

# **FIRST PUMPS**

## **Brochure For**

### **HI-CHROME CENTRIFUGAL MUD PUMP**

#### **(Magnum I Alternative Type)**

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## MAGNUM I ALTERNATIVE TYPE

### HIGH-CHROME CENTRIFUGAL MUD PUMPS



Hi-chrome centrifugal mud pumps (magnum I alternative type), with fluid end parts made of high chrome alloy A05 (Cr.27, 27% chrome ), are designed and engineered to handle abrasive, viscous and corrosive fluids in drilling fluid or industrial slurry applications. The pump performance is matched by exceptional performance, high volume, high temperature capabilities, long service life, ease to maintenance, overall economy and greater savings. All the durable abrasive-resistant parts of High-chrome Centrifugal Mud Pumps can help you maximize reduce down time and minimize the maintenance cost. High-chrome centrifugal mud pumps are currently in operation on land-based and offshore drilling rigs around the world. We will offer the best choice for the intended application, taking into consideration fluid conditions.

#### APPLICATIONS:

- **Drilling Applications:**
  - Mud mixing and Shearing Operations
  - Desanding and Desilting
  - Degassing
  - Supercharging
  - Centrifugal Feed
  - Mud Cooling Towers
  - Wash Down

- **Other Applications:**
  - Chemical Industry
  - Refinery Industry
  - Construction
  - Agriculture



## FEATURES OF HIGH CHROM MAGNUM I ALTERNATIVE PUMPS



### Thicker, Stronger, Concentric Casing

The high-chrome magnum I alternative concentric pump casings are heavier and stronger to outlast conventional pumps. The casings are thicker for extra strength and extended service life. The concentric design allows the distance between the impeller and the casing to be the same at all points. The concentric casing eliminates turbulence and cavitation within the pump. It also reduces the radial load on the bearings. The full pipe diameter of the pump entrance. The housing gasket is recessed to protect it from fluid leaving the impeller.



### Wider Open Impeller, Increased Re-circulation Area

The high-chrome magnum I alternative pumps' open impeller eliminates re-circulation that occurs in closed impellers. The impeller is designed to reduce turbulence, lower radial and thrust loads, and provides a smooth flow of fluid through the pump. Casing wear is reduced by eliminating the high scrubbing action that occurs on conventional pumps. The high-chrome magnum I alternative pump impeller is designed to allow fluid leaving the impeller to blend with recirculating fluid to reduce abrasive wear of the casing. The open impeller has no exposed impeller nuts or shaft threads. The impeller is screwed on and the threads are protected by an O-ring. The high chrome magnum I alternative pump and impeller are designed to increase service life many times over that of conventional pumps.



### **Heavy Duty Big Diameter Shaft**

The shaft of high-chrome magnum I alternative pump has a greater diameter to provide heavy-duty performance with minimal shaft deflection. The replaceable shaft sleeve allows the wear from the packing to be renewed without replacing the entire shaft. The shaft sleeve and mechanical seal can be replaced without removing the shaft from the pump.



### **Easy Maintenance Highest Quality Bearings**

The high-chrome magnum I alternative pump bearings are designed for easy maintenance. The outboard bearing assembly is comprised of two angular contact bearings with high thrust load ratings and zero end play. The inboard bearing is a heavy-duty, double row ball bearing with high radial load capacity to compensate for the larger impeller sizes and heavy-duty applications. The magnum I alternative pump only uses the best bearings available.





### **High-Wear Resistant High-Chrome Alloy Fluid End Parts**

High chrome fluid end parts provide excellent wear life while maintaining efficiency during the wear cycle providing the best total operating cost. All the wet-end wear parts, including stuffing box, impeller and casing assembly, are manufactured in High Chrome Alloy A05 at a minimum hardness of not less than 62HRC≈648HB. High chrome fluid end parts are heat treated in compliance with our Two Steps Heat Treatment Process to ensure better grouping and alignment of the primary and secondary groups of carbides in the micro-structure of the material. This assure the hardness of high-chrome parts to handle the heaviest mill duties, also extended pump life and keep stable performance.

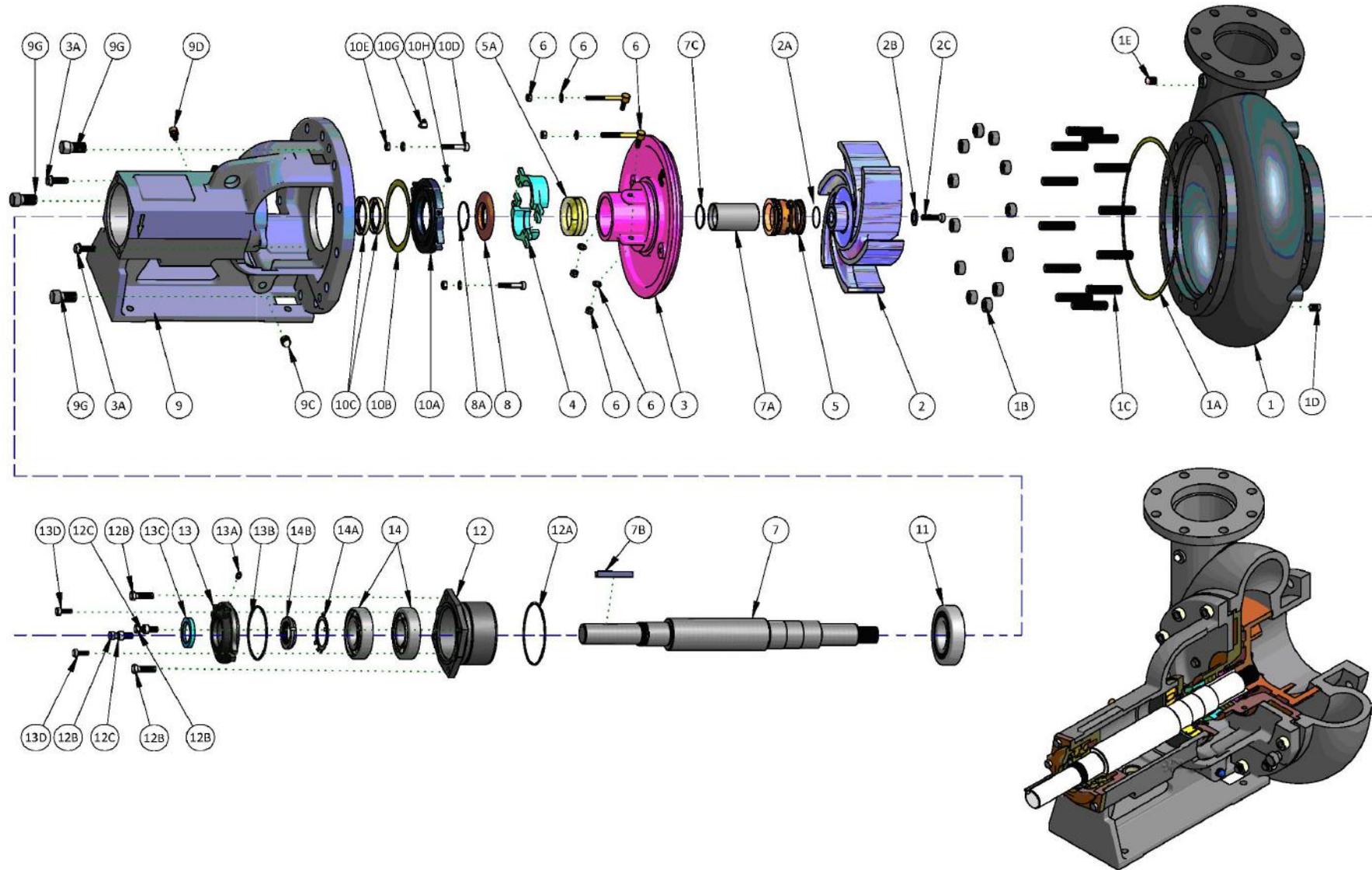
## **THE HIGH-CHROME**

The **HIGH-CHROME** centrifugal pump is built to deliver superior fluid handling performance in a variety of applications. It's performance incorporates the power, durability and ease of maintenance of the field proven MAGNUM I with a new high strength material in critical component areas.

