

Brochure For
KRS12X14 (14X12X22 XP Transformed TYPE)
HI-CHROME FRAC BLENDER DISCHARGE PUMP

FIRST PUMPS

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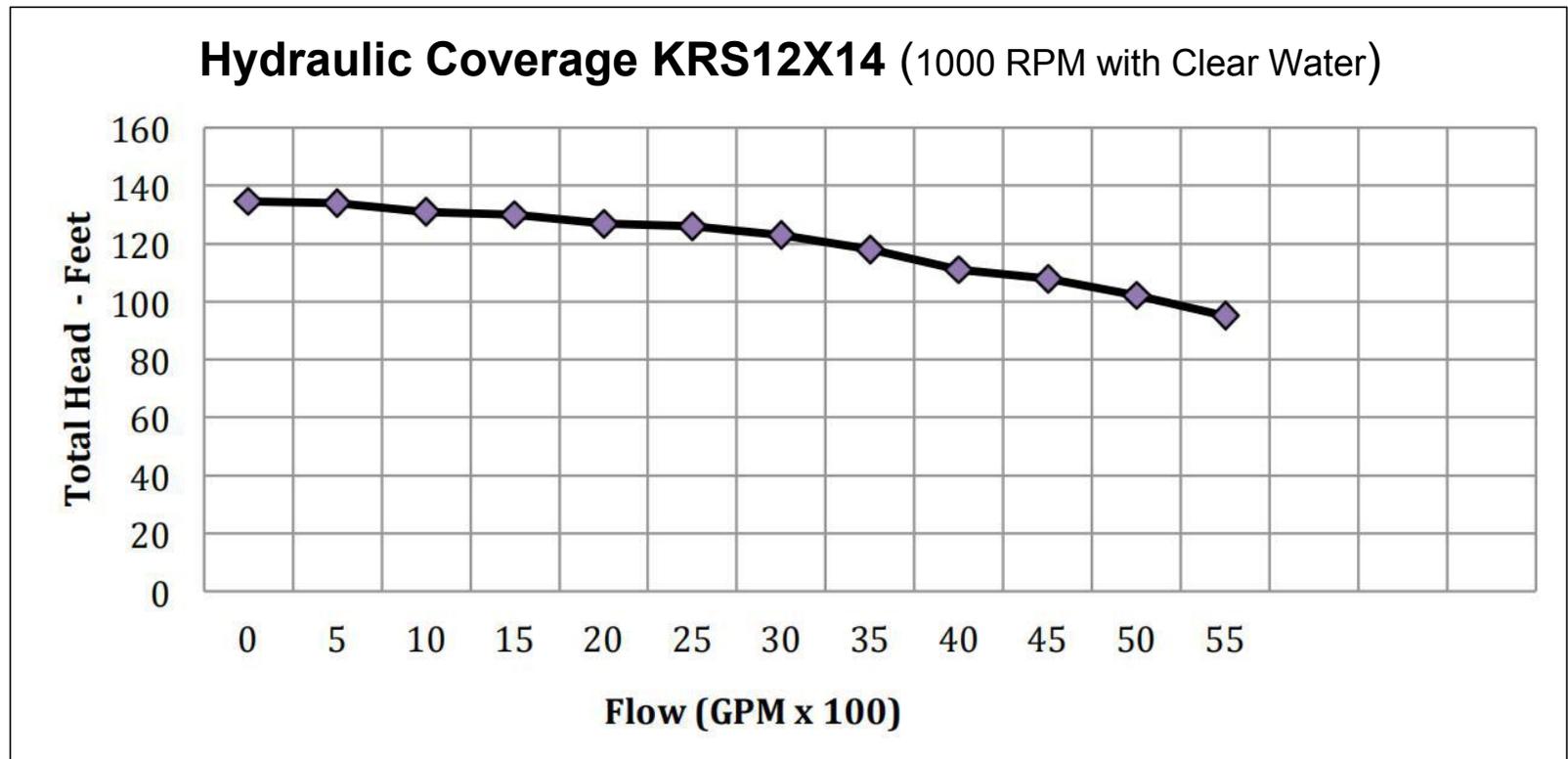
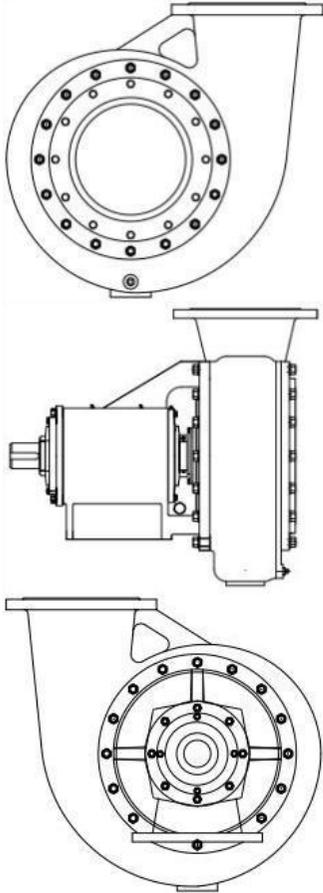
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KRS12X14

HI-CHROME FRAC BLENDER DISCHARGE PUMP

The KRS12X14 Hi-chrome blender pump was derived from the heavy duty slurry pump, with outstanding wear life, which is designed for the heaviest mill duties in mining industry. In virtue of robust performance and Ultra stable characters, KRS12X14 pump has transformed into the longest lasting and most reliable blender pump which handles abrasive proppant slurry with high sand content in oil and gas fracturing operations. All the durable parts of KRS12X14 pump can help you maximize reduce down time and minimize the maintenance cost.



