

ANSI Limits of Error

Unless otherwise specified, all thermocouple wire and extension wire is supplied to meet either Standard or Special Limits of Error per ASTM/ANSI E - 230.

The Standard and Special Limits of Error for thermocouple and extension wires are given in the accompanying tables.

Where Limits of Error are given in percent, the percentage applies to the temperature being measured.

Limits of Error for Thermocouples and Thermocouple Wire

Reference Junction 0 °C [32 °F]

T/C TYPE	TEMPERATURE RANGE	LIMITS OF ERROR	
		STANDARD	SPECIAL
T	(0 to 133) °C [32 to 270] °F (133 to 350) °C [270 to 662] °F	± 1 °C [2 °F] ± 0.75%	± 0.5 °C [1 °F] ± 0.4%
J	(0 to 293) °C [32 to 559] °F (293 to 750) °C [559 to 1382] °F	± 2.2 °C [4 °F] ± 0.75%	± 1.1 °C [2 °F] ± 0.4%
E	(0 to 340) °C [32 to 644] °F (340 to 900) °C [644 to 1652] °F	± 1.7 °C [3 °F] ± 0.5%	± 1 °C [2 °F] ± 0.4%
K	(0 to 293) °C [32 to 559] °F (293 to 1250) °C [559 to 2282] °F	± 2.2 °C [4 °F] ± 0.75%	± 1.1 °C [2 °F] ± 0.4%
N	(0 to 293) °C [32 to 559] °F (0 to 1250) °C [559 to 2282] °F	± 2.2 °C [4 °F] ± 0.75%	± 1.1 °C [2 °F] ± 0.4%
R, S	(0 to 600) °C [32 to 1112] °F (600 to 1450) °C [1112 to 2642] °F	± 1.5 °C [3 °F] ± 0.25%	± 0.6 °C [1 °F] ± 0.1%
B	(870 to 1700) °C [1598 to 3092] °F	± 0.5%	
T ^[1]	(-200 to -66) °C [-328 to -87] °F (-66 to 0) °C [-87 to + 32] °F	± 1 °C [2 °F] ± 1.5%	
E ^[1]	(-200 to -100) °C [-328 to -148] °F (-100 to 0) °C [- 148 to 32] °F	± 1.1 °C [3 °F] ± 1%	
K ^[1]	(-200 to -110) °C [-328 to -166] °F (-110 to 0) °C [-166 to 32] °F	± 2.2 °C [4 °F] ± 2%	

[1] Thermocouples and thermocouple materials are normally supplied to meet the limits of error specified in the table for temperatures above 0 °C [32 °F]. The same materials, however, may not fall within the sub-zero limits of error given in the second section of the table. If materials are required to meet the sub-zero limits, the purchase order must so state. Selection of materials usually will be required. Little information is available to justify establishing special limits of error for sub-zero temperatures. Limited experience suggest the following limits for types E and T thermocouples:

Type E	(-200 to 0) °C [-328 to 32] °F
Type T	(-200 to 0) °C [-328 to 32] °F

These limits are given only as a guide for information purposes. Due to the characteristics of the materials, sub-zero limits of error for type J thermocouples and special sub-zero limits for type K thermocouples are not listed.

Limits of Error for Thermocouple

Extension Wire Reference Junction 0 °C [32 °F]

EXT. WIRE TYPE	TEMPERATURE RANGE	LIMITS OF ERROR	
		STANDARD	SPECIAL
KX	(0 to 200) °C [32 to 392] °F	± 2.2 °C [4 °F]	
JX	(0 to 200) °C [32 to 392] °F	± 2.2 °C [4 °F]	± 1.1 °C [2 °F]
EX	(0 to 200) °C [32 to 392] °F	± 1.7 °C [3 °F]	
TX	(0 to 100) °C [32 to 212] °F	± 1.0 °C [2 °F]	± 0.5 °C [1 °F]
NX	(0 to 200) °C [32 to 392] °F	± 2.2 °C [4 °F]	

Limits of Error for Thermocouple Compensating

Extension Wire Reference Junction 0 °C [32 °F]

T/C TYPE	COMPENSATION WIRE TYPE	TEMPERATURE RANGE	LIMITS OF ERROR ^[1]
R, S	SX§	(0 to 200) °C [32 to 392] °F	± 5 °C [9 °F]
B	BX#	(0 to 100) °C [32 to 212] °F	0 °C [0 °F] -3.7 °C [- 6 °F]

[1] Due to the non-linearity of the types R, S, and B temperature-EMF curves, the error introduced into a thermocouple system by the compensating wire will be variable when expressed in degrees. The degree C tolerances given in parentheses are based on the following measuring junction temperatures:

WIRE TYPE	MEASURING JUNCTION TEMPERATURE
SX	Greater than 870 °C [1598] °F
BX	Greater than 1000 °C [1832] °F

§ Copper (+) versus copper nickel alloy (-)

Copper versus copper compensating extension wire, usable to 100 °C [212 °F] with maximum errors as indicated, but with no significant error over (0 to 50) °C [32 to 122] °F range. Matched proprietary alloy compensating wire is available for use over the range (0 to 200) °C [32 to 392] °F with claimed tolerances of (+ 0.033 mV + 3.7) °C⁻¹.

Calibrating, Checking, and Tagging

Pyromation thermocouple wire and extension wire is available calibrated, "checked and tagged" when so specified, at an extra charge. Wires of this classification are within the Standard Limits of Error but, most important, their specific departure at temperatures specified is known and can be taken into account. Each thermocouple, coil, reel, or spool of wire is checked and tagged to show the departure from the curve. Single conductors will be calibrated to show their EMF values versus pure platinum, with a 0 °C [32 °F] reference junction unless otherwise specified. Thermocouples and wire sample sent to the factory for evaluation must be at least 36" long.

The temperature range for all checking and selecting is from 0 °C [32 °F] to 1371 °C [2500 °F], depending on type and gauge of wire. Sub-zero checking to -79 °C [-110 °F] and high temperature rising from 1371 °F [2500 °F] to 1649 °C [3000 °F] is available. Calibration can also be accomplished at standard check points such as boiling points of helium, oxygen, and nitrogen.

Shipping

Each coil or spool is marked with its exact length, however, Pyromation reserves the right to ship plus or minus 10% of the total amount of either standard or special wire ordered.

ASTM/ANSI Letter Designations

Thermocouple and extension wires are now generally ordered and specified by ASTM/ANSI designations for calibration. Popular generic and trade name examples are Chromel/Alumel-ASTM/ANSI Type K; Iron/Constantan-ASTM/ANSI Type J; Copper/Constantan-ASTM/ANSI Type T; Chromel/Constantan-ASTM/ANSI Type E; Nicrosil/Nisil-ASTM/ANSI Type N; Platinum/Platinum 10% Rhodium-ASTM/ANSI Type S; Platinum/Platinum 13% Rhodium-ASTM/ANSI Type R; and Platinum 6% Rhodium/Platinum 30% Rhodium-ASTM/ANSI Type B. Positive and negative legs are identified by the appropriate letter suffixes P and N, respectively. Those not familiar with this system will find this table helpful.

ANSI Letter Designations	Generic or Trade Names
JP	Iron
JN, EN, or TN	Constantan, Cupron®, Advance
TP	Copper
KP or EP	Chromel®, Tophel®, T1
NP	Nicrosil
KN	Alumel®, Nial®, T2
NN	Nisil
RP	Platinum 13% Rhodium
SP	Platinum 10% Rhodium
RN or SN	Pure Platinum
BN	Platinum 6% Rhodium
BP	Platinum 30% Rhodium

Color Coding

Standard ASTM/ANSI color coding is used on all insulated thermocouple wire and extension wire when type of insulation permits. In color coding, the right is reserved to include a tracer to distinguish the calibration.

