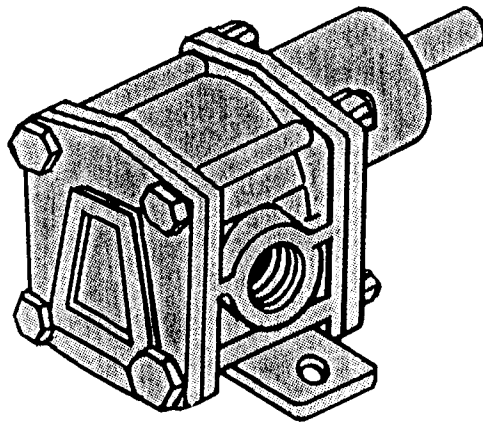


® FPUGR400 Series

® Chemical Gear Pumps



Operator's Manual
M1333/0192

FPUGR400

Chemical Gear Pumps

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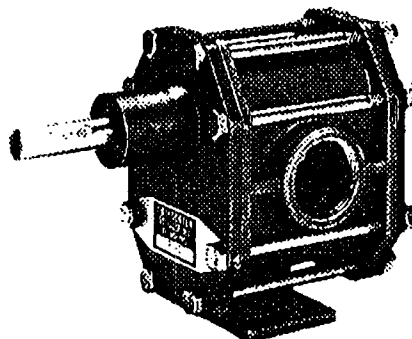
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FPUGR400 Chemical Gear Pumps

SECTION 1

INSTALLATION

Available Models



Model Number	Flow Rate (GPM)	Ports NPT (F)	Shaft Dia.	Motor HP*	Shaft Center-Line Above Base Plate	Overall Dim. In. H x W x L	Shipping Wt Lbs (kg)
316SS Body, Drive Gear, and Shafts; Teflon® Idler Gear; Carbon Bearings; Carbon/Ceramic with Viton® O-Ring Mechanical Seal							
FPUGR411	1	3/8"	3/8"	1/4	1.875"	3 x 2 x 5	2.5 (1.1)
FPUGR412	2	3/8"	3/8"	1/3	1.875"	3 x 2 x 6	3 (1.4)
FPUGR413	4	3/8"	1/2"	1/2	2.625"	4 x 3 x 6	5 (2.3)
FPUGR414	10	3/4"	5/8"	1 1/2	3.0"	5 x 4 x 7	8 (3.6)
FPUGR415	23	1 1/4"	5/8"	3	3.875"	6 x 4 x 8	13 (5.9)
316SS Body and Shafts, Non-Galling SS Gears; Teflon Bearings; Carbon/Ceramic with Viton O-Ring Mechanical Seal							
FPUGR421	1	3/8"	3/8"	1/4	1.875"	3 x 2 x 5	2.5 (1.1)
FPUGR422	2	3/8"	3/8"	1/3	1.875"	3 x 2 x 6	3 (1.4)
FPUGR423	4	3/8"	1/2"	1/2	2.625"	4 x 3 x 6	5 (2.3)
FPUGR424	10	3/4"	5/8"	1 1/2	3.0"	5 x 4 x 8	8 (3.6)
FPUGR425	23	1 1/4"	5/8"	3	3.875"	6 x 4 x 8	13 (5.9)
Hastelloy C Body, Drive Gear, and Shafts; Ryton Idler Gear; Carbon Bearings; Carbon/Ceramic with PTFE Wedge Mechanical Seal							
FPUGR431	1	3/8"	3/8"	1/4	1.875"	3 x 2 x 5	2.5 (1.1)
FPUGR432	2	3/8"	3/8"	1/3	1.875"	3 x 2 x 6	3 (1.4)
FPUGR433	4	3/8"	1/2"	1/2	2.625"	4 x 3 x 6	5 (2.3)
FPUGR434	10	3/4"	5/8"	1 1/2	3.0"	5 x 4 x 8	8 (3.6)
FPUGR435	23	1 1/4"	5/8"	3	3.875"	6 x 4 x 8	13 (5.9)
Glass-Filled Ryton Body and Gears; Carbon Bearings; Carbon/Ceramic Mechanical Seal with Viton O-Ring for FPUGR441, PTFE Wedge for FPUGR442. 316SS (FPUGR441) or Hastelloy C (FPUGR442) Shafts							
FPUGR441	4	3/8"	1/2"	1/2	2.625"	4 x 3 x 6	3.5 (1.6)
FPUGR442	4	3/8"	1/2"	1/2	2.625"	4 x 3 x 6	3.5 (1.1)

INSTALLATION

Principle of Operation

All FPUGR400 Chemical Gear pumps are the positive displacement type. A definite amount of liquid is displaced with each revolution of the pump. The displacement capacity will vary directly with the pump speed within specified limitations.

These pumps will produce a discharge pressure equivalent to the conditions of the particular installation. If these conditions are in excess of the design capability of the pump, the discharge pressure may rise to a point where the pump will be damaged and/or the driver overloaded.

Inspection

Remove the packing list and verify that all equipment has been received. If there are any questions about the shipment, please call OMEGA Customer Service Department at 1-800-622-2378 or (203) 359-1660.

Upon receipt of the shipment, inspect the container and equipment for any signs of damage. Take particular note of any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE: The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

Be sure that the shaft has not been bent or damaged. Rotate the pump by hand to be sure it is free and without tight spots.

If the pump is to be stored, it should be kept in a dry location.

Product Contamination

WARNING: All Chemical Gear pumps are assembled and tested using a suitable grade of machinery oil. Unless specified, this oil is left in the pump during shipment. It ensures some lubrication during start up.

If this oil is detrimental to the system, it will be necessary to dismantle the pump and clean all parts thoroughly.

Before starting, be sure to fill the pump with a compatible liquid.

INSTALLATION

Mounting Bases

Pump units should be mounted on either a concrete or metal foundation of sufficient weight and strength to properly support the entire pump unit. It should be located as close to the liquid source as is practical, while allowing for accessibility for normal pump maintenance.

The foundation should be made flat and smooth to ensure correct alignment of the pump. Provisions should be made to bolt the unit securely in place.

Do not locate the pump unit in a pit unless provisions have been made for proper drainage and ventilation.

Alignment

WARNING: Correct alignment is absolutely essential for satisfactory pump life.

Complete pump units are optionally available set and aligned at the factory on a flat surface plate and shims are inserted where necessary to provide perfect alignment. However, all baseplates are somewhat elastic and as a result we cannot assume responsibility for mechanical operation unless the shop alignment is reproduced when the unit is secured to its foundation.

Since no foundation is perfectly flat or level, it is therefore necessary to shim the baseplate until the pump and motor shafts are level and parallel.

Recommended drive arrangement for pump only is direct motor drive.

