


# JASS International FZE

## Thermocouple & Extension Wire

**International Thermocouple Color Codes - Thermocouple and Extension Grade Wires**

THERMO-COUPLE TYPE	ALLOY COMBINATION	U.S. & CANADIAN (ANSI/MC98.1, ANSI/ASTM E230)		PLUG & JACK						
		THERMO-COUPLE GRADE	EXTENSION GRADE		International IEC 584-3	International IEC 584-3 Intrinsically Safe	Czech British BS 1843	Netherlands German DIN 43710	Japanese JIS C 1610	French NFC 42-324
T	Copper			Blue						
	Constantan (Copper-Nickel)			Blue						
J	Iron (magnetic)			Black						
	Constantan (Copper-Nickel)			Black						
E	Nickel - Chromium			Purple						
	Constantan (Copper-Nickel)			Purple						
K	Nickel - Chromium			Yellow						
	Nickel - Aluminium (magnetic)			Yellow						
N	Nicrosil (Nickel-Chromium- Silicon)			Orange				No Standard (Use American Color Codes)	No Standard (Use American Color Codes)	No Standard (Use American Color Codes)
	Nisil (Nickel-Silicon-Magnesium)			Orange				No Standard (Use American Color Codes)	No Standard (Use American Color Codes)	No Standard (Use American Color Codes)
S	Platinum Rhodium - 10%	None Established		Green						
	Platinum	None Established		Green						
R	Platinum Rhodium - 13%	None Established		Green						
	Platinum	None Established		Green						
B	Platinum Rhodium - 30%	None Established		White (Uncompensated)			No Standard (Use Copper Wire)			No Standard (Use Copper Wire)
	Platinum Rhodium - 6%	None Established		White (Uncompensated)			No Standard (Use Copper Wire)			No Standard (Use Copper Wire)
C	Tungsten Rhenium - 5%	None Established		Red				No Standard (Use American Color Codes)	No Standard (Use American Color Codes)	No Standard (Use American Color Codes)
	Tungsten Rhenium - 26%	None Established		Red				No Standard (Use American Color Codes)	No Standard (Use American Color Codes)	No Standard (Use American Color Codes)

All GRAHAM SENSOR TECHNOLOGIES INC. wire is manufactured to the most stringent quality standards to assure high performance and reliability. We stock the most popular kinds of WIRE, both thermocouple grades as well as extension grade for Quick delivery.

The Listing on the next couple of pages represents the most popular construction. However other designs are available upon request.

There is a significant difference between the wire used to measure temperature and the wire used to carry the signal to an instrument. The difference between the two types of wires is that the "EXTENSION" grade wire is not calibrated above 400°F (204°C).

Long leadwire runs, and or the use of analog based instrumentation; make conductor resistance an important consideration in selecting the wire gauge best suited for your application. On the following pages you will find a chart listing wire gauge as well as the minimal ohms per double foot @68°F (20°C) for each calibration and for each wire size

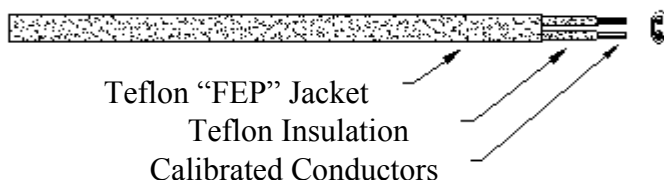
Ohms (Ω) per double foot is the total resistance, in Ohms (Ω), for both conductors, per foot.

## TEFLON® FEP (TE/TE)

The Thermocouple grade wire is used to form temperature sensors. Extension grade wire issued as the interconnecting link in the temperature system. Suggested operating temperature is -90°F to 400°F (-67°C to 204°C). The insulation on the individual conductors and the jacketing are both colour coded to ANSI standards for quick identification of conductors and calibration.

