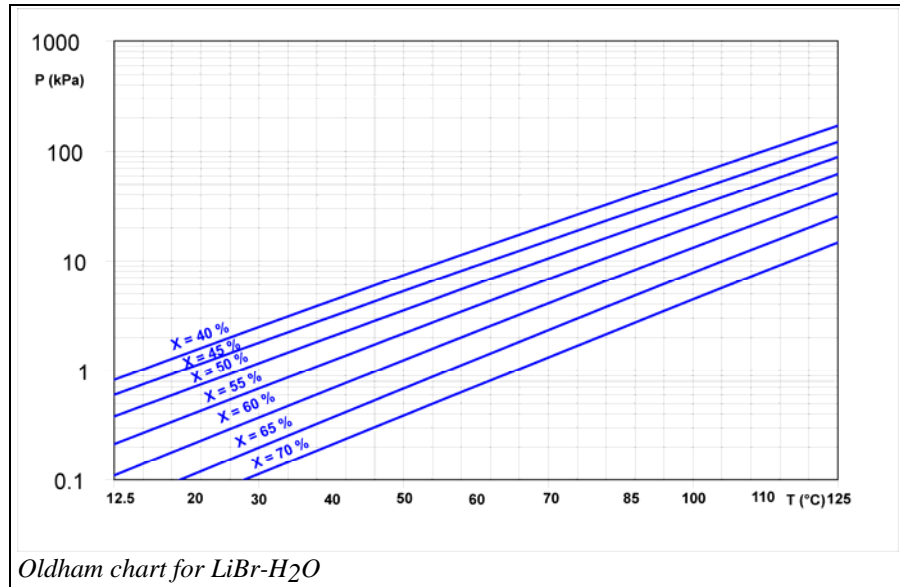


Properties of LiBr-H₂O system

In machines using LiBr-H₂O mixture, the difference in vapor pressure of the solvent (LiBr) and solute (H₂O) is such that we can neglect the mass fraction of solvent vapor, thereby simplifying calculations: the equilibrium chart can then be directly calibrated as a function of the solution temperature.

Incidentally, it is customary to set the LiBr-H₂O pair chart as a function of solvent (LiBr) mass fraction and not of solute. Water being likely to crystallize at low temperatures, the crystallization curve of the mixture often appears on the chart, which corresponds to the lower operating limit of machines.



For this pair, ASHRAE (2001) provides equations (1) and (2), established by generalizing the mixture saturation law of the coolant (water) pressure, in which the water temperature t' (°C) is replaced by a linear function of the solution temperature T (°C). P , expressed from the decimal logarithm, is the pressure in kPa, and X the mass fraction of LiBr mixture (Table 2.6.4).

These equations, which were used to prepare the chart in Figure 2.6.32 are valid in the ranges of values:

$$-15 < t' < 110 \text{ }^{\circ}\text{C}, 5 < t < 175 \text{ }^{\circ}\text{C}, 45 < X < 70 \text{ } \%$$

$$\log(P) = C + \frac{D}{t' + 273.15} + \frac{E}{(t' + 273.15)^2} \quad (1)$$

$$t' = \frac{t - \sum_{i=0}^3 B_i X^i}{\sum_{i=0}^3 A_i X^i} \quad (2)$$

TABLE 1 COEFFICIENTS OF EQUATIONS 2.6.51 AND 2.6.52

A0	-2.00755	B0	124.937	C	7.05
A1	0.16976	B1	-7.71649	D	-1596.49
A2	-3.13E-03	B2	0.152286	E	-104095.5
A3	1.98E-05	B3	-7.95E-04		

REFERENCE

ASHRAE *Fundamentals Handbook* (SI), Thermophysical properties of refrigerants, 2001.

