Offshore Communication Cables

Cavicel QFCI/QFCU - Multiloose Fire resistant 2
Draka QFCI - F1 4
Draka QFCI - F1 MUD protected 6
Draka Coaxial cable RG – 215 8
Draka Coaxial cable RG – 12 9
Draka Toughcat.5E S/FTP 10
Draka ToughCat.5E S/FTP - MUD Resistant 12
Draka ToughCat.7 S/FTP 14
Draka ToughCat.7 S/FTP - MUD resistant 16
Draka ToughCat.7S LSHF-FR - Version with Solid conductors 18
Draka ToughCat.7S LSHF-FR MUD Resistant Version with Solid conductors 21

Cavicel QFCI/QFCU - Multiloose Fire resistant MLO-000-**-M1-A1-FR-QFCI/QFCU

Applications
- Safety Systems, Critical Connections and Fire Fighting Systems
- Outdoor installation in Off-shore, Oil & Gas and Marine applications
- Data transmission and telecommunication systems

Operating temperature
-40 °C / + 70 °C (operating)
-40 °C / + 70 °C (storage)
-10 °C / + 70 °C (installation)

Minimum bending radius
20 times overall diameter (dynamic) 10 times overall diameter (static)

Cable construction
- Fibres

Singlemode and multimode fibres, with loose technology coating.
- Structure

The jelly filled tubes containing the fibres are individually wrapped with a mica tape and are cabled around a central steel or FRP (fibreglass reinforced plastic) element. A flame resistant tape improves fire resistance.
- Inner sheath

LSZH compound.
- Armouring

Galvanized steel wire braid
- Outer sheath

QFCI type: LSZH - SHF1 compound
QFCU type: LSZH SHF2, SHF2 MUD resistant compound(1)

Appicable standarts
- Materials

IEC 60092-360
- Optical fibre characteristics

IEC 60794-1-1, IEC 60794-1-2
- Fire resistant

IEC 60331-25
- Fire retardant

IEC 60332-3-24
- Flame retardant

IEC 60332-1-2
- Acid gas emission

IEC 60754-1, EC 60754-2
- Smoke density

IEC 61034-2 EN 50268-2
- Cables for offshore installation

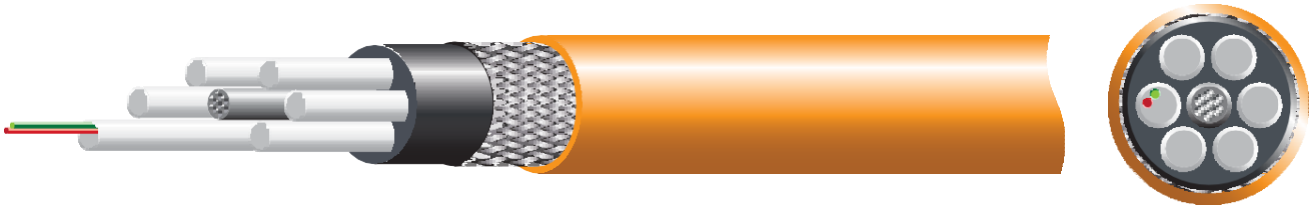
NEK 606

Type	Fibre (n° max)	Tube Diameter (mm)	Diameter (mm)	Weight (kg/km)	Tension load (N)	Crush (N/100mm)	**Ordering information**
Single mode							
Optical Cable SM 9/125 OS1/OS2	8	2,5	13,5	230	1500	3000	8099601
Optical Cable SM 9/125 OS1/OS2	24	2,5	13,5	230	1500	3000	8099768
Optical Cable SM 9/125 OS1/OS2	48	2,5	13,5	230	1500	3000	8108819
Multi-Mode							
Optical Cable MM 62,5/125 OM1	8	2,5	13,5	230	1500	3000	8099600
Optical Cable MM 62,5/125 OM1	24	2,5	13,5	230	1500	3000	8099767
Optical Cable MM 62,5/125 OM1	48	2,5	13,5	230	1500	3000	8099928

approximate values

Draka QFCI - F1

Fire Resistant optical fibre cable, QFCI-I/O/RM-JM/-, F101



NEK TS 606:2016 Code F101

Optical cable for indoor and outdoor use in vital communication and emergency systems that need to be operational during a fire. The cable is flame retardant, halogen-free and fire-resistant. Designed for use on offshore drilling rigs, on board marine vessels and on fixed floating facilities.
Outer sheath is orange weather resistant material and may be exposed for shorter periods to fluids such as diesel and mineral oils.

Weight and dimensions

Number of fibres	Number of fibres in each tube	Number of tubes + fillers	Loose tube diameter (mm)	Outer diameter (mm)	Weight (kg/km)	Heat release (MJ/km)
4	4	1+5	2,2	13,5	230	1500
8	8	1+5	2,2	13,5	230	1500
12	12	1+5	2,2	13,5	230	1500
24	12	2+4	2,2	13,5	230	
36	12	3+3	2,2	13,5	230	1500
48	12	4+2	2,2	13,5	230	1500
60	12	5+1	2,2	13,5	230	1500
72	12	6+0	2,2	13,5	230	1500

