# Equilibrium Relative Humidity
## Saturated Salt Solutions

| Relative Humidity (%RH) | | | |
|---|---|---|---|
| Temperature °C | Lithium Chloride | Potassium Acetate | Magnesium Chloride |
| 0 | 11.23 ± 0.54 | | 33.66 ± 0.33 |
| 5 | 11.26 ± 0.47 | | 33.60 ± 0.28 |
| 10 | 11.29 ± 0.41 | 23.28 ± 0.53 | 33.47 ± 0.24 |
| 15 | 11.30 ± 0.35 | 23.40 ± 0.32 | 33.30 ± 0.21 |
| 20 | 11.31 ± 0.31 | 23.11 ± 0.25 | 33.07 ± 0.18 |
| 25 | 11.30 ± 0.27 | 22.51 ± 0.32 | 32.78 ± 0.16 |
| 30 | 11.28 ± 0.24 | 21.61 ± 0.53 | 32.44 ± 0.14 |
| 35 | 11.25 ± 0.22 | | 32.05 ± 0.13 |
| 40 | 11.21 ± 0.21 | | 31.60 ± 0.13 |
| 45 | 11.16 ± 0.21 | | 31.10 ± 0.13 |
| 50 | 11.10 ± 0.22 | | 30.54 ± 0.13 |
| 55 | 11.03 ± 0.23 | | 29.93 ± 0.16 |
| 60 | 10.95 ± 0.26 | | 29.26 ± 0.18 |
| 65 | 10.86 ± 0.29 | | 28.54 ± 0.21 |
| 70 | 10.75 ± 0.33 | | 27.77 ± 0.25 |
| 75 | 10.64 ± 0.38 | | 26.94 ± 0.29 |
| 80 | 10.51 ± 0.44 | | 26.05 ± 0.34 |
| 85 | 10.38 ± 0.51 | | 25.11 ± 0.39 |
| 90 | 10.23 ± 0.59 | | 24.12 ± 0.46 |
| 95 | 10.07 ± 0.67 | | 23.07 ± 0.52 |
| 100 | 9.90 ± 0.77 | | 21.97 ± 0.60 |

**Saturated Salt Solutions**

A very convenient method to calibrate humidity sensors is the use of saturated salt solutions. At any temperature, the concentration of a saturated solution is fixed and does not have to be determined. By providing excess solute, the solution will remain saturated even in the presence of modest moisture sources and sinks. When the solute is a solid in the pure phase, it is easy to determine that there is saturation.

The saturated salt solution, made up as a slushy mixture with distilled water and chemically pure salt, is enclosed in a sealed metal or a glass chamber. Wexler and Hasegawa measured the humidity in the atmosphere above eight saturated salt solutions for ambient temperatures 0 to 50°C using a dew-point hygrometer. Later, Greenspan compiled, from the literature, data on 28 saturated salt solutions to cover the entire range of relative humidity. Using a data base from 21 separate investigations comprising 1106 individual measurements, fits were made by the method of least squares to regular polynomial equations to obtain the "best" value of relative humidity in air as a function of temperature. These values are summarized in the table shown.

| Relative Humidity (%RH) | | | | | | |
|---|---|---|---|---|---|---|
| Temperature °C | Potassium Carbonate | Magnesium Nitrate | Sodium Chloride | Potassium Chloride | Potassium Nitrate | Potassium Sulfate |
| 0 | 43.13 ± 0.66 | 60.35 ± 0.55 | 75.51 ± 0.34 | 88.61 ± 0.53 | 96.33 ± 2.9 | 98.77 ± 1.1 |
| 5 | 43.13 ± 0.50 | 58.86 ± 0.43 | 75.65 ± 0.27 | 87.67 ± 0.45 | 96.27 ± 2.1 | 98.48 ± 0.91 |
| 10 | 43.14 ± 0.39 | 57.36 ± 0.33 | 75.67 ± 0.22 | 86.77 ± 0.39 | 95.96 ± 1.4 | 98.18 ± 0.76 |
| 15 | 43.15 ± 0.33 | 55.87 ± 0.27 | 75.61 ± 0.18 | 85.92 ± 0.33 | 95.41 ± 0.96 | 97.89 ± 0.63 |
| 20 | 43.16 ± 0.33 | 54.38 ± 0.23 | 75.47 ± 0.14 | 85.11 ± 0.29 | 94.62 ± 0.66 | 97.59 ± 0.53 |
| 25 | 43.16 ± 0.39 | 52.89 ± 0.22 | 75.29 ± 0.12 | 84.34 ± 0.26 | 93.58 ± 0.55 | 97.30 ± 0.45 |
| 30 | 43.17 ± 0.50 | 51.40 ± 0.24 | 75.09 ± 0.11 | 83.62 ± 0.25 | 92.31 ± 0.60 | 97.00 ± 0.40 |
| 35 | | 49.91 ± 0.29 | 74.87 ± 0.12 | 82.95 ± 0.25 | 90.79 ± 0.83 | 96.71 ± 0.38 |
| 40 | | 48.42 ± 0.37 | 74.68 ± 0.13 | 82.32 ± 0.25 | 89.03 ± 1.2 | 96.41 ± 0.38 |
| 45 | | 46.93 ± 0.47 | 74.52 ± 0.16 | 81.74 ± 0.28 | 87.03 ± 1.8 | 96.12 ± 0.40 |
| 50 | | 45.44 ± 0.60 | 74.43 ± 0.19 | 81.20 ± 0.31 | 84.78 ± 2.5 | 95.82 ± 0.45 |
| 55 | | | 74.41 ± 0.24 | 80.70 ± 0.35 | | |
| 60 | | | 74.50 ± 0.30 | 80.25 ± 0.41 | | |
| 65 | | | 74.71 ± 0.37 | 79.85 ± 0.48 | | |
| 70 | | | 75.06 ± 0.45 | 79.49 ± 0.57 | | |
| 75 | | | 75.58 ± 0.55 | 79.17 ± 0.66 | | |
| 80 | | | 76.29 ± 0.65 | 78.90 ± 0.77 | | |
| 85 | | | | 78.68 ± 0.89 | | |
| 90 | | | | 78.50 ± 1.0 | | |
| 95 | | | | | | |
| 100 | | | | | | |