

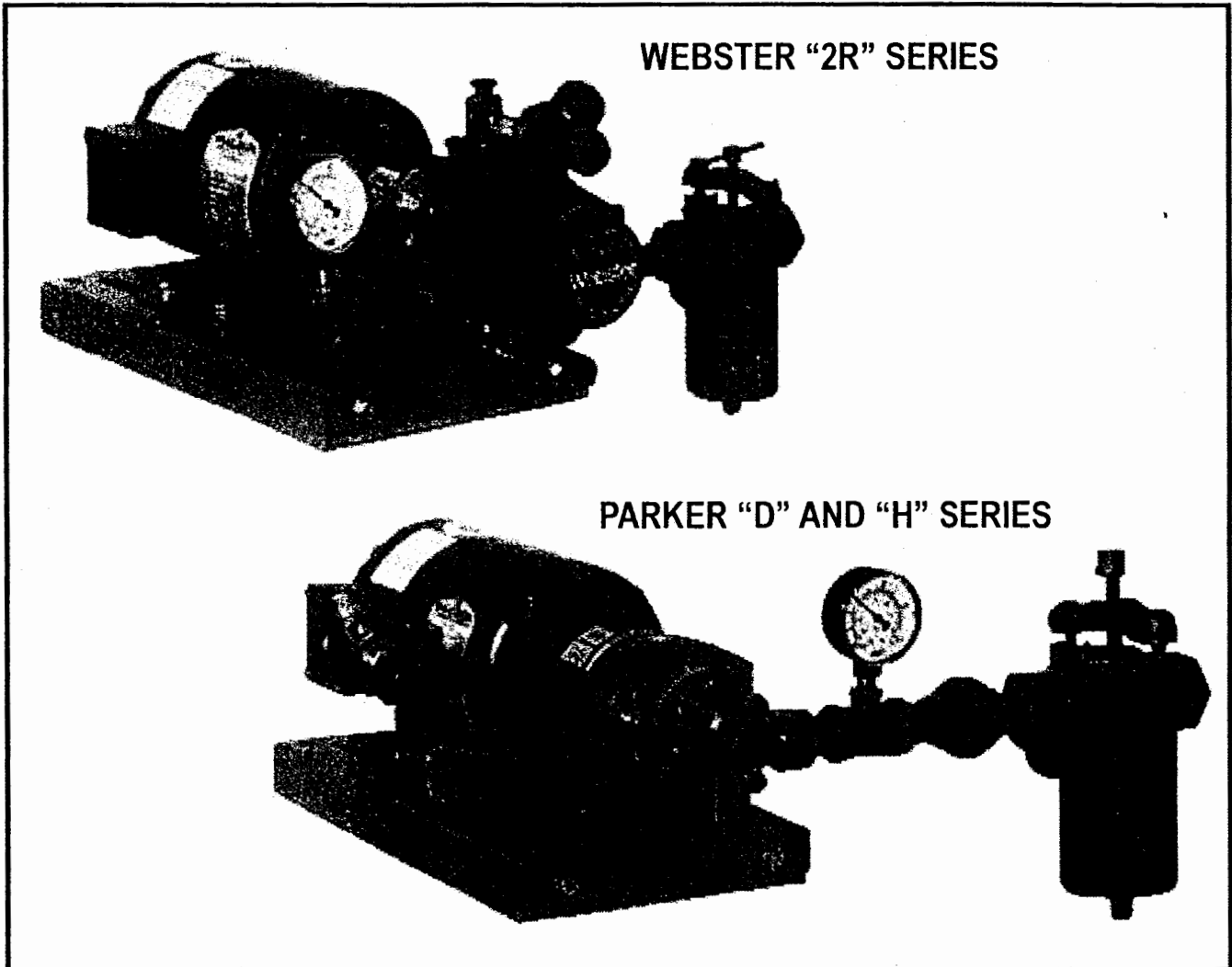
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|-------|----------|------|--------|
| 6 | 10 | 2.2 | Rev. 6 |
| 11-00 | Replaces | 8-96 | |

DATA SHEET

Model HS2D Series Oil Pump Sets

HIGH PRESSURE PUMP SET

for use with pressure atomizing oil burners



General Description: These pump sets are primarily arranged to supply oil to John Zink burners at high pressure (300 PSI range) where burner design does not provide for mounted pumps or in place of burner mounted pumps when pump sets remote from the burner are more compatible to the job site conditions.

The pump set is made up with a standard base mounted electric motor; gear type pump; flexible drive coupling and coupling guard mounted on a heavy steel base.

Accessories include a compound gauge (0-30 PSI x 30" Hg); pipe or tubing fittings to make standard connections; relief/regulator valve; check valve and a simplex strainer with removable basket.

To prevent damage in shipment the strainer is not mounted on simplex systems and requires field piping. Strainers should be installed as close to the pump inlet port as practical.

Reference Bulletin (1-gen-10.6) for a more detailed discussion on suction lines and piping in general.

WEBSTER "2R" SERIES

INLET CONDITIONS: -

- 15" HG SUCTION
- 3 PSI POSITIVE PRESSURE (3)
- SUCTION CAPACITY DETERMINED AT ATMOSPHERIC INLET TO ATMOSPHERIC DISCHARGE.

PIPING SCHEMATIC - FIGURE 1

PARKER "D" AND "H" SERIES

INLET CONDITIONS: -

- 10" HG SUCTION
- 20 PSI POSITIVE PRESSURE (3)
- SUCTION CAPACITY DETERMINED AT ATMOSPHERIC INLET TO ATMOSPHERIC DISCHARGE.

PIPING SCHEMATIC - FIGURE 2

| PUMP MODEL (1) | PUMP CAPACITY (GPH) | | RELIEF/REG. VALVE | | PUMP RPM (2) @ 60 HZ. | MOTOR H.P. |
|----------------|---------------------|---------|-------------------|-------------|-----------------------|------------|
| | DISCHARGE | SUCTION | MODEL | SPR. RANGE | | |
| 2R23D-5AA14 | 23 | 70 | INTEGRAL | 70-330 PSI | 1725 | .33 |
| 2R626D-5AA14 | 50 | 125 | INTEGRAL | 70-330 PSI | 1725 | .50 |
| D05AA2A | 18 | 33 | RV2102 | 100-330 PSI | 1725 | .33 |
| D05AA2A | 30 | 50 | RV2102 | 100-330 PSI | 1725 | .33 |
| D07AA2A | 60 | 73 | RV2102 | 100-330 PSI | 1725 | .50 |
| D09AA2A | 80 | 92 | RV2102 | 100-330 PSI | 1725 | .50 |
| D11AA2A | 95 | 114 | RV2102 | 100-330 PSI | 1725 | .75 |
| D14AA2A | 120 | 143 | RV2102 | 100-330 PSI | 1725 | 1.00 |
| D17AA2A | 150 | 176 | RV2102 | 100-330 PSI | 1725 | 1.50 |
| D22AA2A | 190 | 228 | RV2102 | 100-330 PSI | 1725 | 1.50 |
| D27AA2A | 235 | 280 | RV2102 | 100-330 PSI | 1725 | 1.50 |
| H31AA2B | 275 | 327 | RV2102 | 100-330 PSI | 1725 | 2.00 |
| H39AA2B | 345 | 408 | RV2102 | 100-330 PSI | 1725 | 2.00 |

NOTES

1. Parker "D" and "H" series pumps are suitable for jet fuel, kerosene or No. 1 fuel oil. Deduct 10% from listed discharge capacities.
2. Voltage same as burner voltage or as requested. When operating on 50 HZ./1450 RPM; deduct 17% from listed suction and discharge capacities.
3. NFPA-31 or local codes may limit inlet pressures on some installations.

FIGURE 1

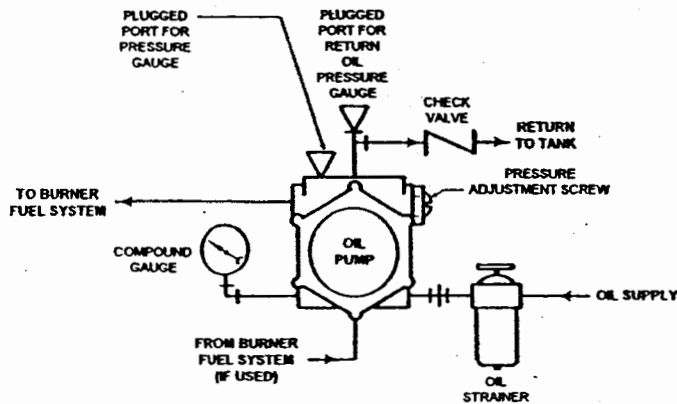
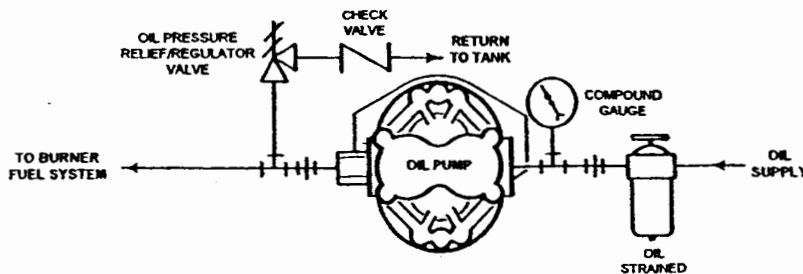


