YANGER MARINE

Special Cable Solutions

LAN CABLE | COAXIAL CABLE | FIBER OPTIC | BUS CABLE

YANGER MARINE

YANGER® Special Cable Expert

Yanger Marine is a high-tech enterprise focusing on the field of marine & offshore cable system solutions, integrating R & D, design, manufacture and service. At present, Yanger Marine has companies located in Shanghai and Hong Kong.

Yanger also anticipates the demands of future markets with progressive research and development. The company continuously monitors and interprets industry trends, and uses state-of-the-art R&D methods to introduce innovative new products that meet the needs of the rapidly changing market.

Yanger quality system is approved to conform to the requirements of ISO-9001:2015. In addition, many Yanger products are approved and verified by national and international certification bodies such as UL, CUTR, FSC, DNV, ABS, CCS etc.

Apart from manufacturing cables, Yanger also provides cable cutting, pre-trimming and cable assembly component services. Thus, with our one-stop turnkey service, Yanger customers can immediately use their cables.

Copper Data Cables for the Shipping Industry and Offshore Installations -

These cables are fully compliant with the IEC 61156 standards. All designs in this catalog are DNV/ABS/CCS approved for ship, onshore and offshore use.

Instrumentation and Control Cables for Ship, Onshore and Offshore Installations -

Covering the most extensive range available of conductors, lay-up, shielding and armoring and voltage options, Yanger's Instrumentation and Control cables for the entire onshore, offshore and shipboard industry cannot be surpassed.

FiberOptic Cables for Data Communication and Emergency Systems -

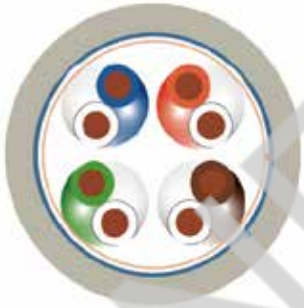
Our FiberOptic cables, for indoor,indoor/outdoor and outdoor use, are for vital rapid communication and emergency systems required to be operational during a fire for more than three hours. You can find many of the hundreds of options available with Yanger DNV /ABS/CCS FiberOptic Cables in the Fiber-Optic chapter of this catalog.

Bus Cables for Ship, Onshore and Offshore Installations -

When combining data communication cabling with an industrial environment either onshore or offshore, use Yanger's DNV/ABS/CCS approved BUS or Industrial Ethernet Cables. Whether you require CanBUS, FieldBUS, InterBUS, DeviceNET or RS-485 cables, with any shielding and armoring option, and varying pair counts, Yanger Cables and Systems is your "one-stop-DNV/ABS/CCS-cable-shop"!

Part 1
LAN CABLE

CAT5E 4x2x24/1 AWG Solid F/UTP LSZH-SHF1



Application: Shipboard installations, Maritime Environment, Fixed or portable installations, Indoor use, fixed installations, High data rates, Ships, High speed & Light craft.
Install at: 0°C to + 60 °C, Bend minimum: 20 times O.D.
Operate at: -30°C to + 75 °C, Bend minimum: 10 times O.D.
Pull maximum: 110 N
Weight: 70 kg/km
Standards: ISO/IEC 11801 , IEC 61156-1, IEC 61156-5, IEC 60092-350, IEC 60092-360, RoHS-2 2011/65/EU, UL1581

Design & Construction

Conductor:	Soft annealed bare copper wire
Conductor size:	24 AWG
Insulation:	HDPE
Insulation OD:	Normal Ø1.05 ± 0.05 mm
Insulation thickness	0.25 mm
Pair:	2 insulated conductors stranded together into a pair
Color code:	1. White/blue + Blue 2. White/orange + Orange 3. White/green + Green 4. White/brown + Brown
Outer shield:	Aluminum Foil-Polyester Tape
Outer shield Coverage:	100%
Drain wire:	Solid Tin Copper
Outer jacket:	LSZH SHF1
Nominal outer sheath thickness	0.75 ± 0.30 mm
Outer jacket OD:	6.8 ± 0.50 mm
Marking:	YANGER® CAT5E 4x2x24/1 AWG Solid F/UTP LSZH-SHF1 <batch no.> <meter marking>
Outer jacket color:	Grey

Environmental properties and Fire Performances

Degree of acidity of gases:	IEC 60754-1/2
Halogen acid gas:	IEC 60754-1/2
Smoke Emission:	IEC 61034-1/2
Flame retardant:	IEC 60332-1-2
UV resistance:	UL 1581
Fire retardant:	IEC 60332-3-22

