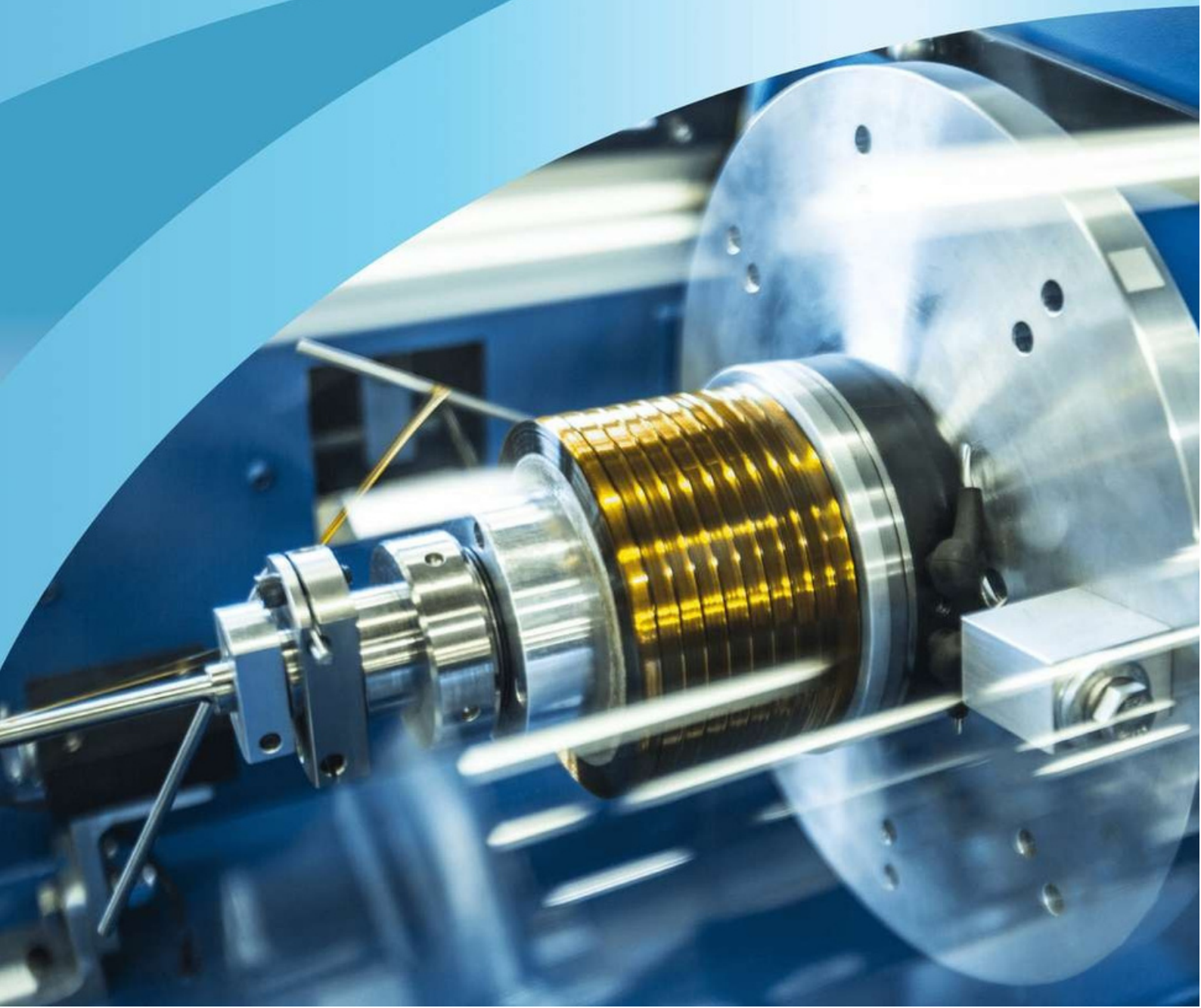


# QUIRKWIRECO.

High Temperature Wire & Cable





This company was founded in 1956, as Wirecraft Products, Inc., to produce high-temperature insulated wire and cable. In 1978 the factory was purchased and reorganized by Harrison P. Quirk and became Quirk Wire Co. Inc. doing business as Wirecraft Products. Then, in 2003 the company became an employee owned business through the establishment of an employee stock ownership plan (ESOP).

Wirecraft's principal product line remains high temperature wire and cable utilizing PTFE, FEP, ETFE, PFA and KAPTON\* insulations. Wirecraft also has product lines in ULTRA HIGH TEMPERATURE mica/glass braid insulations, LOW NOISE CABLES and a wide selection of THERMOCOUPLE WIRE. In addition, we have added HIGH VOLTAGE and insulated RESISTANCE WIRE to our catalog.

Wirecraft utilizes both wrapped and extruded insulation with an extensive list of UL, CSA and CE approvals. Wirecraft is approved to M22759 and also manufactures high temperature cable to M27500 and a variety of other military specifications.

Whether a customer needs 250,000 feet or 250 feet, we react within minutes from the time an order is received. We take pride in our knowledgeable sales staff that can quickly respond to quotation requests and provide accurate product information about high temperature wire and cable requirements.

For over 60 years Wirecraft has been a trusted source for high temperature wire and cable. We are dedicated to providing the highest quality products that meet our customers' specifications while at the same time concentrating on a program to improve our manufacturing processes and competitiveness in the industry.

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\*DuPont Registered Trademark

## Wirecraft Testing Facilities

### Quality Control Equipment Includes:

- 3 KHZ Spark Testers
- 30 KVAC Spark Tester
- Impulse Dielectric Testers
- 5 KVA Dielectric Testers
- Sub-Zero Refrigerator
- 316°C Circulating Oven
- Vertical Flame Tester
- Continuity Testers
- Capacitance Impedance Bridge
- Conductor Resistance Tester
- Resistance Tester
- Cable Fault Tester
- Scott Tensile & Elongation Tester
- Kocour Plating Tester
- Stripe Abrasion Tester
- Pin Micrometer
- Low Noise Tester

### Quality Control System:

Certified by DQS to ISO 9001:2015  
 MIL-I-45208 for 100% source traceability.  
 Samples retained on all shipments for three years.  
 Underwriters Laboratory Inspection.  
 Canadian Standards Inspection.  
 ASTM Standards.  
 NEMA Standards.  
 CE/CENELEC Approvals.

### Quality Control Includes:

	E	EE	ET
Spark Test	4600 VAC	5700 VAC	2900 VAC
Dielectric Test (in water)	2000 VAC	3000 VAC	1500 VAC
Insulation Resistance (in water)	over 5000 megohms/m feet		

Lot samples are tested for heat resistance, cold bend, soldering, flammability, dielectric constant, power factor, surface resistance, tensile and elongation.



## Services and Special Constructions

### Bonding

Wirecraft bonding uses a silica based material with PTFE added to the solution. A granular surface is actually bonded to the wire insulation to mechanically aid in encapsulation.

### Etching

Wirecraft sodium naphthalene based etchants are much more aggressive than bonding and will physically allow wire to be held tighter in the encapsulation process. The special cleaning process used on our etched wire insures a surface free of build-up.

### Printing

Wirecraft prints hook-up wire to meet UL, CSA, and military specifications. We will also print special legends on hook-up wire and on some jackets per customer requirements.

### Striping

Wirecraft can stripe 30 awg. through 10 awg.

### Special OD's

Wirecraft will manufacture special outside diameters which may be requested for extruded, wrapped, or jacketed wire and cable.

### Matched Multiples

Wirecraft can ship wire and cable in exact matched multiples for cabling, harnessing, or further processing when a minimum amount of scrap is needed.

### Special Constructions

Wirecraft operates as a job shop to manufacture high temperature wire and cable. Within existing specifications we can custom design new products for specific applications using many conductors, dimensions, and insulations which may not be shown in this catalog.

### Special Jacketing

Wirecraft can supply unique jacket types such as nylon braids, PVC and polyurethane.

### Heavy Metal Free

Wirecraft has eliminated heavy metals from our resins and color concentrates. Consult factory for specific details.



STRIPING, PRINTING AND CURING TOWERS

## MIL-W-16878 PTFE and NEMA HP 3 Wire

200°C (Silver Plated Conductors) - 260°C (Nickel Plated Conductors)

