THE OKONITE COMPANY

RAILROAD CABLES

MADE in USA
Quality Cables Since 1878

Serving the Railroad Industry Since 1878

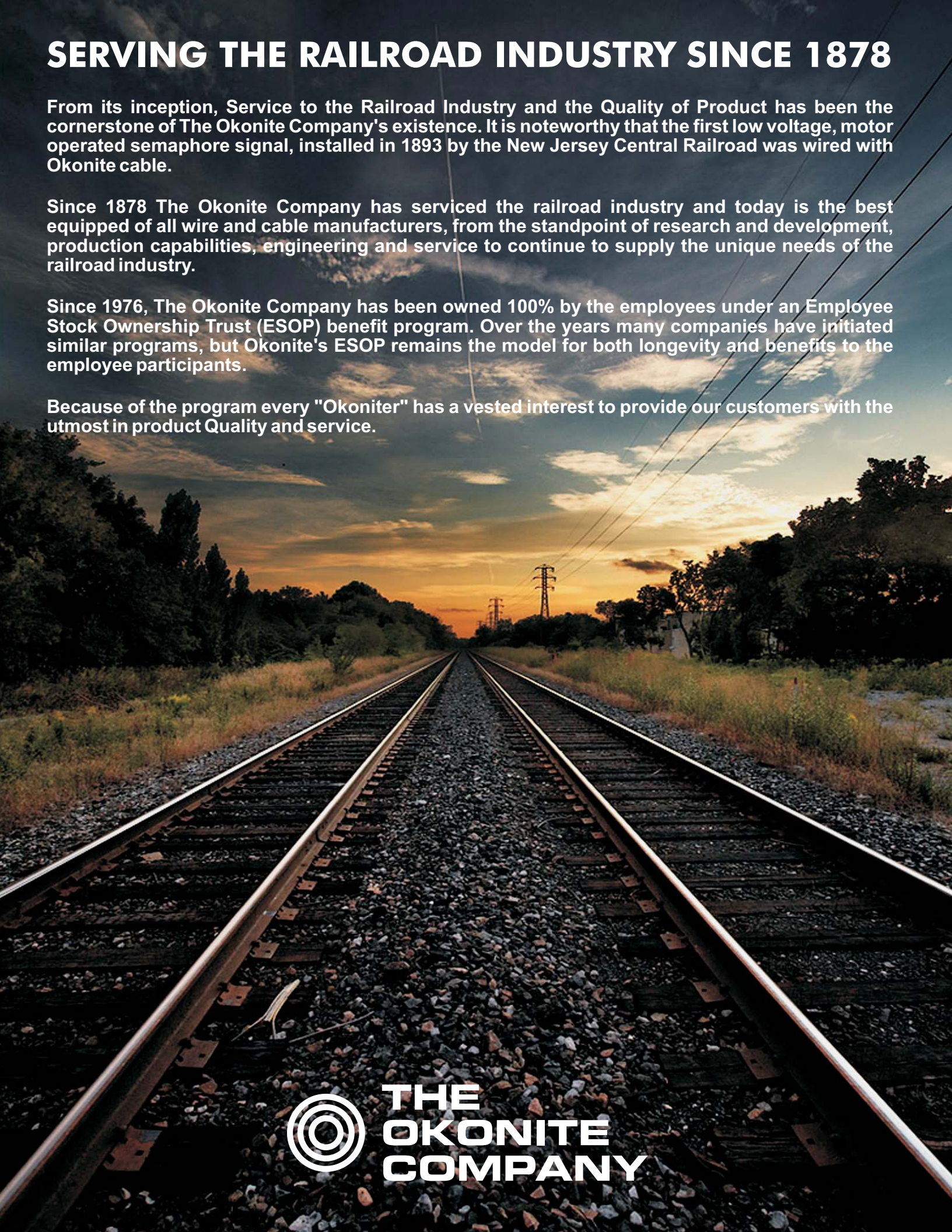
SERVING THE RAILROAD INDUSTRY SINCE 1878

From its inception, Service to the Railroad Industry and the Quality of Product has been the cornerstone of The Okonite Company's existence. It is noteworthy that the first low voltage, motor operated semaphore signal, installed in 1893 by the New Jersey Central Railroad was wired with Okonite cable.

Since 1878 The Okonite Company has serviced the railroad industry and today is the best equipped of all wire and cable manufacturers, from the standpoint of research and development, production capabilities, engineering and service to continue to supply the unique needs of the railroad industry.

Since 1976, The Okonite Company has been owned 100% by the employees under an Employee Stock Ownership Trust (ESOP) benefit program. Over the years many companies have initiated similar programs, but Okonite's ESOP remains the model for both longevity and benefits to the employee participants.

Because of the program every "Okoniter" has a vested interest to provide our customers with the utmost in product Quality and service.



THE OKONITE COMPANY

BUILDING LASTING QUALITY

For 135 years the name OKONITE has been synonymous with QUALITY. In 1997, The Okonite Company successfully completed an internal implementation of the Quality Management procedures required for ISO 9000. This was done at Headquarters, our Research Labs, all plant locations as well as all of our (5) Service Center locations.

The AAR has established a Qualification Process for their "Suppliers Quality Management System" that is administered by the SMI - RIF (Supply Management Institute - Rail Industry Forum).

Okonite has contracted with an AAR approved certification company and received 3rd party certification to ISO 9000 and AAR M-1003 for our (4) manufacturing plants located in Richmond, KY; Ashton, RI; Orangeburg, SC and Santa Maria, CA and Corporate HQ located in Ramsey, NJ. Refer to our Website at www.okonite.com/quality/assurance.html, for the latest copy of this certification along with our current Quality System Manual.

QUALITY SYSTEM

The Okonite Company's commitment to Total Quality in the design, manufacture, delivery and service of wire and cable products since 1878 has been proven by continuing improvements achieved by dedicated employees for our valued customers. Quality consistency of Okonite cables for industrial, railroad, rapid transit, electric utility, generating (both fossil and nuclear) /distribution and military applications are demonstrated by Okonite ESOP employees following planned and systematic procedures which assure customer satisfaction and years of reliable service.

1. ORGANIZATION

The Okonite Company has established and executed a formal Quality Management System since the 1970's. The authority and duties of the personnel and organizations performing quality functions are clearly defined and documented.

2. DESIGN CONTROL

Okonite HQ design control is based upon the selection and qualification of raw materials that are used to produce premium standard cable constructions. These materials must meet or exceed Okonite and regulatory acceptance test and performance criteria. Customer requirements are satisfied by applying Okonite cable quality standards to meet to meet the highest performance criteria.

Material Research Lab

3. CONTROL OF PURCHASE MATERIAL

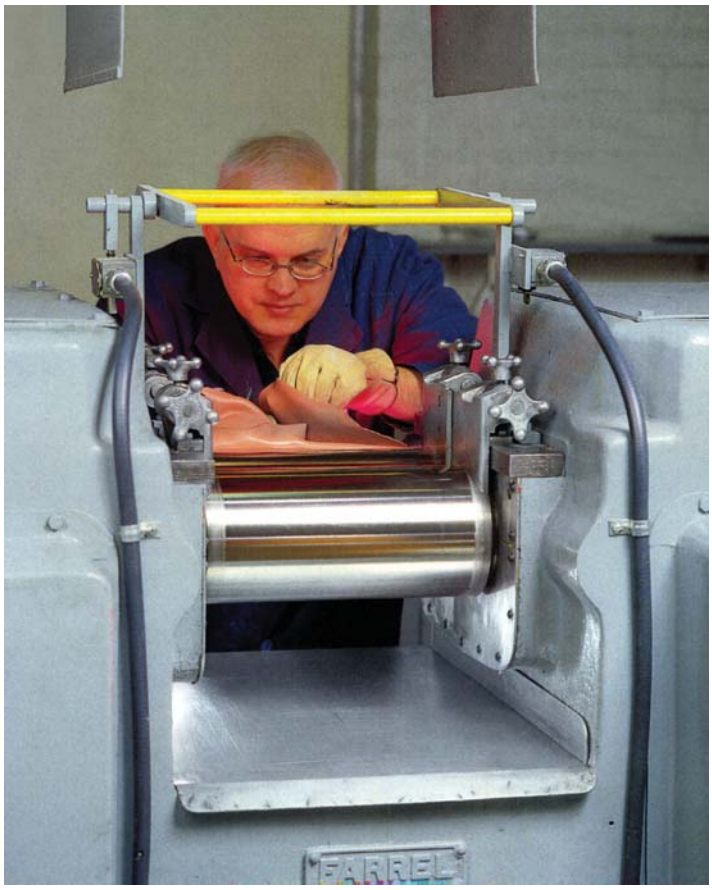
Cable quality is assured by a proven system of Okonite policies and procedures for product materials that provide for development and review of quality requirements, materials evaluation, purchase specifications, supplier selection/approvals and incoming materials inspection. Suppliers of materials that have achieved satisfactory performance and are certified, enter into a Quality Partnership to maintain the highest consistency.

4. INSPECTION

Inspection and testing programs are in effect to insure compliance with appropriate instructions, Industry Specifications, procedures and/or drawings. Inspections are performed by trained and qualified personnel.

5. TEST CONTROL

Inspection and testing programs are in effect to insure compliance with appropriate instructions, Industry Specifications, procedures and/or drawings. Inspections are performed by trained and qualified personnel.



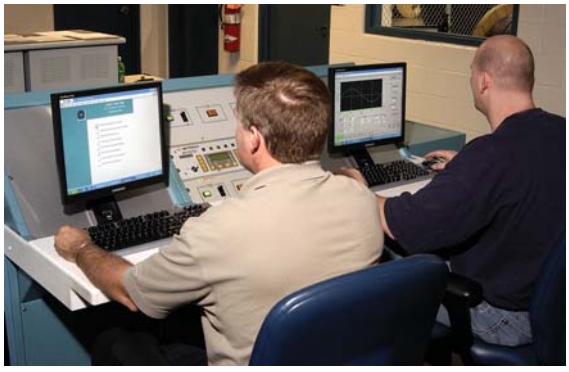
Purchased Material Testing

6. CONTROL OF MEASURING & TEST EQUIPMENT

Measurement devices employed for acceptance/rejection decisions of materials, components and finished wire and cables are covered by a stringent calibration maintenance program. This includes as-found conditions, frequency, status identification and the use of standards traceable to The National Institute of Standards Technology (NIST).

7. INSPECTION, TEST & OPERATING STATUS

A product traveler document (C&R) is prepared for each item to be manufactured. This document defines the manufacturing processes involved, the proper sequence of all manufacturing, test and inspection operations required to assure the product complies with applicable specifications. The highest quality manufacturing sequence is assured on every cable shipment.



Okonite Information System for "In Process" Testing

8. QUALITY RECORDS

Procedures have been established and are maintained that control quality records. Quality records are maintained by each functional activity as a means of providing evidence that OKONITE wire/cables meet specified technical and quality requirements. Applicable system records and retention periods are as specified within our Quality System Manual.

Material Qualification Testing

9. QUALITY AUDITS

Internal audits are performed by Quality Assurance in accordance with established procedures on a regularly scheduled basis. These audits provide ongoing analysis of the effectiveness of the Okonite Quality System in maintaining compliance to three important industry requirements; 10CFR50 Appendix B, which is the Quality Assurance Criteria for Nuclear Power Plants, AAR M-1003 for our Class 1 Railroads and International Standard ISO 9000-1994 for our commercial customers.

Third party certification to AAR M-1003 and ISO 9000-1994 is performed by an AAR approved certification company every three years at our manufacturing facilities and corporate headquarters. Records of these audits are maintained and copies of our current certifications are maintained on our web page.

10. TRAINING

Personnel performing activities affecting quality are qualified for their assigned duties. Training needs are identified and appropriate instruction is provided, as required.

11.STATISTICALTECHNIQUES

Statistical data is utilized for process control, data analysis (including process capability), defect prevention, problem identification and solving, product improvement and service improvement.

The Okonite Company has made, and will continue to make, uncompromising commitment to quality and reliability of the products manufactured in our factories

Cable Tank Testing

THE OKONITE CABLE SYSTEM

The Okonite Cable System is made up of several key components

CONDUCTOR

Okonite produces, in-house, the copper conductor furnished in each railroad product. This conductor is created by "Drawing Down" 5/16" copper rod through a series of dies to produce th desired conductor size

Orangeburg, South Carolina Compound Facility

INSULATION

The cornerstone of a Vital Signal Cable is the insulation covering the conductor. Many years ago, The Okonite Company formulated a proprietary Ethylene Propylene Rubber Compound (EPR) in our Material Research Laboratory specifically for the Railroad Industry. Electrical Integrity, Moisture Resistance, Thermal Stability, Vibration Resistance, and Ruggedness were all key considerations by the Okonite Technical design Team. Our State-of-the-Art Compound facility in Orangeburg, South Carolina is dedicated to the compounding of this insulation. This plant represents the latest in equipment and technology using a closed loop automated and computer controlled process that meets every aspect of the ISO 9000-1994 Quality Standard.

Okonite is very proud of this in-house capability to develop materials specifically for the Railroad Industry. This compounding uniqueness insures our commitment to Quality and Reliability that has been proven by our Long-Term Record of Service.

PRODUCT ASSEMBLY

The Okonite Company has the latest State-of-the-Art manufacturing facilities. This modern equipment allows Okonite to maintain the most exacting performance standards.

After the insulation has been extruded on the individual conductors and cured, then multi-conductor vital signal cable are formed by an elaborate cabling process.

After cabling into a multi-conductor core, a copper alloy shield is applied to provide mechanical and electrical protection

New Compound Equipment

JACKETING

The primary function of a cable jacket it to protect the insulated conductors during installation throughout service. Several jacketing materials are available and provide long-life installation requirements. Many of the Okonite jacket materials are produced at our Orangeburg, SC facility.