For belt or pulley drive application, pillow block bearing **must** be used to achieve acceptable pump life. However, it is important to ensure that the pump and motor shafts are parallel and in line. Recheck the alignment after the piping has been connected to the pump.

After the unit has been completely set and piped, check that the pump rotates freely by hand before activating the driver. When pumps only are supplied for field mounting, it is important that the proper alignment between pump and drive is maintained. The baseplate should be secured to a flat surface plate and the driver and pump set so that the shafts are level and parallel.

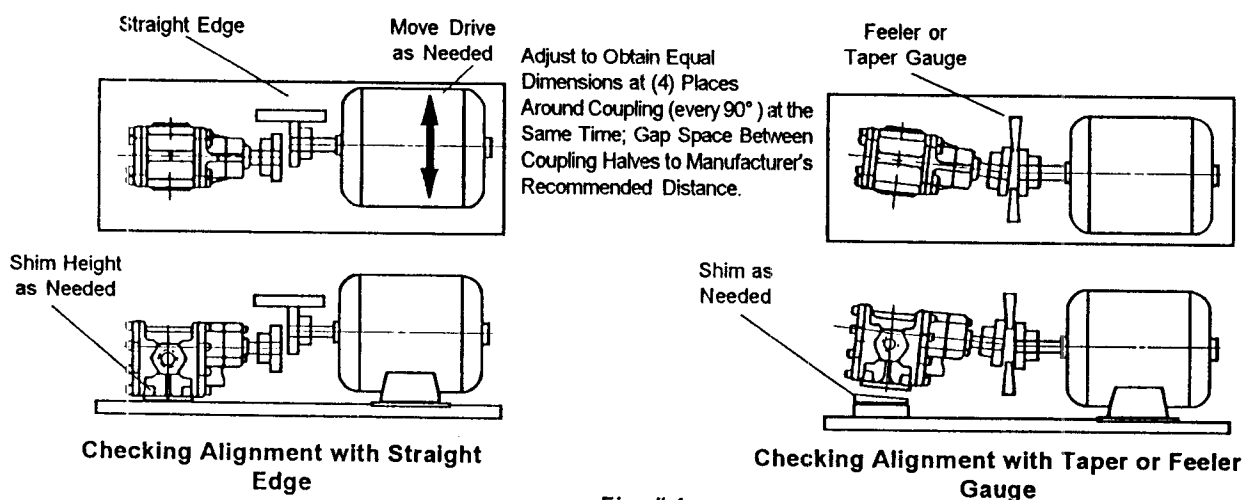
The use of a flexible coupling **will not** compensate for poor alignment.

Parallel alignment can be determined by use of a **straight edge** across the rim of both coupling halves at four positions 90° apart. Couplings aligned in this manner should be true to within .005" at any position.

INSTALLATION

Angular alignment can be checked by gauging the coupling gap at several points.
(See Fig.# 1, Below)

It is **particularly important** that pumps driven through a flexible coupling be mounted in such a manner as to ensure sufficient gap between the coupling components to allow for any end play in the driver.



Suction Piping

Chemical Gear pumps are capable of operating at 17.7 inches mercury suction (20' water). If the static lift plus pipe friction losses combine to exceed this figure, pump operation will be erratic or no pumping at all will be realized.

The most desirable pump installations are those with the shortest suction lines. It is therefore **important** to locate the pump as close to the liquid source as is practical.

Suction piping should **never** be less in diameter than the pump suction opening. When handling thick liquids with appreciable viscosity the suction pipe should be increased to a greater size than the pump opening.

It is **particularly important** that the suction line be air tight. Use a good pipe joint compound or tape at all joints. If the suction line is not tight and air is allowed to enter, the pump capacity will be noticeably reduced or it may not pump at all.

INSTALLATION

Be sure that the suction line is completely clean and free of any foreign matter. Avoid high spots in piping which will tend to trap air.

It is good practice to install either a foot valve or check valve in the suction line to ensure that the pump will prime quickly when started.

When handling highly volatile chemicals it is **necessary** to reduce the suction height to a point where vaporization will not occur. In some instances a positive suction head will be required.

Suction Strainers

Gear pumps are designed and fitted with very close internal clearances. The entry of foreign material or abrasives will cause rapid wear or extensive damage to the pump.

WARNING: It is therefore **necessary** to install a strainer at the pump suction.

Select a strainer of proper size and material with as fine a mesh as is practical, being careful that the pressure drop through the strainer will not add to the suction lift to exceed the suction capability of the pump. Install the strainer as near the pump suction as is practical and in such a manner that it can be easily opened and cleaned.

Be sure to arrange a regular inspection on the strainer basket to avoid clogging.

Discharge

Select pipe of sufficient size to ensure that the resulting friction loss does not add to the discharge head an amount that will exceed the design capability of the pump or motor.

It is **advisable** to install a fitting in the discharge line adjacent to the pump to allow for priming or venting and installation of a pressure gauge for both system and pump performance evaluation.

To avoid excessive pressure build-up due to a closed or blocked discharge line, or due to an increase in liquid viscosity, it is often necessary to install a relief valve in the pumping system.

FPUGR400 Series Gear pumps are **not** available with a relief valve built onto the pump. When required, it is necessary that the relief valve be installed in the discharge piping and piped back to the source of supply.

The relief valve should be set at a pressure of approximately 10 p.s.i. in excess of the designed operating pressure, but not so high as to overload the drive or the pump itself.

OPERATION

Priming

Before operating the pump, make sure that it is thoroughly primed. If at all possible, use a good grade of light lubricating oil.

WARNING: Failure to properly prime the pump could cause immediate damage to the working parts.

Lubrication

The internal bearings in all Chemical Gear pumps are lubricated by the liquid being pumped.

Outboard pillow block support bearings and motor bearing should be lubricated as covered by the manufacturer's instructions.

Direction of Rotation

Upper shaft drive is standard and standard direction of rotation is clockwise when facing shaft end of the pump. When rotated in this manner, the pump and/or piping must be installed so that the suction line is connected to the port on the left hand side of the pump.

If the right hand port is to be the inlet or suction, the rotation must be counter clockwise when facing the pump from the shaft end.

