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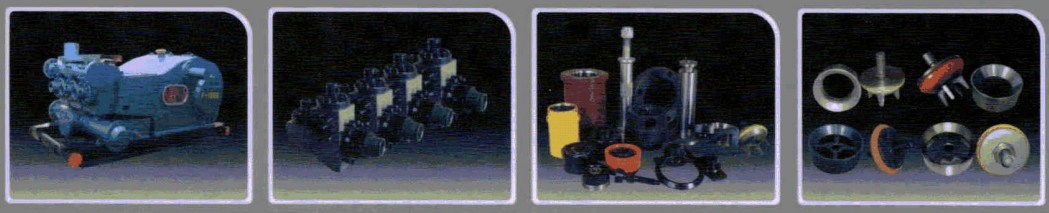
International Mineral Processing Equipment

A Division of Canamera Enterprises Inc.

IMP - intMPE MUD PUMPS & PARTS



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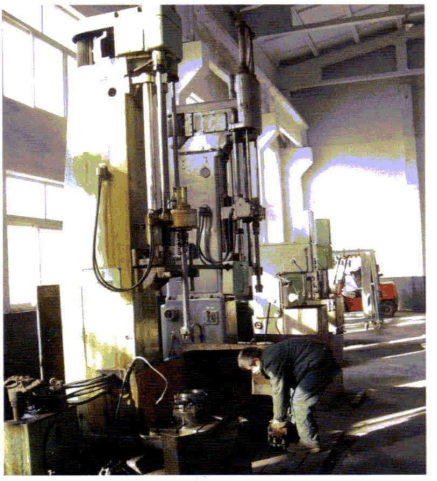
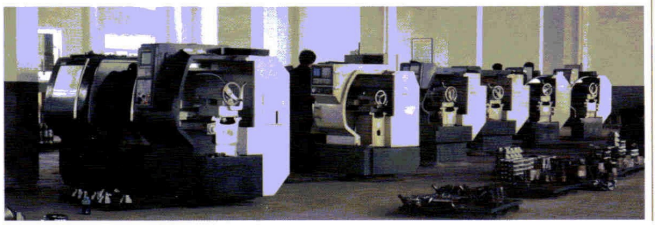
Machining

We machine most all of our own parts in our own manufacturing facility. We also do custom machine work or custom machining for OEMs as well as other companies as per drawings, samples or specifications. We have Computer Operated Lathes , Manual Lathes, Milling machine, Drill press Planning machine , Boring machine, Grinding machine and Computer Operated Machine Centers in size, so that we are able to machine a variety of different size parts. We also have 3 honing machines and a digital readout milling machine.

■ Computer Operated Lathes

■ Drill press/Milling machine





■ Computer Operated Machine Center

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Forging

We have a full line of forging facility so that we can manufacture quality forged parts ourselves

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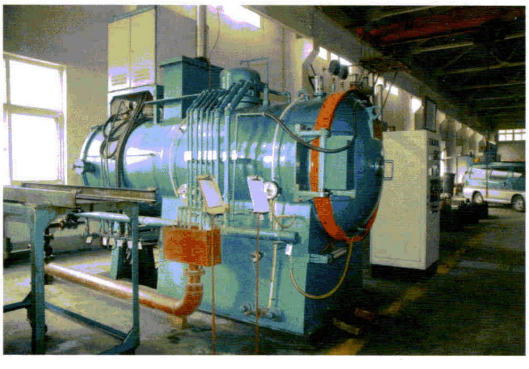
Heat Treatment



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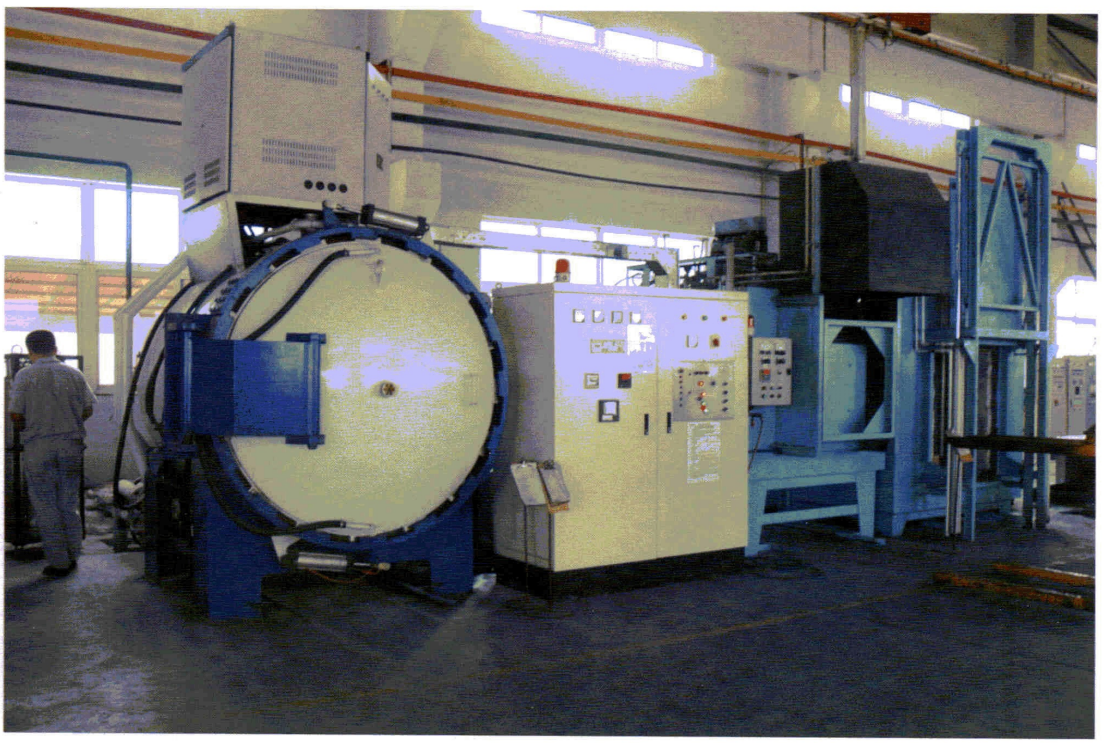
IMP makes heat treatment in its own factory with advanced techniques and computer operated equipments, such as carburizing , hardening and tempering, backfire, carbonitriding, vacuum hardening. Our overall process control system and complete inspection equipments guarantee the quality of heat-treated parts.



