Thermocouple Wire and Cable Insulation
THERMOCOUPLE AND EXTENSION GRADE WIRE
Type R and S

This Section Contains

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Multipair Cable
General Reference Data
Please CALL for Quote!

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Thermocouple Wire and Cable Insulation

Type	Product Description	Performance Features	Applications
CFCF	**Ceramic Fiber:** Highest temperature flexible insulation available. The braided yarn is a composition of the oxides of alumina, Boric and silicone. Each conductor as well as the overall jacket is braided with high temperature yarn to provide maximum flexibility at extremely high temperatures.	Designed for continuous use at temperatures to 2200°F (1205°C), intermittent use to 2600°F (1430°C). Good abrasion and chemical resistance.	▸ Replacement for beaded T/C's ▸ Heat treating ▸ Coke Ovens ▸ Soaking pits ▸ Furnace Survey T/C's ▸ Brick & Tile Kilns
MCFCF	**Ceramic Fiber & Mica:** This construction has a mica barrier tape applied to each single conductor prior to being insulated with the ceramic fiber yarns. This construction is identical to the CFCF construction except for the addition of a light jacket of saturant and the mica tape, which protects against potential shorting from abrasion and chemical oxide	Designed for continuous use at temperatures to 2200°F (1205°C), intermittent use to 2600°F (1430°C). Good abrasion and chemical resistance. Helps prevent shorting caused from abrasion and chemical oxidation.	▸ Replacement for beaded T/C's ▸ Heat treating ▸ Coke Ovens ▸ Soaking pits ▸ Furnace Survey T/C's ▸ Brick & Tile Kilns
GG	**Fiberglass:** Most popular and widely applied of all glass insulation's. A color-coded fiberglass braid saturated with high-performance resin is used for insulation of the overall construction.	Designed for continuous use at temperatures to 950□F (480□C). Good moisture and chemical resistance,; fair abrasion resistance	▸ Heat treating ▸ Glass & Ceramic Kilns ▸ Foundries ▸ Extensive use in aluminum Processing
HGHG	**High Temp Glass:** A high temperature, high tensile strength fiberglass, either color-coded or with tracer yarn, is braided on both the single conductors and the overall jacket. Both are impregnated with a 500□F modified resin saturant.	Designed for continuous use at temperatures to 1200□F (650□C), intermittent temperatures to 1450□F (1450□C). Good moisture and chemical resistance; fair abrasion resistance	▸ Preheating & Stress relieving ▸ Heat treating for annealing, aging or hardening ▸ Furnace Temperature Surveys
RR	**Refrasil (Vitreous Silica):** High temperature silica fibers are braided on the single conductors as well as the overall jacket. Because saturant is not used, this product is not recommended for abrasive applications. This construction is braided to provide maximum flexibility at extremely high temperatures. A tracer is braided into the insulation for polarity and calibration identification.	Designed for continuous use at temperatures to 1800□F (980□C), intermittent use to 2000□F (1095□C). Not recommended for applications where insulation may be subject to abrasion.	▸ Furnace survey T/C's ▸ Heat treating
STW	**High Temp "S" Glass:** A high temperature, high tensile strength, **extra heavy fiberglass** yarn braided over each conductor. The insulated, color-coded conductors are impregnated with a high-temperature modified resin and twisted to form a pair. This product construction does not include an overall jacket	Designed for continuous use at 1200□F (650□C). Good abrasion resistance Easily stripped and terminated. Economically practical for short-duration applications.	▸ Homogenizing furnaces for billet preheating ▸ Furnace Temperature Surveys ▸ Heat Treating.