A **HIGH-CHROME** alloyed iron provides greater wear resistance and higher strength in the casing, stuffing box, and impeller. This new alloy gives the casing, impeller and stuffing box a hardness of 648 HB.

This process gives the critical components in the **HIGH-CHROME** a more uniform structure; and a 27% Cr. content. The components of the **HIGH-CHROME** have a wear resistance of more than 9 times that of cast iron and more than 6 times that of hard iron.

# HIGH-CHROME MAGNUM I ALTERNATIVE CENTRIFUGAL PUMP



**FIRST PUMPS** High Chrome Centrifugal Mud Pump (**Magnum I Alternative Type**)

<b>HIGH-CHROME MAGENUM I ATERNATIVE TYPE PARTS LIST</b>				
Item	Qty	Part Number	Description	Material
1*	1	See Below	Casing	High-Chrome A05
1A	1	10399-46-1	Gasket, Casing	Vellumoid
1B	12	3932-61	3/4 Nut, Casing	Stl
1C	12	3862-76	3/4X85 Stud, Casing	Stl
1D	1	8505-04-01	3/8 Plug, Flush Line	Stl
1E	1	8505-04-01	1/2 Plug, Flush Line	Iron
2*	1	See Below	Impeller	High-Chrome A05
2A	1	19110-72	46.2X1.8 Seal, Impeller	Viton
2B	1		Washer, Impeller	Stl
2C	1		Bolt, Impeller Lock	Stl
3*	1	22223-01-30	Stuffing Box, Mech, Seal	High-Chrome A05
3*	1	20614-01-30	Stuffing Box, Packed	High-Chrome A05
3A	2	3861-117	Bolt, Stuffing Box	Stl
4	1	20622A	Gland Assy, Packing	Bronze
5	1	22451-1	Seal, Mechanical	Tungsten Carbide
5A	3	25014-04M-B	12X12Packing, Shaft	Kevlar
6	2	B3701A	Bolt Assy, Gland	Stl
7	1	20612-02-33	Shaft	AISI 4140
7A	1	20943-21	Sleeve, Shaft (M.S.Pump)	AISI E7140
7B	1	4372-5-21	Key, Shaft	416SS
7C	1	23444-01-72	51.5X2.65 Seal, Shaft Sleeve	Viton
8	1	22210-1-A	Deflector Assembly	Bronze
8A	1		63X2.65 Seal, Shaft Sleeve	Viton
9	1	20618-12-1	Frame, Grease Lubricate	Cast Iron
9A				
9B				

<b>HIGH-CHROME MAGENUM I ATERNATIVE TYPE PARTS LIST</b>				
Item	Qty	Part Number	Description	Material
9C	1	8505-05	1/2 Plug, Frame Drain	Iron
9D	1	8267-01	Breather	Stl
9E				
9F				
9G	3	2538-1A	Bolt, Casing Jack	Stl
10A	1	20626	Cover, Inboard Bearing	Iron
10B	1	20625	Gasket, I.B. Brg. Cover	Vegetable Fiber
10C	2	20619-01	Oil Seal, I.B. Brg. Cover	Buna-n
10D	2	3861-1	Bolt, I.B. Brg. Cover	Stl
10E	2	3932-2	Nut, I.B. Brg. Cover	Stl
10F				
10G	1	21641-01	NPT1/8 Grease Fitting	Stl
11	1	N/A	NUP313E Bearing, Inboard & Spacer	Vendor
12	1	20624-01-01	Housing, O.B. Bearing	Iron
12A	1	7496-253	140X3.55 Seal, O.B. Brg. Housing	Buna-n
12B	4	3861-138	Bolts, O.B. Brg. Housidng	Stl
12C	2	3932-62	Nut,O.B. Brg. Housidng Jam	Stl
13	1	20617-01-01	Cover, O.B. Bearing	Iron
13A	1		NPT1/8 Grease Fitting	Stl
13B	1	7496-26	O-ring, O.B. Bearing Cover	Buna-n
13C	1	20619-02	Oil Seal, O.B. Brg. Cover	Buna-n
13D	2	3861-139	Bolt, O.B. Brg. Cover	Stl
14	1	N/A	7311B/DB Bearing, O.B.(2Brg. Set)	Vendor
14A	1	6124-4	Lock Washer, O.B. Bearing	Stl
14B	1	6123-4	Locknut, O.B. Bearing	Stl

**FIRST PUMPS** High Chrome Centrifugal Mud Pump (**Magnum I Alternative Type**)

Casing					Impeller				
1*	1	19203-01-30A(A05)	Casing 3X2X13	High-Chrome A05	2*	1	19204-XX-30(A05)	Impeller 3X2X13	High-Chrome A05
1*	1	19205-01-30A(A05)	Casing 4X3X13	High-Chrome A05	2*	1	19206-XX-30(A05)	Impeller 4X3X13	High-Chrome A05
1*	1	19222-01-30A(A05)	Casing 5X4X11	High-Chrome A05	2*	1	19224-XX-30(A05)	Impeller 5X4X11	High-Chrome A05
1*	1	19122-01-30A(A05)	Casing 6X5X11	High-Chrome A05	2*	1	19121-XX-30(A05)	Impeller 6X5X11	High-Chrome A05
1*	1	19123-01-30A(A05)	Casing 6X5X14	High-Chrome A05	2*	1	19121-XX-30(A05)	Impeller 6X5X14	High-Chrome A05
1*	1	19763-01-30A(A05)	Casing 8X6X11	High-Chrome A05	2*	1	19121-XX-30(A05)	Impeller 8X6X11	High-Chrome A05
1*	1	19117-01-30A(A05)	Casing 8X6X14	High-Chrome A05	2*	1	19116-XX-30(A05)	Impeller 8X6X14	High-Chrome A05
1*	1	20937-01-30A(A05)	Casing 10X8X14	High-Chrome A05	2*	1	21867-XX-30(A05)	Impeller 10X8X14	High-Chrome A05

XX-Impeller Code - First X equals diameter of impeller in inches minus 4. Therefore 10"=6,9"=5,8" =4, etc... 14" use letter A.

Second X equals fractional data in 1/8's. Therefore 1/8"=1, 1/4"=2, 1/2"=4, etc... Thus a 10.5" impeller is coded as 64, a 12" impeller is coded as 80, a 13.25" impeller is coded as 92 etc...

Notes:

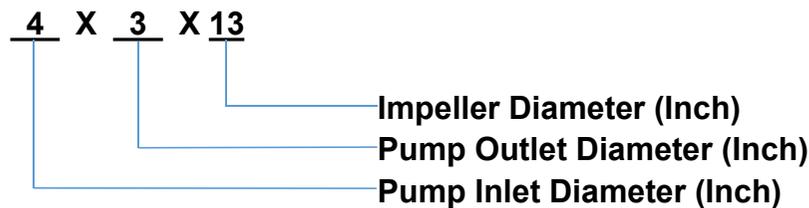
\* - Casings, Impellers and Stuffing Boxes are also available as hard iron.

# - Used for pumps equipped with mechanical seal only.

& - Used for pumps equipped with packing only.

! - Used for oil lubricate pumps only.