FIGURE 2



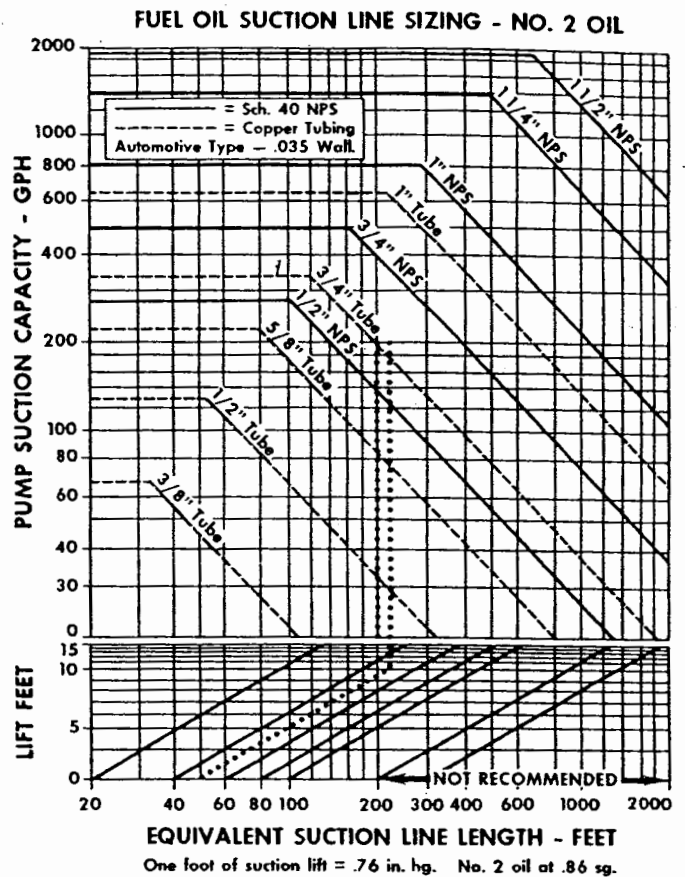
Suction Line Sizing

Pump sets that deliver oil to the burner for firing are normally sized 1 1/2 times the boiler requirement. Transfer and circulation pump set selections are often based on different requirements. Suction line sizing is based on the suction capacity of the pump selected.

Equivalent suction line length includes the measured length of the suction line from the point of entry (bottom of tank) to the pump, plus the friction loss equivalent length of valves, fittings, etc. installed in the suction line piping. (See Table)

On installations where suction lift is not required, use the upper portion of the chart. Eg: A 200 ft. suction line flowing 200 GPH will intersect at approximately the 3/4" tubing size. When three points intersect (GPH, suction line length and pipe size), the suction requirement will be approximately 6-7" Hg. Suction requirement can be reduced by selecting the next size larger pipe or tubing if desired. The horizontal line extension for each pipe or tubing size indicates a high velocity range. An increase in GPH above the horizontal line will produce a velocity in excess of 300 FPM.

Use the lower portion of the chart to compensate for suction lift. Eg: Assume an equivalent suction line length of 50 ft., 200 GPH suction capacity and a 10 ft. lift. Enter the chart at the 50 ft. line length, move diagonal up at 30° to the 10 ft. lift line. Then vertical to the 200 GPH line. Use the 3/4" NPS or the 1" tubing. An increase in line size at this point on the chart would be of a small valve.



Practical design would limit one ft. of suction lift to one in. Hg of the pumps capability. Eg: A pump with 10" Hg suction capability should be limited to 10 ft. of lift. Suction lifts over 15 ft. with any pump using No. 2 oil should be avoided. Suction lines of 200 ft. in length or longer should be avoided and should have no suction lift.

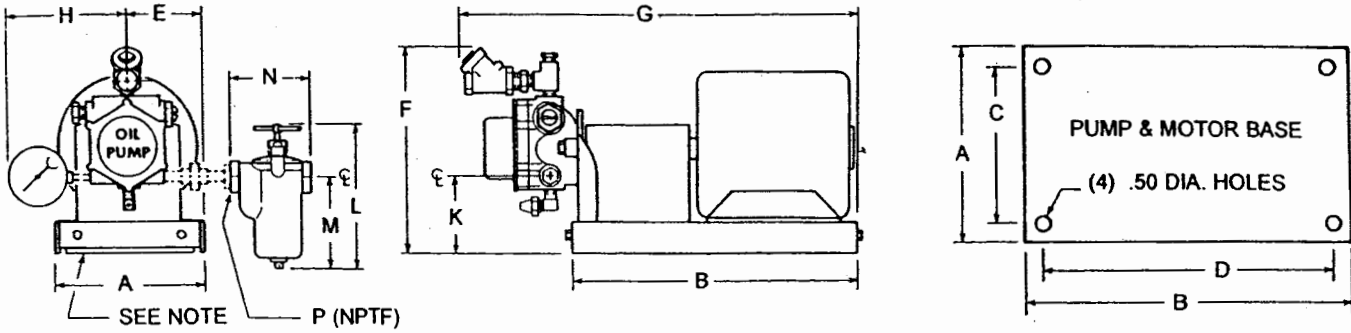
**FRICITION LOSS IN STANDARD VALVES AND FITTINGS.
TABLE GIVES EQUIVALENT LENGTHS IN FEET OF STRAIGHT PIPE.**

| PIPE SIZE NPS (INCHES) | TYPE OF FITTING OR VALVE (1) | | | | | | |
|------------------------------|------------------------------|--------------------|--------------------|--------------------------|----------------------|--------------------|-------------------------|
| | GATE VALVE (OPEN) | GLOBE VALVE (OPEN) | CHECK VALVE (OPEN) | ELL (2) STANDARD 90 DEG. | ELL STANDARD 45 DEG. | TEE SGT. THRU FLOW | TEE (2) RGT. ANGLE FLOW |
| 0.50 | 0.35 | 17 | 2.0 | 1.5 | 0.8 | 1.0 | 3.2 |
| 0.75 | 0.50 | 22 | 5.5 | 2.2 | 1.0 | 1.3 | 4.5 |
| 1.00 | 0.60 | 27 | 6.0 | 2.5 | 1.3 | 1.7 | 5.7 |
| 1.25 | 0.80 | 38 | 9.0 | 3.6 | 1.7 | 2.3 | 7.5 |
| 1.50 | 1.20 | 44 | 11.0 | 4.5 | 2.0 | 2.8 | 9.0 |
| 2.00 | 1.20 | 53 | 14.0 | 5.2 | 2.6 | 3.5 | 12.0 |
| 2.50 | 1.40 | 61 | 17.0 | 6.0 | 3.0 | 4.3 | 14.0 |
| 3.00 | 1.70 | 80 | 20.0 | 8.0 | 4.0 | 5.2 | 16.0 |
| 4.00 | 2.30 | 120 | 25.0 | 11.0 | 5.0 | 7.0 | 22.0 |
| 5.00 | 2.80 | 140 | 34.0 | 14.0 | 6.2 | 9.0 | 27.0 |
| 6.00 | 3.50 | 150 | 40.0 | 16.0 | 7.8 | 11.0 | 33.0 |
| 8.00 | 4.50 | 220 | 54.0 | 21.0 | 11.0 | 14.0 | 43.0 |
| 10.00 | 5.70 | 280 | 67.0 | 26.0 | 14.0 | 17.0 | 53.0 |

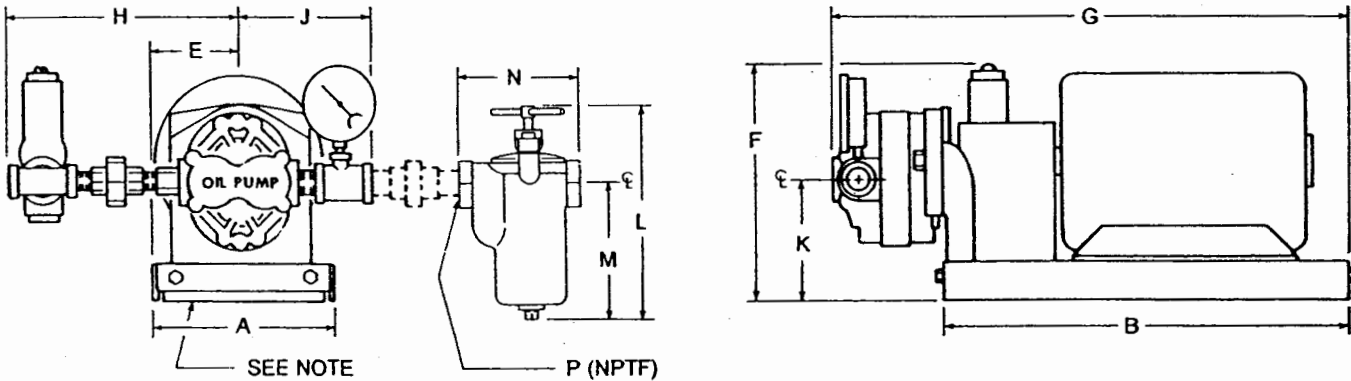
1. Preferred anti siphon valves require a minimum of 2" hg to operate.
2. Basket type strainers that are line size have a friction loss similar to a 90° ell. Strainers one line size smaller are similar to a right angle tee.

