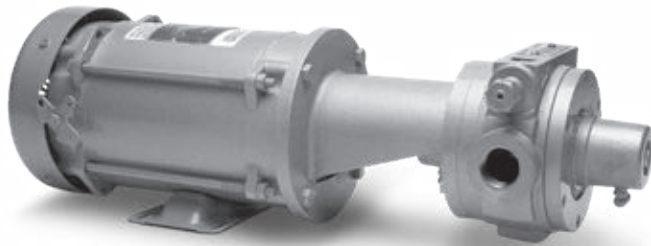


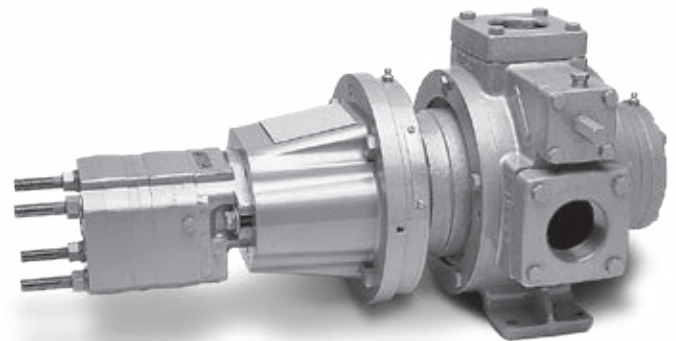
Installation, Operation & Maintenance Manual

Stationary & Mobile Sliding-Vane Pumps for Industrial Applications

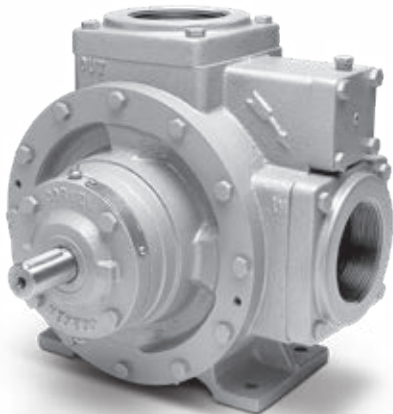
All Models 51, 521, 721, 1021, 1321, and 1521



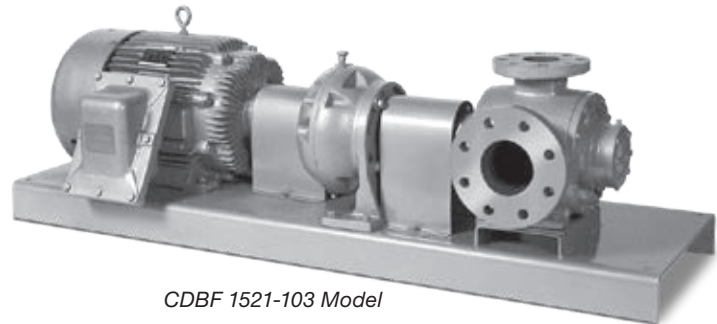
D51 Model



CDHN0521 Model



CDBN1021 Model



CDBF 1521-103 Model

Warning: (1) Periodic inspection and maintenance of Corken products is essential. (2) Inspection, maintenance and installation of Corken products must be made only by experienced, trained and qualified personnel. (3) Maintenance, use and installation of Corken products must comply with Corken instructions, applicable laws and safety standards (such as NFPA Pamphlet 58 for LP-Gas and ANSI K61.1-1972 for Anhydrous Ammonia). (4) Transfer of toxic, dangerous, flammable or explosive substances using Corken products is at user's risk and equipment should be operated only by qualified personnel according to applicable laws and safety standards.

Solutions beyond products...

CORKEN[®]

Warning

Install, use and maintain this equipment according to Corken's instructions and all applicable federal, state, local laws and codes. Periodic inspection and maintenance is essential.

Corken One Year Warranty

CORKEN, INC. warrants that its products will be free from defects in material and workmanship for a period of one year from date of installation, provided that the warranty shall not extend beyond twenty-four (24) months from the date of shipment from CORKEN. If a warranty dispute occurs, the DISTRIBUTOR may be required to provide CORKEN with proof of date of sale. The minimum requirement would be a copy of the DISTRIBUTOR'S invoice to the customer.

CORKEN products which fail within the warrant period due to defects in material or workmanship will be repaired or replaced at CORKEN's option, when returned, freight prepaid to CORKEN, INC., 9201 North I-35 Service Road, Oklahoma City, OK. 73131.

Parts subject to wear or abuse, such as mechanical seals, blades, piston rings, valves and packing, and other parts showing signs of abuse, neglect or failure to be properly maintained are not covered by this limited warranty. Also, equipment, parts and accessories not manufactured by CORKEN but furnished with CORKEN products are not covered by this limited warranty and the purchaser must look to the original manufacturer's warranty, if any. This limited warranty is void if the CORKEN product has been altered or repaired without the consent of CORKEN.

All implied warranties, including any implied warranty of merchantability or fitness for a particular purpose, are expressly negated to the extent permitted by law and shall in no event extend beyond the expressed warrantee period.

CORKEN DISCLAIMS ANY LIABILITY FOR CONSEQUENTIAL DAMAGES DUE TO BREACH OF ANY WRITTEN OR IMPLIED WARRANTY ON CORKEN PRODUCTS. Transfer of toxic, dangerous, flammable or explosive substances using CORKEN products is at the user's risk. Experienced, trained personnel in compliance with governmental and industrial safety standards should handle such substances.

Important notes relating to the European Union (EU) Machinery Directive

Pumps delivered without electric motors are not considered as machines in the EU Machinery Directive. These pumps will be delivered with a Declaration of Incorporation. The fabricator of the machinery must assure and declare full compliance with this Directive before the machine in which the pump will be incorporated, or of which it is a part, is put into service.

Contacting the Factory

Before you contact the factory, note the model number and serial number of your pump. The serial number directs us to a file containing all information on material specifications and test data applying to your specific pump. When ordering parts, the Corken service manual or Operations, Installation and Maintenance (IOM) manual should be consulted for the proper part numbers. ALWAYS INCLUDE THE MODEL NUMBER AND SERIAL NUMBER WHEN ORDERING PARTS.

The model and serial numbers are shown on the nameplate of the unit. Record this information for future reference.

Model No. _____

Serial No. _____

Date Purchased _____

Date Installed _____

Purchased From _____

Installed By _____

Table of Contents

Chapter 1—Installation of a Stationary Pump	4
1.1 The Inlet Piping Should Include the Following	6
1.2 The Outlet Piping Should Include the Following	6
1.3 The Bypass System Must Include the Following	6
1.4 A Vapor Equalizing System Should be Included	6
1.5 Driver Installation	6
Chapter 2—Installation of a Truck Pump	7
2.1 Pump Rotation	7
2.2 Pump Piping	7
2.3 Suction Piping Guidelines	7
2.4 Outlet Piping Guidelines	8
2.5 Back-To-Tank Bypass Systems	8
2.6 Vapor Equalizing System	8
2.7 Power Take-off Drive Systems	8
2.8 Hydraulic Drive Systems	9
Chapter 3—Operation	10
Chapter 4—Maintenance	10
Chapter 5—Preventative Maintenance	11
Chapter 6—Seal Replacement Instructions	12
6.1 Repair Kits and Spare Parts for Stationary Coro-Vane® Pumps	15
Appendices	
A. Model Number Identification Code and Available Options	16
B. Specifications	23
C. Performance	26
D. Outline Dimensions	33
E. Parts Details	40
F. V-Belt Selection	51
G. Troubleshooting Guide	52
G. Extended Storage	53
H. Operating Specifications for Char-Lynn Hydraulic Motor	53

Principles of the Sliding-Vane Pump

The Corken Coro-Vane® pumps are a special type of rotary positive displacement pump, known as a sliding vane pump.

The sliding vane pump has many of the positive displacement advantages of the gear pump, plus the ability to compensate for wear, and operate at a lower noise level.

The sliding vane pump consists of a rotor turning in a cam (liner) machined eccentrically in relation to the rotor; thereby displacing the liquid trapped between the rotor, cam and vanes. The Corken Coro-Vane® pumps are made with vanes produced from advanced polymers which exhibit extremely low coefficients of friction. The vanes are self-adjusting for wear which gives the pump long life.

Exclusive Features of the Coro-Vane® Pump

The pumping of volatile liquids is one of the most difficult of all pumping jobs, so more attention must be given to the design and manufacture of the pump and to its installation and operation.

In addition to being especially suited for handling volatile liquids, your Coro-Vane® pump has a number of features to help make it more easily operated and maintained.

The industrial style Coro-Vane® pump is manufactured in six models: the Models D51 and F51 small stationary and the Models 0521/0522, 0721/0722, 1021/1022, 1321/1322 and 1521/1522 stationary pumps. The F Models (e.g. CPBF1021) have ANSI flanged connections.

The CASE AND HEADS are made of cast or ductile iron.

The VANES are manufactured of advanced polymers to provide excellent life and quiet operation. After long service, the vanes are simply and inexpensively replaced.

Both the CAM and the SIDEPLATES are easily replaced should the need arise.

The MECHANICAL SEAL is designed for longer life under greater loads and may be inspected or replaced without disturbing the piping of the pump. No special tools are needed.

BEARINGS are heavy-duty roller type for long bearing life.

PRESSURE GAUGE connections, 1/4" pipe thread, are provided.

The PUMP NOZZLES on Models 521, 721, 1021, 1321 and 1521 equipped with flanges to simplify piping. It is not necessary to provide unions in the piping system near the pump because the flanges serve this purpose.

The RELIEF VALVE is built-in as part of the pump on all NPT models and is adjustable under pressure.



NOTE: even with this internal safety valve, an external bypass valve must be installed.

Chapter 1—Installation of a Stationary Pump

The installation of the Coro-Vane® pump is simple. However, in order for the pump to deliver optimum performance, the principles discussed in this book should be followed. The piping details are furnished to illustrate methods proved by hundreds of installations. Your own needs may require slight variations, but every effort should be made to follow the recommendations identified in this manual.

No pump can discharge more liquid than it receives, so the pump location and the inlet piping must be given careful attention. If the inlet piping is inadequate to supply the demand of the pump, you may have trouble. In the piping diagram shown in figure 1.2, never use a piping size smaller than the inlet of the pump.

For the transfer of flammable liquids like LPG, the pump must be installed according to the applicable local safety and health regulations. The installer and/or the user must take into account the following:

- The pump must be located as near as possible to the storage tank. The complete inlet line, including the vertical line from the tank must not exceed twelve feet (3.7 m) in length.

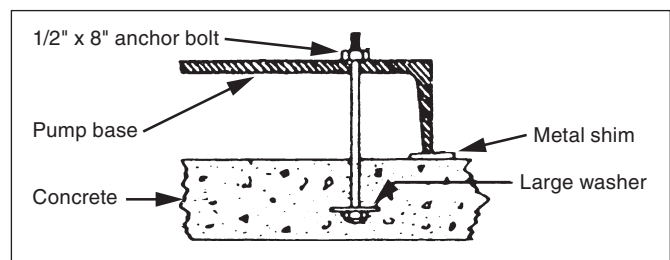


Figure 1.1: Concrete Foundation Diagram

- The bottom of the tank must be no less than two feet (0.6 m) above the pump inlet nozzle, with four feet (1.2 m) considered standard.
- The foundation for the pump is important. The foundation must be firm, level and preferably made of concrete. The suggestions in figure 1 should be observed.
- Potential risk due to local conditions regarding the installation and operation (e.g. poor ventilation and additional risks due to other elements in the vicinity, etc.).
- Qualification of the personnel.

- Type of liquid being transferred.

- Specific safety measures to be applied (e.g. gas detection, automatic shut-off valves, personal protective equipment, etc.).

The following table shows the approximate weight of the bare pump for each model. For handling a bare pump, lifting slings should be used. Web slings are preferred over metal slings to minimize damage to the paint. See Appendix D for outline dimensions.

Model	Approximate Shipping Weight	
	lb	kg
D51	40	18.1
F51	25	11.3
521	120	54.4
721	140	63.5
1021	170	77.1
1321	200	90.7
1521	205	92.9

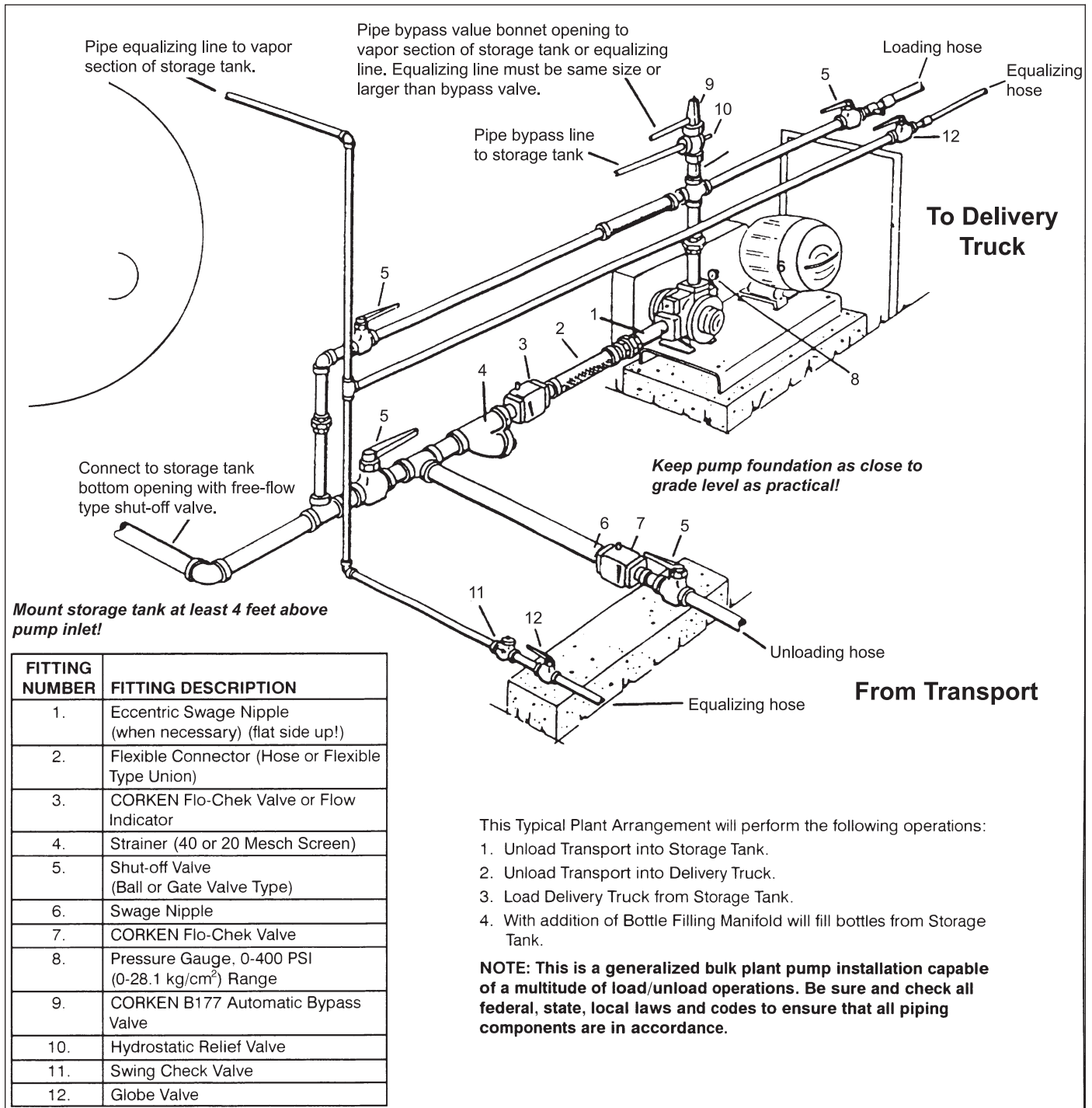


Figure 1.2: Typical Piping Diagram

1.1 The Inlet Piping Should Include the Following

1. The tank excess flow valve (EFV) should have a flow rate of 1-1/2 to 2 times the capacity of the pump. Do not use an EFV without knowing its flow capacity.
2. The tank shut-off valve must be a free-flow type and not a standard globe valve.
3. A strainer of the “Y” type, with 20–40 mesh screen, must be on the inlet line of the pump. (Mesh size indicates the number of openings per lineal inch).
4. Use a flexible connection in the pump inlet and outlet piping to compensate for piping strains.
5. Use an eccentric swage at the pump inlet nozzle to change the line size (flat side up).
6. Make the inlet line level or slope it downward to the pump.
7. Inlet piping size should never be smaller than the inlet of the pump (see piping diagram in figure 2 for more details).

1.2 The Outlet Piping Should Include the Following

1. A pressure gauge should be installed in the pump outlet or near it. A pressure gauge is necessary to determine the efficiency of your pumping system.
2. A hydrostatic relief valve is required by most state laws and for your own safety.
3. If the outlet piping exceeds 50 feet (15.2 m) in length, a check valve should be installed near the pump outlet and after the bypass valve. A check valve is not necessary in applications that do not require a bypass valve.
4. Outlet piping size should never be smaller than the outlet of the pump (see piping diagram in figure 2 for more details).

1.3 The Bypass System Must Include the Following

1. A pump bypass system must be installed. If the pump discharge is shut off before the driver is stopped, dangerously high pressures can develop, unless a bypass valve is installed to permit the pump to discharge back to the supply tank, at a predetermined pressure.
2. The pump may have an internal relief valve, but it is intended as a safety relief valve device and not an operational bypass.

Pump Model	Maximum Differential Pressure
521, 721, 1021	125 psi (8.8 kg/cm ²)
1321, 1521	100 psi (7.0 kg/cm ²)

3. Always install an external bypass relief valve (such as the Corken B177) in the pump discharge line. The bypass valve may discharge into the tank at any convenient opening, either liquid or vapor; however, it should not connect into the pump inlet piping system.

1.4 A Vapor Equalizing System Should be Included

To obtain maximum performance from your Coro-Vane® pump, a vapor equalizing system should be installed. This system is simply a pipe connecting the vapor sections of the tank being unloaded and the tank being filled. This equalizing line allows vapor to move freely between the two tanks (in either direction) and assures that both tanks remain at the same pressure.

As liquid is withdrawn from a tank, it must be replaced by an equal amount of vapor or the pressure in the tank will drop. If an equalizing line is not present, this vapor is formed by “boiling” of the liquid and a reduction of the tank’s pressure. Meanwhile, the tank being filled experiences a pressure increase as the rising fluid levels compresses the vapor space above it. A vapor equalizing line will eliminate both of these problems and will reduce pumping time, differential pressure, noise and wear on the entire system. Slow transfer rates will minimize these effects, and reduce the need for a vapor equalizing line. However, today’s high transfer rates require that a vapor equalizing line be installed.

Another way to consider this principle is to remember that it takes two holes in an oil can for oil to be poured smoothly from the can; one for the oil to exit and the other for the air to enter (see the piping diagram in figure 1.2 for more details).

1.5 Driver Installation

The wiring of your electric motor is extremely important and must be done by a competent electrical contractor. The following wire sizing chart indicates the minimum standards for wire sizes.

Improper motor wiring will cause expensive motor difficulties from low voltage. If you suspect you have low voltage, call your power company. Connecting your motor for the voltage you have available is important too. The motors furnished with the stationary pumps are usually dual voltage, so you must be sure of the voltage your power company is supplying you. Your motor will be completely ruined if it is connected to the wrong voltage.

Motor				Recommended wire size, AWG ¹		
Hp	Motor phase	Volts	Approximate full load amperes	Length of run (ft)		
				0 to 100	to 200	to 300
3	1	115	34.0	6	4	2
		220	17.0	12	8	8
	3	230	9.6	12	12	12
		460	4.8	12	12	12
5	1	115	56.0	4	1	1/0
		230	28.0	10	6	4
	3	230	15.2	12	12	10
		460	7.6	12	12	12
7-1/2	1	230	40.0	8	6	4
	3	230	22.0	10	10	8
		450	11.0	12	12	12
10	3	230	28.0	8	8	8
		460	14.0	12	12	12
15	3	230	42.0	6	6	6
		460	21.0	10	10	10
20	3	230	54.0	4	4	4
		460	27.0	8	8	8
25	3	230	68.0	2	2	2
		460	34.0	6	6	6
30	3	230	80.0	1	1	1
		460	40.0	6	6	6
40	3	230	100.0	2/0	2/0	2/0
		460	52.0	4	4	4
50	3	230	130.0	3/0	3/0	3/0
		460	65.0	2	2	2

¹Based upon 3% voltage loss copper wire type TW. Single phase motor calculations are based on two times distance.

A humid climate can cause problems, particularly in explosion proof motor applications. The normal breathing of the motor, and alternating between being warm when running and cool when stopped, often will cause moist air to be drawn into the motor housing. This moist air will condense, and may eventually add enough free water to the inside of the motor to cause it to fail. To prevent this, make a practice of running the motor and pump at least once a week on a bright, dry day for an hour or so (pumping through the bypass system). In this period the motor will heat up and vaporize the condensed moisture, and drive it out of the motor. No motor manufacturer will guarantee an explosion-proof or totally enclosed motor against damage from moisture.

Engine drivers pose a special consideration. The manufacturer's instructions must be followed. When the stationary pump is equipped with an engine from the factory, the engine speed should normally not exceed 1,800 RPM. Excessive engine speed will overload the engine and cause early failure. The engine loses 3% of its power for every 1,000 feet (305 m) above sea level, so if your installation is at a higher altitude than normal, consult the factory.

Chapter 2—Installation of a Truck Pump

The mechanical installation of a Coro-Vane pump is a simple matter; however, proper attention must be paid to the design of the piping and drive system to ensure proper pump performance and life.

2.1 Pump Rotation

Pump rotation direction is indicated by an arrow that is cast on the side of the case. Truck pump models have shafts on both sides to allow use of the pump without modification regardless of PTO direction.

If it is necessary to run the pump backwards, expect reduced capacity and increased noise. (It will be helpful to slow the pump down). A separate pressure relief valve will be required to protect the pump from excessive pressures should it pump against a closed valve.

2.2 Pump Piping

The piping system design must be carefully reviewed to ensure proper pump operation. Suction head/lift, friction losses due to piping and fittings and fluid properties must all be evaluated before installing a pump.

All piping should be solidly supported at frequent intervals. Loose hangers or strap-like supports can allow pipe movement and are not acceptable. No strain from the piping should be imparted to the pump body.

Pipes subject to wide temperature variations, and pipes installed outdoors must have provisions made to allow for pipe contraction and expansion. A section of flexible pipe near the pump is desirable.

Use low restriction type fittings whenever possible, particularly on the suction line. Oversize piping, strainers and valves; long radius elbows and ball valves will help reduce friction losses.

2.3 Suction Piping Guidelines

- A. Keep the suction pipe as short and simple as possible.
- B. Use as few elbows and other fittings as possible.
- C. The pipe size must be as large as the pump inlet; one size larger is preferable.
- D. Always use a strainer in the suction line. The strainer's net open area should be at least four times the size of the pump suction (eight times for fluids with viscosities over 1000 SSU). A 20–40 mesh screen is normally adequate. A strainer may sometimes be omitted if the pump is above the suction tank.

- E. Do not use any fitting closer than 10 pipe diameters to the pump inlet.
- F. Air leaks must be eliminated from the suction line. A pressure test of the inlet is advisable.

2.4 Outlet Piping Guidelines

- A. The pipe size should be at least as large as the pump discharge opening.
- B. A hydrostatic relief valve is required by most state laws and for your own safety.
- C. All pumps with or without an internal relief valve should have an external bypass valve.
- D. Pumps handling liquefied gases must have an external back-to-tank bypass system. (Liquefied gases are stored in sealed vessels at their vapor pressure. Some typical liquefied gases are propane, anhydrous ammonia, refrigerants, sulphur dioxide, carbon dioxide, etc.)
- E. Pumps handling volatile liquids at a high suction lift should have an external back-to-tank bypass system.

2.5 Back-To-Tank Bypass Systems

(Liquefied Gas Pumps or Volatile Liquid Pumps Only)

1. A back-to-tank bypass system must be installed if the pump is to handle liquefied gases or highly volatile liquids. If the pump discharge is shut-off before the driver is stopped, dangerously high pressures can develop, unless a bypass valve is installed to permit the pump to discharge back to the supply tank at a predetermined pressure.
2. The pump may have an internal relief valve, but it is intended as a relief device and not as an operational valve.
3. Always install an external bypass relief valve (such as the CORKEN ZV200, B166, T166, B177 bypass valve) in the pump discharge line. The bypass valve may discharge into the tank at any convenient "opening," either liquid or "vapor," but it must not connect into the pump inlet piping system.

Pump Model	Maximum Differential Pressure
522, 722, 1022	125 psi (8.8 kg/cm ²)
1322, 1522	100 psi (7.0 kg/cm ²)

4. The setting of the external bypass relief valve should be lower than the internal relief valve (if so equipped).

2.6 Vapor Equalizing System

(Liquefied Gas Pumps Only)

To obtain maximum performance from your Coro-Vane pump when used on liquefied gases, a vapor equalizing system should be installed. This system is simply a pipe connecting the vapor sections of the tank being unloaded and the tank being filled. This equalizing line allows vapor to move freely between the two tanks (in either direction) and assures that both tanks remain at the same pressure.

As liquid is being withdrawn from a tank, it must be replaced by an equal amount of vapor or the pressure in the tank will drop. If an equalizing line is not present, this vapor is formed by "boiling" of the liquid and a reduction of the tank's pressure. Meanwhile, the tank being filled experiences a pressure increase as the rising liquid level compresses the vapor space above it. A vapor equalizing line will eliminate both of these problems and will reduce pumping time, differential pressure, noise, and wear on the entire system. Slow transfer rates will minimize these effects, and reduce the need for a vapor equalizing line. However, today's high transfer rates require that a vapor equalizing line be installed.

Another way to consider this principle is to remember that it takes two holes in an oil can for oil to be poured smoothly from the can; one for the oil to exit and the other for the air to enter.

2.7 Power Take-off Drive Systems

Proper pump operation and long life are directly dependent upon a good drive system. Many truck pumps utilize a power train consisting of shafts and universal joints from a power take-off shaft on the truck engine to the pump.

There are several basic principles that should be followed in laying out a PTO drive. These principles should not be violated. Following them will produce a workable power train that results in long pump life and reduced drive wear.

First, the driver shaft and the driven shaft must be parallel to one another within plus or minus one degree. Improper alignment will cause jerking and back and forth "whip" to the pump shaft, thereby imparting a surging pulsation to the liquid flow, which results in noise, vibration and abnormal wear.

Second, the angle of the "floating" shaft should be within the limits for the particular equipment being used (usually a maximum of 15° at pump speeds up to 800 RPM). To ensure that shaft expansion or contraction does not distort the drive system, a splined slip joint

should be placed between the two universal joints. The drive shaft should be of the "splined" or slip type to permit the shaft to adjust for PTO movement and twisting of the truck frame. A fixed drive shaft transmits the forces directly to the pump and PTO which will shorten the life of both considerably.

Third, the yokes of the drive shaft universal joints must be in a parallel position. Figures 2.7.1 and 2.7.2 illustrate the proper arrangement.

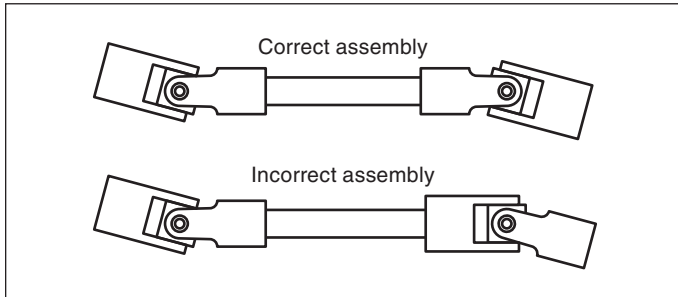


Figure 2.7.1: Universal joint alignment.

Improper installation of the U-joints will soon destroy them along with the bearings in the pump and PTO. Properly mounted, the second universal gives uniform motion to the drive shaft by compensating for the rotational error introduced by the first U-joint. An even number of universal joints (2, 4, 6 etc.) should always be used. An odd number of U-joints will cause unbalanced pump shaft rotation. This problem becomes greater with increased angularity.

Other points to consider include the proper sizing of the shaft components with a maximum horsepower load to be expected, good alignment of hanger bearings and proper pump coupling alignment. Improper PTO systems count for a high percentage of truck pump failures. Always remember to disengage the clutch before shifting the PTO into gear. Shifting the PTO into gear without disengaging the clutch imparts an enormous shock on the PTO, drive shaft, pump and meter and will soon damage one or all of them.

For proper installation of pump drives, follow the rules listed below:

1. Driver shaft and pump shaft must be parallel, plus or minus one degree.
2. Operating angle of the "floating" shaft must be fifteen degrees maximum.
3. Universal yokes must be in line and parallel.
4. Splined slip joints must be used where needed.
5. Use an even number of universal joints.
6. Always use the least practical number of shafts.

PTO selection and drive system design is extremely important. The PTO should have an average output speed of 500 to 800 RPM when the truck engine is operating at the recommended speed.

The designer of the drive system must select a PTO drive shaft capable of meeting the torque requirements of the pumping system.

2.8 Hydraulic Drive Systems

Truck pumps are also driven by hydraulic systems, consisting of an adaptor, motor, pump, cooler and connecting hoses.

The truck pump's shaft must be properly aligned with the hydraulic motor's shaft to avoid excessive stress on the truck pump's main and thrust absorbing bearings. See [Appendix D](#) for outline dimensions.

The sizing of the hydraulic motor, the hydraulic pump and the hydraulic oil cooler must be done using the operational requirements of the truck pump, i.e., flow rate, differential pressure, pump speed, required torque and power. These data are on the performance charts in [Appendix C](#). Information on the Char-Lynn hydraulic motor is found in [Appendix H](#).

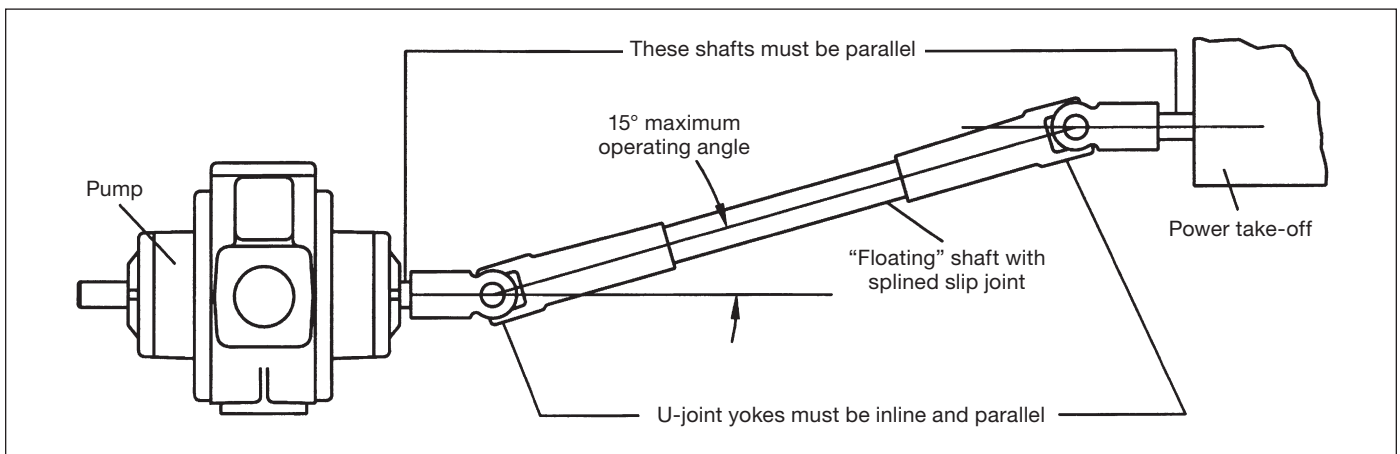


Figure 2.7.2: Typical piping diagram

Chapter 3—Operation

Performance curves and charts are provided in [Appendix C](#).