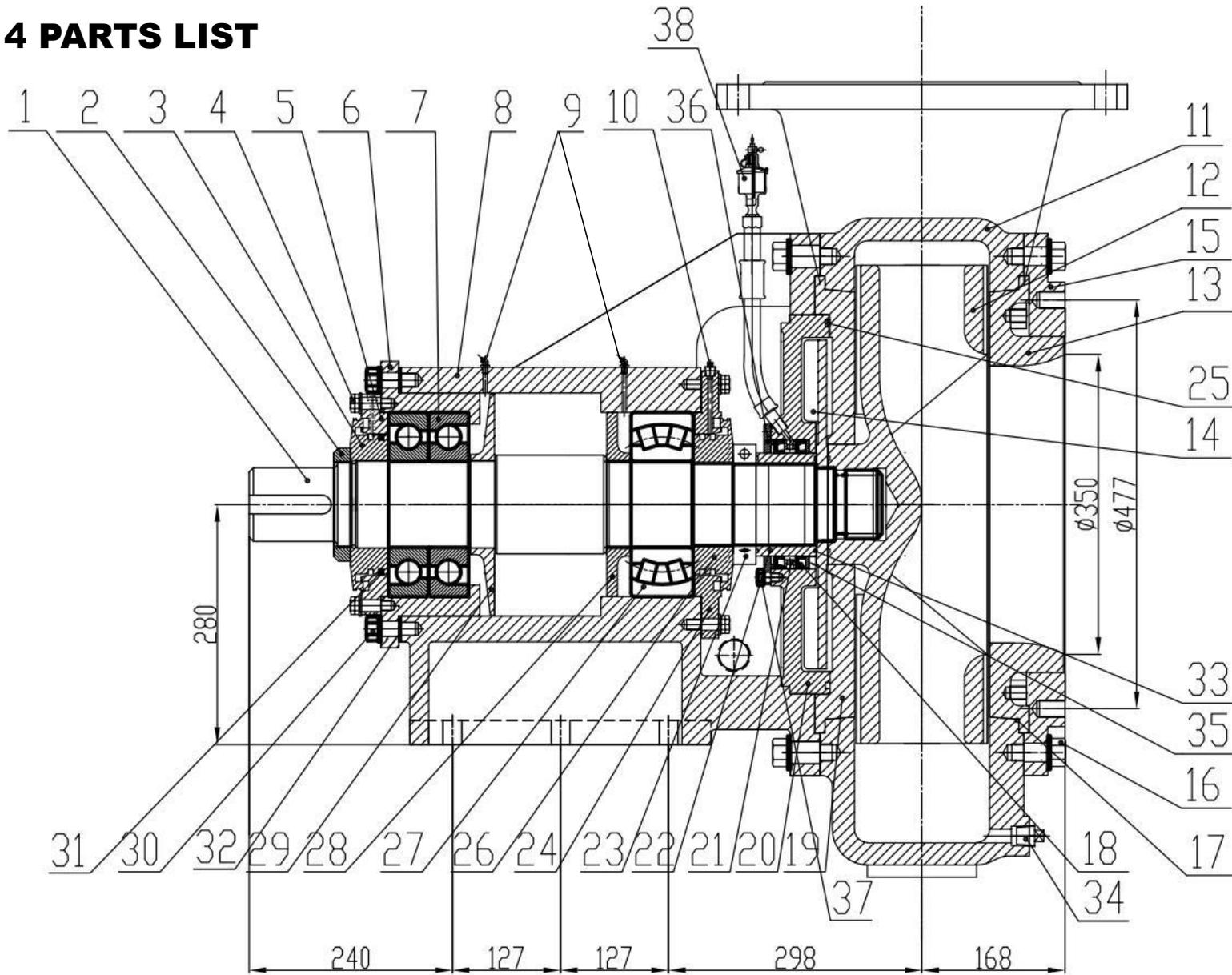
GENERAL INSTRUCTIONS

- **Maximum RPM Allowed 1,500RPM**
- (With the large shaft and large bearing used in this pump, the above limitations must be observed in order to control bearing running temperature. Operate the pump only in the performance range for which it was designed)
- **It is absolutely essential that the rotation of the motor is checked before connecting the shaft coupling.**
- A complete serial number record of every pump is maintained at Shijiazhuang First Pump Factory Co., Ltd. Information requested can be more quickly and accurately furnished if the size and serial number of the pump is given with your request.
- For any additional information not provided in this instruction brochure, contact us:
 - **Whatsapp: +86 13933194434**
 - **firstpumps@outlook.com**

KEY FEATURES

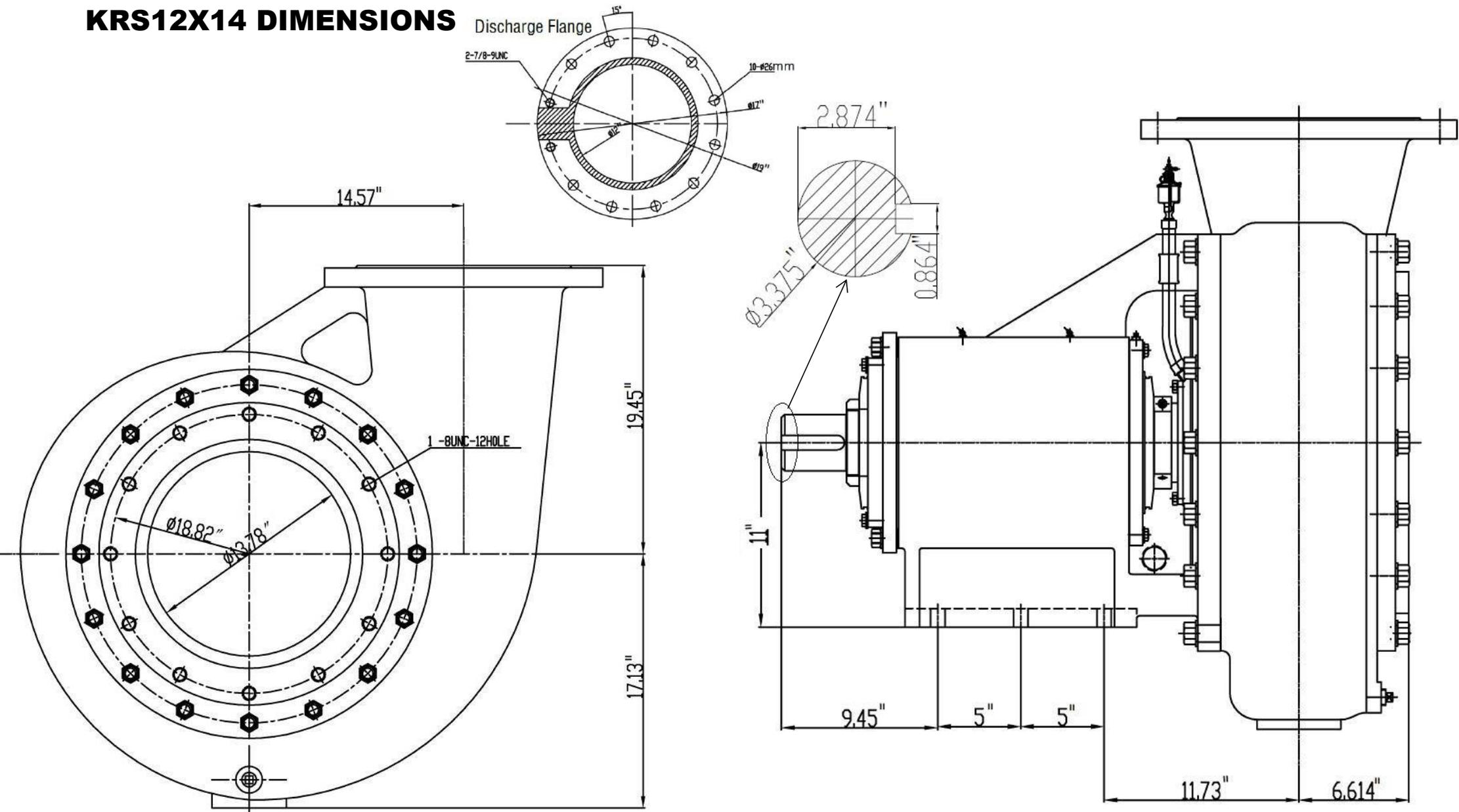
- **Frame** - Dimensionally interchangeable with existing 14X12XP pump, fits into 14X12X22 foot-print.
- **High Chrome Pump Parts** provide excellent wear life while maintaining efficiency during the wear cycle providing the best total operating cost.
- **Enclose Impeller** - Cast in impeller threads require no inserts or nuts. High efficiency, long life and high head designs are also available.
- **Throatbush & Back Liner** are maintenance simplified by the use of tapered mating faces to allow positive accurate alignment during assembly and simple removal.
- **Large Diameter Shaft & Large Bearing** minimize deflection and vibration to extend bearing life and seal life.
- **An Impeller Release Collar** is fitted to Shaft to enable the Impeller to be readily unscrewed from the Shaft.
- **Dry-run Capable** for short periods of time
- **Affordable Shaft Seal - Expeller Seal** lasts much longer than other mechanical seals in the fieldwork environment, also has the advantages of much easier installation & disassembly,

