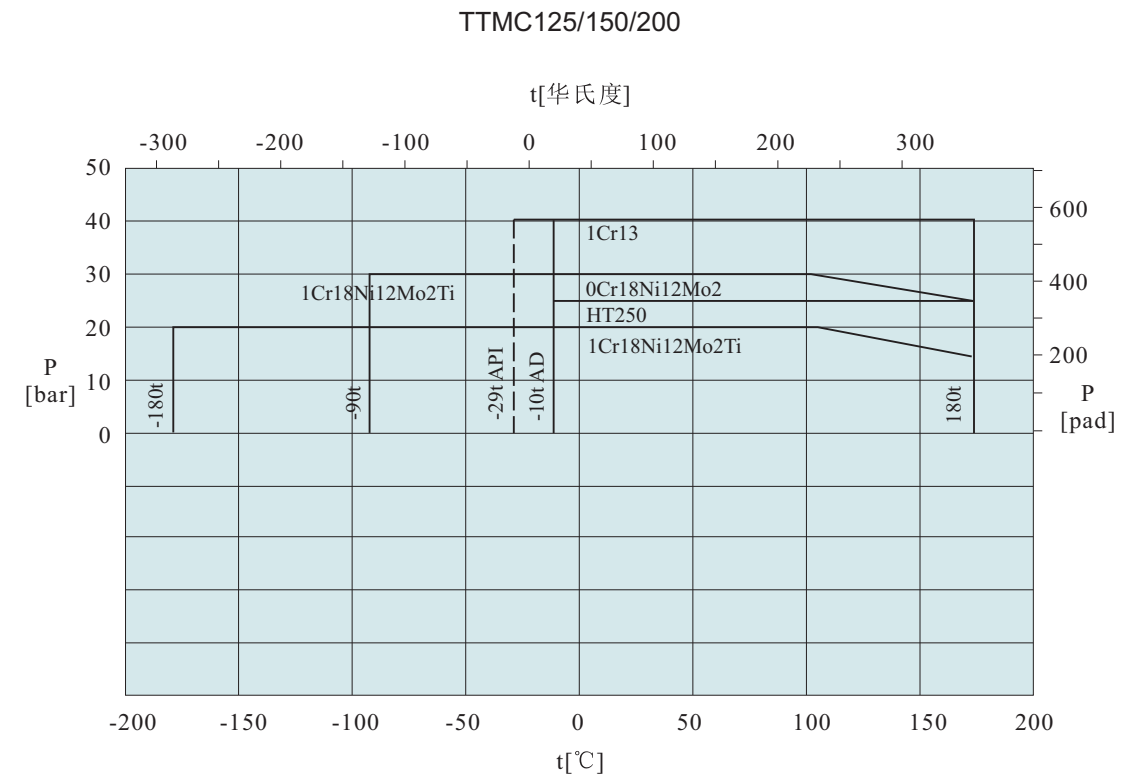
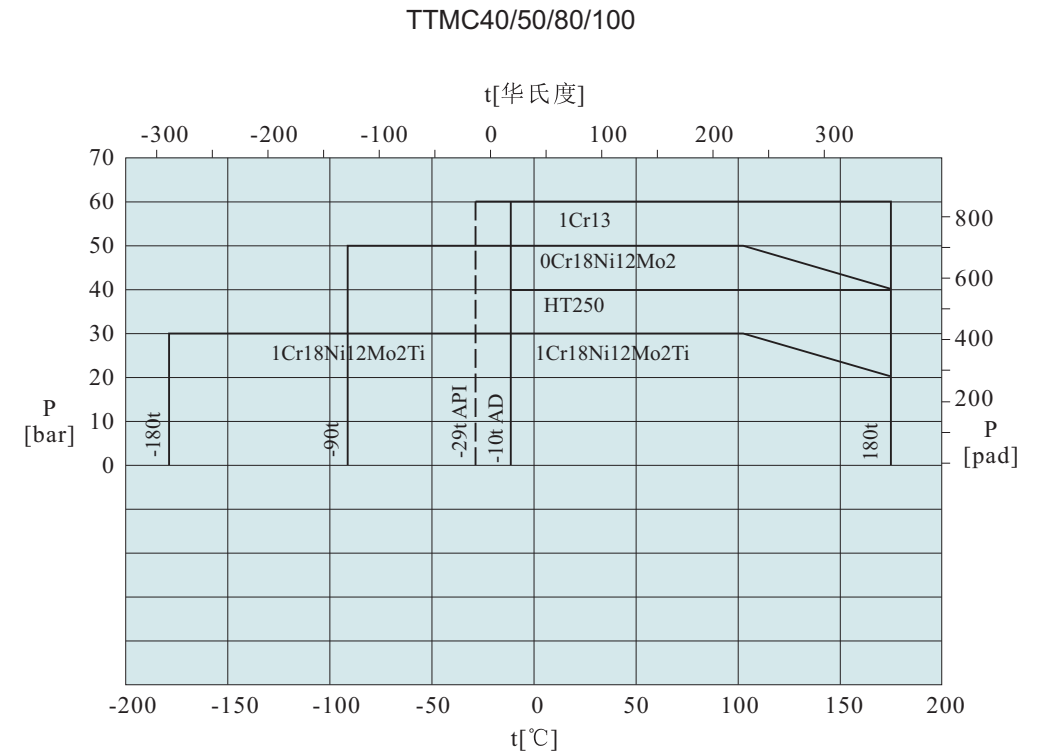
密封 Seal



注：以上为密封示意图，本公司会根据具体工况配备最适用的密封方案。

Note: the above shows the schematic diagram of the seal, this Co. will provide the most suitable sealing program upon the actual working conditions.

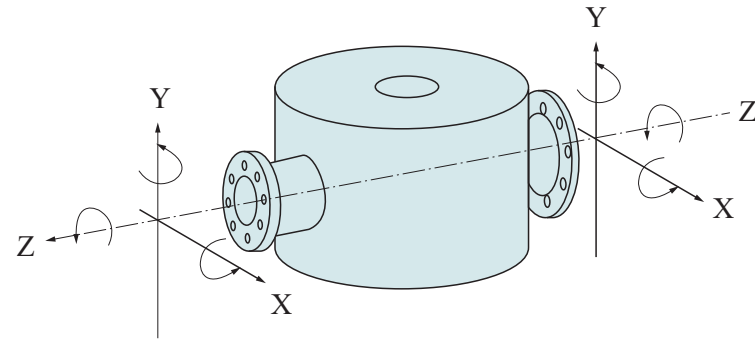
压力-温度曲线 Pressure-temperature curve



管路载荷 Loading of pipeline

图中输出和

法兰输出扭矩	TTMC40	TTMC50	TTMC80	TTMC100	TTMC125	TTMC150	TTMC200
入口							
出口							

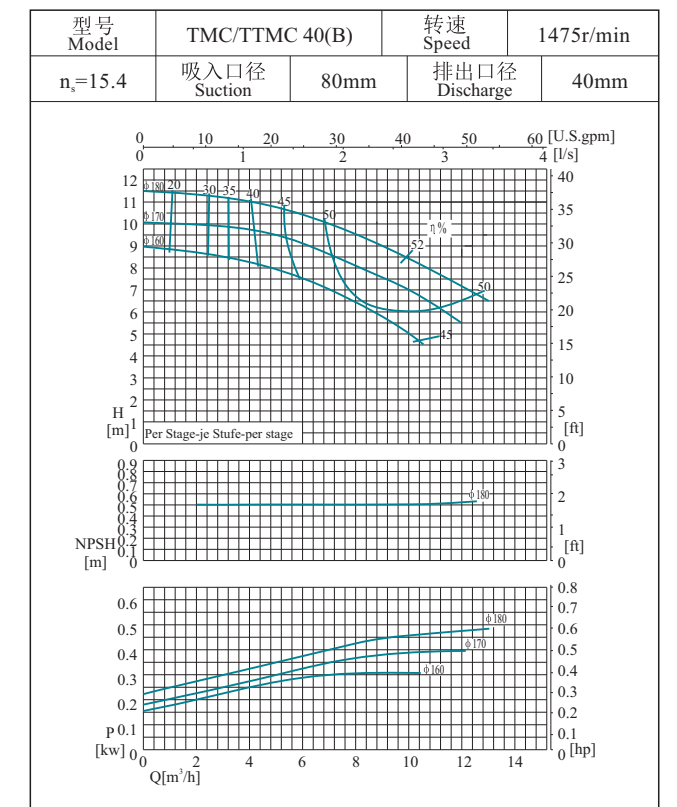
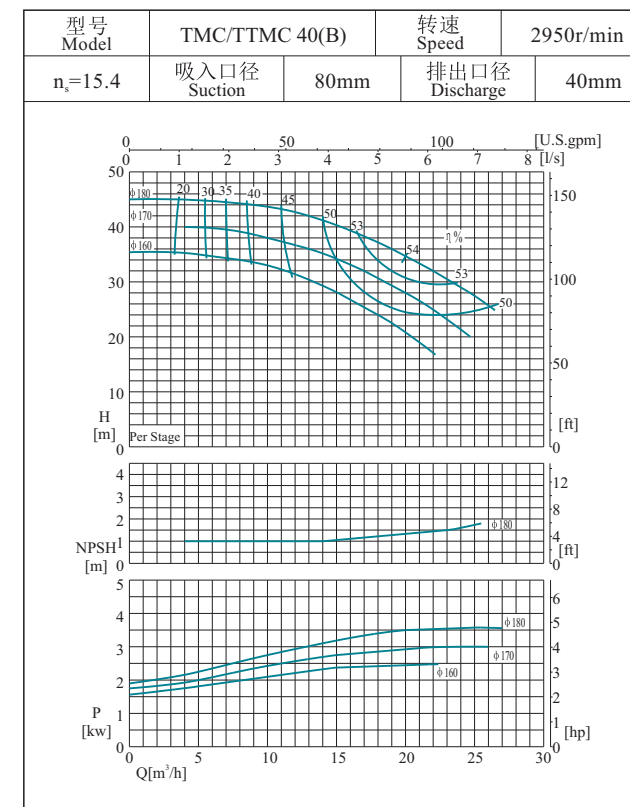
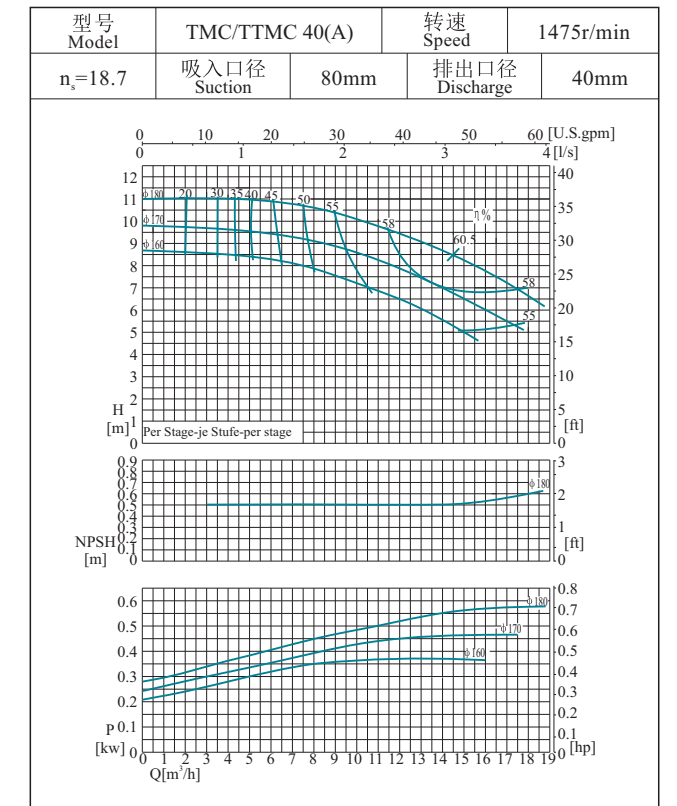
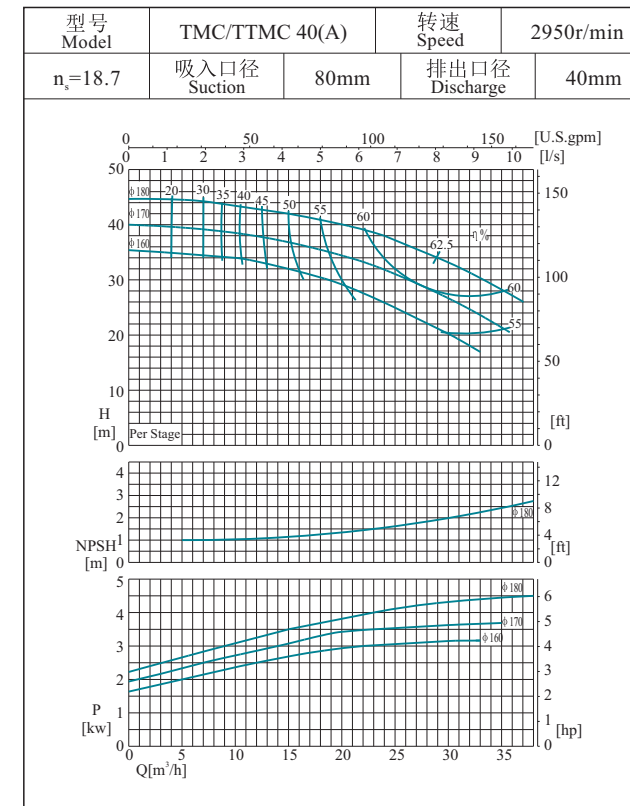