ASTM/ANSI TYPE		MAGNETIC		ASTM/ANSI COLOR CODE		
T/C	Sgl.	Yes	No	Sgl.	Overall Extension Wire	Overall T/C Wire
T	TP TN		X X	Blue Red	Blue	Brown
J	JP JN	X	X	White Red	Black	Brown
E	EP EN		X X	Purple Red	Purple	Brown
K	KP KN	X	X	Yellow Red	Yellow	Brown
N	NP NN		X X	Orange Red	Orange	Brown
R, S	RP, SP RN, SN		X X	Black Red	Green	
B	BP BN		X X	Grey Red	Grey	

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Solid and Stranded Conductors

Thermocouple wire and extension wire are usually solid conductors. When greater flexibility is required, either are available in stranded construction. The accompanying table gives the stranding combinations used in Pyromation wire. However, other stranding combinations may be ordered to suit requirements.

Stranding Combinations

CONDUCTOR		STRANDING	
GAUGE	I.S.I. TYPE	NO. of STRANDS	GAUGE
14	ALL	7	22
16	ALL	7	24
18	ALL	7	26
20	ALL	7	28
22	ALL	7	30
24	ALL	7	32

Stock Insulated Wire

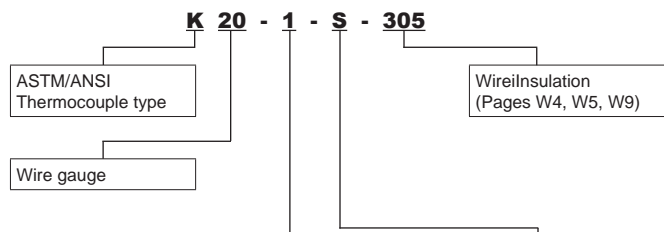
'Stocked' insulated thermocouple and extension wire, as indicated in the catalog pages, is available in the following "standard packaging": 50 ft. coils - 100 ft. coils - 250 ft. spools - 500 ft. spools - 1,000 ft. spools. Coils or spools of less than 1,000 ft. packaged in non-standard lengths, are available at an additional charge and may result in a delay in shipment. Spools or reels of over 1,000 ft. can be supplied at no extra charge, but may also result in a delay in shipment.

Non-Stock Insulated Wire

'Non-stocked' insulated thermocouple and extension wire in 1,000 ft. spools and over is available at no additional charge. Coils or spools of less than 1,000 ft. are available at an additional charge. Minimum order is 100 ft.

How to Read Pyromation Catalog Numbers

EXAMPLE ORDER NUMBER:



Conductor Type

CODE	DESCRIPTION			
T/C Grades	Solid	Stranded	Std. Limits	Special
1	X		X	
2	X			X
3		X	X	
4		X		X
Ext. Grades	Solid	Stranded	Std. Limits	Special
5	X		X	
6	X			X
7		X	X	
8		X		X

Opt. Overbraid Selections

CODE	DESCRIPTION
S	SS wire braid
C	Tinned copper wire braid
F	Flat SS ribbon wrap
W	Flat SS spiral wrap
G	Half oval galvanized steel spiral wrap
N	Alloy 600 wire braid

1/32	1/64	0.015625	33/64	0.515625
	3/64	0.03125	17/32	0.53125
	5/64	0.046875	9/16	0.5625
1/16	7/64	0.0625	37/64	0.578125
	9/64	0.078125	19/32	0.59375
3/32	11/64	0.09375	39/64	0.609375
	13/64	0.109375	41/64	0.625
1/8	15/64	0.125	43/64	0.640625
	17/64	0.140625	21/32	0.65625
5/32	19/64	0.15625	23/32	0.671875
	21/64	0.171875	25/32	0.6875
3/16	23/64	0.1875	27/32	0.703125
	25/64	0.203125	29/32	0.71875
7/32	27/64	0.21875	31/32	0.734375
	29/64	0.234375	1	0.75
1/4	31/64	0.25		0.765625
	33/64	0.265625		0.78125
9/32	35/64	0.28125		0.796875
	37/64	0.296875		0.8125
5/16	39/64	0.3125		0.828125
	41/64	0.328125		0.84375
11/32	43/64	0.34375		0.859375
	45/64	0.359375		0.875
3/8	47/64	0.375		0.890625
	49/64	0.390625		0.90625
13/32	51/64	0.40625		0.921875
	53/64	0.421875		0.9375
7/16	55/64	0.4375		0.953125
	57/64	0.453125		0.96875
15/32	59/64	0.46875		0.984375
	61/64	0.484375		1
1/2	63/64	0.5		

INCHES in DECIMALS of a FOOT

1/16 - 0.0052	1 - 0.0833
3/32 - 0.0078	2 - 0.1667
1/8 - 0.0104	3 - 0.2500
3/16 - 0.0156	4 - 0.3333
1/4 - 0.0208	5 - 0.4167
5/16 - 0.0260	6 - 0.5000
3/8 - 0.0313	7 - 0.5833
1/2 - 0.0417	8 - 0.6667
5/8 - 0.0521	9 - 0.7500
3/4 - 0.0625	10 - 0.8333
7/8 - 0.0729	11 - 0.9167

Standard Wire Gauges in Approximate Decimals of an Inch and mm.

WIRE GAUGE	AMERICAN or BROWN AND SHARP DIAMETER (inches)	DIAMETER MILLIMETERS	BIRMINGHAM or STUBS	US STANDARD
1	0.2893	7.348	0.300	0.281
2	0.2576	6.544	0.284	0.266
3	0.2294	5.827	0.259	0.250
4	0.2043	5.189	0.238	0.234
5	0.1819	4.621	0.220	0.219
6	0.1620	4.115	0.203	0.203
7	0.1443	3.665	0.180	0.188
8	0.1285	3.264	0.165	0.172
9	0.1144	2.906	0.148	0.156
10	0.1019	2.588	0.134	0.141
11	0.0907	2.304	0.120	0.125
12	0.0808	2.053	0.109	0.109
13	0.0720	1.829	0.095	0.0938
14	0.0641	1.628	0.083	0.0781
15	0.0571	1.450	0.072	0.0703
16	0.0508	1.291	0.065	0.0625
17	0.0453	1.150	0.058	0.0563
18	0.0403	1.024	0.049	0.0500
19	0.0359	0.9116	0.042	0.0438
20	0.0320	0.8118	0.035	0.0375
21	0.0285	0.7230	0.032	0.0344
22	0.0253	0.6438	0.028	0.0313
23	0.0226	0.5733	0.025	0.0281
24	0.0201	0.5106	0.022	0.0250
25	0.0179	0.4547	0.020	0.0219
26	0.0159	0.4049	0.018	0.0188
27	0.0142	0.3606	0.016	0.0172
28	0.0126	0.3211	0.014	0.0156
29	0.0113	0.2859	0.013	0.0141
30	0.0100	0.2546	0.012	0.0125
31	0.0089	0.2268	0.010	0.0109
32	0.0080	0.2019	0.009	0.0102
33	0.00708	0.178	0.008	0.0094
34	0.00630	0.152	0.007	0.0086
35	0.00561	0.138	0.005	0.0078
36	0.00500	0.127	0.004	0.0070
37	0.00445	0.1131		0.0066
38	0.00397	0.1007		0.0063
39	0.00353	0.08969		
40	0.00314	0.07987		