### Thermocouple grade

P/N	Cal.	Wire Type	Wire Gauge	Colour Jacket	Colour Positive Leg	Colour Negative Leg	Nominal Diameter	Resistance in $\Omega$ $\pi\epsilon\rho$ Double Foot	Approx. Ship. Weight Per 1,000 ft.
WT-I-J-L-20	J	Solid	20 AWG	Brown	White	Red	.068 x .116	0.357	12
WT-I-J-F-20	J	STRANDED	20 AWG	Brown	White	Red	.074 x .128	0.357	12
WT-I-K-L-20	K	Solid	20 AWG	Brown	Yellow	Red	.068 x .116	0.586	12
WT-I-K-F-20	K	STRANDED	20 AWG	Brown	Yellow	Red	.074 x .128	0.586	12
WT-I-T-L-20	T	Solid	20 AWG	Brown	Blue	Red	.068 x .116	0.298	12
WT-I-E-L-20	E	Solid	20 AWG	Brown	Purple	Red	.068 x .116	0.707	12
WT-I-N-L-20	N	Solid	20 AWG	Brown	Orange	Red	.068 x .116	0.781	12



TEFLON® is applied as an insulation or jacket by conventional extruder processes. It retains useful strength and flexibility over a broad range of environmental temperature or thermal aging; and a volume resistivity greater than  $10^{18}$   $\Omega$ -cm and a surface resistivity above  $10^{16}$   $\Omega$ /Sq. both are at the top of the measurable range.

### Extension Grade

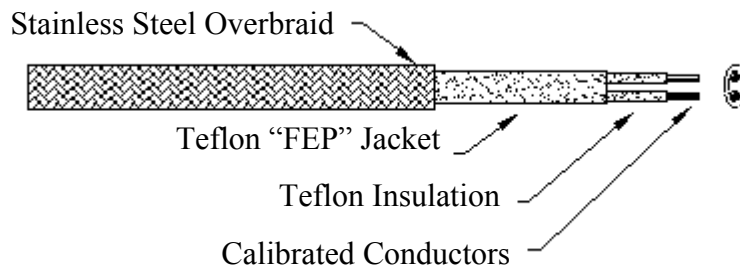
P/N	Cal.	Wire Type	Wire Gauge	Colour Jacket	Colour Positive Leg	Colour Negative Leg	Nominal Diameter	Resistance in $\Omega$ $\pi\epsilon\rho$ Double Foot	Approx. Ship. Weight Per 1,000 ft.
WE-I-J-L-20	JX	Solid	20 AWG	Brown	White	Red	.068 x .116	0.357	12
WE-I-J-F-20	JX	STRANDED	20 AWG	Brown	White	Red	.074 x .128	0.357	12
WE-I-K-L-20	KX	Solid	20 AWG	Brown	Yellow	Red	.068 x .116	0.586	12
WE-I-K-F-20	KX	STRANDED	20 AWG	Brown	Yellow	Red	.074 x .128	0.586	12
WE-I-T-L-20	TX	Solid	20 AWG	Brown	Blue	Red	.068 x .116	0.298	12
WE-I-E-L-20	EX	Solid	20 AWG	Brown	Purple	Red	.068 x .116	0.707	12
WE-I-N-L-20	NX	Solid	20 AWG	Brown	Orange	Red	.068 x .116	0.781	12

# TEFLON® FEP (TE/TE) with Stainless Steel Overbraid

Stainless Steel Overbraid is by far the most common of the overbraid and is available on almost all thermocouple and extension wires. While highly resistant to corrosion, stainless steel is able to maintain a continuous operating temperature of 1,400°F (760°C). But remember the maximum temperature is set by the element with the lowest temperature range whether it's the insulation, outer-jacket or overbraid.

