

# TECHNICAL SPECIFICATIONS

## Pin-pricked Hose Covers

Air and other gases will slowly pass through most elastomers. This is easily shown by balloons and car tires gradually becoming flat even though they are sealed. Some gases (freon, for example) are much more aggressive at moving through certain hose materials and may even require specialized hose to contain them. Since cover compounds may allow gas leakage at different rates than the tube compound used on the same hose, most air, welding, steam and other hoses used for gaseous products have pin-pricked covers. The pin-pricks allow trapped gas to escape rather than having it build up until the pressure

separates the cover from the reinforcement, resulting in cover blisters. However when detectable amounts of gas are noticed leaking from cover pin-pricks, there is a tube failure somewhere in the hose. Often the failure will be at the junction of hose and fitting, where severe sideways pull has caused the tube to be cut by the fitting stem (such as can occur when a portable compressor is dragged along by the hose). Other times, for example in air nailing hose applications, a nail has punctured the hose, and the resulting hole has been repaired with tape rather than with a mender and clamps. This allows air to leak from the perforated tube into the reinforcement and to escape via the cover pinpricks.

## Water Hose Flow Rates...

Flow of water through 100 foot lengths hose  
(straight with smooth bore)  
U.S. Gallons per minute

These are maximum recommended flow rates, and this chart is based on a maximum acceptable pressure drop of 15% per 100 feet of hose. Where pressure drop must be reduced, hose size must be increased.

| PSI at<br>Hose<br>Inlet | Nominal Hose Diameters |     |     |    |       |       |     |       |      |      |       |       |
|-------------------------|------------------------|-----|-----|----|-------|-------|-----|-------|------|------|-------|-------|
|                         | 1/2                    | 5/8 | 3/4 | 1  | 1 1/4 | 1 1/2 | 2   | 2 1/2 | 3    | 4    | 6     | 8     |
| 20                      | 4                      | 8   | 12  | 26 | 47    | 76    | 161 | 290   | 468  | 997  | 2895  | 6169  |
| 30                      | 5                      | 9   | 15  | 32 | 58    | 94    | 200 | 360   | 582  | 1240 | 3603  | 7679  |
| 40                      | 6                      | 11  | 18  | 38 | 68    | 110   | 234 | 421   | 680  | 1449 | 4209  | 8970  |
| 50                      | 7                      | 12  | 20  | 43 | 77    | 124   | 264 | 475   | 767  | 1635 | 4748  | 10118 |
| 60                      | 8                      | 14  | 22  | 47 | 85    | 137   | 291 | 524   | 846  | 1804 | 5239  | 11165 |
| 75                      | 9                      | 15  | 25  | 53 | 95    | 154   | 329 | 591   | 955  | 2035 | 5910  | 12595 |
| 100                     | 10                     | 18  | 29  | 62 | 112   | 180   | 384 | 690   | 1115 | 2377 | 6904  | 14712 |
| 125                     | 11                     | 20  | 33  | 70 | 126   | 203   | 433 | 779   | 1258 | 2681 | 7788  | 16595 |
| 150                     | 12                     | 22  | 36  | 77 | 139   | 224   | 478 | 859   | 1388 | 2958 | 8593  | 18313 |
| 200                     | 15                     | 26  | 42  | 90 | 162   | 262   | 558 | 1004  | 1621 | 3455 | 10038 | 21390 |

Figures are to be used as a guide only, since the type of fittings used, variance of hose I.D., and orifice restriction all influence the actual discharge.

## Air Line Sizing

Maximum recommended air flow in standard cubic feet per minute (scfm) as a guide in sizing hose and piping in compressed air systems.

