

Starwire® Solution

EUROPEAN STAR ON CONNECTIVITY



**N-LC SERIES
CONNECTOR**



7/16 CONNECTORS



**FLANGE SERIES
7/8" 1-5/8" 3-1/8"**



**RF MOULDED
JUMPERS**



**STARWIRE CABLES
1/4" TO 1-5/8"**



STARWIRES ENGINEERING
(SWE)

Sponsored by

CPE ITALIA SpA



Edition Dec.2010

Preliminary Remarks

The present catalogue has been conceived in this format by CPE Italia SpA.

Aiming to show to Telecommunication Customers its flexibility, its potentiality, its involvement in the Customer successful solution, CPE Italia SpA has grouped in the following pages all products needed to implement an installation: cables, connectors to assemble the cables with an indeed very exhaustive range of configurations, accessories (grounding kits, cable clamps, tools, etc).

Throughout all shown products, Customer can just select what is more suitable to satisfy its requirements ... without worrying about quality: it is assured by CPE Italia SpA.

In fact, everything is supervised by CPE Italia SpA:

- Cables: For any reason, Customer may wish to use a specific brand already qualified and used within his organization and well accepted.

CPE ITALIA SpA,

because of its vast experience on the market can fulfil his specific request.

In the same time, CPE ITALIA SpA, by means of

STARWIRE ENGINEERING (SWE)

made by a group of highly skilled specialists and consultants driving some cable manufacturers, can provide to Customers the necessary cable with any desired characteristics and an outstanding quality.

Only the cables produced under the direct supervision of STARWIRE ENGINEERING Group constitute the Starwire® Product line.

- Connectors and adapters: no doubt about the competence of CPE Italia SpA on this domain: since 1998, its products received the "Declaration of Conformity" by the Communication Ministry. Definition of connector characteristics through its R&D office as well as the capability of production on its own is a fact started almost 15 years ago.
- Assembling: this is an other activity lasting since years. Also on this matter there is an award of the same Ministry but, in addition, there is the satisfaction of many Customers: the production average in the last 5 years is of 1.2 Million assembled cables/year.
- Grounding kit: an other design coming out from our R&D Group. Fully qualified by CESI (Italian Experimental Centre for Electricity), is produced by CPE Italia SpA at a volume of .5 Million pcs/year
- The same R&D Group, by gathering years and years of experience has defined the specifications and the production process definition of many other products: Clamps, Adapters, Connectors for elliptical wave guides, Assembled racks to interface different mobile phone operators, etc.

Conclusion: we strongly hope that the present catalogue will helpfully give to our Telecommunication Customer an exhaustive idea of its capabilities, its extensive experiences, its broad connection with extremely important Partners.

All this background, gathered in more than 30 years of presence on the market, is the key factor allowing CPE Italia SpA to offer to his Customers the best service, assistance and advises possible.

Connection Technology for Wireless Communication Systems

Due to its almost unique value added chain, CPE ITALIA SpA along with STARWIRE ENGINEERING Group is able to offer cable solutions both with copper and fiber optic elements, making up standard as well as special or hybrid cables according to our customer's requirements or whole cable systems for their optimal solutions.

Products are manufactured in selected plants scattered around the world. All these plants certified by STARWIRE ENGINEERING Group offer high-quality and environmentally compatible products (DIN EN ISO 9001 and DIN EN ISO 14001, DIN EN 9100).

CPE ITALIA SpA offers a comprehensive product range of cables, connectors and accessories for **Mobile Network Solutions**, such as GSM, CDMA, 3G, WiMAX and radio link systems.

Our **Starwire®** product line offer the whole of **Connection Technology for Wireless Communications Systems** and will be highlighted in this catalogue. Feel free to contact our sales team if you are looking for further information on a product or any other site solution to suit your special application. We are happy to provide you with the perfect cable or cable system solution!



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Fields of Application

Field of Application

The high pace of innovation in mobile communications requires products that meet the highest standards of performance and reliability.

Starwire® product line cables, connectors and accessories were specially developed to serve as the link between the base station (BTS or Node B) and the antenna in current and new GSM, 3G, CDMA, WiMAX and radio link systems. **Starwire®** cable systems show excellent electrical performances and they are ideal for a wide range of RF applications. Some of these applications include Jumper cables for the connection of antennas.

Flexibility, low attenuation values and high shielding effectiveness make **Starwire®** cables systems a world class product.

CPE ITALIA SpA and STARWIRE ENGINEERING Group offer coaxial cables with corrugated as well as with braided outer conductor for highly flexible applications.

For latest Remote Radio Head (RRH) technology CPE ITALIA SpA and STARWIRE ENGINEERING Group offer a new generation of **Multi-tech** cables to interconnect the transceiver unit to the top of the antenna with the base station. Additional to high quality fiber optic or copper cables for RRH, CPE ITALIA SpA and STARWIRE ENGINEERING Group offer **Multi-tech** cables including both, copper and fiber optic elements in only one cable.

Outdoor applications

Highly efficient data transfer between base station and transceiver as well as high frequency supply to the antenna are guaranteed by choosing **Starwire®** line products. Together with the right installation material CPE ITALIA SpA and STARWIRE ENGINEERING Group creates connection that are both, "futureproof" and durable to resist any harsh environment.

Special features such as sunlight resistance and waterproof characteristics according to IP68 standard make **Starwire®** line products solutions suitable for any challenging outdoor applications.

Indoor applications

To distribute an up to date WLAN and mobile network system in a building, CPE ITALIA SpA and STARWIRE ENGINEERING Group show up a big variety of **Starwire®** line Coaxial and **Multi-tech** cables and accessories for in-building and rooftop installation. To fulfil the strict fire protection requirements in the indoor area **Starwire®** line Coaxial cables with FRNC (flame retardant, non corrosive) jacket are required to guarantee flame retardant and non corrosiveness according to in-building standards. Flexibility and small outside diameters are only two requirements of **Starwire®** line cables for indoor applications, which they fulfil.



Indoor Applications

Outdoor Applications

Starwire® Coaxial cables, corrugated conductor



Starwire® Coaxial cables, braided conductor



Mechanical characteristics

Inner conductor

The inner conductors of corrugated **Starwire®** Coaxial cables consist of copper wire, copperclad aluminium wire or a copper tube. For corrugated cables with small dimensions or braided **Starwire®** Coaxial cables, wires or even litz wires are used to guarantee sufficient flexibility. The inner conductors of corrugated **Starwire®** Coaxial cables with larger dimensions are made of copper tubes. This ensures low weight as well as the necessary flexibility. Spiral corrugation of the inner conductor tube lends the corrugated **Starwire®** Coaxial cable additional flexibility.

Outer conductor

The outer conductor of corrugated **Starwire®** Coaxial cables is formed by a welded copper tube with either spiral or ring-shaped corrugations. The welded copper tube guarantees RF shielding with screening attenuation values in excess of 120 dB. Spiral corrugations, braids and foils are used for highly flexible cable versions. The deep and tightly spaced corrugations in the outer conductor of corrugated **Starwire®** Coaxial cables result in the smallest possible bending radii and highest flexibility. **Starwire®** Coaxial cables are often used for jumper cables.

Dielectric

In all **Starwire®** Coaxial cables, highly foamed polyethylene ensures excellent attenuation to be achieved with the smallest possible dimensions. A thin layer of unfoamed polyethylene is applied directly to the inner conductor so that the dielectric can be stripped with ease. A physical foaming process produces up to 80% of the polyethylene with a fine-pore, non hygroscopic cell structure that lays the foundation for the cable's electrical performance. High foaming means a high proportion of air in the dielectric which results in lower weight, and attenuation characteristics approaching those of air dielectric cables of similar size.

Jacket options

Black polyethylene is the standard outer jacket for all **Starwire®** cables. This material is suitable for indoor and outdoor use (also underground). It is UV-resistant and halogen-free, and develops no corrosive gases in case of fire.

For applications which demand flame-retardant cables an outer cable jacket made of FRNC material (Flame Retardant Non Corrosive) is available. The FRNC-material is also halogen-free and enables the cable to comply with the various listed IEC, NEC and UL flame tests. FRNC material is used as the standard outer jacket for **Starwire®** Coaxial jumper cables. All **Starwire®** cable jackets are available in various colours for both polyethylene and FRNC material.

Specifications according to IEC, NEC and UL

IEC 60754-1

Test on gases evolved during combustion of materials from cables part 1: Determination of the amount of halogen acid gas

IEC 60754-2

Test on gases evolved during combustion of electric cables part 2: Determination of degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity

IEC 61034

Measurement of smoke density of electric cables burning under defined conditions

IEC 60332-1

Tests on electric cables under fire conditions part 1: Test on a single vertical insulated wire or cable

IEC 60332-3.C

Tests on electric cables under fire conditions part 3: Tests on bunched wires or cables category C

UL 1581, sec. 1080

Vertical wire flame test ,VW-1

CATV

Community Antenna Television Systems compliant with the NEC (National Electric Code) require a flame test in accordance with UL (Underwriters Laboratories) 1685 vertical tray (UL1581 sec.1160).

Tensile strength

The tensile strength of a cable defines the maximum permissible tensile force which may be applied to the cable during installation or handling. The unit of measurement is Newton (N) and takes into account all the materials used in the cable. Exceeding the quoted values may result in impairment of the cable's mechanical or electrical characteristics. The values are determined by technical measuring instruments and include an additional safety factor.

Bending radius

Specific minimal bending radii are defined for all **Starwire®** types and cable sizes. A distinction is drawn between single bending and repeated bending. In the case of single bending, the cable should not be bent back again after reaching its minimal bending radius. Repeated bending allows the cable to be bent to the minimal bending radius at least 15 times. It is typical for a cable to be bent between 40 and 50 times without any impairment of its transmission characteristics. A cable's behaviour and stability when subjected to repeated bending is very important during installation and assembly.

Tests are conducted parallel to production by subjecting a cable specimen to repeated alternating bends up to the minimal permissible bending radius and then checking the cable's characteristics.

Corrugations of the outer conductor enable the smallest bending radii with corrugated **Starwire®** Coaxial cables. Electrical and mechanical values of all **Starwire®** cables remain stable even after repeated bending. The minimum bending radii of **Starwire®** cables guarantee simple and reliable installation of the cables, resulting in dependable and durable connections.

P_{in} = power input into a cable of a specific length in W; P_{out} = power at the other end of the cable in W; α_R = return loss in dB; r = reflection factor;
 s = voltage standing wave ratio (VSWR); Z_1 = input impedance of the cable in Ω ; Z_2 = impedance of the reflection wave in Ω



Temperature ranges

Temperature ranges are defined for cables in storage, during installation and operation. The following table shows the temperature ranges which apply for cables with a standard polyethylene jacket or FRNC jacket:

	Polyethylene jacket	FRNC jacket
Storage:	– 70 °C to +85 °C	– 70 °C to +85 °C
Installation:	– 40 °C to +60 °C	– 40 °C to +60 °C
Operation:	– 55 °C to +85 °C	– 55 °C to +85 °C

The cables are approved for continuous duty within these temperature ranges.

Recommended hanger spacing

Various aspects need to be considered when fastening corrugated cables. Hangers must be spaced in accordance with specific values that are dependent on the location, the environmental conditions and the choice of installation materials. Extreme loads to the cable due to icing or strong winds must be taken into account when calculating the distance between the hangers.

The recommended maximum hanger spacings for the various cable sizes are shown in the following table:

Starwire® Coaxial with corrugated outer conductor

1/4"S	3/8"S	1/2"S	1/2"R	5/8"R	7/8"S	7/8"R	1 1/4"R	1 5/8"R
0.6 m	0.6 m	0.8 m	0.8 m	1.0 m	1.0 m	1.0 m	1.2 m	1.5 m

Electrical characteristics

DC resistance

The direct current resistance denotes the ohmic value of the inner or outer conductor based on a length of 1 km and expressed in Ω/km . It is dependent on the cross section of the conductor and on the conductor materials (specific conductance).

DC breakdown voltage

The DC breakdown voltage is determined between the inner conductor and the outer conductor. It is defined as the voltage at which the insulation between two conductors will fail and allow electricity to conduct or 'arc'. The DC breakdown voltage depends on the type of dielectric used and its dimensions. This value is established for each cable size and forms the basis for determining and calculating the permissible peak power rating.

Capacitance

For coaxial cables the capacitance is calculated directly from the dimensions of the cable and the dielectric constant " ϵ_r " of the dielectric. The relative dielectric constant depends on the material used and the degree of foaming. The capacitance value depends on the length of the cable and is expressed in farad/unit of length.

$$C' = \frac{\epsilon_r \cdot 10^3}{18 \cdot \ln\left(\frac{D}{d}\right)} \quad [\text{in pF/m}]$$

Relative velocity of propagation

This defines the velocity of propagation of a wave along the cable in relation to the speed of light in a vacuum. The relative velocity of propagation depends essentially on the dielectric constant " ϵ_r ", which is derived from the type of material used and its degree of foaming. High foaming of the dielectric results in values of 88% for Starwire® Coaxial cables.

$$V_r = \frac{100}{\sqrt{\epsilon_r}} \quad [\text{in \%}]$$

Impedance

Impedance is defined by the ratio of wave voltages to wave currents at each point along the transmission path. This ratio of voltage to current is constant for the superimposed waves (going and reflected/returning) and thus represents a characteristic parameter of the cable. The impedance is dependent on the frequency but approximates to a defined value for high frequencies. This property enables coaxial cables to be divided into defined impedance classes. Typical examples are 50 Ω cables for antenna systems and 75 Ω cables for television systems. Corrugated cables are normally used for antenna systems and have an impedance of 50 Ω . Tolerance are held very low at $\pm 1 \Omega$ for excellent adaptation (for High Power types $\pm 2 \Omega$).

The following formula is used for calculating impedance values:

$$Z = \frac{60}{\sqrt{\epsilon_r}} \cdot \ln\left(\frac{D}{d}\right) \quad [\text{in } \Omega]$$

Attenuation

Attenuation is one of the main criteria for selecting a suitable type of cable. Attenuation is the decrease in signal level over a distance in the direction of propagation. Attenuation is expressed as a ratio (dB) over distance in either feet or meters. The higher the frequency, the greater a cable's attenuation. Every transmission system attenuates the signal when the various components are connected. In addition to frequency, the main factors that influence attenuation are the cross section of the conductors and the dimension and characteristic of the materials. Attenuation is defined by the following equation:

$$\alpha = 10 \cdot \log \left(\frac{P_{in}}{P_{out}} \right) \quad [\text{in dB / unit of length}]$$

A cable's attenuation is quoted for an ambient temperature of 20°C. The higher the ambient temperature values and the hotter the cable becomes due to the power transmitted, the higher attenuation.

Starwire® Coaxial cables feature excellent attenuation values. Maximum transmission distances can be realized due to their efficient signal propagation characteristic. The secret lies in the high foaming of the dielectric and the optimised dimensions of the cables. Which cable type is correct depends on the system requirements and the length of the connection.

Return loss – voltage standing wave (ratio VSWR)

Irregularities along the path of a cable and the fluctuations of impedance can result in reflections of the transmitted waves. The outcome can be interfering signals over the complete frequency spectrum of the transmission system. Periodic deviation will cause immense interference at a specific frequency through accumulation. The fact that all manufacturing processes are subject to certain fluctuations, means that reflections are to be found on every cable transmission path. Reflections can also arise at all cable to connector junctions.

Return loss is defined as the ratio in decibels (dB) of the input signal power level to the signal power level that is reflected from the irregularities along the path of the cable or cable system. Corrugated **Starwire®** Coaxial cables and connectors are specifically designed to provide return loss values of 26 dB in the respective frequency ranges of the transmission system.

These reflections are also defined by VSWR (voltage standing wave ratio). The VSWR is a measure of the ratio of the maximum voltage to

the minimum voltage in the standing wave. The larger the impedance mismatch (fluctuations in impedance along the path of the cable system) the larger the amplitude of the standing wave. How well the cable and connectors are matched in impedance have a major impact on the VSWR performance of the cable system. When the impedances are improperly matched, reflections occur (increasing the amplitude of the standing wave) resulting in signal loss, which results in attenuation of the transmissions, poor reception or both. Corrugated **Starwire®** Coaxial cables and connectors are specifically designed to provide VSWR values of 1.105 in the respective frequency ranges of transmission system.

$$\alpha_r = 20 \cdot \log \left(\frac{1}{r} \right) \quad r = \frac{Z_1 - Z_2}{Z_1 + Z_2} \quad s = \frac{1+r}{1-r} \quad [\text{in dB}]$$

The following conversion table provides an overview of the most important values:

Return loss	Voltage standing wave ratio
20.0	1.220
21.0	1.196
22.0	1.173
23.0	1.152
24.0	1.133
25.0	1.118
26.0	1.105
27.0	1.094
28.0	1.082
29.0	1.073
30.0	1.065
31.0	1.056
32.0	1.051
33.0	1.045
34.0	1.040
35.0	1.036
36.0	1.032
37.0	1.028
38.0	1.025
39.0	1.022
40.0	1.020

[Subject to error and change]

P_{in} = power input into a cable of a specific length in W; P_{out} = power at the other end of the cable in W; α_r = return loss in dB; r = reflection factor; s = voltage standing wave ratio (VSWR); Z_1 = input impedance of the cable in Ω ; Z_2 = impedance of the reflection wave in Ω



Passive intermodulation

Passive intermodulation represents a further potential source of interference in the frequency range for transmission. It arises when two transmission signals from intermodulation products as the result of component nonlinearities (in this case cables and connectors). In particular the product of the third order is critical because it lies in the transmission range and can therefore interfere with the transmission signals.

Passive intermodulation mainly depends on the characteristics of the materials and on the quality of contact between the cable and the connector.

Resulting intermodulation products are measured by inputting two signals with defined frequencies into the transmission system. The degree of intermodulation is expressed as a signal level in either dBm or dBc (dBc=in relation to the carrier signal).

The measurement is conducted using carrier signals at levels of +43 dBm (20 W) and a frequency based on the range of application, e.g. GSM 900 or GSM 1800. Typical measured values for **Starwire®** Coaxial cable systems are <-117 dBm (<-160 dBc).

Cutoff frequency

Cutoff frequency is defined as the highest radio frequency that will pass through the cables. Above this frequency there is a risk of undefined modes (waves) arising and exerting a negative influence (increased attenuation) on the transmission. The cutoff frequency for each cable depends on the dimensions and materials.

The cutoff frequency can be calculated with the following equation:

$$f_c = \frac{1,91}{\sqrt{\epsilon_r} \cdot (D + d)} \cdot 100 \quad [\text{in GHz}]$$

Maximum operating frequency

The maximum operating frequency is normally based on the cutoff frequency and includes a defined safety factor.

Peak power rating

The peak power rating is the input power achieved when operating the coaxial cable with the maximum RF operating voltage (peak value). The measurement is limited by the DC breakdown voltage between the cable's inner conductor and outer conductor. The peak power rating is a calculated value which is independent of the frequency.

Mean power rating

Starwire® Coaxial cables permit a continuous maximum temperature of 85°C at the inner conductor, i.e. the heat generated by the continuous power must not exceed this value. The crucial factor is the material of the dielectric. The values quoted for the maximum continuous power rating are based on an ambient temperature of 40°C and a voltage standing wave ratio of 1.0. The higher the ambient temperature, the lower the maximum permissible continuous power rating. Increasing the voltage standing wave ratio has the same effect. The continuous power rating is also affected by other ambient conditions, e.g. direct sunlight.

Shielding effectiveness

Shielding effectiveness is quoted as a measure of the shielding effect of a cable's construction. It defines the logarithmic ratio of the power, which is input into the cable to the power that is radiated from the cable. On corrugated **Starwire®** Coaxial cables the shielding attenuation is greater than 120 dB as a result of using a solid copper tube outer conductor with a RF-tight weld. Braided **Starwire®** Coaxial cables that contain a shielding foil typically achieve shielding effectiveness values of only 90 dB.

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Model Highlights

The **Starwire®** product range of coaxial cables with suitable stripping tools and connectors for site solutions guarantees excellent electrical characteristics and has outstanding mechanical and climatic properties ideal for outdoor installations. Its small sizes and super flexible types are additionally applicable as high performance cables for base station and antenna feeders in mobile radio stations and radio link systems, as well as for in-building and rooftop installations. One part of these **Starwire®** Coaxial cables has a corrugated outer conductor construction, which guarantees optimal shielding, low attenuation and provides the flexibility for easy stripping, handling and installation.

Apart from different sizes there are four different **Starwire® Coaxial types with corrugated outer conductor** to be distinguished:

Starwire® Coaxial flexible cables R [*ring-shaped corrugations in outer conductor*] are designed to provide low-loss connections between electronic transmission or reception units and antennas.

Starwire® Coaxial low loss cables R [*ring-shaped corrugations in outer conductor*] have optimised transmission characteristics while still assuring constant outer dimensions to suit to all frequent **Starwire®** installation material and connectors.

Starwire® Coaxial super flexible cables S [*spiral corrugations in outer conductor*] for use in tight wiring spaces, which request cables with the smallest bending radii, high flexibility, low attenuation and high shielding.

Starwire® Coaxial super flexible feeder cables H [*spiral corrugations in outer conductor*] ideal as feeder cables for difficult installations thanks to the cables' minimal bending radius, flexibility and low weight and having a ring-shaped inner and spiral outer conductor.

Flexibility and bendability are hallmarks of the **Starwire® Coaxial cables with braided outer conductor**. The single or double braids of different wire materials enable the tightest bending radii available for any cable of similar sizes and performance.

The standard **Starwire®** Coaxial cable is protected by a sunlight resistant PE jacket. The addition of waterproofing compound in and around the foil/braid ensures continuous reliable service in case of any damage during installation or operation. **Starwire®** Coaxial cables with FRNC jacket are flame retardant, non-corrosive cables, especially designed for in-building applications. **Starwire®** Coaxial cables with PVC jacket are for general-purpose indoor-/outdoor-applications and are characterised by their high flexibility.

