Foks Kablo

Genel Tanıtım & Teknik Bilgi
Company Presentation & Engineering
Data & Lan Cables

"The only way to do great works
is to love what you do"

Steve Jobs

Foks Kablo

Your Solution Partner

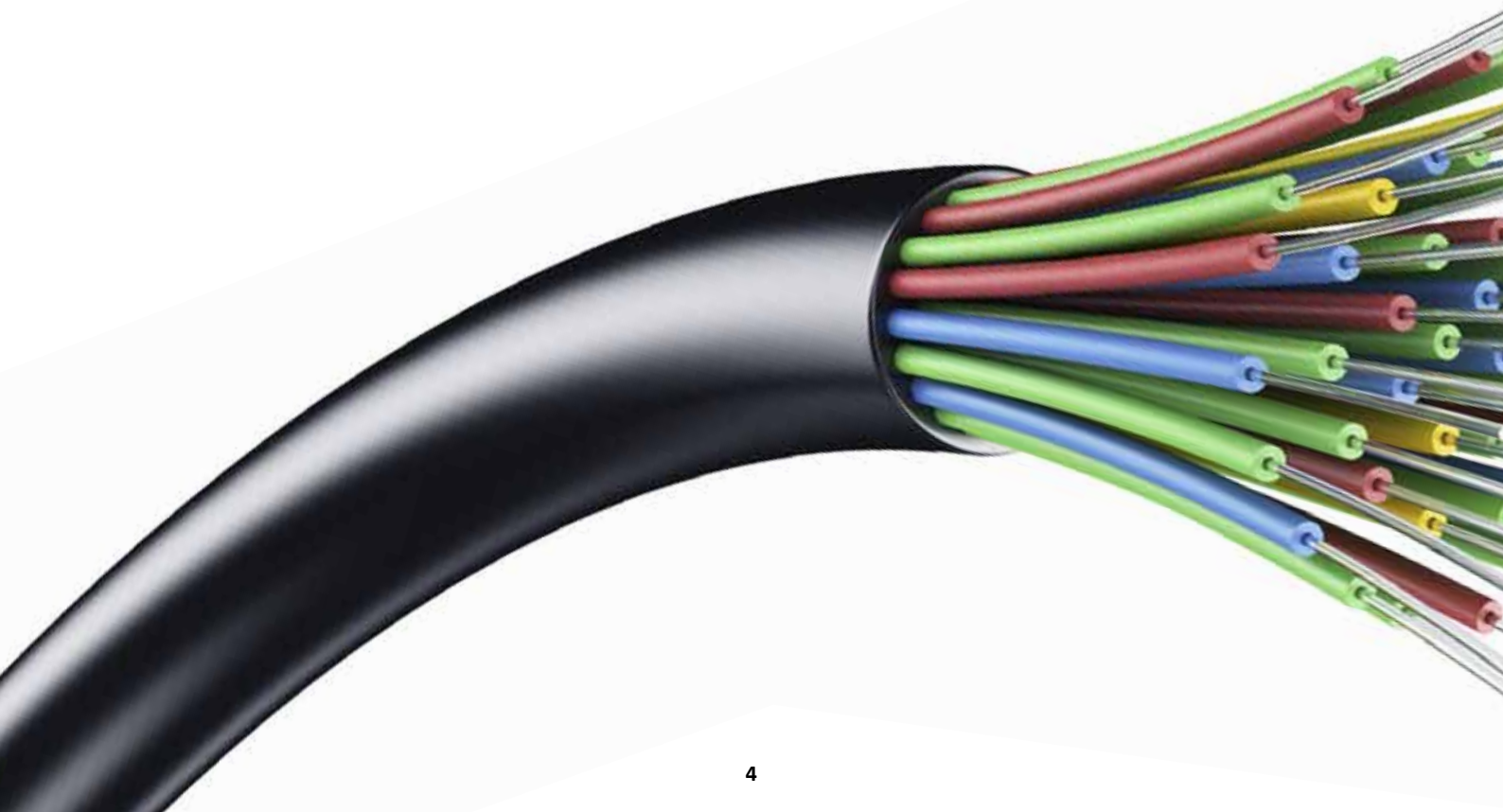
İÇİNDEKİLER
CONTENT

Yaşamın Renkleri

Foks

Foks Kablo A.Ş. modern makineler, etkileyici kalite kontrol sistemi ve test ekipmanları ile müşterilerine yüksek performanslı, kaliteli ürünler sunmayı garanti eder.

Hatasız bir şekilde üretilen ürünler ve üretim prosedürü uluslararası ISO 9001 ve ISO 18001 sertifikaları ile; çevreye karşı duyarlılığı ise ISO 14001 sertifikasıyla ödüllendirilmiştir.



Colours of Life

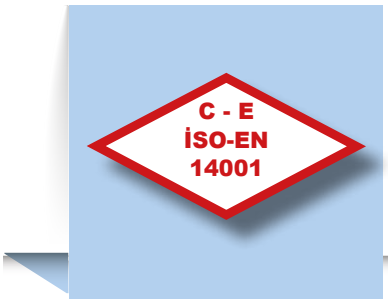
Kablo

Foks Kablo A.Ş. is equipped with Modern Machineries and fascinating control and test equipments, thereby ensuring the highest quality.

Perfectly manufactured products and production process have been proven by the award of ISO 9001 and ISO 18001 certificates, whereas environmental management system is certified to ISO 14001.

Sertifikalar

Foks Kablo A.Ş. yüksek kaliteli ürünleri ve hizmeti şu sertifikalara sahiptir;



EN ISO 14001 ÇEVRE YÖNETİM SİSTEMİ

EN ISO 14001 ENVIRONMENTAL MANAGEMENT SYSTEM

EN 18001 İŞ SAĞLIĞI ve GÜVENLİĞİ YÖNETİM SİSTEMİ

EN 18001 OCCUPATIONAL HEALTH AND SAFETY SYSTEM

EN ISO 9001 KALİTE YÖNETİM SİSTEMİ

EN ISO 9001 QUALITY MANAGEMENT SYSTEM

Geniş ürün yelpazesinde Data Kabloları, Dahili / Harici Telekomünikasyon kabloları, son teknoloji üretim hatlarında üretilmektedir. "Foks Kablo" markalı tüm ürünler performans garantilidir.

Foks Kablo yatırımlarına devam eden, kaynaklarını ve tüm gücünü bölgesel bir güç olmak için harcayan bir kablo üreticisi olmakla beraber sadece Türkiye'de değil Dünya ve bölge pazarlarından büyük paylar almaya çalışan öncü üreticilerdendir. Maliyet avantajlı ileri teknoloji ürünü kabloları Dünya'da 40'ın üzerinde ülkeye ihraç edilmektir. Hedefimiz ve amacımız müşterilerimizin beklentilerini karşılamak ve bu beklentileri yukarıya çekerek rakiplere karşı müşteri memnuniyeti ve sadakatiyle avantaj sağlamaktır.

Ortadoğu ve Avrupa kıtasının ortasında yeralan ve Afrika'ya açılan bir kapı olan Türkiye'nin lojistik avantajını kullanarak, Türk malı kalitesi ve bilinirliğini, dalında uzman ve işini severek yapan uzman satış elemanlarıyla Dünya'ya tanıtan bir üretici firma; aynı zamanda ülkemiz kablo sektörünün en tecrübeli üreticilerindendir.

Certificates

Our high quality products and services are certified by;

TSE TÜRK STANDARDLARI ENSTİTÜSÜ

TSE TURKISH STANDARD INSTITUTION

RoHS UYUMLU – DIRECTIVE 2002/95/EC

RoHS CO MPLIANT DIRECTIVE 2002/95/EC

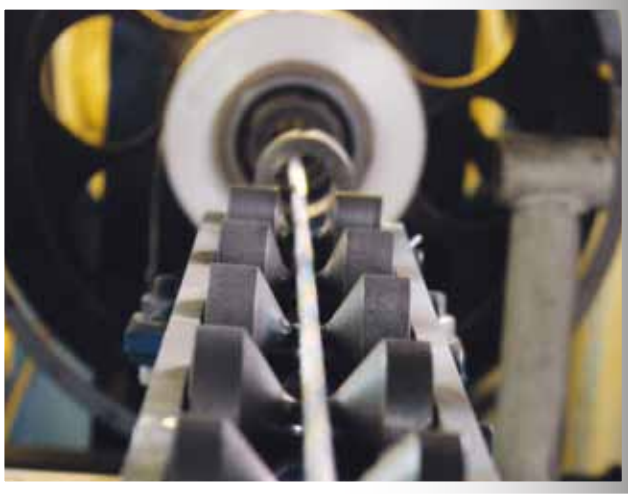
CE DEKLERASYONU

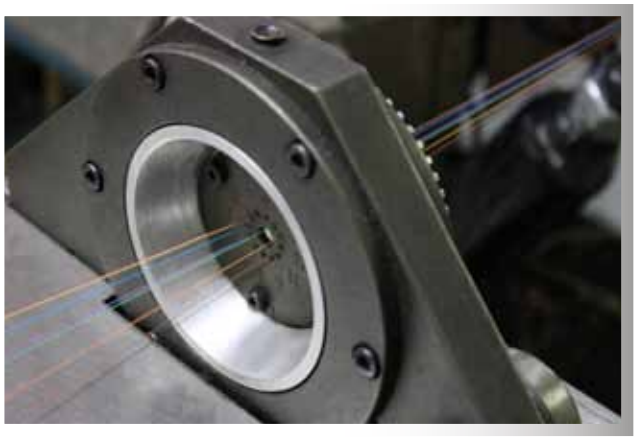
CE MARKING

Wide range of products includes Data Cables, Indoor & Outdoor Telecommunication Cables, are manufactured by latest technology machineries are all proven-performance and under the guarantee of Foks Kablo. We continue in investing and using our resources and power for the creation of a regional leader cable manufacturer company in Europe. Foks Kablo is struggling to be a regional power and one of the pioneering companies throughout South-eastern Europe & Western Asia. Cost-effective products of Foks Kablo are sold over 30 countries worldwide. Our commitment is to meet and exceed the customer expectations. By the advantage of being located between Asia and Europe and also being a gate opening to Africa we can offer advantageous logistic and delivery conditions. Our well motivated sales team is at your disposal at any time you may need.

Üretim Parkı

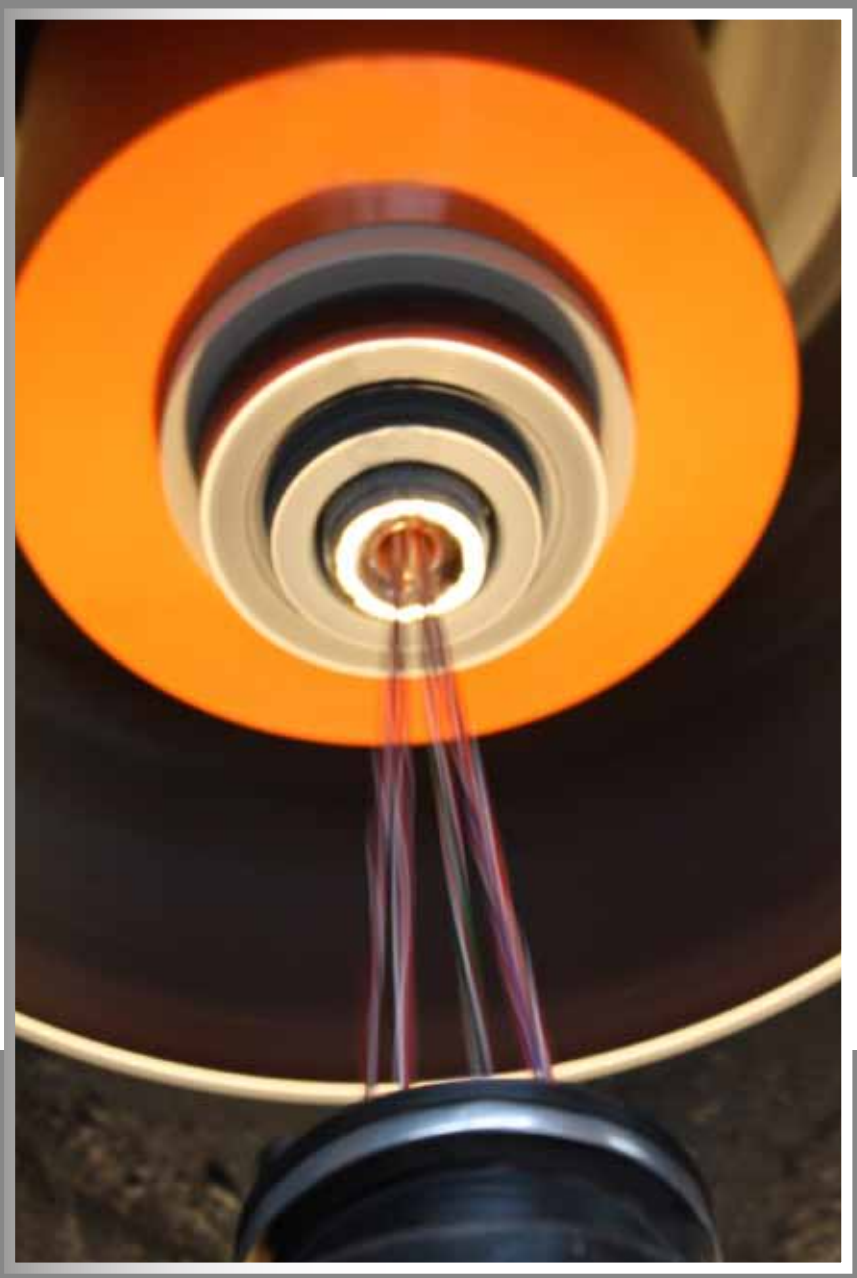
Modern makineler, etkileyici kontrol ve test ekipmanları, dolayısıyla en yüksek kalitede ürün, garanti altında;

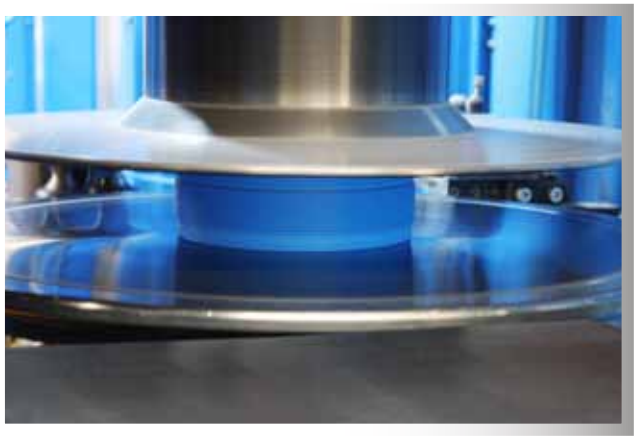




Production Complex

Modern Machineries and fascinating control and test equipments, thereby ensuring the highest quality;





Küresel

Foks Kablo dünya çapında bir çok telekom firması, İnternet Servis Sağlayıcısı ve GSM operatörünün tedarikçisi konumundadır.

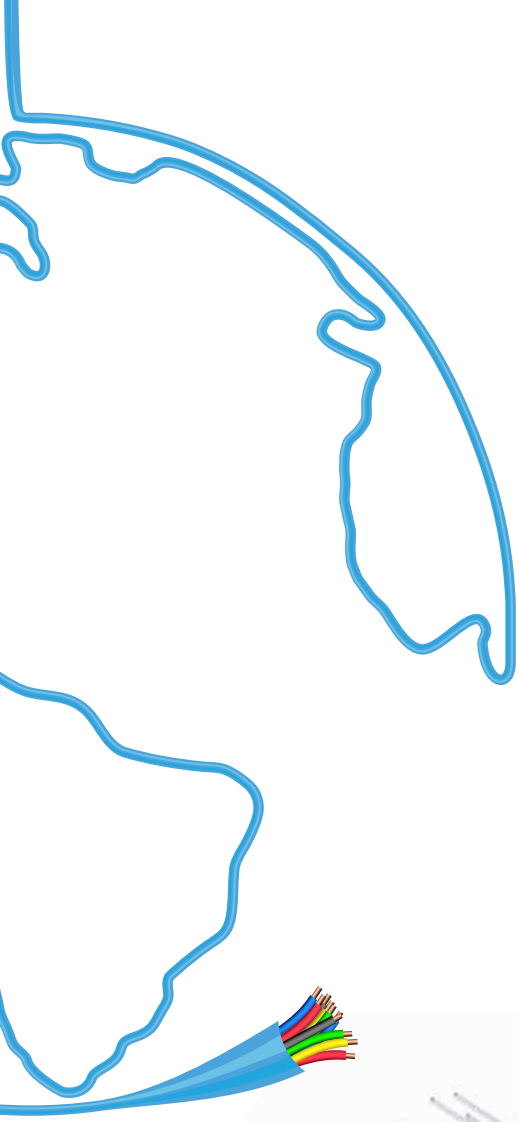
Tecrübemizi, olanaklarımızı ve rekabetçi gücümüzü ortaklarımızla paylaşıyoruz.

Siz de onlardan biri misiniz?

@fokskablo

KÜRESEL BİR KABLO ÜRETİCİSİ VE ÇÖZÜM ORTAĞI

Global



Foks Kablo is the supplier & solution partner of numerous Telecom companies, Internet Service Providers and GSM Operators all around the world.

We share our experience, capabilities & competitiveness with our partners.

Are you one of them?

A GLOBAL CABLE MANUFACTURER & SOLUTION PARTNER

CAT 5e U/UTP 24 AWG

Foks Kablo U/UTP Kategori 5 kablolar 100MHz'e kadar çalışmaktadır. ISO/IEC 11801 gereksinimlerine göre üretilen, U/UTP kablolar Ethernet, Fast Ethernet, Gigabit Ethernet gibi tüm E sınıfı uygulamaları desteklemek için en iyi seçenektir. Cat 5 U/UTP kablolar 100 MHz'e kadar temel ses ve veri yüklemeleri için de kullanılabilir.

İletken
- 24 AWG tek tel tavlı bakır

İzolasyon
- Poliolefin yalıtkan

Renk Kodu
- 1. Çift : Mavi - Beyaz/Mavi
- 2. Çift : Turuncu - Beyaz/Turuncu
- 3. Çift : Yeşil - Beyaz/Yeşil
- 4. Çift : Kahve - Beyaz/Kahve

Kılıf
- PVC (Turuncu LSZH veya Siyah PE kılıf opsiyonları)

Standartlar ve Uygunluklar
- ANSI/TIA/EIA 568-C.2
- ANSI/TIA 862 (Bina Otomasyonu)
- ISO/IEC 11801 Ed. 2.0 (D sınıfı)

Transmission Properties - Transmisyon Özellikleri

Frequence (MHz)	Attenuation dB/100 m	NEXT dB	ACR dB/100 m	PS NEXT dB	EL-FEXT dB/100 m	PS EL FEXT dB/100 m	Return Loss dB
1	2.1	65.3	63.2	62.3	64.0	61.0	20.0
4	4.1	56.3	52.2	53.3	52.0	49.0	23.0
10	6.5	50.3	43.8	47.3	44.0	41.0	25.0
16	8.3	47.2	39.0	44.2	39.9	36.9	25.0
20	9.3	45.8	36.5	42.8	38.0	35.0	25.0
31.25	11.7	42.9	31.1	39.9	34.1	31.1	23.6
62.5	17.0	38.4	21.4	35.4	28.1	25.1	21.5
100	22.0	35.3	13.3	32.3	24.0	21.0	20.1

Electrical Properties - Elektriksel Özellikler

Characterisitic Impedance Karekteristik Empedans (ohm)	Conductor Resistance İletken Direnci (DC max. ohm / km)	Resistance Unbalance Direnç Dengesizliği (Max. %)	Mutual Capacitance Efektif Kapasite (Max. nF/km)	Temperature Operating Range Çalışma Sıcaklığı
100 ±15	93,8	3,0	56	-20°C ~ +60°C

Physical Properties - Fiziksel Özellikler

Copper Diameter Bakır Çapı	Cable Diameter Kablo çapı (mm)	Cable Weight Kablo Ağırlığı (kg/km)	Length Kılıf Boyu (m)
24 AWG	5.3 ±0,1	32	305 - 500 - 1000

CAT 5e U/UTP 24 AWG

Foks Kablo

Foks U/UTP Category 5 cables are capable of operating up to 100MHz. Produced according to ISO/IEC 11801 requirements, the U/UTP cable is the best option to support all Class E applications such as Ethernet, Fast Ethernet, Gigabit Ethernet. The Cat 5 U/UTP cables are applicable for basic voice and data installations up to 100 MHz.

