Introducing IW's Log Spec™ PTFE Insulated Wire

Q. Why a Log Spec wire?

A. It was developed to provide a reliable, low bulk, high performance PTFE insulated wire which was not available to the oil well logging industry. Hence, the trademark "Log Spec".

Q. How does Log Spec wire differ from conventional wire?

A. It is a smooth fused PTFE multi-ply laminate, indistinguishable in appearance from a good PTFE extruded wire. It differs however, in the fact that it is concentric by construction, which helps to reduce bulk and being a multi-plied laminated insulation it also provides for a remarkable wire in respect to performance and reliability.

Q. What are some of the uses of Log Spec wire?

A. Among them are:

- It fills the need for performance and reliability in all types of PTFE insulated wire constructions.
- It provides a lower bulk, lighter weight wire.
- It provides long continuous lengths of wire such as wire incorporated in four mile lengths of downhole armored cable.
- It supplies the needs of the oil well logging industry for a multitude of downhole wires that can function reliably at temperatures of 260°C, pressures to 25,000 psi in an environment that can include saline water, steam, hydrogen sulfide, methane, caustic elements, drilling muds and, that can survive the shock and vibration incidental to multi-mile bore hole descents.
- It provides wire for very low temperature requirements. Submergence in liquid Helium at 4.2°K in Cryoelectronics for instance.
- It permits the manufacture of a microwave cable ductile enough to be formed by hand with a low VSWR and low attenuation loss and with negligible change in electrical characteristics with bending and forming.
- It provides for light and heavy walled core for microwave cable.
- It makes possible the manufacture of long lengths of PTFE insulated high current carrying conductors.
- It provides miniature coaxial and triaxial cables and miniature multi-conductor general purpose cables.
- It allows for the identification of wire and cable with indestructible subsurface printing, coloring and striping.

Q. Interested?

A. Samples of IW's Log Spec PTFE insulated wires are available to you for evaluation without obligation.

The Company

The high level performance of IW's wire manifest since its introduction could not have been reached by following the conventional constructions and test procedures currently in use for producing polytetrafluoroethylene (PTFE) insulated wire.

The new insulation, which retains undiminished all of the outstanding mechanical, thermal, chemical, and electrical properties of PTFE, lends itself admirably to uses where a reduction in bulk is needed along with an improvement in performance. Its use in oil exploration is a case in point, for here, in spite of a reduction in bulk, the wire performs consistently where conventional wire sometimes fails.

As radical departures from conventional procedures were made in order to manufacture this wire, and since it was first made to fill the needs of the oil well logging industry, IW has used "Log Spec™" as its identifying trademark.

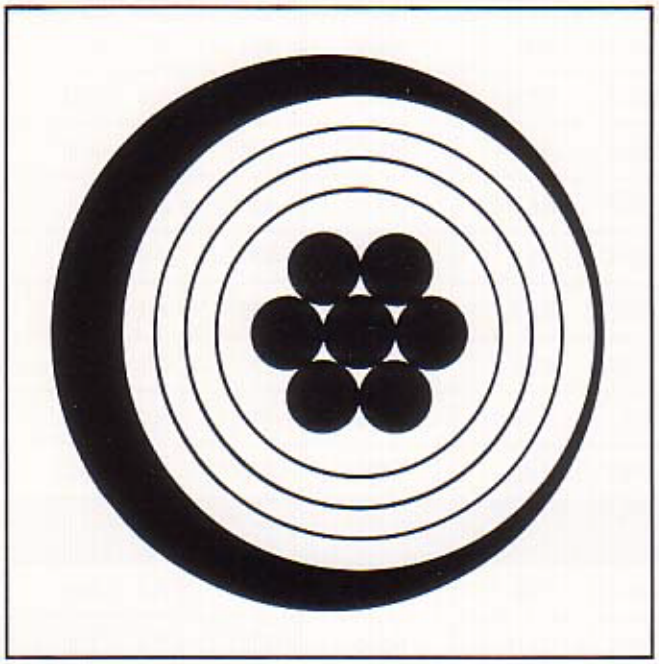
The capability of the equipment required to produce Log Spec wire allowed for the manufacture of a wide variety of additional wire and cable. For example: a microwave coaxial cable used on a modern phased array radar antenna system manufactured for Navy shipboard use. It was chosen for its exceptional stability . . . fifteen foot lengths were matched, installed, field tested, and dismantled. The change in electrical length after going through the cycle several times was less than two electrical degrees. Two thousand feet of cable used for this purpose performed in the same way.

IW's manufacturing controls are exceptional as evidenced by the ability to run continuous four-mile lengths of PTFE insulated wire used in armored geophysical cable. Some of these cables have seen service at temperatures of 300°C.

Last but not least, IW's advanced technology has allowed it the pleasure of manufacturing products to fit customer needs as opposed to customer design being restricted to the limitations of conventional wire and cable.

The Product

The product has two salient features. A reduction in wire bulk and an improvement in wire reliability. Bulk reduction is obtained in part by holding concentricity along the entire length of the wire. See sketch below.