CONDUIT SIZE (I.P.S.)	Approximate No. of Insulated Double Conductor Lengths of Extension					
	Wire - Size Conductor					
	NO. 14	NO. 14 ^[1]	NO. 16	NO. 16 ^[2]	NO. 20	NO. 24
1/2"	1	2	2	1	7	9
3/4"	3	7	4	2	16	21
1"	5	10	6	4	24	29
1 1/4"	7	14	10	5	35	44
1 1/2"	13	23	13	7	48	69
2"	18	48	20	11	73	95

[1] Single Conductor Insulated

[2] Three Conductor Insulated



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STANDARD INSULATED BASE METAL THERMOCOUPLE WIRE

The following four pages give the details of the standard insulated thermocouple wires generally available for stock delivery. All of these wires are selected and matched to meet the Standards Limits of Error of ASTM/ANSI E230 given on page one of this catalog section. If the closer accuracy of the Special Limits of Error wire is desired, then special limit wires can be selected and matched. To order, change the fourth figure of the catalog number to the next higher "even" digit (example: K20-1-305 becomes K20-2-305). With the aid of the wire temperature limit tables from page one and the tabulated wire insulation data below, thermocouple wire can be selected to meet most industrial process requirements. When conditions call for other than the listed standard wires, special wires and insulations can be made to fulfill application requirements with minimum purchases. Complete process requirements and specifications should accompany quotation requests.

Thermocouple Wire Types, Construction and Characteristics

Standard Fiberglass Insulations

SINGLE CONDUCTOR			DUPLEX CONDUCTOR		TEMP. RATING		PHYSICAL PROPERTIES			
Type	Insulation (Inches)	Impregnation	Insulation (Inches)	Impregnation	Continuous	ASTM/ANSI Sgl. Reading	Color-Code	Abrasion-Resistance	Moisture-Resistance	Notes
302	Double glass braid 0.12 wall	Modified resin	Glass braid 0.006	Modified resin	482 °C [900 °F]	538 °C [1000 °F]	Yes	Good	Good	Impregnation retained to 204 °C [400 °F]
304	Glass braid 0.006	Modified resin	Glass braid 0.006	Modified resin	482 °C [900 °F]	538 °C [1000 °F]	Yes	Fair	Good	Impregnation retained to 204 °C [400 °F]
305	Double glass wrap 0.005	High-temp. varnish	Glass braid 0.006	Modified resin	482 °C [900 °F]	538 °C [1000 °F]	Yes	Fair	Good	Impregnation retained to 204 °C [400 °F]
306	Glass braid 0.006	None	Glass braid 0.006	None	482 °C [900 °F]	538 °C [1000 °F]	No	Fair	Fair	Heat treated
307	TFE tape (not fused) 0.004 TFE coated glass, 0.006	None	TFE coated glass braid	None	482 °C [900 °F]	538 °C [1000 °F]	Yes	Good	Excellent	TFE good to 316 °C [600 °F]
313	Glass braid 0.008	Modified resin	Glass braid 0.006	Modified resin	482 °C [900 °F]	538 °C [1000 °F]	Yes	Good	Good	Impregnation retained to 204 °C [400 °F]
315	Glass braid 0.008	Modified resin	None twisted	None	482 °C [900 °F]	538 °C [1000 °F]	Yes	Good	Good	Impregnation retained to 204 °C [400 °F]
317	Heavy glass braid	High-temp. varnish	None twisted	None	482 °C [900 °F]	538 °C [1000 °F]	Yes	Good	Good	Impregnation retained to 204 °C [400 °F]

High Temperature Fiberglass Insulations

SINGLE CONDUCTOR			DUPLEX CONDUCTOR		TEMP. RATING		PHYSICAL PROPERTIES			
Type	Insulation (Inches)	Impregnation	Insulation (Inches)	Impregnation	Continuous	ASTM/ANSI Sgl. Reading	Color-Code	Abrasion-Resistance	Moisture-Resistance	Notes
309	High-temp. glass braid 0.012	None	High-temp. glass braid 0.012	Modified resin	704 °C [1300 °F]	871 °C [1600 °F]	Tracer	Good	Fair	Impregnation retained to 204 °C [400 °F]
311	High-temp. glass braid 0.012	None	High-temp. glass braid 0.012	Light lacquer	704 °C [1300 °F]	871 °C [1600 °F]	No	Fair	Fair	Coating retained to 149 °C [300 °F]
314	High-temp. glass braid 0.008	High-temp. varnish	None twisted	None	704 °C [1300 °F]	871 °C [1600 °F]	Yes	Good	Good	Impregnation retained to 204 °C [400 °F]
321	High-temp. glass braid	High-temp. varnish	High-temp. glass braid	High temp. varnish	704 °C [1300 °F]	871 °C [1600 °F]	Yes	Good	Good	Impregnation retained to 204 °C [400 °F]

Vitreous Silica Insulation

SINGLE CONDUCTOR			DUPLEX CONDUCTOR		TEMP. RATING		PHYSICAL PROPERTIES			
Type	Insulation (Inches)	Impregnation	Insulation (Inches)	Impregnation	Continuous	ANSI Sg. Reading	Color-Code	Abrasion-Resistance	Moisture-Resistance	Notes
301	Vitreous Silica Fiber 0.015	None	Vitreous Silica Fiber 0.020	None	871 °C [1600 °F]	1093 °C [2000 °F]	No	Fair	Fair	

Ceramic Fiber Insulation

SINGLE CONDUCTOR			DUPLEX CONDUCTOR		TEMP. RATING ^[1]		PHYSICAL PROPERTIES			
Type	Insulation (Inches)	Impregnation	Insulation (Inches)	Impregnation	Continuous	ANSI Sg. Reading	Color-Code	Abrasion-Resistance	Moisture-Resistance	Notes
350	Ceramic Fiber Braid 0.018	None	Ceramic Fiber Braid 0.018	None	1204 °C [2200 °F]	1430 °C [2600 °F]	No	Good	Fair	

Polyvinyl Insulation

SINGLE CONDUCTOR			DUPLEX CONDUCTOR		TEMP. RATING		PHYSICAL PROPERTIES			
Type	Insulation (Inches)	Impregnation	Insulation	Impregnation	Continuous	ANSI Sg. Reading	Color-Code	Abrasion-Resistance	Moisture-Resistance	Notes
505	Polyvinyl Extr. 0.012-0.014	None	Singles Fused-Ripcord	None	(-29 to 105) °C [-20 to 221] °F	None	Yes	Good	Excellent	

Fluoropolymer Insulations

SINGLE CONDUCTOR			DUPLEX CONDUCTOR		TEMP. RATING		PHYSICAL PROPERTIES			
Type	Insulation (Inches)	Impregnation	Insulation (Inches)	Impregnation	Continuous	ANSI Sg. Reading	Color-Code	Abrasion-Resistance	Moisture-Resistance	Notes
506	FEP Extr. 0.005	None	FEP Extr. 0.005	None	204 °C [400 °F]	260 °C [500 °F]	Yes	Good	Excellent	
507	FEP Extr. 0.008	None	FEP Extr. 0.010	None	204 °C [400 °F]	260 °C [500 °F]	Yes	Good	Excellent	
508	TFE tape fused 0.005	None	TFE Tape fused 0.0075	None	260 °C [500 °F]	316 °C [600 °F]	Yes	Very Good	Excellent	
509	FEP Extr. 0.009	None	FEP Extr. 0.010 Twisted	None	204 °C [400 °F]	260 °C [500 °F]	Yes	Good	Excellent	Polyester shield w/ #20 drain wire
516	Extruded PFA	None	Extruded PFA	None	260 °C [500 °F]	316 °C [600 °F]	Yes	Good	Excellent	
517	Extruded PFA	None	Twisted; Extr. PFA Overall	None	260 °C [500 °F]	316 °C [600 °F]	Yes	Good	Excellent	Polyester shield w/ drain wire
595	FEP Extruded	None	FEP Extruded	None	204 °C [400 °F]	260 °C [500 °F]	Yes	Good	Excellent	Stainless steel overbraid inner

