

## R-22 Replacements Pressure-Temperature Guide

Key: **Green** (in of Hg) = Vacuum  
 Black (psig) = Saturated Vapor (calculate Superheat)  
**Bold** (psig) = Saturated Liquid (calculate Subcooling)

| °F  | Freon™<br>22<br>(R-22) | Opteon™<br>XP40<br>(R-449A) | Freon™<br>M029<br>(R-422D) | Freon™<br>NI-22B™<br>(R-422B) | Freon™<br>407A<br>(R-407A) | Freon™<br>M099™<br>(R-438A) | Freon™<br>407C<br>(R-407C) | Freon™<br>410A<br>(R-410A) |
|-----|------------------------|-----------------------------|----------------------------|-------------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|
|     | -50                    | 6.1                         | 7.4                        | 9.2                           | 11.4                       | 9.0                         | 11.4                       | 11.0                       |
| -48 | 4.8                    | 6.1                         | 7.9                        | 10.3                          | 7.7                        | 10.3                        | 9.8                        | 5.9                        |
| -46 | 3.4                    | 4.7                         | 6.6                        | 9.2                           | 6.4                        | 9.1                         | 8.6                        | 7.1                        |
| -44 | 1.9                    | 3.2                         | 5.3                        | 7.9                           | 5.0                        | 7.8                         | 7.3                        | 8.2                        |
| -42 | 0.4                    | 1.7                         | 3.8                        | 6.7                           | 3.5                        | 6.5                         | 6.0                        | 9.4                        |
| -40 | 0.6                    | 0.1                         | 2.3                        | 5.4                           | 2.0                        | 5.2                         | 4.6                        | 10.7                       |
| -38 | 1.4                    | 0.8                         | 0.8                        | 4.0                           | 0.4                        | 3.8                         | 3.2                        | 12.0                       |
| -36 | 2.2                    | 1.6                         | 0.4                        | 2.6                           | 0.6                        | 2.3                         | 1.6                        | 13.3                       |
| -34 | 3.1                    | 2.5                         | 1.2                        | 1.1                           | 1.5                        | 0.8                         | 0.1                        | 14.7                       |
| -32 | 4.0                    | 3.4                         | 2.1                        | 0.2                           | 2.3                        | 0.4                         | 0.8                        | 16.2                       |
| -30 | 4.9                    | 4.4                         | 3.0                        | 1.1                           | 3.3                        | 1.2                         | 1.6                        | 17.7                       |
| -28 | 5.9                    | 5.4                         | 3.9                        | 1.9                           | 4.2                        | 2.1                         | 2.5                        | 19.3                       |
| -26 | 6.9                    | 6.4                         | 4.9                        | 2.8                           | 5.2                        | 3.0                         | 3.5                        | 20.9                       |
| -24 | 8.0                    | 7.5                         | 5.9                        | 3.7                           | 6.3                        | 3.9                         | 4.4                        | 22.6                       |
| -22 | 9.1                    | 8.6                         | 7.0                        | 4.7                           | 7.4                        | 4.9                         | 5.4                        | 24.4                       |
| -20 | 10.2                   | 9.8                         | 8.1                        | 5.7                           | 8.5                        | 5.9                         | 6.5                        | 26.2                       |
| -18 | 11.4                   | 11.0                        | 9.2                        | 6.7                           | 9.7                        | 7.0                         | 7.6                        | 28.1                       |
| -16 | 12.6                   | 12.3                        | 10.4                       | 7.8                           | 10.9                       | 8.1                         | 8.7                        | 30.0                       |
| -14 | 13.9                   | 13.6                        | 11.7                       | 8.9                           | 12.2                       | 9.2                         | 9.9                        | 32.0                       |
| -12 | 15.2                   | 14.9                        | 12.9                       | 10.1                          | 13.5                       | 10.4                        | 11.1                       | 34.1                       |
| -10 | 16.5                   | 16.3                        | 14.3                       | 11.3                          | 14.9                       | 11.6                        | 12.3                       | 36.3                       |
| -8  | 17.9                   | 17.8                        | 15.6                       | 12.5                          | 16.3                       | 12.9                        | 13.7                       | 38.5                       |
| -6  | 19.4                   | 19.3                        | 17.1                       | 13.8                          | 17.8                       | 14.2                        | 15.0                       | 40.8                       |
| -4  | 20.9                   | 20.8                        | 18.5                       | 15.2                          | 19.3                       | 15.6                        | 16.4                       | 43.2                       |
| -2  | 22.4                   | 22.5                        | 20.1                       | 16.6                          | 20.9                       | 17.0                        | 17.9                       | 45.7                       |