**Explanation of model**



**PUMP PERFORMANCE TABLE**

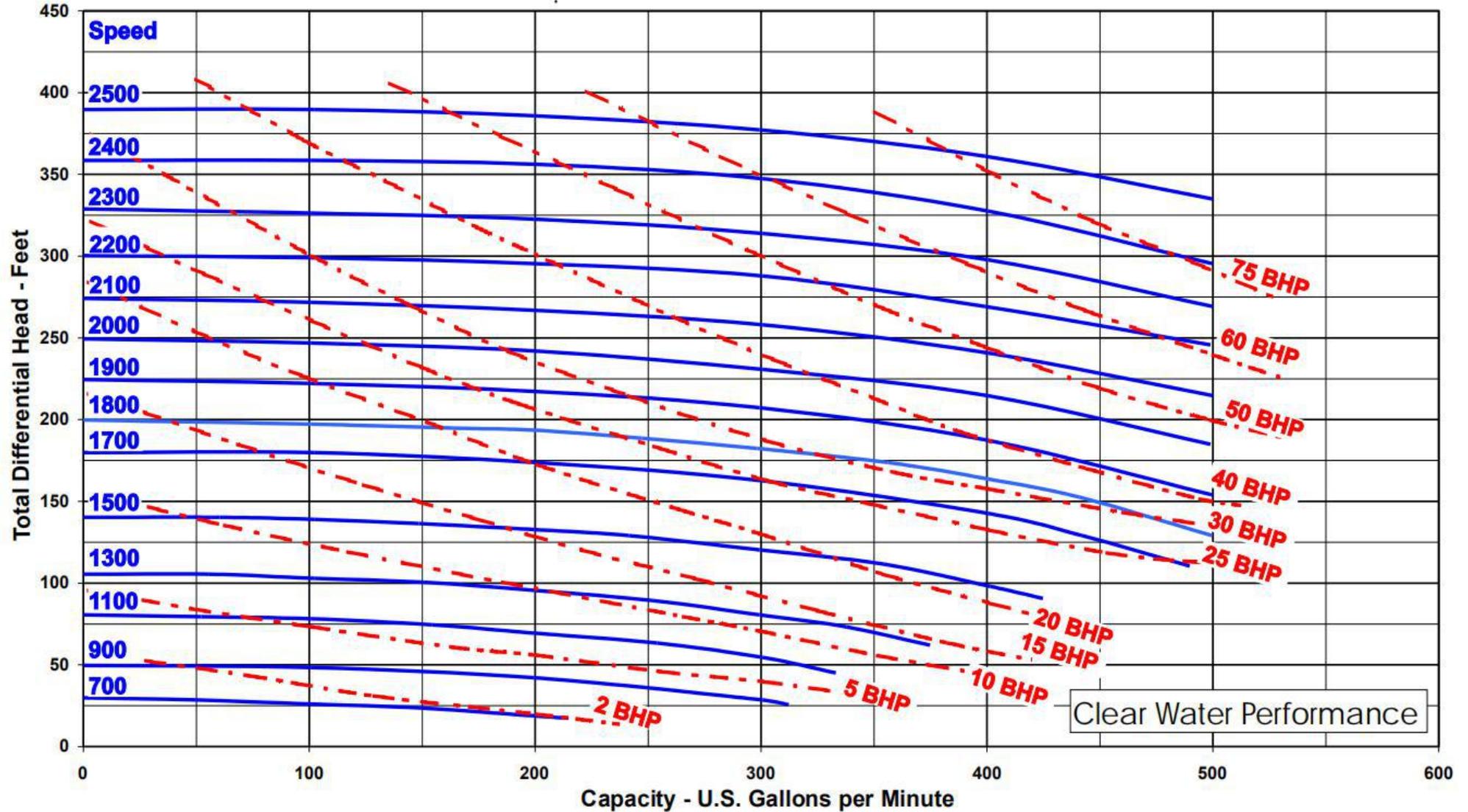
Model	Capacity (m <sup>3</sup> /h)	Head (m)	Speed (RPM)	Efficiency (%)	[NPSH]r (m)	Power	
						Shaft (KW)	Motor (KW)
8×6x14	256	43	1450	64	4.0	46.8	75
	320	40		65		53.63	
	416	35		64		61.9	
8×6x13	232	35	1450	60	4.5	36.8	55
	290	33		64		40.7	
	377	28		65		44.2	
8×6x12	216	30	1450	61	4.5	28.9	45
	270	28		64		32	
	351	26		67		37.1	
8×6x14I	160	43	1450	61	3.2	30.7	55
	200	40		62		35.1	
	260	33		51		38.3	
8×6x13I	144	37	1450	57	3.0	25.4	45
	180	34		60		27.8	
	230	29		55		33.6	
8×6-12I	128	32	1450	57	3.0	19.6	30
	160	30		60		22	
	208	25		57		24.8	
6×5-14	160	43	1450	61	3.2	30.7	55
	200	40		62		35.1	
	260	33		51		38.3	
6×5-13	144	37	1450	57	3.0	25.4	45
	180	34		60		27.8	
	234	29		55		33.6	
6×5-12	128	32	1450	57	3.0	19.6	30
	160	30		60		22	
	208	25		57		24.8	
6×5-11	160	23	1450	59	2.5	17	30
	200	21		62		18.5	
	260	20		62		22.8	
6×5-9	128	13	1450	55	3.0	8.2	15
	160	12		58		9.02	
	208	10		59		9.6	
5×4-14	96	43	1450	51	4.6	22	37
	120	40		56		23.3	
	156	34		57		25.3	

Model	Capacity (m <sup>3</sup> /h)	Head (m)	Speed (RPM)	Efficiency (%)	[NPSH]r (m)	Power	
						Shaft (KW)	Motor (KW)
5×4-13	72	42	1450	53	4.5	15.5	30
	90	40		56		17.5	
	117	37		60		19.6	
5×4-12	72	32	1450	56	4.5	11.2	22
	90	30		56		13.1	
	117	27		55		15.6	
5×4-11	72	26	1450	55	4.5	9.3	18.5
	90	24		56		10.5	
	117	21		53		12.6	
5×4-10	68	24	1450	56	4.2	7.9	15
	85	20		56		8.4	
	110.5	15		40		11.2	
5×4-9	64	23	1450	56	4.5	7.2	15
	80	19.5		54		7.9	
	104	16		47		9.6	
4×3-13	40	42	1450	46	4.5	9.9	18.5
	50	40		48		11.3	
	65	36		53		12.0	
4×3-12	36	32	1450	46	4	6.8	15
	45	30		47		7.8	
	58.5	27		51		8.4	
4×3-11	40	26	1450	46	4	6.1	11
	45	24		46		6.4	
	57	21		49		6.7	
3×2-13	20	37	1450	39	3	5.2	11
	25	35		40		5.9	
	32.5	31		39		7.0	
3×2-12	18.4	34	1450	39	3	4.4	7.5
	23	29		39		5.1	
	30	23		42		5.6	
3×2-11	16	25	1450	38	3	2.9	5.5
	20	23		39		3.2	
	26	20		38		3.7	