规格 Model	尺寸 Size φ mm	排出口 Discharge				吸入口 Suction				
		力 Force		力矩 Torque		力 Force		力矩 Torque		
		$\sqrt{Fx^2+Fz^2}$	Fy	$\sqrt{Mx^2+Mz^2}$	My	$\sqrt{Fx^2+Fy^2}$	Fz	$\sqrt{Mx^2+My^2}$	Mz	
TTMC40	40	1500	±1500	1000	600	80	3000	±3000	2300	1500
TTMC50	50	2000	±2000	1500	1000	100	4000	±4000	3000	2000
TTMC80	80	3000	±3000	2300	1500	150	6000	±5000	4000	3000
TTMC100	100	4000	±4000	3000	2000	150	8000	±6000	4000	3000
TTMC125	125	5000	±5000	3500	2500	200	9000	±7000	5000	4000
TTMC150	150	6000	±6000	4000	3000	300	10000	±8000	75000	6000
TTMC200	200	8000	±7000	5000	4000	400	15000	±10000	10000	9000

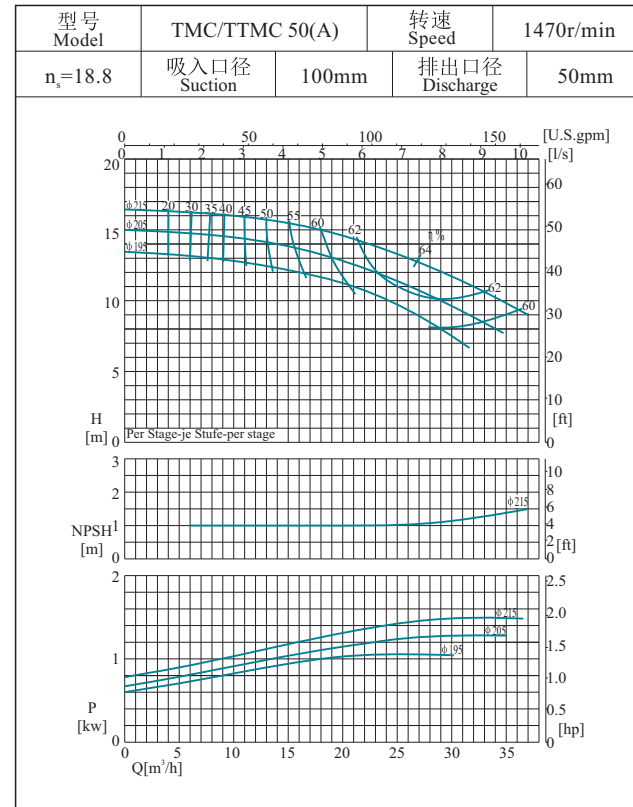
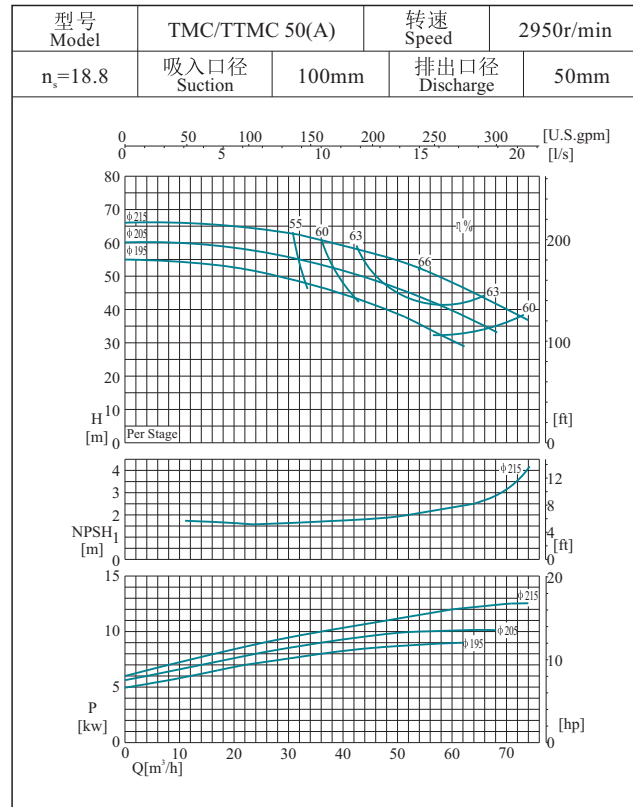
最大允许 $\frac{P(KW)}{N(r/min)}$ 值:

规格 Model	材料 Material	0Cr17Ni7Al		3Cr13	
	dk				
TTMC40	32	0.066	0.034		
TTMC50	38	0.115	0.066		
TTMC80	42	0.159	0.093		
TTMC100	48	0.249	0.145		
TTMC125	55	0.390	0.226		
TTMC150	60	0.518	0.302		
TTMC200	75	1.085	0.631		

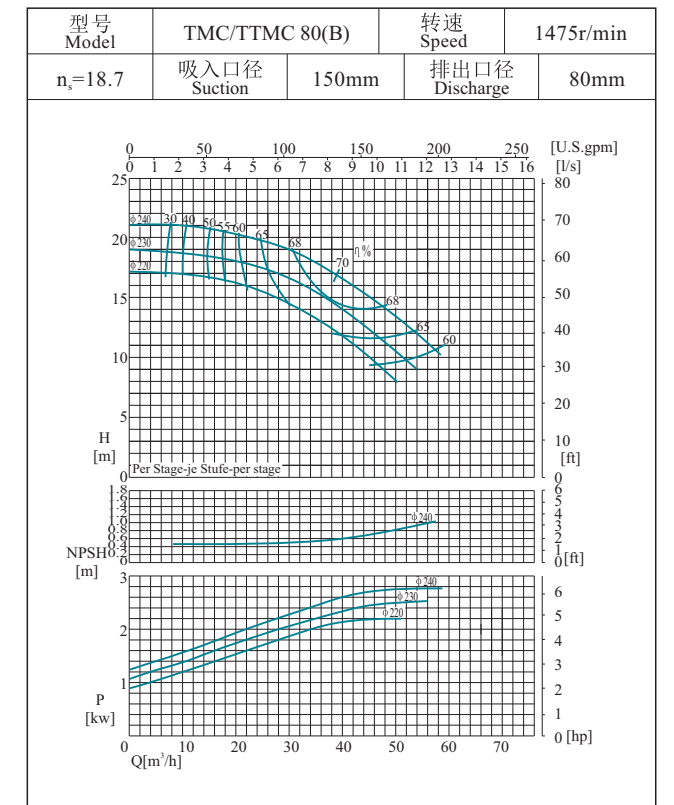
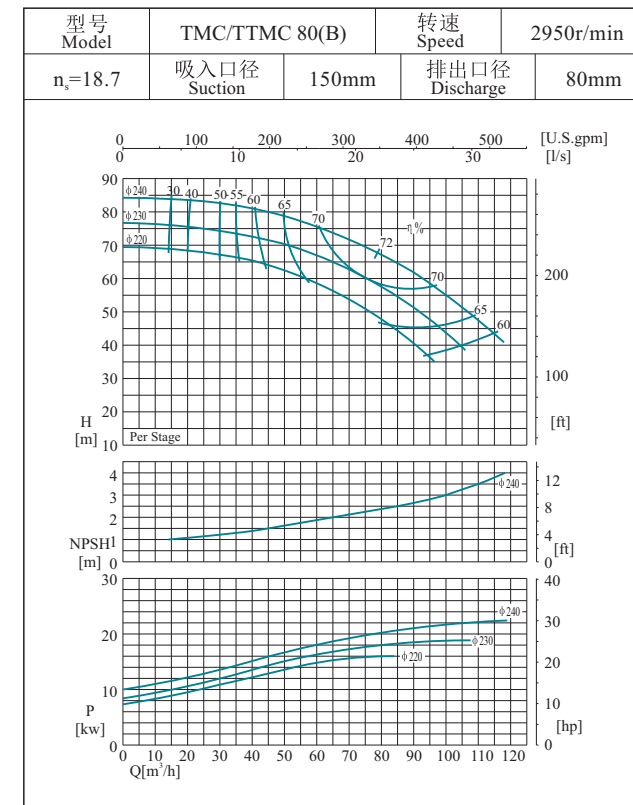
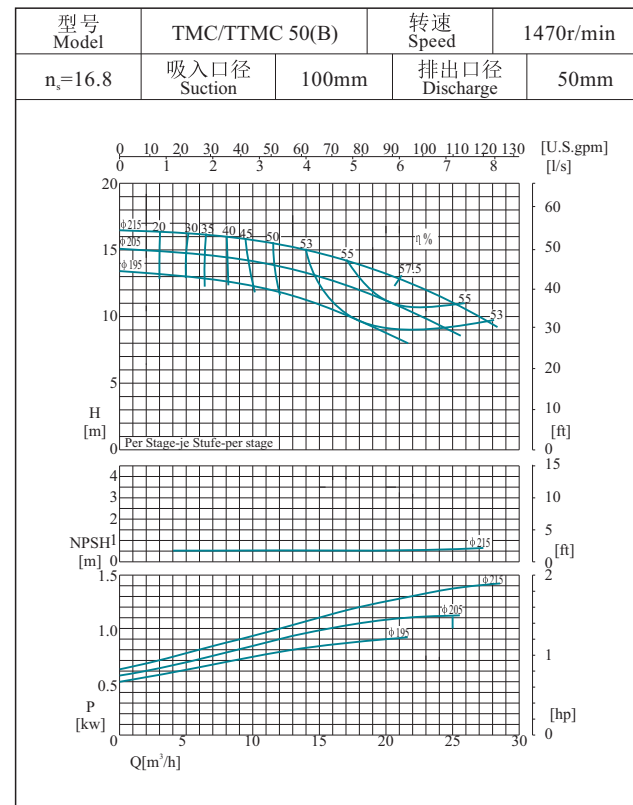
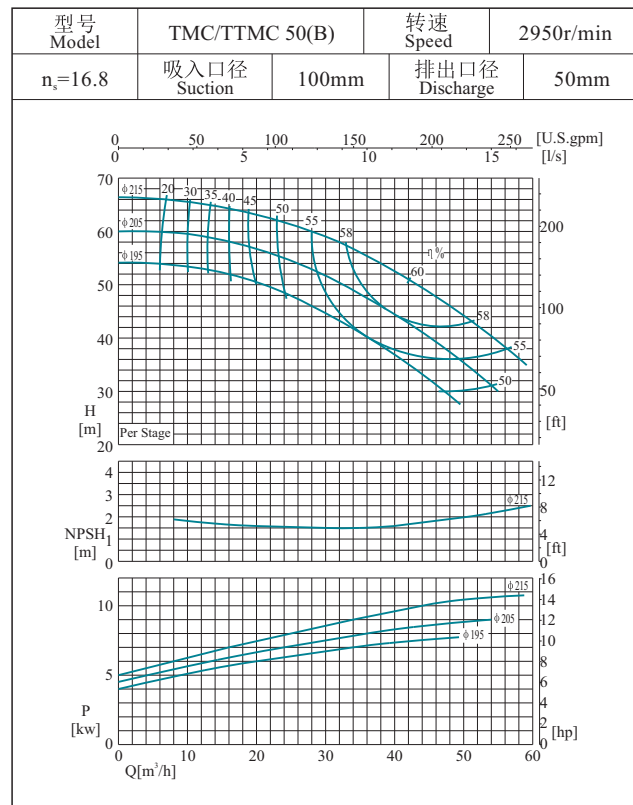
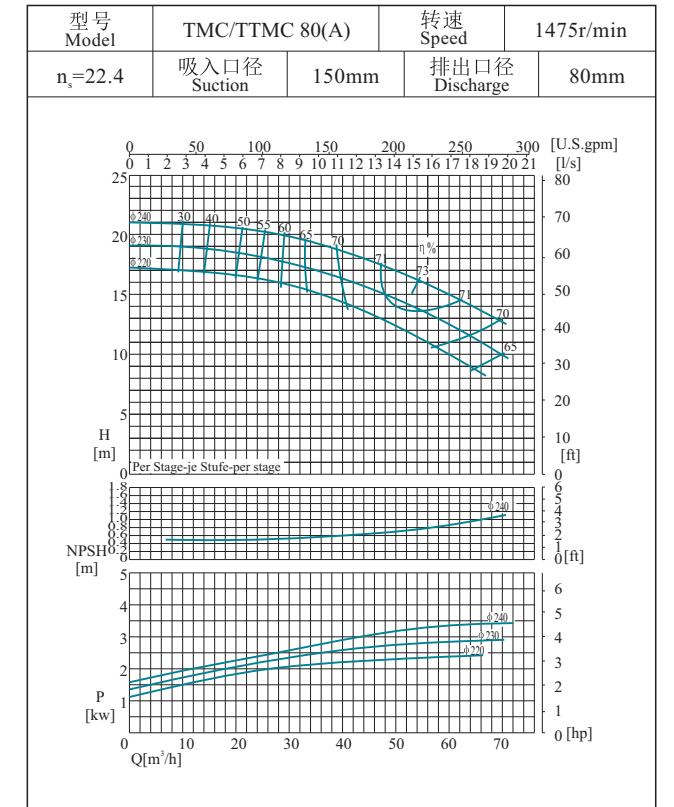
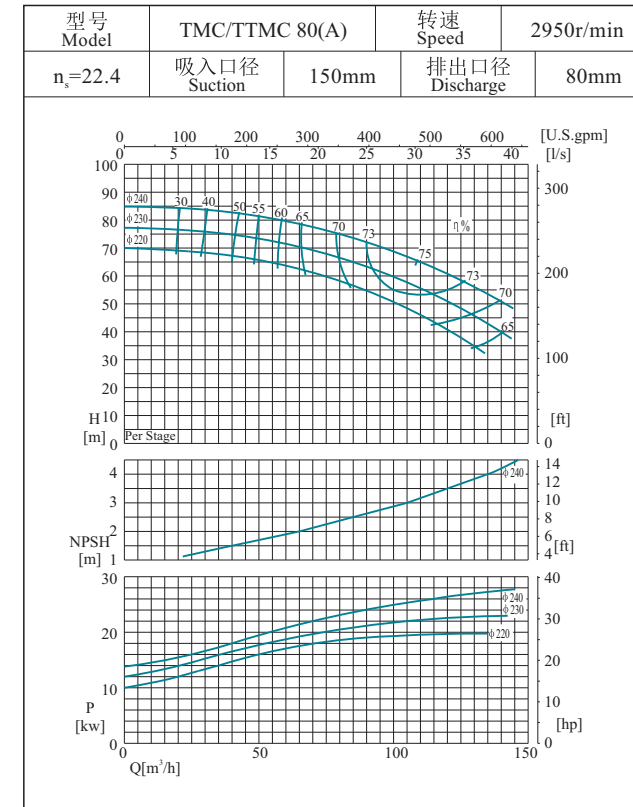
性能曲线图 Performance curve



