

Overhead Power Ground Wire (OPGW) FIBER CABLE

► Application

OPGW is a dual functioning cable performing the duties of a ground wire and also providing a path for the transmission of voice, video or data signals . The fibers are protected from environmental conditions (lightning, short circuit, loading) to ensure reliability and longevity. The cable is designed to be installed on transmission and distribution lines to carry voice, data and video communications, especially in lighting waveform monitoring system, an observation system for overhead test line, maintenance data information system, power line protection system, power line operation system, and unmanned substation monitoring.

► Description

OPGW cable has two constructions:

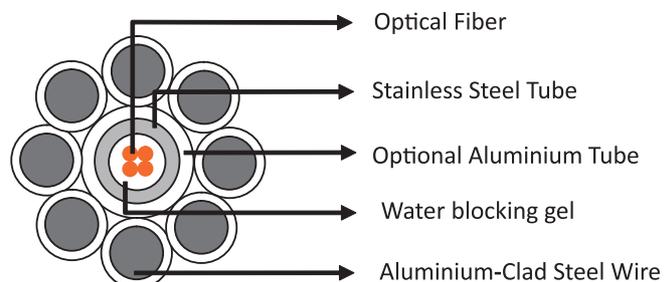
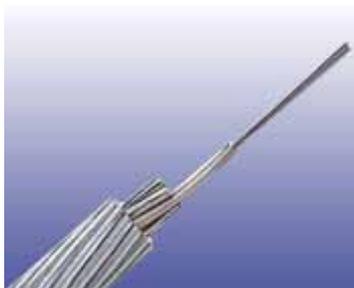
Central loose tube type---The fibers is placed loosely in a sealed and water resistant stainless steel tube filled with water blocking gel. This tube provides protection to the fibers during installation and operation under severe environmental conditions. Aluminium layer over the tube is optional. The stainless optical tube is located at the center of the cable protected by single or multiple layers of aluminium clad steel and aluminium alloy wires. The Aluminium-clad steel wires are shaped trapezoidally around the optical unit to provide compact construction. The metallic wires provide mechanical strength to withstand severe installation and operating conditions, while achieving conductivity to control temperature rise during short circuit conditions.

This type can accommodate up to 48 fibers in a cable. Despite such a high fiber count in a single tube, each optical fiber is clearly distinguishable utilizing a fiber identification system consisting of coloring and the number of ring marks on it. This compact design features high mechanical strength and fault current rating within a smaller diameter. The smaller diameter also results in excellent sag tension performance.

Multi loose tube type--- The fibers is placed loosely in a sealed and water resistant stainless steel tube filled with water blocking gel. Two or three stainless steel optical tubes are helically stranded in the inner layer of a multiple-layer cable.

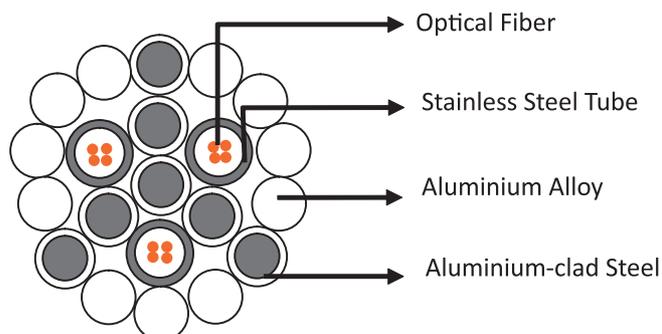
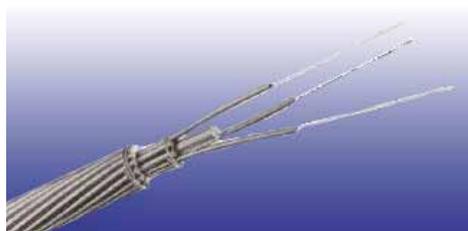
The multi loose tube type is designed mostly for very high fiber count requirement over 48 with the maximum fiber count reaching 144. The multi loose tube type can meet the requirement of huge cross and large current capacity.

► Construction



Central Loose Tube Type

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Multi Loose Tube Type

► Physical Properties

Cable section (mm ²)	Nominal Outer Diameter (mm/in)	Nominal Weight (kg/km)/(lb/kft)	Max working tension (kN)	Modulus of elasticity (kN/mm ²)	Heat expansion coefficient (10 ⁻⁶ /°C)	DC Resistance (Ω/km)	Short-circuit current capacity (kA ² s)
35	8.1/0.318	250/167.79	45.2	162.0	13.0	2.433	8.9
50	9.6/0.378	343/230.20	63.0	162.0	13.0	1.743	16.5
70	11.4/0.448	487/326.85	89.3	162.0	13.0	1.237	3.04
90	12.5/0.492	368/246.98	58.2	94.1	17.3	0.473	72.7
105	13.5/0.531	428/287.25	67.9	94.1	17.3	0.403	98.8
130	15.0/0.590	527/353.69	83.8	94.1	17.3	0.329	149.9

- * The effective sectional area of the single-layer design ranges from 50mm² to 83mm², suitable for rated voltages of 66kV, 115kV, 150kV, 250kV and 275kV.
- * The effective sectional area of the double-layer design ranges from 90mm² to 200mm², suitable for rated voltages of 150kV, 250kV, 275kV, 380kV and 500kV.
- * The effective sectional area of the three-layer design ranges from 200mm² to 400mm², suitable for rated voltages of 380kV, 420kV and 500kV in European markets.





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► Mechanical Properties

Minimum Bend Radius:		Maximum Compressive Load: 4000N for unarmoured cables;
Under installation:	20×OD	6000N for armoured cables
During operation:	10×OD for unarmoured cables	Repeated Impact: 4.4 N.m (J)
	20×OD for armoured cables.	Twist (Torsion): 180×10 times, 125×OD
Temperature Range:		Cyclic Flexing: 25 cycles for armoured cables.;
Operating Temperature Range:	-40°C(-40°F) to +70°C(+158°F)	100 cycles for unarmoured cables.
Storage Temperature Range:	-50°C(-58°F) to +70°C(+158°F)	Crush Resistance: 220N/cm (125lb/in)

► Fiber Compliance

Temperature Cycling	IEC60794-1-2-F2	Repeated Bending	IEC60794-1-2-E6
Tensile Strength	IEC60794-1-2-E1A	Torsion	IEC60794-1-2-E7
Crush	IEC60794-1-2-E3	Kink	IEC60794-1-2-E10
Impact	IEC60794-1-2-E4	Cable Bend	IEC60794-1-2-E11
		Cool Bend	IEC60794-1-2-E11

► Standard Compliance

IEEE 1138-1994

► Features

- Colored coded fibers and binders for quick and easy identification during installation.
- Compact design results in excellent sag tension performance of the cable
- Aluminium-clad steel wires and Aluminium alloy wires provides mechanical strength to withstand the installation and operating conditions, while achieving conductivity required to control temperature rise, during the short circuit fault condition
- Optical unit placed inside the Aluminium tube provides exceptional mechanical and thermal protection for the fiber against severe environments and external lateral force.
- Thick walled Aluminium tubes provide hermetic seal for optical units, providing excellent crush resistance and low resistivity.
- Unique design has maximum allowable tension to control fiber strain
- Stranded wires used for optimizing the mechanical and electrical properties of the cables
- High load, long span capability.