| 0   | 24.0                   | 24.1                        | 21.7                       | 18.0                          | 22.5                       | 18.5                        | 19.4                       | 48.2                       |
| 2   | 25.7                   | 25.9                        | 23.3                       | 19.5                          | 24.2                       | 20.0                        | 21.0                       | 50.8                       |
| 4   | 27.4                   | 27.7                        | 25.0                       | 21.1                          | 26.0                       | 21.6                        | 22.6                       | 53.5                       |
| 6   | 29.2                   | 29.5                        | 26.7                       | 22.7                          | 27.8                       | 23.2                        | 24.3                       | 56.3                       |
| 8   | 31.0                   | 31.4                        | 28.5                       | 24.4                          | 29.7                       | 24.9                        | 26.1                       | 59.2                       |
| 10  | 32.8                   | 33.4                        | 30.4                       | 26.1                          | 31.6                       | 26.6                        | 27.9                       | 62.2                       |
| 12  | 34.8                   | 35.4                        | 32.3                       | 27.8                          | 33.6                       | 28.4                        | 29.8                       | 65.2                       |
| 14  | 36.8                   | 37.6                        | 34.3                       | 29.7                          | 35.7                       | 30.3                        | 31.7                       | 68.4                       |
| 16  | 38.8                   | 39.7                        | 36.4                       | 31.6                          | 37.8                       | 32.2                        | 33.7                       | 71.6                       |
| 18  | 40.9                   | 42.0                        | 38.5                       | 33.5                          | 40.0                       | 34.2                        | 35.7                       | 74.9                       |
| 20  | 43.1                   | 44.3                        | 40.7                       | 35.5                          | 42.3                       | 36.2                        | 37.9                       | 78.4                       |
| 22  | 45.3                   | 46.7                        | 42.9                       | 37.6                          | 44.7                       | 38.3                        | 40.1                       | 81.9                       |
| 24  | 47.6                   | 49.1                        | 45.2                       | 39.7                          | 47.1                       | 40.5                        | 42.3                       | 85.5                       |
| 26  | 50.0                   | 51.7                        | 47.6                       | 41.9                          | 49.6                       | 42.8                        | 44.7                       | 89.2                       |
| 28  | 52.4                   | 54.3                        | 50.1                       | 44.2                          | 52.2                       | 45.1                        | 47.1                       | 93.1                       |
| 30  | 55.0                   | 56.9                        | 52.6                       | 46.6                          | 54.8                       | 47.5                        | 49.6                       | 97.0                       |
| 32  | 57.5                   | 59.7                        | 55.2                       | 49.0                          | 57.6                       | 49.9                        | 52.1                       | 101.1                      |
| 34  | 60.2                   | 62.6                        | 57.9                       | 51.5                          | 60.4                       | 52.5                        | 54.8                       | 105.2                      |
| 36  | 62.9                   | 65.5                        | 60.6                       | 54.0                          | 63.3                       | 55.1                        | 57.5                       | 109.5                      |
| 38  | 65.7                   | 68.5                        | 63.5                       | 56.7                          | 66.3                       | 57.7                        | 60.3                       | 113.9                      |
| 40  | 68.6                   | 71.6                        | 66.4                       | 59.4                          | 69.4                       | 60.5                        | 63.2                       | 118.4                      |
| 42  | 71.5                   | 74.8                        | 69.4                       | 62.1                          | 72.5                       | 63.3                        | 66.1                       | 123.0                      |
| 44  | 74.5                   | 78.0                        | 72.5                       | 65.0                          | 75.8                       | 66.3                        | 69.2                       | 127.7                      |
| 46  | 77.6                   | 81.4                        | 75.6                       | 67.9                          | 79.1                       | 69.3                        | 72.3                       | 132.6                      |
| 48  | 80.8                   | 84.8                        | 78.9                       | 71.0                          | 82.6                       | 72.3                        | 75.5                       | 137.5                      |
| 50  | 84.1                   | 88.4                        | 82.2                       | 74.1                          | 86.1                       | 75.5                        | 78.8                       | 142.6                      |
| 52  | 87.4                   | 110.8                       | 86.1                       | 88.6                          | 108.2                      | 94.6                        | 101.7                      | 148.4                      |
| 54  | 90.8                   | 115.0                       | 91.1                       | 92.1                          | 112.3                      | 98.3                        | 105.6                      | 153.8                      |