Overview on different cable types with Starwire® 7/8"	7/8" H	7/8" R	7/8" R low loss
Inner conductor	Spiral	Smooth	Smooth
Outer conductor	Ring (flex)	Ring	Ring
Attenuation for GSM 900 MHz (dB/100m/dB/100ft)	4.22 (1.29)	3.81 (1.16)	3.54 (1.10)
Attenuation for GSM 1800 MHz (dB/100m/dB/100ft)	6.23 (1.90)	5.63 (1.72)	5.19 (1.60)
Attenuation for GSM 2200 MHz (dB/100m/dB/100ft)	6.99 (2.13)	6.32 (1.93)	5.81 (1.80)
Flexibility	Super flexible	Flexible	Flexible
Accessories	Standard	Standard	Standard

Overview Starwire® Coaxial cables with braided outer conductor and related Technical Characteristics

Type	Inner conductor	Outer conductor	Jacket options	Order number
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Superflexible cables

Starwire® 1/6" S	Bare copper wire	Spiral corrugated copper tube	PE	04SWE0SFLX101
Starwire® 1/6" S High power	Silver plated copper wire	Spiral corrugated copper tube	FEP	04SWE0SFLX102
Starwire® 1/5" S	Copper clad aluminium wire	Spiral corrugated copper tube	FRNC	04SWE0SFLX103
Starwire® 1/4" S	Copper clad aluminium wire	Spiral corrugated copper tube	PE	04SWE0SFLX104
			FRNC	04SWE0SFLX105
			FRNC-CMR	04SWE0SFLX106
Starwire® 1/4" S High power	Silver plated copper wire	Spiral corrugated copper tube	FEP	04SWE0SFLX107
Starwire® 3/8" S	Copper clad aluminium wire	Spiral corrugated copper tube	PE	04SWE0SFLX108
			FRNC-UL listed	04SWE0SFLX109
			FRNC-CMR/CATVR	04SWE0SFLX110
Starwire® 1/2" S	Copper clad aluminium wire	Spiral corrugated copper tube	PE	04SWE0SFLX111
			FRNC-UL listed	04SWE0SFLX112
			FRNC-CMR/CATVR	04SWE0SFLX113

Flexible cables

Starwire® 1/4" R	Copper clad aluminium wire	Ring-shaped corrugated copper tube	PE	04SWE0FLEX151
			FRNC	04SWE0FLEX152
			FRNC-CMR	04SWE0FLEX153
Starwire® 1/2" R	Copper clad aluminium wire	Ring-shaped corrugated copper tube	PE	04SWE0FLEX154
			FRNC	04SWE0FLEX155
			FRNC-CMR/CATVR	04SWE0FLEX156
Starwire® 7/8" R	Copper tube	Ring-shaped corrugated copper tube	PE	04SWE0FLEX157
			FRNC	04SWE0FLEX158
			FRNC-CMR/CATVR	04SWE0FLEX159
Starwire® 1-1/4" R	Copper tube	Ring-shaped corrugated copper tube	PE	04SWE0FLEX160
			FRNC	04SWE0FLEX161
			FRNC-CMR	04SWE0FLEX162
Starwire® 1-5/8" R	Spiral corrugated copper tube	Ring-shaped corrugated copper tube	PE	04SWE0FLEX163
			FRNC	04SWE0FLEX164
			FRNC-CMR	04SWE0FLEX165

Superflexible feeder cables

Starwire® 7/8" H	Spiral corrugated copper tube	Ring-shaped corrugated copper tube	PE	04SWE0FEED201
			FRNC	04SWE0FEED202

Low loss cables

Starwire® 7/8" R	Copper tube	Ring-shaped corrugated copper tube	PE	04SWE0LLOS231
			FRNC	04SWE0LLOS232
Starwire® 1-1/4" R	Copper tube	Ring-shaped corrugated copper tube	PE	04SWE0LLOS233
			FRNC	04SWE0LLOS234
Starwire® 1-5/8" R	Spiral corrugated copper tube	Ring-shaped corrugated copper tube	PE	04SWE0LLOS235
			FRNC	04SWE0LLOS236

FRNC = Flame Retardant Non Corosive (halogene free)
 S = Spiral corrugation of the outer conductor
 R = Ring corrugation of the outer conductor
 CATVR = Community Antenna Television System with Riser Flame Test, classified according to NEC

UL listed = Listed by UL (Underwriters Laboratories) for Wires, Miscellaneous
 FEP = Perfluorethylenepropylene
 PE = Polyethylene
 CMR = Conductor Metallic with Riser Flame Test, classified according to NEC



Starwire® 1/6" S super flexible

Type	Order number
Standard polyethylene jacket	04SWE05FLX101



Mechanical characteristics			
Inner conductor	bare copper wire	1.13 mm	0.044 in
Dielectric	foamed PE	2.95 mm	0.116 in
Diameter over outer conductor	spiral corrugated copper tube	4.1 mm	0.161 in
Diameter over outer jacket		4.9 mm	0.193 in
Cable weight		38 kg/km	26 lb/1000 ft
Tensile strength		100 N	22.5 lbf
Bending moment		0.5 Nm	0.37 lbf*ft
Flat plate crush strength		3 N/mm	17.10 lbf/in
Min. bending radius, single		7 mm	0.28 in
Min. bending radius, repeated		13 mm	0.51 in
Number of bends, minimum (typical)		20 (50)	
Permissible temperature range, installation		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, operation		- 55 °C to + 85 °C	- 67 °F to + 185 °F

Electrical characteristics		
Impedance	50 ± 2 Ω	
Relative velocity of propagation	82 %	
Capacitance	85 pF/m	25.9 pF/ft
Inductance	0.19 μH/m	0.06 μH/ft
Maximum operating frequency	18 GHz	
Cut off frequency	40 GHz	
Peak power rating	2.5 kW	
DC breakdown voltage	1000 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	18 Ω/km	5.49 Ω/1000 ft
Outer conductor DC-resistance	23 Ω/km	7.01 Ω/1000 ft
Return loss 800 – 2200 MHz	26 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
30	5.43	1.65	0.65
50	7.06	2.15	0.49
88	9.46	2.88	0.36
100	10.1	3.08	0.34
108	10.5	3.21	0.32
150	12.5	3.81	0.27
174	13.5	4.11	0.25
200	14.5	4.43	0.23
300	18.0	5.49	0.18
400	21.0	6.40	0.16
450	22.4	6.82	0.15
500	23.7	7.22	0.14
512	24.0	7.31	0.14
600	26.1	7.97	0.13
700	28.4	8.66	0.12
800	30.6	9.32	0.11
824	31.1	9.48	0.11
894	32.5	9.91	0.10
900	32.6	9.95	0.10
925	33.1	10.1	0.10
960	33.8	10.3	0.10
1000	34.6	10.5	0.09
1250	39.2	11.9	0.08
1500	43.4	13.2	0.08
1700	46.6	14.2	0.07
1800	48.2	14.7	0.07

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
1900	49.7	15.1	0.07
2000	51.2	15.6	0.06
2100	52.6	16.0	0.06
2200	54.1	16.5	0.06
2300	55.5	16.9	0.06
2500	58.2	17.7	0.06
2700	60.9	18.6	0.05
3000	64.8	19.7	0.05
3300	68.5	20.9	0.05
3400	69.7	21.3	0.05
4000	76.8	23.4	0.04
4900	86.8	26.5	0.04
5000	87.9	26.8	0.04
6000	98.3	30.0	0.04
6100	99.3	30.3	0.04
8000	118	35.8	0.03
8800	125	38.1	0.03
10000	135	41.3	0.03
10200	137	41.8	0.03
12000	152	46.4	0.02
13400	164	49.9	0.02
14000	169	51.4	0.02
16000	184	56.1	0.02
18000	199	60.7	0.02



Starwire® 1/6" S super flexible, high power

Type	Order number
High power, FEP jacket	04SWE0SFLX102

Mechanical characteristics

Inner conductor	silver plated copper wire	1.02 mm	0.040 in
Dielectric	Perfluorethylen-propylen (FEP)	2.95 mm	0.116 in
Diameter over outer conductor	spiral corrugated copper tube	4.1 mm	0.161 in
Diameter over outer jacket	FEP	4.9 mm	0.193 in
Cable weight		46 kg/km	31lb/1000 ft
Tensile strength		100 N	22.5 lbf
Bending moment		0.5 Nm	0.37 lbf*ft
Flat plate crush strength		3 N/mm	17.10 lbf/in
Min. bending radius, single		7 mm	0.28 in
Min. bending radius, repeated		13 mm	0.51 in
Number of bends, minimum (typical)		20 (50)	
Permissible temperature range, installation		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, operation		- 50 °C to + 205 °C	- 58 °F to + 401 °F

Electrical characteristics

Impedance	50 ± 2 Ω	
Relative velocity of propagation	82 %	
Capacitance	95 pF/m	28.69 pF/ft
Inductance	0.38 μH/m	0.12 μH/ft
Maximum operating frequency	8 GHz	
Cut off frequency	40 GHz	
Peak power rating	2.8 kW	
DC breakdown voltage	1000 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	23 Ω/km	7.01 Ω/1000 ft
Outer conductor DC-resistance	23 Ω/km	7.01 Ω/1000 ft
Return loss 800 – 2200 MHz	20 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m	
30	5.30	1.61	4.37
50	7.17	2.19	3.18
88	10.0	3.05	2.23
100	10.8	3.28	2.06
108	11.3	3.44	1.96
150	13.7	4.17	1.60
174	14.9	4.55	1.45
200	16.2	4.94	1.33
300	20.6	6.29	1.03
400	24.6	7.49	0.86
450	26.4	8.05	0.80
500	28.2	8.58	0.75
512	28.6	8.71	0.74
600	31.5	9.61	0.67
700	34.7	10.6	0.61
800	37.7	11.5	0.56
824	38.5	11.7	0.55
894	40.5	12.3	0.52
900	40.7	12.4	0.52
925	41.4	12.6	0.51
960	42.4	12.9	0.50

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m	
1000	43.5	13.3	0.49
1250	50.2	15.3	0.42
1500	56.6	17.3	0.38
1700	61.5	18.8	0.35
1800	63.9	19.5	0.34
1900	66.3	20.2	0.33
2000	68.6	20.9	0.32
2100	70.9	21.6	0.31
2200	73.2	22.3	0.30
2300	75.4	23.0	0.29
2500	79.8	24.3	0.27
2700	84.2	25.7	0.26
3000	90.5	27.6	0.24
3300	96.8	29.5	0.23
3400	98.8	30.1	0.23
4000	111	33.8	0.20
4900	128	39.1	0.18
5000	130	39.7	0.18
6000	149	45.3	0.16
6100	150	45.9	0.16
8000	184	56.1	0.13

Starwire® 1/5" S super flexible

Type	Order number
Flame retardant, non corrosive jacket (FRNC)	04SWE0SFLX103



Mechanical characteristics			
Inner conductor	copper clad aluminium wire	1.57 mm	0.062 in
Dielectric	foamed PE	3.9 mm	0.154 in
Diameter over outer conductor	spiral corrugated copper tube	5.7 mm	0.224 in
Diameter over outer jacket	FRNC	6.9 mm	0.272 in
Cable weight	FRNC	54.6 kg/km	36.6 lb/1000 ft
Tensile strength		250 N	56.2 lbf
Bending moment		1 Nm	0.73 lbf*ft
Flat plate crush strength		6 N/mm	34.3 lbf/in
Min. bending radius, single		8 mm	0.31 in
Min. bending radius, repeated		15 mm	0.412 in
Number of bends, minimum (typical)		15 (50)	
Permissible temperature range, installation (FRNC)		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 40 °C to + 85 °C	- 40 °F to + 185 °F

Electrical characteristics		
Impedance	50 ± 1 Ω	
Relative velocity of propagation	82 %	
Capacitance	80 pF/m	24.4 pF/ft
Inductance	0.19 µH/m	0.06 µH/ft
Maximum operating frequency	8 GHz	
Cut off frequency	25 GHz	
Peak power rating	4.2 kW	
DC breakdown voltage	1300 V	
Jacket spark, volts RMS	1500 V	
Inner conductor DC-resistance	14 Ω/km	4.27 Ω/1000 ft
Outer conductor DC-resistance	10 Ω/km	3.05 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
30	3.97	1.21	1.31
50	5.16	1.57	1.00
88	6.89	2.10	0.75
100	7.35	2.24	0.70
108	7.65	2.33	0.67
150	9.06	2.76	0.57
174	9.79	2.98	0.53
200	10.5	3.21	0.49
300	13.0	3.96	0.40
400	15.1	4.61	0.34
450	16.1	4.90	0.32
500	17.0	5.19	0.30
512	17.2	5.25	0.30
600	18.7	5.71	0.28
700	20.4	6.20	0.26
800	21.9	6.66	0.24
824	22.2	6.77	0.24
894	23.2	7.07	0.23
900	23.3	7.10	0.22
925	23.6	7.21	0.22

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
960	24.1	7.35	0.22
1000	24.7	7.52	0.21
1250	27.8	8.49	0.19
1500	30.8	9.38	0.17
1700	33.0	10.0	0.16
1800	34.0	10.4	0.16
1900	35.1	10.7	0.15
2000	36.1	11.0	0.15
2100	37.1	11.3	0.14
2200	38.0	11.6	0.14
2300	39.0	11.9	0.14
2500	40.9	12.5	0.13
2700	42.7	13.0	0.13
3000	45.3	13.8	0.12
3300	47.8	14.6	0.11
3400	48.7	14.8	0.11
4000	53.4	16.3	0.10
4900	60.1	18.3	0.09
5000	60.8	18.5	0.09
6000	67.7	20.6	0.08
6100	68.3	20.8	0.08
8000	80.3	24.5	0.07



Starwire® 1/4" S super flexible

Type	Order number
Standard polyethylene jacket	04SWE0SFLX104
Flame retardant, non corrosive jacket (FRNC)	04SWE0SFLX105
Flame retardant, non corrosive jacket (FRNC), UL CMR	04SWE0SFLX106

Mechanical characteristics			
Inner conductor	copper clad aluminium wire	1.88 mm	0.074 in
Dielectric	foamed PE	4.40 mm	0.173 in
Diameter over outer conductor	spiral corrugated copper tube	6.50 mm	0.256 in
Diameter over outer jacket	PE	7.70 mm	0.303 in
	FRNC	7.70 mm	0.303 in
	FRNC, CMR	7.70 mm	0.303 in
	PE (FRNC)	7.70 mm	0.303 in
Cable weight	PE (FRNC)	73(83) kg/km	49(56) lb/1000 ft
Tensile strength		350 N	78.6 lbf
Bending moment		1.5 Nm	1.1 lbf*ft
Flat plate crush strength		8 N/mm	45.7 lbf/in
Min. bending radius, single		12.5 mm	0.492 in
Min. bending radius, repeated		25 mm	0.984 in
Number of bends, minimum (typical)		20 (50)	
Recommended hanger spacing		0.6 m	1.97 ft
Permissible temperature range, installation (PE)		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, installation (FRNC)		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 55 °C to + 85 °C	- 67 °F to + 185 °F

Electrical characteristics		
Impedance	50 ± 1 Ω	
Relative velocity of propagation	82 %	
Capacitance	80 pF/m	24.4 pF/ft
Inductance	0.195 µH/m	0.06 µH/ft
Maximum operating frequency	20.4 GHz	
Cut off frequency	25 GHz	
Peak power rating	8.2 kW	
DC breakdown voltage	1600 V	
Jacket spark, volts RMS	5000 V	
Inner conductor DC-resistance	10.5 Ω/km	3.5 Ω/1000 ft
Outer conductor DC-resistance	6.6 Ω/km	2.01 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m	
30	2.99	0.91	2.09
50	3.89	1.19	1.61
88	5.22	1.59	1.21
100	5.58	1.70	1.13
108	5.81	1.77	1.09
150	6.90	2.10	0.92
174	7.46	2.27	0.86
200	8.02	2.45	0.80
300	9.94	3.03	0.65
400	11.6	3.53	0.56
450	12.3	3.76	0.52
500	13.0	3.98	0.50
512	13.2	4.03	0.49
600	14.4	4.39	0.45
700	15.6	4.77	0.42
800	16.8	5.13	0.39
824	17.1	5.21	0.38
894	17.9	5.45	0.37
900	17.9	5.47	0.37
925	18.2	5.55	0.36
960	18.6	5.66	0.35
1000	19.0	5.79	0.35
1250	21.5	6.55	0.31
1500	23.8	7.25	0.28
1700	25.5	7.77	0.26

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft
1800	26.3	8.03	0.25
1900	27.2	8.28	0.25
2000	28.0	8.52	0.24
2100	28.7	8.76	0.23
2200	29.5	8.99	0.23
2300	30.3	9.22	0.22
2500	31.7	9.67	0.21
2700	33.2	10.1	0.20
3000	35.2	10.7	0.19
3300	37.2	11.3	0.18
3400	37.9	11.5	0.18
4000	41.7	12.7	0.16
4900	47.0	14.3	0.15
5000	47.5	14.5	0.14
6000	53.0	16.2	0.13
6100	53.5	16.3	0.13
8000	63.1	19.2	0.11
8800	67.0	20.4	0.10
10000	72.5	22.1	0.10
10200	73.4	22.4	0.10
12000	81.3	24.8	0.09
13400	87.2	26.6	0.08
14000	89.7	27.3	0.08
16000	97.7	29.8	0.07
18000	106	32.2	0.07
19000	109	33.3	0.07
20400	115	34.9	0.06

Starwire® 1/4" S super flexible, high power

Type	Order number
High power, FEP jacket	04SWE0SFLX107



Mechanical characteristics			
Inner conductor	silver plated copper wire	1.8 mm	0.071 in
Dielectric	foamed Fluorethylen	4.4 mm	0.173 in
Diameter over outer conductor	spiral corrugated copper tube	6.4 mm	0.252 in
Diameter over outer jacket	Perfluoethylen-propylen (FEP)	7.4 mm	0.291 in
Cable weight		102 kg/km	68.4 lb/1000 ft
Tensile strength		100 N	22.5 lbf
Bending moment		1.5 Nm	1.10 lbf*ft
Flat plate crush strength		8 N/mm	45.60 lbf/in
Min. bending radius, single		12.5 mm	0.492 in
Min. bending radius, repeated		25 mm	0.984 in
Number of bends, minimum (typical)		20 (50)	
Permissible temperature range, installation		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, operation		- 200 °C to + 205 °C	- 328 °F to + 401 °F

Electrical characteristics		
Impedance	50 ± 2 Ω	
Relative velocity of propagation	82 %	
Capacitance	78 pF/m	23.8 pF/ft
Inductance	0.3 μH/m	0.09 μH/ft
Maximum operating frequency	8 GHz	
Cut off frequency	25.4 GHz	
Peak power rating	6.4 kW	
DC breakdown voltage	1600 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	6.9 Ω/km	2.10 Ω/1000 ft
Outer conductor DC-resistance	5.0 Ω/km	1.52 Ω/1000 ft
Return loss 800 – 2200 MHz	20 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
0.5	0.06	0.02	6.40
1	0.24	0.07	6.40
1.5	0.38	0.12	6.40
2	0.50	0.15	6.40
10	1.62	0.49	6.40
20	2.47	0.75	5.49
30	3.14	0.96	4.59
50	4.23	1.29	3.67
88	5.85	1.78	2.87
100	6.30	1.92	2.71
108	6.58	2.01	2.62
150	7.94	2.42	2.27
174	8.65	2.64	2.13
200	9.37	2.86	2.00
300	11.9	3.61	1.67
400	14.0	4.28	1.48
450	15.1	4.59	1.40
500	16.0	4.88	1.34
512	16.3	4.95	1.32
600	17.9	5.45	1.24
700	19.6	5.98	1.15
800	21.3	6.48	1.09
824	21.7	6.60	1.08

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
894	22.8	6.94	1.04
900	22.9	6.97	1.03
925	23.2	7.08	1.02
960	23.8	7.25	1.01
1000	24.4	7.43	0.99
1250	28.0	8.54	0.90
1500	31.4	9.58	0.83
1700	34.0	10.4	0.78
1800	35.3	10.8	0.76
1900	36.6	11.1	0.75
2000	37.8	11.5	0.73
2100	39.0	11.9	0.71
2200	40.2	12.3	0.70
2300	41.4	12.6	0.69
2500	43.7	13.3	0.66
2700	46.0	14.0	0.64
3000	49.3	15.0	0.61
3300	52.6	16.0	0.59
3400	53.6	16.3	0.58
4000	59.9	18.2	0.54
4900	68.8	21.0	0.49
5000	69.8	21.3	0.49
6000	79.3	24.2	0.45
6100	80.2	24.5	0.45
8000	97.4	29.7	0.40



Starwire® 1/4" R flexible

Type	Order number
Standard polyethylene jacket	04SWE0FLEX151
Flame retardant, non corrosive jacket (FRNC), CATV (NEC)	04SWE0FLEX152
Flame retardant, non corrosive jacket (FRNC), UL CMR	04SWE0FLEX153

Mechanical characteristics			
Inner conductor	copper wire	2.38 mm	0.094 in
Dielectric	foamed PE	6.4 mm	0.252 in
Diameter over outer conductor	ring-shaped corrugated copper tube	7.5 mm	0.295 in
Diameter over outer jacket	PE	8.8 mm	0.346 in
	FRNC	8.7 mm	0.343 in
	FRNC, CMR	8.7 mm	0.343 in
Cable weight	PE (FRNC)	102 (110) kg/km	69(74.4) lb/1000 ft
Tensile strength		600 N	135 lbf
Bending moment		2 Nm	1.47 lbf*ft
Flat plate crush strength		10 N/mm	57 lbf/in
Min. bending radius, single		40 mm	1.57 in
Min. bending radius, repeated		120 mm	4.72 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		0.6 m	1.97 ft
Permissible temperature range, installation (PE)		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, installation (FRNC)		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 55 °C to + 85 °C	- 67 °F to + 185 °F

Electrical characteristics		
Impedance	50 ± 1 Ω	
Relative velocity of propagation	82 %	
Capacitance	80 pF/m	24.4 pF/ft
Inductance	0.195 μH/m	0.06 μH/ft
Maximum operating frequency	15.8 GHz	
Cut off frequency	19 GHz	
Peak power rating	13 kW	
DC breakdown voltage	2200 V	
Jacket spark, volts RMS	5000 V	
Inner conductor DC-resistance	5.95 Ω/km	1.82 Ω/1000 ft
Outer conductor DC-resistance	3.5 Ω/km	1.07 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
30	2.29	0.70	3.30
50	2.97	0.91	2.54
88	3.98	1.21	1.91
100	4.25	1.30	1.79
108	4.43	1.35	1.72
150	5.25	1.60	1.45
174	5.68	1.73	1.34
200	6.11	1.86	1.25
300	7.57	2.31	1.01
400	8.82	2.69	0.87
450	9.39	2.86	0.82
500	9.94	3.03	0.77
512	10.1	3.07	0.77
600	11.0	3.34	0.71
700	11.9	3.63	0.65
800	12.8	3.91	0.61
824	13.0	3.97	0.60
894	13.6	4.15	0.57
900	13.7	4.17	0.57
925	13.9	4.23	0.56
960	14.2	4.32	0.55
1000	14.5	4.42	0.54
1250	16.4	5.00	0.48
1500	18.2	5.54	0.43
1700	19.5	5.94	0.40

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
1800	20.1	6.14	0.39
1900	20.8	6.33	0.38
2000	21.4	6.51	0.37
2100	22.0	6.70	0.36
2200	22.6	6.88	0.35
2300	23.1	7.05	0.34
2500	24.3	7.40	0.33
2700	25.4	7.74	0.31
3000	27.0	8.23	0.30
3300	28.5	8.70	0.29
3400	29.0	8.85	0.28
4000	32.0	9.74	0.25
4900	36.1	11.0	0.22
5000	36.5	11.1	0.22
6000	40.8	12.4	0.20
6100	41.2	12.5	0.20
8000	48.6	14.8	0.17
8800	51.6	15.7	0.16
10000	55.9	17.1	0.15
10200	56.7	17.3	0.15
12000	62.8	19.2	0.13
13400	67.5	20.6	0.12
14000	69.4	21.2	0.12
16000	75.7	23.1	0.11
18000	81.8	24.9	0.10
19000	84.8	25.9	0.10

Starwire® 3/8" S super flexible

Type	Order number
Standard polyethylene jacket	04SWE0SFLX108
Flame retardant, non corrosive jacket (FRNC), UL listed	04SWE0SFLX109
Flame retardant, non corrosive jacket (FRNC), UL CATVR+CMR	04SWE0SFLX110



Mechanical characteristics			
Inner conductor	copper clad aluminium wire	2.6 mm	0.102 in
Dielectric	foamed PE	6.5 mm	0.256 in
Diameter over outer conductor	spiral corrugated copper tube	9.1 mm	0.358 in
Diameter over outer jacket	PE	10.3 mm	0.406 in
	FRNC	10.3 mm	0.406 in
	FRNC, CMR	10.7 mm	0.421 in
Cable weight	PE (FRNC)	125(130) kg/km	84.5(87.9) lb/1000 ft
Tensile strength		600 N	134.9 lbf
Bending moment		2.5 Nm	1.84 lbf*ft
Flat plate crush strength		15 N/mm	85.6 lbf/in
Min. bending radius, single		12.5 mm	0.492 in
Min. bending radius, repeated		25 mm	0.984 in
Number of bends, minimum (typical)		20 (50)	
Recommended hanger spacing		0.6 m	1.97 ft
Permissible temperature range, installation (PE)		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, installation (FRNC)		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 55 °C to + 85 °C	- 67 °F to + 185 °F

