Air Velocity in a Pipe

Using the equation and typical values of V, D, and L explained to the right approximate values of P are computed as follows:

Velocity Ft / Sec	Pipe Diameter in Inches, 10' long				
	1	2	4	6	10
1	.0004	.0002	.0001	.00007	.00004
2	.0016	.0008	.0004	.00030	.00016
5	.0100	.0050	.0025	.00170	.0010
10	.0400	.0200	.0100	.00670	.0040
15	.0900	.0450	.0225	.01500	.0090
20	.1600	0080	.0400	.02700	.0160
25	.2500	.1250	.0625	.04170	.0250
30	.3600	.1800	.0900	.06000	.0360

$$V = \sqrt{\frac{25{,}000\ DP}{L}}$$

V = air velocity in feet per second
D = pipe inside diameter in inches
L = length of pipe in feet
P = pressure loss due to air friction in ounces/square inch

Air Volume Discharged from Pipe

CFM = air volume in cubic feet per minute
V = air velocity in feet per second as determined in the equation at the top of this page
A = cross section area of pipe in square feet

$$CFM = 60VA$$

Boyle's Law

If temperature is kept constant, the volume of a given mass of gas is inversely proportional to the pressure which is exerted upon it.

$$\frac{\text{Initial Pressure}}{\text{Final Pressure}} = \frac{\text{Final Volume}}{\text{Initial Volume}}$$

Air Supply Requirements (operating pressure: 90 PSI)

Tool	Class	Typical Air Consumption (CFM)	Hose Size (inches)		
			0 - 10 ft.	10 - 50 ft.	50 - 200 ft.
Paving breakers	25 lb. 35 lb. 60 lb. 80 lb.	45 50 65 80	1/2" 1/2" 1/2" 3/4"	1/2" 3/4" 3/4" 3/4"	3/4" 3/4" 1" 1"
Clay diggers		45	1/2"	1/2"	3/4"
Hand drills	8 lb. 15 lb.	20 32	3/8" 3/8"	3/8" 1/2"	1/2" 1/2"
Rock (sinker) drills	45 lb. 55 lb.	105 130	3/4" 3/4"	3/4" 1"	1" 1"
Tampers	5" butt 6" butt	20 30	3/8" 1/2"	1/2" 1/2"	1/2" 3/4"
Sump pump Sludge pump	3 HP Ejector	100 90	3/4" 1"	3/4" 1"	1" 1"
Vibrators	2-1/2" 3"	60 60	1" 1"	1" 1"	1" 1"
Chipping hammers		25	3/8"	1/2"	1/2"
Impact wrenches	3/8" sq. dr. 1/2" 3/4" 1"	10 15 25 50	5/16" 5/16" 3/8" 1/2"	3/8" 3/8" 1/2" 3/4"	3/8" 1/2" 1/2" 3/4"
Drills	1/4" - 1/2"	22	3/8"	3/8"	1/2"
Grinders	die / burr small angle 3 HP vertical	20 20 75	3/8" 3/8" 1/2"	3/8" 3/8" 3/4"	1/2" 1/2" 1"