## **Maximum Safe Working Pressures**



Medium and Heavy Pressure Pipe Specification: AS 1074

| Nominal<br>Size | Quality | Outside<br>Diameter<br>d <sub>o</sub> | Thickness<br>t | Mass per Metre<br>Black Plain<br>Ends | Material<br>Design Minimum<br>Temperature | Recommended<br>Test Pressure<br>at 20 <sup>0</sup> C |      | Maximum Design Pressure<br>Maximum Metal Temperature - <sup>O</sup> C |      |      |      |      |      |      |      |      |      |
|-----------------|---------|---------------------------------------|----------------|---------------------------------------|---|--|------|---|------|------|------|------|------|------|------|------|------|
| (DN)            |         |                                       |                |                                       |   |  |      | 50  |      | 100  |      | 150  |      | 200  |      | 250  |      |
|                 |         | mm                                    | mm             | kg/m                                  | °C  | MPa  | PSI  | MPa   | PSI  | MPa  | PSI  | MPa  | PSI  | MPa  | PSI  | MPa  | PSI  |
| 20              | Medium  | 26.9x                                 | 2.6CHS         | 1.56                                  | -48.3                                     | 22.1   | 3210 | 14.7  | 2140 | 13.5 | 1960 | 12.2 | 1780 | 11.0 | 1600 | 9.75 | 1420 |
|                 | Heavy   |                                       | 3.2CHS         | 1.87                                  | -45.6                                     | 27.8   | 4040 | 18.5  | 2690 | 17.0 | 2460 | 15.4 | 2240 | 13.8 | 2010 | 12.3 | 1780 |
| 25              | Medium  | 33.7x                                 | 3.2CHS         | 2.41                                  | -45.6                                     | 21.7   | 3150 | 14.5  | 2100 | 13.2 | 1920 | 12.0 | 1740 | 10.8 | 1570 | 9.56 | 1390 |
|                 | Heavy   |                                       | 4.0CHS         | 2.94                                  | -42.0                                     | 27.8   | 4030 | 18.5  | 2690 | 16.9 | 2460 | 15.4 | 2230 | 13.8 | 2000 | 12.2 | 1780 |
| 32              | Medium  | 42.4x                                 | 3.2CHS         | 3.10                                  | -45.6                                     | 16.9   | 2450 | 11.3  | 1640 | 10.3 | 1500 | 9.37 | 1360 | 8.41 | 1220 | 7.46 | 1080 |
|                 | Heavy   |                                       | 4.0CHS         | 3.80                                  | -42.0                                     | 21.5   | 3120 | 14.4  | 2080 | 13.1 | 1910 | 11.9 | 1730 | 10.7 | 1550 | 9.50 | 1380 |
| 40              | Medium  | 48.3x                                 | 3.2CHS         | 3.57                                  | -45.6                                     | 14.7   | 2140 | 9.81  | 1420 | 8.98 | 1300 | 8.15 | 1180 | 7.32 | 1060 | 6.49 | 942  |
|                 | Heavy   |                                       | 4.0CHS         | 4.38                                  | -42.0                                     | 18.7   | 2710 | 12.5  | 1810 | 11.4 | 1660 | 10.4 | 1500 | 9.30 | 1350 | 8.24 | 1200 |
| 50              | Medium  | 60.3x                                 | 3.6CHS         | 5.03                                  | -43.8                                     | 13.2   | 1910 | 8.78  | 1270 | 8.04 | 1170 | 7.30 | 1060 | 6.55 | 951  | 5.81 | 843  |
|                 | Heavy   |                                       | 4.5CHS         | 6.19                                  | -39.8                                     | 16.7   | 2420 | 11.1  | 1620 | 10.2 | 1480 | 9.25 | 1340 | 8.31 | 1210 | 7.37 | 1070 |
| 65              | Medium  | 76.1x                                 | 3.6CHS         | 6.43                                  | -43.8                                     | 13.2   | 1910 | 6.88  | 998  | 6.30 | 914  | 5.72 | 829  | 5.13 | 745  | 4.55 | 661  |
|                 | Heavy   |                                       | 4.5CHS         | 7.93                                  | -39.8                                     | 13.0   | 1890 | 8.70  | 1260 | 7.96 | 1160 | 7.22 | 1050 | 6.49 | 942  | 5.75 | 835  |
| 80              | Medium  | 88.9x                                 | 4.0CHS         | 8.37                                  | -42.0                                     | 11.5   | 1670 | 6.53  | 948  | 5.98 | 867  | 5.42 | 787  | 4.87 | 707  | 4.32 | 627  |
|                 | Heavy   |                                       | 5.0CHS         | 10.3                                  | -37.5                                     | 12.4   | 1800 | 8.25  | 1200 | 7.55 | 1100 | 6.85 | 995  | 6.15 | 893  | 5.46 | 792  |
| 90              | Medium  | 101.6x                                | 4.0CHS         | 9.63                                  | -42.0                                     | 11.5   | 1670 | 5.68  | 825  | 5.20 | 755  | 4.72 | 685  | 4.24 | 615  | 3.76 | 546  |
|                 | Heavy   |                                       | 5.0CHS         | 11.9                                  | -37.5                                     | 10.8   | 1560 | 7.17  | 1040 | 6.56 | 953  | 5.96 | 864  | 5.35 | 776  | 4.74 | 688  |
| 100             | Medium  | 114.3x                                | 4.5CHS         | 12.2                                  | -39.8                                     | 8.52   | 1240 | 5.68  | 825  | 5.20 | 755  | 4.72 | 685  | 4.24 | 615  | 3.76 | 546  |
|                 | Heavy   |                                       | 5.4CHS         | 14.5                                  | -35.7                                     | 10.3   | 1500 | 6.87  | 997  | 6.29 | 913  | 5.71 | 828  | 5.13 | 744  | 4.54 | 660  |
| 125             | Medium  | 139.7x                                | 5.0CHS         | 16.6                                  | -37.5                                     | 7.72   | 1120 | 5.15  | 747  | 4.71 | 684  | 4.28 | 621  | 3.84 | 558  | 3.41 | 494  |
|                 | Heavy   |                                       | 5.4CHS         | 17.9                                  | -35.7                                     | 8.36   | 1210 | 5.58  | 809  | 5.10 | 741  | 4.63 | 672  | 4.16 | 604  | 3.69 | 535  |
| 150             | Medium  | 165.1x                                | 5.0CHS         | 19.7                                  | -37.5                                     | 6.50   | 944  | 4.33  | 629  | 3.97 | 576  | 3.60 | 523  | 3.23 | 469  | 2.87 | 416  |
|                 | Heavy   |                                       | 5.4CHS         | 21.3                                  | -35.7                                     | 7.04   | 1020 | 4.69  | 681  | 4.29 | 623  | 3.90 | 566  | 3.50 | 508  | 3.10 | 450  |