KRS12X14 PARTS LIST

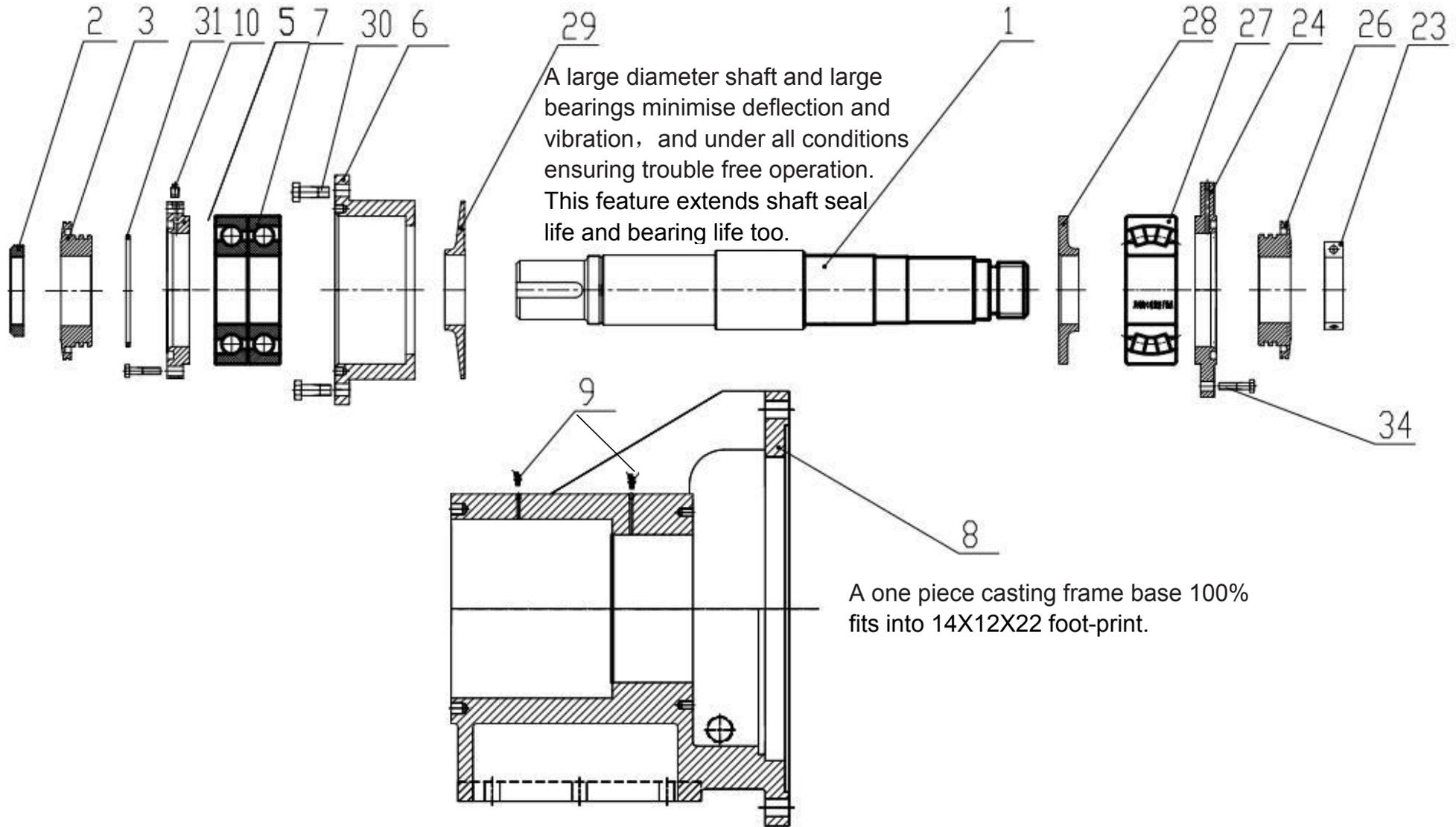


Item	Part Name	Material	Item	Part Name	Material	Item	Part Name	Material
1	Shaft	45# Steel	21	Lantern Ring	3Cr13	41	O-Ring (Casing)	Nature Rubber
2	Bearing Lock Nut	45 D.Zn	22	Shaft Sleeve	3Cr13	42	O-Ring (Shaft Sleeve)	Nature Rubber
3	Labyrinth Seal (Outboard)	HT200 D.Zn	23	Impeller Release Collar		43	O-Ring (Bearing House)	Nature Rubber
4	Stud (Bearing Cover)	45 D.Zn	24	Bearing Cover (Inboard)	HT200	44	Stud (Throatbush)	45 D.zn
5	Bearing Cover (Outboard)	HT200	25	O-ring (Expeller Ring)	Nature Rubber	45	Nut (Throatbush&Back Liner)	45 D.zn
6	Bearing Housing	HT200	26	Labyrinth Seal (Inboard)	HT200 D.Zn	46	Washer (Throatbush&Back Liner)	45 D.zn
7	Cylindrical Roller Bearing O.B.		27	Thrust Bearing (Inboard)		47	Reducer (Pipe Nipple)	45 D.zn
8	Frame	QT500-7	28	Grease Retainer (Inboard)	HT200	48	Stud (Back Liner)	45 D.zn