- Trademark of E. I. DuPont

Thermocouple Wire and Cable Insulation, continued

Type	Product Description	Performance Features	Applications
SFSF	**Synthetic Fiber:** Tough, heavy insulation for use where abrasion resistance on braided insulation is required. Conductors are insulated with braided composite synthetic yarn & impregnated with a color-coded moisture resistant saturant. The insulated conductors are laid parallel & insulated with a heavy yarn composite fiber jacket which is then coated with the same saturant.	Designed for continuous use at temperatures to 550□F (290□C); intermittent readings to 650□F (340□C). Excellent abrasion & good chemical resistance.	▸ Glass Manufacturing ▸Ceramic Manufacturing ▸ Heat treating ▸ Metal working plants
KK	**Kapton* Tape:** Very tough, durable double-wrap of heat-fused polyimide tape applied over each conductor. Each insulated single conductor is coated with an ANSI color-coded polyimide varnish. The jacket consists of a double-wrapped heat-fused polyimide tape.	Designed for continuous use at temperatures to 500□F (315□C), intermittent readings to 650□F (430□C). Color-coding offers easy identification. Excellent abrasion, moisture & chemical resistance	▸ Power Plants ▸ Kilns ▸ Petroleum Plants ▸ Aerospace Industry ▸ Cryogenic Applications
KAP	**Kapton* Tape:** Very tough, durable double wrap of heat-fused polyimide tape applied over each conductor. Insulated conductors are **twiste**d with a **stranded drain wire** and the twisted construction is covered with **aluminum/ Kapton tape**. The outer jacket consists of a double wrapped heat-fused polyimide tape.	Designed for continuos use at temperatures to 500□F (315□C), intermittent readings to 650□F (430□C). Color-coding offers easy identification. Excellent abrasion, moisture & chemical resistance. **Twisted/ Shielded** construction minimizes electrical interference.	▸ Power Plants ▸ Kilns ▸ Petroleum Plants ▸ Aerospace Industry ▸ Cryogenic Applications
PAP	**Polyvinyl Insulation, Overall Shielding:** Single & Multi-pair cables with an overall shield are constructed by insulating the single conductors with 220□F (105□C) PVC. One conductor of each pair is numbered and twisted with its counterpart. The twisted pairs are cabled with an insulated copper communications wire and the entire construction is wrapped with an aluminum/Mylar tape shield. A copper drain wire is applied under the extruded 195□F (90□C) PVC jacket.	Continuous temperature rating of 220□F (105□C). Shielded construction provides noise protection. Excellent moisture resistance; good chemical & abrasion resistance. **Approved UL Sub 13 PLTC**	▸ General Plant Use
PAAP	**Polyvinyl Insulation Individual and Overall Shielding:** This construction is the same as the PAP construction, except this construction has an aluminum/Mylar tape and drain wire over each single pair. This provides isolation for each separate pair in the construction and eliminates internal and external noise in the circuit.	Continuous temperature rating of 220□F (105□C). Dual Shielding construction provides excellent noise protection. Excellent moisture resistance; good chemical & abrasion resistance. **Approved UL Sub 13 PLTC**	▸ General Plant Use
PP	**Polyvinyl Duplex:** The least expensive wire insulation available. The PVC individual color-coded conductors are insulated with 15 mils (nominal) of PVC, then parallel conductors are given a 20 mil PVC jacket. The jacket is easily stripped for separation of insulated conductors.	Designed for continuous use at temperatures to 220□F (105□C). Good abrasion & chemical resistance.	▸ Permanent Sensor Fabrication ▸Laboratories ▸Test Facilities ▸General Plant Use.