Electrical characteristics		
Impedance	50 ± 1 Ω	
Relative velocity of propagation	82 %	
Capacitance	80 pF/m	24.4 pF/ft
Inductance	0.195 µH/m	0.06 µH/ft
Maximum operating frequency	13.4 GHz	
Cut off frequency	17.0 GHz	
Peak power rating	13.5 kW	
DC breakdown voltage	2300 V	
Jacket spark, volts RMS	5000 V	
Inner conductor DC-resistance	5.4 Ω/km	1.65 Ω/1000 ft
Outer conductor DC-resistance	5.6 Ω/km	1.71 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
30	2.12	0.65	3.43
50	2.74	0.84	2.65
88	3.66	1.12	1.98
100	3.91	1.19	1.86
108	4.06	1.24	1.79
150	4.82	1.47	1.51
174	5.20	1.59	1.40
200	5.59	1.71	1.30
300	6.93	2.11	1.05
400	8.08	2.46	0.91
450	8.61	2.62	0.85
500	9.11	2.78	0.81
512	9.23	2.81	0.80
600	10.1	3.07	0.73
700	10.9	3.34	0.68
800	11.8	3.59	0.63
824	12.0	3.65	0.62
894	12.5	3.82	0.59
900	12.6	3.83	0.59
925	12.8	3.89	0.58
960	13.0	3.97	0.57
1000	13.3	4.06	0.56
1250	15.1	4.61	0.49

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
1500	16.8	5.11	0.45
1700	18.0	5.49	0.42
1800	18.6	5.67	0.41
1900	19.2	5.85	0.39
2000	19.8	6.03	0.38
2100	20.3	6.20	0.37
2200	20.9	6.37	0.36
2300	21.5	6.54	0.35
2500	22.5	6.87	0.34
2700	23.6	7.19	0.32
3000	25.1	7.65	0.31
3300	26.6	8.10	0.29
3400	27.0	8.25	0.28
4000	29.8	9.10	0.26
4900	33.8	10.3	0.23
5000	34.2	10.4	0.23
6000	38.3	11.7	0.21
6100	38.7	11.8	0.20
8000	45.9	14.0	0.17
8800	48.8	14.9	0.16
10000	53.1	16.2	0.15
10200	53.8	16.4	0.15
12000	59.8	18.2	0.14
13400	64.4	19.6	0.13



Starwire® 1/2" S super flexible

Type	Order number
Standard polyethylene jacket	04SWE0SFLX111
Flame retardant, non corrosive jacket (FRNC), UL listed	04SWE0SFLX112
Flame retardant, non corrosive jacket (FRNC), UL CATVR+CMR	04SWE0SFLX113

Mechanical characteristics			
Inner conductor	copper clad aluminium wire	3.6 mm	0.142 in
Dielectric	foamed PE	9.1 mm	0.358 in
Diameter over outer conductor	ring-shaped corrugated copper tube	12.3 mm	0.484 in
Diameter over outer jacket	PE	13.5 mm	0.531 in
	FRNC	13.5 mm	0.531 in
	FRNC, CMR	13.9 mm	0.547 in
Cable weight	PE (FRNC)	203(226) kg/km	136.1 (149.5) lb/1000 ft
Tensile strength		1000 N	225 lbf
Bending moment		3 Nm	2.21 lbf*ft
Flat plate crush strength		15 N/mm	85.6 lbf/in
Min. bending radius, single		15 mm	0.59 in
Min. bending radius, repeated		30 mm	1.18 in
Number of bends, minimum (typical)		20 (50)	
Recommended hanger spacing		0.8 m	2.6 ft
Permissible temperature range, installation (PE)		-40 °C to +60 °C	-40 °F to +140 °F
Permissible temperature range, installation (FRNC)		-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
30	1.58	0.48	4.82
50	2.11	0.64	3.72
88	2.89	0.88	2.78
100	3.10	0.94	2.60
108	3.23	0.99	2.50
150	3.87	1.18	2.11
174	4.20	1.28	1.95
200	4.53	1.38	1.81
300	5.67	1.73	1.46
400	6.64	2.02	1.26
450	7.09	2.16	1.18
500	7.52	2.29	1.11
512	7.62	2.32	1.10
600	8.32	2.54	1.01
700	9.07	2.76	0.93
800	9.78	2.98	0.87
824	9.94	3.03	0.85
894	10.4	3.17	0.82
900	10.4	3.18	0.81
925	10.6	3.23	0.80

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
960	10.8	3.30	0.79
1000	11.1	3.38	0.77
1250	12.6	3.84	0.68
1500	14.0	4.26	0.61
1700	15.0	4.58	0.57
1800	15.5	4.74	0.55
1900	16.0	4.89	0.54
2000	16.5	5.04	0.52
2100	17.0	5.18	0.51
2200	17.5	5.33	0.49
2300	17.9	5.47	0.48
2500	18.8	5.74	0.46
2700	19.7	6.01	0.44
3000	21.0	6.40	0.41
3300	22.2	6.78	0.39
3400	22.6	6.90	0.39
4000	25.0	7.61	0.35
4900	28.3	8.62	0.31
5000	28.6	8.73	0.31
6000	32.1	9.77	0.27
6100	32.4	9.88	0.27
8000	38.5	11.7	0.23
8800	40.9	12.5	0.22
10000	44.4	13.5	0.20
10200	45.0	13.7	0.20

Electrical characteristics		
Impedance	50 ± 1 Ω	
Relative velocity of propagation	82 %	
Capacitance	80 pF/m	24.4 pF/ft
Inductance	0.195 µH/m	0.06 µH/ft
Maximum operating frequency	10.2 GHz	
Cut off frequency	13.0 GHz	
Peak power rating	19 kW	
DC breakdown voltage	2500 V	
Jacket spark, volts RMS	5000 V	
Inner conductor DC-resistance	3.0 Ω/km	0.92 Ω/1000 ft
Outer conductor DC-resistance	3.4 Ω/km	1.04 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



Starwire® 1/2" R flexible

Type	Order number
Standard polyethylene jacket	04SWE0FLEX154
Flame retardant, non corrosive jacket (FRNC)	04SWE0FLEX155
Flame retardant, non corrosive jacket (FRNC), UL CATVR+CMR	04SWE0FLEX156

Mechanical characteristics

Inner conductor	copper clad aluminium wire	4.8 mm	0.189 in
Dielectric	foamed PE	12.1mm	0.476 in
Diameter over outer conductor	ring-shaped corrugated copper tube	13.7 mm	0.539 in
Diameter over outer jacket	PE	16.0 mm	0.630 in
	FRNC	16.0 mm	0.630 in
	FRNC, CMR	15.3 mm	0.602 in
Cable weight	PE (FRNC)	235(274) kg/km	157.5 (183.6) lb/1000 ft
Tensile strength		1200 N	269 lbf
Bending moment		5 Nm	3.68 lbf*ft
Flat Plate Crush Strength		20 N/mm	114.2 lbf/in
Min. bending radius, single		70 mm	2.75 in
Min. bending radius, repeated		120 mm	4.72 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		0.8 m	2.62 ft
Permissible temperature range, installation (PE)		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, installation (FRNC)		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 55 °C to + 85 °C	- 67 °F to + 185 °F

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	88 %	
Capacitance	76 pF/m	23.2pF/ft
Inductance	0.19 µH/m	0.06 µH/ft
Maximum operating frequency	8.8 GHz	
Cut off frequency	10.0 GHz	
Peak power rating	58 kW	
DC breakdown voltage	4000 V	
Jacket spark, volts RMS	8000 V	
Inner conductor DC-resistance	1.6 Ω/km	0.49 Ω/1000 ft
Outer conductor DC-resistance	1.9 Ω/km	0.58 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	



Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft
30	1.14	0.35	7.31
50	1.48	0.45	5.62
88	1.98	0.60	4.19
100	2.12	0.65	3.92
108	2.20	0.67	3.77
150	2.61	0.80	3.17
174	2.82	0.86	2.93
200	3.04	0.93	2.72
300	3.76	1.15	2.19
400	4.38	1.33	1.87
450	4.66	1.42	1.76
500	4.93	1.50	1.66
512	4.99	1.52	1.64
600	5.44	1.66	1.50
700	5.91	1.80	1.38
800	6.35	1.94	1.28
824	6.46	1.97	1.25
894	6.75	2.06	1.20
900	6.78	2.07	1.19
925	6.88	2.10	1.18

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft
960	7.02	2.14	1.15
1000	7.18	2.19	1.12
1250	8.12	2.48	0.99
1500	8.99	2.74	0.90
1700	9.64	2.94	0.83
1800	9.96	3.04	0.81
1900	10.3	3.13	0.78
2000	10.6	3.22	0.76
2100	10.9	3.31	0.74
2200	11.2	3.40	0.72
2300	11.4	3.49	0.70
2500	12.0	3.66	0.66
2700	12.5	3.82	0.63
3000	13.3	4.06	0.59
3300	14.1	4.30	0.56
3400	14.3	4.37	0.55
4000	15.8	4.81	0.50
4900	17.8	5.42	0.44
5000	18.0	5.49	0.43
6000	20.1	6.13	0.39
6100	20.3	6.19	0.38
8000	24.0	7.31	0.32
8800	25.4	7.75	0.30



Starwire® 7/8" H super flexible

Type	Order number
Standard polyethylene jacket	04SWE0FEED201
Flame retardant, non corrosive jacket (FRNC)	04SWE0FEED202

Mechanical characteristics			
Inner conductor	spiral copper tube	9.3 mm	0.362 in
Dielectric	foamed PE	21.1 mm	0.831 in
Diameter over outer conductor	ring-shaped corrugated copper tube	25.0 mm	0.984 in
Diameter over outer jacket	PE	27.7 mm	1.091 in
	FRNC	27.7 mm	1.091 in
Cable weight	PE (FRNC)	462 (534) kg/km	309.7(357.9) lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		14 Nm	10.3 lbf*ft
Flat plate crush strength		14 N/mm	79.6 lbf/in
Min. bending radius, single		90 mm	3.543 in
Min. bending radius, repeated		125 mm	4.921 in
Number of bends, minimum (typical)		20 (50)	
Recommended hanger spacing		1.0 m	3.28 ft
Permissible temperature range, installation (PE)		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, installation (FRNC)		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 55 °C to + 85 °C	- 67 °F to + 185 °F

Electrical characteristics		
Impedance	50 ± 1 Ω	
Relative velocity of propagation	88 %	
Capacitance	78 pF/m	23.8 pF/ft
Inductance	0.195 µH/m	0.06 µH/ft
Maximum operating frequency	5.0 GHz	
Cut off frequency	5.3 GHz	
Peak power rating	90 kW	
DC breakdown voltage	6000 V	
Jacket spark, volts RMS	8000 V	
Inner conductor DC-resistance	3.0 Ω/km	0.91 Ω/1000 ft
Outer conductor DC-resistance	1.2 Ω/km	0.37 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
30	0.71	0.22	12.30
50	0.92	0.28	9.47
88	1.23	0.37	7.07
100	1.31	0.40	6.62
108	1.36	0.42	6.36
150	1.62	0.49	5.36
174	1.75	0.53	4.96
200	1.88	0.57	4.61
300	2.33	0.71	3.72
400	2.72	0.83	3.19
450	2.90	0.88	2.99
500	3.06	0.93	2.83
512	3.10	0.95	2.79
600	3.38	1.03	2.56
700	3.68	1.12	2.36
800	3.96	1.21	2.19
824	4.02	1.23	2.16
894	4.21	1.28	2.06
900	4.22	1.29	2.06
925	4.29	1.31	2.03

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
960	4.38	1.33	1.98
1000	4.48	1.37	1.94
1250	5.07	1.55	1.71
1500	5.62	1.71	1.54
1700	6.03	1.84	1.57
1800	6.23	1.90	1.39
1900	6.43	1.96	1.35
2000	6.62	2.02	1.31
2100	6.81	2.08	1.27
2200	6.99	2.13	1.24
2300	7.18	2.19	1.21
2500	7.53	2.30	1.16
2700	7.88	2.40	1.11
3000	8.38	2.55	1.04
3300	8.86	2.70	0.99
3400	9.02	2.75	0.96
4000	9.94	3.03	0.87
4900	11.23	3.42	0.77

Starwire® 7/8" R flexible

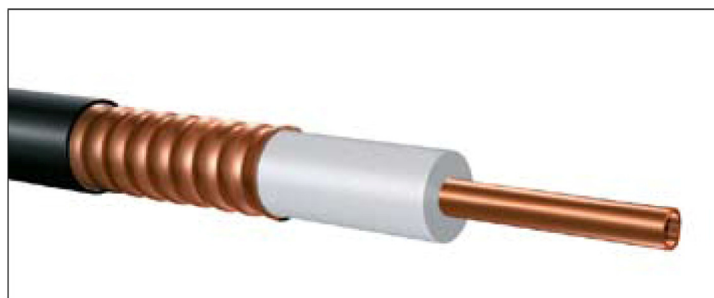
Type	Order number
Standard polyethylene jacket	04SWE0FLEX157
Flame retardant, non corrosive jacket (FRNC)	04SWE0FLEX158
Flame retardant, non corrosive jacket (FRNC), UL CATVR+CMR	04SWE0FLEX159

Mechanical characteristics

Inner conductor	copper tube	9.13 mm	0.359 in
Dielectric	foamed PE	22.5 mm	0.886 in
Diameter over outer conductor	ring-shaped corrugated copper tube	25.0 mm	0.984 in
Diameter over outer jacket	PE	27.7 mm	1.091 in
	FRNC	27.7 mm	1.091 in
	FRNC, CMR	27.3 mm	1.075 in
Cable weight	PE (FRNC)	495 (564) kg/km	331.8 (378.0) lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		18 Nm	13.27 lbf*ft
Flat plate crush strength		14 N/mm	79.9 lbf/in
Min. bending radius, single		120 mm	4.724 in
Min. bending radius, repeated		240 mm	9.449 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		1.0 m	3.28 ft
Permissible temperature range, installation (PE)		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, installation (FRNC)		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 55 °C to + 85 °C	- 67 °F to + 185 °F

Electrical characteristics

Impedance	50 ± 1Ω	
Relative velocity of propagation	88 %	
Capacitance	76 pF/m	23.2pF/ft
Inductance	0.190 μH/m	0.06 μH/ft
Maximum operating frequency	5.0 GHz	
Cut off frequency	5.3 GHz	
Peak power rating	91 kW	
DC breakdown voltage	6000 V	
Jacket spark, volts RMS	8000 V	
Inner conductor DC-resistance	1.65 Ω/km	0.5 Ω/1000 ft
Outer conductor DC-resistance	1.3 Ω/km	0.4 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	



Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
30	0.61	0.19	17.4
50	0.81	0.25	13.3
88	1.09	0.33	9.83
100	1.17	0.36	9.17
108	1.21	0.37	8.80
150	1.45	0.44	7.35
174	1.57	0.48	6.78
200	1.69	0.51	6.27
300	2.10	0.64	4.99
400	2.45	0.75	4.24
450	2.61	0.80	3.96
500	2.76	0.84	3.72
512	2.80	0.85	3.67
600	3.05	0.93	3.34
700	3.32	1.01	3.05
800	3.57	1.09	2.82
824	3.63	1.11	2.77
894	3.80	1.16	2.63
900	3.81	1.16	2.62
925	3.87	1.18	2.58
960	3.95	1.20	2.52

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
1000	4.04	1.23	2.46
1250	4.58	1.40	2.14
1500	5.08	1.55	1.91
1700	5.45	1.66	1.77
1800	5.63	1.72	1.70
1900	5.81	1.77	1.64
2000	5.98	1.82	1.59
2100	6.15	1.87	1.54
2200	6.32	1.93	1.50
2300	6.48	1.98	1.45
2500	6.80	2.07	1.38
2700	7.11	2.17	1.31
3000	7.57	2.31	1.22
3300	8.00	2.44	1.14
3400	8.15	2.48	1.12
4000	8.97	2.73	1.00
4900	10.1	3.09	0.88
5000	10.3	3.13	0.86



Starwire® 7/8" R flexible, low loss

Type	Order number
Standard polyethylene jacket	04SWE0LLOS231
Flame retardant, non corrosive jacket (FRNC)	04SWE0LLOS232

Mechanical characteristics			
Inner conductor	copper tube	9.3 mm	0.366 in
Dielectric	foamed PE	22.5 mm	0.886 in
Diameter over outer conductor	ring-shaped corrugated copper tube	25.0 mm	0.984 in
Diameter over outer jacket	PE	27.7 mm	1.091 in
	FRNC	27.7 mm	1.091 in
Cable weight	PE (FRNC)	495 (564) kg/km	331.8(378.0)lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		18 Nm	13.27 lbf*ft
Flat plate crush strength		14 N/mm	79.9 lbf/in
Min. bending radius, single		120 mm	4.724 in
Min. bending radius, repeated		240 mm	9.449 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		1.0 m	3.28 ft
Permissible temperature range, installation (PE)		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, installation (FRNC)		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 55 °C to + 85 °C	- 67 °F to + 185 °F

Electrical characteristics		
Impedance	50 ± 1 Ω	
Relative velocity of propagation	90 %	
Capacitance	76 pF/m	23.2pF/ft
Inductance	0.190 µH/m	0.058 µH/ft
Maximum operating frequency	5.0 GHz	
Cut off frequency	5.2 GHz	
Peak power rating	90 kW	
DC breakdown voltage	4000 V	
Jacket spark, volts RMS	8000 V	
Inner conductor DC-resistance	1.65 Ω/km	0.5 Ω/1000 ft
Outer conductor DC-resistance	1.3 Ω/km	0.4 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
30	0.61	0.19	17.4
50	0.78	0.24	13.3
88	1.04	0.31	9.83
100	1.11	0.34	9.17
108	1.16	0.35	8.80
150	1.37	0.42	7.35
174	1.48	0.45	6.78
200	1.59	0.48	6.27
300	1.97	0.60	4.99
400	2.29	0.70	4.24
450	2.44	0.74	3.96
500	2.58	0.79	3.72
512	2.61	0.80	3.67
600	2.84	0.87	3.34
700	3.09	0.94	3.05
800	3.32	1.01	2.82
824	3.37	1.03	2.77

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
894	3.52	1.07	2.63
900	3.54	1.08	2.62
925	3.59	1.09	2.58
960	3.66	1.12	2.52
1000	3.75	1.14	2.46
1250	4.24	1.29	2.14
1500	4.69	1.43	1.91
1700	5.03	1.53	1.77
1800	5.19	1.58	1.70
1900	5.35	1.63	1.64
2000	5.51	1.68	1.59
2100	5.66	1.73	1.54
2200	5.81	1.77	1.50
2300	5.97	1.82	1.45
2500	6.25	1.91	1.38
2700	6.53	1.99	1.31
3000	6.97	2.12	1.22
3300	7.35	2.24	1.14
3400	7.48	2.28	1.12
4000	8.22	2.51	1.00
4900	9.28	2.83	0.88
5000	9.39	2.86	0.86

Starwire® 1 1/4" R flexible

Type	Order number
Standard polyethylene jacket	04SWE0FLEX160
Flame retardant, non corrosive jacket (FRNC)	04SWE0FLEX161
Flame retardant, non corrosive jacket (FRNC), UL CMR	04SWE0FLEX162

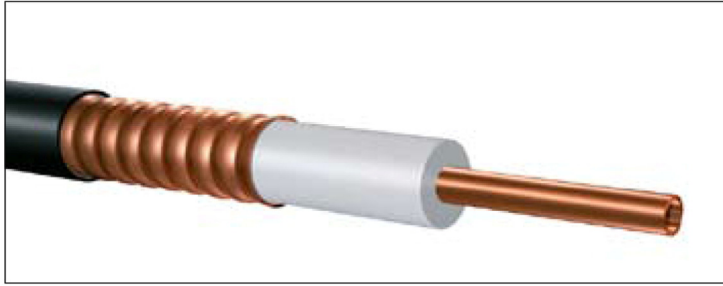


Mechanical characteristics			
Inner conductor	copper tube	12.7 mm	0.500 in
Dielectric	foamed PE	32.5 mm	1.280 in
Diameter over outer conductor	ring-shaped corrugated copper tube	36.0 mm	1.417 in
Diameter over outer jacket	PE	39.5 mm	1.555 in
	FRNC	39.5 mm	1.555 in
	FRNC, CMR	38.3 mm	1.508 in
Cable weight	PE (FRNC)	881(987) kg/km	590.5(661.5)lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		50 Nm	36.87 lbf*ft
Flat plate crush strength		14 N/mm	79.9 lbf/in
Min. bending radius, single		200 mm	7.87 in
Min. bending radius, repeated		380 mm	14.96 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		1.2 m	3.93 ft
Permissible temperature range, installation (PE)	- 40 °C to + 60 °C	- 40 °F to + 140 °F	
Permissible temperature range, installation (FRNC)	- 25 °C to + 60 °C	- 13 °F to + 140 °F	
Permissible temperature range, operation	- 55 °C to + 85 °C	- 67 °F to + 185 °F	

Electrical characteristics		
Impedance	50 ± 1 Ω	
Relative velocity of propagation	88 %	
Capacitance	78 pF/m	23.2 pF/ft
Inductance	0.190 μH/m	0.06 μH/ft
Maximum operating frequency	3.3 GHz	
Cut off frequency	3.7 GHz	
Peak power rating	200 kW	
DC breakdown voltage	9000 V	
Jacket spark, volts RMS	10000 V	
Inner conductor DC-resistance	1.25 Ω/km	0.38 Ω/1000 ft
Outer conductor DC-resistance	0.6 Ω/km	0.18 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft
30	0.44	0.13	24.6
50	0.57	0.18	19.1
88	0.77	0.24	13.5
100	0.82	0.25	12.9
108	0.86	0.26	12.5
150	1.02	0.31	10.3
174	1.11	0.34	9.42
200	1.19	0.36	8.81
300	1.49	0.45	7.17
400	1.74	0.53	6.03
450	1.86	0.57	5.62
500	1.97	0.60	5.27
512	2.00	0.61	5.19
600	2.18	0.67	4.71
700	2.38	0.73	4.27
800	2.57	0.79	3.93

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft
824	2.62	0.80	3.85
894	2.74	0.84	3.66
900	2.75	0.84	3.64
925	2.80	0.85	3.58
960	2.86	0.87	3.50
1000	2.93	0.89	3.40
1250	3.34	1.02	2.94
1500	3.72	1.13	2.61
1700	4.01	1.22	2.40
1800	4.15	1.26	2.31
1900	4.29	1.31	2.22
2000	4.42	1.35	2.15
2100	4.55	1.39	2.07
2200	4.69	1.43	2.01
2300	4.82	1.47	1.95
2500	5.07	1.55	1.84
2700	5.32	1.62	1.74
3000	5.68	1.73	1.62
3300	6.03	1.84	1.51



Starwire® 1 1/4" R flexible, low loss

Type	Order number
Standard polyethylene jacket	04SWE0LLOS233
Flame retardant, non corrosive jacket (FRNC)	04SWE0LLOS234

Mechanical characteristics			
Inner conductor	copper tube	12.9 mm	0.500 in
Dielectric	foamed PE	32.5 mm	1.280 in
Diameter over outer conductor	ring-shaped corrugated copper tube	36.0 mm	1.417 in
Diameter over outer jacket	PE	39.5 mm	1.555 in
	FRNC	39.5 mm	1.555 in
Cable weight	PE (FRNC)	770(987) kg/km	234.7(300.8) lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		50 Nm	36.87 lbf*ft
Flat plate crush strength		14 N/mm	79.9 lbf/in
Min. bending radius, single		200 mm	7.87 in
Min. bending radius, repeated		380 mm	14.96 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		1.2 m	3.93 ft
Permissible temperature range, installation (PE)		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, installation (FRNC)		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 55 °C to + 85 °C	- 67 °F to + 185 °F