Electrical characteristics

Resistance of the conductor@20°C:	≤145 Ω/km
Insulation resistance:	≥5000 MΩ/km
Transfer impedance:	<100 mΩ/m @10 MHz
Average characteristic impedance@100 MHz:	100 ± 5 Ω
Delay skew (4~100 MHz):	≤45 ns/100m
Velocity factor:	67%
Conductor resistance unbalance within pair:	≤2.0%
Conductor resistance unbalance between pair:	≤4.0%
capacitance unbalance to earth at 800 Hz or 1000 Hz:	≤160 pF/100m
Mutual capacitance:	≤56 nF/km

Electrical Properties

Frequency (MHz):	1	4	8	10	16	20	25	31.25	62.5	100
Attenuation dB/100m (Max.)	—	4.1	5.8	6.5	8.2	9.3	10.4	11.7	17	22
NEXT dB (Min.)	65.3	56.3	51.8	50.3	47.2	45.8	44.3	42.9	38.4	35.3
PS-NEXT (Min.)	62.3	53.3	48.8	47.3	44.2	42.8	41.3	39.9	35.4	32.3
ELFEXT dB (Min.)	64	52	45.9	44	39.9	38	36	34.1	28.1	24
Return Loss dB (Min.)	20	23	24.5	25	25	25	24.3	23.6	21.5	20.1
PSELFEXT dB (Min.)	61	49	42.9	41	36.9	35	33	31.1	25.1	21

CAT6 4x2x24/1 AWG Solid F/UTP LSZH-SHF1

Application:	Shipboard installations, Maritime Environment, Fixed or portable installations, Indoor use, fixed installations, High data rates, Ships, High speed & Light craft.
Install at:	0°C to + 60 °C, Bend minimum: 20 times O.D.
Operate at:	-30°C to + 75 °C, Bend minimum: 10 times O.D.
Pull maximum:	110 N
Weight:	70 kg/km
Standards:	ISO/IEC 11801 , IEC 61156-1, IEC 61156-5, IEC 60092-350, IEC 60092-360, RoHS-2 2011/65/EU, UL 1581

Design & Construction

Conductor:	Soft annealed bare copper wire
Conductor size:	24 AWG
Insulation:	HDPE
Insulation OD:	Normal Ø1.05 ± 0.05 mm
Insulation thickness	0.25 mm
Pair:	2 insulated conductors stranded together into a pair
Color code:	1. White/blue + Blue 2. White/orange + Orange 3. White/green + Green 4. White/brown + Brown
Outer shield:	Aluminum Foil-Polyester Tape
Outer shield Coverage:	100%
Drain wire:	Solid Tin Wire
Outer jacket:	LSZH SHF1
Nominal outer sheath thickness	0.75 ± 0.30 mm
Outer jacket OD:	7.2 ± 0.50 mm
Marking:	YANGER® CAT6 4x2x24/1 AWG Solid F/UTP LSZH-SHF1 <batch no.> <meter marking>
Outer jacket color:	Grey

Environmental properties and Fire Performances

Degree of acidity of gases:	IEC 60754-1/2
Halogen acid gas:	IEC 60754-1/2
Smoke Emission:	IEC 61034-1/2
Flame retardant:	IEC 60332-1-2
UV resistance:	UL 1581
Fire retardant:	IEC 60332-3-22

Electrical characteristics

Resistance of the conductor@20°C:	≤145 Ω/km
Insulation resistance:	≥5000 MΩ/km
Transfer impedance:	<100 mΩ/m @10 MHz
Average characteristic impedance@100 MHz:	100 ± 5 Ω
Delay skew (4~100 MHz):	≤45 ns/100m
Velocity factor:	67%
Conductor resistance unbalance within pair:	≤2.0%
Conductor resistance unbalance between pair:	≤4.0%
capacitance unbalance to earth at 800 Hz or 1000 Hz:	≤160 pF/100m
Mutual capacitance:	≤56 nF/km