**PUMP PERFORMANCE CURVE**

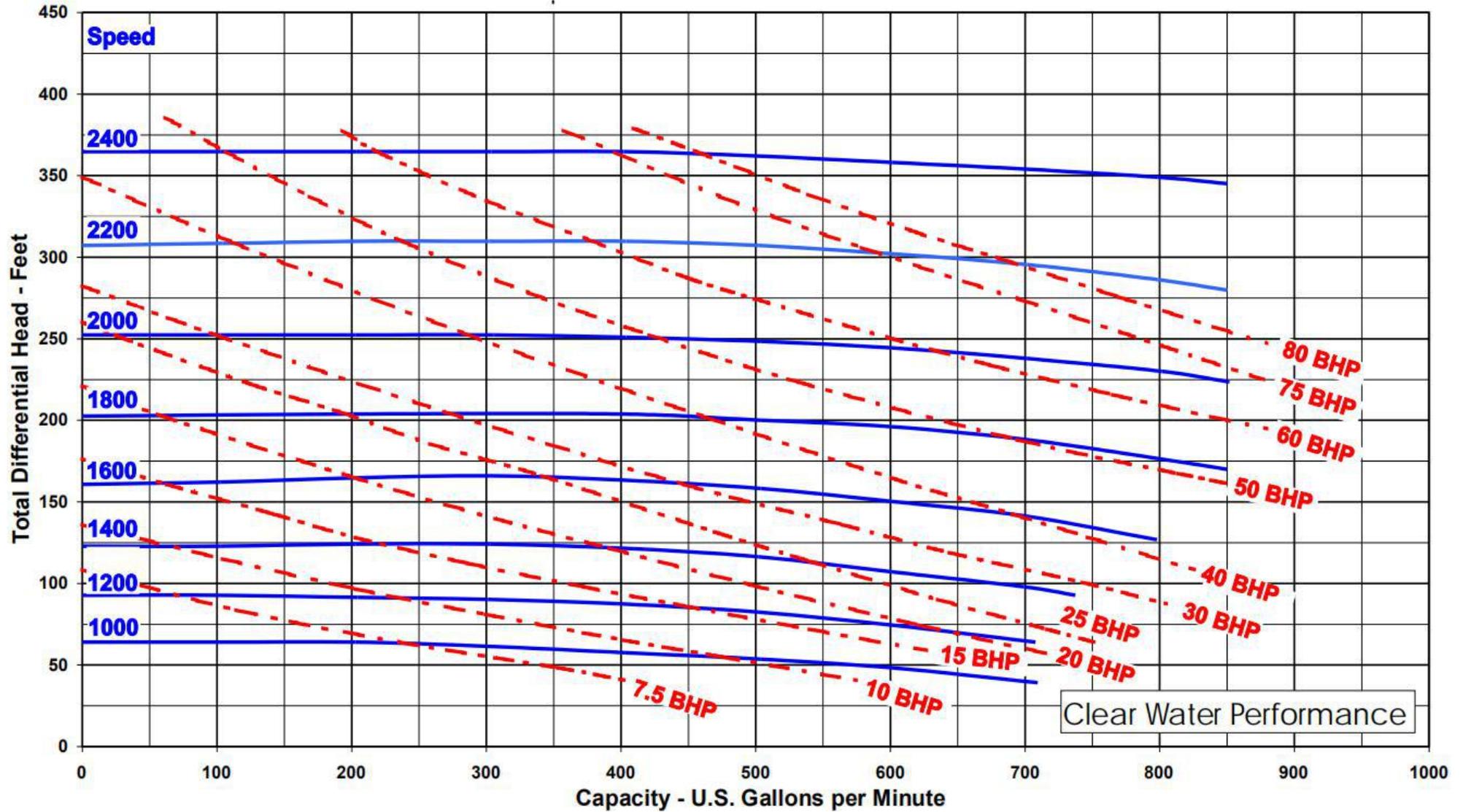
HIGH-CHROME MAGENUM I ALTERNATIVE TYPE

3X2X13 IMP. DIA.: 13"



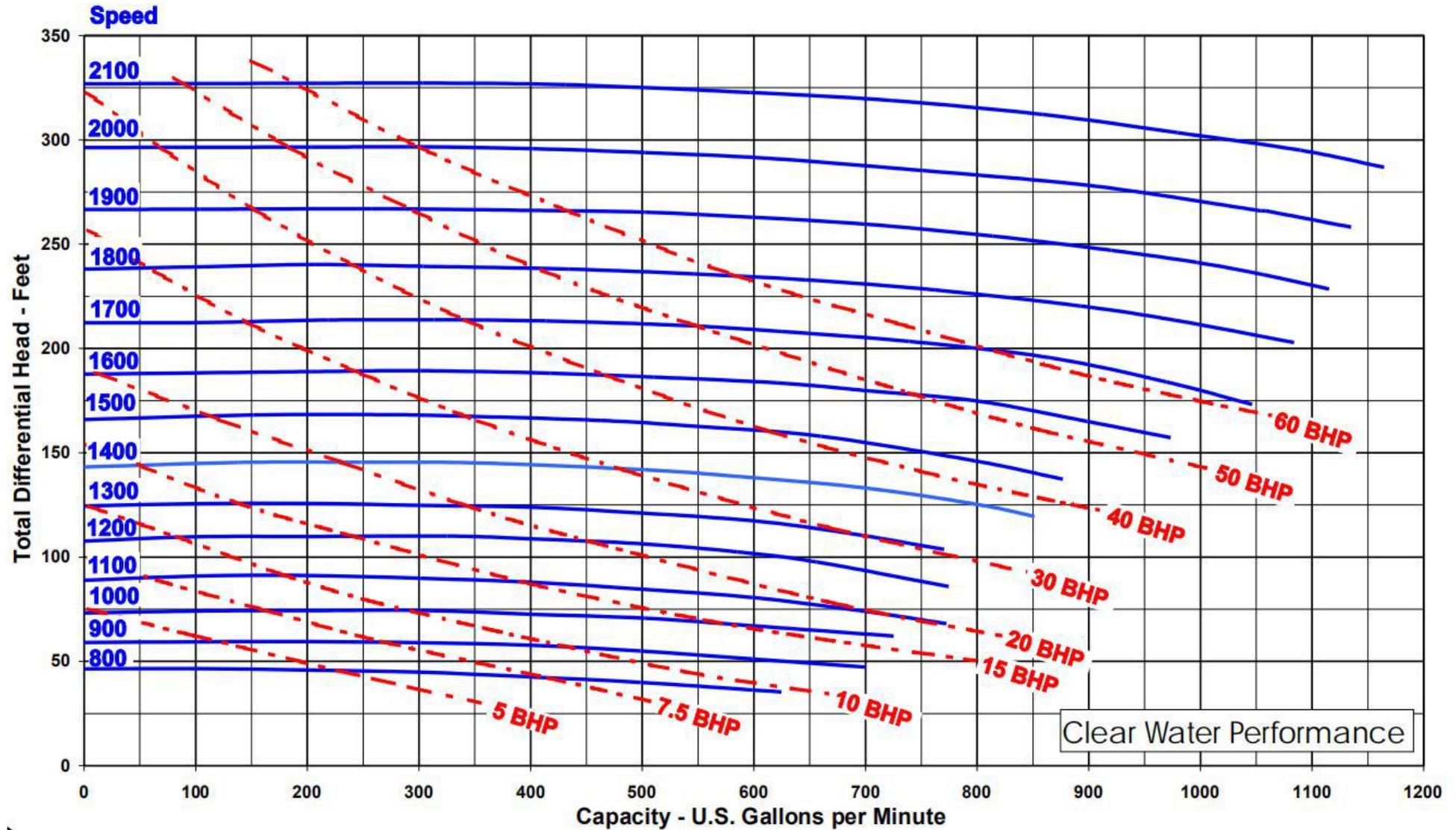
HIGH-CHROME MAGENUM I ALTERNATIVE TYPE

4X3X13 IMP. DIA.: 13"