The following steps should be performed for the initial pumping operation:

1. Make sure the strainer screen is clean.
2. Rotate the pump by hand.
3. Check V-belt drive or direct drive coupling alignment. Misalignment will cause accelerated wear of the drive system, motor bearings and pump.
4. Check motor for proper wiring.
5. Review complete system to make certain the function of every valve and piece of equipment is clearly understood. Everyone operating this system must be properly trained in normal operating procedures and emergency procedures in event of a malfunction.
6. Close all hose valves.
7. Slowly open the storage tank bottom shut-off valve (suction line to the pump). Immediately check the system for leaks.
8. Open any shut-off valves between the bypass valve and the storage tank.
9. Record all pressure gauge readings, especially the pressure gauge located at the discharge of the pump. Start the pump and circulate the liquid through the bypass system back to the storage tank.
10. Verify the proper pump rotation direction. There is an arrow cast in the side of the pump case.
11. An ampmeter may be used by adjusting the bypass valve until the ampmeter indicates the full load motor amperage rating shown on the motor nameplate or maximum rated differential, whichever comes first. Permit the pump to circulate liquid for half an hour or more. If the motor overload protection device stops the motor in this period the bypass valve setting is too high and should be readjusted until the motor will run for half an hour. After a satisfactory setting is achieved, “seal” the valve adjusting stem to prevent tampering with the adjustment (see IH102 and IH106 for more details on the use of the Corken bypass valves).
12. If your pump has an internal relief valve, it must be set higher than the external bypass setting. The internal relief valve may be adjusted while the pump is under pressure. For CD versions remove the flush plug. To decrease the internal relief valve setting, turn the adjusting screw clockwise. For CP versions remove the adjusting screw cap. To decrease the internal relief valve setting, turn the adjusting screw counterclockwise.
13. After initial operation, re-check the strainer screen.

Chapter 4—Maintenance



ALL REPAIRS TO THE PUMP MUST BE PERFORMED BY QUALIFIED PERSONNEL IN A SAFE MANNER, UTILIZING TOOLS AND/OR EQUIPMENT THAT ARE FREE OF HAZARDS, AND FOLLOWS THE APPLICABLE SAFETY CODES OF PRACTICE SET BY THE LOCAL AUTHORITIES HAVING JURISDICTION. MAKE SURE THE SYSTEM PRESSURE HAS BEEN RELIEVED BEFORE ATTEMPTING ANY REPAIR TO THE PUMP.

Your Corken pump requires regular maintenance and care like all mechanical equipment. A neglected or improperly repaired pump will result in premature failure and cause unsafe conditions.



To promote product longevity and safety, maintenance must be performed by properly trained technicians. Make sure all safety systems are in place and the system pressure has been relieved before attempting ANY maintenance.

Make sure the transfer hoses are not “kinked” which can cause excessive pump discharge pressure. Always make sure your hoses are not out of date.

There are two lubrication points in which to grease the pump bearings; one zerk per bearing cap located at opposite ends of the pump. Four grease relief and seal ventilation fittings have been provided, two at each end of the pump, to prevent overgreasing the bearings. Overgreasing can cause seal failure if grease passageways are blocked in some way. Clean each fitting before lubricating the bearings. This practice helps to prevent foreign-material contamination of the bearings and accidental over-pressurization of the mechanical seals. Use only ball bearing grease (MIL-G-10924C) with a temperature rating of -50°F.

Normal wear parts are the mechanical shaft seals, bearings, vanes and sideplates. All of these parts plus O-rings and grease seals are offered in the Corken “repair kit” listed in this manual directly after the “Seal Replacement Instructions”. Use only genuine Corken replacement parts when repairing your Corken pump.

When it becomes necessary to repair your pump or remove it from the system, you must be absolutely certain that all propane, anhydrous ammonia or whatever product being pumped is bled from the pump and connecting piping. Once all the product has safely been bled from the pump and connecting piping, make certain no pressure is left in the system.



SPECIAL CARE MUST BE TAKEN DURING THE BLEED DOWN PROCESS TO AVOID DANGER TO PERSONNEL AND PROPERTY IN THE AREA.

Bleeding a system too fast is a common mistake and may leave “refrigerated” liquid in the pump and piping even though the pressure gauge shows no pressure. As the “refrigerated” liquid begins to warm, more gas will escape causing a dangerous condition. Take your time in bleeding your system and make proper provisions to vent or capture the gas in accordance with local regulations.

 **ONLY A PROPERLY TRAINED INDIVIDUAL SHOULD BE ALLOWED TO BLEED A PUMPING SYSTEM.**

Pump Maintenance Schedule

	Daily	Monthly	Three Months
Lubricate bearings			X ¹
Inspect drive coupling			X
Clean inlet strainer		X	
Check for leaks	X		
Inspect hose and fittings	X		

¹Continuous duty applications may require monthly lubrication.
Figure 4

For a complete list of storage procedures for your Coro-Vane® pump, refer to [Appendix G](#).

Chapter 5—Preventative Maintenance

Purpose

By following an effective preventive maintenance program, unscheduled downtime can be eliminated. This program should be used by the Operation Manager to get a maximum utilization of manpower and equipment as well as to prevent possible unsafe situations and/or production delays due to equipment breakdown.

Scope

The Preventive Maintenance chart in figure 4 includes the items to be regularly checked and inspected with a recommended time schedule. These are basic maintenance recommendations, and each company should develop their own comprehensive preventive maintenance program schedule, tailor-made to their individual operational procedures and requirements.

Maintenance must only be performed by a properly trained and qualified individual following all the applicable safety procedures.

Procedures

Every procedure herein recommended must be performed in a safe manner (utilizing tools and/or equipment which are free of hazards) and following the safety codes of practice set by the authorities having jurisdiction. These are general guidelines and are not intended to cover all

the safety aspects that must be considered and followed while performing these procedures.

1. Visual Inspection:

This includes checking for leaks, corroded areas, condition of hoses, piping and fittings, and any unsafe condition which may hinder the safety of the personnel and/or the facility.

2. Clean Inlet Strainer Screen:

A clogged strainer screen will create too much flow restriction and vapor will be formed causing the pump to cavitate. This reduces the pump’s capacity and accelerates the wear of the internal parts.

3. Inspect Drive Coupling and Driveline:

Check the coupling alignment and the condition of the union for cuts, broken sections and wear.

4. Lubricate Pump Bearings:

Use only ball bearing grease, applied with a manual lubrication pump or gun. Always clean the grease openings thoroughly before greasing.

5. Lubricate Motor Bearing:

Follow the recommendations of the electric motor manufacturer for the type of grease to use and the lubrication frequency.

6. Performance Test:

a. While transferring liquid with the pump, check the pressure at the pump’s inlet port. The pressure drop in the inlet piping is typically less than 3 psi.

b. While transferring liquid with the pump, close the discharge valve(s) so the full flow will be directed back to the storage tank through the bypass valve.

Then slowly close the valve downstream of the bypass valves. The discharge pressure of the pump should increase to the maximum differential pressure of the pump at no flow conditions (see [Appendix C, Performance Curves](#)).

c. If the maximum differential pressure is not obtained, the pump must be serviced. See [Appendix G, Troubleshooting Guide](#) for additional help.

d. Replace vanes or sideplates if worn.

7. Tighten all hold-down bolts.

8. Inspect motor starter contact points.

This procedure must be performed by an authorized and qualified electrician according to the electric motor manufacturer’s guidelines.

Chapter 6—Seal Replacement Instructions

For all Models 521, 721, 1021, 1321, and 1521.

Simple as A, B, C... but watch alignments A, B and C or your new seal will leak!

Caution: Bleed all pressure from the pump and piping before starting to install your seal assembly.

Cleanliness

Even the smallest amount of dirt on your new seal can cause early failure. Keep all parts, tools and your

hands clean while installing the seal. Never touch the smooth lapped faces of the carbon rotor or seal seat. With LP-Gas, anhydrous ammonia, and similar liquids, the fluid is 5 to 10 times thinner than water so the smooth/lapped surfaces of the new seal need to be as clean as possible.

Workmanship

This pump is a precision piece of equipment with very close clearances and should be treated with care. Never beat on it when inserting or removing parts.

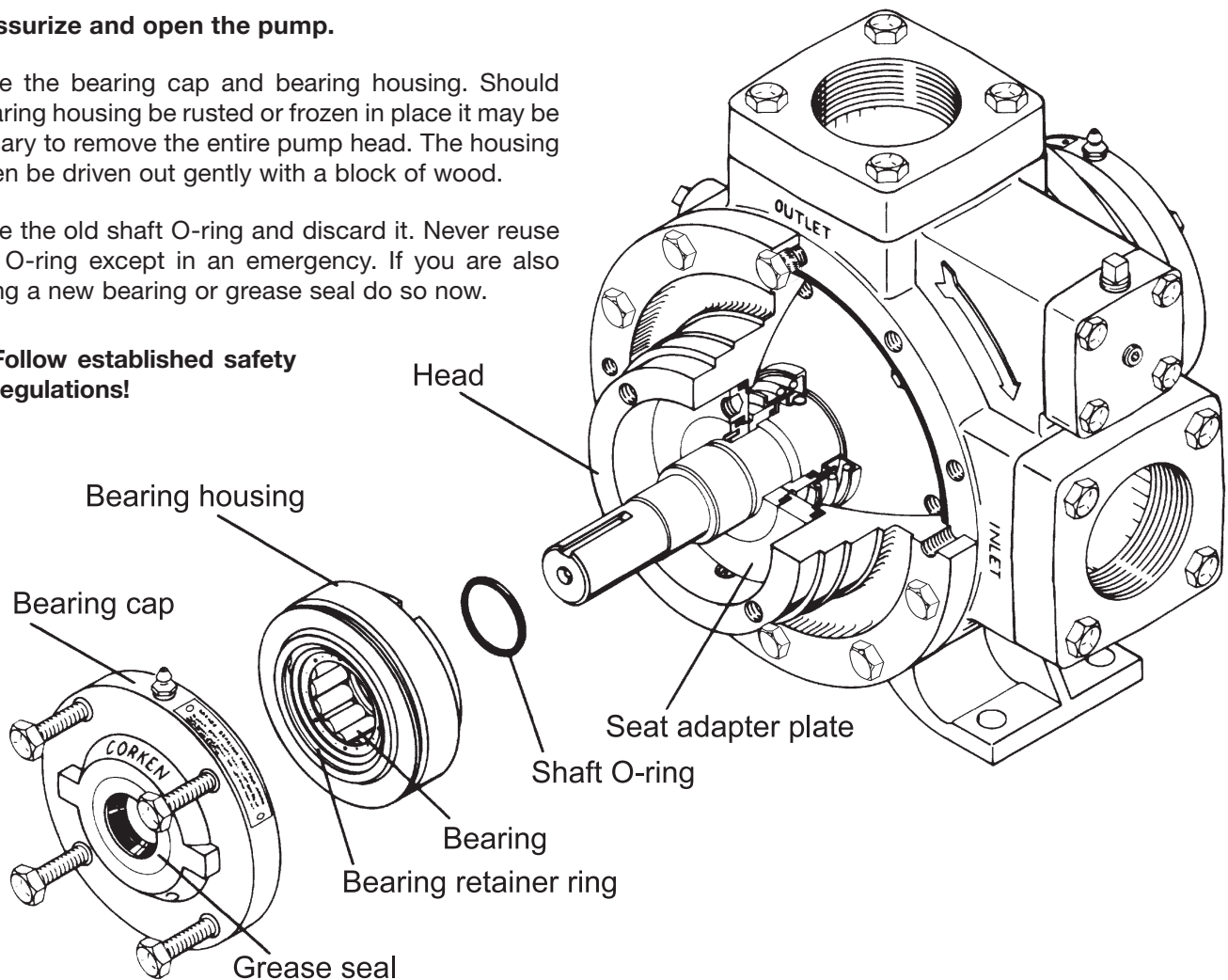
Step 1

Depressurize and open the pump.

Remove the bearing cap and bearing housing. Should the bearing housing be rusted or frozen in place it may be necessary to remove the entire pump head. The housing can then be driven out gently with a block of wood.

Remove the old shaft O-ring and discard it. Never reuse an old O-ring except in an emergency. If you are also installing a new bearing or grease seal do so now.


Follow established safety regulations!

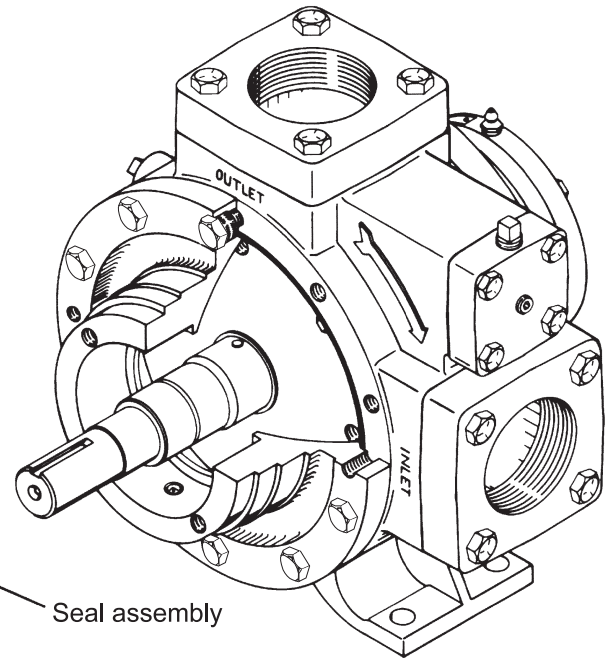
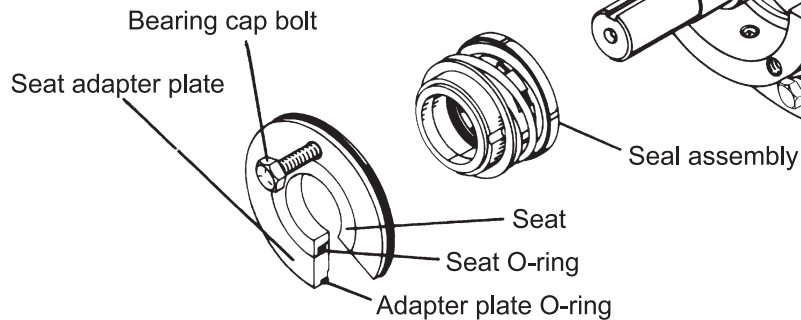


Step 2

Remove the old seal.

The seat adapter plate can be removed using a bearing cap bolt as a puller. Disregard the old adapter plate O-ring, seat, and seat O-ring. Remove and discard the rest of the old seal. Thoroughly clean all surfaces that contact O-rings. Use fine emery or crocus cloth. The shaft under the seal O-ring should be shiny smooth. Lubricate all surfaces with a clean, light oil. Do not let dirt settle on the parts.

 **Caution: Mechanical seals are precision devices. Care must be used when handling and installing the seal seat to prevent chipping or cracking.**



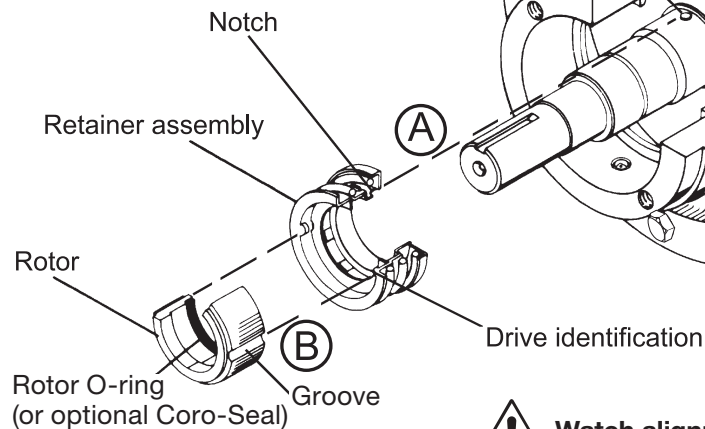
Step 3

Proper alignment of the new seal.

This is the most critical step of the seal installation. With clean hands unwrap the new seal without touching the seal faces.

- A. Locate the notch on the back of the retainer assembly and position over the shaft drive pin as shown in the illustration. If the shaft drive pin is not aligned with the notch, the seal will be improperly positioned and leak. It should not require any force to install the retainer assembly.

Hold the carbon rotor without touching the lapped face; lubricate the rotor O-ring with a light oil and install both on the pump shaft. (For the optional PTFE Coro-Seal installation, see the following paragraph.)



 **Watch alignments A and B!**

If you are using the optional PTFE Coro-Seal, make sure the shaft is very clean and smooth as the PTFE seal is not as tolerant of surface blemishes as rubber O-rings. After lubricating the Coro-Seal, install in the backside of carbon rotor with the spring toward you and slide the carbon rotor in position as previously described.

- B. The two grooves in the carbon rotor must line up with the drive indentations in the retainer assembly. If they do not, the seal will be improperly positioned and leak. Do not allow the carbon rotor to cock. This may chip the lapped face.

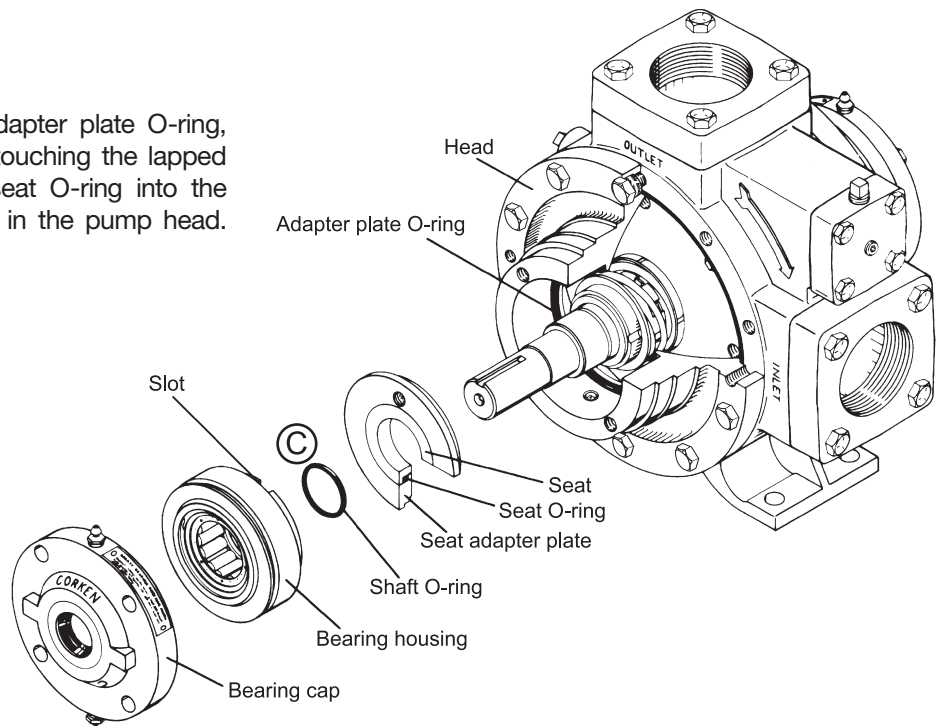
Step 4

Completing the installation.

After applying some oil to the new adapter plate O-ring, insert it into the pump head. Without touching the lapped face, insert the new seat and oiled seat O-ring into the adapter plate. Install the adapter plate in the pump head. Install the shaft O-ring on the shaft.

C. Slide the bearing housing over the shaft and install the bearing cap using a criss-cross method on the bolts and make sure the pump shaft turns freely.

 **Watch alignment C!**



Step 5

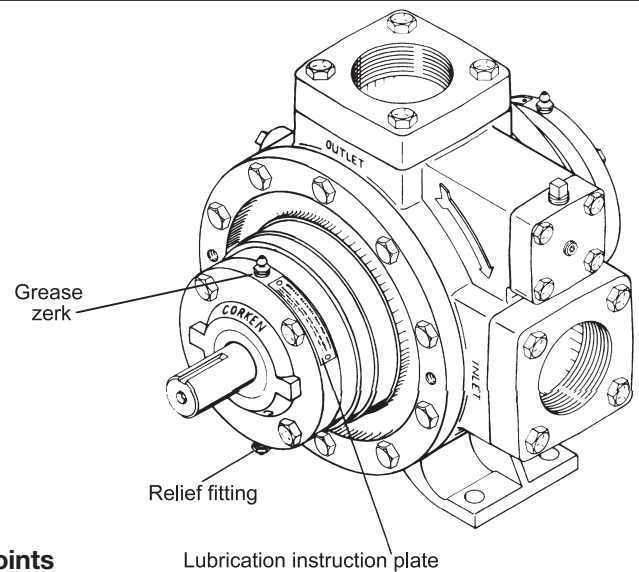
Proper lubrication.

For proper lubrication, use MIL-G-10924C ball bearing grease only. Each pump is equipped with a grease zerk and relief fitting. Before greasing the bearing, the grease zerk and relief fitting must be cleaned thoroughly. If any dirt is forced through the grease zerk, early bearing failure will result.

Overgreasing will damage the pump bearings. To help prevent overgreasing, use a hand operated grease gun. Insert the grease slowly and stop as soon as the relief fitting opens. Excessive grease may drip out of the relief fitting for several hours after lubrication.

 **Do not overgrease!**

NOTE: When lubricating truck pumps, grease the U-joints and the spline of the drive shaft as well.

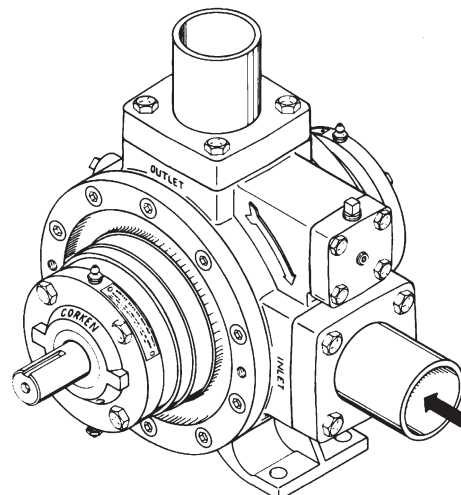


Step 6

Repressurize the system.

For best results slowly pressurize the pump with vapor before introducing liquid to the pump. When liquid enters a unpressurized pump—even slowly—it can sometimes refrigerate enough to keep the O-rings/elastomers from sealing properly and cause a leak.

 **Vapor first, then liquid!**



6.1 Repair Kits and Spare Parts for Stationary Coro-Vane® Pumps

D51 and F51 Standard Repair Parts (no kit available)

2296-1X_6 ^a	Seal assembly
2451-2	Vane
2-154_ ^a	Case O-ring
2491	Sideplate

D51 and F51 Additional Spare Parts

2492-X	Rotor and shaft
2471	Roller bearing

All 0521 and 0522 Models

Repair Kits: Includes blades, push rods, seals, bearings, grease seals, and O-rings.

Part Number **Trim Option**

3101-X1A6	Buna-N
3101-X1B6	Neoprene ^{®b}
3101-X1D6	Viton ^{®b}
3101-X1E6	PTFE

Rebuild Kits: Includes a repair kit plus sideplates and cam.

Part Number **Trim Option**

3101-X2A6	Buna-N
3101-X2B6	Neoprene ^{®b}
3101-X2D6	Viton ^{®b}
3101-X2E6	PTFE

All 0721 and 0722 Models

Repair Kits: Includes blades, push rods, seals, bearings, grease seals, and O-rings.

Part Number **Trim Option**

3126-X1A6	Buna-N
3126-X1B6	Neoprene ^{®b}
3126-X1D6	Viton ^{®b}
3126-X1E6	PTFE

Rebuild Kits: Includes a repair kit plus sideplates and cam.

Part Number **Trim Option**

3126-X2A6	Buna-N
3126-X2B6	Neoprene ^{®b}
3126-X2D6	Viton ^{®b}
3126-X2E6	PTFE

^a _ denotes material code. See material code chart for details.

^b Registered trademark of the DuPont company.

Material Code	
A	Buna-N
B	Neoprene ^{®b}
D	Viton ^{®b}
E	PTFE

All 1021 and 1022 Models

Repair Kits: Includes blades, push rods, seals, bearings, grease seals, and O-rings.

Part Number **Trim Option**

3103-X1A6	Buna-N
3103-X1B6	Neoprene ^{®b}
3103-X1D6	Viton ^{®b}
3103-X1E6	PTFE

Rebuild Kits: Includes a repair kit plus sideplates and cam.

Part Number **Trim Option**

3103-X2A6	Buna-N
3103-X2B6	Neoprene ^{®b}
3103-X2D6	Viton ^{®b}
3103-X2E6	PTFE

All 1321 and 1322 Models

Repair Kits: Includes blades, push rods, seals, bearings, grease seals, and O-rings.

Part Number **Trim Option**

3106-X1A6	Buna-N
3106-X1B6	Neoprene ^{®b}
3106-X1D6	Viton ^{®b}
3106-X1E6	PTFE

Rebuild Kits: Includes a repair kit plus sideplates and cam.

Part Number **Trim Option**

3106-X2A6	Buna-N
3106-X2B6	Neoprene ^{®b}
3106-X2D6	Viton ^{®b}
3106-X2E6	PTFE

All 1521 and 1522 Models

Repair Kits: Includes blades, push rods, seals, bearings, grease seals, and O-rings.

Part Number **Trim Option**

3105-X1A6	Buna-N
3105-X1B6	Neoprene ^{®b}
3105-X1D6	Viton ^{®b}
3105-X1E6	PTFE

Rebuild Kits: Includes a repair kit plus sideplates and cam.

Part Number **Trim Option**

3105-X2A6	Buna-N
3105-X2B6	Neoprene ^{®b}
3105-X2D6	Viton ^{®b}
3105-X2E6	PTFE

Appendix A—Model Number Identification Code and Available Options

Models D51 and F51

Product Description

D51 Bare pump with mounting bracket and flexible coupling to close couple the pump to any NEMA 56 or 66 C-face motor. (Note motor is not included)

F51 Frame mounted pump for baseplate mounting (bare pump only)

Base Model #	D51	F51
Inlet	1" NPT	1" NPT
Outlet	3/4" NPT	3/4" NPT
Weight bare pump lbs. (kg)	40 (18.1)	25 (11.3)

Model Number
Base X X X X

Specification Fields

Pump	Ductile iron	Standard	A
Vanes	Carbon	Standard	D
O-ring Material	Buna-N	Standard	A
	Neoprene ^{®1}	No charge option	B
Seal Seat Material	Silicon carbide	Standard	6

Mounting Options

Part Number	Model Reference	Maximum Motor Frame Size	Ship Weight lb (kg) Mounting Only	Mounting Option
101-12	F51 only	145T	25 (11.3)	Mounting for frame mounted pump (F51) mounting includes steel baseplate and direct drive through flexible coupling

¹Registered trademark of the DuPont company.

Appendix A—Model Number Identification Code and Available Options

CP-Series (low pressure)

Base Model # ¹	CPBN0521	CPBN0721	CPBF0721	CPBN1021	CPBF1021	CPBN1321	CPBF1321	CPBN1521	CPBF1521	Model Number					
Inlet ²	2" NPT	2½" NPT	3" ANSI 300 lb	3" NPT	3" ANSI 300 lb	4" NPT	4" ANSI 300 lb	4" NPT	4" ANSI 300 lb	Base	X	X	X	X	X
Outlet ²	2" NPT	2½" NPT	2" ANSI 300 lb	3" NPT	2½" ANSI 300 lb	3" NPT	3" ANSI 300 lb	4" NPT	3" ANSI 300 lb						
Internal Relief Valve	Yes	Yes	No ³	Yes	No ³	Yes	No ³	Yes	No ³						
Weight bare pump (lbs.)	121	138	145	170	170	194	205	194	205						

Specification Fields

Blade Type	6 blades with blade drivers	Standard	H
Blade Material	GCB-50 with composite push rods	Standard	G
O-ring Material	Buna-N	Standard	A
	Neoprene ^{®4}	No charge option	B
	Viton ^{®4}	Optional	D
	PTFE	Optional	E
	Buna-N w/Viton ^{®4} Seal O-rings	Optional	L
	Buna-N w/PTFE Seal O-rings	Optional	M
	Viton w/PTFE Seal O-rings	Optional	N
Seal Seat Material	Silicon carbide	Standard	6

Flange Options WF=Slip on weld flange All ANSI flanges are 300 lb. • = Available option "Blank" = Not available

Inlet Flange

Standard	2" NPT	•								E
	2-1/2" NPT		•							J
	3" NPT			•						M
	3" ANSI				•					P
	4" NPT					•			•	Q
No Cost	4" ANSI						•		•	S
	2-1/2" NPT	•			•					J
Extra Cost	3" NPT	•	•							M
	2" WF	•								F
	2-1/2" WF	•	•		•					K
	3" WF	•	•		•					N
	4" WF					•			•	R

Outlet Flange

Standard	2" NPT	•								E
	2-1/2" NPT		•							J
	2" ANSI			•						H
	2-1/2" ANSI					•				L
	3" NPT				•		•			M
	3" ANSI							•	•	P
No Cost	4" NPT							•		Q
	1-1/2" NPT	•								C
	2" NPT		•		•					E
	2-1/2" NPT	•			•					J
	3" NPT		•					•		M
Extra Cost	4" NPT					•				Q
	1-1/2" WF	•								D
	2" WF	•	•		•					F
	2-1/2" WF	•	•		•					K
	3" WF	•	•		•		•		•	N
	4" WF					•		•		R

¹F=300 lb. ANSI flanges with no internal relief valve. N=NPT threaded flanges with internal relief valve.

²See Flange Options for available sizes.

³External bypass valve required, such as CORKEN model B177.

⁴Registered trademark of the DuPont company.