Electrical Properties

Frequency (MHz):	1	4	10	16	20	31.25	62.5	100	200	250
Attenuation dB/100m (Max.)	—	3.8	5.9	7.5	8.4	10.5	15.0	19.1	27.6	31.1
NEXT dB (Min.)	74.3	65.3	59.3	56.2	54.8	51.9	47.4	44.3	39.8	38.3
PS-NEXT (Min.)	72.3	63.3	57.3	54.2	52.8	49.9	45.4	42.3	37.8	36.3
ELFEXT dB (Min.)	67.8	55.8	47.8	43.7	41.8	37.9	31.9	27.8	21.8	19.8
Return Loss dB (Min.)	20.0	23.0	25.0	25.0	25.0	23.6	21.5	20.1	18.0	17.3
PSELFEXT dB (Min.)	64.8	52.8	44.8	40.7	38.8	34.9	28.9	24.8	18.8	16.8

CAT6A 4x2x23/1 AWG Solid S/FTP LSZH-SHF1

Application:	Telecom systems, High data rates, High bandwidth digital applications with low BER, Indoor use, fixed installations
Install at:	0°C to + 60 °C, Bend minimum: 20 times O.D.
Operate at:	-30°C to + 75 °C, Bend minimum: 10 times O.D.
Pull maximum:	110 N
Weight:	78 kg/km
Standards:	ISO/IEC 11801 , IEC 61156-1, IEC 61156-5, IEC 60092-350, IEC 60092-360, RoHS-2 2011/65/EU, UL 1581

Design & Construction

Conductor:	Soft annealed bare copper wire
Conductor size:	23 AWG
Insulation:	PE-Foam/skin-PE
Insulation OD:	Normal Ø1.35 ± 0.05 mm
Insulation thickness	0.39 mm
Pair:	2 insulated conductors stranded together into a pair
Color code:	1. White/blue + Blue 2. White/orange + Orange 3. White/green + Green 4. White/brown + Brown
Shield pair to pair:	Aluminum Foil-Polyester Tape
Shield pair to pair coverage	100%
Outer shield:	Solid Tinned Copper Braid
Outer shield coverage:	Nom 80%
Outer jacket:	LSZH SHF1
Nominal outer sheath thickness	0.75 ± 0.30 mm
Outer jacket OD:	8.0 ± 0.50 mm
Marking:	YANGER® CAT6A 4x2x23/1 AWG Solid S/FTP LSZH-SHF1 <batch no.> <meter marking>
Outer jacket color:	Grey

Environmental properties and Fire Performances

Degree of acidity of gases:	IEC 60754-1/2
Halogen acid gas:	IEC 60754-1/2
Smoke Emission:	IEC 61034-1/2
Flame retardant:	IEC 60332-1-2
UV resistance:	UL 1581
Fire retardant:	IEC 60332-3-22

Electrical characteristics

Resistance of the conductor@20°C:	≤93.8 Ω/km
Insulation resistance:	≥5000 MΩ/km
Average characteristic impedance@100 MHz	100 ± 5Ω
Transfer impedance:	＜100 mΩ/m @10 MHz
Delay skew (4~100 MHz):	≤45 ns/100 m
Velocity factor:	69%
Conductor resistance unbalance within pair:	≤2.0%
Conductor resistance unbalance between pair:	≤4.0%
capacitance unbalance to earth at 800 Hz or 1000 Hz:	≤160 pF/100 m
Mutual capacitance:	≤56 nF/km

Electrical Properties

Frequency (MHz):	1	4	10	16	20	31.25	62.5	100	200	250	400	500
Attenuation dB/100m (Max.)	—	3.8	5.9	7.5	8.4	10.5	15.0	19.1	27.6	31.1	40.1	45.3
NEXT dB (Min.)	74.3	65.3	59.3	56.2	54.8	51.9	47.4	44.3	39.8	38.3	35.3	33.8
PS-NEXT (Min.)	72.3	63.3	57.3	54.2	52.8	49.9	45.4	42.3	37.8	36.3	33.3	31.8
ELFEXT dB (Min.)	67.8	55.8	47.8	43.7	41.8	37.9	31.9	27.8	21.8	19.8	15.8	13.8
Return Loss dB (Min.)	20.0	23.0	25.0	25.0	25.0	23.6	21.5	20.1	18.0	17.3	15.9	15.2
PSELFEXT dB(Min.)	64.8	52.8	44.8	40.7	38.8	34.9	28.9	24.8	18.8	16.8	12.8	10.8

