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DOWNHOLE PUMPS FOR WATER SAMPLING IN SMALL-DIAMETER WELLS

By F. C. Koopman

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Multiply inch-pound unit	By	To obtain metric (SI) unit
foot (ft)	3.048×10^{-1}	meter (m)
inch (in.)	25.4	millimeter (mm)
inch (in.)	2.54	centimeter (cm)
gallon per minute (gal/min)	3.78	liter per minute (L/m)

"The use of brand names in this report
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DOWNHOLE PUMPS FOR WATER SAMPLING IN SMALL-DIAMETER WELLS

By F. C. Koopman

ABSTRACT

The relatively high cost and difficulty in locating a source of pumps for use in obtaining ground-water samples from small-diameter wells has demonstrated a need for this report.

Criteria for selection of a pump and pumping equipment to meet specific requirements has been tabulated to assist field personnel in making a selection from commercial sources.

INTRODUCTION

The increased demand for obtaining water samples from small-diameter wells (of 1.5-in. to 3.5-in. inside diameter) has demonstrated a need to aid field personnel of the U.S. Geological Survey, Water Resources Division (WRD), in determining the kind and availability of pumping equipment to meet their requirements. This report covers an investigation into the availability of pumps that will meet all or part of the following criteria:

1. Smallness of size to permit operation in well casings 1.5-in. to 3.5-in. in diameter.
2. Lift capability in the range of 30 ft to 1,000 ft.
3. Pumping capacity between 0.5 gal/min and 5 gal/min.

These and some additional criteria, such as pump type, kind of material in contact with the water, approximate pump weight, and pump cost have been tabulated in this report to make the selection of equipment best suited to a specific task as convenient as possible.

Data concerning suction-lift pumps are not included in this report, primarily because such pumps are (a) limited in lift capability to no more than about 30 ft under ideal conditions; (b) generally operated at the land surface rather than within the confines of the well casing; and (c) independent of well-casing size.

To cover as wide a range of equipment and sources as possible, 90 pump manufacturers were selected and contacted. Seventy-five percent were eliminated after the first contact, because their equipment could not be used in wells smaller than 4 in. diameter, which confirmed findings and results from earlier inquiries made by WRD. Several other companies were eliminated after thorough screening of their literature and product capabilities. This report thus identifies the remaining commercial suppliers, offers brief descriptions of their products, and presents basic technical data for their pumping equipment. This does not imply, however, that these are the only sources for pumping equipment meeting all or part of the previously stated criteria. Undoubtedly other companies in the business either manufacture small pumps or are in the process of developing them.

To use the data compiled in this report, WRD personnel should first determine well-casing size, pumping-lift requirements, and the necessary or desired pumping rate. The tabulated data will then allow selection of the type and size of pump(s) that will best meet the existing well conditions and sampling requirements. Should there be any doubt about obstructions or the straightness and (or) wall condition of the well, the casing should be probed with a properly-sized dummy to assure that the pump equipment can be freely lowered to and retrieved from the required depth.

High pumping lift and small-diameter casings compound the problem of obtaining ground water from deeper aquifers for tests needed to monitor or measure adequately this resource. The high cost and difficulty in obtaining water samples from small-diameter wells should alert planners on projects involving well drilling to consider the options carefully before installing a casing with a diameter of less than 4 in.

PUMPING EQUIPMENT

The following is a brief discussion of selected types of deep-well pumping equipment. More detailed narrative descriptions may be found in the 1st ed., 3rd printing, 1974, of "Ground Water and Wells--a Reference Book for the Water-Well Industry" published by the Johnson Division of Universal Oil Products in St. Paul, Minn. If more detailed operating data are required, refer to 3rd ed., 3rd printing, 1975, of "Water Well Handbook" edited by Keith E. Anderson, published by the Missouri Water Well & Pump Contractors Assn., Inc. at Bells, Mo.

There are seven types of deep-well pumps:

1. Reciprocating--plunger, power, or hand operated--pumps
2. Jet pumps
3. Vertical turbine (shaft type) pumps
4. Submersible (multi-stage centrifugal) pumps
5. Helical rotor pumps
6. Gas lift pumps
7. Gas or air squeeze pumps

Types 1, 2, 4, 6, and 7 are manufactured for well-casing diameters smaller than 4 inches.

Reciprocating Pumps

These pumps (sometimes called rod pumps) consist of a plunger moving inside a submerged cylinder. There are two basic types--the stationary barrel type (most common) in which the cylinder is held in place, and the traveling barrel type in which the plunger is held in a fixed position. Then there are two operating modes--single acting, where water is pumped during the up-stroke only, and double acting, where water is pumped during both strokes, thus minimizing pulsations and equalizing the power required. These pumps can be used in wells where the depth to water is as much as several thousand feet.

For the stationary barrel type, the mechanical device that operates the plunger is located at the land surface and directly over the well. It is connected to the submerged cylinder through sections of pipe (drop line) with wooden or steel rods (sucker rod) installed inside this pipe to provide the mechanical linkage with the plunger. The mechanical device is usually driven by electric motors, gasoline engines, or windmills. The smallest-diameter casing in which such commercially available pumps can be installed is 2 inches.

The pumping capacity depends on the inside diameter of the cylinder, the stroke length, and the number of strokes per minute. Once these parameters are fixed, there will be little variation in the output of the pump (positive displacement pump). Some slippage may occur owing to seepage between the plunger and the cylinder walls and to stretch of the sucker rod, which increases with the depth of the well.

A similar but somewhat less satisfactory pump system, featured in some western windmill setups, involves the installation of a retrievable check valve in a 2-in. or even 1.5-in. diameter well casing and use of "leathers" as washers on the lower end of a plunger. In this system the

leathers bear directly against the well casing and after a few hours of operation, when the roughness of the casing has been smoothed out, they are replaced. In some installations this second set of leathers has performed for years. As can be imagined, however, the wear is considerable over a finite portion of the casing wall. To maintain the integrity of the well casing, the plunger with leathers is shifted periodically to a new depth location by changing the length of sucker rod.

While this installation offers a larger discharge capacity, the depth to water level is measurable only if the sucker rod, plunger, leathers, and check valve are removed.

Jet Pumps

Jet pumps usually consist of a motor-driven centrifugal pump used in combination with a submerged jet assembly. Various combinations of pumps and jets are able to lift water several hundred feet.

In principle the jet assembly serves to feed the centrifugal pump. The assembly consists of a supply line (pressure pipe) delivering water to a submerged jet nozzle mounted in a second pipe line connecting the jet venturi tube to the suction side of a centrifugal pump. A high-pressure "jet" of water passes through the venturi creating a partial vacuum. Atmospheric pressure on the water in the well forces additional water into and through the jet, and the combined stream is picked up by the suction side of the centrifugal pump.

In well casings smaller than 4-in. diameter, only a single line (pressure pipe) is introduced. The well casing is sealed off so that the annulus between the pressure pipe and casing becomes the "second" or suction pipe.

Submersible Pumps

The basic design features a centrifugal pump mounted, along with a small-diameter motor, inside a discharge pipe called a column or riser pipe which supports the weight of the pump-motor unit. Because this unit must operate submerged in the well water at all times, the motor is designed for long service without attention. The unit requires a power cable and lubrication connections back up to the land surface.

Submersible pumps generally are designed for 6-in. or larger diameter wells. However, one supplier has been found (see table 4) who offers a unit that can be installed in a 3-in. diameter well.

There are limits in design features and operating speeds for a given centrifugal pump that fix the maximum pumping lift that it can achieve. Greater lifts can be reached, however, simply by "stacking" additional centrifugal components. Each such component is termed a "stage" and some large pump units have as many as 300 stages capable of reaching pumping lifts equivalent to 12,000 ft.

Gas Lift Pumps

The principle of the gas lift pump is to eject a gas under pressure into an ejector pipe set well below the pumping water level. Lifts of as much as 700 ft can be achieved with a single ejector, while the use of a string of multiple ejectors can increase the lift capacity to thousands of feet. The previously cited "Water Well Handbook" gives requirements for gas-lift pumping installations.

Not only is it low in efficiency but a gas lift pump generally precludes a precision chemical quality analysis due to mixing of the gas with the water. This type of pump should only be used for sampling a well when neither efficiency nor a precision chemical analysis are factors.

The lack of commercially available small-diameter water-sampling pumps prompted several WRD personnel to develop their own models. A brief discussion of three such pumps follows.

Air Squeeze Pump

R. F. Middelburg, U.S. Geological Survey (written commun., 1976), describes a small air squeeze submersible pump which can collect water samples from wells with a 2-in. diameter casing. It consists of a stainless-steel cylinder 2.0 in. O.D. with 0.40 in. wall thickness and 30 in. long, with a 1/2-in. perforated brass pipe inside surrounded by a rubber sleeve made from 2.125-in. bicycle inner tube. When the pump is submerged, water enters the rubber sleeve through a foot valve at the base. After the sleeve is filled, compressed air is pumped into the annular space between the sleeve and the cylinder wall. This compresses the sleeve forcing the water through the perforated pipe and a check valve into the discharge line. Removing the pressure from the air supply line permits the water to reenter through the foot valve expanding the rubber sleeve and the cycle is repeated.

A 1/4-in. standard air hose serves as the air supply line and a 1/2-in. nylon-reinforced garden hose is used as discharge line. The endplugs of the cylinder are of polyvinylchloride (PVC). As built, this pump is adequate for water sampling that is related to the analysis of most chemical quality parameters. For sampling water in which the presence of exotic or trace elements must be analyzed, some changes in the pump materials may be required.

Although Middelburg's design features manual cycling of air pressure with a standard three-way air valve, the operation can be made automatic by substituting a timer-operated solenoid valve.

Gas-Driven Reciprocating Pumps

The other two pumps developed by WRD personnel are submersible gas-driven piston pumps. M. S. Hillerich (written commun., 1977) describes his model in the following paragraphs.

This pump is a model that is 24 in. long and has an outside diameter of 1.438 in.; thus it can be used to sample wells as small in diameter as 1.5 in. It consists of two in-line chambers--a gas chamber in the bottom of the pump housing and a water chamber in the top. A connecting rod joins a piston in the gas chamber to a piston in the water chamber. Pressurizing the bottom part of the gas chamber moves both pistons upwards. This draws water into the lower part of the water chamber and at the same time forces water out of the upper part through a check valve and into the pump discharge line. At the end of the stroke, gas pressure is fed into the top part of the gas chamber moving both pistons downward. Now the reed valve of the water piston opens allowing water to flow through into the top part of the upper chamber. At the end of the down-stroke, the gas pressure is shifted to the bottom part of the gas chamber and the cycle repeated.