Appendix A—Model Number Identification Code and Available Options

CD-Series (high pressure)

Base Model # ¹	CDBN0521	CDBN1021	CDBF1021	CDBN1321	CDBF1321	CDBN1521	CDBF1521	SF521 ²	Model Number
Inlet ³	2" NPT	3" NPT	3" ANSI 300 lb	4" NPT	4" ANSI 300 lb	4" NPT	4" ANSI 300 lb	2-1/2" ANSI	Base X X X X X
Outlet ³	2" NPT	3" NPT	2-1/2" ANSI 300 lb	3" NPT	3" ANSI 300 lb	4" NPT	3" ANSI 300 lb	2" ANSI	X X X X X
Internal Relief Valve	Yes	Yes	No ⁴	Yes	No ⁴	Yes	No ⁴	No ⁴	X X X X X
Weight bare pump (lbs.)	121	170	170	194	205	194	205	140	X X X X X

Specification Fields

Blade Type	6 blades with blade drivers	Standard	H
Blade Material	GCB-50 with composite push rods	Standard	G
O-ring Material	Buna-N	Standard	A
	Neoprene ^{®5}	No charge option	B
	Viton ^{®5}	Optional	D
	PTFE	Optional	E
	Buna-N w/Viton ^{®5} Seal O-rings	Optional	L
	Buna-N w/PTFE Seal O-rings	Optional	M
	Viton w/PTFE Seal O-rings	Optional	N
Seal Seat Material	Silicon carbide	Standard	6

Flange Options WF=Slip on weld flange All ANSI flanges are 300 lb. • = Available option "Blank" = Not available

Inlet Flange

Standard	2" NPT	•							E
	3" NPT		•						M
	3" ANSI			•					P
	4" NPT				•		•		Q
	4" ANSI					•		•	S
	2-1/2" ANSI								•
No Cost	2-1/2" NPT	•							J
	3" NPT	•			•				M
	4" NPT		•						Q
Extra Cost	2" WF	•							F
	2-1/2" WF	•							K
	3" WF		•						N
	4" WF		•		•		•		R

Outlet Flange

Standard	2" NPT	•							E
	2" ANSI							•	H
	2-1/2" ANSI			•					L
	3" NPT		•		•				M
	3" ANSI					•		•	P
	4" NPT						•		Q
No Cost	1-1/2" NPT	•							C
	2" NPT		•						E
	2-1/2" NPT	•							J
	3" NPT						•		M
	4" NPT		•		•				Q
Extra Cost	1-1/2" WF	•							D
	2" WF	•							F
	2-1/2" WF	•							K
	3" WF		•		•		•		N
	4" WF		•		•		•		R

¹F=300 lb. ANSI flanges with no internal relief valve. N=NPT threaded flanges with internal relief valve.

²This pump has a cast steel case.

³See Flange Options for available sizes.

⁴External bypass valve required, such as CORKEN model B177.

⁵Registered trademark of the DuPont company.

Appendix A—Model Number Identification Code and Available Options

Hydraulic/Internal Gear CP-Series (low pressure)

Base Model # ¹	CPHN0521	CPHN0721	CPHF0721	CPHN1021	CPHF1321	CPHN1321	CPHF1321	CPHN1521	CPHF1521	Model Number					
Inlet ²	2" NPT	2½" NPT	3" ANSI 300 lb	3" NPT	3" ANSI 300 lb	4" NPT	4" ANSI 300 lb	4" NPT	4" ANSI 300 lb	Base	X	X	X	X	X
Outlet ²	2" NPT	2½" NPT	2" ANSI 300 lb	3" NPT	2½" ANSI 300 lb	3" NPT	3" ANSI 300 lb	4" NPT	3" ANSI 300 lb						
Internal Relief Valve	Yes	Yes	No ³	Yes	No ³	Yes	No ³	Yes	No ³						
Weight bare pump (lbs.)	121	138	145	170	170	194	205	194	205						

Specification Fields

Blade Type	6 blades with blade drivers	Standard	H
Blade Material	GCB-50 with composite push rods	Standard	G
O-ring Material	Buna-N	Standard	A
	Neoprene ^{®4}	No charge option	B
	Viton ^{®4}	Optional	D
	PTFE	Optional	E
	Buna-N w/Viton ^{®4} Seal O-rings	Optional	L
	Buna-N w/PTFE Seal O-rings	Optional	M
	Viton w/PTFE Seal O-rings	Optional	N
Seal Seat Material	Silicon carbide	Standard	6

Flange Options

WF=Slip on weld flange All ANSI flanges are 300 lb. • = Available option "Blank" = Not available

Inlet Flange

Standard	2" NPT	•								E
	2-1/2" NPT		•							J
	3" NPT			•						M
	3" ANSI			•	•					P
	4" NPT					•		•		Q
No Cost	4" ANSI						•		•	S
	2-1/2" NPT	•		•						J
Extra Cost	3" NPT	•	•							M
	2" WF	•								F
	2-1/2" WF	•	•		•					K
	3" WF	•	•		•					N
	4" WF					•		•		R

Outlet Flange

Standard	2" NPT	•								E
	2-1/2" NPT		•							J
	2" ANSI			•						H
	2-1/2" ANSI				•					L
	3" NPT				•		•			M
	3" ANSI						•		•	P
No Cost	4" NPT							•		Q
	1-1/2" NPT	•								C
	2" NPT		•		•					E
	2-1/2" NPT	•			•					J
	3" NPT		•					•		M
Extra Cost	4" NPT					•				Q
	1-1/2" WF	•								D
	2" WF	•	•		•					F
	2-1/2" WF	•	•		•					K
	3" WF	•	•		•		•	•		N
	4" WF					•		•		R

¹F=300 lb. ANSI flanges with no internal relief valve. N=NPT threaded flanges with internal relief valve. Model numbers include a mounting flange with an 8-1/2" rabbet ready to accept, BUT LESS an adaptor bracket and coupling for a hydraulic motor gear reducer. (8-1/2" rabbet corresponds to NEMA 182-184TC frame.)

²See Flange Options for available sizes.

³External bypass valve required, such as CORKEN model B177.

⁴Registered trademark of the DuPont company.

Appendix A—Model Number Identification Code and Available Options

Hydraulic/Internal Gear CD-Series (high pressure)

Base Model # ¹	CDHN0521	CDHN1021	CDHN1521	Model Number
Inlet ²	2" NPT	3" NPT	4" NPT	Base X X X X X
Outlet ²	2" NPT	3" NPT	4" NPT	
Internal Relief Valve	Yes	Yes	Yes	
Weight bare pump (lbs.)	121	170	194	

Specification Fields

Blade Type	6 blades with blade drivers	Standard	H
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Blade Material	GCB-50 with composite push rods	Standard	G
-----------------------	---------------------------------	----------	---

O-ring Material	Buna-N	Standard	A
	Neoprene ^{®3}	No charge option	B
	Viton ^{®3}	Optional	D
	PTFE	Optional	E
	Buna-N w/Viton ^{®3} Seal O-rings	Optional	L
	Buna-N w/PTFE Seal O-rings	Optional	M
	Viton w/PTFE Seal O-rings	Optional	N

Seal Seat Material	Silicon carbide	Standard	6
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Flange Options WF=Slip on weld flange All ANSI flanges are 300 lb. • = Available option "Blank" = Not available

Inlet Flange				
Standard	2" NPT	•		E
	3" NPT		•	M
	4" NPT			Q
No Cost	2-1/2" NPT	•		J
	4" NPT		•	Q
Extra Cost	2" WF	•		F
	2-1/2" WF	•		K
	3" WF		•	N
	4" WF		•	R

Outlet Flange				
Standard	2" NPT	•		E
	3" NPT		•	M
	4" NPT			Q
No Cost	1-1/2" NPT	•		C
	2-1/2" NPT	•		J
	3" NPT		•	M
	4" NPT		•	Q
Extra Cost	1-1/2" WF	•		D
	2" WF	•		F
	2-1/2" WF	•		K
	3" WF		•	N
	4" WF		•	R

¹F=300 lb. ANSI flanges with no internal relief valve. N=NPT threaded flanges with internal relief valve.

²See Flange Options for available sizes.

³Registered trademark of the DuPont company.

Appendix A—Model Number Identification Code and Available Options

Truck CP-Series (low pressure)

Base Model # ¹	CPBN0522	CPBN0722	CPBF0722	CPBN1022	CPBF1022	CPBN1322	CPBF1322	CPBN1522	CPBF1522	Model Number					
Inlet ²	2" NPT	2½" NPT	3" ANSI 300 lb	3" NPT	3" ANSI 300 lb	4" NPT	4" ANSI 300 lb	4" NPT	4" ANSI 300 lb	Base	X	X	X	X	X
Outlet ²	2" NPT	2½" NPT	2" ANSI 300 lb	3" NPT	2½" ANSI 300 lb	3" NPT	3" ANSI 300 lb	4" NPT	3" ANSI 300 lb						
Internal Relief Valve	Yes	Yes	No ³	Yes	No ³	Yes	No ³	Yes	No ³						
Weight bare pump (lbs.)	121	138	145	170	170	194	205	194	205						

Specification Fields

Blade Type	6 blades with blade drivers	Standard	H
Blade Material	GCB-50 with composite push rods	Standard	G
O-ring Material	Buna-N	Standard	A
	Neoprene ^{®4}	No charge option	B
	Viton ^{®4}	Optional	D
	PTFE	Optional	E
	Buna-N w/Viton ^{®4} Seal O-rings	Optional	L
	Buna-N w/PTFE Seal O-rings	Optional	M
	Viton w/PTFE Seal O-rings	Optional	N
Seal Seat Material	Silicon carbide	Standard	6

Flange Options WF=Slip on weld flange All ANSI flanges are 300 lb. • = Available option "Blank" = Not available

Inlet Flange

Standard	2" NPT	•								E
	2-1/2" NPT		•							J
	3" NPT			•						M
	3" ANSI				•					P
	4" NPT						•		•	Q
No Cost	4" ANSI						•		•	S
	2-1/2" NPT	•			•					J
Extra Cost	3" NPT	•	•							M
	2" WF	•								F
	2-1/2" WF	•	•		•					K
	3" WF	•	•		•					N
	4" WF						•		•	R

Outlet Flange

Standard	2" NPT	•								E
	2-1/2" NPT		•							J
	2" ANSI			•						H
	2-1/2" ANSI					•				L
	3" NPT				•		•			M
	3" ANSI							•	•	P
No Cost	4" NPT							•		Q
	1-1/2" NPT	•								C
	2" NPT		•		•					E
	2-1/2" NPT	•			•					J
	3" NPT		•					•		M
Extra Cost	4" NPT					•				Q
	1-1/2" WF	•								D
	2" WF	•	•		•					F
	2-1/2" WF	•	•		•					K
	3" WF	•	•		•		•		•	N
	4" WF					•		•		R

¹F=300 lb. ANSI flanges with no internal relief valve. N=NPT threaded flanges with internal relief valve.

²See Flange Options for available sizes.

³External bypass valve required, such as CORKEN model B177.

⁴Registered trademark of the DuPont company.

Appendix A—Model Number Identification Code and Available Options

Truck CD-Series (high pressure)

Base Model # ¹	CDBN0522	CDBN1022	CDBF1022	CDBN1322	CDBF1322	CDBN1522	CDBF1522	Model Number
Inlet ²	2" NPT	3" NPT	3" ANSI 300 lb	4" NPT	4" ANSI 300 lb	4" NPT	4" ANSI 300 lb	Base X X X X X
Outlet ²	2" NPT	3" NPT	2½" ANSI 300 lb	3" NPT	3" ANSI 300 lb	4" NPT	3" ANSI 300 lb	X X X X X
Internal Relief Valve	Yes	Yes	No ³	Yes	No ³	Yes	No ³	X X X X X
Weight bare pump (lbs.)	121	170	170	194	205	194	205	X X X X X

Specification Fields

Blade Type	6 blades with blade drivers	Standard	H
Blade Material	GCB-50 with composite push rods	Standard	G
O-ring Material	Buna-N	Standard	A
	Neoprene ^{®4}	No charge option	B
	Viton ^{®4}	Optional	D
	PTFE	Optional	E
	Buna-N w/Viton ^{®4} Seal O-rings	Optional	L
	Buna-N w/PTFE Seal O-rings	Optional	M
	Viton w/PTFE Seal O-rings	Optional	N
Seal Seat Material	Silicon carbide	Standard	6

Flange Options WF=Slip on weld flange All ANSI flanges are 300 lb. • = Available option "Blank" = Not available

Inlet Flange

Standard	2" NPT	•						E
	3" NPT		•					M
	3" ANSI			•				P
	4" NPT				•		•	Q
	4" ANSI					•		S
No Cost	2-1/2" NPT	•						J
	4" NPT		•					Q
Extra Cost	2" WF	•						F
	2-1/2" WF	•						K
	3" WF		•					N
	4" WF		•		•		•	R

Outlet Flange

Standard	2" NPT	•						E
	2-1/2" ANSI			•				G
	3" NPT		•		•			M
	3" ANSI					•		P
	4" NPT						•	Q
No Cost	1-1/2" NPT	•						C
	2-1/2" NPT	•						J
	3" NPT						•	M
	4" NPT		•		•			Q
Extra Cost	1-1/2" WF	•						D
	2" WF	•						F
	2-1/2" WF	•						K
	3" WF		•		•		•	N
	4" WF		•		•		•	R

¹F=300 lb. ANSI flanges with no internal relief valve. N=NPT threaded flanges with internal relief valve.

²See Flange Options for available sizes.

³External bypass valve required, such as CORKEN model B177.

⁴Registered trademark of the DuPont company.

Appendix B—Specifications for Models D51 and F51 Pumps

Operating Specifications

Minimum RPM:	1450
Maximum RPM:	1750
Minimum temperature:	-25°F (-32°C)
Maximum temperature:	225°F (107°C)
Maximum working pressure:	350 psig (25.2 bar g)
Maximum differential pressure:	125 psi (8.6 bar d)
Maximum driver size:	2 hp (1.5 kW)
Flow range:	1–6 gpm (4–23 L/min)

Material Specifications

Part	Model	Standard Material
Case, head rotor	All	Ductile iron ASTM A536
Sideplate	All	Gray iron ASTM A48, Class 30
Seal seat	All	Silicon carbide
Seal rotor	All	Carbon
Seal metal parts	All	Steel
Vanes	All	Carbon
Relief valve springs	All	Steel, cadmium plated
Relief valve	All	Steel
Shaft	All	“Stressproof” steel
Mounting bracket	D51	Gray iron ASTM A48, Class 30
Base	F51	Steel
O-rings	All	Buna-N (standard), PTFE, Viton ^{®1} , Neoprene ^{®1} (optional)
Relief valve adjusting stem seal	All	Buna-N
Retainer rings	All	Steel
Bearings	All	Cylindrical roller

¹Registered trademark of the DuPont company.

Appendix B—Specifications for All CP-Series (low pressure) Models

Operating Specifications for All CP-Series Models with NPT Flanges

Model	0521/22	0721/22	1021/22	1321/22	1521/22
Suction flange	2"	2-1/2"	3"	4"	4"
Discharge flange	2"	2-1/2"	3"	3"	4"
Maximum RPM	950	950	780	780	780
Minimum temperature	-25°F (-32°C)				
Maximum temperature	225°F (107°C)				
Maximum working pressure	200 psig (13.8 bar)				
Maximum differential pressure	125 psid (8.6 bar)			100 psid (6.9 bar)	
Suction flange option	2-1/2", 3"	3"	2-1/2"	No	No
Discharge flange option	2-1/2"	2", 3"	2-1/2"	4"	3"
Internal relief	Yes				
Seal seat material options	Silicon carbide				
Steel slip-on flange option	Yes (suction and discharge)				
Maximum driver hp (kW)	10 (7.5)		20 (15)		30 (22)

Operating Specifications for All CP-Series Models with ANSI Flanges

Model	0721/22	1021/22	1521/22
Suction flange	2-1/2" 300 lb ANSI	3" 300 lb ANSI	4" 300 lb ANSI
Discharge flange	2-1/2" 300 lb ANSI	3" 300 lb ANSI	4" 300 lb ANSI
Maximum RPM	950	780	780
Minimum temperature	-25°F (-32°C)	-25°F (-32°C)	-25°F (-32°C)
Maximum temperature	225°F (107°C)	225°F (107°C)	225°F (107°C)
Maximum working pressure	200 psig (13.8 bar)	200 psig (13.8 bar)	200 psig (13.8 bar)
Maximum differential pressure	125 psid (8.6 bar)	125 psid (8.6 bar)	100 psid (6.9 bar)
Suction or discharge flange option	No		
Internal relief	No		
Seal seat material options	Silicon carbide		
Maximum driver hp (kW)	10 (7.5)	20 (15)	30 (22)

Material Specifications

Part	Pump Construction	Standard Material
Case	0521/22, 0721/22, 1021/22	Gray iron ASTM A48, Class 30
Head	0521/22, 0721/22, 1021/22	Ductile iron ASTM A536
Case, head	1321/22, 1521/22	Ductile iron ASTM A536
Flange, rotor, seat adapter plate	All	Ductile iron ASTM A536
Sideplate	All	Gray iron ASTM A48, Class 40
Cam, bearing cap	All	Gray iron ASTM A48, Class 30
Welding flange	All	Steel
Seal seat	All	Silicon carbide
Seal metal parts	All	Steel
Shaft	All	8620 Steel
Blades	All	Advanced polymer
Relief valve spring	All	Steel cadmium plated
Relief valve	CPBN/HN0521	Steel
	All others	Gray iron ASTM A48, Class 30
Bearing	All	Cylinder roller
O-rings	All	Buna-N (Standard), PTFE, Viton ^{®1} , Neoprene ^{®1} (optional)
Retainer rings	All	Steel

¹Registered trademark of the DuPont company.

Appendix B—Specifications for All CD-Series (high pressure) Models

Operating Specifications for All CD-Series Models with NPT Flanges

Model	0521/22	1021/22	1321/22	1521/22
Suction flange	2"	3"	4"	4"
Discharge flange	2"	3"	3"	4"
Maximum RPM	950	950	860	860
Minimum temperature	-25°F (-32°C)			
Maximum temperature	225°F (107°C)			
Maximum working pressure	400 psig (27.6 bar)			
Maximum differential pressure	125 psid (8.6 bar)	125 psid (8.6 bar)	100 psid (6.9 bar)	100 psid (6.9 bar)
Suction flange option	2½", 3"	2½"	No	No
Discharge flange option	2½"	2½"	4"	3"
Internal relief	Yes			
Seal seat material options	Silicon carbide			
Steel slip-on flange option	Yes (suction & discharge)			
Maximum driver hp (kW)	10 (7.5)	20 (15)	20 (15)	30 (22)

Operating Specifications for All CD-Series Models with ANSI Flanges

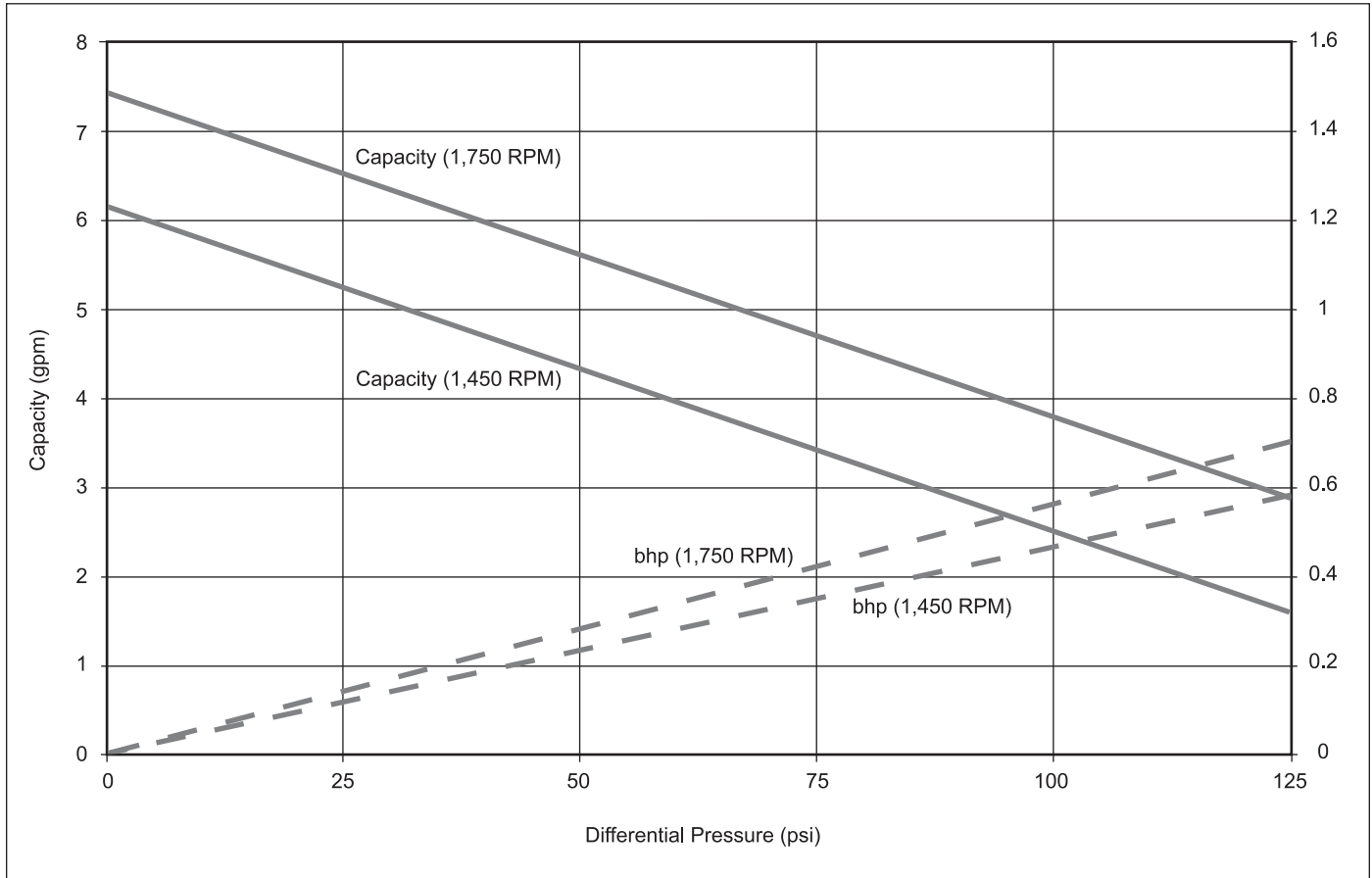
Model	1021/22	1321/22	1521/22
Suction flange	3" 300 lb ANSI	4" 300 lb ANSI	4" 300 lb ANSI
Discharge flange	2-1/2" 300 lb ANSI	3" 300 lb ANSI	3" 300 lb ANSI
Maximum RPM	950	860	860
Minimum temperature	-25°F (-32°C)	-25°F (-32°C)	-25°F (-32°C)
Maximum temperature	225°F (107°C)	225°F (107°C)	225°F (107°C)
Maximum working pressure	400 psig (27.6 bar)	400 psig (27.6 bar)	400 psig (27.6 bar)
Maximum differential pressure	125 psid (8.6 bar)	125 psid (8.6 bar)	100 psid (6.9 bar)
Suction or discharge flange option	No		
Internal relief	No		
Seal seat material options	Silicon carbide		
Maximum driver hp (kW)	20 (15)	20 (15)	30 (22)

Material Specifications

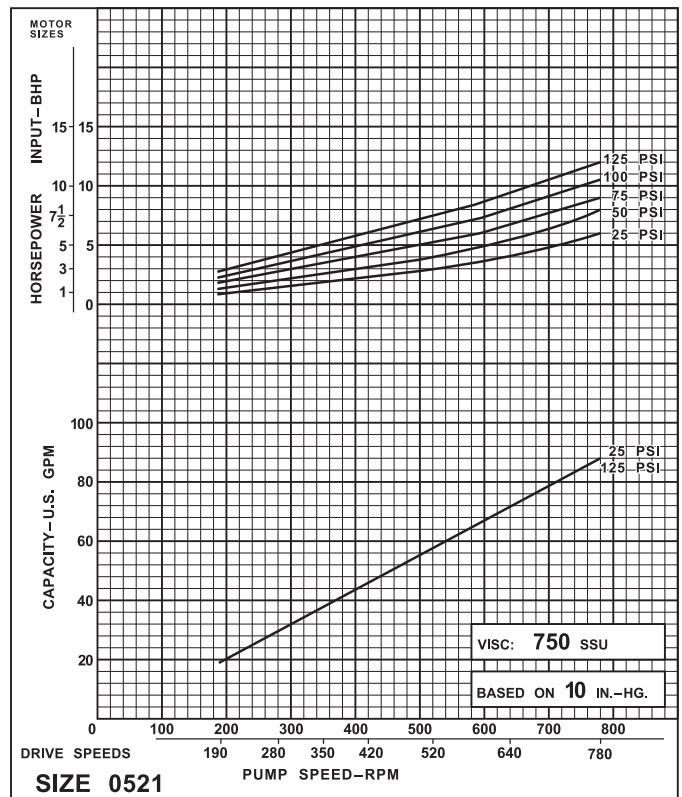
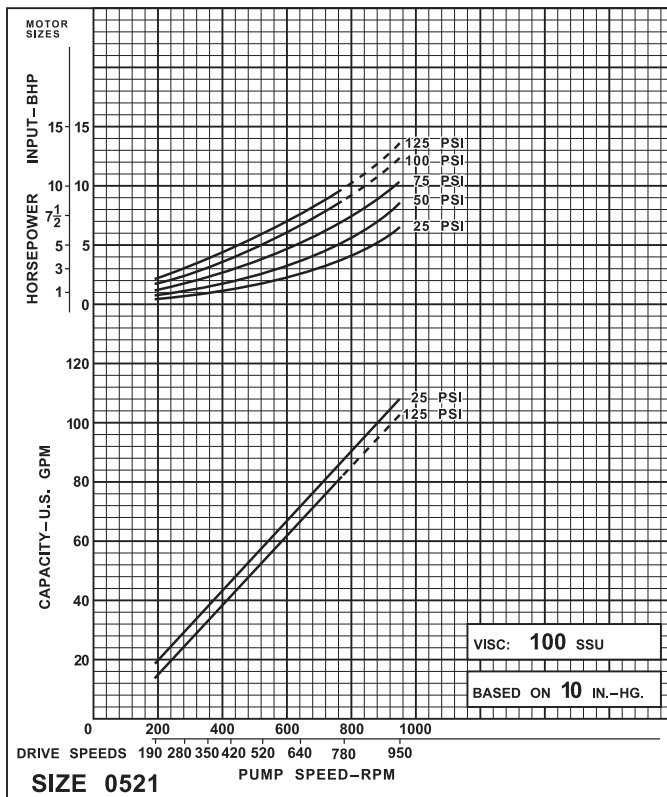
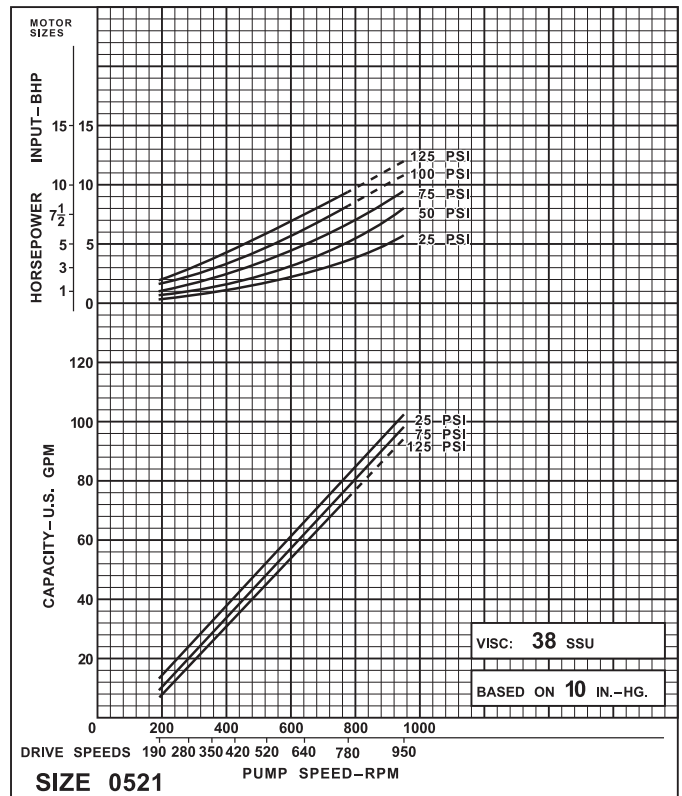
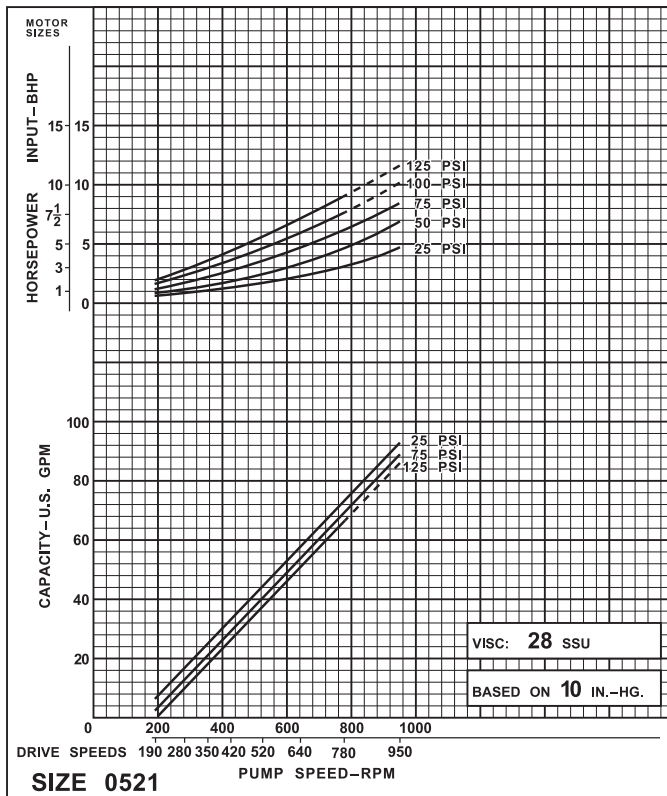
Part	Pump Construction	Standard Material
Case, head	All	Ductile iron ASTM A536
Flange, rotor, seat adapter plate	All	Ductile iron ASTM A536
Sideplate	All	Gray iron ASTM A48, Class 40
Cam	All	Gray iron ASTM A48, Class 40
Bearing cap	All	Ductile iron ASTM A536
Welding flange	All	Steel
Seal seat	All	Silicon carbide
Seal metal parts	All	Steel
Shaft	All	8620 Steel
Blades	All	Advanced polymer
Relief valve spring	All	Steel cadmium plated
Relief valve	CDBN/HN0521	Steel
	All others	Gray iron ASTM A48, Class 30
Bearing	All	Cylinder roller
O-rings	All	Buna-N (Standard), PTFE, Viton ^{®1} , Neoprene ^{®1} (optional)
Retainer rings	All	Steel

¹Registered trademark of the DuPont company.