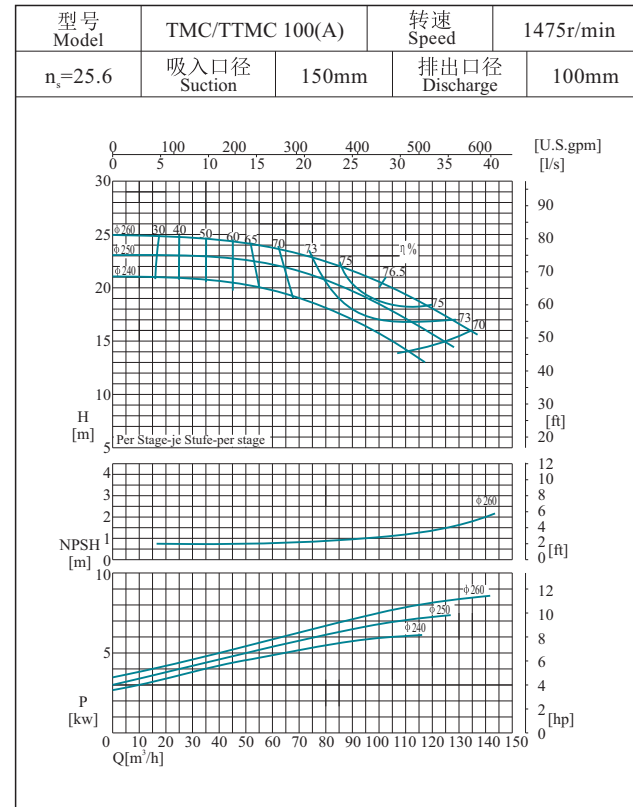
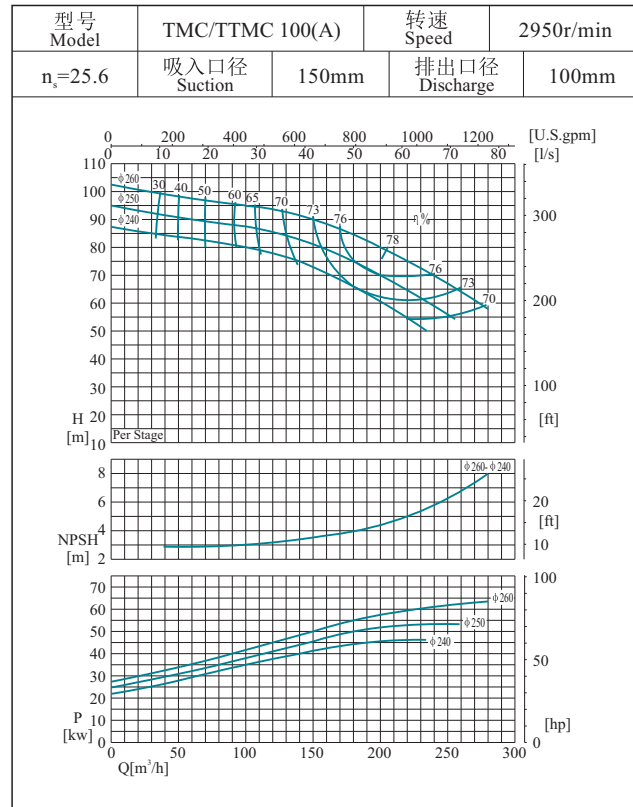
性能曲线图 Performance curve