The cycling period is controlled at the land surface by a four-way solenoid valve that alternates the pressure into and out of the two gas lines to the pump. Operating gas pressure can vary from 90 psi to 250 psi. The pump can deliver approximately 0.52 gal/min over a pumping lift of 80 ft. Lifts as great as 320 ft have been achieved with this pump.

The gas cylinder of the pump is connected to the control valve with high-pressure twin-lead 3/16-in. diameter welding hose; the pump discharge line is 1/4 in. diameter air hose.

The second type of gas-driven piston pump was developed by D. C. Signor, Lubbock, Tex., and is described in an open-file report dated March 1978, obtainable from the Texas District office, WRD (Signor, D. C., 1978, Gas-driven pump for ground-water samples: Water-Resources Investigations/Open-File Report 78-72, 25 p.). While the construction of this pump is outwardly similar to the Hillerich pump, there are basic internal differences and unique features in the mode of operation.

The Signor pump comprises two in-line water cylinders joined by an intermediate gas chamber and switching unit through which a common connecting rod passes to a piston in each cylinder. Through an ingenious arrangement of "O"-ring seals, button bleed valves, and needle-valve restrictions in the switching unit, the driving gas both enters and exhausts from the intermediate chamber as it alternately drives the two-piston assembly upward and then downward. Two check valves in each water cylinder operate so that on the upstroke water is expelled from the upper cylinder and drawn into the lower cylinder; on the downstroke water is expelled from the lower and drawn into the upper. Thus the Signor pump is a double-acting type as compared to the single-acting Hillerich model.

Another advantage of the Signor pump is the cycle control or switching unit, comprising part of the intermediate gas chamber. This permits using just one gas supply line under constant pressure and one water

discharge line at atmospheric pressure. Therefore, depressurizing occurs only in the water cylinders, avoiding alternate pressurizing and depressurizing of the gas supply line, which results in a much more economical use of compressed gas.

COMMERCIAL SUPPLIERS

The following list of suppliers contains brief descriptions of their products as they pertain to this investigation. The majority of these suppliers also manufacture, and may be able to furnish, pumping systems and accessories for well casings of 4.0-in. diameter or larger.

The number preceding the company name in the list corresponds with that in the column "SUPP'R." in tables 2 through 5, "Criteria and Commercial Data for Pump Selection." Note also that the listing is in alphabetical order and does not imply any Government rating or recommendations concerning any of the companies or products. Likewise, the absence of data on potential suppliers does not indicate their failure to meet any requirements in this report.

List of Suppliers

1) AXELSON, INC.
INDUSTRIAL BLVD.
LONGVIEW, TX 75601
(214) 757-6650

Fabricates reciprocating pumps which, except for pumps with liners, are in accord with American Petroleum Institute (API) Standard 11AX. Does not offer any literature or price lists because its products are manufactured to order only.

2) BAKER MFG. CO.
133 ENTERPRISE ST.
EVANSVILLE, WI 53536
(608) 882-5100

Manufactures power jacks[1/] and hand pumps. Some of the power jacks are straight-lift devices which can be mounted directly on the well casing. They are easily disconnected from the rod pump and tilted back out of the way when servicing the well. The jacks can be powered by gasoline engines or electric motors of appropriate horsepower.

[1/] The mechanical device at the land surface which, when powered, serves alternately to raise and lower the string of rods which operate the reciprocating pump.

3) ROBERT BENNET COMPANY
P. O. BOX 7644
AMARILLO, TX 79109
(806) 352-1976

Fabricates its own design of a gas-driven double-acting piston pump. The working principle is the same as the D. C. Signor pump. However, the smallest-diameter well casing in which the Signor pump can be used is 2.0 in., whereas the Bennet pump can be installed in a 1.5-inch casing. The pump has only been laboratory tested and is presently being market evaluated by the University of Oregon. Laboratory tests have shown that the pump should be able to deliver 0.1 gal/min over a lift of 1,000 ft.

4) BURKS PUMPS, DECATUR PUMP CO.
90 ELK ST.
DECATUR, IL 62525
(217) 429-2591

Fabricates shallow and deep-well jet pump systems using centrifugal pumps. Maximum lift is 190 ft and 200 ft from 2.0-in. and 3.0-in. diameter wells respectively, using multistage pumps. Data are tabulated under supplier reference number 8.

5) COLUMBIANA PUMP DIV.
131-T E. RAILROAD ST.
COLUMBIANA, OH 44408
(216) 482-3383

Manufactures manual pumps and claims that a modified version of its No. 3 house force pump may be able to lift water from depths ranging between 150 ft and 200 ft in well casings of 1.5-in. to 3.5-in. diameter by using the casing as the pump cylinder.

6) DEMPSTER INDUSTRIES, INC.
P. O. BOX 848
BEATRICE, NE 68310
(402) 223-4026

Fabricates shallow and deep well jet pump systems using centrifugal pumps and reciprocating pump systems powered by its own windmill motors. Its ejectors can be installed in wells of 2-in. and 3-in. diameter. The maximum lift capacity is 160 ft at 4.2 gal/min.

7) DOVER CORPORATION/NORRIS DIVISION
P. O. BOX 2070
TULSA, OK 74101
(918) 584-4241

Manufactures a variety of reciprocating pumps for the oil industry. They can be installed in well casings of 2.5-in. diameter and larger, with lift and delivery capacities far exceeding WRD's normal requirements.

8) GELBER PUMP CO.
5806 N. LINCOLN AVENUE
CHICAGO, IL 60659
(312) 769-2535

Gelber Pump Company is a distributor for jet pumps. It supplied the information for Burk pumps (see supplier ref. no. 4) and Sta-Rite pumps (see below) used in the tables later in this report.

Sta-Rite ejectors can be installed in 2.0-in. and 3.0-in. diameter well casings and have maximum lifts of 260 ft and 320 ft, respectively, using multistage pumps.

9) JACUZZI BROS., INC.
11511 NEW BENTON HWY.
LITTLE ROCK, AR 72203
(501) 562-1234

Manufactures shallow and deep well jet pump systems using centrifugal pumps. It has only one line that can be used in 2.0-in. diameter well casing with a 1-in. or 1 1/4-in. inner pipe. Maximum lift capacity is 130 ft and 170 ft, respectively, using two-stage pumps.

10) JENSEN BROS. MFG. CO., INC.
14TH & PACIFIC ST.
COFFEVILLE, KS 67337
(316) 251-5700

Designs and fabricates complete water systems using reciprocating pumps in wells of 2.0-in. diameter and larger. It offers a small power jack that can pump water from a 2-in. diameter well from a depth of 350 ft at 1.1 gal/min. For larger discharges and (or) greater lifts, balanced-beam drives are employed.

The weights and prices listed in the tables are for an entire system as shown in Jensen's "List Price Schedule." Weight and price data for the pump cylinders have been included, but similar data for the rods and drop pipes are not.

11) MCC CLAYTON MARK
143 E. MAIN ST.
LAKE ZURICH, IL 60047
(312) 438-2303

Manufactures cylinders, valves, and other rod-pump and well components which can be installed in 2-in. and larger diameter well casings. Only the 442 series has been tabulated for 2.0-in., 2.5-in., and 3.0-in.-diameter casings under different lift and discharge requirements. Data are tabulated under supplier reference number 14.

12) MACCO/SCHLUMBERGER
P. O. BOX 7471
HOUSTON, TX 77008
(713) 491-1313

Manufactures gas lift equipment for the oil industry. This equipment can be installed in well casings as small as 1 3/4-in. diameter. Data are not tabulated because supplier fabricates solely to customer specifications.

13) A. Y. MC DONALD MFG. CO.
P. O. BOX 508
DUBUQUE, IA 52001
(319) 583-7311

Manufactures shallow and deep well jet pump systems using centrifugal pumps. The single pipe ejectors can be installed in 2.0-in. and 3.0-in.-diameter well casings. Using single or multistage pumps, maximum lift is 120 ft and 160 ft, respectively.

14) MIDWEST WELL SUPPLY CO.
P. O. BOX 547
11213 DUNDER RD.
HUNTLEY, IL 60142
(312) 669-5135

Distributor for rod pumps and accessories manufactured by MCC Clayton Mark (see supplier ref. no. 11).

15) MONTGOMERY WARD

No specific performance data are available. However, if a pump for a 2.0-in.-diameter well with a lift requirement of as much as 160 ft is needed, and a Montgomery Ward store is conveniently located, it may be advantageous to inquire about their 2-in. jet pump systems.

16) F. E. MYERS CO.
400 ORANGE ST.
ASHLAND, OH 44805
(419) 322-1544

Manufactures shallow and deep well jet pump systems using centrifugal pumps. The single pipe ejectors can be installed in 2.0-in., 2.5-in., and 3.0-in.-diameter well casings. Using single or multistage pumps, maximum lift is 120 ft and 180 ft, respectively.

17) PEABODY BARNES
651 N. MAIN ST.
MANSFIELD, OH 44902
(419) 522-1511

Manufactures shallow and deep well pump systems using centrifugal pumps. Single pipe ejectors can be installed in 2.0-in. and 3.0-in.-diameter well casings with a maximum lift of 180 ft at a discharge rate of 2.1 gal/min.

18) SEARS, ROEBUCK AND CO.

Sears sells shallow and deep well jet pump systems using centrifugal pumps. The single-pipe ejectors can be installed in 2.0-in. and 3.0 in.-diameter well casings. Using single or multistage pumps, maximum lift is 110 ft and 280 ft, respectively.

19) TRW REDA PUMP DIV.
P. O. BOX 1181
BARTLESVILLE, OK 74003
(918) 661-2000

This is the only company contacted during this investigation, which manufactures a multistage submersible turbine pump, that can be installed in a well with a 3.0-in.-diameter casing. The lift capacity is 300 ft at a discharge rate of 2.3 gal/min.

20) TOLE DEVICES CO.
P. O. BOX 456
NEW ALBANY, IN 47150
(812) 944-9873

Manufactures a gas-driven pump working on the same principle as R. F. Middelburg's air squeeze pump. However, it has a 1.375-in. O.D. and can, therefore, be installed in a 1.5-in.-diameter well casing. Performance data show it can pump 1.0 gal/min from a depth of 125 ft. The pumps are strictly custom built and the company does not intend any type of mass production in the near future. It is now developing a pump with a 0.75-in. O.D. which can be installed in a 1.0-in.-diameter well casing.