Cable properties

Tensile strength (IEC 60794-1-21, E1)		**Chemical resistance**	
Max tensile load during installation	1500 N	Mineral oils IRM 902 (IEC60811-404)	- 7 days/23°C - 4 hours/70°C
Max tensile load during operation	500 N	Diesel - IRM 903 (IEC60811-404)	- 7 days/23°C - 4 hours/70°C
Crush (IEC 60794-1-21, E3)	3000 N/10cm	**Fire and smoke classifications*)** IEC 60331-25 (750 ^{0}C, 90 minutes)	<1.0 dB excess loss
Impact (IEC 60794-1-21, E4)	30J	Upgraded IEC 60331-25 (1000 ^{0}C, 3 hours)	<1.5 dB excess loss
Torsion (IEC 60794-1-21, E7)	±1 turn/1m	IEC 60331-1(830°C, 120 minutes incl. hammer shock, followed by water jet acc. to BS 8491:2008)	<1,5 dB excess loss
Cable bending		IEC 60331-2 (830°C, 90 minutes incl. hammer shock) followed by water spray acc. to EN 50200	<1,5 dB excess loss
Minimum bending diameter	250 mm	IEC 60331-2 (830°C, 90 minutes incl. hammer shock) IEC 61034	<1,5 dB excess loss
Cable bend (IEC 60794-1-21, E11)	<0.1dB/ ±5 turn	IEC 60332-3-22(Cat.A)	
Temperature window (IEC 60794-1-22, F1)		IEC 60332-3-24 (Cat. C)	
	-40 ^{0}C to +70 ^{0}C	IEC 60754-1	
Operation	-10 ^{0}C to +70 ^{0}C	IEC 60754-2	
Installation Storage	-40 ^{0}C to +70 ^{0}C		

Ordering information

Manufacturer's Part no	Number of fibres	Cabe Type	Fiber type	Fiber data sheet	Ordering information
20184651	4	G4-9/125 QFCI-I/O/RM-JM/-	OS2 Single mode	C03e	on request
20184655	8	G8-9/125 QFCI-I/O/RM-JM/-	OS2 Single mode	C03e	**8003300**
20184659	12	G12-9/125 QFCI-I/O/RM-JM/-	OS2 Single mode	C03e	on request
20184663	24	G24-9/125 QFCI-I/O/RM-JM/-	OS2 Single mode	C03e	**8003299**
20184642	48	G48-9/125 QFCI-I/O/RM-JM/-	OS2 Single mode	C03e	on request
*)	60	G60-9/125 QFCI-I/O/RM-JM/-	OS2 Single mode	C03e	on request
20184647	72	G72-9/125 QFCI-I/O/RM-JM/-	OS2 Single mode	C03e	on request
20184652	4	G4-50/125 QFCI-I/O/RM-JM/-	OM2 50/125 multi mode	C34	on request
20184656	8	G8-50/125 QFCI-I/O/RM-JM/-	OM2 50/125 multi mode	C34	on request
20184660	12	G12-50/125 QFCI-I/O/RM-JM/-	OM2 50/125 multi mode	C34	on request
20184664	24	G24-50/125 QFCI-I/O/RM-JM/-	OM2 50/125 multi mode	C34	on request
20184643	48	G48-50/125 QFCI-I/O/RM-JM/-	OM2 50/125 multi mode	C34	on request
*)	60	G60-50/125 QFCI-I/O/RM-JM/-	OM2 50/125 multi mode	C34	on request
20184648	72	G72-50/125 QFCI-I/O/RM-JM/-	OM2 50/125 multi mode	C34	on request
20184654	4	G4-50/125OM3 QFCI-I/O/RM-JM/-	OM3 MaxCap-OM3	C31	on request
20184658	8	G8-50/125OM3 QFCI-I/O/RM-JM/-	OM3 MaxCap-OM3	C31	on request
20184662	12	G12-50/125OM3 QFCI-I/O/RM-JM/-	OM3 MaxCap-OM3	C31	on request
20184641	24	G24-50/125OM3 QFCI-I/O/RM-JM/-	OM3 MaxCap-OM3	C31	on request
20184645	48	G48-50/125OM3 QFCI-I/O/RM-JM/-	OM3 MaxCap-OM3	C31	on request
*)	60	G60-50/125OM3 QFCI-I/O/RM-JM/-	OM3 MaxCap-OM3	C31	on request
20184650	72	G72-50/125OM3 QFCI-I/O/RM-JM/-	OM3 MaxCap-OM3	C31	on request
*)	4	G4-50/125OM4 QFCI-I/O/RM-JM/-	OM4 MaxCap-OM4	C32	on request
*)	12	G12-50/125OM4 QFCI-I/O/RM-JM/-	OM4 MaxCap-OM4	C32	on request
*)	24	G24-50/125OM4 QFCI-I/O/RM-JM/-	OM4 MaxCap-OM4	C32	on request
20184646	48	G48-50/125OM4 QFCI-I/O/RM-JM/-	OM4 MaxCap-OM4	C32	on request
*)	60	G60-50/125OM4 QFCI-I/O/RM-JM/-	OM4 MaxCap-OM4	C32	on request
*)	72	G72-50/125OM4 QFCI-I/O/RM-JM/-	OM4 MaxCap-OM4	C32	on request
20184653	4	G4-62.5/125 QFCI-I/O/RM-JM/-	OM1 62.5/125 multi mode	C02	on request
20184657	8	G8-62.5/125 QFCI-I/O/RM-JM/-	OM1 62.5/125 multi mode	C02	**8000357**
20184661	12	G12-62.5/125 QFCI-I/O/RM-JM/-	OM1 62.5/125 multi mode	C02	on request
20184665	24	G24-62.5/125 QFCI-I/O/RM-JM/-	OM1 62.5/125 multi mode	C02	**8003235**
20184644	48	G48-62.5/125 QFCI-I/O/RM-JM/-	OM1 62.5/125 multi mode	C02	on request
*)	60	G60-62.5/125 QFCI-I/O/RM-JM/-	OM1 62.5/125 multi mode	C02	on request
20184649	72	G72-62.5/125 QFCI-I/O/RM-JM/-	OM1 62.5/125 multi mode	C02	on request

*)-Part numbers will be given on request. When ordering, pls. refer to data sheet: D95QFCI

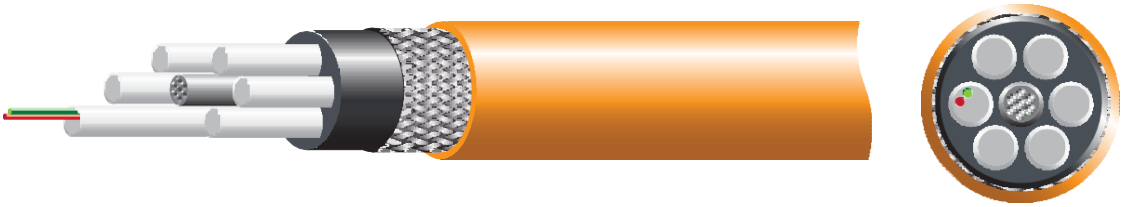
Color code

Fibre no.	Colour	Fibre no.	Colour	Tube no.	Colour
1	White	7	Brown	1	Red
2	Red	8	Black	2	Green
3	Yellow	9	Violet	3	White
4	Green	10	Turquise	4	White
5	Blue	11	Orange	5	White
6	Grey	12	Pink	6	White

Standard colour of outer sheath is black.
Other fibre types and qualities are available on request.

