

AIR - Flow Table

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Table A - Based upon inlet pressure 10 times higher than drop through valve
(valve pressure drop is 10% of inlet pressure)

| FLOW CUBIC FEET OF FREE AIR PER HOUR | PRESSURE DROP | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------------|---|------|-----|------|------|-----|------|------|-----|-----|------|-----|--------|------|-----|--------|------|-----|-----|------|-----|--------|------|-----|------|------|-----|
| | IN POUNDS PER SQUARE INCH THRU { V - FULL PORT MAGNATROL OR GLOBE VALVE PIPE - PER LENGTH AS INDICATED | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3/8" | | | 1/2" | | | 3/4" | | | 1" | | | 1-1/4" | | | 1-1/2" | | | 2" | | | 2-1/2" | | | 3" | | |
| | V | PIPE | | V | PIPE | | V | PIPE | | V | PIPE | | V | PIPE | | V | PIPE | | V | PIPE | | V | PIPE | | | | |
| | 25' | 50' | | 25' | 50' | | 25' | 50' | | 25' | 50' | | 50' | 100' | | 50' | 100' | | 50' | 100' | | 50' | 100' | | 100' | 200' | |
| 400 | .50 | .55 | 1.4 | .23 | .23 | .55 | | | | | | | | | | | | | | | | | | | | | |
| 600 | .99 | .91 | 2.4 | .46 | .39 | 1.0 | | | | | | | | | | | | | | | | | | | | | |
| 800 | 1.3 | 1.3 | 3.4 | .71 | .58 | 1.5 | .21 | .20 | .47 | | | | | | | | | | | | | | | | | | |
| 1,000 | 1.7 | 1.7 | 4.4 | 1.0 | .77 | 2.0 | .33 | .27 | .65 | | | | | | | | | | | | | | | | | | |
| 1,500 | 3.1 | 2.6 | 7.0 | 1.7 | 1.2 | 3.3 | .61 | .50 | 1.2 | .24 | .21 | .49 | | | | | | | | | | | | | | | |
| 2,000 | 4.3 | 3.5 | 9.5 | 2.5 | 1.7 | 4.6 | .93 | .67 | 1.8 | .38 | .31 | .76 | .19 | .23 | .50 | | | | | | | | | | | | |
| 3,000 | 6.8 | 5.4 | 15 | 4.0 | 3.0 | 7.2 | 1.6 | 1.1 | 3.0 | .71 | .50 | 1.4 | .38 | .41 | .99 | .23 | .23 | .50 | | | | | | | | | |
| 4,000 | 9.5 | 7.2 | 20 | 5.6 | 3.7 | 10 | 2.4 | 1.5 | 4.2 | 1.1 | .78 | 2.0 | .60 | .61 | 1.5 | .38 | .34 | .83 | .14 | .11 | .24 | | | | | | |
| 6,000 | 15 | 11 | 31 | 8.8 | 5.6 | 15 | 3.6 | 2.4 | 6.5 | 1.6 | 1.2 | 3.3 | 1.1 | 1.2 | 2.8 | .71 | .61 | 1.5 | .30 | .23 | .50 | .16 | .10 | .21 | | | |
| 8,000 | 20 | 15 | 42 | 12 | 7.5 | 21 | 5.5 | 3.3 | 9.0 | 2.7 | 1.7 | 4.6 | 1.6 | 1.5 | 4.0 | 1.1 | .91 | 2.3 | .47 | .34 | .83 | .26 | .16 | .36 | .13 | .12 | .24 |
| 10,000 | 25 | 19 | 53 | 15 | 9.3 | 27 | 6.8 | 4.2 | 12 | 3.6 | 2.2 | 6.0 | 2.2 | 2.0 | 5.3 | 1.5 | 1.2 | 3.1 | .67 | .49 | 1.2 | .38 | .24 | .54 | .19 | .17 | .38 |
| 15,000 | 38 | 26 | 84 | 24 | 14 | 41 | 11 | 6.3 | 18 | 5.7 | 3.5 | 9.3 | 3.4 | 3.3 | 8.6 | 2.5 | 2.0 | 5.3 | 1.2 | .82 | 2.1 | .72 | .44 | 1.0 | .39 | .36 | .80 |