In conventional extruded wire an excess of insulation must be available to permit a predetermined effective thickness to be maintained along the wires length as the conductor "drifts" inside its extruded envelope. The excess insulation (dark area) is shown on the left by laying a cross section of IW's concentric construction over the required cross section of its extruded counterpart.

The improved performance and reliability of a multi-plied laminate also makes possible some further reduction in bulk

The following characteristics tending to improve reliability are common to all IW's Log Spec™ wire and cable.

- The insulation is polytetrafluoroethylene applied concentrically as a fused laminate, with negligible variation in O.D. along a wire length.
- Standard conductor is oxygen free, high purity, high conductivity copper, silver plated for 200°C service and nickel plated for 260°C service.
- For applications where extreme flexing is to be encountered, the conducting material is a Phelps Dodge cadmium-chrome alloy. Silver or nickel plated.
- Conductor strands are never joined by welding or brazing to extend their lengths because the juncture can result in a corona site. In addition they create a discontinuity in the plating leaving the wire exposed to thermal and chemical degradation.
- The broken ends that are not uncommon in conventional braided shields are also corona sites and have been eliminated.
- Braid shielding is tightly and uniformly applied to provide a consistent coverage of at least 95%.
- No surface markings that may be eradicated or damaging to the insulation are used for conductor or cable identification. All numbering or printing is applied to the first insulating layer, well below the surface. Color pigments used for identification are dispersed in the PTFE resins to provide coloring for solidly colored wire or striped wires.

Tables on the following pages show the characteristics of Log Spec wire and the bulk and weight savings that may be realized by their use.

The tables cover the more popular Log Spec products, and are not all inclusive, so please keep in mind that whether shown or not, a sample of a desired wire can be provided for your evaluation without cost or obligation, and be assured that the sample will be representative of any subsequent wire furnished.

IW Log Spec™ PTFE insulated hookup / lead and interconnecting wire

200°C silver plate, 260° nickel plate, all conductors OFHC copper in continuous lengths free of welds or brazes

Wire Size AWG	Stranding	IW Part Number*	Diameter Over Cond. Inch	Diameter Over Ins. Inch	Resistance OHMS/M' 20°C Silver	Resistance OHMS/M' 20°C Nickel	Tank Test Direct Current	Corona Extinction Voltage†	Weight Lbs./M' Silver	Weight Lbs./M' Nickel
250 Volts 60Hz RMS 750 Volts D.C.										
30	19x42	30(SC)19x42LS3	0.013	0.021	96.1	109	3000	400	0.7	0.7
28	19x40	28(SC)19x40LS3	0.016	0.024	61.5	67.6	3000	400	0.9	1.0
26	19x38	26(SC)19x38LS3	0.021	0.029	36.4	40.0	3000	400	1.4	1.5
24	19x36	24(SC)19x36LS3	0.025	0.034	23.0	24.5	3000	400	2.0	2.1
22	19x34	22(SC)19x34LS3	0.032	0.040	14.4	15.3	3000	400	2.9	3.0
20	19x32	20(SC)19x32LS3	0.040	0.049	8.87	9.43	3000.	400	4.4	4.6
18	19x30	18(SC)19x30LS3	0.050	0.059	5.64	5.94	3000	400	6.6	6.8
16	19x29	16(SC)19x29LS3	0.057	0.069	4.41	4.64	3000	400	8.7	8.9
14	19x27	14(SC)19x27LS3	0.072	0.084	2.80	2.92	3000	400	14.0	14.5
600 Volts 60Hz RMS 1800 Volts D.C.										
30	19x42	30(SC)19x42LS5	0.013	0.026	96.1	109	5000	800	0.8	0.9
28	19x40	28(SC)19x40LS5	0.016	0.029	61.5	67.6	5000	800	1.1	1.2
26	19x38	26(SC)19x38LS5	0.021	0.033	36.4	40.0	5000	800	1.5	1.6
24	19x36	24(SC)19x36LS5	0.025	0.038	23.0	24.5	5000	800	2.1	2.2
22	19x34	22(SC)19x34LS5	0.032	0.044	14.4	15.3	5000	800	3.1	3.2
20	19x32	20(SC)19x32LS5	0.040	0.053	8.87	9.43	5000	800	4.6	4.8
18	19x30	18(SC)19x30LS5	0.050	0.062	5.64	5.94	5000	800	7.1	7.3
16	19x29	16(SC)19x29LS5	0.057	0.069	4.41	4.64	5000	800	8.7	9.0
14	19x27	14(SC)19x27LS5	0.072	0.088	2.80	2.92	5000	800	14.2	14.7
1000 Volts 60Hz RMS 3000 Volts D.C.										
30	19x42	30(SC)19x42LS8	0.013	0.030	96.1	109	8000	1200	1.0	1.1
28	19x40	28(SC)19x40LS8	0.016	0.033	61.5	67.6	8000	1200	1.2	1.3
26	19x38	26(SC)19x38LS8	0.021	0.037	36.4	40.0	8000	1200	1.8	1.9
24	19x36	24(SC)19x36LS8	0.025	0.042	23.0	24.5	8000	1200	2.6	2.7
22	19x34	22(SC)19x34LS8	0.032	0.049	14.4	15.3	8000	1200	3.4	3.6
20	19x32	20(SC)19x32LS8	0.040	0.057	8.87	9.43	8000	1200	5.0	5.2
18	19x30	18(SC)19x30LS8	0.050	0.067	5.64	5.94	8000	1200	7.3	7.6
16	19x29	16(SC)19x29LS8	0.057	0.077	4.41	4.64	8000	1200	9.1	9.4
14	19x27	14(SC)19x27LS8	0.072	0.092	2.80	2.92	8000	1200	14.4	14.9