Chemical Gear pumps are designed to operate in either direction of rotation. (See Fig. #2, Below)

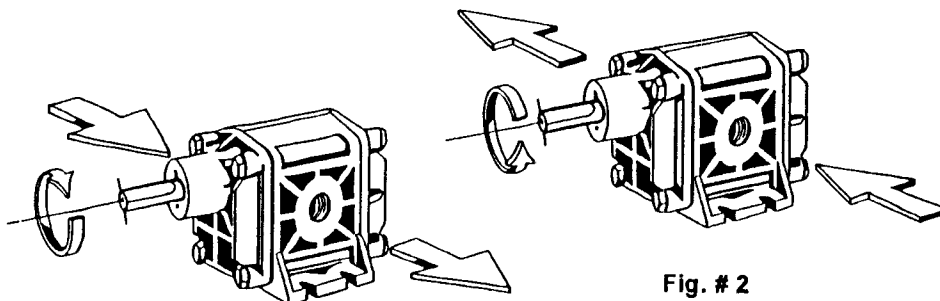


Fig. # 2

OPERATION

Operating Temperatures & Pressures

For metal **Chemical Gear pumps** (stainless steel and Hastelloy "C") several gear options are available.

1. A combination of Metallic drive gear and Teflon idle gear (as in the FPUGR410 series) offers maximum corrosion resistance with limits of 50 p.s.i. pressure and 110°F temperature.
2. Drive and idle gears of non-galling W88 stainless steel (as in the FPUGR420 series) are suitable for 100 p.s.i. pressure and 400°F temperature.
3. Drive gear and idle gear of Teflon (optionally available) offer excellent corrosion resistance, low noise level and economy, but are limited to 50 p.s.i. pressure and 110° F temperature. Teflon gears have lower life expectancy than metal gears.

For Ryton Chemical Gear pumps (FPUGR440 series) - temperature extremes are detrimental to service life and should be avoided.

Basic materials of construction allow temperature range of -40° to 180°F and pressures up to 100 p.s.i

High pressures accelerate pump wear and reduce service life.

When handling products with temperatures in excess of 200° F, care should be taken to avoid sudden temperature shock by introduction of high temperature to a cold pump or reverse. It is advisable to bring the temperature up gradually. Freezing liquid in pumps can deform or damage pumps.

Specifications

Max. Pressure/Temperature:

FPUGR410 Series:	50 psig/110°F (43°C)
FPUGR420 Series:	100 psig/400°F (204°C)
FPUGR430, 440 Series:	100 psig/180°F (82°C)

Minimum Temperature: -60°F (-51°C)

SECTION 2

FPUGR400 Chemical Gear Pumps

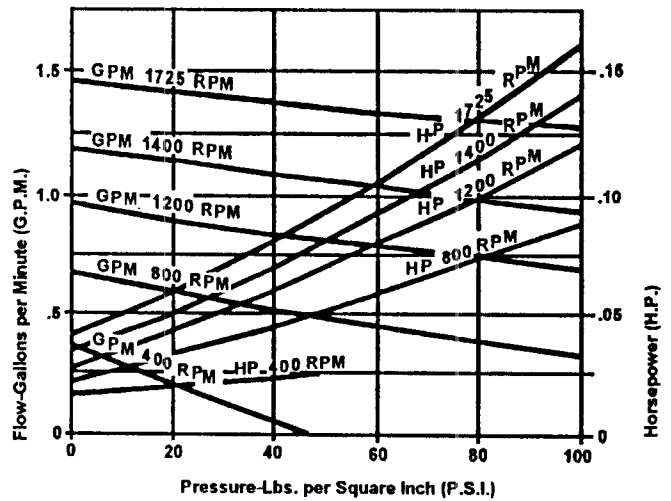
OPERATION

Performance Curves

1 GPM

Water 70°F

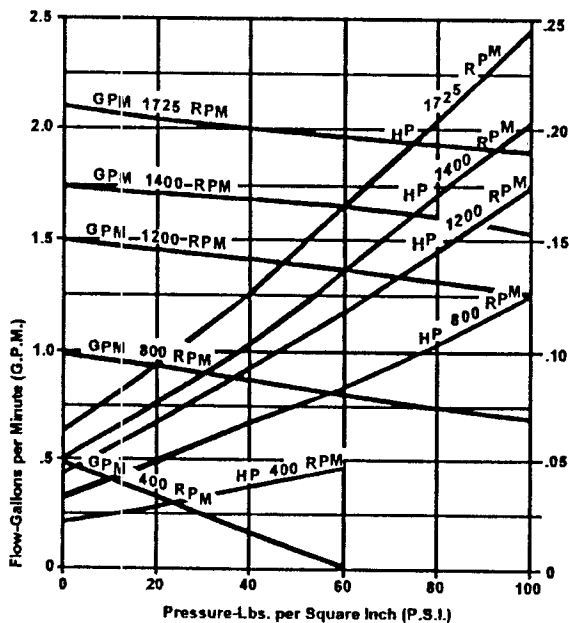
Viscosity 31 S.S.U.



2 GPM

Water 70°F

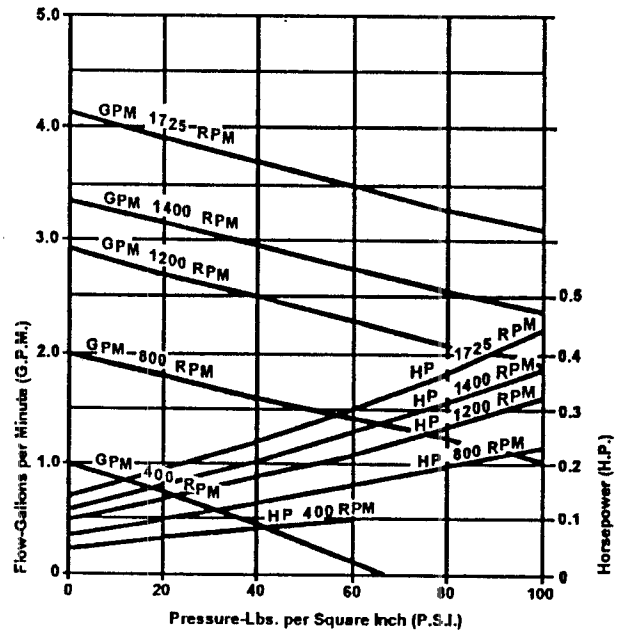
Viscosity 31 S.S.U.