Okonite provides a full spectrum of jacketing materials including:

OKOLENE® - A thermoplastic polyethylene based jacketing compound with excellent moisture resistance and mechanical ruggedness.

OKOCLEAR® - A low smoke, zero halogen compound ideal for tunnels and other enclosed or hazardous locations where human exposure to hazardous elements need to be minimized.

OKOSEAL® - A polyvinyl chloride (PVC) Thermoplastic jacketing compound with excellent resistance to flame and most chemicals.

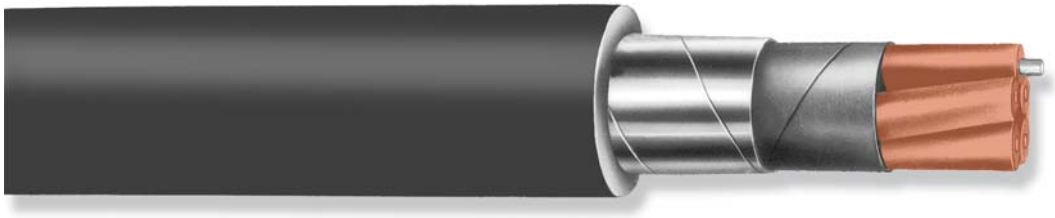
OKOLON®
A moisture resistant, flame retardant chlorinated polyethylene (CPE) jacketing material. Available in Thermosetting and Thermoplastic constructions.

View of Richmond and Orangeburg type continuous vulcanization profiles

CV Lines (above and below) at our Richmond and Orangeburg Manufacturing Plants

METALLIC ARMORS AND SHIELDS

Copper Alloy Tape armor — A helically applied 7 mil high performance copper alloy tape designed to resist damage from rodents and termites as well as excellent mechanical protection.



Armored Signal Cable

C-L-X® — Continuous lightweight external armor which can be furnished in aluminum, bronze, copper or steel

C-L-X Cable

Underwater or Submarine — Cables such as this are a particular Okonite speciality. Typically very rugged constructions, this underwater cable has a totally filled core, a non-hygroscopic core tape, polyethylene jacket, jute bedding and high strength armor wires. In some constructions wire armors are flooded with a bitumen material or covered overall by a polyethylene jacket.

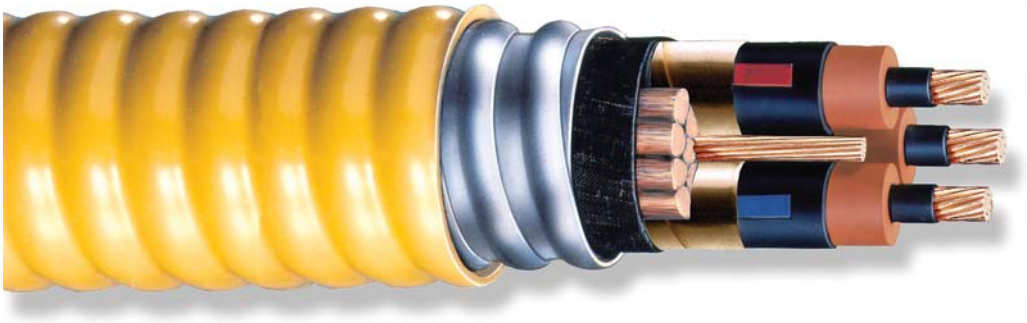
Armored Submarine Telephone Cable

Composite Cable — This cable incorporates video pair conductors along with communications conductors in common overall jacket, bi-metal shielding tape, inner polyethylene jacket, jute covering under wire armor and an outer polyethylene jacket. Okonite can provide cables having voice, data, control, power and instrumentation conductors in one composite construction.

Voice, Data, Control & Power Composite Cable

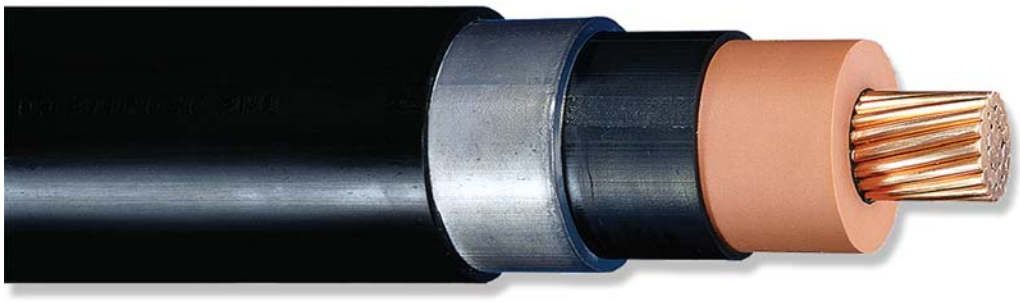
METALLIC ARMORS AND SHIELDS

Loxarmor® — Aluminum or Galvanized Steel interlocked armor.



Loxarmor Cable

Lead Sheath — Okonite can provide lead sheathed cable in all sizes and types. Medium voltage and 600 volt power cable, vital signal cable, communication cable and instrumentation cable.



Lead Sheath Cable

Okobon — This is a moisture resistant cable finish consisting of aluminum/copolymer tape fused to itself and an overall (CPE) chlorinated polyethylene jacket.

Okobon Cable

MULTI-PLANT PRODUCTION CAPABILITIES

Okonite operates manufacturing facilities in Santa Maria, California; Richmond, Kentucky; Orangeburg, South Carolina; Paterson, New Jersey and Ashton, Rhode Island. All of these plants are involved with cable products for the Railroad Industry.

Santa Maria, California

Richmond, Kentucky

Orangeburg, South Carolina

Aston, Rhode Island

Paterson, New Jersey

This multi-plant capability provides our customers with multi-source manufacturing that assures an uninterrupted supply of cable for all your project and maintenance needs.

RAILROAD INDUSTRY MULTI-PLANT PRODUCTION CAPABILITY
Okonite Plant Capability by Location

The following chart shows the multi-plant production capability of The Okonite Company.

CABLE DESIGN	Richmond KY	Santa Maria CA	Orangeburg SC	Ashton RI	Paterson NJ
Armored Underground Signal Cable	X	X	X		
DF Direct Burial Signal Cable	X	X	X		
Aerial Signal Cable	X	X	X		
Okonite-Okolon TS-CPE Duplex Track Wire	X	X	X		
Okonite-Okolene Duplex Track Wire	X	X	X		
Okozel Case Wire	X	X			
Okonite/Okoseal TC Blue	X	X			
Okonite Tower and Case Wire	X	X			
DEL	X	X	X		
Okolon TS-CPE Line Wire	X	X	X		
Okolene Line Wire	X	X	X	X	
Okonite-Okolon TS-CPE Case Wire	X	X		X	
Okonite-Nylon Braid Case Wire				X	
Centralized Traffic Control Cable	X	X		X	
Okolene-Okolene Power Cable	X	X		X	
Okonite Communication Case				X	X
Okolene-Okoseal Control Cable	X		X	X	
Okoguard URO-J	X	X	X		
CTC-Code Line Cable		X		X	
Low Inductive Interference Cable	X	X		X	
Medium Voltage Power Cable	X	X	X		
C-L-X	X	X		X	
Self Supporting Aerial Cable	X	X	X		
Paper Insulated Lead Covered (PILC)					X
Instrumentation (Armored & Unarmored)				X	

OKONITE CABLES - IN STOCK

Okonite utilizes an online computer network that links district sales offices, service centers and manufacturing plants for the purpose of providing instantaneous in-stock and stock replenishment information. Each service center maintains a large inventory of Okonite products, including a complete variety of standard railroad cable constructions, tailored to the needs of the geographical area being served, i.e. Houston, Texas; Kansas City, Kansas; New Orleans, Louisiana; Pittsburgh, Pennsylvania; and Portland, Oregon. There is also component and finished stock at our five manufacturing plants in Kentucky, South Carolina, California, Rhode Island and New Jersey.

Your local Okonite office is ready to assist you with information and to expedite your cable selection. Our "in Stock" program ensures our customers of the shortest possible lead times, often less than 1 week, combined with maximum flexibility in reel lengths and packaging.

▲ *All stock items are identified on our product data sheets with a black triangle next to the catalog number.*

SERVICE CENTERS

Portland District Office
and Service Center
6777 S.W. Bonita Road Suite 150
Portland, OR 97224
(503) 598-0598
FAX:(503) 620-7447

New Orleans District Office
and Service Center
101 Delta Drive, Suite J
St. Rose, LA 70087
(504) 467-1920
FAX:(504) 467-1926

Pittsburgh Service Center
120 Solar Drive
Imperial, PA 15126
(724) 899-4300
FAX:(724) 899-4320

Kansas City District Office
and Service Center
2631 S. 96th Street
Edwardsville, KS 66111
(913) 422-6958
FAX:(913) 422-1647

Houston District Office
and Service Center
802 Century Plaza Drive
Houston, TX 77073
(281) 821-5500
FAX:(281) 821-7855

COMPONENT STOCK INVENTORY

The Okonite Company maintains several million feet of component (single insulated conductor) stock inventory in many conductor sizes. This allows us to cable, shield and jacket where necessary, a final product in a very short time.

Component Stock Inventory

PRODUCT DATA SHEETS

NOTE: This catalog displays many of the commonly used cables for Railroad applications. For additional Okonite product information, please refer to our online catalog at www.okonite.com, or call your local Okonite District Office.

Product Data
RR: Sheet 1

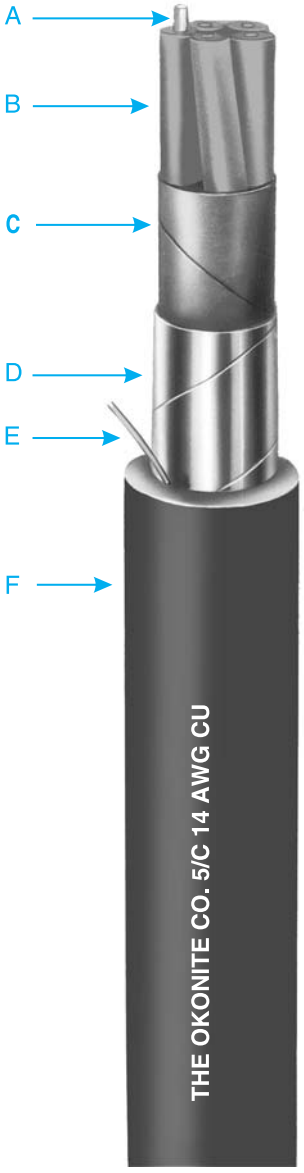
Okonite® Armored Underground Signal Cables

With P.C.F. (Pull Cord Feature)

Heavy Duty Direct Burial Railroad Signal Cable

— AREMA Class "A" Insulation — 600V

Multiple Copper Conductors/90°C Rating



A Solid or stranded, Uncoated Copper Conductors
B Insulation—Okonite #14 AWG-#9 AWG 5/64", #6 - #2 AWG 6/64" with printed number code and tracer
C Cushion Tape Layer
D Flat Copper Alloy Armor Tape
E Pull Cord
F Jacket—Okolene with sequential footage markings

Insulation

Okonite EPR insulation is a heat, moisture and chemical resistant, mechanically rugged compound. The insulation thickness for size #14 AWG through #9 AWG is 5/64" and for #6 AWG through #2 AWG is 6/64". One conductor in each layer is identified as "Tracer". In addition, each conductor is number coded for ease of identification.

Assembly and Finish

Individual conductors are assembled with suitable fillers, where necessary, and a cable cushioning tape. A 7 mil flat copper alloy tape is then helically applied, giving outstanding mechanical protection. The black Okolene® (polyethylene) jacket is then applied overall.

Applications

Okonite Armored Underground Signal Cables are designed for use in all vital railroad signal circuits where security of service and long life are required in all vital circuit and safety related applications. These cables are recommended for use where crush resistance, termite and rodent protection are considerations and in all wet and dry locations.

Specifications

AREMA Signal Manual Part 10.3.17

Conductors: Solid uncoated copper per ASTM B-3, stranded uncoated compact round copper per ASTM B-496.

Insulation: Meets or exceeds electrical and physical requirements of ICEA S-95-658 (NEMA WC70) and AREMA Manual Part 10.3.19.

Armor Tape: Copper alloy C19400 per ASTM B-465.

Jacket: Meets or exceeds electrical and physical requirements of ICEA S-95-658, Part 4.1.5.

Product Features

- Mechanically rugged.
- Resistant to aging.
- Easy to install and splice.
- Resistant to environmental hazards.
- Superior moisture resistance.
- Outstanding termite and rodent protection.
- Excellent electrical properties... high dielectric strength, low SIC and power factor and high insulation resistance.
- The Pull Cord feature affords easy and quick accessibility to conductors for splicing and terminating.
- Sequential footage markings on surface of outer jacket.

COMPOSITE CONSTRUCTIONS

Okonite Insulation: #14 AWG through #9 AWG 5/64", #6 AWG 6/64"

Catalog Number	Composite Make-Up	Conductors No. x Size (# Strands)	Conductors No. x Size (# Strands)	Outer Jacket Thickness 64th	Approx Cable O.D. (In.)	Approx Net Wt. Lbs./M'	Approx Ship Wt. Lbs./M
206-11-8974	7/C	2 x 9 (1X)	5 x 14 (1X)	5	0.99	523	574
▲ 206-11-8255	15/C	3 x 6 (1X)	12 x 14 (1X)	6	1.48	1711	1319
▲ 206-11-6283	19/C	6 x 6 (1X)	13 x 14 (1X)	6	1.69	1674	1877

▲ **Authorized Stock Item** - Available from Customer Service Centers.

Composite Cable Constructions are also available with stranded conductors. Consult your Okonite Representative.