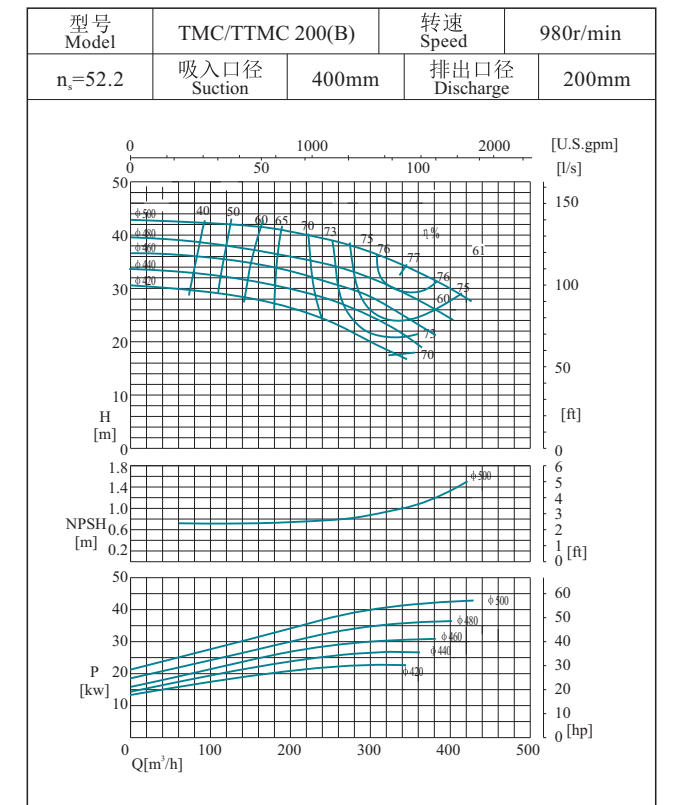
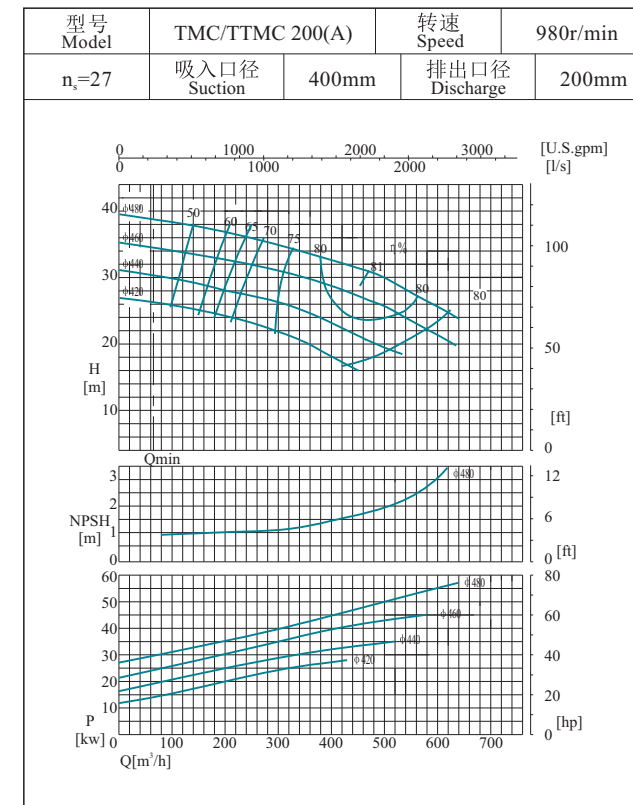
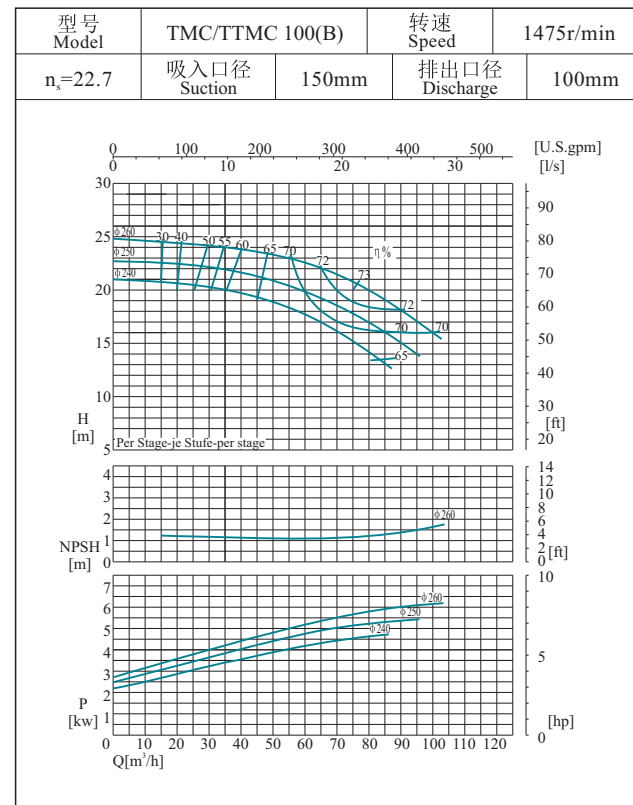
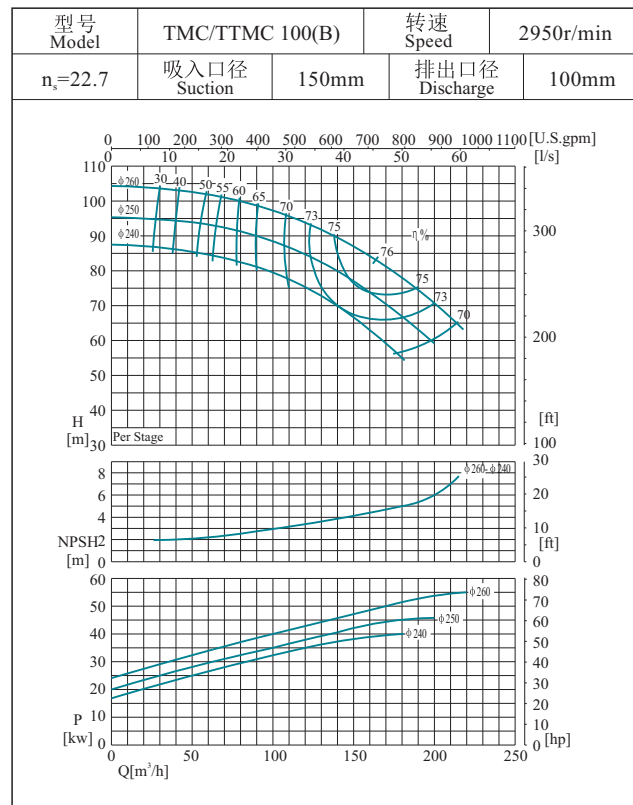
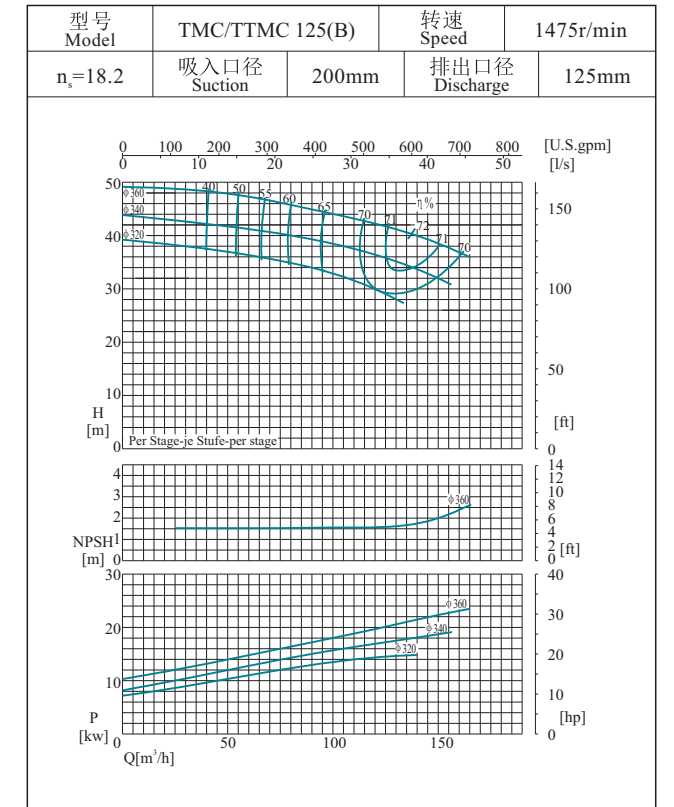
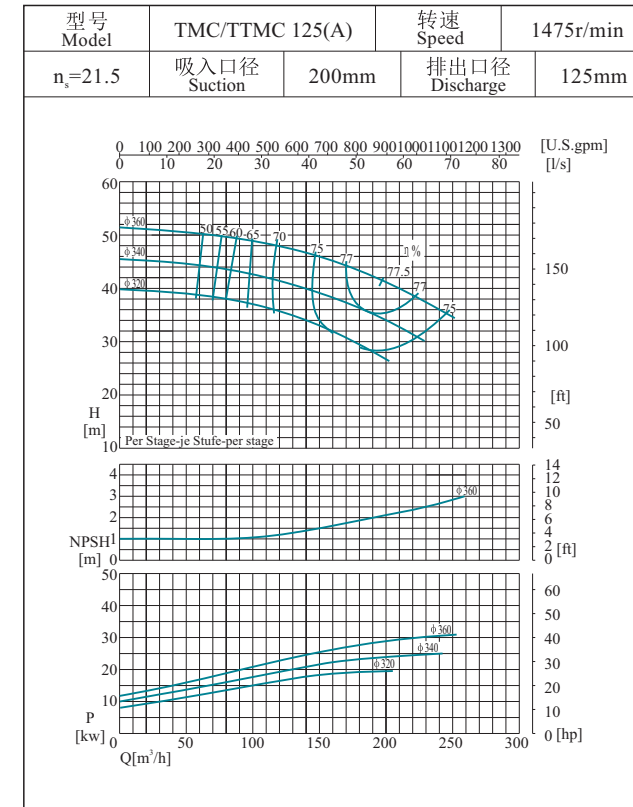
性能曲线图 Performance curve



性能曲线图 Performance curve



性能曲线图 Performance curve



外形及安装尺寸图 External form and installation dimension drawing

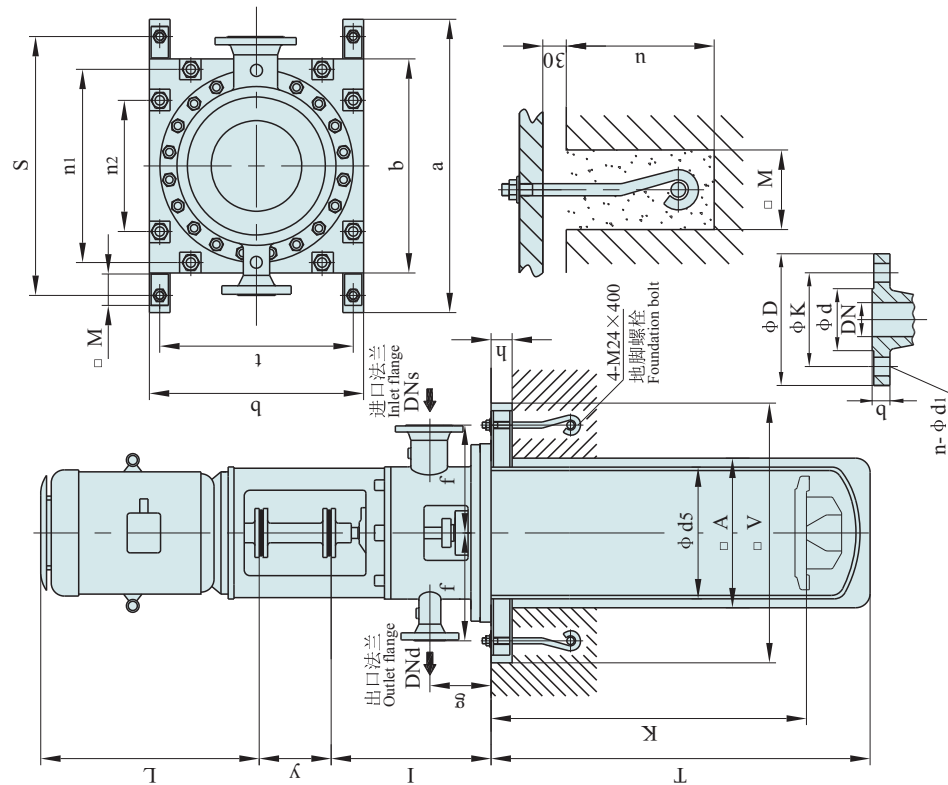
TTMC 40型泵 Type pump

电机型号 Motor model	100L	112M	132S	160M	160L	180M	180L	200L	225M	250M	
L	430	460	510	550	655	800	820	875	940	1025	
电机型号 Motor model	280S	280M									
L	1100	1150									

T	K	级数 Stage			φ d5	l	f	g	y	备注 Remark
		①	②	③						
755	535	2-9	2-9	2-9	φ 426	834	325	190	180	①: n _{max} =1750rpm ②: n=2950rpm ③: n=3550rpm
980	760	2-14	2-14	2-14						
1205	985	2-17								
1430	1210	2-17								
1655	1435	2-17								
1880	1660	2-17								
2105	1885	2-17								
2330	2110	2-17								
2555	2335	2-17								
2780	2560	2-17								

基础尺寸 Basis dimensions										
温度 T ≤ 0 °C Temperature	a	b	n1	n2	t	s	h	φ A	φ V	u
温度 T > 0 °C Temperature	800	560	500	360	500	700	140	470	900	100
	1000	750	680	450	680	900	160	630	1100	100

执行标准 Adopted standard		DN	φ D	φ K	b	φ d	n-φ d1
进口法兰 Inlet flange	GB9113.1-PN4.0	80	200	160	24	132	8-φ 18
出口法兰 Outlet flange	GB9113.1-PN10.0	40	170	125	26	84	4-φ 22



外形及安装尺寸图 External form and installation dimension drawing

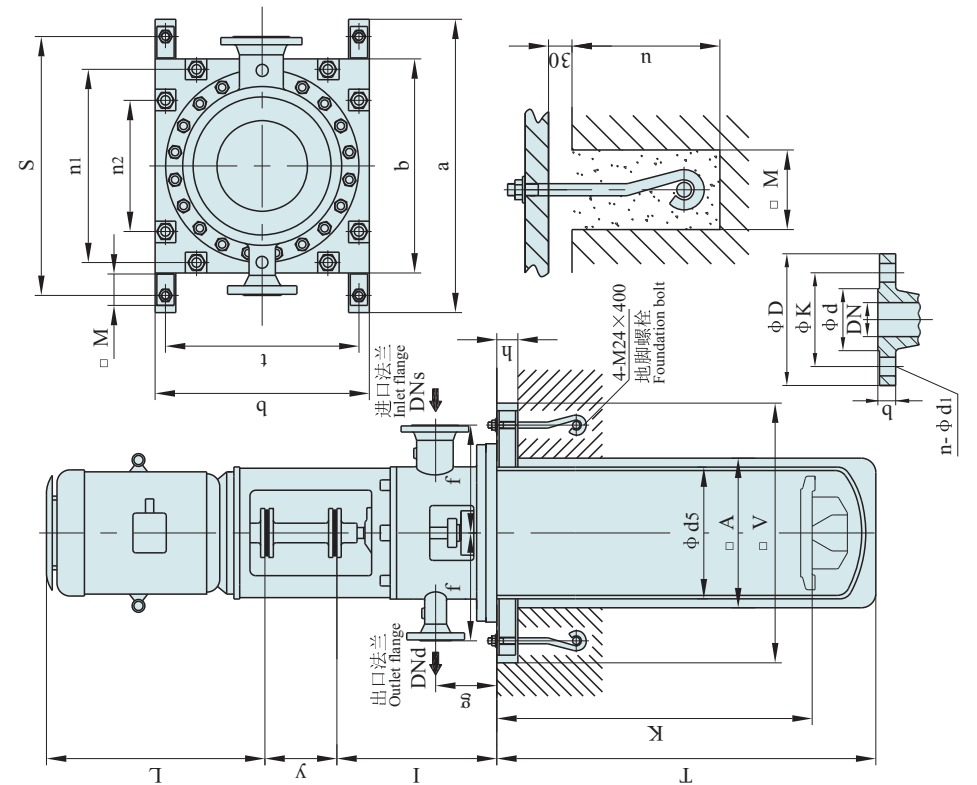
TTMC 50型泵 Type pump

电机型号 Motor model	160M	160L	180M	180L	200L	225M	250M	280S	280M	315S	315M
L	655	695	800	820	875	940	1025	1100	1150	1300	1440