Draka QFCI - F1 MUD protected

Fire resistant QFCI-1/0/RM/C-JM/



NEK TS 606:2016 Code F101

Optical cable for indoor and outdoor use in vital communication and emergency systems that need to be operational during fire. The cable has a patented design that ensures operation for more than 3 hours in fires up to 1000°C. The cable is halogen free and flame retardant to protect against secondary damage to electronic equipment during and after fire. Outer sheath(1) is made from black UV-stabilized and weather resistant material and may be exposed for shorter periods to fluids such as diesel and mineral oils. The resistance to these fluids is according to IEC60811-2-1. The cable is reinforced with a steel wire braiding. The fibres are protected in jelly filled loose tubes stranded around a central strength member to ensure optimum performance and long life. Each fibre and loose tube is colour coded for easy identification during splicing and termination . The outer sheath is marked to show fibre type and cable type.
An additional outer sheath is added for improved oil- and MUD protection.

Weight and dimensions

Number of fibres	Number of fibres in each tube	Number of tubes + fillers	Loose tube diameter (mm)	Outer diameter (mm)	Weight (kg/km)	Heat release (Estimated) (MJ/km)
4	2	2+4	2.2	15.5	325	2000
8	4	2+4	2.2	15.5	325	2000
12	4	3+3	2.2	15.5	325	2000
24	4	6+0	2.2	15.5	325	2000
48	8	6+0	2.2	15.5	325	2000

Cable properties

Tensile strength (IEC 60794-1-2E1)		**Chemical resistance**	
Max tensile load during installation	1500 N	Mineral oils IRM 902 (IEC60811-2-1)	- 7 days/100°C
Max tensile load during operation	500 N	Diesel - IRM 903 (IEC60811-2-1)	- 7 days/100°C
Crush (IEC 60794-1-2E3)	3000 N/10cm	**Fire and smoke classifications**	
Impact (IEC 60794-1-2E4)	30J	IEC 60331-25 (750°C, 90 minutes)	<1.0 dB excess loss
Torsion (IEC 60794-1-2E7)	±1 turn/1m	Upgraded IEC 60331-25 (1000°C, 3 hours) BP GS 112-2 Clause7.1	<1.5 dB excess loss
Cable bending		IEC 61034	
Minimum bending diameter	250 mm	IEC 60332-3-22 (Cat. A)	
Cable bend (IEC 60794-1-2E11)	<0.1dB/ ±5 turn	IEC 60332-3-24 (Cat. C)	
		IEC 60754-1	
Temperature window			
Operation	-40°C to +70°C		
Installation	-10°C to +70°C		
Storage	-40°C to +70°C		

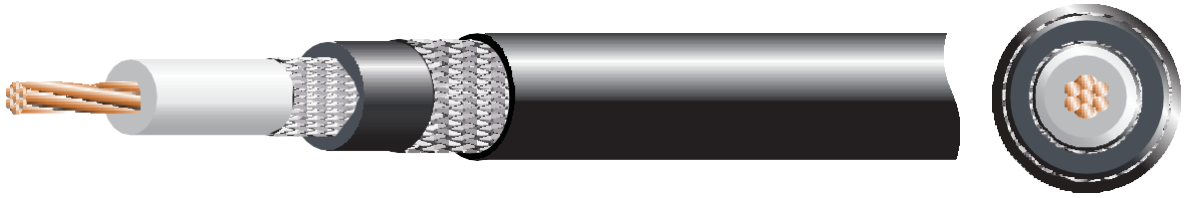
Ordering information
(outer MUD sheath is oranqe)

Manufacturers' Part no	Number of fibres	Cabe Type	Fiber type	Fiber data sheet	Ordering information
20183224	4	G4-9/125 QFCI-I/O/RM/C-JM/-(OG)	OS2 Single mode	C03e	on request
	8	G8-9/125 QFCI-I/O/RM/C-JM/-(OG)	OS2 Single mode	C03e	on request
20180340	12	G12-9/125 QFCI-I/O/RM/C-JM/-(OG)	OS2 Single mode	C03e	on request
20183225	24	G24-9/125 QFCI-I/O/RM/C-JM/-(OG)	OS2 Single mode	C03e	on request
	48	G48-9/125 QFCI-I/O/RM/C-JM/-(OG)	OS2 Single mode	C03e	on request
	8	G8-50/125 QFCI-I/O/RM/C-JM/-(OG)	OM2 50/125 multi mode	C34	on request
	12	G12-50/125 QFCI-I/O/RM/C-JM/-(OG)	OM2 50/125 multi mode	C34	on request
	24	G24-50/125 QFCI-I/O/RM/C-JM/- (OG)	OM2 50/125 multi mode	C34	on request
	48	G48-50/125 QFCI-I/O/RM/C-JM/- (OG)	OM2 50/125 multi mode	C34	on request
	12	G12-50/125OM3 QFCI-I/O/RM/C-JM/- (OG)	OM3 MaxCap-OM3	C31	on request
	24	G24-50/125OM3 QFCI-I/O/RM/C-JM/- (OG)	OM3 MaxCap-OM3	C31	on request
	48	G48-50/125OM3 QFCI-I/O/RM/C-JM/- (OG)	OM3 MaxCap-OM3	C31	on request
	4	G4-62.5/125 QFCI-I/O/RM/C-JM/- (OG)	OM1 62.5/125 multi mode	CO2	on request
20258944	8	G8-62.5/125 QFCI-I/O/RM/C-JM/- (OG)	OM1 62.5/125 multi mode	CO2	8086952
	12	G12-62.5/125 QFCI-I/O/RM/C-JM/- (OG)	OM1 62.5/125 multi mode	CO2	on request
	24	G24-62.5/125 QFCI-I/O/RM/C-JM/- (OG)	OM1 62.5/125 multi mode	CO2	on request
	48	G48-62.5/125 QFCI-I/O/RM/C-JM/- (OG)	OM1 62.5/125 multi mode	CO2	on request