*Please see ordering information †60Hz Rms

IW Log Spec™ PTFE insulated high strength wire

High flex life, high conductivity copper. Cadmium-chromium alloy wire, 86-92% conductivity.
Tensile strength 55000 PSI minimum. 8% elongation minimum. Nickel or silver plate.

Wire Size AWG	IW Part Number*	Diameter Over Cond. Inches	Diameter Over Ins. Inches	Resistance Ohms/M' 20°C Silver	Resistance Ohms/M' 20°C Nickel	Weight Lbs/M' (Nominal)
250 Volts 60Hz RMS — 750 Volts D.C.						
28	28(SCC)19x40LS3	0.015	0.022	67.1	75.5	.88
28	28(SCC)37x43LS3	0.015	0.022	69.1	76.7	.88
26	26(SCC)19x38LS3	0.019	0.025	40.3	44.5	1.3
26	26(SCC)37x41LS3	0.019	0.025	42.7	46.1	1.3
24	24(SCC)19x36LS3	0.024	0.031	25.8	27.5	1.9
24	24(SCC)37x39LS3	0.024	0.031	27.3	24.5	1.9
22	22(SCC)19x34LS3	0.031	0.038	16.3	17.1	2.9
22	22(SCC)37x37LS3	0.031	0.038	16.5	17.8	2.9
20	20(SCC)19x32LS3	0.039	0.046	10.08	10.5	4.5
20	20(SCC)37x35LS3	0.039	0.046	10.66	11.5	4.5
18	18(SCC)19x30LS3	0.050	0.057	6.45	6.6	6.8
18	18(SCC)37x33LS3	0.050	0.057	6.63	6.9	6.8
600 Volts 60Hz RMS — 1800 Volts D.C.						
28	28(SCC)19x40LS5	0.015	0.026	67.1	75.5	1.1
28	28(SCC)37x43LS5	0.015	0.026	69.1	76.7	1.1
26	26(SCC)19x38LS5	0.019	0.030	40.3	44.5	1.5
26	26(SCC)37x41LS5	0.019	0.030	42.7	4.1	1.5
24	24(SCC)19x36LS5	0.024	0.035	25.8	27.5	2.1
24	24(SCC)37x39LS5	0.024	0.035	27.3	29.5	2.1
22	22(SCC)19x34LS5	0.031	0.042	16.3	17.1	3.1
22	22(SCC)37x37LS5	0.031	0.042	16.5	17.8	3.1
20	20(SCC)19x32LS5	0.039	0.050	10.08	10.5	4.7
20	20(SCC)37x35LS5	0.039	0.050	10.66	11.5	4.7
18	18(SCC)19x30LS5	0.050	0.061	6.45	6.6	7.1
18	18(SCC)37x33LS5	0.050	0.061	6.63	6.9	7.1
16	16(SCC)19x29LS5	0.055	0.067	5.05	5.2	9.1
16	16(SCC)37x32LS5	0.055	0.067	5.23	5.4	9.1
1000 Volts 60Hz RMS — 3000 Volts D.C.						
28	28(SCC)19x40LS8	0.015	0.032	67.1	75.5	1.2
28	28(SCC)37x43LS8	0.015	0.032	69.1	76.7	1.2
26	26(SCC)19x38LS8	0.019	0.036	40.3	44.5	1.7
26	26(SCC)37x41LS8	0.019	0.036	42.7	46.1	1.7
24	24(SCC)19x36LS8	0.024	0.041	25.8	27.5	2.3
24	24(SCC)37x39LS8	0.024	0.041	27.3	29.5	2.3
22	22(SCC)19x34LS8	0.031	0.048	16.3	17.1	3.3
22	22(SCC)37x37LS8	0.031	0.048	16.5	17.8	3.3
20	20(SCC)19x36LS8	0.039	0.056	10.08	10.5	4.9
20	20(SCC)37x35LS8	0.039	0.056	10.66	11.5	4.9
18	18(SCC)19x30LS8	0.050	0.067	6.45	6.6	7.3
18	18(SCC)37x30LS8	0.050	0.067	6.63	6.9	7.3
16	16(SCC)19x29LS8	0.055	0.072	5.05	5.2	9.1
16	16(SCC)37x32LS8	0.055	0.072	5.23	5.4	9.1

*Please see ordering information

IW Log Spec™ PTFE insulated single conductor shielded and jacketed cable

Conductor and shield silver plated OFHC copper in continuous lengths free of welds and brazes