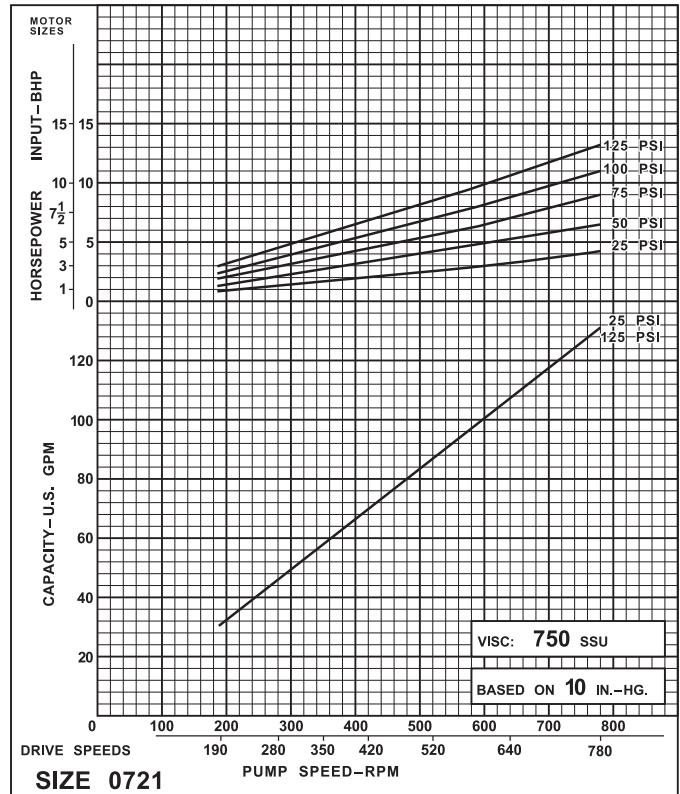
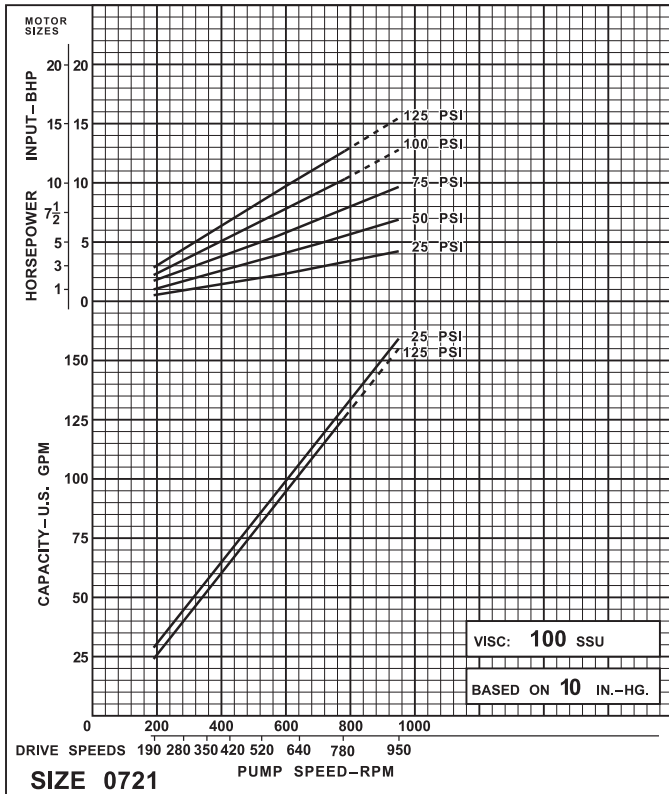
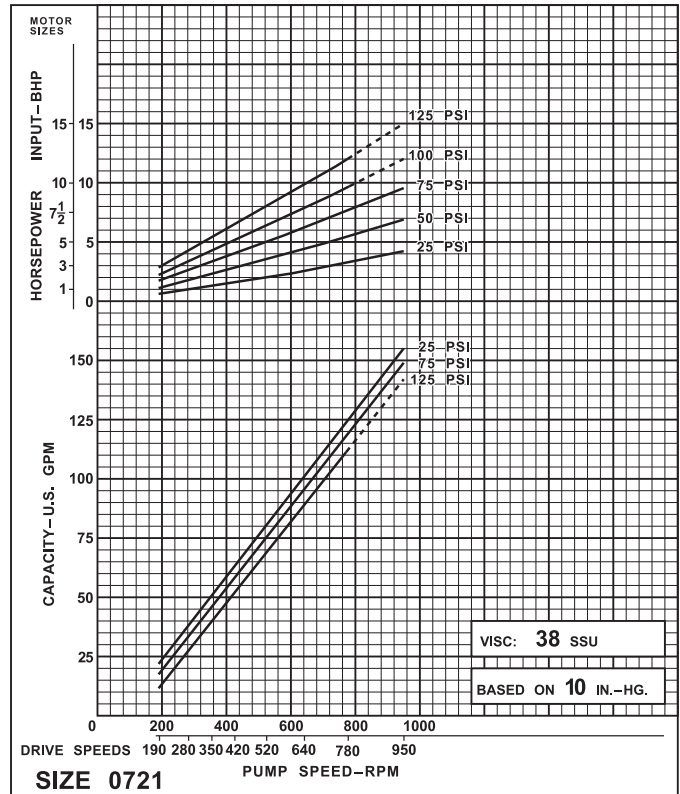
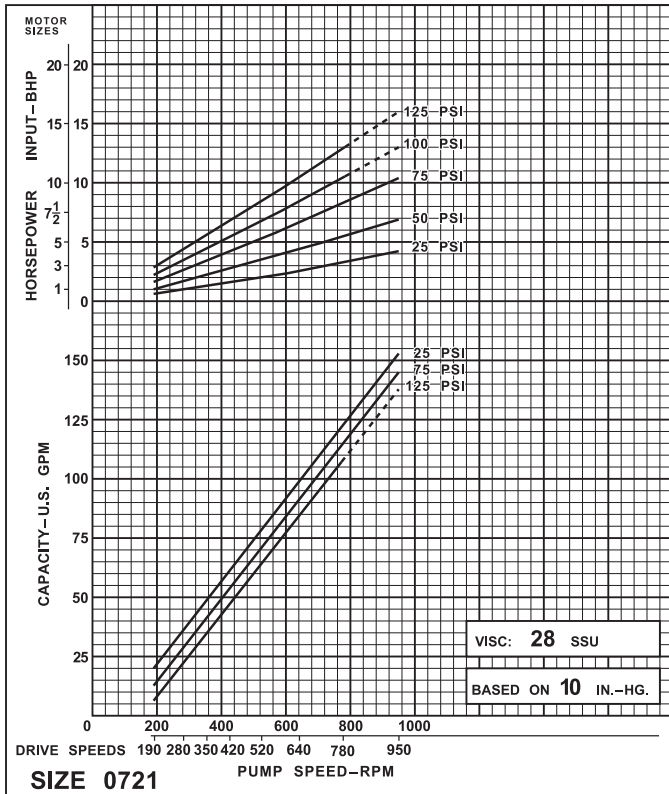
Appendix C—Performance Curves for Models D51 and F51



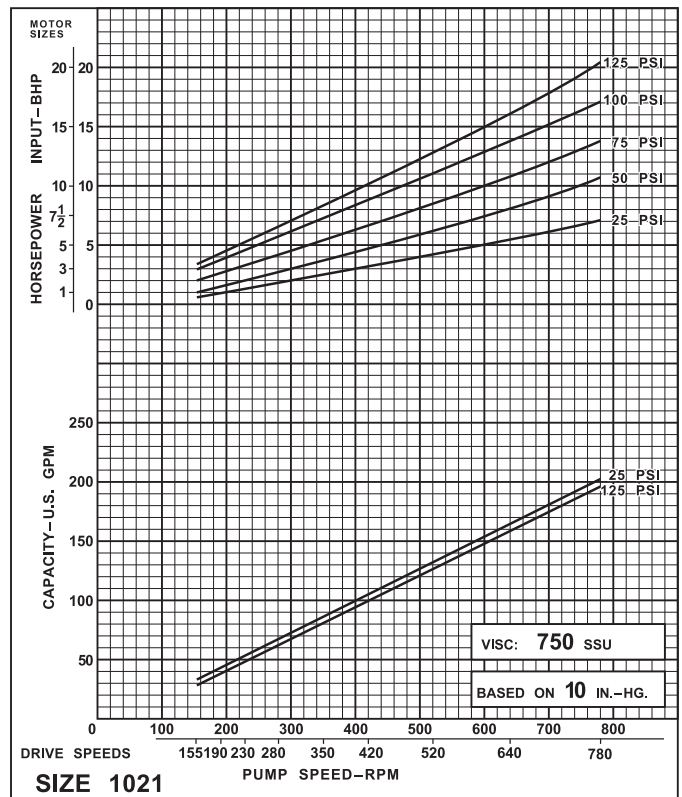
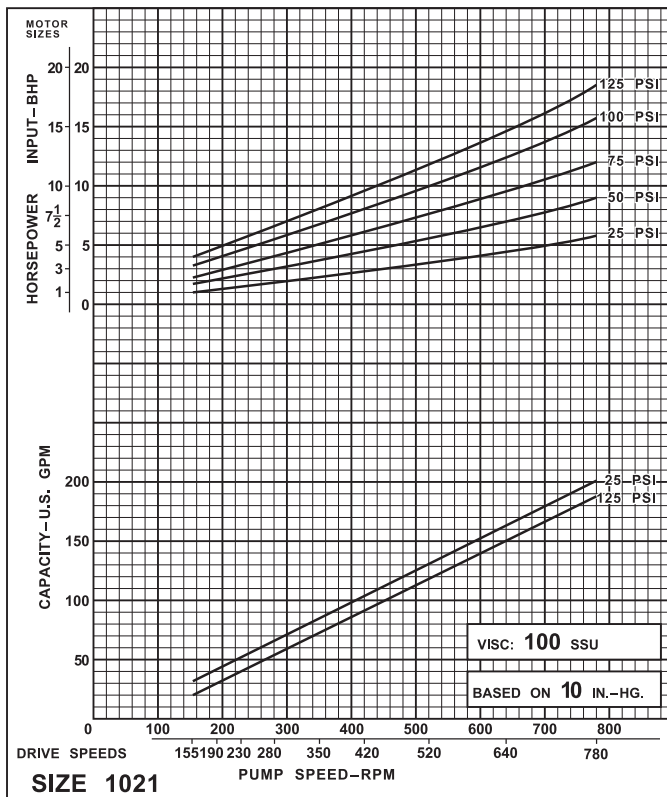
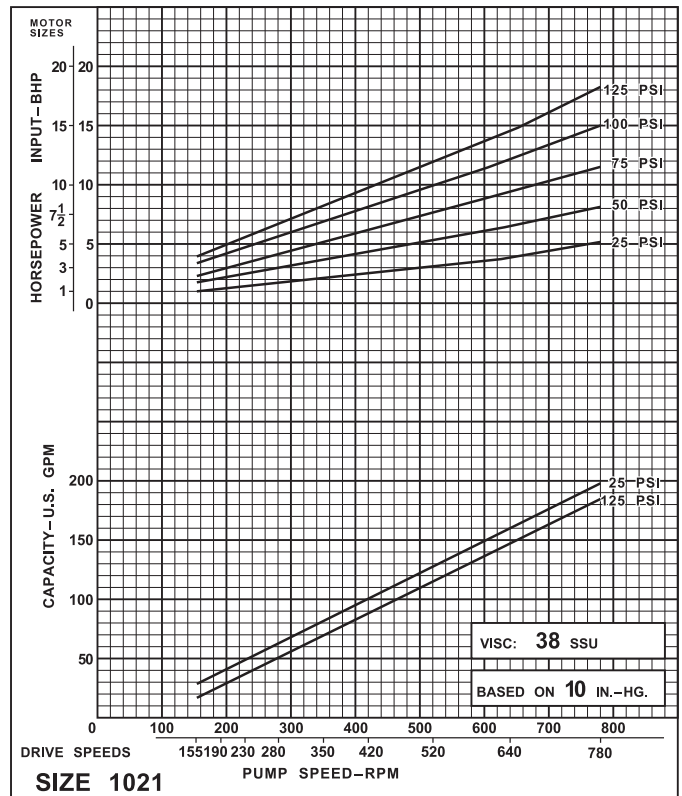
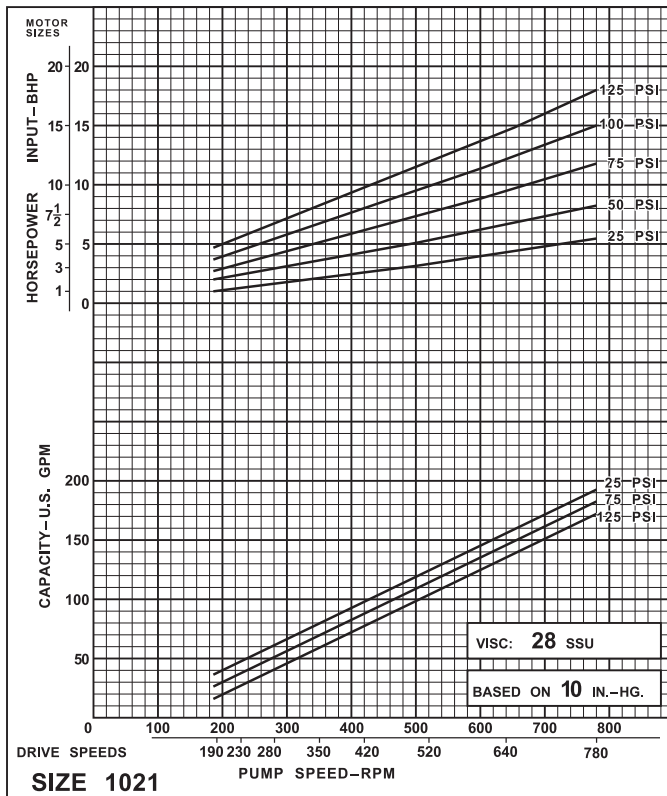
Appendix C—Performance Curves for All Mechanically Sealed Models 0521/22



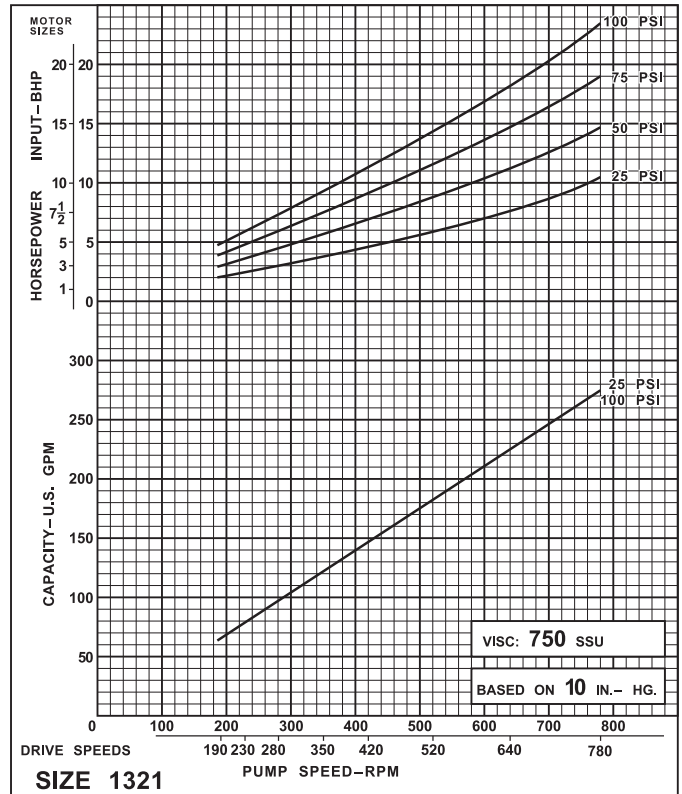
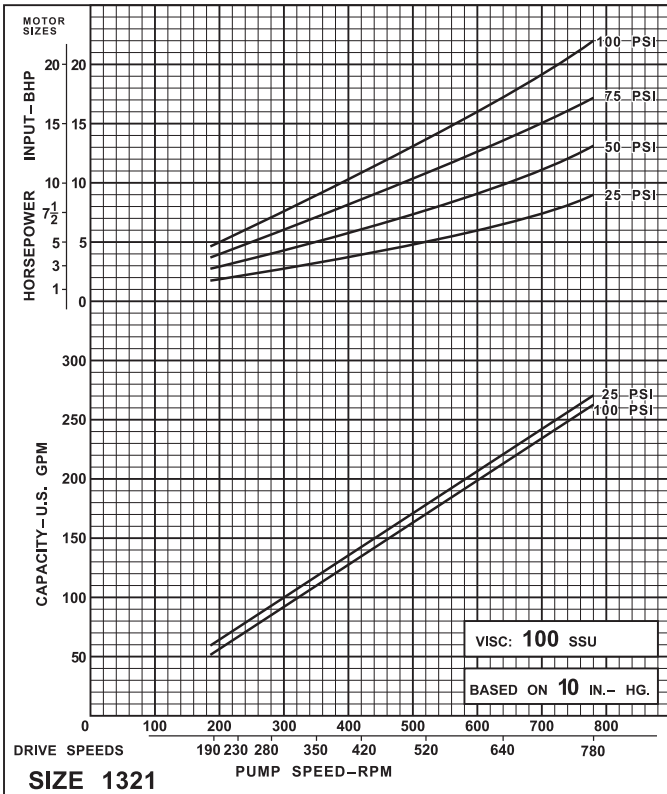
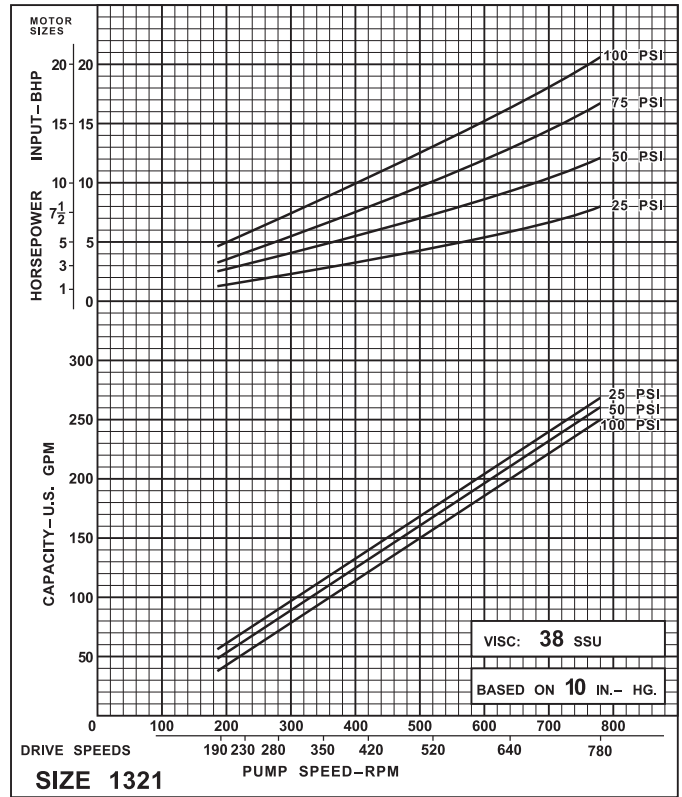
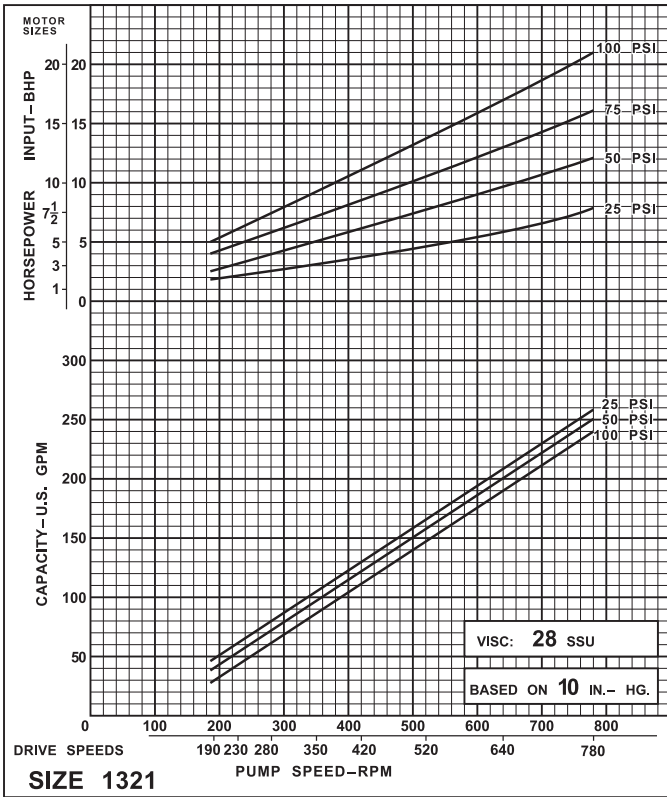
Appendix C—Performance Curves for All Mechanically Sealed Models 0721/22



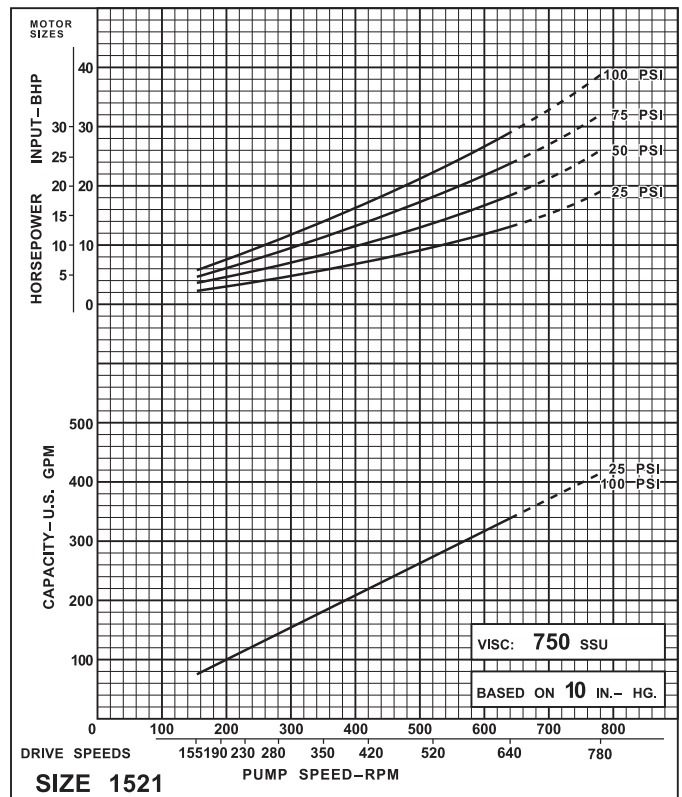
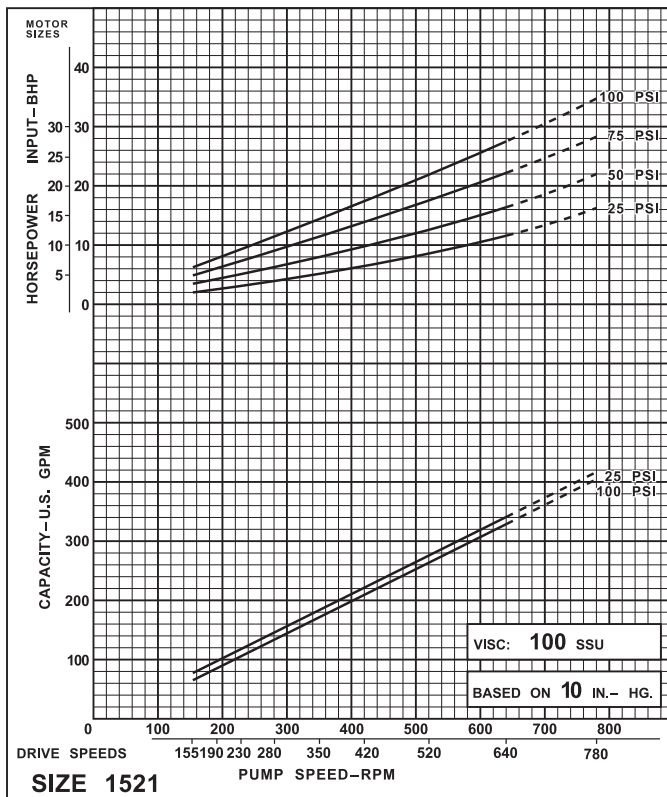
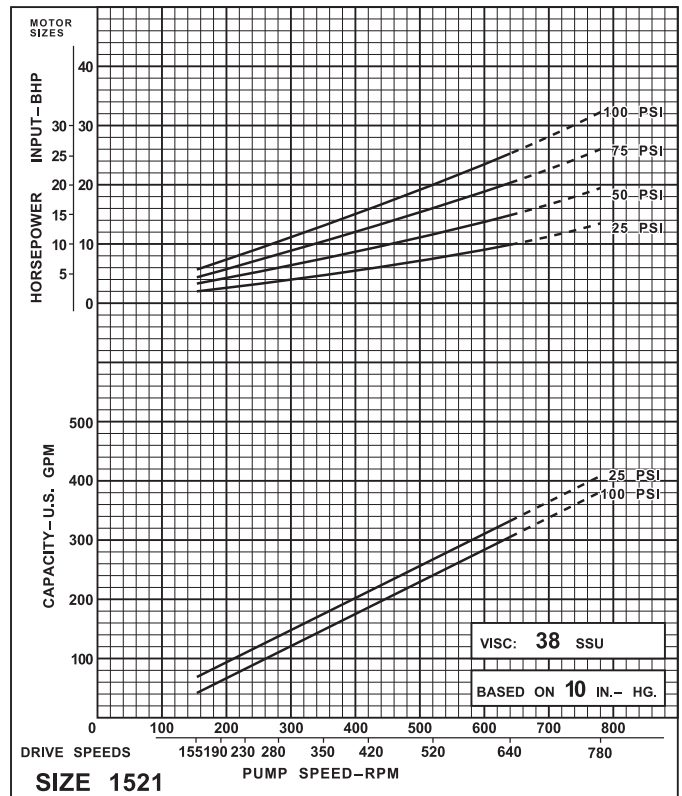
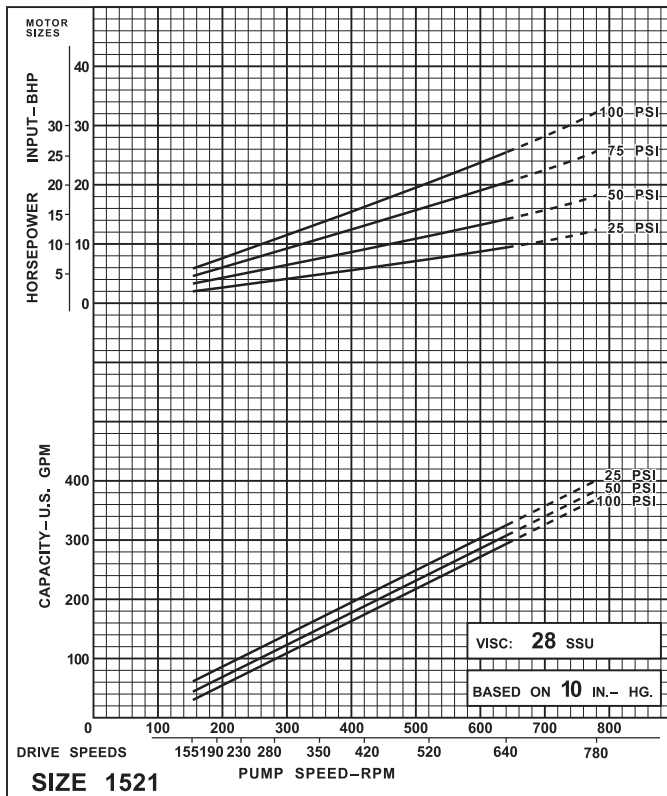
Appendix C—Performance Curves for All Mechanically Sealed Models 1021/22



Appendix C—Performance Curves for All Mechanically Sealed Models 1321/22

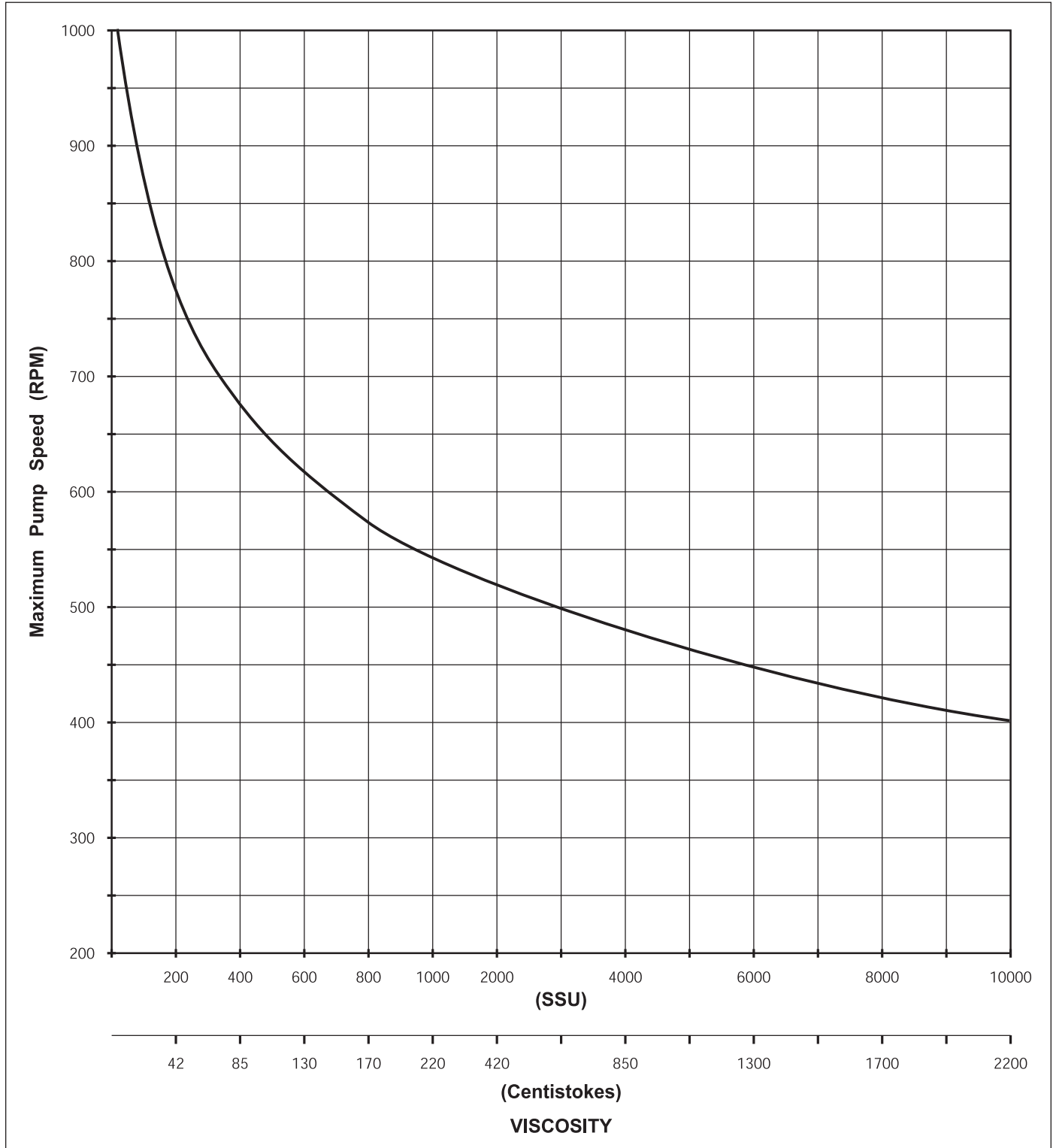


Appendix C—Performance Curves for All Mechanically Sealed Models 1521/22



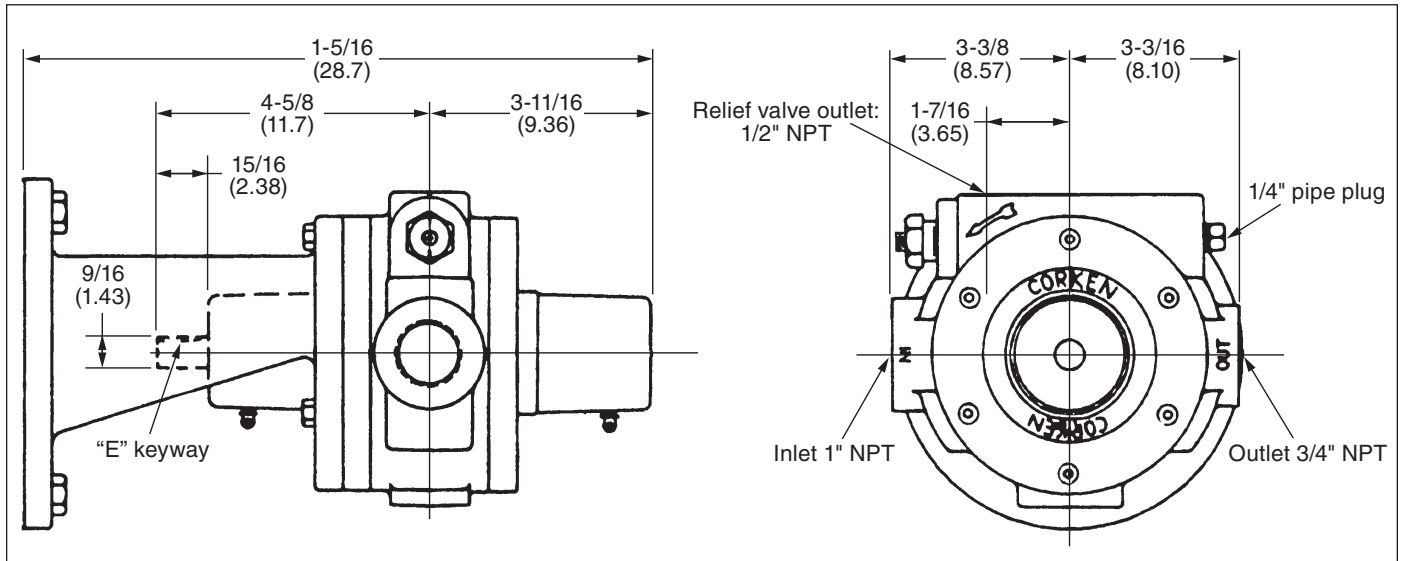
Appendix C—Viscosity Performance Curves for All Coro-Vane® Industrial Pumps

The graph below provides recommendations for maximum pump speed when operating at elevated viscosities. Use this as a guideline when determining the pump speed for your application. Currently our published performance curves stop at just under 1,000 SSU. For applications in which the liquid exceeds this viscosity, please contact your local distributor or call our factory.