Okonite Armored Underground Signal Cables

Product Data
RR: Sheet 1

Okonite Insulation: #14 AWG Through #9 AWG, 5/64", #6 through #2 AWG, 6/64"

Catalog Number	Size AWG	No. of Strands (1)	No. Condrs.	Outer Jacket Thickness-64th	Approx. Cable O.D. Inches	Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
▲ 206-11-6882	14	Sol.	2	4	.65	208	241
206-11-6883	14	Sol.	3	4	.68	253	286
206-11-6884	14	Sol.	4	4	.74	300	338
▲ 206-11-6885	14	Sol.	5	4	.81	349	408
▲ 206-11-6887	14	Sol.	7	5	.91	451	510
206-11-6889	14	Sol.	9	5	1.05	579	671
206-11-6890	14	Sol.	10	5	1.12	698	790
▲ 206-11-6892	14	Sol.	12	5	1.17	700	792
206-11-6895	14	Sol.	15	6	1.33	871	994
206-11-6896	14	Sol.	16	6	1.33	906	1029
▲ 206-11-6899	14	Sol.	19	6	1.40	1028	1151
206-11-6901	14	Sol.	21	6	1.47	1127	1250
▲ 206-11-6907	14	Sol.	27	6	1.67	1388	1638
▲ 206-11-6910	14	Sol.	37	7	1.89	1834	2076
206-11-6692	12	Sol.	2	4	.68	240	273
206-11-6693	12	Sol.	3	4	.72	292	330
206-11-6694	12	Sol.	4	4	.78	354	392
206-11-6695	12	Sol.	5	4	.85	412	471
206-11-6697	12	Sol.	7	5	.96	535	594
206-11-6699	12	Sol.	9	5	1.11	689	781
206-11-6700	12	Sol.	10	5	1.19	774	866
206-11-6702	12	Sol.	12	5	1.24	847	952
206-11-6812	10	Sol.	2	4	.72	279	317
206-11-6813	10	Sol.	3	4	.76	346	384
206-11-6814	10	Sol.	4	4	.83	424	483
206-11-6815	10	Sol.	5	5	.94	518	577
206-11-6817	10	Sol.	7	5	1.02	654	746
206-11-6819	10	Sol.	9	5	1.18	842	934
206-11-6820	10	Sol.	10	6	1.30	973	1078
206-11-6822	10	Sol.	12	6	1.36	1076	1199
206-11-6922	9	Sol.	2	4	.75	317	350
▲ 206-11-6923	9	Sol.	3	4	.79	384	443
206-11-6924	9	Sol.	4	5	.90	495	554
▲ 206-11-6925	9	Sol.	5	5	.97	581	640
▲ 206-11-6927	9	Sol.	7	5	1.06	737	829
206-11-6928	9	Sol.	8	5	1.14	843	935
206-11-6929	9	Sol.	9	5	1.23	952	1057
▲ 206-11-6930	9	Sol.	10	6	1.35	1098	1221
206-11-6931	9	Sol.	12	6	1.42	1215	1338
▲ 206-11-6242	6	Sol.	2	5	.94	505	564
▲ 206-11-6243	6	Sol.	3	5	1.00	632	724
206-11-6244	6	Sol.	4	5	1.10	789	881
▲ 206-11-6245	6	Sol.	5	5	1.20	952	1044
▲ 206-11-6247	6	Sol.	7	6	1.34	1245	1368
206-11-6248	6	Sol.	8	6	1.45	1429	1552
206-11-6249	6	Sol.	9	6	1.56	1642	1820
▲ 206-11-6070	6	7	3	5	1.01	698	753
▲ 206-11-6042	4	7	2	5	1.02	619	674
▲ 206-11-6045	4	7	5	6	1.34	1266	1356
▲ 206-11-6130	2	7	3	6	1.28	1256	1346

Minimum Manufacturing Quantity is 1000 ft. Standard Package—1000' N.R. Reel.

▲ **Authorized Stock Item -** Available from Customer Service Centers.

(1) This construction is also available with stranded conductors. Consult your Okonite Representative.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okonite®-DF-Direct Burial or Duct Railroad Signal Cable

(With PCF-Pull Cord Feature)

Heavy Duty — AREMA Class "A" Insulation — 600V

Multiple Copper Conductors/90°C Rating

A Solid or Stranded Uncoated Copper Conductors
B Insulation—Okonite #14 AWG-#9 AWG 5/64", #6 AWG 6/64" with printed number code and tracer
C Pull Cord
D Extruded Cushion Layer
E Jacket—Okolene with sequential footage marking

Insulation

Okonite EPR insulation is a heat, moisture and chemical resistant, mechanically rugged compound. The insulation thickness for size #14 AWG through #9 AWG is 5/64" and for #6 AWG it is 6/64". One conductor in each layer is identified as "Tracer". In addition each conductor is number coded for ease of identification.

D.F. Finish

Insulated conductors are assembled with a shock absorbing extruded cushion layer and a black Okolene® (polyethylene) jacket is then applied overall.

Applications

Okonite-D.F. Signal Cables are designed for use in all vital signal circuits where continuity of service and long life are required in all vital circuit and safety related applications. They are especially recommended for use where crush resistance is vital. This cable is recommended for direct burial or duct installations in all wet and dry locations

Specifications

AREMA Signal Manual 10.3.17

Conductors: Solid uncoated copper per ASTM B-3.

Insulation: Meets or exceeds electrical and physical requirements of ICEA S-95-658 and AREMA Manual Part 10.3.19.

Jacket: Meets or exceeds electrical and physical requirements of ICEA S-95-658, Part 4.1.5.

Product Features

- Mechanically rugged.
- Resistant to aging.
- Easy to install and splice.
- Resistant to environmental hazards.
- Superior moisture resistance.
- Excellent electrical properties.. high dielectric strength, low SIC and power factor and high insulation resistance.
- The Pull Cord affords easy and quick accessibility to conductors for splicing and terminating.
- Sequential footage markings on surface of outer jacket.

Okonite-DF-Direct Burial or Duct Railroad Signal Cable

(With PCF-Pull Cord Feature)
Heavy Duty-AREMA Class "A" Insulation — 600V
Multiple Copper Conductors/90°C Rating

Product Data
RR: Sheet 2

Okonite Insulation: #14 AWG Through #9 AWG, 5/64"; #6 AWG, 6/64"

Catalog Number	Size AWG	No. of Strands (1)	No. Condrs.	Cushion Layer-64ths	Outer Jacket Thickness-64th	Approx. Cable O.D. Inches	Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
206-14-3512	14	Sol.	2	3	5	.76	262	302
206-14-3513	14	Sol.	3	3	5	.70	294	369
206-14-3514	14	Sol.	4	3	5	.85	365	440
206-14-3515	14	.Sol.	5	3	6	.95	425	500
206-14-3517	14	Sol.	7	3	6	1.02	504	612
206-14-3519	14	Sol.	9	3	6	1.16	662	770
206-14-3520	14	Sol.	10	3	6	1.23	755	900
206-14-3522	14	Sol.	12	3	7	1.32	785	930
206-14-3525	14	Sol.	15	3	7	1.44	929	1074
206-14-3526	14	Sol.	16	3	7	1.44	970	1115
206-14-3529	14	Sol.	19	3	7	1.51	1101	1311
206-14-3531	14	Sol.	21	3	7	1.59	1214	1424
206-14-3535	14	Sol.	27	3	7	1.64	1570	1856
206-14-3540	14	Sol.	37	4	8	2.04	2008	2444
206-14-3632	12	Sol.	2	3	5	.79	298	373
206-14-3633	12	Sol.	3	3	5	.83	340	415
206-14-3634	12	Sol.	4	3	6	.92	423	498
206-14-3635	12	Sol.	5	3	6	.99	499	607
206-14-3637	12	Sol.	7	3	6	1.07	596	704
206-14-3639	12	Sol.	9	3	6	1.22	785	893
206-14-3640	12	Sol.	10	3	7	1.33	923	1068
206-14-3642	12	Sol.	12	3	7	1.39	960	1105
206-14-3752	10	Sol.	2	3	5	.83	349	424
206-14-3753	10	Sol.	3	3	5	.87	405	480
206-14-3754	10	Sol.	4	3	6	.98	505	613
206-14-3755	10	Sol.	5	3	6	1.05	603	711
206-14-3757	10	Sol.	7	3	6	1.13	727	835
206-14-3759	10	Sol.	9	3	7	1.44	983	1128
206-14-3760	10	Sol.	10	3	7	1.41	1124	1269
206-14-3762	10	Sol.	12	3	7	1.48	1178	1388
206-14-3872	9	Sol.	2	3	5	.86	382	457
206-14-3873	9	Sol.	3	3	6	.93	464	539
206-14-3874	9	Sol.	4	3	6	1.00	562	670
206-14-3875	9	Sol.	5	3	6	1.08	667	775
206-14-3877	9	Sol.	7	3	6	1.17	813	921
206-14-3878	9	Sol.	8	3	6	1.26	938	1083
206-14-3880	9	Sol.	10	3	7	1.46	1253	1463
206-14-3882	9	Sol.	12	3	7	1.53	1321	1531
206-14-3182	6	Sol.	2	3	6	1.05	608	716
206-14-3183	6	Sol.	3	3	6	1.10	724	832
206-14-3184	6	Sol.	4	3	6	1.20	888	996
206-14-3185	6	Sol.	5	3	7	1.33	1093	1238
206-14-3187	6	Sol.	7	3	7	1.43	1348	1493
206-14-3188	6	Sol.	8	3	7	1.55	1570	1780

Standard Package—1000' N.R. Reel.

(1) This construction is also available with stranded conductors. Consult your Okonite Representative.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okonite®-Okolene® Duplex Track Wire

600V

One Copper Conductor/90°C Rating

A Solid Uncoated Copper Conductors
B Insulation - Okonite-Sizes #9 AWG and #8 AWG-5/64", #6 AWG-6/64"
C Jacket-Okolene, Color Coded; 1-Black, 1-Red

Insulation

Okonite EPR is Okonite's trade name for its heat resistant, mechanically rugged ethylene-propylene based insulating compound. The insulation thickness for wire sizes #9 AWG is 5/64" and for #6 AWG is 6/64".

Jackets and Finishes

The Okolene (PE) jacket supplied with this cable provides excellent resistance to mechanical abuse, weathering and most acids, oils and alkalies. Color Coded; 1-Black, 1-Red.

Applications

Okonite-Okolene 600V Duplex Track Wire is recommended for use in track circuits, signal operations, car retarder and switch machine applications. Can be installed in either wet or dry locations, in conduit trays or trough or buried direct.

Specifications

Conductor: Solid uncoated copper per ASTM B-3.

Insulation: Per ICEA S-95-658, and AREMA Signal Manual Part 10.3.19.

Jacket: Meets or exceeds the physical and electrical requirements of ICEA S-95-658, and AREMA Signal Manual Part 10.3.21

Product Features

- Exceptional heat resistance.
- 90°C Continuous Rating
130°C Emergency Overload Rating.
250°C Short Circuit Rating.
- Mechanically rugged.
- Flexible, easy to handle and splice.
- Resistant to most oils, acids, alkalies and effects of weather.
- Stable electrical and physical properties.
- Excellent moisture resistance.

Okonite Insulation: #9 AWG, 5/64", #6 AWG, 6/64"

Catalog Number	Size AWG	No. of Strands	Jacket Thickness 64 th's	Approx. Duplexed O.D. (In.)	Approx. Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
150-12-3931	9	Solid	4	0.83"	199	243
▲ 150-12-3933	6	Solid	4	1.00"	329	404

▲ Authorized Stock Item: Available from our Customer Service Center
Standard Package -1000' Non-Returnable Reel

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okonite® Duplex TC Blue Tower and Case Wire

600 Volt

Duplex Copper Conductors/90°C Rating

A Stranded Uncoated Copper Conductor
B Insulation—Okonite Sizes #10 AWG - #14 AWG-2/64"
C Jacket—Blue Okoseal

Insulation

Okonite EPR is Okonite's trade name for its heat resistant, mechanically rugged ethylene-propylene based insulating compound. The insulation thickness for wire sizes are listed below.

Jackets and Finishes

The Blue Okoseal® (PVC) jacket supplied with this cable provides excellent resistance to mechanical abuse, flame, weathering, and most acids, oils, and alkalies.

Applications

Okonite Tower and Case Wire is recommended for use as relay and associated signal apparatus wiring and for connector wire use where a flexible, small diameter wire is required.

Specifications

Conductor: Uncoated stranded copper stranded per ASTM B-8.

Insulation: Per ICEA S-95-658. Meets or exceeds all requirements for EPR insulation.

Jacket: Per ICEA S-95-658. Meets or exceeds all requirements.

Okonite Tower and Case Wire meets or exceeds the requirements of AREMA Manual Part 10.3.15.

Product Features

- Exceptional heat resistance.
- 90°C Continuous Rating
130°C Emergency Overload Rating.
250°C Short Circuit Rating.
- Mechanically rugged.
- Flexible, easy to handle and splice.
- Flame resistant—meets U.L. horizontal flame test.
- Resistant to most oils acids, alkalies and effects of weather.
- Stable electrical and physical properties.

Okonite Insulation: 2/64"

Catalog Number	Size AWG	No. of Strands	Jacket Thickness Mils	Approx. Duplexed O.D. (In.)	Approx. Net Wt. Lbs./m'	Approx. Ship Wt. Lbs./m'
▲ 152-11-3025	14	19	20	.368	54	58
▲ 152-11-3039	10	19	20	.454	103	125

▲ **Authorized Stock Item** - Available from our Customer Service Centers.
Note: The construction described has a Blue Jacket. Consult your local Okonite Representative for details about alternate colors.
Standard Package - 500' spool.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okonite® TC Blue Tower and Case Wire

600 Volt

One Copper Conductor/90°C Rating

A Uncoated, Stranded Copper Conductor
B Insulation—Okonite
C Jacket—Blue Okoseal

Insulation

Okonite EPR is Okonite's trade name for its heat resistant, mechanically rugged ethylene-propylene based insulating compound. The insulation thickness for wire sizes are listed below.