## Thermocouple Grade

P/N	Cal.	Wire Type	Wire Gauge	Colour Jacket	Colour Positive Leg	Colour Negative Leg	Nominal Diameter	Resistance in $\Omega$ per Double Foot	Approx. Ship. Weight Per 1,000 ft.
WT-J-J-L-20	J	Solid	20 AWG	Brown	White	Red	.068 x .116	0.357	12
WT-J-J-F-20	J	STRANDED	20 AWG	Brown	White	Red	.074 x .128	0.357	12
WT-J-K-L-20	K	Solid	20 AWG	Brown	Yellow	Red	.068 x .116	0.586	12
WT-J-K-F-20	K	STRANDED	20 AWG	Brown	Yellow	Red	.074 x .128	0.586	12
WT-J-T-L-20	T	Solid	20 AWG	Brown	Blue	Red	.068 x .116	0.298	12
WT-J-E-L-20	E	Solid	20 AWG	Brown	Purple	Red	.068 x .116	0.707	12
WT-J-N-L-20	N	Solid	20 AWG	Brown	Orange	Red	.068 x .116	0.781	12



TEFLON® is applied as an insulation or jacket by conventional extruder processes. Then the Stainless Steel Overbraid is added. Adding durability, flexibility and abrasion resistance to your wire there by lengthening the life of the wire. NOTE: If you connect one end of the Stainless Steel Overbraid to ground you will provide a measurable amount of electrical shielding.

## Extension Grade

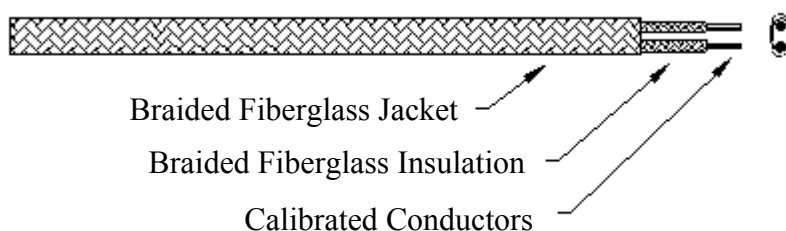
P/N	Cal.	Wire Type	Wire Gauge	Colour Jacket	Colour Positive Leg	Colour Negative Leg	Nominal Diameter	Resistance in $\Omega$ per Double Foot	Approx. Ship. Weight Per 1,000 ft.
WE-J-J-L-20	JX	Solid	20 AWG	Brown	White	Red	.068 x .116	0.357	12
WE-J-J-F-20	JX	STRANDED	20 AWG	Brown	White	Red	.074 x .128	0.357	12
WE-J-K-L-20	KX	Solid	20 AWG	Brown	Yellow	Red	.068 x .116	0.586	12
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## FIBERGLASS BRAID (FB/FB)

This construction is one of the earliest insulation used and is perhaps still the most widely used. It consists of the single conductors insulated with a fiberglass braid then impregnated with a special binder to improve moisture and abrasion resistance. The singles are then laid parallel and a braided jacket of the same material is applied and impregnated.

### Thermocouple Grade

P/N	Cal.	Wire Type	Wire Gauge	Colour Jacket	Colour Positive Leg	Colour Negative Leg	Nominal Diameter	Resistance in $\Omega$ per Double Foot	Approx. Ship. Weight Per 1,000 ft.
WT-A-J-L-20	J	Solid	20 AWG	Brown	White	Red	.060 x .106	0.357	10
WT-A-J-F-20	J	STRANDED	20 AWG	Brown	White	Red	.066 x .118	0.357	10
WT-A-K-L-20	K	Solid	20 AWG	Brown	Yellow	Red	.060 x .106	0.586	10
WT-A-K-F-20	K	STRANDED	20 AWG	Brown	Yellow	Red	.066 x .118	0.586	10
WT-A-T-L-20	T	Solid	20 AWG	Brown	Blue	Red	.060 x .106	0.298	10
WT-A-E-L-20	E	Solid	20 AWG	Brown	Purple	Red	.060 x .106	0.707	10
WT-A-N-L-20	N	Solid	20 AWG	Brown	Orange	Red	.060 x .106	0.781	10



This insulation is designed to withstand a maximum continuous use at 900°F (482°C) and a single exposure use at 1,000°F (537°C). Wire gauge size, calibration and atmosphere will effect the maximum useful temperature / life in a particular application.