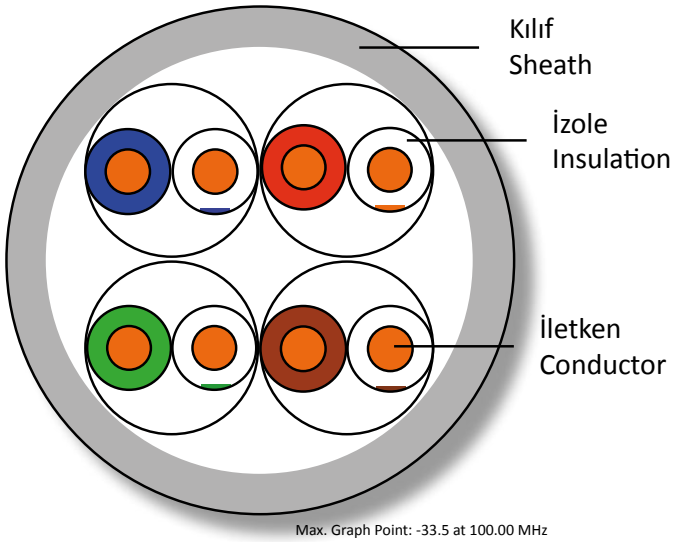
Conductor
- 24 AWG solid bare annealed copper

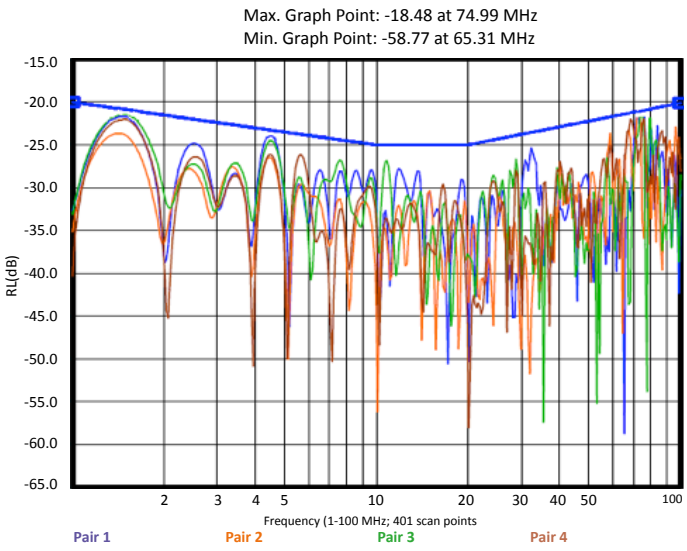
Insulation
- Polyolefin

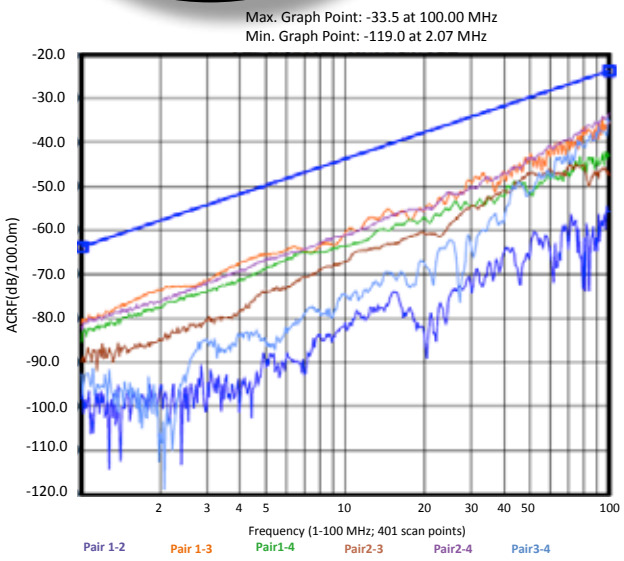
Color Code
- Pair 1: Blue - White/Blue
- Pair 2: Orange - White/Orange
- Pair 3: Green - White/Green
- Pair 4: Brown - White/Brown

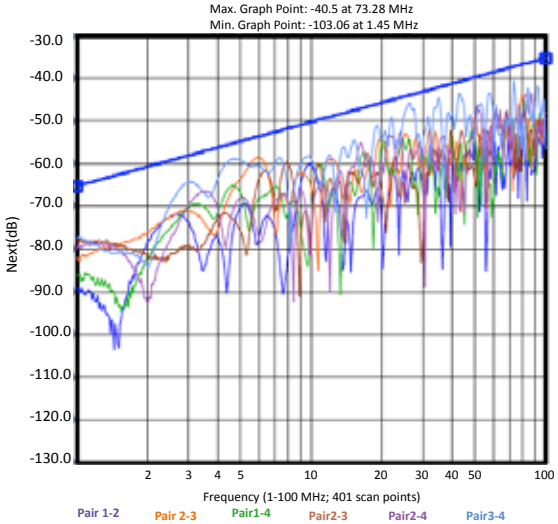
Sheath
- PVC (Orange LSZH and Black PE sheath options)

Standards & Compliances
- ANSI/TIA/EIA 568-C.2
- ANSI/TIA 862 (Building Automation)
- ISO/IEC 11801 Ed. 2.0 (Class D)
- RoHS Compliant









CAT 5e F/UTP 24 AWG

Foks Kablo F/UTP Kategori 5 kablolar 100MHz'e kadar çalışmaktadır. ISO/IEC 11801 gereksinimlerine göre üretilen, F/UTP kablolar Ethernet, Fast Ethernet, Gigabit Ethernet gibi tüm E sınıfı uygulamaları desteklemek için en iyi seçenektir. Cat 5 F/UTP kablolar 100 MHz'ekadar temel ses ve veri yüklemeleri için de kullanılabilir.

İletken
• 24 AWG tek tel tavlı bakır

İzolasyon
• Poliolefin yalıtkan

Renk Kodu
• 1. Çift : Mavi - Beyaz/Mavi
• 2. Çift : Turuncu - Beyaz/Turuncu
• 3. Çift : Yeşil - Beyaz/Yeşil
• 4. Çift : Kahve - Beyaz/Kahve

Öz Bandı
• Polyester bant

Toprak Teli
• 24 AWG Kalaylı bakır

Koruyucu Ekran
•AL-PES (Polyester destekli aluminyum folyo)

Kılıf
• PVC (Turuncu LSZH veya Siyah PE kılıf opsiyonları)

Standartlar ve Uygunluklar
• ANSI/TIA/EIA 568-C.2
• ANSI/TIA 862 (Bina Otomasyonu)
• ISO/IEC 11801 Ed. 2.0 (D sınıfı)

Transmission Properties - Transmisyon Özellikleri

Frequence (MHz)	Attenuation dB/100 m	NEXT dB	ACR dB/100 m	PS NEXT dB	EL-FEXT dB/100 m	PS EL FEXT dB/100 m	Return Loss dB
1	2.1	65.3	63.2	62.3	64.0	61.0	20.0
4	4.1	56.3	52.2	53.3	52.0	49.0	23.0
10	6.5	50.3	43.8	47.3	44.0	41.0	25.0
16	8.3	47.2	39.0	44.2	39.9	36.9	25.0
20	9.3	45.8	36.5	42.8	38.0	35.0	25.0
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62.5	17.0	38.4	21.4	35.4	28.1	25.1	21.5
100	22.0	35.3	13.3	32.3	24.0	21.0	20.1

Electrical Properties - Elektriksel Özellikler

Characterisitic Impedance Karekteristik Empedans (ohm)	Conductor Resistance İletken Direnci (DC max. ohm/km)	Resistance Unbalance Direnç Dengesizliği (Max. %)	Mutual Capacitance Efektif Kapasite (Max. nF/km)	Temperature Operating Range Çalışma Sıcaklığı
100 ±15	93,8	3,0	56	-20°C ~ +60°C

Physical Properties - Fiziksel Özellikler

Copper Diameter Bakır Çapı	Cable Diameter Kablo çapı (mm)	Cable Weight Kablo Ağırlığı (kg/km)	Length Kılıf Boyu (m)
24 AWG	5.3 ±0,1	35	305 - 500 - 1000

CAT 5e F/UTP 24AWG

Foks Kablo

Foks F/UTP Category 5 cables are capable of operating up to 100MHz. Produced according to ISO/IEC 11801 requirements, the F/UTP cable is the best option to support all Class E applications such as Ethernet, Fast Ethernet, Gigabit Ethernet. The Cat 5 F/UTP cables are applicable for basic voice and data installations up to 100 MHz.

Conductor
- 24 AWG solid bare annealed copper

Insulation
- Polyolefin

Color Code
- Pair 1: Blue - White/Blue
- Pair 2: Orange - White/Orange
- Pair 3: Green - White/Green
- Pair 4: Brown - White/Brown

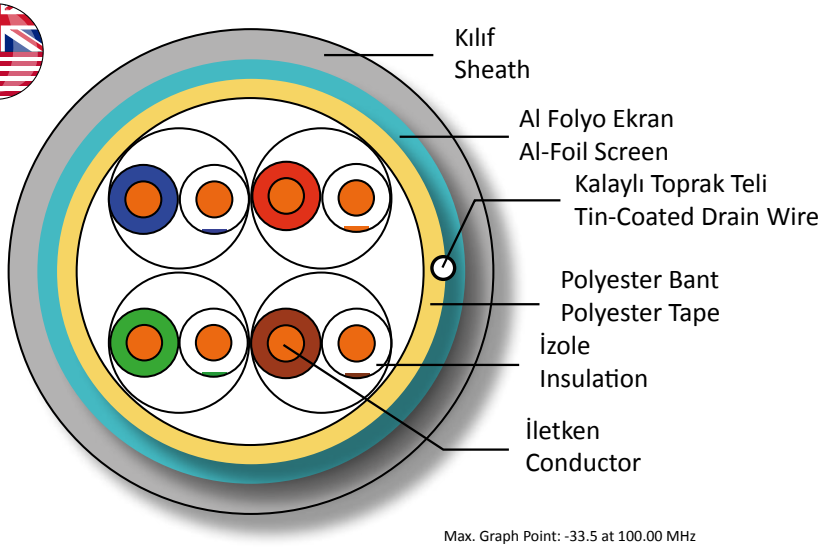
Core Tape
- Polyester tape

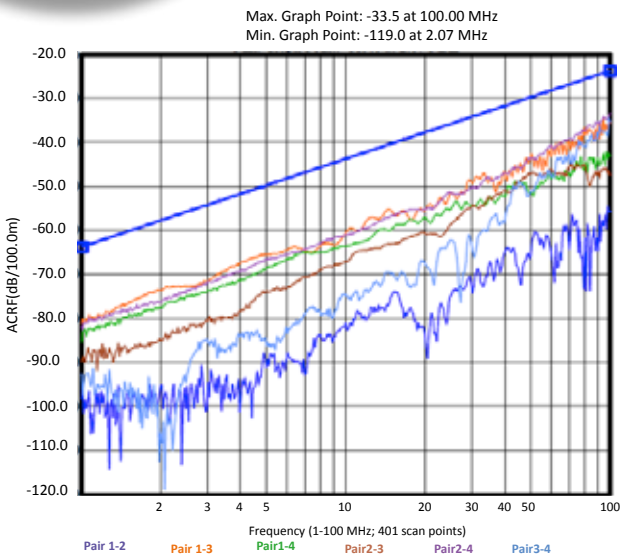
Drain Wire
- 24 AWG tin-coated copper

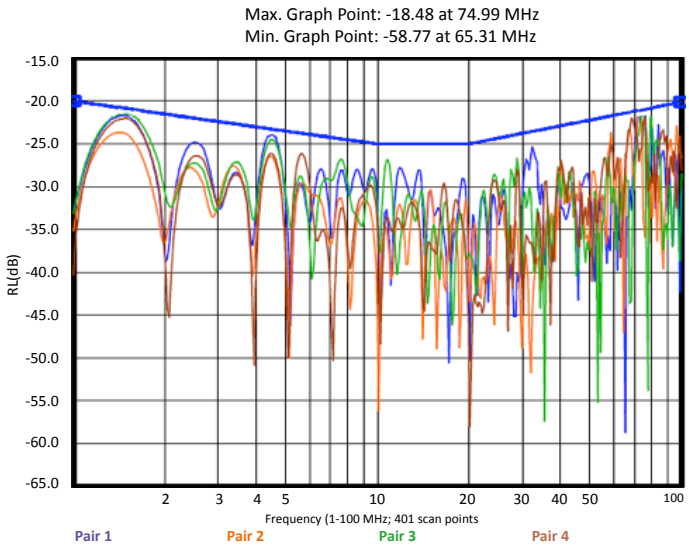
Shield
- AL-PES (Polyester-backed aluminum foil)

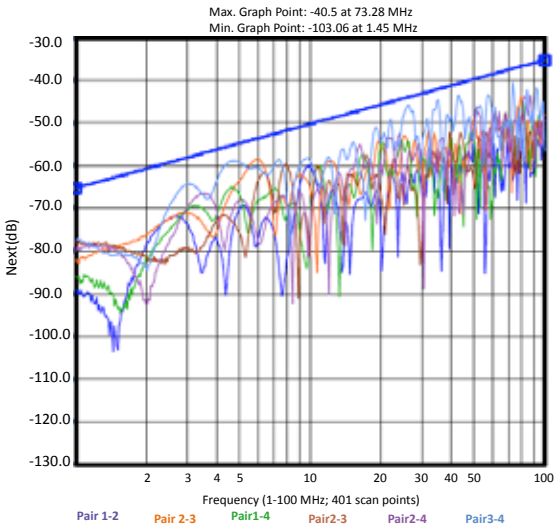
Sheath
- PVC (Orange LSZH and Black
PE sheath options)

Standards & Compliances
- ANSI/TIA/EIA 568-C.2
- ANSI/TIA 862 (Building Automation)
- ISO/IEC 11801 Ed. 2.0 (Class D)
- RoHS Compliant









CAT 6 U/UTP 23 AWG

Foks Kablo U/UTP Kategori 6 kablolar 250MHz'e kadar çalışmaktadır. ISO/IEC 11801 gereksinimlerine göre üretilen, U/UTP kablolar Ethernet, Fast Ethernet, Gigabit Ethernet gibi tüm E sınıfı uygulamaları desteklemek için en iyi seçenektir. Cat 6 U/UTP kablolar 250 MHz'e kadar temel ses ve veri yüklemeleri için de kullanılabilir.

İletken
- 23 AWG tek tel tavlı bakır

İzolasyon
- Poliolefin yalıtkan

Renk Kodu
- 1. Çift : Mavi - Beyaz/Mavi
- 2. Çift : Turuncu - Beyaz/Turuncu
- 3. Çift : Yeşil - Beyaz/Yeşil
- 4. Çift : Kahve - Beyaz/Kahve

Seperatör
- Yalıtkan çapraz seperatör

Kılıf
- PVC (Turuncu LSZH veya Siyah PE kılıf opsiyonları)

Standartlar ve Uygunluklar
- ANSI/TIA/EIA 568-C.2
- ANSI/TIA 862 (Bina Otomasyonu)
- ISO/IEC 11801 Ed. 2.0 (D sınıfı)
- RoHS Uygunluğu

Transmission Properties - Transmisyon Özellikleri

Frequence (MHz)	Max. Insertion Loss (dB/100m)	Min. Return Loss (dB)	Min. NEXT (dB)	Min. PS-NEXT (dB)	Min. Pover Sum ACRF (dB)	Min. Pover Sum PSACRF (dB)
1	2,0	20,0	74,3	72,3	67,8	64,8
4	3,8	23,0	65,3	63,3	55,8	52,8
10	6,0	25,0	59,3	57,3	47,8	44,5
16	7,6	25,0	56,2	54,2	43,7	40,7
20	8,5	25,0	54,8	52,8	41,8	38,8
31,25	10,7	23,6	51,9	49,9	37,9	34,9
62,50	15,4	21,5	47,4	45,4	31,9	28,9
100	19,8	20,1	44,3	42,3	27,8	24,8
200	29,0	18,0	39,8	37,8	21,8	18,8
250	32,8	17,3	38,3	36,3	19,8	16,8

Electrical Properties - Elektriksel Özellikler

Characterisitic Impedance Karekteristik Empedans (ohm)	Conductor Resistance İletken Direnci (DC max. ohm/km)	Resistance Unbalance Direnç Dengesizliği (Max. %)	Mutual Capacitance Efektif Kapasite (Max. nF/km)	Temperature Operating Range Çalışma Sıcaklığı
100 ±15	72	2,5	56	-20°C ~ +60°C

Physical Properties - Fiziksel Özellikler

Copper Diameter Bakır Çapı	Cable Diameter Kablo çapı (mm)	Cable Weight Kablo Ağırlığı (kg/km)	Length Kılıf Boyu (m)
23 AWG	6.4 ±0,1	48	305 - 500 - 1000

CAT 6 U/UTP 23AWG

Foks Kablo

Foks U/UTP Category 6 cables are capable of operating up to 250MHz. Produced according to ISO/IEC 11801 requirements, the U/UTP cable is the best option to support all Class E applications such as Ethernet, Fast Ethernet, Gigabit Ethernet. The Cat 6 U/UTP cables are applicable for basic voice and data installations up to 250 MHz.

Conductor
- 23 AWG solid bare annealed copper

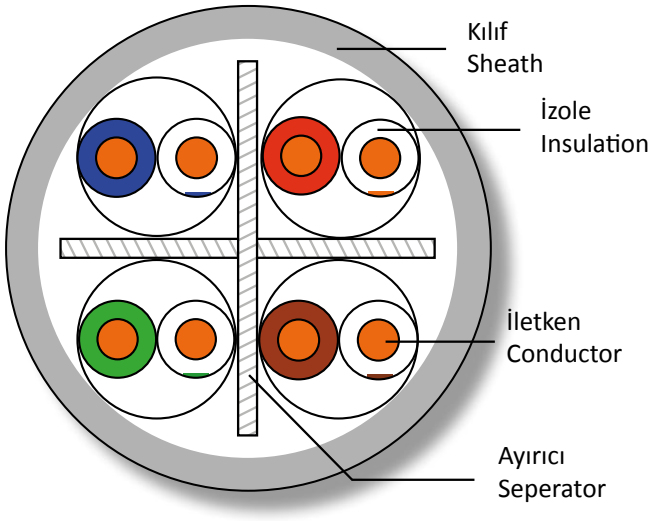
Insulation
- Polyolefin

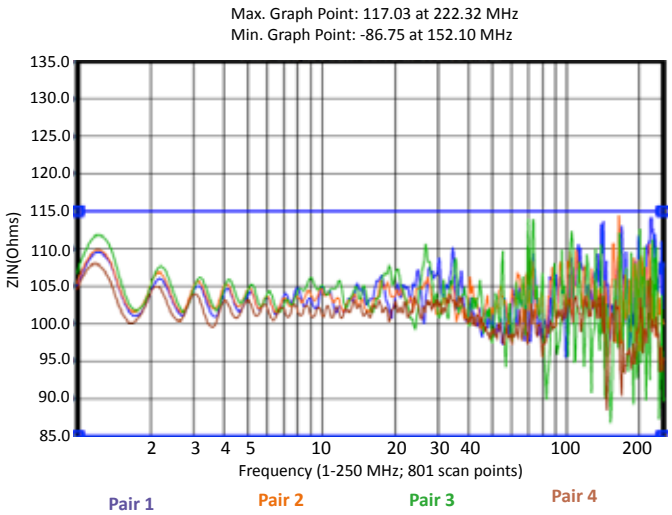
Color Code
- Pair 1: Blue - White/Blue
- Pair 2: Orange - White/Orange
- Pair 3: Green - White/Green
- Pair 4: Brown - White/Brown

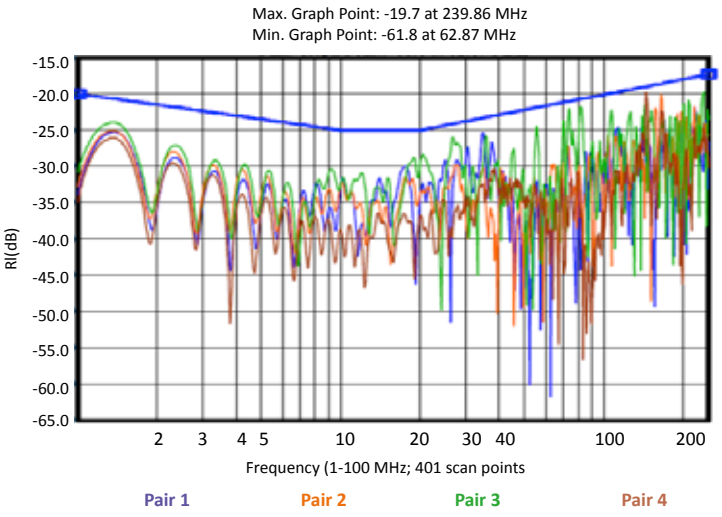
Separator
- Dielectric - cross separator