21) TRUPAR, INC.
2109 W. THIRD ST.
DAYTON, OH 45417
(513) 268-6626

Manufactures shallow and deep well jet pump systems using centrifugal pumps. The single pipe ejectors can be installed in 2.0-in., 2.5-in., and 3.0-in.-diameter well casings with lift capacities as much as 130 ft.

TABULATIONS OF CRITERIA AND COMMERCIAL DATA FOR PUMP SELECTION

The following tables, "Criteria and Commercial Data for Pump Selection", have been compiled from information supplied by various pump manufacturers and distributors. The data are tabulated in order of increasing well casing diameter (pipe size or tubing I.D.), then pumping lift ranges, and finally pump discharge capacity. Measurements are shown in U.S. inch-pound units. Where paired entries appear in the "Lift" column (table 2) the first value signifies the maximum-lift capability for the indicated equipment, and the second value represents that lift at which the pump discharge comes closest to the arbitrarily stipulated pumping capacity limit of 5 gal/min. Entries in the "Pump" and "Ejector" columns designate a jet pump system; an entry in the "Pump" column only designates a submersible pump. Entries in the "Cylinder" column and "SPM-TRAV." (Strokes per minute - Travel) indicate reciprocating pumps. The figures in the "SPM-TRAV." column are simply arbitrary workable combinations of strokes per minute and stroke travel which, for the given cylinder model, yield the listed pump discharge rate or capacity. Obviously other combinations can be made to work also. Horsepower figures shown

for reciprocating pumps are based solely on the energy required to lift a discrete amount of water from a specific depth as shown in the tables.

The capital letters in the "Ejector MAT." and "Remarks" columns designate the material(s) that can come in contact with the water to be sampled. Because of the variety and possible alternatives in choice of materials, the combinations for pumps and cylinders are listed in the remarks column. The letters or letter combinations in front of the virgule (/) show the material for the pump or cylinder housing; the letters behind the virgule show the impeller(s), or piston, or liner materials. A plus sign indicates that several materials in one part can come in contact with the water; a semicolon separates the basic from alternate materials. For example, CI/SS+PL;BA in the remarks column preceded by an entry in the pump column means that the housing of the centrifugal pump is cast iron, the impeller is stainless steel and plastic, but it can be alternately supplied in brass. Table 1 gives the basic material code legend for the letters and letter combinations shown in tables 2, 3, 4, and 5, "Criteria and Commercial Data for Pump Selection."

The weights and prices shown do not include piping for jet-pump systems and drop pipes, sucker rods, or power jacks for reciprocating (rod) pump systems. However, jacks are included in the latter if the word "System" appears parenthetically beneath any data entries in the tables. The numbers in the column "SUPPL'R." correspond with those in the narrative listing of "COMMERCIAL SUPPLIERS."

TABLE 1

MATERIAL CODE ABBREVIATIONS

CODE	MATERIAL
BA	Brass
BO	Bronze
BON	Bronze Partially Nylon Coated
C	Chrome
CAT	Cast Iron Coated With Acrylic Thermoplastic
CEC	Cast Iron Epoxy Coated
CI	Cast Iron
CPL	Cast Iron Partially Plastic Coated
CST	Cast Steel
D	Delrin
FG	Fiberglass
GBA	Galvanized Steel With Brass Liner
GS	Galvanized Steel
L	Lexan
LEG	Lexan Glass Filled
M	Monel
NY	Nylon
PL	Plastic
SS	Stainless Steel
ST	Steel

The pump-availability data given in tables 2, 3, 4, and 5 are graphically summarized in figure 1. The graph simply shows the type(s) of pump equipment obtainable for the desired PUMPING LIFT and WELL-CASING DIAMETER. To evaluate a given field water-sampling situation, the graph can be entered with the foregoing two parameters. These pinpoint which table(s) feature the pump-availability data. By entering that/those table(s) at the given pumping lift value, the variety of equipment models and accessories can be studied and an appropriate choice of pump made.

The graphed and tabular data reflect available pump equipment (1978) designed specifically for the indicated well-casing diameters and pumping lifts. This does not rule out, however, many possibilities for adapting pump equipment designed for one casing diameter to a larger casing diameter. For example, jet pump equipment designed for a 2-inch-diameter well might conceivably be used in a 3-1/2-inch-diameter well simply by installing it along with a 2-inch-diameter drop line. The local site conditions would require thorough evaluation, however, before a decision could be made. A potential adaptation for a given field situation would require verification by the manufacturer or distributor.

TABLE 2

CRITERIA AND COMMERCIAL DATA
FOR
PUMP SELECTION

WELL DIA: 2.0 in

CASING DIA.: 2.0 in; (50.8 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
60 - 40	3.8 - 5.5	3SD	3E3	BA;CI	-	-	1/3	50	250	21	CI/BO
	3.8 - 5.5	3V	3E6	BA;CI	-	-	1/3	45	250	21	CI/BO
70 - 50	3.1 - 4.5	JS3900	36492	CPL	-	-	1/3	50	250	17	CI/SS+PL
	3.2 - 5.3	JS5900	36492	CPL	-	-	1/2	53	300	17	CI/SS+PL
	3.2 - 5.5	8230	734JP	BO	-	-	1/3	50	240	13	CI/PL;BA
	3.3 - 5.2	A3HJD	8838	BON	-	-	1/3	45	250	8	CI/BO
70 - 60	4.2 - 5.7	5HJD	5102	BON	-	-	1/2	50	275	8	CI/BO
80 - 30	1.6 - 6.1	42K2511C	42K2975C	CI	-	-	1/2	48	150	18	FG/L
80 - 60	3.0 - 5.0	33BC	3E5	CI;BA	-	-	1/3	50	210	21	CI/BO
	3.1 - 5.0	JS7900	36492	CPL	-	-	3/4	55	300	17	CI/SS+PL
	3.8 - 5.4	HJ33D	JB2N3	BO	-	-	1/3	50	225	16	CEC/BO
	4.0 - 5.7	HC50	JB2C5		-	-	1/2	60	290	16	CEC/BO
	4.0 - 5.7	HJ50D	JB2N5	BO	-	-	1/2	50	250	16	CEC/BO
	4.0 - 5.8	5SD	5E8	CI;BA	-	-	1/2	55	250	21	CI/BO
	4.0 - 5.8	5V	5E8	CI;BA	-	-	1/2	50	250	21	CI/BO

CASING DIA.: 2.0 in ; (50.8 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
90 - 40	2.2 - 7.4	42K25120	42K2975C	CI	-	-	3/4	49	175	18	FG/L
90 - 60	2.9 - 4.2	5VRM2E	A0711	CI;BO	-	-	1/2	63	375	9	(1) CI/PL;BO;CI
	3.3 - 5.0	7VRM2E	A0713	CI;BO	-	-	3/4	66	400	9	(1) CI/PL;BO;CI
90 - 70	3.0 - 5.0	SJ6700	36492	CPL	-	-	1/2	60	325	17	CI/SS+PL
	3.3 - 5.3	HC75	JB2C7-10	BO	-	-	3/4	75	350	16	CEC/BO
	3.3 - 5.8	7HJD	5102	BON	-	-	3/4	59	350	8	CI/BO
	3.3 - 6.0	SJ6800	36494	CPL	-	-	1/2	65	350	17	CI/SS+PL
	3.4 - 5.5	HJ75D	JB2C7-10	BO	-	-	3/4	65	300	16	CEC/BO
	3.5 - 5.2	7V	7E9	CI;BA	-	-	3/4	60	350	21	CI/BO
	3.9 - 5.0	1VRM2E	A0713	CI;BO	-	-	1	73	425	9	(2) CI/PL;BO;CI
100 - 50	2.3 - 4.8	AJD-33	A9-12	CI;BA	-	-	1/3	61	275	6	CI/FG;BO
	2.5 - 5.8	5RM2HV	A1013	CI;BO	-	-	1/2	52	300	9	CI/PL;BO;CI
	2.5 - 5.8	5VRME	A1013	CI;BO	-	-	1/2	59	325	9	CI/PL;BO;CI
100 - 60	2.8 - 5.7	5RM2	A0813	CI;BO	-	-	1/2	58	300	9	CI/PL;BO;CI
	3.2 - 6.3	7RM2HV	A1318	CI;BO	-	-	3/4	56	300	9	CI/PL;BO;CI

(1) Inner Pipe 1" (2) Inner Pipe 1 1/4"

CASING DIA.: 2.0 **in;** (50.8 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
100 - 70	2.5 - 6.0	10HJD	5102	BON	-	-	1	64	375	8	CI/BO
	2.8 - 5.4	7VRME	A1013	CI;BO	-	-	3/4	61	350	9	CI/PL;BO;CI
	2.8 - 5.7	7RM2	A1116	CI;BO	-	-	3/4	63	325	9	CI/PL;BO;CI
	3.0 - 5.9	1RM2HV	A1420	CI;BO	-	-	1	64	325	9	CI/PL;BO;CI
	3.0 - 5.9	1VRME	A1420	CI;BO	-	-	1	65	375	9	CI/PL;BO;CI
	3.1 - 5.3	AJD-50	B5-12	CI;BA	-	-	1/2	63	275	6	CI/FG;BO
	3.4 - 5.8	55BC	5E8	CI;BA	-	-	1/2	60	225	21	CI/BO
100 - 80	3.0 - 5.3	HC100	JB2C7-10	BO	-	-	1	80	400	16	CEC/BO
	3.0 - 5.5	HJ100D	JB2C7-10	BO	-	-	1	65	350	16	CEC/BO
	3.7 - 6.2	1RM2	A1120	CI;BO	-	-	1	65	325	9	CI/PL;BO;CI
	3.8 - 5.2	BDJ50	5E8	CI;BA	-	-	1/2	60	300	21	CI/BO
	3.8 - 5.4	RV75	D9-12		-	-	3/4	133	350	6	CI/FG;BO
	3.9 - 5.4	HCM75	JB2M7	BO	-	-	3/4	70	400	16	CEC/BO
110 - 50	1.7 - 6.4	42K2513L	42K2976C	CI	-	-	1	53	200	18	FG/L
110 - 70	2.5 - 5.3	HCM50	JB2M5	BO	-	-	1/2	65	350	16	CEC/BO
110 - 80	3.0 - 4.9	8270	813JP	BO	-	-	3/4	60	300	13	CI/PL;BA
	3.3 - 5.7	5HNA2	9077	BON	-	-	1/2	49	275	8	CI/BO