Polyimide Insulations

SINGLE CONDUCTOR			DUPLEX CONDUCTOR		TEMP. RATING		PHYSICAL PROPERTIES			
Type	Insulation (Inches)	Impregnation	Insulation (Inches)	Impregnation	Continuous	ANSI Sg. Reading	Color-Code	Abrasion-Resistance	Moisture-Resistance	Notes
511	Fused Polyimide Tape 0.004	None	None twisted	None	316 °C [600 °F]	427 °C [800 °F]	^[2] ^[2]	Excellent	Excellent	FEP binder melts @ 260 °C [500 °F]
512	Fused Polyimide Tape 0.004	None	Fused Polyimide 0.004	None	316 °C [600 °F]	427 °C [800 °F]	^[2]	Excellent	Excellent	FEP binder melts @ 260 °C [500 °F]
513	Fused Polyimide Tape, 0.006 Polyimide Enamel	None	Fused Polyimide 0.004	None	316 °C [600 °F]	427 °C [800 °F]	Yes singles only	Excellent	Excellent	FEP binder melts @ 260 °C [500 °F]

Fluoropolymer Insulation

SINGLE CONDUCTOR			DUPLEX CONDUCTOR		TEMP. RATING		PHYSICAL PROPERTIES			
Type	Insulation (Inches)	Impregnation	Insulation (Inches)	Impregnation	Continuous	ANSI Sg. Reading	Color-Code	Abrasion-Resistance	Moisture-Resistance	Notes
514	ETFE Extr. 0.008	None	ETFE Extr. 0.010	None	150 °C [302 °F]	200 °C [392 °F]	Yes	Good	Excellent	

[1] These wires have no impregnation on insulation

[2] Both legs have Tracer

Standard length spools are in 50 ft. increments. Non-standard lengths are available at an extra charge.

Duplex - ASTM/ANSI Type J

ASTM/ANSI Color Code: Negative wire, red; Positive wire, white; Overall brown, with Tracer where possible.

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
J20 - 1 - 304	20	Solid	Glass braid	Glass braid		Std.	0.059 x 0.097	8
J20 - 1 - S - 304	20	Solid	Glass braid	Glass braid	Stainless overbraid	Std.	0.080 x 0.119	17
J20 - 2 - 304	20	Solid	Glass braid	Glass braid		Spl.	0.059 x 0.097	8
J20 - 1 - 305	20	Solid	Glass wrap	Glass braid		Std.	0.054 x 0.095	8
J20 - 1 - 314	20	Solid	High-temp. glass braid	None - twisted		Std.	0.120	8
J20 - 2 - 321	20	Solid	High-temp. glass braid	High-temp. glass braid		Spl.	0.085 x 0.140	15
J20 - 1 - 507	20	Solid	FEP extruded	FEP extruded		Std.	0.072 x 0.124	11
J20 - 1 - 508	20	Solid	Fused TFE tape	Fused TFE tape		Std.	0.059 x 0.100	10
J20 - 2 - 513	20	Solid	Fused Polyimide tape	Fused Polyimide tape		Spl.	0.065 x 0.100	11
J20 - 3 - S - 302	20	Strd.	Double glass braid	Glass braid	Stainless overbraid	Std.	0.093 x 0.140	16
J20 - 3 - 304	20	Strd.	Glass braid	Glass braid		Std.	0.072 x 0.132	9
J20 - 3 - 507	20	Strd.	FEP extruded	FEP extruded		Std.	0.077 x 0.128	12
J20 - 3 - S - 507	20	Strd.	FEP extruded	FEP extruded	Stainless overbraid	Std.	0.092 x 0.144	15
J20 - 3 - 512	20	Strd.	Polyimide	Polyimide		Std.	0.055 x 0.1020	11
J24 - 1 - 304	24	Solid	Glass braid	Glass braid		Std.	0.047 x 0.081	4
J24 - 1 - S - 305	24	Solid	Glass wrap	Glass braid	Stainless overbraid	Std.	0.067 x 0.095	9
J24 - 1 - 508	24	Solid	Fused TFE tape	Fused TFE tape		Std.	0.047 x 0.078	5
J24 - 2 - 513	24	Solid	Fused polyimide tape	Fused polyimide tape		Spl.	0.060 x 0.085	6
J24 - 3 - 304	24	Strd.	Glass braid	Glass braid		Std.	0.043 x 0.082	8
J24 - 3 - S - 305	24	Strd.	Glass wrap	Glass braid	Stainless overbraid	Std.	0.074 x 0.104	11
J24 - 3 - 507	24	Strd.	FEP extruded	FEP extruded		Std.	0.065 x 0.110	8
J24 - 3 - 595	24	Strd.	FEP	FEP/Stainless OB	FEP	Std.	0.145	17
J28 - 1 - 305	28	Solid	Glass wrap	Glass braid		Std.	0.036 x 0.057	3
J30 - 1 - 304	30	Solid	Glass braid	Glass braid		Std.	0.037 x 0.059	3
J30 - 2 - 506	30	Solid	FEP extruded	FEP extruded		Spl.	0.030 x 0.050	4

Type J Thermocouple and Extension Wire Conductor Specifications

WIRE GAUGE	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
14	0.0641		0.086	
16	0.0508	0.0600	0.137	0.125
18		0.0490		0.185
20	0.0320	0.0390	0.357	0.343
24	0.0201	0.0250	0.877	0.842
28	0.0126		2.216	
30	0.0100		3.520	

Standard length spools are in 50 ft. increments. Non-standard lengths are available at an extra charge.

Duplex - ASTM/ANSI Type K

ASTM/ANSI Color Code: Negative wire, red; Positive wire, yellow; Overall brown, with Tracer where possible.