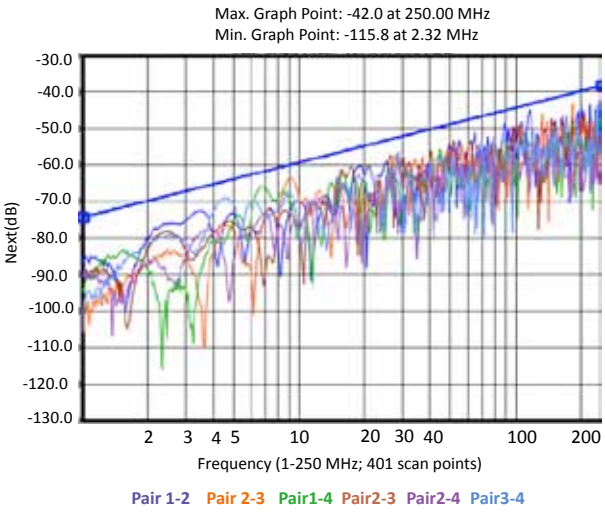
Sheath
- PVC (Orange LSZH and Black
PE sheath options)

Standards & Compliances
- ANSI/TIA/EIA 568-C.2
- ANSI/TIA 862 (Building Automation)
- ISO/IEC 11801 Ed. 2.0 (Class D)
- RoHS Compliant



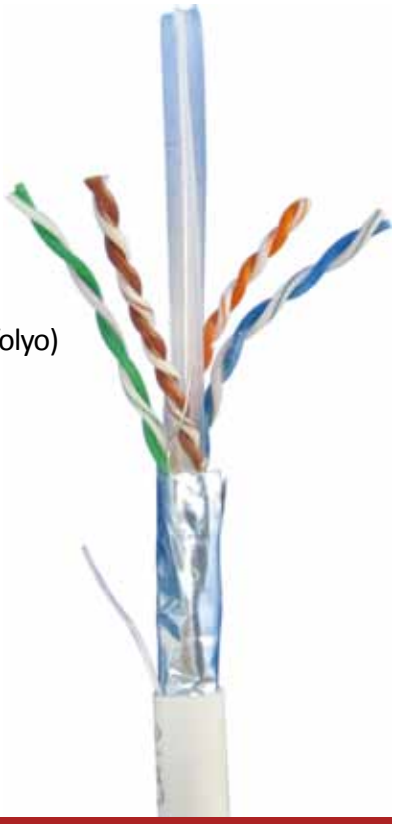






CAT 6 F/UTP 23 AWG

Foks Kablo F/UTP Kategori 6 kablolar 250MHz'e kadar çalışmaktadır. ISO/IEC 11801 gereksinimlerine göre üretilen, F/UTP kablolar Ethernet, Fast Ethernet, Gigabit Ethernet gibi tüm E sınıfı uygulamaları desteklemek için en iyi seçenektir. Cat 6 F/UTP kablolar 250 MHz'e kadar temel ses ve veri yüklemeleri için de kullanılabilir.



İletken
- 23 AWG tek tel tavlı bakır

İzolasyon
- Poliolefin yalıtkan

Renk Kodu
- 1. Çift : Mavi - Beyaz/Mavi
- 2. Çift : Turuncu – Beyaz/Turuncu
- 3. Çift : Yeşil - Beyaz/Yeşil
- 4. Çift : Kahve – Beyaz/Kahve

Seperatör
- Yalıtkan çapraz seperatör

Öz Bandı
- Polyester bant

Toprak Teli
- 24 AWG Kalaylı bakır

Koruyucu Ekran
- AL-PES (Polyester destekli alüminyum folyo)

Kılıf
- PVC (Turuncu LSZH veya Siyah PE kılıf opsiyonları)

Standartlar ve Uygunluklar
- ANSI/TIA/EIA 568-C.2
- ANSI/TIA 862 (Bina Otomasyonu)
- ISO/IEC 11801 Ed. 2.0 (D sınıfı)
- RoHS Uygunluğu

Transmission Properties - Transmisyon Özellikleri

Frequence (MHz)	Max. Insertion Loss (dB/100m)	Min. Return Loss (dB)	Min. NEXT (dB)	Min. PS-NEXT (dB)	Min. Pover Sum ACRF (dB)	Min. Pover Sum PSACRF (dB)
1	2,0	20,0	74,3	72,3	67,8	64,8
4	3,8	23,0	65,3	63,3	55,8	52,8
10	6,0	25,0	59,3	57,3	47,8	44,5
16	7,6	25,0	56,2	54,2	43,7	40,7
20	8,5	25,0	54,8	52,8	41,8	38,8
31,25	10,7	23,6	51,9	49,9	37,9	34,9
62,50	15,4	21,5	47,4	45,4	31,9	28,9
100	19,8	20,1	44,3	42,3	27,8	24,8
200	29,0	18,0	39,8	37,8	21,8	18,8
250	32,8	17,3	38,3	36,3	19,8	16,8

Electrical Properties - Elektriksel Özellikler

Characterisitic Impedance Karekteristik Empedans (ohm)	Conductor Resistance İletken Direnci (DC max. ohm/km)	Resistance Unbalance Direnç Dengesizliği (Max. %)	Mutual Capacitance Efektif Kapasite (Max. nF/km)	Temperature Operating Range Çalışma Sıcaklığı
100 ±15	72	2,5	56	-20°C ~ +60°C

Physical Properties - Fiziksel Özellikler

Copper Diameter Bakır Çapı	Cable Diameter Kablo çapı (mm)	Cable Weight Kablo Ağırlığı (kg/km)	Length Kılıf Boyu (m)
23 AWG	6.4 ±0,1	51	305 - 500 - 1000

CAT 6 F/UTP 23AWG

Foks Kablo

Foks F/UTP Category 6 cables are capable of operating up to 250MHz. Produced according to ISO/IEC 11801 requirements, the F/UTP cable is the best option to support all Class E applications such as Ethernet, Fast Ethernet, Gigabit Ethernet. The Cat 6 F/UTP cables are applicable for basic voice and data installations up to 250 MHz.

Conductor
• 23 AWG solid bare annealed copper

Insulation
• Polyolefin

Color Code
• Pair 1: Blue - White/Blue
• Pair 2: Orange - White/Orange
• Pair 3: Green - White/Green
• Pair 4: Brown - White/Brown

Separator
• Dielectric - cross separator

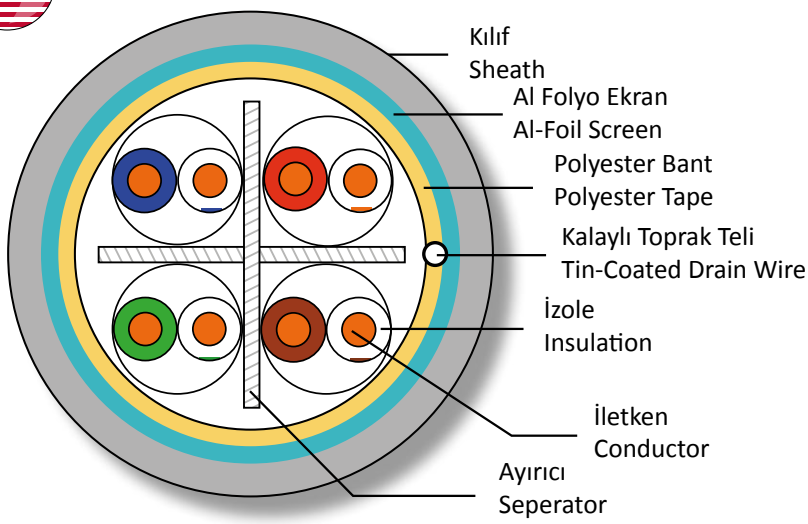
Core Tape
• Polyester tape

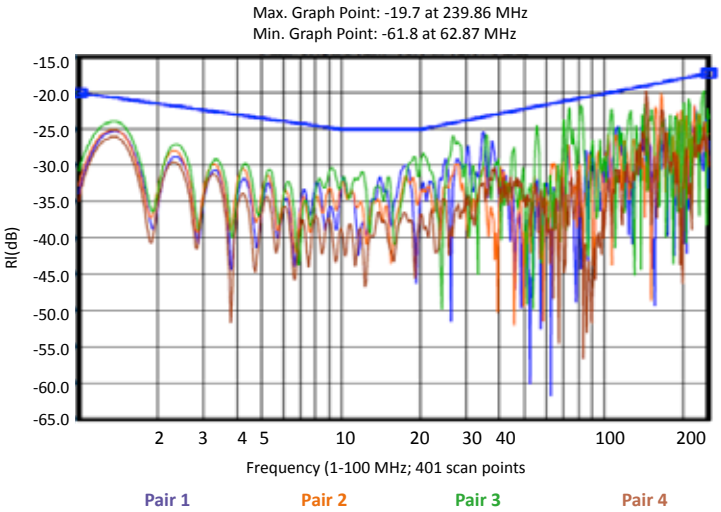
Drain Wire
• 24 AWG tin-coated copper

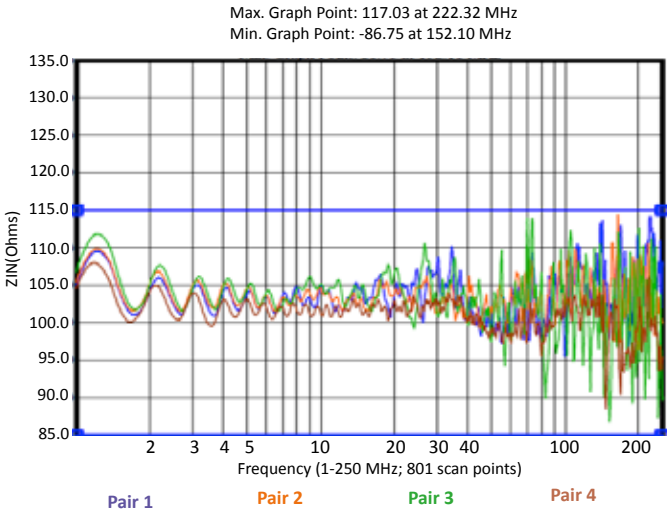
Shield
•AL-PES (Polyester-backed aluminum foil)

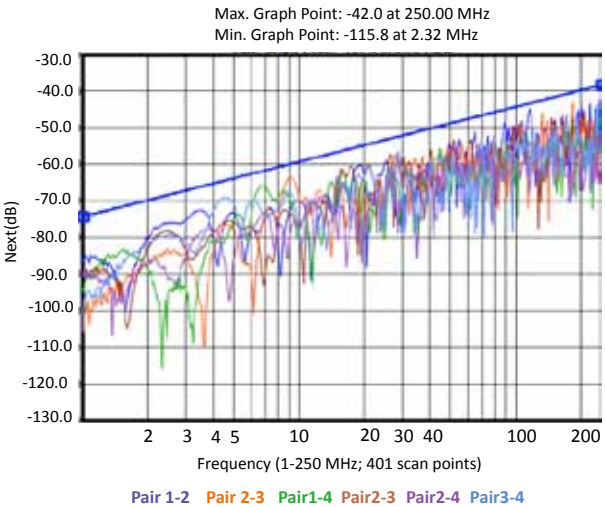
Sheath
• PVC (Orange LSZH and Black
PE sheath options)

Standards & Compliances
• ANSI/TIA/EIA 568-C.2
• ANSI/TIA 862 (Building Automation)
• ISO/IEC 11801 Ed. 2.0 (Class D)
• RoHS Compliant









CAT 5e U/UTP 24 AWG Fig8 - Havai

Foks Kablo U/UTP Kategori 5 havai askı telli kablolar 100MHz'e kadar çalışmaktadır. ISO/IEC 11801 gereksinimlerine göre üretilen, U/UTP kablolar Ethernet, Fast Ethernet, Gigabit Ethernet gibi tüm E sınıfı uygulamaları desteklemek için en iyi seçenektir. Cat 5 U/UTP kablolar 100 MHz'e kadar temel ses ve veri yüklemeleri için de kullanılabilir.

İletken
- 23 AWG tek tel tavlı bakır

İzolasyon
- Poliolefin yalıtkan

Renk Kodu
- 1. Çift : Mavi - Beyaz/Mavi
- 2. Çift : Turuncu - Beyaz/Turuncu
- 3. Çift : Yeşil - Beyaz/Yeşil
- 4. Çift : Kahve - Beyaz/Kahve

Öz Bandı
- Polyester bant

Askı Teli
- Galvaniz kaplı çelik tel

Kılıf
- Polietilen

Standartlar ve Uygunluklar
- EIA/TIA-568-C.2
- ISO/IEC 11801; IEC 61156-5
- EN 50173-1, EN 50288-6-1
- RoHS Uygunluğu

Transmission Properties - Transmisyon Özellikleri

Frequence (MHz)	Attenuation dB/100 m	NEXT dB	ACR dB/100 m	PS NEXT dB	EL-FEXT dB/100 m	PS EL FEXT dB/100 m	Return Loss dB
1	2.1	65.3	63.2	62.3	64.0	61.0	20.0
4	4.1	56.3	52.2	53.3	52.0	49.0	23.0
10	6.5	50.3	43.8	47.3	44.0	41.0	25.0
16	8.3	47.2	39.0	44.2	39.9	36.9	25.0
20	9.3	45.8	36.5	42.8	38.0	35.0	25.0
31.25	11.7	42.9	31.1	39.9	34.1	31.1	23.6
62.5	17.0	38.4	21.4	35.4	28.1	25.1	21.5
100	22.0	35.3	13.3	32.3	24.0	21.0	20.1

Electrical Properties - Elektriksel Özellikler

Characterisitic Impedance Karekteristik Empedans (ohm)	Conductor Resistance İletken Direnci (DC max. ohm/km)	Resistance Unbalance Direnç Dengesizliği (Max. %)	Mutual Capacitance Efektif Kapasite (Max. nF/km)	Temperature Operating Range Çalışma Sıcaklığı
100 ±15	93,8	3,0	56	-20°C ~ +60°C

Physical Properties - Fiziksel Özellikler

Copper Diameter Bakır Çapı	Cable Diameter Kablo çapı (mm)	Cable Weight Kablo Ağırlığı (kg/km)	Length Kılıf Boyu (m)
24 AWG	5.3 – 10,1	51	305 - 500 - 1000

CAT 5e U/UTP 24AWG Fig8 - Aerial

Foks Kablo

Foks U/UTP Category 5e cables are capable of operating up to 100MHz for aerial installations with messenger wire. Produced according to ISO/IEC 11801 requirements, the U/UTP cable is the best option to support all Class E applications such as Ethernet, Fast Ethernet, Gigabit Ethernet. The Cat 5 U/UTP cables are applicable for basic voice and data installations up to 100 MHz.

Conductor
- 24 AWG solid bare annealed copper

Insulation
- Polyolefin

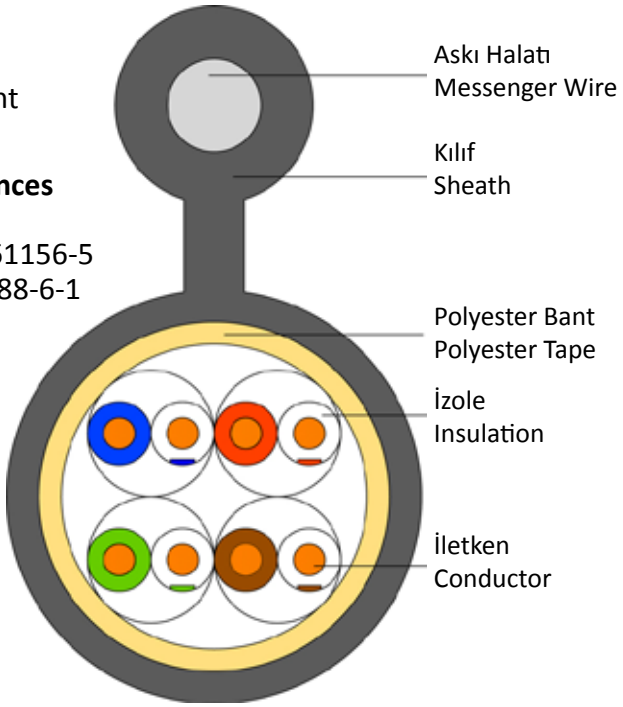
Color Code
- Pair 1: Blue - White/Blue
- Pair 2: Orange - White/Orange
- Pair 3: Green - White/Green
- Pair 4: Brown - White/Brown

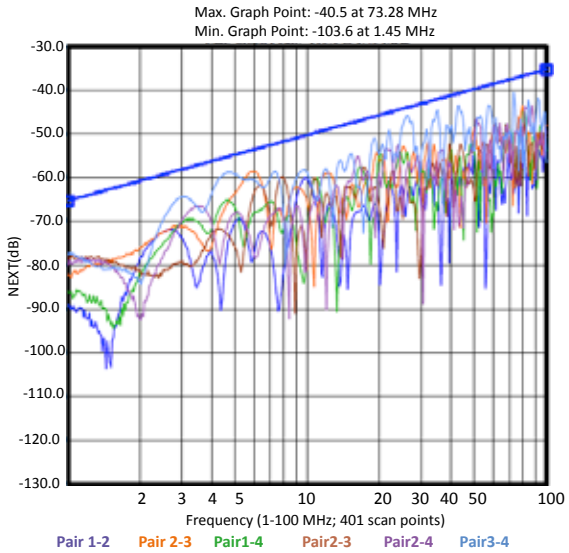
Core Tape
- Polyester tape

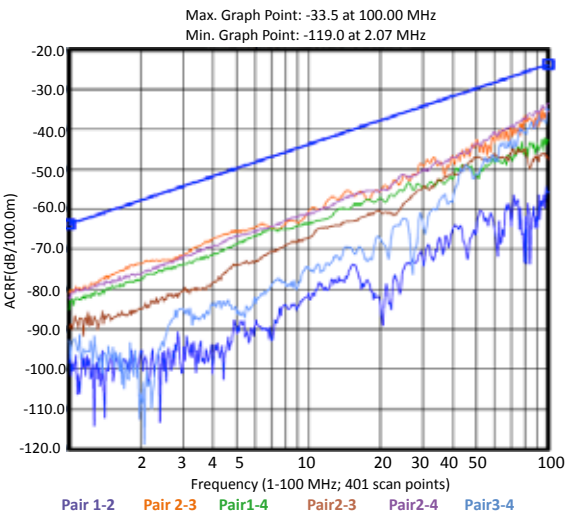
Messenger Wire
- Steel suspension wire

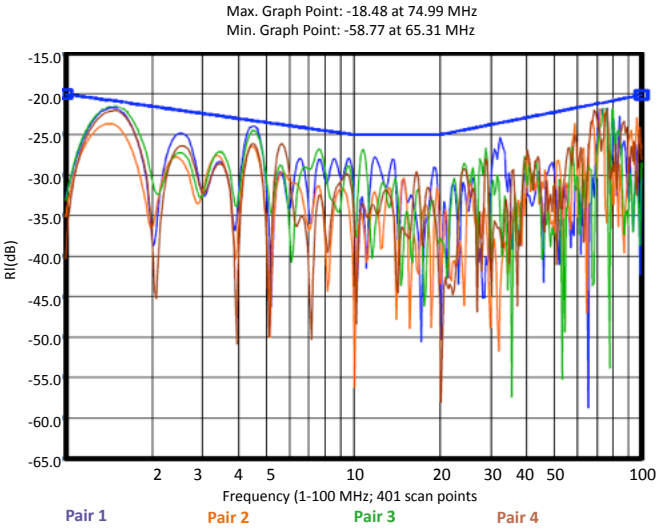
Sheath
- Black PE, UV resistant

Standards & Compliances
- EIA/TIA-568-C.2
- ISO/IEC 11801; IEC 61156-5
- EN 50173-1, EN 50288-6-1
- RoHS Uygunluğu









CAT 5e F/UTP 24 AWG Fig8 - Havai

Foks Kablo üretimi F/UTP Kategori 5 havai askı telli kablolar 100MHz'e kadar çalışmaktadır. ISO/IEC 11801 gereksinimlerine göre üretilen, F/UTP kablolar Ethernet, Fast Ethernet, Gigabit Ethernet gibi tüm E sınıfı uygulamaları desteklemek için en iyi seçenektir. Cat 5 F/UTP kablolar 100 MHz'e kadar temel ses ve veri yüklemeleri için de kullanılabilir.