T	K	级数 Stage			φ d5	l	f	g	y	备注 Remark
		①	②	③						
858	608	2-8	2-8	2-8	φ 457	900	375	207	180	①: n _{max} =1750rpm ②: n=2950rpm ③: n=3550rpm
1078	828	2-12	2-12	2-10						
1298	1048	2-13								
1518	1268	2-13								
1738	1488	2-13								
1958	1708	2-16								
2178	1928	2-16								
2398	2148	2-16								
2618	2368	2-16								

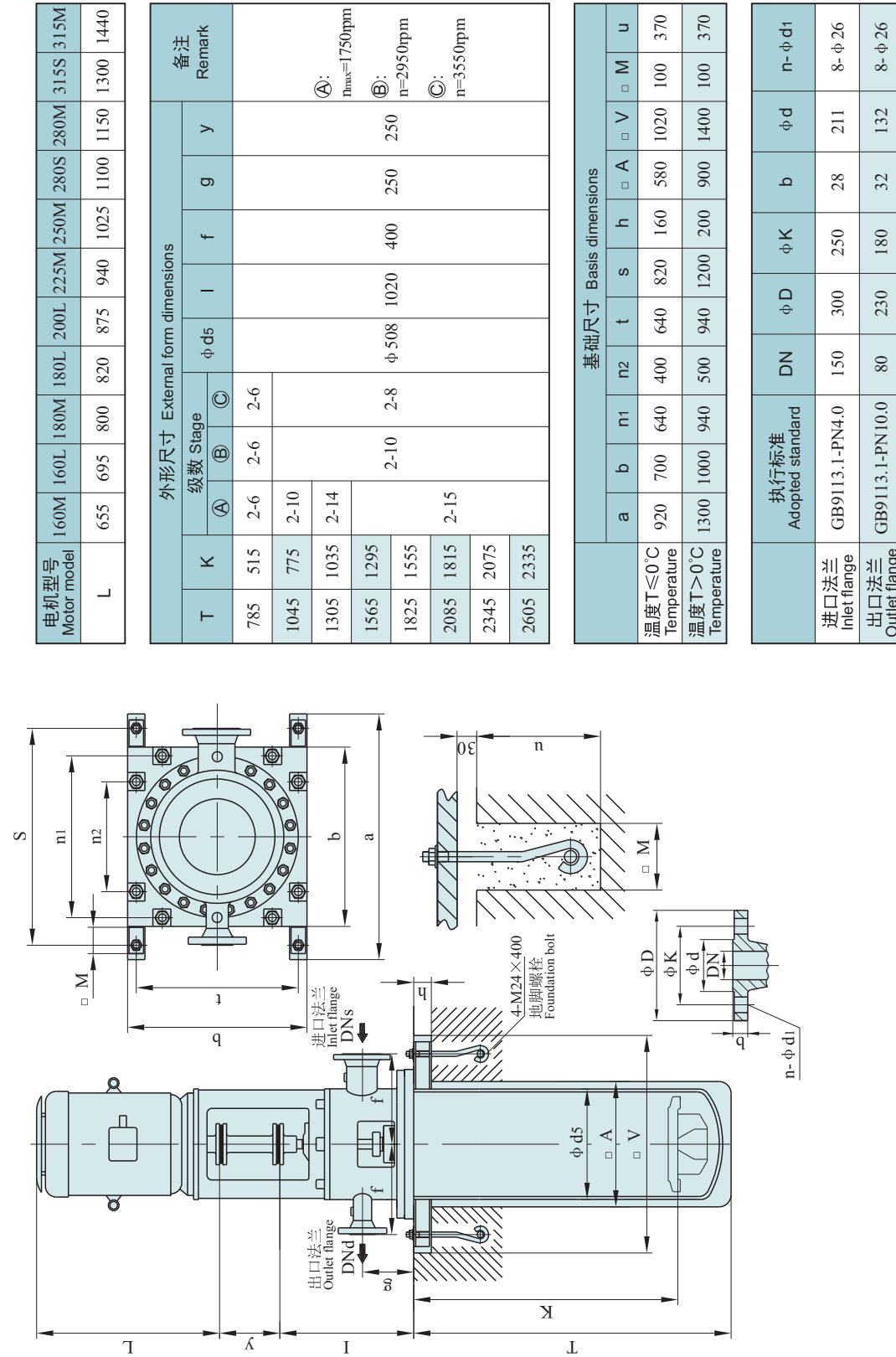
基础尺寸 Basis dimensions										
温度 T ≤ 0 °C Temperature	a	b	n1	n2	t	s	h	φ A	φ V	u
温度 T > 0 °C Temperature	850	620	560	380	560	750	140	520	950	100
	1150	900	840	500	840	1050	200	790	1250	100

执行标准 Adopted standard		DN	φ D	φ K	b	φ d	n-φ d1
进口法兰 Inlet flange	GB9113.1-PN4.0	100	235	190	24	156	4-φ 26
出口法兰 Outlet flange	GB9113.1-PN10.0	50	195	145	28	99	8-φ 22



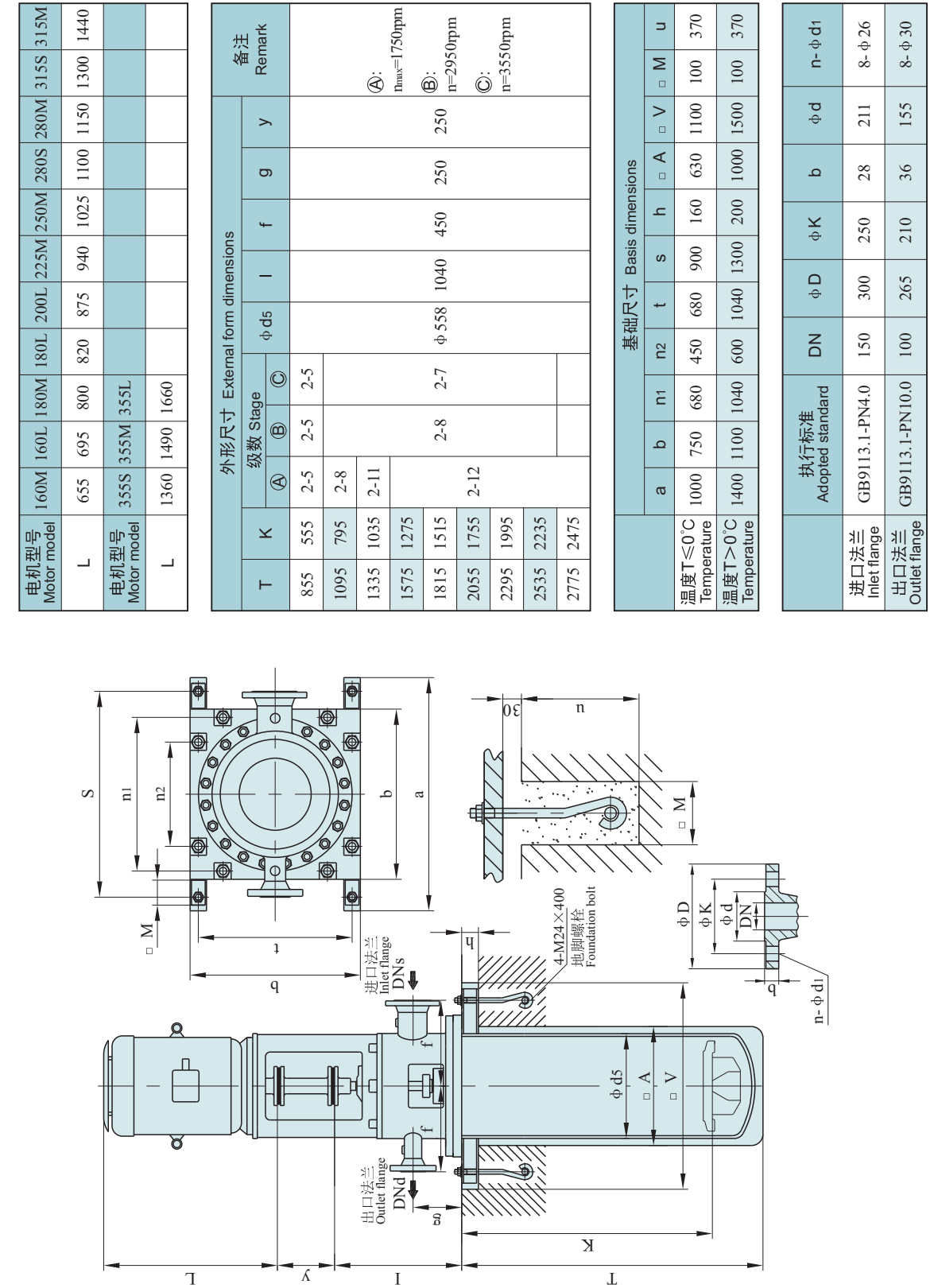
外形及安装尺寸图 External form and installation dimension drawing

TTMC 80型泵 Type pump



外形及安装尺寸图 External form and installation dimension drawing

TTMC 100型泵 Type pump



外形及安装尺寸图 External form and installation dimension drawing

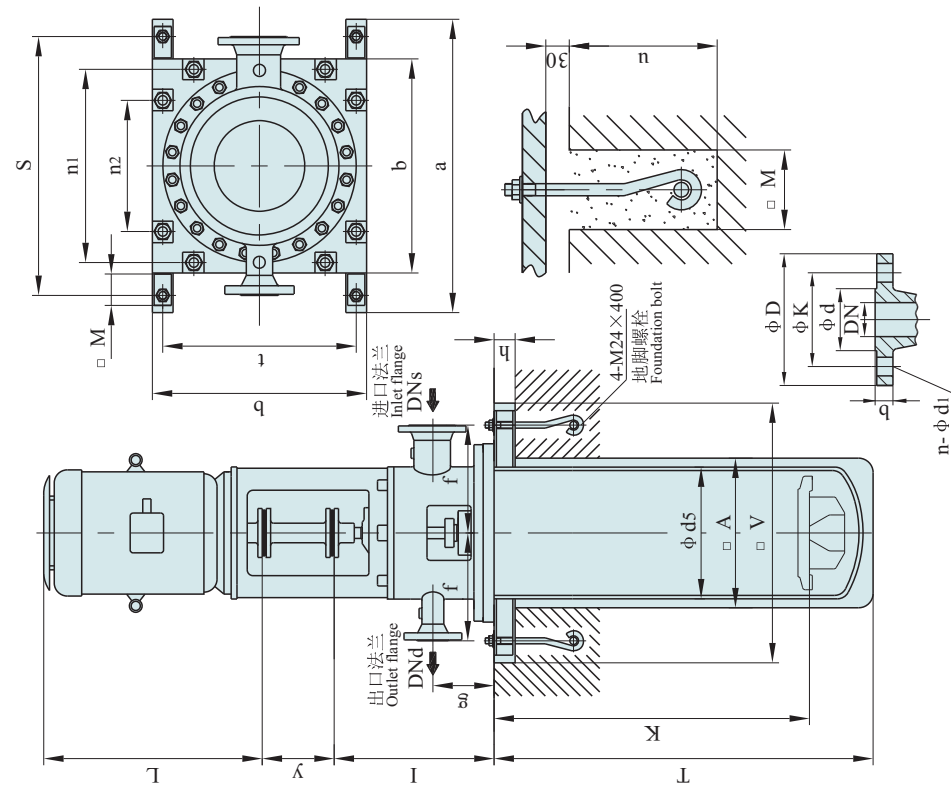
TTMC 125型泵 Type pump

电机型号 Motor model	160M	160L	180M	180L	200L	225M	250M	280S	280M	315S	315M	
L	655	695	800	820	875	940	1025	1100	1150	1300	1440	
电机型号 Motor model	355S	355M	355L									
L	1360	1490	1660									

