International Standards for Thermocouples

Thermo-couple	Alloy Combination		National standards of contact potential for thermocouples	Application temperature of thermocouple		Classification of tolerances according to DIN EN 60584-1: 1994 respectively IEC 584-2: 1992			Description
	(+) Lead	(-) Lead	Standard based on IEC 584-1: 1995 and ITS 90	Continuous operation	Peak operation		Class 1	Class 2	
J	**Iron (Fe)** (magnetic)	**Copper-Nickel (CuNi)** known as Konstantan®	DIN EN 60584-1: 1996 BS EN 60584.1 Pt 3: 1996 ANSI/MC96.1 NF EN 60584.1: 1996 JISC 1602	+20 up to +700°C	-180 up to +750°C	Temperature range Limiting deviation Temperature range Limiting deviation	-40°C up to +375°C ±1,5°C +375°C up to +750°C ± 0,004 · |t|	-40°C up to +333°C ±2,5°C +333°C up to +750°C ± 0,0075 · |t|	Reducing, vacuum, inert. Limited use in oxidising at high temperatures. Not recommended for low temperature.
K	**Nickel-Chromium (NiCr)** known as Chromel®	**Nickel-Aluminum (NiAl)** known as Alumel® (magnetic)	DIN EN 60584-1: 1996 BS EN 60584.1 Pt 4: 1996 ANSI/MC96.1 NF EN 60584.1: 1996 JISC 1602	0 up to +1100°C	-180 up to +1350°C	Temperature range Limiting deviation Temperature range Limiting deviation	-40°C up to +375°C ±1,5°C +375°C up to +1000°C ± 0,004 · |t|	-40°C up to +333°C ±2,5°C +333°C up to +1200°C ± 0,0075 · |t|	Clean oxidising and inert. Limited use in vacuum or reducing. Wide temperature range, most popular calibration.
N	**Nickel-Chromium-Silicon (NiCrSi)** known as Nicrosil®	**Nickel-Silicon (NiSi)** known as Nisil®	DIN EN 60584-1: 1996 BS EN 60584.1 Pt 8: 1996 ANSI/MC96.1 NF EN 60584.1: 1996 JISC 1602	0 up to +1100°C	-270 up to +1300°C	Temperature range Limiting deviation Temperature range Limiting deviation	-40°C up to +375°C ±1,5°C +375°C up to +1000°C ± 0,004 · |t|	-40°C up to +333°C ±2,5°C +333°C up to +1200°C ± 0,0075 · |t|	Alternative to Type K. More stable at high temperature.
T	**Copper (Cu)**	**Copper-Nickel (CuNi)** known as Konstantan®	DIN EN 60584-1: 1996 BS EN 60584.1 Pt 5: 1996 ANSI/MC96.1 NF EN 60584.1: 1996 JISC 1602	-185 up to +300°C	-250 up to +400°C	Temperature range Limiting deviation Temperature range Limiting deviation	-40°C up to +125°C ±0,5°C +125°C up to +350°C ± 0,004 · |t|	-40°C up to +133°C ±1,0°C +133°C up to +350°C ± 0,0075 · |t|	Mild oxidising, reducing vacuum or inert. Good where moisture is present. Low temperature and cryogenic applications.
E	**Nickel-Chromium (NiCr)** known as Chromel®	**Copper-Nickel (CuNi)** known as Konstantan®	DIN EN 60584-1: 1996 BS EN 60584.1 Pt 6: 1996 ANSI/MC96.1 NF EN 60584.1: 1996 JISC 1602	0 up to +800°C	-40 up to +900°C	Temperature range Limiting deviation Temperature range Limiting deviation	-40°C up to +375°C ±1,5°C +375°C up to +800°C ± 0,004 · |t|	-40°C up to +333°C ±2,5°C +333°C up to +900°C ± 0,0075 · |t|	Oxidising or inert. Limited use in vacuum or reducing. Highest EMF change per degree.
R	**Platinum-13% Rhodium (Pt13Rh)**	**Platinum (Pt)** (-) lead softer than (+) lead	DIN EN 60584-1: 1996 BS EN 60584.1 Pt 2: 1996 ANSI/MC96.1 NF EN 60584.1: 1996 JISC 1602	0 up to +1600°C	-50 up to +1700°C	Temperature range Limiting deviation Temperature range Limiting deviation	0°C up to +1100°C ±1,0°C +1100°C up to +1600°C ±(1+0,003 (·|t|-1100))°C	0°C up to +600°C ±1,5°C +600°C up to +1600°C ± 0,0025 · |t|	Oxidising or inert. Do not insert in metal tubes. Beware of contamination. High temperature.
S	**Platinum-10% Rhodium (Pt10Rh)**	**Platinum (Pt)** (-) lead softer than (+) lead	DIN EN 60584-1: 1996 BS EN 60584.1 Pt 1: 1996 ANSI/MC96.1 NF EN 60584.1: 1996 JISC 1602	0 up to +1550°C	-50 up to +1750°C	Temperature range Limiting deviation Temperature range Limiting deviation	0°C up to +1100°C ±1,0°C +1100°C up to +1600°C ±(1+0,003 (·|t|-1100))°C	0°C up to +600°C ±1,5°C +600°C up to +1600°C ± 0,0025 · |t|	Oxidising or inert. Do not insert in metal tubes. Beware of contamination. High temperature.
B	**Platinum-13% Rhodium (Pt13Rh)**	**Platinum-6% Rhodium (Pt6Rh)**	DIN EN 60584-1: 1996 BS EN 60584.1 Pt 7: 1996 ANSI/MC96.1 NF EN 60584.1: 1996 JISC 1602	+100 up to 1600	+100 up to 1820°C	Temperature range Limiting deviation Temperature range Limiting deviation	- - - -	- - +600°C up to +1700°C ± 0,0025 · |t|	Oxidising or inert. Do not insert in metal tubes. Beware of contamination. High temperature. Common use in glass industry.

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