Cable meterials

Polyethylene (Option P)
Used mostly for outdoor applications. Superior Cables uses non reclaimed polyethylene containing carbon black and conforming to appropriate national and international standards such as DIN 0207, BS-6234, and ASTM D 1248. The material has been especially designed for use in cable jackets. It is characterized by high tensile strength and resistance to abrasion. Polyethylene will not crack or become brittle at low temperatures, and will retain its mechanical properties and stability at high temperatures.
Due to the inclusion of carbon black in the formulation, polyethylene has extremely good aging properties and high UV and weather resistance. Non-black colored Poeyethylene jacket is also formulated to be UV resistant to most chemicals and solvents.
Polyethylene is formulated to have good aging properties and high UV and weather resistance by adding either carbon black or other anti-oxidants. Polyethylene is resistant to most chemicals and solvents.

PVC (Option V)
Used mostly for indoor applications. The materials is flexible and flame retardant; it will not allow fire to propagate along the cable when ignited. All the standard PVC jacketed cables produced by Superior Cables meet the flammability requirements of UL 1581 (VW-1) and IEC-332-1. Cables may be ordered which meet the flammability requirements of IEC332-3, UL-1666 (riser rated OFNR) or UL-910 (plenum rated OFNP).
When a cable is intended to be used outdoors, a special PVC formulation can be requested which has an improved resistance to degradation from exposure to UV radiation. PVC possesses high tensile strength and abrasion resistance. It will not crack or deteriorate when used indoors and at moderate temperatures.

Halogen-Free, Flame-Retardant (HFFR,option H)
Used mostly for indoor applications. The compound is specifically formulated to be fire retardant with high oxygen index (LOI) and high temperature index. When exposed to fire it does not emit toxic, corrosive halogen gases (halogen-free as per IEC-754-1 and IEC-754-2) and only low amounts of smoke (as per IEC-1034-2).

Corrugated Steel Tape Armor (Option R)
The steel tape protection against punctures caused by hand tools and rodents. It is recommended for directly buried cables and for special application aerial and duct cables. The tape consists of chrome-plated steel coated with polymer on both sides. The polymer coating enhances the adhesion of the steel to the jacket material during extrusion, creating an extremely rugged composite. The steel tape is corrugated during manufacture to enhance cable flexibility. The corrugated steel armor used by Superior Cables has been successfully tested by independent laboratories for rodent resistance.

Fiberglass Armor (Option J)
When protection is required against damage during installation and damage caused by rodents together with a metal-free construction and high flexibility, fiberglass provides the best design option.

Aluminum Moisture Barrier (Option A)
Whenever enhanced protection is required against radial moisture penetration, for example when a cable is installed in a wet environment, an aluminum tape is incorporated into the jacket to form a moisture barrier along the entire cable length. The barrier to water penetrations assured by a wide overlap of the aluminum tape and by a continuous sealing of the tape along the cable.

Water Blocking (Option X,G)
To prevent axial penetration of water into the loose tubes used in outdoor cables, all the tubes are filled, as a rule, with a water-blocking gel. However, for long term protection of the fibers, it is recommended to also block water passage between the tubes and in all other interstices in the cable core. If the cable has two or more jacket layers, water can penetrate between the jackets. This may cause damage to closures installed along the line. It is therefore recommended to block the water passage also between the jacket layers.
The water blocking option can be chosen separately for the core interstices and for the jacket. Superior Cables offers two water-blocking options for each of these two locations:

***Water blocking gel (Option D)** - Specially formulated gels that are applied inside the cable core and/or between the jackets - "wet" water blocking.

***Dry water blocking** - A polymer which swells on contact with water and blocks the passage of water into the cable. Such a polymer can be applied as a thin tape, longitudinally or horizontally laid either in the cable core, or between jacket layers. Alternatively, the polymer is made into a thin coating applied over the FRP or the aramid strength members in the cable. This "dry" water blocking method makes the cable easier to install, as there is no need to clean messy gels from the cable elements during installation.

The water-blocking gel used by Superior Cables will not flow or drip from cable ends at normal operating temperatures, yet it will remain soft at low temperatures and will help maintain low fiber attenuation. The water-blocking gels and swellable materials are non-toxic, dermatologically safe, and can be removed or cleaned with conventional cleaning fluids.

Self-Supporting (Option SS)
Cables for aerial installation on poles can be ordered with a high-tensile-strength steel messenger wire integrated into the outside jacket. The messenger wire is made of 7 stranded galvanized steel elements having a diameter and tensile strength to match the cable weight: 7 x 1.6 mm for cables weighing more than 150 kg/km, and 7 x 1.0mm for lighter cables. Other messenger wire configurations are available.

cable materials (contd.)