NOTE

Dashed lines means field piping



WEBSTER '2R' SERIES. HS2D-23 AND HS2D-50



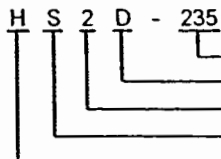
PARKER 'D' AND 'H' SERIES. HS2D-18 THRU HS2D-345

NOTE

Alternate mounting brackets available on request (qty. 2 per base) for welding to metal support or drip pan. Supplied as standard on duplex pump sets.

| PUMP SET | MOTOR | BASIC DIMENSIONS | | | | OVERALL DIMENSIONS | | | | | OIL STRAINER DIMENSIONS | | | | |
|--------------|-------|------------------|-------|------|-------|--------------------|------|-------|------|------|-------------------------|------|------|------|-----|
| | | A | B | C | D | E | F | G | H | J | K | L | M | N | P |
| HS2D-23-2R | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 4.25 | 8.00 | 17.39 | 7.63 | 5.00 | 4.47 | 7.19 | 4.56 | 3.81 | .50 |
| HS2D-50-2R | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 9.62 | 17.50 | 6.00 | -- | 3.69 | 7.19 | 4.56 | 3.81 | .50 |
| HS2D-18-D05 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.50 | 14.75 | 7.63 | 5.00 | 3.97 | 7.19 | 4.56 | 3.81 | .50 |
| HS2D-80-D07 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.00 | 17.39 | 7.63 | 5.00 | 4.47 | 7.19 | 4.56 | 3.81 | .50 |
| HS2D-80-D09 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.00 | 17.39 | 7.63 | 5.00 | 4.47 | 7.19 | 4.56 | 3.81 | .50 |
| HS2D-95-D11 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.00 | 17.39 | 7.63 | 5.00 | 4.47 | 7.19 | 4.56 | 3.81 | .50 |
| HS2D-120-D14 | 143T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.00 | 17.58 | 7.63 | 5.25 | 4.47 | 9.63 | 5.69 | 5.38 | .75 |
| HS2D-150-D17 | 143T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.00 | 17.58 | 7.63 | 5.25 | 4.47 | 9.63 | 5.69 | 5.38 | .75 |
| HS2D-190-D22 | 145T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.50 | 17.90 | 7.63 | 5.25 | 4.47 | 9.63 | 5.69 | 5.38 | .75 |
| HS2D-235-D27 | 145T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.50 | 18.00 | 7.63 | 5.25 | 4.47 | 9.63 | 5.69 | 5.38 | .75 |
| HS2D-275-H31 | 145T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.50 | 18.29 | 8.00 | 4.75 | 4.29 | 9.63 | 5.69 | 5.38 | .75 |
| HS2D-345-H39 | 145T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.50 | 18.29 | 8.00 | 4.75 | 4.29 | 9.63 | 5.69 | 5.38 | .75 |

PUMP SET MODEL NUMBERING SYSTEM

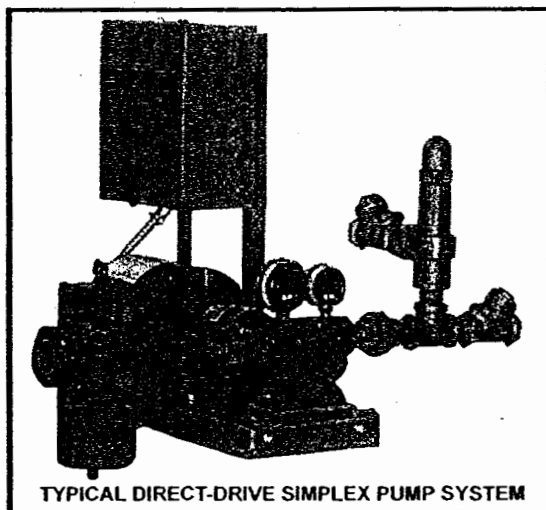


DISCHARGE CAPACITY GPH NO. 2 OIL @ 300 PSI
 DIRECT DRIVE
 NO. 2 OIL, 40 SSSU @ 70° F (4CS @ 21° C)
 SIMPLEX (SINGLE) UNIT. DUPLEX SYSTEMS AVAILABLE ON REQUEST (HD2D)
 HIGH PRESSURE. (300 PSI CONSIDERED HIGH PRESSURE)

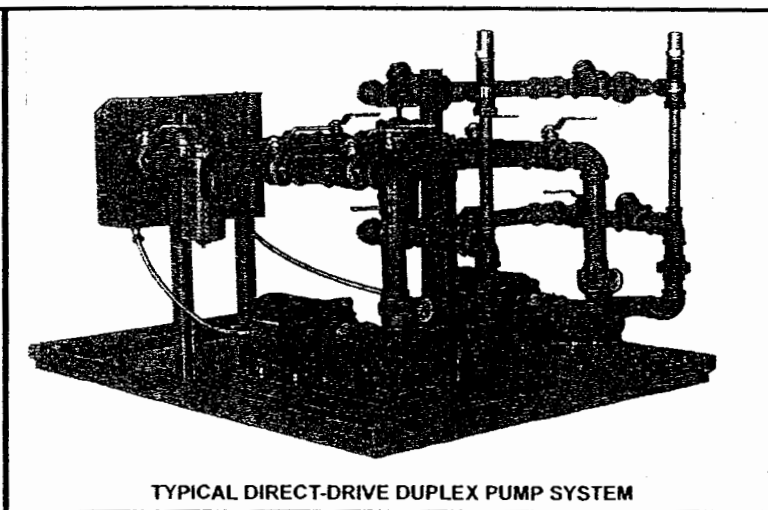
Specification Data OIL CIRCULATING PUMP SYSTEMS

LOW PRESSURE MODELS - LS2D AND LD2D for No. 2 FUEL OIL
INTERMEDIATE PRESSURE MODELS - IS2D AND ID2D for No. 2 FUEL OIL

SIMPLEX OR DUPLEX - DIRECT DRIVE



TYPICAL DIRECT-DRIVE SIMPLEX PUMP SYSTEM



TYPICAL DIRECT-DRIVE DUPLEX PUMP SYSTEM

General Description: Low pressure pump sets (capacities are rated at 15 gph) are suitable for fuel transfer or for supplying a circulating loop to burner pumps. Intermediate pump sets are primarily for the purpose of supplying No. 2 fuel oil to John Zink air atomizing burners (capacities are rated at 100 gph) and are also suitable as fuel transfer units for applications in this pressure range. See charts for spring ranges listed and limitations.

Note that the drawings and components required are the same for the low and intermediate pump sets. The difference lies in capacities of components at different pressures and horsepower required.

Components: The simplex pump set is made up with a standard base mounted electric motor; gear type pump; flexible drive coupling and coupling guard mounted on a heavy gauge steel base.

Accessories include a compound gauge (0-30 psi X 30" Hg.); pressure gauge (0-200 psi) on intermediate pump sets and 0-60 psi on low pressure systems; relief/regulator valve; check and shutoff valve; simplex strainer with removable basket; NEMA-1 cabinet with motor starter(s) mounted and wired. Oil strainer is not mounted on simplex pump sets to prevent damage in shipment.

Duplex pump sets are the same as simplex systems described above except that two each of the components are piped for common supply, discharge and relief return line with necessary shutoff valves and piping to permit transferring from one system to the other. Motor starters are enclosed in a single NEMA-1 control cabinet and wired for single electrical connection. All duplex components are mounted on a liquid tight base pan.

Reference Catalog Sheet (1-gen-10.6) for a more detailed discussion on suction lines and piping in general.

Pump Set Model Numbering System

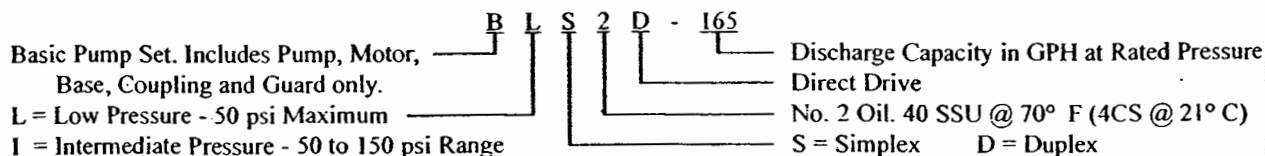


Figure 1

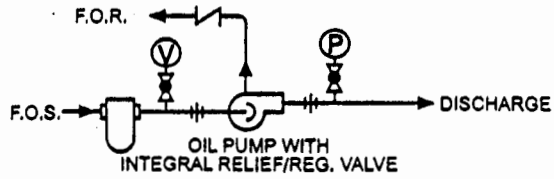


Figure 2

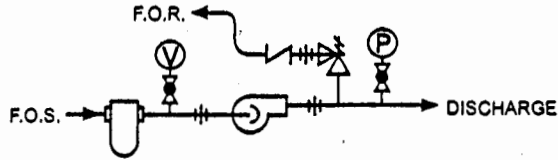
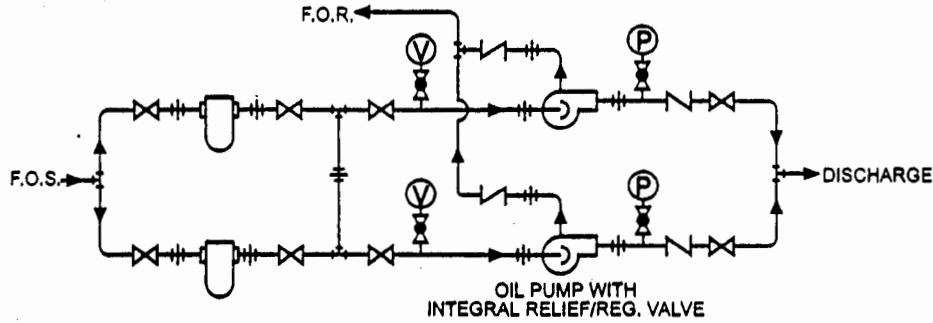
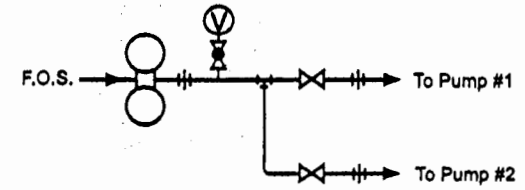