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
K20 - 2 - 301	20	Solid	Vitreous silica fiber braid	Vitreous silica fiber braid		Spl.	0.100 x 0.155	16
K20 - 1 - 304	20	Solid	Glass braid	Glass braid		Std.	0.059 x 0.097	8
K20 - 1 - S - 304	20	Solid	Glass braid	Glass braid	Stainless overbraid	Std.	0.080 x 0.119	17
K20 - 1 - 305	20	Solid	Glass wrap	Glass braid		Std.	0.054 x 0.095	8
K20 - 2 - 321	20	Solid	High-temp. glass braid	High-temp. glass braid		Spl.	0.085 x 0.140	15
K20 - 2 - S - 321	20	Solid	High-temp. glass braid	High-temp. glass braid	Stainless overbraid	Spl.	0.101 x 0.161	15
K20 - 2 - 350	20	Solid	Ceramic fiber braid	Ceramic fiber braid		Spl.	0.096 x 0.175	16
K20 - 2 - N - 350	20	Solid	Ceramic fiber braid	Ceramic fiber braid	Alloy 600 overbraid	Spl.	0.126 x 0.166	23
K20 - 1 - 507	20	Solid	FEP extruded	FEP extruded		Std.	0.072 x 0.124	11
K20 - 1 - 508	20	Solid	Fused TFE tape	Fused TFE tape		Std.	0.059 x 0.100	10
K20 - 2 - 509	20	Solid	FEP extruded	Twisted polyester	FEP	Spl.	0.132	16
K20 - 2 - 513	20	Solid	Fused polyimide tape	Fused polyimide tape		Spl.	0.065 x 0.100	11
K20 - 3 - 302	20	Strd.	Double glass braid	Glass braid		Std.	0.093 x 0.140	9
K20 - 3 - S - 302	20	Strd.	Double glass braid	Glass braid	Stainless overbraid	Std.	0.093 x 0.140	16
K20 - 3 - 304	20	Strd.	Glass braid	Glass braid		Std.	0.077 x 0.113	10
K20 - 3 - 507	20	Strd.	FEP extruded	FEP extruded		Std.	0.077 x 0.128	12
K20 - 3 - S - 507	20	Strd.	FEP extruded	FEP extruded	Stainless overbraid	Std.	0.110 x 0.130	13
K24 - 1 - 304	24	Solid	Glass braid	Glass braid		Std.	0.047 x 0.081	4
K24 - 1 - S - 305	24	Solid	Glass wrap	Glass braid	Stainless overbraid	Std.	0.067 x 0.095	13
K24 - 1 - 508	24	Solid	Fused TFE tape	Fused TFE tape		Std.	0.047 x 0.078	5
K24 - 3 - S - 305	24	Strd.	Glass wrap	Glass braid	Stainless overbraid	Std.	0.070 x 0.100	9

Type K Thermocouple and Extension Wire Conductor Specifications

AWG.	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
14	0.0641	0.0760	0.147	0.134
16	0.0508	0.0600	0.233	0.213
20	0.0320	0.0390	0.590	0.538
24	0.0201	0.0250	1.490	1.435
28	0.0126		3.770	
30	0.0100		5.980	
36	0.0050		24.080	

Standard length spools are in 50 ft. increments. Non-standard lengths are available at an extra charge.

Duplex - ANSI Type T

ASTM/ANSI Color Code: Negative wire, red; Positive wire, blue; Overall brown, with Tracer where possible.

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
T20 - 1 - 507	20	Solid	FEP extruded	FEP extruded		Std.	0.072 x 0.124	11
T20 - 3 - 507	20	Stranded	FEP extruded	FEP extruded		Std.	0.080 x 0.137	12
T24 - 1 - 304	24	Solid	Glass braid	Glass braid		Std.	0.047 x 0.081	4
T24 - 1 - 505	24	Solid	Polyvinyl	None (ripcord constr.)		Std.	0.048 x 0.086	3
T24 - 2 - 508	24	Solid	Fused TFE tape	Fused TFE tape		Spl.	0.047 x 0.078	5
T24 - 1 - 507	24	Stranded	FEP extruded	FEP extruded		Std.	0.065 x 0.110	8
T24 - 3 - 595	24	Stranded	FEP	FEP/stainless OB	FEP	Std.	0.145	17

Duplex - ANSI Type E

ASTM/ANSI Color Code: Negative wire, red; Positive wire, purple; Overall brown, with Tracer where possible.

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
E20 - 1 - 304	20	Solid	Glass braid	Glass braid		Std.	0.059 x 0.097	8
E20 - 1 - S - 304	20	Solid	Glass Braid	Glass braid	Stainless Overbraid	Std.	0.080 x 0.119	17

Type T Thermocouple and Extension Wire Conductor Specifications

WIRE GAUGE	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
16	0.0508		0.118	
20	0.0320	0.0390	0.298	0.272
24	0.0201	0.0250	0.272	
30	0.0100		3.520	
36	0.0050		12.174	

Type E Thermocouple and Extension Wire Conductor Specifications

WIRE GAUGE	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
16		0.0600		0.254
20	0.0320		0.704	

Type N Thermocouple and Extension Wire Conductor Specifications

WIRE GAUGE	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
20	0.0320		0.352	
24	0.0201		1.980	

STANDARD INSULATED THERMOCOUPLE EXTENSION WIRE

On this and the following pages are the details of the standard insulated thermocouple extension wires generally available for base and noble metal thermocouple installations. By using the tabulated wire insulation data below, one can select a wire suitable for most process applications. When process conditions require the use of a special construction wire, please provide complete process requirements and specifications with your request for quotation. Minimums of 2,000 feet are generally required for special constructions.

Extension Wire Types, Construction and Characteristics

ServTex Insulations

SINGLE CONDUCTOR			DUPLEX CONDUCTOR		TEMP. RATING ^[1]		PHYSICAL PROPERTIES			
Type	Insulation	Impregnation	Insulation	Impregnation	Continuous	ANSI Sgl. Reading	Color-Code	Abrasion-Resistance	Moisture-Resistance	Notes
155	Heavy fiberglass braid single insulation	Moisture resistant impregnation	ServTex Braid	Ceramic-like impregnation	288 °C [550 °F]	343 °C [650 °F]	Yes	Good	Fair	Impregnation retained to 200 °C [400 °F]
157	TFE tape (not fused). Heavy fiberglass braid single insulation	Modified resin	ServTex Braid	Moisture-resistant compound	288 °C [550 °F]	343 °C [650 °F]	Yes	Good	Fair	Impregnation retained to 204 °C [400 °F]; TFE good to 260 °C [500 °F]

Fiberglass Insulation

303	Enamel/glass braid 0.006"	Modified resin	Glass braid 0.006"	Modified resin	482 °C [900 °F]	538 °C [1000 °F]	Yes	Good	Fair	Impregnation retained to 204 °C [400 °F]
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Polyvinyl Insulations

SINGLE CONDUCTOR			DUPLEX CONDUCTOR		TEMP. RATING ^[1]		PHYSICAL PROPERTIES			
Type	Insulation	Impregnation	Insulation	Impregnation	Continuous	ANSI Sg. Reading	Color-Code	Abrasion-Resistance	Moisture-Resistance	Notes
502	Polyvinyl Extr. 0.012" to #20; #16 to 0.018"	None	Polyvinyl Extr., 0.016"	None	(-29 to 105) °C [-20 to +221] °F		Yes	Good	Excellent	
503	Polyvinyl Extr. 0.015"	None	Twisted w/cotton filler; PVC 0.030"	None	(-29 to 105) °C [-20 to +221] °F		Yes	Good	Excellent	Stranded conductors only
510	Polyvinyl Extr. 0.015"	None	Polyvinyl 0.020" Twisted	None	(-29 to 105) °C [-20 to +221] °F		Yes	Good	Excellent	Polyester shield for computer application #16 uses #18 drain wire; #20 uses #20 drain wire

Fluoropolymer Insulations

514	ETFE Extr., 0.008"	None	ETFE 0.0010"	None	150 °C [302 °F]	200 °C [392 °F]	Yes	Excellent	Excellent	
515	ETFE Extr., 0.008"	None	Twisted	None	150 °C [302 °F]	200 °C [392 °F]	Yes	Excellent	Excellent	Polyester shield w/20 AWG drain wire

[1] Thermocouple extension grade wire is only calibrated up to 204 °C [400 °F]

Standard length spools are in 50 ft. increments. Non-standard lengths are available at an extra charge.