### MAXIMUM RECOMMENDED AIR FLOW (SCFM)

| System<br>Pressure<br>(psi) | Nominal pipe size or hose i.d. |     |     |     |     |     |       |       |      |       |      |
|-----------------------------|--------------------------------|-----|-----|-----|-----|-----|-------|-------|------|-------|------|
|                             | 1/8                            | 1/4 | 3/8 | 1/2 | 3/4 | 1   | 1 1/4 | 1 1/2 | 2    | 2 1/2 | 3    |
| 5                           | 0.5                            | 1.2 | 2.7 | 4.9 | 6.6 | 13  | 27    | 40    | 80   | 135   | 240  |
| 10                          | 0.8                            | 1.7 | 3.9 | 7.7 | 11  | 21  | 44    | 64    | 125  | 200   | 370  |
| 20                          | 1.3                            | 3.0 | 6.6 | 13  | 18  | 35  | 75    | 110   | 215  | 350   | 600  |
| 40                          | 2.5                            | 5.5 | 12  | 23  | 34  | 62  | 135   | 200   | 385  | 640   | 1100 |
| 60                          | 3.5                            | 8.0 | 18  | 34  | 50  | 93  | 195   | 290   | 560  | 900   | 1600 |
| 80                          | 4.7                            | 10  | 23  | 44  | 65  | 120 | 255   | 380   | 720  | 1200  | 2100 |
| 100                         | 5.8                            | 13  | 29  | 54  | 80  | 150 | 315   | 470   | 900  | 1450  | 2600 |
| 150                         | 8.6                            | 20  | 41  | 80  | 115 | 220 | 460   | 680   | 1350 | 2200  | 3900 |
| 200                         | 11                             | 26  | 58  | 108 | 155 | 290 | 620   | 910   | 1750 | 2800  | 5000 |
| 250                         | 14                             | 33  | 73  | 135 | 200 | 370 | 770   | 1150  | 2200 | 3500  | 6100 |

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## Air Hose Friction Loss...

Approximate pressure loss in psi through 100 foot hose lengths complete with couplings.