9	Grease Nipple	BRASS	29	Grease Retainer (Outboard)	HT200	49	Reducer (Pipe Nipple)	BRASS
10	Pipe Plug (Bearing Housing)	A3	30	Bolts, Gaskets, Nuts (Bearing Housing)	45 D.Zn, 140HVd.Zn	50	Grease Nipple (Bearing I.B.)	BRASS
11	Casing/Frame Plate	A05	31	Piston Ring	HT350	51	Grease Nipple (Expeller)	BRASS
12	Impeller	A05	32	Bearing Adjusting Gasket	Asbestos			
13	Throatbush	A05	33	O-ring (Impeller)	Nature Rubber			
14	Expeller	A05	34	Pipe Plug (Casing)	45 D.Zn			
15	Cover Plate	QT500-7	35	Sand Blocking Ring	3Cr13			
16	Bolt (Casing)	45 D.zn	36	Gland Assembly	HT200			
17	O-ring (Throatbush)	Nature Rubber	37	Gland Bolt	45 D.Zn			
18	Packing	NBR Rubber	38	Auto-lubricator				
19	Back Liner	A05	39	Shaft Key				
20	Expeller Ring	A05	40	O-Ring (Expeller)	Nature Rubber			

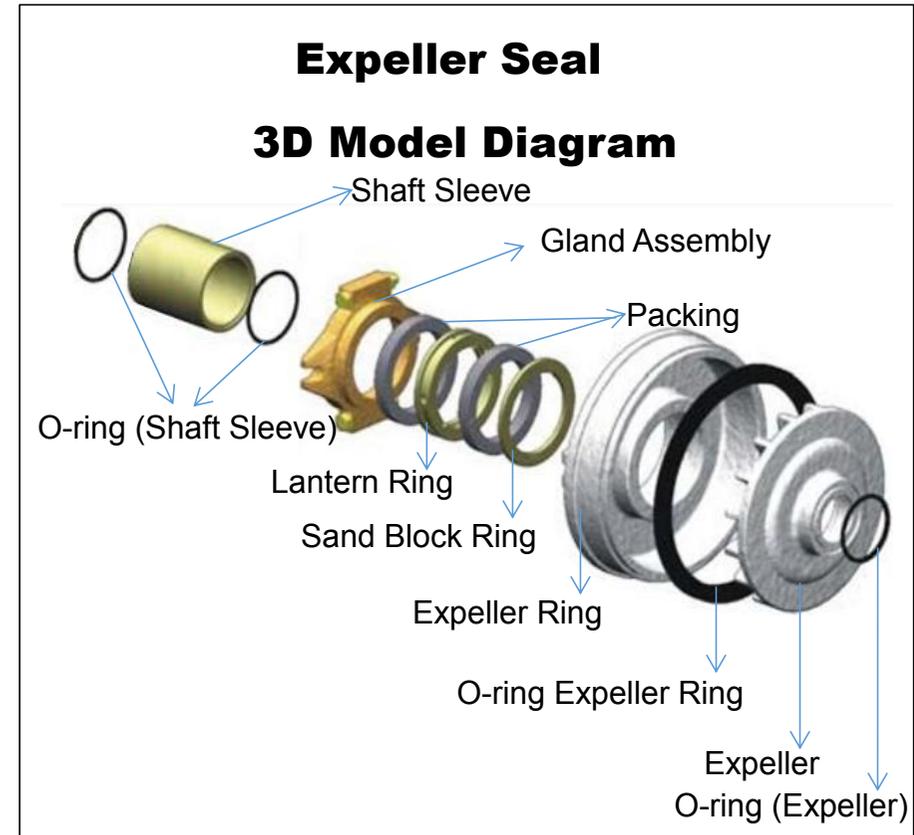
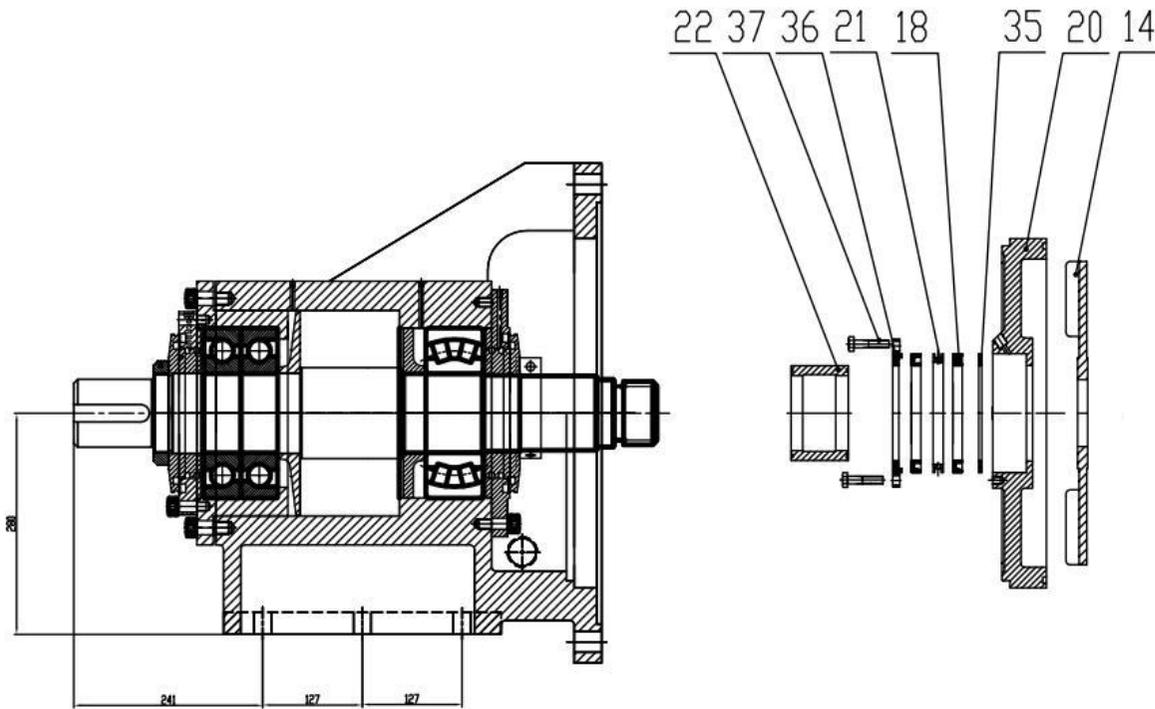
KRS12X14 DIMENSIONS