Thermocouple Wire and Cable Insulation, continued

* Trademark of E. I. DuPont Type	Product Description	Performance Features	Applications
PFPF	**Extruded PFA Teflon:** Color-coded PFA Teflon is extruded over each single conductor. A PFA Teflon jacket is extruded over the insulated parallel singles to form a duplex construction.	Designed for continuous use at temperatures to 500□F (260□C); intermittent readings to 600□F (315□C). Provides the highest temperature rating of our extruded products. Excellent moisture and chemical resistance; good abrasion resistance.	▸ Food Processing ▸ Glass Plants ▸ Ceramic Plants ▸ Brick Plants ▸ Power Plants
PFAPF	**Extruded, Shielded PFA Teflon*:** Color-coded PFA Teflon is extruded over each single conductor. Insulated conductors are twisted with a stranded drain wire, the twisted construction is covered with an aluminum/Mylar tape. A PFA Teflon jacket is extruded over the shielded pairs or triads.	Designed for continuous use at temperatures to 500□F (260□C); intermittent readings to 550□F (290□C). Twisted/Shielded construction minimizes electrical interference. Excellent abrasion, moisture and chemical resistance.	▸ General Plant Use ▸ Aerospace Industry ▸ Glass Plants ▸ Ceramic Plants ▸ Brick Plants ▸ Power Plants
TT	**Extruded FEP Teflon*:** Color-coded FEP Teflon is extruded over each single conductor. The single insulated conductors are laid parallel and insulated with an extruded jacket of FEP Teflon.	Designed for continuous use at temperatures to 400□F (205□C); intermittent readings to 500□F (260□C). Most economic and popular of the Teflon construction. Excellent low-friction jacket facilitates easy pulling of wire through conduits.	▸ Power Generating Plants ▸ Petroleum Plants ▸ Field Heat Treating
TAT	**Extruded, Shielded FEP Teflon*:** Color-coded FEP Teflon is extruded over each single conductor. Insulated conductors are twisted with stranded drain wire and the twisted construction is covered with an aluminum/Mylar tape. An FEP Teflon jacket is extruded over the shielded pairs or triads.	Designed for continuous use at temperatures to 400□F (205□C); intermittent readings to 500□F (260□C). Twisted/Shielded construction minimizes electrical interference. Excellent abrasion , moisture and chemical resistance.	▸ Power Generating Plants ▸ Petroleum Plants ▸ Field Heat Treating
TFTF	**Fused TFE Tape:** A double wrap of heat-fused TFE tape is spirally applied over each single conductor and as an overall jacket. Duplex construction.	Designed for continuous use at temperatures to 500□F (260□C); intermittent use to 600□F (315□C). All the advantages of an extruded product while providing the additional temperature rating. Excellent moisture and chemical resistance; good abrasion resistance.	▸ Petroleum Plants ▸ Power Plants ▸ Aircraft Bonding ▸ Glass Plants ▸ Ceramic Plants ▸ Brick Plants
TFATF	**Fused TFE Tape:** A double wrap of heat-fused TFE tape is spirally applied over each single conductor. Insulated conductors are twisted with a stranded drain wire and the twisted construction is covered with an aluminum/Mylar tape. The outer jacket consists of a double-wrapped heat-fused TFE jacket.	Designed for continuous use at temperatures to 500□F (260□C); intermittent use to 600□F (315□C). All the advantages of an extruded product while providing the additional temperature rating. Excellent moisture and chemical resistance; good abrasion resistance. Twisted/ Shielded construction minimizes electrical interference	▸ Petroleum Plants ▸ Power Plants ▸ Aircraft Bonding ▸ Glass Plants ▸ Ceramic Plants ▸ Brick Plants

* Trademark of E. I. DuPont

Thermocouple Wire Metal Overbraid

Ordering Code Suffix	Product Description	Performance Features
-S	**304 Stainless-Steel** braid material is made of round wire braid. Continuous service temperatures of 1600□F (900□C). 85% minimum coverage. General purpose stainless steel, subject to carbide precipitation between 900□F and 1600□F.	Added mechanical protection.
-Cu	**Tinned Copper** round wire braid with a minimum 85% coverage.	Added mechanical protection and shields against electrostatic interference.
-I600	**Inconel 600** round wire braid with a continuous service temperature of 2100□F (1500□C)	Excellent for severely corrosive applications and has high resistance to oxidizing and reducing atmospheres. Added Mechanical protection.
-X	**Wrapped Spiral Armor** is a Half-Oval Galvanized Iron, 90% minimum coverage	Better resistance to crushing and cutting than braided products.

Ordering Code Example

Part number J-20-GG: Type "J" 20 gauge thermocouple wire with Glass on singles and glass overall, selected from the Insulated Thermocouple Wire section.