| 56  | 94.4                   | 119.2                       | 103.6                      | 95.6                          | 116.5                      | 102.1                       | 109.6                      | 159.3                      |
| 58  | 98.0                   | 123.5                       | 107.4                      | 99.3                          | 120.8                      | 105.9                       | 113.7                      | 164.9                      |
| 60  | 101.6                  | 128.0                       | 111.4                      | 103.0                         | 125.2                      | 109.8                       | 117.9                      | 170.7                      |
| 62  | 105.4                  | 132.5                       | 115.4                      | 106.8                         | 129.7                      | 113.9                       | 122.3                      | 176.6                      |
| 64  | 109.3                  | 137.2                       | 119.6                      | 110.7                         | 134.3                      | 118.0                       | 126.7                      | 182.7                      |
| 66  | 113.2                  | 142.0                       | 123.8                      | 114.7                         | 139.0                      | 122.2                       | 131.2                      | 188.9                      |
| 68  | 117.3                  | 146.8                       | 128.1                      | 118.8                         | 143.9                      | 126.6                       | 135.8                      | 195.3                      |
| 70  | 121.4                  | 151.8                       | 132.6                      | 123.0                         | 148.8                      | 131.0                       | 140.5                      | 201.8                      |
| 72  | 125.7                  | 156.9                       | 137.1                      | 127.3                         | 153.9                      | 135.5                       | 145.4                      | 208.4                      |
| 74  | 130.0                  | 162.2                       | 141.7                      | 131.6                         | 159.1                      | 140.2                       | 150.3                      | 215.2                      |
| 76  | 134.5                  | 167.5                       | 146.5                      | 136.1                         | 164.4                      | 144.9                       | 155.4                      | 222.2                      |
| 78  | 139.0                  | 172.9                       | 151.3                      | 140.7                         | 169.8                      | 149.8                       | 160.5                      | 229.3                      |
| 80  | 143.6                  | 178.5                       | 156.3                      | 145.4                         | 175.3                      | 154.7                       | 165.8                      | 236.5                      |
| 82  | 148.4                  | 184.2                       | 161.4                      | 150.2                         | 181.0                      | 159.8                       | 171.2                      | 244.0                      |
| 84  | 153.2                  | 190.0                       | 166.5                      | 155.1                         | 186.7                      | 165.0                       | 176.8                      | 251.6                      |
| 86  | 158.2                  | 195.9                       | 171.8                      | 160.1                         | 192.6                      | 170.3                       | 182.4                      | 259.3                      |
| 88  | 163.2                  | 202.0                       | 177.2                      | 165.2                         | 198.7                      | 175.7                       | 188.2                      | 267.3                      |
| 90  | 168.4                  | 208.2                       | 182.8                      | 170.4                         | 204.8                      | 181.2                       | 194.1                      | 275.4                      |
| 92  | 173.7                  | 214.5                       | 188.4                      | 175.7                         | 211.1                      | 186.8                       | 200.1                      | 283.6                      |
| 94  | 179.1                  | 221.0                       | 194.2                      | 181.2                         | 217.6                      | 192.6                       | 206.3                      | 292.1                      |
| 96  | 184.6                  | 227.6                       | 200.0                      | 186.7                         | 224.1                      | 198.5                       | 212.5                      | 300.7                      |
| 98  | 190.2                  | 234.3                       | 206.0                      | 192.4                         | 230.8                      | 204.5                       | 219.0                      | 309.5                      |
| 100 | 195.9                  | 241.1                       | 212.2                      | 198.2                         | 237.6                      | 210.6                       | 225.5                      | 318.5                      |
| 102 | 201.8                  | 248.1                       | 218.4                      | 204.1                         | 244.6                      | 216.8                       | 232.2                      | 327.7                      |
| 104 | 207.7                  | 255.3                       | 224.8                      | 210.2                         | 251.7                      | 223.2                       | 239.0                      | 337.1                      |
| 106 | 213.8                  | 262.5                       | 231.3                      | 216.3                         | 259.0                      | 229.7                       | 245.9                      | 346.7                      |
| 108 | 220.0                  | 270.0                       | 237.9                      | 222.6                         | 266.4                      | 236.4                       | 253.0                      | 356.5                      |
| 110 | 226.4                  | 277.5                       | 244.7                      | 229.0                         | 273.9                      | 243.1                       | 260.3                      | 366.4                      |
