Nanmac Notes

Subject: Thermocouple Standards and Calibrations • No. 92-3

Thermocouple Standards

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As shown in Table I, there are seven thermocouple standards applicable to heat treating furnaces. These include Reference Standard, Primary Standard, Secondary Standard, Temperature Uniformity Test Standard, System Accuracy Test plus Working and Load Standards. This chart summarizes the type of thermocouples which can be used for each category in addition to calibration frequency and accuracy requirements. These standards were established by SAE (Society of Automotive Engineers) specification SAE-AMS-2750 Rev. C in 1990. This specification has been adopted by the U.S. Department of Defense. It is a valuable reference and we suggest that anyone who manufactures or uses heat treating furnaces should have a copy of this specification in their Quality Control Department.

Table I

Outline of Sensors				
Nomenclature	**Description**	Calibration		Use/Max Error Limit
		Period	**Against**	**Correction Factor (°F)**
Reference Standard	Platinum Platinum-Rhodium	5 years	NIST Reference Standard	Primary Standard Calibration None
Primary Standard	Platinum Platinum-Rhodium	3 years	Reference Standard	Secondary Standard Calibration ±2.7° or ±0.25%**
Secondary Standard	Base or noble metal	1 year base 2 years noble	Primary Standard	Test Sensor Calibration base: ±2° or ±0.4%** noble: ±2.7° or ±0.25%**
Temperature Uniformity Test	Base of noble metal	3 months base 6 months noble	Primary or Secondary Standard	Temperature Uniformity Tests ±4° or ±0.75%**
System Accuracy Test	Base of noble metal	3 months base 6 months noble	Primary or Secondary Standard	System Accuracy Tests ±2° or ±0.4%**
Working	Base of noble metal	Before installation	Primary or Secondary Standard	Installation in Equipment Class 1: ±2° or ±0.4%** Class 2: ±4° or ±0.75%**
Load	Base of noble metal	3 months N, R, S 6 months other	Primary or Secondary Standard	Insertion in Loads ±4° or ±0.75%**
* Sensors of Equivalent or Greater Accuracy are Acceptable ** Percent of Reading, if Greater Than Correction Factor in Degrees				
Aerospace Material Specification - SAE AMS-2750 Rev. C. issued 1980-04-15, Revised 1990-04-01 Superceding AMS-2750B. Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 (1990).				

Calibration Services

Nanmac's calibration laboratory will calibrate bare or insulated thermocouple wire, assembled thermocouples, RTD's, hermistors and instruments. All of our calibration equipment is calibrated against National Institute of Standards and Technology (NIST) standards. Our calibration data are traceable to NIST standards. Calibration costs are listed in the chart below. The maximum temperature range of our standard services is 2,100 degrees Fahrenheit.

Notes:

a All temperature sensors must be at least 12 inches long to minimize conduction errors.

b Calibrations to 2,950°F can be made on a special basis (contact factory for details). Also, calibrations at cryogenic ranges can also be made on a special basis.

c Your instruments and sensors can also be calibrated and certified (contact factory for details).

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