Manufactured with Stainless Steel Overbraid should be ordered as:

J-20-GG-S

Extension Grade Wire

Type (SX or RX) Insulated Wire *Color Code:* Positive, Black (Copper); Negative, Red, (#11 Alloy); Overall Green

Catalog Number	Wire Gauge	Type Wire	Insulation		Temp. (ºF)	Lbs/ 1000 Ft.	Nominal Size (In)
			Singles	Overall	Continuous		
RSX-16-GG	16	Solid	Fiberglass	Fiberglass	400	18	.087 X .155
RSX-16S-GG	20	Stranded	Fiberglass	Fiberglass	400	39	.160 X .250
RSX-20-GG	20	Solid	Fiberglass	Fiberglass	400	9	.058 X .105
RSX-16-SFSF	16	Solid	Synthetic Fiber	Braided Synthetic Fiber	400	32	.170 X .215
RSX-20-SFSF	20	Solid	Synthetic Fiber	Braided Synthetic Fiber	400	18	.140 X .200
RSX-16-PFPF	16	Solid	PFA Teflon*	PFA Teflon*	400	32	.108 X .158
RSX-16-PFAPF	16	Solid	PFA Teflon*	PFA Teflon* Tw/Sh	400	38	.180
RSX-20-PFPF	20	Solid	PFA Teflon*	PFA Teflon*	400	11	.067 X .115
RSX-20-PFAPF	20	Solid	PFA Teflon*	PFA Teflon* Tw/Sh	400	22	.146
RSX-16-TT	16	Solid	FEP Teflon*	FEP Teflon*	400	32	.107 X .158
RSX-16-TAT	16	Solid	FEP Teflon*	FEP Teflon* Tw/Sh	400	38	.180
RSX-20-TT	20	Solid	FEP Teflon*	FEP Teflon*	400	11	.072 X .124
RSX-20-TAT	20	Solid	FEP Teflon*	FEP Teflon* Tw/Sh	400	22	.146
RSX-16-PP	16	Solid	Polyvinyl	Polyvinyl	220	26	.120 X .207
RSX-16-PAP	16	Solid	Polyvinyl	Polyvinyl	220	39	.250
RSX-16S-PP	16	Stranded	Polyvinyl	Polyvinyl	220	26	.140 X .230
RSX-20-PP	20	Solid	Polyvinyl	Polyvinyl	220	14	.095 X .150
RSX-20-PAP	20	Solid	Polyvinyl	Polyvinyl	220	22	.165
RSX-20S-PP	20	Stranded	Polyvinyl	Polyvinyl	220	16	.105 X .170

Continuous temperature is for extension wire or insulation, whichever is lower.
High performance metal overbraid and armor may be applied over the above insulation to provide additional abrasion and mechanical resistance. See page 17 for additional information.
Respooling charge of $10.00 for orders of less than 1000 continuous feet.
IPS reserves the right to ship within ± 10% of quantity ordered and bill accordingly.
* Trade mark of E. I. DuPont

Note:

RSX Extension wire is a LEAD wire ONLY. The pair of wires are comprised of, Black (**Copper**) is Negative, Red, **(#11 Alloy**) is Positive leg.

UL PLTC 300 Volt
PVC Insulation & Jacket
Overall Shield

Cable Specifications

Conductors: 20 AWG Solid Thermocouple Extension Wire
Singles Insulation: 15 Mils 105°C PVC
Color Code: Jacket and individual pairs are per ANSI MC96.1
Construction: Twisted Pairs
Identification of Pairs: One conductor of each pair is numbered
Twist: Lay is approximately 2.5 inches
Overall Shield: .002" aluminized polyester backed tape overlapped to provide 100% coverage when flexed
Overall Drain Wire: Stranded uninsulated tinned copper in continuos contact with shield
Communications Wire: 22 AWG stranded copper wire insulated and color coded orange
Ripcord: Assists in jacket removal
Jacket Insulation: 90°C Flame retardant PVC

Overall Shielded Type RSX Cable

Order Number	Number Of Pairs	Nominal Outer Jacket Thickness	Nominal O. D. (Inches)	Minimum Bending Radius (Inches)	Maximum Pulling Tension (Lbs.)	Net Wt. (Lbs./ 1000 Ft)
RSX-20-UPAP	1	.035	.220	1.45	26	27
RSX-2-20-UPAP	2	.042	.322	2.00	40	50
RSX-4-20-UPAP	4	.042	.370	2.50	75	76
RSX-6-20-UPAP	6	.052	.440	2.70	105	110
RSX-8-20-UPAP	8	.052	.475	3.00	142	129
RSX-10-20-PAP	10	.052	.540	3.25	170	155
RSX-12-20-UPAP	12	.052	.560	3.25	210	175
RSX-16-20-UPAP	16	.062	.670	4.00	330	280
RSX-20-20-UPAP	20	.062	.745	4.80	405	325
RSX-24-20-UPAP	24	.062	.745	4.80	405	325
RSX-36-20-UPAP	36	.072	.890	6.00	600	470
RSX-50-20-UPAP	50	.072	.995	6.00	830	640