Color code

Fibre no.	Colour	Tube no.	Colour
1	White	1	Red
2	Red	2	Green
3	Yellow	3	White
4	Green	4	White
5	Blue	5	White
6	Grey	6	White
7	Brown		
8	Black		

Draka Coaxial cable RG – 215



Coaxial Cable MIL-C-17 RG - 215
50 ohm
2.25 / 7.25
M17/74
Outdoor
Triax braided screen

Flexible and tough 50 ohm coaxial cable with double braided screen for outdoor use. The cable is intended for transmission of HF/RF signals, and is very suitable for use in HF measurements, video and high speed data transmission. The inner conductor is made of tinned stranded copper, and the outer conductor of plain copper wire. The cable is also armoured with a braid of galvanized steel wires. The dielectricum is made of solid PE and has good crush and impact resistance. The inner and outer sheath is made of halogen free material.

Cable properties

Bending		**Temperature window**	
Minimum bending radius	65 mm	Operation	-40°C to +80°C
Fire rating			
Flame Retardant	IEC 60332-1	Impedance	50 ± 3 ohm
Halognefree	IEC 60754-1	Capacitance, nominal	67 pF/m
	IEC 60754-2	Velocity propagation factor	0.66 c
		DC-Resistance	
		-Inner conductor	22 ohm/km
		-Outer conductor	4.1 ohm/km

Electrical data at 20°C

Attenuation, nominal [dB/100 m]			
10 MHz	1.8	Screening efficiency at 200 MHz (IEC 96-1)	>65 dB
50 MHz	4.6	Maximum working voltage	3.7 kV rms
100 MHz	6.6		
500 MHz	16.0		
1000 MHz	24.0		

Cable Construction

Inner conductor (mm)	Dielectricum diameter (mm)	Screen wires x diameter (mm)	Inner sheath diameter (mm)	Armour Wires x diameter (mm)	Cable diameter (mm)	Weight (kg/km)
7x0.75 KGT	7.25 Solid PE	24x8x0.18 KG Opt.cov: 96%	10.3	24x5x0.30 Tinned Copper Opt.cov: 84%	14.5	260

Ordering information

Description	Ordering information
Coax Cable RG215 Halogen free	**8001771**

Draka Coaxial cable RG – 12

Coaxial Cable MIL-C-17 RG - 12
75 ohm
1.20 / 7.24
M17/6 type
Outdoor
Triax braided screen

Flexible and tough 75 ohm coaxial cable with double braided screen for outdoor use. The cable is intended for transmission of HF/RF signals, and is very suitable for use in HF measurements, video and high speed data transmission. The inner conductor is made of tinned stranded copper, and the outer conductor of plain copper wire. The cable is also armoured with a braid of galvanized steel wires. The dielectricum is made of solid PE and has good crush and impact resistance. The inner and outer sheath is made of halogen free material.

Cable properties

Bending		**Temperature window**	
Minimum bending radius	65 mm	Operation	-40°C to +80°C
Fire rating			
Flame Retardant	IEC 60332-1	Impedance	75 ± 3 ohm
Halognefree	IEC 60754-1	Capacitance, nominal	67 pF/m
	IEC 60754-2	Velocity propagation factor	0.66 c
		DC-Resistance	
		-Inner conductor	22 ohm/km
		-Outer conductor	4.1 ohm/km

Electrical data at 20°C

Attenuation, nominal [dB/100 m]			
10 MHz	1.8	Screening efficiency at 200 MHz (IEC 96-1)	>65 dB
50 MHz	4.6	Maximum working voltage	3.7 kV rms
100 MHz	6.6		
500 MHz	16.0		
1000 MHz	24.0		

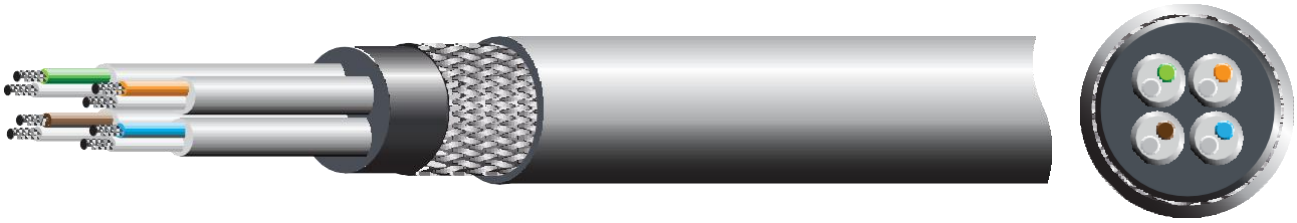
Cable Construction

Inner conductor (mm)	Dielectricum diameter (mm)	Screen wires x diameter (mm)	Inner sheath diameter (mm)	Armour Wires x diameter (mm)	Cable diameter (mm)	Weight (kg/km)
7x0.75 KGT	7.25 Solid PE	24x8x0.18 KG Opt.cov: 96%	10.3	24x5x0.30 Tinned Copper Opt.cov: 84%	13.3	260

Ordering information

Description	Ordering information
Coax Cable RG12 Halogen free	**8000359**

Draka Toughcat.5E S/FTP



Halogen-free, flame retardant, for use on board ships, offshore units and fixed installation. Generic Data transmission: This cable is a Cat5E S/FTP cable meant for use as horizontal cable in tougher electrical and mechanical environment.
This cable is certified by 'Det Norske Veritas' (DNV).

