

## CAUSES OF AGING (DRIFT)

Aging refers to a positive EMF shift (more output) of nickel thermocouple alloys resulting from a temperature gradient along the thermocouple elements. The temperature that aging occurs is estimated to be around 370° to 540°C (700° to 1000°F). There are a few things that can increase the amount of EMF shift:

- The temperature that is being measured or the previous thermal history of the thermocouple.
- The thermocouple composition.
- Duration of aging temperature.
- Amount of thermocouple exposed to the aging temperatures.

It must be recognized that aging depends on the application for which the thermocouple is being used and the temperature gradient it experiences. The operating temperature of the thermocouple should be checked. If the thermocouple has never been exposed to aging temperatures, it should never have errors due to aging.

To reduce the inaccuracy of reading temperatures in the aging range, a pre-aged thermocouple may be used. Pre-aged thermocouples are heat treated and have special compositions to minimize errors caused by aging. However, if these are heated above the aging range then the effect of the pre-aging can be removed. For applications where the temperature is above the aging range, it is important to keep as little length of thermocouple as possible in the aging range. This will help to minimize the aging effects.

The effects of the aging process can actually be removed. This is done by heating the entire thermocouple above 870°C (1600°F) for at least 5 minutes. Then the thermocouple should be rapidly cooled to below the aging temperatures. This should restore the wire to its original calibration.