T	K	外形尺寸 External form dimensions			φ d5	l	f	g	y	备注 Remark
		级数 Stage	①	②						
1000	650	1-4								①: n _{max} =1750rpm
1330	980									②: n=2950rpm
1660	1310									③: n=3550rpm
1990	1640	1-7			φ 711	1260	550	310	250	
2320	1970									
2650	2300									
2980	2630									
3310	2960									

基础尺寸 Basis dimensions											
温度 T ≤ 0°C Temperature	a	b	n1	n2	t	s	h	φ A	φ V	φ M	u
温度 T > 0°C Temperature	1150	900	840	500	840	1050	200	790	1250	100	370
	1500	1200	1140	700	1140	1400	200	1100	1600	100	370

执行标准 Adopted standard		DN	φ D	φ K	b	φ d	n-φ d1
进口法兰 Inlet flange	GB9113.1-PN4.0	200	375	320	34	284	12-φ 30
出口法兰 Outlet flange	GB9113.1-PN10.0	125	315	250	40	184	8-φ 33



外形及安装尺寸图 External form and installation dimension drawing

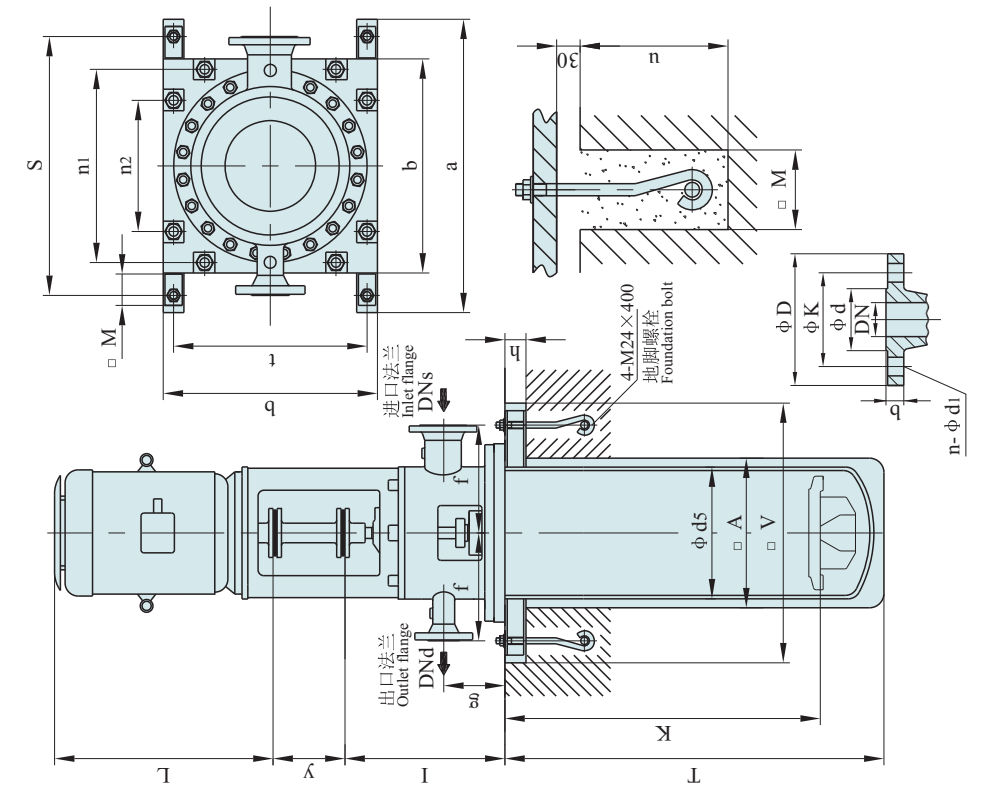
TTMC 150型泵 Type pump

电机型号 Motor model	250M	280S	280M	315S	315M	355S	355M	355L
L	1025	1100	1150	1300	1440	1360	1490	1660

T	K	外形尺寸 External form dimensions			φ d5	l	f	g	y	备注 Remark
		级数 Stage	①	②						
1240	815									①: n _{max} =1750rpm
1520	1095	1-4								②: n=2950rpm
1800	1375				φ 813	1440	600	365	300	③: n=3550rpm
2080	1655									

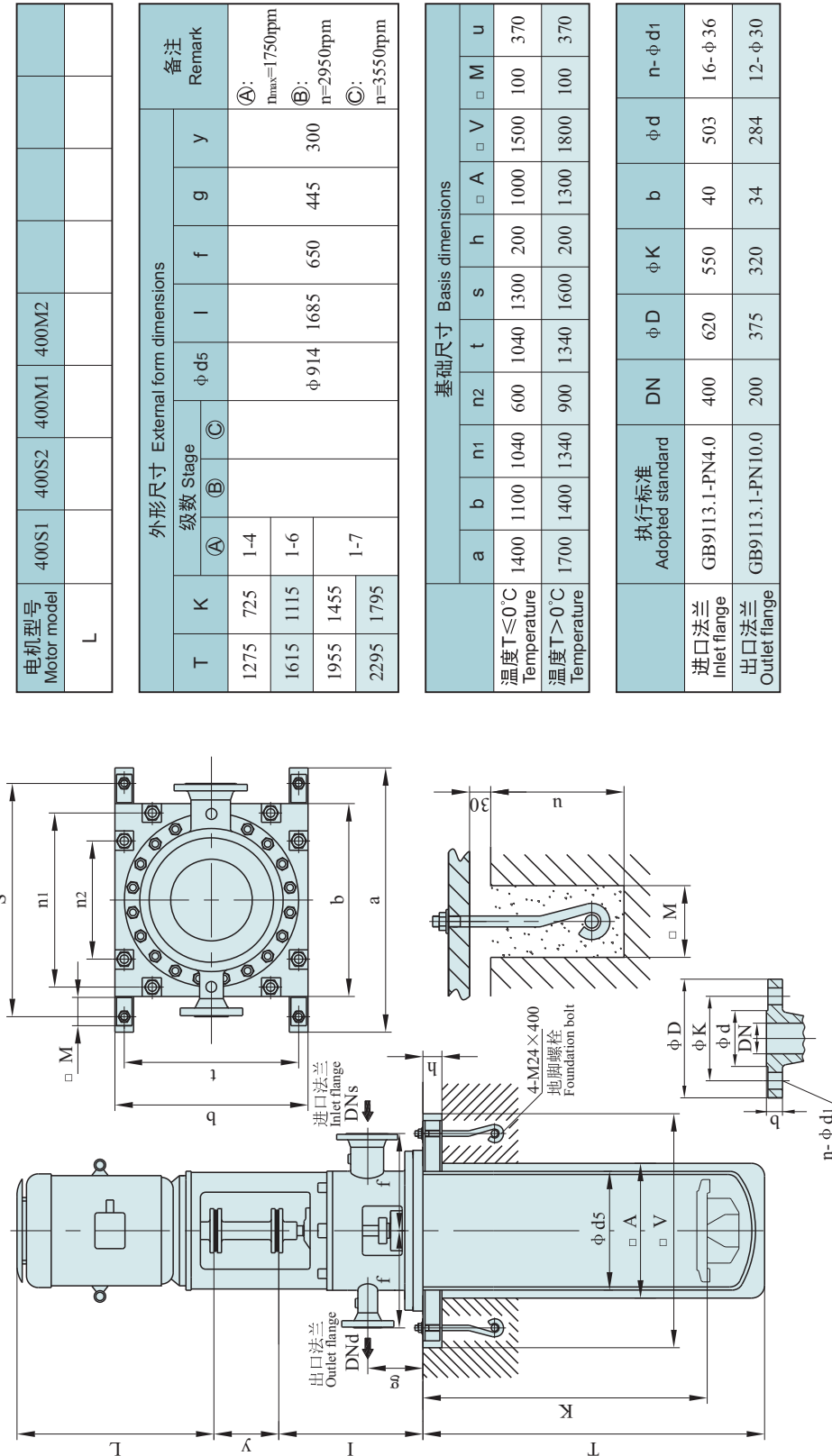
基础尺寸 Basis dimensions											
温度 T ≤ 0°C Temperature	a	b	n1	n2	t	s	h	φ A	φ V	φ M	u
温度 T > 0°C Temperature	1300	1000	940	500	940	1200	200	900	1400	100	370
	1600	1300	1240	800	1240	1500	200	1200	1700	100	370

执行标准 Adopted standard		DN	φ D	φ K	b	φ d	n-φ d1
进口法兰 Inlet flange	GB9113.1-PN4.0	300	485	430	34	389	16-φ 30
出口法兰 Outlet flange	GB9113.1-PN10.0	150	300	250	28	211	8-φ 26



外形及安装尺寸图 External form and installation dimension drawing

TTMC 200型泵 Type pump



泵体材料介质适应表 Table of the pump casing materials suitable for the media

符号说明 Symbol meaning

符号 symbol	说明(耐蚀情况, 腐蚀率、毫米/年) Notice(about corrosion resisting, corrosive rate:mm/year)
A	优良, <0.05 Excellet,<0.05
B	良好, <0.05~0.5 Good,<0.05~0.5
C	可用, 但腐蚀较重, 0.5~1.5 Use, but severe corrosive, 0.5~1.5
D	不适用, 腐蚀严重, >1.5 Unsuitable, severe corrosive,>1.5
*	可能产生应力腐蚀破裂 Possibly to produce stress corroded cracking
△	溶液或介质变色 Color change with solution or medium
∅	可能产生晶间腐蚀 Possibly to form corrosion between crystals
∞	可能产生孔蚀 Possibly to produce hole corrosion

铸铁和低碳钢泵适应介质表

Table of the media suitable to both cast iron and low carbon steel made pumps

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature (°C)			
		25	50	80	100
过氧化氢(双氧水) Hydrogen peroxide	10	B	B	B	B
	20~40	D			
氨水 Ammonia	<30	A	B	B	B
	40	A			
甲醇 Methanol	<100	B	B	B	B
	100	A	A	A	A
乙醇 Ethanol	<100	A	A	A	A
	100	A	A	A	A
丙醇 Propyl alcohol		A	A	A	A
		A	A	A	A
丁醇 Butanol		A	A	A	A
		B(120)			
甲醛 Ormaldehyde	10~30	D			
	40~50	C			
	80~90			D	D
	100	A	A	A	A
乙醛 Acetaldehyde	10	C	C		
	100	A	A	A	A
丙醛 Propionic aldehyde		A	A		
丁醛 Butyric aldehyde		A	A	A	A
(二)甲醚 Dimethyl ether		B	B	B	B
丙酮 Acetone	<100	B			
	100	A	A	A	A
甲烷 Methane		A	A	A	A
		A(120)			
		A(120)			

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature (°C)			
		25	50	80	100
乙烷 Elayl		A	A	A	A
		A(120)			
乙烯 Ethane		A	A	A	A
		A	A	A	A
丙烷 Propane		A	A	A	A
		A(120)			
丁烷 Tetrane		A	A	A	A
		A	A	A	A
汽油(高辛烷值) Gasoline(high octane value)		B	B	B	
		B	B	B	
汽油(含H2S) Gasoline(containing H2S)		B			
		B			
汽油(含HCL, SO2, H2O) Gasoline(containing HCL, SO2, H2O)		C	C		
		C	C		
煤油 Coal oil		B	B	B	B
三乙醇胺 Triethanolamine		B	B	B	B
植物油 Vegetable oil	100	A	A	A	A
		A	D		
	90	D	产生催化 Producing catalyze		
豆油 Soy bean oil		B	B		
玉米油 Corn oil		B	B	B	
棉籽油 Cottonseed oil		B	B	B	
饮用水 Drinking water		B	B	B	
高纯水 High pure water		A			
		A	A		
海水 Sea water	流速 Flowrate				
	<1.5m/s	B			
	>1.5m/s	D	D		
水 PH=7 Water PH=7		C	C	C	C