İletken
- 24 AWG tek tel tavlı bakır

İzolasyon
- Poliolefin yalıtkan

Renk Kodu
- 1. Çift : Mavi - Beyaz/Mavi
- 2. Çift : Turuncu – Beyaz/Turuncu
- 3. Çift : Yeşil - Beyaz/Yeşil
- 4. Çift : Kahve – Beyaz/Kahve

Öz Bandı
- Polyester bant

Toprak Teli
- 24 AWG Kalaylı bakır

Koruyucu Ekran
- AL-PES (Polyester destekli aluminyum folyo)

Askı Teli
- Galvaniz kaplı çelik tel

Kılıf
- Polietilen

Standartlar ve Uygunluklar
- EIA/TIA-568-C.2
- ISO/IEC 11801; IEC 61156-5
- EN 50173-1, EN 50288-6-1
- RoHS Uygunluğu

Transmission Properties - Transmisyon Özellikleri

Frequence (MHz)	Attenuation dB/100 m	NEXT dB	ACR dB/100 m	PS NEXT dB	EL-FEXT dB/100 m	PS EL FEXT dB/100 m	Return Loss dB
1	2.1	65.3	63.2	62.3	64.0	61.0	20.0
4	4.1	56.3	52.2	53.3	52.0	49.0	23.0
10	6.5	50.3	43.8	47.3	44.0	41.0	25.0
16	8.3	47.2	39.0	44.2	39.9	36.9	25.0
20	9.3	45.8	36.5	42.8	38.0	35.0	25.0
31.25	11.7	42.9	31.1	39.9	34.1	31.1	23.6
62.5	17.0	38.4	21.4	35.4	28.1	25.1	21.5
100	22.0	35.3	13.3	32.3	24.0	21.0	20.1

Electrical Properties - Elektriksel Özellikler

Characterisitic Impedance Karekteristik Empedans (ohm)	Conductor Resistance İletken Direnci (DC max. ohm/km)	Resistance Unbalance Direnç Dengesizliği (Max. %)	Mutual Capacitance Efektif Kapasite (Max. nF/km)	Temperature Operating Range Çalışma Sıcaklığı
100 ±15	93,8	3,0	56	-20°C ~ +60°C

Physical Properties - Fiziksel Özellikler

Copper Diameter Bakır Çapı	Cable Diameter Kablo çapı (mm)	Cable Weight Kablo Ağırlığı (kg/km)	Length Kılıf Boyu (m)
24 AWG	5.3 – 10,1	54	305 - 500 - 1000

CAT 5e F/UTP 24AWG Fig8 - Aerial

Foks Kablo

Foks F/UTP Category 5 cables are capable of operating up to 100MHz for aerial installations with messenger wire. Produced according to ISO/IEC 11801 requirements, the F/UTP cable is the best option to support all Class E applications such as Ethernet, Fast Ethernet, Gigabit Ethernet. The Cat 5 F/UTP cables are applicable for basic voice and data installations up to 100 MHz.

Conductor
- 24 AWG solid bare annealed copper

Insulation
- Polyolefin

Color Code
- Pair 1: Blue - White/Blue
- Pair 2: Orange - White/Orange
- Pair 3: Green - White/Green
- Pair 4: Brown - White/Brown

Core Tape
- Polyester tape

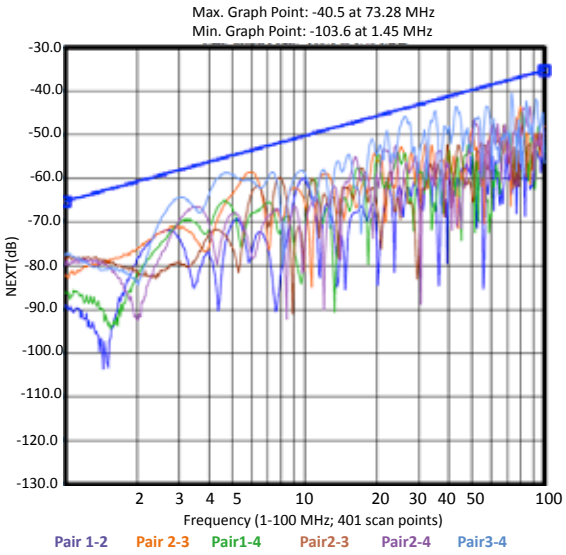
Drain Wire
- 24 AWG tin-coated copper

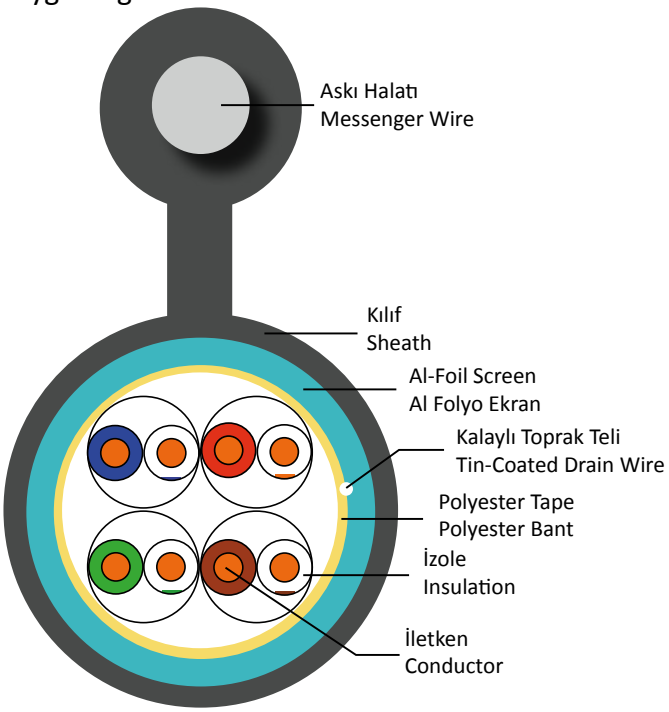
Shield
- AL-PES (Polyester-backed aluminum foil)

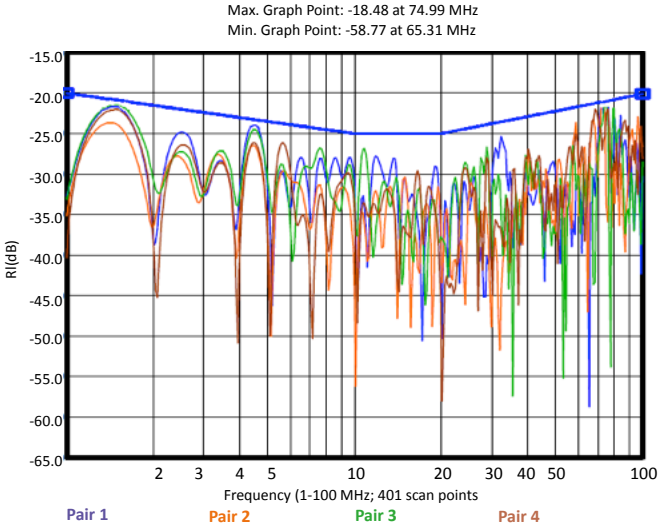
Messenger Wire
- Steel suspension wire

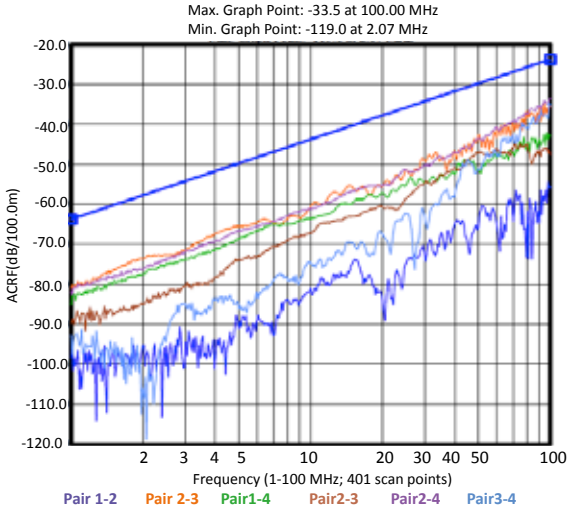
Sheath
- Black PE, UV resistant

Standards & Compliances
- EIA/TIA-568-C.2
- ISO/IEC 11801; IEC 61156-5
- EN 50173-1, EN 50288-6-1
- RoHS Uygunluğu









CAT 6 U/UTP 23 AWG Fig8 - Havai

Foks Kablo üretimi olan U/UTP Kategori 6 havai askı telli kablolar 250MHz'e kadar çalışmaktadır. ISO/IEC 11801 gereksinimlerine göre üretilen, U/UTP kablolar Ethernet, Fast Ethernet, Gigabit Ethernet gibi tüm E sınıfı uygulamaları desteklemek için en iyi seçenektir. Cat 6 U/UTP kablolar 250 MHz'e kadar temel ses ve veri yüklemeleri için de kullanılabilir.

İletken
- 23 AWG tek tel tavlı bakır

İzolasyon
- Poliolefin yalıtkan

Renk Kodu
- 1. Çift : Mavi - Beyaz/Mavi
- 2. Çift : Turuncu - Beyaz/Turuncu
- 3. Çift : Yeşil - Beyaz/Yeşil
- 4. Çift : Kahve - Beyaz/Kahve

Seperatör
- Yalıtkan çapraz seperatör

Öz Bandı
- Polyester bant

Askı Teli
- Galvaniz kaplı çelik tel

Kılıf
- Polietilen

Standartlar ve Uygunluklar
- EIA/TIA-568-C.2
- ISO/IEC 11801; IEC 61156-5
- EN 50173-1, EN 50288-6-1
- RoHS Uygunluğu

Transmission Properties - Transmisyon Özellikleri

Frequence (MHz)	Max. Insertion Loss (dB/100m)	Min. Return Loss (dB)	Min. NEXT (dB	Min. PS-NEXT (dB)	Min. Pover Sum ACRF (dB)	Min. Pover Sum PSACRF (dB)
1	2,0	20,0	74,3	2,0	67,8	64,8
4	3,8	23,0	65,3	3,8	55,8	52,8
10	6,0	25,0	59,3	6,0	47,8	44,5
16	7,6	25,0	56,2	7,6	43,7	40,7
20	8,5	25,0	54,8	8,5	41,8	38,8
31,25	10,7	23,6	51,9	10,7	37,9	34,9
62,50	15,4	21,5	47,4	15,4	31,9	28,9
100	19,8	20,1	44,3	19,8	27,8	24,8
200	29,0	18,0	39,8	29,0	21,8	18,8
250	32,8	17,3	38,3	32,8	19,8	16,8

Electrical Properties - Elektriksel Özellikler

Characterisitic Impedance Karekteristik Empedans (ohm)	Conductor Resistance İletken Direnci (DC max. ohm/km)	Resistance Unbalance Direnç Dengesizliği (Max. %)	Mutual Capacitance Efektif Kapasite (Max. nF/km)	Temperature Operating Range Çalışma Sıcaklığı
100 ±15	72	2,5	56	-20°C ~ +60°C

Physical Properties - Fiziksel Özellikler

Copper Diameter Bakır Çapı	Cable Diameter Kablo çapı (mm)	Cable Weight Kablo Ağırlığı (kg/km)	Length Kılıf Boyu (m)
23 AWG	6,5 – 11,4	62	305 - 500 - 1000

CAT 6 U/UTP 23 AWG Fig8 - Aerial

Foks Kablo

Foks U/UTP Category 6 cables are capable of operating up to 250MHz for aerial installations with messenger wire. Produced according to ISO/IEC 11801 requirements, the U/UTP cable is the best option to support all Class E applications such as Ethernet, Fast Ethernet, Gigabit Ethernet. The Cat 6 U/UTP cables are applicable for basic voice and data installations up to 250 MHz.

Conductor
- 24 AWG solid bare annealed copper

Insulation
- Polyolefin

Color Code
- Pair 1: Blue - White/Blue
- Pair 2: Orange - White/Orange
- Pair 3: Green - White/Green
- Pair 4: Brown - White/Brown

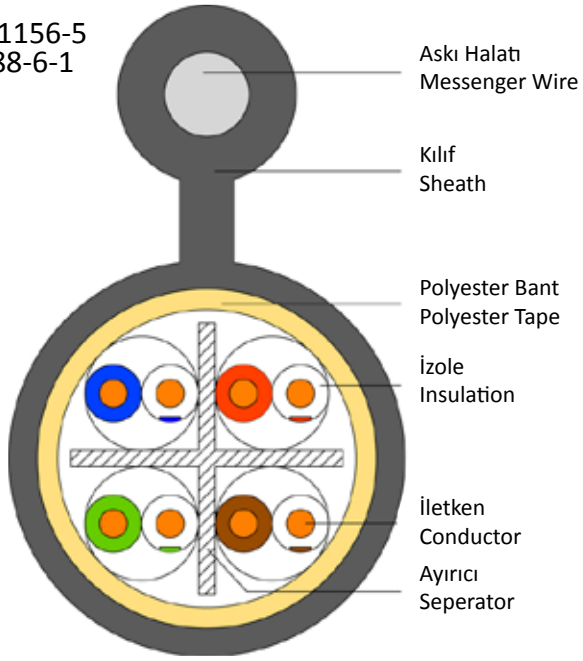
Separator
- Dielectric - cross separator

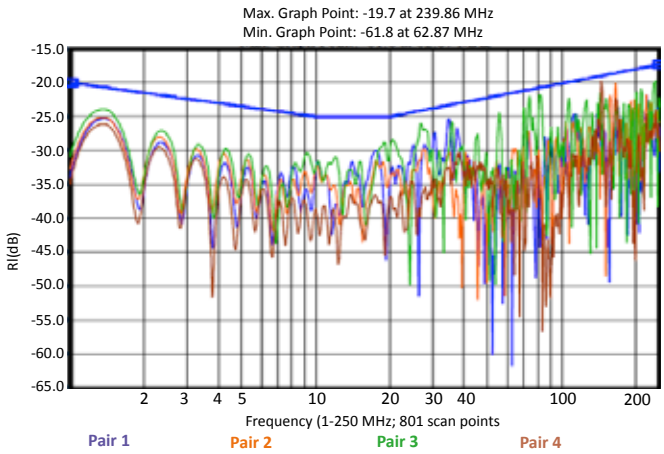
Core Tape
- Polyester tape

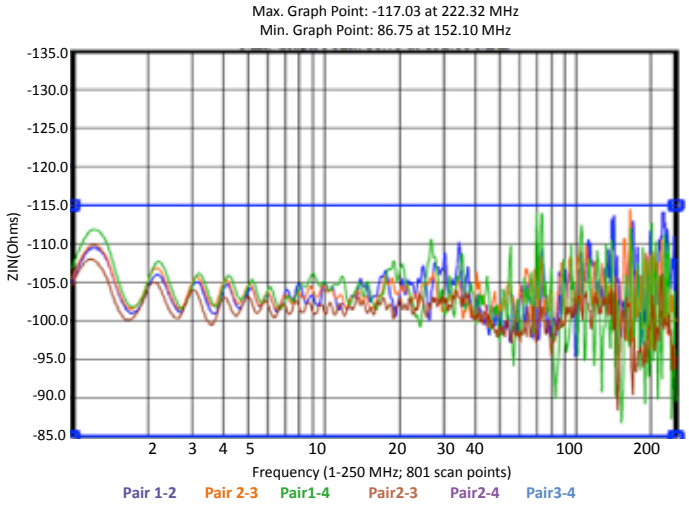
Messenger Wire
- Steel suspension wire

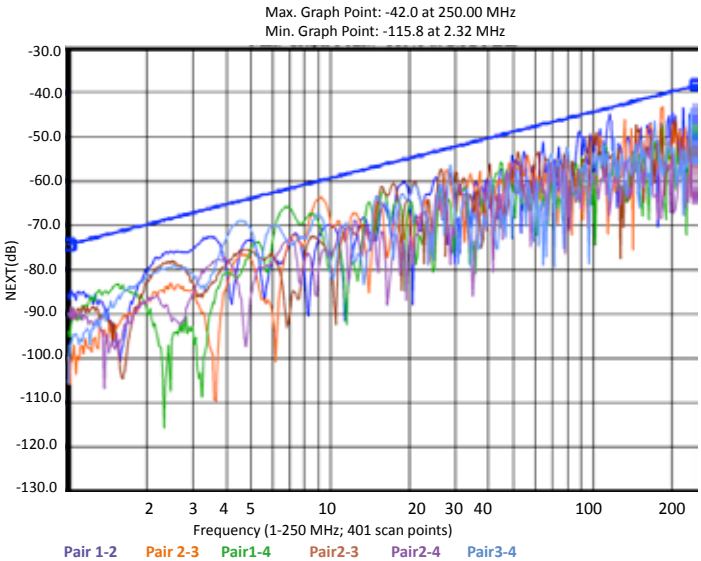
Sheath
- Black PE, UV resistant

Standards & Compliances
- EIA/TIA-568-C.2
- ISO/IEC 11801; IEC 61156-5
- EN 50173-1, EN 50288-6-1
- RoHS Uygunluğu









CAT 6 F/UTP 23 AWG Fig8 - Havai

Foks Kablo üretimi olan F/UTP Kategori 6 havai askı telli kablolar 250MHz'e kadar çalışmaktadır. ISO/IEC 11801 gereksinimlerine göre üretilen, F/UTP kablolar Ethernet, Fast Ethernet, Gigabit Ethernet gibi tüm E sınıfı uygulamaları desteklemek için en iyi seçenektir. Cat 6 F/UTP kablolar 250 MHz'e kadar temel ses ve veri yüklemeleri için de kullanılabilir.

İletken
- 23 AWG tek tel tavlı bakır

İzolasyon
- Poliolefin yalıtkan

Renk Kodu
- 1. Çift : Mavi - Beyaz/Mavi
- 2. Çift : Turuncu – Beyaz/Turuncu
- 3. Çift : Yeşil - Beyaz/Yeşil
- 4. Çift : Kahve – Beyaz/Kahve

Seperatör
- Yalıtkan çapraz seperatör

Öz Bandı
- Polyester bant

Toprak Teli
- 24 AWG Kalaylı bakır

Koruyucu Ekran
- AL-PES (Polyester destekli aluminyum folyo)

Askı Teli
- Galvaniz kaplı çelik tel

Kılıf
- Polietilen

Standartlar ve Uygunluklar
- EIA/TIA-568-C.2
- ISO/IEC 11801; IEC 61156-5
- EN 50173-1, EN 50288-6-1
- RoHS Uygunluğu

Transmission Properties - Transmisyon Özellikleri

Frequence (MHz)	Max. Insertion Loss (dB/100m)	Min. Return Loss (dB)	Min. NEXT (dB	Min. PS-NEXT (dB)	Min. Pover Sum ACRF (dB)	Min. Pover Sum PSACRF (dB)
1	2,0	20,0	74,3	72,3	67,8	64,8
4	3,8	23,0	65,3	63,3	55,8	52,8
10	6,0	25,0	59,3	57,3	47,8	44,5
16	7,6	25,0	56,2	54,2	43,7	40,7
20	8,5	25,0	54,8	52,8	41,8	38,8
31,25	10,7	23,6	51,9	49,9	37,9	34,9
62,50	15,4	21,5	47,4	45,4	31,9	28,9
100	19,8	20,1	44,3	42,3	27,8	24,8
200	29,0	18,0	39,8	37,8	21,8	18,8
250	32,8	17,3	38,3	36,3	19,8	16,8

Electrical Properties - Elektriksel Özellikler

Characterisitic Impedance Karekteristik Empedans (ohm)	Conductor Resistance İletken Direnci (DC max. ohm/km)	Resistance Unbalance Direnç Dengesizliği (Max. %)	Mutual Capacitance Efektif Kapasite (Max. nF/km)	Temperature Operating Range Çalışma Sıcaklığı
100 ±15	72	2,5	56	-20°C ~ +60°C

Physical Properties - Fiziksel Özellikler

Copper Diameter Bakır Çapı	Cable Diameter Kablo çapı (mm)	Cable Weight Kablo Ağırlığı (kg/km)	Length Kılıf Boyu (m)
23 AWG	6,5 – 11,4	65	305 - 500 - 1000

CAT 6 F/UTP 23AWG Fig8 - Aerial

Foks Kablo

Foks F/UTP Category 6 cables are capable of operating up to 250MHz for aerial installations with messenger wire. Produced according to ISO/IEC 11801 requirements, the F/UTP cable is the best option to support all Class E applications such as Ethernet, Fast Ethernet, Gigabit Ethernet. The Cat 6 F/UTP cables are applicable for basic voice and data installations up to 250 MHz.