Features: UL Listed under Subject 13
Passes IEEE 383 70,000 Btu 1 Hr flame test (Non-propagating)
Excellent moisture, chemical & abrasion resistance

Cable

UL PLTC 300 Volt

PVC Insulation & Jacket
Individual & Overall Shield

Cable Specifications

Conductors: 20 AWG Solid Thermocouple Extension Wire
Singles Insulation: 15 Mils 105⍂C PVC
Color Code: Jacket and individual pairs, per ANSI MC96.1
Construction: Twisted Pairs
Identification of Pairs: One conductor of each pair is numbered
Twist: Lay is approximately 2.5 inches
Pair Shield: Aluminized Polyester-backed tape overlapped to provide coverage when flexed
Pair Drain Wire: Stranded uninstalled tinned copper in continuous contact with shield
Overall Shield: .002" aluminized polyester backed tape overlapped to provide 100% coverage when flexed
Overall Drain Wire: Stranded uninsulated tinned copper in continuos contact with shield
Communications Wire: 22 AWG stranded copper wire insulated and color coded orange
Ripcord: Assists in jacket removal
Jacket Insulation: 90⍂C Flame retardant PVC

Overall Shielded Type RSX Cable

Order Number	No. Pairs	Nominal Outer Jacket Thickness	Nominal O. D. (Inches)	Minimum Bending Radius (Inches)	Maximum Pulling Tension (Lbs.)	Net Wt. (Lbs./ 1000 Ft)
RSX-2-20-UPAAP	2	.040	.365	2.90	50	64
RSX-4-20-UPAAP	4	.052	.450	3.40	95	105
RSX-6-20-UPAAP	6	.052	.525	4.20	140	140
RSX-8-20-UPAAP	8	.052	.570	4.45	180	170
RSX-10-20-UPAAP	10	.062	.685	6.45	225	222
RSX-12-20-UPAAP	12	.062	.690	5.45	260	250
RSX-16-20-UPAAP	16	.062	.765	5.90	340	310
RSX-20-20-UPAAP	20	.062	.845	6.70	430	375
RSX-24-20-UPAAP	24	.072	.930	7.50	520	455
RSX-36-20-UPAAP	36	.072	1.040	8.20	780	625
RSX-50-20-UPAAP	50	.072	1.200	9.45	1090	835

Features: UL Listed under Subject 13
Passes IEEE 383 70,000 Btu 1 Hr flame test (Non-propagating)
Excellent moisture, chemical & abrasion resistance

Features: UL Listed under Subject 13
Passes IEEE 383 70,000 Btu 1 Hr flame test (Non-propagating)
Excellent moisture, chemical & abrasion resistance

Bare Wire

Type R	R P	Platinum 13% Rhodium			
Catalog Number	Wire			Inches/ TroyOZ.	Mm/gm
	Gauge	Inch	mm		
RP-24	24	.020	0.51	306	249
RP-30	30	.010	0.25	1230	1005

R N	Platinum	
Catalog Number	Inches/ TroyOZ.	Mm/gm
RN-24	282	230
RN-30	1127	920

Type S	S P	Platinum 10% Rhodium			
Catalog Number	Wire			Inches/ TroyOZ.	Mm/gm
	Gauge	Inch	Mm		
SP-24	24	.020	0.51	301	245
SP-30	30	.010	0.25	1206	986
SP-38	38	.004	0.10	7510	6130

S N	Platinum	
Catalog Number	Inches/ TroyOZ.	Mm/gm
SN-24	282	230
SN-30	1127	920
RN-38	7040	5745

Matched Wire: To order wire matched for accuracy, order equal amounts of bare wire at the same time. Simply state type of wire and gauge to get a matched set. ***Example:*** **8JP + JN = 8J**
Special Limits Wire: Available on request. Double type designation letter and specify gauge. *Examples:* **JJ20, KK20**

Quantities of bare wire ordered under 25 pounds are sold by double foot matched spools only. Quantities shipped may vary plus or minus 10% from quantity ordered unless otherwise arranged with factory. Wire straightened and cut to length available upon request.

