OKONITE

TRANSIT

CABLES

MADE IN THE USA
QUALITY CABLES SINCE 1878

THE OKONITE COMPANY

Setting the Standard in Quality Since 1878

OKONITE TRANSIT CABLES

Since 1878, Okonite has been the leading supplier of insulated wire and cable to the Railroad and Transit Industries. Okonite cables are installed in mass transit, commuter railroads, light rail, people movers and street car networks across the U.S. Okonite provides the total solution for cable system requirements including: Cable components, Application Engineering assistance, direct sales coverage, local customer service, cable management and inventory at our network of plants and service centers.

The Okonite Company hallmark is our 100+ year service record to the transit industry providing the utmost in cable reliability. We can provide the full spectrum of cable types used by the transit industry, including:

- **Vital Circuit Signal Cable**
- **Traction Power Cable**
- **Communication Cable**
- **Low Voltage Power and Control Cable**
- **Medium Voltage Power Cable**
- **Submarine Cable**
- **Track Wire**
- **Case Wire**
- **Centralized Traffic Control - Code Line Cable**
- **Line Wire**
- **DEL Cable**
- **Instrumentation Cable**

Okonite can provide any combination of features to accommodate any application need:

- **Tin Coated or Bare Conductor**
- **Solid or Stranded Conductors**
- **Armored or Non-armored Cables**
- **Jackets- Thermoset, Thermoplastic, Low Smoke- Zero Halogen**

OKONITE TRANSIT SOLUTION

Reliability + Longevity = Safety

Insulation

The key to any Vital Cable is the cable insulation. Okonite pioneered and developed our own proprietary EPR (Ethylene Propylene Rubber) insulation compound specifically for the transit industry. This EPR compound provides superior characteristics in these critical areas: electrical integrity, moisture resistance, thermal stability, vibration resistance and mechanical ruggedness. Okonite EPR insulation is mixed in-house using a closed-loop automated process and the latest in equipment and mixing technology at our recently expanded and updated Orangeburg, SC Compound Facility.

ORANGEBURG, SOUTH CAROLINA
Compound Facility

MULTI-PLANT PRODUCTION CAPABILITIES

Okonite operates manufacturing facilities in Santa Maria, CA; Richmond, KY; Orangeburg, SC; Paterson, NJ and Cumberland, RI. All of these plants are involved with cable products for the Transit Industry.

Orangeburg, SC - Manufacturing & Compound Plants

Richmond, KY - Manufacturing Plant

Cumberland, RI - Manufacturing Plant

Santa Maria, CA - Manufacturing Plant

Paterson, NJ - Manufacturing Plant

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

SERVICE CENTERS

Houston, TX

Kansas City, KS

New Orleans, LA

Portland, OR

Pittsburgh, PA

MASS TRANSIT INDUSTRY
MULTI-PLANT PRODUCTION CAPACITY
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	Cumberland, RI	Paterson, NJ
Vital Circuit Signal Cable	X	X	X	X	
Aerial Signal Cable	X	X	X	X	
Armored UG Signal Cable	X	X	X	X	
DF Direct Buried Signal Cable	X	X	X	X	
Centralized Traffic Control Code Line Cables				X	
Track Wire	X		X	X	
Line Wire	X		X	X	
Tower & Case Wire	X			X	
Communication Cable	X			X	
Traction Cable	X	X	X		
DEL Cable	X	X	X		
Medium Voltage Okoguard (EPR) MV105	X	X	X		
CLX (MC-HL)	X	X		X	
Submarine Cable					X
Self Supporting Aerial Cable (SSAC)			X		
(PILC) Paper Insulated Lead Covered					X
Instrumentation (Armored & Non-armored)				X	

NFPA 130 - WIRE AND CABLE REQUIREMENTS

The National Fire Protection Association (NFPA) is an organization devoted to eliminating injury, property, and economic loss due to fire, electrical, and related hazards. NFPA 130 “Standard for Fixed Guideway Transit and Passenger Rail Systems” provides fire protection and life-safety requirements for underground, surface, and elevated fixed guideway transit and passenger rail systems. The purpose of NFPA 130 is to provide realistic degrees of safety in the event of a fire.

Wire and cable are a critical component in providing electrification to transit and passenger rail systems. NFPA 130 Chapter 12 defines the requirements for wire and cable, including wiring installation methods. The following requirements pertain to cable construction and performance.