CASING DIA.: 2.0 **in**; (50.8 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
110 - 100	3.8 - 4.8	7HNA2	9080	BON	-	-	3/4	52	300	8	CI/BO
	4.9 - 5.3	10HNA2	9095	BON	-	-	1	56	325	8	CI/BO
120 - 60	2.4 - 5.0	42K2531N	42K2977C	CI	-	-	3/4	87	225	18	CI/L
120 - 70	2.0 - 5.0	MSC	8AP	LE	-	-	1/2	69	325	8	CI/LE
120 - 80	2.0 - 5.0	SJ8800	20641	CPL	-	-	3/4	70	350	17	CI/SS+PL
	2.7 - 5.2	SJ10800	20641	CPL	-	-	1	80	400	17	CI/SS+PL
120 - 90	2.8 - 5.9	AJD75	F10-12	BA	-	-	3/4	67	300	6	CI/FG
	3.1 - 5.0	8210	810JP	BO	-	-	1	55	350	13	CI/PL;BA
	3.3 - 6.0	RV-100	C55-12	BA	-	-	1	142	375	6	CI/FG
120 - 100	3.5 - 5.6	BDJ75	7E9	CI;BA	-	-	3/4	70	325	21	CI/BO
	3.8 - 5.8	AJD100	F2-12	BA	-	-	1	60	325	6	CI/FG
130 - 80	2.7 - 5.0	5VRM2E	A1115	CI;BO	-	-	1/2	65	375	9	(1) CI/PL;BO;CI

(1) Inner Pipe 1 1/4"

CASING DIA.: 2.0 **in**; (50.8 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
130 - 90	1.2 - 2.4	5VRM2E	A0509	CI;BO	-	-	1/2	65	375	9	(1) CI/PL;BO;CI
	1.8 - 2.9	7VRM2E	A0509	CI;BO	-	-	3/4	70	400	9	(1) CI/PL;BO;CI
	2.1 - 3.3	1VRM2E	A0509	CI;BO	-	-	1	75	425	9	(1) CI/PL;BO;CI
	2.5 - 4.3	HCM75	JC2M7	BO	-	-	3/4	70	400	16	CEC/BO
130 - 110	3.7 - 5.0	7VRM2E	A1118	CI;BO	-	-	3/4	70	400	9	(1) CI/PL;BO;CI
140 - 30	1.8 - 5.5	MSD	8AP	LE	-	-	3/4	75	350	8	CI;LE
140 - 80	1.3 - 4.9	1550	MP124	BO	-	-	1/2	70	375	13	(2) CAT/PL;BA
140 - 100	2.3 - 4.5	HCM100	JC2M10	BO	-	-	1	85	425	16	CEC/BO
	3.3 - 5.5	HCM150	JC2M15	BO	-	-	1½	95	500	16	CEC/BO
150 - 100	1.3 - 5.0	1575	MP127	BO	-	-	3/4	75	375	13	(3) CAT/BA;PL
160	(4)	(4)	(4)		-	-	(4)	(4)	(4)	15	(4)

(1) Inner Pipe 1 1/4"; (2) #1050 Vert. Pump; (3) #1075 Vert. Pump; (4) Contact Supplier for Specific Data

CASING DIA.: 2.0 **in** ; (50.8 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
160 - 90	1.7 - 5.5	275	A55-12	CI·BA	-	-	3 4	95	375	6	CI/FG
160 - 100	1.5 - 5.8	1510	MP130	BO	-	-	1	80	400	13	(1) CAT/BA;PL
	2.1 - 6.2	SJ15900	20641	CPL	-	-	1½	100	450	17	CI/SS+PL
160 - 110	2.5 - 4.9	10HNA2	20791	BON	-	-	1	56	350	8	CI/BO
	2.8 - 5.4	2100	A55-12	CI;BA	-	-	1	100	400	6	CI/FG
170 - 120	1.8 - 4.1	7VRM2E	A1116	CI;BO	-	-	3/4	70	400	9	(2) CI/PL;BO;CI
	2.0 - 4.8	1VRM2E	A1018	CI;BO	-	-	1	75	425	9	(2) CI/PL;BO;CI
180 - 90	2.3 - 6.0	MSE	8AP	LE	-	-	1	80	350	8	CI/LE
180 - 120	2.0 - 5.0	42K2532N	42K2977C	CI	-	-	1	91	250	18	CI/L
180 - 140	4.1 - 6.0	15HD2	20938	BON	-	-	1½	80	475	8	CI/BO

(1) #1010 Vert. Pump; (2) Inner Pipe 1 1/4"

CASING DIA.: 2.0 **in;** (50.8 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
190 - 160	4.2 - 5.7	20HD2	20938	BON	-	-	2	85	550	8	CI/BO
215	1.1	-	-	-	11W5 (System)	50 - 5	1/6	110	675	10	GBA/BA
240 - 100	1.7 - 6.0	MSF	8AP	LE	-	-	1½	125	450	8	CI/LE
240 - 120	1.6 - 5.5	42K2533N	42K2977C	-	-	-	1½	107	275	18	CI/L
260 - 120	2.5 - 6.0	MSG	8AP	LE	-	-	2	130	525	8	CI/LE
300	0.5	-	-	-	7027A	13 - 4	1/6	4.0	65	14	BA/BA
	1.0	-	-	-	7027A	25 - 4	1/6	4.0	65	14	BA/BA
	2.0	-	-	-	7027C	35 - 5	1/4	4.8	65	14	BA/BA
	3.1	-	-	-	7027C	40 - 7	1/2	4.8	65	14	BA/BA
	3.9	-	-	-	7027D	35 - 10	1/2	5.0	70	14	BA/BA
	5.0	-	-	-	7027D3	37 - 12	3/4	5.2	70	14	BA/BA

CASING DIA.: 2.0 **in;** (50.8 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
350	1.1	-	-	-	11W (System)	50 - 5	1/4	110	700	10	GBA/BA
365	1.6	-	-	-	13W9 (System)	40 - 9	1/4	245	850	10	GBA/BA
400	0.5	-	-	-	7027A	13 - 4	/6	4.0	65	14	BA/BA
	1.0	-	-	-	7027A	25 - 4	/3	4.0	65	14	BA/BA
	2.0	-	-	-	7027C	35 - 5	/2	4.8	65	14	BA/BA
	3.1	-	-	-	7027C	40 - 7	/2	4.8	65	14	BA/BA
	3.9	-	-	-	7027D	35 - 10	/4	5.0	70	14	BA/BA
	5.0	-	-	-	7027D3	37 - 12	1	5.2	70	14	BA/BA
470	1.2	-	-	-	13W7 (System)	40 - 7	/4	245	845	10	GBA/BA
	2.0	-	-	-	13W7 (System)	40 - 12	/3	300	980	10	GBA/BA
											)

CASING DIA.: 2.0 **in**; (50.8 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
500	0.5	-	-	-	7027A	13 - 4	1/6	4.0	65	14	BA/BA
	1.0	-	-	-	7027A	25 - 4	1/4	4.0	65	14	BA/BA
	2.0	-	-	-	7027C	35 - 5	1/2	4.8	65	14	BA/BA
	3.1	-	-	-	7027C	40 - 7	3/4	4.8	65	14	BA/BA
	3.9	-	-	-	7027D	35 - 10	1	5.0	70	14	BA/BA
	5.0	-	-	-	7027D	37 - 12	1	5.2	70	14	BA/BA
595	1.7	-	-	-	19W10 (System)	40 - 10	1/3	300	980	10	GBA/BA
600	0.5	-	-	-	7027A	13 - 4	1/6	4.0	65	14	BA/BA
	1.0	-	-	-	7027A	25 - 4	1/4	4.0	65	14	BA/BA
	2.0	-	-	-	7027C	35 - 5	1/2	4.8	65	14	BA/BA
	3.0	-	-	-	7027D	27 - 10	3/4	5.0	70	14	BA/BA
	3.9	-	-	-	7027D	35 - 10	1	5.0	70	14	BA/BA
	5.0	-	-	-	7027D3	37 - 12	1½	5.2	70	14	BA/BA
650	1.2	-	-	-	19W7 (System)	40 - 7	1/3	300	980	10	GBA/BA

CASING DIA.: 2.0 **in;** (50.8 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
700	0.5	-	-	-	7027A	13 - 4	1/6	4.0	65	14	BA/BA
	1.0	-	-	-	7027A	25 - 4	1/3	4.0	65	14	BA/BA
	2.0	-	-	-	7027C	35 - 5	3/4	4.8	65	14	BA/BA
	3.0	-	-	-	7027D	27 - 10	1	5.0	70	14	BA/BA
	3.9	-	-	-	7027D	35 - 10	1	5.0	70	14	BA/BA
	5.0	-	-	-	7027D3	37 - 12	1½	5.2	70	14	BA/BA
720	1.6	-	-	-	25W (System)	35 - 12	½	575	1700	10	GBA/BA
800	0.5	-	-	-	7027A	13 - 4	1/6	4.0	65	14	BA/BA
	1.0	-	-	-	7027A	25 - 4	1/3	4.0	65	14	BA/BA
	2.0	-	-	-	7027C	35 - 5	3/4	4.8	65	14	BA/BA
	3.0	-	-	-	7027D	27 - 10	1	5.0	70	14	BA/BA
	4.0	-	-	-	7027D	35 - 10	1½	5.0	70	14	BA/BA
	5.0	-	-	-	7027D3	37 - 12	2	5.2	70	14	BA/BA
900	0.5	-	-	-	7027A	13 - 4	¼	4.0	65	14	BA/BA
	1.0	-	-	-	7027A	25 - 4	½	4.0	65	14	BA/BA
	2.0	-	-	-	7027C	35 - 5	3/4	4.8	65	14	BA/BA
	3.0	-	-	-	7027D	27 - 10	1	5.0	70	14	BA/BA
	4.0	-	-	-	7027D3	30 - 12	1½	5.2	70	14	BA/BA
	5.0	-	-	-	7027D3	37 - 12	2	5.2	70	14	BA/BA

CASING DIA.: 2.0 **in** ; (50.8 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
1000	0.5	-	-	-	7027A	13 - 4	¼	4.0	65	14	BA/BA
	1.0	-	-	-	7027A	25 - 4	½	4.0	65	14	BA/BA
	2.0	-	-	-	7027C	35 - 5	1	4.8	65	14	BA/BA
	3.0	-	-	-	7027D	27 - 10	1½	5.0	70	14	BA/BA
	4.0	-	-	-	7027D3	30 - 12	1½	5.2	70	14	BA/BA
	5.0	-	-	-	7027D3	37 - 12	2	5.2	70	14	BA/BA
1060	0.9	-	-	-	25W (System)	35 - 9	1/2	575	1700	10	GBA/BA
1110	1.9	-	-	-	50W (System)	30 - 18	3/4	825	2100	10	GBA/BA