4 GPM

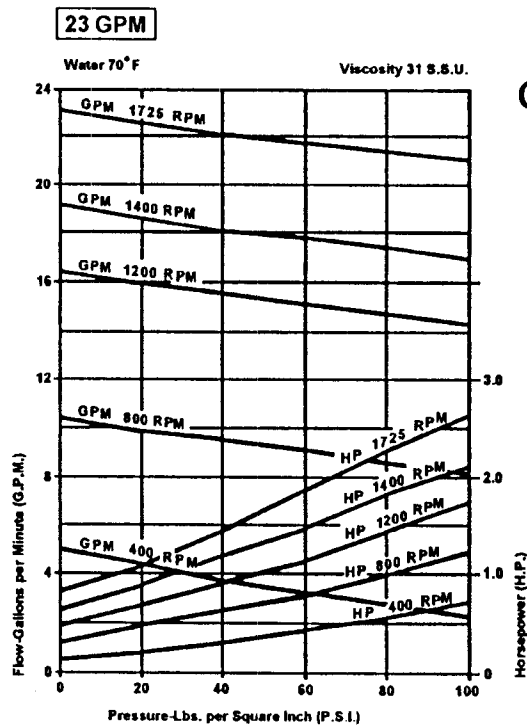
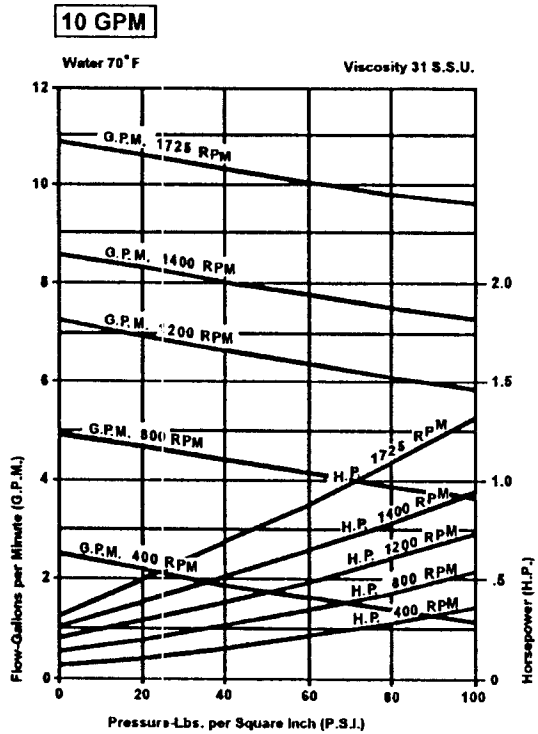
Water 70°F

Viscosity 31 S.S.U.



FPUGR400 Chemical Gear Pumps

SECTION 2



OPERATION

Starting

WARNING: Never start or run the pump dry. This will inevitably cause galling or seizing of the internal parts.

Always prime the pump with a clean, light lubricating oil or with liquid to be pumped.

Before starting, rotate the pump by hand. It should rotate freely without tight spots. Check that all suction and discharge valves are open and that any relief valves have been "backed off".

After priming, start the driver and allow pump to operate at a reduced load while observing for unreasonable noise, heat or vibration. Check to be sure pump is delivering liquid. If not, shutdown immediately and review foregoing instructions.

Gradually bring pump up to operating pressure by tightening relief valve adjustment until the pressure gauge indicates that the system design pressure has been reached. Again check pump for excessive noise, heat or vibration.

Check that the pump is delivering the required capacity and that the vacuum is not in excess of design conditions. If it is determined that the pump is meeting the required conditions it is important to check that the driver is not overloaded.

Be sure that the overload protection for the electric motor is properly sized. Check that the electric motor is operating within the nameplate amperage limitations.

MAINTENANCE & REPAIR

General Maintenance

Chemical Gear pumps are designed to be lubricated by the liquid being pumped and therefore do not require lubrication maintenance.

Barrel type carbon bearings are self-lubricating.

Lubrication for reduction gear drives, outboard bearing supports and electric motors should be maintained as specified in the manufacturer's instructions furnished with the shipment.

Disassembling Pump

Service kits are available for all Chemical Gear pump models. Add "SK" to pump number. Each service kit includes replacement gaskets, seals gears, shafts and bearings.

FPUGR400 Chemical Gear pumps are constructed of three sections: a rear cover, a body section, and a front cover. The three sections are bolted together with thru bolts and nuts.

Remove thru bolts and separate pump sections by tapping lightly while forcing sections apart.

Pump body and a front cover are doweled together. Ease body and front cover off dowel pins by light tapping and forcing apart. Light tapping on exposed pump drive shaft aids separation of pump sections.

Remove rear bearings. Slide out idler gear and shaft assembly and the front idler bearing.

Slide out the drive gear and shaft assembly. For mechanical seal models, the drive gear and shaft assembly also includes thrust washer, seal retaining ring and mechanical seal head.

Two set screws secure the seal head to the drive shaft. Loosen both set screws and slide the seal head from the drive shaft. Removal of the seal retaining ring (snap ring) allows sliding off the thrust washer and upper front bearing.

The mating seal parts in the front cover chamber -seal wearface and seal seat - can be pried out by using a hook tool or by pushing a 1/8" dia. drift through the push-out hole in the front cover.

Metal gears are pinned or keyed to pump shafts and are normally provided as gear and shaft assemblies. Plastic gears are driven via woodruff keys and are positioned and retained over the woodruff keys by retaining rings. Plastic gear and shaft assemblies are also normally provided as gear and shaft assemblies.

Replace any parts where wear is evident.

MAINTENANCE & REPAIR

Reassembling Pump

Carefully clean all parts and lubricate lightly. Make sure pump body faces are clean and free of nicks or scratches. If new bearings are used, try in body and on shaft before reassembling pump.

For mechanical seal models prepare the front cover for reassembly by inserting the **seal wearface** and **seal seat** into the cover's seal chamber.

NOTE: The slot in the ceramic seal wearface must align with and engage with a restraining pin projecting internally from the seal chamber end. Its purpose is to prevent rotation of the ceramic seal wearface.

Improper alignment and non-engagement can result in a chipped or broken ceramic seal wearface when pump sections are bolted together. **Seal leakage will result.**

Next prepare the **drive gear assembly** by sliding on the **front bearing, gasket and thrust washer.**

Install **seal retaining ring** into the groove provided on the shaft. Slide the **mechanical seal head** onto the shaft-metal end first and position against the **seal retaining ring.**

NOTE: The lapped black carbon sealing face on the other end of the mechanical seal head must be clean and lubricated with light oil. It must also be free of marks or scratches when in contact with the seal wearface.

Tighten the two seal head set screws to insure it will rotate with the shaft and carefully insert the complete drive gear and shaft assembly into the pump body.

Next assemble the **lower front carbon bearing** into pump body. Insert **idle gear shaft assembly** and remaining bearings into the pump body section. Assemble front cover by engaging dowel pins into body.

Insert all **(8) cover bolts** into front cover and body, assemble rear cover with gasket and **(8) acorn nuts.** Tighten bolts carefully drawing the three pump sections together. Tighten bolts in diagonal sequence.

Rotate drive shaft by hand to insure alignment and pump looseness.