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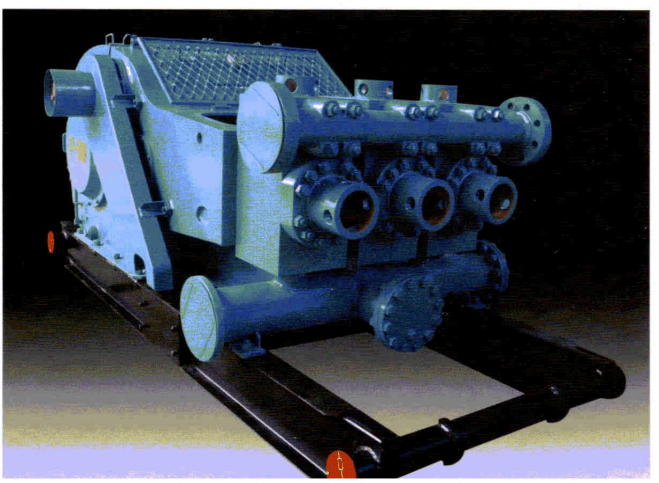
IMP - 500+ MUD PUMPS!

IMP main products are sold to USA, Mid Asia,Canada, Mexico, Middle East, & Russia. The mud pumps are used in oil drilling & mining.

INTMPE IF-500+, IF-1000+, IF-1300+, IF-1600+ and I-9 mud pumps are quality products at competitive prices, responsible service and short delivery time earn a lot of reputation for us. IMP supplies mud pump and mud pump parts for oilfield.



IF+ series mud pump is applicable to the requirement of high pump pressure in oilfield and high displacment technology of well drilling with its solid and compact structure, small vollume and outstanding operation performance.

IF+ series mud pump has long stroke maintaining operation at lower frequency resulting in enhancing the performance of giving water effectively and prolonging the lifetime of the consumable hydrokinetic parts. The air-suction kit is advanced in structure and reliable at operation to reach the optimized absorbing target of air suction into linepipe.

IF+ series pump powering side adopts the combined lubrication of forced and flashing lubrication featured with reliable lubrication and adding the operation lifetime of powering part.

The series pump is produced strictly according to API Spec 7K " the Equipment Specification of Well Drilling and Repairing ", and performed the EX-Work test under the specification thereof.

Stroke/min	Rated power		Liner diameter (mm)&rated pressure MPa(psi)															
			170		160		150		140		130		120		110		100	
			9.4	1365	10.5	1540	12.1	1750	13.9	2010	16.1	2740	22.5	3260	22.5	3260	27.2	3945
	KW	HP	Displacement(L/s)															
170	379	515	36.75	582	32.56	516	28.6	453	24.93	395	21.49	340	18.31	290	15.39	244	12.72	201
165	373	500	35.67	565	31.6	501	27.8	440	24.19	383	20.86	330	17.77	281	14.93	236	12.34	195
150	334	455	32.43	514	28.73	455	25.3	400	21.99	348	18.96	300	16.16	256	13.58	215	11.22	178
140	312	424	30.27	480	26.81	425	23.6	373	20.53	325	17.7	280	15.08	239	12.67	201	10.47	166
130	290	394	28.11	445	24.9	394	21.9	347	19.06	302	16.44	260	14	222	11.77	186	9.73	154
120	267	364	25.94	411	22.98	364	20.2	320	17.6	279	15.71	240	12.93	205	10.86	172	8.98	142
110	245	333	23.78	377	21.07	334	18.5	293	16.13	255	13.91	220	11.85	188	9.96	158	8.23	130
1			0.2162	3.427	0.1915	3.036	0.17	2.67	0.1466	2.324	0.126	2.004	0.1077	1.707	0.0905	1.435	0.0748	1.186

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IMP I-9 MUD PUMP

1 Brief Introduction

IMP mud pump is a horizontal triplex single acting piston pump which has the advanced structure and small in size. It has the reliable performance, good exchangeability, easy maintenance.

The pump consists of two main sections: power end & fluid end. Power end includes pump case pinion shaft, crankshaft, back cover, connection rod, crosshead etc.

Fluid end includes valve pot assembly, valves, cylinder liners, pistons, discharge manifold and suction manifold. Etc.