Solid or Stranded Steel Central Member (option M or B)

For high strength and flexibility in outdoor cables where the cable is to be pulled or blown into ducts, the preferred central member material is steel. The Steel is hot-rolled with anti-corrosion treatment. The steel central member is continuous throughout the cable length. It is coated with plastic to the diameter dictated by the cable geometry. Stranded steel is used when high cable flexibility is needed.

Dielectric FRP Central Member (option D)

The dielectric nature of glass fibers renders them immune to electromagnetic interference (EMI) and lightning. Fiberoptic cables can be laid in unprotected conduits and even in air handling spaces and plenums, as there is no danger of electrical shock. In order to take advantage of the dielectric nature of the optical fibers, the cable should be fully dielectric. The recommended central strength member for most dielectric cables is made of fiber reinforced plastic (FRP). The FRP is formed into thin rods and coated with plastic to the diameter dictated by the cable geometry. In addition to being dielectric, FRP possesses high tensile strength and low weight. Cables requiring high strength may additionally be reinforced with aramed yarn strength members in the jacket.

Aramid Yarn (central member option F, jacket option K)

The preferred central member for lightweight flexible indoor cables is plastic-coated aramed yarn. Aramid is a dielectric, high modulus, low specific weight polymer that is used in the form of thin fiber yarn. Aramid yarn can also be incorporated into the cable outer jacket as peripheral strength member. Aramed peripheral strength members are especially recommended for cables that are designed for aerial installation or for duct installation. The aramid-reinforced jacket is better able to support the stresses that develop during the aerial installation and during the duct installation.

test methods

OPTICAL AND GEOMETRICAL FIBER PROPERTIES

	Test Method	ITU-T Test Method	EIA/TIA-455 FOTP Number	IEC-793-1 Test Method
Fiber Geometry	Transmitted Near Field	SM: G.652 Method 2.2.1 MM: G. 651, Sec. 1, Method B.3	MM: 58	A2
Spectral Attenuation	Cut-Back	SM: G.652 Method 2.4.1, MM: G.651, Sec. 2, 1, Method B.2	SM Fibers: 78 MM Fibers: 46	C1A
Attenuation and Attenuation Uniformity at Specified Wavelengths	Backscattering (OTDR)	SM: G.652 Method 2.4.2, MM: G.651, Sec. 2, Method B.4	61 and 59	C1C
Numerical Aperture (MM Fibers)	Far-Field Light Distribution	G.651 Sec. 1, Method B.4	47	C6
Cutoff Wavelength (SM Fibers)	Transmitted Power	G.652 Methods 2.3.1, 2.3.3	80, 170	C7A
Mode Field Diameter (SM Fibers)	Variable Aperture	G.652 Method 2.1.2	167	
Bandwidth (MM Fibers)	Frequency Domain	G. 651 Sec. 3 Method B. 2	30	C2B
Chromatic Dispersion (SM Fibers)	Pulse Delay	G.652 Method 2.5.3	168	C5B

MECHANICAL AND ENVIRONMENTAL CABLE PROPERTIES

	EIA/TIA-455 FOTP Number	IEC-794-1 Test Method	EN 187000 Test Method (*)
Operating and Pulling Load	33	E1	501
Minimum Bending Radius	33	E1	501
Compression (Crush)	41	E3	504
Impact Resistance	25	E4	505
Twist (Torsion)	85	E7	508
Cyclic Flexing (Repeated Bending)	104	E6	509
Temperature Cycling	3	F1	601

(*) Equivalent to BS EN 187000, DIN EN 187000 and VDE 0888 Teil 100.

SPECIFICATIONS OF CABLE MATERIALS

Material Type	International	German	British	USA/Canada
Polyethylene	IEC-502 IEC-708 IEC-811	DIN 0207 DIN 0818	BS-6234 BS-6469	ASTM D1248 Federal LP 390 Bellcore GR-20-CORE
Polyvinyl Chloride (PVC)	IEC-811 IEC-332-1 IEC-332-3	DIN 57207	BS-6746 BS-7655 BS-6469	ASTM D2633 UL 1581 UL 94 IEEE 383
Halogen-Free, Flame-Retardant	IEC-332-1 IEC-332-3 IEC-754	VDE 0472 804 VDE 0472 813 VDE 0207 24	BS-4066 BS-6724 BS-6469 BS-6425	ASTM D2633 ASTM E662 UL 1581 UL 1685/FT4 UL 94 IEEE 383