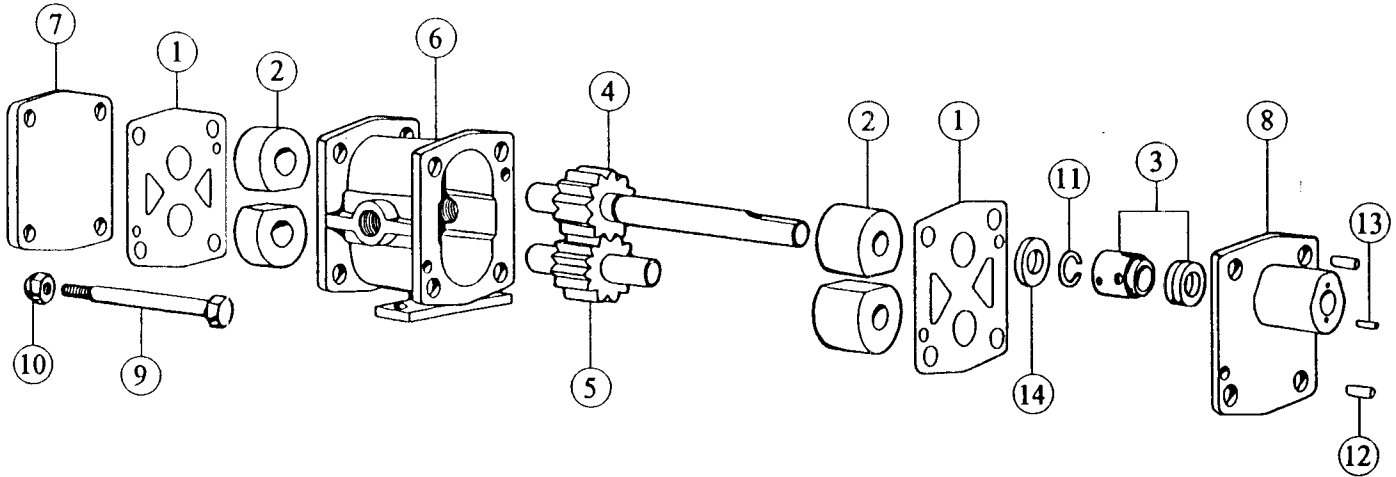
NOTE: Chemical gear pump internal tolerances are held extremely close. Pump parts are manufactured to precise dimensions and most rigid quality control standards. The smallest foreign particle or damage in the form of a nick or gouge could jam the gears and bind the pump.

Extreme cleanliness and care is essential for proper pump assembly.

FPUGR400 Chemical Gear Pumps

SECTION 4

PARTS LIST



**FPUGR411, 421, 431
1 Gallon Per Min.**

Pump Size	Teflon, 316 SS, Carbon, Ceramic										Viton, 316 SS, Carbon, Ceramic													
Seal Mat'l	Carbon Bearing					Teflon Brg.					Carbon Bearing					Teflon Brg.								
Bearg. Mat'l	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Ryton	316SS
Idle Gear Material	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Ryton	316SS
Drive Gear Material	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Ryton	316SS
Pump Number	0141C	0146C	0147C	014BC	014EC	014FC	0141P	0146P	014BP	014EP	0151C	0156C	0157C	015BC	015EC	015FC	0151P	0156P	015BP	015EP				

	No.	Part No.	Part Name	Req.	0141C	0146C	0147C	014BC	014EC	014FC	0141P	0146P	014BP	014EP	0151C	0156C	0157C	015BC	015EC	015FC	0151P	0156P	015BP	015EP
Repair Kit Parts	1	9237	Gasket, Teflon	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	2	9235	Bearing, Carbon	4	*	*	*	*	*	*					*	*	*	*	*	*				
	2	9400	Bearing, White Teflon	4							*	*	*	*							*	*	*	*
	3	32674	Seal Assy. Teflon	1	*	*	*	*	*	*	*	*	*	*										
	3	32771	Seal Assy. Viton	1											*	*	*	*	*	*	*	*	*	*
	4	32768	Drive Gear Assy. Ryton	1	*						*										*	*	*	*
	5	32769	Idle Gear Assy. Ryton	1	*			*			*	*						*			*	*		
	4	32750	Drive Gear Assy. W 88	1		*						*				*						*		
	5	32752	Idle Gear Assy. W 88	1		*						*				*						*		
	4	32751	Drive Gear Assy. Teflon	1			*						*				*						*	
	5	32753	Idle Gear Assy. Teflon	1			*		*				*				*		*				*	
	4	32901	Drive Gear Assy. 316 SS	1				*	*	*		*	*			*	*	*	*	*		*	*	*
5	32902	Idle Gear Assy. 316 SS	1				*	*	*		*	*			*	*	*	*	*		*	*	*	
Other Parts	6	9197	Body 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	7	9128	Rear Cover 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	8	9130	Front Cover 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	9	9223	Hex. Head Cap Screw	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	10	7622	Acorn Nut	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	11	9152	Retaining Ring	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	12	8885	Dowel Pin	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	13	8576	Pin, Ceramic Face	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14	9276	Washer, Teflon	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	

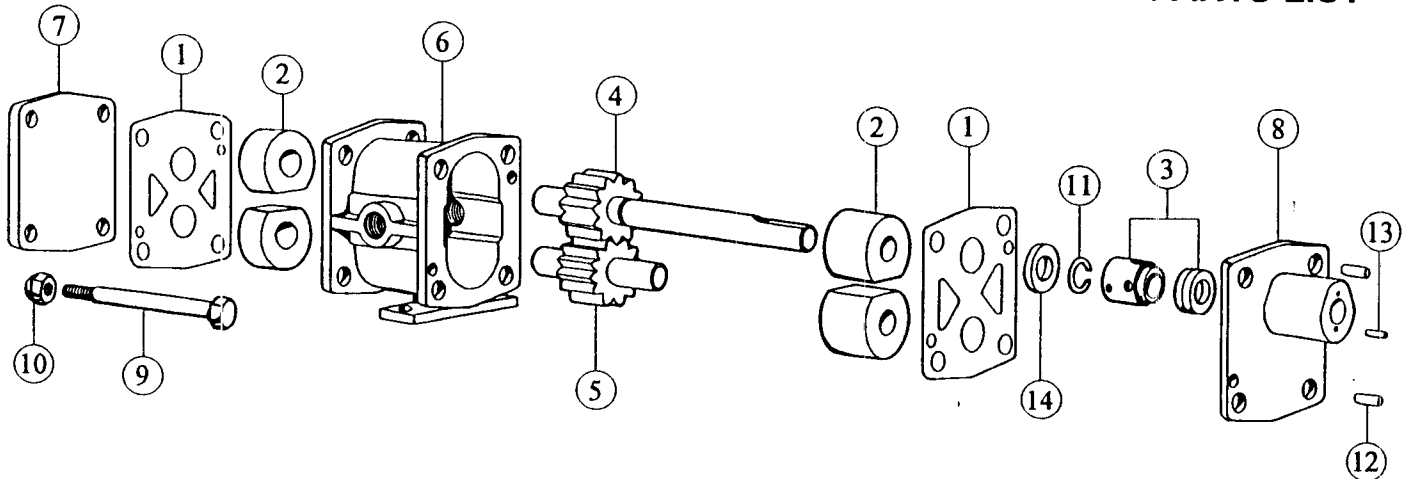
Note: Star (*) indicates usage of part in model numbers as shown.