Electrical characteristics		
Impedance	50 ± 1 Ω	
Relative velocity of propagation	90 %	
Capacitance	78 pF/m	23.2 pF/ft
Inductance	0.190 μH/m	0.06 μH/ft
Maximum operating frequency	3.3 GHz	
Cut off frequency	3.7 GHz	
Peak power rating	200 kW	
DC breakdown voltage	9000 V	
Jacket spark, volts RMS	10000 V	
Inner conductor DC-resistance	1.25 Ω/km	0.38 Ω/1000 ft
Outer conductor DC-resistance	0.6 Ω/km	0.18 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
30	0.43	0.13	24.6
50	0.53	0.17	19.1
88	0.74	0.23	13.5
100	0.79	0.24	12.9
108	0.83	0.25	12.5
150	0.98	0.30	10.3
174	1.06	0.32	9.42
200	1.14	0.35	8.81
300	1.42	0.43	7.17
400	1.66	0.50	6.03
450	1.77	0.54	5.62
500	1.87	0.57	5.27
512	1.90	0.58	5.19
600	2.07	0.63	4.71
700	2.25	0.69	4.27
800	2.43	0.74	3.93
824	2.47	0.75	3.85
894	2.58	0.79	3.66

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
900	2.59	0.79	3.64
925	2.63	0.80	3.58
960	2.69	0.82	3.50
1000	2.75	0.84	3.40
1250	3.12	0.95	2.94
1500	3.47	1.06	2.61
1700	3.73	1.14	2.40
1800	3.86	1.18	2.31
1900	3.98	1.21	2.22
2000	4.10	1.25	2.15
2100	4.22	1.29	2.07
2200	4.34	1.32	2.01
2300	4.46	1.36	1.95
2500	4.69	1.43	1.84
2700	4.91	1.50	1.74
3000	5.23	1.59	1.62
3300	5.54	1.69	1.51

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



Starwire® 1 5/8" R flexible

Type	Order number
Standard polyethylene jacket	04SWE0FLEX163
Flame retardant, non corrosive jacket (FRNC)	04SWE0FLEX164
Flame retardant, non corrosive jacket (FRNC), UL CMR	04SWE0FLEX165

**Mechanical characteristics**

Inner conductor	spiral corrugated copper wire	17.3 mm	0.681 in
Dielectric	foamed PE	43.5 mm	1.713 in
Diameter over outer conductor	ring-shaped corrugated copper tube	46.5 mm	1.83 in
Diameter over outer jacket	PE	50.5 mm	1.988 in
	FRNC	50.5 mm	1.988 in
	FRNC, CMR	49.5 mm	1.949 in
Cable weight	PE (FRNC)	1300(1490) kg/km	871.3 (998.7) lb/1000 ft
Tensile strength		2000 N	449 lbf
Bending moment		68 Nm	50.15 lbf*ft
Flat plate crush strength		20 N/mm	114.2 lbf/in
Min. bending radius, single		300 mm	11.81 in
Min. bending radius, repeated		510 mm	20 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		1.2 m	3.93 ft
Permissible temperature range, installation (PE)		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, installation (FRNC)		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 55 °C to + 85 °C	- 67 °F to + 185 °F

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	88 %	
Capacitance	76 pF/m	23.2 pF/ft
Inductance	0.19 μH/m	0.06 μH/ft
Maximum operating frequency	2.7 GHz	
Cut off frequency	3.0 GHz	
Peak power rating	300 kW	
DC breakdown voltage	11000 V	
Jacket spark, volts RMS	10000 V	
Inner conductor DC-resistance	1.5 Ω/km	0.46 Ω/1000 ft
Outer conductor DC-resistance	0.5 Ω/km	0.15 Ω/1000 ft
Return loss 400-500 MHz	26 dB	
Return loss 800-1000 MHz	26 dB	
Return loss 1700-2700 MHz	26 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
30	0.37	0.11	36.7
50	0.47	0.14	27.8
88	0.64	0.19	20.3
100	0.68	0.21	18.9
108	0.71	0.22	18.0
150	0.84	0.26	14.9
174	0.91	0.28	13.7
200	0.99	0.30	12.6
300	1.23	0.38	9.92
400	1.45	0.44	8.32
450	1.55	0.47	7.73
500	1.65	0.50	7.24
512	1.67	0.51	7.13
600	1.83	0.56	6.45
700	2.00	0.61	5.84

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
800	2.17	0.66	5.35
824	2.21	0.67	5.25
894	2.32	0.71	4.97
900	2.33	0.71	4.95
925	2.36	0.72	4.86
960	2.42	0.74	4.74
1000	2.48	0.76	4.62
1250	2.84	0.87	3.97
1500	3.18	0.97	3.51
1700	3.44	1.05	3.22
1800	3.56	1.09	3.09
1900	3.69	1.12	2.97
2000	3.81	1.16	2.87
2100	3.93	1.20	2.77
2200	4.05	1.23	2.68
2300	4.16	1.27	2.60
2500	4.40	1.34	2.45



Starwire® 1 5/8" R flexible, low loss

Type	Order number
Standard polyethylene jacket	04SWE0LLOS235
Retardant, non corrosive jacket (FRNC)	04SWE0LLOS236

Mechanical characteristics			
Inner conductor	spiral corrugated copper wire	17.3 mm	0.681 in
Dielectric	foamed PE	43.5 mm	1.713 in
Diameter over outer conductor	ring-shaped corrugated copper tube	46.5 mm	1.83 in
Diameter over outer jacket	PE	49.5 mm	1.949 in
	FRNC	50.5 mm	1.988 in
Cable weight	PE (FRNC)	1150(1390) kg/km	770.8(931.6) lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		68 Nm	50.15 lbf*ft
Flat plate crush strength		20 N/mm	114.2 lbf/in
Min. bending radius, single		300 mm	11.81 in
Min. bending radius, repeated		510 mm	20 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		1.2 m	3.93 ft
Permissible temperature range, installation (PE)		- 40 °C to + 60 °C	- 40 °F to + 140 °F
Permissible temperature range, installation (FRNC)		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 55 °C to + 85 °C	- 67 °F to + 185 °F

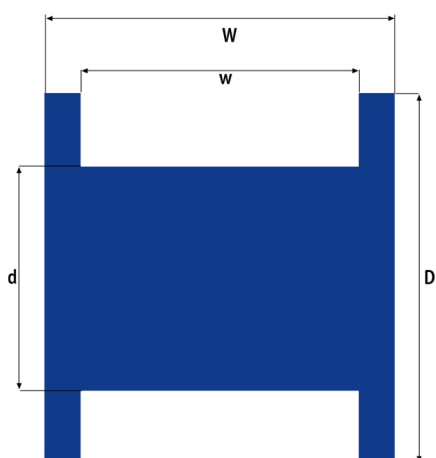
Electrical characteristics		
Impedance	50 ± 1 Ω	
Relative velocity of propagation	90 %	
Capacitance	76 pF/m	23.2 pF/ft
Inductance	0.190 μH/m	0.058 μH/ft
Maximum operating frequency	2.7 GHz	
Cut off frequency	3.0 GHz	
Peak power rating	290 kW	
DC breakdown voltage	7000 V	
Jacket spark, volts RMS	10000 V	
Inner conductor DC-resistance	1.5 Ω/km	0.46 Ω/1000 ft
Outer conductor DC-resistance	0.5 Ω/km	0.15 Ω/1000 ft
Return loss 400-500 MHz	26 dB	
Return loss 800-1000 MHz	26 dB	
Return loss 1700-2700 MHz	26 dB	

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
MHz	dB/100m	dB/100ft	kW
30	0.34	0.10	36.7
50	0.44	0.14	27.8
88	0.60	0.18	20.3
100	0.64	0.20	18.9
108	0.67	0.20	18.0
150	0.79	0.24	14.9
174	0.86	0.26	13.7
200	0.93	0.28	12.6
300	1.15	0.35	9.92
400	1.35	0.41	8.32
450	1.44	0.44	7.73
500	1.53	0.46	7.24
512	1.55	0.47	7.13
600	1.69	0.51	6.45
700	1.84	0.56	5.84

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
MHz	dB/100m	dB/100ft	kW
800	1.98	0.60	5.35
824	2.02	0.61	5.25
894	2.11	0.64	4.97
900	2.12	0.65	4.95
925	2.15	0.66	4.86
960	2.20	0.67	4.74
1000	2.25	0.69	4.62
1250	2.56	0.78	3.97
1500	2.84	0.87	3.51
1700	3.06	0.93	3.22
1800	3.16	0.96	3.09
1900	3.26	0.99	2.97
2000	3.36	1.02	2.87
2100	3.46	1.05	2.77
2200	3.56	1.08	2.68
2300	3.65	1.11	2.60
2500	3.84	1.17	2.45

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Packaging



Starwire® Coaxial cables with corrugated outer conductor are manufactured and shipped on disposable wooden drums, which are fastened to pallets for transportation. These wooden drums provide optimal protection for the cables and are also easy to handle during loading and processing.

These Starwire® Coaxial cables can also be supplied pre assembled and cut to customer specified lengths. Cut-to-length cables are shipped either on drums or in special cable boxes.

Cable type	Max. cable length	Outer dimension D	Drum dimension d	Outer width W	Inner width w	Drum weight	Drum freight
	[m]	[cm]	[cm]	[cm]	[cm]	[kg]	[m³]
Starwire® 1/6" S	500	40	15	23	18	2	0.03
Starwire® 1/5" S	1000	59	30	45	40	14	0.13
Starwire® 1/4" S	1000	70	35.5	47.5	40	15	0.20
Starwire® 1/4" R	500	59	30	45	40	14	0.13
Starwire® 3/8" S	500	70	35.5	47.5	40	15	0.20
Starwire® 1/2" S	500	80	40	47.5	40	18	0.25
Starwire® 1/2" R	500	90	45	51.5	44	24	0.33
Starwire® 7/8" H	500	100	50	105	95	65	0.83
Starwire® 7/8" R	500	100	50	105	95	65	0.83
Starwire® 1-1/4" R	500	160	90	100	91	125	2.01
Starwire® 1-5/8" R	500	192	108	110	98	190	3.20

Cable type	Max. cable length	Outer dimension D	Drum dimension d	Outer width W	Inner width w	Drum weight	Drum freight
	[m]	[cm]	[cm]	[cm]	[cm]	[kg]	[m³]
Starwire® 1/4" S	250	40	15	43	30	2.3	0.05
Starwire® 1/4" R	250	40	15	43	30	2.3	0.05
Starwire® 3/8" S	250	40	15	40	38	2.0	0.05
Starwire® 1/2" S	250	50	15	43	40	3.0	0.08
Starwire® 1/2" R	250	71	35	44	40	8.5	0.17
Starwire® 7/8" H	250	95	56	75	71	30	0.53
Starwire® 7/8" R	250	95	56	75	71	30	0.53
Starwire® 1-1/4" R	250	140	80	75	67	65	1.15
Starwire® 1-5/8" R	250	190	125	75	65	110	2.13

For planking of drum, add 6 cm to the outer diameter D



Overview Starwire® Coaxial cables with braided outer conductor and related Technical Characteristics

Starwire® Coaxial Cables

braided outer conductor

Type	Inner conductor	Outer conductor	Jacket options	Order number
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Single braid

Starwire® 58 (equivalent to RG 58)	Stranded tinned copper wire	Shield braiding of tinned copper wires	FRNC	04SWE0SBRD401
Starwire® 174 (equivalent to RG 174)	Bare copper-clad steel stranded wire	Shield braiding of tinned copper wires	FRNC	04SWE0SBRD402
Starwire® 213 (equivalent to RG 213)	Stranded bare copper wire	Shield braiding of tinned copper wires	FRNC	04SWE0SBRD403

Foil and single braid

Starwire® 195	Stranded bare copper wire	Bonded alulamine foil overlapped, shield braiding of tinned copper wires	PE	04SWE0FSBD501
			FRNC	04SWE0FSBD502
			PVC	04SWE0FSBD503
Starwire® 200	Bare copper wire	Bonded alulamine foil overlapped, shield braiding of tinned copper wires	PE	04SWE0FSBD504
			FRNC	04SWE0FSBD505
			PVC	04SWE0FSBD506
Starwire® 240	Bare copper wire	Bonded alulamine foil overlapped, shield braiding of tinned copper wires	PE	04SWE0FSBD507
			FRNC	04SWE0FSBD508
			PVC	04SWE0FSBD509
Starwire® 300	Copper-clad aluminium wire	Bonded alulamine foil overlapped, shield braiding of tinned copper wires	PE	04SWE0FSBD510
			FRNC	04SWE0FSBD511
			PVC	04SWE0FSBD512
Starwire® 400	Copper-clad aluminium wire	Bonded alulamine foil overlapped, shield braiding of tinned copper wires	PE	04SWE0FSBD513
			FRNC	04SWE0FSBD514
			PVC	04SWE0FSBD515

Double braid

Starwire® 214 (equivalent to RG 214)	Stranded silver-plated wire	Two shield braidings of silver-plated copper wires	FRNC	04SWE0DBRD451
Starwire® 223 (equivalent to RG 223)	Silver-plated copper wire	Two shield braidings of silver-plated copper wires	FRNC	04SWE0DBRD452

FRNC = Flame Retardant Non Corrosive (halogene free)
PE = Polyethylene
PVC = Polyvinylchloride



Starwire® 58 single braid (equivalent to RG 58)

Type	Order number
Flame retardant, non corrosive jacket (FRNC)	04SWE0SBRD401



Mechanical characteristics			
Inner conductor	stranded tinned copper wire	0.93 mm	0.037 in
Dielectric	PE	2.85 mm	0.112 in
Shield	braid of tinned copper wires	Coverage about 80%	
Diameter over shield		3.4 mm	0.134 in
Diameter over outer jacket		4.9 mm	0.193 in
Cable weight		34 kg/km	23 lb/1000ft
Min. bending radius, single		15 mm	0.579 in
Min. bending radius, repeated		30 mm	1.157 in
Permissible temperature range, installation		– 25 °C to +60 °C	– 13 °F to +140 °F
Permissible temperature range, operation		– 40 °C to +80 °C	– 40 °F to +176 °F

Electrical characteristics		
Impedance	50 ± 2 Ω	
Relative velocity of propagation	66 %	
Capacitance	105 pF/m	32 pF/ft
Inductance	0.250 μH/m	0.06 μH/ft
Maximum operating frequency	25 GHz	
Cut off frequency	33 GHz	
Peak power rating	2 kW	
DC breakdown voltage	2000 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	37 Ω/km	11.29 Ω/1000 ft
Outer conductor DC-resistance	18 Ω/km	5.47 Ω/1000 ft
Return loss 800 – 2200 MHz	26 dB	

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m	
30	9.11	2.78	0.31
50	12.0	3.7	0.24
88	16.57	5.05	0.18
100	17.0	5.2	0.17
108	18.54	5.65	0.17
150	22.21	6.77	0.14
174	24.09	7.35	0.13
200	27.0	8.2	0.12
300	34.0	10.4	0.10
400	38.16	11.64	0.09
450	40.75	12.43	0.08
500	41.0	12.5	0.08
512	43.80	13.36	0.08
600	47.88	14.60	0.07
700	52.23	15.93	0.06
800	56.34	17.18	0.06
824	57.29	17.47	0.06
894	60.02	18.31	0.06
900	60.25	18.38	0.06

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m	
925	61.20	18.67	0.06
960	62.51	19.07	0.06
1000	65.0	19.8	0.05
1250	72.77	22.20	0.05
1500	80.91	24.68	0.04
1700	87.07	26.56	0.04
1800	90.05	27.47	0.04
1900	92.98	28.36	0.04
2000	95.0	29.0	0.04
2100	98.66	30.09	0.04
2200	101.44	30.94	0.04
2300	104.17	31.77	0.04
2500	110.0	33.5	0.03

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



Starwire® 174 single braid (equivalent to RG 174)

Type

Flame retardant, non corrosive jacket (FRNC)

Order number

04SWE0SBRD402

Mechanical characteristics

Inner conductor	bare copper-clad steel stranded wire	0.48 mm	0.019 in
Dielectric	PE	1.5 mm	0.058 in
Shield	braid of tinned copper wires	Coverage about 90%	
Diameter over shield		1.9 mm	0.074 in
Diameter over outer jacket		2.8 mm	0.110 in
Cable weight		12 kg/km	8 lb/1000ft
Min. bending radius, single		8 mm	0.31 in
Min. bending radius, repeated		16 mm	0.63 in
Permissible temperature range, installation		– 25 °C to +60 °C	– 13 °F to +140 °F
Permissible temperature range, operation		– 40 °C to +80 °C	– 40 °F to +176 °F

Electrical characteristics

Impedance	50 ± 2 Ω	
Relative velocity of propagation	66 %	
Capacitance	101 pF/m	30.04 pF/ft
Inductance	0.25 uH/m	0.076 uH/ft
Maximum operating frequency	55 GHz	
Cut off frequency	64 GHz	
Peak power rating	1.5 kW	
DC breakdown voltage	2000 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	350 Ω/km	106.75 Ω/1000 ft
Outer conductor DC-resistance	40 Ω/km	12.2 Ω/1000 ft
Return loss 800 – 2200 MHz	26 dB	

Attenuation values and power ratings

Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
30	14.52	4.43	0.20
50	19.0	5.80	0.16
88	25.34	7.73	0.12
100	27.1	8.27	0.11
108	28.24	8.61	0.11
150	33.64	10.26	0.09
174	36.43	11.11	0.08
200	39.2	11.98	0.08
300	48.9	14.95	0.06
400	57.53	17.55	0.06
450	61.46	18.75	0.05
500	65.2	19.90	0.05
512	66.11	20.16	0.05
600	72.36	22.07	0.05
700	79.06	24.11	0.04
800	85.42	26.05	0.04
824	86.90	26.50	0.04
894	91.14	27.80	0.04
900	91.50	27.91	0.04

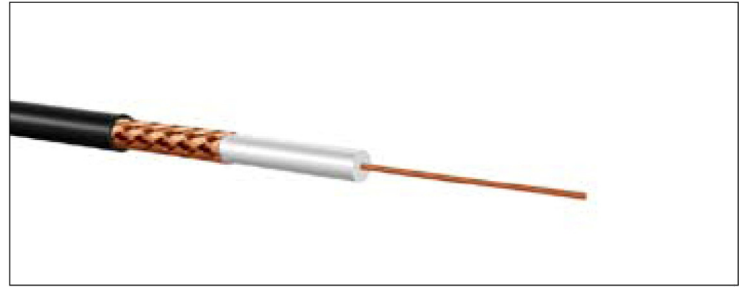
Attenuation values and power ratings

Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
925	92.98	28.36	0.04
960	95.03	28.98	0.04
1000	97.5	29.69	0.04
1250	111.15	33.90	0.03
1500	124.05	37.84	0.03
1700	133.87	40.83	0.03
1800	138.65	42.29	0.03
1900	143.34	43.72	0.03
2000	148.0	45.13	0.03
2100	152.50	46.51	0.02
2200	156.98	47.88	0.02
2300	161.40	49.23	0.02
2500	170.0	51.87	0.02

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature

Starwire® 213 single braid (equivalent to RG 213)

Type	Order number
Flame retardant, non corrosive jacket (FRNC)	04SWE0SBRD403



Mechanical characteristics			
Inner conductor	stranded bare copper wire	2.25 mm	0.089 in
Dielectric	PE	7.3 mm	0.287 in
Shield	braid of bare copper wire	Coverage about 95%	
Diameter over shield		8.0 mm	0.315 in
Diameter over outer jacket		10.3 mm	0.406 in
Cable weight		157 kg/km	106.21 lb/1000ft
Min. bending radius, single		31 mm	1.22 in
Min. bending radius, repeated		62 mm	2.44 in
Permissible temperature range, installation		– 25 °C to +60 °C	– 13 °F to +140 °F
Permissible temperature range, operation		– 40 °C to +80 °C	– 40 °F to +176 °F

Electrical characteristics		
Impedance	50 ± 2 Ω	
Relative velocity of propagation	66 %	
Capacitance	101 pF/m	23.2 pF/ft
Inductance	0.253 μH/m	0.077 μH/ft
Maximum operating frequency	5.8 GHz	
Cut off frequency	13.2 GHz	
Peak power rating	3 kW	
DC breakdown voltage	5000 V	
Jacket spark, volts RMS	5000 V	
Inner conductor DC-resistance	6.2 Ω/km	1.89 Ω/1000 ft
Outer conductor DC-resistance	3.8 Ω/km	1.16 Ω/1000 ft
Return loss 800 – 2200 MHz	26 dB	

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	dB/100m	dB/100ft	
30	4.21	1.28	0.96
50	5.43	1.66	0.74
88	7.24	2.21	0.56
100	7.7	2.36	0.52
108	8.05	2.45	0.50
150	9.55	2.91	0.43
174	10.32	3.15	0.40
200	11.1	3.39	0.37
300	13.8	4.20	0.30
400	16.1	4.91	0.26
450	17.17	5.24	0.25
500	18.2	5.55	0.23
512	18.43	5.62	0.23
600	20.11	6.13	0.21
700	21.92	6.68	0.20
800	23.62	7.20	0.18
824	24.02	7.33	0.18
894	25.15	7.67	0.17
900	25.25	7.70	0.17
925	25.64	7.82	0.17
960	26.19	28.98	0.17

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	dB/100m	dB/100ft	
1000	27.0	8.20	0.16
1250	30.47	9.29	0.15
1500	33.87	10.33	0.13
1700	36.45	11.12	0.13
1800	37.70	11.50	0.12
1900	38.93	11.87	0.12
2000	40.0	12.20	0.12
2100	41.32	12.60	0.11
2200	42.49	12.96	0.11
2300	43.64	13.31	0.11
2500	46.0	14.10	0.10

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



Starwire® 195 foil and single braid

Type	Order number
Standard polyethylene jacket (PE)	04SWE0FSBD501
Flame retardant, non corrosive jacket (FRNC)	04SWE0FSBD502
Standard polyvinylchloride jacket (PVC)	04SWE0FSBD503

Mechanical characteristics			
Inner conductor	bare copper wire	0.95 mm	0.037 in
Dielectric	foamed PE with skin	2.8 mm	0.110 in
Shield	bonded alulamine foil	Coverage about 90 %	
	braid of tinned copper wire		
Diameter over shield		3.4 mm	0.134 in
Diameter over outer jacket		4.9 mm	0.193 in
Cable weight		35 kg/km	23 lb/1000ft
Tensile strength		160 N	35.97 lbf
Min. bending radius, single		20 mm	0.772 in
Min. bending radius, repeated		50 mm	1.930 in
Number of bends, minimum (typical)		50	
Permissible temperature range, installation		– 25 °C to +60 °C	– 13 °F to +140 °F
Permissible temperature range, operation		– 40 °C to +80 °C	– 40 °F to +176 °F

Electrical characteristics		
Impedance	50 ± 2 Ω	
Relative velocity of propagation	78%	
Capacitance	82 pF/m	18.84 pF/ft
Inductance	0.220 μH/m	0.067 μH/ft
Maximum operating frequency	32 GHz	
Cut off frequency	39 GHz	
Peak power rating	2 kW	
DC breakdown voltage	2000 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	26 Ω/km	7.90 Ω/1000 ft
Outer conductor DC-resistance	16 Ω/km	4.80 Ω/1000 ft
Return loss 800 – 2200 MHz	23 dB	

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
30	6.5	2.0	0.76
50	8.4	2.6	0.58
88	11.1	3.4	0.44
100	11.9	3.6	0.41
108	12.4	3.8	0.39
150	14.6	4.4	0.33
174	15.7	4.8	0.31
200	16.9	5.2	0.29
300	20.8	6.3	0.24
400	24.1	7.3	0.20
450	25.5	7.8	0.19
500	27.0	8.2	0.18
512	27.3	8.3	0.18
600	29.6	9.0	0.17
700	32.1	9.8	0.15
800	34.4	10.5	0.14
824	34.9	10.6	0.14
894	36.4	11.1	0.14
900	36.5	11.1	0.13
925	37.0	11.3	0.13
960	37.8	11.5	0.13

