






TYPE J THERMOCOUPLE

Type J thermocouple is a very common and general purpose thermocouple. It has smaller temperature range and a shorter lifespan at higher temperatures. It consist of positive leg made of an Iron wire and negative leg made of an Constantan (Copper-Nickel) alloy wire. Due to the Curie Point of the iron at 770 °C Type J has a limited temperature range of -40°C to 750°C. It should not be used at high temperatures in an oxidizing atmosphere as iron undergoes a molecular change and permanently loses its standard voltage output versus temperature. It does not recover when the iron is cooled. Type J has sensitivity of approx 50 microvolts/ degree C .The expenses and reliability of Type J is same as Type K. For proper working of J Type thermocouple reduction atmosphere is desired and use at low temperature is also not recommended.

J-Type



In J Type thermocouple linearity varies by -70°C over its full range from -210°C to 1200°C .It has a very straight section from 100°C to 500°C which deviates at about -0.5 °C. The lower & higher ranges can be extended with a loss in linearity.

THERMOCOUPLE CONDUCTOR COMBINATION TYPE	INTERNATIONAL COLOUR CODE TO IEC 5843:1989	AMERICAN TO ANSI/MC96.1 	JAPANESE TO JIS C 1610-1981 
J	 + -	 + -	 + -

Why To Prefer J Type Thermocouple:-

- Among all types of thermocouple Type J is the cheapest thermocouple.
- J Type thermocouple gives 1mV output for 18 degree C.
- Useful in reducing atmospheres.
- If J Type is protected by compacted mineral insulation and appropriate outer sheath, it is useable from 0 to 816°C, (32 to 1500°F). It is not susceptible to aging in the 371 to 538°C, (700 to 1000°F) temperature range.

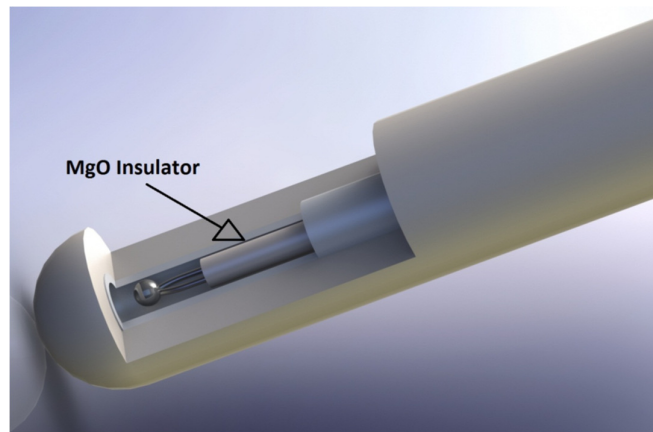
Composition:-

In J Type thermocouple positive leg is composed of Iron(Fe) and negative leg is composed of mixture of Copper 55% and Nickel wire 45% which is known as constantan alloy.

Type J Insulation Material:-

In J Type Thermocouple mainly MgO insulation is used. Due to many desirable characteristics of MgO such as fast response, compact size, broad temperature range, formability, weld ability, durability, accuracy, thermal shock and vibration resistance makes it an excellent choice for virtually all laboratory or process applications. The standard MgO insulation consist of ANSI/ASTM standard limits of error conductor material and standard (96%) pure insulation.

MgO Insulation provide initial calibration tolerances for thermocouple at the temperature range of 0 to 750 °C. Its standard tolerance is +2.2°C or +0.75% which best suits for these thermocouple.



Temperature Range:-

- Thermocouple grade wire, -346 to 1,400F (-210 to 750°C)
- Extension wire, 32 to 392F (0 to 200°C)

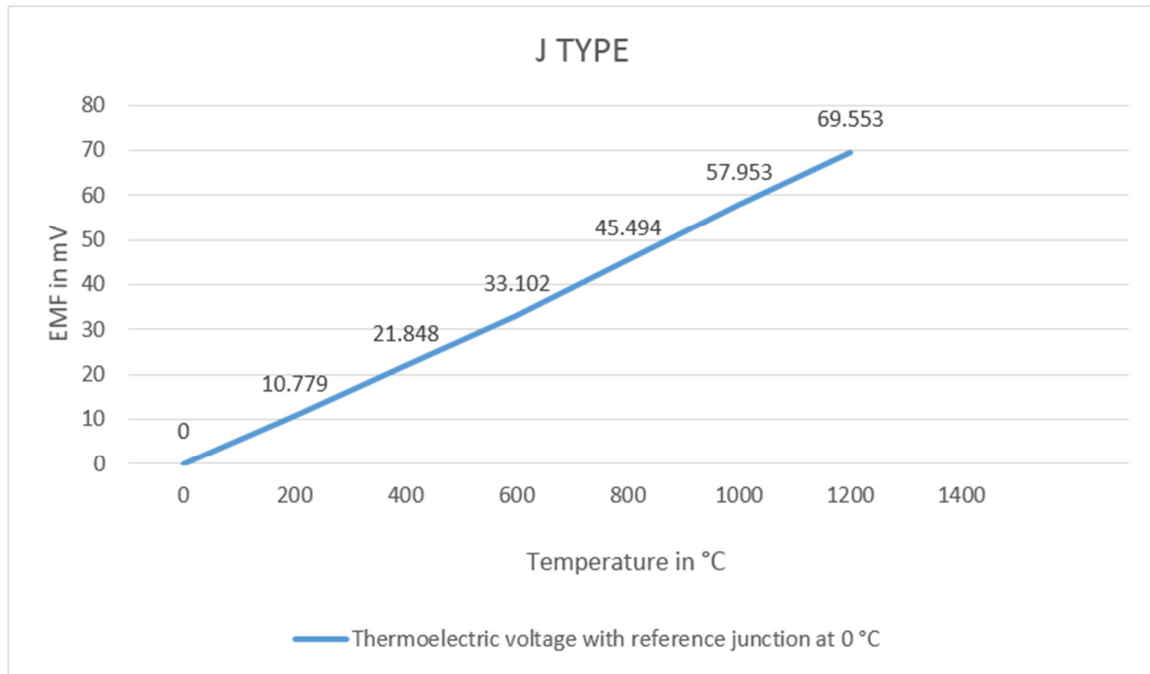
Accuracy (whichever is greater):

- Standard: +/- 2.2°C or +/- 0.75%
- Special Limits of Error: +/- 1.1°C or 0.4%

TOLERANCE:

Type	Temperature range (°C)				Tolerance class (°C)	
	Continuous		Short-term		One	Two
	Low	High	Low	High		
J	0	+750	-180	+800	-40 – 375: ± 1.5 375 – 750: $\pm 0.004 \times T$	-40 – 333: ± 2.5 333 – 750: $\pm 0.0075 \times T$

EMF Vs Temperature Graph for K Type Thermocouple:-



Pros And Cons:-

Pros

- They are cheapest thermocouple.
- Suitable for reducing atmospheres.
- They are versatile and have widespread usage throughout industry.

Cons

- Not suitable for temperature above 760°C.
- They consist of iron wire in one leg so it rusts in humid weather. The rust causes inaccurate readings & at worse open circuit.
- This *thermocouple* get oxidized so it is not recommended for damp conditions or low temperature monitoring.
- If used above 760 °C as an abrupt magnetic transformation will cause permanent recalibrations.

Uses:-

- Used to monitor temperatures of inert materials.
- In vacuum *applications*.
- The main use is with old equipment that can not accept modern thermocouples.