Duplex - ASTM/ANSI Type JX

ASTM/ANSI Color Code: Negative wire, red; Positive wire, white; Overall black.

CODE	AWG. GAUGE	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
J16 - 5 - 502	16	Solid	Polyvinyl	Polyvinyl		Std.	0.111 x 0.188	27
J16 - 5 - 510	16	Solid	Polyvinyl	Twisted Polyester	PVC	Std.	0.206	28
J18 - 7 - 503	18	Strd.	Polyvinyl	Twisted cotton filler	PVC	Spl.	0.254	35
J20 - 5 - 502	20	Solid	Polyvinyl	Polyvinyl		Std.	0.095 x 0.158	14
J20 - 5 - 510	20	Solid	Polyvinyl	Twisted Polyester	PVC	Std.	0.170	20
J20 - 7 - 502	20	Strd.	Polyvinyl	Polyvinyl		Std.	0.108 x 0.185	14
J20 - 7 - 510	20	Strd.	Polyvinyl	Twisted Polyester	PVC	Std.	0.176	24

Duplex - ASTM/ANSI Type KX

ASTM/ANSI Color Code: Negative wire, red; Positive wire, yellow; Overall yellow.

K16 - 5 - 157	16	Solid	TFE heavy glass braid	ServTex braid		Std.	0.170 x 0.220	33
K16 - 5 - 303	16	Solid	Enamel glass braid	Glass braid		Std.	0.100 x 0.160	23
K16 - 5 - 502	16	Solid	Polyvinyl	Polyvinyl		Std.	0.111 x 0.188	27
K16 - 5 - 510	16	Solid	Polyvinyl	Twisted Polyester	PVC	Std.	0.206	28
K20 - 5 - 502	20	Solid	Polyvinyl	Polyvinyl		Std.	0.095 x 0.158	14
K20 - 5 - 510	20	Solid	Polyvinyl	Twisted Polyester	PVC	Std.	0.170	20
K20 - 7 - 502	20	Strd.	Polyvinyl	Polyvinyl		Std.	0.108 x 0.185	14
K20 - 7 - 503	20	Strd.	Polyvinyl	Twisted cotton filler	PVC	Std.	0.225	35
K20 - 7 - 510	20	Strd.	Polyvinyl	Twisted Polyester	PVC	Std.	0.198	20

Duplex - ASTM/ANSI Type TX

ASTM/ANSI Color Code: Negative wire, red; Positive wire, blue; Overall blue.

T20 - 5 - 502	20	Solid	Polyvinyl	Polyvinyl		Std.	0.095 x .158	15
T20 - 5 - 510	20	Solid	Polyvinyl	Twisted Polyester	PVC	Std.	0.170	20

Type J Thermocouple and Extension Wire Conductor Specifications

WIRE GAUGE	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
14	0.0641		0.086	
16	0.0508	0.0600	0.137	0.125
18		0.0490		0.185
20	0.0320	0.0390	0.357	0.343
24	0.0201	0.0250	0.877	0.842
28	0.0126		2.216	
30	0.0100		3.520	

Type K Thermocouple and Extension Wire Conductor Specifications

WIRE GAUGE	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
14	0.0641	0.0760	0.147	0.134
16	0.0508	0.0600	0.233	0.213
20	0.0320	0.0390	0.590	0.538
24	0.0201	0.0250	1.490	1.435
28	0.0126		3.770	
30	0.0100		5.980	
36	0.0050		24.080	

Type T Thermocouple and Extension Wire Conductor Specifications

WIRE GAUGE	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
16	0.0508		0.118	
20	0.0320	0.0390	0.298	0.272
24	0.0201		0.272	
30	0.0100		3.025	
36	0.0050		12.174	

Standard length spools are in 50 ft. increments. Non-standard lengths are available at an extra charge.

Duplex - ASTM/ANSI Type NX

ASTM/ANSI Color Code: Negative wire, red; Positive wire, orange; Overall orange.

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
N20 - 5 - 502	20	Solid	Polyvinyl	Polyvinyl		Std.	0.111 x 0.188	15

Duplex - ASTM/ANSI Type SX and RX

ASTM/ANSI Color Code: Negative wire, red; Positive wire, black; Overall green; Compensating extension wires for Type R, S thermocouples

S16 - 5 - 157	16	Solid	TFE tape/heavy glass braid	ServTex braid		Std.	0.170 x 0.220	30
S20 - 5 - 304	20	Solid	Glass braid	Glass braid		Std.	0.056 x 0.096	8
S20 - 5 - 502	20	Solid	Polyvinyl	Polyvinyl		Std.	0.095 x 0.158	13
S20 - 5 - 507	20	Solid	FEP extruded	FEP extruded		Std.	0.070 x 0.120	13
S20 - 5 - 510	20	Solid	Polyvinyl	Twisted Polyester	PVC	Std.	0.170	20

Duplex - ASTM/ANSI Type BX

ASTM/ANSI Color Code: Negative wire, red; Positive wire, grey; Overall grey; Compensating extension wires for ANSI Type B thermocouples

B20 - 5 - 304	20	Solid	Glass braid	Glass braid		Std.	0.056 x 0.096	8
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Type N Thermocouple and Extension Wire Conductor Specifications

WIRE GAUGE	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
20	0.0320		0.352	
24	0.0201		1.980	

Type S Thermocouple and Extension Wire Conductor Specifications

WIRE GAUGE	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
16	0.0508	0.0600	0.016	0.014
20	0.0320		0.040	
24	0.0201		0.087	

Type B Thermocouple and Extension Wire Conductor Specifications

WIRE GAUGE	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
20	0.0320		0.069	

Type C Thermocouple and Extension Wire Conductor Specifications

WIRE GAUGE	CONDUCTOR DIAMETER		OHMS PER DOUBLE FOOT	
	SOLID (inches)	STRANDED (inches)	SOLID (ohms)	STRANDED (ohms)
24	0.0201		0.940	

Pyromation offers several special construction thermocouple wire and RTD cables for process applications. Those listed below, because of their specialized construction, have been used in many unusual applications to solve problems where standard "off-the-shelf" wire and cable would not suffice. The listed wire and cable is normally carried in stock. Other non-standard wire and cable is available on special order. Please contact us with your specifications for a quotation. Minimum order quantities may apply on special construction items.

Special Construction RTD Cables

CODE	CONSTRUCTION STYLE	GAUGE AND TYPE	OHMS ^[1]	INSULATIONS			TEMP. RATING	COLOR CODE	OUTER JACKET	NOMINAL SIZE (inches)
				EACH COND.	INNER JACKET	OUTER JACKET				
RT24-3-595	Triplex	24 - stranded (silver-plated copper)	0.066	Fluoropolymer	FEP & stainless steel overbraid	Fluoropolymer	204 °C [400 °F]	Red, red, white	White	0.160 O.D.
RT24-3-527	Triplex	24 - stranded (silver-plated copper)	0.066	Fluoropolymer	None	Fluoropolymer	204 °C [400 °F]	Red, red, white	White	0.110 O.D.
RT28-6-527	Six conductor	28 - stranded (silver-plated copper)	0.175	Fluoropolymer	None	Fluoropolymer	204 °C [400 °F]	Red, red, white, black, black, green	White	0.132 O.D.
RT24-2-S-330	Duplex	24 - stranded (nickel-plated copper)	0.060	Glass braid	Glass braid	Stainless steel overbraid	482 °C [900 °F]	Red, white	-	0.110 O.D.
RT24-3-S-330	Triplex	24 - stranded (nickel-plated copper)	0.090	Glass braid	Glass braid	Stainless steel overbraid	482 °C [900 °F]	Red, red, white	-	0.120 O.D.
RT24-3-330	Triplex	24 - stranded (nickel-plated copper)	0.090	Glass braid	None	Glass braid	482 °C [900 °F]	Red, red, white	White	0.072 O.D.
RT22-3-502	Triplex	22 - stranded tinned copper	0.044	PVC	None	PVC	105 °C [221 °F]	Red, red, white	White	0.160 O.D.
RT22-4-502	Four conductor	22 - stranded tinned copper	0.059	PVC	None	PVC	105 °C [221 °F]	Red, red white, white	White	0.175 O.D.
RT24-3-509	Triplex	24 - stranded tinned copper	0.066	Fluoropolymer	Polyester shield with drain wire	Fluoropolymer	204 °C [400 °F]	Red, red, white	White	0.150 O.D.
RT24-4-509	Four conductor	24 - stranded tinned copper	0.066	Fluoropolymer	Polyester shield with drain wire	Fluoropolymer	204 °C [400 °F]	Red, red, white, white	White	0.150 O.D.

