

Extension Wire

Introduction

Barber-Colman offers bare and insulated thermocouple wire as well as insulated extension wire. Two conductor and three conductor insulated extension wire is commonly used with thermocouples; and three conductor wire with RTD's. We also offer multi-pair insulated thermocouple extension wire and cable for panel or other wiring needs.

Color Codes

Thermocouple Compensating Cable Color Codes.

Thermocouple Material	British BS 1843	American ANSI MC 96.1	German DIN 43710	French NFE 18001
Copper T Constantan	+ White - Blue Blue	+ Blue - Red Blue	+ Red - Brown Brown	+ Yellow - Blue Blue
Iron J/L Constantan	+ Yellow - Blue Black	+ White - Red Black	+ Red - Blue Blue	+ Yellow - Black Black
Nickel Chromium K Nickel Aluminum	+ Brown - Blue Red	+ Yellow - Red Yellow	+ Red - Green Green	+ Yellow - Purple Yellow
Platinum/Platinum R 13% Rhodium	+ White - Blue Green	+ Black - Red Green	+ Red - White White	+ Yellow - Green Green
Platinum/Platinum S 10% Rhodium	+ White - Blue Green	+ Black - Red Green	+ Red - White White	+ Yellow - Green Green
Chromel E Constantan	+ Brown - Blue Brown	+ Violet - Red Violet	Red Black Black	+ Yellow - Purple Purple
Platinum 30% Rh B Platinum 6% Rh	- -	+ Grey - Red Grey	Red Black Black	
N Nicrosil / Nisil	+ Orange - Red Orange	+ Orange - Red Orange	+ Orange - Red Orange	+ Orange - Red Orange

Specifications

Bare Thermocouple Wire

Bare, solid wire is available in 8, 14, 16, 18, 20 and 22 gauge, and calibration Types J, K, T and E.

Insulated Multi-pair Wire

20 gauge, insulated, solid, multi-pair extension wire is available in calibration Types J, K and T. Insulation (Fields 6 through 9, code 1900) is 0.015" PVC 0.015" aluminum backed Mylar taped (50% overlaid) with drain and signal wire, 0.045" PVC overall. Individual pairs are twisted.

Insulated Duplex Wire

Thermocouple extension wire must be compatible with the alloys used in the thermocouple. Extension wire for base metal thermocouples is usually constructed of the same alloys as the element. For noble metal elements, base metal alloys are selected to match the characteristics of the element within the operating range of 0° to 150°C.

Two types of wire available – thermocouple grade and extension grade. Thermocouple grade wire is manufactured with alloys to meet the required tolerance. Extension grade wire for base metal thermocouples is made with similar material but is not rated for accuracy at high temperature.

Insulation is the largest factor determining performance of extension wire. Moisture resistance, abrasion resistance, temperature rating and cost are factors to be considered. The following table identifies the characteristics of Barber-Colman thermocouple insulated wire. "Code" is the characters that appears in Fields 6 through 9 of the part number.

RTD Extension Wire

Insulated strand wire is available for RTD's with three 16 gauge copper conductors; and two and three 22 gauge nickel clad copper conductors.

Wire Insulation Characteristics

Specifications (continued)