**NOTE: Moisture Proof Impregnation is retained to 400°F (204°C) only**

### Extension Grade

P/N	Cal.	Wire Type	Wire Gauge	Colour Jacket	Colour Positive Leg	Colour Negative Leg	Nominal Diameter	Resistance in $\Omega$ per Double Foot	Approx. Ship. Weight Per 1,000 ft.
WE-A-J-20	JX	Solid	20 AWG	Brown	White	Red	.060 x .106	0.357	10
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WE-A-E-20	EX	Solid	20 AWG	Brown	Purple	Red	.060 x .106	0.707	10

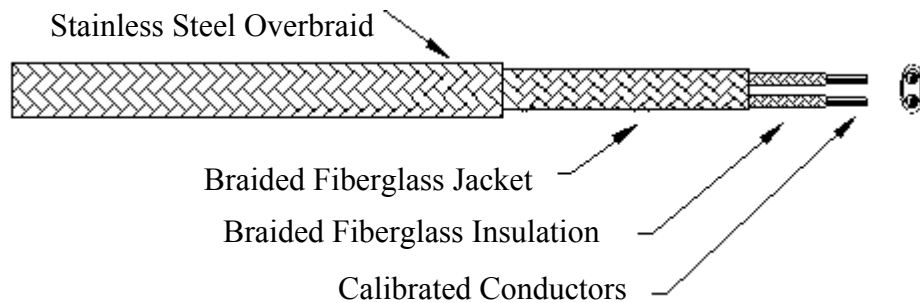
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## Wire Part Numbering System

### First two characters

**WT** = Thermocouple Grade,                      **WE** = Extension Grade  
**WP** = Single Positive wire T/C Grade,        **WN** = Single Negative wire T/C Grade  
**WR** = RTD wire                                      **WI** = Instrument wire  
**WM** = Multi-pair (Add Number of pairs to end of P/N)

### Third character

**A** = Fiberglass,                                      **B** = Fiberglass with Stainless steel overbraid  
**C** = Filaflex,                                        **D** = Filaflex with stainless steel overbraid  
**E** = Kapton,                                         **F** = Kapton with stainless steel overbraid  
**G** = Teflon Tape (TFE),                        **H** = Teflon Tape (TFE) with stainless steel overbraid  
**I** = Extruded Teflon (FEP),                    **J** = Extruded Teflon (FEP) with stainless steel overbraid  
**K** = Rip cord Extruded Teflon (FEP) no outer-jacket  
**L** = Twisted Shielded Teflon (FEP), **M** = Twisted Shielded Teflon (FEP) with stainless steel overbraid  
**LJ** = Twisted NO Shielded Teflon (FEP), New for 2011  
**N** = Synthetic Fiber,                              **O** = Synthetic Fiber with stainless steel overbraid  
**P** = PVC,    **Q** = PVC with stainless steel overbraid  
**R** = Twisted Shielded PVC,                    **S** = PVC Rip cord  
**T** = Nylon,                                         **U** = Nylon with stainless steel overbraid  
**V** = Ceramaflex,                                 **W** = Ceramaflex with stainless steel overbraid  
**X** = Special                                        **Y** = Bare Wire no Jacket or Insulation  
**Z** = Customer definable

### Fourth character

T/C Calibration ( **E, J, K, N, T** )  
Or

(**2,3,4,6**) For Instrument and RTD Wire

### FIFTH character

**D**= Stranded & Special Limits of Error

**F**= Stranded

**L**= Standard limits of error Solid

**S**= Special Limits of Error /Solid wire

### Last two characters

**08** = 8 AWG   **16** = 16 AWG   **20** = 20 AWG   **22** = 22 AWG  
**24** = 24 AWG   **26** = 26 AWG   **30** = 30 AWG