Jackets and Finishes

The Blue Okoseal® (PVC) jacket supplied with this cable provides excellent resistance to mechanical abuse, flame, weathering, and most acids, oils, and alkalies.

Applications

Okonite Tower and Case Wire is recommended for use as relay and associated signal apparatus wiring and for connector wire use where a flexible, small diameter wire is required.

Specifications

Conductor: Uncoated stranded copper stranded per ASTM B-8.

Insulation: Per ICEA S-95-658. Meets or exceeds all requirements for EPR insulation.

Jacket: Per ICEA S-95-658. Meets or exceeds all requirements.

Okonite Tower and Case Wire meets or exceeds the requirements of AREMA Manual Part 10.3.15.

Product Features

- Exceptional heat resistance.
- 90°C Continuous Rating
  130°C Emergency Overload Rating.
  250°C Short Circuit Rating.
- Mechanically rugged.
- Flexible, easy to handle and splice.
- Flame resistant—meets U.L. horizontal flame test.
- Resistant to most oils acids, alkalies and effects of weather.
- Stable electrical and physical properties.

Catalog Number	Size AWG	No. of Strands	Insulation Thickness Mils	Jacket Thickness Mils	Approx. O.D. (In.)	Approx. Net Wt. Lbs./m'	Approx. Ship Wt. Lbs./m'
▲ 152-11-3002	16	19	30	20	.17	20	24
▲ 152-11-3024	14	19	30	20	.20	26	28
152-11-3026	12	19	45	20	.23	42	46
▲ 152-11-3038	10	19	30	20	.23	56	60
152-11-3108	10	37	45	20	.26	58	62
152-11-3010	9	19	45	25	.29	71	75

▲ **Authorized Stock Item -** Available from our Customer Service Centers.

Note: The construction described has a Blue Jacket. Consult your local Okonite Representative for details about alternate colors.

Standard Package - #16 AWG and #14 AWG, 10000 spool; #12 AWG, #10 AWG, and #9 AWG, 500' spool.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okonite® Okolon® - (TS-CPE) Case Wire

600V

One Copper Conductor/90°C Rating

A Uncoated, Stranded Copper Conductor
B Insulation—Okonite—#16 AWG and #14 AWG - 2/64"; #12 AWG thru #6 AWG - 3/64"
C Jacket - Okolon TS-CPE

Insulation

Okonite EPR is Okonite's trade name for its heat resistant, mechanically rugged ethylene-propylene based insulating compound. The insulation thickness for wire size #16 AWG and #14 AWG is 2/64" and for #12 AWG and #10 AWG it is 3/64".

Jackets and Finishes

The Okolon (TS-CP) jacket supplied with this cable provides excellent resistance to mechanical abuse, flame, weathering and most acids, oils and alkalies.

Applications

Okonite Okolon (TS-CP) 600V Case Wire is recommended for use as relay and associated signal apparatus wiring and for connector wire use where a flexible, small diameter wire is required.

Specifications

Conductor: Uncoated stranded copper per ASTM B-8.

Insulation: Per ICEA S-95-658.

Jacket: Per ICEA S-95-658, Part 4.1.13 and 4.1.3.

Product Features

- Exceptional heat resistance.
- 90°C Continuous Rating
130°C Emergency Overload Rating.
250°C Short Circuit Rating.
- Mechanically rugged.
- Flexible, easy to handle and splice.
- Flame resistant — meets U.L. horizontal flame test.
- Resistant to most oils, acids, alkalies and effects of weather.
- Stable electrical and physical properties.

Okonite Insulation: #16 AWG and #14 AWG - 2/64"; #12 AWG to #6 AWG - 3/64"

Catalog Number	Size AWG	No. of Strands	Jacket Thickness 64 th's	Approx. O.D. (In.)	Approx. Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
151-12-1051	16	19	1	.16	20	24
▲151-12-1081	14	19	1	.18	26	30
151-12-1101	12	19	1	.23	42	46
151-12-1140	10	19	1	.25	58	62
151-12-1171	9	19	1	.26	67	75
▲151-12-1201	6	19	1	.31	112	122

▲ Authorized Stock Item - Available from Customer Service Centers.
Standard Package — #16 AWG and #14 AWG, 1000' spool; #12 AWG thru #6 AWG, 500' spool.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okonite®-Nylon Braid Case Wire

600V

One Copper Conductor/90°C Rating

A Uncoated, Stranded Copper Conductor
B Insulation—Okonite #16 and #14 AWG 2/64"; #12 AWG through #9 AWG 3/64"
C Finish—Nylon Braid with Lacquer Overall

Insulation

Okonite EPR is Okonite's trade name for its heat resistant, mechanically rugged ethylene-propylene based insulating compound. The insulation thickness for wire sizes #16 AWG and #14 AWG is 2/64" and for #12 AWG through #9 AWG it is 3/64".

Finish

The nylon braid and lacquer finish supplied with this cable provides excellent resistance to mechanical abuse, weathering and most oils, acids and alkalies.

Applications

Okonite-Nylon Braid 600V Case Wire is recommended for use as relay and associated signal apparatus wiring, and for connector wire use where a flexible, small diameter wire is required.

Specifications

Conductor: Uncoated, stranded copper conductor per ASTM B-8.
Insulation: Per ICEA S-95-658.
Finish: Black nylon braid (100% coverage) with clean lacquer finish.

Product Features

- Mechanically rugged.
- 90°C Continuous Rating
130°C Emergency Overload Rating.
250°C Short Circuit Rating.
- Mechanically rugged.
- Flexible, easy to handle and splice.
- Resists most oils, acids, alkalies and effects of weather.
- Stable electrical and physical properties.

Nominal Finish Thickness: 5 mils

Catalog Number	Size AWG	No. of Strands	Jacket Thickness 64 th's	Approx. O.D. (In.)	Approx. Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
▲151-12-9051	16	19	2	.14	16	20
151-12-9081	14	19	2	.15	22	26
151-12-9111	12	19	3	.20	38	42
151-12-9145	10	19	3	.22	50	54
▲151-12-9161	10	37	3	.23	51	55
151-12-9181	9	19	3	.24	62	66

▲ **Authorized Stock Item** — Available from our Customer Service Centers
Standard Package — #16 AWG and #14 AWG, 1000' spool;
#12 AWG, #10 AWG, and #9 AWG, 500' spool.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okozel® Case Wire

600V

One Copper Conductor/150°C Rating

A Uncoated, Stranded Copper Conductor
B Insulation—Okozel

Insulation

Okozel is Okonite's trade name for ETFE Fluoropolymer, a modified Ethylene Tetrafluorethylene. Okozel is extremely rugged with excellent resistance to cut-through and abrasion. It is chemically inert and has low permeability. Okozel is flame retardant and non-propagating. It is rated for 150°C (302°F) conductor operating temperature for continuous use and retains all useful physical properties at temperatures to -100°C (-148°F).

Applications

Okozel 600V Case Wire is recommended for use as relay and associated signal apparatus wiring and for connector wire use where a flexible, extra small diameter wire is required.

Specifications

Conductor: Stranded copper conductors - Uncoated per ASTM B-8; coated copper conductor per ASTM B-33, upon request.

Insulation: Flame-retardant, radiation-resistant Okozel, a modified ETFE Fluoropolymer per NEMA Std. HP-100.2. Note #14 AWG is UL listed as Type Z.

Product Features

- Exceptional heat resistance.
- 150°C Continuous Rating 250°C Short Circuit Rating.
- Low surface friction provides easier installation.
- Cold installation temperature in excess of -65°C.
- Exceptional abrasion resistance will not cut or tear.
- Chemically inert-unaffected by typical acids, bases, solvents and cleaning agents, fuels and hydraulic fluids.
- High dielectric strength.
- Low dielectric constant.

Catalog Number	Size AWG	No. of Strands	Insul. Thickness (mils)	Insul. Color	Approx. O.D. (In.)	Approx. Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
▲116-75-1948	16	19	15	White	.089	11	13
▲116-75-1941	14	19	15	Black	.104	16	18
▲116-75-1952	10	37	17	White	.151	39	41

▲ **Authorized Stock Item** - Available from Customer Service Centers.
Standard Package — 1000' spool.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okonite® Okolon TS - CPE® Duplex Case Wire

600V

One Copper Conductor/90°C Rating

A Stranded Uncoated Copper Conductor
B Insulation—Okonite, #10 AWG, 2/64"
C Jacket—Okolon TS-CPE

Insulation

Okonite EPR is Okonite's trade name for its heat resistant, mechanically rugged ethylene-propylene based insulating compound. The insulation thickness is 2/64".

Jackets and Finishes

The Okolon TS-CPE thermoset chlorinated polyethylene jacket supplied with this cable provides excellent resistance to mechanical abuse, flame, weathering and most acids, oils and alkalies. Color Codes: 1-Black, 1-Black with tracer.

Applications

Okonite Okolon TS-CPE 600V Case Wire is recommended for use as relay and associated signal apparatus wiring and for connector wire use where a flexible, small diameter wire is required.

Specifications

Conductor: Uncoated stranded copper per ASTM B-38.
Insulation: Per ICEA S-95-658.
Jacket: Per ICEA S-95-658, Part 4.1.13.

Product Features

- Exceptional heat resistance.
- 90°C Continuous Rating
130°C Emergency Overload Rating.
250°C Short Circuit Rating.
- Mechanically rugged.
- Flexible, easy to handle and splice.
- Flame resistant — meets U.L. horizontal flame test.
- Resistant to most oils, acids, alkalies and effects of weather.
- Stable electrical and physical properties.

Okonite Insulation: 2/64"

Catalog Number	Size AWG	No. of Strands	Jacket Thickness 64 th's	Approx. Duplexed O.D. (In.)	Approx. Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
▲151-12-1702	10	19	1	.43	98	120

▲ **Authorized Stock Item** - Available from Customer Service Centers.
Standard Package — 500' spool.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Product Data
RR: Sheet 10

Okonite®-Aerial Signal Cables

Railroad Signal Cable—AREMA Class "B" Insulation (Aerial)
600V
Multiple Copper Conductors/90°C Rating

A Solid or Stranded, Uncoated Copper Conductors
B Insulation—Okonite 4/64" with printed number code and tracer
C Tape
D Jacket—Okolon TS-CPE with sequential footage marking

Insulation
Okonite® EPR insulation is a heat, moisture and chemical resistant, mechanically rugged compound. The insulation thickness for sizes #14 AWG through #9 AWG is 4/64". One conductor in each layer is identified as "Tracer". In addition each conductor is number coded for ease of identification.

Jackets
Individual conductors are assembled with flame and moisture resistant fillers, where needed and cable tape. The overall Okolon® TS-CPE jacket supplied with this cable has high mechanical strength, and excellent resistance to flame, ozone, oil and most chemicals.

Applications
Okonite Railroad Cables are for use in railroad signal circuits where continuity of service and long life are required in all vital circuit and safety related applications. They are designed especially for aerial applications and all wet or dry locations.

Specifications
Annealed Copper Conductors: May be solid or stranded, bare or coated, meeting the requirements of AREMA Signal Manual Part 10.3.16 or 10.3.17.

Insulation: Meets or exceeds electrical and physical requirements of ICEA S-95-658 and AREMA Specifications for Wires and Cables.

Assembly: Per AREMA Signal Manual Part 10.3.16

Outer Jacket: AREMA Signal Manual Part 10.3.20 and meets or exceeds electrical and physical requirements of ICEA S-95-658.

Product Features
- Outstanding mechanical strength at all temperatures.
- Long service life—resists long term aging.
- Excellent electrical stability.
- High insulation resistance.
- Resistant to environmental hazards.
- Easy to install and maintain.
- Acid, alkali, oil and flame resistant.
- Meets IEEE 383-1974 Vertical Tray Flame Test.
- Sequential footage markings on surface of outer jacket.

Okonite-Aerial Signal Cables

Railroad Signal Cable—AREMA
Class "B" Insulation (Aerial)
Multiple Copper Conductors/90°C Rating, 600V

Product Data
RR: Sheet 10

Okonite Insulation: 4/64"

Catalog Number	Size AWG	No. of Strands (1)	No. Condrs.	Outer Jacket Thickness-64th	Approx. Cable O.D. Inches	Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
206-11-1482	14	Sol.	2	4	0.58	162	195
206-11-1483	14	Sol.	3	5	0.64	211	244
206-11-1484	14	Sol.	4	5	0.69	258	291
206-11-1485	14	Sol.	5	5	0.75	312	350
206-11-1487	14	Sol.	7	5	0.81	360	419
206-11-1489	14	Sol.	9	5	0.90	434	473
206-11-1490	14	Sol.	10	6	1.03	594	686
206-11-1492	14	Sol.	12	6	1.08	602	694
206-11-1496	14	Sol.	16	6	1.19	762	890
206-11-1499	14	Sol.	19	6	1.25	857	949
206-11-1505	14	Sol.	27	7	1.52	1216	1398
206-11-1510	14	Sol.	37	7	1.69	1570	1828
206-11-1602	12	Sol.	2	5	0.63	212	245
206-11-1603	12	Sol.	3	5	0.66	249	282
206-11-1604	12	Sol.	4	5	0.72	297	335
206-11-1605	12	Sol.	5	5	0.78	408	467
206-11-1607	12	Sol.	7	5	0.84	425	484
206-11-1842	9	Sol.	2	5	0.70	284	317
206-11-1843	9	Sol.	3	5	0.74	347	385
206-11-1844	9	Sol.	4	5	0.80	425	484
206-11-1845	9	Sol.	5	5	0.87	506	565
206-11-1847	9	Sol.	7	6	0.98	655	747

Standard Package—1000' N.R. Reel.