Requirements	
General:	All cables except traction power cables shall be a recognized wire type per NFPA 70 (National Electrical Code)
Flame Spread and Smoke Release:	Cables required to meet UL 1685 utilizing the FT4/IEEE 1202 procedure.
Temperature, Moisture, and Grounding Requirements:	All cables except communications cables shall be rated 90°C wet or dry.

In response to the ever-demanding transit market, Okonite offers a variety of cable compounds and constructions that comply with NFPA 130. Okonite cables are designed for use in all vital transit circuits where security, low smoke features, and long life are required. They all offer a mechanically rugged construction, providing excellent resistance to flame, ozone, oil, and most chemicals.

Please contact your local Okonite representative if you need any assistance or interpretation with transit specifications.

JACKET

The primary function of the cable jacket is for mechanical protection of the insulation system during installation and throughout the life of the cable's service conditions. For those applications where a Thermoset or Thermoplastic Low Smoke Zero Halogen (LSZH) jacket is required, Okonite can provide our Okoclear® jacket formulations which are also mixed in-house at our compound facility.

Principal properties and advantages of an Okoclear® jacket include:

- **High Oxygen Index**
  - Limits Fire Propagation.
- **Low Smoke**
  - Aids in determining fire locations.
  - Minimizes smoke damage.
  - Allows occupants to evacuate confined areas safely.
- **Exceptionally High Tear Strength**
  - Deters installation damage.
- **Good Tensile Strength and Elongation**
  - Provides physical strength while preserving flexibility.
- **Excellent Heat Aging and Oil Immersion Resistance**
  - Provides long term integrity to the cable in harsh environment.
- **Zero Halogen**
  - Prevents the formation of hydrogen chloride gas during a fire, which is harmful to people and corrosive to electrical equipment.
- **Low Deformation from Heat**
  - Maintains jacket walls during higher temperature exposure.

The ruggedness of this material with its unique qualities makes it ideally suited for rapid transit tunnels and stations. In addition to the LSZH Okoclear jacket, Okonite can provide the full spectrum of other jacketing materials.

These are:

- **OKOLON®** - Thermoset chloronated polyethylene (TS-CPE) compound. This jacket exhibits exceptional heat resistance, mechanical ruggedness, moisture and chemical resistance and excellent flame resistance.
- **OKOLENE®** - A Thermoplastic polyethylene based jacketing compound with excellent moisture resistance and mechanical ruggedness.
- **OKOSEAL®** - A Thermoplastic polyvinyl chloride (PVC) jacketing compound with excellent resistance to flame and most chemicals.

METALLIC ARMORS AND SHIELDS

The Okonite Company can provide various armors and shields to give additional mechanical and environmental protection for your cable. The following armors and shields are readily available upon request:

- **Copper Alloy Tape**
- **Bronze Tape**
- **CLX** (Continuous Lightweight Exterior) - Aluminum, Bronze, Copper
- **Interlocked Armor** - Aluminum (Loxarmor), Galvanized Steel
- **Galvanized Steel Armor Wires**
- **Lead Sheath**

TINNED (OR COATED) COPPER CONDUCTORS

Why is it still in specs?

The Okonite Company has been formulating and compounding rubber insulations since 1878. Up until the late 1930s, all rubber insulations were formulations of natural rubber (polyisoprene). Synthetic polymer advances coupled with a shortage of natural rubber during World War II, led to the rapid development of synthetic rubber insulation. Initially, SBR (Styrene Butadiene Rubber) became a common base polymer for insulation formulations and was commonly used from the 1940s-1960s. From the late 1950s on, Butyl rubber formulations became more common as they offered improved heat, ozone and UV stability over SRB formulations. Finally, the development of EPR and discovery of organic peroxides as cross-linking agents in 1955 became the basis for a major step forward in the development of modern rubber insulations.

All natural and synthetic rubber requires additives to cross-link or cure the monomer into a usable thermoset insulation. Since Goodyear's patents and through the 1960s, sulfer compounds were the primary agents used to cross-link rubber compounds. When sulfer infused rubber is cured over bare copper, the surface of the copper conductor forms copper sulfide which results in a black conductor. Initially lead coated copper and later tin coated copper conductors became common practice to prevent this chemical reaction. Many customer specifications still require tin coated copper conductors today.

Okonite's development of Okoguard and Okonite insulation compounds in the 1960s were based on EPR in combination with organic peroxide curing agents. This chemical reaction no longer produced copper sulfide and thus tin coated copper was no longer needed for this purpose. Unless tin coated copper is required for another reason, reverting back to bare copper conductors is recommended to increase the conductivity of the conductor while reducing lead times and end-user pricing.