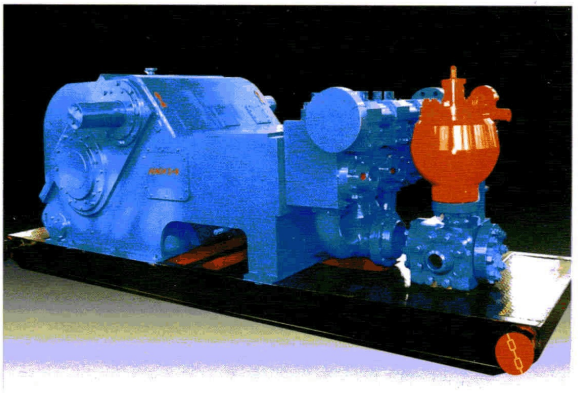
In order to prevent the water-hammer and reduce pressure difference in the outlet side,of the pump.

In order to prevent the over-pressure, there fixed a shear safty valve in the outlet side of the pump.

The gears, bearings, crosshead in the power end adopt splash system and pressure lubrication system. This guarantees a good lubrication.

The cylinder liners & the pistons in the fluid end is cleaned and cooled by a centrifugal spray pump with lubrication water.

This pump has a complete set of special tools for general maintenance & repair.



2 Technical Specifications

(1)Type: horizontal triplex single acting piston pump.
(2)Rated Input Power 1000HP
(3)Rated Speed: 130SPM
(4)Stroke Length 9 " (228.6mm)
(5)Rated Speed Of Pinion shaft 582 rpm
(6)Gear Ratio: 4.48:1
(7)Valve Standard: API7#
(8)Suction Inlet 10 "
(9)Discharge Outlet 5 1/8 " (5000PSI)
(10)Overall Dimension 205X94X100.5in (5200X2388X2550MM)
(11)Pump Weight 44050 ib(20000kg)

3 Technical Performance

Relations between pressures, displacement and speed.

Pump speed(spm)	Liner Size (in)							
	7	63/4	61/2	6	51/2	5	41/2	4
	Theoretical Displacement (gal/min)							
130	585	504	466	430	361	298	242	191
Pressure(psi)	2639	3060	3310	3592	4272	5000	5000	5000

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Mud Pump Pistons

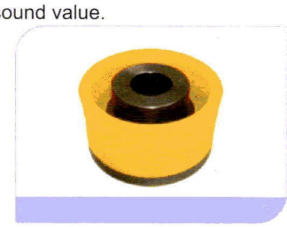
IMP offers a full line of pistons for duplex and triplex mud pumps. All API types are available. Among these are:

Bonded Rubber Pistons

Our premium pistons are fully interchangeable with other API standard designed pistons and deliver maximum performance in almost all drilling conditions. High tensile strength, resistance to chemicals, hydrocarbons, and abrasion, long lasting service, and full interchangeability with other API designed pistons make Our Premium piston a sound value.

Premium Bonded Urethane Pistons

This one piece bonded constructed piston has no joints to leak. Eliminates abrasive fluids between piston and liner. The fluid expanded lip is not damaged by high pressure and fast pump strokes. This Fail-Safe piston seals off to greater diameter as liner wears



Pistons Rubber with Replacement Rubbers

Currently running in pumps using exotic muds and highest drilling pressures! Bonded construction - no joints, no leakage. Longer piston and liner life. This piston will run in higher-pressure, fast stroking pumps, and is resistant to oil base muds and other additives currently being used. This Premium Piston has been in service for years, providing unmatched performance under extreme drilling conditions. This one piece bonded unit provides the same series of advantages, being resistant to oil and other chemicals

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Size of Piston & Parts

	3"	3-1/2"	4"	4-1/2"	5"	5-1/2"	6"	6-1/4"	6-1/2"	6-3/4"	7"	7-1/4"
Duplex	K	K	K	K	B	B	B	L	L	L	L	L
Triplex	K	K	K	K	B	B	B	L	L	L	L	L

Pistons with Replacement Rubbers

IMP also offers a full line of piston replacements including Piston Hubs, Plates, Snap rings and Replacement Rubbers.

The hub is formed from high grade steel.

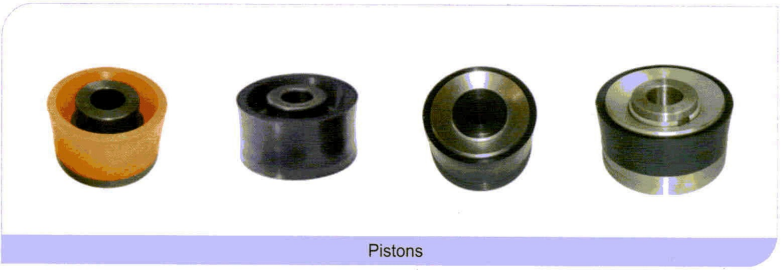
The piston rubber is made from specially formulated compounds which are resistant to the effect of heat, oil and water. The multi-ply fabric reinforced backings used in the production of the piston rubbers provide positive, wear resistant seals.