## Notes:

- 1. The above maximum test and design pressures are applicable only to the pipe, if and only if:
  - The applied loads are only from internal pressure in straight pipe. The pipeline should be supported so that bending and external loads are avoided. The pipeline must also be set up with suitable freedom of angular movement at joints and bends and with provision to accommodate thermal expansion.
  - The pipe is limited to class 2 and 3 piping systems in accordance with AS 4041:2006. Refer to AS 4041:2006, Table 1.4 for Pressure Limits applied to these classes of piping.
  - Uncoated pipe may not be suitable for the conveyance of some fluids due to the fluid reacting with the steel.
  - AS 4343 Pressure equipment Hazard levels, provides information on fluid types and classes.
- Material Design Minimum Temperature has been determined in accordance with AS 4041:2006 Table 2.11.2(A) for product not impact tested, using the +20<sup>o</sup>C curve of AS 4041:2006, Figure 2.11.1.

3. Pressures have been calculated in accordance with AS 4041:2006

 $p = 2 f e M t_f / (d_0 - t_f)$ 

- where p = maximum recommended design pressure
  - f = Design tensile stress
  - = values specified in Table D2 of AS 4041 for AS 1074
  - = 195 MPa for test pressure
  - e = 0.85 weld joint factor from table D12 of AS 4041 for AS 1074 ERW pipe
  - M = 0.7 Class design factor from table 3.12.3 of AS 4041 for Class 3 piping
  - t<sub>f</sub> = 0.9 x nominal wall thickness mm
  - d<sub>o</sub> = outside diameter mm
- 4. No allowance has been made for corrosion, threading, grooving or machining.
- 5. The piping system working pressures can be limited by the type of couplings or the welding class used in the design of the pipeline.

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