| 112 | 232.8                  | 285.2                       | 251.6                      | 235.6                         | 281.6                      | 250.1                       | 267.6                      | 376.6                      |
| 114 | 239.4                  | 293.1                       | 258.7                      | 242.3                         | 289.5                      | 257.1                       | 275.1                      | 387.0                      |
| 116 | 246.1                  | 301.1                       | 265.9                      | 249.1                         | 297.5                      | 264.3                       | 282.8                      | 397.6                      |
| 118 | 253.0                  | 309.3                       | 273.2                      | 256.0                         | 305.6                      | 271.6                       | 290.6                      | 408.4                      |
| 120 | 260.0                  | 317.6                       | 280.7                      | 263.1                         | 314.0                      | 279.1                       | 298.6                      | 419.4                      |
| 122 | 267.1                  | 326.0                       | 288.3                      | 270.3                         | 322.4                      | 286.7                       | 306.7                      | 430.7                      |
| 124 | 274.3                  | 334.7                       | 296.0                      | 277.7                         | 331.1                      | 294.4                       | 315.0                      | 442.1                      |
| 126 | 281.7                  | 343.5                       | 303.9                      | 285.2                         | 339.9                      | 302.3                       | 323.4                      | 453.8                      |
| 128 | 289.2                  | 352.4                       | 312.0                      | 292.8                         | 348.8                      | 310.3                       | 332.0                      | 465.8                      |
| 130 | 296.9                  | 361.5                       | 320.2                      | 300.6                         | 357.9                      | 318.5                       | 340.7                      | 477.9                      |
| 132 | 304.7                  | 370.8                       | 328.6                      | 308.6                         | 367.2                      | 326.9                       | 349.6                      | 490.3                      |
| 134 | 312.6                  | 380.2                       | 337.1                      | 316.6                         | 376.7                      | 335.4                       | 358.7                      | 503.0                      |
| 136 | 320.7                  | 389.9                       | 345.8                      | 324.9                         | 386.3                      | 344.1                       | 368.0                      | 515.9                      |
| 138 | 329.0                  | 399.7                       | 354.7                      | 333.3                         | 396.2                      | 352.9                       | 377.4                      | 529.1                      |
| 140 | 337.4                  | 409.6                       | 363.7                      | 341.8                         | 406.2                      | 361.9                       | 386.9                      | 542.5                      |
| 142 | 345.9                  | 419.7                       | 372.9                      | 350.5                         | 416.3                      | 371.0                       | 396.7                      | 556.2                      |
| 144 | 354.6                  | 430.1                       | 382.3                      | 359.4                         | 426.7                      | 380.3                       | 406.6                      | 570.2                      |
| 146 | 363.5                  | 440.6                       | 391.8                      | 368.5                         | 437.2                      | 389.8                       | 416.7                      | 584.5                      |
| 148 | 372.5                  | 451.2                       | 401.5                      | 377.7                         | 448.0                      | 399.4                       | 427.0                      | 599.0                      |
| 150 | 381.7                  | 462.1                       | 411.4                      | 387.1                         | 458.9                      | 409.2                       | 437.5                      | 613.9                      |

## R-12 and R-502 Replacements Pressure-Temperature Guide

Key: **Green** (in of Hg) = Vacuum  
 Black (psig) = Saturated Vapor (calculate Superheat)  
**Bold** (psig) = Saturated Liquid (calculate Subcooling)

| °F  | Freon™<br>134a<br>(R-134a) | Opteon™<br>XP10<br>(R-513A) | Freon™<br>MO49<br>Plus<br>(R-437A) | Freon™<br>507<br>(R-507A) | Freon™<br>404A<br>(R-404A) | Opteon™<br>XP40<br>(R-449A) | Freon™<br>One<br>Shot-C™<br>(R-422C) | Freon™<br>Hot<br>Shot-2™<br>(R-417C) |
|-----|----------------------------|-----------------------------|------------------------------------|---------------------------|----------------------------|-----------------------------|--------------------------------------|--------------------------------------|
|     | -50                        | 18.7                        | 16.6                               | 17.0                      | 0.9                        | 0.1                         | 7.4                                  | 3.7                                  |
| -48 | 18.0                       | 15.8                        | 16.2                               | 1.7                       | 0.7                        | 6.1                         | 2.2                                  | 16.0                                 |
| -46 | 17.3                       | 14.9                        | 15.3                               | 2.6                       | 1.6                        | 4.7                         | 0.7                                  | 15.0                                 |
| -44 | 16.5                       | 14.0                        | 14.4                               | 3.5                       | 2.4                        | 3.2                         | 0.5                                  | 14.1                                 |