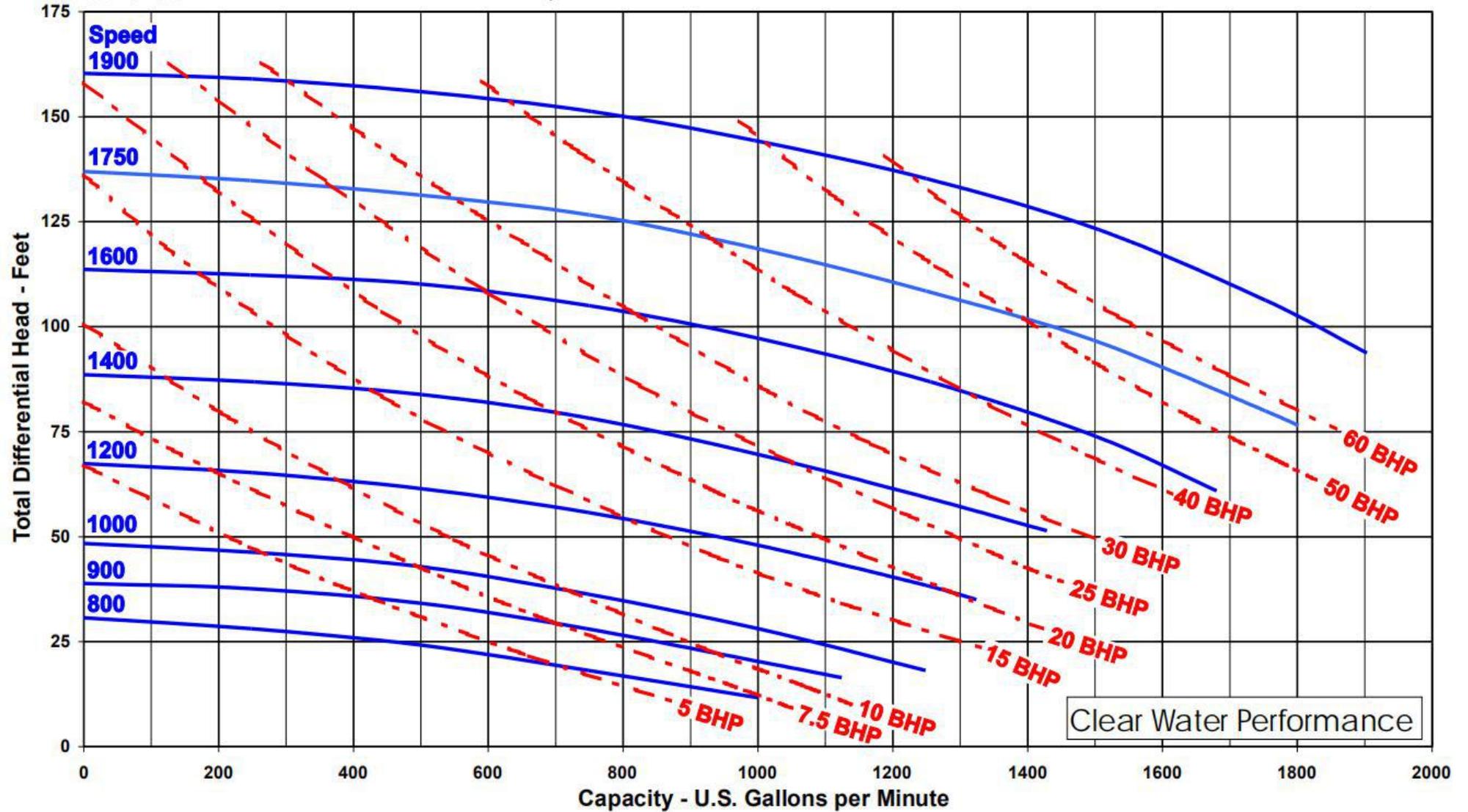
HIGH-CHROME MAGENUM I ALTERNATIVE TYPE

5X4X14 IMP. DIA.: 14"



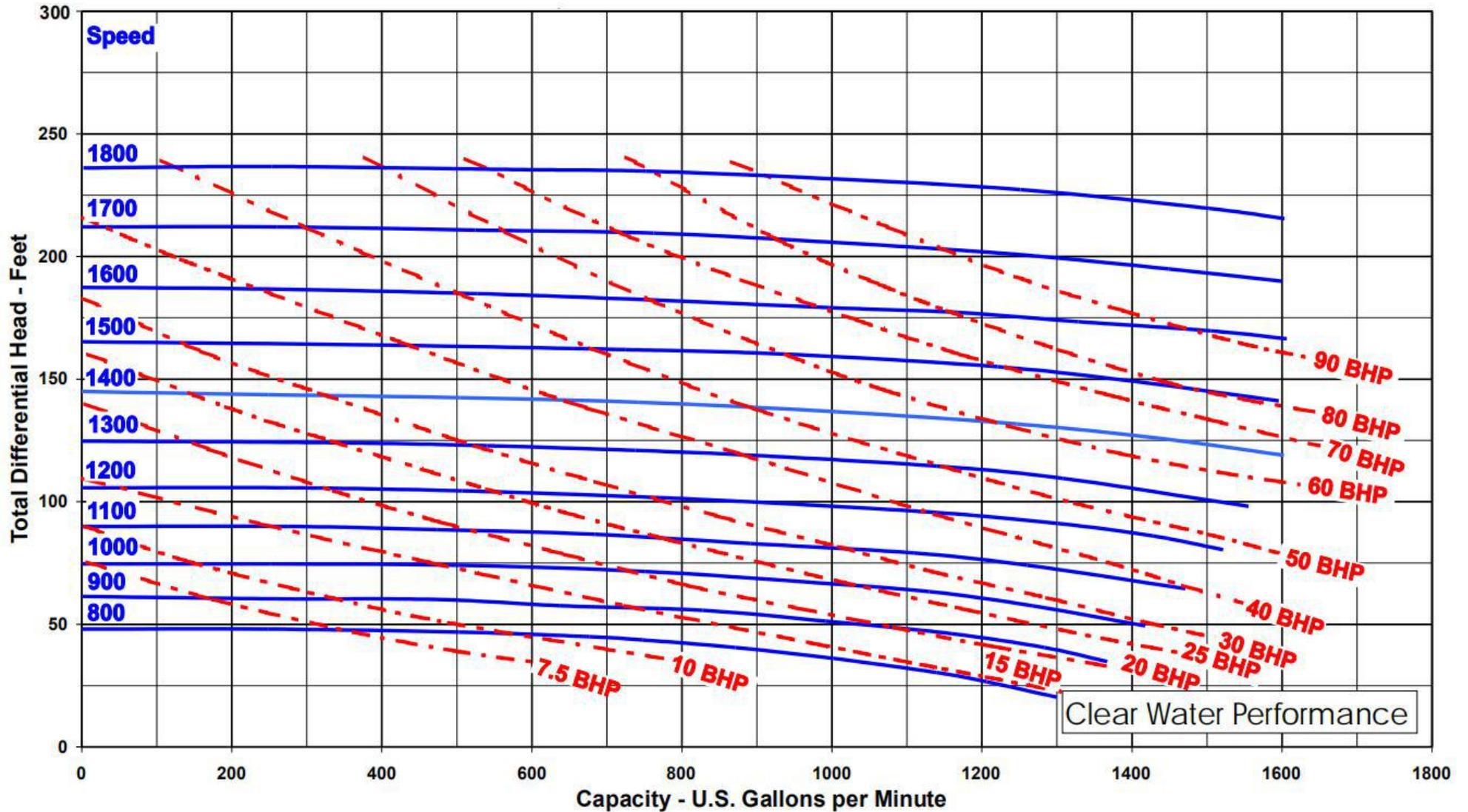
HIGH-CHROME MAGENUM I ALTERNATIVE TYPE

6X5X11 IMP. DIA.: 11"