Chemical resistance

Mineral oils	IRM902 (IEC 60811-2-1)	7 days/23 °C, 4hours / 70 °C
Diesel	IRM903 (IEC 60811-2-1)	7 days/23 °C, 4hours / 70 °C

Fire rating
LSHF-FR (SHF1): IEC 607542-2: IEC 61034, IEC 60332-3-24
Standards: En 50288-2-1, En 50173-1, Det Norske Veritas specification No. 6-827.50-2 and Lloyd Register approval system 2002.
ISO/IEC 11801, IEC 61156-5

Construction

Conductor	Stranded copper wire dia. 0.22 mm^2
Insulation	PE, dia. 1.4 mm
Twisting	2 cores to the pair
Cable lay up	4 pairs
Pair screen	Al-laminated foil around each pair
Overall screen	Copper braid, tinned dia. 6.2 mm
Sheath	Oil resistant, Fire retardant, UV stabile and halogen free LSFROH (SHF1)

Mechanical properties

Bending radius	Installation	8 x D
	Installed	4 x D
Temperature range	During operation	-40 °C to +85 °C
	During installation	-15 °C to + 50 °C
Fire load	4 pair	515 Mj/km
Max tensile load, installation	During installation	100N
	Installed	N/A

Electrical properties

Dc loop resistiance		≤ 158 Ω/km
Resistance unbalance		≤ 2%
Insulation resistance	(500V)	≥ 5000 MΩxkm
Capacitance	at 800 Hz	Nom. 43 nF/km
Capacitance unbalance	(Pair to ground)	≤ 1500pF/km
Mean Characteristic impedance	´@ 100 MHz	100 ± 5 Ω
Nominal velocity of propagation		0.75c
Proagation delay		≤ 450 ns/100 m
Delay skew		≤ 15 ns/100 m
Transfer impedance	at 1Khz	≤ 10 mΩ/m
	at 10 MHz	≤ 8 mΩ/m
	at 30 MHz	≤ 10 mΩ/m

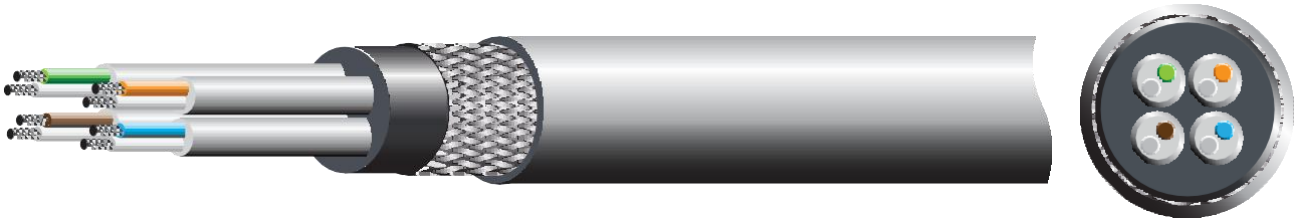
Nominal transmission characteristics

F (NHz)	Attenuation (dB/100m)	NEXT (dB)	ACR (dB/100m)	Return loss (dB)	PS-NEXT (dB)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	Ps-ELFEXT dB/100m)
1	2.1	90	88		87	85	85	82
4	4	90	86	27	87	83	85	82
10	6.3	90	84	30	87	81	79	76
16	8	90	82	30	87	79	75	72
20	9	90	81	30	87	78	73	70
31.25	11.4	90	79	30	87	76	69	66
62.5	16.5	86	70	30	83	67	63	60
100	21.3	83	62	30	80	59	59	56
155	24.2	81	57	26	78	54	57	54
200	31.5	78	47	25	75	44	53	50
250	35.8	77	41	25	74	38	51	48
300	47.1	73	26	23	70	23	47	44
600	60.1	71	11	20	68	8	44	41

Ordering information

Type No	Description	Ordering information
1000745	4x2/022 mm^2 LSHF-FR (SHF 1) Grey outer sheet O.D. 7.6 mm.	**8003536**

Draka ToughCat.5E S/FTP - MUD Resistant



Halogen-free. flame retardant, for use on board ships, offshore units and fixed installations.
Generic data transmission: This cable is a Cat5E S/FTP cable meant for use as horizontal cable in tougher electrical and mechanical environment.
This cable is based on our ToughCat cable certificated by 'Det Norske Veritas' (DNV), but with a MUD resistant outer jacket..

Chemical resistance

Mineral oils	IRM902 (IEC 60811-2-1)	7 days/23 °C, 4hours / 70 °C
Diesel	IRM903 (IEC 60811-2-1)	7 days/23 °C, 4hours / 70 °C

Fire rating
MUD resistant outer sheath: IEC 60754-2; IEC 61034, IEC 60332-3-24 Inner sheath LSHF-FR (SHF1): IEC 60754-2: IEC 61034, IEC 60332-3-24
Standards: En 50288-2-1
ISO/IEC 11801, IEC 61156-5

Construction

Conductor	Stranded copper wire dia. 0.22 mm^2
Insulation	PE, dia. 1.4 mm
Twisting	2 cores to the pair
Cable lay up	4 pairs
Pair screen	Al-laminated foil around each pair
Overall screen	Copper braid, tinned dia. 6.2 mm
Inner Sheath	Oil resistant, Fire retardant, UV stabile and halogen free LSHF-FR (SHF1) dia. 7.7 mm
Outer Sheath	MUD resistant

