Temperature Sensor Element Selection Guide

Attributes	Resistance Temperature Detector (RTD)	Thermocouple	Thermistor	Integrated Circuit (IC) Temperature Transducer
Symbol				
Signal Characteristic	Resistance increases with temperature rise (PTC)	Voltage increases with temperature rise	Resistance decreases with temperature rise (NTC)	Voltage or current increases with temperature rise
Construction	Thin-film or Wirewound	2 unlike metal alloys	Sintered metals	Silicone
Temperature Range	-200 to 1475°F (-129 to 802°C)	-400 to 4200°F (-240 to 2316°C)	-100 to 500°F (-73 to 260°C)	-70 to 300°F (-57 to 149°C)
Temperature Accuracy	Highly accurate	Least accuracy unless purchasing special calibrated TC	Highly accurate	Most accurate
Robustness (Shock and Vibration)	Somewhat sensitive to shock and vibration	Generally considered most robust	Somewhat sensitive to shock and vibration	Most sensitive to shock and vibration
Linearity Across Temperature Span	Linear	Most NON-linear	Non-linear	Most linear
Accuracy Drift over Life of Sensor Element	Less drift than thermocouple	Highly subject to drift	Less drift than thermocouple	Minimal drift
Response to change in temperature	Fast response with thin-film RTDs	Fastest response	Fast response	Fast response
Cold junction compensation in associated temperature controller	None	Required	None	None
Cost of Sensor element	Thin-Film Low	"Type E,J,K, and T lowest / Type B,S,R (Noble Metals) Highest"	Low	Low
Standard temperature control available with sensor input	Available	Available	Limited availability	Not available