Conductor
- 24 AWG solid bare annealed copper

Insulation
- Polyolefin

Color Code
- Pair 1: Blue - White/Blue
- Pair 2: Orange - White/Orange
- Pair 3: Green - White/Green
- Pair 4: Brown - White/Brown

Separator
- Dielectric - cross separator

Core Tape
- Polyester tape

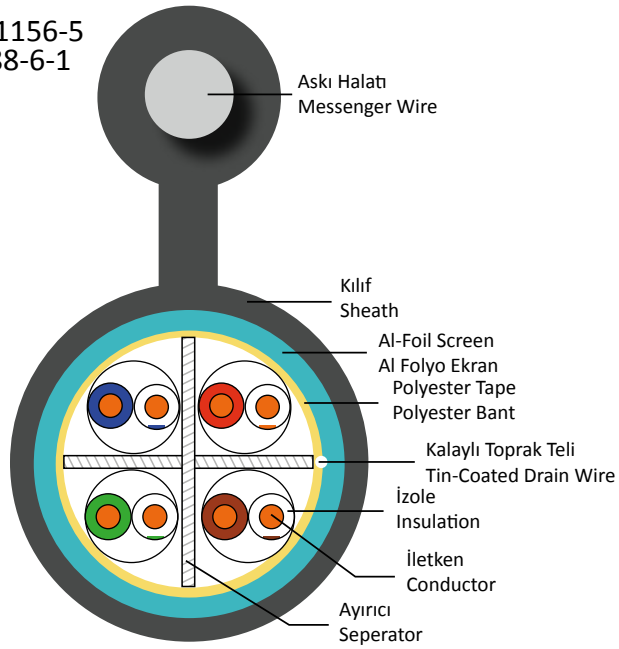
Drain Wire
- 24 AWG tin-coated copper

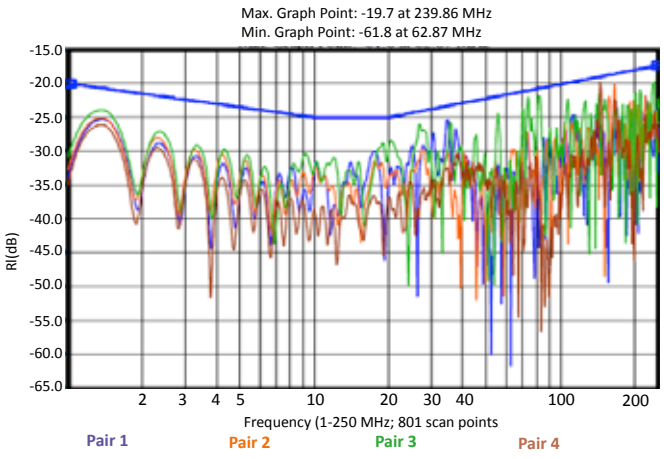
Shield
- AL-PES (Polyester-backed aluminum foil)

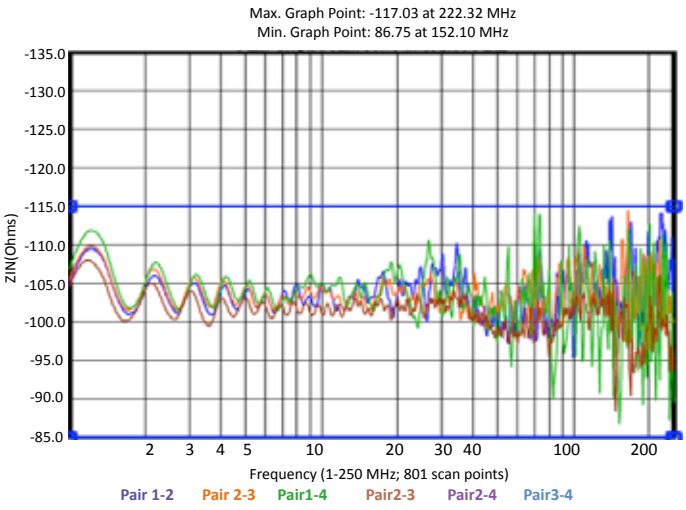
Messenger Wire
- Steel suspension wire

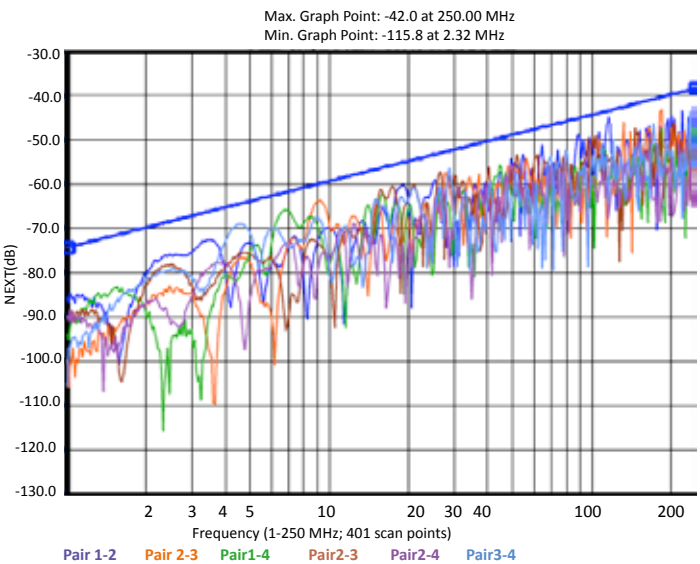
Sheath
- Black PE, UV resistant

Standards & Compliances
- EIA/TIA-568-C.2
- ISO/IEC 11801; IEC 61156-5
- EN 50173-1, EN 50288-6-1
- RoHS Uygunluğu









Sipariş Kılavuzu - Order Guide

Fiber Optik Kablolar için Uluslararası Sembollerin Açıklamaları ve Sipariş Kılavuzu
Description of International Symbols and Ordering Guide for Fiber Optic Cables

A	-	B	C	D	E	...	F		G	H	/	I	J	K	L	M	N	O

J A AT A/J ADSS L-ADSS	Indoor cable Outdoor cable Outdoor cable, breakout type Universal cable for outdoor and indoor app. Metal-free self-supporting aerial cable Metal-free self-supporting aerial cable with single sheath	**A** **Basic Cable Types**
V **D**	Tight Buffered Fiber Tube with Gel-filled	**B** **Cable CoreType**
S **(ZN)** **(ZM)** **Blank**	Metal stranding element in cable 2pcs of non-metallic anti buckling and strength members inside the jacket on sides 2pcs of metallic anti buckling and strength members in the jacket on sides Non-metallic	**C** **Central Strength Member**
Q F (ZN) (BN) B (L) (ZS) (SR)	Water tightness with swelling yarn Cable core petroleum jell-filled Non-metallic strength member (Aramid Yarn) Non-metallic strength member (Glass Yarn) Non-metallic armouring Aluminium tape Steel wire strength members Armoured with corrugated steel tape	**D** **Cable Construction**
Y **H** **2Y**	PVC sheath Halogen-free, flame-resistant sheath PE sheath	**E** **Inner Jacket Material**
Y **H** **2Y**	PVC sheath Halogen-free, flame-resistant sheath PE sheath	**F** **Outer Jacket Material**
n x m	Number of tubes x number of fibers in each tube	**G** **Tube & Fiber Configuration**
E **G**	Single Mode Fibers Graded-index fiber (multi-mode)	**H** **Type**
9	Field Ø in µm for single-mode fibers Core Ø in µm for graded index multimode	**I** **Value**

125 Cladding Ø in µm	**J** **Cladding**
Coefficient of attenuation in dB/km	**K** **Value**
B 850 nm **E** 1310nm **F** 1300 nm **H** 1550 nm	**L** **Wavelength**
Bandwidth in MHz * 1 km for G **or coefficient of dispersion in ps/(nm*km) for E**	**M** **Unit**
MT Stranded Loose Tube **UT** Unitube	**N** **Tube Formation**
Cable size, Cable Tensile Strength, Others. For examples: Diameter for single element and/or outer diameter for cable (e.g. 2.4mm tube) Dimension for flat cables: (e.g. 2.4 x 5.0 mm) For hybrid cables: (e.g. 2 x 1.50 mm2) Strength Member (e.g. 2500 N)	**O** **Supplemental Information**

For Example

A-DQ(ZN)(SR)2Y...2x6 G50CC OM3/125 MT

Outdoor, (Multi) Stranded loose tube, Water Resistant, Aramid yarn, armoured with corrugated steel tape, black PE sheathed, total 12fibers, OM3 Multi Mode Fiber Cable.

A-D(ZM)(SR)2Y...1x8 E9/125 UT

Outdoor, Central tube design, 2pcs of metallic anti buckling and strength members in the jacket on sides, corrugated steel tape, PE black sheathed, total 8 fibers, Single Mode Fiber Cable.

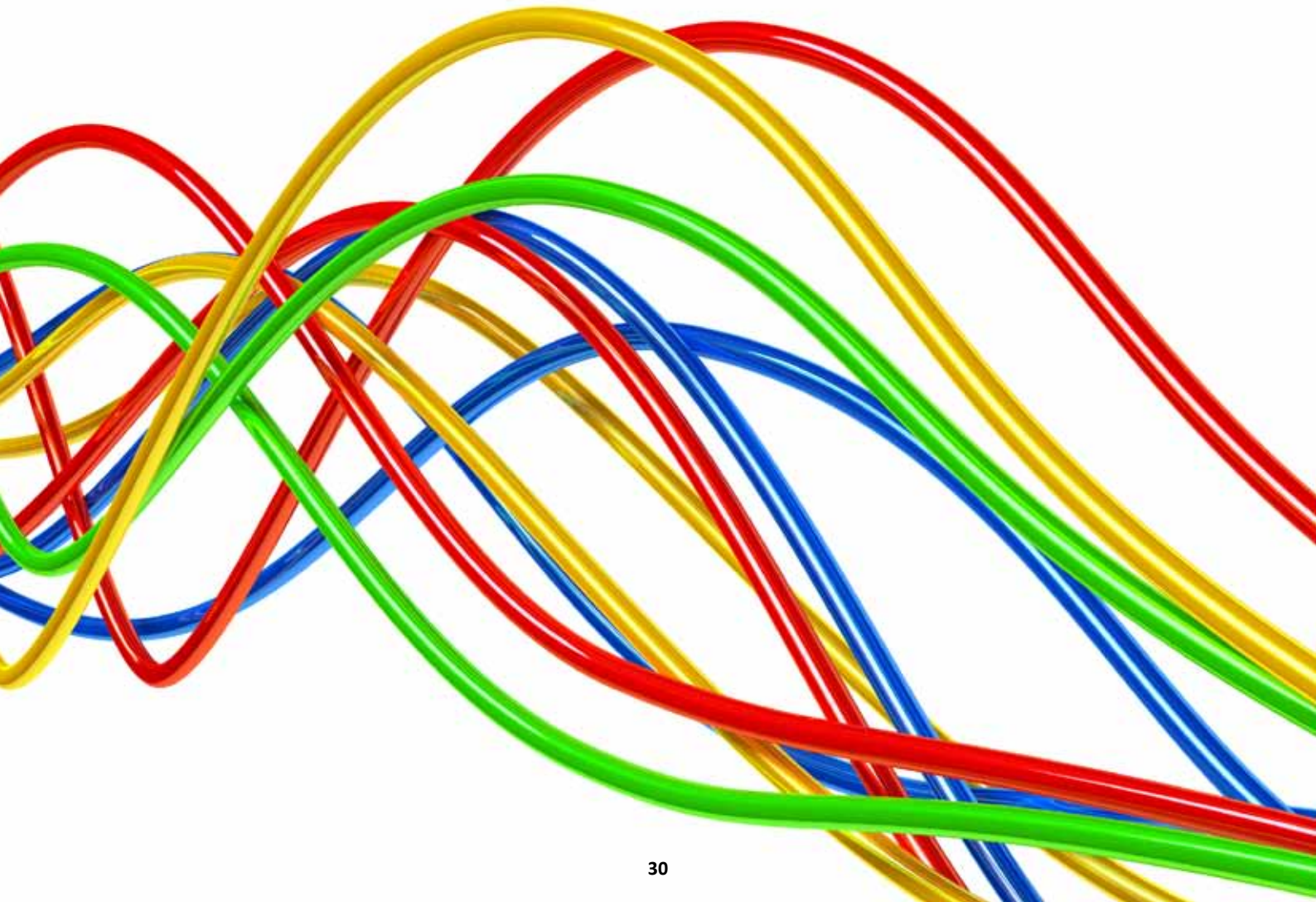
For non-standard design cables ordering information please contact your customer representative.

Cabling

Importance of Cabling

Perhaps one of the most important things in regard to implementing technology is the most overlooked and underappreciated: cabling. Cabling is the underpinning of networks-wide-area networks, local-area networks, cable TV, intranets and the Internet. How well the cabling infrastructure is planned today determines how fast the technology and properly tomorrow's technologies will continue on operating.

The quality of cable will decrease or increase the cost of your investment in a long term period. Replacing a broken cable is harder and more costly than all the other equipments in your system. The speeds of all equipments are limited by the speed and performance of your cables.



Cabling as Infrastructure

Designing a cabling system that just complies with today's standards can result in an infrastructure that may be obsolete in two or three years. Therefore, always put in too much cabling; it never will be enough. Because the system will only be as strong as the weakest link, put in the highest quality cabling, components and hardware. Also, keep in mind that cabling does go bad, so figure on having extra wire or fiber cores.

The evolution and growth of applications are driving the need for higher-value and higher-performance premise cabling. Cabling must meet the needs of today's applications and prepare for future high-speed applications.

It was never expected that the industry could develop copper cabling better and faster than category 5, but they have.

Advances in speed and functionality of copper and fiber to the workstation have given educators capabilities only dreamed of in the past.

Now, information moves at speeds considered impossible only a few years ago.

In this regard Foks Kablo is providing 15-years product warranty to the customers and high-speed proven-performance cables.

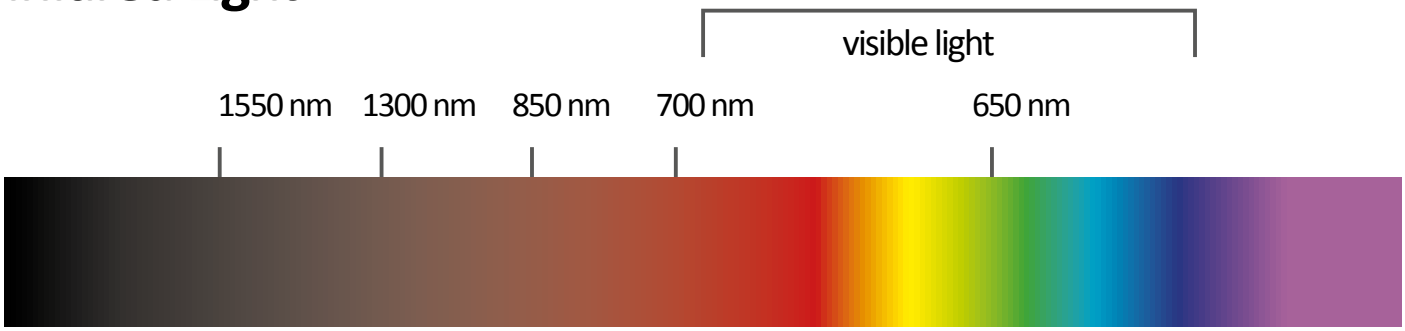
Cable Testing

Whether installing new cable, or troubleshooting existing cable, cable testing plays an important role in the process.Common tests for datacom cabling include length, wiremap, attenuation, NEXT, DC loop resistance, and return loss. As networks evolve, so do the requirements of the cabling infrastructure to support them. New standards are continuously being developed to provide guidelines for cabling professionals when installing, testing, troubleshooting, and certifying both copper and fiber.

Whether it’s fiber or copper, there are specific requirements and potential pitfalls in implementing these technologies.As Foks Kablo we are providing you the result of each for Fiber Communication cables to verify the quality of our cables.

Importance of Cable Testing

Infared Light



Cam Fiber Dalga Boyları 850nm, 1310nm, 1550nm

Glas Fiber Wavelengths 850nm, 1310nm, 1550nm

Fiber Optik Lif

Fiber optik, insanın saç teli kalınlığında ve çok hassas üretilmiş saf bir cam ip üzerinden ışığın iletilmesi prensibiyle çalışan bir sistemdir. Bu şekilde üretilmiş kabloların tercih edilmesinin en büyük sebebi, çevresel şartların ağır olduğu; nemli, rutubetli, elektriksel alan parazitlerinin yoğun olduğu yerlerden etkilenmemesi ve her zaman stabil bir bağlantı sunmasıdır. Fiber optikkablolar, iletimi ışık hızıyla yani saniyede 300 bin km'lik hızla gerçekleştirirler. Bu yönleri sebebiyle uzak mesafelere veri aktarımı için tasarlanmışlardır.

Fiber optik bir kablonun kesitine bakıldığında iç kısımları şunlardır:

- Merkez – Işığın hareket ettiği ince cam tabaka
- Cam Örtü – Merkezin dışını saran optik malzemeden üretilmiş, merkezden yasıyan ışığı tekrar merkeze geri gönderen kısım
- Kılıf – Kabloyu darbelere ve neme karşı koruyan dış katman

Fiber çeşitleri 2'ye ayrılır. Fiber tipine gore ve İndis tipine gore;

Fiber tipine göre;

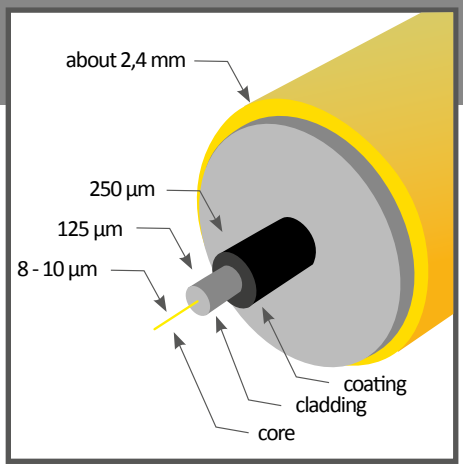
- Çok modlu (İngilizce, multimode fibers- MMF)
- Tek modlu (İngilizce, singlemode fibers - SMF)

İndis tipine göre;

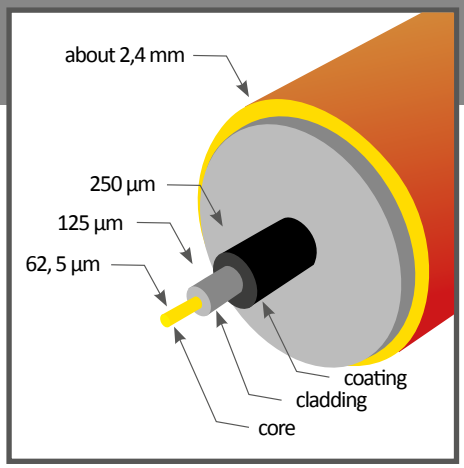
İndis, bir ışık ışınının madde içerisindeki ilerlemesine karşı gösterilen direnci belirten bir katsayıdır.

- Dereceli İndis Fiber
- Kademeli İndis Fiber

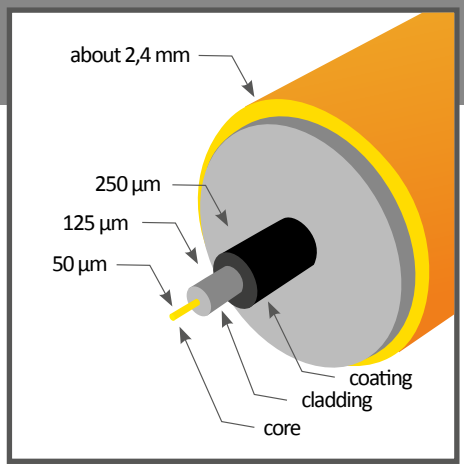
Ölçüler / Dimensions



singlemode 9µm (OS1, OS2)



multimode 62.5µm (OM1)



multimode 50µm (OM2, OM3, OM4)

Tek Modlu Kademe İndeksli Fiber

Tek modlu kademe indeksli fiber, yeterince küçük bir merkezi çekirdeğe sahiptir; öyle ki, temel olarak ışığın kabloda yayınım yaparken izleyebileceği tek bir yol vardır. En basit tek modlu kademe indeksli fiber biçiminde, dıştaki koruyucu zarf havadır. Cam çekirdeğin kırılma indisi yaklaşık 1.5'tir, hava koruyucu zarfının kırılma indisi ise 1'dir. Kırılma indislerindeki büyük fark, cam/hava sınırında küçük bir kritik açı (yaklaşık 42 derece) oluşturur. Dolayısıyla fiber, geniş bir açıklıktan gelen ışığı kabul eder. Bu da, ışığı kaynaktan kabloya bağlamayı nispeten kolay hale getirir. Ancak bu tür fiber, tipik olarak çok zayıftır ve pratikte bu fiberin kullanımı sınırlıdır.