Discount Quantities				Types E,J,K,N,T
Discount	Net	10%	20%	Consult Factory
Pounds	Below 24	25 – 49	50 - 99	100 & up
Kilograms	Below 11	12 - 22	23 – 45	46 & up

Discount Quantities			Types B,R, & S
Discount	Net	10%	Consult Factory
Inches	Below 143	144 - 282	288 & up
Millimeters	Below 3,632	3633 – 7289	7290 & up

THERMOCOUPLE WIRE REFERENCE DATA

ANSI COLOR CODE FOR THERMOCOUPLE AND THERMOCOUPLE EXTENSION WIRE

ANSI TYPE	WIRE ALLOYS	POLARITY	THERMOCOUPLE WIRE COLOR		ANSI TYPE	T/C EXTENSION WIRE COLOR	
			INDIVIDUAL	OVERALL		INDIVIDUAL	OVERALL
T	COPPER CONSTANTAN	+TP -TN	BLUE RED	BROWN	TX	BLUE RED	BLUE
J	IRON CONSTANTAN	+JP -JN	WHITE RED	BROWN	JX	WHITE RED	BLACK
E	CHROMEL™ CONSTANTAN	+EP -EN	PURPLE RED	BROWN	EX	PURPLE RED	PURPLE
K	CHROMEL™ ALUMEL™	+KP -KN	YELLOW RED	BROWN	KX	YELOW RED	YELLOW
N	NICROSIL NISIL	+NP -NN	ORANGE RED	BROWN	NX	ORANGE RED	ORANGE
R	PLAT 13% RHOD RHODIUM	+RP -RN			RX	BLACK RED	GREEN
S	PLAT 10% RHOD PLATINUM	+SP -SN			SX	BLACK RED	GREEN
B	PLAT 30% RHOD PLAT 6% RHOD	+BP -BN			BX	GREY RED	GREY

BARE THERMOCOUPLE WIRE FEET PER POUND AND GAUGE

WIRE GA. B & S	WIRE SIZE DIA.	TYPE J		TYPE K		TYPE E	
		IRON+ JP	CONSTANTAN JN	CHROMEL+ KP	ALUMEL- KN	CHROMEL+ EP	CONSTANTAN- EN
6	.162	14.2	12.6	13	13	13	12.6
7	.144	18.0					
8	.128	22.8	20.2	21	21	21	20.2
14	.064	91.2	80.9	83	83	83	80.9
16	.050	144	127	130	130	130	127
18	.040	233	207	212	212	212	207
20	.032	365	324	331	331	331	324
24	.020	925	821	838	838	838	821
26	.015	1478	1312	1340	1340	1340	1312
28	.012	2353	2089	2130	2130	2130	2089
30	.010	3736	3316	3370	3370	3370	3316
36	.005	14940	13260	13500	13500	13500	13260

THERMOCOUPLE WIRE DATA continued

NOMINAL THERMOCOUPLE RESISTANCE OHMS PER DOUBLE FOOT@ 68°F (20° C)								
Wire Ga. B & S	Wire Size Dia.	ANSI TYPES						
		J	K	T	E	S	R	B
6	.162	.014	.023	.012	.027	.007	.007	.008
*7	.144	.021						
8	.128	.022	.036	.019	.044	.010	.010	.013
14	.064	.089	.147	.074	.176	.044	.044	.054
16	.050	.141	.232	.117	.277	.069	.069	.086
18	.040	.229	.377	.190	.450	.112	.113	.139
20	.032	.357	.588	.297	.702	.175	.178	.218
24	.020	.905	1.488	.745	1.778	.449	.453	.550
26	.015	1.441	2.45	1.20	2.84	.701	.708	.875
28	.012	2.297	3.59	1.92	4.33	1.062	1.073	1.392
30	.010	3.65	6.02	2.94	7.19	1.794	1.813	2.213
36	.005	14.66	24.08	12.22	28.80	7.150	7.226	8.897