Triplex piston hubs

Triplex piston parts

Duplex piston hub

Triplex piston rubber



Pistons

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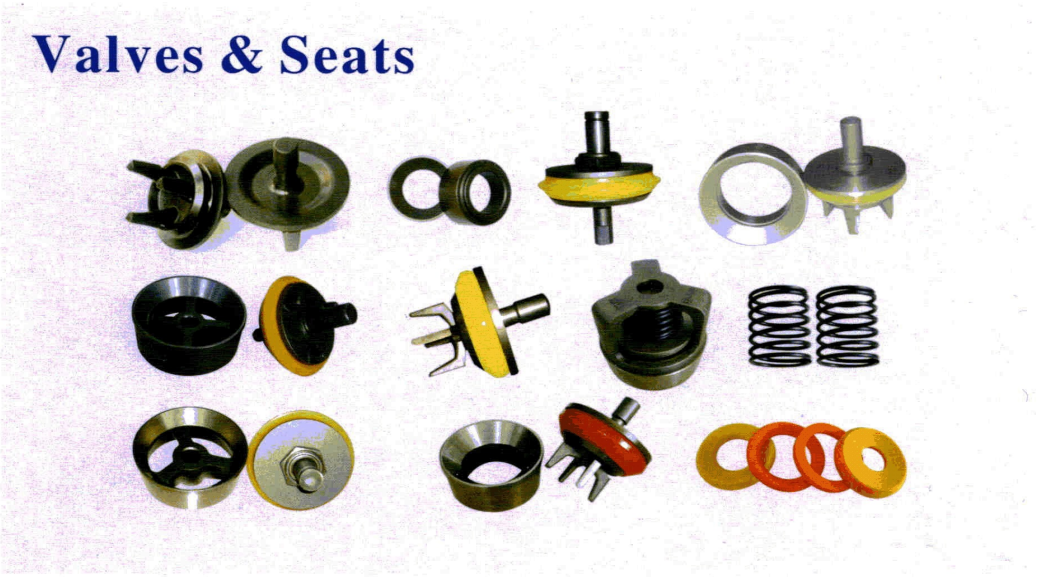


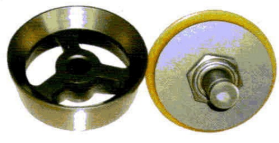
Valves & Seats, Inserts and Springs

IMP offers offers 5 different styles of valves & seats to fit your drilling needs, suiting to almost all popular mud pumps in the world.

The Stem Guided valve and seat and the Wing Guided valve and full open seat offer many advantages for today's higher pressures and faster drilling operations.

Stem-guided valve &Tri-arm seat

Features greater fluid flow than four-arm seats, as well as it features an extra wide metal to metal seal on the valve flange,. The serrated upper surface on the valve gives a longer non-breathing seal between valve body and insert while the rigid seat cross-arms give greater strength and positive sealing. The strong, thick, valve knock off nut holds the insert tightly reducing flex and breathing which lessens the chance of foreign matter getting between valve and insert.



Stem-guided valve & Cross-arm seat

Features an extra wide metal to metal seal on the valve flange. The serrated upper surface on the valve gives a longer non-breathing seal between valve body and insert while the rigid seat cross-arms give greater strength and positive sealing. The strong, thick, valve knock off nut holds the insert tightly reducing flex and breathing which lessens the chance of foreign matter getting between valve and insert.

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Tri-wing guided valve & Full open seat

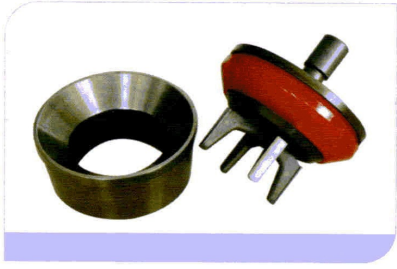
Three-wing guided valves and full open seats features greater fluid flow than four-wing valves, the unibody forged valve features greater strength than traditional welded-wing valve. Innovative unibody valve design eliminates snap rings, plates or keepers providing reduced maintenanle by snap-on valve insert and easy installation

IMP offers two style of Four-wing guided valves and full open seats which feature greater fluid flow through the full open seat. The full open seat provides easier valve maintenance and seat pulling, in valve-over- valve fluid ends.

Four-wing guided valve & Full open seat

Innovative unibody

Valve design eliminates snap rings, plates or keepers providing reduced maintenance by snap-on valve inserts and easy installation. This combination will handle lost circulation material better than most conventional style valves and seats while the seating angle greatly improves flow characteristics and the heavy-duty load bearing capacity greatly improves service life.



Four-wing guided valve & Full open seat

The unibody forged

Features greater strength than traditional welded-wing valve. Innovative unibody valve design eliminates snap rings, plates or keepers providing reduced maintenance by snap-on valve inserts and easy installation

IMP also makes other kinds of valves and seats which fit our customers need.

IMP supplies forged rough and /or semi-manufactured valves and seats to manufacturers in the world.

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Liners

IMP offers four different type of Liner for all popular mud pumps to suit any drilling condition, including Premium Chromium Liners, Ceramic Liners, Chromium-plated Liners and Hardened Liners.

Premium Chromium Liners

IMP premium liners combine the strength of a forged steel outer shell with the abrasion and corrosion resistance of a high chromium iron inner sleeve. These liners feature a centrifugally cast high chrome iron sleeve which is machined and heat treated to a minimum uniform bore hardness of 62 RC. Each liner is machined to close tolerances to assure ease of installation and long liner life with the inside diameter of these premium liners honed to a mirror-like finish for smooth even wear during the life of the liner. IMP premium liners are made for superior performance under tough corrosive and abrasive conditions.

Ceramic Liners

IMP ceramic liners combine the strength of a forged steel outer shell with the abrasion and corrosion resistance of a ceramic inner sleeve. We provide Zirconia(ZrO3) Sleeves as well as Alumina(Al2O3.) sleeves., of which Ziconia exhibits better impact strength, higher hardness and be honed to finer surface finishes than alumina.

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IMP hardened liners offer economy in a liner that is made for normal to mildly corrosive mud conditions. These liners are hardened and heat treated under strict quality control to a minimum of 60 RC hardness and a depth of .125 inches. Each liner is honed to a mirror-like finish for smooth and even wear during the life of the liner and is machined to close tolerances to assure easy installation and long life

---

IMP offers chrome-plated liners made from premium forged steel with the core plated by chrome. The chrome-plated liners have hardening characteristics of 58 to 62 Rockwell C hardness.