|              |                      | Cubic feet of air per minute (SCFM) |      |      |      |      |      |      |      |      |      |      |      |
|--------------|----------------------|-------------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| I D. of Hose | Gauge Pressure (psi) | 40                                  | 50   | 60   | 70   | 80   | 90   | 100  | 110  | 120  | 130  | 140  | 150  |
|              |                      | Pressure loss in psi                |      |      |      |      |      |      |      |      |      |      |      |
| 1/2          | 50                   | 20.2                                | 36.2 |      |      |      |      |      |      |      |      |      |      |
|              | 60                   | 16.8                                | 29.6 | 46.8 |      |      |      |      |      |      |      |      |      |
|              | 70                   | 14.0                                | 24.8 | 40.0 | 56.8 |      |      |      |      |      |      |      |      |
|              | 80                   | 12.0                                | 21.6 | 34.8 | 50.4 | 69.2 |      |      |      |      |      |      |      |
|              | 90                   | 10.8                                | 19.0 | 29.6 | 44.0 | 61.0 | 82.0 |      |      |      |      |      |      |
|              | 100                  | 9.6                                 | 16.8 | 26.6 | 38.6 | 54.4 | 73.3 |      |      |      |      |      |      |
|              | 110                  | 8.6                                 | 15.2 | 24.0 | 35.2 | 49.2 | 66.6 | 89.0 |      |      |      |      |      |
| 3/4          | 50                   | 3.0                                 | 4.8  | 7.0  | 8.8  | 13.0 | 17.0 | 22.8 | 28.4 |      |      |      |      |
|              | 60                   | 2.4                                 | 3.8  | 5.6  | 7.6  | 10.4 | 13.6 | 17.2 | 22.4 | 28.2 |      |      |      |
|              | 70                   | 1.8                                 | 3.0  | 4.6  | 6.4  | 8.4  | 11.0 | 14.0 | 17.6 | 22.0 |      |      |      |
|              | 80                   | 1.6                                 | 2.6  | 3.8  | 5.6  | 7.2  | 9.4  | 11.6 | 14.4 | 17.6 | 21.2 |      |      |
|              | 90                   | 1.4                                 | 2.2  | 3.2  | 4.6  | 6.2  | 8.0  | 10.0 | 12.4 | 15.0 | 18.0 | 21.6 |      |
|              | 100                  | 1.2                                 | 2.0  | 2.8  | 4.0  | 5.4  | 7.0  | 8.8  | 10.8 | 13.2 | 15.8 | 18.8 | 22.2 |
|              | 110                  | 1.0                                 | 1.8  | 2.6  | 3.6  | 4.8  | 6.2  | 7.8  | 9.8  | 11.8 | 14.2 | 16.8 | 19.8 |
| 1            | 50                   | 0.6                                 | 1.0  | 1.6  | 2.2  | 3.0  | 4.0  | 5.2  | 7.0  | 9.6  | 14.0 |      |      |
|              | 60                   | 0.6                                 | 0.8  | 1.2  | 1.6  | 2.4  | 3.0  | 4.0  | 5.2  | 6.6  | 8.2  | 11.0 | 14.4 |
|              | 70                   | 0.4                                 | 0.8  | 1.0  | 1.4  | 2.0  | 2.6  | 3.2  | 4.0  | 5.0  | 6.2  | 7.6  | 9.4  |
|              | 80                   | 0.4                                 | 0.6  | 1.0  | 1.4  | 1.6  | 2.2  | 2.8  | 3.4  | 4.0  | 4.8  | 5.4  | 7.0  |
|              | 90                   | 0.4                                 | 0.6  | 0.8  | 1.2  | 1.4  | 1.8  | 2.4  | 2.8  | 3.4  | 4.0  | 4.8  | 5.6  |
|              | 100                  | 0.4                                 | 0.4  | 0.8  | 1.0  | 1.2  | 1.6  | 2.0  | 2.4  | 3.0  | 3.6  | 4.2  | 4.8  |
|              | 110                  | 0.4                                 | 0.4  | 0.6  | 0.8  | 1.2  | 1.4  | 1.8  | 2.2  | 2.6  | 3.0  | 3.6  | 4.2  |
| 1 1/4        | 50                   |                                     | 0.4  | 0.4  | 0.6  | 0.8  | 1.0  | 1.4  | 2.0  |      |      |      |      |
|              | 60                   |                                     | 0.2  | 0.4  | 0.6  | 0.6  | 1.0  | 1.2  | 1.6  | 2.0  | 2.4  | 3.0  |      |
|              | 70                   |                                     |      | 0.4  | 0.4  | 0.6  | 0.8  | 0.8  | 1.2  | 1.4  | 1.6  | 2.0  | 2.6  |
|              | 80                   |                                     |      | 0.2  | 0.4  | 0.4  | 0.6  | 0.8  | 1.0  | 1.2  | 1.4  | 1.6  | 2.0  |
|              | 90                   |                                     |      |      | 0.4  | 0.4  | 0.6  | 0.6  | 0.8  | 1.0  | 1.2  | 1.4  | 1.6  |
|              | 100                  |                                     |      |      | 0.2  | 0.4  | 0.4  | 0.6  | 0.8  | 0.8  | 1.0  | 1.2  | 1.4  |
|              | 110                  |                                     |      |      | 0.2  | 0.4  | 0.4  | 0.6  | 0.6  | 0.8  | 1.0  | 1.0  | 1.2  |
| 1 1/2        | 50                   |                                     |      |      |      | 0.4  | 0.4  | 0.4  | 0.6  | 0.8  | 0.8  | 1.0  | 1.2  |
|              | 60                   |                                     |      |      |      | 0.2  | 0.4  | 0.4  | 0.4  | 0.6  | 0.6  | 0.8  | 1.0  |
|              | 70                   |                                     |      |      |      |      | 0.2  | 0.4  | 0.4  | 0.6  | 0.6  | 0.6  | 0.8  |
|              | 80                   |                                     |      |      |      |      |      | 0.2  | 0.4  | 0.4  | 0.4  | 0.6  | 0.8  |
|              | 90                   |                                     |      |      |      |      |      |      | 0.2  | 0.4  | 0.4  | 0.4  | 0.6  |
|              | 100                  |                                     |      |      |      |      |      |      |      | 0.4  | 0.4  | 0.4  | 0.4  |
|              | 110                  |                                     |      |      |      |      |      |      |      | 0.4  | 0.4  | 0.4  | 0.4  |

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## Water Hose Friction Loss...

Approximate pressure loss expressed in pounds per square inch (psi) per 100 foot length of straight, smooth bore hose.