FRAME ASSEMBLY



EXPELLER SEAL



Expeller Seal provides a major advantage where no gland service water is required. An expeller running in a ring of the same material and working with the vanes on the back face of the impeller ensures a leak proof seal. A grease lubricated packed gland with sand block ring and lantern ring prevents leakage when the pump is stationary. The inlet head influences the effectiveness of the expeller seal and under normal operating conditions this type of seal is completely leak proof. The **Expeller** and the **Expeller Ring** are in high wear resistance material of Hi-chrome Alloy A05, that makes **Expeller Seal** lasts much longer than other mechanical seals in the fieldwork environment, and Expeller Seal has the advantages of much easier installation & disassembly as well.

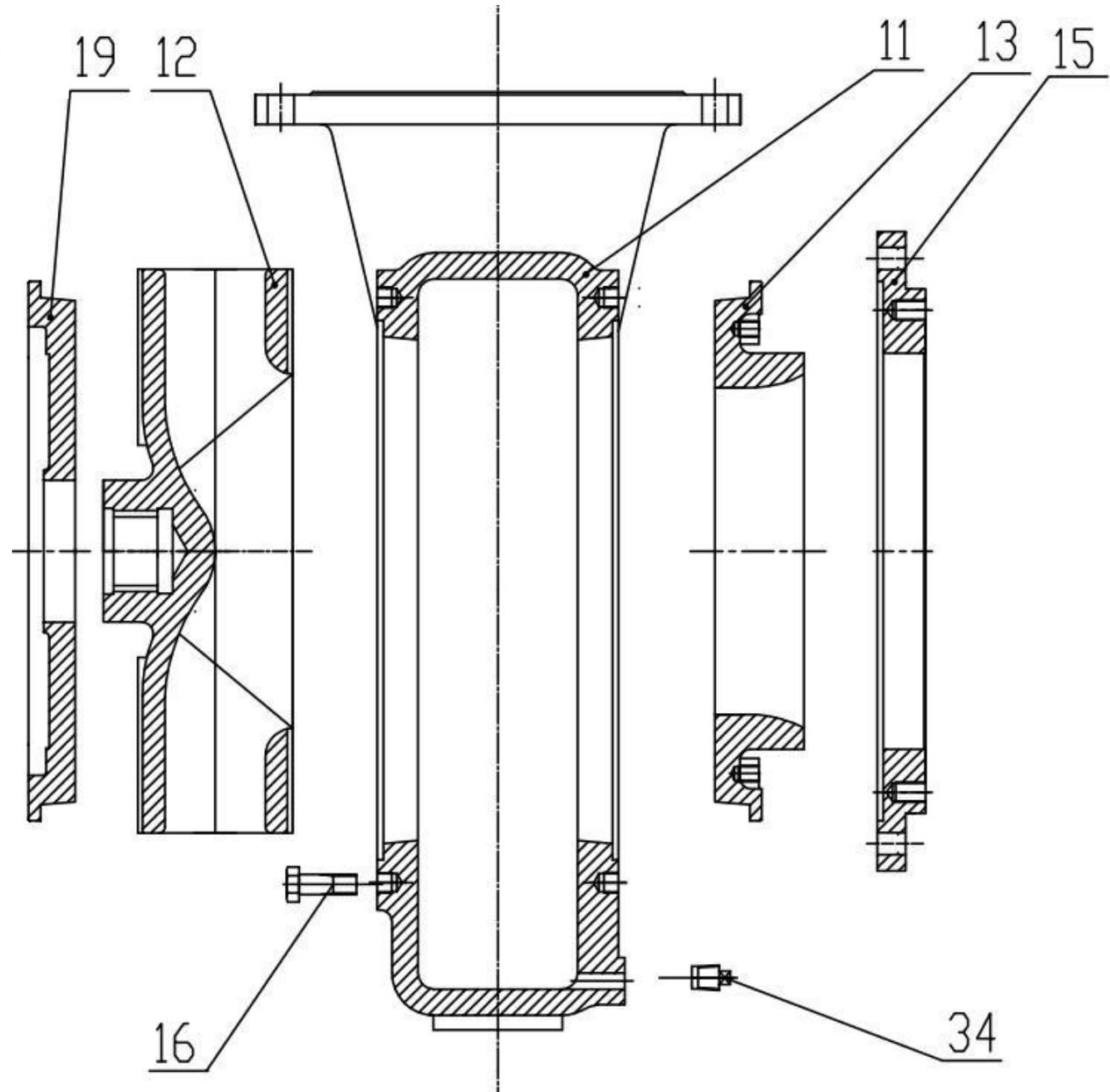
HI-CHROME FLUID END PARTS

The fluid end parts (including: **Casing**(11), **Throatbush**(13), **Impeller**(12) and **Back Liner**(19)) of KRS12X14 pump are in the high wear resistance material of High chrome Alloy A05 also known as High-Chrome 27% or KmTBCr27. Material Type: Erosion resistant white iron. High chrome alloy A05 is also resistant to many corrosive slurry.