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
1000	38.6	11.8	0.13
1250	43.3	13.2	0.11
1500	47.7	14.5	0.10
1700	50.9	15.5	0.10
1800	52.5	16.0	0.09
1900	54.0	16.5	0.09
2000	55.4	16.9	0.09
2100	56.9	17.3	0.09
2200	58.3	17.8	0.09
2300	59.7	18.2	0.08
2500	62.4	19.0	0.08
2700	65.0	19.8	0.08
3000	68.8	21.0	0.07
3300	72.3	22.0	0.07
3400	73.5	22.4	0.07
4000	80.2	24.4	0.06
4900	89.5	27.3	0.06
5000	90.5	27.6	0.06
5800	98.1	29.9	0.05

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature

Starwire® 200 foil and single braid

Type	Order number
Standard polyethylene jacket (PE)	04SWE0FSBD504
Flame retardant, non corrosive jacket (FRNC)	04SWE0FSBD505
Standard polyvinylchloride jacket (PVC)	04SWE0FSBD506



Mechanical characteristics			
Inner conductor	bare copper wire	1.12 mm	0.044 in
Dielectric	foamed PE with skin	2.95 mm	0.116 in
Shield	bonded alulaminare foil	Coverage about 90%	
	braid of tinned copper wire		
Diameter over shield		3.50 mm	0.138 in
Diameter over outer jacket		5.00 mm	0.197 in
Cable weight		36 kg/km	24 lb/1000ft
Tensile strength		185 N	41.59 lbf
Min. bending radius, single		20 mm	0.787 in
Min. bending radius, repeated		50 mm	1.97 in
Number of bends, minimum (typical)		50	
Permissible temperature range, installation		- 25 °C to +60 °C	- 13 °F to +140 °F
Permissible temperature range, operation		- 40 °C to +80 °C	- 40 °F to +176 °F

Electrical characteristics		
Impedance	50 ± 2 Ω	
Relative velocity of propagation	85 %	
Capacitance	80 pF/m	18.38 pF/ft
Inductance	0.195 µH/m	0.060 µH/ft
Maximum operating frequency	33 GHz	
Cut off frequency	38 GHz	
Peak power rating	2.3 kW	
DC breakdown voltage	1000 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	18 Ω/km	5.47 Ω/1000 ft
Outer conductor DC-resistance	16 Ω/km	4.86 Ω/1000 ft
Return loss 800 – 2200 MHz	23 dB	

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
MHz	dB/100m	dB/100ft	kW
30	5.8	1.8	0.94
50	7.5	2.3	0.72
88	10.0	3.0	0.54
100	10.7	3.3	0.50
108	11.1	3.4	0.48
150	13.1	4.0	0.40
174	14.1	4.3	0.37
200	15.1	4.6	0.35
300	18.6	5.7	0.28
400	21.5	6.6	0.24
450	22.8	6.9	0.23
500	24.1	7.3	0.21
512	24.4	7.4	0.21
600	26.5	8.1	0.19
700	28.6	8.7	0.18
800	30.7	9.4	0.17
824	31.1	9.5	0.16
894	32.5	9.9	0.16
900	32.6	9.9	0.16
925	33.0	10.1	0.16
960	33.7	10.3	0.15

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
MHz	dB/100m	dB/100ft	kW
1000	34.4	10.5	0.15
1250	38.6	11.8	0.13
1500	42.4	12.9	0.12
1700	45.3	13.8	0.11
1800	46.6	14.2	0.11
1900	48.0	14.6	0.11
2000	49.3	15.0	0.10
2100	50.6	15.4	0.10
2200	51.8	15.8	0.10
2300	53.0	16.2	0.10
2500	55.4	16.9	0.09
2700	57.7	17.6	0.09
3000	60.9	18.6	0.08
3300	64.1	19.5	0.08
3400	65.1	19.8	0.08
4000	71.0	21.6	0.07
4900	79.0	24.1	0.06
5000	79.9	24.4	0.06
5800	86.5	26.4	0.06

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature





Starwire® 240 foil and single braid

Type	Order number
Standard polyethylene jacket (PE)	04SWE0FSBD507
Flame retardant, non corrosive jacket (FRNC)	04SWE0FSBD508
Standard polyvinylchloride jacket (PVC)	04SWE0FSBD509

Mechanical characteristics			
Inner conductor	bare copper wire	1.4 mm	0.06 in
Dielectric	foamed PE with skin	3.8 mm	0.15 in
Shield	bonded alulamine foil	Coverage about 90%	
	braid of tinned copper wire		
Diameter over shield		4.4 mm	0.17 in
Diameter over outer jacket		6.1 mm	0.240 in
Cable weight		52 kg/km	35 lb/1000ft
Tensile strength		230 N	51.71 lbf
Min. bending radius, single		24 mm	0.96 in
Min. bending radius, repeated		60 mm	2.40 in
Number of bends, minimum (typical)		50	
Permissible temperature range, installation		- 25 °C to +60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 40 °C to +80 °C	- 40 °F to + 176 °F

Electrical characteristics		
Impedance	50 ± 2 Ω	
Relative velocity of propagation	85%	
Capacitance	80 pF/m	18.38 pF/ft
Inductance	0.195 µH/m	0.060 µH/ft
Maximum operating frequency	27 GHz	
Cut off frequency	30 GHz	
Peak power rating	4.2 kW	
DC breakdown voltage	1500 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	12 Ω/Km	3.65 Ω/1000ft
Outer conductor DC-resistance	12.5 Ω/Km	3.80 Ω/1000ft
Return loss 800 – 2200 MHz	23 dB	

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
30	4.4	1.3	1.32
50	5.7	1.7	1.01
88	7.6	2.3	0.75
100	8.1	2.5	0.70
108	8.4	2.6	0.67
150	9.9	3.0	0.56
174	10.7	3.3	0.52
200	11.5	3.5	0.48
300	14.1	4.3	0.39
400	16.3	5.0	0.34
450	17.3	5.3	0.32
500	18.3	5.6	0.30
512	18.5	5.6	0.29
600	20.1	6.1	0.27
700	21.8	6.6	0.25
800	23.3	7.1	0.23
824	23.7	7.2	0.23
894	24.7	7.5	0.22
900	24.8	7.6	0.22
925	25.1	7.7	0.22
960	25.6	7.8	0.21

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
	MHz	dB/100m dB/100ft	
1000	26.2	8.0	0.21
1250	29.4	9.0	0.18
1500	32.4	9.9	0.17
1700	34.6	10.5	0.16
1800	35.6	10.9	0.15
1900	36.7	11.2	0.15
2000	37.7	11.5	0.14
2100	38.7	11.8	0.14
2200	39.6	12.1	0.14
2300	40.6	12.4	0.13
2500	42.4	12.9	0.13
2700	44.2	13.5	0.12
3000	46.8	14.3	0.12
3300	49.2	15.0	0.11
3400	50.0	15.2	0.11
4000	54.6	16.6	0.10
4900	60.9	18.6	0.09
5000	61.6	18.8	0.09
5800	66.8	20.4	0.08

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature

Starwire® 300 foil and single braid

Type	Order number
Standard polyethylene jacket (PE)	04SWE0FSBD510
Flame retardant, non corrosive jacket (FRNC)	04SWE0FSBD511
Standard polyvinylchloride jacket (PVC)	04SWE0FSBD512



Mechanical characteristics			
Inner conductor	copper-clad aluminium wire	1.79 mm	0.070 in
Dielectric	foamed PE with skin	4.8 mm	0.189 in
Shield	bonded alulamine foil	Coverage about 90%	
	braid of tinned copper wire		
Diameter over shield		5.6 mm	0.220 in
Diameter over outer jacket		7.2 mm	0.283 in
Cable weight		48 kg/km	32.2 lb/1000ft
Tensile strength		240 N	53.96 lbf
Min. bending radius, single		29 mm	1.13 in
Min. bending radius, repeated		72 mm	2.83 in
Number of bends, minimum (typical)		50	
Permissible temperature range, installation		- 25 °C to + 60 °C	- 13 °F to + 140 °F
Permissible temperature range, operation		- 40 °C to + 80 °C	- 40 °F to + 176 °F

Electrical characteristics		
Impedance	50 ± 2 Ω	
Relative velocity of propagation	85 %	
Capacitance	78 pF/m	17.92 pF/ft
Inductance	0.195 μH/m	0.060 μH/ft
Maximum operating frequency	21 GHz	
Cut off frequency	24 GHz	
Peak power rating	8.1 kW	
DC breakdown voltage	2000 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	11 Ω/km	3.35 Ω/1000 ft
Outer conductor DC-resistance	8 Ω/km	2.44 Ω/1000 ft
Return loss 800 – 2200 MHz	23 dB	

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
MHz	dB/100m	dB/100ft	kW
30	3.5	1.1	1.41
50	4.5	1.4	1.07
88	6.0	1.8	0.79
100	6.4	2.0	0.74
108	6.7	2.0	0.71
150	7.9	2.4	0.60
174	8.5	2.6	0.55
200	9.1	2.8	0.51
300	11.2	3.4	0.41
400	13.0	4.0	0.35
450	13.8	4.2	0.33
500	14.6	4.4	0.31
512	14.8	4.5	0.31
600	16.1	4.9	0.28
700	17.4	5.3	0.26
800	18.7	5.7	0.24
824	19.0	5.8	0.24
894	19.8	6.0	0.23
900	19.9	6.1	0.23
925	20.2	6.2	0.23
960	20.6	6.3	0.22

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
MHz	dB/100m	dB/100ft	kW
1000	21.0	6.4	0.22
1250	23.6	7.2	0.19
1500	26.0	7.9	0.17
1700	27.8	8.5	0.16
1800	28.7	8.7	0.16
1900	29.5	9.0	0.15
2000	30.3	9.2	0.15
2100	31.1	9.5	0.15
2200	31.9	9.7	0.14
2300	32.7	10.0	0.14
2500	34.2	10.4	0.13
2700	35.6	10.9	0.13
3000	37.7	11.5	0.12
3300	39.7	12.1	0.11
3400	40.4	12.3	0.11
4000	44.1	13.4	0.10
4900	49.4	15.1	0.09
5000	49.9	15.2	0.09
5800	54.2	16.5	0.08

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature





Starwire® 400 foil and single braid

Type	Order number
Standard polyethylene jacket (PE)	04SWE0FSBD513
Flame retardant, non corrosive jacket (FRNC)	04SWE0FSBD514
Standard polyvinylchloride jacket (PVC)	04SWE0FSBD515

Mechanical characteristics			
Inner conductor	copper-clad aluminium wire	2.75 mm	0.108 in
Dielectric	foamed PE with skin	7.2 mm	0.283 in
Shield	bonded alulamine foil	Coverage about 90%	
	braid of tinned copper wire		
Diameter over shield		8.0 mm	0.315 in
Diameter over outer jacket		10.2 mm	0.402 in
Cable weight		100 kg/km	67 lb/1000ft
Tensile strength		420 N	94.43 lbf
Min. bending radius, single		41 mm	1.61 in
Min. bending radius, repeated		102 mm	4.02 in
Number of bends, minimum (typical)		50	
Permissible temperature range, installation		-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-40 °C to +80 °C	-40 °F to +176 °F

Electrical characteristics		
Impedance	50 ± 2 Ω	
Relative velocity of propagation	85%	
Capacitance	78 pF/m	17.92 pF/ft
Inductance	0.195 μH/m	0.060 μH/ft
Maximum operating frequency	12.5 GHz	
Cut off frequency	16 GHz	
Peak power rating	12.9 kW	
DC breakdown voltage	2500 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	5 Ω/km	1.52 Ω/1000ft
Outer conductor DC-resistance	5 Ω/km	1.52 Ω/1000ft
Return loss 800 – 2200 MHz	23 dB	

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
30	2.2	0.7	2.56
50	2.9	0.9	1.94
88	3.8	1.2	1.43
100	4.1	1.2	1.33
108	4.3	1.3	1.28
150	5.0	1.5	1.07
174	5.4	1.7	0.98
200	5.8	1.8	0.91
300	7.2	2.2	0.73
400	8.4	2.6	0.63
450	8.9	2.7	0.59
500	9.4	2.9	0.55
512	9.5	2.9	0.55
600	10.3	3.1	0.50
700	11.2	3.4	0.46
800	12.0	3.7	0.43
824	12.2	3.7	0.42
894	12.8	3.9	0.40
900	12.8	3.9	0.40
925	13.0	4.0	0.40
960	13.2	4.0	0.39

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
1000	13.5	4.1	0.38
1250	15.2	4.6	0.34
1500	16.8	5.1	0.31
1700	18.0	5.5	0.29
1800	18.6	5.7	0.28
1900	19.1	5.8	0.27
2000	19.6	6.0	0.26
2100	20.2	6.2	0.25
2200	20.7	6.3	0.25
2300	21.2	6.5	0.24
2500	22.2	6.8	0.23
2700	23.2	7.1	0.22
3000	24.5	7.5	0.21
3300	25.9	7.9	0.20
3400	26.3	8.0	0.20
4000	28.8	8.8	0.18
4900	32.3	9.8	0.16
5000	32.6	9.9	0.16
5800	35.5	10.8	0.15

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature

Starwire® 214 double braid (equivalent to RG 214)

Type	Order number
Flame retardant, non corrosive jacket (FRNC)	04SWE0DBRD451



Mechanical characteristics			
Inner conductor	stranded silver-plated wire	2.25 mm	0.089 in
Dielectric	PE	7.25 mm	0.285 in
Shield	double braid of silver-plated copper wires	Coverage about 95%	
Diameter over shield		8.9 mm	0.350 in
Diameter over outer jacket		11.1 mm	0.437 in
Cable weight		215 kg/km	144.05 lb/1000ft
Tensile strength		720 N	161.88 lbf
Min. bending radius, single		33 mm	1.30 in
Min. bending radius, repeated		66 mm	2.60 in
Number of bends, minimum (typical)		50	
Permissible temperature range, installation		– 25 °C to +60 °C	– 13 °F to +140 °F
Permissible temperature range, operation		– 40 °C to +80 °C	– 40 °F to +176 °F

Electrical characteristics		
Impedance	50 ± 2 Ω	
Relative velocity of propagation	66 %	
Capacitance	101 pF/m	23.2 pF/ft
Inductance	0.253 μH/m	0.077 μH/ft
Maximum operating frequency	5.8 GHz	
Cut off frequency	13.2 GHz	
Peak power rating	2 kW	
DC breakdown voltage	5000 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	6.2 Ω/km	1.89 Ω/1000 ft
Outer conductor DC-resistance	2.5 Ω/km	0.76 Ω/1000 ft
Return loss 800 – 2200 MHz	26 dB	

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
MHz	dB/100m	dB/100ft	kW
30	2.58	0.79	1.00
50	3.44	1.05	0.77
88	4.79	1.46	0.58
100	5.2	1.58	0.55
108	5.43	1.66	0.52
150	6.66	2.03	0.44
174	7.31	2.23	0.41
200	8.00	2.44	0.38
300	10.4	3.18	0.31
400	12.7	3.87	0.27
450	13.76	4.20	0.26
500	14.8	4.52	0.24
512	15.06	4.59	0.24
600	16.84	5.14	0.22
700	18.81	5.74	0.21
800	20.72	6.32	0.19
824	21.18	6.46	0.19
894	22.48	6.86	0.18
900	22.60	6.89	0.18
925	23.06	7.03	0.18
960	23.70	7.23	0.18

Attenuation values and power ratings			
Frequency	Attenuation		Mean power rating
MHz	dB/100m	dB/100ft	kW
1000	24.4	7.45	0.17
1250	28.89	8.81	0.15
1500	33.21	10.13	0.14
1700	36.59	11.16	0.13
1800	38.26	11.67	0.13
1900	39.92	12.18	0.12
2000	41.6	12.68	0.12
2100	43.20	13.17	0.12
2200	44.82	13.67	0.12
2300	46.43	14.16	0.11
2500	49.6	15.14	0.11

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature





Starwire® 223 double braid (equivalent to RG 223)

Type	Order number
Flame retardant, non corrosive jacket (FRNC)	04SWE0DBRD452

Mechanical characteristics			
Inner conductor	silver-plated copper wire	0.89 mm	0.035 in
Dielectric	PE	2.95 mm	0.116 in
Shield	double braid of tinned copper wires	Coverage about 95%	
Diameter over shield		4.0 mm	0.157 in
Diameter over outer jacket		5.4 mm	0.213 in
Cable weight		58 kg/km	39 lb/1000ft
Tensile strength		250 N	56.21 lbf
Min. bending radius, single		27.0 mm	1.06 in
Min. bending radius, repeated		43 mm	1.70 in
Number of bends, minimum (typical)		50	
Permissible temperature range, installation		- 25 °C to +60 °C	- 13 °F to +140 °F
Permissible temperature range, operation		- 40 °C to +80 °C	- 40 °F to +176 °F

Electrical characteristics		
Impedance	50 ± 2 Ω	
Relative velocity of propagation	66 %	
Capacitance	101 pF/m	23.2 pF/ft
Inductance	0.25 uH/m	0.072 uH/ft
Maximum operating frequency	25 GHz	
Cut off frequency	33 GHz	
Peak power rating	2 kW	
DC breakdown voltage	2000 V	
Jacket spark, volts RMS	2000 V	
Inner conductor DC-resistance	30 Ω/km	9.15 Ω/1000 ft
Outer conductor DC-resistance	7 Ω/km	2.14 Ω/1000 ft
Return loss 800 – 2200 MHz	26 dB	

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
30	6.35	1.94	0.39
50	9.0	2.60	0.30
88	11.72	3.58	0.23
100	13.0	3.84	0.21
108	13.15	4.01	0.21
150	15.81	4.82	0.17
174	17.18	5.24	0.16
200	19.0	5.66	0.15
300	23.0	7.11	0.12
400	27.44	8.37	0.11
450	29.34	8.95	0.10
500	30.0	9.50	0.10
512	31.58	9.63	0.09
600	34.58	10.55	0.09
700	37.79	11.52	0.08
800	40.82	12.45	0.08
824	41.53	12.67	0.07
894	43.54	13.28	0.07
900	43.71	13.33	0.07
925	44.42	13.55	0.07
960	45.39	13.85	0.07

Attenuation values and power ratings			
Frequency MHz	Attenuation		Mean power rating kW
	dB/100m	dB/100ft	
1000	45.0	14.0	0.07
1250	53.02	16.17	0.06
1500	59.10	18.02	0.06
1700	63.70	19.43	0.05
1800	65.94	20.11	0.05
1900	68.13	20.78	0.05
2000	71.0	21.44	0.05
2100	72.40	22.08	0.05
2200	74.49	22.72	0.05
2300	76.54	23.35	0.04
2500	82.0	24.57	0.04
2700	84.49	25.77	0.04
3000	90.21	27.51	0.04
3300	95.75	29.20	0.04
3400	97.56	29.76	0.04
4000	108.13	32.98	0.03
4900	123.15	37.56	0.03
5000	124.77	38.05	0.03
5800	137.42	41.91	0.03

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature

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Symmetric Cables

Starwire® multi-tech cables

The idea of offering the new product identified as “**Starwire®** multi-tech cables” has been conceived to give a prompt answer to the New Remote Radio Head (RRH) Technology whose characteristic is that to install mobile radio stations transceivers close to the antenna.

By combining data, control and power elements in one cluster cable based on copper and fiber-optic technologies as well as possible separated cable types, we are offering a great help to the installers operating in the field.

The interconnection between transceiver unit and antenna is generally provided by a coaxial jumper cable; by using this unique cable, the connection can be implemented by using a personalized cable thus greatly shortening the operating time.

In the following pages of this catalogue you can see just few examples of cable combinations.

Different configurations, appropriate length, association of indoor cables (all with halogen-free and flame-retardant jacket – FRNO) and outdoor cables can be prepared according to your needs.

Do not hesitate to contact us by mail at info@cpeitalia.it or by calling us at +39 (0)2 390961

Starwire® multi-tech cables

Type	Inner conductor	Insulation	Jacket options	Order number
Power				P/n to be defined according to the requested characteristics
Power star-quad copper Starwire® multi-tech cables	Stranded bare copper wire	FRNC	FRNC	
Data & Control				
Data star-quad copper Starwire® multi-tech cables	Bare copper wire	Foamed PE with skin	FRNC	
Control copper Starwire® multi-tech cable with six twisted pair elements	Stranded bare copper wire	FRNC	FRNC	
Data fiber optic indoor duplex cable	Tight buffered fiber (TB), semi-tight fiber (STB) or superstrip (LB)	Strain relief elements: non-metallic (aramid)	FRNC	
Data fiber optic cable with additional rodent protection and central tube (1750N)	Loose tube, gel filled	Armouring: multi-functional E-glass yarn, water-absorbent as strain relief elements and as rodent protection	PE	
Data fiber optic outdoor cable with additional rodent protection and stranded loose tubes	Central strength member with stranding elements, designed as gel filled loose tubes	Armouring: multi-functional, strengthened E-glass yarn, water-absorbent as non-metallic strain relief element and as rodent protection	PE	
Fiber specification: The order number depends on the cable's final configuration with the required fiber specification. Please contact our sales team to find your perfect solution!				
Hybrid				
Starwire® multi-tech cables with Cat 5 element	Stranded bare copper wire	PP	PVC	
Starwire® multi-tech cable with fiber optic elements acc.to ITU-T Rec. G.652 and IEC 60 793-2-50	Stranded bare copper wire / glas optical fiber	PVC / FRNC	PVC	





Starwire® multi-tech cables

Power star-quad copper cable

Construction	
Conductor	4x1x stranded bare copper wire 14 AWG, insulation of FRNC
Core	4 wires twisted
Shield	Shield braiding of tinned copper wires
Jacket	Thermoplastic copolymer (FRNC) black

Temperature range		
Transport and storage	– 40 °C up to +80 °C	– 40 °F up to +176 °F
Installation	– 40 °C up to +80 °C	– 40 °F up to +176 °F
Operation	– 40 °C up to +80 °C	– 40 °F up to +176 °F

Mechanical characteristics		
min. bending radius, single	42 mm	1.654 in
min. bending radius, repeated	84 mm	3.307 in
weight about	207 kg/km	139 lb/1000ft



Application

Power supply of transceiver unit according to RRH technology

Safety Standards

Flame retardant acc. to UL 1581 Sec. 1080 (VW-1)



Starwire® multi-tech cables

Data star-quad copper cable

Construction	
Conductor	4x1x bare copper wire 26 AWG, insulation of foamed PE with skin
Core	4 wires twisted
Shield	Alulamine foil overlapped, shield braiding of tinned copper wires
Jacket	Thermoplastic copolymer (FRNC) black

Temperature range		
Transport and storage	– 40 °C up to +80 °C	– 40 °F up to +176 °F
Installation	– 40 °C up to +80 °C	– 40 °F up to +176 °F
Operation	– 40 °C up to +80 °C	– 40 °F up tp +176 °F

Mechanical characteristics		
min. bending radius, single	27 mm	1.063 in
min. bending radius, repeated	54 mm	2.126 in
weight about	39 kg/km	26 lb/1000ft



Application

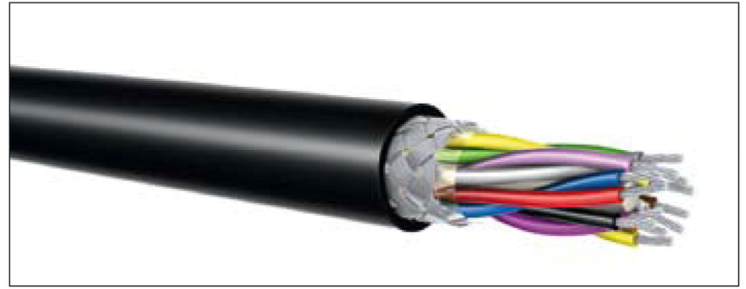
Interconnection of base station (BTS or Node B) and transceiver unit according to RRH technology.