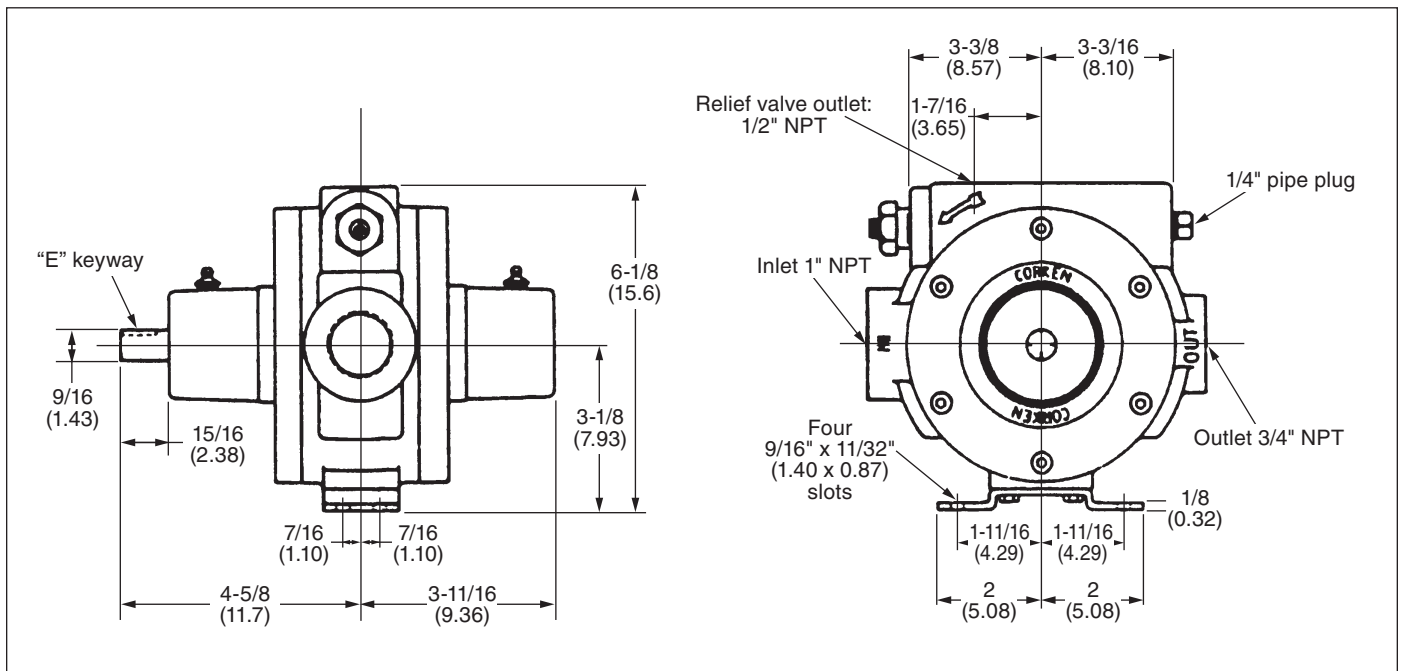


Appendix D—Outline Dimensions for Models D51 and F51

Model D51 (Direct Mount)

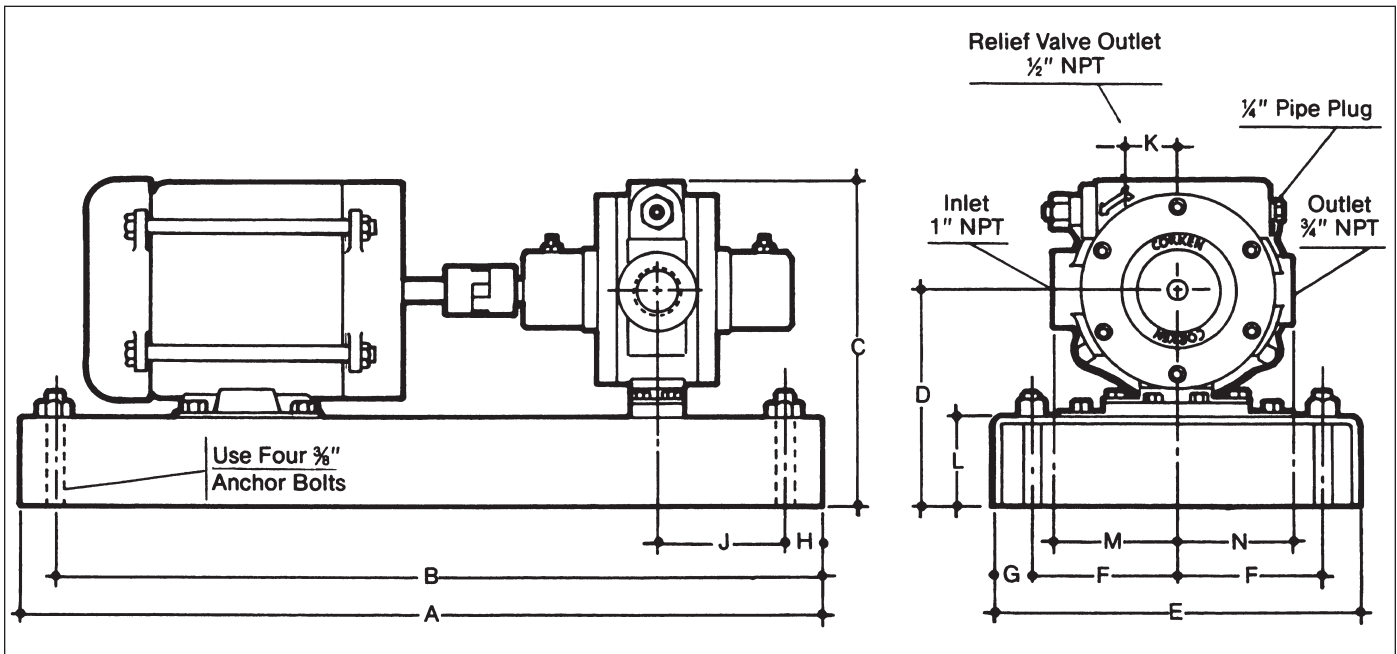


Model F51 (Frame Mount)



All dimensions are in inches (centimeters).

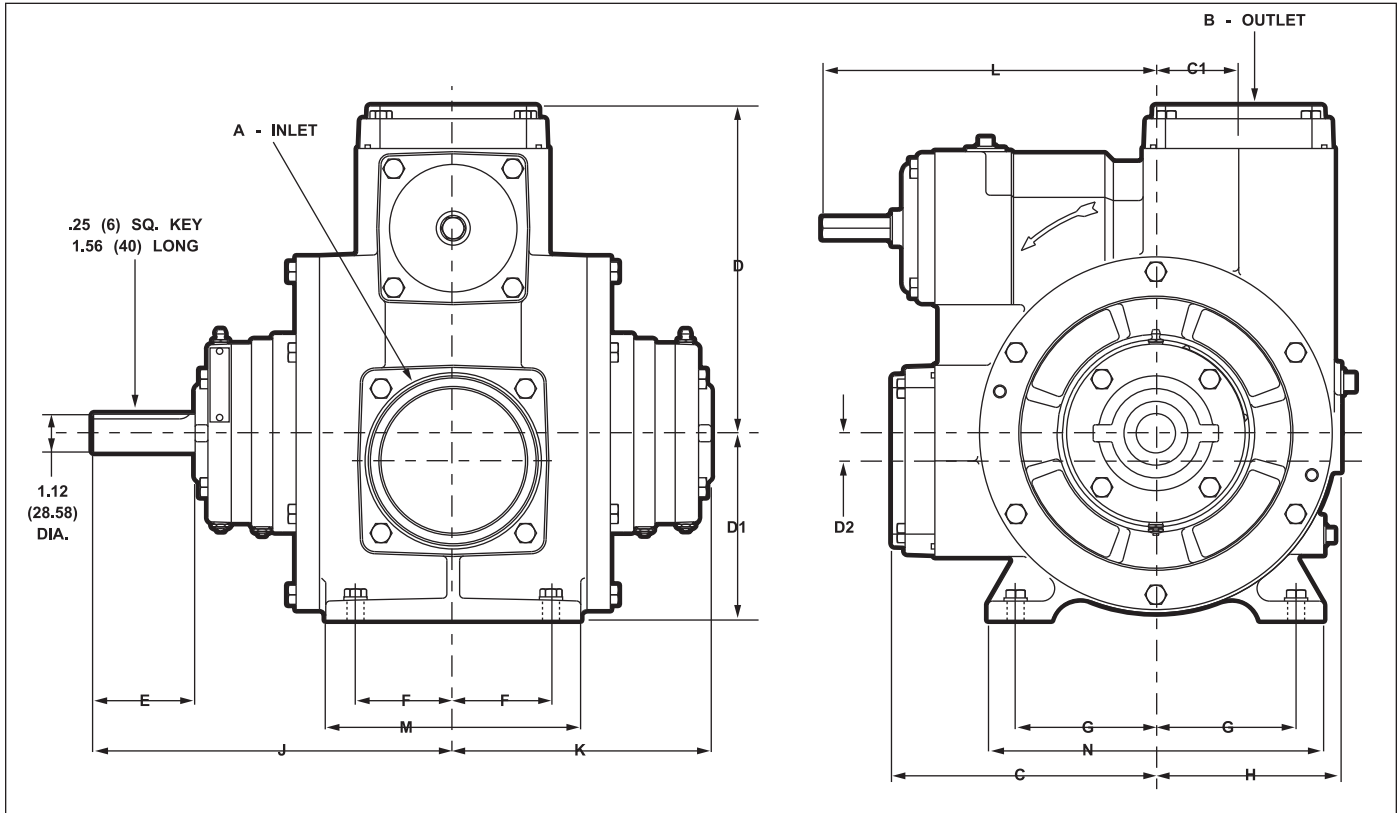
Appendix D—Outline Dimensions for Model F51-101 (Frame Mount)



A	B	C	D	E	F	G	H	J	K	L	M	N
22 (55.9)	20 (50.8)	9 (22.9)	6 (15.2)	10 (25.4)	4 (10.2)	1 (2.54)	1 (2.54)	3-1/2 (8.89)	1-7/16 (3.65)	2-1/2 (6.35)	3-3/8 (8.57)	3-3/16 (8.10)

All dimensions are in inches (centimeters).

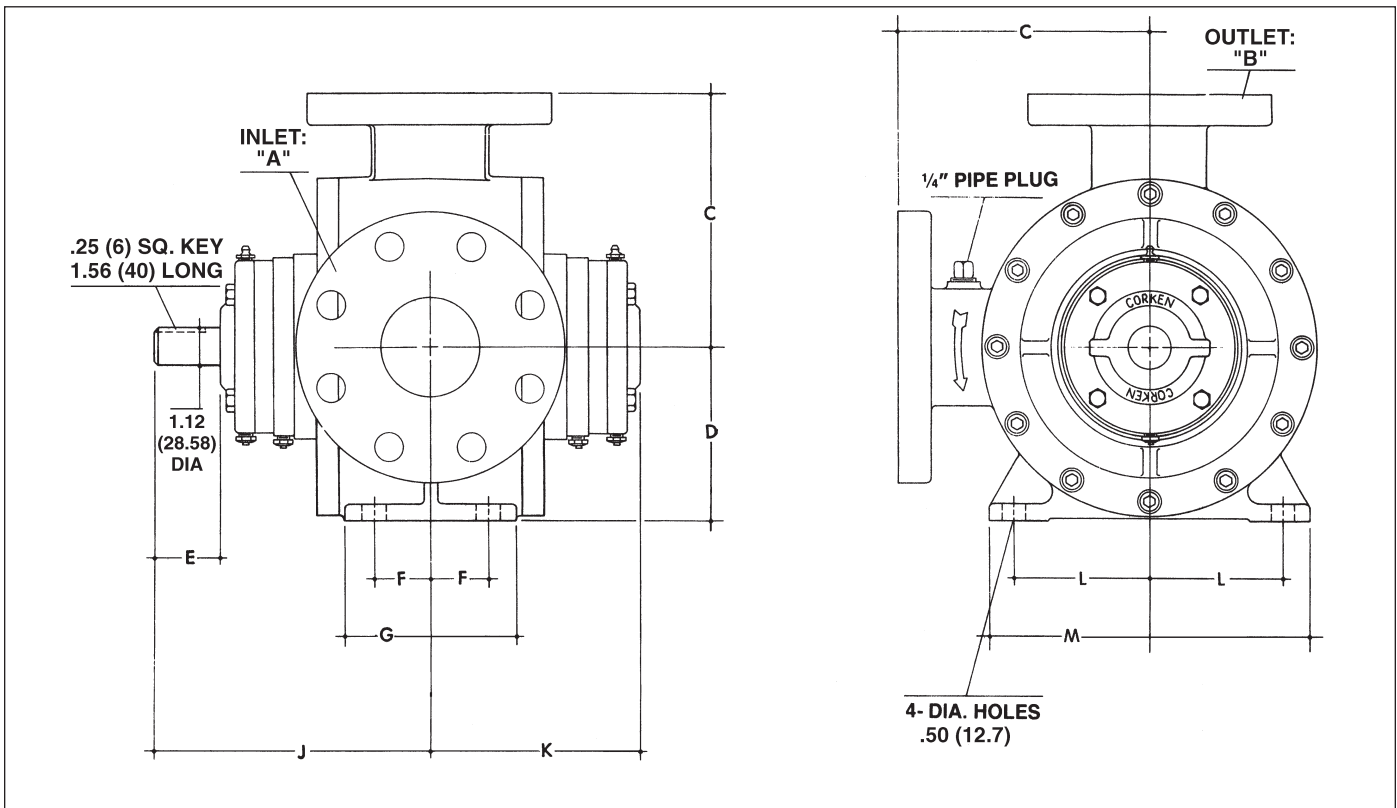
Appendix D—Outline Dimensions for All CP-Series (CPBN) and CD-Series (CDBN) Models with NPT Flanges



Model	A Inlet	B Outlet	C	C1*	D	D1	D2*	E	F	G	H	J	K	L	M	N
CPBN0521	STD: 2" NPT OPT: 2-1/2" NPT 3" NPT	STD: 2" NPT OPT: 2-1/2" NPT 1-1/2" NPT	6.13 (157)	0 (0)	6.13 (157)	5.00 (127)	0 (0)	2.00 (51)	1.38 (35)	4.00 (102)	4.69 (119)	7.88 (200)	5.88 (149)	7.38 (187)	3.75 (95)	9.00 (229)
CPBN0721	STD: 2-1/2" NPT OPT: 3" NPT	STD: 2-1/2" NPT OPT: 2" NPT 3" NPT	5.62 (143)	1.16 (29)	5.75 (146)	4.56 (116)	0.81 (21)	2.00 (51)	1.50 (38)	3.38 (86)	4.56 (116)	8.69 (221)	6.69 (170)	10.19 (259)	4.50 (114)	8.19 (208)
CPBN1021	STD: 3" NPT OPT: 2-1/2" NPT	STD: 3" NPT OPT: 2" NPT 2-1/2" NPT	6.88 (175)	3.13 (79)	7.63 (194)	5.50 (140)	0 (0)	2.00 (51)	1.75 (44)	4.12 (105)	5.50 (140)	8.44 (214)	6.44 (164)	8.88 (225)	5.25 (133)	9.88 (251)
CPBN1321	STD: 4" NPT	STD: 3" NPT OPT: 4" NPT	7.75 (197)	2.44 (62)	9.62 (244)	5.50 (140)	0.81 (21)	3.00 (76)	2.88 (73)	4.12 (105)	5.38 (137)	10.62 (270)	7.62 (194)	9.38 (238)	7.50 (191)	9.88 (251)
CPBN1521	STD: 4" NPT	STD: 4" NPT OPT: 3" NPT	7.75 (197)	2.44 (62)	9.62 (244)	5.50 (140)	0.81 (21)	3.00 (76)	2.88 (73)	4.12 (105)	5.38 (137)	10.62 (270)	7.62 (194)	9.38 (238)	7.50 (191)	9.88 (251)
CDBN0521	STD: 2" NPT OPT: 2-1/2" NPT	STD: 2" NPT OPT: 2-1/2" NPT 1-1/2" NPT	6.13 (157)	0 (0)	6.13 (157)	5.00 (127)	0 (0)	2.00 (51)	1.38 (35)	4.00 (102)	4.69 (119)	7.88 (200)	5.88 (149)	7.38 (187)	3.75 (95)	9.00 (229)
CDBN1021	STD: 3" NPT OPT: 4" NPT	STD: 3" NPT OPT: 4" NPT	7.06 (179)	0 (0)	7.19 (183)	5.50 (140)	0 (0)	2.00 (51)	1.75 (44)	4.12 (105)	5.38 (137)	8.50 (216)	6.50 (165)	11.25 (286)	5.25 (133)	9.88 (251)
CDBN1321	STD: 4" NPT	STD: 3" NPT OPT: 4" NPT	7.75 (197)	2.44 (62)	9.62 (244)	5.50 (140)	0.81 (21)	3.00 (76)	2.88 (73)	4.12 (105)	5.38 (137)	10.62 (270)	7.62 (194)	9.38 (238)	7.50 (191)	9.88 (251)
CDBN1521	STD: 4" NPT	STD: 4" NPT OPT: 3" NPT	7.75 (197)	2.44 (62)	9.62 (244)	5.50 (140)	0.81 (21)	3.00 (76)	2.88 (73)	4.12 (105)	5.38 (137)	10.62 (270)	7.62 (194)	9.81 (249)	7.50 (191)	9.88 (251)

All dimensions are in inches (centimeters).

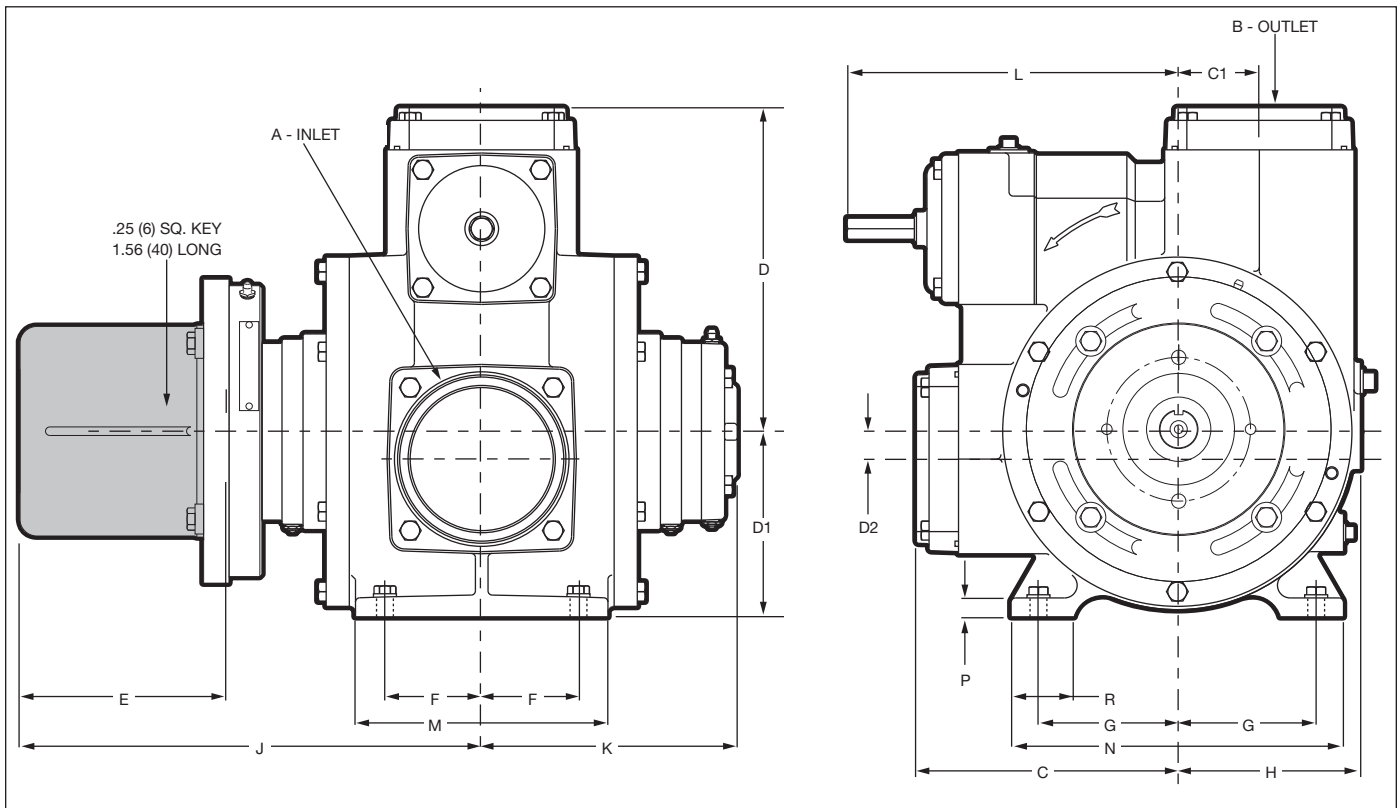
Appendix D—Outline Dimensions for All CP-Series (CPBF) and CD-Series (CDBF) Models with ANSI Flanges



Model	A Inlet	B Outlet	C	D	E	F	G	J	K	L	M
CPBF0721	3" 300# ANSI	2" 300# ANSI	7.00 (178)	5.00 (127)	2.00 (51)	1.38 (35)	4.00 (102)	8.69 (221)	6.69 (170)	4.00 (102)	9.25 (235)
CPBF1021	3" 300# ANSI	2-1/2" 300# ANSI	7.75 (197)	5.50 (140)	2.00 (51)	1.75 (44)	5.25 (133)	8.50 (216)	6.50 (165)	4.12 (105)	9.88 (251)
CPBF1321	4" 300# ANSI	3" 300# ANSI	7.84 (199)	5.50 (140)	3.00 (76)	2.88 (73)	7.50 (191)	10.62 (270)	7.62 (194)	4.12 (105)	9.88 (251)
CPBF1521	4" 300# ANSI	3" 300# ANSI	7.84 (199)	5.50 (140)	3.00 (76)	2.88 (73)	7.50 (191)	10.62 (270)	7.62 (194)	4.12 (105)	9.88 (251)
CDBF1021	3" 300# ANSI	2-1/2" 300# ANSI	7.75 (197)	5.50 (140)	2.00 (51)	1.75 (44)	5.25 (133)	8.50 (216)	6.50 (165)	4.12 (105)	9.88 (251)
CDBF1321	4" 300# ANSI	3" 300# ANSI	7.84 (199)	5.50 (140)	3.00 (76)	2.88 (73)	7.50 (191)	10.62 (270)	7.62 (194)	4.12 (105)	9.88 (251)
CDBF1521	4" 300# ANSI	3" 300# ANSI	7.84 (199)	5.50 (140)	3.00 (76)	2.88 (73)	7.50 (191)	10.62 (270)	7.62 (194)	4.12 (105)	9.88 (251)

All dimensions are in inches (centimeters).

Appendix D—Outline Dimensions for All CP-Series (CPHN) and CD-Series (CDHN) Hydraulic Drive Models with NPT Flanges

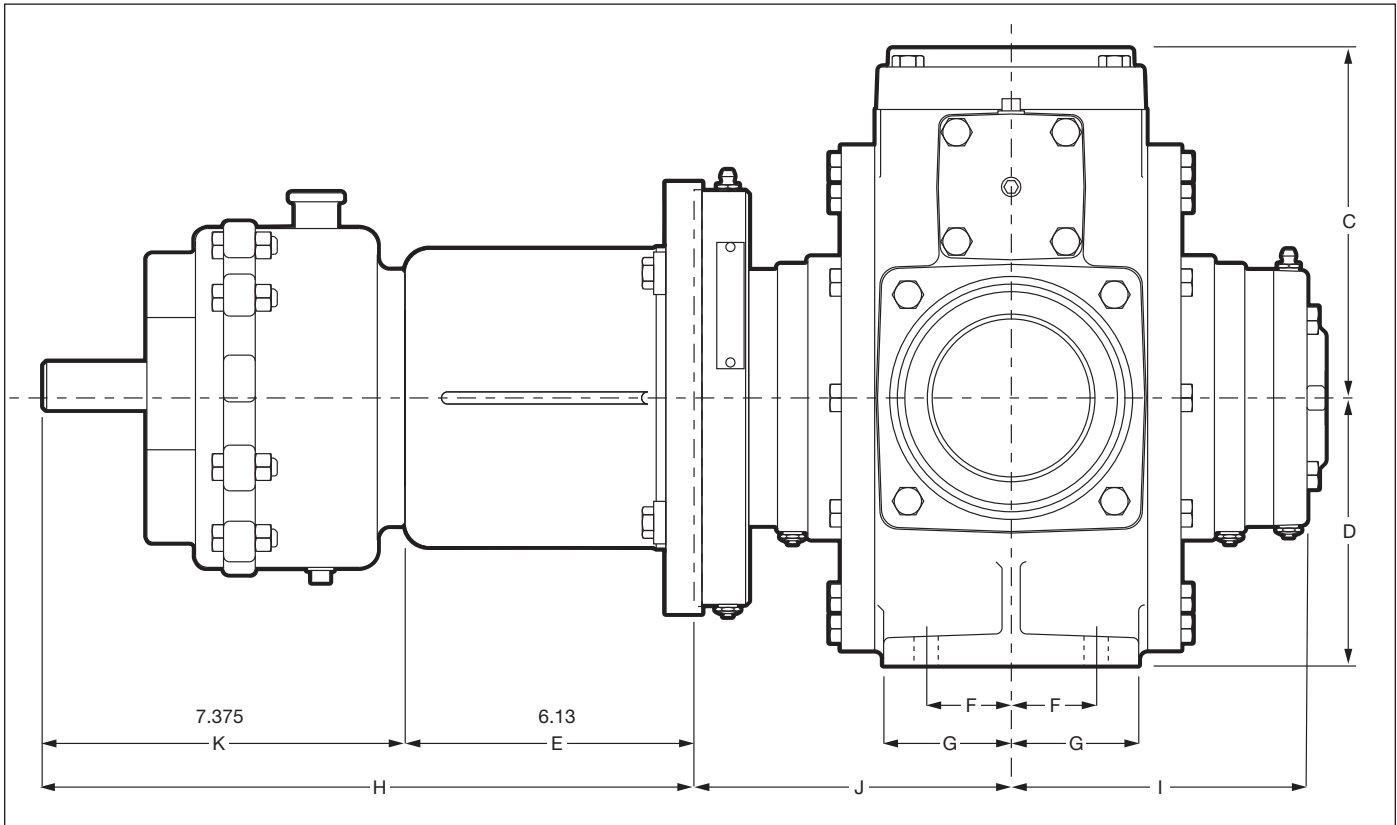


Model	A Inlet	B Outlet	C	C1 ^a	D	D1	D2 ^a	E	F	G	H	J	K	L	M	N
CPHN0521	STD: 2" NPT OPT: 2-1/2" NPT 3" NPT	STD: 2" NPT OPT: 2-1/2" NPT 1-1/2" NPT	6.13 (157)	0 (0)	6.13 (157)	5.00 (127)	0 (0)	6.13 (157)	1.38 (35)	4.00 (102)	4.69 (119)	12.00 (305)	5.88 (149)	7.38 (187)	3.75 (95)	9.00 (229)
CPHN0721	STD: 2-1/2" NPT OPT: 3" NPT	STD: 2-1/2" NPT OPT: 2" NPT	5.62 (143)	1.16 (29)	5.75 (146)	4.56 (116)	0.81 (21)	6.13 (157)	1.50 (38)	3.38 (86)	4.56 (116)	12.81 (325)	6.69 (170)	10.19 (259)	4.50 (114)	8.19 (208)
CPHN1021	STD: 3" NPT OPT: 2-1/2" NPT	STD: 3" NPT OPT: 2-1/2" NPT 2" NPT	6.88 (175)	3.13 (79)	7.63 (194)	5.50 (140)	0 (0)	6.13 (157)	1.75 (44)	4.12 (105)	5.50 (140)	12.56 (319)	6.44 (164)	8.88 (225)	5.25 (133)	9.88 (251)
CPHN1321	STD: 4" NPT	STD: 3" NPT OPT: 4" NPT	7.75 (197)	2.44 (62)	9.62 (244)	5.50 (140)	0.81 (21)	6.13 (157)	2.88 (73)	4.12 (105)	5.38 (137)	13.75 (349)	7.62 (194)	9.38 (238)	7.50 (191)	9.88 (251)
CPHN1521	STD: 4" NPT	STD: 4" NPT OPT: 3" NPT	7.75 (197)	2.44 (62)	9.62 (244)	5.50 (140)	0.81 (21)	6.13 (157)	2.88 (73)	4.12 (105)	5.38 (137)	13.75 (349)	7.62 (194)	9.38 (238)	7.50 (191)	9.88 (251)
CDHN0521	STD: 2" NPT OPT: 2-1/2" NPT	STD: 2" NPT OPT: 2-1/2" NPT 1-1/2" NPT	6.13 (157)	0 (0)	6.13 (157)	5.00 (127)	0 (0)	6.13 (157)	1.38 (35)	4.00 (102)	4.69 (119)	12.00 (305)	5.88 (149)	7.38 (187)	3.75 (95)	9.00 (229)
CDHN1021	STD: 3" NPT OPT: 4" NPT	STD: 3" NPT OPT: 4" NPT	7.06 (179)	0 (0)	7.19 (183)	5.50 (140)	0 (0)	6.13 (157)	1.75 (44)	4.12 (105)	5.38 (137)	12.63 (321)	6.50 (165)	11.25 (286)	5.25 (133)	9.88 (251)
CDHN1521	STD: 4" NPT	STD: 4" NPT OPT: 3" NPT	7.75 (197)	2.44 (62)	9.62 (244)	5.50 (140)	0.81 (21)	6.13 (157)	2.88 (73)	4.12 (105)	5.38 (137)	13.75 (349)	7.62 (194)	9.81 (249)	7.50 (191)	9.88 (251)

^a For some models C1 and D2 will be 0. This denotes that the suction and/or discharge flange will be centered with the shaft.