Gaskets & Packings are made out of appropriately selected grade of synthetic rubber suitably compounded for the required application. Rubber compound for gaskets & packings have been developed after years of research in our laboratory. Packings, require skill-full manufacturing technique have also been developed after several years of application research and now they are rated as one of the best in the market.

$$u_r = \frac{1}{E}\left[\frac{(1-\nu)(a^2 p_i - b^2 p_o)}{b^2-a^2}r + \frac{(1+\nu)a^2 b^2 (p_i - p_o)}{(b^2-a^2)r}\right]$$

$$\left.\begin{matrix}\sigma_r \\ \sigma_\theta\end{matrix}\right\} = \frac{p_i a^2 - p_o b^2}{b^2-a^2} \mp \frac{(p_i - p_o)a^2 b^2}{(b^2-a^2)r^2} \qquad \sigma_z = \nu(\sigma_r + \sigma_\theta) = 2\nu\frac{p_i a^2 - p_o b^2}{b^2-a^2}$$

$$\Delta = p_i c\left[\frac{1}{E_1}\frac{(1-\nu_1)a^2 + (1+\nu_1)c^2}{c^2-a^2} + \frac{1}{E_2}\frac{(1+\nu_2)b^2 + (1-\nu_2)c^2}{b^2-c^2}\right]$$

$$(\sigma_\theta)_{max} = \frac{c\Delta\left(1+\frac{b^2}{c^2}\right)}{(b^2-c^2)\left[\frac{1}{E_1}\frac{(1+\nu_1)c^2 + (1-\nu_1)a^2}{c^2-a^2} + \frac{1}{E_2}\frac{(1+\nu_2)b^2 - (1-\nu_2)c^2}{b^2-c^2}\right]}$$

$$(\sigma_r)_{min} = \frac{-\Delta}{c\left[\frac{(1+\nu_1)a^2 + (1-\nu_1)c^2}{E_1(c^2-a^2)} + \frac{1}{E_2}\frac{(1+\nu_2)b^2 + (1-\nu_2)c^2}{b^2-c^2}\right]}$$

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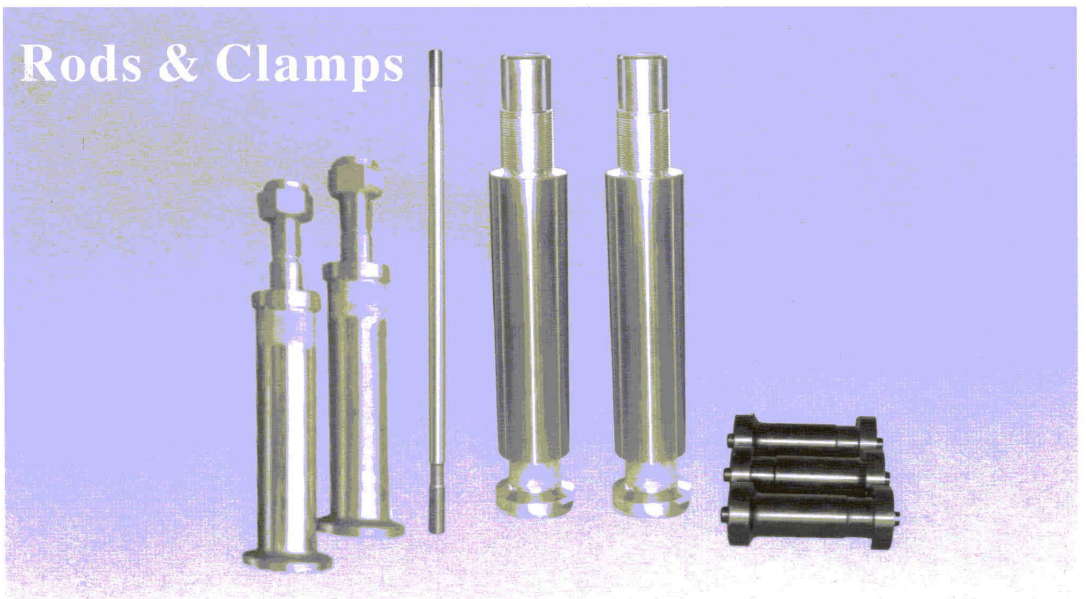

Rods & Clamps

IMP offers Pony Rods, Piston Rods and Clamps to meet today's tough oilfield requirements.

Pony Rods

Our Pony Rods incorporate the longer wearing surface to provide the best Pony Rod for your Triplex or Duplex pump.

Piston Rods for Triplex Mud Pumps

The piston rods are manufactured to exacting standards to meet today ' s tough oilfield requirements, available for a wide range of triplex mud pumps.

Our piston rods are manufactured from high quality alloy steel. Surface is induction hardened for maximum case hardness and core strength - hard on the outside, tough on the inside. Precision ground mirror surfaces meet rigid quality control standards and minimize wear.

Piston Rods for Duplex Mud Pumps

High quality Grayloy material is used on all IMP Duplex Piston Rods. This corrosion-resistant, high-density, long-wearing surface results in fewer packing changes and longer life for gland bushings and junk rings. IMP rods are furnished with a heavy duty Piston Lock Nut.

Clamps

IMP offers a full range of clamps for mating the piston rod to the crosshead extension (pony) rod. Machining tolerances are tightly held to assure proper fit and alignment of the adjoining components. IMP clamps are furnished complete with all required hardware.