Teflon gears cannot be combined with Teflon bearings (galling).
Consult factory for combining Ryton gears with Teflon bearings.

FPUGR400 Chemical Gear Pumps

SECTION 4

PARTS LIST



**FPUGR412, 422, 432
2 Gallon Per Min.**

Pump Size	Teflon, 316 SS, Carbon, Ceramic												Viton, 316 SS, Carbon, Ceramic							
Seal Mat'l	Carbon Bearing						Teflon Brg.		Carbon Bearing				Teflon Brg.							
Bearg. Mat'l	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS
Idle Gear Material	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS
Drive Gear Material	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS
Pump Number	1141C	1146C	1147C	1148C	1149C	1149C	1141P	1146P	1148P	1149P	1151C	1156C	1157C	1158C	1159C	1151P	1156P	1158P	1159P	

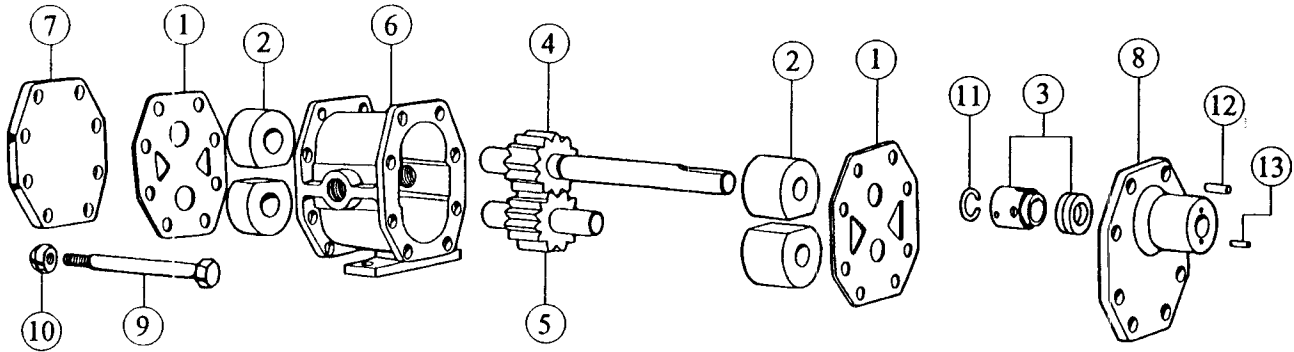
	No.	Part No.	Part Name	Req.																				
					1141C	1146C	1147C	1148C	1149C	1149C	1141P	1146P	1148P	1149P	1151C	1156C	1157C	1158C	1159C	1151P	1156P	1158P	1159P	
Repair Kit Parts	1	9237	Gasket, Teflon	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	2	9235	Bearing, Carbon	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	2	9400	Bearing, White Teflon	4							*	*	*	*	*	*	*	*	*	*	*	*		
	3	32674	Seal Assy. Teflon	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	3	32771	Seal Assy. Viton	1									*	*	*	*	*	*	*	*	*	*		
	4	32768	Drive Gear Assy. Ryton	1	*						*						*				*			
	5	32769	Idle Gear Assy. Ryton	1	*						*						*				*			
	4	32750	Drive Gear Assy. W 88	1		*						*						*						
	5	32752	Idle Gear Assy. W 88	1		*						*						*						
	4	32751	Drive Gear Assy. Teflon	1			*						*						*					
	5	32753	Idle Gear Assy. Teflon	1			*						*						*					
	4	32901	Drive Gear Assy. 316 SS	1				*	*	*			*	*	*	*	*	*	*	*	*	*		
	5	32902	Idle Gear Assy. 316 SS	1				*	*	*			*	*	*	*	*	*	*	*	*	*		
	Other Parts	6	9197	Body 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
7		9128	Rear Cover 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
8		9130	Front Cover 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
9		9223	Hex. Head Cap Screw	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
10		7622	Acorn Nut	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
11		9152	Retaining Ring	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
12		8885	Dowel Pin	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
13		8576	Pin, Ceramic Face	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
14	9276	Washer, Teflon	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			

Note: Star (*) indicates usage of part in model numbers as shown.

Teflon gears cannot be combined with Teflon bearings (galling).
Consult factory for combining Ryton gears with Teflon bearings.

FPUGR400 Chemical Gear Pumps

SECTION 4 PARTS LIST



FPUGR413, 423, 433
4 Gallon Per Min.

Pump Size																				
Seal Mat'l	Teflon, 316 SS, Carbon, Ceramic								Viton, 316 SS, Carbon, Ceramic											
Bearg. Mat'l	Carbon Bearing				Teflon Brg.				Carbon Bearing				Teflon Brg.							
Idle Gear Material	Ryton	W 88	Teflon	Ryton	316SS	316SS	Teflon	Ryton	W 88	Ryton	316SS	316SS	Teflon	Ryton	W 88	Ryton	316SS			
Drive Gear Material	Ryton	W 88	Teflon	316SS	316SS	316SS	Teflon	Ryton	W 88	316SS	316SS	316SS	Teflon	Ryton	W 88	316SS	316SS			
Pump Number	2141C	2146C	2147C	214BC	214EC	214FC	2141P	2146P	2148P	214EP	2151C	2156C	2157C	215BC	215EC	215FC	2151P	2156P	2158P	215EP