A05 PROPERTIES:

- **Density:** (kg/m³) 7500
- **Hardness:** (HBW 10/3000) 650
- **Tensile strength:** (MPa) 780
- **Young's modulus:** (GPa) 220
- **Elongation at break:** (%) 0.4
- **Toughness:** (J) 190
- **PH Value Range of Application:** 5 to 12

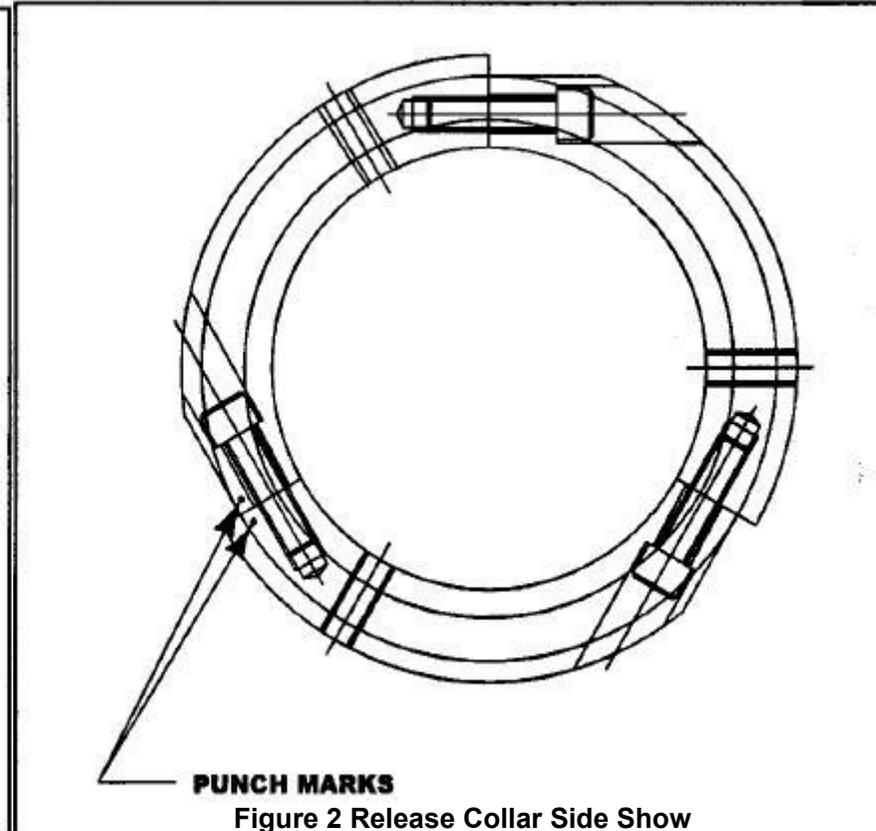
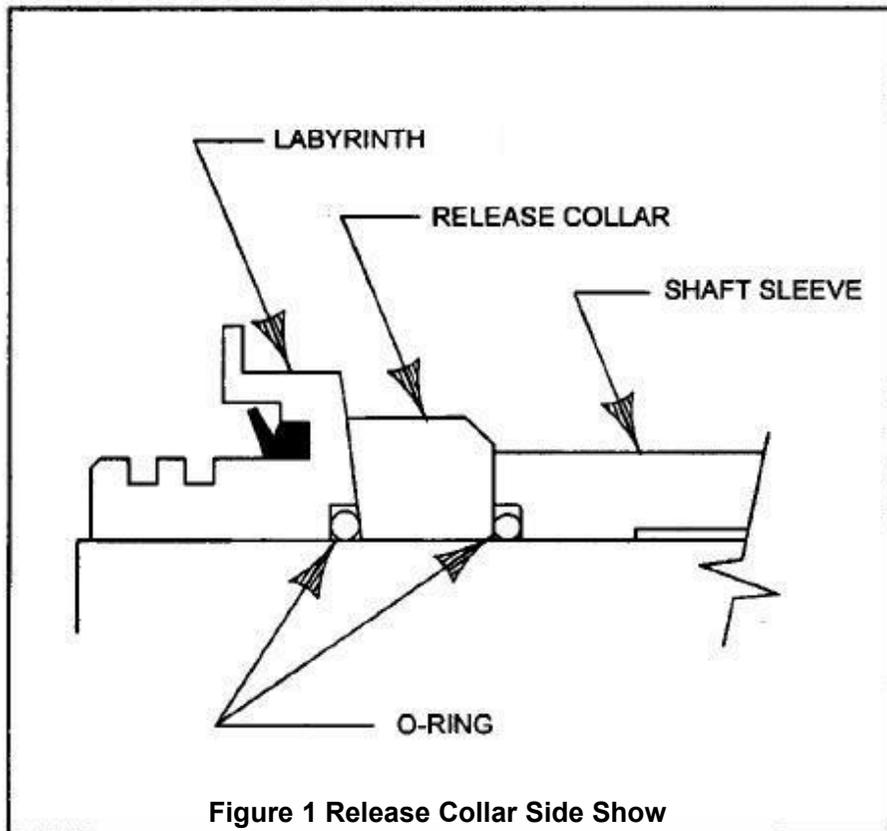
All A05 parts of KRS12X14 pump are more than three times as hard as hard iron.



REMOVAL OF IMPELLER

Access to the IMPELLER requires removal of the COVER PLATE, THROATBUSH. These parts may be withdrawn after removal of nuts on the COVER PLATE BOLTS. Impellers are fitted to Shafts with a right hand screw thread attachment on the pump. Impeller removal generally involves applying an impulsive torque loading to the Impeller, while separately restraining the Shaft from rotation. IMPELLER RELEASE COLLARS are fitted to Shafts of large pumps to assist Impeller removal. The Impeller Release Collar is first removed, to relieve compressive loading on the Impeller hub, allowing the Impeller to be readily unscrewed from the Shaft.

IMPELLER RELEASE COLLAR INSTALLATION AND DISASSEMBLY



RELEASE COLLAR (239) INSTALLATION PROCEDURE

1. Check to ensure that the RELEASE COLLAR O-RING has been installed on the shaft and slid up to the labyrinth.
2. Install the release collar with the tapered side toward the labyrinth and the flat side toward the shaft sleeve (*see Figure 1*).

NOTE

The flat faces of the shaft sleeve and release collar fit together. The 7 degree taper on the labyrinth face and the 7 degree taper on the release collar fit together.

3. It may be necessary to disassemble the three segments of the release collar to install it on the shaft. It is important to reassemble the segments with the punch marks together as shown in *Figure 2*. This will ensure the segments fit properly.

! CAUTION !

Do not reuse the socket head cap screws after they have once been installed in a release collar. Full fastener strength cannot be obtained from a used fastener. Obtain new, unused screws. If 316 SS fasteners are removed they should be replaced with Grade 5 of the same size.