[1] Ohms per double or triple foot @ 20 °C [68 °F]

Cables made up of multi-pairs of thermocouple extension wire have gained wide acceptance as a cost effective means of running thermocouple extension wire from the process area to central control locations. Installation cost reductions are achieved by running one or more cables containing many pairs of wires rather than individual pairs in separate conduits. Pyromation offers two standard constructions of multi-pair cable as listed below, however special made-to-order cables are also available. Contact us with your complete specifications for a quotation. Minimum order quantities will apply on special cables.

900 SERIES STANDARD MULTI-PAIR THERMOCOUPLE EXTENSION CABLE SPECIFICATIONS

Single Conductor Insulation: Extruded PVC (pairs twisted)

Shield: Spiral wrapped aluminized polyester tape over all pairs w/copper drain wire

Overall Insulation: Extruded PVC jacket with a jacket splitting ripcord

Communication Wire: Insulated copper wire

Color Coding: ASTM/ANSI standard color codes

Numbering: Each pair

Temperature Rating: [-20° to 221] °F (-29° to 105) °C

Physical Properties: Abrasion-resistance: good
Moisture-resistance: excellent
Chemical-resistance: good

ASTM/ANSI Type JX Pairs

ASTM/ANSI Color Code:
Negative wire, red; Positive wire, white; Overall black

CODE	NUMBER OF PAIRS	B & S GAUGE	APPROX. O.D. (inches)	APPROX. SHIP WT. PER 1000 FT. (pounds)
J20-5-904	4 - Twisted	20	0.350	83
J20-5-908	8 - Twisted	20	0.420	131
J20-5-912	12 - Twisted	20	0.495	198
J20-5-924	24 - Twisted	20	0.665	338

ASTM/ANSI Type KX Pairs

ASTM/ANSI Color Code:
Negative wire, red; Positive wire, yellow; Overall yellow

CODE	NUMBER OF PAIRS	B & S GAUGE	APPROX. O.D. (inches)	APPROX. SHIP WT. PER 1000 FT. (pounds)
K20-5-904	4 - Twisted	20	0.350	83
K20-5-908	8 - Twisted	20	0.420	131
K20-5-912	12 - Twisted	20	0.495	198
K20-5-924	24 - Twisted	20	0.665	338

1000 SERIES STANDARD MULTI-PAIR THERMOCOUPLE EXTENSION CABLE SPECIFICATIONS

Single Conductor Insulation: Extruded PVC (pairs twisted)

Shield: Spiral wrapped aluminized polyester tape over each pair w/copper drain wire

Overall Insulation: Extruded PVC jacket with a jacket splitting ripcord

Communication Wire: Insulated copper wire

Color Coding: ASTM/ANSI standard color codes

Numbering: Each pair

Temperature Rating: [-20° to 221] °F (-29° to 105) °C

Physical Properties: Abrasion-resistance: good
Moisture-resistance: excellent
Chemical-resistance: good

ASTM/ANSI Type JX Pairs

ASTM/ANSI Color Code:
Negative wire, red; Positive wire, white; Overall black

CODE	NUMBER OF PAIRS	B & S GAUGE	APPROX. O.D. (inches)	APPROX. SHIP WT. PER 1000 FT. (pounds)
J20-5-1004	4 - Twisted	20	0.395	94
J20-5-1008	8 - Twisted	20	0.455	142
J20-5-1012	12 - Twisted	20	0.550	220
J20-5-1024	24 - Twisted	20	0.842	428

ASTM/ANSI Type KX Pairs

ASTM/ANSI Color Code:
Negative wire, red; Positive wire, yellow; Overall yellow

CODE	NUMBER OF PAIRS	B & S GAUGE	APPROX. O.D. (inches)	APPROX. SHIP WT. PER 1000 FT. (pounds)
K20-5-1004	4 - Twisted	20	0.395	94
K20-5-1008	8 - Twisted	20	0.455	142
K20-5-1012	12 - Twisted	20	0.550	220
K20-5-1024	24 - Twisted	20	0.842	428

Minimum order quantities apply to all multi-pair cables. Consult factory for minimum purchase quantities, price and availability.

The thermocouple wire types listed below are not stocked at the factory, but may be available on a special order basis. Minimum order quantities may apply.

Duplex - ASTM/ANSI Type J

ASTM/ANSI Color Code: Negative wire, red; Positive wire, white; Overall brown, with Tracer where possible. Non-stock wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
J14-1-309	14	Solid	High-temp. glass braid	High-temp. glass braid		Std.	0.125 x 0.195	36
J20-1-509	20	Solid	FEP extruded	Twisted polyester	FEP	Std.	0.059 x 0.100	10
J20-1-511	20	Solid	Fused Polyimide tape	Twisted		Std.	0.087	10
J20-1-516	20	Solid	Extruded PFA	Extruded PFA		Std.	0.070 x 0.120	11
J20-1-517	20	Solid	Extruded PFA	Extruded PFA		Std.	0.131	16
J20-2-305	20	Solid	Glass braid	Glass braid		Spl.	0.054 x 0.095	8
J24-3-508	24	Strd.	Fused TFE tape	Fused TFE tape		Std.	0.047 x 0.086	7
J24-1-511	24	Solid	Fused Polyimide tape	Twisted		Std.	0.063	5
J30-2-513	30	Solid	Fused Polyimide tape	Fused Polyimide tape		Spl.	0.048 x 0.058	4

Duplex - ASTM/ANSI Type K

ASTM/ANSI Color Code: Negative wire, red; Positive wire, yellow; Overall brown, with Tracer where possible. Non-stock wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
K20-1-311	20	Solid	High-temp. glass braid	High-temp. glass braid		Std.	0.100 x 0.150	16
K20-1-314	20	Solid	High-temp. glass braid	None - twisted		Std.	0.120	8
K20-1-509	20	Solid	FEP extruded	Twisted Polyester	FEP	Std.	0.132	16
K20-1-516	20	Solid	Extruded PFA	Extruded PFA		Std.	0.070 x 0.120	11
K20-1-517	20	Solid	Extruded PFA	Extruded PFA		Std.	0.131	16
K20-2-355	20	Solid	Ceramic fiber braid	Ceramic fiber braid		Spl.	0.090 x 0.135	14
K20-2-511	20	Solid	Fused Polyimide tape	Fused Polyimide tape		Spl.	0.087	10
K24-2-513	24	Solid	Fused Polyimide tape	Fused Polyimide tape		Spl.	0.060 x 0.085	6
K24-3-508	24	Strd.	Fused TFE tape	Fused TFE tape		Std.	0.047 x 0.085	6
K28-1-304	28	Solid	Glass braid	Glass braid		Std.	0.039 x 0.064	3
K28-1-305	28	Solid	Glass wrap	Glass braid		Std.	0.036 x 0.057	3
K30-1-305	30	Solid	Glass wrap	Glass braid		Std.	0.043 x 0.067	2
K30-2-506	30	Solid	FEP extruded	FEP extruded		Spl.	0.030 x 0.050	4
K30-2-513	30	Solid	Fused Polyimide tape	Fused Polyimide tape		Spl.	0.048 x 0.058	4
K36-2-506	36	Solid	FEP extruded	FEP extruded		Spl.	0.029 x 0.042	2

The thermocouple wire types listed below are not stocked at the factory, but may be available on a special order basis. Minimum order quantities may apply.