Figure 3

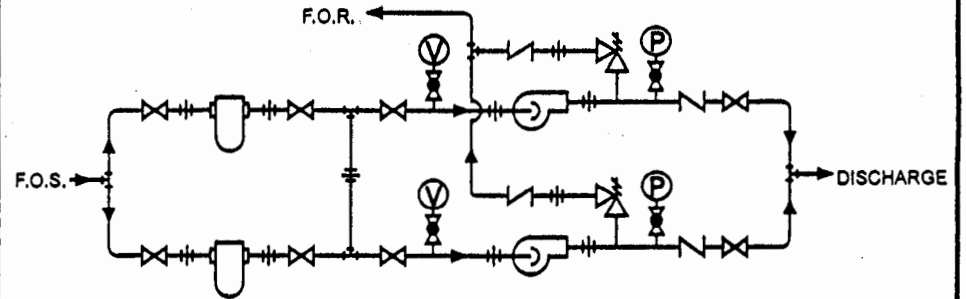


Alternate Piping



Alternate Piping for Duplex Strainer in place of Simplex Strainers on Duplex Pump Sets.

Figure 4



LEGEND (for piping)

- Check Valve.....
- Gate Valve.....
- Globe Valve.....
- Oil Pump.....
- Oil Strainer.....

- Relief/Regulator Valve.....
- Temperature Gauge.....
- Vacuum/Pressure Gauge.....
- Pressure Gauge.....
- Gauge Cock (See Note).....

- Fuel Oil Supply..... F.O.S.
- Fuel Oil Return..... F.O.R.
- Union.....

NOTE: Gauge cock not supplied as standard.

| | | |
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| <p>WEBSTER "2R" SERIES INLET CONDITION: - -- 15" HG SUCTION -- 3 PSI POSITIVE INLET PRESSURE (SEE NOTE 4) -- SUCTION CAPACITY DETERMINED AT ATMOSPHERIC INLET TO ATMOSPHERIC DISCHARGE.</p> <p>STANDARD VOLTAGE - 3 PH / 60 HZ (SEE NOTE 1)</p> <p>PIPING SCHEMATIC - SIMPLEX - FIG. 1 - DUPLEX - FIG. 3</p> | <p>PARKER "D" AND "H" SERIES (SEE NOTE 3) INLET CONDITION: - -- 10" HG SUCTION -- 20 PSI POSITIVE INLET PRESSURE (SEE NOTE 4) -- SUCTION CAPACITY DETERMINED AT ATMOSPHERIC INLET TO ATMOSPHERIC DISCHARGE.</p> <p>HORSEPOWER: LOW PRESSURE TO 50 PSI INTERMEDIATE PRESSURE TO 150 PSI</p> <p>STANDARD VOLTAGE - 3 PH / 60 HZ (SEE NOTE 1)</p> <p>PIPING SCHEMATIC - SIMPLEX - FIG. 2 - DUPLEX - FIG. 4</p> | <p>VIKING "432" AND "4195" SERIES INLET CONDITION: - -- 20" HG SUCTION -- 100 PSI POSITIVE INLET PRESSURE (SEE NOTE 4) -- SUCTION CAPACITY DETERMINED AT 15" HG INLET TO ATMOSPHERIC DISCHARGE.</p> <p>HORSEPOWER: LOW PRESSURE TO 50 PSI INTERMEDIATE PRESSURE TO 150 PSI</p> <p>STANDARD VOLTAGE - 3 PH / 60 HZ (SEE NOTE 1)</p> <p>PIPING SCHEMATIC - SIMPLEX - FIG. 2 - DUPLEX - FIG. 4</p> |
|--|--|--|

| DATA FOR LOW PRESSURE SYSTEMS @ 15 PSI | | | | | | |
|--|---------------------|---------|-------------------------|------------|----------------------|------------|
| PUMP MODEL | PUMP CAPACITY (GPH) | | RELIEF / REG. VALVE (2) | | PUMP RPM (1) @ 60 HZ | MOTOR H.P. |
| | DISCHARGE | SUCTION | MODEL | SPR. RANGE | | |
| 2R233D-5AA4 | 36 | 70 | INTEGRAL | 5-25 PSI | 1725 | .33 |
| 2R636D-5AA4 | 75 | 125 | INTEGRAL | 5-25 PSI | 1725 | .33 |
| D05AA2A | 45 | 50 | RV2103 | 10-25 PSI | 1725 | .33 |
| D07AA2A | 70 | 73 | RV2103 | 10-25 PSI | 1725 | .33 |
| D09AA2A | 90 | 92 | RV2103 | 10-25 PSI | 1725 | .33 |
| D11AA2A | 105 | 114 | RV2103 | 10-25 PSI | 1725 | .33 |
| D14AA2A | 135 | 143 | RV2103 | 10-25 PSI | 1725 | .33 |
| D17AA2A | 165 | 176 | RV3003 | 10-55 PSI | 1725 | .33 |
| D22AA2A | 215 | 228 | RV3003 | 10-55 PSI | 1725 | .33 |
| D27AA2A | 265 | 280 | RV3003 | 10-55 PSI | 1725 | .33 |
| H31AA2A | 310 | 327 | RV3003 | 10-55 PSI | 1725 | .50 |
| H39AA2A | 385 | 408 | RV3003 | 10-55 PSI | 1725 | .50 |
| H49AA2A | 485 | 510 | RV3003 | 10-55 PSI | 1725 | .75 |
| H62AA2A | 605 | 636 | VJ-4US | 7-35 PSI | 1725 | .75 |
| H77AA2A | 760 | 798 | VJ-4US | 7-35 PSI | 1725 | 1.00 |
| H90AA2A | 915 | 963 | VJ-5US | 7-35 PSI | 1725 | 1.00 |
| C432-PHSFCS | 30 | 35 | RV2103 | 10-25 PSI | 1725 | .33 |
| F432-PHSFCV | 65 | 72 | RV2103 | 10-25 PSI | 1150 | .33 |
| F432-PHSFCV | 105 | 114 | RV2103 | 10-25 PSI | 1725 | .33 |
| FH432-PHSFCV | 130 | 138 | RV2103 | 10-25 PSI | 1150 | .33 |
| FH432-PHSFCV | 200 | 210 | RV3003 | 10-55 PSI | 1725 | .33 |
| GG4195-PHSCCV | 390 | 432 | RV3003 | 10-55 PSI | 1150 | .50 |
| GG4195-PHSCCV | 630 | 672 | VJ-4US | 7-35 PSI | 1725 | .75 |
| HJ4195-PHSCCV | 840 | 870 | VJ-5US | 7-35 PSI | 1150 | 1.00 |
| HJ4195-PHSCCV | 1290 | 1320 | VJ-5US | 7-35 PSI | 1725 | 1.50 |
| HL4195-PHSCCV | 1140 | 1200 | VJ-5US | 7-35 PSI | 1150 | 1.50 |
| HL4195-PHSCCV | 1800 | 1860 | VJ-6US | 7-35 PSI | 1725 | 2.00 |