Wire Size AWG	Stranding	IW Part Number*	Diameter Over Shield Inches	Diameter Over Jacket Inches	D.C. Test Volts	Corona Extinction Voltage†	Cap. PF/FT.	Weight Lbs./M'
250 Volts 60Hz RMS 750 Volts								
30	19x42	1C30(SC)19x42LS3-09SJ/14	0.037	0.049	3000	400	53	4.2
28	19x40	1C28(SC)19x40LS3-09SJ/14	0.040	0.052	3000	400	62	4.4
26	19x38	1C26(SC)19x38LS3-09SJ/14	0.045	0.057	3000	400	76	5.0
24	19x36	1C24(SC)19x36LS3-09SJ/14	0.050	0.062	3000	400	94	6.6
22	19x34	1C22(SC)19x34LS3-09SJ/14	0.056	0.068	3000	400	105	7.6
20	19x32	1C20(SC)19x32LS3-09SJ/14	0.065	0.077	3000	400	117	10.3
18	19x30	1C18(SC)19x30LS3-09SJ/14	0.075	0.087	3000	400	142	13.5
600 Volts 60Hz RMS 1800 Volts D.C.								
30	19x42	1C30(SC)19x42LS5-09SJ/14	0.042	0.054	5000	800	40	4.3
28	19x40	1C28(SC)19x40LS5-09SJ/14	0.045	0.057	5000	800	46	4.7
26	19x38	1C26(SC)19x38LS5-09SJ/14	0.049	0.061	5000	800	59	6.1
24	19x36	1C24(SC)19x36LS5-09SJ/14	0.054	0.066	5000	800	64	6.8
22	19x34	1C22(SC)19x34LS5-09SJ/14	0.060	0.072	5000	800	81	7.8
20	19x32	1C20(SC)19x32LS5-09SJ/14	0.069	0.081	5000	800	92	10.5
18	19x30	1C18(SC)19x30LS5-09SJ/14	0.078	0.090	5000	800	117	14.0
1000 Volts 60Hz RMS 3000 Volts D.C.								
30	19x42	1C30(SC)19x42LS8-09SJ/14	0.046	0.058	8000	1200	34	4.6
28	19x40	1C28(SC)19x40LS8-09SJ/14	0.049	0.061	8000	1200	39	5.7
26	19x38	1C26(SC)19x38LS8-09SJ/14	0.053	0.065	8000	1200	49	6.3
24	19x36	1C24(SC)19x36LS8-09SJ/14	0.058	0.070	8000	1200	53	7.1
22	19x34	1C22(SC)19x34LS8-09SJ/14	0.065	0.077	8000	1200	64	9.1
20	19x32	1C20(SC)19x32LS8-09SJ/14	0.073	0.085	8000	1200	76	11.9
18	19x30	1C18(SC)19x30LS8-09SJ/14	0.083	0.095	8000	1200	90	14.5

*Please see ordering information. †60Hz RMS

IW Log Spec™ PTFE insulated two conductor shielded and jacketed cable

Conductor and shield silver plated OFHC copper in continuous lengths free of welds and brazes

Wire Size AWG	Stranding	IW Part Number*	Diameter Over Shield Inches	Diameter Over Jacket Inches	D.C. Test Volts	Corona Extinction Voltage†	Weight Lbs./M'
250 Volts 60Hz RMS 750 Volts D.C.							
30	19x42	2C30(SC)19x42LS3/SJ	0.058	0.070	3000	400	6.3
28	19x40	2C28(SC)19x40LS3/SJ	0.064	0.076	3000	400	7.9
26	19x38	2C26(SC)19x38LS3/SJ	0.074	0.086	3000	400	9.3
24	19x36	2C24(SC)19x36LS3/SJ	0.084	0.096	3000	400	11.7
22	19x34	2C22(SC)19x34LS3/SJ	0.096	0.108	3000	400	15.8
20	19x32	2C20(SC)19x32LS3/SJ	0.114	0.126	3000	400	20.4
18	19x30	2C18(SC)19x30LS3/SJ	0.134	0.146	3000	400	27.6
600 Volts 60Hz RMS 1800 Volts D.C.							
30	19x42	2C30(SC)19x42LS5/SJ	0.064	0.076	5000	800	7.7
28	19x40	2C28(SC)19x40LS5/SJ	0.074	0.086	5000	800	8.3
26	19x38	2C26(SC)19x38LS5/SJ	0.082	0.094	5000	800	9.6
24	19x36	2C24(SC)19x36LS5/SJ	0.092	0.104	5000	800	13.0
22	19x34	2C22(SC)19x34LS5/SJ	0.104	0.116	5000	800	16.4
20	19x32	2C20(SC)19x32LS5/SJ	0.122	0.134	5000	800	21.0
18	19x30	2C18(SC)19x30LS5/SJ	0.142	0.154	5000	800	28.9
1000 Volts 60Hz RMS 3000 Volts D.C.							
30	19x42	2C30(SC)19x42LS8/SJ	0.076	0.086	8000	1200	8.4
28	19x40	2C28(SC)19x40LS8/SJ	0.082	0.094	8000	1200	8.9
26	19x38	2C26(SC)19x38LS8/SJ	0.090	0.102	8000	1200	11.4
24	19x36	2C24(SC)19x36LS8/SJ	0.100	0.112	8000	1200	14.3
22	19x34	2C22(SC)19x34LS8/SJ	0.114	0.126	8000	1200	18.2
20	19x32	2C20(SC)19x32LS8/SJ	0.130	0.142	8000	1200	23.0
18	19x30	2C18(SC)19x30LS8/SJ	0.150	0.166	8000	1200	29.5