CAT6A 4x2x23/7 AWG Stranded S/FTP LSZH-SHF1

Application:	Telecom systems, High data rates, High bandwidth digital applications with low BER, Indoor use, fixed installations
Install at:	0°C to + 60°C, Bend minimum: 20 times O.D.
Operate at:	-30°C to + 75°C, Bend minimum: 10 times O.D.
Pull maximum:	110 N
Weight:	80 kg/km
Standards:	ISO/IEC 11801 , IEC 61156-1, IEC 61156-5, IEC 60092-350, IEC 60092-360, RoHS-2 2011/65/EU, UL 1581

Design & Construction

Conductor:	Stranded Bare copper wire
Conductor size:	23 AWG
Insulation:	PE-Foam/skin-PE
Insulation OD:	Normal Ø1.41 ± 0.05 mm
Insulation thickness	0.39 mm
Pair:	2 insulated conductors stranded together into a pair
Color code:	1. White/blue + Blue 2. White/orange + Orange 3. White/green + Green 4. White/brown + Brown
Shield pair to pair:	Aluminum Foil-Polyester Tape
Shield pair to pair coverage	100%
Outer shield:	Solid Tinned Copper Braid
Outer shield coverage:	Nom 80%
Outer jacket:	LSZH SHF1
Nominal outer sheath thickness	0.75 ± 0.30 mm
Outer jacket OD:	8.4 ± 0.50 mm
Marking:	YANGER® CAT6A 4x2x23/7 AWG Stranded S/FTP LSZH-SHF1 <batch no> <meter marking>
Outer jacket color:	Grey

Environmental properties and Fire Performances

Degree of acidity of gases:	IEC 60754-1/2
Halogen acid gas:	IEC 60754-1/2
Smoke emission:	IEC 61034-1/2
Flame retardant:	IEC 60332-1-2
UV resistance	UL 1581
Fire retardant:	IEC 60332-3-22

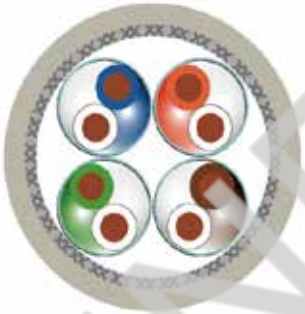
Electrical characteristics

Resistance of the conductor@20°C:	≤95.0 Ω/km
Insulation resistance:	≥5000 MΩ/km
Average characteristic impedance@100 MHz:	100 ± 5 Ω
Transfer impedance:	< 100 mΩ/m @ 10 MHz
Delay skew (4~100 MHz):	≤45 ns/100 m
Velocity factor:	69%
Conductor resistance unbalance within pair:	≤2.0%
Conductor resistance unbalance between pair:	≤4.0%
capacitance unbalance to earth at 800 Hz or 1000 Hz:	≤160 pF/100 m
Mutual capacitance:	≤56 nF/km

Electrical Properties

Frequency (MHz):	1	4	10	16	20	31.25	62.5	100	200	250	400	500
Attenuation dB/100m (Max.)	—	3.8	5.9	7.5	8.4	10.5	15.0	19.1	27.6	31.1	40.1	45.3
NEXT dB (Min.)	74.3	65.3	59.3	56.2	54.8	51.9	47.4	44.3	39.8	38.3	35.3	33.8
PS-NEXT (Min.)	72.3	63.3	57.3	54.2	52.8	49.9	45.4	42.3	37.8	36.3	33.3	31.8
ELFEXT dB (Min.)	67.8	55.8	47.8	43.7	41.8	37.9	31.9	27.8	21.8	19.8	15.8	13.8
Return Loss dB (Min.)	20.0	23.0	25.0	25.0	25.0	23.6	21.5	20.1	18.0	17.3	15.9	15.2
PSELFEXT (Min.)	64.8	52.8	44.8	40.7	38.8	34.9	28.9	24.8	18.8	16.8	12.8	10.8

CAT7 4x2x23/1 AWG Solid S/FTP LSZH-SHF1



Application:	Shipboard installations, Maritime Environment, High data rates, Telecom systems, High bandwidth digital applications with low BER, Indoor/Outdoor use, fixed installations, Ships, High speed & Light craft.
Install at:	0°C to + 60 °C, Bend minimum: 20 times O.D.
Operate at:	-30°C to + 75 °C, Bend minimum: 10 times O.D.
Pull maximum:	110 N
Weight:	78 kg/km
Standards:	ISO/IEC 11801 , IEC 61156-1, IEC 61156-5, IEC 60092-350, IEC 60092-360, RoHS-2 2011/65/EU, UL 1581