4. It is very important that the bolts holding the segments together be torqued properly. Socket head cap screws are supplied with the release collars and should be tightened as shown in *Table 5-1*. Pumps manufactured after September 1, 1994 are supplied with Grade 5 socket head cap screws. All others have 316 SS fasteners. Apply "Loctite 222 Screwlock" or similar product to threads. Replace all used screws with Grade 5 fasteners.

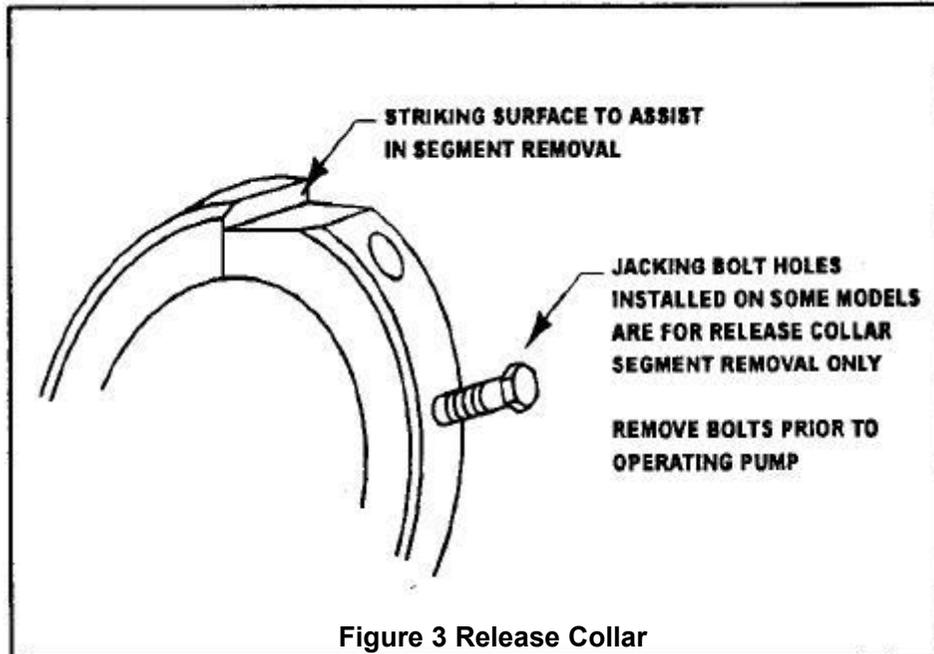
!! WARNING !!

FAILURE TO PROPERLY TORQUE RELEASE COLLAR FASTENERS COULD RESULT IN THE FASTENERS LOOSENING OR FAILING, CONSEQUENTLY RESULTING IN SEVERE DAMAGE TO EQUIPMENT OR PERSONAL INJURY.

5. Fill the recess of the socket head cap screws and pusher holes with silicone or other suitable sealant to prevent moisture from contacting these fasteners and fouling the threads. Release collar installation is now complete.

RELEASE COLLAR REMOVAL

1. Remove sealant or other material in heads of socket head cap screws. Be certain to achieve full engagement of the Allen wrench into the socket head.
2. Remove the three bolts holding the release collar together and install Grade 5 or better bolts into the threaded pusher holes in each segment shown in *Figure 3*. Do not use the socket head cap screws just removed as pusher bolts if they are 316 SS as their softer properties may cause them to strip during the subsequent removal procedure.



3. Alternately tighten the jacking bolts against the shaft to force the segments out. A ledge has been provided on the end of each segment to allow the use of a timber and mallet to assist in the removal process.

! CAUTION !

Do not apply heat to or attempt to cut the segments from the shaft. Heat may damage either the bearing or the shaft.

CAUTION

The following safety information relating to pump operation and maintenance should be carefully observed, and correct procedures followed, to avoid injuries to personnel, and damage to equipment. All statutory requirements relating to this equipment must be complied with at all times.

DO NOT OPERATE THE PUMP WITHOUT SUCTION AND DISCHARGE VALVES OPENED.

DO NOT APPLY HEAT TO THE IMPELLER HUB OR INLET EYE TO ASSIST IMPELLER REMOVAL. APPLICATION OF HEAT MAY RESULT IN SHATTERING OF THE IMPELLER, RESULTING IN INJURY OR EQUIPMENT DAMAGE.

DO NOT OPERATE THE PUMP FOR AN EXTENDED TIME WITH ZERO OR VERY LOW FLOWRATE. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN OVERHEATING OF THE PUMP, AND VAPORISATION OF THE PUMPED FLUID, WITH GENERATION OF VERY HIGH PRESSURES. SERIOUS INJURY TO PERSONNEL, OR DAMAGE TO EQUIPMENT MAY RESULT FROM SUCH ACTION.

DO NOT FEED VERY HOT OR VERY COLD FLUID INTO A PUMP AT AMBIENT TEMPERATURE. THERMAL SHOCK MAY RESULT IN FRACTURE OF PUMP WET-END PARTS.

12X14X22 TRANSFORMED BLENDER PUMP MUST BE REGARDED AS BOTH AN ITEM OF ROTATING MACHINERY, AND A RESSURE VESSEL. ALL RELEVANT SAFETY PRECAUTIONS AND PROCEDURES FOR SUCH EQUIPMENT SHOULD BE OBSERVED DURING PUMP INSTALLATION, OPERATION AND MAINTENANCE.

CHECK THE FOLLOWING ITEMS BEFORE STARTING PUMP

CHECK THE PUMP BASE PLATE. THE PUMP BASE PLATE SHOULD BE CLEAN, FLAT AND ABLE TO SUPPORT ALL FOUR POINTS IN A LEVEL POSITION.

CHECK THE COUPLING ALIGNMENT. GOOD SERVICE LIFE OF THE PUMP/DRIVER DEPENDS ON GOOD ALIGNMENT THROUGHOUT THE COUPLING. POOR ALIGNMENT MAY CAUSE FAILURE OF THE COUPLING, PUMP AND/OR MOTOR BEARING OF EITHER SHAFTS.

CHECK DRIVE MOTOR ROTATION PRIOR TO FITTING OF COUPLINGS. INCORRECT MOTOR ROTATION MAY CAUSE PERSONNEL INJURY OR EQUIPMENT DAMAGE.

PIPING(GENERAL).