*Please see ordering information †60Hz RMS

IW Log Spec™ PTFE insulated three conductor shielded and jacketed cable

Conductor and shield silver plated OFHC copper in continuous lengths free of welds and brazes

Wire Size AWG	Stranding	IW Part Number*	Diameter Over Shield Inches	Diameter Over Jacket Inches	D.C. Test Volts	Corona Extinction Voltage†	Weight Lbs./M'
250 Volts 60Hz RMS 750 Volts D.C.							
30	19x42	3C30(SC)19x42LS3/SJ	0.062	0.074	3000	400	7.4
28	19x40	3C28(SC)19x40LS3/SJ	0.068	0.080	3000	400	9.1
26	19x38	3C26(SC)19x38LS3/SJ	0.079	0.091	3000	400	11.0
24	19x36	3C24(SC)19x36LS3/SJ	0.090	0.102	3000	400	15.1
22	19x34	3C22(SC)19x34LS3/SJ	0.103	0.115	3000	400	19.3
20	19x32	3C20(SC)19x32LS3/SJ	0.122	0.135	3000	400	26.6
18	19x30	3C18(SC)19x30LS3/SJ	0.144	0.158	3000	400	35.4
600 Volts 60Hz RMS 1800 Volts D.C.							
30	19x42	3C30(SC)19x42LS5/SJ	0.073	0.085	5000	800	8.8
28	19x40	3C28(SC)19x40LS5/SJ	0.079	0.091	5000	800	10.0
26	19x38	3C26(SC)19x38LS5/SJ	0.088	0.100	5000	800	13.3
24	19x36	3C24(SC)19x36LS5/SJ	0.099	0.111	5000	800	16.5
22	19x34	3C22(SC)19x34LS5/SJ	0.112	0.124	5000	800	20.2
20	19x32	3C20(SC)19x32LS5/SJ	0.131	0.144	5000	800	27.5
18	19x30	3C18(SC)19x30LS5/SJ	0.150	0.163	5000	800	37.8
1000 Volts 60Hz RMS 3000 Volts D.C.							
30	19x42	3C30(SC)19x42LS8/SJ	0.081	0.093	8000	1200	9.6
28	19x40	3C28(SC)19x40LS8/SJ	0.088	0.100	8000	1200	11.4
26	19x38	3C26(SC)19x38LS8/SJ	0.096	0.108	8000	1200	14.5
24	19x36	3C24(SC)19x36LS8/SJ	0.107	0.119	8000	1200	18.3
22	19x34	3C22(SC)19x34LS8/SJ	0.122	0.134	8000	1200	22.3
20	19x32	3C20(SC)19x32LS8/SJ	0.140	0.154	8000	1200	30.0
18	19x30	3C18(SC)19x30LS8/SJ	0.161	0.175	8000	1200	38.2

*Please see ordering information †60Hz RMS

IW Log Spec™ PTFE insulated four conductor shielded and jacketed cable

Conductor and shield silver plated OFHC copper in continuous lengths free of welds and brazes

Wire Size AWG	Stranding	IW Part Number*	Diameter Over Shield Inches	Diameter Over Jacket Inches	D.C. Test Volts	Corona Extinction Voltage†	Weight Lbs./M'
250 Volts 60Hz RMS 750 Volts D.C.							
30	19x42	4C30(SC)19x42LS3/SJ	0.066	0.078	3000	400	9.2
28	19x40	4C28(SC)19x40LS3/SJ	0.074	0.086	3000	400	10.3
26	19x38	4C26(SC)19x38LS3/SJ	0.086	0.098	3000	400	13.6
24	19x36	4C24(SC)19x36LS3/SJ	0.098	0.110	3000	400	17.5
22	19x34	4C22(SC)19x34LS3/SJ	0.113	0.125	3000	400	23.6
20	19x32	4C20(SC)19x32LS3/SJ	0.135	0.149	3000	400	32.8
18	19x30	4C18(SC)19x30LS3/SJ	0.159	0.173	3000	400	44.2
600 Volts 60Hz RMS 1800 Volts D.C.							
30	19x42	4C30(SC)19x42LS5/SJ	0.078	0.090	5000	800	9.9
28	19x40	4C28(SC)19x40LS5/SJ	0.086	0.098	5000	800	12.3
26	19x38	4C26(SC)19x38LS5/SJ	0.098	0.110	5000	800	15.2
24	19x36	4C24(SC)19x36LS5/SJ	0.113	0.125	5000	800	19.1
22	19x34	4C22(SC)19x34LS5/SJ	0.122	0.134	5000	800	24.8
20	19x32	4C20(SC)19x32LS5/SJ	0.144	0.158	5000	800	33.9
18	19x30	4C18(SC)19x30LS5/SJ	0.166	0.180	5000	800	46.7
1000 Volts 60Hz RMS 3000 Volts D.C.							
30	19x42	4C30(SC)19x42LS8/SJ	0.089	0.101	8000	1200	11.9
28	19x40	4C28(SC)19x40LS8/SJ	0.096	0.108	8000	1200	13.8
26	19x38	4C26(SC)19x38LS8/SJ	0.106	0.118	8000	1200	17.6
24	19x36	4C24(SC)19x36LS8/SJ	0.118	0.130	8000	1200	22.4
22	19x34	4C22(SC)19x34LS8/SJ	0.135	0.149	8000	1200	27.3
20	19x32	4C20(SC)19x32LS8/SJ	0.154	0.168	8000	1200	36.8
18	19x30	4C18(SC)19x30LS8/SJ	0.178	0.192	8000	1200	47.8

