



Wire and Cable

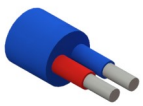


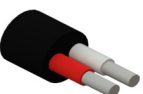

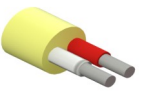
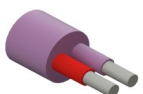


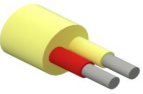

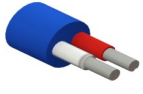

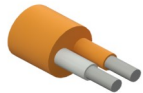







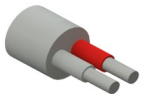
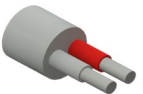
Thermocouple Grade

Thermocouple wire is used in the manufacture of thermocouple sensors and may be calibrated at temperatures above 200°C(392°F). It is exposed to high oven, furnace, and other process temperatures.

Thermocouple Extension Grade

Thermocouple extension wire is used to connect a thermocouple temperature sensor to a measurement or control device such as a transmitter, controller, recorder, or PLC. Extension wire is calibrated for operating temperatures below 200°C(392°F). Runs should not exceed 150 meters (500ft) with consideration for electrical noise pickup and grounding practices.

ANSI ,IEC & JIS Insulation Colour Coding & Magnet Check

Type	Color Codes			(+)	(-)
	ANSI	IEC	JIS		
T				Copper	Constantan
J				Iron (Magnetic)	Constantan
E				Chromel	Constantan
K				Chromel	Alumel (Magnetic)
R				Platinum	Platinum, 13% Rhodium
N				Nicrosil	Nisil
S				Platinum	Platinum, 10% Rhodium
B				Platinum,30% Rhodium	Platinum, 6% Rhodium

- Thermocouple grade wire has a brown outer jacket.
- Braided insulations (ie. fibreglass) may have a coloured tracer
- Extruded insulations (ie. PVC) will be a solid colour
- The RED conductor is always of negative polarity.
- ANSI: American National Standards Institute, standard MC96.1

Temperature Ratings of Insulation Materials

Material	Cont. Op. Temp Range C&F
PVC - Polyvinyl Chloride	-40 to 105 °C (-40 to 221°F)
NYL - Nylon	-51 to 149 °C (-60 to 300°F)
FEP - Teflon	-68 to 260 °C (-90 to 500°F)
TZL - Tefzel	-68 to 260 °C (-90 to 500°F)
KAP - Kapton	-20 to 316 °C (-4 to 600°F)
FGG - Fibreglass	0 to 482 °C (32 to 900°F)
HFG - High Temp. Fibreglass	0 to 704 °C (32 to 1300°F)
CFR - Ceramic Fibre	0 to 1204 °C (32 to 2200°F)

ANSI Limits of Error for Thermocouple Grade Wire

ANSI Letter	Standard Limits of Error (whichever is greater)	Special Limits of Error (whichever is greater)
T	+/- 1.0°C(1.8°F) or +/- 0.75%	+/- 0.5°C(0.9°F) or +/- 0.4%
J	+/- 2.0°C(4.0°F) or +/- 0.75%	+/- 1.1°C(2.0°F) or +/- 0.4%
E	+/- 1.7°C(3.1°F) or +/- 0.5%	+/- 1.0°C(1.8°F) or +/- 0.4%
K	+/- 2.2°C(4.0°F) or +/- 0.75%	+/- 1.1°C(2.0°F) or +/- 0.4%
R&S	+/- 1.5°C(2.7°F) or +/- 0.25%	+/- 0.6°C(1.1°F) or +/- 0.1%
B	+/- 0.5%	--
N	+/- 2.2°C(4.0°F) or +/- 0.75%	+/- 1.1°C(2.0°F) or +/- 0.4%

NOTE: Special **quarter** limits of error available upon request.

Operating Temperature Range for Thermocouple Wire

ANSI Letter	Range
T	-184°C (-300°F) to 371°C (700°F)
J	0°C (32°F) to 760°C (1400°F)
E	0°C (32°F) to 871°C (1600°F)
K&N	0°C (32°F) to 1260°C (2300°F)
R&S	538°C (1000°F) to 1482°C (2700°F)

ANSI Limits of Error for Thermocouple Extension Wire Operating Temp. Range: 0°C (32°F) to 200°C (392°F)

NOTE: Types R,S & B extension wire for Platinum thermocouples is Copper(+) and an Alloy of Copper (-).

ANSI Letter	Standard Limits of Error (whichever is greater)	Special Limits of Error (whichever is greater)
TX	+/- 1.0°C (1.8°F)	+/- 0.5°C (0.9°F)
JX	+/- 2.0°C (4.0°F)	+/- 1.1°C (2.0°F)
EX	+/- 1.7°C (3.1°F)	+/- 1.0°C (1.8°F)
KX	+/- 2.2°C (4.0°F)	+/- 1.1°C (2.0°F)
RX & SX	+/- 5.0°C (9.0°F)	N/A
BX	+/- 5.0°C (9.0°F)	N/A
NX	+/- 2.2°C (4.0°F)	+/- 1.1°C (2.0°F)

How to Specify Single & Multipair Wire & Cable

#TT ___ [1] - ___ [2] - _____ - ___ - _____

Conductor Gauge	Ansi Calibration	Ins. & Jacket Material	Options (Wire)	Options (Cable)
16 or 16S	T or TX	PVC	"L" - Spec. Limits	
18 or 18S	J or JX	NYL	of Error	
20 or 20S	K or KX	FEP	"B" - Stainless Steel	
24 or 24S	E or EX	TZL	Overbraid	
30 or 30S	N or NX	KAP	"S" - Shield, Twisted	
	RX, SX, or BX	FGG	with Drainwire	
		HFG		
		CFR		

[1] - "S" - Stranded conductor, otherwise solid

[2] - "X" - Extension Grade, otherwise Thermocouple Grade

MultiPair Thermocouple Extension Cable

Add to Options in above catalogue number as follows:

- XPR - "X" No. of twisted pairs (ie. 4PR is 4 pairs), cabled
- OVS - Overall Al mylar shield with drainwire
- IOS - Individual pair and overall Al mylar shield with drainwire
- SIA - Steel (galvanized) interlocked armour, PVC jacket
- AIA - Aluminum interlocked armour, PVC jacket
- UUL - UL Approved for USA
- CUL - UL Approved for Canada
- CSA - CSA Certified
- FT4 - Flame Test 4 rated outer jacket
- CHL - Hazardous Locations rated
- 300 - 300 Volt insulation rating
- 600 - 600 Volt insulation rating
- SPE - Other special features

Examples:

- **#TT16S-K-FGG-B** - Specifies #16 gauge stranded conductor, type K calibration, thermocouple grade, fibreglass insulation with stainless steel overbraid, single pair wire
- **#TT20-JX-PVC-6PR-IOA-CSA-FT4-300** - Specifies #20 gauge solid conductor, type J calibration, extension grade, PVC insulation, 6 twisted pairs, individual & overall shield, CSA certified, Flame Test 4, 300V insulation rating, multipair cable

Registered Trade Names

- Kapton (KAP), Nylon (NYL), Teflon (FEP), Tefzel (TZL), Mylar ... **Dupont Co**
- Nextel (CFR) ... **3M Co.**
- Chromel(K+), Alumel (K-) ... **Hoskins Co.**
- Alloy 11(R & S -) ... **Harrison Driver Harris**
- Alloy 30-6 ... **Carpenter Technology**