Safety Standards

Flame retardant acc. to IEC 60332-1-2
UL File E116441 Vol. 1 Sec. 10 Page 1
CL2

Starwire® multi-tech cables

Control copper cable with six twisted pair elements



Construction	
Conductor	6x2x stranded tinned copper wire 24 AWG, insulation of FRNC
Core	6 pairs
Shield	Shield braiding of tinned copper wires
Jacket	Thermoplastic copolymer (FRNC) black

Temperature range		
Transport and storage	– 25 °C up to +70 °C	– 13 °F up to +158 °F
Installation	– 25 °C up to +70 °C	– 13 °F up to +158 °F
Operation	– 25 °C up to +70 °C	– 13 °F up tp +158 °F

Mechanical characteristics		
min. bending radius, single	32.4 mm	1.276 in
min. bending radius, repeated	64.8 mm	2.551 in
weight about	87 kg/km	58 lb/1000ft



Application

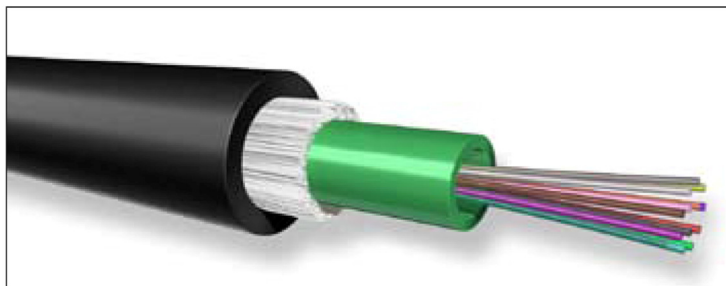
Interconnection of base station (BTS or Node B) and transceiver unit according to RRH technology.

Safety Standards

Flame retardant acc. to UL 1581 Sec. 1080 (VW-1) UL-Style 21286

Starwire® multi-tech cables

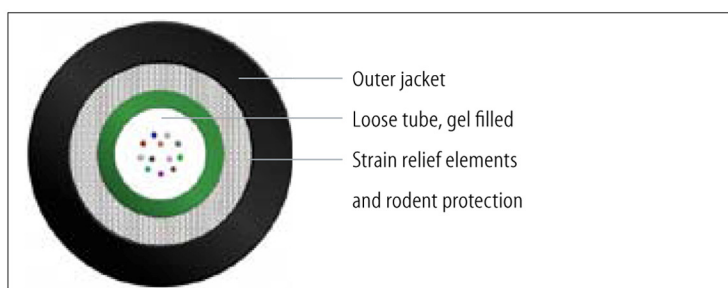
Data fiber optic outdoor cable with additional rodent protection and central tube (1750 N)



Construction	
Cable core	Loose tube, gel filled
Armouring	multi-functional E-glass yarn, water-absorbent as strain relief elements and as rodent protection
Cable jacket	PE-jacket with imprint
Colour of jacket	black

Mechanical characteristics	
min. bending radius	static 15 x outside diameter
	dynamic 20 x outside diameter
max. pull force	long-term 1750 N
max. crush resistance	long-term 1500 N/dm

Temperature range		
Transport and storage	– 25 °C up to +70 °C	– 13 °F up to +158 °F
Installation	– 5 °C up to +50 °C	+23 °F up to +122 °F
Operation	– 20 °C up to +60 °C	– 4 °F up tp +140 °F



Application

Light, flexible and non-metallic outdoor cable for the backbone. For pulling into conduits, installation on cable trays or directly in the ground.

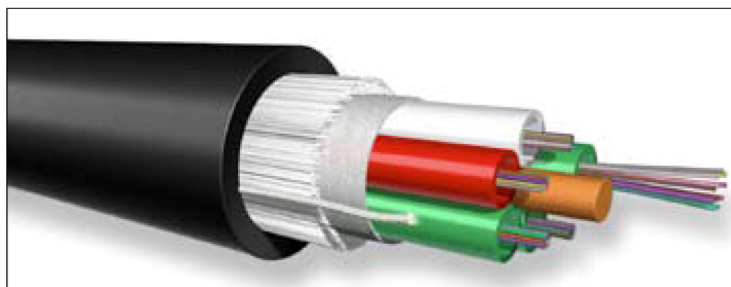
Fire performance

Jacket is halogen-free
No toxic and corrosive fumes

Remarks

The jacket material PE offers good protection against transverse water ingress.

available with different connectors, dimensions, constructions, UL- and conductor-approvals; for further information, please contact our sales team



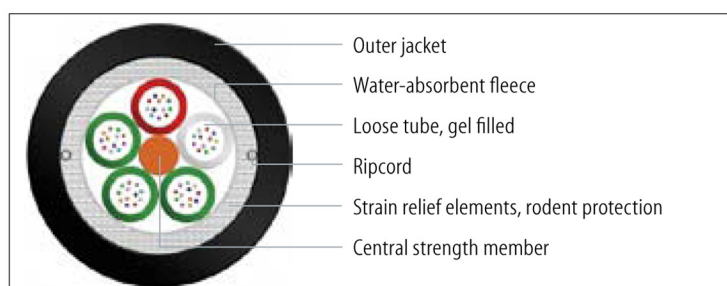
Starwire® multi-tech cables

Data fiber optic outdoor cable with additional rodent protection and stranded loose tubes

Construction	
Cable core	Central strength member with stranding elements, designed as gel filled loose tubes and if necessary fillers
Water-absorbent fleece	
Armouring	multi-functional, strengthened E-glass yarn water-absorbent as non-metallic strain relief element and as rodent protection
Cable jacket	PE-jacket with sinter marking
Colour of jacket	black

Mechanical characteristics	
min. bending radius	static 15 x outside diameter
	dynamic 20 x outside diameter
max. pull force	long-term 4000 N
max. crush resistance	long-term 3000 N/dm

Temperature range		
Transport and storage	– 40 °C up to +70 °C	– 40 °F up to +158 °F
Installation	+23 °C up to +50 °C	– 4 °F up to +122 °F
Operation	– 40 °C up to +60 °C	– 40 °F up to +140 °F



Application

Non-metallic, robust outdoor cable. Installation-friendly because of the cable core kept free of grease. For pulling into conduits, installation on cable trays or directly in the ground.

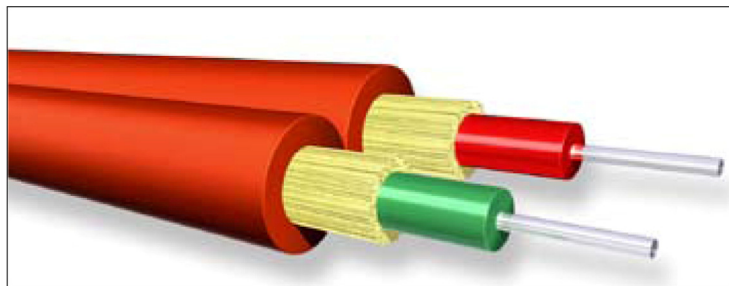
Fire performance

Jacket is halogen-free. No toxic and corrosive fumes.

Remarks

The jacket material PE offers good protection against transverse water ingress. Higher pull forces on request. Also available with aluminium- or corrugated steel tape.

available with different connectors, dimensions, constructions, UL- and conductor-approvals; for further information, please contact our sales team



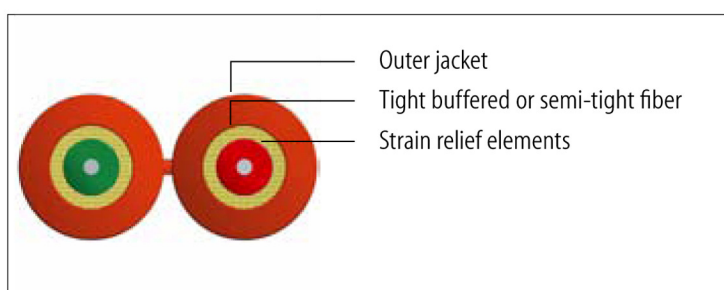
Starwire® multi-tech cables

Data fiber optic indoor duplex cable

Construction	
Cable core	Tight buffered fiber (TB), semi-tight fiber (STB) or superstrip (LB)
Strain relief elements	non-metallic (aramid)
Cable jacket	halogen-free and flame-retardant material
Colour of jacket	orange for multi-mode, yellow for single-mode → other colors possible

Mechanical characteristics	
min. bending radius(over flat side)	static 30 mm
	dynamic 60 mm

Temperature range		
Transport and storage	– 25 °C up to +70 °C	– 13 °F up to +158 °F
Installation	– 5 °C up to +50 °C	+24.8 °F up to +122 °F
Operation	– 10 °C up to +70 °C	+14 °F up to +158 °F



Application

Because of the small diameter and high flexibility, ideal as patch cable in distribution systems as well as for connecting terminals.

Fire performance

Flame retardancy: IEC 60332-1 and IEC 60332-3 Cat. A
Smoke density: IEC 61034
Halogen-free: IEC 60754-2
No toxic and corrosive fumes

Remarks

All duplex cables are available with TB, STB and LB cores.

available with different connectors, dimensions, constructions, UL- and conductor-approvals; for further information, please contact our sales team

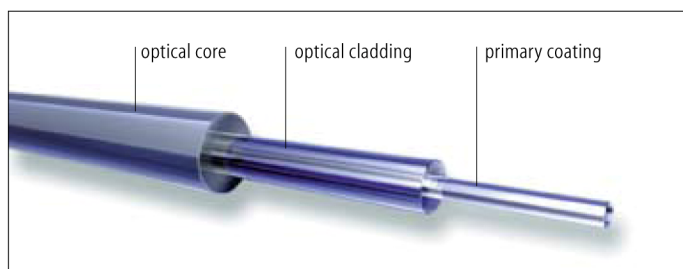
Fiber Specifications for fiber optic cables

Multi-mode fiber G50/125

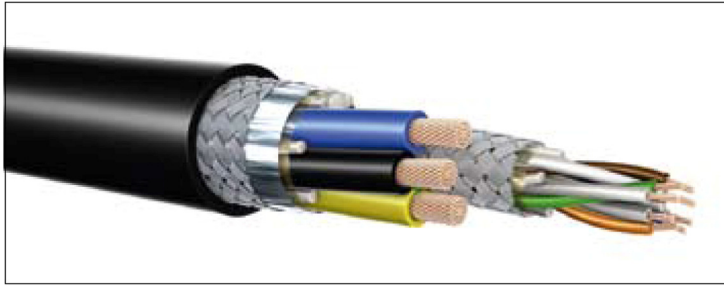
Multi-mode fiber G62,5/125

Single-mode fiber E9/125

matched cladding type



Fiber specification	G50/125		G62,5/125		E9/125	
Geometry/mechanical properties						
Core diameter (μm)	50 ± 2.5		62.5 ± 3		9.2 ± 0.4	
Mode field diameter (at 1310 nm) (μm)					9.2 ± 0.4	
Cladding diameter (μm)	125 ± 2		125 ± 1		125 ± 2	
Coating diameter (μm)	245 ± 10		245 ± 5		245 ± 10	
Core non-circularity (%)	< 5		< 5			
Cladding non-circularity (%)	< 1		< 1		< 1	
Core/Clad concentricity error (μm)	< 1.5		< 1.5		< 0.8	
Eccentricity of coating (μm)	< 10		< 10		< 10	
Screen test	≥100 kpsi		≥100 kpsi		≥100 kpsi	
Transmission properties						
	Fiber type G (OM2)		Fiber type L (OM1)		Fiber type B (OS1)	
Wavelength (nm)	850	1300	850	1300	1310	1550
Attenuation max. (dB/km)	2.7	0.8	3.2	0.9	0.36	0.22
Bandwidth min. (MHz · km)	500	1000	250	600		
Effective group of refraction	1.483	1.478	1.497	1.493	1.4695	1.4701
Numerical aperture	0.200 ± 0.015		0.275 ± 0.015			
Dispersion coefficient max. (ps/nm · km)					3.5	18
Zero dispersion wavelength (nm)					1300 –1322	
Dispersion slope (ps/nm² · km)					≤ 0.092	
Cutoff wavelength (cabled) (nm)					≤ 1250	
Polarization mode dispersion (ps/√km)					≤ 0.1	



Starwire® multi-tech cables

Hybrid copper cable with Ethernet Cat 5 element

Construction	
Conductor	3x1x stranded bare copper wire 14AWG, insulation of PP 4x2x stranded bare copper wire 26AWG, insulation of PP
Core	2 wires twisted to a pair, 4 pairs twisted
Shield	Alulamine foil overlapped, shield braiding of tinned copper wires
Core	3 wires
Shield	Alulamine foil overlapped, shield braiding of tinned copper wires
Jacket	Polyvinylchloride (PVC) black
Diameter	2.1 mm [0.083 in] 3.1 mm [0.122 in] 11.9 ± 0.4 mm [0.469 ± 0.016 in]



Application

Interconnection of base station (BTS or Node B) and transceiver unit according to RRH technology

Safety Standards

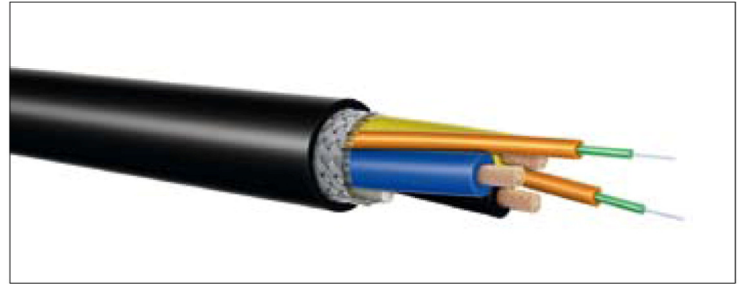
Sunlight resistant acc. to UL 1581
Sec. 1200 Crush resistant acc. to EN 50289-3-5

Temperature range		
Transport and storage	– 40 °C up to +80 °C	– 40 °F up to +176 °F
Installation	– 20 °C up to +80 °C	– 4 °F up to +176 °F
Operation	– 30 °C up to +80 °C	– 22 °F up to +176 °F

Mechanical Characteristics		
min. bending radius, single	59.5 mm	2.343 in
min. bending radius, repeated	119 mm	4.690 in
weight about	233 kg/km	160 lb/1000ft

Starwire® multi-tech cables

Hybrid copper and fiber optic cable



Construction	
Conductor	3 x 1x stranded bare copper wire 14 AWG, insulation of PVC 2 x glas optical fiber insulation of FRNC
Core	3 wires, 2 optical fibers
Shield	Shield braiding of tinned copper wires
Jacket	Polyvinylchloride (PVC) black
Diameter	4.3 mm 0.169 in 2.0 mm 0.079 in 12.2 ± 0.3 mm 0.480 ± 0.012 in



Application

Interconnection of base station
(BTS or Node B) and transceiver unit
according to RRH technology.

Temperature range		
Transport and storage	– 40 °C up to +70 °C	– 40 °F up to +158 °F
Installation	– 20 °C up to +60 °C	– 4 °F up to +140 °F
Operation	– 30 °C up to +70 °C	– 22 °F up tp +158 °F

Mechanical Characteristics		
min. bending radius, single	61 mm	2.402 in
min. bending radius, repeated	122 mm	4.803 in
weight about	218 kg/km	146 lb/1000ft

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Jumper Cables

Starwire® Coaxial jumper cables are ideal for applications requiring durability, small bending radii, high flexibility, low attenuation and high shielding. They are connected between the main feeder and antennas or between the main feeder and the RF equipment.

The jumper cables are offered with **Starwire®** 214, 1/4", 3/8" and 1/2" and are designed for indoor and outdoor use to withstand the harshest environmental conditions.

Starwire® Coaxial jumper cables are distinguished by the following features:

- Designed for outdoor applications under extreme climatic conditions
- High flexibility and small bending diameters
- High shielding effectiveness 120 dB
- Low intermodulation product IM3 –160 dBc (–117 dBm @ 2 x 43 dBm carriers)
- Sealing between connector and cable jacket
- Waterproof to safety class IP 68 (according to IEC 529)
- Cable jackets of Polyethylene (PE) or flame retardant, halogen-free material (FRNC)
- Available in any cable length with a large variety of connector combinations

Technical specification

Electrical data

Type		214	1/4" S	3/8" S	1/2" S	1/2" R
Frequency range		DC to 2700 MHz				
Peak power rating		200 kW	8 kW	13 kW	19 kW	58 kW
Nominal impedance		50Ω				
Return loss ¹	30 – 1000 MHz	≥ 26 dB	≥ 30 dB			
	1000 – 2200 MHz	≥ 26 dB	≥ 28 dB			
	2200 – 2700 MHz	≥ 24 dB	≥ 26 dB			
Insertion loss	900 MHz	0.18 dB/m (cable) 0.05 dB/ft + 0.10 dB (connectors)	0.18 dB/m (cable) 0.05 dB/ft + 0.10 dB (connectors)	0.13 dB/m (cable) 0.04 dB/ft + 0.10 dB (connectors)	0.10 dB/m (cable) 0.03 dB/ft + 0.10 dB (connectors)	0.07 dB/m (cable) 0.02 dB/ft + 0.10 dB (connectors)
	1800 MHz	0.18 dB/m (cable) 0.05 dB/ft + 0.10 dB (connectors)	0.26 dB/m (cable) 0.08 dB/ft + 0.10 dB (connectors)	0.20 dB/m (cable) 0.06 dB/ft + 0.10 dB (connectors)	0.16 dB/m (cable) 0.05 dB/ft + 0.10 dB (connectors)	0.10 dB/m (cable) 0.03 dB/ft + 0.10 dB (connectors)
	2200 MHz	0.18 dB/m (cable) 0.05 dB/ft + 0.10 dB (connectors)	0.30 dB/m (cable) 0.09 dB/ft + 0.10 dB (connectors)	0.22 dB/m (cable) 0.07 dB/ft + 0.10 dB (connectors)	0.17 dB/m (cable) 0.05 dB/ft + 0.10 dB (connectors)	0.11 dB/m (cable) 0.03 dB/ft + 0.10 dB (connectors)
Relative velocity of propagation		65 %	82 % to – 84 %			
Intermodulation at 900 MHz + 1800 MHz + 2200 MHz		≤ – 117 dBm (3 rd order product with 2 x 43 dBm carriers)				

Mechanical data

Type	214	1/4" S	3/8" S	1/2" S	1/2" R
Bending radius, repeated bending	111 mm (4.370 in)	25 mm (0.98 in)	25 mm (0.98 in)	30 mm (1.18 in)	120 mm (4.72 in)
Bending radius, single bending	83.25 mm (3.278 in)	12.5 mm (0.49 in)	12.5 mm (0.49 in)	15 mm (0.59 in)	70 mm (2.76 in)
Max. tensile strength	max. 420 N	max. 350 N	max. 600 N	max. 1000 N	max. 1200 N

Environment

Type	214	1/4" S	3/8" S	1/2" S	1/2" R
Waterproof to safety class (IEC 529)	IP 68 ² with coupled interface				
Max. operating temperature range	– 40 °C to + 80 °C (– 40 °F to +176 °F)				
recommended Installation temperature range	– 15 °C to + 60 °C (+5 °F to +140 °F)				



















Materials

Type		214	1/4" S	3/8" S	1/2" S	1/2" R
Cable	Inner conductor	stranded silver-plated wire	copper clad aluminum wire			
	Dielectric	Polyethylene	highly foamed polyethylene			
	Outer conductor	two shields of silver-plated copper wires	spiral corrugated	spiral corrugated	spiral corrugated	ring-shaped corrugated
			copper tube	copper tube	copper tube	copper tube
	Jacket options	FRNC, black	FRNC and PE, black and light grey (RAL 7004)			
Connector	Inner conductor	brass / CuBe, silver-plated				
	Outer conductor	brass, silver-plated				
	Insulator	PP / PE / PTFE				



















¹ Magnitude in dB





















Standard jumper cable Starwire® 214 FRNC

Connector 1	Connector 2	Order number
N 	 N	<i>P/n to be defined according to Customer Specifications</i>
N 	 N	
N 	 N	
N 	 N	
7-16 	 7-16	
7-16 	 N	
7-16 	 7-16	
7-16 	 7-16	
7-16 	 7-16	



















Standard jumper cable Starwire® 1/4" S FRNC

Connector 1	Connector 2	Order number
N 	 N	<i>P/n to be defined according to Customer Specifications</i>
N 	 N	
N 	 N	
N 	 N	
7-16 	 7-16	
7-16 	 N	
7-16 	 7-16	
7-16 	 7-16	
7-16 	 7-16	

Standard jumper cable Starwire® 1/4" S PE

Connector 1	Connector 2	Order number
N 	 N	<i>P/n to be defined according to Customer Specifications</i>
N 	 N	
N 	 N	
N 	 N	
7-16 	 7-16	
7-16 	 N	
7-16 	 7-16	
7-16 	 7-16	
7-16 	 7-16	

Standard jumper cable Starwire® 1/4" R FRNC

Connector 1	Connector 2	Order number
N 	 N	<i>P/n to be defined according to Customer Specifications</i>
N 	 N	
N 	 N	
N 	 N	
7-16 	 7-16	
7-16 	 N	
7-16 	 7-16	
7-16 	 7-16	
7-16 	 7-16	

Standard jumper cable Starwire® 1/4" R PE

Connector 1	Connector 2	Order number
N	N	<i>P/n to be defined according to Customer Specifications</i>
N	N	
N	N	
N	N	
7-16	7-16	
7-16	N	
7-16	7-16	
7-16	7-16	
7-16	7-16	

Standard jumper cable Starwire® 3/8" S FRNC

Connector 1	Connector 2	Order number
N	N	<i>P/n to be defined according to Customer Specifications</i>
N	N	
N	N	
N	N	
7-16	7-16	
7-16	N	
7-16	7-16	
7-16	7-16	
7-16	7-16	



















Standard jumper cable Starwire® 3/8" S PE

Connector 1	Connector 2	Order number
N	N	<i>P/n to be defined according to Customer Specifications</i>
N	N	
N	N	
N	N	
7-16	7-16	
7-16	N	
7-16	7-16	
7-16	7-16	
7-16	7-16	



















Standard jumper cable Starwire® 1/2" S FRNC

Connector 1	Connector 2	Order number
N	N	<i>P/n to be defined according to Customer Specifications</i>
N	N	
N	N	
N	N	
7-16	7-16	
7-16	N	
7-16	7-16	
7-16	7-16	
7-16	7-16	



















Standard jumper cable Starwire® 1/2" S PE

Connector 1	Connector 2	Order number
N 	 N	<i>P/n to be defined according to Customer Specifications</i>
N 	 N	
N 	 N	
N 	 N	
7-16 	 7-16	
7-16 	 N	
7-16 	 7-16	
7-16 	 7-16	
7-16 	 7-16	

Standard jumper cable Starwire® 1/2" R FRNC

Connector 1	Connector 2	Order number
N 	 N	<i>P/n to be defined according to Customer Specifications</i>
N 	 N	
N 	 N	
N 	 N	
7-16 	 7-16	
7-16 	 N	
7-16 	 7-16	
7-16 	 7-16	
7-16 	 7-16	

Standard jumper cable Starwire® 1/2" R PE

Connector 1	Connector 2	Order number
N 	 N	<i>P/n to be defined according to Customer Specifications</i>
N 	 N	
N 	 N	
N 	 N	
7-16 	 7-16	
7-16 	 N	
7-16 	 7-16	
7-16 	 7-16	
7-16 	 7-16	

1.
2.
3.
4.
5.
6.