*Please see ordering information †60Hz RMS

IW Log Spec™ PTFE insulated seven conductor shielded and jacketed cables

Conductor and shield silver plated OFHC copper in continuous lengths free of welds and brazes

Wire Size AWG	Stranding	IW Part Number*	Diameter Over Shield Inches	Diameter Over Jacket Inches	D.C. Test Volts	Corona Extinction Voltage†	Weight Lbs./M'
250 Volts 60Hz RMS 750 Volts D.C.							
30	19x42	7C30(SC)19x42LS3/SJ	0.079	0.091	3000	400	11.8
28	19x40	7C28(SC)19x40LS3/SJ	0.088	0.100	3000	400	14.4
26	19x38	7C26(SC)19x38LS3/SJ	0.103	0.115	3000	400	20.6
24	19x36	7C24(SC)19x36LS3/SJ	0.118	0.130	3000	400	26.6
22	19x34	7C22(SC)19x34LS3/SJ	0.136	0.148	3000	400	35.9
600 Volts 60Hz RMS 1800 Volts D.C.							
30	19x42	7C30(SC)19x42LS5/SJ	0.094	0.106	5000	800	14.7
28	19x40	7C28(SC)19x40LS5/SJ	0.103	0.115	5000	800	18.2
26	19x38	7C26(SC)19x38LS5/SJ	0.112	0.124	5000	800	22.4
24	19x36	7C24(SC)19x36LS5/SJ	0.130	0.142	5000	800	28.5
22	19x34	7C22(SC)19x34LS5/SJ	0.148	0.160	5000	800	34.5
1000 Volts 60Hz RMS 3000 Volts D.C.							
30	19x42	7C30(SC)19x42LS8/SJ	0.106	0.118	8000	1200	17.4
28	19x40	7C28(SC)19x40LS8/SJ	0.115	0.127	8000	1200	20.1
26	19x38	7C26(SC)19x38LS8/SJ	0.127	0.139	8000	1200	26.0
24	19x36	7C24(SC)19x36LS8/SJ	0.142	0.154	8000	1200	33.6
22	19x34	7C22(SC)19x34LS8/SJ	0.163	0.175	8000	1200	41.3

*Please see ordering information †60Hz RMS

IW Log Spec™ weight and bulk savings over conventional hook up / lead and interconnecting wire*

Wire Size AWG	Log Spec Nominal O.D.	Conventional Nominal O.D.	% Reduction in Diameter	% Reduction in Cross Sectional Area	Log Spec Lbs./1000' Nominal	Conventional Lbs./1000' Nominal	% Reduction in Weight
250 Volts 60Hz RMS 750 Volts D.C.							
30	.020	.024	16%	30%	.7	.75	6%
28	.023	.027	14%	27%	.9	1.02	10%
26	.028	.031	9%	19%	1.4	1.49	6%
24	.033	.036	8%	15%	2.0	2.14	6%
22	.039	.042	7%	13%	2.9	3.09	6%
20	.040	.050	4%	7%	4.4	4.70	6%
600 Volts 60Hz RMS 1800 Volts D.C.							
30	.025	.033	24%	42%	.8	1.2	33%
28	.028	.037	24%	42%	1.1	1.5	26%
26	.032	.041	21%	39%	1.5	2.0	25%
24	.037	.046	19%	35%	2.1	2.7	22%
22	.043	.053	18%	34%	3.1	3.8	18%
20	.052	.061	14%	27%	4.6	5.5	16%
18	.061	.071	14%	26%	7.1	8.2	13%
16	.068	.078	12%	24%	8.7	10.9	20%
14	.087	.093	6%	12%	14.2	15.9	10%
1000 Volts 60Hz RMS 3000 Volts D.C.							
30	.030	.043	30%	51%	1.0	1.8	44%
28	.033	.047	29%	50%	1.2	2.1	42%
26	.037	.051	27%	47%	1.8	2.7	33%
24	.042	.056	25%	43%	2.6	3.5	25%
22	.049	.063	22%	39%	3.4	4.2	27%
20	.057	.071	19%	35%	5.0	6.5	23%
18	.067	.081	17%	31%	7.3	9.4	22%
16	.077	.088	12%	23%	9.1	12.0	24%
14	.092	.103	10%	20%	14.4	17.8	19%

*While the figures above are believed to be current and accurate, they are for study purposes only and not intended for application without verification.

