

# Frictional Head Loss in PSI (and Ft.) per 100 Ft. of Schedule 40 Thermoplastic Pipe (rounded to the nearest integer)

		PIPE DIAMETER (IN.)						
		1/2	3/4	1	1-1/4	1-1/2	2	2-1/2
<b>FLOW (GPM)</b>	5*	10(23)	4(9)	1(2)	0(1)	0(0)	0(0)	0(0)
	10	---	11(25)	3(8)	1(3)	0(1)	0(0)	0(0)
	15	---	23(53)	7(16)	2(6)	1(2)	0(1)	0(0)
	20	---	---	11(26)	4(9)	2(4)	0(1)	0(0)
	25**	---	---	17(39)	6(14)	3(6)	1(1)	0(0)

Note: Minimum pressure should be 25 psi. Therefore, the minimum net head (after losses are subtracted) for gravity feed is 58 feet. In pumped systems, if the pump is capable of 55 psi, the maximum tolerable pressure loss would be 30 psi.

\*Weak (Better not shower and flush the john at the same time.)

\*\*Quite strong (You can turn on everything at once!)

**EXAMPLE 1:** Let's say that you have a spring 75 feet above and 100 feet laterally from your house, and you'd like to know what pipe to use to gravity feed. In addition, you anticipate that you might use as much as 20 gallons of water per minute (GPM). To start with, 1/2" and 3/4" are out of the question. And if you used 1", the net head would be 49 feet (75 - 26), not enough to give sufficient pressure. A better choice is 1 1/4" pipe, which would give a net head of 66 feet (75 - 9).

If your spring was 200 feet away (while still 75 feet up), 1 1/4" pipe would provide a marginal 57 feet of head (75 - the product of 9 X 2). But 1 1/2" pipe would give you 67 feet of head (75 - 8), which should definitely do the job.

**EXAMPLE 2:** Let's say your spring lies 40 feet below your house and 300 feet away, so pumping is mandatory. What pipe size would you use to deliver 20 gallons per minute if your pump can push 50 psi? First of all, the 40 foot climb from the spring demands 17.4 psi (40 X 0.434, the psi-per-foot value), reducing the potential output at the top to 32.6 psi. That means that the maximum pressure loss to pipe friction that you can stand (and still have 25 psi — the recommended minimum — as your final pressure) is 7.6 psi. Since you're pumping through 300 feet of pipe, you can afford to lose no more than 2.5 psi (7.6 ÷ 3) per 100 feet of pipe. If you wanted 20 GPM, you'd have to use 1 1/2" pipe — which has a head loss of only 2 per 100 feet. (You could, of course, use smaller pipe — if you want to save money and are willing to live with a lower GPM rate: 1 1/4" pipe and 10 GPM, for instance.)