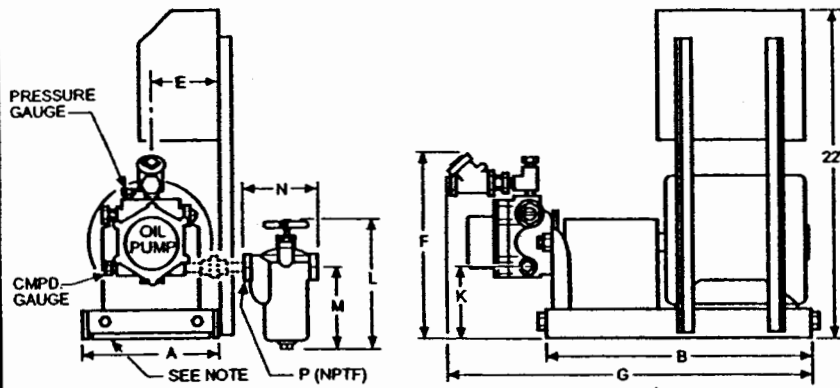
| DATA FOR INTERMEDIATE PRESSURE SYSTEMS @ 100 PSI | | | | | | |
|--|---------------------|---------|-------------------------|------------|----------------------|------------|
| PUMP MODEL | PUMP CAPACITY (GPH) | | RELIEF / REG. VALVE (2) | | PUMP RPM (1) @ 60 HZ | MOTOR H.P. |
| | DISCHARGE | SUCTION | MODEL | SPR. RANGE | | |
| 2R223D-5AA14 | 30 | 70 | INTEGRAL | 70-330 PSI | 1725 | .33 |
| 2R626D-5AA14 | 60 | 125 | INTEGRAL | 70-330 PSI | 1725 | .50 |
| D05AA2A | 35 | 50 | RV2104 | 80-140 PSI | 1725 | .33 |
| D07AA2A | 65 | 73 | RV2104 | 80-140 PSI | 1725 | .33 |
| D09AA2A | 85 | 92 | RV2104 | 80-140 PSI | 1725 | .33 |
| D11AA2A | 100 | 114 | RV2104 | 80-140 PSI | 1725 | .33 |
| D14AA2A | 125 | 143 | RV2104 | 80-140 PSI | 1725 | .50 |
| D17AA2A | 155 | 176 | RV2104 | 80-140 PSI | 1725 | .50 |
| D22AA2A | 205 | 228 | RV2104 | 80-140 PSI | 1725 | .75 |
| D27AA2A | 250 | 280 | RV2104 | 80-140 PSI | 1725 | .75 |
| H31AA2A | 295 | 327 | RV2104 | 80-140 PSI | 1725 | 1.00 |
| H39AA2A | 365 | 408 | RV3002 | 50-220 PSI | 1725 | 1.50 |
| H49AA2A | 460 | 510 | RV3002 | 50-220 PSI | 1725 | 1.50 |
| H62AA2A | 570 | 636 | RV3002 | 50-220 PSI | 1725 | 2.00 |
| H77AA2A | 720 | 798 | VJ-5XS | 60-175 PSI | 1725 | 3.00 |
| H90AA2A | 865 | 963 | VJ-5XS | 60-175 PSI | 1725 | 3.00 |
| C432-PHSFCS | 25 | 35 | RV2104 | 80-140 PSI | 1725 | .33 |
| F432-PHSFCV | 45 | 72 | RV2104 | 80-140 PSI | 1150 | .33 |
| F432-PHSFCV | 80 | 114 | RV2104 | 80-140 PSI | 1725 | .33 |
| FH432-PHSFCV | 95 | 138 | RV2104 | 80-140 PSI | 1150 | .33 |
| FH432-PHSFCV | 165 | 210 | RV2104 | 80-140 PSI | 1725 | .50 |
| GG4195-PHSCCV | 275 | 432 | RV3002 | 50-220 PSI | 1150 | 1.50 |
| GG4195-PHSCCV | 525 | 672 | VJ-5XS | 60-175 PSI | 1725 | 2.00 |
| HJ4195-PHSCCV | 685 | 870 | VJ-5XS | 60-175 PSI | 1150 | 2.00 |
| HJ4195-PHSCCV | 1150 | 1320 | VJ-6XS | 60-175 PSI | 1725 | 3.00 |
| HL4195-PHSCCV | 955 | 1200 | VJ-6XS | 60-175 PSI | 1150 | 3.00 |
| HL4195-PHSCCV | 1600 | 1860 | VJ-7XS | 60-175 PSI | 1725 | 5.00 |

NOTES

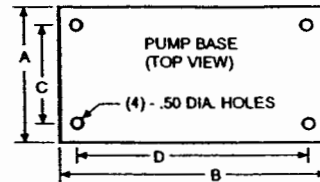
1. If voltage is 50 HZ/1450 RPM ILO 1725 RPM or 950 RPM ILO 1150 RPM, deduct 17% from listed suction and discharge capacities.
2. When Fulflo valves (P/N VJ-XXX) are installed as relief valves; divide the maximum spring range by 1.25 to determine maximum set point.
3. Parker "D" and "H" series pumps are suitable for jet fuel, No. 1 fuel oil and kerosene. Deduct 15% from discharge capacities.
4. NFPA-31 or local codes may limit inlet pressures on some installations.

SIMPLEX PUMP SET DIMENSIONS (Dashed lines are field piping)

Figure 5 - WEBSTER "2R" SERIES



NOTE: Alternate mounting brackets available on request (Qty. 2 per base) for welding to metal support or drip pan. Supplied as standard on duplex pump sets.



CAUTION: Pump and motor shafts are factory aligned to within acceptable tolerances. When mounting the pump base to a surface using the top (4) .5 dia. holes; the base can be pulled into a warped position. This will cause misalignment of the above mentioned shafts producing noise and shorter life of the pump and drive couplings.

Figure 6 - PARKER "D" and "H" SERIES

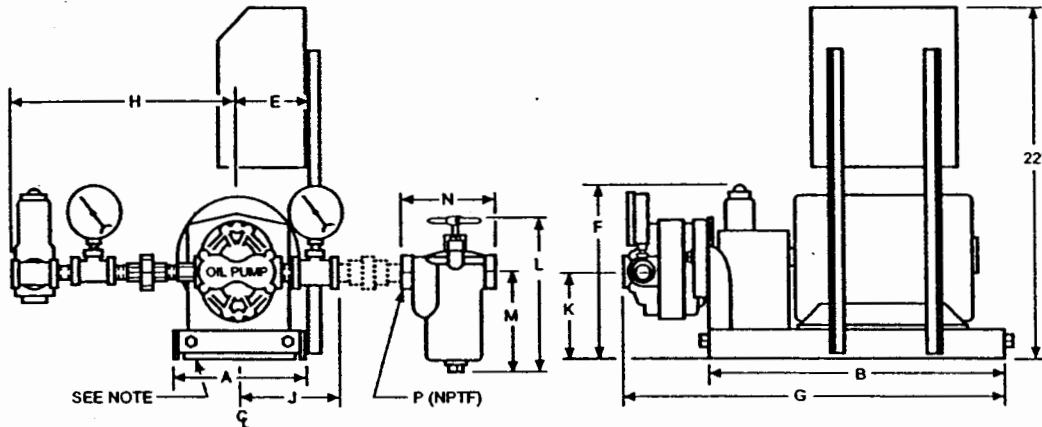


Figure 7 - VIKING "432" SERIES

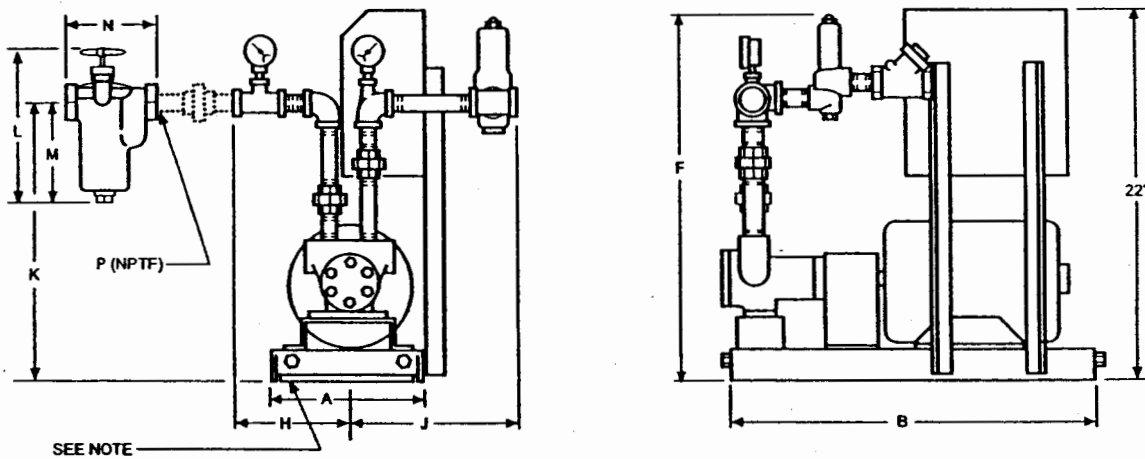
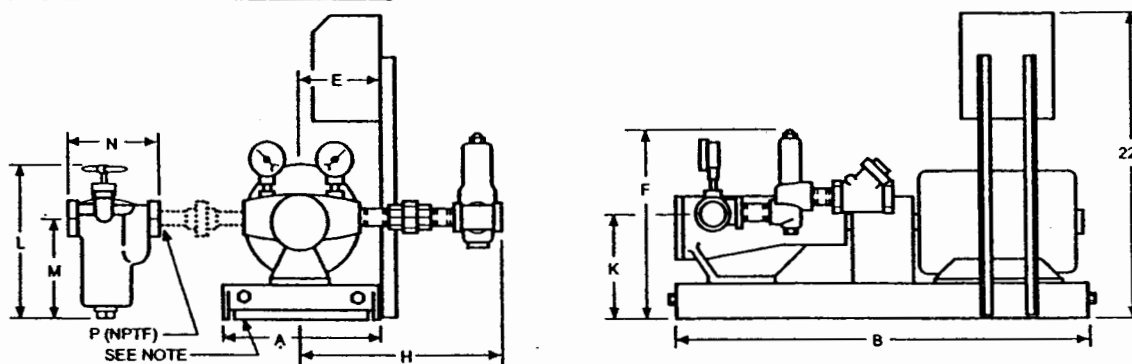


