



TECH BULLETIN

064
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Published regarding engineering changes and improvements

SUBJECT: By-Pass Line Sizing

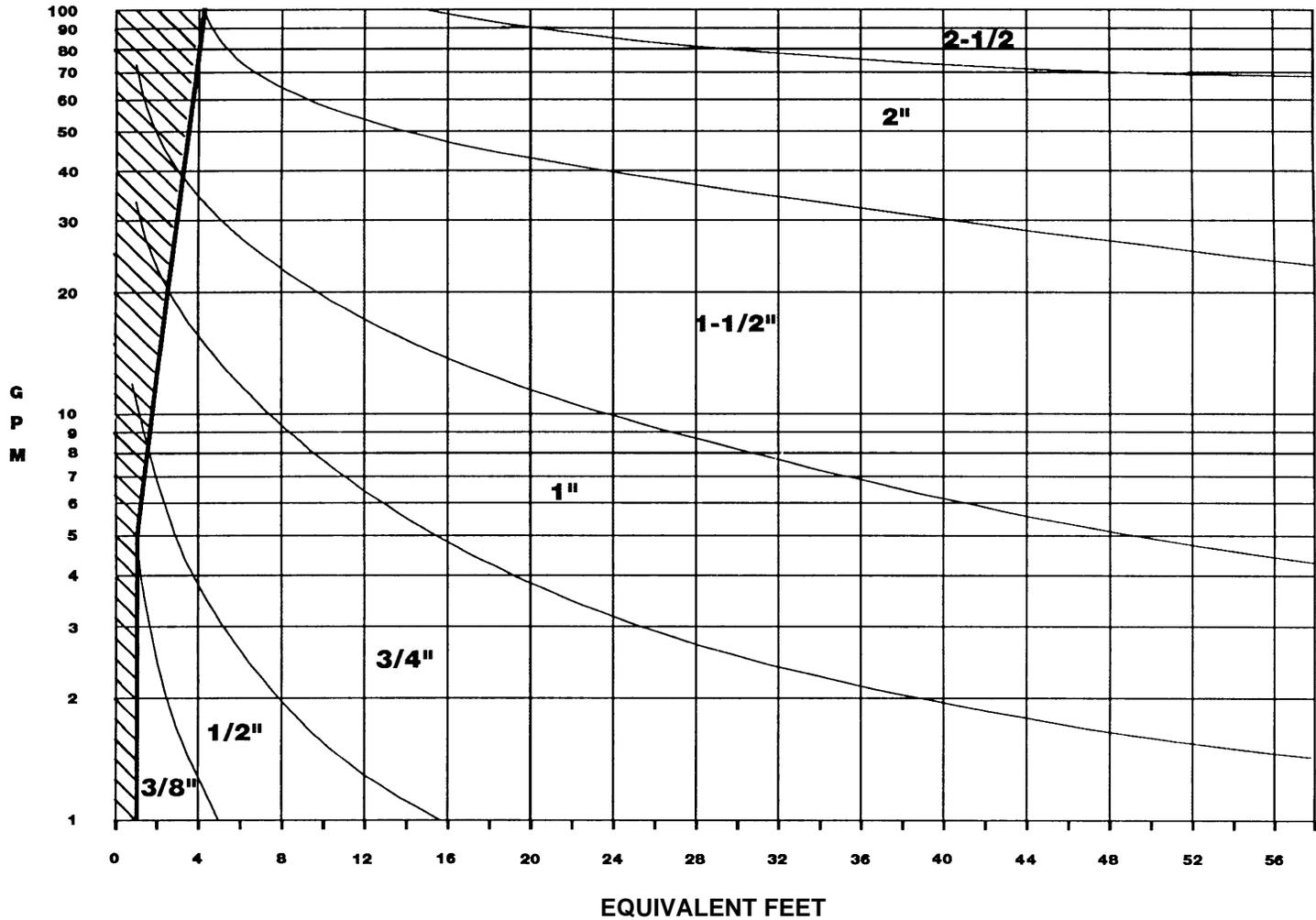
Restricting the by-pass line of your regulating device can result in unnecessary system problems. Damaging turbulence in the supply tank, back pressure to the regulating valve or excessive pressure to the pump inlet are typical problems which can be avoided by properly sizing the by-pass line.

Normally one size larger than the by-pass port of the regulating device is adequate diameter, however, this can vary with the length of line.

The following chart and formula are provided to assist in the proper selection of the low pressure by-pass hose. Remember to use a quality flexible, reinforced hose and follow these steps:

- a. Determine the **number and type of fittings** used with your by-pass hose
- b. Select the **fitting size** from the top of the chart
- c. Determine the desired **hose length**
- d. Calculate the formula and locate where the **Equivalent Feet** and your **system flow** intersect
- e. If the Equivalent Feet and flow do not intersect within the hose diameter size you are using, either increase the diameter or decrease the length, recalculate and verify against the chart again.

See chart and example on reverse side.



EQUIVALENT FEET = Length of by-pass hose (ft.) + Equivalent feet for fittings in by-pass circuit

TYPE OF FITTING	EQUIVALENT FT. FOR FITTING SIZE					
	3/8	1/2	3/4	1	1-1/2	2
—————	3/8	1/2	3/4	1	1-1/2	2
Coupling	0.8	1.0	1.4	1.7	2.8	3.5
90° Elbow	2.7	3.5	4.5	5.7	9.0	11.0
45° Elbow	0.6	0.75	1.0	1.2	2.0	2.5
Tee	2.7	3.5	4.5	5.7	9.0	11.0

EXAMPLE: What size by-pass hose must I use for a system with 6.0 GPM flow using two 90° elbows with a desired hose length of 3 feet?

For 1/2" hose Equivalent ft. length = 3' + 2 x 3.5 = 3 + 7 = 10 ft.
This does not fall in the 1/2" area.

For 3/4" hose Equivalent ft. length = 3' + 2 x 4.5 = 3 + 9 = 12 ft.
This falls in the 3/4" area.