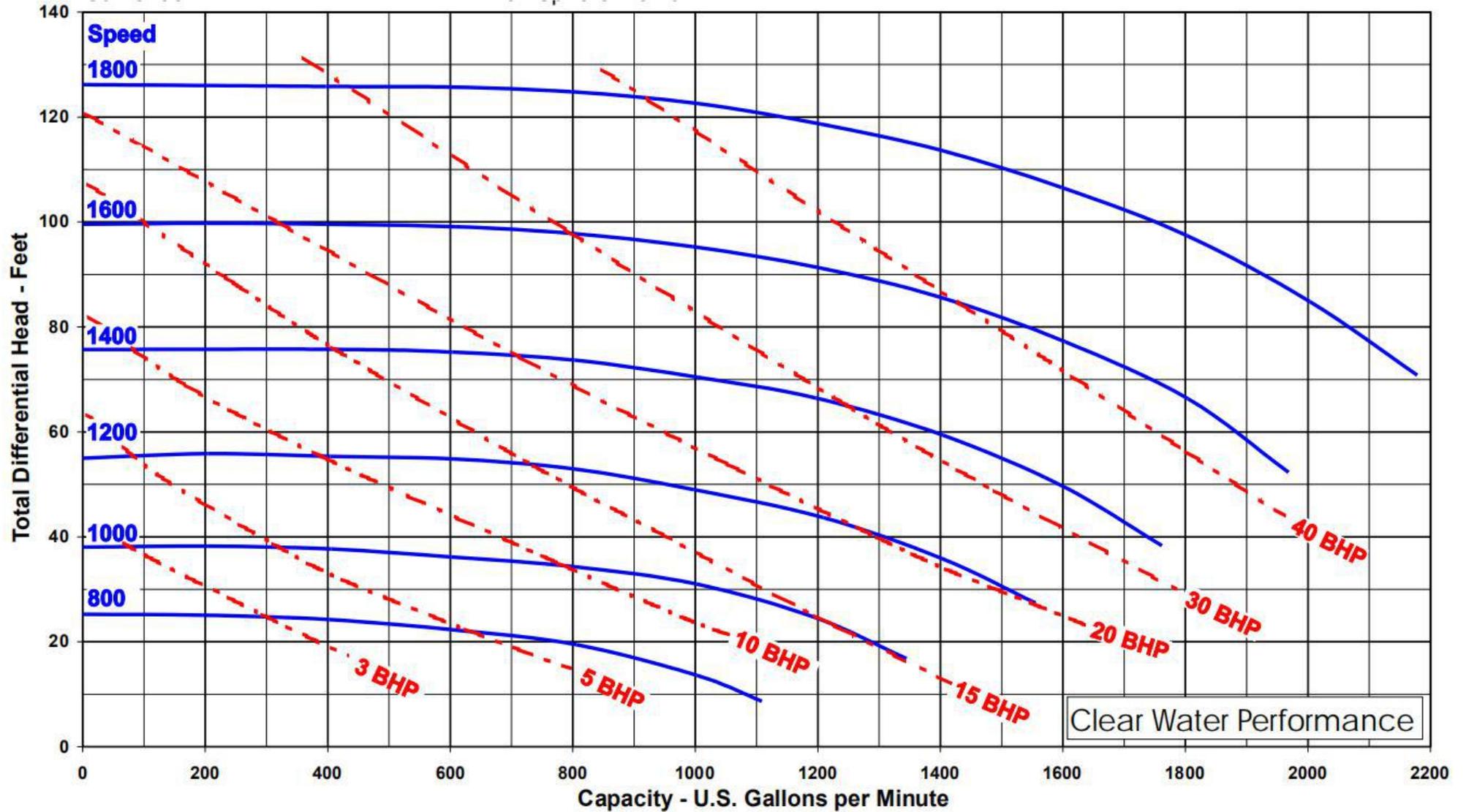
HIGH-CHROME MAGENUM I ALTERNATIVE TYPE

6X5X14 IMP. DIA.: 14"

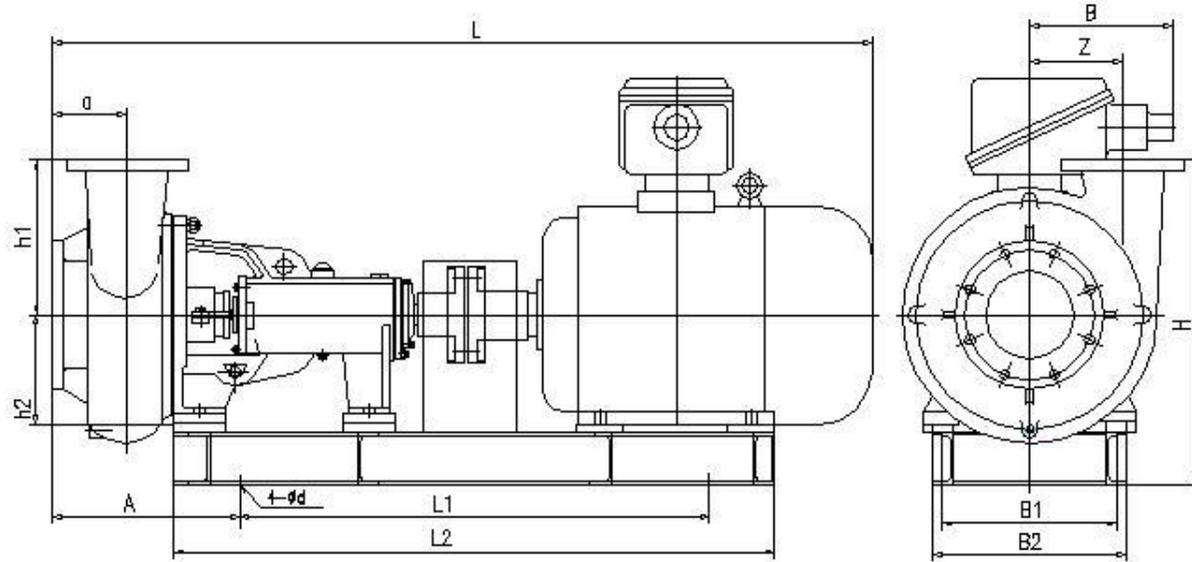


HIGH-CHROME MAGENUM I ALTERNATIVE TYPE

8X6X11 IMP. DIA.: 11"



**FIRST PUMPS** High Chrome Centrifugal Mud Pump (**Magnum I Alternative Type**)



Pump model	Necessary motor		Contour Dimensions						Main Installation Dimensions						
	Model	KW	L	H	B	L2	h <sub>1</sub>	h <sub>2</sub>	a	A	L1	B1	B2	z	n-d
8×6-14	Y280S-4	75	1969	774	330	1458	356	227	173	550	940	457	500	214.3	4-24
8×6-13	Y250M-4	55	1894	744	330	1389	356	227	173	433	1085	406	450	214.3	4-24
8×6-12	Y225M-4	45	1837	721	290	1320	356	227	173	400	1085	356	400	214.3	4-24
8×6-14I	Y250M-4	55	1894	744	330	1389	356	227	173	433	1085	406	450	214.3	4-24
8×6-13I	Y225M-4	45	1837	721	290	1320	356	227	173	400	1085	356	400	214.3	4-24
8×6-12I	Y200L-4	30	1761	721	290	1266	356	227	173	447	1020	318	360	214.3	4-24
6×5-14	Y250M-4	55	1867	668	330	1389	280	227	146	406	1085	406	450	152.4	4-24
6×5-13	Y225M-4	45	1810	645	290	1320	280	227	146	373	1085	356	400	152.4	4-24
6×5-12	Y200L-4	30	1734	645	290	1266	280	227	146	420	1020	318	360	152.4	4-24
6×5-11	Y200L-4	30	1731	645	290	1266	279	227	146	417	1020	318	360	152.4	4-24
6×5-9	Y160L-4	15	1625	645	240	1181	279	227	146	428	800	284	330	152.4	4-24
5×4-14	Y225S-4	37	1749	685	290	1295	320	227	125	338	1085	356	400	191	4-24