* Double feet 7 gauge Type J = 7 gauge Iron and 8 gauge Constantan

AMERICAN WIRE GAUGE DIMENSION IN INCHES							
AWG	DIA.	AWG	DIA.	AWG	DIA.	AWG	DIA.
6/0	.5800	9	.1144	23	.0226	37	.00445
5/0	.5165	10	.1019	24	.0201	38	.00396
4/0	.4600	11	.0907	25	.0179	39	.00353
3/0	.4096	12	.0808	26	.0159	40	.00314
2/0	.3648	13	.0720	27	.0142	41	.00280
1/0	.3249	14	.0641	28	.0126	42	.00249
1	.2893	15	.0571	29	.0113	43	.00222
2	.2576	16	.0508	30	.0100	44	.00198
3	.2294	17	.0453	31	.00893	45	.00176
4	.2043	18	.0403	32	.00795	46	.00157
5	.1819	19	.0359	33	.00708	47	.00140
6	.1620	20	.0320	34	.00630	48	.00124
7	.1443	21	.0285	35	.00561	49	.00111
8	.1285	22	.0253	36	.00500	50	.00099

THERMOCOUPLE WIRE DATA GENERAL

UPPER TEMPERATURE LIMITS FOR THERMOCOUPLES AND THERMOCOUPLE WIRE						
THERMOCOUPLE TYPE	**ANSI TYPE SYMBOL**	**WIRE GAUGE (AWG)**				
		8 ga.	**14 ga.**	**20 ga.**	**24 ga.**	**30 ga.**
Copper – Constantan	**T**		370°C (700°F)	260°C (500°F)	200°C (400°F)	150°C (300°F)
***Iron - Constantan**	**J**	760°C (1400°F)	600°C (1100°F)	500°C (900°F)	370°C (700°F)	320°C (600°F)
Chromel™ - Constantan	**E**	870°C (1600°F)	650°C (1200°F)	550°C (1000°F)	430°C (800°F)	430°C (800°F)
Chromel™ - Alumel™	**K**	1260°C (2300°F)	1100°C (2000°F)	1000°C (1800°F)	870°C (1600°F)	760°C (1400°F)
Nicrosil - Nisil	**N**	1260°C (2300°F)	1100°C (2000°F)	1000°C (1800°F)	870°C (1600°F)	760°C (1400°F)
Platinum – 10% Rhodium	**S**				1480°C (2700°F)	
Platinum – 13% Rhodium	**R**				1480°C (2700°F)	

™ Trademark Hoskins Mfg. Co.

*** Magnetic**

THERMOCOUPLE WIRE DATA GENERAL

Accuracy of IPS Thermocouple Wire

IPS insulated and bare thermocouple wire is matched to meet standard initial calibration tolerances (Standard limits) for temperatures above 0°C as given in ANSI MC96.1 and shown in the table.

Wire conforming to special initial calibration tolerances (Special limits),and wire with certified traceable calibration is available on request. Designate special limit grade wire using a double ANSI symbol (e. g. KK, JJ).

Thermocouple wire may be used to manufacture a thermocouple, keeping in mind the temperature limitations of wire size.