Quality Control *(continued)*

IW's test equipment and procedures were selected knowing that IW would specialize in manufacturing high reliability, low bulk, PTFE insulated wire and cable. To be successful, Quality Control has to assure that only the finest wire leaves the plant. A description of these test and their purpose follows:

Plant tests

1. A length of the unsintered insulation is tested to destruction before starting a wire run. The known breakdown voltage of a satisfactory laminate serves to measure the quality of the sample. This test is performed as sintering cannot improve the dielectric performance of the raw insulation.

2. The same test is applied after sintering to determine that the dielectric performance of the unsintered laminate is maintained.

3. IW's "knot test" is used to establish the integrity of the insulation under mechanical and electrical stress. Figure eight knots pulled taut in the wire severely compress, stretch and twist the insulation. A 60Hz voltage rising at 500 volts per second is used to break down the sample in a water/aerosol bath. Here again, the known breakdown of a good laminate determines the quality of the sample.

The finished wire is delivered to the test department in loose coil form to insure complete wetting, for 100% testing of the insulation. This also facilitates the location and removal of any faults that may be present.

Test department

D.C. dielectric test: The wire is submerged in a tank containing water and an aerosol wetting agent. A D.C. voltage of 500 volts per mil of insulation is then applied. When the charging current drops to zero on a microameter the test is concluded. In the event of a failure the test current, limited to microamperes, is insufficient to damage adjacent submerged coils. Further the long soaking period to wet spooled wire is not required. This eliminates the possibility of bath liquid migrating from the fault by capillary action to later produce copper oxide between conductor and insulation.

A.C. dielectric test: The wire is switched over to a 60Hz source monitored by a corona detector. The voltage is slowly raised until a corona discharge appears on the scope. The insulation is not over stressed as the voltage is immediately lowered until the corona disappears. The purpose of this test is to establish that the wires corona extinction voltage is above its rated operating voltage. Timed high voltage A.C. tests required to meet some standard specifications are not performed. IW believes these tests cause excessive corona bombardment and degradation of the PTFE insulation resulting in marginal wire.

Conventional high voltage A.C. testing of spooled wire is never performed as complete wetting and testing cannot be assured. Fault breakdowns, which damage adjacent wire turns must be located by spark testing. The wire must then be respooled, resoaked, and retested resulting in further cumulative corona damage.

The use of Quality Control's laboratory and Production test equipment shown in the upper and lower photographs are explained below to add interest to a later discussion on Quality Control. First the upper photograph:

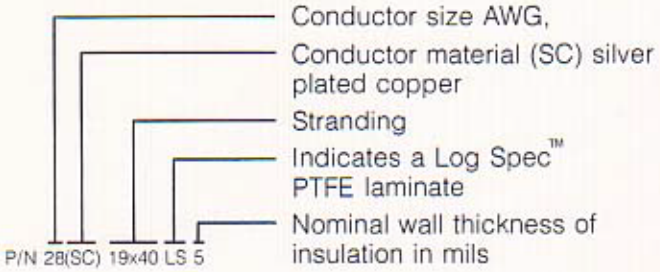
1. The tall piece standing on the floor is a 60Hz corona detector.
2. On the shelf, to its right, is a DC dielectric tester.
3. The open door under the corona detector is for "dry" cell testing.
4. The open cover on the bench to the right is for "wet" cell testing.
5. The high voltage transfer switches in the open box on the wall are remotely controlled and energize both test cell electrodes in either the DC test mode or AC test mode. The electrodes are connected in parallel.
6. The transfer switches are conveniently operated from a remote control switch on the panel just below the DC dielectric tester. Turned to the right, it energizes both electrodes DC. To the left, AC. Vertically, it grounds both electrodes. The grounding mode of the heavy grounding relay is gravity operated and its heavy grounding contacts are visible to the operator.
7. A shielded wire is placed in the "dry" cell for testing, the shield acting as the ground. With both test cell covers closed, the DC test and then the AC corona test are made using the remote control switch to effect the change. When finished, positioning the remote control switch vertically or opening either test cell returns all voltages to zero and grounds both electrodes.
8. An unshielded wire is placed in the "wet" cell and tested in the same manner, the aerosol/water bath in this case acting as the ground.
9. To the right of the DC dielectric tester is a high voltage bridge.
10. Just above the long coil of cable is a capacity discharge "thumper". It is used to locate conductor to shield faults on small cables, the discharge at the fault site being visible.
11. If the cable is too much for the "thumper", the high voltage bridge is employed. Its null meter will indicate when the bridge is balanced and, the point of balance can be read on a dial as the percentage that the distance to the fault is to the total length of the cable. The fault can then be located simply by counting the corresponding number of turns.
12. When the fault is in the cable jacket, the whole cable is lowered into a water/phenolphthalein bath where a DC voltage will cause a current to flow from the fault to the bath and a tell-tale pink plume will be seen to rise from the fault.