Tek modlu kademe indeksli fiberin daha kullanışlı türü, koruyucu zarf olarak hava yerine başka bir malzemenin kullanıldığı türdür. Koruyucu zarfın kırılma indisi merkezi çekirdeğin kırılma indisinden biraz daha azdır ve koruyucu zarf boyunca sabittir. Bu tür kablo, fiziksel olarak hava koruyucu zarflı kablodan daha güçlüdür, ancak kritik açısı da çok daha yüksektir (yaklaşık 77 derece). Kritik açının bu kadar yüksek olması, kabul açısının küçük, kaynak-fiber açıklığının ise dar olmasına yol açarak ışığı ışık kaynağından fibere bağlamayı güçleştirir. Her iki tür tek modlu kademe indeksli fiberde de, ışık fibere de yansıma yoluyla yayınım yapar. Fibere giren ışık ışınları, çekirdekte doğrudan yayınım yaparlar ya da belki bir kez yansırlar. Dolayısıyla, bütün ışık ışınları kabloda yaklaşık aynı yolu izler ve kablonun bir ucundan diğer ucuna olan mesafeyi yaklaşık aynı sürede kat ederler. Bu, tek modlu kademe indeksli fiberlerin çok önemli avantajlarından biridir.

Singlemode Fiber Optic

Singlemode cables are categorized in OS1 and OS2 (Optical Singlemode 1 or 2 /ISO/IEC):
OS1: maximum attenuation 1dB/km at 1300nm to 1550nm
OS2: maximum attenuation 0,4dB/km at 1300nm to 1550nm
Because of the structure of singlemode cables more information can be transmitted at the same time. But the smaller core diameter makes coupling light into the core more difficult. High definition video is always transported via singlemode glass fiber cables.

Because of the single mode transmission the theoretical bandwidth is nearly infinity but the practical bandwidth is restricted to about 100GHz. The transmission within singlemode cable is also restricted because of "chromatic dispersion".

Different wavelengths arrive at the receiver at slightly different time intervals. This has a measurable effect only at very long distances.

The signal transmission at 1550nm has a narrower spectral response than the transmission at 1310nm and therefore enables longer transmitting distances. Transmitters at 1550nm are generally more expensive than transmitters at 1310nm.

Multimode Fiber Optic

Generally two core sizes are used: 62,5 µm and 50 µm. Both cables have a cladding diameter of 125 µm. The usual labelling is: 50/125 and 62.5/125. 50 µm multimode fibers were first deployed in the 1970s, 62.5 µm fiber was introduced in 1985. Today, especially in Europe, only 50 µm cable is used. Multimode fibers are categorized by the 'Optical Mode' or 'Optical Multimode' (OM), defined by ISO/IEC 11801. Available are the types OM1, OM2, OM3, OM4. The latest version, OM4, was defined 2009 by TIA-492-AAAD.
OM1: bandwidth 200MHz-km at 850nm wavelength, 500MHz-km at 1300nm wavelength, max. attenuation 3,5dB/km at 850nm and 1,5dB/km at 1300nm, OM1 is typically a 62,5/125 µm fiber
„OM2: bandwidth 500MHz-km at 850nm wavelength, 500MHz-km at 1300nm wavelength, max. attenuation 3,5dB/km at 850nm and 1,5dB/km at 1300nm, OM2 is typically a 50/125 µm fiber

OM3: bandwidth 2000MHz-km (EMB) and 1500MHz-km (OFL) at 850nm wavelength, 500MHz-km (OFL) at 1300nm wavelength, max. attenuation 3,5dB/km at 850nm and 1,5dB/km at 1300nm, OM3 is a 50/125 µm fiber

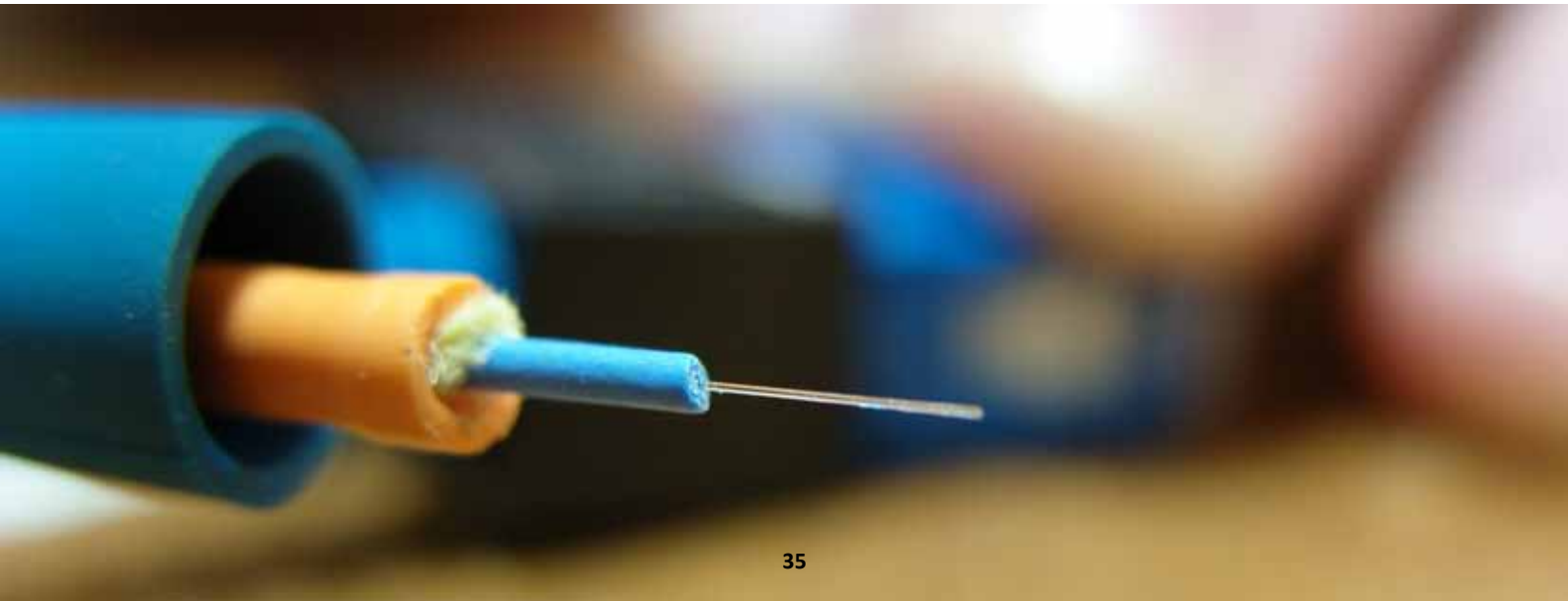
OM4: bandwidth 4700MHz-km (EMB) and 3500MHz-km (OFL) at 850nm wavelength, 500MHz-km (OFL) at 1300nm wavelength, max. attenuation 3,5dB/km at 850nm and 1,5dB/km at 1300nm, OM4 is a 50/125 µm fiber

EMB: effective modal bandwidth
OFL: over-filled launch

For 10G Ethernet an OM3 cable works for a maximum distance of 300m, an OM4 for a maximum distance of 550m. For future 40G Ethernet with OM3 only a maximum distance of 100m and with OM4 a maximum distance of 125m is possible.

Çok Modlu Dereceli İndeksli Fiber

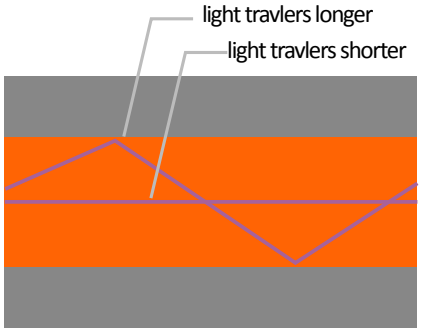
Dereceli indisli çok modlu fiberin yapısındaki çekirdeğin indisi yarı çapa bağlı olarak değişir. Yani dışarıdan bakıldığında (çok hassas ve güçlü mikroskoplarla) içten dışa doğru eşmerkezli halkalar halindedir. Bu halkaların her birinin kırılma indeksi farklıdır ve içten dışa doğru gidildikçe kırılma indisi düşer. Yani tam merkezde en büyük indeks, en dışta ise en küçük indeks bulunur. Bu katmanların sayısı imalatçı firmaya göre değişir. Genellikle bu katmanların sayısı 50-400 arasındadır. Merkezde direkt olarak giden ışık az yol alır ancak burada indeks büyüktür. Daha dış katmanlarda giden ışıkların aldıkları yol daha fazladır ancak bu katmanlarda indeks küçük olduğundan ışığın hızı indeks profili ile ters orantılı olarak değişir. Dolayısıyla tüm ışıklar belli düğüm noktalarında birleşirler ancak alıcı uçta darbeler arasında bir gecikme olur. Buna rağmen gecikme basamak indeksli ve çok modlu fiberlerinkine göre daha azdır.



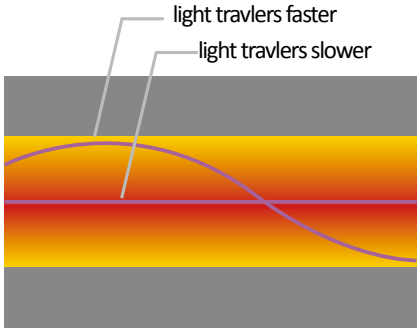
Graded Index Fiber

To improve the transmission quality of multimode fiber optic cables, graded index cables were developed. The optical characteristics of the core material are altered by modifying the refractive index of the material. The refractive index of the glass fiber core decreases with increasing radial distance from the fiber axis. Usually the refractive index changes nearly parabolic from the center to the most outer layers of the core material. Because of this parabolic profile a continual refocusing of the rays in the core is accomplished. With a changing refractive index from the inside to the outside of the core material light travels more slowly at the center and faster at the outer layers. Light that is bouncing around in modes near the outside of the core travels a longer distance but faster and arrives about at the same tome as the light travelling straight at the center of the core. Graded index fiber typically transmits about 600 to 1000 modes.

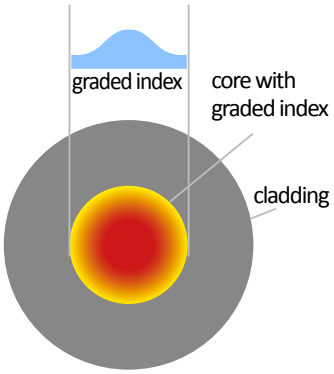
The standards OM2, OM3 and OM4 for multimode fibers imply the graded index specification.



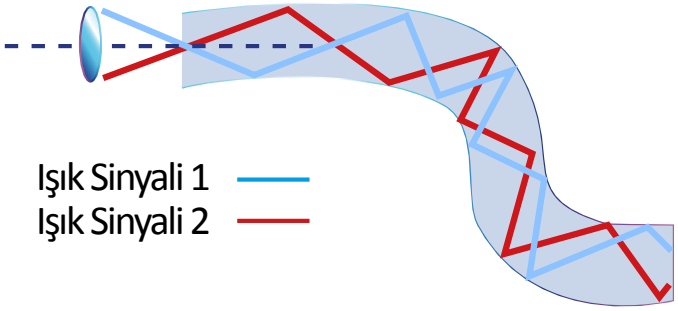
continous core material



core material with changing refractive index



Fiber Optik Kablolar Işığı Nasıl İletirler?



Lazerden gönderilen ışın demeti ilk başta doğrusal bir yol izler. İlk başta ışık sinyali 1 ve 2 olarak çıkan alt – üst sınır ışınları şekilde görüldüğü gibi kablonun kıvrıldığı noktalarda; ışık cam örtüye çarpıp geri yansır bu şekilde yansıya yansıya merkezdeki yoluna yavaşlayarak ve bir miktar kayba uğrayarak da olsa devam ederler.

Bu nedenledir ki, fiber kabloların fazla kıvrım yapmadan genellikle düz bir yol izlemesi, veri iletim hızı ve kalitesi açısından önemlidir. Cam örtü tabakası ışığı kesinlikle absorbe etmez ve neredeyse tam olarak yansıtır bu da bilginin kayıpsız şekilde ulaşması için çok önemli bir noktadır. Fiber optik kablolar kullanım yeri ve şartlarına bağlı olarak çelik zırh ya da jel tabakası gibi başka koruyucu ve esneklik kazandırıcı kısımlar da ilave edilebilmektedir. Kablonun üzerine yerleştirilen bu koruyucu tabaka aynı zamanda kemirgenlerin ısırmalarına engel olmak için özel kimyasal maddeler içerir. Bu maddeler kemirgenlerin kabloyu ısırdıklarında tiksinerek kabloyu koparmalarına engel olur.

How Does an Optical Fiber Transmit Light?

Suppose you want to shine a flashlight beam down a long, straight hallway. Just point the beam straight down the hallway -- light travels in straight lines, so it is no problem. What if the hallway has a bend in it? You could place a mirror at the bend to reflect the light beam around the corner. What if the hallway is very winding with multiple bends? You might line the walls with mirrors and angle the beam so that it bounces from side-to-side all along the hallway. This is exactly what happens in an optical fiber.

The light in a fiber-optic cable travels through the core (hallway) by constantly bouncing from the cladding (mirror-lined walls), a principle called total internal reflection. Because the cladding does not absorb any light from the core, the light wave can travel great distances.

However, some of the light signal degrades within the fiber, mostly due to impurities in the glass. The extent that the signal degrades depends on the purity of the glass and the wavelength of the transmitted light (for example, 850 nm = 60 to 75 percent/km; 1,300 nm = 50 to 60 percent/km; 1,550 nm is greater than 50 percent/km). Some premium optical fibers show much less signal degradation -- less than 10 percent/km at 1,550 nm.

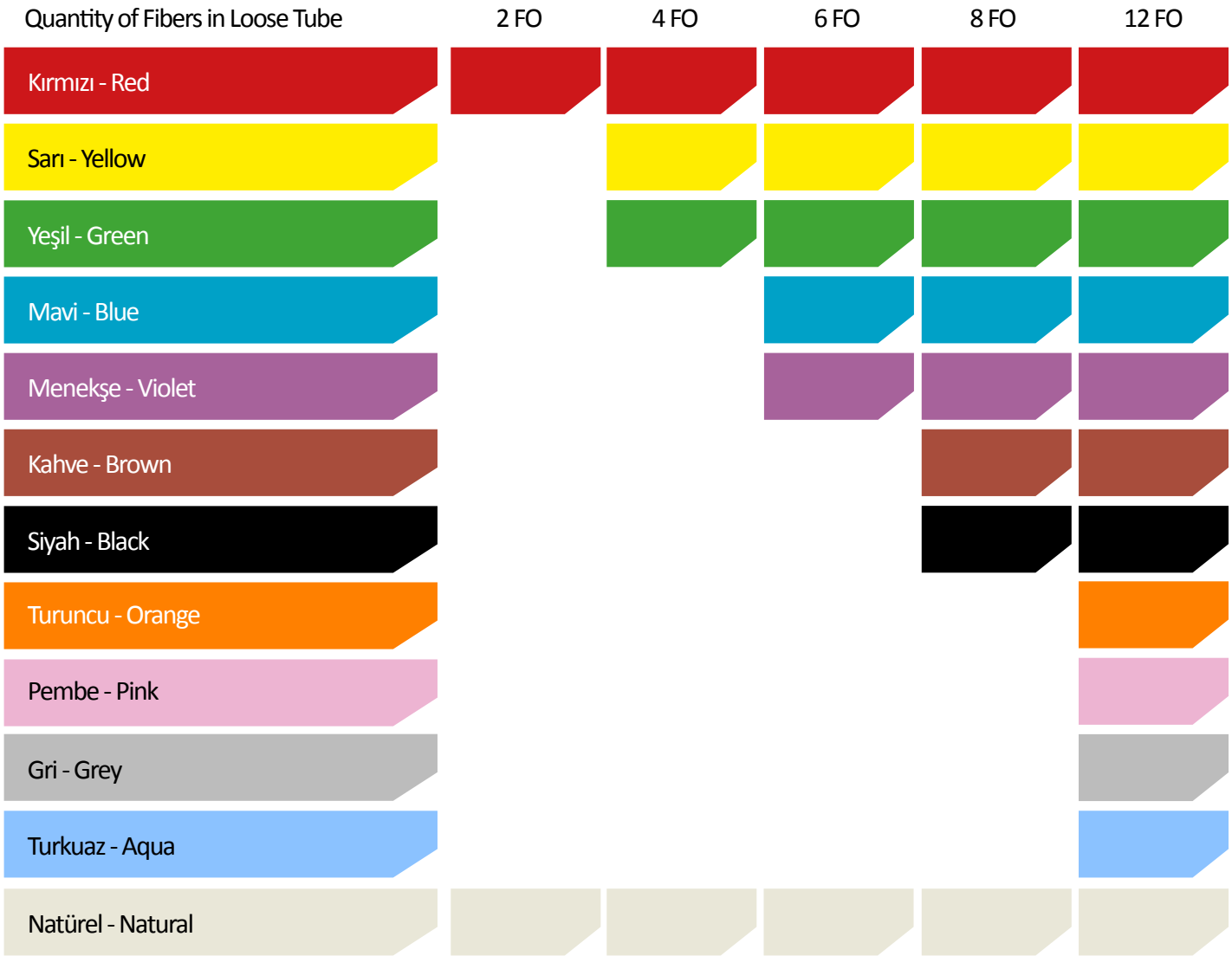
Fiber Renk Kodu
Optical Fiber Color Coding

Varsayılan Fiber Renkleri Default Fiber Colors	Renk Kodu - Color CodeTIA EIA 598-A	Renk Kodu - Color Code DIN VDE 0888	Renk Kodu - Color Code IEC 60794-2
1 Kırmızı Red	Mavi Blue	Kırmızı Red	Mavi Blue
2 Sarı Yellow	Turuncu Orange	Yeşil Green	Sarı Yellow
3 Yeşil Green	Yeşil Green	Mavi Blue	Kırmızı Red
4 Mavi Blue	Kahve Brown	Sarı Yellow	Beyaz White
5 Menekşe Violet	Gri Grey	Beyaz White	Yeşil Green
6 Kahve Brown	Beyaz White	Gri Grey	Menekşe Violet
7 Siyah Black	Kırmızı Red	Kahve Brown	Turuncu Orange
8 Turuncu Orange	Siyah Black	Menekşe Violet	Gri Grey
9 Pembe Pink	Sarı Yellow	Turkuaz Aqua	Turkuaz Aqua
10 Gri Grey	Menekşe Violet	Siyah Black	Siyah Black
11 Turkuaz Aqua	Pembe Pink	Turuncu Orange	Kahve Brown
12 Natürel Natural	Turkuaz Aqua	Pembe Pink	Pembe Pink

Tüp Renk Kodu (Tek Tüplüler İçin)
Loose Tube Color Coding (Only Single Loose tube)

Fiber Tipi – Fiber Type	Tube Rengi - Tube Color
E 9/125 (OS1)	Natürel -Natural
G 62.5/125 (OM1)	Sarı – Yellow
G 50/125 (OM2)	Yeşil - Green
G 50/125 (OM3)	Turkuaz - Aqua
G 50/125 (OM4)	Turuncu - Orange

Fiber Renkleri Kodları (Tek Tüplüler İçin)
Color Code for Fibers (Only Single Loose tube)

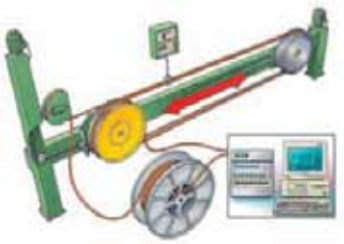


Optical Characteristics

Fiber Type	G62.5/125	G50/125	G50/125	G50/125	E9/125
Fibre Core Ø(µm), Type	62.5 Multimode	62.5 Multimode	62.5 Multimode	50 Multimode	9 Singlemode
Fibre Category	OM1	OM2	OM3	OM4	OS2
Wavelengths(nm)	850 / 1300	850 / 1300	850 / 1300	850 / 1300	1310 / 1550
Attenuation (dB/km)	2.9 / 0.7	2.4 / 0.8	2.4 / 0.8	2.4 / 0.8	0.33 / 0.20
Attenuation max. (dB/km)	3.1 / 0.8	2.8 / 1.0	2.8 / 1.0	2.8 / 1.0	0.36 / 0.22
Bandwidth (MHz.km)	200 / 600	700 / 500	1500 / 500	3500 / 500	--------
Minimum Effective Modal Bandwidth EMB (MHz.km)	220 / -	950 / -	2000 / -	4700 / -	--------
Serial 1 Gigabit Ethernet (m)	300 / 550	750 / 600	1000 / 600	1100 / 600	5000 / ----
Serial 10 Gigabit Ethernet (m)	33/ --	150/ --	300/ --	550/ --	10000/40000

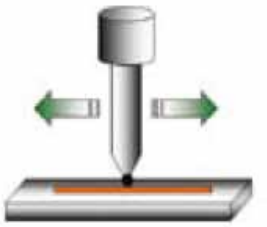
CABLE TESTS

TENSILE PERFORMANCE



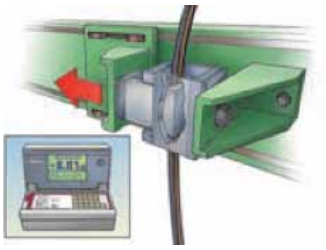
Standard: IEC 60794-1-2-E1
Object: Detect the attenuation behavior and/or fiber elongation strain as a function of the load on the cable when occur during installation Meanwhile the tension applied shall be within the maximum allowable tensile force.
Requirement: the result data shall not exceed the values given in the relevant detail specification.