- DO NOT CONNECT THE PIPING TO THE PUMP BEFORE THE PUMP HOLD-DOWN BOLTS HAVE BEEN TIGHTENED. **MAX 200FT/LBS OF FORCE.**
- PIPING SHOULD BE ANCHORED INDEPENDENTLY OF THE PUMP. PIPE COMPANION FLANGES SHOULD LINE UP NATURALLY WITH PUMP FLANGES. **DO NOT DRAW OR PULL THE PIPE TO THE PUMP WITH FLANGE BOLTS.**

PIPING (SUCTION)

- PROPERLY SELECTED AND INSTALLED SUCTION PIPING IS EXTREMELY IMPORTANT TO ELIMINATE VIBRATION AND CAVITATION IN THE PUMP. VIBRATION CAN CAUSE ISSUES WITH THE PACKING, MECHANICAL SEAL AND/OR BEARINGS.
- THE CAPACITY OF A CENTRIFUGAL PUMP SHOULD NEVER BE ADJUSTED BY THROTTLING THE SUCTION LINE.

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- A POSITIVE SHUT-OFF VALVE (TO CAUSE MINIMUM TURBULENCE) SHOULD BE INSTALLED IN THE SUCTION LINE TO PERMIT THE CLOSING OF THE LINE AND REMOVAL OF THE PUMP FOR INSPECTION AND MAINTENANCE.
- THE SUCTION LINE SHOULD BE DESIGNED TO ELIMINATE ANY POCKETS. THE PIPING SHOULD GRADUALLY SLOPE DOWNWARDS TO THE SOURCE OF SUPPLY TO ELIMINATE AIR POCKETS.
- THE SUCTION LINE SHOULD HAVE A STRAIGHT SECTION INTO THE PUMP OF A LENGTH EQUIVALENT TO AT LEAST TWO TIMES ITS DIAMETER, i.e., FOUR-INCH (4") SUCTION EIGHT (8") STRAIGHT SECTION RUN.
- FOR TEMPORARY HOOK-UP WHERE FLEXIBLE HOSE IS USED, A NON-COLLAPSING HOSE IS ESSENTIAL SINCE THE SUCTION LINE PRESSURE IS OFTEN BELOW ATMOSPHERIC PRESSURE. A COLLAPSING SUCTION LINE WILL RESULT IN BELOW AVERAGE OR COMPLETE LOSS OF FLOW.

PIPING (DISCHARGE)

- A POSITIVE SHUT-OFF VALVE SHOULD BE LOCATED IN THE DISCHARGE PIPING TO PERMIT INSPECTION OF THE PUMP.
- ALL PIPING SHOULD BE INDEPENDENTLY SUPPORTED AND ACCURATELY ALIGNED. **THE PUMP MUST NOT SUPPORT THE WEIGHT OF THE PIPE OR COMPENSATE FOR MISALIGNMENT.**
- IF OPERATING CONDITIONS ARE NOT KNOWN WITH SUFFICIENT ACCURACY, IT WILL BE NECESSARY TO PROVIDE A THROTTLE VALVE IN THE DISCHARGE LINE TO ENSURE THAT THE PUMP OPERATES AT THE DESIGN POINT.
- IF THE PUMP IS CONNECTED TO A PRESSURE SYSTEM, IT IS IMPORTANT TO INSTALL A CHECK VALVE BETWEEN THE PUMP DISCHARGE AND THE THROTTLING VALVE. THE CHECK VALVE WILL PREVENT BACK FLOW THROUGH THE PUMP. BACK FLOW MAY CAUSE THE IMPELLER TO BECOME LOOSE ON THE SHAFT, WITH WOULD LIKELY RESULT IN MECHANICAL DAMAGE AND FLUID LEAKAGE BENEATH THE SHAFT SLEEVE.

START-UP

- Pump rotates freely by hand
- Coupling is aligned
- Pump's auto-greaser and trailer's auto-lube system are installed
- Suction valve is fully open
- Pump and suction line is full of fluid
- Discharge valve is slightly open

OPERATION\PRIMING

- Vent air from suction line and fill with liquid
- Start pump with discharge valve cracked open
- After discharge pressure stabilizes, gradually open discharge valve to required position
- If flow is lost, close discharge valve and wait a few seconds for discharge pressure to build
- Continuous issues with flow indicates an improper selection or installation
- Running the pump too long with improper prime may destroy pump

! CAUTION !

Do not run pump with suction and discharge valves closed.

PUMP RECORDS

Maintain data cards or pump records whenever possible.

1. Pump size and serial number
2. Motor horsepower and speed of operation
3. Service conditions
4. Frequency of operation
5. Record of maintenance, including parts usage and general condition of pump

LUBRICATION (Packing)

- Bearings and Packing are pre-lubricated and hand packed full of grease before leaving Frac Pump Parts
- When pump is in regular duty, the bearings and packing should be re-lubricated at regular intervals for maximum bearing life, and packing seals efficiency
- The bearings and packing are lubricated with Mystic JT6 Hi-Temp grease
- An Auto-lubricator is provided (temporarily attached) to pump. The Auto-lubricator must be installed before pump is placed into service.

KRS12X14 PUMP TROUBLESHOOTING

Causes	Noticing Vibrations	No Flow	Limited Flow	Insufficient Pressure	Excessive Power Required	Intermittent Flow	Short Bearing Life
Pump Not Primed		X	X				
Speed Too Low			X	X			
Speed Too High					X		X
Excessive Discharge Head		X	X				
Insufficient NPSH	X	X	X			X	
Impeller Clogged		X	X			X	
Wrong Direction of Rotation			X	X			
Plugged Suction or Discharge Line	X	X	X				
Foot Valve or Suction Line Not Immersed Deep Enough		X	X			X	
Impeller Damaged		X	X	X			
Shaft Packing / Seal Defective			X	X			
Impeller Too Small			X	X			
Impeller Too Large					X		
Excessive Amount of Air or Gas In Liquid				X		X	X
Total Head Lower Than Design					X		
Specific Gravity or Viscosity Too High		X			X		X
Bent Shaft	X				X		X

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Causes	Noticing Vibrations	No Flow	Limited Flow	Insufficient Pressure	Excessive Power Required	Intermittent Flow	Short Bearing Life
Improper Electric Motor Winding or Voltage					X		
Rotating Elements Bind	X				X		X
Leaky Suction Line or Shaft Seal		X	X			X	
Misalignment	X				X		X
Bearing Worn	X						X
Impeller Out of Balance	X						X
Suction or Discharge Piping Not Anchored	X						
Improper Foundation	X						
Insufficient Discharge Head (Excessive Flow)	X			X	X	X	X
Improper Lubricant or Level							X