TABLE 3

CRITERIA AND COMMERCIAL DATA
FOR
PUMP SELECTION

WELL DIA: 2.5 in

CASING DIA.: 2.5 **in**; (63.5 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
70 - 50	3.8 - 5.5	3V	3F7	BA;CI	-	-	1/3	50	225	21	CI/BO
80 - 60	3.0 - 5.0	33BC	3F7	CI;BA	-	-	1/3	45	210	21	CI/BO
	3.0 - 5.8	5V	5F8	CI;BA	-	-	1/2	55	250	21	CI/BO
	3.6 - 5.2	HJ33D	JB25N3	BO	-	-	1/3	50	250	16	CEC/BO;LEG
	3.7 - 5.8	HC33	JB25C3	BO	-	-	1/3	60	275	16	CEC/BO
100 - 70	3.4 - 5.8	55BC	5F1	CI;BA	-	-	1/2	50	225	21	CI/BO
100 - 80	4.2 - 5.5	HCM50	JB25M5	BO	-	-	1/2	65	375	16	CEC/BO
110 - 90	3.3 - 5.7	HC75	JC25C7	BO	-	-	3/4	75	350	16	CEC/BO
	3.5 - 5.6	HJ75D	JC25C7	BO	-	-	3/4	65	325	16	CEC/BO

CASING DIA.: 2.5 **in** ; (63.5 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
120 - 100	3.7 - 5.7	HC100	JC25C-10	BO	-	-	1	80	425	16	CEC/BO
	3.9 - 6.3	7SD	7F12	BA;CI	-	-	3/4	80	350	21	CI/BO
130 - 90	2.2 - 4.5	HCM50	JB25M5	BO	-	-	1/2	65	375	16	CEC/BO
130 - 120	4.3 - 5.3	1SD	1SF13	CI;BA	-	-	1	85	400	21	CI/BO
140 - 110	2.5 - 5.2	HCM75	JC25M7	BO	-	-	3/4	70	400	16	CEC/BO
180 - 130	2.6 - 5.2	HCM100	JC25M10-15	BO	-	-	1	85	450	16	CEC/BO
180 - 140	3.5 - 5.5	HCM150	JC25M10-15	BO	-	-	1½	90	525	16	CEC/BO

CASING DIA.: 2.5 in ; (63.5 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
300	0.5	-	-	-	7027E	10 - 4	1/6	6.8	85	14	BA/BA
	0.5	-	-	-	2XNS3U-6	20 - 5	1/6	30	301	7	ST/BO;C;M
	1.0	-	-	-	7027E	25 - 3	1/6	6.8	85	14	BA/BA
	1.1	-	-	-	2XNS3U-6	25 - 8	1/6	30	301	7	ST/BO;C;M
	1.6	-	-	-	11W (System)	50 - 5	1/4	120	700	10	GBA/BA
	2.0	-	-	-	7027E	30 - 5	1/4	6.8	85	14	BA/BA
	2.0	-	-	-	2XNS3U-6	25 - 15	1/4	30	301	7	ST/BO;C;M
	2.3	-	-	-	13W9 (System)	40 - 9	1/4	250	900	10	GBA/BA
	3.0	-	-	-	7027E	25 - 9	1/2	6.8	85	14	BA/BA
	3.0	-	-	-	2XNS3U-6	35 - 16	1/2	30	301	7	ST/BO;C;M
	4.0	-	-	-	2NS3U-6	35 - 15	1/2	46	311	7	ST/BO;C;M
	4.1	-	-	-	7027F1	25 - 12	1/2	7.2	90	14	BA/BA
	4.9	-	-	-	7027F1	30 - 12	3/4	7.2	90	14	BA/BA
	5.0	-	-	-	2NS3U-7	30 - 22	3/4	50	318	7	ST/BO;C;M
395	1.8	-	-	-	13W7 (System)	40 - 7	1/4	245	875	10	GBA/BA

CASING DIA.: 2.5 **in;** (63.5 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
400	0.5	-	-	-	7027E	10 - 4	1/6	6.8	85	14	BA/BA
	0.5	-	-	-	2B73-5	30 - 5	1/6	24	279	7	ST/BO;C;ST
	0.5	-	-	-	2XNS3U-6	20 - 5	1/6	30	301	7	ST/BO;C;ST
	1.0	-	-	-	7027E	25 - 3	1/6	6.8	85	14	BA/BA
	1.0	-	-	-	2B73-5	30 - 10	1/6	24	279	7	ST/BO;C;ST
	1.1	-	-	-	2XNS3U-6	25 - 8	1/4	30	301	7	ST/BO;C;ST
	2.0	-	-	-	7027E	30 - 5	1/4	6.8	85	14	BA/BA
	2.0	-	-	-	2B73-5	24 - 25	1/4	24	279	7	ST/BO;C;ST
	2.0	-	-	-	2XNS3U-6	25 - 15	1/4	30	301	7	ST/BO;C;ST
	3.0	-	-	-	19W12(System)	40 - 12	1/2	325	1050	10	GBA/BA
	3.0	-	-	-	7027E	25 - 9	1/2	6.8	85	14	BA/BA
	3.0	-	-	-	2B73-6	25 - 35	1/2	28	290	7	ST/BO;C;ST
	3.0	-	-	-	2XNS3U-6	35 - 16	1/2	30	301	7	ST/BO;C;M
	4.0	-	-	-	2NS3U-6	35 - 15	3/4	46	311	7	ST/BO;C;M
	4.1	-	-	-	7027F1	25 - 12	3/4	7.2	90	14	BA/BA
	4.1	-	-	-	2B73-8	20 - 60	3/4	34	311	7	ST/BO;C;ST
	4.9	-	-	-	7027F	30 - 12	1	7.2	90	14	BA/BA
	5.0	-	-	-	2NS3U-7	30 - 22	1	50	318	7	ST/BO;C;M
	5.1	-	-	-	2B73-10	25 - 60	1	41	333	7	ST/BO;C;M
420	2.5	-	-	-	19W10(System)	40 - 10	1/3	325	1050	10	GBA/BA

CASING DIA.: 2.5 **in;** (63.5 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
500	0.5	-	-	-	7027E	10 - 4	1/6	6.8	85	14	BA/BA
	0.5	-	-	-	2B73-5	30 - 5	1/6	2.4	279	7	ST/BO;C;ST
	0.5	-	-	-	2XNS3U-6	20 - 5	1/6	30	301	7	ST/BO;C;M
	1.0	-	-	-	7027E	25 - 3	1/4	6.8	85	14	BA/BA
	1.0	-	-	-	2B73-5	30 - 10	1/4	24	279	7	ST/BO;C;ST
	1.1	-	-	-	2XNS3U-6	25 - 8	1/4	30	301	7	ST/BO;C;M
	2.0	-	-	-	7027E	30 - 5	1/2	6.8	85	14	BA/BA
	2.0	-	-	-	2B73-5	24 - 25	1/2	24	279	7	ST/BO;C;ST
	2.0	-	-	-	2XNS3U-6	25 - 15	1/2	30	301	7	ST/BO;C;M
	3.0	-	-	-	7027E	25 - 9	3/4	6.8	85	14	BA/BA
	3.0	-	-	-	2B73-6	25 - 35	3/4	28	290	7	ST/BO;C;ST
	3.0	-	-	-	2XNS3U-6	35 - 16	3/4	30	301	7	ST/BO;C;M
	4.0	-	-	-	2NS3U-6	35 - 15	1	46	311	7	ST/BO;C;M
	4.1	-	-	-	7027F1	25 - 12	1	7.2	90	14	BA/BA
	4.1	-	-	-	2B73-8	20 - 60	1	34	311	7	ST/BO;C;ST
	4.9	-	-	-	7027F1	30 - 12	1	7.2	90	14	BA/BA
	5.0	-	-	-	2NS3U-7	30 - 22	1	50	318	7	ST/BO;C;M
	5.1	-	-	-	2B73-10	25 - 60	1½	41	333	7	ST/BO;C;ST
510	2.5	-	-	-	19W10 (System)	40 - 10	1/2	325	1050	10	GBA/BA
560	1.7	-	-	-	19W7 (System)	40 - 7	1/3	325	1050	10	GBA/BA

CASING DIA.: 2.5 **in**; (63.5 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
590	2.5	-	-	-	25W (System)	35 - 12	1/2	575	1750	10	GBA/BA
600	0.5	-	-	-	7027E	10 - 4	1/6	6.8	85	14	BA/BA
	0.5	-	-	-	2B73-5	30 - 5	1/6	24	279	7	ST/BO;C;ST
	0.5	-	-	-	2XNS3U-6	20 - 5	1/6	30	301	7	ST/BO;C;M
	1.0	-	-	-	7027E	25 - 3	1/4	6.8	85	14	BA/BA
	1.0	-	-	-	2B73-5	30 - 10	1/4	24	279	7	ST/BO;C;ST
	1.1	-	-	-	2XNS3U-6	25 - 8	1/2	30	301	7	ST/BO;C;M
	2.0	-	-	-	7027E	30 - 5	1/2	6.8	85	14	BA/BA
	2.0	-	-	-	2B73-5	24 - 25	1/2	24	279	7	ST/BO;C;ST
	2.0	-	-	-	2XNS3U-6	25 - 15	1/2	30	301	7	ST/BO;C;M
	3.0	-	-	-	7027E	25 - 9	3/4	6.8	85	14	BA/BA
	3.0	-	-	-	2B76-6	25 - 35	3/4	28	290	7	ST/BO;C;ST
	3.0	-	-	-	2XNS3U-6	35 - 16	3/4	30	301	7	ST/BO;C;M
	4.0	-	-	-	2NS3U-6	35 - 15	1	30	301	7	ST/BO;C;M
	4.1	-	-	-	7027F1	25 - 12	1	7.2	84	14	BA/BA
	4.1	-	-	-	2B73-8	20 - 60	1	34	311	7	ST/BO;C;ST
	4.9	-	-	-	7027F1	30 - 12	1½	7.2	84	14	BA/BA
	5.0	-	-	-	2NS3U-7	30 - 22	1½	50	318	7	ST/BO;C;M
	5.1	-	-	-	2B73-10	25 - 60	1½	41	333	7	ST/BO;C;ST