All dimensions are in inches (centimeters).

Appendix D—Outline Dimensions for All CP- & CD-Series Hydraulic Drive Models with Integral Gear and NPT Flanges



Model	A Inlet	B Outlet	C	D	E	F	G	H	I	J	K
CPHN0521	STD: 2" NPT OPT: 2-1/2" NPT 3" NPT	STD: 2" NPT OPT: 2-1/2" NPT 1-1/2" NPT	6.13 (157)	5.00 (127)	6.13 (157)	1.38 (35)	1.88 (48)	13.50 (343)	5.88 (149)	5.88 (149)	7.38 (187)
CPHN0721	STD: 2-1/2" NPT OPT: 3" NPT	STD: 2-1/2" NPT OPT: 2" NPT	5.75 (146)	4.56 (116)	6.13 (157)	1.50 (38)	2.25 (57)	13.50 (343)	6.69 (170)	6.69 (170)	7.38 (187)
CPHN1021	STD: 3" NPT OPT: 2-1/2" NPT	STD: 3" NPT OPT: 2-1/2" NPT 2" NPT	7.63 (194)	5.50 (140)	6.13 (157)	1.75 (44)	2.63 (67)	13.50 (343)	6.50 (165)	6.44 (164)	7.38 (187)
CPHN1321	STD: 4" NPT	STD: 3" NPT OPT: 4" NPT	9.62 (244)	5.50 (140)	6.13 (157)	2.88 (73)	3.75 (95)	13.50 (343)	7.62 (194)	7.62 (194)	7.38 (187)
CPHN1521	STD: 4" NPT	STD: 3" NPT OPT: 3" NPT	9.62 (244)	5.50 (140)	6.13 (157)	2.88 (73)	3.75 (95)	13.50 (343)	7.62 (194)	7.62 (194)	7.38 (187)
CPHF0721	STD: 3" 300#	STD: 2" 300#	7.00 (178)	4.56 (116)	6.13 (157)	1.38 (35)	2.25 (57)	13.50 (343)	6.69 (170)	6.69 (170)	7.38 (187)
CPHF1021	STD: 3" 300#	STD: 2-1/2" 300#	7.75 (197)	5.50 (140)	6.13 (157)	1.75 (44)	2.63 (67)	13.50 (343)	6.50 (165)	6.44 (164)	7.38 (187)
CPHF1521	STD: 4" 300#	STD: 3" 300#	7.84 (199)	5.50 (140)	6.13 (157)	2.88 (73)	3.75 (95)	13.50 (343)	7.62 (194)	7.62 (194)	7.38 (187)
CPHF1321	STD: 4" 300#	STD: 3" 300#	9.62 (244)	5.50 (140)	6.13 (157)	2.88 (73)	3.75 (95)	13.50 (343)	7.62 (194)	7.62 (194)	7.38 (187)
CDHN0521	STD: 2" NPT OPT: 2-1/2" NPT	STD: 2" NPT OPT: 2-1/2" NPT 1-1/2" NPT	6.13 (157)	5.00 (127)	6.13 (157)	1.38 (35)	1.88 (48)	13.50 (343)	5.88 (149)	5.88 (149)	7.38 (187)
CDHN1021	STD: 3" NPT OPT: 4" NPT	STD: 3" NPT OPT: 4" NPT	7.19 (183)	5.50 (140)	6.13 (157)	1.75 (44)	2.63 (67)	13.50 (343)	6.50 (165)	6.50 (165)	7.38 (187)
CDHN1521	STD: 4" NPT	STD: 4" NPT OPT: 3" NPT	9.62 (244)	5.50 (140)	6.13 (157)	2.88 (73)	3.75 (95)	13.50 (343)	7.62 (194)	7.62 (194)	7.38 (187)

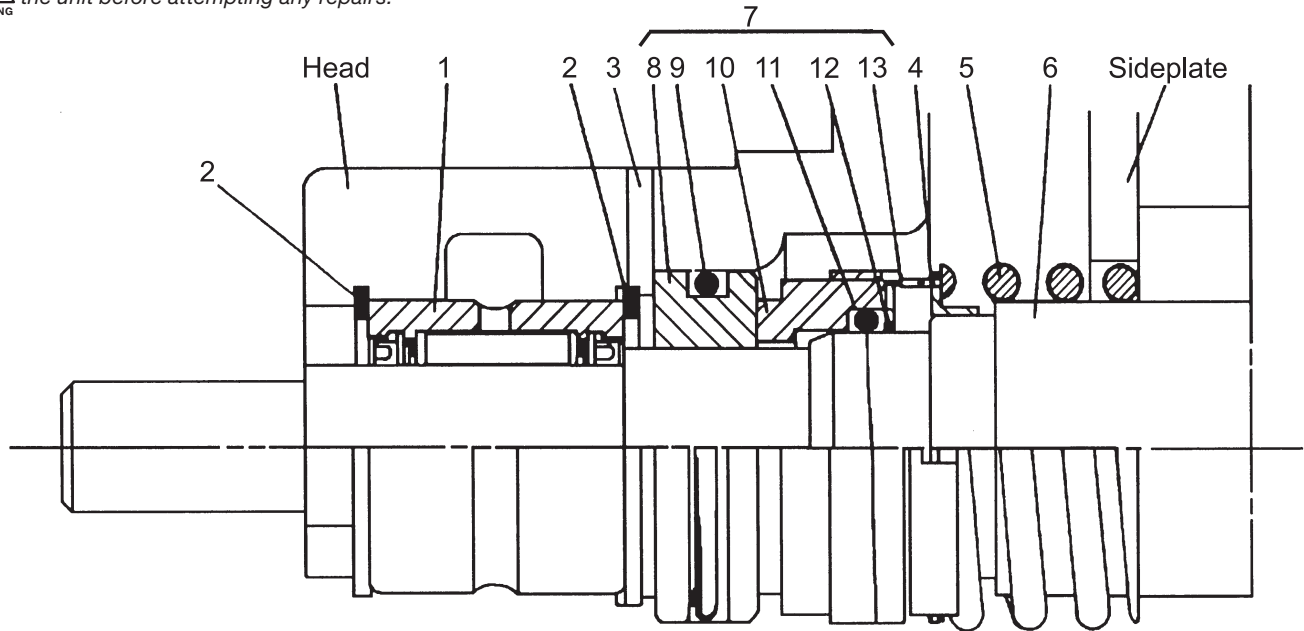
All dimensions are in inches (centimeters).

Appendix E—Parts Details for Seal Assembly (2296 Series)

Models D51 and F51



CAUTION: Always relieve pressure in the unit before attempting any repairs.



Ref No.	Part No.	Description	Qty.
1.	2471	Roller bearing	1
2.	5000-112	Retainer ring	1
3.	2595	Seat location pin	1
4.	2735	Drive band (with 2492-X)	1
5.	3471	Spring (with 2492-X)	1
6.	2492-X	Rotor and shaft assembly	1
7.	2296-1X_6 ^{a,b}	Seal Assembly	1
	2299-1X_6 ^{a,b}	Seal	1
8.	Not sold separately ^c	Silicon carbide seal seat	1
9.	Not sold separately ^c	Seat O-ring	1
10.	Not sold separately ^c	Rotor	1
11.	Not sold separately ^c	O-ring	1
12.	Not sold separately ^c	Disc	1
13.	Not sold separately ^c	Retainer	1

Material Code	
A	Buna-N
B	Neoprene ^{®d}
D	Viton ^{®d}

^a _ denotes material code. See material code chart for details.

^b Seal assembly includes the seal and a 2-154_ ^a case O-ring.

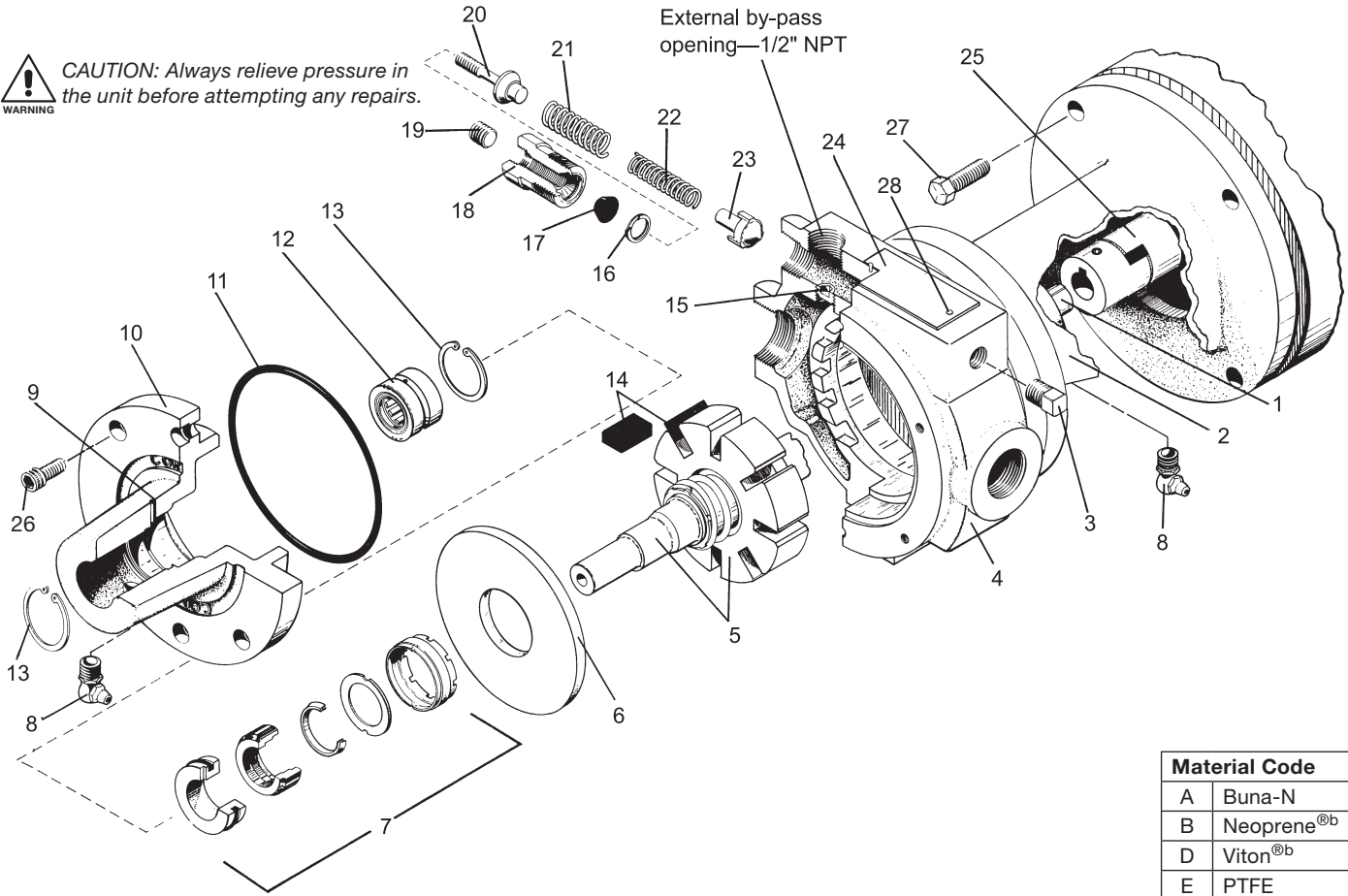
^c Not sold separately. These items are included in both the seal and the seal assembly.

^d Registered trademark of the DuPont company.

Appendix E—Parts Details for Model D51 (Direct Mount)



CAUTION: Always relieve pressure in the unit before attempting any repairs.



Material Code	
A	Buna-N
B	Neoprene ^{®b}
D	Viton ^{®b}
E	PTFE

Ref No.	Part No.	Description	Qty.
1.	2592	Key—1/8" sq. x 9/16"	1
2.	2510	Mounting bracket	1
3.	3442	Pipe plug—1/4" NPT	1
4.	2468	Case	1
5.	2492-X	Rotor and shaft assembly	1
6.	2491	Sideplate	2
7.	2296-1X_6 ^a	Seal assembly	2
8.	2604	Elbow grease zerk—1/8" NPT	2
	2159	Lubricap #2 (not shown)	2
9.	2595	Seat location pin	2
10.	2472	Head	2
11.	2-154 ^a	Case O-ring	2
12.	2471 ^d	Roller bearing	2
13.	5000-112	Retainer ring	4
14.	2451-2	Carbon vane	8
15.	2590 ^c	Flush plug—1/8" NPT	1
16.	2760-53	Retainer ring	1
17.	2589	Stem seal	1
18.	2585	Relief valve plug	1
19.	2590	Flush plug—1/8" NPT	1
20.	2584-X	Adjusting stem assembly	1
21.	2587 ^c	Outer relief valve spring	1
22.	2586 ^c	Inner relief valve spring	1
23.	2588	Relief valve	1
24.	2591	Nameplate	1
25.	2593-1	Coupling with spider	1
	2774	Coupling spider only	1

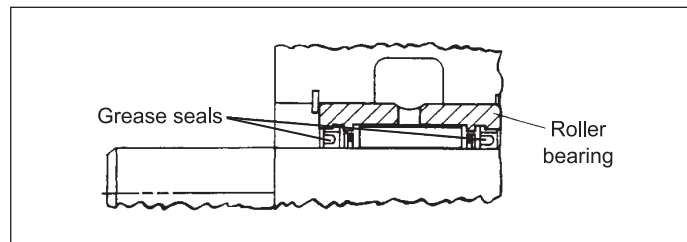
Ref No.	Part No.	Description	Qty.
26.	7002-025NC062A	Bolt socket head	9
27.	7001-037NC100A	Bolt hex head	4
28.	7012-006SF019E	Nameplate screw	2

^a _ denotes material code. See material chart for details.

^b Registered trademark of the DuPont company.

^c The pump relief valve is installed at the factory to operate as an external bypass through the 1/2" NPT hole back to the storage tank. To change from this external configuration to an internal relief valve, remove relief valve plug 2585 and relief valve springs 2586 and 2587. Then remove flush seal plug 2590 and plug the 1/2" NPT opening. Replace the relief valve plug and springs. In this case a separate external bypass valve must be used in the piping between the pump discharge and the storage tank. Set the internal valve at a pressure slightly above the setting on the external valve. Use only the outer relief valve spring 2587 for units with 1/3 hp motors. Use both springs for 1/2 hp motors and larger. Always replace the flush seal plug 2590 that screws into the relief valve plug 2585 after any relief valve adjustment.

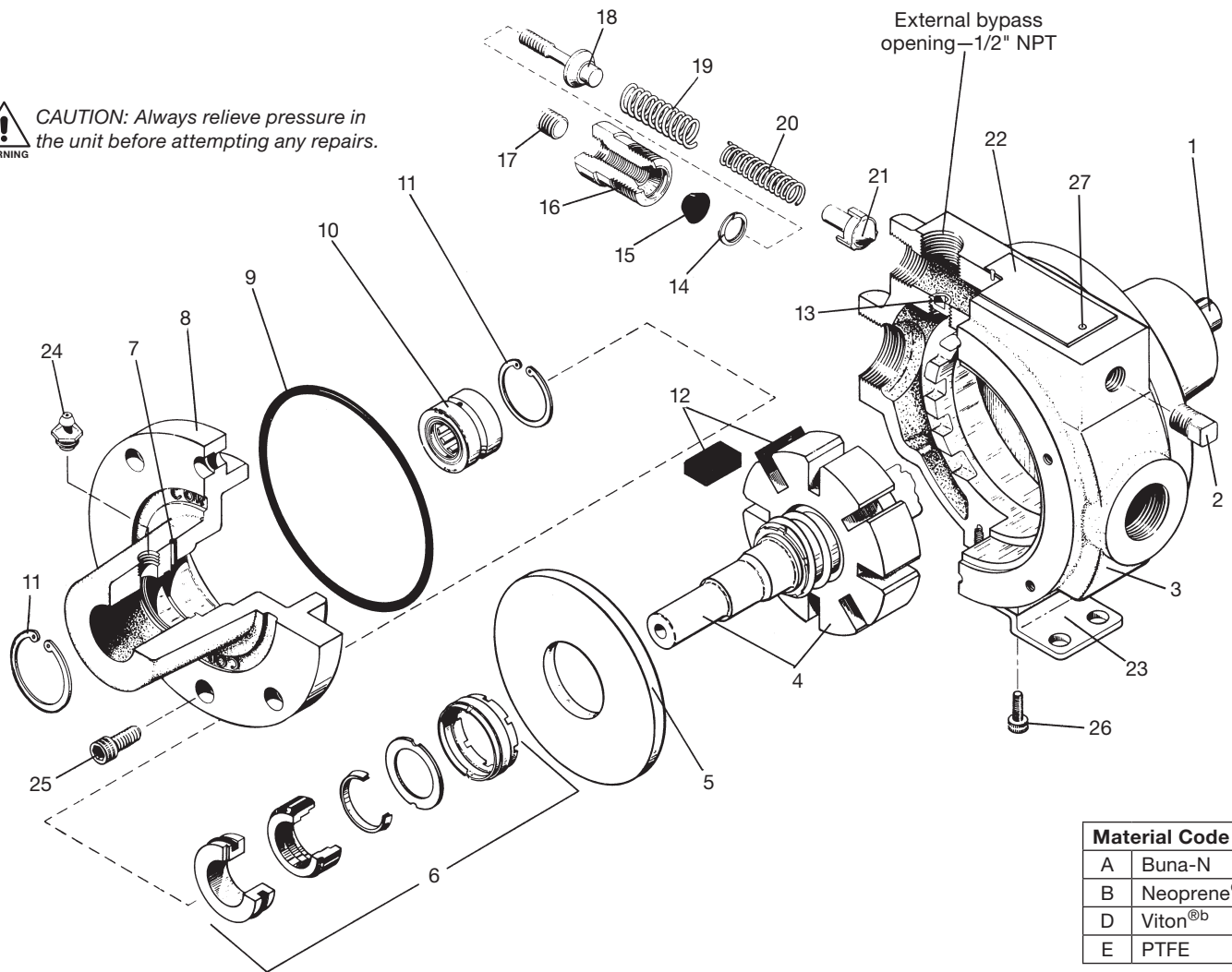
^d Bearing replacement: Install roller bearing 2471 with open side of grease seals toward outside of pump as shown below.



Appendix E—Parts Details for Model F51 (Frame Mount)



CAUTION: Always relieve pressure in the unit before attempting any repairs.



Material Code	
A	Buna-N
B	Neoprene ^{®b}
D	Viton ^{®b}
E	PTFE

Ref No.	Part No.	Description	Qty.
1.	2592	Key—1/8" sq. x 9/16"	1
2.	3442	Pipe plug—1/4" NPT	1
3.	2468-1	Case	1
4.	2492-X	Rotor and shaft assembly	1
5.	2491	Sideplate	2
6.	2296-1X_6 ^a	Seal assembly	2
7.	2595	Seat location pin	2
8.	2472	Head	2
9.	2-154_ ^a	Case O-ring	2
10.	2471 ^d	Roller bearing	2
11.	5000-112	Retainer ring	4
12.	2451-2	Carbon vane	8
13.	2590 ^c	Flush plug—1/8" NPT	1
14.	2760-53	Retainer ring	1
15.	2589	Stem seal	1
16.	2585	Relief valve plug	1
17.	2590	Flush plug—1/8" NPT	1
18.	2584-X	Adjusting stem assembly	1
19.	2587 ^c	Outer relief valve spring	1
20.	2586 ^c	Inner relief valve spring	1
21.	2588	Relief valve	1
22.	2591	Nameplate	1
23.	2594	Base	1
24.	2158	Grease zerk—1/8" NPT	2
	2159	Lubricap #2 (not shown)	2

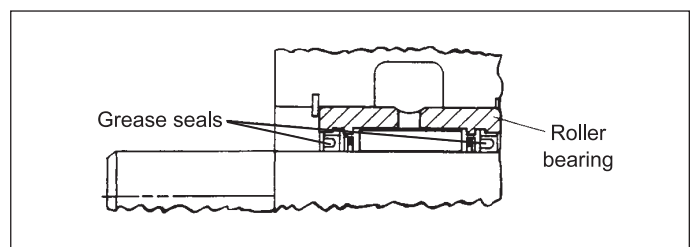
Ref No.	Part No.	Description	Qty.
25.	7002-025NC062A	Bolt socket head	12
26.	7002-010NC050A	Bolt socket head	3
27.	7012-006SF019E	Nameplate screw	2

^a _ denotes material code. See material chart for details.

^b Registered trademark of the DuPont company.

^c The pump relief valve is installed at the factory to operate as an external bypass through the 1/2" NPT hole back to the storage tank. To change from this external configuration to an internal relief valve, remove relief valve plug 2585 and relief valve springs 2586 and 2587. Then remove flush seal plug 2590 and plug the 1/2" NPT opening. Replace the relief valve plug and springs. In this case a separate external bypass valve must be used in the piping between the pump discharge and the storage tank. Set the internal valve at a pressure slightly above the setting on the external valve. Use only the outer relief valve spring 2587 for units with 1/3 hp motors. Use both springs for 1/2 hp motors and larger. Always replace the flush seal plug 2590 that screws into the relief valve plug 2585 after any relief valve adjustment.

^d Bearing replacement: Install roller bearing 2471 with open side of grease seals toward outside of pump as shown below.



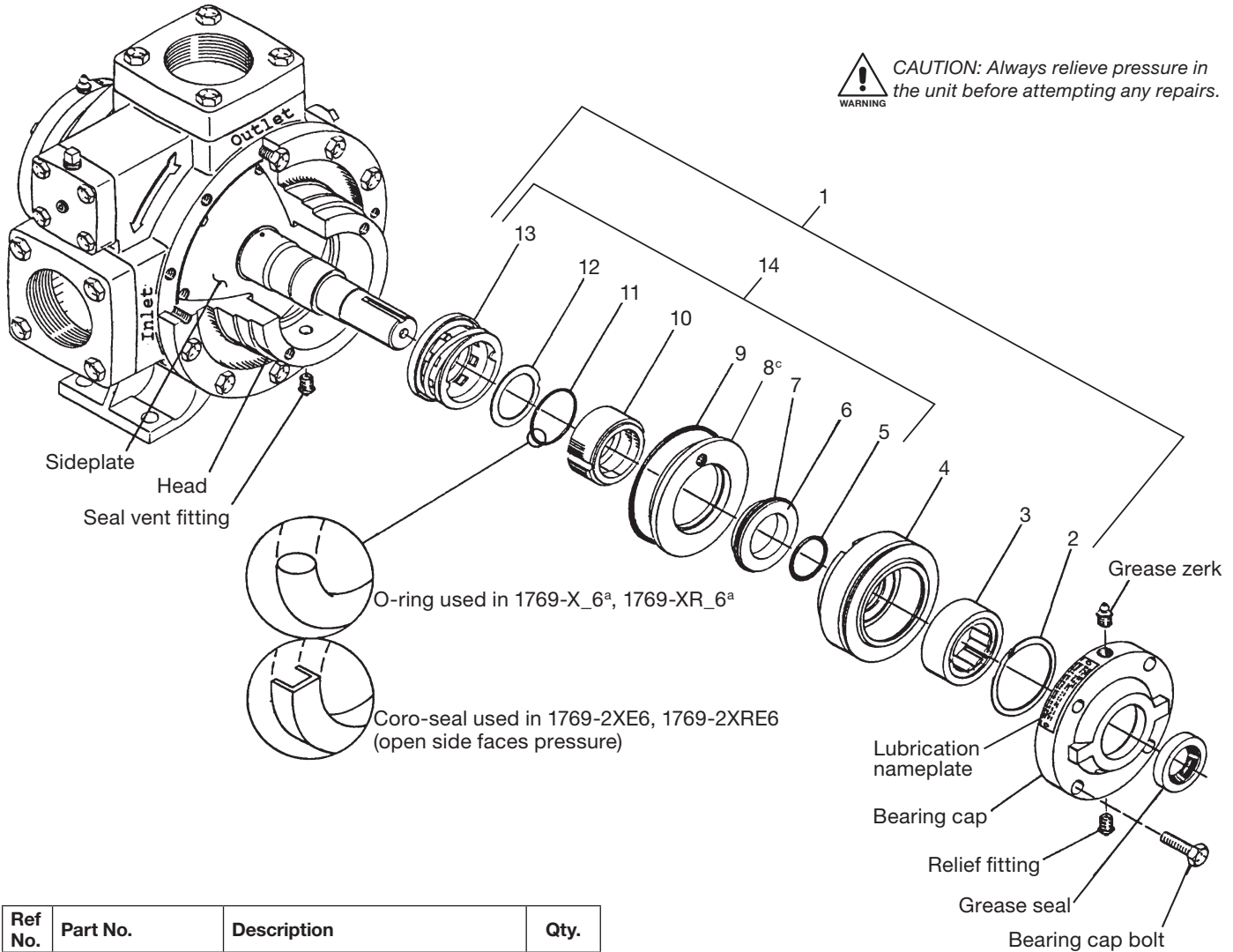
Appendix E—Parts Details for Seal Assembly (1769 Series)

All Stationary Models 521, 721, 1021, 1321, and 1521

All Truck Models 522, 722, 1022, 1322, and 1522



CAUTION: Always relieve pressure in the unit before attempting any repairs.



Ref No.	Part No.	Description	Qty.
1.	1769-X_6 ^a	Complete seal assembly	1
	1769-2XE6	Complete seal assembly Coro-Seal (PTFE only)	1
2.	2760-244	Retainer ring	1
3.	2754-X	Roller bearing, complete	1
	2754	Bearing outer race	1
	2755	Bearing inner race	1
4.	1769	Bearing housing	1
5.	2-128 ^a	Shaft O-ring	1
6.	Not sold separately ^d	Seal seat	1
7.	2-227 ^a	Seat O-ring	1
8.	1822 ^c	Seat adapter plate	1
9.	2-240 ^a	Adapter plate O-ring	1
10.	Not sold separately ^d	Carbon seal	1
11.	2-223 ^a	Rotor O-ring	1
12.	Not sold separately ^d	Disc	1
13.	Not sold separately ^d	Retainer assembly	1
14.	1769-XR_6 ^a	Field replacement seal assembly	1
	1769-2XRE6	Field replacement seal assembly Coro-Seal (PTFE only)	1

Material Code	
A	Buna-N
B	Neoprene ^{®b}
D	Viton ^{®b}
E	PTFE

^a _ denotes material code. See material code chart for details.

^bRegistered trademark of the DuPont company.

