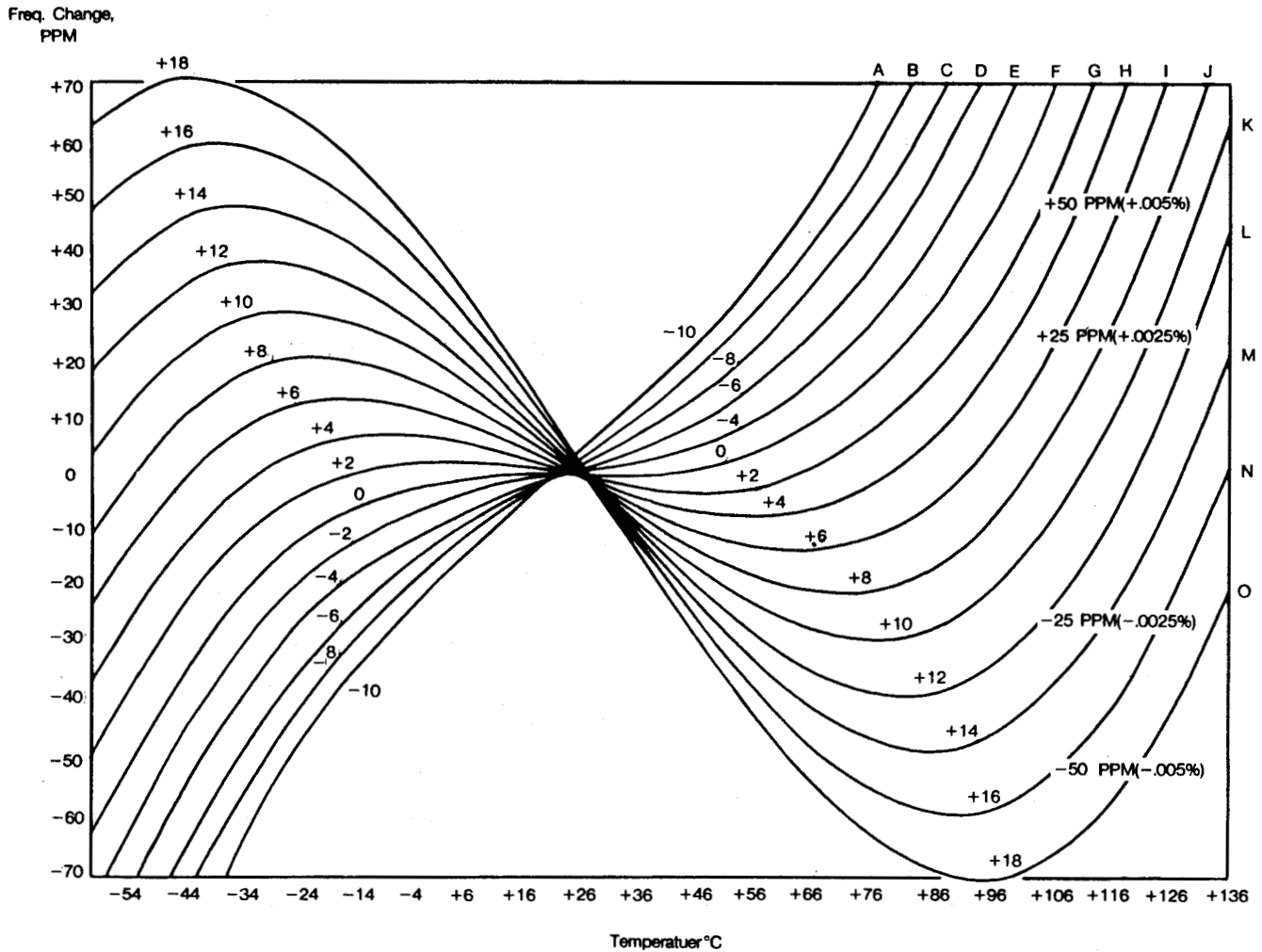


**FREQUENCY-TEMPERATURE CURVES - AT CUT CRYSTALS**



Several items of foremost interest in specifying quartz crystals are highlighted here; however, there is no substitute, in developing specifications, for direct contact with the company.

The performance of a crystal over the temperature range is completely governed by the angle at which the blank is cut vs. the axis of the quartz. The typical "S" curves shown give the anticipated variation of frequency vs. temperature. It is BREL's responsibility as the manufacturer to select the angle cut which will produce a crystal which will perform within the limits set by the customer's specifications. Obviously, the tight tolerance specifications have to have extreme selection of blanks, resulting in higher price. For crystals from 1 to 150MHz, a frequency tolerance of  $\pm 0.005\%$  over a temperature range of  $-55$  to  $+105^\circ\text{C}$  can be considered normal for BREL manufacturing. Tighter tolerance will influence costing.