Design & Construction

Conductor:	Soft annealed bare copper wire
Conductor size:	23 AWG
Insulation:	PE-Foam/skin-PE
Insulation OD:	Normal Ø1.38 ± 0.05 mm
Insulation thickness	0.39mm
Pair:	2 insulated conductors stranded together into a pair
Color code:	1. White/blue + Blue 2. White/orange + Orange 3. White/green + Green 4. White/brown + Brown
Shield pair to pair:	Aluminum Foil-Polyester Tape
Shield pair to pair coverage	100%
Outer shield:	Solid Tinned Copper Braid
Outer shield coverage:	Nom 80%
Outer jacket:	LSZH SHF1
Nominal outer sheath thickness	0.75 ± 0.30 mm
Outer jacket OD:	8.0 ± 0.50 mm
Marking:	YANGER® CAT7 4x2x23/1 AWG Solid S/FTP LSZH-SHF1 <batch no.> <meter marking>
Outer jacket color:	Grey

Environmental properties and Fire Performances

Degree of acidity of gases:	IEC 60754-1/2
Halogen acid gas:	IEC 60754-1/2
Smoke Emission:	IEC 61034-1/2
Flame retardant:	IEC 60332-1-2
UV resistance:	UL 1581
Fire retardant:	IEC 60332-3-22

Electrical characteristics

Resistance of the conductor@20°C:	≤93.8 Ω/km
Insulation resistance:	≥5000 MΩ/km
Average characteristic impedance@100 MHz	100 ± 5 Ω
Transfer impedance:	≤100 mΩ/m @10 MHz
Delay skew (4~100 MHz):	≤25 ns/100 m
Velocity factor:	74%
Conductor resistance unbalance within pair:	≤2.0%
Conductor resistance unbalance between pair:	≤4.0%
capacitance unbalance to earth at 800 Hz or 1000 Hz:	≤160 pF/100 m
Mutual capacitance:	≤56 nF/km

Electrical Properties

Frequency (MHz):	1	4	10	16	20	31.25	62.5	100	200	250	300	600
Attenuation dB/100m (Max.)	_	3.7	5.9	7.4	8.3	10.4	14.9	19.0	27.5	31.0	34.2	50.1
NEXT dB (Min.)	78.0	78.0	78.0	78.0	78.0	78.0	75.5	72.4	67.9	66.4	65.2	60.7
PS-NEXT (Min.)	75.0	75.0	75.0	75.0	75.0	75.0	72.5	69.4	64.9	63.4	62.2	57.7
ELFEXT dB (Min.)	78.0	78.0	75.3	71.2	69.3	65.4	59.4	55.3	49.3	47.3	45.8	38.4
Return Loss dB (Min.)	20.0	23.0	25.0	25.0	25.0	23.6	21.5	20.1	18.0	17.3	17.3	17.3
PSELFEXT (Min.)	75.0	75	72.3	68.2	66.3	62.4	56.4	52.3	46.3	44.3	42.8	35.4

CAT7 4x2x23/7 AWG Stranded S/FTP LSZH-SHF1

Application: Shipboard installations, Maritime Environment, High data rates, Telecom systems, High bandwidth digital applications with low BER, Indoor/Outdoor use, fixed installations, Ships, High speed & Light craft.
Install at: 0°C to + 60 °C, Bend minimum: 20 times O.D.
Operate at: -30°C to + 75 °C, Bend minimum: 10 times O.D.
Pull maximum: 110 N
Weight: 80 kg/km
Standards: ISO/IEC 11801 , IEC 61156-1, IEC 61156-5, IEC 60092-350, IEC 60092-360, RoHS-2 2011/65/EU

Design & Construction

Conductor: Stranded Bare copper wire
Conductor size: 23 AWG
Insulation: PE-Foam/skin-PE
Insulation OD: Normal Ø1.41 ± 0.05 mm
Insulation thickness 0.39 mm
Pair: 2 insulated conductors stranded together into a pair
Color code: 1. White/blue + Blue 2. White/orange + Orange
3. White/green + Green 4. White/brown + Brown
Shield pair to pair: Aluminum Foil-Polyester Tape
Shield pair to pair coverage 100%
Outer shield: Solid Tinned Copper Braid
Outer shield coverage: Nom 80%
Outer jacket: LSZH SHF1
Nominal outer sheath thickness 0.75 ± 0.30 mm
Outer jacket OD: 8.4 ± 0.50 mm
Marking: YANGER® CAT7 4x2x23/7 AWG Stranded S/FTP LSZH-SHF1 <batch no.> <meter marking>
Outer jacket color: Grey