**FIRST PUMPS** High Chrome Centrifugal Mud Pump (**Magnum I Alternative Type**)

Pump model	Necessary motor		Contour Dimensions						Main Installation Dimensions						
	Model	KW	L	H	B	L2	h <sub>1</sub>	h <sub>2</sub>	a	A	L1	B1	B2	z	n-d
5×4-13	Y200L-4	30	1697	685	290	1266	320	227	125	383	1020	318	360	191	4-24
5×4-12	Y180L-4	22	1648	685	240	1225	320	227	125	447	800	279	325	191	4-24
5×4-11	Y180M-4	18.5	1617	644	240	1187	279	227	125	436	800	279	325	160	4-24
5×4-10	Y160L-4	15	1581	646	240	1181	279	227	125	384	800	284	330	160	4-24
5×4-9	Y160L-4	15	1581	646	240	1181	279	227	125	384	800	284	330	160	4-24
4×3-13	Y180M-4	18.5	1597	625	240	1187	260	227	108	416	800	279	325	171.5	4-24
4×3-12	Y160L-4	15	1561	627	240	1181	260	227	108	365	800	284	330	171.5	4-24
4×3-11	Y160M-4	11	1520	627	240	1137	260	227	108	364	800	284	330	171.5	4-24
3×2-13	Y160M-4	11	1504	627	240	1137	260	227	95	348	800	284	330	177.8	4-24
3×2-12	Y132M-4	7.5	1398	627	240	1055	260	227	95	348	800	270	314	177.8	4-24
3×2-11	Y132S-4	5.5	1358	627	240	1017	260	227	95	348	800	270	314	177.8	4-24

■ **Installation**

● Pump is installed closely to the drawing resource as best you can, in order to shorter the length of suction pipeline and reduce its loss. Sure to install the pump under the horizontal line of drawing resource because of its bad self-priming Character.

● Firstly pour the concrete foundation, place " T " type channel iron when pouring, and install skid base after the concrete freezing. All the bases are required to be level in order to avoid the machine shaking.

● **Coupling installation**

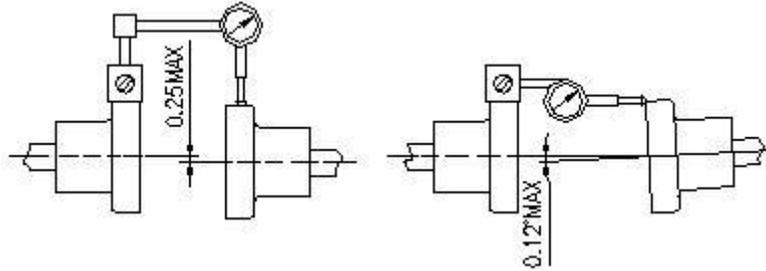
◆ Coupling must be concentric with Shaft, the two axes must be aligned and its error limits: The value of parallel deviation cannot be over 0.25; the

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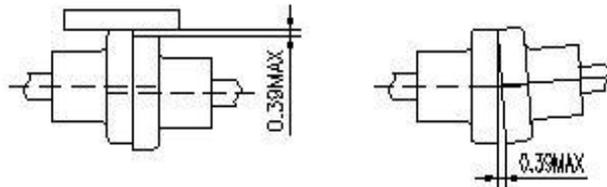
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value of intersection angle error of the two axes cannot be over 0.12.

◆ Check: Checking the two errors by percentage meter with pedestal (As fig. shown). Its two touches must keep close to the outside circle surface or face of the coupling and rotate slowly when checking. Take the max reading shown on the meter as error value.



◆ Adjustment: It needs to be adjusted to the range of error if the checked result goes beyond. When adjusting axes, the two couplings must be aligned through pump, tightening or loosening the bolts on the motor and padding iron. Take clearance gauge to check when checking (As fig. shown) and require that the clearance value cannot be over 0.39.



### ● Installation of the suction pipeline

◆ The sectional area of the suction pipeline is no less than pump flowing channel's.

◆ Not to be allowed to install throttle valve, along the suction pipeline, but can install a opening valve in order to reduce liquid flow chaos and the valve is closed only when unloading pump for overhaul.

◆ To avoid producing bubbles in the suction pipeline should transit gradually from high to low between the drawing resource and pump. Please take

## **FIRST PUMPS** High Chrome Centrifugal Mud Pump (**Magnum I Alternative Type**)

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vacuum pump or foot valve to prime if you require the pump to work under the suction head condition.

- ◆ The pipeline at the entrance of pump must be level and straight, its length is two times at least as much as the diameter of suction pipeline.

- ◆ When temporarily taking flexible pipe as suction pipeline, sure to guarantee it against compression. Because the pressure in suction pipe is lower than atmospheric pressure, the flexible pipe is compressed by atmospheric pressure and this will result in reducing capacity even cutting off flow.

- Installation of outlet pipeline

- ◆ The outlet pipeline should be installed the opening valve that it is easy to pump's overhaul.

- ◆ All the pipeline (including inlet pipeline) must have their struts, not allowing their weight to load on pump.

- ◆ A throttle valve must be installed along outlet pipeline when the conditions of work are not clear or stable, this can guarantee operation at the design point.

- ◆ When pump's outlet is connected with pressure equipments, sure to install a check valve between the throttle valve and pump's outlet in order to prevent from liquid back flowing, otherwise the back flowing liquid will result in loosening of impeller.

- Mechanical seal

- ◆ It is installed, adjusted and tested by manufacturer. Sure to draw cooling liquid and lubricating liquid into it as using, and guarantee the cool lubricating liquid to be drawn into the mechanical seal reliably before the pump operation, the used cooling lubricating liquid must be clean and clear.

- Use

- Emphases

- ◆ The pump is only used in the range of design.

- ◆ Packing cannot be too tight, sure to guarantee some leakage for lubrication.

- ◆ Sure to maintain the mechanical seal according to the guide.

- ◆ Sure to let out the liquid in the pump when not rwpning and wash clear water or the pump maybe damaged when it run again.

## **FIRST PUMPS** High Chrome Centrifugal Mud Pump (**Magnum I Alternative Type**)

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### ● Preparations

- ◆ Check the rotating direction (The wrong rotating direction will result in impeller loosening and suffering heavy damage to pump).
- ◆ Rotating pump shaft by hands, sure to guarantee easy to rotate.
- ◆ Fully open the valve of inlet part.
- ◆ Fully pour casing and inlet pipeline by liquid in order to eliminate air in them.
- ◆ Open packing seal cavity and cooling water pipe of other positions.
- ◆ Open the valve of outlet pipeline a little.

### ● Operating

- ◆ Start motor after finishing all the preparations.
- ◆ Gradually open the outlet throttle valve after the pump pressure is stable, close the outlet valve if no liquid flowing out, gradually open it again after pressure is stable and until capacity is normal.
- ◆ When using mechanical seal, don't close the inlet & outlet valves during normal operation, otherwise will result in damage on seal parts surface by pounding or overheating of flowing liquid.

### ● Lubrication

- ◆ Bearing lubrication
- ▲ Grease lubrication

Because the bearings used for the pump have been applied lubricating grease by pump manufacturer according to forms , it doesn't need to apply lubricating grease under the low speed and low temperature (compared with 120℃) conditions in the course of operating the pump. Bearing must be applied regularly by lubricating grease under the high loading and high temperature (compared with 120℃) conditions, in order to guarantee its using life. Sure to select the lubricator which can dissolve with original used lubricating grease for the pump regularly applied grease, otherwise the lubricating

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effect is bad and bearing's life is affected.

Pouring Tool: standard manual grease gun. Lubricating Period and Amount: For the pump operating day and night, once per week and five guns each time to every bearing, also can pour once per month and twenty guns each time to every bearing, for the pump operating eight hours in a day and night, once per three weeks and five guns each time to every bearing.

▲Oil lubrication: check once every day and pour lubricating oil according to requirement when necessary.