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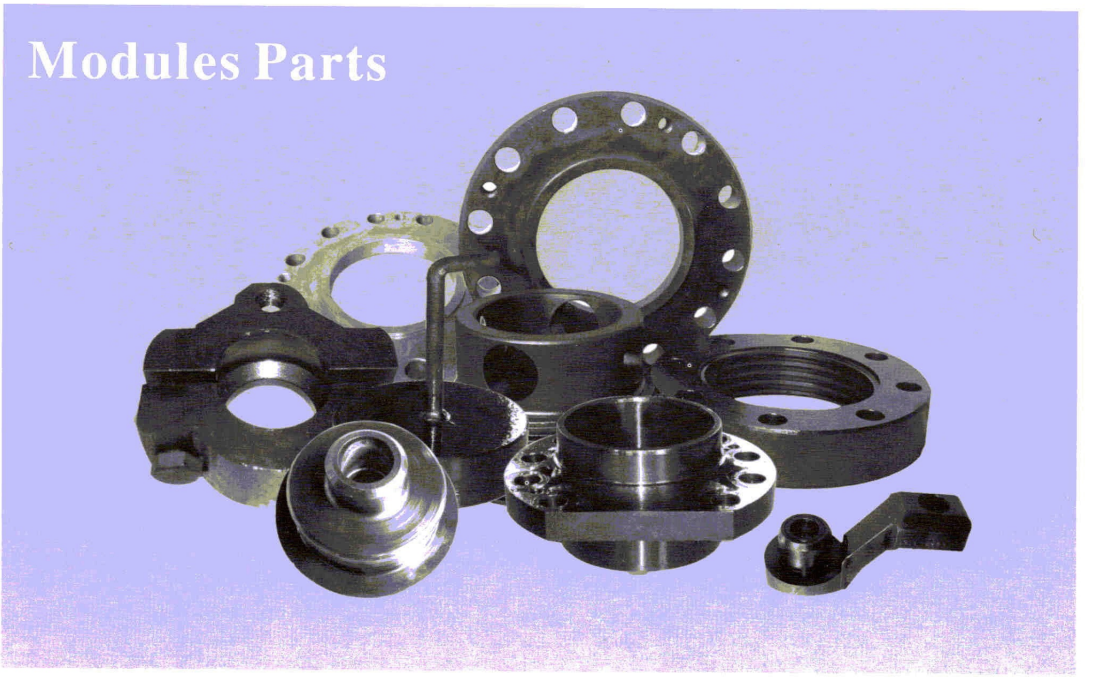
Modules Parts

IMP also supplies other expendable fluid end parts such as Threaded Ring, Liner Clamp, Rod Clamp, Valve Pot Cover, Liner Cage, Wear Plate, Valve Guide which all fit the request of most popular mud pumps.



Module Repairs:

We provide repair services for all type of fluid end modules

Over a 1,000,000 of interchangeable mud pump parts, centrifugal pump parts, rig parts and swivel parts in stock for all major manufactures such as: mud pump spares and the mud pump spare parts / mud pump replacement parts that we offer.

These parts include:mud pump liners, mud pump pistons, triplex single action pistons, piston rods and clamps, pony rods, threaded rings and caps, valve guides, liner packing cage assemblies, duplex pump spares and duplex mud pump parts, triplex pump spares and triplex mud pump , piston rods, gland brass and junk rings, full open valves and valve seats, web valves and web valve seats, stuffing box and gland nut, and mud pump gasket and mud pump rubbers.

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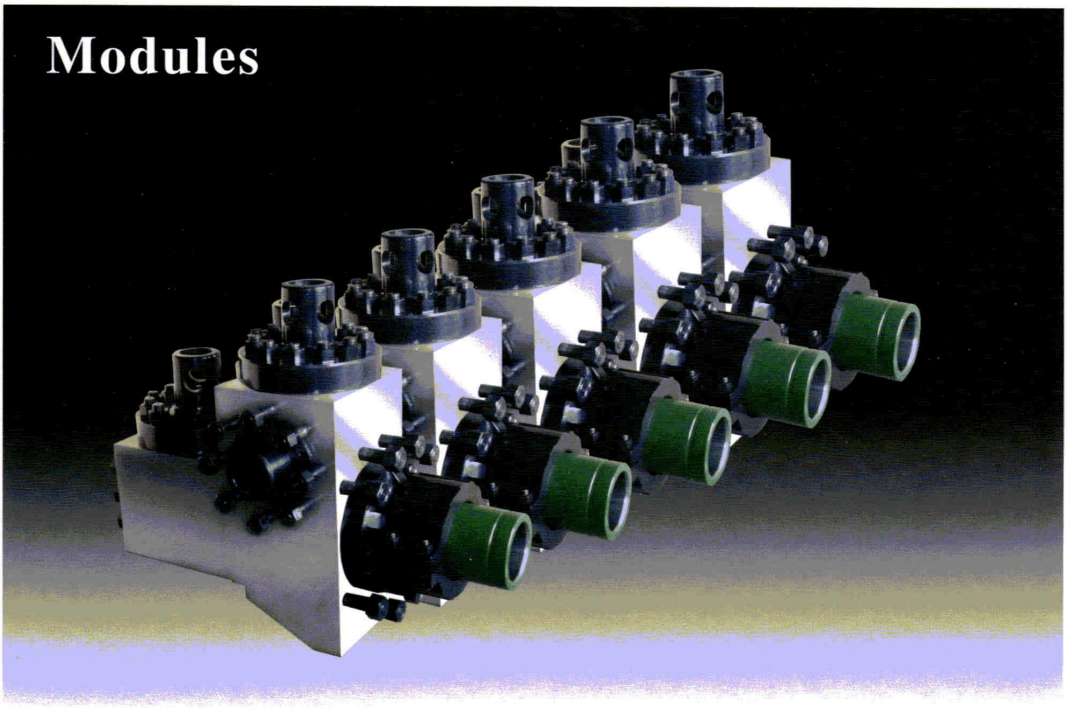

Heat-treated and internally hardened for high durability; available in various materials to meet a wide range of applications; standard one-and/or-two-piece configuration, with designs available for pressure of 5000PSI(35.1Mpa), 7500PSI(52.7Mpa), and 10000PSI(70.3Mpa); discharge connections available on each side; suction connections on each side or front center.