Insulation: PTFE Extruded or Spiral Wrapped & Fused as Specified by MIL-W-16878

CONDUCTOR						M16878/4 SPC EXTRUDED M16878/21 SPC WRAPPED M16878/25 NPC EXTRUDED TYPE E 600V RMS				M16878/5 SPC EXTRUDED M16878/22 SPC WRAPPED M16878/27 NPC EXTRUDED TYPE EE 1000V RMS				M16878/6 SPC EXTRUDED M16878/20 SPC WRAPPED M16878/23 NPC EXTRUDED TYPE ET 250V RMS			
AWG.	NUMBER OF STRANDS	STRAND		COND. DIAM. (NOM.)	CM MIN.	DIAMETER OVER INSULATION		WIRECRAFT CATALOG NUMBER		DIAMETER OVER INSULATION		WIRECRAFT CATALOG NUMBER		DIAMETER OVER INSULATION		WIRECRAFT CATALOG NUMBER	
		SIZE AWG.	DIAM.			MIN.	MAX.	EXTRUDED	SPIRAL WRAPPED	MIN.	MAX.	EXTRUDED	SPIRAL WRAPPED	MIN.	MAX.	EXTRUDED	SPIRAL WRAPPED
32	7	40	.0031	.009	69	.025	.033	—	327-TE	.035	.043	—	327-TH	.019	.023	—	327-TT
32	1	32	.0080	.008	63	.024	.032	—	321-TE	.034	.042	—	321-TH	.018	.022	—	321-TT
30	7	38	.0040	.012	110	.028	.036	307-XE	307-TE	.038	.046	307-XH	307-TH	.022	.026	307-XT	307-TT
30	19	42	.0025	.012	92	.028	.036	3019-XE	3019-TE	.038	.046	3019-XH	3019-TH	.022	.026	3019-XT	3019-TT
30	1	30	.010	.010	100	.026	.034	301-XE	301-TE	.036	.044	301-XH	301-TH	.020	.024	301-XT	301-TT
28	7	36	.0050	.015	175	.031	.039	287-XE	287-TE	.041	.049	287-XH	287-TH	.025	.029	287-XT	287-TT
28	19	40	.0031	.015	182	.031	.039	2819-XE	2819-TE	.041	.049	2819-XH	2819-TH	.025	.029	2819-XT	2819-TT
28	1	28	.0126	.0126	160	.029	.037	281-XE	281-TE	.039	.047	281-XH	281-TH	.023	.027	281-XT	281-TT
26	7	34	.0063	.019	278	.035	.043	267-XE	267-TE	.045	.053	267-XH	267-TH	.029	.033	267-XT	267-TT
26	19	38	.0040	.019	304	.035	.043	2619-XE	2619-TE	.045	.053	2619-XH	2619-TH	.029	.033	2619-XT	2619-TT
26	1	26	.016	.016	253	.032	.040	261-XE	261-TE	.042	.050	261-XH	261-TH	.026	.030	261-XT	261-TT
24	7	32	.0080	.024	448	.040	.048	247-XE	247-TE	.050	.058	247-XH	247-TH	.034	.038	247-XT	247-TT
24	19	36	.0050	.024	475	.040	.048	2419-XE	2419-TE	.050	.058	2419-XH	2419-TH	.034	.038	2419-XT	2419-TT
24	1	24	.020	.020	404	.036	.044	241-XE	241-TE	.046	.054	241-XH	241-TH	.030	.034	241-XT	241-TT
23	1	23	.022	.022	511	.038	.046	231-XE	231-TE	.048	.056	231-XH	231-TH	.032	.036	231-XT	231-TT
22	7	30	.0100	.030	700	.046	.054	227-XE	227-TE	.056	.064	227-XH	227-TH	.040	.044	227-XT	227-TT
22	19	34	.0063	.030	755	.046	.054	2219-XE	2219-TE	.056	.064	2219-XH	2219-TH	.040	.044	2219-XT	2219-TT
22	27	36	.0050	.030	675	.046	.054	2227-XE	2227-TE	.056	.064	2227-XH	2227-TH	.040	.044	2227-XT	2227-TT
22	1	22	.025	.025	640	.041	.049	221-XE	221-TE	.051	.059	221-XH	221-TH	.035	.039	221-XT	221-TT
20	7	28	.0126	.038	1113	.054	.062	207-XE	207-TE	.064	.072	207-XH	207-TH	.048	.052	207-XT	207-TT
20	19	32	.0080	.038	1216	.054	.062	2019-XE	2019-TE	.064	.072	2019-XH	2019-TH	.048	.052	2019-XT	2019-TT
20	1	20	.032	.032	1020	.048	.056	201-XE	201-TE	.058	.066	201-XH	201-TH	.042	.046	201-XT	201-TT
19	1	19	.036	.036	1288	.052	.060	191-XE	191-TE	.062	.070	191-XH	191-TH	—	—	—	—
18	7	26	.0159	.047	1771	.064	.074	187-XE	187-TE	.074	.084	187-XH	187-TH	—	—	—	—
18	19	30	.0100	.047	1900	.064	.074	1819-XE	1819-TE	.074	.084	1819-XH	1819-TH	—	—	—	—
18	1	18	.040	.040	1620	.056	.066	181-XE	181-TE	.066	.076	181-XH	181-TH	—	—	—	—
16	19	29	.0113	.053	2432	.073	.087	1619-XE	1619-TE	.083	.095	1619-XH	1619-TH	—	—	—	—
16	26	30	.0100	.057	2600	.073	.087	1626-XE	1626-TE	.083	.095	1626-XH	1626-TH	—	—	—	—
16	1	16	.051	.051	2580	.066	.080	161-XE	161-TE	.076	.088	161-XH	161-TH	—	—	—	—
14	19	27	.0142	.067	3838	.087	.101	1419-XE	1419-TE	.097	.113	1419-XH	1419-TH	—	—	—	—
12	19	25	.0179	.084	6080	.107	.121	1219-XE	1219-TE	.117	.133	1219-XH	1219-TH	—	—	—	—
12	37	28	.0126	.085	5883	.105	.119	1237-XE	1237-TE	.115	.131	1237-XH	1237-TH	—	—	—	—
12	65	30	.0100	.089	6500	.109	.123	—	1265-TE	.119	.135	—	1265-TH	—	—	—	—
10	37	26	.0159	.108	9361	.127	.141	1037-XE	1037-TE	.137	.153	1037-XH	1037-TH	—	—	—	—
10	105	30	.0100	.127	10500	.147	.161	—	10105-TE	.157	.172	—	10105-TH	—	—	—	—
8	133	29	.0113	.161	17024	—	—	—	—	.199	.219	—	8133-TH	—	—	—	—
6	133	27	.0142	.202	26866	—	—	—	—	.286	.301	—	6133-TH	—	—	—	—
4	133	25	.0179	.255	42560	—	—	—	—	.349	.369	—	4133-TH	—	—	—	—

• Special Stranding made similar to MIL-W-16878  
Cage Code 24868

## MIL-W-16878 PTFE vs. UL and CSA

Common Comparisons of Wall Thicknesses, Voltages, and Temperatures.

	AVG. WALL <sup>(3)</sup>	AWG.	VOLTS	TEMP. °C	CONDUCTORS <sup>(1)</sup>
MIL-W-16878/6-ET	.005	30-20	250	200	SPC
MIL-W-16878/23-ET	.005	30-20	250	260	NPC
UL 1371	.005	30-20	N/S <sup>(2)</sup>	105	SPC, NPC
UL 1538	.005	30-20	N/S <sup>(2)</sup>	105	SPC, NPC
CSA	Goes to .010 in the next category				
MIL-W-16878/4-E	.010	30-10	600	200	SPC
MIL-W-16878/25-E	.010	30-10	600	260	NPC
UL 1213	.008	30-16	N/S <sup>(2)</sup>	105	SPC, NPC
UL 1371	.008	18-16	N/S <sup>(2)</sup>	105	SPC, NPC
CSA 150V	.010	30-16	150	150 <sup>(4)</sup>	SPC, NPC
MIL-W-16878/5-EE	.013	30-10	1000	200	SPC
MIL-W-16878/27-EE	.013	30-10	1000	260	NPC
UL 1180	.013	30-10	300	200	SPC, NPC
UL 1815	.013	30-10	300	250	NPC
CSA 300V	.010	28-10	300	200/250 <sup>(4)</sup>	SPC/NPC
No Equivalent Mil Spec for this wall thickness - See MIL-W-16878-EE					
UL 1199	.020	30-10	600	200	SPC, NPC
UL 1659	.020	26-10	600	250	NPC
CSA 600V	.012	28-10	600	200/250 <sup>(4)</sup>	SPC/NPC
UL 1584	.022	30-10	1000	200	SPC
CSA 1000V	.020	28-10	1000	200/250 <sup>(4)</sup>	SPC/NPC

### Notes

- (1) Common conductors listed, others available such as "A" nickel, 27% NPC, and Alloys.
- (2) NS = Not Specified.
- (3) Wall tolerances outside of the average wall can still meet UL & CSA requirements based on actual minimum wall and actual conductor diameter.
- (4) Please consult factory for verification on CSA 150°C, 200°C, and 250°C temperature ratings.



## MIL-W-16878 and NEMA HP 4

### FEP Insulated Wire

### Insulation: Extruded Fluorinated Ethylene Propylene

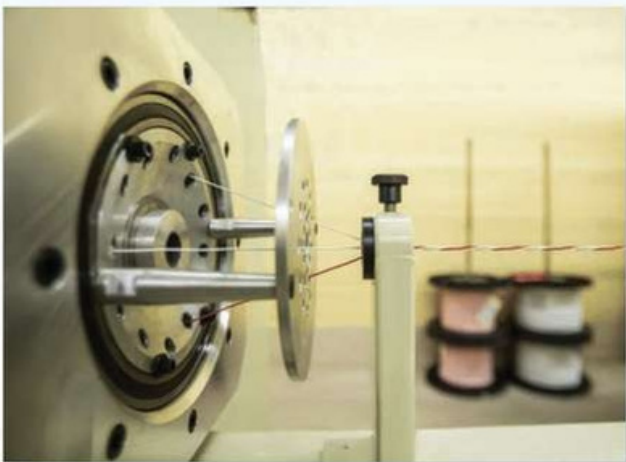
200°C Silver Plated Conductors

**TEFZEL\* (ETFE)** 150°C/200°C and  
**PERFLUOROALKOXY (PFA)** 260°C  
are also in our product line for  
commercial use.

FEP using tin plated conductors is available  
for commercial use.

For additional strandings and conductors  
please consult factory.