Mechanical properties

Bending radius	Installation	8 x D
	Installed	4 x D
Temperature range	During operation	-40 °C to +85 °C
	During installation	-15 °C to + 50 °C
Max tensile load, installation	During installation	100N
	Installed	N/A

Electrical properties

Dc loop resistance		≤ 158 Ω/km
Resistance unbalance		≤ 2 %
Insulation resistance	(500V)	≥ 5000 MΩxkm
Capacitance	at 800 Hz	Nom. 43 nF/km
Capacitance unbalance	(Pair to ground)	≤ 1500pF/km
Mean characteristic impedance	´@ 100 MHz	100 ± 5 Ω
Nominal velocity of propagation		0.75c
Proagation delay		≤ 450 ns/100 m
Delay skew		≤ 15 ns/100 m
Transfer impedance	at 1Khz	≤ 10 mΩ/m
	at 10 MHz	≤ 8 mΩ/m
	at 30 MHz	≤ 10 mΩ/m

Nominal transmission characteristics

F (NHz)	Attenuation (dB/100m)	NEXT (dB)	ACR (dB/100m)	Return loss (dB)	PS-NEXT (dB)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	Ps-ELFEXT dB/100m)
1	2.1	90	88		87	85	85	82
4	4	90	86	27	87	83	85	82
10	6.3	90	84	30	87	81	79	76
16	8	90	82	30	87	79	75	72
20	9	90	81	30	87	78	73	70
31.25	11.4	90	79	30	87	76	69	66
62.5	16.5	86	70	30	83	67	63	60
100	21.3	83	62	30	80	59	59	56
155	24.2	81	57	26	78	54	57	54
200	31.5	78	47	25	75	44	53	50
250	35.8	77	41	25	74	38	51	48
300	47.1	73	26	23	70	23	47	44
600	60.1	71	11	20	68	8	44	41

Ordering information

Type No	Description	Ordering information
1000846	4x2/022 mm^2 MUD resistant black outer sheet O.D. 9.6 mm.	**8002542**

Draka ToughCat.7 S/FTP

Halogen-free, flame retardant, for use on board ships, offshore units and fixed installation. Generic Data transmission: This cable ia a Cat7 S/FTP cable meant for use as horizontal cable in tougher electrical and mechanical environment.
This cable is certified by 'Det Norske Veritas' (DNV).

Chemical Resistance

Mineral oils	IRM902 (IEC60811-2-1)	7 days/23 °C, 4hours / 70 °C
Diesel	IRM 902 (IEC60811-2-1)	7 days/23 °C, 4hours / 70 °C

Fire rating
LSHF-FR (SHF1): IEC 60754-2: IEC 61034, IEC 60332-3-24

Standards
En 50288-4-1, EN50173-1, Det Norske Veritas specification No. 6-827.50-2, ISO/IEC 11801, IEC 61156-5.

Construction

Conductor	Stranded copper wire dia. 0.27 mm^2
Insulation	PE, dia. 1.6 mm.
Twisting	2 cores to the pair
Cable lay up	4 pairs
Pair screen	Al-laminated foil around each pair
Overall screen	Copper braid, tinned dia. 6.6mm
Sheath	Oil resistant, Fire retardant, UV stabile and halogen free LSHF-FR (SHF1)

Mechanical properties

Bending radius	Installation	8 x D
	Installed	4 x D
Temperature range	During operation	-40 °C to +85 °C
	During installation	-15 °C to + 50 °C
Fire load	4 pair	670 Mj/km
Max tensile load, installation	During installation	100N
	Installed	N/A

Electrical properties

Dc loop resistance		≤ 138 Ω/km
Resistance unbalance		≤ 2%
Insulation resistance	(500V)	≥ 5000 MΩxkm
Capacitance	at 800 Hz	Nom. 43 nF/km
Capacitance unbalance	(Pair to ground)	≤ 1500pF/km
Mean Characteristic impedance	´@ 100 MHz	100 ± 5 Ω
Nominal velocity of propagation		0,75c
Proagation delay		≤ 450 ns/100 m
Delay skew		≤ 15 ns/100 m
Transfer impedance	at 1Mhz	≤ 10 mΩ/m
	at 10 MHz	≤ 8 mΩ/m
	at 30 MHz	≤ 10 mΩ/m

Nominal transmission characteristics

F (NHz)	Attenuation (dB/100m)	NEXT (dB)	ACR (dB/100m)	Return loss (dB)	PS-NEXT (dB)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	Ps-ELFEXT dB/100m)
1	2	90	88		87	85	85	82
4	3.6	90	86	27	87	83	85	82
10	5.5	90	84	30	87	81	79	76
16	7.5	90	82	30	87	79	75	72
20	7.7	90	82	30	87	79	73	70
31.25	9.8	90	80	30	87	77	69	66
62.5	14.0	86	72	30	83	69	63	60
100	17.9	83	65	30	80	62	59	56
155	22.4	81	59	26	78	55	57	54
200	25.6	78	52	25	75	49	53	50
250	28.8	77	48	25	74	45	51	48
300	31.6	73	41	23	70	38	47	44
600	45.7	71	25	20	68	22	44	41

Ordering information

Type No	Description	Ordering information
1016274	4x2/0.27mm^2 LSHF-FR (SHF 1) Grey outer sheet OD 8.1 mm	**8009023**

Draka ToughCat.7 S/FTP - MUD resistant

Halogen-free, flame retardant, for use on board ships, offshore units and fixed installation. Generic Data transmission: This cable is a Cat7 S/FTP cable meant for use as horizontal cable in tougher electrical and mechanical environment.
This cable is based on our ToughCat cable certificated by 'Det Norske Veritas' (DNV), but with a MUD resistant outer jacket.

