Air Flow Chart

Another industrial use for compressed air is using a blast of compressed air, released at the proper moment, to blow away small parts from a punch after forming or blanking.

An automatic valve allows air to flow from a properly positioned and aimed nozzle against the work pieces. The pressure employed and the diameter of the passage through the nozzle determine the volume of free air which will flow through the nozzle.

The chart below indicates the rate of flow (volume) per minute, through various sizes of orifices at definite pressures.

Flow is expressed in cubic feet per minute (cfm), and is assumed to take place from a receiver or other vessel, in which air is contained under pressure, into the atmosphere at sea level. Temperature of air in receiver is assumed at 60 deg. F. This table is only correct for orifices with narrow edges; flow through even a short length of pipe would be less than that given below.

Gage Pres. in Receiver (Lbs.)	Flow of Free Air (cfm) Through Orifices of various Diameters							
	1/64"	1/32"	3/64"	1/16"	3/32"	1/8"	3/16"	1/4"
1	.027	.107	.242	.430	.97	1.72	3.86	6.85
2	.038	.153	.342	.607	1.36	2.43	5.42	9.74
3	.046	.188	.471	.750	1.68	2.98	6.71	11.9
5	.059	.242	.545	.965	2.18	3.86	8.71	15.4
10	.084	.342	.77	1.36	3.08	5.45	12.3	21.8
15	.103	.418	.94	1.67	3.75	6.65	15.0	26.7
20	.119	.485	1.07	1.93	4.25	7.7	17.1	30.8
25	.133	.54	1.21	2.16	4.75	8.6	19.4	34.5
30	.156	.632	1.40	2.52	5.6	10.	22.5	40.0
35	.173	.71	1.56	2.80	6.2	11.2	25.0	44.7
40	.19	.77	1.71	3.07	6.8	12.3	27.5	49.1
45	.208	.843	1.9	3.36	7.6	13.4	30.3	53.8
50	.225	.914	2.05	3.64	8.2	14.5	32.8	58.2
60	.26	1.05	2.35	4.2	9.4	16.8	37.5	67
70	.295	1.19	2.68	4.76	10.7	19.0	43.0	76
80	.33	1.33	2.97	5.32	11.9	21.2	47.5	85
90	.364	1.47	3.28	5.87	13.1	23.5	52.5	94
100	.40	1.61	3.66	6.45	14.5	25.8	58.3	103
110	.43	1.76	3.95	7.00	15.7	28.0	63	112
120	.47	1.90	4.27	7.58	17.0	30.2	68	121
130	.50	2.04	4.57	8.13	18.2	32.4	73	130
140	.54	2.17	4.87	8.68	19.5	34.5	78	138
150	.57	2.33	5.20	9.20	20.7	36.7	83	147
175	.66	2.65	5.94	10.6	23.8	42.1	95	169
200	.76	3.07	6.90	12.2	27.5	48.7	110	195

The capacity of an air compressor cannot be checked accurately by use of this table and a narrow edge orifice. Specialized equipment is necessary to check compressor capacity.

Example: An air ejector is being used on a punch press. It is connected to an air line with pressure at 120-150 psi. It has a nozzle orifice 3/32 in. in diameter, and, through use of a stop watch, it delivers compressed air for a total of 30 seconds out of each one minute of operation.

Reference to the chart indicates at 150 psi a 3/32 in. diameter orifice will allow 20.7 cfm to flow through the nozzle in one minute. However, air flow intakes place only for 30 seconds out of each 60 seconds or 30/60 of the time, therefore, only 1/2 of 20.7 or 10.35 cfm will flow for each elapsed minute.

From page 14, under the column "Continuous Operation" and opposite the pressure range 120-150 psi, select the air compressor, which will be a 3 HP, 2-stage unit.