\*DuPont Registered Trademark



MELT EXTRUSION FOR INSULATING WITH FEP, PFA, AND ETFE

CONDUCTOR				MIL-W-16878/11 TYPE K 600V (RMS)				MIL-W-16878/12 TYPE KK 1000V (RMS)				MIL-W-16878/13 TYPE KT 250V (RMS)			
AWG.	NUMBER OF STRANDS	STRAND		COND. DIAM. (NOM.)	CM AREA (NOM.)	DIAM. OVER INSULATION		WIRECRAFT CATALOG # EXTRUDED	DIAM. OVER INSULATION		WIRECRAFT CATALOG # EXTRUDED	DIAM. OVER INSULATION		WIRECRAFT CATALOG # EXTRUDED	
		SIZE AWG.	DIAM.			MIN.	MAX.		MIN.	MAX.		MIN.	MAX.		
28	7	36	.0050	.015	175	.031	.039	287-K-SPC	.041	.049	287-KK-SPC	.025	.029	—	
26	7	34	.0063	.019	278	.035	.043	267-K-SPC	.045	.053	267-KK-SPC	.029	.033	267-KT-SPC	
26	19	38	.0040	.019	304	.035	.043	2619-K-SPC	.045	.053	2619-KK-SPC	.029	.033	2619-KT-SPC	
26	1	26	.016	.016	253	.032	.040	261-K-SPC	.042	.050	261-KK-SPC	.026	.030	261-KT-SPC	
24	7	32	.0080	.024	448	.040	.048	247-K-SPC	.050	.058	247-KK-SPC	.034	.038	247-KT-SPC	
24	19	36	.0050	.024	475	.040	.048	2419-K-SPC	.050	.058	2419-KK-SPC	.034	.038	2419-KT-SPC	
24	1	24	.020	.020	404	.036	.044	241-K-SPC	.046	.054	241-KK-SPC	.030	.034	241-KT-SPC	
22	7	30	.0100	.030	700	.046	.054	227-K-SPC	.056	.064	227-KK-SPC	.040	.044	227-KT-SPC	
22	19	34	.0063	.030	755	.046	.054	2219-K-SPC	.056	.064	2219-KK-SPC	.040	.044	2219-KT-SPC	
22	1	22	.025	.025	640	.041	.050	221-K-SPC	.051	.060	221-KK-SPC	.035	.040	221-KT-SPC	
20	7	28	.0126	.038	1113	.054	.062	207-K-SPC	.064	.072	207-KK-SPC	.048	.052	207-KT-SPC	
20	19	32	.0080	.038	1216	.054	.062	2019-K-SPC	.064	.072	2019-KK-SPC	.048	.052	2019-KT-SPC	
20	1	20	.032	.032	1020	.048	.056	201-K-SPC	.058	.066	201-KK-SPC	.042	.046	201-KT-SPC	
18	7	26	.0159	.047	1771	.064	.074	187-K-SPC	.074	.084	187-KK-SPC	—	—	—	
18	19	30	.0100	.047	1900	.064	.074	1819-K-SPC	.074	.084	1819-KK-SPC	—	—	—	
18	1	18	.040	.040	1620	.056	.066	1819-K-SPC	.066	.077	181-KK-SPC	—	—	—	
16	19	29	.0113	.053	2432	.073	.087	1619-K-SPC	.083	.095	1619-KK-SPC	—	—	—	
16	26	30	.0100	.057	2600	—	—	—	.086	.098	1626-KK-SPC	—	—	—	
16	1	16	.051	.051	2580	.067	.081	161-K-SPC	.077	.089	161-KK-SPC	—	—	—	
14	19	27	.0142	.067	3838	.088	.102	1419-K-SPC	.098	.114	1419-KK-SPC	—	—	—	
14	41	30	.0100	.072	4100	—	—	—	.102	.118	1441-KK-SPC	—	—	—	
12	19	25	.0179	.084	6080	.107	.121	1219-K-SPC	.117	.133	1219-KK-SPC	—	—	—	
12	65	30	.0100	.089	6500	—	—	—	.119	.135	1265-KK-SPC	—	—	—	
10	37	26	.0159	.108	9361	.127	.141	1037-K-SPC	.137	.153	1037-KK-SPC	—	—	—	
10	105	30	.0100	.127	10500	—	—	—	.146	.162	10105-KK-SPC	—	—	—	
8	133	29	.0113	.161	17024	.185	.199	8133-K-SPC	.199	.219	8133-KK-SPC	—	—	—	
6	133	27	.0142	.202	26866	—	—	—	.286	.301	6133-KK-SPC	—	—	—	
4	133	25	.0179	.255	42560	—	—	—	.349	.369	4133-KK-SPC	—	—	—	



## NEMA HP3 PTFE and NEMA HP4 FEP

### NEMA Standard for PTFE Insulated Wire<sup>1</sup>:

HP3-(Type) (Construction) (Conductor Material) (AWG) (Number of Strands) (Color)

NEMA Type: ET, E, EE  
as described above

**Example:** HP3-EXCFE9

PTFE, Type E, Extruded, Nickel Plated Copper, 22 AWG, 19 Strands, White

Construction:  
Wrapped (W), Extruded (X)

### NEMA Standard for FEP Insulated Wire<sup>2</sup>:

HP4-(Type) (Conductor Material) (AWG) (Number of Strands) (Color)

NEMA Type: KT, K, KK  
as described above

**Example:** HP4-K-BFA9

FEP, Type K, Silver Plated Copper, 22 AWG, Solid, White

### Part Number Identification:

#### Conductor Material and Coating

Letter	Conductor Material & Coating	Letter	Conductor Material & Coating
B	Silver Plated Copper (SPC)	E	Nickel Plated High Strength Copper Alloy (NPC Alloy)
C	Nickel Plated Copper (NPC)	F	Silver Plated Copper Clad Steel (SPCCS)
D	Silver Plated High Strength Copper Alloy (SPC Alloy)	G	Nickel Plated Copper Clad Steel (NPCCS)
		H	Tin Plated Copper (TPC) (HP4 only, not for HP3)

#### AWG Nominal Conductor Size

AWG	Letter	AWG	Letter	AWG	Letter	AWG	Letter
32	A	20	G	8	N	2/0	W
30	B	18	H	6	P	3/0	Y
28	C	16	J	4	R	4/0	Z
26	D	14	K	2	S		
24	E	12	L	1	T		
22	F	10	M	1/0	U		

#### Number of Strands

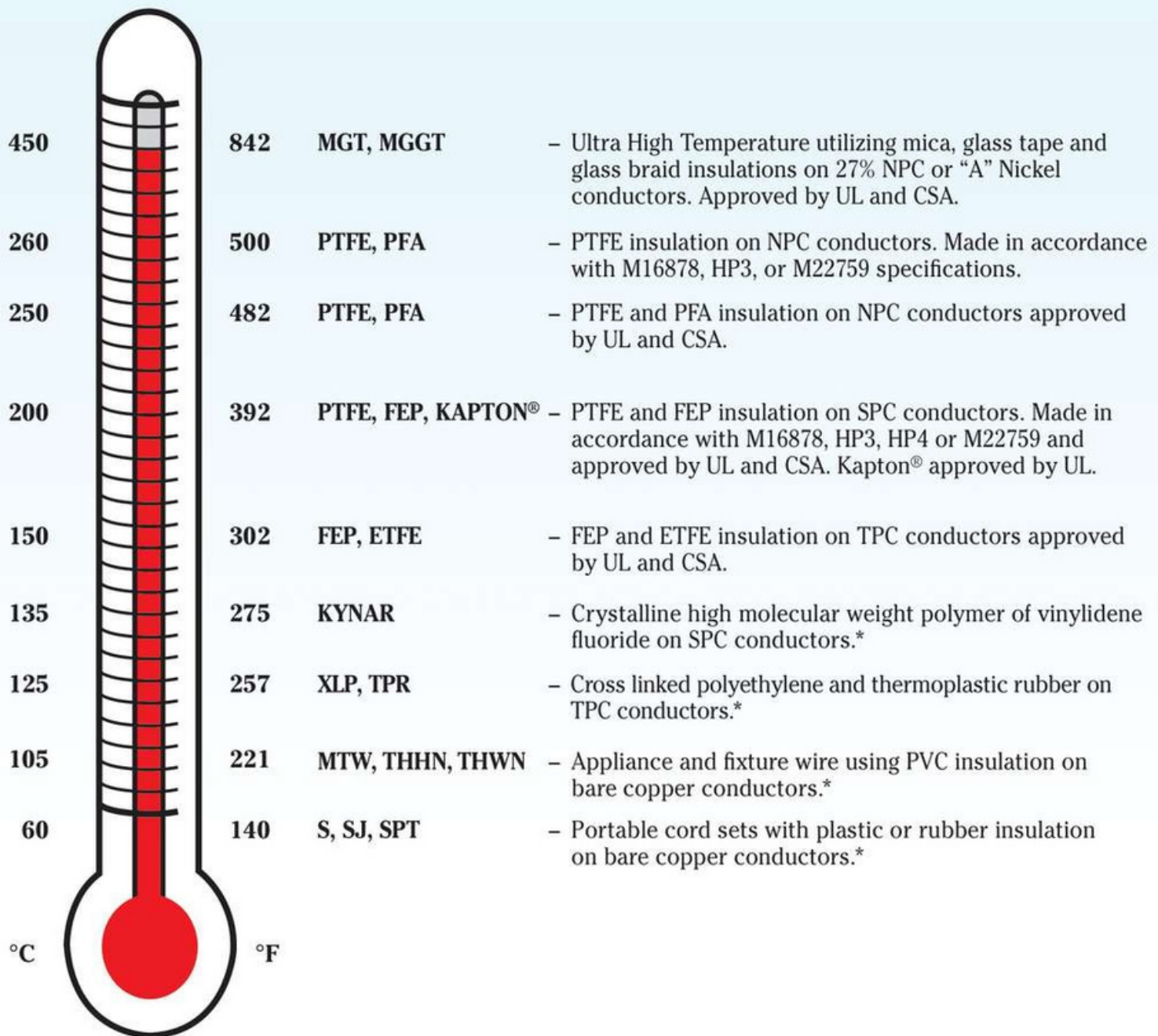
Letter	Number of Strands	Letter	Number of Strands	Letter	Number of Strands	Letter	Number of Strands
A	1	G	37	R	817	V	1665
B	7	L	133	S	1045	W	2109
E	19	P	665	T	1330		