Material is 35CrMoA or 40CrMoNn alloy forged steel. To get better fiber texture, we use electric stove for second forging, It is forged from three directions and the forging ratio is no less than 4.0:1.0. It can not have crack, impurity, looseness, overburns, etc. And weld is not allowed. It should be confirming to the stipulation of JB/TQ252-81, and should be checked by gradeIII After quenching the rough module will be rough processed, then the hull hardness is HB285-330.

Mechanical property: $\sigma b \geqslant 850MPa$, $\sigma s \geqslant 670MPa$, $\delta \geqslant 5\%$, $\psi \geqslant 30\%$.

The two1:6(1:12) taper hole rolling treatments are checked by ring gage. Its contact area has continuous distribution on the circumference. The contact area is no less than 75% .The line of intersection of all cylindrical surface of the hull are facetted obtuse angle by hand or grinding wheel ,forming a circumference $R \geqslant 8$.Test pressure is 49Mpa, keep pressure 1 hour, pressure can not be reduced. Finished products have crack detection report.

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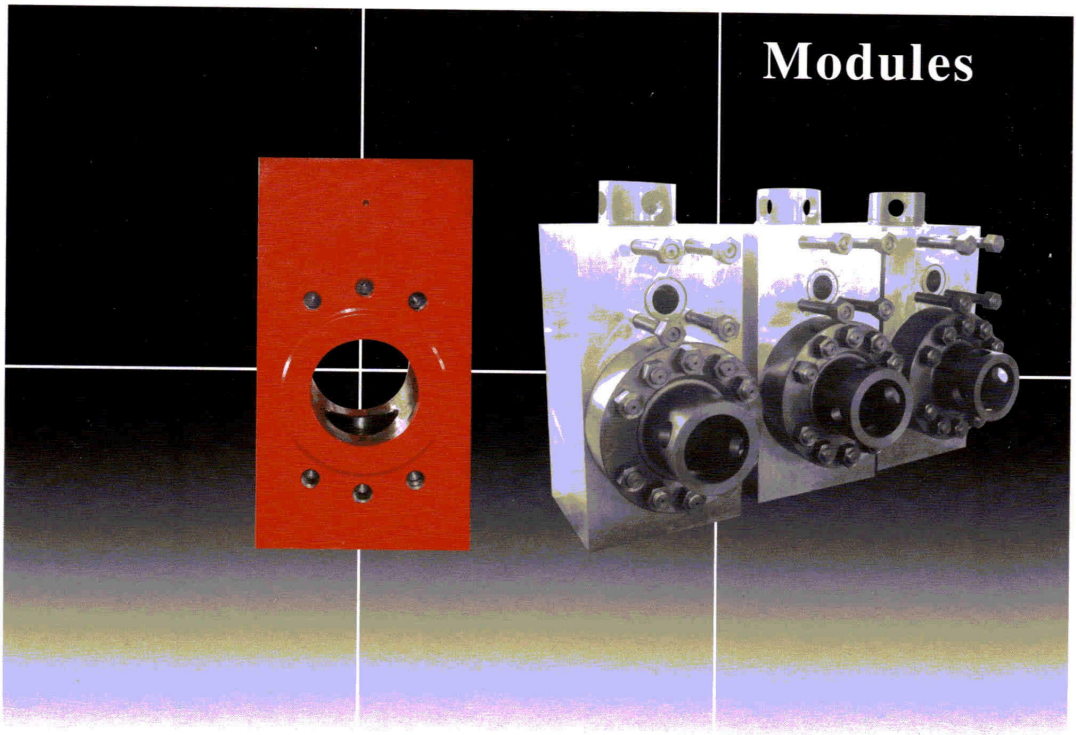


Detailed Product Description

Triplex Fluid End Modules:

Our high strength forged triplex fluid end modules, are made from 4130 or 4135 metal and heat treated to a hardness for long wear. The clean exterior finish reflects the superior inside quality.

We furnish all associated items with the modules:

Valve and cylinder head plugs

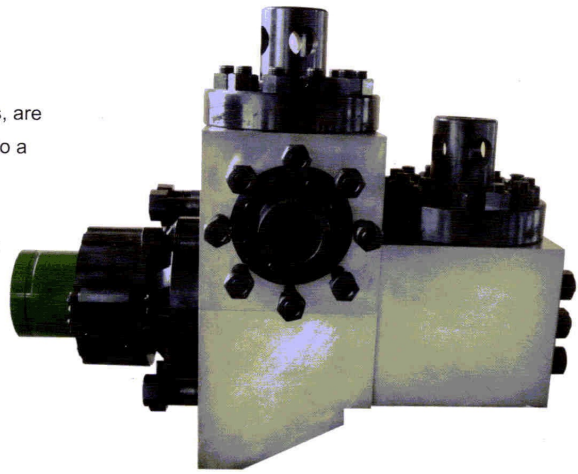
Valve cylinder head threaded rings

Valve cylinder head locks

Studs and nuts

Duplex Fluid Ends:

Our principal also maufactuers duplex fluid end modules to API standards



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Drill Collar Slips

IMP supplies three models of Drill Collar Slips which accommodate drill collars from 3 inch to 14 inch O.D.:

DCSS

DCSR

DSCL

Specifications

Casing O.D.	in	9 5/8	10 3/4	11 3/4	13 3/8	16	18 5/8	20	24	26	30
Weight	kg	87	95	118	112	140	167	174	201	220	248

Casing slips

IMP Supplies Casing Slips Which Can Accommodate Casing Size From $6^{5}/_{8}$ to 30 Inch O.D.