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature (°C)			
		25	50	80	100
水 PH<7 Water PH<7		D			
水 PH>7 Water PH>7		A	B		
硫酸 Sulphuric acid	<65	D	D		
	65~75	C	C	D	D
	75~100 ^①	B	C	D	D

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature (°C)			
		25	50	80	100
铬酸 Chromic acid	100	B	B	C	
	<25	D			
	30~80	B			
硼酸 Boric acid	<10	C	C	C	C
	>10	C(120)			
70~90%硫酸+硝酸 70~90% sulphuric acid+nitric acid		D			
氢氧化钠 Sodium hydroxide	<30 ^②	A	B	B	B*
		D*(200)			
	30~40	A	B	B	C
	50~60	B	B	D	D
		D*(200)			
	80	B	D	D	D
氯化铵 Ammonium hydride	90			D	D
	100	B			
		D*(370)			
硫酸钠(PH>7) Sodium sulphate(PH>7)		C	D		
硝酸钠 Sodium nitrate	<10	C	D		
	10~99	D	D		
碳酸钠 Sodium carbonate	100	B			
	<90	A	A	B	C
氯化钠(含氧) Solidum chloride (containing oxygen)	100	A	A	A	A
		B(120)			
	10	A	A	A	A
氧化钠 Sodium cyanide	10	A	A	A	A
	20~90	A(120)			

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature (°C)			
		25	50	80	100
氢氟酸(不含氧) Hydrofluoric acid (containing no oxygen)	<70	D	D		
	70~90	C			
	100	B	B		
氢氟酸(含氧) Hydrofluoric acid (containing oxygen)	<70	B	B		
	70~90	C			

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature (°C)			
		25	50	80	100
碳酸氢钠 Sodium bicarbonate	<100	B	B	B	B
	100	C			
硅酸钠 Sodium silicate		B	B	B	B
		B(120)			
柠檬酸钠 Sodium citrate	10	D			
	100	A			
硫酸钾△ Potassium sulphate△	10~20	B	B	B	D ^④
	100	A			
硝酸钾 Potassium nitrate	<90	B	B	B	B
	100	A	A	A	A
氟化钾 Potassium fluoride	20	B	B	B	B
	100	A	B	B	B
氰化钾 Potassium cyanide	<50	C ^①	C	C	C
	60~70			C	C
	80~90	B			C
重铬酸钾 Heavy Potassium chromate	100	B	B	B	B
	<60	B	B	B	B
高锰酸钾 Potassium permanganate	<100	B	B	B	C
	100	B			
氯化钙 Lime chloride	10	A	A	A	A
		A(120)			
	20~70	B	B	C	D
	100	A	A	A	A
氟化钙 Calcium fluoride	90	C			
	100	B	B	B	B

注：①高转速泵、阀，以用高铬镍不锈钢为好。铸铁优于碳钢，可用于80~100℃以下。②铸铁不耐100℃。③铸铁为C。④铸铁为D。
 Note: ①It is better to use the high Cr-Ni stainless steel for the pump and valve of a high rotating speed. Cast iron is better than carbon steel. May be used below 80~100℃.
 ②Cast iron does not withstand 100℃. ③Cast iron to be C. ④Cast iron to be D.

铬18镍19不锈钢(304, 304L)泵适应介质表

Table of the media suitable to the pump made of cr18ni9 stainless steel(304,304L)

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
无机酸 Inorganic acid					
硫酸*(不充气) Shlphuric acid* (without gas filled)	<5	B	D		
	10~80	D	D		
	90	B	D		
	100	B	C		D
硫酸*(充气) Shlphuric acid* (gas filled)	<20	C	D		
	30~60	D	D		
	70~80	C	D		
发烟硫酸 Fuming sulphuric acid		D			
		A	A	A	A
硝酸 Nitric acid	<30	C(120)		D(150)	
	40~60				
	70				
盐酸 Chlorhydric acid		D			
磷酸 Phosphoric acid	<5	B	B	B	B
		B(沸点) B(Boiling point)			
	10	B	D	D	D
	10~85	D(沸点) D(Boiling point)			
氢氟酸(不充气)*∞ Hydrofluoric acid (without gas filled)*∞	<100	D			
	100	B	D		
氢氟酸(充气)*∞ Hydrofluoric acid (gas filled)*∞		D		D	
铬酸*∞ Chromic acid*∞	<10	B	C	C	
		C(沸点) C(Boiling point)			
	20~30	B	D	D	D
	50	D			
硼酸∞ Boric acid∞	100	D			
	<30	A	A	A	A
		A(沸点) A(Boiling point)			
硼酸∞ Boric acid∞	40	B	B	B	B
		B(150)			
	50	B	B	B	B

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
硼酸∞ Boric acid∞	70~80	D			
	70~80	D(120)			
	100	B	B		
		D(200)			
混酸：硫酸>50%+硝酸<50%+水>20% Mixed acid: sulphuric acid>50%+nitric acid<50%+water>20%		B	B	B	D(沸点) D(Boiling point)
硫酸20~60%+硝酸<25%+水>20% Sulphuric acid 20~60%+nitric acid<25%+water>20%		D			
硫酸15%+硝酸5%+水80% Sulphuric acid 15%+nitric acid 5%+water 80%		B	B	B	B (沸104) (Boiled 104)
氢氧化钠 Sodium hydroxide	<50	A	C	C	D
		D*(200)			
	70*	B	B	B	D*
		D*(200)			
氢氧化钾* Potassium hydroxide*	80*	B	B	B	D
		D*(200)			
	100	B	B	B	B
		C(316)		D(370)	
氢氧化钾* Potassium hydroxide*	<50	B	B	B	B
		B(沸点) B(Boiling point)			
	50	B	B	B	D
		D(200)			
氢氧化钾* Potassium hydroxide*	60~70	B	B	B	C
		C(120)			
氢氧化钾* Potassium hydroxide*	80	B			D
		D(200)			
氢氧化钾 Potassium hydroxide	100	A			
		D(250)			
硫酸钠* Sodium sulphate*		A	A	A	A
		A(200)		B(840)	

铸铁和低碳钢泵适应介质表

Table of the media suitable to the pump made of cast iron and low carbon steel

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
硝酸钠 [∞] Sodium nitrate [∞]	<70	A	A	A	A
	100	A(沸点) A(Boiling point)		D	
碳酸钠 Sodium carbonate	10	A	A	A	A
	20~40	A(沸点) A(Boiling point)			
	100	B	B	A	A
碳酸钠 Sodium carbonat	100	D*(400)		D*(900)	
氯化钠* [∞] Sodium chloride* [∞]	10~30	B	B	B	B
	90	B(沸点) B(Boiling point)			
	100	B	B	B	
氧化钠 Sodium cyanide	10	A	A	A	A
	20~30	A			
硅酸钠 Sodium silicate	40~100	A	A	A	D
		D(700)			
醋酸钠 [∞] Sodium acetate [∞]	10	A	A	A	A
	20~60	A(150)			
柠檬酸钠 Sodium citrate	<40	B	B	B	B
	100	B			
硫酸钾 Potassium sulphate	<饱和	A	A	A	A
	100	A(沸点) A(Boiling point)			
硝酸钾 Saturation	<80	B(沸点) B(Boiling point)		B	B
	100	A	A	A	A
氯化钾 Potassium fluoride		B	B	B	B
氧化钾 Potassium cyanide	<30	A	A	A	A
	40~	B	B	B	B

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
氰化钾 Potassium cyanide	90				
	100	B			
重铬酸钾 Heavy potassium chromate	<30	A	A	A	A
	40~60	A(沸点) A(Boiling point)			
	100	A	A	A	A
高锰酸钾 Potassium permanganate	<30	B	B	B	B
	100	B(沸点) B(Boiling point)			
氯化钙* [∞] Calcium chloride* [∞]	<20	A	A	A	D
	30~80	B	B	B	D
	100	B	D(150)		
氟化钙 Calcium fluoride	10	A	A	A	A
	100	A	A	A	A
过氧化氢(PH>7) Solozone(PH>7) (双氧水) (Hydrogen peroxide solution)	10~40	B	B	B	B
	90	B(沸点) B(Boiling point)			
	100	A	A		C
氨水 Ammonium water		A	A	A	A
氨(无水) Ammonium (free of water)		A	A	A	A
		A(316)		A(500)	
甲醇 Methanol	<100	A	A	A	A
	100	A	A	A	C
乙醇 Alcohol		A	B	B	B
丙醇 Propanol		A	A	A	A
丁醇 Butanol		A	A	A	A
甲醛 [∞] Formaldehyde [∞]	<40	A	A	A	A
		A(150)			
	50	A	A	B	B
	60~70	B(300)			
	80~90	A	A	A	
	100	A			
乙醛 Acetaldehyde		A	A	A	A
丙醛 Propionic aldehyde		A			
丁醛 Butyric aldehyde		A	A	A	A
(二)甲醚 Dimethyl ether		B	B	B	B

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
乙醚 Ethyl ether		A	A	A	A
丙酮 Acetone		A	A	A	A
甲烷 Methane		A	A	A	A
		A(370)			
乙烷 Ethane		A	A	A	A
		A(316)			
丙烷(液及气) Propane(liuid and gas)		A	A	A	A
丁烷 Tetrane		A	A	A	A
汽油(高辛烷值) Gasoline(high value of octane)		B	B	B	
汽油(喷汽机燃料) Gasoi(fuel of steam sprayer)		B	B	B	
煤油 Coal oil		A	A	A	A
		A(200)			
三乙醇胺 Triethanolamine		B	B	B	B

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
植物油 Vegetable oil		A	A	A	A
		A(350)			
豆油 Soy bean oil		A	A	A	A
玉米油 Corn oil		A	A	A	A
棉子油 Cottonseed oil		A	A	A	A
饮用水 Drinking water		A	A	A	A
海水 Sea water	流速 Flowrate				
	<1.5m/s	A [∞]		A	
	>1.5m/s	A [∞]			

铬18镍12钼(钛)(316,316L)不锈钢泵的适应介质表

Table of the media suitable to the pump made of Cr18Ni12Mo(Ti) (316,316L) stainless steel

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
硫酸*(充气) Vitriol* (gas filled)	<5	B	B	D	D
	10~30	B	C	D	D
	40~50	C	D	D	
	60~70	D	D	D	
	90	B ⁰	C	D	D
	100	B	C	C	C
硫酸*(不充气) Vitriol* (without gas filled)	<5	B	D	D	D
	20~80	D	D	D	D
	80~90	B	D	D	
	100	B	B	B	C
硝酸 Nitric acid	<20	A	A	A	A
		C(120)		D(150)	
	30~60	A	B	B	B
		D(120)			
	70	A	B	B	
	80	A	B	D	
	90	A	D		
	100	A ₂	D		
磷酸*(充气) Phosphoric acid (gas filled)	<25	A	A	A	A
	25-50	A(沸点) A(Boiling point)		D(>120)	

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
磷酸*(不含氧) Phosphoric acid*(containing no oxygen)	50~85	D(120)			
		A	B	B	B
	90	D			
	100	B			
氢氟酸(不充气) Hydrofluoric acid (without gas filled)	<100	D			
	100	B			
氢氟酸(充气) Hydrofluoric acid (gas filled)	<10	B			
	10~90	D			
	100	B			
碳酸 Carbethylc acid	10	B			
	30				A
	100	A	A	A	A
		A(816)			
铬酸 Chromic acid		D			D
氯酸 [∞] Chloric acid [∞]		D			
四磷酸 Tetra-phosphoric acid		B			
硼酸 [∞] Boric acid [∞]	<10	A(沸点) A(Boiling point)			
	20~50	B	B	B	B