ABRASION



Standard: IEC 60794-1-2 E2
Object: Determines the ability of the cable sheath to resist abrasion and the ability of cable markings to resist abrasion.
Requirement: No perforation of the sheath and optical continuity shall be maintained and the marking shall be legible after performing the number of Cycles specified in the detail specification.

CRUSH RESISTANCE

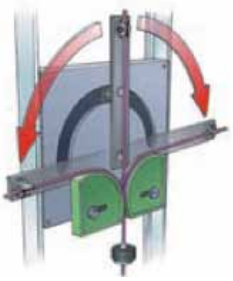


Standard: IEC 60794-1-2 E3
Object: Determines the ability of cable to withstand crushing and detect
the influence of the constant load on the attenuation.
Requirement: the result data shall not exceed the values given in the relevant detail specification and no typical failure modes including the degradation transmission or physical damage to the cable.

IMPACT PERFORMANCE

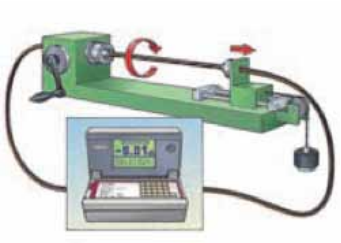
Standard: IEC 60794-1-2 E4
Object: Determines the ability of the cable to withstand repeated impacts on the attenuation and it simulates the dropping heavy object such as stones and tools when on operation.
Requirement: the result data shall not exceed the values given in the relevant detail specification and no typical failure modes including the degradation transmission or physical damage to the cable.

REPEATED BENDING



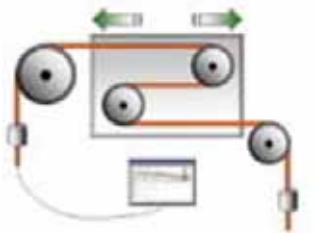
Standard: IEC 60794-1-2 E6
Object: Determines the ability of the cable to withstand repeated bending under tension load and two extreme positions make an angle of 90 degree on both sides of the vertical.
Requirement: the result data shall not exceed the values given in the relevant detail specification and no typical failure modes including the degradation transmission or physical damage to the cable.

TORSION



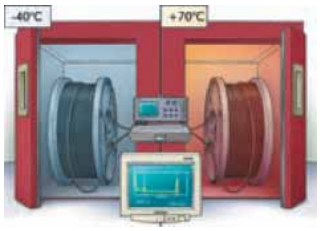
Standard: IEC 60794-1-2 E7
Object: Detects the ability of the cable to withstand the mechanical twisting and measure any variation in the optical transmission when the cable is subjected to torsional forces external to the cable jacket and evaluates the possibility of physical damage.
Requirement: the result data shall not exceed the values given in the relevant detail specification and no typical failure modes including loss of optical continuity or physical damage to the jacket or components.

FLEXING PERFORMANCE



Standard: Iec 60794-1-2 E8
Object: Determines the ability of the cable to withstand repeated flexing, for example elevator cable and measures any variation in the optical transmission when the cable is on repeated state and evaluates the possibility of physical damage.
Requirement: the result data shall not exceed the values given in the relevant detail specification and no typical failure modes including loss of optical continuity or physical damage to the jacket.

TEMPERATURE CYCLING



Standard: IEC 60794-1-2 F1
Object: Determines the stability behavior of the attenuation of optical cables when the temperature changes. It is generally the result of buckling or tensioning of fibers resulting from differences between their thermal expansion coefficient and the coefficients of strength and jacket members.
Requirement: the result data shall not exceed the values given in the relevant detail specification and no typical failure modes including loss of optical continuity or physical damage to the jacket.

WATER PENETRATION

Standard: IEC 60794-1-2 F5A/F5B
Object: Applies to the continuously water -blocked cables and determines the ability of a cable to block water migration along a specified length and evaluates the resistance ability to the water and humidity.
Requirement: No water shall be detected at the unsealed end of the sample cable and the dispersal of the water within the sample are the determining test criteria.

VERTICAL FLAMEPROPAGATION FOR A SINGLE CABLE

Standard: IEC 60332-1
Object: Evaluates the flame propagation on the single cable, which is for communication, installed on the surface of walls inside buildings under the fire condition.
Requirement: 60 mm length sample is mounted vertically and the flame must extinguish itself in relevant time and the damage must not reach the upper end of the sample cable.

VERTICAL FLAME PROPAGATION FOR THE BUNDLE CABLE

Standard: IEC 60332-3
Object: Evaluates the flame propagation on the bundle cables, which are depend on the volume of flammable material, fixed on a 3.5m long ladder and flame is applied at the base during 20 minutes.
Requirement: the height of fire damage must not exceed 2.5m and cables have an improved characteristics regarding fire propagation when it pass the test.

INFORMATION ABOUT COMPOUNDS

INSULATIONS and JACKETS

Overview

Foks Kablo chooses the right

Insulation & Jacket compounds

Foks Kablo expends a great time to choose the right compound suppliers all around the world in order to manufacture the best quality of cables for all its customers.

Type of Jackets

PVC (Polyvinyl Chloride) (thermoplastic)

PVC formulations vary widely depending on the desired properties. Because it is relatively inexpensive, easy to extrude and exhibits many excellent mechanical and electrical properties, PVC has been used for many applications.
The maximum temperature range for the best PVC formulations is -55°C to 105°C with general purpose vinyls ranging -20°C to 80°C. PVC has excellent flame, moisture and abrasion resistance, as well as superb gasoline, alcohol, ozone, acids and solvent resistance.

PVC can be formulated with non-migrating plasticizers for special electrical or termination applications. PVC compounds exhibit high capacitance and attenuation loss due to their relatively high dielectric constant when used in wire and cable. In retractile cord applications, PVC has below average to average elastomeric properties. Additionally, at low temperatures, PVC should not be used when flexibility and flex life are required.
PVC can be used in thin and heavy wall applications as a primary wire insulation as well as a cable jacket insulation.

Semi Rigid PVC

Used as a very abrasion resistant primary PVC insulation. For 30-16 gauge, a 10 mil. wall meets UL style 1061, 80°C 300V.

Polyethylene (thermoplastic)

Polyethylene is the compound most widely used in coaxial and low capacitance cables due to its fine electrical properties. Although polyethylene is flammable, additives can be used to make the polyethylene flame retardant at the expense of the dielectric constant and power loss characteristics.
Usable temperature ranges from a low of -65°C to as high as 80°C. Polyethylene (in high, medium and low densities) is generally very hard and stiff, and these properties typically do not change over the usable temperature range. Polyethylene can be foamed to reduce the dielectric constant to 1.50, creating an economically attractive insulation for use in special application coaxials and ultra low capacitance transmission cable. Polyethylene can be used by for primary insulation as will as a cable jacketing compound.

Polypropylene (thermoplastic)

Polypropylene has properties almost identical to that of polyethylene and is used almost exclusively for thin wall primary insulations. Polypropylene can be rated for -30°C to 80°C. Polypropylene can be foamed for improved electrical properties.

Polyurethane

Polyurethane in general has excellent low-temp flexibility, high tensile strength, and long flex-life. It exhibits excellent chemical, water, and abrasion resistance, as well as being extremely tough and cut-through resistant.
Plasticizers, which can migrate out to contaminate other compounds or cause embrittlement with aging, are not present in polyurethane.
Polyurethane is extremely flammable but can be offered in a flame-retardant version at the expense of tensile strength and surface finish.
One major disadvantage of polyurethane is its poor electrical qualities, which restrict its use to jackets. It does have excellent retractile cord characteristics, and is a good candidate for use in salt-spray and low-temperature military applications.

Low smoke zero halogen or low smoke free of halogen (LSZH or LSOH or LS0H or LSFH or OHLS)

LSH is a material classification typically used for cable jacketing in the wire. LSZH cable jacketing is composed of thermoplastic or thermoset compounds that emit limited smoke and no halogen when exposed to high sources of heat.When burned, a low-smoke cable (also known as limited-smoke cable) emits a less optically dense smoke that releases at a lower rate. During a fire, a low-smoke cable is desirable because it reduces the amount and density of the smoke, which makes exiting a space easier for occupants as well as increases the safety of firefighting operations. Most network cables are insulated with polyethylene, PVC or thermoplastic urethane (TPU). In a fire, a halogen-containing plastic material releases hydrogen chloride, a poisonous gas that forms hydrochloric acid when it comes in contact with water. Designated halogen-free cables, on the other hand, do not produce a dangerous gas/acid combination or toxic smoke when exposed to flame.Low smoke zero halogen cable reduces the amount of toxic and corrosive gas emitted during combustion. This type of material is typically used in poorly ventilated areas such as aircraft or rail cars. It is also used extensively in the railroad industry, wherever high voltage or track signal wires must be run into and through underground tunnel systems. This reduces the chance of toxic gasses accumulating in these areas should the wires be damaged by fire or a short circuit fault. Low smoke zero halogen is becoming very popular and, in some cases, a requirement where the protection of people and equipment from toxic and corrosive gas is critical.

Other benefits of halogen free cable include:

- It is often lighter, so overall cable network system weights can be reduced.
- The environmental impact of halogen free cabling can be lower if there are fewer toxic chemicals.

Properties	ASTM Method	PVC	Semi - Rigid PVC	Polyethylene	Polyethylene Foamed
Specific Gravity	D-792-66	1.16-1.70	1.38	0.91-1.26	0.50-0.60
Tensile Strength, psi	D-638-7.2	500-4500	4000	1500-2200	550
Elongation	D-412	40-400	250	180-600	175
Volume Resistivity, ohm-cm	D-257-6	10^4-10^6	10^15	10^15+	-
Dielectric Strength, volts/mil	D-149-64	250-500	400	230-1420	300
Dielectric Constant, @ 60 Hz	D-150-70	3.2-9.0	3.8	2.23-2.50	1.69
Dielectric Constant, @ 1 kHz	D-150-70	3.0-8.0	3.8	2.27-2.50	1.69
Power Factor (Dissipation) @ 60 Hz.		0.007-0.15	-	0.003-0.044	0.0015
Power Factor (Dissipation) @ 1 kHz.		0.009-0.16	-	0.00048-0.00049	0.00025
Abrasion Resistance		Good	Excellent	Good	Poor
Heat Resistance		Good	Good	Good	Poor
Weather ability		Good	Good	Excellent	Poor
Flame Retardancy		Excellent	Good	Poor	Poor
Water Resistance		Good	Good	Excellent	Poor
Acid Resistance		Good	Good	Good	Fair
Alkali Resistance		Excellent	Excellent	Good	Fair
Aliphatic Hydro Resistance		Good	Good	Poor	Fair
Aromatic Hydro Resistance		Poor	Poor	Poor	Fair

ARMORINGS

Overview

Foks Kablo offers different armouring types for the outdoor applications because both fiber optic cables can be damaged seriously due mechanical impact or rodents (rats, gophers, squirrels). Such damages can affect the performance and reliability of cables (Indoor and outdoor). No matter your geographical location Foks can offer you the adequate armouring compound.

Rodent protection for optical fibre cables is generally based on making it difficult for the animal to gnaw into the cable core. Rodents are usually able to eat away the cable outer sheath. The challenge is to prevent additional penetration. This can be done in several ways.

The primary cable design features for improving rodent resistance are increasing the overall cable outside diameter and incorporating metallic armouring. Consequently cable occupies more space on ducts and buildings. Therefore Foks Kablo offers you non-metallic armouring "Glass Yarn" rodent protection, having thinner outer diameter cables compared to metallic armroed cables.

Galvanized Steel Wire Armoring (SWA)

A concentric layer of galvanized round steel wires, providing over 90% coverage, applied between inner and outer sheath. A steel wire armour is often used for heavy duty applications when high crush is required. The steel wire armour also provides 100% rodent protection like steel tape.
-Good Mechanical Protection, Good Tensile Strength, Fair Bending Properties,Good Rodent Protection

Double Steel Tape Armoring (DSTA)

Two layers of galvanized steel tape armour, providing %100 coverage of the cable core. This type of armoured cables are designed for outside application and also designed to protect optical fiber for the unexpected mechanical and environmental conditions.
-Good Mechanical Protection against Pressure & Shocks, Good Rodent Protection,Cost Saving & Light-Weight,Not resistant to tractive force

FRP (Fiber Reinforced Plastic)

Rod Strength Member

The advantages of FRP fiberglass (non-metallic) is to adopt electrolyte completely, and is broad in application scope, resistant to various corrosion, compatible with other cable material and long in service life, moreover, the transmission performance can not be damaged because of bad gases produced by metallic corrosion. The non-metallic material is not sensitive to electric shock, not be disturbed by electromagnetism. It is of more excellent extension intensity, high flexibility, high bending performance, low rate of elongation and small specific gravity (about one fifth of that of steel wire), what's more, it can also provide longer disk length at the same dimension, greatly improving production efficiency and rate of finished product.

Glass Yarn

Foks Kablo knows the labor and costs related with installing and grounding a typical armoured fiber optic cable is too high. Because the armour is usually made of steel, and therefore grounding is a obligatory for all installers. Consequently the use of non-metallic GRP/FRP armouring compounds in order to reduce the costs has become more popular. Foks offers indoor and outdoor cables with Glass yarn protection for rodent protection to its customers. Glass yarn protects the cable because the rodents can snag the jacket but when they reach to Glass Yarn it won't be pleasant to gnaw the glass yarn for rodents.
Cost-Saving & Light-Weight, Good Rodent Protection, Compact

İletkenin Yapısı, Kesiti, Direnci ve Ağırlığı - AWG Telleri ve AWG Damarlı İletkenler

AWG-Wires and AWG-Stranded Conductors - Conductor Make-Up, Cross-Section, Resistance and Weight

AWG No	Conductor make-up mm İletkenin yapısı	Cross-section mm² İletken Kesiti	Conductor outer Ø mm İletken çapı	Conductor resistance Ω/km İletken direnci	Conductr weight kg/km İletken Ağırlığı
36	Solid	0,013	0,127	1460,0	0,116
36	7x0,05	0,014	0,152	1271,0	0,125
34	Solid	0,020	0,160	918,0	0,178
34	7x0,064	0,022	0,192	777,0	0,196
32	Solid	0,032	0,203	571,0	0,284
32	7x0,078	0,034	0,203	538,0	0,302
32	19x0,05	0,037	0,229	448,0	0,329
30	Solid	0,051	0,254	365,0	0,45
30	7x0,102	0,057	0,305	339,0	0,507
30	19x0,064	0,061	0,305	286,7	0,543
28	Solid	0,080	0,330	232,0	0,71
28	7x0,127	0,087	0,381	213,0	0,774
28	19x0,078	0,091	0,406	186,0	0,81
27	7x0,142	0,111	0,457	179,0	0,998
26	Solid	0,128	0,409	143,0	1,14
26	10x0,127	0,127	0,533	137,0	1,13
26	19x0,122	0,155	0,508	113,0	1,38
26	7x0,160	0,141	0,483	122,0	1,25
24	Solid	0,205	0,511	89,4	1,82
24	7x0,203	0,227	0,610	76,4	2,02
24	10x0,160	0,201	0,582	85,6	1,79
24	19x0,127	0,241	0,610	69,2	2,14
24	41x0,078	0,196	0,582	84,0	1,74
22	Solid	0,324	0,643	55,3	2,88
22	7x0,254	0,355	0,762	48,4	3,16
22	19x0,160	0,382	0,787	45,1	3,4
22	26x0,127	0,330	0,762	52,3	2,94
20	Solid	0,519	0,813	34,6	4,61
20	7x0,320	0,562	0,965	33,3	5,0
20	10x0,254	0,507	0,899	33,9	4,51
20	19x0,203	0,615	0,940	28,3	5,47
20	26x0,160	0,52	0,914	33,0	4,65
20	41x0,127	0,50	0,914	32,9	4,63
18	Solid	0,823	1,020	21,8	7,32
18	7x0,404	0,897	1,219	19,2	7,98
18	16x0,254	0,811	1,194	21,3	7,22
18	19x0,254	0,963	1,245	17,9	8,57
18	41x0,160	0,824	1,194	20,9	7,33
18	65x0,127	0,823	1,194	21,0	7,32
16	Solid	1,310	1,290	13,7	11,66
16	7x0,511	1,440	1,524	12,0	12,81
16	65x0,160	1,310	1,499	13,2	11,65
16	26x0,254	1,317	1,499	13,1	11,72
16	19x0,287	1,229	1,473	14,0	10,94
16	105x0,127	1,330	1,499	13,1	11,84
14	Solid	2,080	1,630	8,6	18,51
14	7x0,643	2,238	1,854	7,6	19,92
14	19x0,361	1,945	1,854	8,9	17,31
14	41x0,254	2,078	1,854	8,3	18,49
14	105x0,160	2,111	1,854	8,2	18,79

AWG No	Conductor make-up mm İletkenin yapısı	Cross-section mm² İletken Kesiti	Conductor outer Ø mm İletken çapı	Conductor resistance Ω/km İletken direnci	Conductr weight kg/km İletken Ağırlığı
12	Solid	3,31	2,05	5,4	29,46
12	7x0,813	3,63	2,438	4,8	32,30
12	19x0,455	3,09	2,369	5,6	27,50
12	65x0,254	3,292	2,413	5,7	29,29
12	165x0,160	3,316	2,413	5,2	29,51
10	Solid	5,26	2,59	3,4	46,81
10	37x0,404	4,74	2,921	3,6	42,18
10	49x0,363	5,068	2,946	3,6	45,10
10	105x0,254	5,317	2,946	3,2	47,32
8	49x0,455	7,963	3,734	2,2	70,87
8	133x0,287	8,604	3,734	2,0	76,57
8	655x0,127	8,297	3,734	2,0	73,84
6	133x0,363	13,764	4,676	1,5	122,49
6	259x0,254	13,123	4,674	1,3	116,79
6	1050x0,127	13,316	4,674	1,3	118,51
4	133x0,455	21,625	5,898	0,80	192,46
4	259x0,363	26,804	5,898	0,66	238,55
4	1666x0,127	21,104	5,898	0,82	187,82
2	133x0,574	34,416	7,417	0,50	306,30
2	259x0,404	33,201	7,417	0,52	295,49
2	665x0,254	33,696	7,417	0,52	299,89
2	2646x0,127	33,518	7,417	0,52	298,31
1	133x0,643	43,187	8,331	0,40	384,37
1	259x0,455	42,112	8,331	0,41	374,80
1	817x0,254	41,397	8,331	0,42	368,43
1	2109x0,160	42,403	8,331	0,41	377,39
1/0	133x0,724	54,75	9,347	0,31	487,28
1/0	259x0,511	53,116	9,347	0,32	472,73
2/0	133x0,813	69,043	10,516	0,25	614,48
2/0	259x0,574	67,021	10,516	0,25	596,49
3/0	259x0,643	84,102	11,786	0,20	748,51
3/0	427x0,511	87,570	11,786	0,19	779,37
4/0	259x0,724	106,626	13,259	0,16	948,97
4/0	427x0,574	110,494	13,259	0,15	983,39

AWG No	Wire-Ø mm
44	0,050
41	0,070
40	0,079
39	0,089
38	0,102
37	0,114

AWG No	Wire-Ø mm
28	0,320
27	0,363
26	0,404
25	0,455
24	0,511
23	0,574

AWG No	Wire-Ø mm
14	1,628
13	1,829
12	2,052
11	2,304
10	2,588
9	2,906

AWG No	Wire-Ø mm
1/0	8,252
2/0	9,266
3/0	10,404
4/0	11,684

RoHS: PAST, PRESENT, FUTURE

Who's Involved ?