| -42 | 15.7                       | 13.1                        | 13.5                               | 4.4                       | 3.4                        | 1.7                         | 1.3                                  | 13.2                                 |
| -40 | 14.8                       | 12.1                        | 12.5                               | 5.4                       | 4.3                        | 0.1                         | 2.2                                  | 12.2                                 |
| -38 | 13.9                       | 11.1                        | 11.5                               | 6.4                       | 5.3                        | 0.8                         | 3.1                                  | 11.2                                 |
| -36 | 13.0                       | 10.0                        | 10.4                               | 7.5                       | 6.3                        | 1.6                         | 4.0                                  | 10.1                                 |
| -34 | 12.0                       | 8.9                         | 9.3                                | 8.6                       | 7.4                        | 2.5                         | 5.0                                  | 9.0                                  |
| -32 | 10.9                       | 7.8                         | 8.1                                | 9.8                       | 8.5                        | 3.4                         | 6.1                                  | 7.8                                  |
| -30 | 9.8                        | 6.6                         | 6.9                                | 11.0                      | 9.6                        | 4.4                         | 7.1                                  | 6.7                                  |
| -28 | 8.7                        | 5.3                         | 5.6                                | 12.2                      | 10.8                       | 5.4                         | 8.3                                  | 5.4                                  |
| -26 | 7.5                        | 4.0                         | 4.3                                | 13.5                      | 12.0                       | 6.4                         | 9.4                                  | 4.1                                  |
| -24 | 6.3                        | 2.6                         | 2.9                                | 14.8                      | 13.3                       | 7.5                         | 10.6                                 | 2.7                                  |
| -22 | 5.0                        | 1.2                         | 1.4                                | 16.2                      | 14.6                       | 8.6                         | 11.9                                 | 1.2                                  |
| -20 | 3.7                        | 0.1                         | 0.0                                | 17.6                      | 16.0                       | 9.8                         | 13.2                                 | 0.2                                  |
| -18 | 2.3                        | 0.9                         | 0.8                                | 19.1                      | 17.4                       | 11.0                        | 14.5                                 | 0.9                                  |
| -16 | 0.8                        | 1.7                         | 1.6                                | 20.6                      | 18.9                       | 12.3                        | 15.9                                 | 1.8                                  |
| -14 | 0.4                        | 2.5                         | 2.5                                | 22.2                      | 20.4                       | 13.6                        | 17.3                                 | 2.6                                  |
| -12 | 1.1                        | 3.4                         | 3.4                                | 23.8                      | 22.0                       | 14.9                        | 18.8                                 | 3.5                                  |
| -10 | 1.9                        | 4.3                         | 4.3                                | 25.5                      | 23.6                       | 16.3                        | 20.4                                 | 4.4                                  |
| -8  | 2.8                        | 5.2                         | 5.2                                | 27.2                      | 25.3                       | 17.8                        | 22.0                                 | 5.4                                  |
| -6  | 3.6                        | 6.1                         | 6.2                                | 29.0                      | 27.0                       | 19.3                        | 23.7                                 | 6.3                                  |
| -4  | 4.6                        | 7.1                         | 7.2                                | 30.9                      | 28.8                       | 20.8                        | 25.4                                 | 7.4                                  |
| -2  | 5.5                        | 8.1                         | 8.3                                | 32.8                      | 30.7                       | 22.5                        | 27.1                                 | 8.4                                  |
| 0   | 6.5                        | 9.2                         | 9.4                                | 34.8                      | 32.6                       | 24.1                        | 29.0                                 | 9.6                                  |
| 2   | 7.5                        | 10.3                        | 10.5                               | 36.8                      | 34.6                       | 25.9                        | 30.9                                 | 10.7                                 |
| 4   | 8.5                        | 11.4                        | 11.7                               | 38.9                      | 36.6                       | 27.7                        | 32.8                                 | 11.9                                 |
| 6   | 9.6                        | 12.6                        | 12.9                               | 41.1                      | 38.7                       | 29.5                        |                                      |                                      |