Chemical Resistance

Mineral oils	IRM903 (IEC60811-2-1)	7 days / 100 °C
Diesel	IRM 902 (IEC60811-2-1)	7 days / 100 °C

Fire rating
Inner sheath LSHF-FR (SHF1): IEC 607542-2: IEC 61034, IEC 60332-3-24
MUD protecting outer sheath IEC 60754-2: IEC 61034, IEC 60332-3-24

Standards
EN50288-2-1, EN50173-1, Det Norske Veritas specification No. 6-827.50, ISO/IEC 11801, IEC 61156-5

Construction

Conductor	Stranded copper wire dia. 0.27 mm2
Insulation	PE, dia. 1.6 mm.
Twisting	2 cores to the pair
Cable lay up	4 pairs
Pair screen	Al-laminated foil around each pair
Overall screen	Copper braid, tinned dia. 6.6mm
Sheath	Oil resistant, Fire retardant, UV stabile and halogen free LSHF-FR (SHF1)
Outer sheath	MUD resistant

Mechanical properties

Bending radius	Installation	8 x D
	Installed	4 x D
Temperature range	During operation	-40 °C to +85 °C
	During installation	-15 °C to + 50 °C
Max tensile load, installation	During installation	100N
	Installed	N/A

Electrical properties

Dc loop resistance		≤ 138 Ω/km
Resistance unbalance		≤ 2%
Insulation resistance	(500V)	≥ 5000 MΩxkm
Capacitance	at 800 Hz	Nom. 43 nF/km
Capacitance unbalance	(Pair to ground)	≤ 1500pF/km
Mean Characteristic impedance	´@ 100 MHz	100 ± 5 Ω
Nominal velocity of propagation		0,75c
Proagation delay		≤ 450 ns/100 m
Delay skew		≤ 15 ns/100 m
Transfer impedance	at 1Khz	≤ 10 mΩ/m
	at 10 MHz	≤ 8 mΩ/m
	at 30 MHz	≤ 10 mΩ/m

Nominal transmission characteristics

F (NHz)	Attenuation (dB/100m)	NEXT (dB)	ACR (dB/100 m)	Return loss (dB)	PS-NEXT (dB)	PS-ACR (dB/100 m)	ELFEXT (dB/100 m)	Ps-ELFEXT dB/100m)
1	2	90	88		87	85	85	82
4	3.6	90	86	27	87	83	85	82
10	5.5	90	84	30	87	81	79	76
16	7.5	90	82	30	87	79	75	72
20	7.7	90	82	30	87	79	73	70
31.25	9.8	90	80	30	87	77	69	66
62.5	14.0	86	72	30	83	69	63	60
100	17.9	83	65	30	80	62	59	56
155	22.4	81	59	26	78	55	57	54
200	25.6	78	52	25	75	49	53	50
250	28.8	77	48	25	74	45	51	48
300	31.6	73	41	23	70	38	47	44
600	45.7	71	25	20	68	22	44	41

Ordering information

Type No	Description	Ordering information
1019269	4x2/0.27mm^2 LSHF-FR (SHF 1) Grey outer sheet OD 10.1 mm	**8009022**

Draka ToughCat.7S LSHF-FR - Version with Solid conductors

Generic Data transmission. This cable is a Cat7 S/FTP cable meant for use as installation/horizontal cable in tougher electrical and mechanical environment, including ships and offshore units.
This cable is certified by: Det Norske Veritas (DNV) and Lloyd Register approval system, 2002

Chemical Resistance

Mineral oils	IRM 903 (IEC60811-404)	7 days / 100 °C
Diesel	IRM 902 (IEC60811-404)	7 days / 100 °C

Fire rating
LSHF-FR(SHF1) : IEC 60754-2; IEC 61034, IEC 60332-3-24, EN 50399 Class D_{ca}s2d1a1

Standards
EN 50173-1; EN 50288-4-1; ISO/IEC 11801; IEC 61156-5; Power over Ethernet (PoE/PoE+), Det Norske Veritas (DNV) specification No. 6-827.50-2

Construction

Conductor	Solid copper wire, Ø 0.56 mm (AWG 23)
Insulation	foamskin PE, Ø 1.4 mm
Twisting	2 cores to the pair
Cable lay up	4 pairs (PiMF) to the core
Pair screen	Al-laminated plastic foil
Screen	copper braid, tinned
Sheath	Oil resistant, Fire retardant and halogen free LSHF-FR, SHF1, acc. to IEC60092-360. Standard colour Grey RAL7035)

Mechanical properties

Bending radius	Installation	8 x D
	Instaled	4 x D
Temerature range	During operation	-40°C to + 85°C
	During installation	-15°C to + 50°C
Fire load	4 pair	670 MJ/km
Max tensile load, installation	During installation	No load
	Installed	200 N

Electrical properties **at 20°C± 5°C**

Dc loop resistiance		□ 150 Ω/km
Resistance unbalance		≤ 2%
Insulation resistance	(500V)	≥ 5000 MΩxkm
Mutual capacitance	at 800 Hz	Nom. 43 nF/km
Capacitance unbalance	(pair/ground)	≤ 1500pF/km
Mean Characteristic impedance	(1-100 MHz)	100 ± 5 Ω
	(100 - 250) MHz	100 ± 10 Ω
	(250 - 600) MHz	100 ± 15 Ω
Nominal velocity of propagation		ca. 79 %
Proagation delay		□ 570 ns/100m
Delay skew		□ 9 ns/100m
Test voltage	(DC, 1 min) core/core and core/screen	1000 V
Transfer impedance(Grade 1)	at 1 MHz	□ 10 mΩ/m
	at 10 MHz	□ 10 mΩ/m
	at 30 MHz	□ 10 mΩ/m
	at 100MHz	□ 20 mΩ/m
Coupling attenuation		□ 85 dB
Segregation classification	Acc. to EN 50174-2	“D”