(1) This construction is also available with stranded conductors. Consult your Okonite Representative.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okolon® - (TS-CPE) Line Wire

One Conductor/90°C Rating

A Solid or Stranded Uncoated Copper or Copperweld Conductor

B Covering—Okolon (TS-CPE)— #12 AWG and #10 AWG - 2/64", #9 AWG through #4 AWG - 3/64"

Conductor

Solid or stranded hard drawn uncoated copper or solid Copperweld® conductors.

Covering

Okolon (TS-CPE) is Okonite's trade name for its thermoset chlorinated polyethylene based covering. The covering thickness for sizes #12 AWG and #10 AWG is 2/64", for #9 AWG through #4 AWG is 3/64".

Applications

Okolon (TS-CPE) Line Wire is designed especially for use on overhead signal and power circuits installed on insulators.

Specifications

Conductor: Uncoated, copper, solid or stranded per ASTM B3 and B8 or Copperweld Grade 30 HS or Grade 40 HS per ASTM B-227.

Covering: Okolon (TS-CPE) per AREMA Signal Manual Part 10.3.20 and ASTM D-752.

Finished cable meets all requirements of AREMA Signal Manual Part 10.3.10.

Product Features

- Mechanically rugged.
- Excellent moisture, heat and weather resistance.

Okolon (TS-CPE) Line Wire

One Conductor/90°C Rating

Product Data
RR: Sheet 11

Okolon (TS-CPE) Insulation: Sizes #12 AWG and #10 AWG - 2/64"; Sizes #9 AWG through #4 AWG - 3/64"

Catalog Number	Size AWG	No. of Strands	Insulation Thickness-64th	Approx. Cable O.D. Inches	Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
Hard Drawn Bare Copper Conductor						
509-55-3042	12	Sol.	2	.15	29	33
509-55-3046	10	Sol.	2	.17	42	46
509-55-3102	9	Sol.	3	.22	60	68
509-55-3362	8	Sol.	3	.23	72	80
509-55-3360	6	Sol.	3	.27	106	114
509-55-3364	6	Sol.	3	.28	112	120
509-55-3460	4	Sol.	3	.30	157	165
509-55-3464	4	7x	3	.33	166	176
Copperweld 30 HS Conductor						
509-55-4042	12	Sol.	2	.15	27	31
509-55-4046	10	Sol.	2	.17	39	32
509-55-4102	9	Sol.	3	.22	57	65
509-55-4362	8	Sol.	3	.23	68	76
509-55-4262	6	Sol.	3	.27	99	107
509-55-4282	4	Sol.	3	.30	146	154
Copperweld 40 HS Conductor						
509-55-5042	12	Sol.	2	.15	27	31
509-55-5062	10	Sol.	2	.17	39	43
509-55-5102	9	Sol.	3	.22	57	65
509-55-5362	8	Sol.	3	.23	68	76
509-55-5262	6	Sol.	3	.27	99	107
509-55-5282	4	Sol.	3	.30	146	154

Standard Package—#12 AWG and #10 AWG, 1000' Coils; #9 AWG Through #4 AWG, 2500' N.R. Reel.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Product Data
RR: Sheet 12

Okolene® Line Wire
One Conductor

A Solid or Stranded uncoated Copper or Copperweld Conductor
B Covering—Okolene—#12 AWG through #4 AWG, 2/64"

Conductor
Solid or stranded hard drawn uncoated copper or solid Copperweld® conductors.

Covering
Okolene® (PE) is Okonite's trade name for its polyethylene covering with high dielectric strength. The covering thickness for sizes #12 AWG through #4 AWG is 2/64".

Applications
Okolene Line Wire is designed especially for use on overhead signal and power circuits installed on insulators.

Specifications
Conductor: Uncoated, copper, solid or stranded per ASTM B-3 and B-8 or Copperweld Grade 30 HS or Grade 40 HS per ASTM B-227.

Covering: Okolene (polyethylene) per AREMA Signal Manual Part 10.3.21."Recommended Design Criteria for Polyethylene Insulation and Jacketing for Wire and Cable".

Finished wire meets all requirements of AREMA Signal Manual Part 10.3.10.

Product Features
- Excellent electrical properties.
- Mechanically rugged.
- Excellent moisture, heat and weather resistance.

Okolene Line Wire

One Conductor

Product Data
RR: Sheet 12

Okolene (PE) Covering: 2/64"

Catalog Number	Size AWG	No. of Strands	Covering Thickness-64th	Approx. Cable O.D. Inches	Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
Hard Drawn Bare Copper Conductor						
509-89-3040	12	Sol.	2	0.15	25	29
509-89-3060	10	Sol.	2	0.17	38	42
509-89-3095	9	Sol.	2	0.22	46	54
509-89-3140	8	Sol.	2	0.20	57	65
509-89-3211	6	Sol.	2	0.23	88	96
509-89-3215	6	7X	2	0.25	91	99
509-89-3260	4	Sol.	2	0.27	137	145
509-89-3265	4	7X	2	0.30	141	149
Copperweld 30 HS Conductor						
509-89-4040	12	Sol.	2	0.15	23	27
509-89-4060	10	Sol.	2	0.17	35	39
509-89-4100	9	Sol.	2	0.19	43	51
509-89-4210	8	Sol.	2	0.20	53	61
509-89-4213	6	Sol.	2	0.23	81	89
509-89-4280	4	Sol.	2	0.27	126	134
Copperweld 40 HS Conductor						
509-89-5040	12	Sol.	2	0.15	23	27
509-89-5060	10	Sol.	2	0.17	35	39
509-89-5100	9	Sol.	2	0.19	43	51
509-89-5210	8	Sol.	2	0.20	53	61
509-89-5213	6	Sol.	2	0.23	81	89
509-89-5280	4	Sol.	2	0.27	126	134

Standard Package—#12 AWG and #10 AWG, 1000' Coils; #9 AWG Through #4 AWG, 2500' N.R. Reel.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Type DEL

600-2000V Diesel-Electric Locomotive, Motor Traction and Car Wire

One Copper Conductor/90°C — 110°C Hot Spot Rating

A Coated Stranded Copper Conductor
B Separator (sizes 36,700 CM and larger)
C Insulation - Okonite
D Jacket - Okolon TS-CPE

Insulation

Okonite EPR® is Okonite's trade name for its heat resistant, mechanically rugged ethylene-propylene based insulating compound. The insulation thickness for DEL numbers 002 and 004 is 2/64", for 008 through 016 is 3/64", 018 through 026 is 4/64", 030 through 040 is 5/64", 044 and 048 is 6/64", 050 through 056 is 7/64" and for 058 it is 8/64".

Jackets and Finishes

The Okolon TS-CPE jacket supplied with this cable provides excellent resistance to mechanical abuse, flame, weathering, most oils, acids and alkalies.

Applications

Okonite Type DEL, Diesel-Electric Locomotive Traction and Car Wires is designed for use in locomotives and car equipment circuits where reliability is for prime consideration. DEL can also be used in other low voltage applications where flexibility is important. It is suitable for use in wet or dry locations, in conduits, ducts, cable troughs or trays.

Specifications

Conductor: Coated copper stranded per AREMA Recommended Practice, Section M, RP-588, as applicable and ICEA S-95-658.

Insulation: Per AREMA Recommended Practice, Section M, RP-588, as applicable and ICEA S-95-658.

Jacket: Per AREMA Recommended Practice, Section M, RP-588, as applicable and ICEA S-95-658.

Product Features

- Extreme heat resistance.
- Extra flexible conductor.
- 90°C Continuous Rating, 110°C Hot Spot Rating, 130°C emergency Overload Rating, 300°C Short Circuit Rating.
- Mechanically rugged.
- Exceptional resistance to deformation and cut through at high temperature.
- Excellent flame resistance. Meets both UL vertical and horizontal flame test requirements.
- Resistant to oils, weather and most chemicals and alkalies.
- Stable electrical properties at high temperatures.
- Meets the RHH/RHW requirements of NEC/UL and can be labeled as such on special orders.

Type DEL

600-2000V Diesel - Electric Locomotive, Motor Traction and Car Wire

One Copper Conductor/90°C - 110°C Hot Spot Rating

Product Data
RR: Sheet 13

Catalog Number	DEL Number	Size AWG or MCM	No. of Strands	Thickness 64ths Ins.	Jkt.	Voltage Rating	Approx. O.D. In.	Approx. Wt. Lbs./M' Net	Ship	Ampacity ac or dc 1/C in Air[1]	3/C in Duct[2]	Conduit Size Inches[3]	DC Resis @ 25°C ohms/1000'
▲ 112-11-1702	002	16	19 X .0117	2	1	600	.16	19	23	—	18	1/2"	4.490
112-11-1704	004	14	19 X .0142	2	1	600	.17	24	28	—	22	1/2"	2.790
112-11-1708	008	14	19 X .0147	3	1	2000	.21	31	35	—	23	1/2"	2.790
112-11-1710	010	12	19 X .0179	3	1	2000	.22	40	44	—	26	1/2"	1.720
▲ 112-11-1714	014	10	27 X .0201	3	1	2000	.26	58	60	55	37	3/4"	1.100
112-11-1716	016	8	37 X .0201	3	1	600	.28	74	78	83	42	3/4"	0.690
112-11-1718	018	6	61 X .0201	4	2	2000	.38	133	141	109	73	1"	0.440
112-11-1720	020	5	91 X .0201	4	2	2000	.44	182	200	122	91	1 1/4"	0.350
112-11-1722	022	4	105 X .0201	4	2	2000	.46	204	222	145	98	1 1/4"	0.280
112-11-1724	024	3	125 X .0201	4	2	2000	.48	223	241	167	107	1 1/4"	0.220
112-11-1726	026	2	150 X .0201	4	2	2000	.53	278	298	192	125	1 1/2"	0.180
112-11-1730	030	1	225 X .0201	5	3	2000	.68	459	497	223	160	2"	0.140
112-11-1732	032	1/0	275 X .0201	5	3	2000	.71	504	550	258	184	2"	0.110
112-11-1734	034	2/0	325 X .0201	5	3	2000	.75	579	633	298	202	2"	0.090
112-11-1738	038	3/0	450 X .0201	5	3	2000	.85	769	842	345	252	2 1/2"	0.070
112-11-1740	040	4/0	550 X .0201	5	3	2000	.90	912	985	400	285	2 1/2"	0.060
112-11-1744	044	313.1	775 X .0201	6	3	2000	1.06	1263	1371	515	364	3"	0.040
112-11-1748	048	444.4	1100 X .0201	6	3	2000	1.20	1722	1830	645	450	3 1/2"	0.030
112-11-1750	050	535.3	1325 X .0201	7	4	2000	1.36	2118	2263	725	493	4"	0.020
112-11-1752	052	646.4	1600 X .0201	7	4	2000	1.45	2490	2700	815	555	4"	0.018
112-11-1754	054	777.7	1925 X .0201	7	4	2000	1.55	2938	3148	910	608	5"	0.016
112-11-1756	056	929.2	2300 X .0201	7	4	2000	1.65	3350	3560	1025	664	5"	0.013
112-11-1758	058	1111.1	2750 X .0201	8	4	2000	1.80	3786	4072	1145	728	5"	0.011

▲ **Authorized Stock Item** - Available from Customer Service Centers.

Standard Package - 1000' Non-Returnable Reel; #16 #8 - 1000' coil in carton; # 6 - 500' coil in carton; #5 - #4/0 - 2000' N.R. Reel; #313.1 MCM and Larger - 1000' N.R. Reel

[1] Ampacities based on single conductor in free air, 90°C conductor temperature, 40°C ambient air temperature per ICEA S-75-381.

[2] Three (3) conductors in a single enclosed or exposed conduit. Ampacities based on 90°C conductor temperature and 40°C ambient using ICEA methods. For 30°C ambient multiply values by 1.10; for 50°C multiply by 0.90. For other ambients or installation conditions, refer to Engineering Data Book.

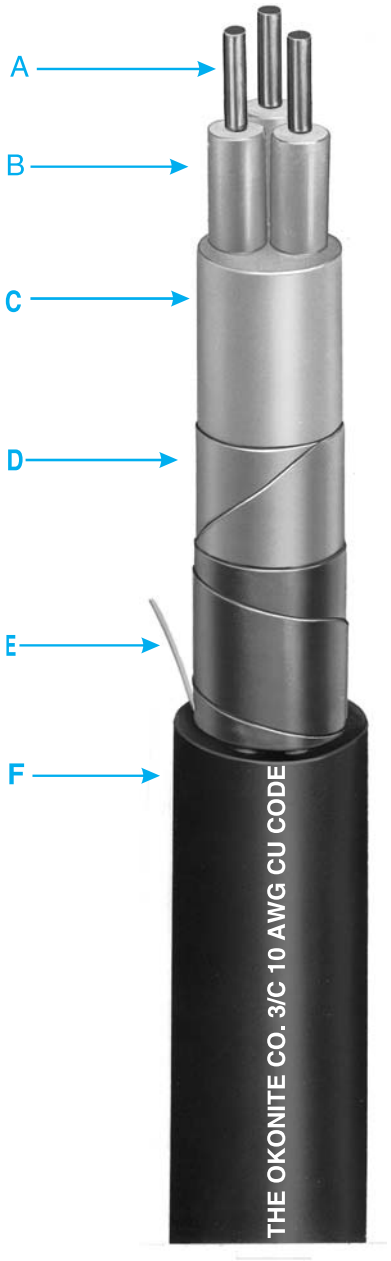
[3] Based on three (3) conductors in conduit with a fill of 40% or less.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okolene® - Okolene Power Cable

With PCF (Pull Cord Feature) Aerial

Three Copper Conductors



A Uncoated, Solid Copper Conductors
B Insulation — Okolene
C Polyester Tape
D 8 mil Corrugated Aluminum Shield
E Pull Cord Feature
F Jacket — Okolene

Insulation

Okolene® (PE) is Okonite's trade name for its low loss polyethylene insulation. The three solid bare copper conductors are insulated with Okolene.