Figure 8 - VIKING "4195" SERIES



SIMPLEX PUMP SET DIMENSIONAL DATA

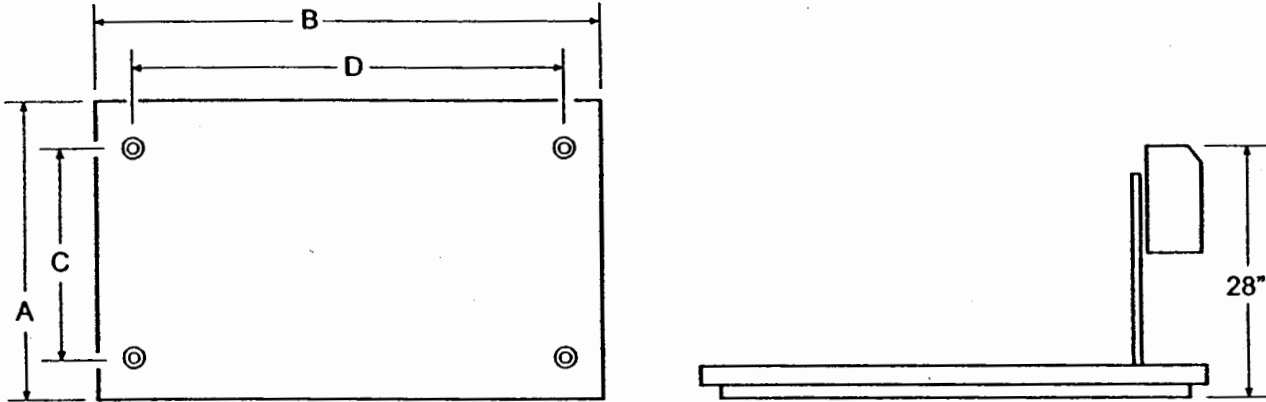
| LOW PRESSURE SYSTEMS (15 PSI RANGE) | | | | | | | | | | | | | | | | |
|-------------------------------------|----------|-------------|-----------------|-------|------|-------|--------------------|-------|-------|-------|------|-------|-------------------------|------|------|------|
| PUMP SET MODEL | FIG. NO. | MOTOR FRAME | BASE DIMENSIONS | | | | OVERALL DIMENSIONS | | | | | | OIL STRAINER DIMENSIONS | | | |
| | | | A | B | C | D | E | F | G | H | J | K | L | M | N | P |
| LS2D-36-2R233 | 5 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 9.25 | 17.50 | -- | -- | 3.19 | 7.19 | 4.56 | 3.81 | .50 |
| LS2D-75-2R636 | 5 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 9.25 | 17.50 | -- | -- | 3.19 | 7.19 | 4.56 | 3.81 | .50 |
| LS2D-45-D05 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.00 | 14.75 | 8.00 | 5.00 | 3.97 | 7.19 | 4.56 | 3.81 | .50 |
| LS2D-70-D07 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.00 | 14.82 | 8.00 | 5.00 | 3.97 | 7.19 | 4.56 | 3.81 | .50 |
| LS2D-90-D09 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.00 | 14.89 | 8.00 | 5.00 | 3.97 | 7.19 | 4.56 | 3.81 | .50 |
| LS2D-105-D11 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.00 | 14.97 | 8.00 | 5.00 | 3.97 | 7.19 | 4.56 | 3.81 | .50 |
| LS2D-135-D14 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.00 | 15.08 | 8.00 | 5.00 | 3.97 | 7.19 | 4.56 | 3.81 | .50 |
| LS2D-165-D17 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.91 | 15.21 | 8.00 | 5.00 | 3.97 | 9.63 | 5.69 | 5.38 | .75 |
| LS2D-215-D22 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.91 | 15.40 | 8.00 | 5.00 | 3.97 | 9.63 | 5.69 | 5.38 | .75 |
| LS2D-265-D27 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.91 | 15.59 | 8.00 | 5.00 | 3.97 | 9.63 | 5.69 | 5.38 | .75 |
| LS2D-310-H31 | 6 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 9.12 | 18.29 | 8.00 | 4.75 | 4.29 | 9.63 | 5.69 | 5.38 | .75 |
| LS2D-385-H39 | 6 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 9.12 | 18.43 | 8.50 | 4.75 | 4.29 | 9.63 | 5.69 | 5.38 | .75 |
| LS2D-485-H49 | 6 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 9.12 | 18.61 | 8.50 | 4.75 | 4.29 | 9.63 | 5.69 | 5.38 | 1.00 |
| LS2D-605-H62 | 6 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 14.10 | 18.83 | 8.50 | 4.75 | 4.29 | 9.63 | 5.69 | 5.38 | 1.00 |
| LS2D-760-H77 | 6 | 143T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 14.10 | 19.38 | 8.50 | 4.75 | 4.29 | 9.63 | 5.69 | 5.38 | 1.00 |
| LS2D-915-H90 | 6 | 143T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 15.31 | 19.67 | 8.50 | 4.75 | 4.29 | 10.50 | 5.94 | 7.00 | 1.25 |
| LS2D-30-C432 | 7 | 48 | 7.50 | 15.25 | 6.00 | 13.75 | 3.75 | 14.75 | -- | 4.50 | 5.00 | 11.62 | 7.19 | 4.56 | 3.81 | .50 |
| LS2D-65-F432 | 7 | 56 | 8.50 | 16.00 | 7.00 | 14.50 | 4.25 | 15.25 | -- | 4.50 | 5.00 | 12.12 | 7.19 | 4.56 | 3.81 | .50 |
| LS2D-105-F432 | 7 | 48 | 7.50 | 15.25 | 6.00 | 13.75 | 3.75 | 14.75 | -- | 4.50 | 5.00 | 11.62 | 7.19 | 4.56 | 3.81 | .50 |
| LS2D-130-FH432 | 7 | 56 | 8.50 | 16.00 | 7.00 | 14.50 | 4.25 | 15.25 | -- | 4.50 | 5.00 | 12.12 | 7.19 | 4.56 | 3.81 | .50 |
| LS2D-200-FH432 | 7 | 48 | 7.50 | 15.25 | 6.00 | 13.75 | 3.75 | 14.75 | -- | 4.50 | 5.00 | 11.62 | 9.63 | 5.69 | 5.38 | .75 |
| LS2D-390-GG4195 | 8 | 56 | 8.50 | 21.00 | 7.00 | 19.50 | 4.25 | 9.75 | -- | 10.50 | -- | 5.52 | 9.63 | 5.69 | 5.38 | 1.00 |
| LS2D-630-GG4195 | 8 | 56 | 8.50 | 21.00 | 7.00 | 19.50 | 4.25 | 15.62 | -- | 10.00 | -- | 5.52 | 10.50 | 5.94 | 7.00 | 1.25 |
| LS2D-800-HJ4195 | 8 | 145T | 9.50 | 23.75 | 8.00 | 22.25 | 4.75 | 16.87 | -- | 12.50 | -- | 6.24 | 12.00 | 7.44 | 7.00 | 1.50 |
| LS2D-1290-HJ4195 | 8 | 145T | 9.50 | 23.75 | 8.00 | 22.25 | 4.75 | 16.87 | -- | 12.50 | -- | 6.24 | 12.00 | 7.44 | 7.00 | 1.50 |
| LS2D-1140-HL4195 | 8 | 143T | 9.50 | 23.75 | 8.00 | 22.25 | 4.75 | 16.87 | -- | 11.25 | -- | 6.24 | 12.00 | 7.44 | 7.00 | 1.50 |
| LS2D-1800-HL4195 | 8 | 145T | 9.50 | 23.75 | 8.00 | 22.25 | 4.75 | 18.00 | -- | 11.25 | -- | 6.24 | 13.75 | 7.81 | 9.00 | 2.00 |