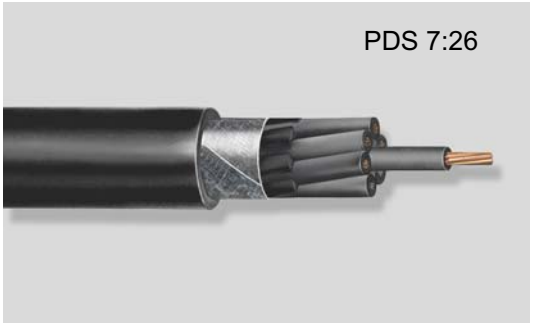
Please contact your local Okonite sales office if you need any further information on this subject.

PRODUCT DATA PAGES

Cable Type	Section	Sheet	Description
• Vital Circuit Signal Cable	7	3	Okonite Underground Installations for Transit
	7	5	Okonite Aerial / Tunnel Installations for Transit
	7	26	Okonite LSX Okoclear Low Smoke Type TC
• Traction Power Cable	7	15	Okonite-Okoclear-TS Low Smoke
	7	16	Okonite-Okolon TS-CPE
• Communication Cable	7	24	Okonite Communication Cable for Transit Systems
• Medium Voltage Power Cable	2	1	Okoguard-Okoseal Non-Shielded Type MV-90, 2.4kV
	2	2	Okoguard-Okolon TS-CPE Non-Shielded Type MV-90 2.4kV
	2	2A	Okoguard-TS Okoclear 2.4kV
	3	12	Okoguard-Okoclear-TS Type RHH/RHW/RHW-2, 600V
	2	3	Okoguard-Okoseal Shielded Type MV-105, 5/8kV
	2	9	Okoguard-Okoseal Type MV-105, 15kV
	2	11	Okoguard-Okolon Type MV-105, 15kV
	2	14	Okoguard-Okoseal Type MV-105, 25kV
	2	16	Okoguard-Okoseal Type MV-105, 35kV
	2	18	Okoguard-Okoseal 69kV
• Submarine Cable	2	30	Okoguard Submarine Cable 15kV
• Track Wire	7	6	Duplex-Okonite-Okolene
• Case Wire	7	14	Duplex Okonite-Okolon TS-CPE
	7	12	Okonite-Nylon Braid
	7	9	Duplex Okonite TC Blue
• Low Voltage Power & Control Cable	4	5	Okonite-FMR Okoseal Type TC-ER Cable
	4	6	Okonite-FMR Okolon TS-CPE TC-ER Cable
• Low Inductive Interference Cable	7	25	Low Inductive Interference Cable
• Centralized Traffic Control Cable	7	19	Code Line Cable w/PCF Aerial or Direct Burial
	7	20	Code Line Cable w/2 pairs of Communication Wires & PCF Aerial or Direct Burial
• Line Wire	7	7	Okolon TS-CPE Line Wire
	7	8	Okolene Line Wire
• DEL Cable	7	17	Type DEL 600-2000V

****Okonite's most up to date data sheets are found online at www.okonite.com**

OKONITE TRANSIT CABLES FOR SIGNAL & POWER

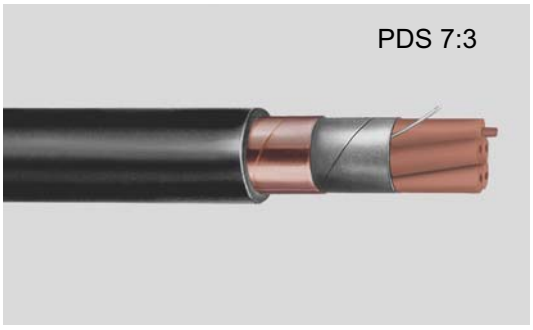


OKONITE LSX/OKOCLEAR-TS (XLPO JACKET) TRANSIT SIGNAL CABLES

UL Type TC-LS, XHHW-2, FT4/IEEE 1202, NFPA 130 compliant, Sunlight Resistant, 90°C wet or dry, 600V.

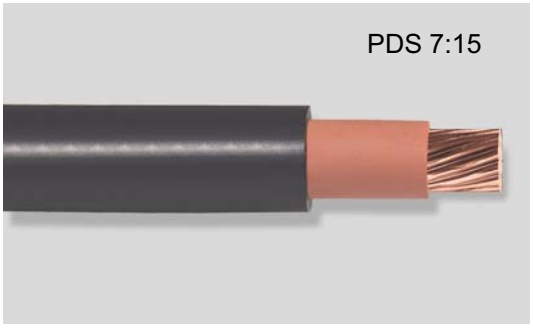
Okonite LSX insulation is a non-halogenated low smoke flame retardant EPCV insulation and is heat, moisture and chemical resistant. Okonite LSX Transit Signal Cables are designed for use in all vital transit circuit where security of service, low smoke features and long life are required. Multiconductor constructions available.