Color Code & Initial Calibration Tolerances

Thermocouple Wire

Type	Color Code	Initial Calibration Tolerances		
Wire Alloys	+/- Individual (Jacket)	Temperature Range	Standard Limits	Special Limits
**Iron (+) vs. Constantan(TM) (-) ANSI Symbol = J	white/red (brown)	+32°F (0°C) to +545°F (+285°C) +545°F (+285°C) to +1400°F (+750°C)	+/- 4°F (2.2°C) +/- .75%	+/- 2°F (1.1°C) +/- .4%
CHROMEL®* (+) vs. **ALUMEL®* (-) ANSI Symbol = K	yellow/red (brown)	-330°F (-200°C) to -165°F (-110°C) -165°F (-110°C) to +32°F (0°C) +32°F (0°C) to +545°F (+285°C) +545°F (+285°C) to +2300°F (+1250°C)	+/- 2% +/- 4°F (2.2°C) +/- 4°F (2.2°C) +/- .75%	 +/- 2°F (1.1°C) +/- .4%
Copper (+) vs. Constantan(TM) (-) ANSI Symbol = T	blue/red (brown)	-330°F (-200°C) to -85°F (-65°C) -85°F (-65°C) to +270°F (+130°C) +270°F (+130°C) to +660°F (+350°C)	+/- 1.5% +/- 1.8°F (1°C) +/- 75%	+/- .8% +/- .9°F (.5°C) +/- .4%
CHROMELI®* (+) vs. Constantan(TM) (-) ANSI Symbol = E	purple/red (brown)	-330°F (-200°C) to -270°F (-170°C) -270°F (-170°C) to +480°F (+250°C) +480°F (+250°C) to +640°F (+340°C) +640°F (+340°C) to +1600°F (+900°C)	+/-1% +/-3°F (1.7°C) +/-3°F (1.7°C) +/- .5%	+/- 1.8°F (1°C) +/- 1.8°F (1°C) +/- .4% +/- .4%
Nicrosil(TM) (+) vs. Nisil(TM) (-) ANSI Symbol = N	orange/red (brown)	+32°F (0°C) to +545°F (+285°C) +545°F (+285°C) to +2300°F (+1250°C)	+/- 4°F (2.2°C) +/- .75%	+/- 2°F (1.1°C) +/- .4%

NOTE: Percent limits apply directly to temperature in °C units, but for °F equivalents are applied to the numbers of °F above or below the ice point (+32°F).
(i.e. Limit (°F) = (Temp. °F-32°F) x Percentage)

Thermocouple wire cannot be expected to meet the limits of error at temperatures below the ice point unless specified at time of purchase.

** Magnetic

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THERMOCOUPLE WIRE DATA GENERAL

Accuracy of IPS Thermocouple Extension Wire

Thermocouple extension wire has approximately the same thermoelectric characteristic as thermocouple wire but its accuracy is guaranteed over a more limited range of temperatures. Thermocouple extension wire can offer a less expensive when used to connect a thermocouple to an instrument.

For noble metal types, an entirely different alloy is formulated to match the noble metal characteristics over a specified temperature range. This is necessary due to the high cost of the noble metals. The “X” in the ANSI code denotes extension grade wire.

Due to composition, you can not manufacture a thermocouple from noble metal extension wire.

Color Code & Initial Calibration Tolerances Thermocouple Extension Wire

Thermocouple Type		Color Code		Initial Calibration Tolerances		
Wire Alloys	ANSI Symbol	+/- Individual	Jacket	Temperature Range	Standard Limits	Special Limits
**Iron vs. Constantan(TM)	JX	white/red	black	+32°F (0°C) to +400°F (+200°C)	+/- 4°F (2.2°C)	+/- 2°F (1.1°C)
CHROMEL®* vs. **ALUMEL®*	KX	yellow/red	yellow	+32°F (0°C) to +400°F (+200°C)	+/- 4°F (2.2°C)	+/- 2°F (1.1°C)
Copper vs. Constantan(TM)	TX	blue/red	blue	-75°F (-60°C) to +210°F (+100°C)	+/- 2°F (1.1°C)	+/- 1°F (.5°C)
CHROMEL®* vs. Constantan(TM)	EX	purple/red	purple	+32°F (0°C) to +400°F (+200°C)	+/- 3°F (1.7°C)	+/- 2°F (1.1°C)
Nicrosil(TM) vs. Nisil(TM)	NX	orange/red	orange	+32°F (0°C) to +400°F (+200°C)	+/- 4°F (2.2°C)	+/- 2°F (1.1°C)
Copper vs. Copper Alloy	SX RX	black/red	green	+75°F (+25°C) to +400°F (+200°C)	+/- 9°F (5°C)	-

NOTE: Percent limits apply directly to temperature in °C units, but for °F equivalents are applied to the numbers of °F above or below the ice point (+32°F).
(i.e. Limit (°F) = (Temp. °F-32°F) x Percentage)

Thermocouple wire cannot be expected to meet the limits of error at temperatures below the ice point unless specified at time of purchase.

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