Environmental properties and Fire Performances

Degree of acidity of gases: IEC 60754-1/2
Halogen acid gas: IEC 60754-1/2
Smoke emission: IEC 61034-1/2
Flame retardant: IEC 60332-1-2
UV resistance: UL 1581
Fire retardant: IEC 60332-3-22

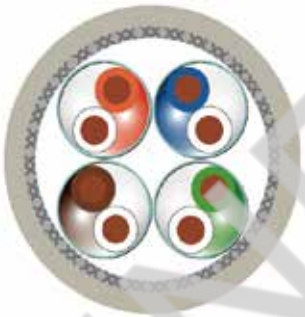
Electrical characteristics

Resistance of the conductor@20°C: ≤95.0 Ω/km
Insulation resistance: ≥5000 MΩ/km
Average characteristic impedance @100 MHz: 100 ± 5 Ω
Transfer impedance: ≤100 mΩ/m @10 MHz
Delay skew (4~100 MHz): ≤25 ns/100 m
Velocity factor: 74%
Conductor resistance unbalance within pair: ≤2.0%
Conductor resistance unbalance between pair: ≤4.0%
capacitance unbalance to earth at 800 Hz or 1000 Hz: ≤160 pF/100 m
Mutual capacitance: ≤56 nF/km

Electrical Properties

Frequency (MHz):	1	4	10	16	20	31.25	62.5	100	200	250	300	600
Attenuation dB/100m (Max.)	_	3.7	5.9	7.4	8.3	10.4	14.9	19.0	27.5	31.0	34.2	50.1
NEXT dB (Min.)	78.0	78.0	78.0	78.0	78.0	78.0	75.5	72.4	67.9	66.4	65.2	60.7
PS-NEXT (Min.)	75.0	75.0	75.0	75.0	75.0	75.0	72.5	69.4	64.9	63.4	62.2	57.7
ELFEXT dB (Min.)	78.0	78.0	75.3	71.2	69.3	65.4	59.4	55.3	49.3	47.3	45.8	38.4
Return Loss dB (Min.)	20.0	23.0	25.0	25.0	25.0	23.6	21.5	20.1	18.0	17.3	17.3	17.3
PSELFEXT (Min.)	75.0	75	72.3	68.2	66.3	62.4	56.4	52.3	46.3	44.3	42.8	35.4

CAT7A 4x2x23/1 AWG Solid S/FTP LSZH-SHF1



Application:	Shipboard installations, Maritime Environment, High data rates, Telecom systems, High bandwidth digital applications with low BER, Indoor/Outdoor use, fixed installations, Ships, High speed & Light craft.
Install at:	0°C to + 60 °C, Bend minimum: 20 times O.D.
Operate at:	-30°C to + 75 °C, Bend minimum: 10 times O.D.
Pull maximum:	110 N
Weight:	81 kg/km
Standards:	ISO/IEC 11801 , IEC 61156-1, IEC 61156-5, IEC 60092-350, IEC 60092-360, RoHS-2 2011/65/EU, UL 1581

Design & Construction

Conductor:	Soft annealed bare copper wire
Conductor size:	23 AWG
Insulation:	PE-Foam
Insulation OD:	Normal Ø1.38 ± 0.05 mm
Insulation thickness	0.39 mm
Pair:	2 insulated conductors stranded together into a pair
Color code:	1. White/blue + Blue 2. White/orange + Orange 3. White/green + Green 4. White/brown + Brown
Shield pair to pair:	Aluminum Foil-Polyester Tape
Shield pair to pair coverage	100%
Outer shield:	Solid Tinned Copper Braid
Outer shield coverage:	Nom 80%
Outer jacket:	LSZH SHF1
Nominal outer sheath thickness:	0.75 ± 0.30 mm
Outer jacket OD:	8.4 ± 0.50 mm
Marking:	YANGER® CAT7A 4x2x23/1 AWG Solid S/FTP LSZH-SHF1 <batch no.> <meter marking>
Outer jacket color:	Grey

