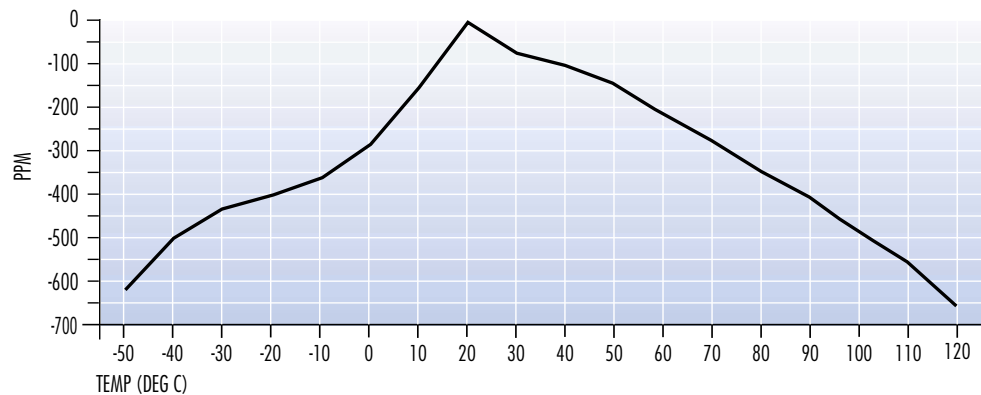


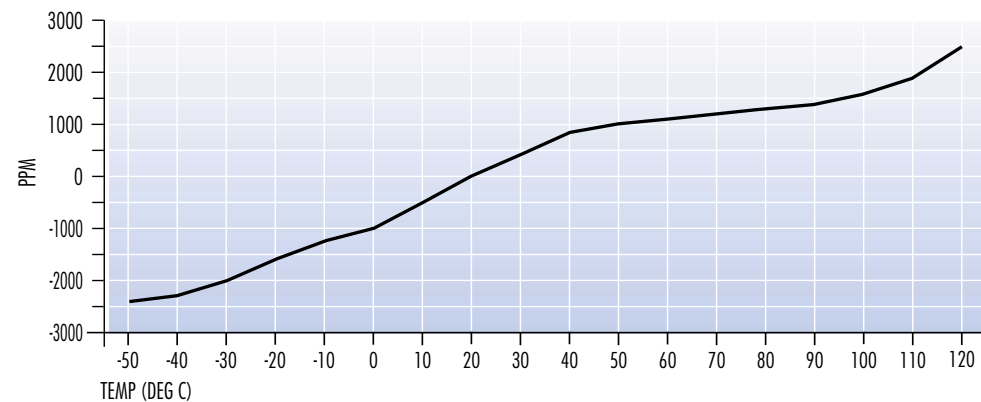
PHASE CHARACTERISTICS

Maximum phase charges for 140, 150, 180, 230 and 480 series cables



Any of the above cables having the same part number will track each other within ± 100 PPM.

Maximum phase charges for 115, 125, and 160 series cables



Determination of phase change over temperature

The following is an example of how to determine the change in phase and tracking error of cable assemblies over a specific temperature range.

Example: Determine the change in phase of an IW 2801 cable assembly over the -40 to +80 degree temperature range. Also determine the tracking error of two or more assemblies of the same type. The frequency is 10 GHz, the assembly length 2.0mm, the dielectric constant 1.4, and the starting temperature 20°C.

The electrical length of a cable assembly in degrees is:

$\theta = (L \cdot \sqrt{e} \cdot f \cdot 360) / 300$, where L is the length in mm, f is the frequency in GHz and e, the dielectric constant of the cable.

$$\theta = (2600 \cdot \sqrt{1.4} \cdot 10 \cdot 360) / 300 = 28,397 \text{ degrees}$$

From the phase vs temp curve on the previous page, the maximum change in ppm over the temperature range specified is -500

$$\Delta\theta = \theta \cdot \text{PPM} / 1,000,000$$

$$\Delta\theta = 25973 \cdot (-500) / 1,000,000 = -12.98 \text{ degrees.}$$

The phase tracking between assemblies of the same type can be calculated by the following equation:

$$\theta \text{ tracking} = \theta \cdot (\text{PPM tracking}) / 1,000,000 = 28397 \cdot (+100) / 1,000,000 = +2.83 \text{ degrees.}$$

Summarizing, the example assembly electrical length increased a maximum of 13 degrees over the specific temperature range, however, multiple assemblies would track to within ± 2.6 degrees of each other.

Phase change with flexing

Phase change when flexing will be slightly different depending on the particular cable. Larger cables have more dielectric and greater internal forces, thus the phase change of larger cables will be greater than smaller diameter cables. When wrapped 360° around a 102mm diameter mandrel, the phase change will be:

Cables 4806, 2301, and 1801: Phase change = $\pm 0.30 \cdot F$
Cables 1501, and 1401: Phase change = $\pm .2 \cdot F$

F is the frequency in GHz and phase change is in degrees.