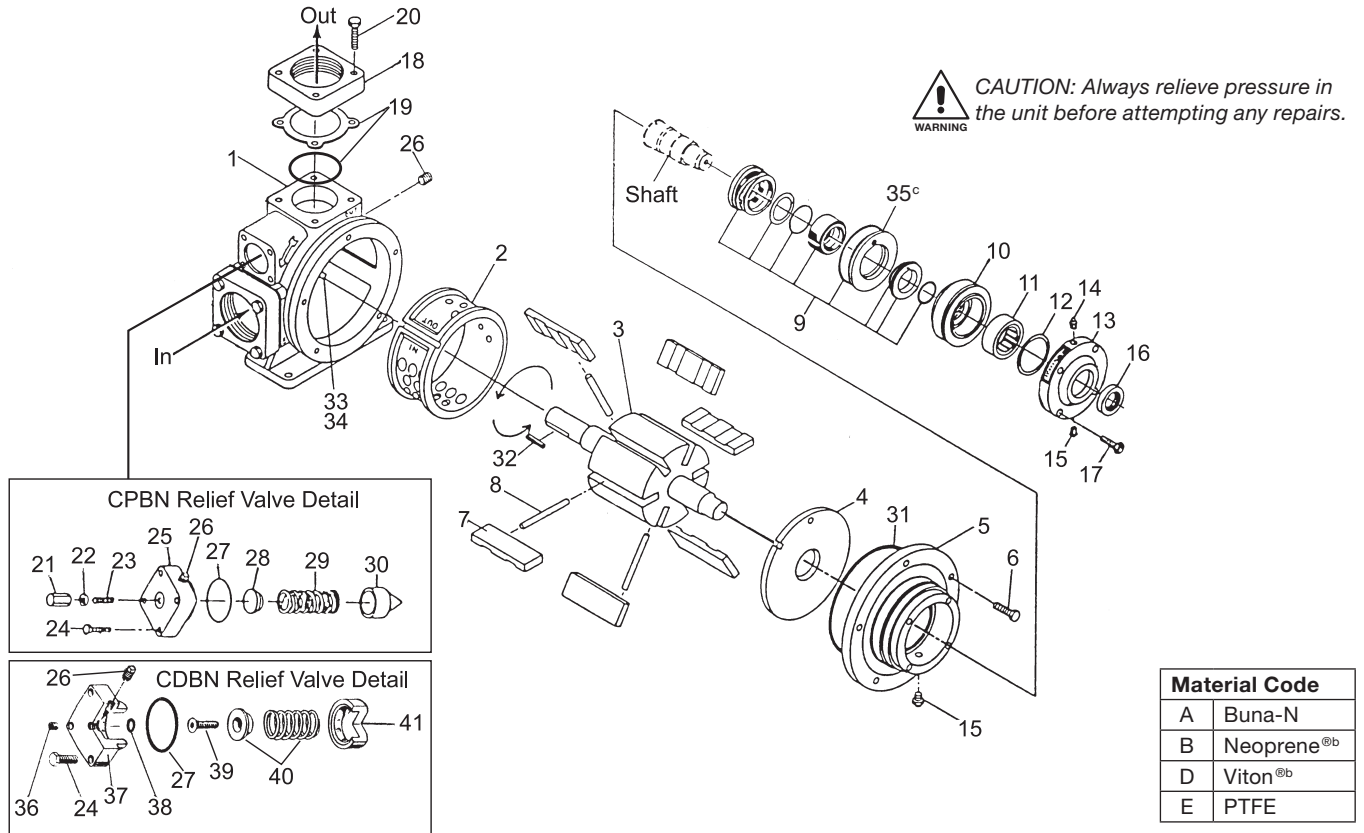
^cNot included in field replacement seal assembly.

^dNot sold separately. Available with 1769-X_6^a, 1769-XR_6^a, 1769-2XE6, and 1769-2XRE6 only.

Appendix E—Parts Details for Stationary and Truck Pumps

Stationary Models CPBN 0521 and CDBN 0521

Truck Models CPBN 0522 and CDBN 0522



Ref No.	Part No.	Description	Qty.
1.	2153	Casing (CPBN)	1
	2832-1	Casing (CDBN)	1
2.	1162-2	Liner	1
3.	1166-1X5R	Rotor and shaft assembly (0521)	1
	1166-1X6R	Rotor and shaft assembly (0522)	1
4.	3932	Side plate	2
5.	1161-5	Head (CPBN)	2
	1161-4	Head (CDBN)	2
6.	7001-037NC125A	Bolt for head 3/8"–16 NC x 1-1/4" (CPBN)	10
	7001-037NC125A	Bolt for head 3/8"–16 NC x 1-1/4" (CDBN)	20
7.	3934	Vane	6
8.	2705-X	Push rod	3
9.	1769-XR_6 ^a	Seal assembly (field replacement)	2
10.	1769	Bearing housing	2
11.	2754-X	Roller bearing	2
12.	2760-244	Retainer ring	2
13.	1164-1	Bearing cap	2
14.	2158	Grease zerk—1/8" NPT	2
15.	1343	Relief fitting—1/8" NPT	4
16.	1358	Grease seal	2
17.	7001-037NC125A	Bolt for bearing cap 3/8"–16 NC x 1-1/4"	8
	1172-1.5	Flange—1-1/2" NPT	2
	1172-2	Flange—2" NPT	2
	1172-2.5	Flange—2-1/2" NPT	2
18.	1172-3	Flange—3" NPT	2
	1999	Gasket for 1172 Flange for CPBN	2
19.	2-234_ ^a	Flange O-ring for CDBN	2

Ref No.	Part No.	Description	Qty.
20.	7001-037NC150A	Bolt for flange 3/8"–16 NC x 1-1/2"	8
21.	2458	Adjusting screw cap (CPBN)	1
22.	1480	Relief valve adjusting screw gasket (CPBN)	1
23.	2459	Relief valve adjusting screw 7/16"–14 NC x 1-1/4" (CPBN)	1
24.	7001-031NC125A	Bolt for relief valve cover 5/16"–18 NC x 1-1/4"	4
25.	1174-1	Relief valve cap (CPBN)	1
26.	3442	Pipe plug—1/4" NPT (CPBN)	1
27.	2-224_ ^a	Relief valve cap O-ring	1
28.	2457	Relief valve spring seat (CPBN)	1
29.	2178	Relief valve spring (CPBN)	1
30.	2456	Relief valve poppet (CPBN)	1
31.	2-261_ ^a	Casing O-ring	2
32.	2270	Key—1/4"	1
33.	1170	Liner key	1
34.	3253	Liner key pin—3/8" x 1/2"	2
35.	1822 ^c	Seal adaptor plate	2
36.	2590	Flush plug—1/8" NPT (CDBN)	1
37.	1174	Relief valve cap (CDBN)	1
38.	2-112_ ^a	O-ring adjusting screw (CDBN)	1
39.	2252	Relief valve adjusting screw (CDBN)	1
40.	1242-X	Spring guide assembly (CDBN)	1
41.	1241	Relief valve (CDBN)	1

^a _ denotes material code. See material code chart for details.

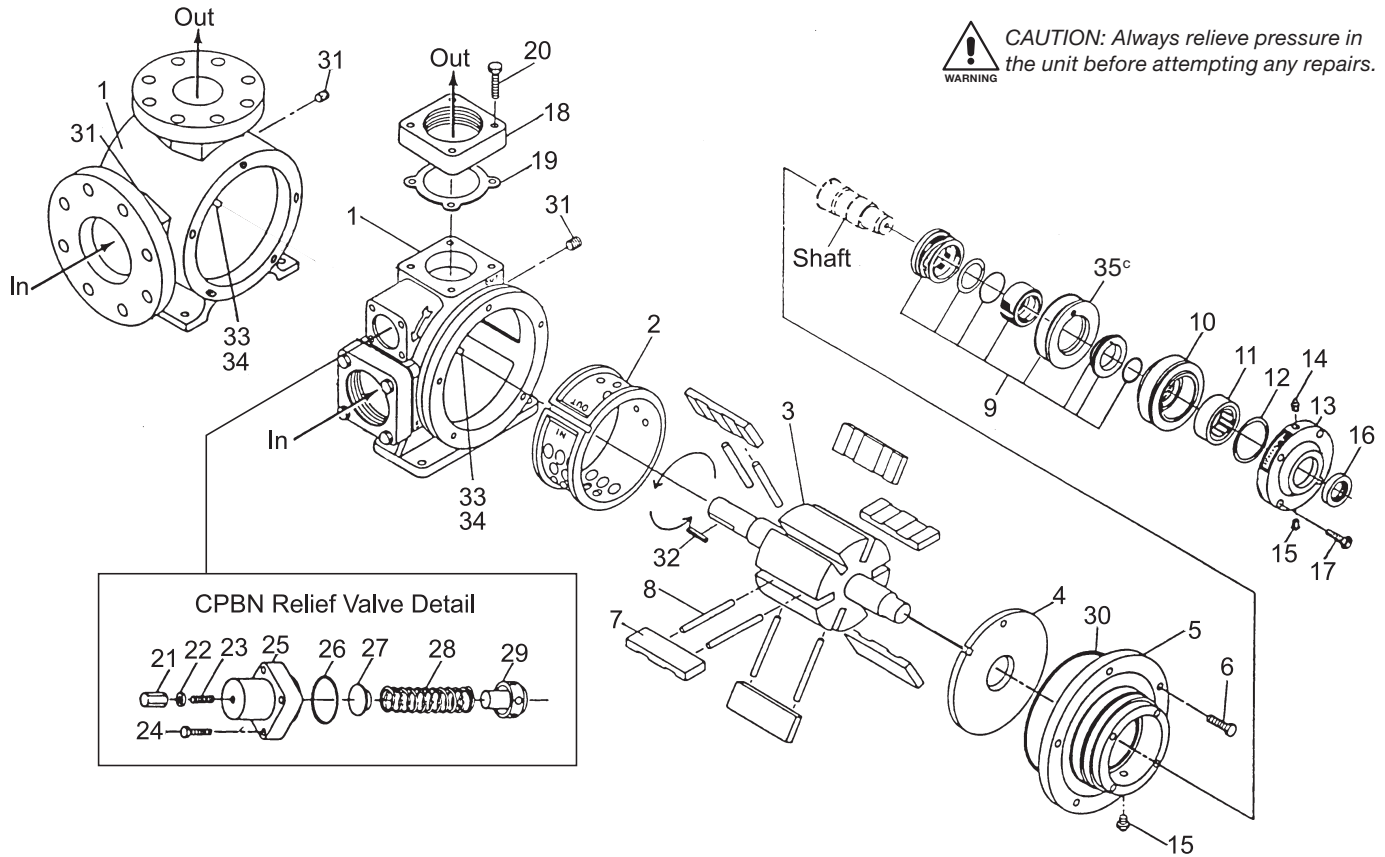
^b Registered trademark of the DuPont company.

^c Not included in field replacement seal assembly.

Appendix E—Parts Details for Stationary and Truck Pumps

Stationary Models CPBN 0721 and CPBF 0721

Truck Models CPBN 0722 and CPBF 0722



Ref No.	Part No.	Description	Qty.
1.	4042	Casing (CPBN)	1
	4077	Casing (CPBF)	1
2.	4044	Liner	1
3.	3983-X5R	Rotor and shaft assembly (0721)	1
	3983-X6R	Rotor and shaft assembly (0722)	1
4.	3932	Side plate	2
5.	1161-5	Head	2
6.	7001-037NC125A	Bolt for head 3/8"–16 NC x 1-1/4"	10
7.	5365	Vane	6
8.	2705-X	Push rod	6
9.	1769-XR_6 ^a	Seal assembly (field replacement)	2
10.	1769	Bearing housing end	2
11.	2754-X	Roller bearing	2
12.	2760-244	Spiral retainer ring	2
13.	1164-1	Bearing cap	2
14.	2158	Grease zerker—1/8" NPT	2
15.	1343	Relief fitting—1/8" NPT	4
16.	1358	Grease seal	2
17.	7001-037NC125A	Bolt for bearing cap 3/8"–16 NC x 1-1/4"	8
18.	1172-2.5	Flange—2-1/2" NPT	2
	1172-2	Flange—2" NPT	2
	1172-3	Flange—3" NPT	2
19.	1999	Gasket for flange	2

Ref No.	Part No.	Description	Qty.
20.	7001-037NC150A	Bolt for flange 3/8"–16 NC x 1-1/2"	4
21.	4025	Adjusting screw cap	1
22.	1480	Relief valve adjusting screw gasket	1
23.	7006-043NC250A	Relief valve socket head adjustment screw 7/16"–14 NC x 2-1/2"	1
24.	7001-037NC175A	Bolt for relief valve cover 3/8"–16 NC x 1-3/4"	4
25.	3930	Relief valve cover	1
26.	2-228 ^a	Relief valve cap O-ring	1
27.	2470	Relief valve spring seat	1
28.	2949	Relief valve spring	1
29.	4024	Relief valve poppet	1
30.	2-261 ^a	Casing O-ring	2
31.	3442	Pipe plug—1/4" NPT	2
32.	2270	Shaft key	1
33.	1891	Liner key	1
34.	3253	Liner key pin—3/8" x 1/2"	2
35.	1822 ^c	Seal adapter plate	2

Material Code

A	Buna-N
B	Neoprene ^{®b}
D	Viton ^{®b}
E	PTFE

^a _ denotes material code. See material code chart for details.

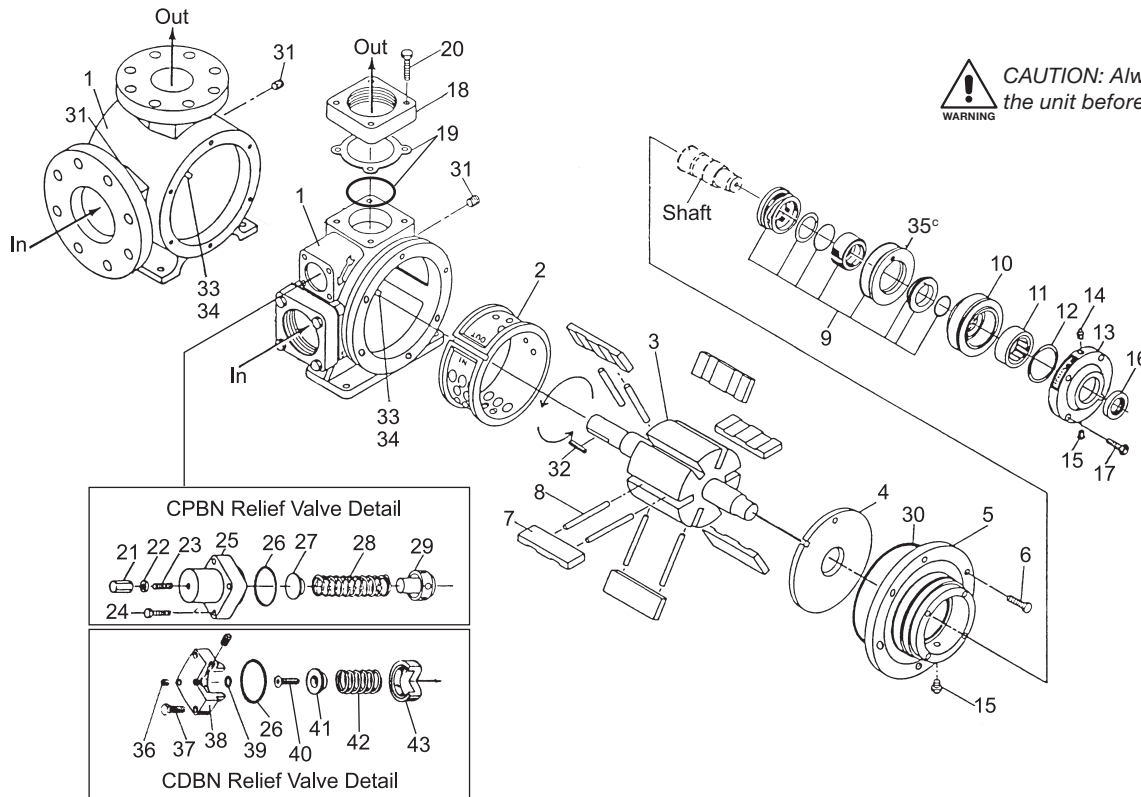
^bRegistered trademark of the DuPont company.

^cNot included in field replacement seal assembly.

Appendix E—Parts Details for Stationary and Truck Pumps

Stationary Models CPBN/BF 1021 and CDBN/BF 1021

Truck Models CPBN/BF 1022 and CDBN/BF 1022



Material Code	
A	Buna-N
B	Neoprene ^{®b}
D	Viton ^{®b}
E	PTFE

Ref No.	Part No.	Description	Qty.
1.	4145	Casing (CPBN)	1
	2841	Casing (CDBN)	1
	2433	Casing (CPBF and CDBF)	1
2.	1201-2	Liner	1
3.	1208-1X5R	Rotor and shaft assembly (1021)	1
	1208-1X6R	Rotor and shaft assembly (1022)	1
4.	3935	Side plate	2
5.	1205-5	Head (CPBN)	2
	1205-4	Head (CDBN)	2
6.	7001-037NC125A	Bolt for head 3/8"–16 NC x 1-1/4" (CPBN)	12
	7001-037NC125A	Bolt for head 3/8"–16 NC x 1-1/4" (CDBN)	24
7.	3936	Vane	6
8.	2708-X	Push rod	6
9.	1769-XR_6 ^a	Seal assembly (field replacement)	2
10.	1769	Bearing housing	2
11.	2754-X	Roller bearing	2
12.	2760-244	Spiral retainer ring	2
13.	1164-1	Bearing cap	2
14.	2158	Grease zerk—1/8" NPT	2
15.	1343	Relief fitting—1/8" NPT	4
16.	1358	Grease seal	2
17.	7001-037NC125A	Bolt for bearing cap 3/8"–16 NC x 1-1/4"	8
18.	1172-2	Flange—2" NPT, optional (CPBN outlet)	2
	1172-2.5	Flange—2-1/2" NPT, optional (CPBN outlet)	2
	1172-3	Flange—3" NPT, standard (CPBN inlet and outlet)	2
	1206-3	Flange—3" NPT, standard (CDBN inlet and outlet)	2
	1206-3S	Flange—3" Weld, optional (CDBN outlet)	2
	1206-4	Flange—4" NPT, optional (CDBN outlet)	2
	1206-4S	Flange—4" Weld, optional (CDBN outlet)	2

Ref No.	Part No.	Description	Qty.
19.	1999	Gasket for 1172 flange (CPBN)	2
	2-245_ ^a	O-ring for CDBN	2
20.	7001-037NC175A	Bolt for flange 3/8"–16 NC x 1-3/4"	8
21.	4025	Adjusting screw cap (CPBN)	1
22.	1480	Relief valve adjusting screw gasket (CPBN)	1
23.	7006-043NC250A	Relief valve socket head adjustment screw 7/16"–14 NC x 2-1/2" (CPBN)	1
24.	7001-037NC175A	Bolt for relief valve cover 3/8"–16 NC x 1-3/4" (CPBN)	4
25.	4061-1	Relief valve cover (CPBN)	1
26.	2-228_ ^a	Relief valve cap O-ring	1
27.	4074	Relief valve spring seat (CPBN)	1
28.	4149	Relief valve spring (CPBN)	1
29.	4146	Relief valve poppet (CPBN)	1
30.	2-268_ ^a	Casing O-ring	2
31.	3442	Pipe plug—1/4" NPT	2
32.	2270	Shaft key—1/4"	1
33.	1309	Liner key	1
34.	3253	Liner key pin—3/8" x 1/2"	2
35.	1822 ^c	Adaptor plate	2
36.	2590	Flush plug—1/8" NPT (CDBN)	1
37.	7001-037NC125A	3-8/16" x 1-1/4" hex head (CDBN)	4
38.	1207	Relief valve cap (CDBN)	1
39.	2-112_ ^a	O-ring for adjusting screw	1
40.	2252	Relief valve adjustment screw (CDBN)	1
41.	1227	Relief valve guide (CDBN)	1
42.	1226	Relief valve spring (CDBN)	1
43.	1224	Relief valve (CDBN)	1

^a _ denotes material code. See material code chart for details.

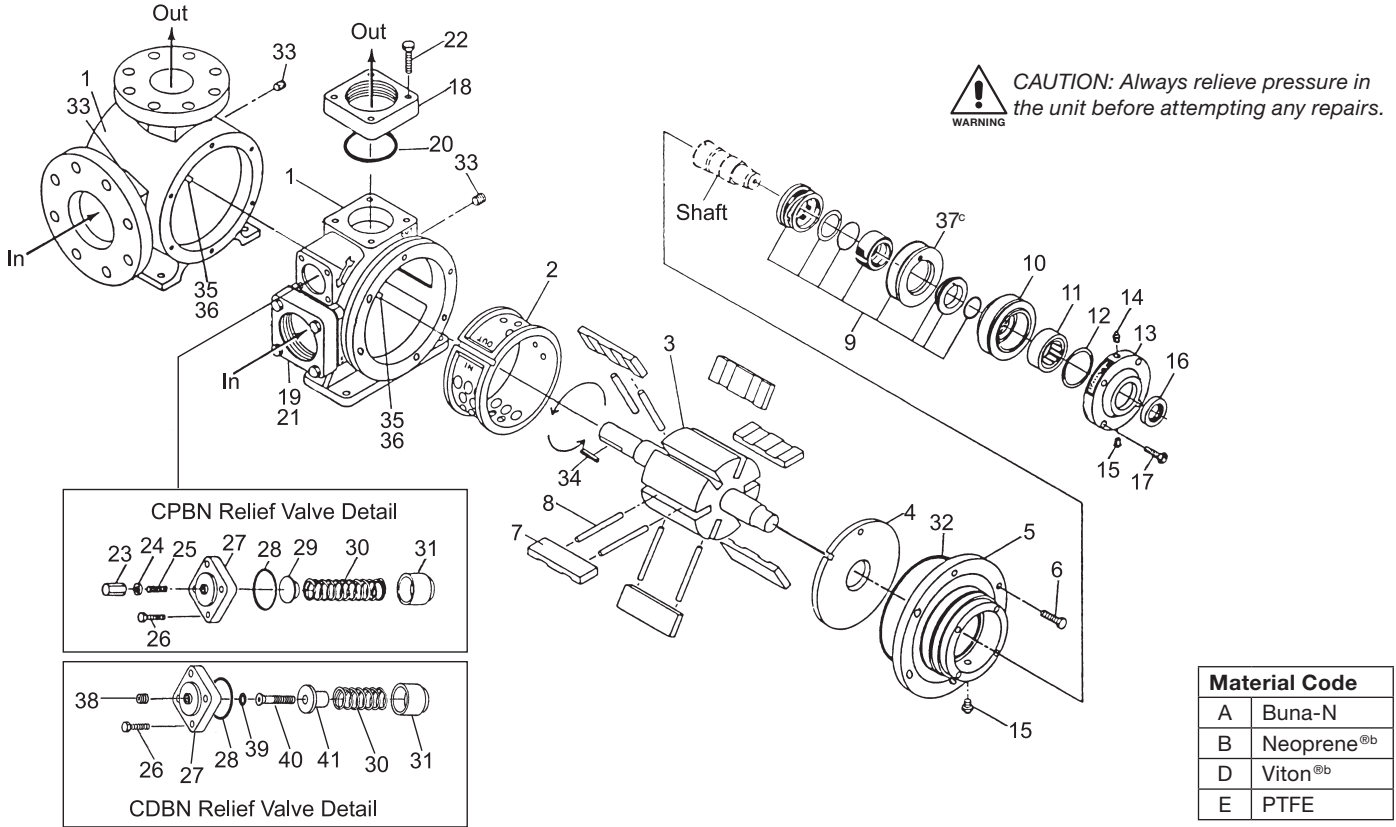
^b Registered trademark of the DuPont company.

^c Not included in field replacement seal assembly.

Appendix E—Parts Details for Stationary and Truck Pumps

Stationary Models CPBN/BF 1321, 1521, and CDBN/BF 1321, 1521

Truck Models CPBN/BF 1322, 1522, and CDBN/BF 1322, 1522



Ref No.	Part No.	Description	Qty.
1.	3254	Casing (CPBN and CDBN)	1
	2437	Casing (CPBF and CDBF)	1
2.	1792-1	Liner (1521 and 1522)	1
	4072	Liner (1321 and 1322)	1
3.	3350-X3R	Rotor and shaft assembly (1321 and 1521)	1
	3350-X4R	Rotor and shaft assembly (1322 and 1522)	1
4.	3935	Side plate	2
5.	1205-5	Head (CPBN and CPBF)	2
	1205-4	Head (CDBN and CDBF)	2
6.	7001-037NC125A	Bolt for head 3/8" —16 NC x 1-1/4" (CPBN)	12
	7001-037NC125A	Bolt for head 3/8" —16 NC x 1-1/4" (CDBN)	24
7.	3309	Vane	6
8.	4028-X	Push rod (1521 and 1522)	6
	4083-X	Push rod (1321 and 1322)	6
9.	1769-XR_6 ^a	Seal assembly (field replacement)	2
10.	1769	Bearing housing	2
11.	2754	Bearing outer race	2
12.	2760-244	Retainer ring	2
13.	1164-1	Bearing cap	2
14.	2158	Grease zerk—1/8" NPT	2
15.	1343	Relief fitting—1/8" NPT	4
16.	1358	Grease seal	2
17.	7001-037NC125A	Bolt for bearing cap 3/8" —16 NC x 1-1/4"	8
18.	1206-3	Flange—3" NPT CPBN/CDBN 1321 outlet standard	1

Ref No.	Part No.	Description	Qty.
19.	1206-4	Flange—4" NPT CPBN/CDBN (1321 inlet) (1521 inlet and outlet) std.	1
20.	2-245_ ^a	O-ring gasket for 1206-3 flange	1
21.	2-249_ ^a	O-ring gasket for 1206-4 flange	1
22.	7001-037NC150A	Bolt for flange 3/8" —16 NC x 1-1/2"	8
23.	4025	Adjusting screw cap (CPBN)	1
24.	1480	Gasket (CPBN)	1
25.	7006-043NC250A	Relief valve soc. hd. adj. screw 7/16" —14 NCx2-1/2" (CPBN)	1
26.	7001-037NC100A	Bolt for relief valve cover 3/8" —16 NC x 1"	4
	4061-1	Relief valve cap (CPBN)	1
27.	4061	Relief valve cap (CDBN)	1
28.	2-240_ ^a	Relief valve cap O-ring	1
29.	4074	Relief valve spring seat (CPBN)	1
30.	4075	Relief valve spring	1
31.	4062	Relief valve poppet	1
32.	2-268_ ^a	Casing O-ring	2
33.	3442	Pipe plug—1/4" NPT	2
34.	2270	Shaft key—1/4"	1
35.	1309	Liner key	1
36.	3253	Liner key pin—3/8" x 1/2"	2
37.	1822 ^c	Seal adaptor plate	2
38.	2590	Flush plug—1/8" NPT (CDBN)	1
39.	2-112_ ^a	O-ring (CDBN)	1
40.	4078	Relief valve adjustment screw (CDBN)	1
41.	4073	Relief valve spring seat (CDBN)	1

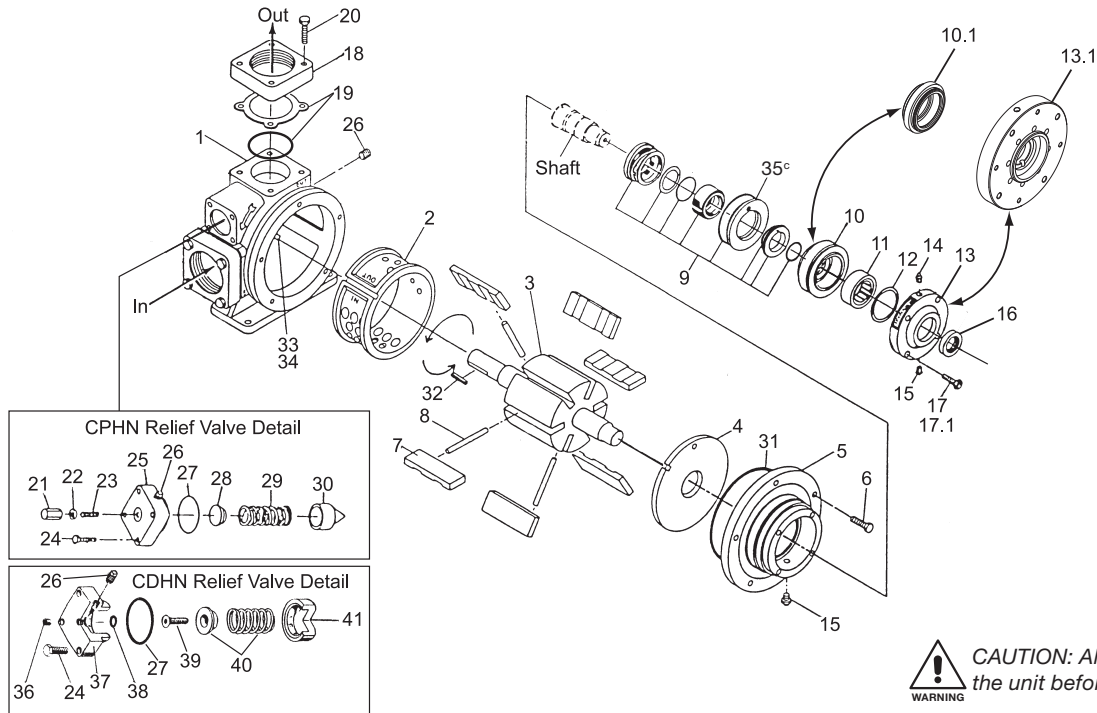
^a _ denotes material code. See material code chart for details.

^b Registered trademark of the DuPont company.

^c Not included in field replacement seal assembly.

Appendix E—Parts Details for Stationary Pumps

Models CPHN 0521 and CDHN 0521



WARNING CAUTION: Always relieve pressure in the unit before attempting any repairs.

Ref No.	Part No.	Description	Qty.
1.	2153	Casing (CPHN)	1
	2832-1	Casing (CDHF)	1
2.	1162-2	Liner	1
3.	1166-1X5R	Rotor and shaft assembly (0521)	1
	1166-1X6R	Rotor and shaft assembly (0522)	1
4.	3932	Side plate	2
5.	1161-5	Head (CPHN)	2
	1161-4	Head (CDHN)	2
6.	7001-037NC125A	Bolt for head 3/8"–16 NC x 1-1/4" (CPHN)	10
	7001-037NC125A	Bolt for head 3/8"–16 NC x 1-1/4" (CDHN)	20
7.	3934	Vane	6
8.	2705-X	Push rod	3
9.	1769-XR_6 ^a	Seal assembly (field replacement)	2
10.	1769	Bearing housing (used on non-hydraulic side of pump)	1
10.1.	1769-3	Bearing housing (used on hydraulic drive side of pump)	1
11.	2754-X	Roller bearing	2
12.	2760-244	Retainer ring	2
13.	1164-1	Bearing cap (used on non-hydraulic side of pump)	1
13.1.	4193	Bearing cap (used on hydraulic drive side of pump)	1
14.	2158	Grease zerk—1/8" NPT	2
15.	1343	Relief fitting—1/8" NPT	4
16.	1358	Grease seal	2
17.	7001-037NC125A	Bolt for bearing cap 3/8"–16 NC x 1-1/4 (non-hydraulic side)	4
17.1.	7001-037NC150A	Bolt for bearing cap 3/8"–16 NC x 1-1/2 (hydraulic side)	4
18.	1172-1.5	Flange—1-1/2" NPT	2
	1172-2	Flange—2" NPT	2
	1172-2.5	Flange—2-1/2" NPT	2
	1172-3	Flange—3" NPT	2

Ref No.	Part No.	Description	Qty.
19.	1999	Gasket for 1172 flange for CPHN	2
	2-234_ ^a	Flange O-ring for CDHN	2
20.	7001-037NC150A	Bolt for flange 3/8"–16 NC x 1-1/2"	8
21.	2458	Adjusting screw cap (CPHN)	1
22.	1480	Relief valve adjusting screw gasket (CPHN)	1
23.	2459	Relief valve adjusting screw 7/16"–14 NC x 1-1/4" (CPHN)	1
24.	7001-031NC125A	Bolt for relief valve cover 5/16"–18 NC x 1-1/4"	4
25.	1174-1	Relief valve cap (CPHN)	1
26.	3442	Pipe plug—1/4" NPT (CPHN)	1
27.	2-224_ ^a	Relief valve cap O-ring	1
28.	2457	Relief valve spring seat (CPHN)	1
29.	2178	Relief valve spring (CPHN)	1
30.	2456	Relief valve poppet (CPHN)	1
31.	2-261_ ^a	Casing O-ring (Buna-N standard)	2
32.	2270	Key—1/4"	1
33.	1170	Liner key	1
34.	3253	Liner key pin—3/8" x 1/2"	2
35.	1822 ^c	Seal adaptor plate	2
36.	2590	Flush plug—1/8" NPT (CDHN)	1
37.	1174	Relief valve cap (CDHN)	1
38.	2-112_ ^a	O-ring adjusting screw (CDHN)	1
39.	2252	Relief valve adjusting screw (CDHN)	1
40.	1242-X	Spring guide assembly (CDHN)	1
41.	1241	Relief valve (CDHN)	1

Material Code	
A	Buna-N
B	Neoprene ^{®b}
D	Viton ^{®b}
E	PTFE

^a _ denotes material code. See material code chart for details.

