

Temperature - Electromotive Force (EMF) Tables for Non-Letter Designated Thermocouples ¹

This reference manual consists of reference tables that give temperature-electromotive force (emf) relationships for Pyromation, Inc. Types C, M, and P thermocouples. These are not ANSI/ASTM recognized coded thermocouple types

These tables give emf values to three decimal places (1 μ V) for each degree of temperature. Such tables are satisfactory for most industrial uses but may not be adequate for computer and similar applications. If greater precision is required, the reader should contact the manufacturer for equations which permit easy and unique generation of the temperature-emf relationship.

¹ All temperature - electromotive force data in Tables 21 to 26 have been developed from wire manufacturers' data. The data in these tables are based upon the International Temperature Scale of 1990 (ITS-90).

List of Tables

Following is a list of the thermocouple tables included in this reference manual.

Table	Type	Range
19	Limits of error	
20	Recommended upper temperature limits for protected thermocouples	
21	C W,5%Re - W,26%Re	(0 to 2315) °C
22	C W,5%Re - W,26%Re	(32 to 4200) °F
23	M Ni - Ni,18%Moly	(-50 to 1410) °C
24	M Ni - Ni,18%Moly	(-58 to 2570) °F
25	P Platinel II	(0 to 1395) °C
26	P Platinel II	(32 to 2543) °F

Table 19 — Initial Limits of Error for Thermocouples

Type	Temperature Range		Tolerances-Reference Junction 0 °C [32 °F]			
	°C	°F	Standard Tolerances		Special Tolerances	
			°C	°F	°C	°F
C	0 to 400	32 to 750	± 4.5	Note 1	n/a	Note 1
C	400 to 2315	750 to 4200	± 1.0 %		n/a	
M	-50 to 277	-58 to 530	± 2.2		±1.1	
M	277 to 1410	530 to 2570	± 0.75 %		± 0.4 %	
P	0 to 1395	32 to 2543	± 1.0 %		n/a	

Note 1 — The Fahrenheit tolerance is 1.8 times larger than the °C tolerance at the equivalent °C temperature. Note particularly that percentage tolerance apply only to temperature that are expressed in °C

Table 20 — Recommended Upper Temperature Limits for Thermocouples

Type	Upper Temperature limit for Various Wire Gage Sizes (Awg). °C [°F]				
	8 Gage	18 Gage	20 Gage	24 Gage	28 Gage
C			2315 [4200]	2315 [4200]	2315 [4200]
M	1260 [2300] ^A	1204 [2200] ^A			
P			1250 [2280]	1250 [2280]	1250 [2280]

^A Note that the upper temperature limits only apply in a protected sheath