N connector series
DIN 7-16 connector series
Adaptors
Terminations
Attenuators

Connectors & Adaptors

Starwire® connectors and adaptors are available in N and DIN 7-16 series with both male and female interfaces for **Starwire®** cables from 1/4" to 1.5/8". All connectors are designed to guarantee excellent electrical characteristics with **Starwire®** cables.



1 1/4" R
N male straight



1 5/8" R
N female straight



1/2" R
N male right angle



1/2" S
N male straight

Starwire® N connectors are extremely robust and waterproof with outstanding electrical, mechanical and climatic characteristics.

All **Starwire®** N connectors are designed in accordance with:

EC 60169-16; MIL C-39012; CECC 22210

Quality tested in accordance with: US MIL-Std 202

Technical characteristics

Nominal impedance	50 Ω
Frequency range	DC to 11 GHz
Insertion loss	0.1 dB
Intermodulation	≤ -117 dBm @ 2 x 43 dBm
Shielding effectiveness	≥ 128 dB @ 1 GHz
Operating temperature	- 45 °C to +85 °C

Waterproof	EN 60529	IP68 ¹ , 2.5 bar
	IEC 169-1	14.7 water immersion test
	IEC 169-1	16.5.1.3 sealing 2.5 bar leakage air rate: $< 2.77 \times 10^{-4} \frac{\text{mbar} \times \text{l}}{\text{sec}}$
	EN 122190	4.6.8 water tightness of the connector 2.5 bar leakage air rate: $< 2.77 \times 10^{-4} \frac{\text{mbar} \times \text{l}}{\text{sec}}$

Return loss²

1/4", 3/8", 1/2", 7/8", 1 1/4"	≥ 35 dB	DC to 1.0 GHz
	≥ 30 dB	1.0 to 2.7 GHz
1 5/8"	≥ 30 dB	DC to 2.7 GHz

Cable type Connector type

1/4" S	male straight
	female straight
	male right angle
1/4" R	male straight
	female straight
	right angle
3/8" S	male straight male
	female straight
	male right angle
1/2" S	male straight
	female straight
	male right angle
1/2" R	male straight
	female straight
	male right angle
7/8" S	male straight
	female straight
	male right angle
7/8" R	male straight
	female straight
7/8" H	male straight
	female straight
1 1/4" R	male straight
	female straight
1 5/8" R	male straight
	female straight

Sample
of most common
products

See
specific P/n's
on the
appropriate
catalogue

¹ All **Starwire®** connectors exceed the IP68 Ingress Protection standard.

Each connector is designed and tested to withstand 2.5 bars (36 psi) of pressure.

The excellent mechanical and climatic properties of **Starwire®** connectors insure long-term durability and performance in outdoor installations.

² Magnitude in dB





1 1/4" R
DIN 7-16 male straight



1 5/8" R
DIN 7-16 female straight



1/2" R
DIN 7-16 male right angle



1/2" S
DIN 7-16 male straight

Starwire® DIN 7-16 connectors are especially designed for high power applications in mobile radio base stations. They guarantee signal transmission with low attenuation and intermodulation.

All **Starwire®** DIN 7-16 connectors are designed in accordance with:
IEC 60169-4; DIN 47223; CECC 22190, VG 95250
Quality tested in accordance with: US MIL-Std 202

Technical characteristics

Nominal impedance	50 Ω
Frequency range	DC to 8.3 GHz
Insertion loss	0.05 dB
Intermodulation	≤ -117 dBm @ 2 x 43 dBm
Shielding effectiveness	≥ 128 dB @ 1 GHz
Operating temperature	- 45 °C to + 85 °C

Waterproof	EN 60529	IP68 ¹ , 2.5 bar
	IEC 169-1	14.7 water immersion test
	IEC 169-1	16.5.1.3 sealing 2.5 bar leakage air rate: $< 2.77 \times 10^{-4} \frac{\text{mbar} \times \text{l}}{\text{sec}}$
	EN 122190	4.6.8 water tightness of the connector 2.5 bar leakage air rate: $< 2.77 \times 10^{-4} \frac{\text{mbar} \times \text{l}}{\text{sec}}$

Return loss²

1/4", 3/8", 1/2", 7/8"	≥ 35 dB	DC to 1.0 GHz
	≥ 30 dB	1.0 to 2.7 GHz
1 1/4", 1 5/8"	≥ 30 dB	DC to 2.7 GHz

Cable type Connector type

1/4" S	male straight
	female straight
	male right angle
1/4" R	male straight
	female straight
	male right angle
3/8" S	male straight
	female straight
	male right angle
1/2" S	male straight
	female straight
	male right angle
1/2" R	male straight
	female straight
	male right angle
7/8" S	male straight
	female straight
	male right angle
7/8" R 7/8" H	male straight
	female straight
	male right angle
1 1/4" R	male straight
	female straight
1 5/8" R	male straight
	female straight

Sample
of most common
products

See
specific P/n's
on the
appropriate
catalogue

¹ All **Starwire®** connectors exceed the IP68 Ingress Protection standard.
Each connector is designed and tested to withstand 2.5 bars (36 psi) of pressure.
The excellent mechanical and climatic properties of **Starwire®** connectors insure long-term durability and performance in outdoor installations.

² Magnitude in dB

Adaptors

Interface
N male - N male, straight
N female - N female, straight
N male - N female, straight
N male - N female, right angle
DIN 7-16 male – DIN 7-16 male, straight
DIN 7-16 female – DIN 7-16 female, straight
DIN 7-16 male – DIN 7-16 female, straight
DIN 7-16 male – DIN 7-16 female, right angle
N male, straight – DIN 7-16 male
N male, straight – DIN 7-16 female
N female, straight – DIN 7-16 male
N female, straight – DIN 7-16 female

Sample
of most common
products

See
specific P/n's
on the
appropriate
catalogue



Adaptor DIN 7-16 male – DIN 7-16 male



Adaptor N male – DIN 7-16 female



Adaptor N female – DIN 7-16 female

Terminations, frequency range DC to 8 GHz

Power rating	Interface
1 W	DIN 7-16 male
	DIN 7-16 female
	N male
	N female
20 W	DIN 7-16 male
	DIN 7-16 female
	N male
	N female

Sample
of most common
products

See
specific P/n's
on the
appropriate
catalogue



DIN 7-16 male termination, 1 W



DIN 7-16 male termination, 20 W

Attenuators, frequency range DC to 8 GHz

Attenuation	Interface	Power rating
3 dB	DIN 7-16 male-female	5 W
		20 W
	N male-female	5 W
		20 W
6 dB	DIN 7-16 male-female	5 W
		20 W
	N male-female	5 W
		20 W
10 dB	DIN 7-16 male-female	5 W
		20 W
	N male-female	5 W
		20 W
20 dB	DIN 7-16 male-female	5 W
		20 W
	N male-female	5 W
		20 W

Sample
of most common
products

See
specific P/n's
on the
appropriate
catalogue



N attenuator



DIN 7-16 attenuator

General Overview on applicable Stripping Tools

Starwire® Coaxial stripping tools are easy to use and perfect for fast and reliable preparation of the cable to ensure proper connector attachment. By means of a substantially faster and more precise stripping with **Starwire®** automatic stripping tools, installation time is reduced by up to 70 percent. The tools are available for all **Starwire®** Coaxial cables with corrugated outer conductor from 1/4" to 1.5/8"



Automatic stripping tool
for **Starwire®** 1 1/4"



Automatic stripping tool
for **Starwire®** 7/8"

Automatic stripping tools

Cable type	Order number	Spare blades (see NOTE)
Starwire® 1/4" S	03SWE0STRP101	PJ-2, PJ-4L, X17 (1 pc each)
Starwire® 1/4" R	03SWE0STRP102	PJ-2 (3 pcs), PJ-4L (1 pc)
Starwire® 3/8" S	03SWE0STRP103	PJ-2, PJ-4L, X17 (1 pc each)
Starwire® 1/2" S	03SWE0STRP104	PJ-2, PJ-4L, X17 (1 pc each)
Starwire® 1/2" R	03SWE0STRP105	PJ-2 (4 pcs)
Starwire® 7/8" S	03SWE0STRP106	PJ-2 (3 pcs)
Starwire® 7/8" R	03SWE0STRP107	PJ-2 (3 pcs)
Starwire® 1-1/4" R	03SWE0STRP108	PJ-2, PJ-3, PJ-222 (1 pc each)
Starwire® 1-5/8" R	03SWE0STRP109	PJ-3 (2 pcs), PJ-333 (1 pc)

NOTE: This column is to highlight the usage of blades on each stripping tool. Their P/n's are shown on the following page.

Stripping tool

Cable type	Order number	Spare blades
Starwire® 1/2" S	03SWE0STRP151	No. 51 large, No. 78 small (1 pc each)
Starwire® 1/2" R	03SWE0STRP152	No. 51 large, No. 78 small (1 pc each)
Starwire® 7/8" R	03SWE0STRP153	No. 51 large, No. 78 small (1 pc each)
Starwire® 1-1/4" R	03SWE0STRP154	–
Starwire® 1-5/8" R	03SWE0STRP155	–

Stripping tool
for Starwire® 7/8"

Stripping tools for grounding kits

Cable type	Order number	Stripping dimension
Starwire® 1/2" S	03SWE0STRP201	15 mm and 26 mm
Starwire® 1/2" R	03SWE0STRP202	15 mm and 26 mm
Starwire® 7/8" R	03SWE0STRP203	20 mm and 26 mm
Starwire® 1-1/4" R	03SWE0STRP204	20 mm and 30 mm
Starwire® 1-5/8" R	03SWE0STRP205	20 mm and 30 mm

Stripping tool
for grounding kits

Flaring tools

Cable type	Order number
Starwire® 1/4" R	03SWE0FLAR251
Starwire® 1/2" R	03SWE0FLAR252
Starwire® 7/8" R	03SWE0FLAR253
Starwire® 1-1/4" R	03SWE0FLAR254
Starwire® 1-5/8" R	03SWE0FLAR255

Spare blades for stripping tools

Spare blade type	Order number
PJ-2	03SWE0BLAD301
PJ-3	03SWE0BLAD302
PJ-4L	03SWE0BLAD303
PJ-222	03SWE0BLAD304
PJ-333	03SWE0BLAD305
X17	03SWE0BLAD306
No. 51 large (10 pcs)	03SWE0BLAD307
No. 78 small (10 pcs)	03SWE0BLAD308



DIN female - DIN male (GT)

Technical characteristics

Wideband surge arrestors	DIN 7-16	N
Characteristic impedance	50 Ω	
Frequency range	800 – 2500 MHz	
Return loss ¹ 800 to 880 MHz	≥ 20 dB	≥ 23 dB
880 to 2400 MHz	≥ 26 dB	≥ 26 dB
2400 to 2500 MHz	≥ 20 dB	≥ 23 dB
Insertion loss	≤ 0.05 dB	≤ 0.1 dB
Temperature range	– 45 °C to + 85 °C	
Design based on specifications	IEC 60169-4; DIN 47223; CECC 22190; VG 95250	IEC 60169-16; MIL C-39012; CECC 22210
Quality tested in accordance with	US MIL-Std 202	US MIL-Std 202
Residual voltage	1 V (50 kA, wave 8/20 μ s)	

Gas-capsule surge arrestors	DIN 7-16	N
Characteristic impedance	50 Ω	
Frequency range	DC to 3 GHz	DC to 3 GHz
Return loss ¹ DC to 1 GHz	≥ 30 dB	≥ 30 dB
1 to 2 GHz	≥ 20 dB	≥ 17 dB
2 to 3 GHz	–	≥ 10 dB
Insertion loss	≤ 0.2 dB	≤ 0.1 dB
Temperature range	– 45 °C to + 85 °C	
Design in accordance with	IEC 60169-4; DIN 47223; CECC 22190; VG 95250	IEC 60169-16; MIL C-39012; CECC 22210
Quality tested in accordance with	US MIL-Std 202	US MIL-Std 202
Residual voltage	in correspondence with gas-capsule	

Starwire® Coaxial surge arrestors provide excellent protection and outstanding RF performance to ensure the security of the whole system (antenna, cable connections and base station) against overvoltage damage and effective lightning.

Starwire® Coaxial surge arrestors are ideal for frequency ranges from 700 to 2700 MHz and they are available in both Type N and 7/16 DIN interfaces configured for either the antenna side or RxTx (protected) installations.

Three different functional types of **Starwire®** Coaxial surge arrestors are available:

Wideband surge arrestors

Applications for a broad frequency range from 700 to 2700 MHz with either Aluminium (AL-) or Brass (SX-) type.

Gas-capsule surge arrestors

Applications from DC to 7000 MHz with N connectors or DC to 3000 MHz with 7/16 DIN connectors with gas discharge capsules (GT-type).

Wideband DC-pass surge arrestors

Applications from 800 – 2500 MHz (GX-type).

¹ Magnitude in dB

Wideband surge arrestors for 700 – 2700 MHz, application: wideband-dc blocked

Aluminium-Type (AL-Type)	Antenna Side	RxTx Side [protected]	RF Power [Watts]	Order number
N series	N female	N female	500	03SWE0WSAN101
	N male	N female		03SWE0WSAN102
	N female	N male		03SWE0WSAN103
N/DIN 7-16 interconnection series	DIN 7-16 male	N female		03SWE0WSAN104
DIN 7-16 series	DIN 7-16 female	DIN 7-16 female	750	03SWE0WSAD115
	DIN 7-16 male	DIN 7-16 female		03SWE0WSAD116
	DIN 7-16 female	DIN 7-16 male		03SWE0WSAD117



N female - N female (AL)



N male - N female (SX)



DIN male - DIN female (GT)

Brass Type (SX-Type)	Antenna Side	RxTx Side [protected]	RF Power [Watts]	Order number
N series	N female	N female	500	03SWE0WSAN131
	N male	N female		03SWE0WSAN132
	N female	N male		03SWE0WSAN133
N/DIN 7-16 interconnection series	DIN 7-16 male	N female		03SWE0WSAN134
DIN 7-16 series	DIN 7-16 female	DIN 7-16 female	750	03SWE0WSAD141
	DIN 7-16 male	DIN 7-16 female		03SWE0WSAD142
	DIN 7-16 female	DIN 7-16 male		03SWE0WSAD143

Gas-capsule surge arrestors for DC-3000 MHz (DIN type) and DC-7000 (N type); application: gastube-dc pass

GT-Type	Antenna Side	RxTx Side [protected]	RF Power [Watts]	Order number
N series	N female	N female	80	03SWE0GSAN151
	N male	N female		03SWE0GSAN152
DIN 7-16 series	DIN 7-16 female	DIN 7-16 female		03SWE0GSAD161
	DIN 7-16 male			03SWE0GSAD162



N male - N female (GX)

Wideband DC-pass surge arrestors for 800 – 2500 MHz

GX-Type	Antenna Side	Antenna Side	RxTx Side [protected]	Operating Voltage [V]	Order number
N series	N female	N female	0.25	6	03SWE0DSAN171
			2.25	15	03SWE0DSAN172
				24	03SWE0DSAN173
				48	03SWE0DSAN174
			40	– 48	03SWE0DSAN175
				– 60	03SWE0DSAN176
				36	03SWE0DSAN177
	N male		40		
DIN 7-16 series	DIN 7-16 female	DIN 7-16 female	0.25	6	03SWE0DSAD185
			300	± 72	03SWE0DSAD186

Grounding Kits

Starwire® Coaxial grounding kits are used for the low-induction connection of cable systems to the antenna site ground. They discharge any lightning strikes that occur to ground. For equipotential bonding on site, the grounding kits are installed in the upper cable ends, in the vicinity of the mast foundation and at the building entrances. In longer feeder systems, additional ground connections are recommended at distances of every 60 m.

Starwire® Coaxial grounding kits demonstrate the following features:

- simple, rapid and safe installation
- compact version with no loose component parts
- high security against lightning strikes
- contact resistance < 1
- installation time of approx. 3 min
- waterproof to IP 68
- weather-resistant due to the use of stainless steel
- DIN EN 50164-1, VDE 0185 part 201:2000-4
- max. current 100 kA
- Amper +/- 10 %



Grounding kit KMT

Grounding kit KMT-N

Cable type	Normal exit	Order number
Starwire® 1/4" S	KMT 7-N, Ø 7-8mm	03SWE0GKN0101
Starwire® 1/4" R	KMT 9-N, Ø 8-9mm	03SWE0GKN0102
Starwire® 3/8" S	KMT 11-N, Ø 10-11mm	03SWE0GKN0103
Starwire® 1/2" S	KMT 14-N, Ø 13-14mm	03SWE0GKN0104
Starwire® 1/2" R	KMT 1/2"-N, Ø 16-17mm	03SWE0GKN0105
Starwire® 7/8" S+H+R	KMT 7/8"-N, Ø 26-28mm	03SWE0GKN0106
Starwire® 1-1/4" R	KMT 1.1/4"-N, Ø 38-40mm	03SWE0GKN0107
Starwire® 1-5/8" R	KMT 1.5/8"-N, Ø 50-52mm	03SWE0GKN0108



Grounding kit KMT

Grounding kit KMT-P

Cable type	Parallel exit	Order number
Starwire® 1/4" S	KMT 7-P, Ø 7-8mm	03SWE0GKP0121
Starwire® 1/4" R	KMT 9-P, Ø 8-9mm	03SWE0GKP0122
Starwire® 3/8" S	KMT 11-P, Ø 10-11mm	03SWE0GKP0123
Starwire® 1/2" S	KMT 14-P, Ø 13-14mm	03SWE0GKP0124
Starwire® 1/2" R	KMT 1/2"-P, Ø 16-17mm	03SWE0GKP0125
Starwire® 7/8" S+H+R	KMT 7/8"-P, Ø 26-28mm	03SWE0GKP0126
Starwire® 1-1/4" R	KMT 1.1/4"-P, Ø 38-40mm	03SWE0GKP0127
Starwire® 1-5/8" R	KMT 1.5/8"-P, Ø 50-52mm	03SWE0GKP0128

Grounding kit "M Version"

Cable type	Diameter (mm)	Order number
Starwire® 1/2" S	21 – 22	03SWE0GKM0151
Starwire® 1/2"	23 – 24	03SWE0GKM0152
Starwire® 7/8"	35 – 36	03SWE0GKM0153
Starwire® 1-1/4"	46 – 47	03SWE0GKM0154
Starwire® 1-5/8"	58 – 59	03SWE0GKM0155



Grounding kit "Easy Version"

Cable type	Order number
LMR-300	03SWE0GKE0181
LMR-400	03SWE0GKE0182
Starwire® 1/4"	03SWE0GKE0183
Starwire® 3/8"	03SWE0GKE0184
Starwire® 7/8"	03SWE0GKE0185
Starwire® 1-1/4"	03SWE0GKE0186
Starwire® 1-5/8"	03SWE0GKE0187



Cable Clamps

Starwire® Coaxial self-locking Cable Clamps are the optimal solutions for an easy and quick fastening to various supports of:

- coaxial cables,
- wave guides,
- fiber optic cables.

The cables are firmly secured, without danger of deformation, by plastic shells which hold them without crushing.

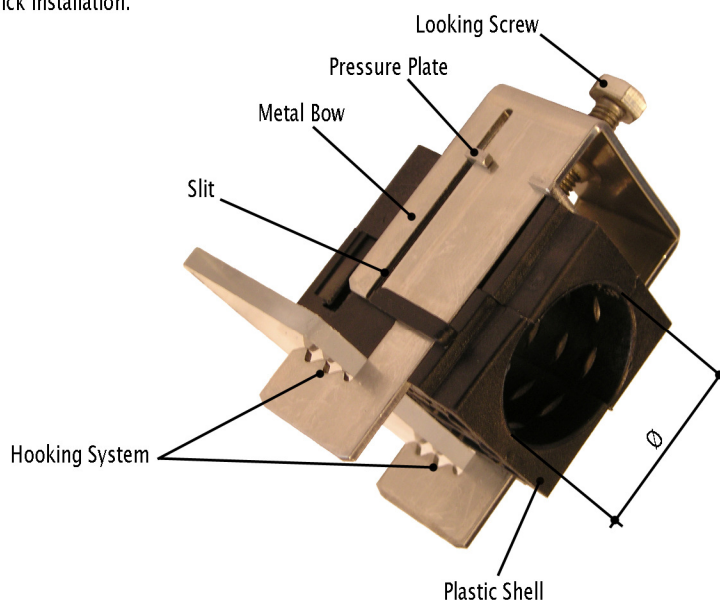
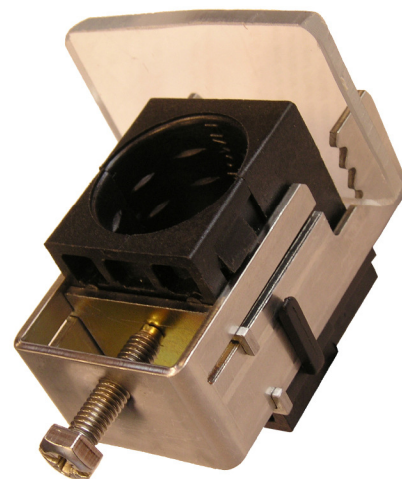
The installer can visually control the pressure exerted by the screw.

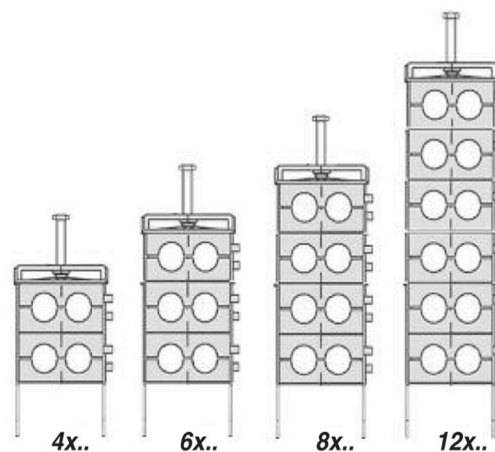
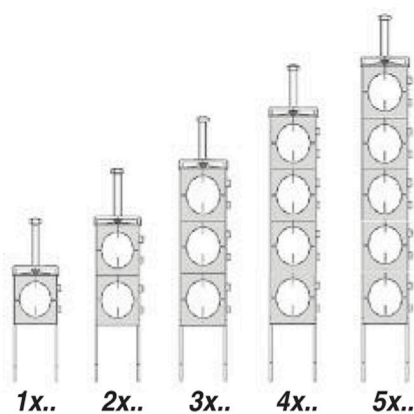
Between 1 and 8 cables can be fastened with the same clamp.

The plastic shells, secured by a clip, can be inserted either frontally or laterally in the bow.

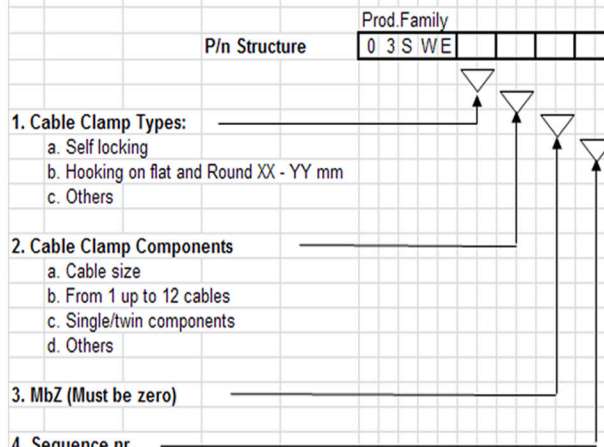
Main features:

- simple and strong structure;
- secured components with easy mounting;
- selected high quality materials;
- resistance to atmospheric factors (U.V. rays, salty air, a.s.o.);
- high resistance to temperature variations (from -30°C to $+120^{\circ}\text{C}$);
- absolute safety for cables and installers;
- easy and quick installation.