| INTERMEDIATE PRESSURE SYSTEMS (100 PSI RANGE) | | | | | | | | | | | | | | | | |
|---|----------|-------------|-----------------|-------|-------|-------|--------------------|-------|-------|-------|------|-------|-------------------------|------|------|------|
| PUMP SET MODEL | FIG. NO. | MOTOR FRAME | BASE DIMENSIONS | | | | OVERALL DIMENSIONS | | | | | | OIL STRAINER DIMENSIONS | | | |
| | | | A | B | C | D | E | F | G | H | J | K | L | M | N | P |
| IS2D-30-2R223 | 5 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 9.25 | 17.50 | -- | -- | 3.19 | 7.19 | 4.56 | 3.81 | .50 |
| IS2D-60-2R626 | 5 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 9.25 | 17.50 | -- | -- | 3.69 | 7.19 | 4.56 | 3.81 | .50 |
| IS2D-35-D05 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.00 | 14.75 | 8.00 | 5.00 | 3.97 | 7.19 | 4.56 | 3.81 | .50 |
| IS2D-65-D07 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.00 | 14.82 | 8.00 | 5.00 | 3.97 | 7.19 | 4.56 | 3.81 | .50 |
| IS2D-85-D09 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.00 | 14.89 | 8.00 | 5.00 | 3.97 | 7.19 | 4.56 | 3.81 | .50 |
| IS2D-100-D11 | 6 | 48 | 7.50 | 12.50 | 6.00 | 11.00 | 3.75 | 7.00 | 14.97 | 8.00 | 5.00 | 3.97 | 7.19 | 4.56 | 3.81 | .50 |
| IS2D-125-D14 | 6 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 7.50 | 17.58 | 8.00 | 5.00 | 4.47 | 7.19 | 4.56 | 3.81 | .50 |
| IS2D-155-D17 | 6 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 7.50 | 17.71 | 8.00 | 5.00 | 4.47 | 9.63 | 5.69 | 5.38 | .75 |
| IS2D-205-D22 | 6 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 7.50 | 17.90 | 8.00 | 5.00 | 4.47 | 9.63 | 5.69 | 5.38 | .75 |
| IS2D-250-D27 | 6 | 56 | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 7.50 | 18.09 | 8.00 | 5.00 | 4.47 | 9.63 | 5.69 | 5.38 | .75 |
| IS2D-295-H31 | 6 | 143T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 7.50 | 18.29 | 8.00 | 4.75 | 4.29 | 9.63 | 5.69 | 5.38 | .75 |
| IS2D-365-H39 | 6 | 145T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.41 | 18.43 | 8.00 | 4.75 | 4.29 | 9.63 | 5.69 | 5.38 | .75 |
| IS2D-460-H49 | 6 | 145T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.41 | 18.61 | 8.50 | 4.75 | 4.29 | 9.63 | 5.69 | 5.38 | 1.00 |
| IS2D-570-H62 | 6 | 145T | 8.50 | 15.00 | 7.00 | 13.50 | 4.25 | 8.41 | 18.83 | 8.50 | 4.75 | 4.29 | 9.63 | 5.69 | 5.38 | 1.00 |
| IS2D-720-H77 | 6 | 182T | 9.50 | 16.00 | 8.00 | 14.50 | 4.75 | 15.85 | 20.38 | 8.50 | 4.75 | 5.29 | 9.63 | 5.69 | 5.38 | 1.00 |
| IS2D-865-H90 | 6 | 182T | 9.50 | 16.00 | 8.00 | 14.50 | 4.75 | 15.85 | 20.67 | 8.50 | 4.75 | 5.29 | 10.50 | 5.94 | 7.00 | 1.25 |
| IS2D-25-C432 | 7 | 48 | 7.50 | 15.25 | 6.00 | 13.75 | 3.75 | 14.75 | -- | 4.50 | 5.00 | 11.62 | 7.19 | 4.56 | 3.81 | .50 |
| IS2D-45-F432 | 7 | 56 | 8.50 | 16.00 | 7.00 | 14.50 | 4.25 | 15.25 | -- | 4.50 | 5.00 | 12.12 | 7.19 | 4.56 | 3.81 | .50 |
| IS2D-80-F432 | 7 | 48 | 7.50 | 15.25 | 6.00 | 13.75 | 3.75 | 14.75 | -- | 4.50 | 5.00 | 11.62 | 7.19 | 4.56 | 3.81 | .50 |
| IS2D-95-FH432 | 7 | 56 | 8.50 | 16.00 | 7.00 | 14.50 | 4.25 | 15.25 | -- | 4.50 | 5.00 | 12.12 | 7.19 | 4.56 | 3.81 | .50 |
| IS2D-165-FH432 | 7 | 56 | 8.50 | 16.00 | 7.00 | 14.50 | 4.25 | 15.25 | -- | 4.50 | 5.00 | 12.12 | 9.63 | 5.69 | 5.38 | .75 |
| IS2D-275-GG4195 | 8 | 145T | 8.50 | 21.00 | 7.00 | 19.50 | 4.25 | 9.75 | -- | 10.50 | -- | 5.52 | 9.63 | 5.69 | 5.38 | 1.00 |
| IS2D-525-GG4195 | 8 | 145T | 8.50 | 21.00 | 7.00 | 19.50 | 4.25 | 16.87 | -- | 10.00 | -- | 5.52 | 10.50 | 5.94 | 7.00 | 1.25 |
| IS2D-685-HJ4195 | 8 | 184T | 9.50 | 23.75 | 8.00 | 22.25 | 4.25 | 18.12 | -- | 12.50 | -- | 5.87 | 12.00 | 7.44 | 7.00 | 1.50 |
| IS2D-1150-HJ4195 | 8 | 182T | 9.50 | 23.75 | 8.00 | 22.25 | 4.75 | 19.38 | -- | 11.50 | -- | 5.87 | 12.00 | 7.44 | 7.00 | 1.50 |
| IS2D-955-HL4195 | 8 | 213T | 12.00 | 28.00 | 10.00 | 26.00 | 6.00 | 21.00 | -- | 11.25 | -- | 8.87 | 12.00 | 7.44 | 7.00 | 1.50 |
| IS2D-1600-HL4195 | 8 | 184T | 9.50 | 23.75 | 8.00 | 22.25 | 4.75 | 21.38 | -- | 11.25 | -- | 5.87 | 13.75 | 7.81 | 9.00 | 2.00 |

DUPLEX PUMP SET DIMENSIONAL DATA

NOTE

Base pans listed below are for standard pump sets as priced. Check with factory when special equipment (eg: larger control cabinet or added components) are required for correct base pan dimensions.



| PUMP SET MODEL | | BASE PAN DIMENSIONS (inches) | | | |
|----------------|---------------|------------------------------|-------|-------|-------|
| LOW PRESSURE | INT. PRESSURE | A | B | C | D |
| LD2D-36 | ID2D-30 | 30.00 | 36.00 | 20.88 | 33.00 |
| LD2D-75 | ID2D-60 | | | | |
| LD2D-45 | ID2D-35 | | | | |
| LD2D-70 | ID2D-65 | | | | |
| LD2D-90 | ID2D-85 | | | | |
| LD2D-105 | ID2D-100 | | | | |
| LD2D-135 | ID2D-125 | | | | |
| LD2D-165 | ID2D-155 | | | | |
| LD2D-215 | ID2D-205 | | | | |
| LD2D-265 | ID2D-250 | | | | |
| LD2D-310 | ID2D-295 | | | | |
| LD2D-385 | ID2D-365 | | | | |
| LD2D-485 | ID2D-460 | 36.00 | 45.00 | 26.88 | 42.00 |
| LD2D-605 | ID2D-570 | | | | |
| LD2D-760 | ID2D-720 | | | | |
| LD2D-915 | ID2D-865 | | | | |
| LD2D-30 | ID2D-25 | | | | |
| LD2D-65 | ID2D-45 | | | | |
| LD2D-105 | ID2D-80 | | | | |
| LD2D-130 | ID2D-95 | | | | |
| LD2D-200 | ID2D-165 | 36.00 | 45.00 | 26.88 | 42.00 |
| LD2D-390 | ID2D-275 | | | | |
| LD2D-630 | ID2D-525 | | | | |
| LD2D-800 | ID2D-685 | | | | |
| LD2D-1290 | ID2D-1150 | | | | |
| LD2D-1140 | ID2D-955 | | | | |
| LD2D-1800 | ID2D-1600 | | | | |

BACK PRESSURE REGULATOR VALVE

Low pressure and intermediate pressure pump sets are used in many different applications and do not always require a back pressure valve; therefore, valves are not included on standard pump set material lists. When required, order separately to be shipped loose with the pump set.

Diaphragm material available:

Non-metallic = Viton

Metallic = Monel

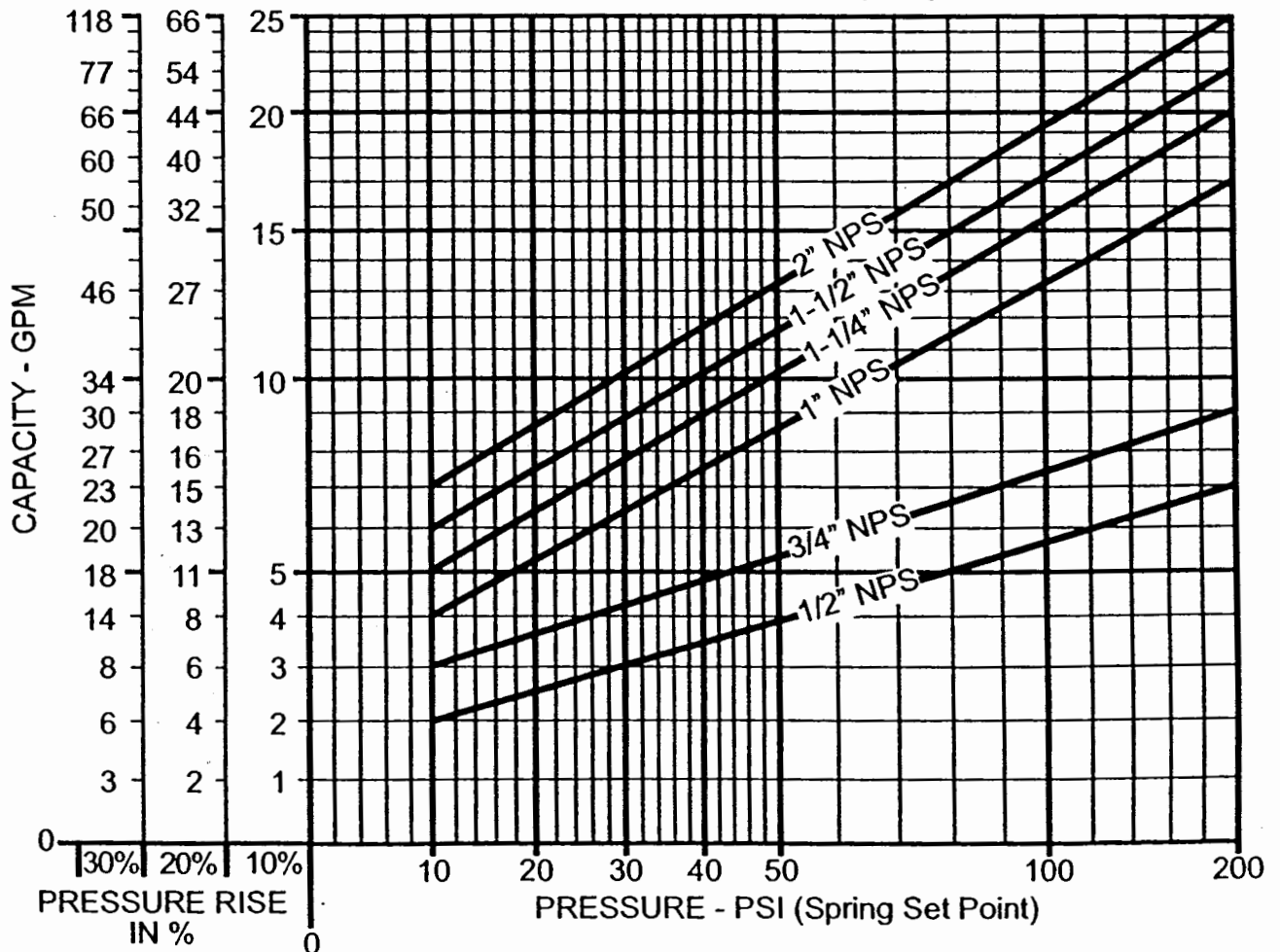
Flow chart is for Cash-Acme Model FR10 with non-metallic diaphragm and a 10% rise in pressure from set point. eg: A valve flowing the full discharge capacity of a pump will have a 10% rise in pressure from set point. For a more sensitive pressure control, select the valve with next pipe size larger. For a less sensitive pressure control, use the 20% or 30% pressure rise capacities.

Valves with metallic diaphragms have approximately 1/2 the capacity shown for non-metallic diaphragms. eg: Multiply the required flow capacity by 2.0 for sizing.

| SIZE (inches) | RANGE OF ADJUSTMENT IN PSI | | | | |
|------------------|----------------------------|-------|--------|--------|---------|
| | 0-25 | 5-50 | 30-100 | 75-175 | 100-250 |
| 1/2 | 0-25 | 5-50 | 30-100 | 75-175 | 100-250 |
| 3/4 | 0-10 | 10-50 | 20-110 | 30-150 | 100-250 |
| 1 | 0-20 | 20-90 | 40-125 | 50-250 | |
| 1-1/4 | 0-15 | 20-85 | 40-125 | 50-250 | |
| 1-1/2, 2 | 0-10 | 10-55 | 30-100 | 40-200 | 125-250 |

BACK PRESSURE REGULATOR FLOW CHART

No. 2 oil Cash-Acme Model FR10
with non-metallic diaphragm

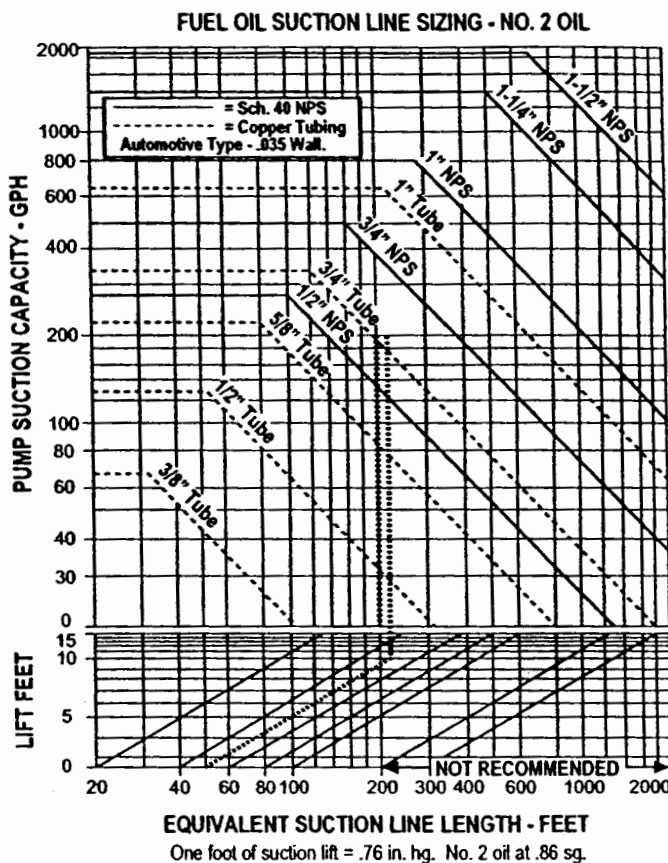


Pump sets that deliver oil to the burner for firing are normally sized 1-1/2 times the boiler requirement. Transfer and circulating pump set selections are often based on different requirements. Suction line sizing is based on the suction capacity of the pump selected.

Equivalent suction line length includes the measured length of the suction line from the point of entry (bottom of tank) to the pump, plus the friction loss equivalent length of valves, fittings, etc. installed in the suction line piping. (See Table)

On installations where suction lift is not required, use the upper portion of the chart. Eg: A 200 ft. suction line flowing 200 GPH will intersect at approximately the 3/4" tubing size. When three points intersect (GPH, suction line length and pipe size), the suction requirement will be approximately 6-7" Hg. Suction requirement can be reduced by selecting the next size larger pipe or tubing if desired. The horizontal line extension for each pipe or tubing size indicates a high velocity range. An increase in GPH above the horizontal line will produce a velocity in excess of 300 FPM.

Use the lower portion of the chart to compensate for suction lift. Eg: Assume an equivalent suction line length of 50 ft., 200 GPH suction capacity and a 10ft. lift. Enter the chart at the 50 ft. line length, move diagonal up at 30 deg. to the 10 ft. lift line. Then vertical to the 200 GPH line. Use the 3/4" NPS or the 1" tubing. An increase in line size at this point on the chart would be of a small value.



Practical design would limit one ft. of suction lift to one in. Hg of the pumps capability. Eg: A pump with 10" Hg suction capability should be limited to 10 ft. of lift. Suction lifts over 15 ft. with any pump using No. 2 oil should be avoided. Suction lines of 200 ft. in length or longer should be avoided and should have no suction lift.

FRICION LOSS IN STANDARD VALVES AND FITTINGS (Table gives equivalent lengths in feet of straight pipe)

| PIPE SIZE NPS | TYPE OF FITTING OR VALVE (1) | | | | | | |
|---------------|------------------------------|--------------------|--------------------|--------------------------|----------------------|--------------------|-------------------------|
| | GATE VALVE (OPEN) | GLOBE VALVE (OPEN) | CHECK VALVE (OPEN) | ELL (2) STANDARD 90 DEG. | ELL STANDARD 45 DEG. | TEE SGT. THRU FLOW | TEE (2) RGT. ANGLE FLOW |
| 1/2 | 0.35 | 17 | 4.0 | 1.5 | 0.8 | 1.0 | 3.2 |
| 3/4 | 0.50 | 22 | 5.5 | 2.2 | 1.0 | 1.3 | 4.5 |
| 1 | 0.60 | 27 | 6.0 | 2.7 | 1.3 | 1.7 | 5.7 |
| 1-1/4 | 0.80 | 38 | 9.0 | 3.6 | 1.7 | 2.3 | 7.5 |
| 1-1/2 | 1.20 | 44 | 11.0 | 4.5 | 2.0 | 2.8 | 9.0 |
| 2 | 1.20 | 53 | 14.0 | 5.2 | 2.6 | 3.5 | 12.0 |
| 2-1/2 | 1.40 | 68 | 17.0 | 6.5 | 3.0 | 4.3 | 14.0 |
| 3 | 1.70 | 80 | 20.0 | 8.0 | 4.0 | 5.2 | 16.0 |
| 4 | 2.30 | 120 | 25.0 | 11.0 | 5.0 | 7.0 | 22.0 |
| 5 | 2.80 | 140 | 34.0 | 14.0 | 6.2 | 9.0 | 27.0 |
| 6 | 3.50 | 170 | 40.0 | 16.0 | 7.8 | 11.0 | 33.0 |
| 8 | 4.50 | 220 | 54.0 | 21.0 | 11.0 | 14.0 | 43.0 |
| 10 | 5.70 | 280 | 67.0 | 26.0 | 14.0 | 17.0 | 53.0 |

NOTES

1. Preferred anti siphon valves require a minimum of 2" HG to operate.
2. Basket type strainers that are line size have a friction loss similar to a 90° ell. Strainers one line size smaller are similar to a right angle tee.