Insulation Construction and Characteristics					Moisture Resistance			Comments		
					Abrasion Resistance					
Code	Insulation				ANSI Color Coded			Rating °C (°F)		
					Cont.	Single Read-Ing				
	Each Conductor	Impreg-nation	Overall	Impreg-nation						
151	Felted synthetic fiber. 0.015" to #24	Hot melt compound	Braided synthetic fiber .030"	Moisture resistant compound	290 (550)	-	Y	G	F	Impregnation retained to 150°C (300°F)
153	Teflon TFE tape not fused 0.004"/Felted synthetic fiber 0.020"	Silicone modified resin	Braided synthetic fiber	Moisture resistance compound	290 (550)	-	Y	G	G	Impregnation retained to 204°C (400°F); Teflon good to 260°C (500°F)
251	Felted synthetic fiber 0.010"	Silicone modified resin	Glass braid 0.006"	Silicone modified resin	288 (550)	343 (650)	Y	G	F	Impregnation retained to 204°C (400°F)
301	Vitreous Silica fiber 0.015"	None	Vitreous Silica fiber 0.020"	None	871 (1600)	1093 (2000)	N	F	F	
302	Double glass braid 0.006"	Silicone modified resin	Glass braid 0.006"	Silicone modified resin	482 (900)	538 (1000)	Y	G	G	Impregnation retained to 204°C (400°F)
303	Enamel/glass braid 0.006"	Silicone modified resin	Glass braid 0.006"	Silicone modified resin	482 (900)	-	Y	F	G	
304	Glass braid 0.006"	Silicone modified resin	Glass braid 0.006"	Silicone modified resin	482 (900)	538 (1000)	Y	F	G	Impregnation retained to 204°C (400°F)
305	Double glass wrap 0.005"	High temp. varnish	Glass braid 0.006"	Silicone modified resin	482 (900)	538 (1000)	Y	F	G	Impregnation retained to 204°C (400°F)
307	Teflon TFE tape (not fused) 0.004" TFE coated glass 0.006"		Teflon coated glass braid 0.006"		482 (900)	538 (1000)	Y	G	E	
309	High temp glass braid 0.012"	-	High temp glass braid 0.012"	Silicone modified resin	704 (1300)	871 (1600)	Y (2)	G	F	Impregnation retained to 204°C (400°F)
311	High temp glass braid 0.012"	-	High temp glass braid 0.012"	Lacquer coated	704 (1300)	871 (1600)	N	F	F	Impregnation retained to 149°F (300°F)
313	Glass braid 0.008/0.006"	Silicone modified resin	Glass braid .008/.006"	Silicone modified resin	482 (900)	538 (1000)	Y	G	G	Impregnation retained to 204°C (400°F)
314	High temp glass braid 0.008"	Silicone modified resin	None - twisted	-	704 (1300)	871 (1600)	Y	G	G	Impregnation retained to 204°C (400°F)
315	Glass braid 0.008"	Silicone Modified resin	None - twisted	-	482 (900)	538 (1000)	Y	G	G	Impregnation retained to 204°C (400°F)
316	Glass braid 0.008/0.006"	Silicone modified resin	High temp glass braid .013/.012"	Silicone modified resin	482 (900)	538 (1000)	Y	G	G	Impregnation retained to 149°C (300°F)
350	Ceramic fiber 0.018"	-	Ceramic fiber 0.018"	-	1430 (2600)	1430 (2600)	N	G	F	
355	Ceramic fiber 0.014"	-	Ceramic fiber 0.014"	-	1430 (2600)	1430 (2600)	N	G	F	

Y=yes, N=No, T=tracers, F=fair, G=good, VG=very good, E=excellent, (2) = both legs

Wire Insulation Characteristics

Specifications (continued)

Insulation Construction and Characteristics (continued)					Moisture Resistance			Comments	
					Abrasion Resistance		Rating °C (°F)		
Code	Insulation				ANSI Color Coded				
	Each Conductor	Impreg-nation	Overall	Impreg-nation					
401	PVC 0.013" to #20, 0.014" to #16, 0.016" to #14	-	Cotton braid	Wax	88 (190)	-	Y	G	E
502	PVC 0.013" to #20, 0.014" to #16, 0.016" to #14	-	PVC 0.016"	-	-29 to +105 (-20 to +221)	-	Y	G	E
503	PVC 0.015"	-	Twisted with filler cotton serve/PVC 0.030"	-	-29 to +105 (-20 to +221)	-	Y	G	E
504	Nylon 0.010"	-	Nylon 0.008" to 0.010"	-	177 (356)	-	Y	E	F
505	PVC 0.012" to 0.014"	-	Ripcord	-	-29 to +105 (-20 to +221)	-	Y	G	E
507	Teflon FEP extr. 0.008"	-	Teflon FEP extr. 0.010"	-	204 (400)	316 (600)	Y	V-G	E
508	Teflon TFE tape fused 0.005"	-	Teflon TFE tape fused 0.0075"	-	260 (500)	316 (600)	Y	G	E
509	Teflon FEP extr. 0.009"	-	Teflon FEP extr. 0.010"	-	204 (400)	316 (600)	Y	V-G	E
510	PVC 0.015"	-	pvc 0.020" twisted	-	-29 to +105 (-20 to +221)	-	Y	G	E
512	Fused Kapton tape 0.004"	-	Fused Kapton tape 0.004"	-	316 (600)	427 (800)	T	E	E
513	Fused Kapton tape 0.006"	-	Fused Kapton tape 0.004"	-	316 (600)	427 (800)	T	E	E
514	Tefzel 0.008"	-	Tefzel 0.010"	-	150 (302)	-	Y	E	E
515	Tefzel 0.008"	-	Tefzel 0.010" twisted	-	150 (302)	-	Y	E	E
591	Kapton/Kapton tape 0.007/0.004"	-	Kapton tape w/ SS overtraid	-	316 (600)	427 (800)	Y	E	E

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Trade Names

Teflon and Kapton are trade names of E. I. duPont de Nemours & Co. Chromel and Alumel are trade names of Hoskins Mfg. Co. Platinel is a trade name of Englehard Industries.