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
		B(150)		B(沸点) B(Boiling point)	
王水 Nitro-hydrochloric acid	70~80	B	B	D(120)	
王水 Nitro-hydrochloric acid	100	B	B	D(250)	
混酸: 硫酸>50%+硝酸<50%+水<20% Mixed acid: sulphuric acid>50%+nitric acid<50%+water<20%		B	B	B	
		D(沸点) D(Boiling point)			
		D			
混酸: 硫酸20~60%+硝酸<25%+水<20% Mixed acid: sulphuric acid>20~60%+nitric acid<25%+water<20%		D			
混酸: 硫酸30%+硝酸15%+水55% Mixed acid: sulphuric acid 30%+nitric acid 15%+water55%		B	B	B	
		B(沸点) B(Boiling point) (110)			
混酸: 硫酸15%+硝酸5%+水80% Mixed acid: sulphuric acid 15%+nitric acid 5%+water80%		B	B	B	
		B(沸点) B(Boiling point) (110)			
甲酸 [∞] Aminic acid	<5	B	B	B	B
	>5	C	C	C	C
		D(沸点) D(Boiling point)			
醋酸 [∞] (不充气) (乙酸) Acetic acid* (without gas filled) (acetic acid)	<50	A	A	A	A
	60~90	B	B	B	B
	100	B	B	B	B
		D(200)			
醋酸(充气) Acetic acid (gas filled)	<40	A	A	A	A
		B(150)		D(200)	
	50	A	B	B	B
	60~90	A	B	B	C
	100	A	B	B	C
		D(150)			
氢氧化钠 Sodium hydroxide	<20	A	A	A	A
		B(沸点) B(Boiling point)		D(150)	
	30~50	A	A	B	D
		D*(150)			
	70	A	A	B	B
		D*(150)			
	80	A	A	B	D*
		D(260)		D(370)	

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
		C(260)		D(370)	
氢氧化钠 Sodium hydroxide	100	A	A	A	A
		C(260)		D(370)	
氢氧化钾* Potassium hydroxide*	<50	A	A	A	A
		A(沸点) A(Boiling point)			
	50	B	B	B	D
		D(200)			
	60~70	B	B	B	C
		C(150)			
	80	B			
		D(200)			
	100	A			
		D(260)			
硫酸钠 Sodium sulphate		A	A	A	A
		A(200)		B(840)	
硝酸钠 Sodium nitrate	<70	A	A	A	A
		A(沸点) A(Boiling point)			
	100	B			
		A(510)			
碳酸钠 Sodium carbonate	10	A	A	A	A
		A(沸点) A(Boiling point)			
	20~40	B	B	A	A
		A(沸点) A(Boiling point)			
	100	B	B	B	B(260)
		D*(400)		D*(900)	
氯化钠* [∞] Sodium chloride* [∞]	10	B	D		
	20~30	B	B	B	B
		B(沸点) B(Boiling point)		D(120)	
	90	D			
	100	A			
		D(700)			
碳酸氢钠 Sodium bicarbonate		A	A	A	A
氰化钠 [∞] Sodium cyanide* [∞]	<10	A	A	A	A
	20~30	A			
	40~100	B			D
		D(700)			
硅酸钠 Potassium silicate		A	A	A	A
		D(800~100)			
硫酸钠 Potassium sulphate	<100	A	A	A	A
		A(沸点) A(Boiling point)			

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
		100			
硝酸钾 Potassium nitrate	<80	B	B	B	B
		B(沸点) B(Boiling point)			
	100	B			
		B(550)			
碳酸钾 Potassium bicarbonate	<70	B	B	B	B
		B(沸点) B(Boiling point)			
	100	B	B	B	B
氟化钾 Potassium fluoride		B	B	B	B
氰化钾 Potassium cyanide	<90	B	B	B	B
	100	B			
重铬酸钾 Heavy potassium chromate	<30	A	A	A	A
		A(沸点) A(Boiling point)			
	40~60				A
	10	B			
高锰酸钾 Potassium permanganate	<30	B	B	B	B
	10	B	D		
	20~30	B	B		
氯化钙* [∞] Calcium chloride* [∞]	40~90	B	B	B	
		D(沸点) D(Boiling point)			
	100	A	A	A	A
	50	C(-18)			
氟化钙 Calcium fluoride	10	A	A	A	A
	100	A	A	A	A
甲醇 Methanol	<100	A	A	A	A

注: ① Cr26Mo1铁素体钢不耐蚀;
② 高流速和摩擦会增加腐蚀;
③ 不许含微量盐酸、硫酸或氯化钠。Cr26Mo1铁素体钢耐蚀较好。

Note: ① Cr26Mo1 ferritic steel does not withstand corrosion;
② High flowrate and friction may increase corrosion;
③ Not allowed to contain micro chlorhydric acid, sulphuric acid or sodium chloride. Cr26MO1 ferritic steel is of a better corrosion resistance.

钛及钛合金泵的适应介质表

Table of the media suitable to the pump of titanium and titanium alloy

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
		100			
硫酸 [∞] (充气) Vitriol [∞] (gas filled)	1	B	B	B	B
		B(沸点) B(Boiling point)			
	<3	B	B		D
	<10	B	C	D	D
	10~30	B	C	D	
	40~50	C	D		
	50~100	D	D		
硫酸(不充气) Vitriol (without gas filled)	<10	B			
	10~100	D			

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
		100			
乙醇 Alcohol		A	A	A	A
乙二醇 Ethandiol		A	A	A	A
甲醛 [∞] Formaldehyde [∞]	<40	A	A	A	A
		A(150)			
	50	A	A	B	B
		B(300)			
	60~70	A	A		
	80~90	A	A	A	
	100	A			
乙醚 Ethyl ether		A	A	A	A
丙酮 Acetone		A	A	A	A
醋酸乙酯 Ethyl ester acetate		A	A	B	B
甲苯 Toluene		A	A	A	A
		A(沸点) A(Boiling point)			
汽油 Gasoline		A	A	A	A
		A(175)			
煤油 Coal oil		A	A	A	A
		A(200)			
苯酚 Phenyl hydroxide	70~90	B	B	B	B
		B(150)		D(200)	
海水 Sea water	流速 Flowrate				
	<1.5m/s	A**		A(PH≈7)	
	>1.5m/s	A**			

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
		100			
硝酸 Nitric acid	10	A	A	A	A(150)
		B(200)			
	20	A	A	A	
		A(150)		B(200)	
		D(316)			
	30~80	A	A	A	A(150)
		D(200)			
	80~100	A	A	B	
		B(150)			

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
盐酸 [®] (不充气) Chlorhydric acid [®] (without gas filled)	10	B	D		
	20	C	D		
	>30	D			
盐酸 [®] (充气) Chlorhydric acid [®] (gas filled)	1	B	B	B	B(沸点) B(Boiling point)
	<20	B			D(35)
	30	B	D		
	>50	D			
磷酸(充气) Phosphoric acid (gas filled)	5	B	B	B	B
	<10	B	B	B	
磷酸(充气) Phosphoric acid (gas filled)		D(沸点) D(Boiling point)			
	10~20	B	D		
	30	B	C		D
	40	C	C		
	50~70	C	C	D	
100	D				
磷酸 [®] (不充气) Phosphoric acid [®] (without gas filled)		D			
铬酸 Chromic acid	10	A	A	A	A
	<90	A	A	A	A
硼酸 Boric acid	10	A	A	A	A
	<饱和 <Saturation	A	A	A	A
盐酸1%+硝酸3% Chlorhydric acid 1%+nitric acid 3%		A			
盐酸2%+硝酸1% Chlorhydric acid 2%+nitric acid 1%		A			
王水 Nitro-hydrochloric acid		A	A	B	B
盐酸4%+硝酸1% Chlorhydric acid 4%+nitric acid 1%		A			

介质名称 Medium name	浓度 Concentration (%)	温度 Temperature(°C)			
		25	50	80	100
甲酸(不充气) Aminic acid (without gas filled)	<10	A	A	A	
		A(沸点) A(Boiling)			
	30	D			D
	<50	B	B	D	D
90			D	D	
甲酸(充气) Aminic acid(gas filled)		B	B	B	B
醋酸 Acetic acid		A	A	A	A
		A(200)			
氢氧化钾 Potassium hydroxide	10	A	A	A	A
氢氧化钾 Potassium hydroxide	20~100	A(沸点) A(Boiling point)			
		B			D(沸点) D(Boiling point)
		D(260)			
氢氧化钠 Sodium hydroxide	10	A	A	A	A
硫酸钠 Sodium sulphate	10~30	A	A	A	A
		A(沸点) A(Boiling point)			
	饱和 Saturation	A	A		
		D(900)			
硝酸钠 Sodium nitrate	<饱和 <Saturation	A	A	A	A
		A(300)			
氯化钠 Sodium chloride	<饱和 <Saturation	A	A	A	A
		A(沸点) A(Boiling point)			
	100	A*(沸点) A*(Boiling point)			
乙醇* [®] Alcohol*		A	A	A	A
乙二醇 Ethandiol		A	A	A	A
乙醚 Ethyl ether		A	A	A	A
丙酮 Acetone		A	A	A	A
醋酸乙酯 Ethyl ester acetate		A	A	A	A
甲苯 Toluene		A	A	A	A
苯酚 Phenyl hydroxide		A			

注：①含Cu、Ni等离子或其他氧化剂会降低腐蚀。

②含微量Cl的甲、乙醇可能产生应力腐蚀破裂，含2%以上的水时可避免。

Note: ①Containing Cu, Ni etc.ions or other oxidants can lower the corrosion.

②Both methanol and alcohol containing micro cl⁻ may produce stress corrosive craking,which can be avoided by containing more than 2% water.

ZGOOCr20Ni25Mo4.5Cu1.5(904L)耐腐蚀性能表
ZGOOCr20Ni25MO4.5CU1.5(904L)Table of anti-corrosive performance

介质名称 Medium name	介质条件 Medium condition		腐蚀情况 Corrosion condition
	浓度 Concentration(%)	温度 Temperature(°C)	
硫酸 Vitriol	5-40	60	A
	10	80	B
	20	70	B
	30	70	B
	40	30-50	A
	50	40	A
	50	50	B
	60	20-35	A
	60	40	B
	80-98	40	A
80-98	50	B	

介质名称 Medium name	介质条件 Medium condition		腐蚀情况 Corrosion condition
	浓度 Concentration(%)	温度 Temperature(°C)	
硝酸 Nitric acid	10-40	20-沸腾 20-Boiling	A
	50	100	A
	60	90	A
	70	100	B
	80	80	B
醋酸 Acetic acid	1-80	沸腾 Boiling	A
	99.5	200	A
	100	20-75	A
	100	100	A
	100	沸腾 Boiling	A

ZG1Cr13(410)耐腐蚀性能表
ZG1Cr13(410) Table of anti-corrosive performance

介质名称 Medium name	介质条件 Medium condition		延长时间 Extended time h	腐蚀情况 Corrosion condition
	浓度 Concentration(%)	温度 Temperature(°C)		
硝酸 Nitric acid	5	20		A
	7	20	720	A
	5	沸腾 Boiling		D
	20	20		A
	20	沸腾 Boiling		A
	50	20		A
	50	沸腾 Boiling	24	C
	65	20		A
	65	沸腾 Boiling	24	D
	90	20		A
90	沸腾 Boiling		D	
醋酸 Acetic acid	10-50	20		C
	10	沸腾 Boiling		D
蚁酸 Formic acid	10-50	20		A
	10-50	沸腾 Boiling		D
柠檬酸 Citric acid	1	20		A
	1	沸腾 Boiling		D
	25	20	720	C
氨 Ammonia	溶液或气体 Solution or air	20-100		A
氢氧化钠 Sodium hydroxide	20	20		A
	20	沸腾 Boiling		A
	50	100		D
	浓液 Thick liquid	20		A

介质名称 Medium name	介质条件 Medium condition		延长时间 Extended time h	腐蚀情况 Corrosion condition
	浓度 Concentration(%)	温度 Temperature(°C)		
草酸 Oxalic acid	浓液 Thick liquid	20		A
	浓液 Thick liquid	沸腾 Boiling		D
硝酸铵 Ammonium nitrate	约65 About 65	20	1127	A
	约65 About 65	125	110	C