CASING DIA.: 2.5 in; (63.5 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
700	0.5	-	-	-	7027E	10 - 4	1/6	6.8	85	14	BA/BA
	0.5	-	-	-	2B73-5	30 - 5	1/6	24	279	7	ST/BO;C;ST
	0.5	-	-	-	2XNS3U-6	20 - 5	1/6	30	301	7	ST/BO;C;M
	1.0	-	-	-	7027E	25 - 3	1/3	6.8	85	14	BA/BA
	1.0	-	-	-	2B73-5	30 - 10	1/3	24	279	7	ST/BO;C;ST
	1.1	-	-	-	2XNS3U-6	25 - 8	1/3	30	301	7	ST/BO;C;M
	2.0	-	-	-	7027E	30 - 5	3/4	6.8	85	14	BA/BA
	2.0	-	-	-	2B73-5	24 - 25	3/4	24	279	7	ST/BO;C;ST
	2.0	-	-	-	2XNS3U-6	25 - 15	3/4	30	301	7	ST/BO;C;M
	3.0	-	-	-	7027E	25 - 9	1	6.8	85	14	BA/BA
	3.0	-	-	-	2B76-6	25 - 35	1	28	290	7	ST/BO;C;ST
	3.0	-	-	-	2XNS3U-6	35 - 16	1	30	301	7	ST/BO;C;M
	4.0	-	-	-	2NS3U-6	35 - 15	1½	46	311	7	ST/BO;C;M
	4.1	-	-	-	7027F1	25 - 12	1½	7.2	84	14	BA/BA
	4.1	-	-	-	2B73-8	20 - 60	1½	34	311	7	ST/BO;C;ST
	4.9	-	-	-	7027F1	30 - 12	1½	7.2	84	14	BA/BA
	5.0	-	-	-	2NS3U-7	30 - 22	1½	50	318	7	ST/BO;C;M
	5.1	-	-	-	2B73-10	25 - 60	1½	41	333	7	ST/BO;C;ST
750	3.1	-	-	-	50W (System)	30 - 18	3/4	825	2200	10	GBA/BA

CASING DIA.: 2.5 **in** ; (63.5 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
800	0.5	-	-	-	7027E	10 - 4	1/4	6.8	85	14	BA/BA
	0.5	-	-	-	2B73-5	30 - 5	1/4	24	279	7	ST/BO;C;ST
	0.5	-	-	-	2XNS3U-6	20 - 5	1/4	30	301	7	ST/BO;C;M
	1.0	-	-	-	7027E	25 - 3	1/2	6.8	85	14	BA/BA
	1.0	-	-	-	2B73-5	30 - 10	1/2	24	279	7	ST/BO;C;ST
	1.1	-	-	-	2XNS3U-6	25 - 8	1/2	30	301	7	ST/BO;C;M
	2.0	-	-	-	7027E	30 - 5	3/4	6.8	85	14	BA/BA
	2.0	-	-	-	2B73-5	24 - 25	3/4	24	279	7	ST/BO;C;ST
	2.0	-	-	-	2XNS3U-6	25 - 15	3/4	30	301	7	ST/BO;C;M
	3.0	-	-	-	7027E	25 - 9	1	6.8	85	14	BA/BA
	3.0	-	-	-	2B76-6	25 - 35	1	28	290	7	ST/BO;C;ST
	3.0	-	-	-	2XNS3U-6	35 - 16	1	30	301	7	ST/BO;C;M
	4.0	-	-	-	2NS3U-6	35 - 15	1½	46	311	7	ST/BO;C;M
	4.1	-	-	-	7027F1	25 - 12	1½	7.2	84	14	BA/BA
	4.1	-	-	-	2B73-8	20 - 60	1½	34	311	7	ST/BO;C;ST
	4.9	-	-	-	7027F1	30 - 12	2	7.2	84	14	BA/BA
	5.0	-	-	-	2NS3U-7	30 - 22	2	50	318	7	ST/BO;C;M
	5.1	-	-	-	2B73-10	25 - 60	2	41	333	7	ST/BO;C;M
850	1.5	-	-	-	25W (System)	35 - 9	1/2	575	1750	10	GBA/BA

CASING DIA.: 2.5 **in** ; (63.5 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
900	0.5	-	-	-	7027E	10 - 4	1/4	6.8	85	14	BA/BA
	0.5	-	-	-	2B73-5	30 - 5	1/4	24	279	7	ST/BO;C;ST
	0.5	-	-	-	2XNS3U-6	20 - 5	1/4	30	301	7	ST/BO;C;M
	1.0	-	-	-	7027E	25 - 3	1/2	6.8	85	14	BA/BA
	1.0	-	-	-	2B73-5	30 - 10	1/2	24	279	7	ST/BO;C;ST
	1.1	-	-	-	2XNS3U-6	25 - 8	1/2	30	301	7	ST/BO;C;M
	2.0	-	-	-	7027E	30 - 5	3/4	6.8	85	14	BA/BA
	2.0	-	-	-	2B73-5	24 - 25	3/4	24	279	7	ST/BO;C;ST
	2.0	-	-	-	2XNS3U-6	25 - 15	3/4	30	301	7	ST/BO;C;M
	3.0	-	-	-	7027E	25 - 9	1½	6.8	85	14	BA/BA
	3.0	-	-	-	2B76-6	25 - 35	1½	28	290	7	ST/BO;C;ST
	3.0	-	-	-	2XNS3U-6	35 - 16	1½	30	301	7	ST/BO;C;M
	4.0	-	-	-	2NS3U-6	35 - 15	1½	46	311	7	ST/BO;C;M
	4.1	-	-	-	7027F1	25 - 12	1½	7.2	84	14	BA/BA
	4.1	-	-	-	2B73-8	20 - 60	1½	34	311	7	ST/BO;C;ST
	4.9	-	-	-	7027F1	30 - 12	2	7.2	84	14	BA/BA
	5.0	-	-	-	2NS3U-7	30 - 22	2	50	318	7	ST/BO;C;M
	5.1	-	-	-	2B73-10	25 - 60	2	41	333	7	ST/BO;C;ST
990	3.1	-	-	-	50W (System)	30 - 18	1	825	2250	10	GBA/BA

CASING DIA.: 2.5 **in**; (63.5 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
1000	0.5	-	-	-	7027E	10 - 4	1/4	6.8	85	14	BA/BA
	0.5	-	-	-	2B73-5	30 - 5	1/4	24	279	7	ST/BO;C;ST
	0.5	-	-	-	2XNS3U-6	20 - 5	1/4	30	301	7	ST/BO;C;M
	1.0	-	-	-	7027E	25 - 3	1/2	6.8	85	14	BA/BA
	1.0	-	-	-	2B73-5	30 - 10	1/2	24	279	7	ST/BO;C;ST
	1.1	-	-	-	2XNS3U-6	25 - 8	1/2	30	301	7	ST/BO;C;M
	2.0	-	-	-	7027E	30 - 5	1	6.8	85	14	BA/BA
	2.0	-	-	-	2B73-5	24 - 25	1	24	279	7	ST/BO;C;ST
	2.0	-	-	-	2XNS3U-6	25 - 15	1	30	301	7	ST/BO;C;M
	3.0	-	-	-	7027E	25 - 9	1½	6.8	85	14	BA/BA
	3.0	-	-	-	2B76-6	25 - 35	1½	28	290	7	ST/BO;C;ST
	3.0	-	-	-	2XNS3U-6	25 - 16	1½	30	301	7	ST/BO;C;M
	4.0	-	-	-	2NS3U-6	35 - 15	2	46	311	7	ST/BO;C;M
	4.1	-	-	-	7027F1	25 - 12	2	7.2	84	14	BA/BA
	4.1	-	-	-	2B73-8	20 - 60	2	34	311	7	ST/BO;C;ST
	4.9	-	-	-	7027F1	30 - 12	2	7.2	84	14	BA/BA
	5.0	-	-	-	2NS3U-7	30 - 22	2	50	318	7	ST/BO;C;M
	5.1	-	-	-	2B73-10	25 - 60	2	41	333	7	ST/BO;C;ST
1120	1.6	-	-	-	50W (System)	30 - 12	3/4	825	2200	10	GBA/BA

TABLE 4

CRITERIA AND COMMERCIAL DATA
FOR
PUMP SELECTION

WELL DIA: 3.0 in

CASING DIA.: 3.0 in ; (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
70 - 50	3.2 - 5.2	JS3900	36497	CPL	-	-	1/3	50	250	17	CI/SS+PL
	3.6 - 5.2	A3HJD	8840	BON	-	-	1/3	45	250	8	CI/BO
	3.6 - 6.1	8230	738JP	PL;BA	-	-	1/3	50	275	13	CI/PL;BA
	3.8 - 5.5	3V	3C7	BA;CI	-	-	1/3	50	250	21	CI/BO
80 - 50	2.5 - 6.1	JS5900	36504	-	-	-	1/2	53	300	17	CI/SS+PL
80 - 60	2.8 - 5.2	JS7900	36504	-	-	-	3/4	55	300	17	CI/SS+PL
	3.0 - 5.0	33BC	3C7	CI;BA	-	-	1/3	50	210	21	CI/BO
	3.0 - 5.8	5V	5C8	CI;BA	-	-	1/2	50	250	21	CI/BO
	3.7 - 5.8	HC33	JB3C3	BO	-	-	1/3	60	275	16	CEC/BO
90 - 40	1.6 - 5.4	42K2511C	42K2987C	CI	-	-	1/2	50	150	18	FG/L
90 - 60	2.6 - 5.2	42K2512C	42K2987C	CI	-	-	3/4	51	175	18	FG/L
90 - 70	3.0 - 6.2	5HJD	4874	BON	-	-	1/2	50	275	8	CI/BO
	3.4 - 5.8	SJ6700	36504	CPL	-	-	1/2	60	350	17	CI/SS+PL

CASING DIA.: 3.0 **in**; (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
100 - 70	3.4 - 5.8	55BC	5CI	BA;CI	-	-	1/2	60	250	21	CI/BO
100 - 80	3.8 - 5.2	BDJ50	5CI	BA;CI	-	-	1/2	60	275	21	CI/BO
	3.8 - 5.4	RV-75	D9-13	BA	-	-	3/4	133	350	6	CI/BO;FG
	4.2 - 5.5	HCM50	JB3M5	BO	-	-	1/2	65	375	16	CEC/BO
110 - 80	1.7 - 5.0	42K2513L	42K2987C	CI	-	-	1	55	200	18	FG/L
	3.4 - 5.6	8270	819JP	BO	-	-	3/4	60	350	13	CI/BA;PL
110 - 90	3.3 - 5.7	HC75	JC3C7	BO	-	-	3/4	75	300	16	CEC/BO
	3.5 - 5.6	HJ75D	JC3C7	BO	-	-	3/4	65	325	16	CEC/BO
120 - 60	2.7 - 5.8	42K2531N	42K2987C	CI	-	-	3/4	88	225	18	CI/L
120 - 80	2.0 - 5.1	SJ8700	36647	CPL	-	-	3/4	75	350	17	CI/SS+PL
120 - 90	3.3 - 6.0	RV-100	C55-13	BA	-	-	1	150	375	6	CI/FG