Shield and Jacket

A polyester tape, 8 mil corrugated aluminum tape and a 5/64" black Okolene jacket is applied.

Applications

Used for supplying power at service drops.

Specifications

Conductors: Solid uncoated copper per ASTM B-3.

Insulation: Okolene® (PE), the dielectric meets or exceeds electrical and physical requirements of ASTM D-1248-84, Type I, Class A, Category 5, Grade #5.

Color Coding: 1-Black with no stripe, 1-Black with Red stripe, 1-Black with White stripe.

Jacket: Meets or exceeds requirements of ASTM D-1248-84, Class C, Type I, Grade J3 and AREMA Signal Manual Part 10.3.21.

Product Features

- Mechanically rugged.
- Resistant to aging.
- Easy to install and maintain.
- Resistant to environmental hazards.
- Superior moisture resistance.
- Excellent electrical properties...high dielectric strength, low capacity (SIC) and power factor and high insulation resistance.
- Pull Cord feature affords easy and quick accessibility to conductors for splicing and terminations. PCF is safety oriented.

Okolene Insulation: 0.045" (5/64")

Catalog Number	Size AWG	No. of Strands	No. of Condrs.	Jacket Thickness (64th)	Approx. O.D. (In.)	Approx. Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
▲ 207-84-6953	10	Sol.	3	4	.62	202	234

▲ Authorized Stock Item - Available from Customer Service Centers.
Standard Package — 1000' N.R. Reel

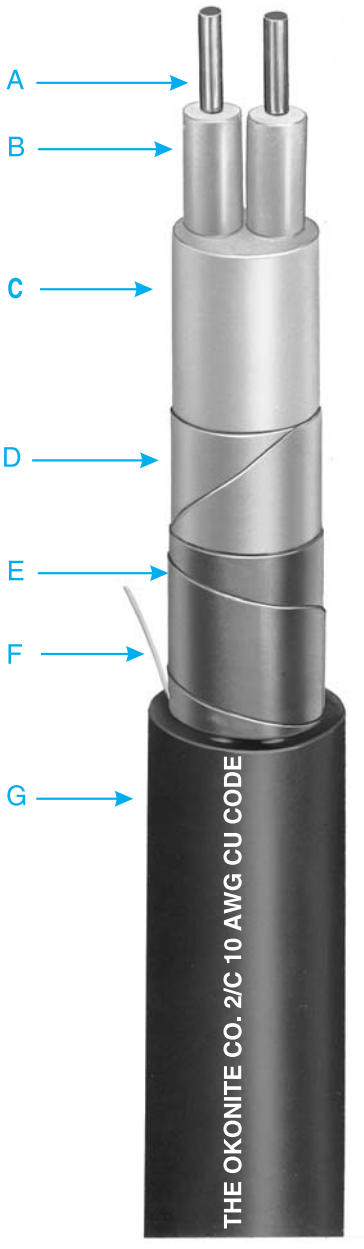
THE OKONITE COMPANY
Ramsey, New Jersey 07446

Product Data
RR: Sheet 15

Centralized Traffic Control—Code Line Cable

With PCF (Pull Cord Feature) Aerial or Direct Burial

Two Copper Conductors



A Uncoated, Solid Copper Conductors
B Insulation — Okolene
C Okolene Belt
D Polyester Tape
E 5 mil Copper Shield
F Pull Cord Feature
G Jacket — Okolene

Insulation

Okolene® is Okonite's trade name for its low loss polyethylene insulation. The two solid bare copper conductors are insulated with Okolene and twisted together to form a balanced pair. A belt of Okolene is then extruded over the twisted pair and into the interstices.

Shield and Jacket

A polyester tape, 5 mil flat copper tape and a 5/64" black Okolene jacket is applied over the belted core to complete the construction a twin coaxial cable configuration.

Applications

This C.T.C. cable is used on circuits where minimum attenuation and low capacity is essential. It is designed not only for code pulses but also provides for superimposed high frequency circuits. The cable is mechanically rugged and can be installed aerially or underground and is suitable for direct burial by means of a cable plow in all wet and dry locations.

Specifications

Conductors: Solid uncoated copper per ASTM B-3.

Insulation: The dielectric meets or exceeds electrical and physical requirements of ASTM D-1248-84, Type I, Class A, Category 5, Grade #5.

Jacket: Meets or exceeds requirements of ASTM D-1248-84, Class C, Type I, Grade J3 and AREMA Signal Manual Part 10.3.21.

Product Features

- Mechanically rugged.
- Resistant to aging.
- Easy to install and maintain.
- Resistant to environmental hazards.
- Superior moisture resistance.
- Outstanding termite protection.
- Excellent electrical properties...high dielectric strength, low capacity (SIC) and power factor and high insulation resistance.
- Pull Cord feature affords easy and quick accessibility to conductors for splicing and terminations. PCF is safety oriented.

Centralized Traffic Control—Code Line Cable

With PCF (Pull Cord Feature) Aerial or Direct Burial

Two Copper Conductors

Product Data
RR: Sheet 15

Okolene Insulation

Catalog Number	Size AWG	No. of Strands	No. Condrs.	Jacket Thickness-64th	Approx. O.D. Inches	Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
207-84-3982	10	Sol.	2	5	.83	316	356
207-84-3994	9	Sol.	2	5	.92	386	445

Minimum Manufacturing Quantity is 1000 ft.
Standard Package—1000' N.R. Reel.

Standard Package will be furnished where orders do not specify otherwise.

Engineering Data (Approximate Values)

Characteristic Impedence: Z_o = 101 ohms
Electrical Characteristics at 20kH_z:

Size AWG	Attenuation db/mile	Mutual Capacitance µf/mile	Capacity Unbalance
10	0.69	0.080	3%
9	0.64	0.080	3%

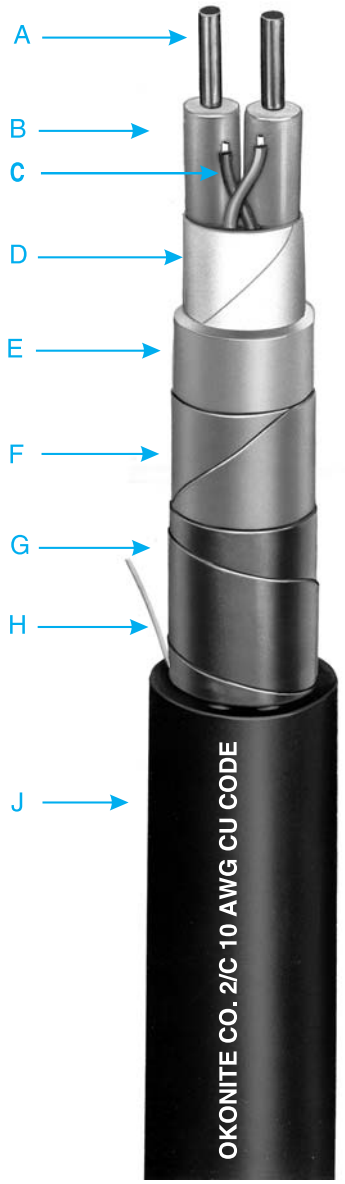
Notes: These characteristics result in a smooth match with available equipment either direct or through matching impedance transformers. The attenuation value is low for the dollar investment and the balanced low capacity results in good quality operation.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Centralized Traffic Control—Code Line Cable

With 2 Pairs of Communication Wires and PCF (Pull Cord Feature)
Aerial or Direct Burial

Two Copper Conductors



A Uncoated, Solid Copper Conductors
B Insulation—Okolene
C Communication Pair
D Polyester Tape
E Okolene Belt
F Polyester Tape
G 5 mil Copper Shield
H Pull Cord
J Jacket—Okolene

Insulation

Okolene® (PE) is Okonite's trade name for its low loss polyethylene insulation. The two #10 AWG solid bare copper conductors, each insulated with Okolene, are twisted together to form a balanced pair. Two pairs of #16 AWG or #18 AWG communication wire with Okolene insulation are cabled into the interstices of the C.T.C. twisted pair. A polyester tape is wrapped over the assembly. A belt of Okolene is then extruded over the assembly.

Shield and Jacket

A polyester tape, 5 mil flat copper tape and 5/64" black Okolene jacket is applied over the belted core to complete the construction.

Applications

This C.T.C. cable is used on circuits where minimum attenuation and low capacity is
essential. It is designed not only for code pulses but also provides for superimposed high frequency circuits. The two color coded twisted pairs are designed for communication circuit application. The cable is mechanically rugged and can be installed aerially or underground and is suitable for direct burial by means of a cable plow in all wet and dry locations.

Specifications

Conductors: Solid uncoated copper per ASTM B-3.

Insulation: Okolene® (PE) the dielectric meets or exceeds electrical and physical requirements of ASTM D-1248-84, Type I, Class A, Category 5, Grade E5.

Jacket: Okolene® (PE) meets or exceeds requirements of ASTM D-1248-84, Type I, Class C, Grade J3 and AREMA Signal Manual Part 10.3.21.

Product Features

- Mechanically rugged.
- Resistant to aging.
- Easy to install and maintain.
- Resistant to environmental hazards.
- Superior moisture resistance.
- Outstanding termite protection.
- Excellent electrical properties.. high dielectric strength, low capacity (SIC) and power factor and high insulation resistance.
- Two pairs of communication circuits are provided for telephone communications.
- Pull Cord feature affords easy and quick accessibility to conductors for splices and terminations. PCF is safety oriented.

Centralized Traffic Control—Code Line Cable

With 2 Pairs of Communication Wires
With PCF (Pull Cord Feature) Aerial or Direct Burial

Two Copper Conductors

Product Data
RR: Sheet 16

Catalog Number	Size AWG	No. of Strands	No. Condrs.	Jacket Thickness-64th	Approx. O.D. Inches	Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
207-84-3990	10	Sol.	2	5	0.83	312	352
207-84-3991	9	Sol.	2	5	0.92	370	429

Engineering Data (Approximate Values)

Characteristic Impedence: Z_o = 101 ohms
Electrical Characteristics at 20kHz:

Size AWG	Attenuation db/mile	Mutual Capacitance µf/mile	Capacity Unbalance
10	0.69	0.080	3%
9	0.64	0.080	3%

Notes: These characteristics result in a smooth match with available equipment either direct or through matching impedance transformers. The attenuation value is low for the dollar investment and the balanced low capacity results in good quality operation.

Standard Package—1000' N.R. Reel.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Centralized Traffic Control — Temporary Code Line Cable

Aerial

Two Copper Conductors

A Uncoated Copper Conductor-Size #14 AWG
B Insulation - Okolene

Insulation

Okolene® (PE) is Okonite's trade name for its low loss polyethylene insulation. The two solid bare copper conductors are insulated with Okolene and twisted together to form a balanced pair.

Applications

For temporarily restoring code line circuits.

Specifications

Conductor: Solid uncoated copper per ASTM B-3.

Insulation: Okolene® (PE), the dielectric meets or exceeds electrical and physical requirements of ASTM D-1248-84, Type 1, Class A, Category 5, Grade #5.

Product Features

- Mechanically rugged.
- Easy to install
- Resistant to environmental hazards.
- Superior moisture resistance.
- Excellent electrical properties... high dielectric strength, low capacity (SIC) and power factor and high insulation resistance.

Okolene Insulation

Catalog Number	Size AWG	No. of Strands	No. of Condrs.	Insulation Thickness 64 th's	Approx. O.D. (In.)	Approx. Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
▲116-87-1852	14	sol.	2	2	.26	34	40

▲ Authorized Stock Item - Available from Customer Service Centers.
Standard Package —2,000 N.R. Reel.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okolene - Okoseal® Control Cable

Two Copper Conductors, 600 Volts

A Uncoated, Solid Copper Conductors
B Insulation — Okolene, Black/White Color Code
C Polyester Tape
D Jacket — Okoseal

Insulation

Okolene® (PE) is Okonite's trade name for its low loss polyethylene insulation. The two solid bare copper conductors are insulated with Okolene and twisted together to form a balanced pair.

Jacket

A polyester tape and a 5/64" black Okoseal (PE) jacket is applied to complete the construction.

Applications

Used for control circuits and temporary lighting.

Specifications

Conductors: Solid uncoated copper per ASTM B-3.

Insulation: Okolene® (PE) the dielectric meets or exceeds electrical and physical requirements of ASTM D-1248-84, Type I, Class A, Category 5, Grade #5.

Jacket: Okoseal (PE) per ICEA S-95-658. Meets or exceeds all requirements.

Product Features

- Mechanically rugged.
- Resistant to aging.
- Easy to install and maintain.
- Resistant to environmental hazards.
- Excellent electrical properties...high dielectric strength, low capacity (SIC) and power factor and high insulation resistance.

Okolene Insulation - 0.025" mils

Catalog Number	Size AWG	No. of Strands	No. of Condrs.	Okoseal Jacket Thickness 64 th's	Approx. O.D. (In.)	Approx. Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
▲ 207-84-3502	14	sol.	2	3	.34	59	65

▲ **Authorized Stock Item** - Available from Customer Service Centers.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Okonite Communication Cable Underground Installations

Type KTTG-F-B

Multiple Copper Conductors

A Solid Uncoated Copper Conductors
B Color Coded Insulation
C Filling Compound
D Non-hygroscopic Core Tape
E Flooding Compound
F Inner Polyethylene Jacket
G Gopher Resistant Bi-Metallic Shield
H Outer Polyethylene Jacket

Insulation

Polyolefin compound color coded per U.S. telephone industry standards with color concentrates chosen for permanency and electrical balance of individual circuits.