Duplex - ASTM/ANSI Type T

ASTM/ANSI Color Code: Negative wire, red; Positive wire, blue; Overall brown, with Tracer where possible. Non-stock wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
T20-1-S-304	20	Solid	Glass braid	Glass braid	Stainless overbraid	Std.	0.080 x 0.097	17
T20-1-305	20	Solid	Glass braid	Glass braid		Std.	0.054 x 0.095	8
T20-1-508	20	Solid	Fused TFE tape	Fused TFE tape		Std.	0.059 x 0.100	10
T20-1-509	20	Solid	FEP extruded	Twisted polyester	FEP	Std.	0.132	16
T20-1-516	20	Solid	Extruded PFA	Extruded PFA		Std.	0.070 x 0.120	11
T20-1-517	20	Solid	Extruded PFA	Extruded PFA		Std.	0.070 x 0.120	16
T20-2-513	20	Solid	Fused Polyimide tape	Fused Polyimide tape		Spl.	0.065 x 0.100	11
T20-3-512	20	Strd.	Polyimide	Polyimide		Std.	0.055 x 0.102	11
T24-1-S-304	24	Solid	Glass braid	Glass braid	Stainless overbraid	Std.	0.067 x 0.095	13
T24-1-305	24	Solid	Glass wrap	Glass braid		Std.	0.045 x 0.077	4
T24-2-513	24	Solid	Fused Polyimide tape	Fused Polyimide tape		Spl.	0.060 x 0.085	5
T30-1-305	30	Solid	Glass wrap	Glass braid		Std.	0.043 x 0.067	2
T30-2-506	30	Solid	FEP extruded	FEP extruded		Spl.	0.030 x 0.050	4
T30-2-513	30	Solid	Fused Polyimide tape	Fused Polyimide tape		Spl.	0.048 x 0.058	4
T36-2-506	36	Solid	FEP extruded	FEP extruded		Spl.	0.029 x 0.042	2

Duplex - ASTM/ANSI Type E

ASTM/ANSI Color Code: Negative wire, red; Positive wire, purple; Overall brown, with Tracer where possible. Non-stock wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
E20-1-508	20	Solid	Fused TFE tape	Fused TFE tape		Std.	0.059 x 0.100	10
E20-1-516	20	Solid	Extruded PFA	Extruded PFA		Std.	0.070 x 0.120	11
E20-1-517	20	Solid	Extruded PFA	Extruded PFA		Std.	0.070 x 0.120	16

Duplex - ASTM/ANSI Type N

ASTM/ANSI Color Code: Negative wire, red; Positive wire, orange; Overall brown, with Tracer where possible. Non-stock wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
N20-1-304	20	Solid	Glass braid	Glass braid		Std.	0.059 x 0.097	8
N20-2-301	20	Solid	Vitreous silica fiber braid	Vitreous silica fiber braid		Spl.	0.100 x 0.155	16
N24-1-304	24	Solid	Glass braid	Glass braid		Std.	0.047 x 0.081	4
N20-1-S-304	20	Solid	Glass braid/TFE impregnated	Glass braid/TFE impregnated	Stainless overbraid	Std.	0.075 x 0.117	11
N20-1-S-307	20	Solid	Impregnated glass braid	Glass braid	Stainless overbraid	Std.	0.095 x 0.138	13

The thermocouple extension wire types listed below are not stocked at the factory, but may be available on a special order basis. Minimum order quantities may apply.

Duplex - ASTM/ANSI Type J

ASTM/ANSI Color Code: Negative wire, red; Positive wire, white; Overall black. Non-stock extension wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
J14-6-502	14	Solid	Polyvinyl	Polyvinyl		Spl.	0.130 x 0.226	37
J16-5-303	16	Solid	Enamel glass braid	Glass braid		Std.	0.100 x 0.160	18
J16-7-155	16	Strd.	ServTex	ServTex braid		Std.	0.188 x 0.260	31
J16-7-515	16	Strd.	ETFE	Twisted polyester		Std.	0.185	29
J20-5-514	20	Solid	ETFE	ETFE	ETFE	Std.	0.080 x 0.130	10

Duplex - ASTM/ANSI Type KX

ASTM/ANSI Color Code: Negative wire, red; Positive wire, yellow; Overall yellow. Non-stock extension wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
K14-5-502	14	Solid	Polyvinyl	Polyvinyl		Std.	0.130 x 0.226	38
K16-7-515	16	Strd.	ETFE	Twisted Polyester	ETFE	Std.	0.185	30
K20-5-514	20	Solid	ETFE	ETFE		Std.	0.080 x 0.130	10

Duplex - ASTM/ANSI Type TX

ASTM/ANSI Color Code: Negative wire, red; Positive wire, blue; Overall blue. Non-stock extension wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
T16-5-502	14	Solid	Polyvinyl	Polyvinyl		Std.	0.111 x 0.188	38
T20-7-502	16	Strd.	Polyvinyl	Polyvinyl		Std.	0.108 x 0.185	30

Duplex - ASTM/ANSI Type EX

ASTM/ANSI Color Code: Negative wire, red; Positive wire, purple; Overall purple. Non-stock extension wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
E16-7-515	16	Strd.	ETFE	Twisted polyester	ETFE	Std.	0.185	30
E20-5-502	20	Solid	Polyvinyl	Polyvinyl		Std.	0.095 x 0.158	15

Duplex - ASTM/ANSI Type NX

ASTM/ANSI Color Code: Negative wire, red; Positive wire, orange; Overall orange. Non-stock extension wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
N20-5-510	20	Solid	Polyvinyl	Twisted polyester	PVC	Std.	0.170	20

Duplex - ASTM/ANSI Type SX and RX

ASTM/ANSI Color Code: Negative wire, red; Positive wire, black; Overall green; Compensating extension wire for ANSI Types R, S thermocouples. Non-stock extension wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
S24-5-304	24	Solid	Glass Braid	Glass Braid		Std.	0.045 x 0.077	4

Tungsten/Tungsten Rhenium Type C

ASTM/ANSI Color Code: Negative wire, red; Positive wire, orange; Overall orange. Non-stock extension wire

CODE	AWG.	CONDUCTOR	INSULATIONS			LIMITS OF ERROR	NOMINAL SIZE (inches)	WEIGHT per 1000 FT. (pounds)
			EACH CONDUCTOR	OUTER JACKET	OVERALL			
C24-5-304	24	Solid	Glass Braid	Glass Braid		Std.	0.045 x 0.072	7