India | South Korea | China | United States | EU

RoHS /rs/, /r/, /roz/, /rohz/
noun
1. The Directive on the restriction of the use of six hazardous substances in electrical and electronic equipment 2002 / 95 /EC (commonly referred to as the Restriction of Hazardous Substances Directive or RoHS). The six materials are Lead, Mercury, Cadmium, Hexavalent chromium, Polyorominated biphenyls (PBB), and Polybrominated biphenyls (PBB), and Polybrominated diphenly ether (PBDE).

1996:
EU review identified need to reduce certain hazardous substances and create community-wide rules regarding waste managment

1998:
EU insliuted and invoked a community action program to combat cadmium pollution

2000:
First draft of RoHS written

2001:
Common position text was created by EU members

2002:
Proposition re-entered Parliament for a second reading leading to major amendments to original directive proposal

2003:
Offical Directive was published after "conciliation process"

2004:
Countries forced to pass appropriate legislation

2006:
RoHS directive officially becomes enforceable law

2006:
China introduces Management Methods for Controlling Pollution Caused by Electronic Information Products Regulation (China RoHS)

2007:
Korea introduces Act for Resource Recycling of Electrical and Electronic Equipment and Vehicles (Korea RoHS)

2007:
1 st phası of China RoHS implemented

2007:
California RoHS regulations take effect

2008:
RoHS amendment with new exemptions is introduced

2008:
RoHS Recast is proposed

2008:
Korea RoHS is implemented

2010:
European Commission adopts a revised list of exemptions and restruclured annexes Expiration dates are now included with the new exemption structure

2010:
India adopts Electronic Waste Rules (India RoHS)

2010:
European Parliament approves RoHS Recast

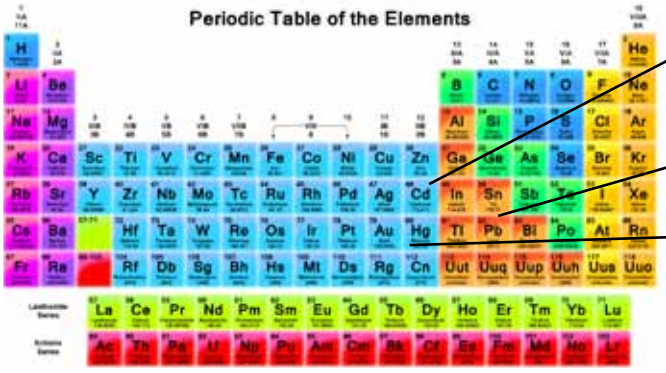
2011:
RoHS Recast becomes law

2012:
India RoHS will become law

2013:
Countries will be required to pass appropriate legislation in regards to RoHS Recast

Key Changes from RoHS Recast

3 categories added (medical, monitoring, other)•
CE marking required•
Exemption expiration dates (subject to renewal)•
EEE Now expiration dates (subject to renewal)•
EC declaration of conformity required•



Cd Cadmium

Hg Mercury

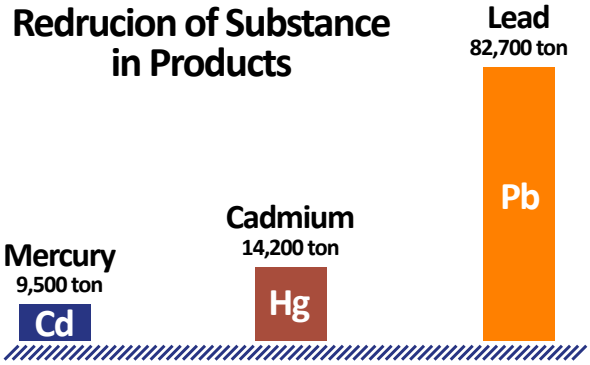
Pb

Cadmium waste streams have been reduced from 15,873 tons to 5,873 tons or 63%

Mercury waste streams have been reduced from 12,321 tons to 5,421 tons or 56%

Lead in waste streams have been reduced from 292,000 tons to 233,600 tons or 20%

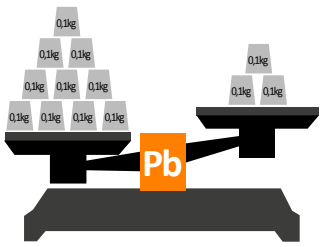
Redrucion of Substance in Products

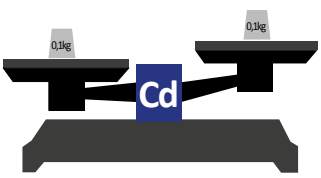


Product Waste Reduction

Lead use in copiers has been reduced from more than 1 kg to a little more than 0,3 kg

Cadmium use has been reduced in TVs, copiers, and refrigerators from greater than 0,1 kg to a little more than 0,01 kg per product





INSTRUCTIONS

INSTRUCTION FOR TRANSPORTATION, HANDLING, STORAGE and LAYING of CABLE DRUMS

The armoured and un-armored cables are manufactured by Foks Kablo allowing long storage, handling, transportation and unreeling subject to the below mentioned recommendations.

DRUM STORAGE, TRANSPORTATION & HANDLING

Storage

Cable Drums can be stored between the temperatures: -15°C to + 60° C. The cables drums must be appropriately wedged and stored in a vertical position -never laid on flange- on a flat, dry and solid ground and in a covered place (applicable only for export project). They must be protected to avoid any mechanical damages and exterior shocks and also from the sun shines.

The original wooden lags have to be kept until the cable unreeling to ensure a good protection of the cable. The both ends of the cable (inner end and outer end) have to be watertight in order to avoid penetration of water or humidity inside the cable. Thermo retractable polyethylene caps must be installed on the both ends.

Transportation and handling

The wooden drums must be always carried vertically. They must be fixed and properly chocked with care on the vehicle, on the wagon and on the ship, in order to avoid any exterior shocks.

The unloading and the different handling will be done carefully with lifting equipments.
- In case of handling with a crane, an axle is used in crossing the drum centre, lifted from both ends by two slings. It must have a length equal, at least, to the width of the drum. It is prohibited to put the slings on the lags,

- In case of handling with a forklift truck, the drum is put vertically with care on the forks,
Never let a drum fall during all kind of unloading and do not place any weight on the drums.
When the cables drums are arriving on site, they must be checked especially. The good order of the lagging and of the end caps of the cables (a breaking of a wooden lag could tear the outer sheath of the cable).

Rolling direction

If a drum has to be rolled, for transportation, it must be rolled “only” in the direction indicated by an arrow pointed on the flange of the drum: “do not roll the drum in the opposite direction of the arrow of the drum”.

LAYING OF THE CABLES

Laying temperature

The cables can be pulled with a minimum outer temperature of: - 5°C, but with a slow and regular speed (about 20 m/min) without shock. It is always necessary, before unreeling, to store the cables for at least 24 hours in a warmed room (about + 10°C).

Bending radius

During the unreeling, the bending radius shall be, at least, "twice the static bending radius (as specified in our technical data sheets)"

Pulling strength

The pulling strengths exerted directly on the copper or aluminium cores of the cables should not exceed the values:

- 5 daN/mm² of cross section for copper conductors.

The pulling must be regular without shock and continuously checked by a dynamometer (especially in case of using a winch).

Cables unreeling

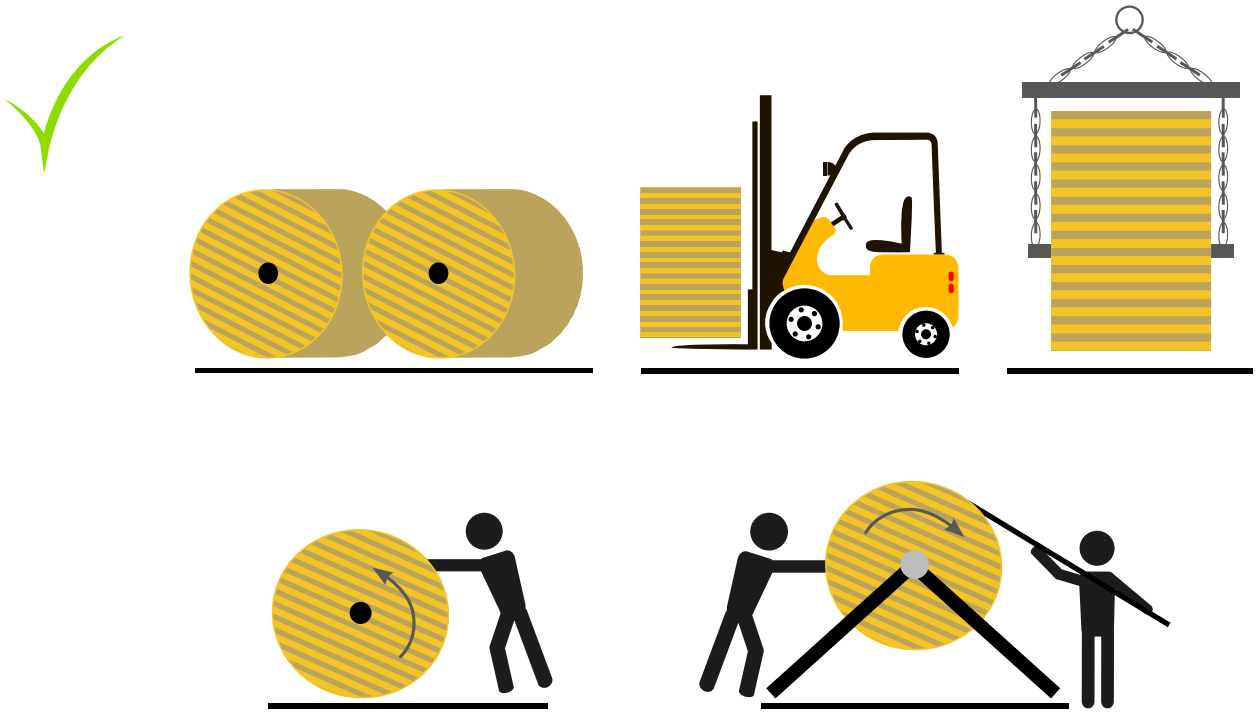
The drum shall be settled on jacks by using a spindle through the central hole of the drum. The unreeling speed shall be monitored at any moment.

The cables must be unreeled "only in the opposite direction of the one indicated by an arrow " ainted on the flange of the drum ("do not unreel the cable in the same direction of the arrow").

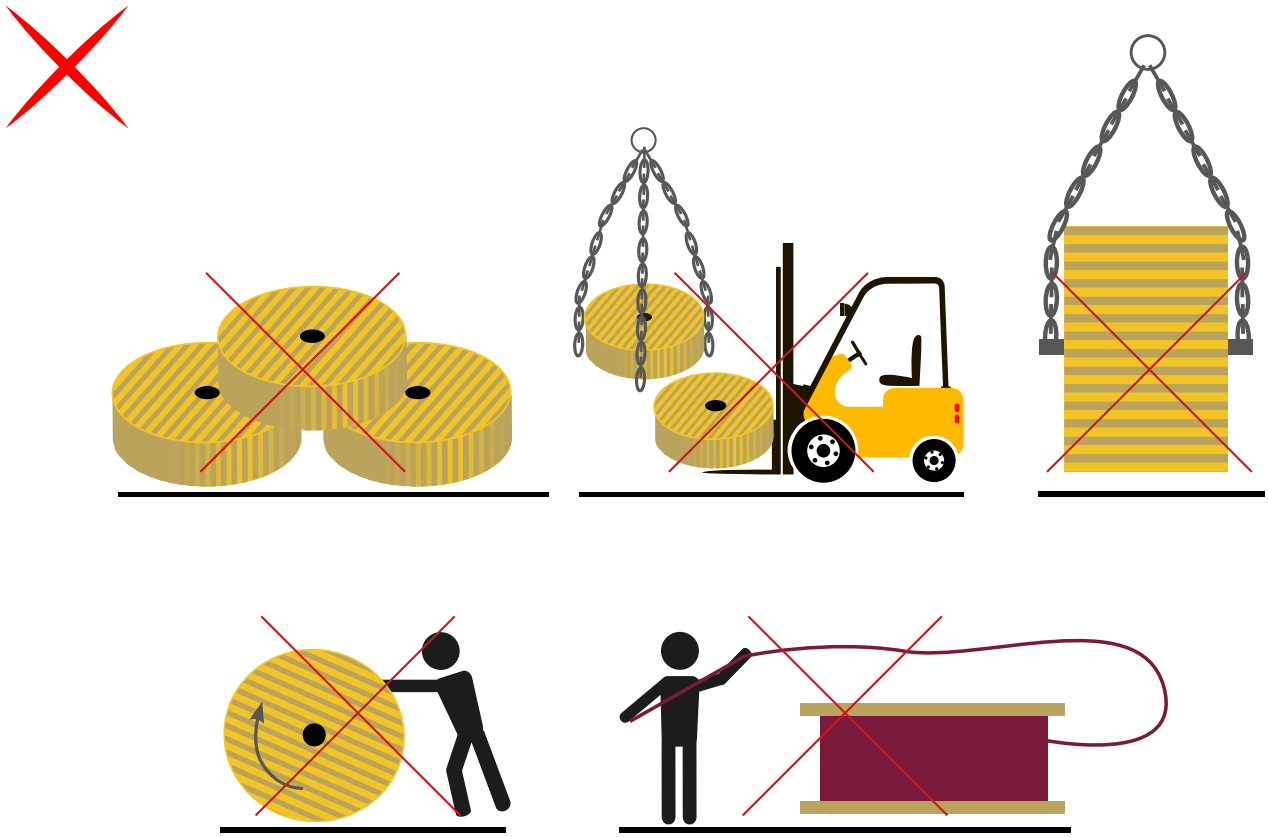
While unreeling, the cables shall not be twisted, waved or buckled.

Depolama, elleçleme ve döşeme - Storage, handling and laying

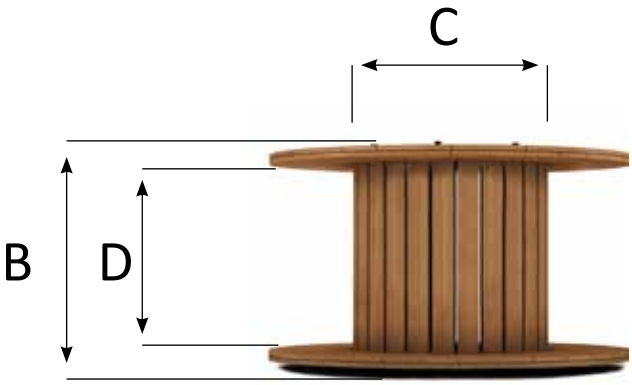
Doğru metodlar - Correct methods



Yanlış metodlar - Wrong methods



Makara Ölçüleri - Drum Sizes



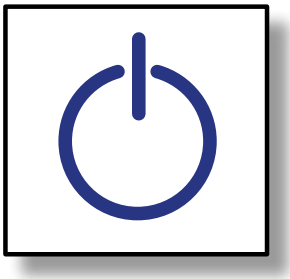
Makara Tipi Drum Type	A (cm)	B (cm)	C (cm)	D (cm)	Boş Makara Ağırlığı Empty Drum Weight (kg)
M70X75	70	75	30	67	45
M75X75	75	75	33	67	50
M80X75	80	75	35	67	55
M85X75	85	75	38	67	60
M90X75	90	75	40	67	75
M95X75	95	75	43	67	80
M100X75	100	75	45	67	90
M105X75	105	75	48	67	95
M110X75	110	75	50	67	100
M115X75	115	75	53	67	105
M120X75	120	75	55	67	125
M127X75	125	75	58	67	135
M110X110	110	110	50	98	125
M115X110	115	110	53	98	130
M120X110	120	110	55	98	135
M125X110	125	110	58	98	145
M130X110	130	110	60	98	155
M135X110	135	110	63	98	165
M140X110	140	110	65	98	175
M145X110	145	110	68	98	185
M150X110	150	110	70	98	195
M155X110	155	110	73	98	205
M160X110	160	110	75	96	220
M165X110	165	110	78	96	230
M170X110	170	110	80	96	245
M180X110	180	110	85	94	280
M190X110	190	110	90	94	320
M195X110	195	110	93	94	340
M200X110	200	110	95	94	360
FO 70X75	70	75	40	67	55
FO 80X75	80	75	60	67	60
FO 85X75	85	75	40	67	60
FO 85X75	85	75	60	67	65
FO 90X75	90	75	60	67	70
FO 95X75	95	75	60	67	75
FO 100X75	100	75	50	66	80
FO 100X75	100	75	60	66	80
FO 105X75	105	75	60	66	95
FO 110X75	110	75	50	66	95
FO 110X75	110	75	65	66	100
FO 115X75	115	75	50	66	100
FO 115X75	115	75	65	66	105
FO 120X75	120	75	65	66	110
FO 125X75	125	75	65	66	115
FO 115X110	115	110	60	98	130
FO 120X110	120	110	60	98	130
FO 120X110	120	110	70	98	140
FO 125X110	125	110	60	98	145
FO 125X110	125	110	70	98	150
FO 130X110	130	110	70	98	160
FO 135X110	135	110	70	98	170
FO 140X110	140	110	70	98	180
FO 150X110	150	110	70	98	190
FO 170X110	170	110	80	98	200

PİKTOGRAMLAR

PICTOGRAMS

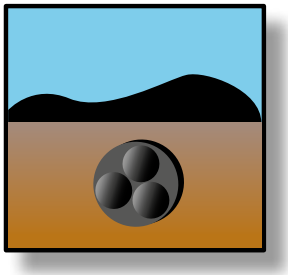
RoHS

Kompozit
Composite



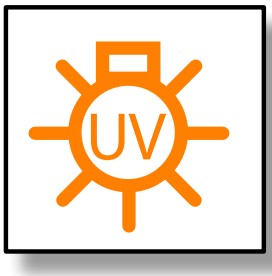
Kemirgenlere karşı
Rodent Proof

Direkt Yeraltına
Gömülebilir
Direct Buried

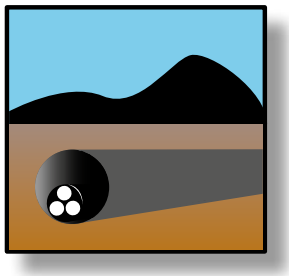


Dahili Kullanım
Indoor

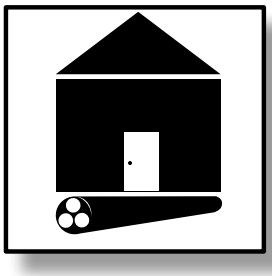
UV Koruma
UV Proteced



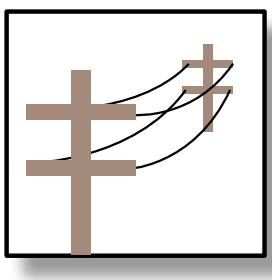
Boru tipi
Duct



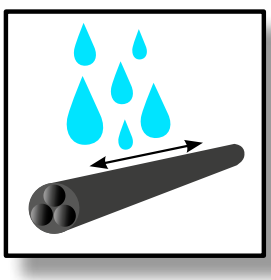
Harici Kullanım
Outdoor



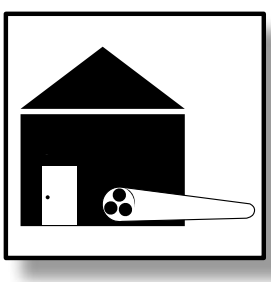
Havai
Aerial

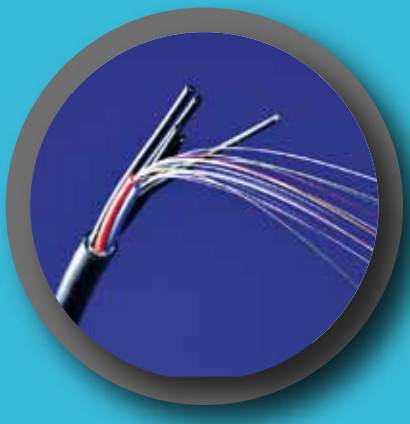


Su Geçirmezlik
Water Resistant



Dahili - Harici kullanım
Indoor - Outdoor





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