Pairs, Assembly and Fill

Pairs: Insulated conductors twisted into pairs of specified color combinations to provide pair identification as well as low susceptibility to noice pick-up, and with varying lay lengths to minimize crosstalk.

The average pair lay length is limited to 6 inches (15cm) to avoid split pairs in field splicing or circuit rearrangements.

Core Assembly: Pairs assembled, as required by pair count and geometry, into concentric sub-units of less than 25 pairs, concentric 25 pair units, and 50 or 100 pair super-units, which are then formed into cable core in such a manner as to avoid parallelism of like twist pairs in outside layers of adjacent units for control of unit to unit crosstalk and to ensure cable flexibility as well as circular core with uniform distribution of pairs.

Each 25-pair group in the cable core is identified by color coded non-hygroscopic binders.

Cable Core Fill: A petroleum jelly base multi-component filling compound completely fills the cable core space between insulated conductors and between the core and the core wrap including the core wrap tape overlap. The filling compound is especially designed to prevent moisture or water entry and migration transversely and longitudinally in the cable core. High immunity to moisture and water penetration is enhanced through high adhesion and cohesive properties of the compound.

Core Wrap: A non-hygroscopic polymeric tape applied with overlap over the cable core to ensure high dielectric strength from cable core to shield, enhance mechanical properties of the cable, and provide thermal barrier for cable jacket extrusion operation.

The space between the core tape and the inner jacket, is filled with specially formulated flooding compound which is designed to prevent moisture and/or water entry and migration.

Inner Jacket: Virgin. black, high molecular weight polyethylene copolymer jacket provides additional mechanical properties and dielectric strength between the cable core and the shield. The inner jacket also provides additional provides additional moisture or water ingress protection in case of outer jacket damage during cable installation or service.

Shield/Armor: (KTTG-F-B) 0.005 inch thick, corrugated bimetal tape, consisting of metallurgically bonded 0.8 mils Cu, 3.4 mils Fe and 0.8 mils Cu, applied longitudinally with overlap. Corrugations designed to enhance cable flexibility and to minimize shield/armor metal fatigue.

Outer Jacket: Virgin black, high molecular weight polyethylene copolymer jacket extruded overall. The jacket compound is selected for high resistance to abrasion, weathering, exposure to sunlight, temperature extremes, environmental stress cracking, and mechanical stresses encountered during cable installation and service. The jacket outer surface is sequentially marked at two-foot intervals with cable type, year of manufacture, footage, pair count, size, and manufacturer.

Shield/Armor: The bi-metallic shield/armor design makes the cables especially suitable for direct burial installations in gopher infested areas or in rocky terrain.

The cables are totally filled to prevent moisture and/or water entry and migration during service life of the cables, and consequently assuring little, if any, change in transmission characteristics of Okonite's filled cables.

All cable components including insulation and filling compound are highly compatible with each other, assuring stability of electrical and physical properties of the cables within their expected 40-year service life.

Applications

Type KTTG-F-B filled cables are designed for exchange area or trunk service and are primarily intended for direct burial installation. These cables may also be used in underground duct installations.

Specifications

Conductors: Solid uncoated copper per ASTM B-3.

Insulation: Polyolefin per ICEA, REA PE-39. REA designation BFCY.

Jacket: Okolene (PE), meets or exceeds requirements of ICEA S-95-658, Part 4.1.6

Okonite Communication Cable Underground Installations

Type KTTG-F-B

Multiple Copper Conductors

Product Data
RR: Sheet 19

Polyolefin Insulation:

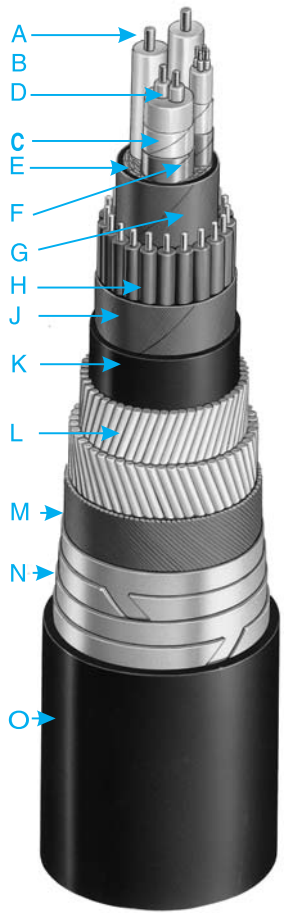
Catalog Number	Size AWG	No. of Pairs	Inner Jacket Thickness, mils	Outer Jacket Thickness, mils	Approx. O.D. Inches	Approx Net Wt. Lbs./M'	Approx. Ship Wt. Lbs./M'
▲ 709-07-3025	22	25	30	60	0.80	320	476
▲ 709-07-4006	19	6	30	60	0.66	202	222
▲ 709-07-4012	19	12	30	60	0.81	322	346
▲ 709-07-4018	19	18	30	60	0.94	437	476
▲ 709-07-4025	19	25	30	60	1.07	576	638
709-07-4050	19	50	35	70	1.39	1013	1111

▲ **Authorized Stock Item** - Available from Customer Service Centers.

Note: Dimensions and weights are approximate.
Please contact your Okonite Representative for exact information.
Catalog numbers shown are for 0.005" Bi-metallic armor.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Low Inductive Interference Cable



A OKOLENE® Insulated Communications Conductors
B OKOLENE Insulated Communication Quad
C Mylar Tape
D OKOLENE Insulated CTC Code Pair
E Fillers
F Copper Shield Tape
G Binder Tape
H OKONITE® Vital Circuit Conductors
J Binder Tape
K OKOLENE Bedding
L Non-Magnetic Shielding Conductors
M Bedding
N Magnetic Shielding Tapes
O Outer Covering

This composite cable is representative of one of the many types Okonite can manufacture to meet specific needs.

Inductive Interference can be a Problem

When railway communications and signal circuits are in the vicinity of high energy power lines, it is essential to investigate and mitigate inductive interference effects. Because of the economic desirability of using existing railway right-of-way for high voltage transmission and the increasing use of solid state circuitry in railroad equipment, the need for precise definition of inductive interference effects becomes most important.

The AAR/EEI are recommending as the maximum allowable 60 volts RMS steady state, and 650 volts RMS fault induced voltage. Other limits are required for some special circuits and by some railway systems.

Induced Circuit and Voltage Effects

Current and voltage in power lines induce electromagnetic and electrostatic effects in communication and signal circuits. In designing these cables, these effects are frequently controlled by means of a shielding system consisting of a concentric conductor and magnetic tapes. The type of concentric conductor and the magnetic tapes are based on calculations of the allowable induced voltage. The space relationship between all metallic circuits in the area, the changing effectiveness of the magnetic cable shield when power currents change, the terminal ground resistance and the resistivity of the earth are all taken into account in these calculations.

Solutions for Inductive Interference Problems

The Okonite Company has made extensive engineering and laboratory studies of the electromagnetic and electrostatic inductive effects of power lines on communications and signal circuits. These studies, based on computer programs, permit the calculation of impedance, current and voltage parameters which allows us to specify the optimum cable shielding designs.

Okonite Cables Provide Protection

Okonite designs and manufactures conductors using insulations time-proven in vital railroad signal service. Low loss insulation is used for centralized traffic control (CTC) and communication circuits.

Separate inductively shielded cables for signal, CTC, communications and power circuits can be furnished. Signal, CTC and communication conductors with appropriate isolation shielding can be made up in a composite cable with an overall inductive shielding system such as is illustrated at left.

Here's how Okonite can help you

Experience. Okonite has a great deal of experience, the most of any cable manufacturer, in solving inductive interference problems. Put this experience to work for you at the earliest stages of your planning — it can save you a lot of time, dollars and frustration.

Since it is recognized that there are no "standard' problems of inductive interference on a system-by-system basis, each one being unique, it follows logically that there is no single standard cable construction to meet universal requirements. However, Okonite experience in working with the criteria of a variety of systems now in service may be able to provide a relatively simple solution, and by combining elements of successful cable designs, give you a quality built — less expensive construction to meet your particular needs.

The technically trained personnel in our sales-service offices are cable professionals to whom the problems of inductive interference are no mystery. Backed by the best engineering and manufacturing facilities in the wire and cable industry, they can make measurable contributions to the solving of your inductive interference problems. Call your local Okonite Office now — have one of our professionals go to work for you.

Low Inductive Interference Cable

Product Data
RR: Sheet 20

For each section the information below is needed to make an inductive interference calculation:

A. First pick a reference point x, y = O. Usually this point is chosen to the lower left of all circuits in a given cross section so that all x and y measurements are positive.

B. List x and y coordinates of all metallic conductors in the area:
   (1) All disturbing power phase conductors (A_1, B_1, C_1, A_2, B_2, C_2, etc.).
   (2) Cable shield circuit.
   (3) Any parallel grounded circuits with the same terminal grounds as the cable (such as messengers).
   (4) All OHG or “static” wires.
   (5) Catenaries and feed cables for electric railways.
   (6) Center line coordinates of rails (if rails are electrically bonded and used on electrified rail circuits).
   (7) Any other metallic circuits paralleling the cable that may be grounded, such as bare ground wires or “neutralizing” wire.

C. Advise diameters (over metal) and resistance of all items under “B” (above) except (1) and (6).

D. Advise length of section and whether this section can be isolated (isolated grounds) from other sections.

E. Earth resistivity (meter-ohms—if no resistivity is given, 100 meter-ohms assumed).

F. Current flowing in each power conductor under each given circuit condition in complex (rl,jl) components or polar coordinates (l,α). If phases are balanced, it is assumed that the current stated is flowing in phase A at zero degrees. If short circuit current is given, unless otherwise specified it is assumed it is in the phase nearest the cable (usually phase A) and the other power conductors are open circuited.

G. Terminal ground resistance. Since these terminal grounds are in series with the cable shield circuit, low values are important for low induced voltages from cable core to ground.

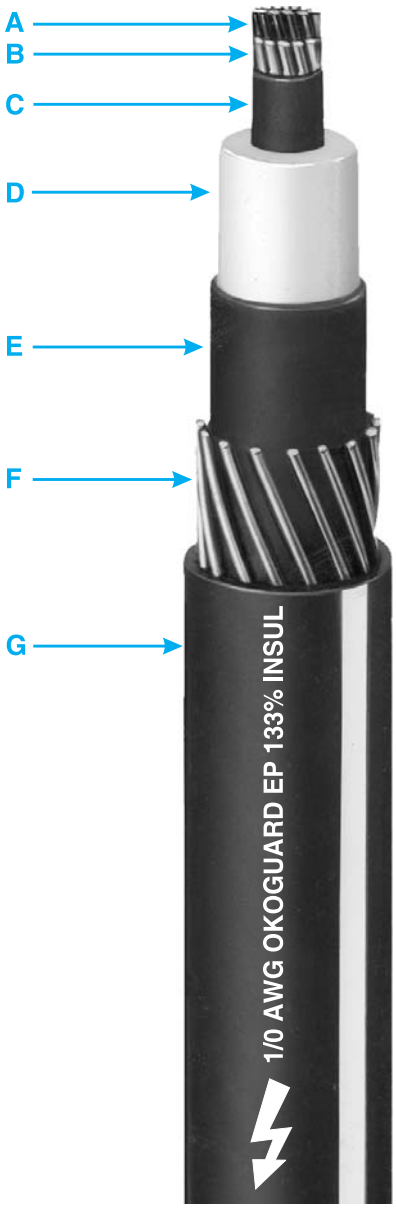
H. If cable under B (2) is already installed, a complete description of the existing cable and shield should be given. If cable is to be designed to meet inductive interference specifications, paragraph “C” can be disregarded *for cable shield only.* The number of the circuits required in this cable, must be given and the cable core and shield will be designed to meet the specifications.

THE OKONITE COMPANY
Ramsey, New Jersey 07446

Product Data
RR: Sheet 21

Okoguard® URO-J

15kV Underground Primary Distribution Cable-Jacketed
Red Identification Stripes
Filled Strand Aluminum Conductor/105°C Rating
100% and 133% Insulation Levels



A Conductor - Stranded Aluminum with Filled Strand - Water Swellable Power
B Strand Screen - Extruded Semi-conducting EPR
C Insulation - Okoguard EPR
D Insulation Screen - Extruded Semi-conducting EPR
E Concentric Conductor-Bare Copper Wires
F Encapsulating Jacket-Okolene with Extruded ID Stripes & NESC lightning bolt

Insulation
Okoguard is Okonite's registered trade name for its exclusive ethylene-propylene rubber (EPR) based, thermosetting compound, whose optimum balance of electrical and physical properties is unequaled in other solid dielectrics. Okoguard insulation, with the distinctive red color and a totally integrated EPR system, provides the optimum balance of electrical and physical properties for long, problem free service.

The triple tandem extrusion of the screens with the insulation provides optimum electrical characteristics.

The compressed conductors are filled with water swellable powder. This construction slows the migration of water through the strands in the event of a mechanical dig-in followed by external exposure to water.

An insulation screen of ethylene-propylene rubber is extruded over the insulation. The copper concentric wires are uniformly spaced around the insulation screen. The overall polyethylene jacket provides protection against mechanical damage and corrosion.

Product identification is provided through the use of three red stripes placed 120° apart in the black jacket, with an NESC lightning bolt.

Applications
Okoguard URO-J cables provide maximum circuit longevity in underground residential distribution systems. They can be buried directly or installed in underground ducts or conduits.