^b Registered trademark of the DuPont company.

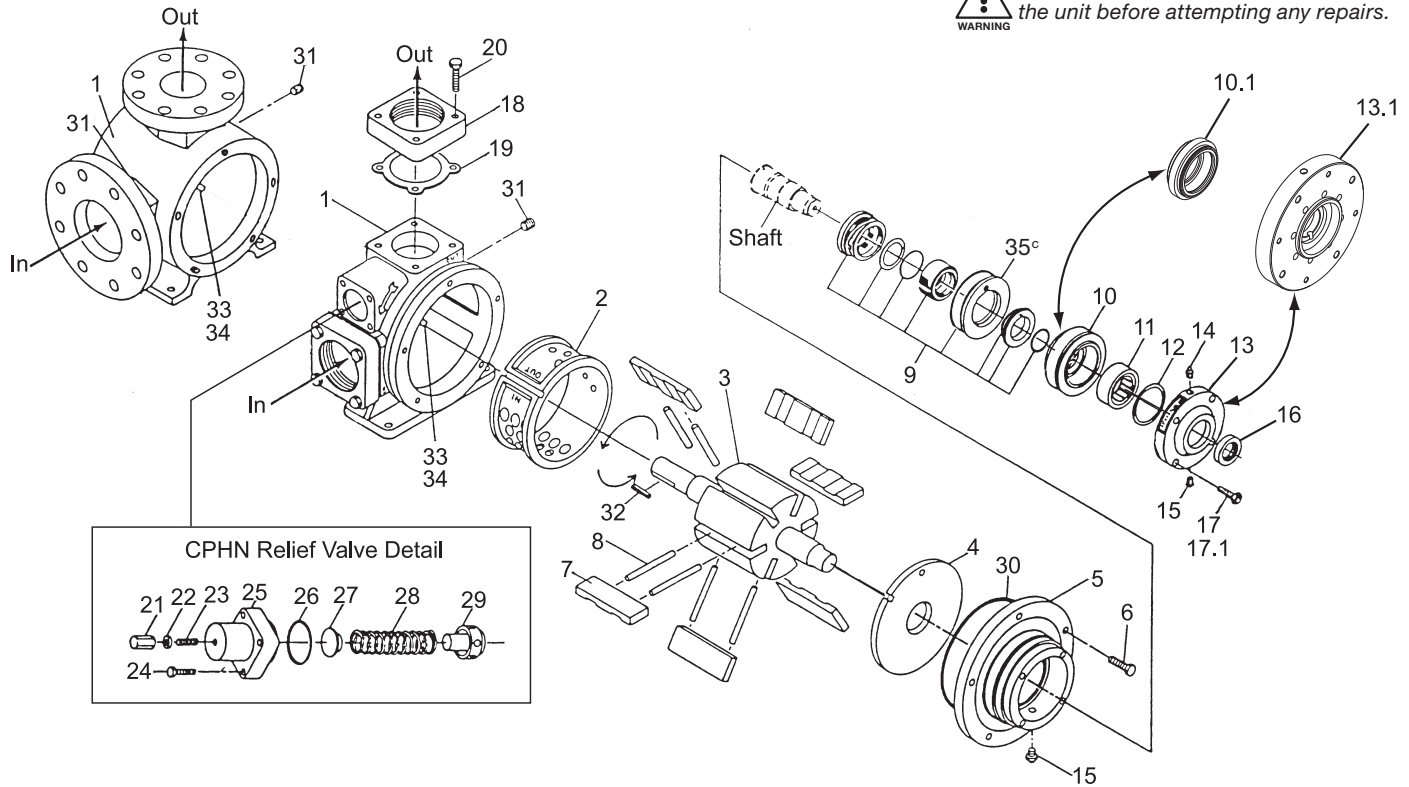
^c Not included in field replacement seal assembly.

Appendix E—Parts Details for Stationary Pumps

Models CPHN/HF 0721



CAUTION: Always relieve pressure in the unit before attempting any repairs.



Ref No.	Part No.	Description	Qty.
1.	4042	Casing (CPHN)	1
	4077	Casing (CPHF)	1
2.	4044	Liner	1
3.	3983-X5R	Rotor and shaft assembly (0721)	1
	3983-X6R	Rotor and shaft assembly (0722)	1
4.	3932	Side plate	2
5.	1161-5	Head	2
6.	7001-037NC125A	Bolt for head 3/8"—16 NC x 1-1/4"	10
7.	5365	Vane	6
8.	2705-X	Push rod	6
9.	1769-XR_6 ^a	Seal assembly (field replacement)	2
10.	1769	Bearing housing (used on non-hydraulic side of pump)	1
10.1.	1769-3	Bearing housing (used on hydraulic side of pump)	1
11.	2754-X	Roller bearing	2
12.	2760-244	Spiral retainer ring	2
13.	1164-1	Bearing cap (used on non-hydraulic side of pump)	1
13.1.	4193	Bearing cap (used on hydraulic side of pump)	1
14.	2158	Grease zerk—1/8" NPT	2
15.	1343	Relief fitting—1/8" NPT	4
16.	1358	Grease seal	2
17.	7001-037NC125A	Bolt for bearing cap 3/8"—16 NC x 1-1/4" (non-hydraulic side)	4
17.1.	7001-037NC150A	Bolt for bearing cap 3/8"—16 NC x 1-1/2" (hydraulic side)	4

Ref No.	Part No.	Description	Qty.
18.	1172-2.5	Flange—2-1/2" NPT	2
	1172-2	Flange—2" NPT	2
	1172-3	Flange—3" NPT	2
19.	1999	Gasket for flange	2
20.	7001-037NC150A	Bolt for flange 3/8"—16 NC x 1-1/2"	8
21.	4025	Adjusting screw cap	1
22.	1480	Relief valve adjusting screw gasket	1
23.	7006-043NC250A	Relief valve socket head adjustment screw 7/16"—14 NC x 2-1/2"	1
24.	7001-037NC175A	Bolt for relief valve cover 3/8"—16 NC x 1-3/4"	4
25.	3930	Relief valve cover	1
26.	2-228_ ^a	Relief valve cap O-ring	1
27.	2470	Relief valve spring seat	1
28.	2949	Relief valve spring	1
29.	4024	Relief valve poppet	1
30.	2-261_ ^a	Casing O-ring	2
31.	3442	Pipe plug—1/4" NPT	2
32.	2270	Shaft key—1/4"	1
33.	1891	Liner key	1
34.	3253	Liner key pin—3/8" x 1/2"	2
35.	1822 ^c	Seal adapter plate	2

Material Code

A	Buna-N
B	Neoprene ^{®b}
D	Viton ^{®b}
E	PTFE

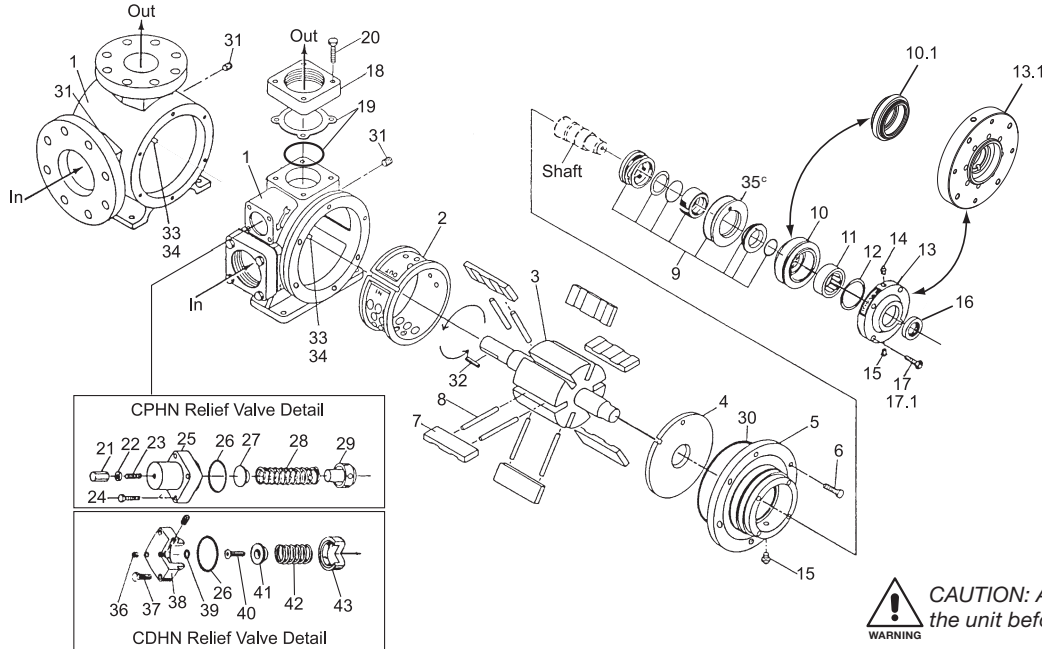
^a _ denotes material code. See material code chart for details.

^bRegistered trademark of the DuPont company.

^cNot included in field replacement seal assembly.

Appendix E—Parts Details for Stationary Pumps

Models CPHN/HF 1021 and CDHN 1021



Ref No.	Part No.	Description	Qty.
1.	4145	Casing (CPHN)	1
	2841	Casing (CDHN)	1
	2433	Casing (CPHF and CDHF)	1
2.	1201-2	Liner	1
3.	1208-1X5R	Rotor and shaft assembly (1021)	1
	1208-1X6R	Rotor and shaft assembly (1022)	1
4.	3935	Side plate	2
5.	1205-5	Head (CPHN)	2
	1205-4	Head (CDHN)	2
6.	7001-037NC125A	Bolt for head 3/8"–16 NC x 1-1/4" (CPHN)	12
	7001-037NC125A	Bolt for head 3/8"–16 NC x 1-1/4" (CDHN)	24
7.	3936	Vane	6
8.	2708-X	Push rod	6
9.	1769-XR_6 ^a	Seal assembly (field replacement)	2
10.	1769	Bearing housing (used on non-hydraulic side of pump)	1
10.1.	1769-3	Bearing housing (used on hydraulic side of pump)	1
11.	2754-X	Roller bearing	2
12.	2760-244	Spiral retainer ring	2
13.	1164-1	Bearing cap (used on non-hydraulic side of pump)	1
13.1.	4193	Bearing cap (used on hydraulic side of pump)	1
14.	2158	Grease zerk—1/8" NPT	2
15.	1343	Relief fitting—1/8" NPT	4
16.	1358	Grease seal	2
17.	7001-037NC125A	Bolt for bearing cap 3/8"–16 NC x 1-1/4" (non-hydraulic side)	4
17.1.	7001-037NC150A	Bolt for bearing cap 3/8"–16 NC x 1-1/2" (hydraulic side)	4
18.	1172-2	Flange—2" NPT, optional (CPHN outlet)	2
	1172-2.5	Flange—2-1/2" NPT, optional (CPHN outlet)	2
	1172-3	Flange—3" NPT, standard (CPHN inlet and outlet)	2
	1206-3	Flange—3" NPT, standard (CDHN inlet and outlet)	2
	1206-3S	Flange—3" Weld, optional (CDHN outlet)	2
	1206-4	Flange—4" NPT, optional (CDHN outlet)	2
	1206-4S	Flange—4" Weld, optional (CDHN outlet)	2

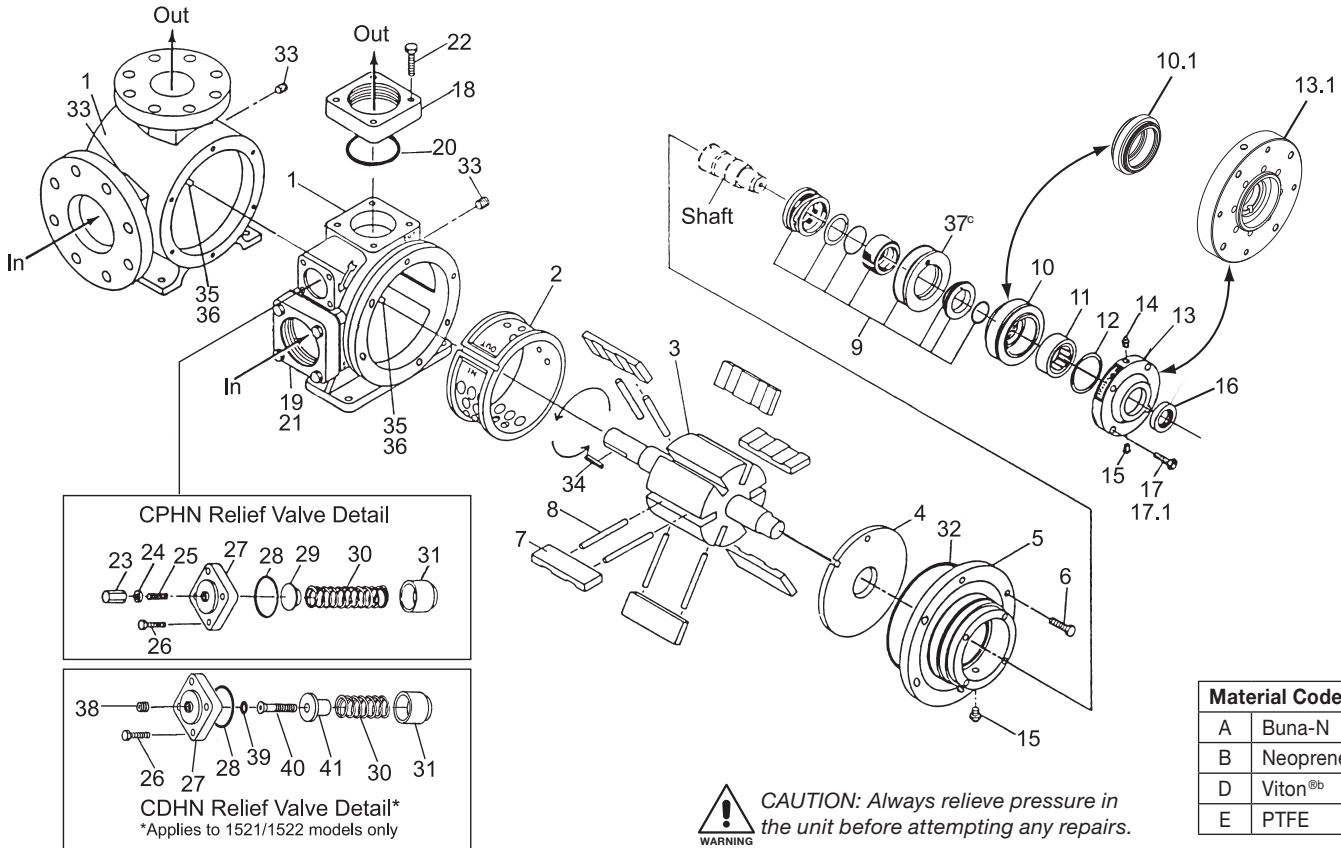
Ref No.	Part No.	Description	Qty.
19.	1999	Gasket for 1172 flange (CPHN)	2
	2-245 ^a	O-ring for CDHN	2
20.	7001-037NC175A	Bolt for flange 3/8"–16 NC x 1-3/4"	8
21.	4025	Adjusting screw cap (CPHN)	1
22.	1480	Relief valve adjusting screw gasket (CPHN)	1
23.	7006-043NC250A	Relief valve socket head adjustment screw 7/16"–14 NC x 2-1/2" (CPHN)	1
24.	7001-037NC175A	Bolt for relief valve cover 3/8"–16 NC x 1-3/4" (CPHN)	4
25.	4061-1	Relief valve cover (CPHN)	1
26.	2-228 ^a	Relief valve cap O-ring	1
27.	4074	Relief valve spring seat (CPHN)	1
28.	4149	Relief valve spring (CPHN)	1
29.	4146	Relief valve poppet (CPHN)	1
30.	2-268 ^a	Casing O-ring	2
31.	3442	Pipe plug—1/4" NPT	2
32.	2270	Shaft key—1/4"	1
33.	1309	Liner key	1
34.	3253	Liner key pin—3/8" x 1/2"	2
35.	1822 ^c	Adaptor plate	2
36.	2590	Flush plug—1/8" NPT (CDHN)	1
37.	7001-037NC125A	3-8/16" x 1-1/4" hex head (CDHN)	4
38.	1207	Relief valve cap (CDHN)	1
39.	2-112 ^a	O-ring for adjusting screw	1
40.	2252	Relief valve adjustment screw (CDHN)	1
41.	1227	Relief valve guide (CDHN)	1
42.	1226	Relief valve spring (CDHN)	1
43.	1224	Relief valve (CDHN)	1

Material Code	
A	Buna-N
B	Neoprene ^{®b}
D	Viton ^{®b}
E	PTFE

^a _ denotes material code. See material code chart for details.
^b Registered trademark of the DuPont company.
^c Not included in field replacement seal assembly.

Appendix E—Parts Details for Stationary Pumps

Models CPHN/HF 1321, 1521 and CDHN 1521



Ref No.	Part No.	Description	Qty.
1.	3254	Casing (CPHN and CDHN)	1
	2437	Casing (CPBF and CDBF)	1
2.	1792-1	Liner (1521 and 1522)	1
	4072	Liner (1321 and 1322)	1
3.	3350-X3R	Rotor and shaft assembly (1321 and 1521)	1
	3350-X4R	Rotor and shaft assembly (1322 and 1522)	1
4.	3935	Side plate	2
5.	1205-5	Head (CPHN and CPHF)	2
	1205-4	Head (CDHN)	2
6.	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CPHN)	12
	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CDHN)	24
7.	3309	Vane	6
8.	4028-X	Push rod (1521)	6
	4083-X	Push rod (1321)	6
9.	1769-XR_6 ^a	Seal assembly (field replacement)	2
10.	1769	Bearing housing (used on non-hydraulic side of pump)	1
10.1.	1769-3	Bearing housing (used on hydraulic side of pump)	1
11.	2754	Bearing outer race	2
12.	2760-244	Retainer ring	2
13.	1164-1	Bearing cap (used on non-hydraulic side of pump)	1
13.1.	4193	Bearing cap (used on hydraulic side of pump)	1
14.	2158	Grease zerk—1/8" NPT	2
15.	1343	Relief fitting—1/8" NPT	4
16.	1358	Grease seal	2
17.	7001-037NC125A	Bolt for bearing cap 3/8" — 16 NC x 1-1/4" (non-hydraulic side)	4
17.1.	7001-037NC150A	Bolt for bearing cap 3/8" — 16 NC x 1-1/2" (hydraulic side)	4

WARNING CAUTION: Always relieve pressure in the unit before attempting any repairs.

Ref No.	Part No.	Description	Qty.
18.	1206-3	Flange—3" NPT, standard (CPHN1321 outlet)	1
19.	1206-4	Flange—4" NPT, standard (CPHN1321 inlet) (CPHN/CDHN 1521 inlet and outlet)	1
20.	2-245_ ^a	O-ring gasket for 1206-3 flange	1
21.	2-249_ ^a	O-ring gasket for 1206-4 flange	1
22.	7001-037NC150A	Bolt for flange 3/8" — 16 NC x 1-1/2"	8
23.	4025	Adjusting screw cap (CPHN)	1
24.	1480	Gasket (CPHN)	1
25.	7006-043NC250A	Relief valve soc. hd. adj. screw 7/16" — 14 NC x 2-1/2" (CPHN)	1
26.	7001-037NC100A	Bolt for relief valve cover 3/8" — 16 NC x 1"	4
27.	4061-1	Relief valve cap (CPHN)	1
	4061	Relief valve cap (CDHN)	1
28.	2-240_ ^a	Relief valve cap O-ring	1
29.	4074	Relief valve spring seat (CPHN)	1
30.	4075	Relief valve spring	1
31.	4062	Relief valve poppet	1
32.	2-268_ ^a	Casing O-ring	2
33.	3442	Pipe plug—1/4" NPT	2
34.	2270	Shaft key—1/4"	1
35.	1309	Liner key	1
36.	3253	Liner key pin—3/8" x 1/2"	2
37.	1822 ^c	Seal adaptor plate	2
38.	2590	Flush plug—1/8" NPT (CDHN)	1
39.	2-112_ ^a	O-ring (Buna-N standard) (CDHN)	1
40.	4078	Relief valve adjustment screw (CDHN)	1
41.	4073	Relief valve spring seat (CDHN)	1

^a _ denotes material code. See material code chart for details.

^b Registered trademark of the DuPont company.

^c Not included in field replacement seal assembly.

Appendix F—V-Belt Selection for Stationary Coro-Vane® Pumps

1,450 RPM Motor			Motor Hp	Nominal Pump RPM	1,750 RPM Motor		
Belt Number	Sheave Pitch Diameter				Sheave Pitch Diameter		Belt Number
	Pump	Motor			Pump	Motor	
B64	B15.4	B7.4	2	420	1-3V14.0	1-3V3.35	3V600
B60	B13.6	B4.2		470	1-3V10.6	1-3V2.80	3V530
B60	B12.4	B4.2		520	1-3V10.6	1-3V3.15	3V530
B55	B11.0	B4.2		580	1-3V10.6	1-3V3.65	3V560
B56	B11.0	B4.8		640	1-3V8.0	1-3V3.00	3V500
B64	B15.4	B4.4	3	420	2-3V10.6	2-3V2.65	3V530
B64	B15.4	B4.8		470	2-3V10.6	2-3V2.80	3V530
A55	2A10.6	2A3.6		520	1-3V14.0	1-3V4.12	3V630
B55	2B11.0	2B4.2		580	1-3V14.0	1-3V4.75	3V630
B60	B12.4	B5.4		640	2-3V8.0	2-3V3.00	3V500
B56	B11.0	B5.2		710	2-3V6.9	2-3V2.80	3V475
B53	B9.4	B4.8		780	1-3V8.0	1-3V3.65	3V500
B53	B8.6	B5.0		860	2-3V5.3	2-3V2.65	3V450
B51	B7.4	B4.8		950	1-3V6.5	1-3V3.65	3V475
B64	2B15.4	2B4.4	5	420	3-A13.2	3-A3.2	A60
B60	2B13.6	2B4.2		470	2-A13.2	2-A3.6	A60
B60	2B12.4	2B4.2		520	2-A12.0	2-A3.6	A56
B55	2B11.0	2B4.2		580	2-3V10.6	2-3V3.65	3V560
B56	2B11.0	2B4.8		640	3-3V8.0	3-3V3.00	3V500
B56	2B11.0	2B5.2		710	2-3V8.0	2-3V3.35	3V500
B53	2B9.4	2B4.8		780	2-3V6.9	2-3V3.15	3V475
B53	2B8.6	2B5.0		860	2-3V6.5	2-3V3.15	3V475
B51	2B7.4	2B4.8		950	2-3V6.0	2-3V3.35	3V475
B64	3B15.4	3B4.4	7-1/2	420	4-A13.2	4-A3.2	A60
B64	2B15.4	2B4.8		470	3-A13.2	3-A3.6	A60
B60	3B12.7	3B4.2		520	3-3V14.0	3-3V4.12	3V630
B55	3B11.0	3B4.2		580	2-3V14.0	2-3V4.75	3V630
B56	3B11.0	3B4.8		640	2-3V14.0	2-3V5.30	3V630
B56	3B11.0	3B5.2		710	2-3V10.6	2-3V4.50	3V560
B53	3B9.4	3B4.8		780	3-3V6.9	3-3V3.15	3V475
B53	3B8.6	3B5.0		860	3-3V6.5	3-3V3.15	3V475
B51	3B7.4	3B4.8		950	2-3V8.0	2-3V4.50	3V530
B71	3B18.4	3B5.2	10	420	3-3V19.0	3-3V4.50	3V710
B71	2B18.4	2B5.8		470	3-3V19.0	3-3V5.00	3V710
B60	4B12.4	4B4.2		520	3-3V14.0	3-3V4.12	3V630
B55	4B11.0	4B4.2		580	3-3V14.0	3-3V4.50	3V630
B56	4B11.0	4B4.8		640	2-3V14.0	2-3V5.30	3V630
B62	3B12.4	3B5.8		710	2-3V14.0	2-3V5.60	3V630
B56	3B11.0	3B5.8		780	2-B12.4	2-B5.6	B60
B62	3B12.4	3B7.0		860	2-3V10.6	2-3V5.30	3V560
B60	3B9.4	3B6.0		950	2-3V10.6	2-3V5.60	3V560
B71	4B18.4	4B5.2	15	420	4-3V19.0	4-3V4.75	3V710
B71	3B18.4	3B5.8		470	4-3V19.0	4-3V5.00	3V710
B62	5B13.6	5B4.8		520	3-3V19.0	3-3V5.60	3V750
B60	5B12.4	5B4.8		580	4-3V14.0	4-3V4.75	3V630
B56	5B11.0	5B4.8		640	3-3V14.0	3-3V5.30	3V630
B56	5B11.0	5B5.2		710	3-3V14.0	3-3V5.60	3V630
B53	5B9.4	5B4.8		780	3-B12.4	3-B5.6	B60
B53	5B8.6	5B5.0		860	2-B12.4	2-B6.0	B60
B51	5B7.4	5B4.8		950	2-B11.0	2-B6.0	B56
B75	4B18.4	4B6.6	20	520	4-3V19.0	4-3V5.60	3V750
B68	4B15.4	4B6.8		640	4-3V14.0	4-3V5.30	3V630
B64	4B12.4	4B6.6		780	3-B13.6	3-B6.0	B62
B68	3B13.6	3B8.0		860	4-3V10.6	4-3V5.30	3V560
B65	3B12.4	3B8.0		950	3-B11.0	3-B6.0	B56

Do not use a V-belt drive system on a Coro-Vane® pump with a driver greater than 25 horsepower. Consult factory if your application is outside this parameter.

Appendix G—Troubleshooting Guide

In diagnosing pump and system troubles, record the following data during product transfers:

1. Pressure at pump suction.
2. Pressure at pump discharge.
3. Pressure in truck tank.
4. Pressure in tank being filled.
5. Pipe size and length of suction and discharge lines.
6. Size and length of vapor equalizing line.
7. Pump speed if practical.

Symptom	Probable Cause	Remedy
Low capacity	Pump speed too slow	Check engine speed and PTO ratio. Consult pump performance curve. Use tachometer on pump if speed is questionable.
	High differential pressure	Restriction in discharge piping or hose too small. Vapor equalization lines too small or not used.
	External bypass valve stuck open or set too low	Readjust, repair, or replace valve.
	Clogged strainer	Clean strainer.
	Suction pipe too small or restricted	Indicated by pump inlet pressure dropping several pounds when pump is started. Remove restriction or modify piping.
	Worn vanes	Replace.
	Pump without vapor return	Without vapor equalization, a pump can remove only about 3% of the truck tank capacity per minute without severe cavitation and capacity loss.
	Worn sideplates	Reverse or replace sideplates. Check universal drive assembly to make sure angularity is within limits, yokes are parallel and slip-joint is greased. Check bearings.
Pump runs but no flow	Vanes sticking	Remove vanes and clean out foreign matter (check strainer). Replace vanes if swollen.
	Valve closed	Check valves. Make sure internal tank excess flow valve is open! Refer to manufacturer's instructions.
	Excess flow valve slugged	Stop pump until valve opens. If problem continues, slow pump down or install a new or larger excess flow valve.
	Broken shaft	Disassemble and inspect pump. Repair if necessary.
Pump will not turn or is locked up	Defective meter	Service meter.
	Foreign matter in pump	Clean out the pump and check strainer in suction line
	Vanes broken	Clean out pump carefully and replace vanes. Has pump been operated dry? Then, check for damage to cam and rotor shaft assembly.
	Bearing seized	Replace pump bearings. Grease monthly. Use ball bearing grease manufactured for intended service.
Will not build pressure	Moisture frozen in pump	Let thaw and break loose carefully. Add alcohol to tank (on LP-Gas). Check with product supplier about the possibility of water in the gas.
	Poor suction conditions	Clean inlet strainer. Increase pipe size.
	External bypass valve set too low	Set valve for higher pressure—see instructions.
Pump is noisy	Worn vanes and/or sideplates	Disassemble, inspect and repair as necessary. Do not run pump dry!
	Cavitation from poor suction conditions	As above.
	Vanes sticking	As above.
	Bearings worn	Replace if necessary and grease monthly.
	Very high differential	Check for restriction in discharge line. Delivery hose too small pressure and too long. Slow down pump! Check vapor release float assembly on meter and meter differential valve.
Pump leaks around shaft	PTO shaft vibration	Inspect and repair driveline component.
	Seal or O-rings failed	Inspect seal assembly and replace if necessary. Keep new seal very clean when replacing seal. Recommend a light oil film on O-rings. Do not run pump dry!

Appendix G—Extended Storage Procedures

If your Corken Coro-Vane® pump is to be removed from service for some time, the pump must be protected as propane, butane and anhydrous ammonia all leave the metal “bare” and open to corrosion. Piping and tanks not in service should also be protected, as the rust particles can destroy the pump's seals almost immediately after startup.

1. Fill or thoroughly flush the pump with a light rust inhibiting oil. (If the pump is flushed with oil, placing some desiccant packets inside the pump will provide added protection.)
2. Plug all pump openings.
3. Store in a dry location.
4. Before placing the pump back into service, drain the oil and remove any desiccant packets.
5. Refer to “Operation” on [page 10](#) of this Installation, Operation and Maintenance (IOM) manual.

Appendix H—Operating Specifications for Char-Lynn Hydraulic Motor

Mounting flange	2 bolt SAE A
Input shaft	1" diameter straight keyed
Port 'A'	7/8-14 O-ring
Port 'B'	7/8-14 O-ring
Pilot diameter	3.250/3.245 in (57.15/57.02 mm)
Motor displacement	6.2 cubic inches per revolution
Maximum speed continuous duty	742 RPM
Flow continuous duty	20 gpm (76 L/min)
Torque continuous duty	3,500 in•lb (395.5 N•M)
Case drain	7/16-20 O-ring
Recommended fluids	Premium quality anti-wear
Minimum viscosity	70 SSU (13 cSt)
Maximum operating temperature	180°F (82°C)

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