<sup>1</sup>NEMA HP3

<sup>2</sup>NEMA HP4

## Temperature Ratings

### Common Wire & Cable Products



## Underwriter Laboratory Approvals

PTFE UL STYLE NUMBERS							
UL STYLE #	UL TEMP. °C	UL VOLTAGE AC	AVERAGE WALL THICKNESS	INSULATION TYPE	EXTRUDED (EXT) WRAPPED (WRAP)	CONDUCTOR SIZES AWG.	BASIC CONDUCTOR TYPES (Check for Specials)
1164	150	300	.013	PTFE	EXT	32-10	SPC, NPC
1180	200	300	.013	PTFE	EXT/WRAP	32-10	SPC, NPC
1198	150	600	.020	PTFE	EXT/WRAP	30-10	SPC, NPC
1198	150	600	.030	PTFE	WRAP	8-2	SPC, NPC
1199	200	600	.020	PTFE	EXT/WRAP	30-10	SPC, NPC
1199	200	600	.030	PTFE	WRAP	8-2	SPC, NPC
1212	80	N/S	.008	PTFE	EXT/WRAP	32-20	SPC, NPC
1213	105	N/S	.008	PTFE	EXT/WRAP	32-16	SPC, NPC
1371	105	N/S	.0055	PTFE	EXT/WRAP	32-20	SPC, NPC
1371	105	N/S	.008	PTFE	EXT/WRAP	19-16	SPC, NPC
1371	105	N/S	.013	PTFE	EXT/WRAP	15-10	SPC, NPC
1371	105	N/S	.020	PTFE	WRAP	9-6	SPC, NPC
1512	105	N/S	.010	PTFE	EXT	16-14	SPC, NPC
1538	105	125	.0055	PTFE	EXT/WRAP	36-20	SPC, NPC
1538	105	125	.008	PTFE	EXT/WRAP	19-15	SPC, NPC
1538	105	125	.013	PTFE	EXT/WRAP	14-10	SPC, NPC
1538	105	125	.020	PTFE	WRAP	9-6	SPC, NPC
1577	200	N/S	.012	PTFE	EXT	32-16	SPC, NPC
1584	200	1000	.022	PTFE	EXT	30-10	SPC, NPC
1636	250	600	.030	PTFE/GB	EXT	18-10	NPC, A
1659	250	600	.020	PTFE/MICA/GB	EXT	26-10	NPC, A
1659	250	600	.030	PTFE/MICA/GB	EXT	8-2	NPC, A
1716	150	150	.010	PTFE	EXT/WRAP	32-10	SPC, NPC
1716	150	150	.020	PTFE	WRAP	9-6	SPC, NPC
1723	200	N/S	.010	PTFE	EXT/WRAP	32-16	SPC, NPC
1744	80	300	.013	PTFE	EXT/WRAP	32-10	SPC, NPC
1746	200	125	.008	PTFE	WRAP	20-16	SPC, NPC
1815	250	300	.013	PTFE	EXT	32-10	NPC, A

N/S = Voltage not specified by UL    PTFE = Polytetrafluoroethylene "TFE"    GB = Glass Braid    UL File # E 67145

KAPTON* UL STYLE NUMBERS							
UL STYLE #	UL TEMP. °C	UL VOLTAGE AC	AVERAGE WALL THICKNESS	INSULATION TYPE (Wrapped)	CONDUCTOR SIZES AWG.	BASIC CONDUCTOR TYPES	
1450	105	N/S	.005	POLYIMIDE	32-20	SPC, NPC	
1530	105	N/S	.008	POLYIMIDE	32-20	SPC, NPC	
10094	200	600	.010	POLYIMIDE	32-12	SPC, NPC**	
10114	200	300	.007	POLYIMIDE	32-12	SPC, NPC**	
10115	200	150	.004	POLYIMIDE	32-18	SPC, NPC**	

\*DuPont Registered Trademark

\*\*Can use TPC with individual strand larger than .015

N/S = Voltage not specified by UL

### FEP UL STYLE NUMBERS

UL STYLE #	UL TEMP. °C	UL VOLTAGE AC	AVERAGE WALL THICKNESS	INSULATION TYPE	CONDUCTOR SIZES AWG.	BASIC CONDUCTOR TYPES (Check for Specials)
1226	80	N/S	.008	FEP	32-20	BARE, TPC, SPC, NPC
1226	80	N/S	.013	FEP	19-14	BARE, TPC, SPC, NPC
1227	105	N/S	.008	FEP	32-20	BARE, TPC, SPC, NPC
1227	105	N/S	.013	FEP	19-14	BARE, TPC, SPC, NPC
1330	200	600	.020	FEP	30-10	SPC, NPC
1330	200	600	.030	FEP	8-2	SPC, NPC
1330	200	600	Per AWG.	FEP	Larger than .015 strand	TPC
1331	150	600	.020	FEP	30-10	TPC, SPC, NPC
1331	150	600	.030	FEP	8-2	TPC, SPC, NPC
1332	200	600	.013	FEP	30-10	SPC, NPC
1332	200	300	.013	FEP	Larger than .015 strand	TPC
1333	150	300	.013	FEP	30-10	TPC, SPC, NPC
1371	105	N/S	.0055	FEP	32-20	TPC, SPC, NPC
1371	105	N/S	.008	FEP	19-16	TPC, SPC, NPC
1371	105	N/S	.013	FEP	15-10	TPC, SPC, NPC
1371	105	N/S	.020	FEP	9-6	TPC, SPC, NPC
1538	105	125	.0055	FEP	36-20	TPC, SPC, NPC
1538	105	125	.008	FEP	19-15	TPC, SPC, NPC
1538	105	125	.013	FEP	14-10	TPC, SPC, NPC
1538	105	125	.020	FEP	9-6	TPC, SPC, NPC
1577	200	N/S	.012	FEP	32-16	TPC, SPC, NPC, A
1591	150	300	.016	FEP	26-16	TPC, SPC, NPC
1716	150	150	.010	FEP	32-10	TPC, SPC, NPC
1716	150	150	.020	FEP	9-6	TPC, SPC, NPC
1723	200	N/S	.010	FEP	32-16	SPC, NPC
1886	150	300	.010	FEP	30-10	TPC, SPC, NPC
1887	150	600	.014	FEP	30-10	TPC, SPC, NPC
1887	150	600	.020	FEP	8-2	TPC, SPC, NPC
1900	200	300	.010	FEP	30-10	SPC, NPC
1900	200	300	.010	FEP	Larger than .015 strand	TPC
1901	200	600	.014	FEP	30-10	SPC, NPC
1901	200	600	.020	FEP	8-2	SPC, NPC
1901	200	600	Per AWG.	FEP	Larger than .015 strand	TPC

N/S = Voltage not specified by UL      FEP = Fluorinated Ethylene Propylene      UL File # E 67145

### PFA UL STYLE NUMBERS

(Can also be found on website)

UL STYLE #	UL TEMP. °C	UL VOLTAGE AC	AVERAGE WALL THICKNESS	INSULATION TYPE	CONDUCTOR SIZES AWG.	BASIC CONDUCTOR TYPES (Check for Specials)
1726	250	300	.013	PFA	32-10	NPC
1726	250	300	.020	PFA	8-6	NPC
1726	250	300	.030	PFA	4-2	NPC
1727	250	600	.020	PFA	32-10	NPC
1727	250	600	.030	PFA	8-2	NPC
10362	250	600	.010	PFA	30-10	NPC
10590	200	1000	.020	PFA	32-10	SPC
10590	200	1000	.030	PFA	8-2	SPC
10590	250	1000	.020	PFA	32-10	NPC
10590	250	1000	.030	PFA	8-2	NPC

Also shown on website under >Spec Sheet >Underwriter Laboratory Approvals

### TEFZEL\* UL STYLE NUMBERS

UL STYLE #	UL TEMP. °C	UL VOLTAGE AC	AVERAGE WALL THICKNESS	INSULATION TYPE	CONDUCTOR SIZES AWG.	BASIC CONDUCTOR TYPES
1644	150	600	.020	ETFE	26-10	TPC
1644	150	600	.030	ETFE	8-2	TPC
1644	150	600	.045	ETFE	1-4/0	TPC
10086	150/200	600	.010	ETFE 750	26-14	TPC/SPC**
10086	150/200	600	.015	ETFE 750	12-10	TPC/SPC**
10086	150/200	600	.030	ETFE 750	8-4	TPC/SPC**
10109	150/200	300	.006	ETFE 750	26-18	TPC/SPC**
10109	150/200	300	.008	ETFE 750	16-14	TPC/SPC**
10109	150/200	300	.010	ETFE 750	12-10	TPC/SPC**
10109	150/200	300	.030	ETFE 750	8-4	TPC/SPC**
10125	150	300	.006	ETFE 750	26-18	TPC
10125	150	300	.008	ETFE 750	16-14	TPC
10125	150	300	.010	ETFE 750	12-10	TPC
10125	150	300	.030	ETFE 750	8-4	TPC
10126	150	600	.010	ETFE 750	26-14	TPC
10126	150	600	.015	ETFE 750	12-10	TPC
10126	150	600	.030	ETFE 750	8-4	TPC

\*Du Pont Registered Trademark

\*\*TPC with individual strand larger than .015 for 200°C rating, otherwise use SPC

