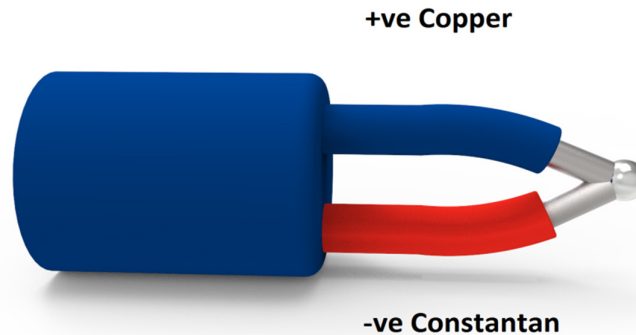





TYPE T THERMOCOUPLE

Type T thermocouple is the best thermocouple to measure low temperature. It is very stable thermocouple and is used in extremely low temperature applications such as cryogenics or ultra low freezers. It consist of positive leg made of an Copper wire and negative leg made of Constantan (Cu & Cu-Ni) alloy wire.

T-Type



In T Type thermocouple copper has a much higher thermal conductivity than the alloys which are generally used in thermocouple construction. In T Type thermocouple only copper wire touches the probes. As we know both conductors are non-magnetic, there is no Curie point due to which there is no immediate change in characteristics of the thermocouple. Type T thermocouples have a sensitivity of about $43 \mu\text{V}/^\circ\text{C}$.

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

Why To prefer T Type Thermocouple:-

- They prove to have a high stability at sub-zero temperatures due to which it is used in a wide variety of cryogenic and low temperature applications
- Well Suited To Oxidizing Atmosphere.
- Type T thermocouples can be used in atmosphere with inert pressures.
- It provide high level of accuracy as it can perform well in presence of moisture without oxidizing.

- When protected by compacted mineral insulation and appropriate outer sheath, they usually has 0 to 350°C, (32 to 662°F).

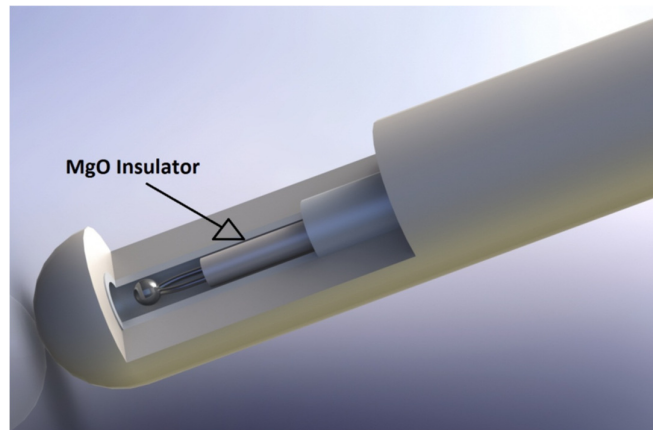
Composition:-

In Type T thermocouple positive leg is composed of Copper and negative leg consist of mixture of 55% Copper and 45% Nickel which is known as constantan alloy.

Type T Insulation Material:-

In T 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, -454 to 700°F (-270 to 370°C)
- Extension wire, 32 to 392°F (0 to 200°C)

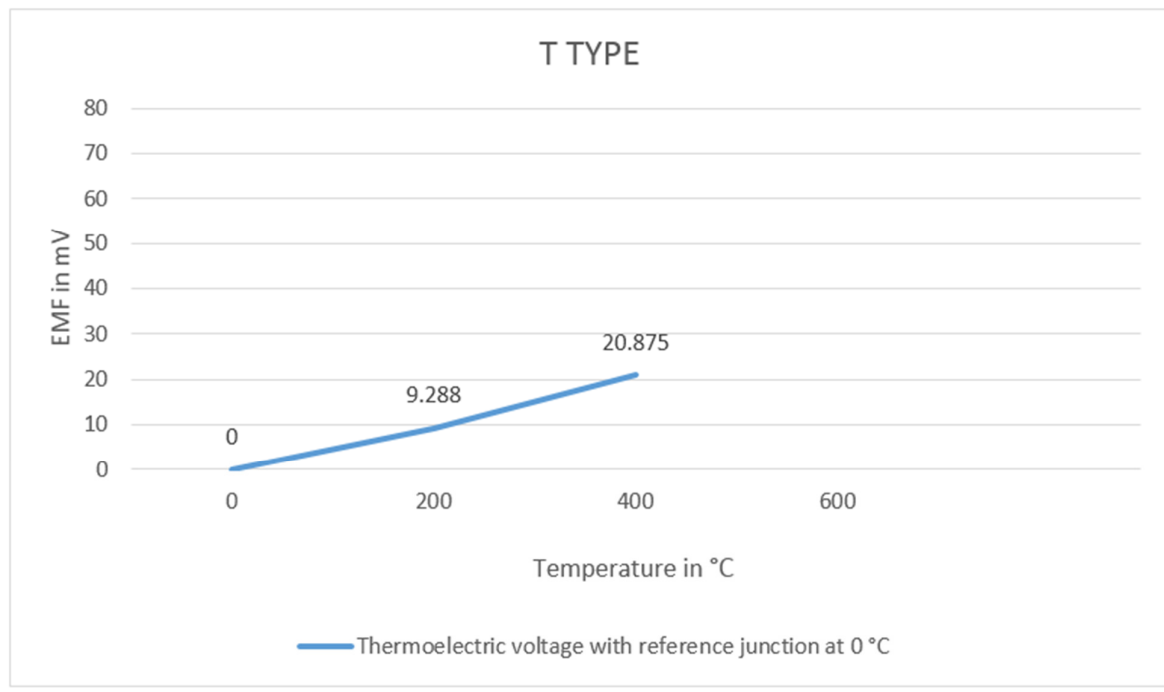
Accuracy (whichever is greater):

- Standard: +/- 1.0C or +/- .75%
- Special Limits of Error: +/- 0.5°C or 0.4%

Tolerance Class:-

Type	Temperature range (°C)				Tolerance class (°C)	
	Continuous		Short-term		One	Two
	Low	High	Low	High		
T	-185	+300	-250	+400	-40 – 125: ± 0.5 125 – 350: $\pm 0.004 \times T$	-40 – 133: ± 1.0 133 – 350: $\pm 0.0075 \times T$

EMF Vs Temperature Graph for T Type Thermocouple:-



Pros And Cons:-

Pros

- Can be used in both oxidizing and reducing atmosphere.
- Rust and Corrosion Resistant.
- Best for cryogenic and low Temperature.

Cons

- Not suitable for temperature above 370°C.

Uses:-

- Used for measuring cryogenic and low temperatures.
- Used in Blood Banks, Laboratories etc.
- Used in ultra low freezers.
- These are used in rigid metal tubes commonly used in used in thermowell or head assemblies.