

Pressure Data

A pressure gauge applied to the pressure gauge port reveals the pressure to which the fuel unit has been regulated. An adjustment can be made to suit the firing conditions (usually 100 psi). Also the pressure gauge, when applied to the pressure gauge port, can be used to check fuel unit efficiency. A unit in satisfactory operating condition should be able to support a nozzle at full spray, up to several psi above the rated burner pressure. Fuel unit manufacturers typically rate domestic units for maximum burning rate at a nominal 100 psi. Collapse of nozzle spray below specified limits indicates either excess bypass, missing or damaged valve gasket, worn valve piston or sleeve, worn gear set, or pump RFS less than nozzle rating. Pumping capacity also decreases under correspondingly higher lift (or vacuum).

A pressure gauge applied directly to nozzle outlet port for cut-off check should hold differential pressure on shutdown. For example, with operating pressure of 100 psi, the cut-off should be approximately 80 psi. If the pressure gauge drops below the cut-off point, this would indicate a leak at cut-off, therefore the valve assembly should be disassembled, cleaned or replaced if necessary. Cut-off pressure must never be more than 20% below set operating pressure.

To determine what pressures should be provided by each pump, refer to the selection charts in the desired model sections.

Correct System Tubing Sizing

Many people both in engineering and in service make the mistake of laying out and installing jobs with tubing which is too small in diameter and too long in length. If a fuel unit with a pumping capacity of not more than 30 gallons per hour is used, tubing of 1/2" OD can be used with safety.

The tubing size can vary widely depending upon flow rate. See the pipe sizing charts for help in determining which tubing size is best suited for each application.

To Determine Suction Line Size in Installations Using Webster Fuel Units on Two-Pipe Systems

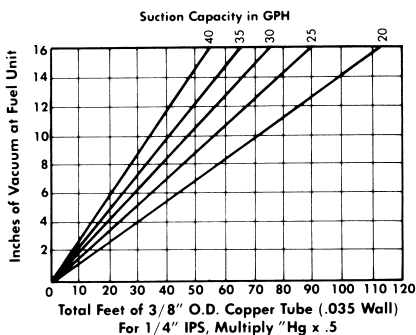
1. Check suction gear capacity (see table of pumps).
2. Measure total tube length (horizontal and vertical).
3. Refer to "Friction Tube Loss Chart" for desired tubing size. Read up from line "total feet of copper tube" to "suction capacity" in gph.
4. Read left to column "inches of vacuum at fuel unit". (This is vacuum required to draw oil through tube listed of given length.)
5. If installation has lift add .75" of vacuum for every foot of lift.

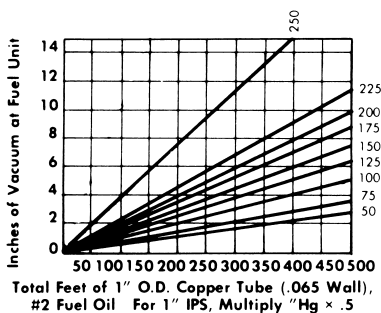
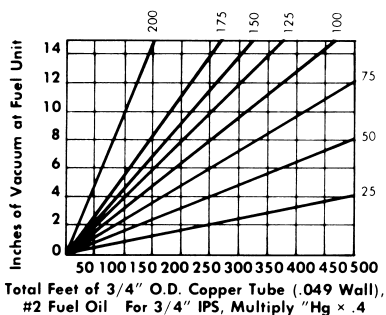
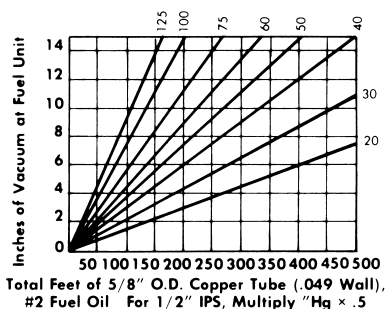
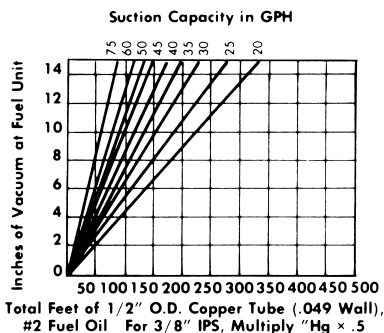
Rule of Thumb:

A quick rule to check an installation is to figure "1" of vacuum for every foot of vertical lift, and 1" of vacuum for every 10' of horizontal run. Refer to Frictional Tube Loss charts for actual installation data.

6. Total inches of vacuum (frictional tube loss plus lift if any).
7. If total is over 10" when single stage is employed on two-pipe system, check on next larger tube size chart for proper tube size.
8. If total is over 15" when two-stage unit is employed on a two-pipe system, check on next larger tube size chart
9. The above does not allow for any added restrictions such as line filter, elbows, sharp bends, check valves, etc.

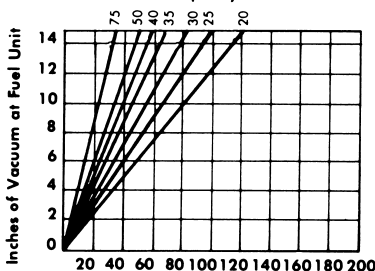
On high lifts and long runs, too small tubing will cause the oil to separate and have a milky appearance. This is not air, it is actually light, volatile portion of the oil separating from the heavy portion. This is likely to occur any time the vacuum gauge shows a reading of 15" or more, and may occur at a lower vacuum with some oils. When vacuums of 20" to 22" are reached, the pressure gauge will start to bounce and delivery at the nozzle will begin to fall off. To correct these conditions, check the tubing. If the tubing size is correct and there are no kinks or other restrictions, a supply or booster pump may be required to assure the fuel unit of a solid column of oil. This is especially desirable where a series of suspended furnaces are included in the system with high lifts and long horizontal runs.

**FRICTION TUBE LOSS CHARTS —
#2 FUEL OIL**

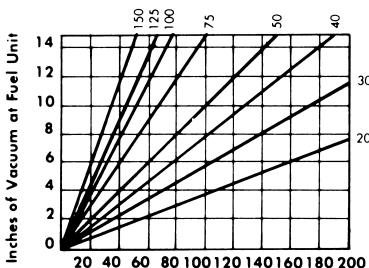


FRICITION TUBE LOSS CHARTS — HEAVY OIL-1000 SSU

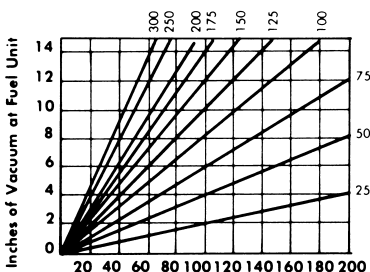
Suction Capacity in GPH



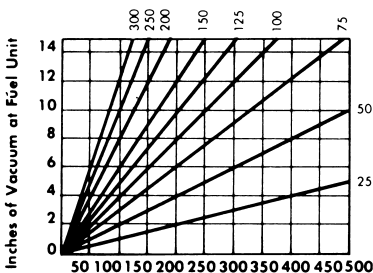
**Total Feet of 7/8" O.D. Copper Tube (.065 Wall),
1000 SSU Oil For 3/4" IPS, Multiply "Hg × .7**



**Total Feet of 1-1/8" O.D. Copper Tube (.065 Wall),
1000 SSU Oil For 1" IPS, Multiply "Hg × .8**



**Total Feet of 1-3/8" O.D. Copper Tube (.065 Wall),
1000 SSU Oil For 1-1/4" IPS, Multiply "Hg × .7**



**Total Feet of 1-5/8" O.D. Copper Tube (.072 Wall),
1000 SSU Oil For 1-1/2" IPS, Multiply "Hg × .7**