### ULTRA HIGH TEMPERATURE UL STYLE NUMBERS

UL STYLE #	UL TEMP. °C	UL VOLTAGE AC	AVERAGE WALL THICKNESS	INSULATION TYPE	CONDUCTOR SIZES AWG.	BASIC CONDUCTOR TYPES
5098	450	600	.020 MICA, .010 Glass, .020 GB		22-8	27% NPC, A
5107	200	600	.025 MICA, .007 GB		22-12	NPC, SPC
5107	200	600	.030 MICA, .015 GB		11-4	NPC, SPC
5107	450	600	.025 MICA, .007 GB		22-12	27% NPC, A
5107	450	600	.030 MICA, .015 GB		11-4	27% NPC, A
5108	250	600	.025 MICA, .007 GB		22-12	NPC, A
5108	250	600	.030 MICA, .015 GB		11-4	NPC, A
5128	450	300	.015 MICA, .007 GB		24-12	27% NPC, A
5128	450	300	.020 MICA, .015 GB		11-4	27% NPC, A
5138	450	600	.027 MICA, .015 Glass, .020 GB		18-10	27% NPC, A
5138	450	300	See Specification		8-2	27% NPC, A
5158	450	300	.005 GB, .010 MICA, .007 GB		24-12	27% NPC, A
5158	450	300	.010 GB, .020 MICA, .015 GB		11-4	27% NPC, A
5359	200°C	600VAC	.016MICA, .007 GB		28-12	27% NPC, A
5359	200°C	600VAC	.020MICA, .015 GB		10	27% NPC, A
5359	450°C	600VAC	.016MICA, .007 GB		28-12	27% NPC, A
5359	450°C	600VAC	.020MICA, .015 GB		10	27% NPC, A
5360	200	300	.012 Mica, .007 GB		30-12	NPC, SPC
5360	200	300	.016 Mica, .007 GB		11-8	NPC, SPC
5360	200	300	.020 Mica, .015 GB		7-4	NPC, SPC
5360	450	300	.012 Mica, .007 GB		30-12	27% NPC, A
5360	450	300	.016 Mica, .007 GB		11-8	27% NPC, A
5360	450	300	.020 Mica, .015 GB		7-4	27% NPC, A

Glass = Glass tape

GB = Glass Braid

UL File #E 67145

### MULTI-CONDUCTOR LISTED APPROVALS SHIELDED OR UNSHIELDED

Power limited circuit cable per article 725 of the National Electrical Code. Suitable for general purpose use, cable tray use and for resistance to the spread of fire.

UL TYPE	UL TEMP. °C	UL VOLTAGE AC	AVERAGE WALL THICKNESS	INNER CONDUCTOR INSULATION TYPE	CONDUCTOR SIZES AWG.	BASIC CONDUCTOR TYPES	OUTER JACKET INSULATION TYPES
PLTC	250°C	300	.010	PTFE or PFA	22-12	NPC, T/C†	PFA
PLTC	200°C	300	.010	PTFE or FEP	22-12	SPC, T/C†	FEP
CL3	250°C	300	.010	PTFE or PFA	22-12	NPC	PFA
CL3	200°C	300	.010	PTFE or FEP	22-12	SPC	FEP
CL2	250°C	300	.010	PTFE or PFA	22-12	NPC	PFA
CL2	200°C	300	.010	PTFE or FEP	22-12	SPC	FEP

†Thermocouple Wire

## Canadian Standards Association, CE and CENELEC Approvals

### PTFE CSA AWM RATINGS

CSA TEMP. °C(2)	CSA VOLTAGE AC	AVERAGE WALL THICKNESS	INSULATION TYPE	EXTRUDED (EXT) WRAPPED (WRAP)	CONDUCTOR SIZES AWG.	BASIC CONDUCTOR TYPES (Check for Specials)
150	150	.010	PTFE	EXT	30-10	SPC, NPC
200/250	300	.010	PTFE	EXT	30-10	SPC/NPC
200/250	600	.012	PTFE	EXT	30-10	SPC/NPC
200/250	1000	.020	PTFE	EXT	28-10	SPC/NPC
150	150	.010	PTFE	WRAP	32-10	SPC, NPC
200/250	300	.010	PTFE	WRAP	32-10	SPC/NPC
200/250	600	.012	PTFE	WRAP	32-10	SPC/NPC
200/250	600	.030	PTFE	WRAP	8-4	SPC/NPC
200/250	1000	.020	PTFE	WRAP	28-10	SPC/NPC

### FEP CSA AWM RATINGS

CSA TEMP. °C(2)	CSA VOLTAGE AC	AVERAGE WALL THICKNESS	INSULATION TYPE	CONDUCTOR SIZES AWG.	BASIC CONDUCTOR TYPES (Check for Specials)
150/200	150	.010	FEP	28-10	TPC, <sup>(1)</sup> SPC, NPC
150/200	300	.010	FEP	28-10	TPC, <sup>(1)</sup> SPC, NPC
150/200	600	.012	FEP	28-10	TPC, <sup>(1)</sup> SPC, NPC
150/200	600	.030	FEP	8-4	TPC, <sup>(1)</sup> SPC, NPC

(1) TPC single strand size under .0149" reduces temperature to 150°C.

(2) Please consult factory for verification on CSA 150°C, 200°C, and 250°C temperature ratings.

CSA Approval # LL 46216

### PFA CSA AWM RATINGS

CSA TEMP. °C	CSA VOLTAGE AC	AVERAGE WALL THICKNESS	INSULATION TYPE	CONDUCTOR SIZES AWG.	BASIC CONDUCTOR TYPES (Check for Specials)
200/250	300	.010	PFA	32-10	SPC/NPC
200/250	600	.012	PFA	32-10	SPC/NPC
200/250	600	.028	PFA	9-2	SPC/NPC

### ETFE CSA AWM RATINGS

CSA TEMP. °C	CSA VOLTAGE AC	AVERAGE WALL THICKNESS	INSULATION TYPE	CONDUCTOR SIZES AWG.	BASIC CONDUCTOR TYPES (Check for Specials)
150	300	.010	ETFE	32-10	TPC
150	600	.012	ETFE	32-10	TPC
150	600	.028	ETFE	9-2	TPC
150	600	.040	ETFE	1-4/0	TPC

### CE and CENELEC

These approvals state that a product conforms to applicable directives as required by the European economic area. These directives are harmonized under CENELEC, which are based on IEC standards.

PTFE Singles	200°C/250°C	300V/600V	PTFE Multi-core Cables	200°C/250°C	300V/600V
FEP Singles	150°C/200°C	300V/600V	FEP Multi-core Cables	150°C/200°C	300V/600V
Thermocouple Wire	200°C/250°C	300V	PFA Multi-core Cables	200°C/250°C	300V/600V
ETFE Singles	150°C	600V			

## M22759

### PTFE Insulated Wire

### Insulation: Polytetrafluoroethylene Extruded

600 Volts

M22759/11— Silver Plated Copper— 200°C

M22759/12— Nickel Plated Copper— 260°C

1000 Volts

M22759/9— Silver Plated Copper— 200°C

M22759/10— Nickel Plated Copper— 260°C

WIRE SIZE	STRANDING	DIAMETER OF CONDUCTOR (inches)		FINISHED WIRE	
		(min.)	(max.)	SPC/Resistance at 20°C (68°F)	DIAMETER (inches)
				(ohms/1000 ft.) (max.)	
28	7 x 36	.014	.015	63.8	.031 - .035
26	19 x 38	.018	.020	38.4	.036 - .040
24	19 x 36	.023	.025	24.3	.041 - .045
22	19 x 34	.029	.032	15.1	.047 - .051
20	19 x 32	.037	.040	9.19	.056 - .060
18	19 x 30	.046	.050	5.79	.066 - .070
16	19 x 29	.052	.057	4.52	.073 - .077
14	19 x 27	.065	.072	2.88	.088 - .092
12	19 x 25	.082	.090	1.81	.108 - .114
10	37 x 26	.106	.112	1.19	.135 - .143

WIRE SIZE	STRANDING	DIAMETER OF CONDUCTOR (inches)		FINISHED WIRE	
		(min.)	(max.)	NPC/Resistance at 20°C (68°F)	DIAMETER (inches)
				(ohms/1000 ft.) (max.)	
28	7 x 36	.014	.015	67.9	.041 - .045
26	19 x 38	.018	.020	42.2	.046 - .050
24	19 x 36	.023	.025	25.9	.051 - .055
22	19 x 34	.029	.032	16.0	.058 - .062
20	19 x 32	.037	.040	9.77	.066 - .070
18	19 x 30	.046	.050	6.10	.076 - .080
16	19 x 29	.052	.057	4.76	.083 - .087
14	19 x 27	.065	.072	3.00	.097 - .103
12	19 x 25	.082	.090	1.89	.116 - .124
10	37 x 26	.106	.112	1.24	.137 - .145



SINGLE WIRE INVENTORY

## M22759 (ALLOY)

### PTFE Insulated Wire

### Insulation: Polytetrafluoroethylene Extruded

600 Volts—High Strength Alloy

M22759/22—Silver Plated Copper—200°C

M22759/23—Nickel Plated Copper—260°C

WIRE SIZE	STRANDING	DIAMETER OF CONDUCTOR (inches)		FINISHED WIRE	
		(min.)	(max.)	NPC/Resistance at 20°C (68°F) (ohms/1000 ft.) (max.)	DIAMETER (inches)
28	7 x 36	.014	.016	79.0	.031 - .035
26	19 x 38	.018	.020	49.4	.036 - .040
24	19 x 36	.023	.025	30.1	.041 - .045
22	19 x 34	.029	.031	18.6	.047 - .051
20	19 x 32	.037	.040	11.4	.056 - .060

1000 Volts—High Strength Alloy

M22759/20—Silver Plated Copper—200°C

M22759/21—Nickel Plated Copper—260°C

WIRE SIZE	STRANDING	DIAMETER OF CONDUCTOR (inches)		FINISHED WIRE	
		(min.)	(max.)	SPC/Resistance at 20°C (68°F) (ohms/1000 ft.) (max.)	DIAMETER (inches)
28	7 x 36	.014	.015	74.4	.041 - .045
26	19 x 38	.018	.020	44.8	.046 - .050
24	19 x 36	.023	.024	28.4	.051 - .055
22	19 x 34	.029	.031	17.5	.058 - .062
20	19 x 32	.037	.039	10.7	.066 - .070