	No.	Part No.	Part Name	Req.	Material/Configuration Matrix																				
					2141C	2146C	2147C	214BC	214EC	214FC	2141P	2146P	2148P	214EP	2151C	2156C	2157C	215BC	215EC	215FC	2151P	2156P	2158P	215EP	
Repair Kit Parts	1	7750	Gasket, Teflon	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			
	2	7521	Bearing, Carbon	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			
	2	8995	Bearing, White Teflon	4							*	*	*	*	*	*	*	*	*	*	*	*			
	3	32335	Seal Assy. Teflon	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	3	32772	Seal Assy. Viton	1								*	*	*	*	*	*	*	*	*	*	*			
	4	32417	Drive Gear Assy. Ryton	1	*						*							*	*	*	*	*			
	5	32392	Idle Gear Assy. Ryton	1	*			*			*				*			*	*	*	*	*			
	4	32361	Drive Gear Assy. W 88	1		*						*						*	*	*	*	*			
	5	32362	Idle Gear Assy. W 88	1		*						*						*	*	*	*	*			
	4	32599	Drive Gear Assy. Teflon	1			*						*					*	*	*	*	*			
	5	32600	Idle Gear Assy. Teflon	1			*		*				*			*		*	*	*	*	*			
	4	32899	Drive Gear Assy. 316 SS	1				*	*	*		*	*	*	*	*	*	*	*	*	*	*			
	5	32900	Idle Gear Assy. 316 SS	1				*	*	*		*	*	*	*	*	*	*	*	*	*	*			
Other Parts	6	7532	Body 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			
	7	7535	Rear Cover 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			
	8	7534	Front Cover 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			
	9	7551	Hex. Head Cap Screw	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			
	10	7622	Acorn Nut	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			
	11	8533	Retaining Ring	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			
	12	8885	Dowel Pin	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			
13	7615	Pin, Ceramic Face	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*				

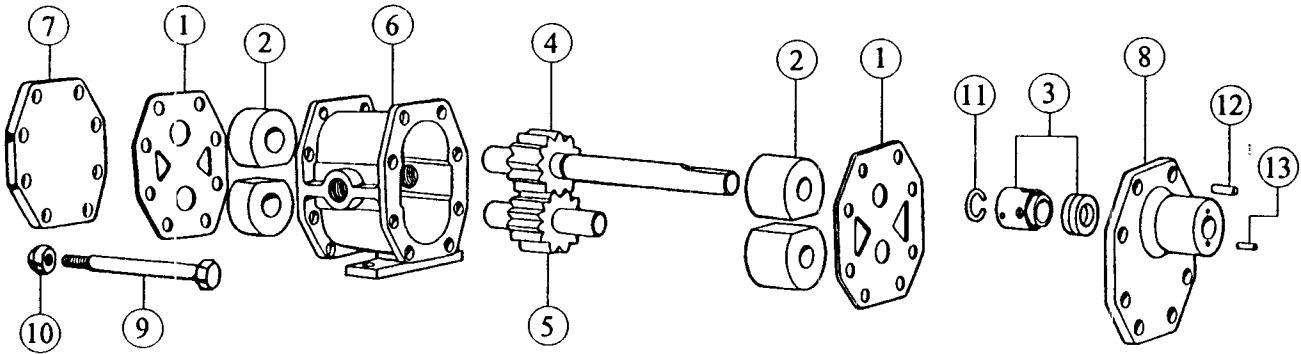
Note: Star (*) indicates usage of part in model numbers as shown.

Teflon gears cannot be combined with Teflon bearings (galling).
Consult factory for combining Ryton gears with Teflon bearings.

FPUGR400 Chemical Gear Pumps

SECTION 4

PARTS LIST



**FPUGR414, 424, 434
10 Gallon Per Min.**

Pump Size	Teflon, 316 SS, Carbon, Ceramic								Viton, 316 SS, Carbon, Ceramic											
Seal Mat'l	Carbon Bearing				Teflon Brg.				Carbon Bearing				Teflon Brg.							
Bearg. Mat'l	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS
Idle Gear Material	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS
Drive Gear Material	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Teflon	Ryton	316SS	Teflon	Ryton	W 88	Ryton	316SS
Pump Number	4141C	4146C	4147C	4148C	414EC	414FC	4141P	4146P	4148P	414EP	4151C	4156C	4157C	4158C	415EC	415FC	4151P	4156P	4158P	415EP

	No.	Part No.	Part Name	Req.	Material Selection Matrix																			
					4141C	4146C	4147C	4148C	414EC	414FC	4141P	4146P	4148P	414EP	4151C	4156C	4157C	4158C	415EC	415FC	4151P	4156P	4158P	415EP
Repair Kit Parts	1	8853	Gasket, Teflon	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	2	8852	Bearing, Carbon	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	2	8890	Bearing, White Teflon	4							*	*	*	*	*	*	*	*	*	*	*	*		
	3	32512	Seal Assy. Teflon	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	3	32761	Seal Assy. Viton	1							*	*	*	*	*	*	*	*	*	*	*	*		
	4	32858	Drive Gear Assy. Ryton	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	5	32857	Idle Gear Assy. Ryton	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	4	32595	Drive Gear Assy. W 88	1		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	5	32596	Idle Gear Assy. W 88	1		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	4	32597	Drive Gear Assy. Teflon	1			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	5	32594	Idle Gear Assy. Teflon	1			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	4	32897	Drive Gear Assy. 316 SS	1				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	5	32898	Idle Gear Assy. 316 SS	1				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Other Parts	6	8848	Body 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	7	8849	Rear Cover 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	8	8850	Front Cover 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	9	8854	Hex. Head Cap Screw	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	10	8395	Acorn Nut	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	11	8860	Retaining Ring	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
	12	8597	Dowel Pin	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
13	8576	Pin, Ceramic Face	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			

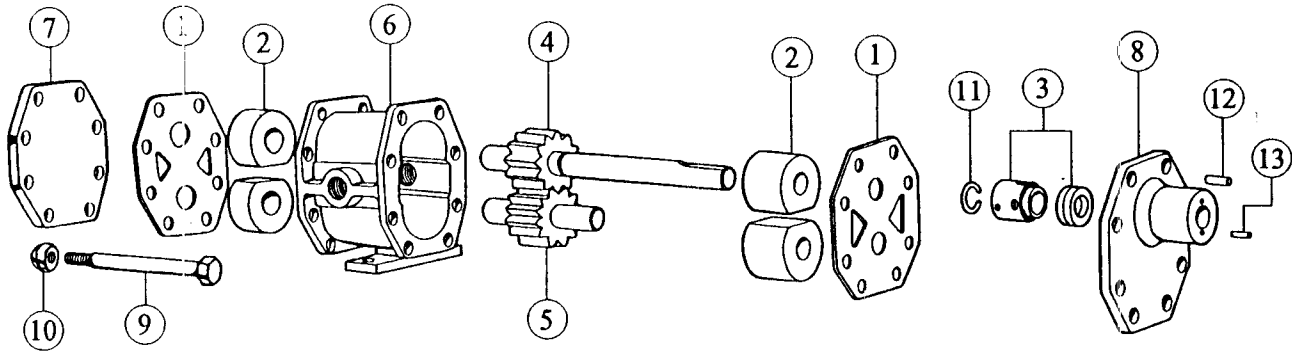
Note: Star (*) indicates usage of part in model numbers as shown.

Teflon gears cannot be combined with Teflon bearings (galling).
Consult factory for combining Ryton gears with Teflon bearings.

