Standard Callendar - Van Dusen

The relationship between resistance (R) and temperature (t) can be generated from the **Callendar-Van Dusen** equation.

Note: The carot symbol " ^ " is used here to denote exponents.
Example: 4^2 = 16, 4^-1 = 0.25.

For the range -200 °C to 0 °C: $R(t) = R(0) [1 + \mathbf{A}(t) + \mathbf{B}(t)^2 + (t - 100)\mathbf{C}(t)^3]$

For the range 0 °C to 661 °C: $R(t) = R(0) (1 + \mathbf{A}(t) + \mathbf{B}(t)^2)$

Where: R(t) = resistance in Ohms at temperature t

R(0) = resistance in Ohms at 0°C
t = temperature in °C

Typical Calibration Coefficients:

SDI Element part numbers beginning with **PT** (example: PT100/15A):

ALPHA (°C^-1) = 3.85055 x 10^-3

A (°C^-1) = 3.90830 x 10^-3
B (°C^-2) = -5.77500 x 10^-7
C (°C^-4) = -4.18301 x 10^-12

SDI Element part numbers beginning with **D** (example: D100/15A):

ALPHA (°C^-1) = 3.92000 x 10^-3

A (°C^-1) = 3.97869 x 10^-3
B (°C^-2) = -5.86863 x 10^-7
C (°C^-4) = -4.16696 x 10^-12

ALPHA is the temperature coefficient of resistance obtained by measurement of the detector resistance at 0°C and 100°C.

ALPHA (°C^-1) = (R(100) - R(0)) / (100 x R(0))

Where: R(100) = resistance in Ohms at 100°C

These equations are listed as the basis for the temperature/resistance tables for platinum resistance thermometers and are not intended to be used for the calibration of individual thermometers.

The coefficients for individual thermometers can be obtained by calibration. Contact SDI for details on Calibration Services for Industrial Platinum Resistance Thermometers. All calibrations are traceable to the National Institute of Standards and Technology (NIST).