◆Packing cavity lubrication

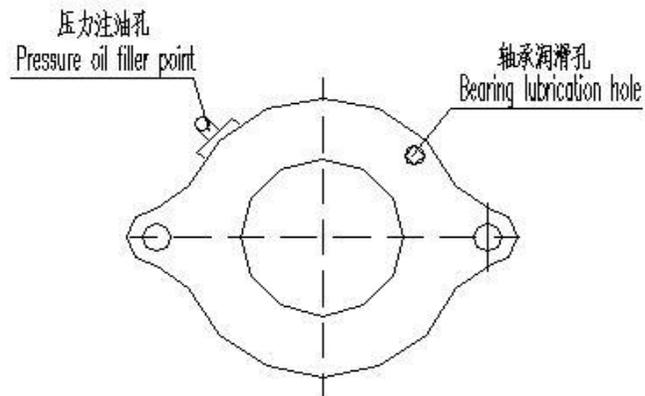
▲Packing cavity must be lubricated usually in order to prevent packing from damaging because of overheating, usually require once every day.

▲Sure to rotate the pump shaft when pouring lubricating grease, in order that the grease can get into packing cavity fully until have grease oozed out from gland.

▲Under the normal condition use general lubricating grease, you had best use heavy water lubricating grease for pump if too much leakage loss.

◆Inboard face seal lubrication

▲The position of pouring: The pressure oil filler point is at the left top corner of inboard bearing cover (see Fig.)



▲Lubricating grease: General grease or heavy water grease used for pump.

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▲ Pouring period and amount: Once and more per week, five guns every time.

▲ If the grease piling up in seal cannot clear away automatically that it will result in reduction of lubricating effect, so you should guarantee the reliability of pressure oil device.

### ■ **Maintenance**

● Dismantlement

◆ Dismantle gland set

◆ Dismantle casing

◆ Dismantle impeller: If no impeller wrench, you must take the wooden cushion and hammer to strike the reinforcements at the back of impeller, and withdraw impeller from shaft in the counter clockwise direction (Looking from the front of impeller) when dismantling, you should firstly wedge shaft at coupling end in order to prevent from rotating.

◆ Dismantle seal cover, strike the connected location of cover and frame by wooden hammer, and separate from (Note: Don't dismantle the mechanical seal stationary ring if the purpose of dismantlement isn't change of mechanical seal).

◆ Withdrawing gland ring from packing cavity.

◆ Withdrawing shaft sleeve, if the sleeve is too tight you can strike its end (at shaft shoulder) by contact block for loosening (Note: Don't dismantle the rotating ring of mechanical seal if the purpose of dismantlement isn't change of mechanical seal. Can't damage the rotating ring when dismantling sleeve, by the end of this to dismantlement if only for installation or change of mechanical sleeve).

◆ Withdrawing defector assembly.

◆ Withdrawing the set of bearing and shaft from frame.

◆ Dismantling outboard bearing cover.

◆ Loosening lock padding place and dismantling locknut and lock washer.

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◆ Dismantling frame and withdrawing outboard bearing (Pad a padding block and strike its axle center). Withdrawing inboard bearing (Take a 3" muff to align inside circle of bearing and strike another end of muff).

### ● Checking

◆ Impeller: Sure to change impeller if it has serious cavitations (main vanes in particular), over corrosion, wear and tear and breakage.

◆ Shaft: When radial positive tolerance exceeds 0.55, bearing housing and the position of oil seal are scratched seriously and shaft surface is damaged, you are required to repair and maintain, but when no measures of doing it, you must change shaft.

◆ Shaft sleeve: Sure to change sleeve when its surface is rough and damaged seriously.

◆ Mechanical seal: seal face, gasket and shaft seal, etc parts must be undamaged, otherwise will result in over leakage, sure to change parts with wear and tear or damage.

◆ Ball bearing: For bearing that it is too wearing, and too tight, loose or with noise when operating, sure to change it (Note: New bearing packet is opened only when changing, the changed bearing must be the same model and size as original bearing).

◆ O seal: usually the dismantled O seal should be changed totally, but the gasket, etc without breakage also can be reused.

### ● Assembly (see the sectional drawings & parts list)

◆ All the parts and moveable ring of mechanical, O seal groove, thread, seal face, bearing and the lubricating location of bearing in particular must be cleaned before assembly. Also should polish the rough location by soft gauze.

◆ When installing outboard bearing, two bearings should be back to back, sure to buckle the lock washer after screwing plug locknut and the Locking force of locknut is 346N.m.

◆ Surely applying a thin layer of antifriction when installing sleeve.

◆ The clearance value is 0.51 between the seal cover and the back of impeller.

◆ The locking force of each bolt and nut is 195N.m.

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- ◆ Packing gland can't be screwed too tight, keep liquid leaking drop by drop, otherwise it maybe cause to packing burn down.
- ◆ The assembly order is opposite to dismantlement, shaft should rotate easily after assembly.

**■ Breakdowns and elimination**

- When packing seal leaking, packing and sleeve surface are worn seriously.

◆ Dismantle packing and take a crooked iron wire(90° )to move on the inside surface of sleeve, if too deep groove is checked out you must change sleeve, packing gland is too tight that it will result in wearing seriously.

- Packing burn down

- ◆ Elimination: Change packing

- ◆ Reason: The packing is too tight, so that no normal leakage.

- ◆ Appearance: The packing is hard and axial leakage increase rapidly.

- Unusual rotation of impeller

- ◆ Reason: The clearance between seal cavity and the back of impeller is too little.

- ◆ Elimination: Adjust the clearance (see the preceding).

- Breakdown of mechanical seal: Please contact manufacturer for solution.

**General Breakdowns Reason List.**

原因 Reason	噪音或 振动 Noise or vibration	断流 Cutting off flow	流量不够 Capacity insufficiency	压力不够 Pressure insufficiency	效率过低 (功率不够) Too low efficiency(Power insufficiency)	流量不稳 Capacity instability	轴承 寿命短 Short life of bearing
泵未注水 No pouring water to pump		×	×				
转速过低 Too low speed			×	×			

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原因 Reason	噪音或 振动 Noise or vibration	断流 Cutting off flow	流量不够 Capacity insufficiency	压力不够 Pressure insufficiency	效率过低 (功率不够) Too low efficiency(Power insufficiency)	流量不稳 Capacity instability	轴承 寿命短 Short life of bearing
扬程过高 Too high head		×	×				
有效汽蚀余量不够 [NPSH] <sub>r</sub> insufficiency	×	×	×			×	
叶轮堵塞 Impeller jam		×	×			×	
转向不对 Wrong rotating direction			×	×			
进口管路堵塞 Inlet pipeline Jam	×	×	×				
进口管路或阀过低 Inlet pipeline or valve too low		×	×				
叶轮破损 Impeller breakage		×	×	×			
轴封不良 Bad shaft seal			×	×			
叶轮直径过小 Too small impeller diameter			×	×			
液流含气量过大 Too much air in liquid				×		×	×
转速过高 Too high speed					×		×
扬程过低 Too low head					×		
介质比重过大 Too big specific gravity of medium			×		×		×
轴弯曲 Shaft crookedness	×				×		×
电机接线不对、电压不稳 Wrong wiring of motor & unstable voltage					×		×
转子干扰 Rotor disturbance	×				×		×

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原因 Reason	噪音或 振动 Noise or vibration	断流 Cutting off flow	流量不够 Capacity insufficiency	压力不够 Pressure insufficiency	效率过低 (功率不够) Too low efficiency(Power insufficiency)	流量不稳 Capacity instability	轴承 寿命短 Short life of bearing
进口管路或轴封泄漏 Inlet pipeline of shaft seal leakage		×	×			×	
轴中心线未对正 Axis is not aligned	×				×		×
轴承磨损 Bearing is worn	×						×
叶轮不平衡 Impeller disequilibria	×						×
进出口管路固定不良 Bad fixing of inlet & outlet pipeline	×						
地基不良 Bad foundation	×						
流量过大 Too big capacity	×			×	×	×	×
润滑不良安装不好 Bad lubrication & installation							×
叶轮间隙过大 Too big impeller clearance			×	×	×		