P/n Designation



See appropriate catalogue for specific P/n's

Glossary

Plastic Shell – Physical holder of the cable, its inner hole size must be selected according to the cable outer diameter to be clamped.

21 different types of diameters are available ranging from 5mm up to 76mm.

Metal Bow – It is the cage on which the shells are housed. It ends with an hooking system that fixes the complete cable clamp to:

- a flat bar;
- an angular bar;
- to a section bar;
- to a round bar (pipe).

Looking Screw – By applying a pressure on the metal plate sliding on the lateral bow slit, the shells remain tightened in the bow.



Installation Material

All installation materials for **Starwire®** Site Solutions are simple and easy to assemble. Durable quality components are used to provide the reliability for years of trouble-free installations.

■ angle adapters:

secure hangers to angle members or in areas where mounting holes are not easily accessible; allow locking to units of less than 22 mm thickness

■ clip hangers:

have a dual-clip locking mechanism to hold the cable firmly in place and offer different mounting options

■ hanger clamp sets:

each set holds up to three runs of cables in the smallest area possible

■ round member

adapter kits:

provide an easy method for supporting transmission lines to small diameter pipes or poles and contain adjustable clamps.

■ coax block clamp sets:

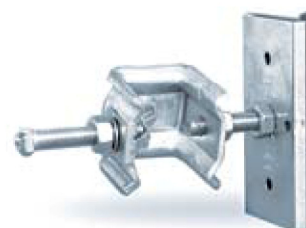
each unit holds two cables, allowing a compact bundle of six runs to be supported by stacking three blocks

■ feed-thru entry panels 4":

these aluminium panels multiple cable runs to enter buildings and shelters and can be used in interior and exterior wall mounting applications

■ feed-thru boot assemblies:

each assembly includes the boot and two round member adapter clamps



Right angle adapter

Angle adaptor

Dimension	Kit quantity	Order number
with 10 mm tapped hole	10 pcs.	03SWE0ADPT101

Clip hanger

Cable type	Kit quantity	Order number
Starwire® 1/2" R	10 pcs.	03SWE0CLPH102
Starwire® 7/8" H+R		03SWE0CLPH103
Starwire® 1-1/4" R		03SWE0CLPH104
Starwire® 1-5/8" R		03SWE0CLPH105

Round member adapter kits

Dimension	Kit quantity	Order number
1" - 2" (25.4 mm - 50.8 mm)	10 pcs.	03SWE0RADP121
2" - 3" (50.8 mm - 76.2 mm)		03SWE0RADP122
3" - 4" (76.2 mm - 101.6 mm)		03SWE0RADP123
4" - 5" (101.6 mm - 127.0 mm)		03SWE0RADP124
5" - 6" (127.0 mm - 152.4 mm)		03SWE0RADP125
6" - 8" (152.4 mm - 203.2 mm)		03SWE0RADP126

Adjustable clamps

Dimension	Kit quantity	Order number
2" - 7" (50.8 mm - 177.8 mm)	1 pcs.	03SWE0ACLM141
1/2" - 1-7/8" (12.7 mm - 47.6 mm)		03SWE0ACLM142



Clip hanger

Feed trough entry panel 4" (101.6mm)

Description	Order number
1 port, 1 x 1	03SWE0FDTH101
2 ports, 1 x 2	03SWE0FDTH102
4 ports, 2 x 2	03SWE0FDTH103
6 ports, 2 x 3	03SWE0FDTH104
8 ports, 2 x 4	03SWE0FDTH105
9 ports, 3 x 3	03SWE0FDTH106
10 ports, 2 x 5	03SWE0FDTH107
12 ports, 3 x 4	03SWE0FDTH108

*Feed through entry panel, 4 ports, 2x2***Feed trough boot assembly 4" (101.6mm)**

Cable type	Description	Order number
Starwire® 213, Starwire® 214, Starwire® 400	6 holes	03SWE0FDTH121
Starwire® 1/2" R	1 holes	03SWE0FDTH122
	2 holes	03SWE0FDTH123
	3 holes	03SWE0FDTH124
	4 holes	03SWE0FDTH125
	5 holes	03SWE0FDTH126
Starwire® 1/2" S	1 holes	03SWE0FDTH127
	2 holes	03SWE0FDTH128
	3 holes	03SWE0FDTH129
	4 holes	03SWE0FDTH130
Starwire® 7/8" H+R	1 holes	03SWE0FDTH131
	2 holes	03SWE0FDTH132
	3 holes	03SWE0FDTH133
	4 holes	03SWE0FDTH134
Starwire® 1-1/4" R	1 holes	03SWE0FDTH135
Starwire® 1-5/8" R	1 holes	03SWE0FDTH136

*Feed through boot assembly, 3 holes*

Insulation and Weatherproofing

3M™ Cold Shrink Kit

The cold shrink sealing kits are specially designed for cable installations. Cold shrink is the fastest way to secure waterproof protection for connectors, splices and jumper-antenna interfaces. Installation is quick and easy and no tools are required. The shrinking process is performed by removing (unwinding) the core from inner side of the cold shrink kit.

Weatherproofing Tapes

Weatherproofing tapes are used for protection of connectors, splices and interfaces that are exposed to corrosive environmental conditions. They also help to prevent the loosening of connectors at interfaces that are subjected to vibrations.

Universal Weatherproofing Kit

These kits are used to protect connector junctions from moisture ingress and to prevent vibration from loosening the connection. They accommodate connections consisting of any size from Starwire® 58 to 1 5/8", simplifying ordering and inventory management and installation setup. The kits feature a combination of butyl mastic and electrical tapes, which are applied using a multi-layer wrapping procedure to create a long-term environmental seal for main feed, jumper, and antenna connections.



3M Cold shrink™	Supported cable types	Application diameter	Length	Order number
Cold Shrink™ jumper/antenna 1/2"	Starwire® 1/2" – Antenna connector	39.0 mm – 13.5 mm	150 mm (5.9 in)	03SWE0INSL101
Cold Shrink Coax-Kit 1/2" to 7/8"	Starwire® 1/2" to Starwire® 7/8"	49.3 mm – 13.5 mm	220 mm (8.7 in)	03SWE0INSL102
Cold Shrink Coax-Kit 1/2" to 1 5/8"	Starwire® 1/2" to Starwire® 1–5/8"	67.8 mm – 13.5 mm	280 mm (11 in)	03SWE0INSL103

3M™ Insulating material	Dimensions	Length per roll	Operating temperature	Order number
Scotchfil, Electrical insulation putty	38 mm x 3.20 mm (1.5 in x 0.125 in)	1.5 m (4.9 ft)	up to +80 °C (176 °F)	03SWE0INSL104
Scotch 23, All voltage splicing tape	19 mm x 0.75 mm (0.75 in x 0.03 in)	9 m (29.5 ft)	up to +90 °C (194 °F)	03SWE0INSL105
Scotch 710, Vinyl electrical tape	19 mm x 0.17 mm (0.75 in x 0.01 in)	20 m (65.6 ft)	–10 °C to +90 °C (14 °F to 194 °F)	03SWE0INSL106
Scotch 33+, Vinyl electrical tape, bk	19 mm x 0.18 mm (0.75 in x 0.01 in)	6 m (19.7 ft)	up to +105 °C (221 °F)	03SWE0INSL107
Scotch 33+, Vinyl electrical tape, bk	19 mm x 0.18 mm (0.75 in x 0.01 in)	20 m (65.6 ft)	up to +105 °C (221 °F)	03SWE0INSL108
Scotch 33+, Vinyl electrical tape, bk	19 mm x 0.18 mm (0.75 in x 0.01 in)	33 m (9.8 ft)	up to +105 °C (221 °F)	03SWE0INSL109
Scotch 33+, Vinyl electrical tape, gy	19 mm x 0.18 mm (0.75 in x 0.01 in)	20 m (65.6 ft)	up to +105 °C (221 °F)	03SWE0INSL110

Insulating material	Dimensions	Length per roll	Operating temperature	Order number
SCAPA 34, Electrical insulation putty	38 mm x 3.00 mm (1.5 in x 0.125 in)	1.5 m (4.9 ft)	– 30 °C to +90 °C (– 22 °F to 194 °F)	03SWE0INSL111
NAS 1, Self agglomerating silicon rubber tape	25 mm x 0.50 mm (0.98 in x 0.02 in)	1.0 m (3.3 ft)	– 50 °C to +150 °C (– 58 °F to 302 °F)	03SWE0INSL112
NAS 10, Self agglomerating silicon rubber tape	25 mm x 0.50 mm (0.98 in x 0.02 in)	10 m (32.8 ft)	– 50 °C to +150 °C (– 58 °F to 302 °F)	03SWE0INSL113
NEP 19, Self agglomerating tape	19 mm x 0,75 mm (0.75 in x 0.03 in)	10 m (32.8 ft)	– 40 °C to +70 °C (– 40 °F to 158 °F)	03SWE0INSL114

Heat-shrinking tubes for the protection of cable joints	Supported cable types	Application diameter	Length	Order number
MWT-M 25/ 8, Heat shrinking tubes	Starwire® 1/2" to Starwire® 3/8"	25 mm (0.984 in) (shrunk 8 mm (0.315 in))	1 m (3.3 ft)	03SWE0INSL115
MWT-M 35/ 12, Heat shrinking tubes	Starwire® 7/8"	35 mm (1.378 in) (shrunk 12 mm (0.472 in))	1 m (3.3 ft)	03SWE0INSL116
MWT-M 50/ 16, Heat shrinking tubes	Starwire® 1–1/4"	50 mm (1.969 in) (shrunk 16 mm (0.630 in))	1 m (3.3 ft)	03SWE0INSL117
MWT-M 63/ 19, Heat shrinking tubes	Starwire® 1–5/8"	63 mm (2.480 in) (shrunk 19 mm (0.748 in))	1 m (3.3 ft)	03SWE0INSL118

Universal Weatherproofing kit	for connection size	Connections per kit	Order number
6x butyl mastic tape & 3x wide electrical tape	1/2" to 7/8"	6	03SWE0INSL119
	1/2" to 1 1/4"	5	03SWE0INSL120
	1/2" to 1 5/8"	4	03SWE0INSL121
	1/2" to 1/2"	8	03SWE0INSL122
	7/8" to 7/8"	4	03SWE0INSL123
	1 1/4" to 1 1/4"	3	03SWE0INSL124
	1 5/8" to 1 5/8"	2	03SWE0INSL125



Hoisting Grips



Hoisting grips are important tools for the installation of **Starwire®** cables. In use for many years, hoisting grips ensure a smooth and safe distribution of tensile forces from the pulling member onto the cable.

Only with a suitable hoisting grip, can the maximum cable pull force be applied without elongation, deformation or damage. A wide range of hoisting grips are offered.

The assortment of hoisting grips includes both open and closed versions. The closed version is

used at the end of standard feeder cable. The open version is typically used on feeder cables with attached connectors and can be applied at any point along the cable. Open and closed versions are offered in either galvanized steel or stainless steel.

Cable type	Description	Application diameter		Order number
Starwire® 1/2" R	Cable grip, closed, galvanized steel	15 – 18 mm	(0.59 – 0.71 in)	03SWE0GRIP101
	Cable grip, closed, stainless steel	16 – 18 mm	(0.59 – 0.71 in)	03SWE0GRIP102
	Cable grip, lace-up, galvanized steel	15 – 25 mm	(0.59 – 0.98 in)	03SWE0GRIP103
	Cable grip, lace-up, stainless steel	16 – 25 mm	(0.59 – 0.98 in)	03SWE0GRIP104
Starwire® 7/8" H + R + R low loss	Cable grip, closed, galvanized steel	22 – 28 mm	(0.87 – 1.10 in)	03SWE0GRIP105
	Cable grip, closed, stainless steel	23 – 28 mm	(0.87 – 1.10 in)	03SWE0GRIP106
	Cable grip, lace-up, galvanized steel	25 – 45 mm	(0.98 – 1.77 in)	03SWE0GRIP107
	Cable grip, lace-up, stainless steel	25 – 45 mm	(0.98 – 1.77 in)	03SWE0GRIP108
Starwire® 1-1/4"	Cable grip, closed, galvanized steel	37 – 44 mm	(1.46 – 1.73 in)	03SWE0GRIP109
	Cable grip, closed, stainless steel	37 – 44 mm	(1.46 – 1.73 in)	03SWE0GRIP110
	Cable grip, lace-up, galvanized steel	25 – 45 mm	(0.98 – 1.77 in)	03SWE0GRIP111
	Cable grip, lace-up, stainless steel	25 – 45 mm	(0.98 – 1.77 in)	03SWE0GRIP112
Starwire® 1-5/8"	Cable grip, closed, galvanized steel	50 – 55 mm	(1.97 – 2.17 in)	03SWE0GRIP113
	Cable grip, closed, stainless steel	50 – 55 mm	(1.97 – 2.17 in)	03SWE0GRIP114
	Cable grip, lace-up, galvanized steel	45 – 60 mm	(0.98 – 2.36 in)	03SWE0GRIP115
	Cable grip, lace-up, stainless steel	45 – 60 mm	(0.98 – 2.36 in)	03SWE0GRIP116



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DET NORSKE VERITAS QUALITY MANAGEMENT SYSTEM CERTIFICATE

Certificato No. / Certificate No. **CERT-01876-97-AQ-MIL-SINCERT**

Si attesta che / This certifies that

il sistema di gestione per la qualità di / the quality management system of

CPE Italia S.p.A.

Via Dante Chiasserini, 15 - 20157 Milano (MI) - Italy
SS. Appia Km. 195,000 - 81047 Vitulazio (CE) - Italy

È conforme ai requisiti della norma per i sistemi di gestione per la qualità
Conforms to the quality management systems standard

UNI EN ISO 9001:2008 (ISO 9001:2008)

Questa certificazione è valida per il seguente campo applicativo:

This certificate is valid for the following products or services:

(Ulteriori chiarimenti riguardanti lo scopo e l'applicabilità dei requisiti della normativa si possono ottenere consultando l'organizzazione certificata)
(Further clarifications regarding the scope and the applicability of the requirements of the standard(s) may be obtained by consulting the certified organization)

**Progettazione, assemblaggio e commercializzazione di componenti coassiali passivi
per telecomunicazioni e componenti passivi per trasmissione dati**

**Design, assembly and trade of coaxial passive components for the telecommunication and
passive components for data transmission**

Data Prima Emissione
First Issue Date
1997-06-18

Data di scadenza
Expiry Date
2013-09-28

Luogo e data
Place and date

Agrate Brianza, (MI) 2010-09-28

SINCERT
INTERNATIONAL SURVEILLANCE PROGRAM

per l'Organismo di Certificazione
for the Accredited Unit

DET NORSKE VERITAS ITALIA S.R.L.

Settore EA : 19

Pasquale Talucci
Lead Auditor

Vittore Marangon
Management Representative

La validità del presente certificato è subordinata a sorveglianza periodica (ogni 6, 9 o 12 mesi) e al riesame completo del sistema con periodicità triennale.
The validity of this certificate is subject to periodical audits (every 6, 9 or 12 months) and the complete re-assessment of the system every three years.
La validità del presente certificato è subordinata a sorveglianza periodica (ogni 6, 9 o 12 mesi) e al riesame completo del sistema con periodicità triennale.



DET NORSKE VERITAS QUALITY MANAGEMENT SYSTEM CERTIFICATE

Certificato No. / Certificate No. **11044-2007-AQ-ITA-SINCERT**

Si attesta che / This certifies that

il sistema di gestione per la qualità di / the quality management system of

CPE Italia S.p.A.

Via Dante Chiasserini, 15 - 20157 Milano (MI) - Italy
SS. Appia Km. 195,000 - 81047 Vitulazio (CE) - Italy

È conforme ai requisiti della norma per i sistemi di gestione per la qualità
Conforms to the quality management system standard

UNI EN ISO 9001:2008 (ISO 9001:2008)

e / and
UNI EN 9100:2005 (EN 9100:2003)

Certificazione rilasciata in conformità al Regolamento Tecnico SINCERT RT - 18

Certification has been granted in conformity with the SINCERT Technical Regulation RT - 18

La Verifica è stata condotta in accordo ai requisiti della Norma EN 9104. DNV è accreditato da SINCERT sotto il controllo dello Schema Europeo Aerospaziale.
The assessment was performed in accordance with the requirements of the Norm EN 9104. DNV is accredited by SINCERT under the control of the Aerospace European Scheme.

Questa certificazione è valida per il seguente campo applicativo:

This certificate is valid for the following products or services:

(Ulteriori chiarimenti riguardanti lo scopo e l'applicabilità dei requisiti della normativa si possono ottenere consultando l'organizzazione certificata)
(Further clarifications regarding the scope and the applicability of the requirements of the standard(s) may be obtained by consulting the certified organization)

**Assemblaggio e commercializzazione di componenti coassiali passivi per
telecomunicazioni e componenti passivi per trasmissione dati**

**Assembly and trade of coaxial passive components for the telecommunication and
passive components for data transmission**

Data Prima Emissione
First Issue Date
2007-10-26

Data di scadenza
Expiry Date
2013-09-28

Luogo e data
Place and date

Agrate Brianza, (MI) 2010-09-28

SINCERT
INTERNATIONAL SURVEILLANCE PROGRAM

per l'Organismo di Certificazione
for the Accredited Unit

DET NORSKE VERITAS ITALIA S.R.L.

Settore EA : 19

Pasquale Talucci
Lead Auditor

Vittore Marangon
Management Representative

La validità del presente certificato è subordinata a sorveglianza periodica (ogni 6, 9 o 12 mesi) e al riesame completo del sistema con periodicità triennale.
The validity of this certificate is subject to periodical audits (every 6, 9 or 12 months) and the complete re-assessment of the system every three years.
La validità del presente certificato è subordinata a sorveglianza periodica (ogni 6, 9 o 12 mesi) e al riesame completo del sistema con periodicità triennale.



DET NORSKE VERITAS ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE

Certificato No. / Certificate No. **74833-2010-AE-ITA-SINCERT**

Si attesta che / This certifies that

il sistema gestione ambientale di / the environmental management system of

CPE ITALIA S.p.A.

Via Dante Chiasserini, 15 - 20157 Milano (MI) - Italy

È conforme ai requisiti della normativa

Conforms to the environmental management system standard

UNI EN ISO 14001:2004 (ISO 14001:2004)

Certificazione rilasciata in conformità al Regolamento Tecnico SINCERT RT - 09

Certification has been granted in conformity with the SINCERT Technical Regulation RT - 09

Questa certificazione è valida per il seguente campo applicativo:

This certificate is valid for the following products or services:

**Progettazione e assemblaggio mediante la fasi di taglio, saldatura e moldatura di
componenti coassiali passivi per telecomunicazioni e componenti passivi per trasmissione dati**

**Design and assembling through the following processes: cutting, soldering, molding of
coaxial passive components for both telecommunication and for data transmission**

Data di scadenza
Expiry Date
2013-03-09

Luogo e data
Place and date

Agrate Brianza, (MI) 2010-03-09

SINCERT
INTERNATIONAL SURVEILLANCE PROGRAM

per l'Organismo di Certificazione
for the Accredited Unit

DET NORSKE VERITAS ITALIA S.R.L.

Settore EA : 19

Mara Zaccari
Lead Auditor

Vittore Marangon
Management Representative

La validità del presente certificato è subordinata a sorveglianza periodica (ogni 6, 9 o 12 mesi) e al riesame completo del sistema con periodicità triennale.
The validity of this certificate is subject to periodical audits (every 6, 9 or 12 months) and the complete re-assessment of the system every three years.
La validità del presente certificato è subordinata a sorveglianza periodica (ogni 6, 9 o 12 mesi) e al riesame completo del sistema con periodicità triennale.



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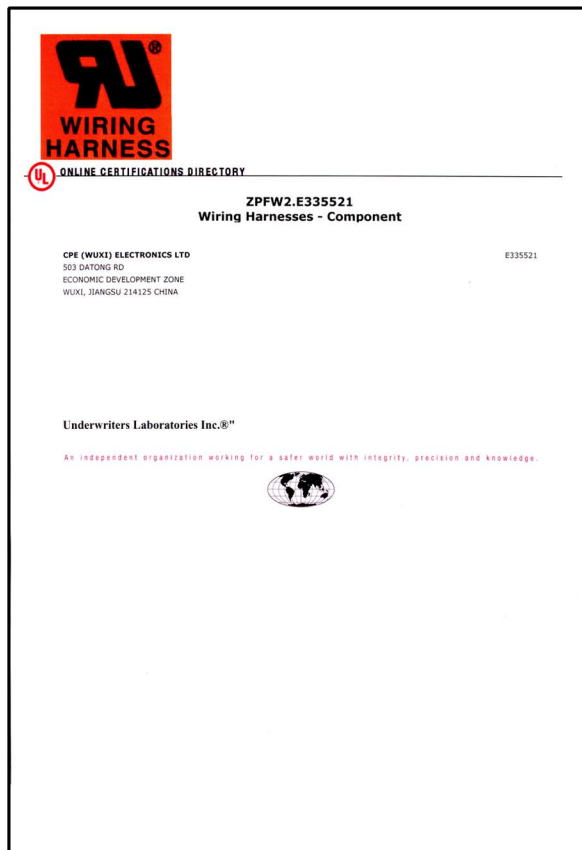
CPE ITALIA SPA
VIA D.CHIASSERINI 15
20157 MILANO, MI ITALY

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1-CPE Italia GROUP

(Headquarter, Technical Operation & Lab)

Via Chiasserini, 15
20157 Milano (Italy)
Ph. +39 (0) 2.390961
Fax +39 (0) 2.3570774
info@cpeitalia.it

2-CPE Italia

(Main Italian Production Plant)

Via Appia, Km. 196,150
81041 Vitulazio - CE (Italy)
Ph. +39 (0) 823.969180
Fax +39 (0) 823.997318
info@cpeitalia.it

3-CPE East Europe

Str. Pitesti, 222
Slatina - OLT (Romania)
Ph. +40 249414262
Fax +40 249414262
sales@cpeitalia-group.com



4-CPE do Brasil
(Ind. & Com. Ltda)

Rua Inaja, 698 – Vila E. Perneta
BR-83.324.050 PINHAIS-PR/Brasil
Ph. +55 41 30336883
Fax +55 41 36686883
info@cpedobrasil.com.br

5-CPE WuXi Electronics Ltd.

n.503 Da Tong Road
Bin Hu District, WuXi City, JiangSu Province
P.R. China, 214124
Ph. +86 (0) 510 85189768
Fax +86 (0) 510 85188016
sales@cpeitalia.com

6-CPE China
(Shanghai Office)

Rm 2205, n.58 JinXin Road
JinQiao, Pudong, Shanghai
P.R. China, 201206
Ph. +86 (21) 503 20587
Fax +86 (21) 503 20587
sales@cpeitalia.com

STARWIRES ENGINEERING-SWE

n.503 Da Tong Road
Bin Hu District, WuXi City, JiangSu Province
P.R. China, 214124
Ph. +86 (0) 510 85189768
Fax +86 (0) 510 85188016
sales@cpeitalia.com

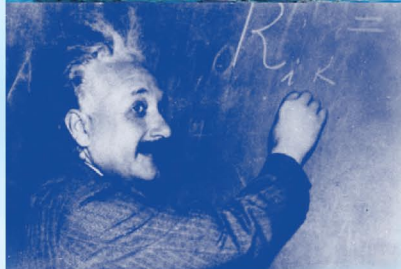
Telecommunication

Broadcasting

Avionics Aerospace

Navy

Research Institutes



STARWIRES ENGINEERING - SWE

n.503 Da Tong Road

Bin Hu District, WuXi City, JiansgSu Province

P.R. China, 214124

Tel. 0086.51085189768 - Fax. 0086.51085188016

E-mail: sales@starwires-engineering.com