| Flow of water in U.S. Gal. per min. | Hose Inside Diameter: |      |      |      |       |       |      |       |      |      |      |      |      |      |      |      |
|-------------------------------------|-----------------------|------|------|------|-------|-------|------|-------|------|------|------|------|------|------|------|------|
|                                     | 1/2                   | 5/8  | 3/4  | 1    | 1 1/4 | 1 1/2 | 2    | 2 1/2 | 3    | 4    | 5    | 6    | 8    | 10   | 12   |      |
| 1                                   | 1.41                  |      |      |      |       |       |      |       |      |      |      |      |      |      |      |      |
| 2                                   | 5.09                  | 1.72 | 0.71 |      |       |       |      |       |      |      |      |      |      |      |      |      |
| 5                                   | 27.7                  | 9.36 | 3.85 | 0.95 | 0.32  | 0.13  |      |       |      |      |      |      |      |      |      |      |
| 10                                  | 100                   | 33.7 | 13.9 | 3.42 | 1.15  | 0.47  | 0.12 |       |      |      |      |      |      |      |      |      |
| 15                                  |                       | 71.4 | 29.4 | 7.24 | 2.44  | 1.00  | 0.25 | 0.08  |      |      |      |      |      |      |      |      |
| 20                                  |                       | 122  | 50.0 | 12.3 | 4.16  | 1.71  | 0.42 | 0.14  |      |      |      |      |      |      |      |      |
| 25                                  |                       |      | 75.6 | 18.6 | 6.28  | 2.59  | 0.64 | 0.21  |      |      |      |      |      |      |      |      |
| 30                                  |                       |      | 106  | 26.1 | 8.80  | 3.62  | 0.89 | 0.30  | 0.12 |      |      |      |      |      |      |      |
| 35                                  |                       |      | 141  | 34.7 | 11.7  | 4.82  | 1.19 | 0.40  | 0.16 |      |      |      |      |      |      |      |
| 40                                  |                       |      |      | 44.4 | 15.0  | 6.17  | 1.52 | 0.51  | 0.21 |      |      |      |      |      |      |      |
| 45                                  |                       |      |      | 55.3 | 18.6  | 7.67  | 1.89 | 0.64  | 0.26 |      |      |      |      |      |      |      |
| 50                                  |                       |      |      | 67.1 | 22.7  | 9.32  | 2.30 | 0.77  | 0.32 |      |      |      |      |      |      |      |
| 60                                  |                       |      |      | 94.1 | 31.7  | 13.1  | 3.22 | 1.09  | 0.45 |      |      |      |      |      |      |      |
| 70                                  |                       |      |      | 125  | 42.2  | 17.4  | 4.28 | 1.44  | 0.59 |      |      |      |      |      |      |      |
| 80                                  |                       |      |      |      | 54.0  | 22.2  | 5.48 | 1.85  | 0.76 |      |      |      |      |      |      |      |
| 90                                  |                       |      |      |      | 67.2  | 27.7  | 6.81 | 2.30  | 0.95 | 0.23 |      |      |      |      |      |      |
| 100                                 |                       |      |      |      | 81.7  | 33.6  | 8.28 | 2.79  | 1.15 | 0.28 |      |      |      |      |      |      |
| 125                                 |                       |      |      |      | 123   | 50.8  | 12.5 | 4.22  | 1.74 | 0.43 |      |      |      |      |      |      |
| 150                                 |                       |      |      |      |       | 71.1  | 17.5 | 5.91  | 2.43 | 0.60 | 0.20 |      |      |      |      |      |
| 175                                 |                       |      |      |      |       | 94.6  | 23.3 | 7.86  | 3.24 | 0.80 | 0.27 |      |      |      |      |      |
| 200                                 |                       |      |      |      |       |       | 121  | 29.8  | 10.1 | 4.14 | 1.02 | 0.34 |      |      |      |      |
| 225                                 |                       |      |      |      |       |       |      | 37.1  | 12.5 | 5.15 | 1.27 | 0.43 |      |      |      |      |
| 250                                 |                       |      |      |      |       |       |      | 45.1  | 15.2 | 6.26 | 1.54 | 0.52 |      |      |      |      |
| 275                                 |                       |      |      |      |       |       |      | 53.8  | 18.1 | 7.47 | 1.84 | 0.62 |      |      |      |      |
| 300                                 |                       |      |      |      |       |       |      | 63.2  | 21.3 | 8.77 | 2.16 | 0.73 | 0.30 |      |      |      |
| 350                                 |                       |      |      |      |       |       |      |       | 84.0 | 28.3 | 11.7 | 2.87 | 0.97 | 0.40 |      |      |
| 400                                 |                       |      |      |      |       |       |      |       | 108  | 36.3 | 14.9 | 3.68 | 1.24 | 0.51 |      |      |
| 450                                 |                       |      |      |      |       |       |      |       |      | 45.1 | 18.6 | 4.57 | 1.54 | 0.64 |      |      |
| 500                                 |                       |      |      |      |       |       |      |       |      | 54.8 | 22.6 | 5.56 | 1.88 | 0.77 | 0.19 |      |
| 600                                 |                       |      |      |      |       |       |      |       |      | 76.8 | 31.6 | 7.79 | 2.63 | 1.08 | 0.27 |      |
| 700                                 |                       |      |      |      |       |       |      |       | 102  | 42.1 | 10.4 | 3.49 | 1.44 | 0.35 | 0.12 |      |
| 800                                 |                       |      |      |      |       |       |      |       | 131  | 53.8 | 13.3 | 4.47 | 1.84 | 0.45 | 0.15 |      |
| 1000                                |                       |      |      |      |       |       |      |       |      | 81.4 | 20.0 | 6.76 | 2.78 | 0.69 | 0.23 | 0.10 |
| 1200                                |                       |      |      |      |       |       |      |       |      | 114  | 28.1 | 9.47 | 3.90 | 0.96 | 0.32 | 0.13 |
| 1400                                |                       |      |      |      |       |       |      |       |      | 152  | 37.3 | 12.6 | 5.18 | 1.28 | 0.43 | 0.18 |
| 1600                                |                       |      |      |      |       |       |      |       |      |      | 47.8 | 16.1 | 6.64 | 1.64 | 0.55 | 0.23 |
| 1800                                |                       |      |      |      |       |       |      |       |      |      | 59.5 | 20.0 | 8.25 | 2.03 | 0.69 | 0.28 |
| 2000                                |                       |      |      |      |       |       |      |       |      |      | 72.2 | 24.4 | 10.0 | 2.47 | 0.83 | 0.34 |
| 2500                                |                       |      |      |      |       |       |      |       |      |      |      | 36.8 | 15.2 | 3.73 | 1.26 | 0.52 |
| 3000                                |                       |      |      |      |       |       |      |       |      |      |      | 51.6 | 21.2 | 5.23 | 1.76 | 0.73 |