FPUGR400 Chemical Gear Pumps

SECTION 4

PARTS LIST



FPUGR415, 425, 435
23 Gallon Per Min.

Pump Size	Teflon, 316 SS, Carbon, Ceramic								Viton, 316 SS, Carbon, Ceramic										
Seal Mat'l	Carbon Bearing				Teflon Brg.				Carbon Bearing				Teflon Brg.						
Bearg. Mat'l	Ryton	W 88	Teflon	Ryton	316SS	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Teflon	Ryton	W 88	Ryton	316SS	
Idle Gear Material	Ryton	W 88	Teflon	Ryton	316SS	316SS	Teflon	Ryton	W 88	Ryton	316SS	Ryton	W 88	Teflon	Ryton	W 88	Ryton	316SS	
Drive Gear Material	Ryton	W 88	Teflon	316SS	316SS	316SS	Teflon	Ryton	W 88	316SS	316SS	Ryton	W 88	Teflon	316SS	316SS	Ryton	W 88	
Pump Number	N/A	9146C	9147C	N/A	914EC	914FC	914FC	N/A	9146P	N/A	914EP	N/A	9156C	9157C	N/A	915EC	915FC	N/A	9156P
	N/A	9146C	9147C	N/A	914EC	914FC	914FC	N/A	9146P	N/A	914EP	N/A	9156C	9157C	N/A	915EC	915FC	N/A	9156P

	No.	Part No.	Part Name	Req.																	
Repair Kit Parts	1	8339	Gasket, Teflon	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	2	8036	Bearing, Carbon	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	2	9411	Bearing, White Teflon	4						*	*	*	*					*	*	*	*
	3	32512	Seal Assy. Teflon	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	3	32761	Seal Assy. Viton	1						*	*	*	*	*	*	*	*	*	*	*	*
	4	-----	Drive Gear Assy. Ryton	1	*					*								*	*	*	*
	5	-----	Idle Gear Assy. Ryton	1	*			*		*	*							*	*	*	*
	4	32517	Drive Gear Assy. W 88	1		*				*								*	*	*	*
	5	32514	Idle Gear Assy. W 88	1		*				*								*	*	*	*
	4	32589	Drive Gear Assy. Teflon	1			*							*				*	*	*	*
	5	32590	Idle Gear Assy. Teflon	1			*		*					*				*	*	*	*
	4	32895	Drive Gear Assy. 316 SS	1				*	*		*	*			*	*		*	*	*	*
	5	32896	Idle Gear Assy. 316 SS	1				*	*		*	*			*	*		*	*	*	*
Other Parts	6	8246	Body 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	7	8247	Rear Cover 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	8	8247	Front Cover 316 SS	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	9	8396	Hex. Head Cap Screw	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	10	8395	Acorn Nut	4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	11	8860	Retaining Ring	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	12	8597	Dowel Pin	2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13	8576	Pin, Ceramic Face	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	

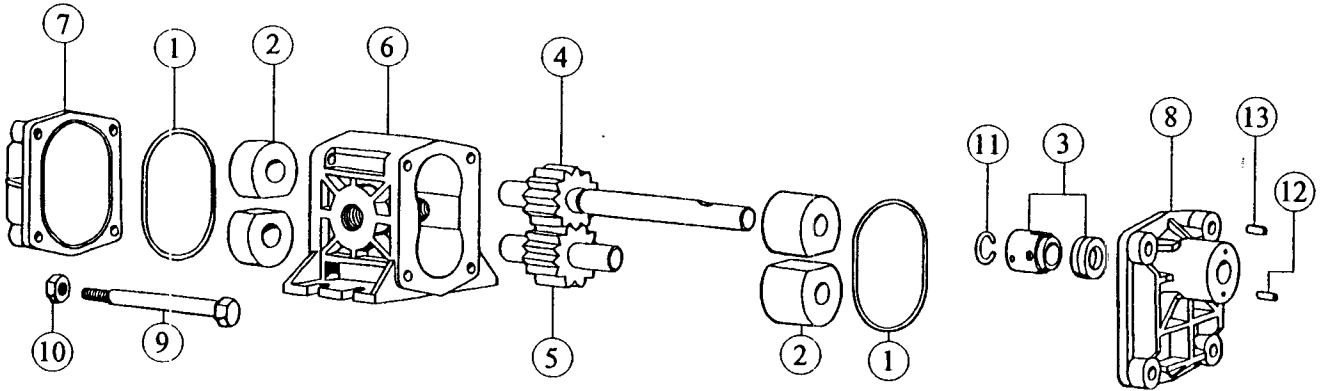
Note: Star (*) indicates usage of part in model numbers as shown.

Teflon gears cannot be combined with Teflon bearings (galling).
Consult factory for combining Ryton gears with Teflon bearings.

FPUGR400 Chemical Gear Pumps

SECTION 4

PARTS LIST



FPUGR441, 442 4 Gallon Per Min. Ryton Pump

Pump Size				
Gear Material	Ryton			
Shaft Material	316 SS		Alloy C	
Mechanical Seal Materials	Teflon 316 SS Carbon Ceramic	Viton 316 SS Carbon Ceramic	Teflon Alloy C Carbon Ceramic	Viton Alloy C Carbon Ceramic
Pump Number	2641C	2651C	2941C	2951C

	No.	Part No.	Part Name	Req.				
Repair Kit Parts	1	8333	O-Ring, Cover	2	*	*	*	*
	2	7521	Bearing, Carbon	4	*	*	*	*
	3	32335	Seal Assy. Teflon, 316 SS	1	*			
	3	32772	Seal Assy. Viton, 316 SS	1		*		
	3	32536	Seal Assy. Teflon, Alloy C	1			*	
	3	32847	Seal Assy. Viton, Alloy C	1				*
	4	32417	Drive Gear Assy. 316 SS Shaft	1	*	*		
	5	32392	Idle Gear Assy. 316 SS Shaft	1	*	*		
	4	32537	Drive Gear Assy. Alloy C Shaft	1			*	*
	5	32538	Idle Gear Assy. Alloy C Shaft	1			*	*
Other Parts	6	8075	Body	1	*	*	*	*
	7	32516	Rear Cover Assy.	1	*	*	*	*
	8	8377	Front Cover	1	*	*	*	*
	9	9713	Hex. Head Cap Screw	4	*	*	*	*
	10	7622	Acorn Nut	4	*	*	*	*
	11	8533	Retaining Ring	1	*	*	*	*
	12	7615	Pin, Ceramic Face	1	*	*	*	*
	13	9714	Dowel Sleeve	2	*	*	*	*

Note: Star (*) indicates usage of part in model numbers as shown.

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