Specifications
Central Conductor: Aluminum per ASTM B-609, Class B stranded per B-231.

Filled Strand: Water swellable powder meets or exceeds ICEA T-31-610 water penetration resistance and ANSI/NEMA class A connectorability requirements.

Conductor Screen: Extruded semiconucting ethylene-propylene rubber meets or exceeds the requirements of ICEA S-94-649 and AEIC CS8.

Insulation: Extruded Okoguard meets or exceeds the requirements of ICEA S-94-649 and AEIC CS8.

Insulation Screen: Extruded semiconducting ethylene-propylene rubber meets or exceeds the requirements of ICEA S-94-649 and AEIC CS8.

Concentric Conductor: Bare copper wires.

Jacket: Black Okolene with red extruded stripes meets or exceeds the requirements of ICEA S-94-649 for polyethylene jackets.

Product Features
- Triple tandem extruded, all EPR system.
- Okoguard cables meet or exceed NEMA/ICEA and RUS U-1 standards.
- 105°C continuous operating temperature.
- 140°C emergency rating.
- 250°C short circuit rating.
- Excellent corona resistance.
- Low dielectric constant and power factor.
- Screens are clean stripping.
- Exceptional resistance to “treeing”.
- Filled strand conductor.
- Moisture resistant.
- Overall jacket provides extended life.
- Excellent resistance to most chemicals.
- Can be listed by UL as Type MV-90 on special orders.
- Cable listed by CSA to C68.3 on special orders.
- Design Options:
  Additional conductor sizes
  Copper central conductor
  Copper flat strap concentric neutral
  Product identification via colored jackets.
  Semiconducting jackets.
- Improved Temperature Rating.

Okoguard insulation system has been tested and qualified for operation at 105°C continuous and 140°C emergency operating temperature.

- Minimum installation temperature of -40°C.

Okoguard URO-J

15kV Underground Primary Distribution Cable-Jacketed
Red Identification Stripes
Filled Strand Aluminum Conductor/105°C Rating
100% Insulation Level

Product Data
RR: Sheet 21

Okoguard Insulation: 175 mils 100% Insulation Level

Catalog Number	Conductor Size AWG|kcmil	Nominal Dia. over Insulation (in.)	Nominal Dia. over Insulation Screen (in.)	Copper Neutral, No. x AWG (1)	Nominal O.D. (in.)	Aprox. Net Weight lbs./1000'	Aprox. Ship Weight lbs./1000'	90° Ampacity Direct Burial (2)	90° Ampacity Duct (2)	105° Ampacity Direct Burial (2)	105° Ampacity Duct (2)
FULL NEUTRAL											
163-23-2060	2(7x)	0.68	0.76	10 x 14	1.00	536	626	165	120	180	130
163-23-2066	1(19x)	0.72	0.80	13 x 14	1.03	608	698	185	135	205	150
**163-23-2072	1/0(19x)	0.76	0.84	16 x 14	1.07	688	778	210	155	235	170
163-23-2075	2/0(19x)	0.81	0.88	13 x 12	1.15	820	910	240	175	270	200
163-23-2078	3/0(19x)	0.86	0.93	16 x 12	1.20	939	1029	270	200	305	225
163-23-2081	4/0(19x)	0.91	0.99	13 x 10	1.30	1138	1238	310	230	350	260
163-23-2084	250(37x)	0.97	1.04	16 x 10	1.36	1302	1418	340	255	385	285
163-23-2090	350(37x)	1.07	1.17	20 x 10	1.49	1615	1793	405	300	455	340
1/3 NEUTRAL											
162-23-2057	2(1x)	0.66	0.73	6 x 14	0.97	467	528	155	135	165	130
162-23-2060	2(7x)	0.68	0.76	6 x 14	1.00	489	579	155	135	165	130
162-23-2066	1(19x)	0.72	0.80	6 x 14	1.03	527	617	175	155	190	150
162-23-2072	1/0(19x)	0.76	0.84	6 x 14	1.07	572	662	200	175	215	175
162-23-2075	2/0(19x)	0.81	0.88	7 x 14	1.12	636	726	230	200	245	195
162-23-2078	3/0(19x)	0.86	0.93	9 x 14	1.17	722	889	260	230	280	225
162-23-2081	4/0(19x)	0.91	0.99	11 x 14	1.23	822	922	290	240	315	255
162-23-2084	250(37x)	0.97	1.04	13 x 14	1.28	918	1018	320	260	345	280
162-23-2090	350(37x)	1.07	1.17	18 x 14	1.41	1166	1315	380	320	415	345
162-23-2093	500(37x)	1.20	1.30	16 x 12	1.57	1513	1691	455	385	495	415
162-23-2096	750(61x)	1.39	1.49	15 x 10	1.87	2152	2402	555	470	600	510
162-23-2099	1000(61x)	1.54	1.68	18 x *(B)	2.06	2711	3059	645	550	685	585

* - Special Conductor Size (A) Wire O.D. =0.1066"
** Stocked as unfilled strand as 161-23-2072, see Sec 2, Sheet 35.
(1) Individual wire size and count may vary. The resulting combination meets the 1/3 or full neutral, size requirement.

Visit Okonite's web site www.okonite.com for the most up to date dimensions.

Ampacities

(2) Full neutral, single phase ampacities are based on 90°C or 105°C conductor temperature, 20°C ambient temperature, 100% load factor, and earth thermal resistivity of RHO 90.
One third neutral ampacities are based on ICEA P-53-426 triplexed or triangular configuration for the same conditions stated above.

Okoguard URO-J

15kV Underground Primary Distribution Cable-Jacketed
Red Identification Stripes
Filled Strand Aluminum Conductor/105°C Rating
133% Insulation Level

Product Data
RR: Sheet 21

Okoguard Insulation: 220 mils 133% Insulation Level

Catalog Number	Conductor Size AWG\kcmil	Nominal Dia. over Insulation (in.)	Nominal Dia. over Insulation Screen (in.)	Copper Neutral, No. x AWG (1)	Nominal O.D. (in.)	Aprox. Net Weight lbs./1000'	Aprox. Ship Weight lbs./1000'	90° Ampacity Direct Burial (2)	90° Ampacity Duct (2)	105° Ampacity Direct Burial (2)	105° Ampacity Duct (2)
FULL NEUTRAL											
▲ 163-23-3060	2(7x)	0.77	0.85	10 x 14	1.08	602	669	165	120	180	130
163-23-3066	1(19x)	0.82	0.90	13 x 14	1.14	694	766	185	135	205	150
▲ 163-23-3072	1/0(19x)	0.84	0.92	16 x 14	1.15	753	820	210	155	235	170
163-23-3075	2/0(19x)	0.91	0.98	13 x 12	1.25	916	996	240	175	270	200
163-23-3078	3/0(19x)	0.96	1.04	16 x 12	1.31	1045	1125	270	200	305	225
163-23-3081	4/0(19x)	1.02	1.09	13 x 10	1.41	1252	1347	310	230	350	260
163-23-3084	250(37x)	1.07	1.17	16 x 10	1.48	1456	1606	340	255	385	285
163-23-3090	350(37x)	1.18	1.28	20 x 10	1.59	1762	1912	405	300	455	340
1/3 NEUTRAL											
162-23-3060	2(7x)	0.78	0.85	6 x 14	1.09	562	627	155	135	165	130
162-23-3066	1(19x)	0.82	0.90	6 x 14	1.14	612	684	175	155	190	150
162-23-3072	1/0(19x)	0.86	0.94	6 x 14	1.18	661	733	200	175	215	175
162-23-3075	2/0(19x)	0.91	0.98	7 x 14	1.22	730	810	230	200	245	195
162-23-3078	3/0(19x)	0.96	1.04	9 x 14	1.27	825	905	260	230	280	225
▲ 162-23-3081	4/0(19x)	0.99	1.06	11 x 14	1.30	891	1005	290	240	315	255
162-23-3084	250(37x)	1.07	1.17	13 x 14	1.41	1069	1164	320	260	345	280
▲ 162-23-3090	350(37x)	1.16	1.26	18 x 14	1.50	1254	1425	380	320	415	345
▲ 162-23-3093	500(37x)	1.29	1.39	16 x 12	1.72	1666	1853	455	385	495	415
▲ 162-23-3096	750(61x)	1.48	1.58	15 x 10	1.95	2244	2468	555	470	600	510
▲ 162-23-3099	1000(61x)	1.63	1.77	18 x *(A)	2.15	2808	3093	645	550	685	585

* - Special Conductor Size (A) Wire O.D. =0.1066"

(1) Individual wire size and count may vary. The resulting combination meets the 1/3 or full neutral, size requirement.

Visit Okonite's web site www.okonite.com for the most up to date dimensions.

▲ **Authorized Stock Item** - Available from Customer Service centers.

Ampacities

(2) Full neutral, single phase ampacities are based on ICEA's S-94-649, Appendix F for 90°C conductor temperature, 20°C ambient temperature, 100% load factor, and earth thermal resistivity of RHO 90 and modified for jacketed cable.
One third neutral ampacities are based on ICEA P-53-426 triplexed or triangular configuration for the same conditions stated above.

RAILROAD POWER, CONTROL, SIGNAL AND INSTRUMENTATION CABLES

The following table shows the minimum values for the radii to which insulated cables may be bent for permanent training during installation. These limits may not apply to conduit bends, duct bends, sheaves, or other curved surfaces around which the cable may be pulled under tension since sidewall pressure may limit these values to larger radii. In all cases, the minimum radii specified refers to the inner surface of the cable and not to the axis of the cable.

Cable Without Shielding or Armor:

OD of Cables Inches	Minimum Bending Radii as a Multiple of Cable Diameter
0 to 1.000	5
1.001 to 2.000	6
2.001 and larger	7

Cable With Flat or Corrugated Tape Shield or Armor:

Shall have minimum bending radius = 12 x Cable OD

Cable With Corrugated Sheath or Interlock Armor:
(Without Tape Shielded Conductors)

Shall have minimum bending radius = 7 x Cable OD

ADDITIONAL INFORMATION can be provided by accessing our website at www.okonite.com or contacting your local sales representative whose office location is located on the following page.

Okonite Cables Facilities Overview

Manufacturing Plants

Orangeburg, SC - Manufacturing Plant

Orangeburg, SC - Compound Facility

Richmond, KY - Manufacturing Plant

Santa Maria, CA - Manufacturing Plant

Ashton, RI - Manufacturing Plant

District Offices, Manufacturing Plants & Service Centers

Atlanta District Office
(770) 928-9778
FAX: (770) 928-0913
E-Mail: atlanta@okonite.com

Birmingham District Office
(205) 655-0390
FAX: (205) 655-0393
E-Mail: birmingham@okonite.com

Boston District Office
(603) 625-1900
(781) 749-3374
FAX: (603) 624-2252
E-Mail: boston@okonite.com

Charlotte District Office
(704) 542-1572
FAX: (704) 541-6183
E-Mail: charlotte@okonite.com

Chicago District Office
(630) 961-3100
FAX: (630) 961-3273
E-Mail: chicago@okonite.com

Cincinnati District Office
(513) 771-2122
FAX: (513) 771-2126
E-Mail: cincinnati@okonite.com

Cleveland District Office
(330) 926-9181
FAX: (330) 926-9183
E-Mail: cleveland@okonite.com

Dallas District Office
(940) 383-1967
FAX: (940) 383-8447
E-Mail: dallas@okonite.com

Denver District Office
(303) 255-5531
FAX: (303) 255-3128
E-Mail: denver@okonite.com

Hartford District Office
(860) 258-1900
FAX: (860) 258-1903
E-Mail: hartford@okonite.com

Houston District Office & Service Center
(281) 821-5500
FAX: (281) 821-7855
E-Mail: houston@okonite.com

Kansas City District Office & Service Center
(913) 422-6958
FAX: (913) 422-1647
E-Mail: kansascity@okonite.com

Los Angeles District Office
(562) 590-3070
Fax: (562) 590-3139
E-Mail: losangeles@okonite.com

Minneapolis District Office
(763) 432-3818
FAX: (763) 432-3811
E-Mail: minneapolis@okonite.com

New Orleans District Office and Service Center
(504) 467-1920
FAX: (504) 467-1926
E-Mail: neworleans@okonite.com

New York District Office
NJ (973) 742-8040
NY (212) 239-0660
FAX: (973) 742-2156
E-Mail: newyork@okonite.com

Philadelphia District Office
(856) 931-0595
(215) 567-5739
FAX: (856) 931-1193
E-Mail: philadelphia@okonite.com

Phoenix District Office
(480) 838-8596
FAX: (480) 897-8924
E-Mail: phoenix@okonite.com

Pittsburgh Service Center
(724) 899-4300
FAX: (724) 899-4320
E-Mail: pittsburgh@okonite.com

Portland District Office & Service Center
(503) 598-0598
FAX: (503) 620-7447
E-Mail: portland@okonite.com

Salt Lake District Office
(801) 262-1993
FAX: (801) 262-3167
E-Mail: saltlake@okonite.com

San Francisco District Office
(925) 830-0801
FAX: (925) 830-0954
E-Mail: sanfrancisco@okonite.com

Tampa District Office
(813) 627-9400
FAX: (813) 246-4705
E-Mail: tampa@okonite.com

Washington District Office
(703) 904-9494
FAX: (703) 904-1610
E-Mail: washington@okonite.com

International Sales
(201) 825-0300
FAX: (201) 825-9026
E-Mail: ramsey@okonite.com

Service Centers

Houston, TX

Kansas City, KS

New Orleans, LA

Portland, OR

Pittsburgh, PA

Corporate HDQ

Ramsey, NJ

THE OKONITE COMPANY
102 Hilltop Road, Ramsey, NJ 07446 • 201.825.0300 Fax: 201.825.9026 • www.okonite.com