Figures are to be used as a guide only, since factors such as temperature and hose bends can greatly affect friction loss.

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## Force (in pounds) acting on end fittings...

The figures in this table demonstrate the importance of good fitting selection and installation. For example, a 4" dia. water discharge hose rated for 150 psi has 1885 lb of force acting on the end fitting when operating at full pressure.

| Hose ID | 50 psi | 100 psi | 150 psi | 300 psi | 500 psi | 1000 psi |
|---------|--------|---------|---------|---------|---------|----------|
| 1/4     | 2      | 2       | 7       | 15      | 25      | 49       |
| 3/8     | 6      | 11      | 17      | 33      | 55      | 110      |
| 1/2     | 10     | 20      | 29      | 59      | 98      | 196      |
| 3/4     | 22     | 44      | 66      | 133     | 221     | 442      |
| 1       | 39     | 79      | 118     | 236     | 393     | 785      |
| 1 1/4   | 61     | 123     | 184     | 368     | 614     | 1227     |
| 1 1/2   | 88     | 177     | 265     | 530     | 884     | 1767     |
| 2       | 157    | 314     | 471     | 942     | 1571    | 3142     |
| 2 1/2   | 245    | 491     | 726     | 1473    | 2454    | 4909     |
| 3       | 353    | 707     | 1060    | 2121    | 3534    | 7070     |
| 4       | 628    | 1257    | 1885    | 3770    | 6283    | 12566    |
| 5       | 982    | 1964    | 2945    | 5891    | 9818    | 19635    |
| 6       | 1414   | 2827    | 4241    | 8482    | 14137   | 28274    |
| 8       | 2513   | 5027    | 7540    | 15080   | 25133   | 50274    |
| 10      | 3927   | 7854    | 11781   | 23562   | 39270   | 78540    |
| 12      | 5655   | 11310   | 16965   | 33929   | 56549   | 113100   |

## Weight of water in one foot of hose...

This table is useful when considering support requirements for hoses during operation. For example, a 10" dia. 30 ft length of G941W-1000 suction hose can contain 1021 lb (over half a ton) of water when filled

| Hose I.D. | lb     | kg     |
|-----------|--------|--------|
| 1/4       | 0.021  | 0.010  |
| 3/8       | 0.048  | 0.022  |
| 1/2       | 0.085  | 0.039  |
| 5/8       | 0.133  | 0.060  |
| 3/4       | 0.191  | 0.087  |
| 1         | 0.340  | 0.154  |
| 1 1/4     | 0.532  | 0.241  |
| 1 1/2     | 0.766  | 0.347  |
| 2         | 1.361  | 0.618  |
| 2 1/2     | 2.127  | 0.965  |
| 3         | 3.063  | 1.389  |
| 4         | 5.445  | 2.470  |
| 5         | 8.509  | 3.859  |
| 6         | 12.252 | 5.558  |
| 8         | 21.782 | 9.880  |
| 10        | 34.034 | 15.438 |
| 12        | 49.009 | 22.230 |