Specifications

Type		DCS-S		DCS-R		DCS-L					
OD	in	3-4	4-4 7/8	4 1/2-6	5 1/2-7	6 3/4-8 1/4	8-9 1/2	8 1/2-10	9 1/4-11 1/4	11-12 3/4	12-14
Weight	kg	51	47	54	51	70	78	84	90	116	107
Insert Bowl No.		API or No.3						No.2		No.1	

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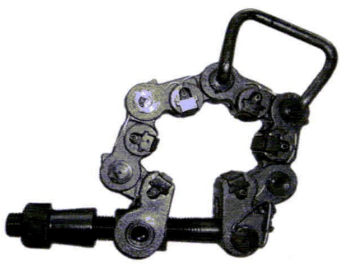
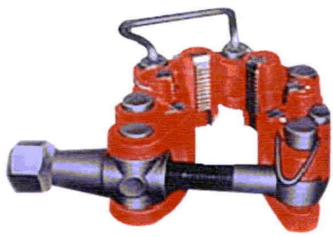
Safety Clamps

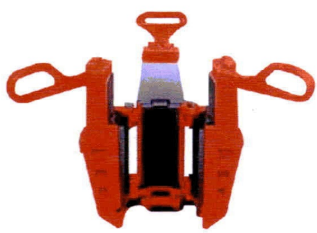
IMP supplies two models of Safety Clamps:
Model WA-C
Model WA-T

Type	Handling Pipe Size	Weight
	in	kg
WA-C	3 1/2-4 5/8	20.9
	4 1/2-5 5/8	25.0
	5 1/2-6 5/8	27.7
	6 1/2-7 5/8	29.1
	7 1/2-8 5/8	31.3
	8 1/2-9 5/8	32.7
	9 1/2-10 5/8	40.0
	10 1/2-11 5/8	41.8
	11 1/2-12 5/8	44.0
	12 1/2-13 5/8	46.3
	13 1/2-14 5/8	48.6
	14 1/2-15 5/8	50.9
WA-T	1 1/8-2	16.3
	2 1/8-3 1/4	18.2
	3 1/2-4 1/2	20.0





Type Flake Rotary Slips



IMP supplies two types of Flake rotary slips which can handle various O.D. drill pipes, drill collars or casing by changing insert gripping dies or insert boxes:
W 31/2-5/100
W 5-7/100

Type	W 3 1/2-5/100					W 5-7/100							
Drill Pipe O.D.	in	3 1/2	4	4 1/2	5	5	5 1/2	5 9/16	5 3/4	6 1/8	6 1/4	6 5/8	7
Max Load	1000kn					1000kn							

intMPE

International Mineral Processing Equipment

A Division of Canamera Enterprises Inc.

Power End Parts

IMP supplies power end parts such as Crank shaft, Pinion shaft, Crosshead, Bull Gear, Pulsation Dampener, Frame and so on for following triplex mud pumps:

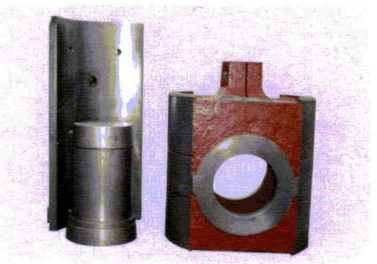
EMSCO: F-500 F-800 F-1000 F-1300 F-1600

NATIONAL OILWELL: 8-P-80 9-P-100 10-P-130 12-P-160

GARDNER DENVER: PZ-8 PZ-9

Crosshead

Crosshead and crosshead guide are made of ASTM A48-83 meehanite featuring god abrasion resistance and long service life. Besides F-500 mud pump that is cylindrical structure, upper and lower guide structures are used for other mud pumps, so that the concentricity can be adjusted by adding space under the lower guide. Flange-bolts with pinhole fit are used for connecting crosshead to extension rod. This rigid connection ensures the concentricity of extension rod and crosshead. Coupling is used for connecting extension rod to crosshead. Light coupling enables the extension rod and the crosshead to connect to each other with ease and reliableness



Pinion Shaft

Pinion shaft is made of forged alloy steel, on which a herringbone gear with the medium-hard teeth surface is machined. For easy maintenance, single row radial cylindrical roller bearing with double ribbed outer ring is used. The pinion shaft ends are prolonged so that sheave or sprocket can be mounted on either end.

Crankshaft

IMP brand crankshaft is made of casted alloy steel. Eccentric ring gear, connection rod and bearings are mounted on it. The eccentric ring gear is herringbone. When assembly, the herringbone bore and crankshaft are of interference fit and fastened with bolts and lock nuts. Big ends of connection rod are mounted on three eccentric straps of the crankshaft via single row cylindrical roller bearings. Small ends are mounted on crosshead pin via double row cylindrical roller bearing. Double row radial spherical roller bearings are mounted at either end of the crankshaft.