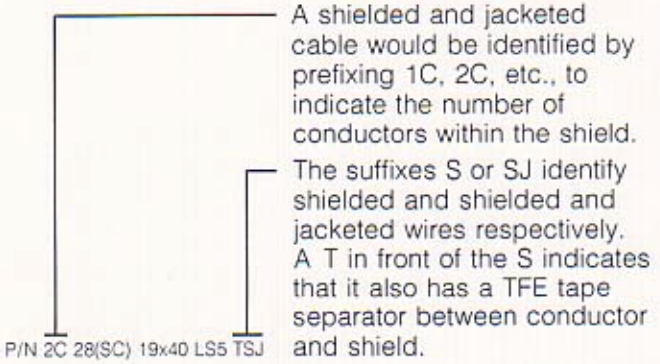
The Quality Control equipment in the lower photograph is used for testing long continuous wire lengths as they are produced.

1. The top piece of the two that are stacked, is a corona detector.
2. The bottom piece is the corona detector's power supply.
3. The long horizontal piece above the corona detector is a four foot bead chain used for the DC spark testing of continuous wire lengths. Its power supply can detect and record faults in milliseconds. A single fault passing through the bead chain will record its presence not once, but many hundreds of times. Complete assurance that the one unacceptable fault in a continuous length cannot pass undetected.
4. The unusual piece to it's right is the electrode for the corona detector: actually a miniature water bath in which the wire is submerged as it passes through. While it does the work of an AC sparker, its vital importance is that it permits the monitoring of corona discharge.
5. On the floor, left side, is a large take up spool for continuous wire lengths, longest to date, about 5 miles.
6. The familiar basket, lower right, first seen in the upper photograph, is used to hold the loose coils of shorter lengths, up to about 5000 feet for later laboratory testing.

Ordering information

IW's Part Number (P/N) Coding System used to readily identify its hook-up wires and shielded and jacketed wires and cables is explained below:





The suggested operating voltages, 60Hz RMS for the different insulating wall thicknesses, based on Corona extinction voltages, follows:

250 volt wire starts with 3 mils of insulation
600 volt wire starts with 5 mils of insulation
1000 volt wire starts with 8 mils of insulation
Wall thicknesses vary slightly with stranding.

Conductors – Below are the conductor codes and strand configurations used in IW part numbers.

AWG 30	1x30	7x38	19x42	—
AWG 28	1x28	7x36	19x40	37x43
AWG 26	1x26	7x34	19x38	37x39
AWG 24	1x24	7x32	19x36	37x39
AWG 22	1x22·	7x30	19x34	37x37
AWG 20	1x20	7x28	19x32	37x35
AWG 18	1x18	—	19x30	37x33
AWG 16	1x16	—	19x29	37x32
AWG 14	1x14	—	19x27	37x30

Conductor materials available

(C) Copper
(CS) Copper clad steel
(SC) Silver plated copper
(SCS) Silver plated copper clad steel
(SCC) Silver plated cadmium-chrome alloy
(NC) Nickel plated copper
(NCS) Nickel plated copper clad steel
(NCC) Nickel plated cadmium-chrome alloy

Wire and cable identification

Explained below are the three methods of wire and cable identification offered by IW.

Solid colors – IW offers all the colors listed below on all hookup wire and jackets. The color pigment and PTFE resins are mixed prior to the insulation being applied to the conductor. This results in colors that are homogeneous throughout the insulating wall.

Striped insulation – IW provides striped insulation utilizing any two solid colors and/or clear. IW's striping differs from the conventional striping in that it is subsurface and cannot be removed without destroying the insulation.

Subsurface printing* – IW's numbering and lettering system offers the same indelible identification found in our striped insulation. The characters are printed on the bottom laminate. This has five advantages over conventional hot stamped identification.

1. No insulation damage due to hot stamping.
2. No corona sites created by hot stamping.
3. The characters cannot be destroyed without removing the insulation.
4. All final Quality Control tests are made after the wire has been numbered.
5. There is no scrap or lost labor normally associated with hot stamping.

Colors

Colors may be specified by inserting the identifying dash number as shown below:

Example: P/N 7C 28(S) 19x40 LS8 -00 -01 -02 -03 -04 -05 -06 SJ -14 identifies a seven conductor cable of 28AWG silver plated wires 19x40 strands each with 8 mils of insulation, and the Log Spec wires are colored black, brown, red, orange, yellow, green and blue, shielded and jacketed with a clear jacket.

-00 Black	-04 Yellow	-08 Gray
-01 Brown	-05 Green	-09 White
-02 Red	-06 Blue	-14 Clear
-03 Orange	-07 Violet	

*Subsurface printing is available on AWG #24 and larger, and on the jackets of multiconductor cables.