*please contact your local representative to inquire about specific options for conductor identification and ratings.



OKONITE TRANSIT VITAL SIGNAL CABLES

Okonite EPR insulation is a heat, moisture, chemical resistant and is a non-halogenated compound. It has a proven superior service life and is mechanically rugged. Each conductor is number coded for ease of identification. Okonite insulation meets or exceeds the requirements for AREMA 10.3.19 EPR Insulations. Available Jackets include Okolon (TS-CPE), Okoclear (XLPO) and Okolene (PE). Optional Copper Alloy armor tape is available. 600V.



OKONITE/OKOCLEAR-TS (XLPO JACKET) TRACTION POWER CABLES

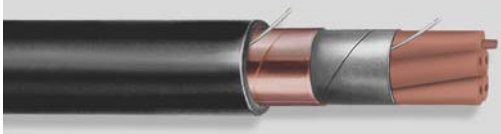
UL 1685/IEEE1202, AREMA Part 10.3.19 & ICEA S-95-658

Okonite/Okoclear-TS is a non-halogenated low smoke cable designed for tunnel and other below grade indoor or outdoor applications. It has a very long service life with excellent resistance to heat and moisture. Okonite EPR has stable electrical properties at high temperatures and is mechanically rugged. Available in 600V, 1000V, 2000V, 2400V and 5000V constructions and various conductor strand designs.

Contact your local Okonite office for more details on available cable designs

OKONITE RAILROAD STOCK CABLES
Can be used in Outdoor Transit Applications

PDS 7:1



Specifications: AREMA, ICEA

*OKONITE ARMORED UNDERGROUND RAILROAD SIGNAL CABLE

Construction: Multiple solid or stranded bare copper conductors, Okonite AAR Class “A” insulation, taped cushion layer, copper alloy armor and Okolene jacket overall with rip cord feature.
Conductor Temperature: 90°C
Sizes: 2 to 37 conductors #14 AWG - #2 AWG
Application: For direct burial or underground duct signal circuits where rodent and termite protection is required. Can also be used for squirrel resistant aerial applications.

PDS 7:11

Specifications: AREMA, ICEA

*OKONITE-OKOLON TS-CPE CASE WIRE 600V

Construction: Bare stranded copper conductor, Okonite EPR insulation, Okolon TS-CPE jacket.
Conductor Temperature: 90°C
Sizes: #16 AWG - #6 AWG
Application: For use as relay and associated signal apparatus wiring and for connector wire.

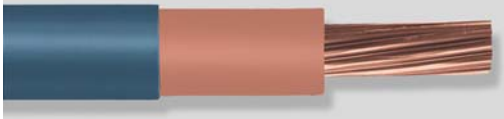
PDS 7:12

Specifications: ICEA

*OKONITE-NYLON BRAID CASE WIRE 600V

Construction: Bare stranded copper conductor, Okonite insulation, nylon braid with lacquer finish overall.
Conductor Temperature: 90°C
Sizes: #16 AWG,#12 AWG, #10 AWG
Application: For use as relay and associated signal apparatus wiring and for connector wire.

PDS 7:10



Specifications: AREMA, ICEA

*OKONITE TC BLUE TOWER & CASE WIRE 600V

Construction: Bare stranded copper conductor, Okonite insulation, Okoseal jacket in blue or black.
Conductor Temperature: 90°C
Sizes: #16 AWG, #14 AWG, #10 AWG.
Application: For use as relay and associated signal apparatus wiring and for connector wire.

PDS 7:6

*OKONITE-OKOLENE DUPLEX TRACK WIRE

Construction: Solid bare copper conductor, Okonite insulation,Okolene jacket.
Conductor Temperature: 90°C
Sizes: Solid conductor #6 AWG
Application: For use in track circuits, signal operations, car retarder and switch machine applications. Can be installed in wet or dry locations, in conduit, trays or troughs, or direct burial.

Okonite Cables Facilities Overview

District Offices, Manufacturing Plants & Service Centers

Manufacturing Plants

Orangeburg, SC - Compound Facility

Orangeburg, SC - Manufacturing Plant

Richmond, KY - Manufacturing Plant

Santa Maria, CA - Manufacturing Plant

Cumberland, RI - Manufacturing Plant

Paterson, NJ - Manufacturing Plant

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