

Tungsten-Rhenium Thermocouples Calibration Equivalents

CALIBRATIONS G AND C

The nominal emf versus temperature values for WM26Re (type G) and W5ReM26Re (type C) thermocouples are defined by fifth degree polynomials. The emf in absolute millivolts (IPTS68) is determined, using the equation and coefficients shown below, from the temperature in Fahrenheit degrees.

Gen. Form: $EMF = AT + BT^2 + CT^3 + DT^4 + ET^5 + K$

Temp. Range: 32°F to 4200°F (0 to 2315°C)

CALIBRATION D

A similar equation is used to generate emf versus temperature values for W3ReM25Re thermocouples. For this combination, however, the curve is broken into two functions and the temperature is expressed in Celsius degrees.

Gen. Form: $EMF = AT + BT^2 + CT^3 + DT^4 + ET^5$

Temp. Range: 32 to 4208°F (0 to 2320°C)




THERMOCOUPLE WIRE IDENTIFICATION GUIDE

Coefficients	W/W26Re	W5Re/W26Re
A	0.2883146×10^{-3}	0.7190027×10^{-2}
B	0.6783829×10^{-5}	0.3956443×10^{-5}
C	$-0.1795965 \times 10^{-8}$	$-0.1842722 \times 10^{-8}$
D	$0.2125270 \times 10^{-12}$	$0.3471851 \times 10^{-12}$
E	$-0.1176051 \times 10^{-16}$	$-0.2616792 \times 10^{-16}$
K	$-0.1580014 \times 10^{-1}$	-0.234471

Coefficients	T < 783°C	T ≥ 783°C
A	9.5685256×10^{-3}	9.9109462×10^{-3}
B	2.0592621×10^{-5}	1.8666488×10^{-5}
C	$-1.8464573 \times 10^{-8}$	$-1.4935266 \times 10^{-8}$
D	$7.9498033 \times 10^{-12}$	$5.3743821 \times 10^{-12}$
E	$-1.4240735 \times 10^{-15}$	$-7.9026726 \times 10^{-16}$

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Letter Code	Alloy Combination		Color Coding Ext. Grade	Maximum Useful Temperature Range	EMF(mV) Over Useful Temperature Range	Standard Limits of Error	Comments Environment Bare Wire
	+Lead	-Lead					
G	TUNGSTEN W	TUNGSTEN 26% RHENIUM W-26% Re		32 TO 4208°F 0 TO 2320°C Thermocouple Grade 32 to 500°F 0 to 260°C Extension Grade	0 TO 38.564	4.5°C TO 425°C 1.0% TO 2320°C	Vacuum Inert Hydrogen. Beware of Embrittlement. Not Practical Below 750°F Not for Oxidizing Atmosphere
		TUNGSTEN 5% RHENIUM W-5% Re		TUNGSTEN 26% RHENIUM W-26% Re			
C	TUNGSTEN 5% RHENIUM W-5% Re	TUNGSTEN 26% RHENIUM W-26% Re		32 TO 4208°F 0 TO 2320°C Thermocouple Grade 32 to 1600°F 0 to 870°C Extension Grade	0 TO 37.066	4.5°C TO 425°C 1.0% TO 2320°C	Vacuum Inert Hydrogen. Beware of Embrittlement. Not Practical Below 750°F Not for Oxidizing Atmosphere
		TUNGSTEN 3% RHENIUM W-3% Re		TUNGSTEN 25% RHENIUM W-56% Re			
D	TUNGSTEN 3% RHENIUM W-3% Re	TUNGSTEN 25% RHENIUM W-56% Re		32 TO 4208°F 0 TO 2320°C Thermocouple Grade 32 to 5000°F 0 to 260°C Extension Grade	0 TO 39.506	4.5°C TO 425°C 1.0% TO 2320°C	Vacuum Inert Hydrogen. Beware of Embrittlement. Not Practical Below 750°F Not for Oxidizing Atmosphere
		TUNGSTEN 3% RHENIUM W-3% Re		TUNGSTEN 25% RHENIUM W-56% Re			