| 20,000 | - | - | - | 32 | 20 | 55 | 15 | 8.6 | 24 | 7.6 | 4.5 | 13 | 4.9 | 4.4 | 12 | 3.6 | 2.8 | 7.2 | 1.8 | 1.2 | 3.1 | 1.1 | .65 | 1.6 | .61 | .57 | 1.3 |
| 30,000 | - | - | - | - | - | - | 23 | 13 | 36 | 12 | 7.1 | 20 | 8.1 | 6.8 | 19 | 5.7 | 4.3 | 12 | 3.0 | 2.0 | 5.3 | 1.9 | 1.2 | 2.9 | 1.1 | 1.0 | 2.6 |
| 40,000 | - | - | - | - | - | - | 31 | 18 | 50 | 17 | 9.5 | 26 | 11 | 9.3 | 26 | 7.8 | 6.1 | 16 | 4.2 | 2.8 | 7.2 | 2.8 | 1.6 | 4.2 | 1.6 | 1.5 | 4.0 |
| 60,000 | - | - | - | - | - | - | - | - | - | 26 | 15 | 41 | 17 | 14 | 39 | 12 | 9.2 | 26 | 6.9 | 4.4 | 12 | 4.4 | 2.6 | 6.9 | 2.8 | 2.6 | 6.6 |
| 80,000 | - | - | - | - | - | - | - | - | - | 35 | 19 | 55 | 23 | 19 | 53 | 17 | 12 | 35 | 9.1 | 6.0 | 17 | 6.3 | 3.8 | 9.7 | 3.9 | 3.7 | 9.8 |
| 100,000 | - | - | - | - | - | - | - | - | - | - | - | - | 29 | 24 | 67 | 21 | 16 | 44 | 12 | 7.6 | 21 | 7.9 | 4.8 | 13 | 5.1 | 4.8 | 13 |
| 150,000 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 32 | 24 | 67 | 18 | 12 | 32 | 12 | 6.5 | 19 | 8.0 | 7.6 | 20 |
| 200,000 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 25 | 16 | 44 | 17 | 9.7 | 27 | 11 | 10 | 28 |
| 300,000 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 37 | 24 | 67 | 26 | 15 | 41 | 17 | 16 | 44 |
| 400,000 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 35 | 20 | 55 | 23 | 22 | 60 |
| 600,000 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 35 | 33 | 92 |

PROBLEM: Air is required at the rate of 8,000 cubic feet per hour. Inlet pressure is 60 PSI. Delivery pressure should be at least 45 PSI. Branch layout calls for one Magnatrol Valve, one globe check valve, 35 feet of pipe, plus fittings consisting of elbows, tees and unions, the fittings together having a resistance comparable to that of about 15 feet of pipe.

SOLUTION: The total pressure drop is 15 pounds, which is 25% of the inlet pressure. From this drop less than 1/3 will go to the valve, hence its drop will be less than 10%. Table (A) should be used, wherein; the calculations are based upon drop through the valve as being 10% of inlet pressure.

Reading to the right of 8,000, the 3/4 inch pipe size bears investigation. For the two valves the drop would be 5.5 pounds each. For the pipe and fittings with a total length corresponding to 50 feet, the drop would be 9.0 pounds; or a total drop of 20.0 pounds for the entire branch line. This brings the delivery pressure down to about 40 pounds, which is too low, and it will be necessary to go to the 1 inch size. Here the figures are 2.7 plus 2.7 plus 4.6 amounting to 10.0 pounds as the total drop; for an indicated delivery pressure of 50 pounds.