Electrical data (nominal) **acc. to Cat.7 (at 20°C)**

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	PS-NEXT (dB)	ACR (dB/100m)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)	Return loss (dB)
1,0	1,8	100	97	98	95	105	105	-
4,0	3,4	100	97	97	94	105	102	27
10,0	5,4	100	97	95	92	97	94	30
16,0	6,8	100	97	93	90	93	90	30
20,0	7,7	100	97	92	89	91	88	30
31,2	9,6	100	97	90	87	87	84	30
62,5	13,7	100	97	86	83	81	78	30
100,0	17,4	100	97	83	80	77	74	30
125,0	19,5	95	92	75	72	75	72	26
155,5	21,9	94	91	72	69	73	70	26
175,0	23,3	93	90	70	67	72	69	25
200,0	25,0	92	89	67	64	71	68	25
250,0	28,1	90	87	62	59	69	66	24
300,0	30,9	89	86	58	55	67	64	24
450,0	38,3	87	84	48	45	64	61	23
600,0	44,8	85	82	40	37	61	58	22

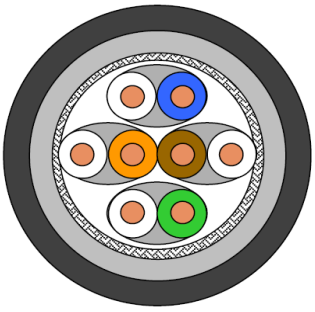
Technical data

Reference code	Description	Colour	Euro class	Fire load		Outer diameter (mm)	Weight kg/km
				MJ/km	kWh/m		
60015280	ToughCat7S S/FTP 4x2/0.56	Grey RAL7005	Dca	670	0,186	7,6	64

Ordering information

Product Description	Manufacturer's Part Number	Ordering information
ToughCat C7S LSHF-FR 4x2/0.56	60015280	**on request**
ToughCat C7S LSHF-FR 4x2/0.56 500DP	60015282	**8066949**

Draka ToughCat.7S LSHF-FR MUD Resistant Version with Solid conductors



Generic Data transmission. This cable is a Cat7 S/FTP cable is based on our DNV certified ToughCat, but with an additional fire retardant, halogen-free, low smoke MUD protecting outer jacket. This cabel is meant for use as installation/horisontal cable in tougher electrical and mechanical environment, including ships and offshore units.

Chemical Resistance

Mineral oils	IRM 902 (IEC60811-2-1)	7 days / 100 °C
Diesel	IRM 903 (IEC60811-2-1)	7 days / 100 °C

Fire rating

Inner sheath: LSHF-FR (SHF1) : IEC 60754-2; IEC 61034, IEC 60332-3-24
MUD protecting outer sheath : IEC 60754-2; IEC 61034, IEC 60332-3-24

Standards

EN 50173-1; EN 50288-4-1; ISO/IEC 11801; IEC 61156-5

Construction

Conductor	Solid copper wire, Ø 0.56 mm (AWG 23)
Insulation	foamskin PE, Ø 1.4 mm
Twisting	2 cores to the pair
Cable lay up	4 pairs (PiMF) to the core
Pair screen	Al-laminated plastic foil
Screen	copper braid, tinned
Inner Sheath	Oil resistant, Fire retardant and halogen free LSHF-FR (SHF1)
Outer Sheath	MUD protecting

Mechanical properties

Bending radius	Installation	8 x D
	Instaled	4 x D
Temerature range	During operation	-40°C to + 85°C
	During installation	-15°C to + 50°C
Fire load	4 pair	670 MJ/km
Max tensile load, installation	During installation	No load
	Installed	200 N

Electrical properties **at 20°C± 5°C**

Dc loop resistance		≤ 155 Ω/km
Resistance unbalance		≤ 2%
Insulation resistance	(500V)	≥ 5000 MΩxkm
Mutual capacitance	at 800 Hz	Nom. 43 nF/km
Capacitance unbalance	(pair/ground)	≤ 1500pF/km
Mean Characteristic impedance	(1-100 MHz)	100 ± 5 Ω
	(100 - 250) MHz	100 ± 10 Ω
	(250 - 600) MHz	100 ± 15 Ω
Nominal velocity of propagation		ca. 79 %
Proagation delay		≤ 570 ns/100m
Delay skew		≤ 9 ns/100m
Test voltage	(DC, 1 min) core/core and core/screen	1000 V
Transfer impedance(Grade 1)	at 1 MHz	≤ 10 mΩ/m
	at 10 MHz	≤ 10 mΩ/m
	at 30 MHz	≤ 10 mΩ/m
	at 100MHz	≤ 20 mΩ/m
Coupling attenuation		≥ 85 dB

Electrical data (nominal) **acc. to Cat.7 (at 20°C)**

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	PS-NEXT (dB)	ACR (dB/100m)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)	Return loss (dB)
1,0	1,8	100	97	98	95	105	105	-
4,0	3,4	100	97	97	94	105	102	27
10,0	5,4	100	97	95	92	97	94	30
16,0	6,8	100	97	93	90	93	90	30
20,0	7,7	100	97	92	89	91	88	30
31,2	9,6	100	97	90	87	87	84	30
62,5	13,7	100	97	86	83	81	78	30
100,0	17,4	100	97	83	80	77	74	30
125,0	19,5	95	92	75	72	75	72	26
155,5	21,9	94	91	72	69	73	70	26
175,0	23,3	93	90	70	67	72	69	25
200,0	25,0	92	89	67	64	71	68	25
250,0	28,1	90	87	62	59	69	66	24
300,0	30,9	89	86	58	55	67	64	24
450,0	38,3	87	84	48	45	64	61	23
600,0	44,8	85	82	40	37	61	58	22

Technical data

Reference code	Description	Colour	Fire load		Outer diameter (mm)	Weight kg/km
			MJ/km	kWh/m		
1026769	ToughCat MUD C7S 4x2/0.56	Dark Grey RAL7024	670	0,186	9,6	100

Ordering information

Product Description	Manufacturer's Part Number	Ordering information
ToughCat MUD C7S 4x2/0.56	60022014	**on request**
ToughCat MUD C7S 4x2/0.56 500DP	60015706	**8065371**