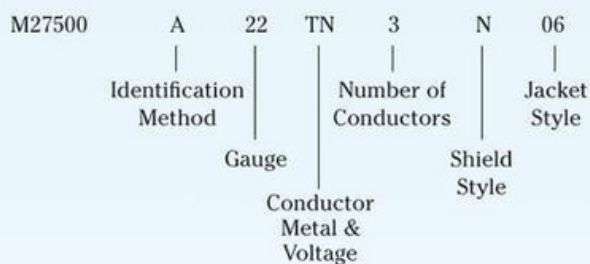
PTFE EXTRUSION



## M27500

### PTFE Shielded and Jacketed Cables

#### Sample Catalog Number



CONDUCTOR METAL, VOLTAGE AND TEMPERATURE				
M22759/9	LE	SPC	1000 Volts	200°C
M22759/10	LH	NPC	1000 Volts	260°C
M22759/11	RC	SPC	600 Volts	200°C
M22759/12	RE	NPC	600 Volts	260°C
M22759/20	TK	SPC ALLOY	1000 Volts	200°C
M22759/21	TL	NPC ALLOY	1000 Volts	260°C
M22759/22	TM	SPC ALLOY	600 Volts	200°C
M22759/23	TN	NPC ALLOY	600 Volts	260°C

PREFERRED IDENTIFICATION FOR M27500 CABLES UNLESS OTHERWISE SPECIFIED	
Number of Conductors	
1	White
2	White x White/Blue
3	White x White/Blue x White/Orange
4	White x White/Blue x White/Orange x White/Green
5	White x White/Blue x White/Orange x White/Green x White/Red
6	White x White/Blue x White/Orange x White/Green x White/Red x White/Black
7	White x White/Blue x White/Orange x White/Green x White/Red x White/Black x White/Yellow
8	White x White/Blue x White/Orange x White/Green x White/Red x White/Black x White/Yellow x White/Violet
9	White x White/Blue x White/Orange x White/Green x White/Red x White/Black x White/Yellow x White/Violet x White/Gray
10	White x White/Blue x White/Orange x White/Green x White/Red x White/Black x White/Yellow x White/Violet x White/Gray x White/Brown
11	White x White/Blue x White/Orange x White/Green x White/Red x White/Black x White/Yellow x White/Violet x White/Gray x White/Brown x White/Blue/Blue
12	White x White/Blue x White/Orange x White/Green x White/Red x White/Black x White/Yellow x White/Violet x White/Gray x White/Brown x White/Blue/Blue x White/Orange/Orange
13	White x White/Blue x White/Orange x White/Green x White/Red x White/Black x White/Yellow x White/Violet x White/Gray x White/Brown x White/Blue/Blue x White/Orange/Orange x White/Green/Green
14	White x White/Blue x White/Orange x White/Green x White/Red x White/Black x White/Yellow x White/Violet x White/Gray x White/Brown x White/Blue/Blue x White/Orange/Orange x White/Green/Green x White/Red/Red
15	White x White/Blue x White/Orange x White/Green x White/Red x White/Black x White/Yellow x White/Violet x White/Gray x White/Brown x White/Blue/Blue x White/Orange/Orange x White/Green/Green x White/Red/Red x White/Black/Black

SHIELD STYLES			
SINGLE SHIELD	DOUBLE SHIELD	SHIELD MATERIAL	MAXIMUM TEMPERATURE
U	U	No Shield	—
T	V	TPC Round	150°C
S	W	SPC Round	200°C
N	Y	NPC Round	260°C
F	Z	Stainless Steel	400°C
C	R	NPC 27% Round	400°C
M	K	SPC Alloy Round	200°C
P	L	NPC Alloy Round	260°C
G	A	SPC Flat	200°C

JACKET STYLES			
SINGLE JACKET	DOUBLE JACKET	JACKET MATERIAL	MAXIMUM TEMPERATURE
00	00	No Jacket	—
01	51	White PVC	90°C
02	52	Clear Nylon	105°C
03	53	White Nylon Braid Over Polyester Tape	105°C
05	55	Clear FEP	200°C
06	56	White PTFE Tape	260°C
07	57	White Glass Braid PTFE Treated	260°C
09	59	White FEP	200°C
14	64	White ETFE	150°C
15	65	Clear ETFE	150°C
20	70	White PFA	260°C
21	71	Clear PFA	260°C



## PTFE Shielded and Jacketed Cables

600 Volts — 200°C Silver Plated Copper

600 Volts — 260°C Nickel Plated Copper



HIGH TEMPERATURE SHIELDED



AWG SIZE	STRANDS	NOMINAL DIAM. OVER		1 CONDUCTOR		CATALOG NUMBER
		COND.	INSUL.	NOMINAL DIAM. OVER*		
				SHIELD	CABLE	
32	7 x .0031	.009	.029	.047	.070	E327-1CSTJ E327-1CSFJ E327-1CSGB
30	7 x .0040	.012	.032	.050	.073	E307-1CSTJ E307-1CSFJ E307-1CSGB
28	7 x .0050	.015	.033	.055	.078	E287-1CSTJ E287-1CSFJ E287-1CSGB
26	7 x .0063	.019	.038	.060	.083	E267-1CSTJ E267-1CSFJ E267-1CSGB
26	19 x .0040	.019	.038	.060	.083	E2619-1CSTJ E2619-1CSFJ E2619-1CSGB
24	7 x .0080	.024	.043	.065	.088	E247-1CSTJ E247-1CSFJ E247-1CSGB
24	19 x .0050	.025	.043	.065	.088	E2419-1CSTJ E2419-1CSFJ E2419-1CSGB
22	7 x .0100	.030	.049	.071	.094	E227-1CSTJ E227-1CSFJ E227-1CSGB
22	19 x .0063	.030	.049	.071	.094	E2219-1CSTJ E2219-1CSFJ E2219-1CSGB
20	7 x .0126	.038	.058	.080	.103	E207-1CSTJ E207-1CSFJ E207-1CSGB
20	19 x .0080	.038	.058	.080	.103	E2019-1CSTJ E2019-1CSFJ E2019-1CSGB
18	19 x .0100	.047	.068	.090	.113	E1819-1CSTJ E1819-1CSFJ E1819-1CSGB
16	19 x .0113	.053	.075	.097	.120	E1619-1CSTJ E1619-1CSFJ E1619-1CSGB
14	19 x .0142	.067	.090	.112	.135	E1419-1CSTJ E1419-1CSFJ E1419-1CSGB
12	19 x .0179	.084	.111	.133	.156	E1219-1CSTJ E1219-1CSFJ E1219-1CSGB

2 CONDUCTOR			3 CONDUCTOR			4 CONDUCTOR		
NOMINAL DIAM. OVER*		CATALOG NUMBER	NOMINAL DIAM. OVER*		CATALOG NUMBER	NOMINAL DIAM. OVER*		CATALOG NUMBER
SHIELD	CABLE		SHIELD	CABLE		SHIELD	CABLE	
.076	.099	E327-2CSTJ E327-2CSFJ E327-2CSGB	.080	.103	E327-3CSTJ E327-3CSFJ E327-3CSGB	.088	.111	E327-4CSTJ E327-4CSFJ E327-4CSGB
.082	.105	E307-2CSTJ E307-2CSFJ E307-2CSGB	.087	.110	E307-3CSTJ E307-3CSFJ E307-3CSGB	.095	.118	E307-4CSTJ E307-4CSFJ E307-4CSGB
.084	.109	E287-2CSTJ E287-2CSFJ E287-2CSGB	.088	.113	E287-3CSTJ E287-3CSFJ E287-3CSGB	.097	.122	E287-4CSTJ E287-4CSFJ E287-4CSGB
.094	.119	E267-2CSTJ E267-2CSFJ E267-2CSGB	.099	.124	E267-3CSTJ E267-3CSFJ E267-3CSGB	.109	.134	E267-4CSTJ E267-4CSFJ E267-4CSGB
.094	.119	E2619-2CSTJ E2619-2CSFJ E2619-2CSGB	.099	.124	E2619-3CSTJ E2619-3CSFJ E2619-3CSGB	.109	.134	E2619-4CSTJ E2619-4CSFJ E2619-4CSGB
.104	.129	E247-2CSTJ E247-2CSFJ E247-2CSGB	.111	.135	E247-3CSTJ E247-3CSFJ E247-3CSGB	.121	.146	E247-4CSTJ E247-4CSFJ E247-4CSGB
.104	.129	E2419-2CSTJ E2419-2CSFJ E2419-2CSGB	.111	.135	E2419-3CSTJ E2419-3CSFJ E2419-3CSGB	.121	.146	E2419-4CSTJ E2419-4CSFJ E2419-4CSGB
.116	.141	E227-2CSTJ E227-2CSFJ E227-2CSGB	.123	.148	E227-3CSTJ E227-3CSFJ E227-3CSGB	.135	.160	E227-4CSTJ E227-4CSFJ E227-4CSGB
.116	.141	E2219-2CSTJ E2219-2CSFJ E2219-2CSGB	.123	.148	E2219-3CSTJ E2219-3CSFJ E2219-3CSGB	.135	.160	E2219-4CSTJ E2219-4CSFJ E2219-4CSGB
.134	.159	E207-2CSTJ E207-2CSFJ E207-2CSGB	.142	.167	E207-3CSTJ E207-3CSFJ E207-3CSGB	.157	.186	E207-4CSTJ E207-4CSFJ E207-4CSGB
.134	.159	E2019-2CSTJ E2019-2CSFJ E2019-2CSGB	.142	.167	E2019-3CSTJ E2019-3CSFJ E2019-3CSGB	.157	.186	E2019-4CSTJ E2019-4CSFJ E2019-4CSGB
.154	.179	E1819-2CSTJ E1819-2CSFJ E1819-2CSGB	.164	.189	E1819-3CSTJ E1819-3CSFJ E1819-3CSGB	.181	.210	E1819-4CSTJ E1819-4CSFJ E1819-4CSGB
.168	.193	E1619-2CSTJ E1619-2CSFJ E1619-2CSGB	.179	.204	E1619-3CSTJ E1619-3CSFJ E1619-3CSGB	.198	.227	E1619-4CSTJ E1619-4CSFJ E1619-4CSGB
.198	.223	E1419-2CSTJ E1419-2CSFJ E1419-2CSGB	.212	.241	E1419-3CSTJ E1419-3CSFJ E1419-3CSGB	.234	.263	E1419-4CSTJ E1419-4CSFJ E1419-4CSGB
.238	.263	E1219-2CSTJ E1219-2CSFJ E1219-2CSGB	.255	.284	E1219-3CSTJ E1219-3CSFJ E1219-3CSGB	.283	.312	E1219-4CSTJ E1219-4CSFJ E1219-4CSGB