CASING DIA.: 3.0 in; (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
120 - 100	3.3 - 5.1	8210	816JP	BO	-	-	1	55	375	13	CI/PL;BO
	3.3 - 5.5	7HJD	3695	BON	-	-	3/4	59	375	8	CI/BO
	3.5 - 6.0	5HD2	9079	BON	-	-	1/2	62	350	8	CI/BO
	3.7 - 5.7	HC100	JC3C-10	BO	-	-	1	80	425	16	CEC/BO
	3.9 - 6.3	7SD	7C12	BA;CI	-	-	3/4	75	350	21	CI/BO
130 - 30	2.2 - 5.5	MSC	16CP	LE	-	-	1/2	69	300	8	CI/LE
130 - 90	2.2 - 4.5	HCM50	JC3M5	BO	-	-	1/2	65	375	16	CEC/BO
130 - 100	3.5 - 5.5	7HD2	9097	BON	-	-	3/4	66	375	8	CI/BO
130 - 120	4.3 - 5.3	BDJ100	1C13	BA;CI	-	-	1	80	450	21	CI/BO
	4.6 - 5.3	10HD2	9189	BON	-	-	1	70	400	8	CI/BO
140 - 70	2.5 - 5.5	MSD	16CP	LE	-	-	3/4	71	300	8	CI/LE
140 - 80	1.5 - 5.4	1050	MP140	BO	-	-	1/2	70	400	13	(1) CI/BA;PL

(1) #1550 Horiz. Pump

CASING DIA.: 3.0 **in** ; (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
140 - 100	2.5 - 5.2	HCM75	JC3M7	BO	-	-	3/4	70	425	16	CEC/BO
	2.7 - 5.6	SJ8800	36648	CPL	-	-	3/4	75	400	17	CI/SS+PL
140	3.0	-	-	-	11W (System)	50 - 5	1/6	125	750	10	GBA/BA
150 - 90	1.5 - 6.4	1075	MP143	BO	-	-	3/4	80	400	13	(1) CI/BA;PL
150 - 110	2.7 - 6.0	10HJD	8845	BON	-	-	1	64	375	8	CI/BO
150 - 130	1.9 - 2.5	7HD2	20790	BON	-	-	3/4	66	375	8	CI/BO
160 - 100	2.7 - 5.4	275	A55-13	BO	-	-	3/4	100	400	6	CI/FG
	2.7 - 6.7	SJ10800	36649	CPL	-	-	1	85	425	17	CI/SS+PL
160 - 110	1.7 - 5.5	1010	MP146	BO	-	-	1	80	425	13	(2) CI/BA;PL
160 - 130	4.2 - 6.0	2100	B3-13	BO	-	-	1	110	425	6	CI/FG

(1) #1575 Horiz. Pump (2) #1510 Horiz. Pump

CASING DIA.: 3.0 **in;** (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
180 - 120	2.1 - 5.2	SJ15900	36649	CPL	-	-	1½	105	475	17	CI/SS+PL
180 - 130	2.3 - 4.2	10HD2	20790	BON	-	-	1	70	400	8	CI/BO
	2.6 - 5.2	HCM100	JC3M10-15	BO	-	-	1	85	450	16	CEC/BO
180 - 140	3.5 - 5.5	HCM150	JC3M10-15	BO	-	-	1½	95	525	16	CEC/BO
200 - 160	3.2 - 5.7	15HD2	20937	BON	-	-	1½	80	475	8	CI/BO
200	3.0	-	-	-	11W5 (System)	50 - 5	1/4	125	775	10	GBA/BA
210 - 120	2.1 - 5.1	42K2532N	42K2987C	CI	-	-	1	92	250	18	CI/L
260 - 70	1.3 - 5.5	MSE	16CP	LE	-	-	1	85	350	8	CI/LE
280 - 140	2.3 - 5.0	42K2532N	42K2987C	CI	-	-	1½	108	275	18	CI/L

CASING DIA.: 3.0 in; (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
300	0.5	-	-	-	2½NS3U-6	18 - 2	1/6	55	475	7	ST/BO;C;M
	0.5	-	-	-	7027H	15 - 2	1/6	7.8	85	14	BA/BA
	1.0	-	-	-	2½NS3U-6	25 - 3	1/6	55	475	7	ST/BO;C;M
	1.0	-	-	-	7027H	30 - 2	1/6	7.8	85	14	BA/BA
300 - 80	2.0 - 5.5	MSF	16CP	LE	-	-	1½	130	475	8	CI/LE
300	2.0	-	-	-	2½NS3U-6	25 - 6	1/4	55	475	7	ST/BO;C;M
	2.0	-	-	-	7027H	30 - 4	1/4	7.8	85	14	BA/BA
	3.0	-	-	-	7027H	35 - 5	1/2	7.8	85	14	BA/BA
	3.1	-	-	-	2½NS3U-6	25 - 9	1/2	55	475	7	ST/BO;C;M
	4.0	-	-	-	7027J	30 - 8	1/2	8.5	90	14	BA/BA
	4.0	-	-	-	2½NS3U-6	27 - 11	1/2	55	475	7	ST/BO;C;M
	5.0	-	-	-	7027J	36 - 8	3/4	8.5	90	14	BA/BA
	5.0	-	-	-	2½NS3U-6	26 - 14	3/4	55	475	7	ST/BO;C;M
300 - 200	2.3 - 5.7	20X4P050	-	-	-	-	1/2	60	536	19	(1) ST/SS+BO+L+D
320 - 80	2.7 - 5.5	MSG	16CP	LE	-	-	2	135	525	8	CI/LE
340	4.8	-	-	-	25W12(System)	35 - 12	1/2	575	1750	10	GBA/BA

(1) Submergible Pump

CASING DIA.: 3.0 **in**; (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
400	0.5	-	-	-	2½NS3U-6	18 - 2	1/6	55	475	7	ST/BO;C;M
	0.5	-	-	-	7027H	15 - 2	1/6	7.8	85	14	BA/BA
	1.0	-	-	-	2½NS3U-6	25 - 3	1/4	55	475	7	ST/BO;C;M
	1.0	-	-	-	7027H	30 - 2	1/4	7.8	85	14	BA/BA
	2.0	-	-	-	2½NS3U-6	25 - 6	1/2	55	475	7	ST/BO;C;M
	2.0	-	-	-	7027H	30 - 4	1/2	7.8	85	14	BA/BA
	3.0	-	-	-	7027H	35 - 5	1/2	7.8	85	14	BA/BA
	3.1	-	-	-	2½NS3U-6	25 - 9	1/2	55	475	7	ST/BO;C;M
	4.0	-	-	-	2½NS3U-6	27 - 11	3/4	55	475	7	ST/BO;C;M
	4.0	-	-	-	7027J	30 - 8	3/4	8.5	90	14	BA/BA
	4.8	-	-	-	25W12(System)	35 - 12	3/4	575	1800	10	GBA/BA
	5.0	-	-	-	2½NS3U-6	26 - 14	1	55	475	7	ST/BO;C;M
	5.0	-	-	-	7027J	36 - 8	1	8.5	90	14	BA/BA
410	3.2	-	-	-	19W7(System)	40 - 7	1/2	300	1050	10	GBA/BA
460	3.4	-	-	-	25W9(System)	35 - 9	1/2	575	1725	10	GBA/BA

CASING DIA.: 3.0 **in;** (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
500	0.5	-	-	-	2½NS3U-6	18 - 2	1/6	55	475	7	ST/BO;C;M
	0.5	-	-	-	7027H	15 - 2	1/6	7.8	85	14	BA/BA
	1.0	-	-	-	2½NS3U-6	25 - 3	1/4	55	475	7	ST/BO;C;M
	1.0	-	-	-	7027H	30 - 2	1/4	7.8	85	14	BA/BA
	2.0	-	-	-	2½NS3U-6	25 - 6	1/2	55	475	7	ST/BO;C;M
	2.0	-	-	-	7027H	30 - 4	1/2	7.8	85	14	BA/BA
	3.0	-	-	-	7027H	35 - 5	3/4	7.8	85	14	BA/BA
	3.1	-	-	-	2½NS3U-6	25 - 9	3/4	55	475	7	ST/BO;C;M
	4.0	-	-	-	2½NS3U-6	27 - 11	1	55	475	7	ST/BO;C;M
	4.0	-	-	-	7027J	30 - 8	1	8.5	90	14	BA/BA
	5.0	-	-	-	2½NS3U-6	26 - 4	1	55	475	7	ST/BO;C;M
	5.0	-	-	-	7027J	36 - 8	1	8.5	90	14	BA/BA
590	3.4	-	-	-	25W9 (System)	35 - 9	3/4	575	1750	10	GBA/BA

CASING DIA.: 3.0 **in** ; (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
600	0.5	-	-	-	2½NS3U-6	18 - 2	1/6	55	475	7	ST/BO;C;M
	0.5	-	-	-	7027H	15 - 2	1/6	7.8	85	14	BA/BA
	1.0	-	-	-	2½NS3U-6	25 - 3	1/4	55	475	7	ST/BO;C;M
	1.0	-	-	-	7027H	30 - 2	1/4	7.8	85	14	BA/BA
	2.0	-	-	-	2½NS3U-6	25 - 6	1/2	55	475	7	ST/BO;C;M
	2.0	-	-	-	7027H	30 - 4	1/2	7.8	85	14	BA/BA
	3.0	-	-	-	7027H	35 - 5	3/4	7.8	85	14	BA/BA
	3.1	-	-	-	2½NS3U-6	25 - 9	3/4	55	475	7	ST/BO;C;M
	4.0	-	-	-	2½NS3U-6	27 - 11	1	55	475	7	ST/BO;C;M
	4.0	-	-	-	7027J	30 - 8	1	8.5	90	14	BA/BA
	5.0	-	-	-	2½NS3U-6	26 - 4	1½	55	475	7	ST/BO;C;M
	5.0	-	-	-	7027J	36 - 8	1½	8.5	90	14	BA/BA