## General Construction

### Conductors:

SPC, NPC, SPCCS, NPCCS,  
SPC Alloy and NPC Alloy

### Insulation:

PTFE extruded or  
spiral wrapped

### Shielding:

85% minimum coverage  
SPC, NPC, TPC

### Jacketing:

TJ = PTFE spiral wrapped

FJ = FEP extruded

GB = PTFE saturated  
glass braid

### MILITARY SPECIFICATIONS:

M22759	MPD 1506
M27500	MPD 1507
MIL-C-7078	MIS-13928
MIL-C-27072	MIS-13929
MIL-W-47206	MIL-W-16878
MIL-DTL-55021	MIL-W-81822

In addition to the E (600 Volts) cables listed, Wirecraft manufactures cables in ET (250 Volts) and EE (1000 Volts).

For other strandings, constructions, and additional conductors, please consult factory.

\*Nominal  $\pm 10\%$



## COAX CABLES

WIRECRAFT produces many PTFE RG type coax and triax cables as well as custom designed cables to customer specification.

CONDUCTORS:	SPC, NPC, TPC SPCCS, NPCCS
INSULATIONS:	FEP, PFA, PTFE
SHIELDS:	NPC, SPC, TPC
JACKETS:	FEP, PFA, PTFE GLASS BRAID and ETFE

## CORES AND CABLES:

RG142B/U	RG195A/U
RG178B/U	RG196U
RG179B/U	RG303U
RG187A/U	RG316U
RG188A/U	RG400U



## LOW NOISE CABLES

WIRECRAFT manufactures many original design low noise cables for medical and electronic OEM use. We have a complete low-noise test lab to measure noise characteristics.

## “Ultra High-Temperature” Appliance and Equipment Wire

MGT, TGGT and TGT  
AWG #24 - #10  
300 and 600 volts  
200°C to 450°C  
UL Approved

### Conductors:

SPC, NPC, NPC 27%, and  
Grade “A” nickel.

### Insulations:

MGT uses MICA reinforced cable tape followed by an impregnated fiberglass braid jacket. The TGGT and TGT constructions use layers of PTFE tape and glass tape or glass serve under the jacket to help with cut through and moisture applications.

### Saturants:

MGT, TGGT and TGT jackets can be saturated with PTFE or a high temperature anti-fray coating of 100% solvent free synthetic enamel.



GLASS BRAIDERS



UL STYLE 5128 MICA/GLASS CONSTRUCTION

## High Voltage Insulations

### Commercial (non-UL) and Style 1911

#### I. Commercial (non-UL) Corona Resistant PTFE 200°C and 260°C Wrapped Insulation

	2,000 VAC 6,000 VDC	3,000 VAC 12,000 VDC	4,000 VAC 15,000 VDC	4,500 VAC 17,000 VDC	5,000 VAC 20,000 VDC	6,000 VAC 25,000 VDC
26 <sup>19</sup> / <sub>38</sub>	.064-.073	.074-.083	.084-.093	.094-.103	.104-.113	.124-.134
24 <sup>19</sup> / <sub>36</sub>	.069-.078	.079-.088	.089-.098	.099-.108	.104-.118	.129-.139
22 <sup>19</sup> / <sub>34</sub>	.075-.084	.085-.094	.095-.104	.105-.114	.115-.124	.135-.145
20 <sup>19</sup> / <sub>32</sub>	.083-.092	.093-.102	.103-.112	.113-.122	.123-.132	.143-.153
18 <sup>19</sup> / <sub>30</sub>	.092-.101	.102-.111	.112-.121	.122-.131	.132-.141	.152-.162
16 <sup>19</sup> / <sub>29</sub>	.098-.107	.108-.117	.118-.127	.128-.137	.138-.147	.158-.168
14 <sup>19</sup> / <sub>27</sub>	.112-.121	.122-.131	.132-.141	.142-.151	.152-.161	.172-.182
12 <sup>19</sup> / <sub>25</sub>	.129-.138	.139-.148	.149-.158	.159-.168	.169-.178	.189-.199



HIGH VOLTAGE WRAPPED INSULATION

#### II. Style 1911 PTFE and PFA 200°C and 250°C Wrapped and Extruded Insulation

	10,000 VDC	15,000 VDC	20,000 VDC
24 <sup>19</sup> / <sub>36</sub>	.084-.094	.104-.114	.124-.134
22 <sup>19</sup> / <sub>34</sub>	.090-.100	.110-.120	.130-.140
20 <sup>19</sup> / <sub>32</sub>	.098-.108	.118-.128	.138-.148
18 <sup>19</sup> / <sub>30</sub>	.107-.117	.127-.137	.147-.157
16 <sup>19</sup> / <sub>29</sub>	.113-.123	.133-.143	.153-.163
14 <sup>19</sup> / <sub>27</sub>	.127-.137	.147-.157	.167-.177
12 <sup>19</sup> / <sub>25</sub>	.144-.154	.164-.174	.184-.194



HIGH VOLTAGE EXTRUDED INSULATION

## Resistance Wire

Wirecraft will make to order solid or stranded resistance wire from a vast array of available alloy single end wires.

Single end wires can be bunched to specified resistance values and then insulated with our high temperature insulations.

### Available Alloys\*:

30	294
60	600
90	650
102	675
180	710
220	875
290	Inconel

### Available Insulations:

PTFE
FEP
PFA
ETFE
Polyimide
Glass Braid </td

\*Consult factory on alloys not listed and for available strandings.



VDE APPROVED HAZARDOUS LOCATION RESISTANCE WIRE



BUNCHER SET UP FOR STRANDING RESISTANCE WIRE



POLYIMIDE INSULATED STRANDED RESISTANCE WIRE



## Information Tables

### Dielectric Constants<sup>1</sup>

MATERIAL	CONSTANT
PTFE Foam	1.5
PTFE	2.1
FEP	2.1
PFA	2.1
Polyethylene <sup>2</sup>	2.3
Polypropylene <sup>2</sup>	2.3
TPR (Rubber) <sup>2</sup>	2.5
ETFE	2.6
Silicone	3.1
Polyimide	3.1
Nylon <sup>2</sup>	3.5
PVC <sup>2</sup>	4.5
Neoprene	6.0
PVDF	7.9

<sup>1</sup>The ratio of the capacitance of a condenser with the dielectric between the electrodes to the capacitance when air is between the electrodes.

<sup>2</sup>Typical number that can change based on compound and processing techniques.



### AC versus DC

Approximate Voltage Conversion	
1,000 VAC	1,400 VDC
2,000 VAC	2,800 VDC
3,000 VAC	4,200 VDC
4,000 VAC	5,600 VDC
5,000 VAC	7,000 VDC
6,000 VAC	8,400 VDC
7,000 VAC	9,800 VDC
8,000 VAC	11,300 VDC
9,000 VAC	12,700 VDC
10,000 VAC	14,100 VDC

## Thermocouple Wires

### Specifications Conform to ANSI Color Codes and ISA Published Limits of Error

Wirecraft insulated Thermocouple wires can be made as singles, parallel jacketed pairs or per customer specified special constructions which may include shielding or stainless steel braiding.

Insulations available are PTFE, FEP, PFA, ETFE, KAPTON<sup>†</sup> as well as Glass Braiding. Our Glass Braid insulations can be saturated with PTFE or Silicon.

### Thermocouple Wire Accuracy (32°F)

Type	Temperature Range	ANSI Standard	LIMITS OF ERROR		
			ANSI Special	RS4937 Class 2	RS4937 Class 1
<b>J</b>	0° to 293°C (32° to 559°F)	±2.2°C (4.0°F)	±1.1°C (2.0°F)		
	293° to 750°C (559° to 1382°F)	±.75%	±.4%		
	-40° to 375°C (-40° to 707°F)				±1.5°C (2.7°F)
	375° to 750°C (707° to 1382°F)				±.4%
<b>K, N</b>	0° to 293°C (32° to 559°F)	±2.2°C (4.0°F)	±1.1°C (2.0°F)		
	293° to 1250°C (559° to 2282°F)	±.75%	±.4%		
	-40° to 375°C (-40° to 707°F)				±1.5°C (2.7°F)
	375° to 1000°C (707° to 1832°F)				±.4%
<b>T</b>	0° to 133°C (32° to 271°F)	±1°C (1.8°F)	±.5°C (.9°F)		
	133° to 350°C (271° to 662°F)	±.75%	±.4%		
	-40° to 125°C (-40°F to 257°F)				±.5°C (.9°F)
	125° to 350°C (257° to 662°F)				±.4%
<b>E</b>	0° to 340°C (32° to 644°F)	±1.7°C (3.1°F)	±1°C (1.8°F)		
	340° to 900°C (644° to 1652°F)	±.5%	±.4%		
	-40° to 375°C (-40° to 707°F)				±1.5°C (2.7°F)
	375° to 800°C (707° to 1472°F)				±.4%
	-40° to 333°C (-40° to 631°F)			±2.5°C (4.5°F)	
	333° to 900°C (631° to 1652°F)			±.75%	