CASING DIA.: 3.0 **in** ; (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
700	0.5	-	-	-	2½NS3U-6	18 - 2	1/6	55	475	7	ST/BO;C;M
	0.5	-	-	-	7027H	15 - 2	1/6	7.8	85	14	BA/BA
	1.0	-	-	-	2½NS3U-6	25 - 3	1/3	55	475	7	ST/BO;C;M
	1.0	-	-	-	7027H	30 - 2	1/3	7.8	85	14	BA/BA
	2.0	-	-	-	2½NS3U-6	25 - 6	3/4	55	475	7	ST/BO;C;M
	2.0	-	-	-	7027H	30 - 4	3/4	7.8	85	14	BA/BA
	3.0	-	-	-	7027H	35 - 5	1	7.8	85	14	BA/BA
	3.1	-	-	-	2½NS3U-6	25 - 9	1	55	475	7	ST/BO;C;M
	4.0	-	-	-	2½NS3U-6	27 - 11	1½	55	475	7	ST/BO;C;M
	4.0	-	-	-	7027J	30 - 8	1½	8.5	90	14	BA/BA
	5.0	-	-	-	2½NS3U-6	26 - 4	1½	55	475	7	ST/BO;C;M
	5.0	-	-	-	7027J	36 - 8	1½	8.5	90	14	BA/BA

CASING DIA.: 3.0 **in**; (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
800	0.5	-	-	-	2½NS3U-6	18 - 2	1/4	55	475	7	ST/BO;C;M
	0.5	-	-	-	7027H	15 - 2	1/4	7.8	85	14	BA/BA
	1.0	-	-	-	2½NS3U-6	25 - 3	1/2	55	475	7	ST/BO;C;M
	1.0	-	-	-	7027H	30 - 2	1/2	7.8	85	14	BA/BA
	2.0	-	-	-	2½NS3U-6	25 - 6	3/4	55	475	7	ST/BO;C;M
	2.0	-	-	-	7027H	30 - 4	3/4	7.8	85	14	BA/BA
	3.0	-	-	-	7027H	35 - 5	1	7.8	85	14	BA/BA
	3.1	-	-	-	2½NS3U-6	25 - 9	1	55	475	7	ST/BO;C;M
	3.7	-	-	-	50W12(System)	30 - 12	1½	830	2250	10	GBA/BA
	4.0	-	-	-	2½NS3U-6	27 - 11	1½	55	475	7	ST/BO;C;M
	4.0	-	-	-	7027J	30 - 8	1½	8.5	90	14	BA/BA
	5.0	-	-	-	2½NS3U-6	26 - 4	2	55	475	7	ST/BO;C;M
	5.0	-	-	-	7027J	36 - 8	2	8.5	90	14	BA/BA

CASING DIA.: 3.0 **in**; (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
900	0.5	-	-	-	2½NS3U-6	18 - 2	1/4	55	475	7	ST/BO;C;M
	0.5	-	-	-	7027H	15 - 2	1/4	7.8	85	14	BA/BA
	1.0	-	-	-	2½NS3U-6	25 - 3	1/2	55	475	7	ST/BO;C;M
	1.0	-	-	-	7027H	30 - 2	1/2	7.8	85	14	BA/BA
	2.0	-	-	-	2½NS3U-6	25 - 6	3/4	55	475	7	ST/BO;C;M
	2.0	-	-	-	7027H	30 - 4	3/4	7.8	85	14	BA/BA
	3.0	-	-	-	7027H	35 - 5	1½	7.8	85	14	BA/BA
	3.1	-	-	-	2½NS3U-6	25 - 9	1½	55	475	7	ST/BO;C;M
	4.0	-	-	-	2½NS3U-6	27 - 11	1½	55	475	7	ST/BO;C;M
	4.0	-	-	-	7027J	30 - 8	1½	8.5	90	14	BA/BA
	5.0	-	-	-	2½NS3U-6	26 - 4	2	55	475	7	ST/BO;C;M
	5.0	-	-	-	7027J	36 - 8	2	8.5	90	14	BA/BA

CASING DIA.: 3.0 **in** ; (76.2 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
1000	0.5	-	-	-	2½NS3U-6	18 - 2	1/4	55	475	7	ST/BO;C;M
	0.5	-	-	-	7027H	15 - 2	1/4	7.8	85	14	BA/BA
	1.0	-	-	-	2½NS3U-6	25 - 3	1/2	55	475	7	ST/BO;C;M
	1.0	-	-	-	7027H	30 - 2	1/2	7.8	85	14	BA/BA
	2.0	-	-	-	2½NS3U-6	25 - 6	1	55	475	7	ST/BO;C;M
	2.0	-	-	-	7027H	30 - 4	1	7.8	85	14	BA/BA
	3.0	-	-	-	7027H	35 - 5	1½	7.8	85	14	BA/BA
	3.1	-	-	-	2½NS3U-6	25 - 9	1½	55	475	7	ST/BO;C;M
	4.0	-	-	-	2½NS3U-6	27 - 11	2	55	475	7	ST/BO;C;M
	4.0	-	-	-	7027J	30 - 8	2	8.5	90	14	BA/BA
	5.0	-	-	-	2½NS3U-6	26 - 4	2	55	475	7	ST/BO;C;M
	5.0	-	-	-	7027J	36 - 8	2	8.5	90	14	BA/BA

TABLE 5

CRITERIA AND COMMERCIAL DATA
FOR
PUMP SELECTION

WELL DIA: 3.5 in

CASING DIA.: 3.5 in; (88.9 mm)

LIFT ft	CAPACITY gal/min	MODEL NO. PUMP	EJECTOR NO.	EJECTOR MAT.	CYLINDER	SPM-TRAV. in	HP	WT. lb	PRICE $	SUPPL'R.	REMARKS
100	4.3	-	-	-	11W (System)	50 - 5	1/6	150	800	10	GBA/BA
150	4.3	-	-	-	11W (System)	50 - 5	1/4	150	850	10	GBA/BA
165	4.7	-	-	-	13W7 (System)	40 - 7	1/4	260	975	10	GBA/BA
220	4.7	-	-	-	13W7 (System)	40 - 7	1/3	260	1000	10	GBA/BA
330	4.7	-	-	-	19W7 (System)	40 - 7	1/2	325	1100	10	GBA/BA
450	5.0	-	-	-	25W9 (System)	35 - 9	3/4	576	1850	10	GBA/BA
560	5.7	-	-	-.	50W12(System)	30 - 12	1	850	2425	10	GBA/BA
750	6.0	-	-	-	100W16(System)	25 - 16	1½	1000	3000	10	GBA/BA
980	6.0	-	-	-	100W16(System)	25 - 16	2	1000	3100	10	GBA/BA

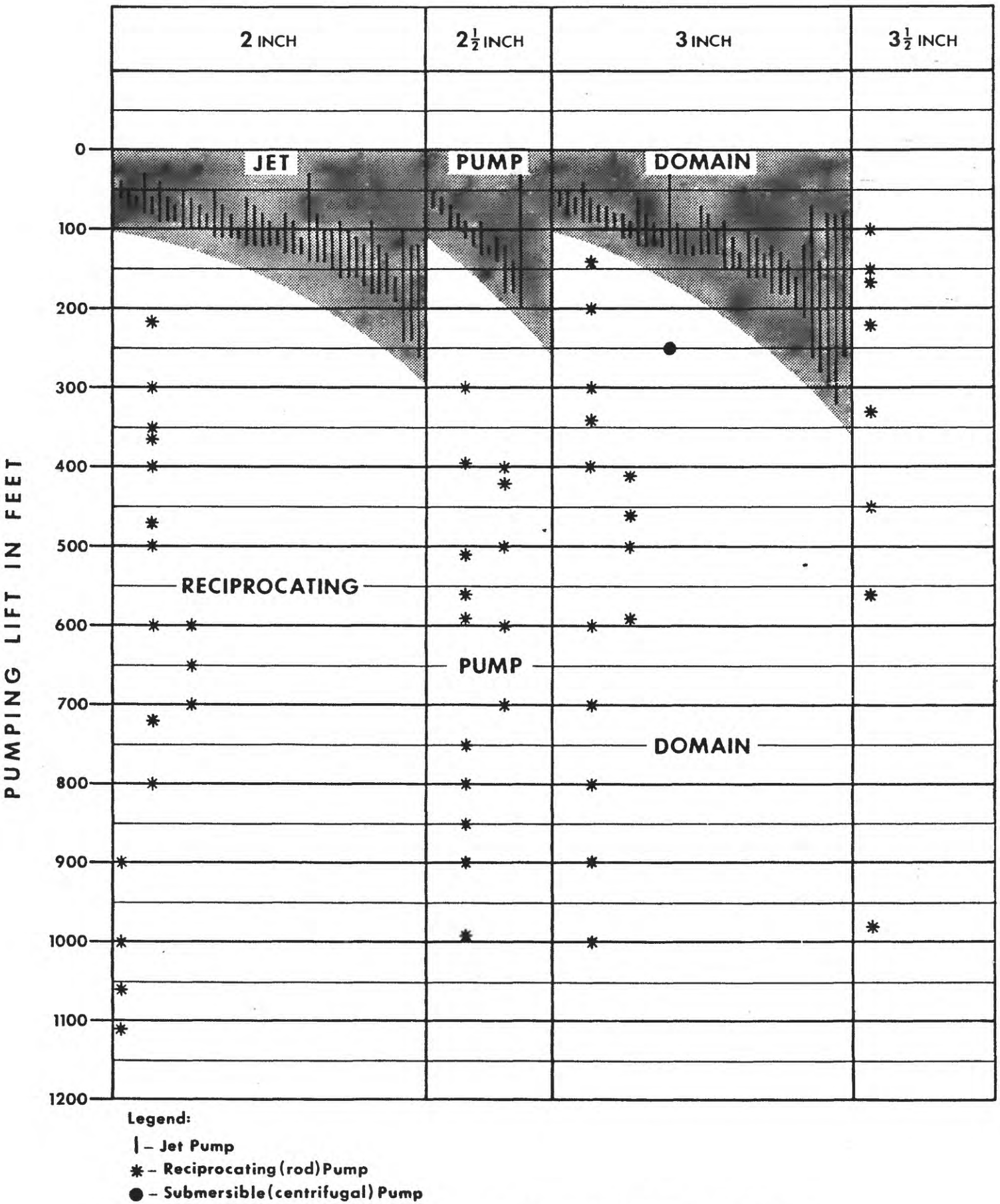

Figure 1.--Graphic summary of commercially available pump equipment.