ANSI CALIBRATION AND COLOR CODE				
THERMOCOUPLE GRADE				
Calibration Symbol	Positive (+)	Negative (-)	PTFE/FEP Jacket	Glass Jacket
J	Iron-White	Constantan-Red	Brown	Brown/Black
K	Chromel*-Yellow	Alumel*-Red	Brown	Brown/Yellow
T	Copper-Blue	Constantan-Red	Brown	Brown/Blue
E	Chromel*-Purple	Constantan-Red	Brown	Brown/Purple
EXTENSION GRADE				
JX	Iron-White	Constantan-Red	Black	Black
KX	Chromel*-Yellow	Alumel*-Red	Yellow	Yellow
TX	Copper-Blue	Constantan-Red	Blue	Blue
EX	Chromel*-Purple	Constantan-Red	Purple	Purple

<sup>†</sup>DuPont registered trademark \*Hoskins Trademark

## International Thermocouple Color Codes

ANSI CODE	INTERNATIONAL IEC 584-3	BRITISH TO BS 4937	GERMAN TO DIN 43710	JAPANESE TO JIS C1610-1981	FRENCH TO NFE-18001
J	+ Black - White Jacket Black	+ Yellow - Blue Jacket Black	+ Red - Blue Jacket Blue	+ Red - White Jacket Yellow	+ Yellow - Black Jacket Black
K	+ Green - White Jacket Green	+ Brown - Blue Jacket Red	+ Red - Green Jacket Green	+ Red - White Jacket Blue	+ Yellow - Violet Jacket Yellow
T	+ Brown - White Jacket Brown	+ White - Blue Jacket Blue	+ Red - Brown Jacket Brown	+ Red - White Jacket Brown	+ Yellow - Blue Jacket Blue
E	+ Violet - White Jacket Violet	+ Brown - Blue Jacket Brown	+ Red - Black Jacket Black	+ Red - White Jacket Violet	+ Yellow - Violet Jacket Violet
N	+ Pink - White Jacket Pink	+ Pink - White Jacket Pink	—	—	—

WIRECRAFT manufactures thermocouple singles and cables to many international standards. We utilize high temperature insulations of PTFE wrap, FEP, PFA, ETFE and KAPTON\*. We also manufacture with glass braid insulations. Our thermocouple wires are available in Class 1 and Class 2 accuracy and in many metric solid and stranded configurations.



\*DuPont Registered Trademark

## British Standards Institution

### PTFE Insulated Equipment Wires

### Qualification to Defense Standard 61-12 Part 8

### Qualification to BS3G210

**TABLE 1: Single-core (cables and wires), unscreened types A and NA 300 V  
(Silver or nickel plated copper conductors)**

SIZE	NUMBER OF STRANDS	NOMINAL DIAM. OF STRANDS	NOMINAL DIAM. OF CONDUCTOR	AREA	CIRCULAR MIL AREA <sup>(1)</sup>	INSULATION RADIAL THICKNESS		OVERALL DIAMETER		MASS PER UNIT LENGTH (MAX.)
		mm	mm			mm	mm	mm	mm	
30	1	.250	.250	.0491	97	.10	.15	.45	.60	.96
28	1	.320	.320	.0804	159	.10	.15	.52	.67	1.32
26	1	.400	.400	.1257	248	.10	.15	.60	.75	1.83
32	7	.080	.240	.0352	69	.10	.15	.44	.59	.84
30	7	.100	.300	.0550	109	.10	.15	.50	.65	1.10
28	7	.120	.360	.0792	156	.10	.15	.56	.71	1.40
26	7	.150	.450	.1237	244	.10	.15	.65	.80	1.96
24	7	.200	.600	.2199	434	.10	.15	.80	.95	3.04
26	19	.100	.500	.1492	295	.10	.15	.70	.85	2.26
24	19	.120	.600	.2149	424	.10	.15	.80	.95	2.99
22	19	.150	.750	.3358	663	.10	.15	.95	1.10	4.41
20	19	.200	1.000	.5969	1178	.10	.15	1.20	1.35	7.19

**TABLE 2: Single-core (cables and wires), unscreened types B and NB 600 V  
(Silver or nickel plated copper conductors)**

SIZE	NUMBER OF STRANDS	NOMINAL DIAM. OF STRANDS	NOMINAL DIAM. OF CONDUCTOR	AREA	CIRCULAR MIL AREA <sup>(1)</sup>	INSULATION RADIAL THICKNESS		OVERALL DIAMETER		MASS PER UNIT LENGTH (MAX.)
		mm	mm			mm	mm	mm	mm	
26	1	.400	.400	.1257	248	.20	.25	.80	1.00	2.56
23	1	.600	.600	.2827	558	.20	.25	1.00	1.20	4.38
32	7	.080	.240	.0352	69	.20	.25	.65	.84	1.44
30	7	.100	.300	.0550	109	.20	.25	.70	.90	1.75
28	7	.120	.360	.0792	156	.20	.25	.76	.96	2.10
26	7	.150	.450	.1237	244	.20	.25	.85	1.05	2.74
24	7	.200	.600	.2199	434	.20	.25	1.00	1.20	3.95
26	19	.100	.500	.1492	295	.20	.25	.90	1.10	3.09
24	19	.120	.600	.2149	424	.20	.25	1.00	1.20	3.89
22	19	.150	.750	.3358	663	.20	.25	1.15	1.35	5.44
20	19	.200	1.000	.5969	1178	.20	.25	1.40	1.60	8.43
18	19	.250	1.250	.9327	1841	.20	.25	1.65	1.85	12.11

<sup>(1)</sup>The circular mil area (CMA) is equal to 1550.003  $D^2N$  where  $D$  is the diameter (in mm) of the individual strands of the conductor and  $N$  is the number of strands in the complete conductor.

**TABLE 3: Single-core (cables and wires), unscreened types C and NC 1000 V  
(Silver or nickel plated copper conductors)**

SIZE	NUMBER OF STRANDS	NOMINAL DIAM. OF STRANDS	NOMINAL DIAM. OF CONDUCTOR	AREA	CIRCULAR MIL AREA <sup>(1)</sup>	INSULATION RADIAL THICKNESS		OVERALL DIAMETER		MASS PER UNIT LENGTH (MAX.)
		mm	mm			mm	mm	mm	mm	
19	1	.900	.900	.6362	1256	.33	.40	1.56	1.82	9.94
32	7	.080	.240	.0352	69	.33	.40	.90	1.16	2.52
30	7	.100	.300	.0550	109	.33	.40	.96	1.22	2.90
28	7	.120	.360	.0792	156	.33	.40	1.02	1.28	3.31
26	7	.150	.450	.1237	244	.33	.40	1.11	1.37	4.04
24	7	.200	.600	.2199	434	.33	.40	1.26	1.52	5.42
26	19	.100	.500	.1492	295	.33	.40	1.16	1.42	4.45
24	19	.120	.600	.2149	424	.33	.40	1.26	1.52	5.36
22	19	.150	.750	.3358	663	.33	.40	1.41	1.67	7.08
20	19	.200	1.000	.5969	1178	.33	.40	1.66	1.92	10.33
18	19	.250	1.250	.9327	1841	.33	.40	1.91	2.17	14.30
16	19	.300	1.500	1.3430	2651	.33	.40	2.16	2.46	19.25
14	19	.335	1.675	1.6747	3305	.33	.40	2.34	2.74	23.90
12	19	.450	2.250	3.0218	5964	.33	.40	2.91	3.31	38.50
10	37	.400	2.800	4.6496	9176	.33	.43	3.46	3.86	56.00

<sup>(1)</sup> The circular mil area (CMA) is equal to  $1550.003 D^2 N$  where  $D$  is the diameter (in mm) of the individual strands of the conductor and  $N$  is the number of strands in the complete conductor.

**TABLE 13: Single- and multi-core cables, screened and sheathed types BSM and NBSM 600 V  
(Silver or nickel plated copper conductors)**

SIZE	STRANDING	SINGLE-CORE			TWO-CORE			THREE-CORE			FOUR-CORE		
		OVERALL DIAMETER		MASS PER UNIT LENGTH	OVERALL DIAMETER		MASS PER UNIT LENGTH	OVERALL DIAMETER		MASS PER UNIT LENGTH	OVERALL DIAMETER		MASS PER UNIT LENGTH
		MIN.	MAX.	(max.)	MIN.	MAX.	(max.)	MIN.	MAX.	(max.)	MIN.	MAX.	(max.)
32	7/0.080	1.49	1.89	8.22	2.13	2.73	14.12	2.23	2.86	16.09	2.40	3.08	18.94
30	7/0.100	1.55	1.95	8.78	2.25	2.85	15.22	2.36	2.99	17.79	2.54	3.23	21.13
28	7/0.120	1.61	2.01	9.53	2.37	2.97	16.59	2.49	3.12	19.70	2.68	3.37	22.97
26	7/0.150	1.70	2.10	10.60	2.55	3.15	18.99	2.69	3.32	22.57	2.91	3.59	27.09
24	7/0.200	1.85	2.25	12.51	2.85	3.45	22.96	3.01	3.64	28.32	3.27	3.95	33.67
26	19/0.100	1.75	2.15	11.22	2.65	3.25	20.21	2.79	3.43	24.26	3.03	3.71	29.07
24	19/0.120	1.85	2.25	12.45	2.85	3.45	22.82	3.01	3.64	28.14	3.27	3.95	33.42
22	19/0.150	2.00	2.40	14.87	3.15	3.75	27.73	3.33	3.97	34.43	3.63	4.32	41.84
20	19/0.200	2.25	2.65	19.12	3.65	4.25	36.52	3.87	4.51	46.64	4.24	4.92	57.33
18	19/0.250	2.50	2.90	23.94	4.15	4.75	46.71	4.41	5.05	60.93	4.84	5.53	75.90

**Quirk Wire Company, Inc.**

**DBA Wirecraft Products**

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