Environmental properties and Fire Performances

Degree of acidity of gases:	IEC 60754-1/2
Halogen acid gas:	IEC 60754-1/2
Smoke emission:	IEC 61034-1/2
Flame retardant:	IEC 60332-1-2
UV resistance	UL 1581
Fire retardant:	IEC 60332-3-22

Electrical characteristics

Resistance of the conductor@20°C:	≤93.8 Ω/km
Insulation resistance:	≥5000 MΩ/km
Average characteristic impedance @100 MHz:	100 ± 5 Ω
Transfer impedance:	≤100 mΩ/m @10 MHz
Delay skew (4~100 MHz):	≤25 ns/100 m
Velocity factor:	74%
Conductor resistance unbalance within pair:	≤2.0%
Conductor resistance unbalance between pair:	≤4.0%
capacitance unbalance to earth at 800Hz or 1000Hz:	≤160 pF/100 m
Mutual capacitance:	≤56 nF/km

Electrical Properties

Frequency (MHz):	1	4	10	16	20	31.25	62.5	100	200	250	300	500	600	1000
Attenuation dB/100m (Max.)	_	3.7	5.8	7.3	8.2	10.3	14.6	18.5	26.5	29.7	32.7	42.8	47.1	61.9
NEXT dB (Min.)	78.0	78.0	78.0	78.0	78.0	78.0	78.0	75.4	70.9	69.4	68.2	64.9	63.7	60.4
PS-NEXT (Min.)	75.0	75.0	75.0	75.0	75.0	75.0	75.0	72.4	67.9	66.4	65.2	61.9	60.7	57.4
Return Loss dB (Min.)	20.0	23.0	25.0	25.0	25.0	23.6	21.5	20.1	18.0	17.3	17.3	17.3	17.3	15.1

Part 2
COAXIAL CABLE

RG6 Coaxial Cable LSZH-SHF1

Application: Shipboard installations, Maritime Environment, Fixed installations, Indoor & outdoor use, fixed installations, High data rates, Ships, High speed & Light craft.
Outer Jacket: LSZH
Outer Diameter: 7.0 ± 0.20 mm
Weight: 63 kg/km
Standards: IEC 60096-0-1, IEC 60332-1, IEC 60332-3-22 , IEC 60754-1/2, IEC 61034-1/2, UL 1581

Design & Construction

Conductor: Copper clad steel (21%)
Conductor Size: 1.02 ± 0.025 mm
Insulation: Foam Polyethylene
Insulation OD: 4.60 ± 0.15 mm
Foil shield: AL/PET/AL foil, bonded
Braid: Tinned copper wire
Braid Coverage: ≥ 80%
Outer jacket: LSZH SHF1
Outer Jacket OD: 7.0 ± 0.20 mm
Outer Jacket Color: Grey (optional)

Environmental properties and Fire Performances

Temperature Range: -30°C~70°C
Halogen acid gas, Degree of acidity of gases: IEC 60754-1/2
Jacket, Insulation material: IEC 60092-360
Smoke Emission: IEC 61034-1/2
Flame Retardant: IEC 60332-3-22
UV-resistant: UL 1581

Electrical characteristics

Inner Conductor DC resistance: ≤102 Ω/km
Outer Conductor DC resistance: ≤9.0 Ω/km
Capacity: 52 ± 5 pF/m
Characteristic Impedance200MHz: 75 ± 3 Ω

Electrical Properties

Maximum attenuation is 3% higher Nominal attenuation														
Frequency (MHz):	5	55	211	300	500	600	870	1000	1300	1450	1700	2000	2250	3000
Attenuation dB/100 m (Nom.):	1.95	5.25	10.0	11.64	15.29	16.73	20.04	22.0	25.0	26.8	29.5	32.0	34.4	40.4

Return Loss		
Frequency (MHz)	30~1000	1000~3000
Return Loss (dB)	≥20	≥15

RG11 Coaxial Cable LSZH-SHF1

Application: Shipboard installations, Maritime Environment, Fixed installations, Indoor & outdoor use, fixed installations, High data rates, Ships, High speed & Light craft.
Outer Jacket: LSZH
Outer Diameter: 10.3 ± 0.20 mm
Weight: 120 kg/km
Standards: IEC 60096-0-1, IEC 60332-1, IEC 60332-3-22 , IEC 60754-1/2, IEC 61034-1/2, UL 1581

Design & Construction

Conductor:	Bare copper
Conductor Size:	1.63 ± 0.025 mm
Insulation:	Foam Polyethylene
Insulation OD:	7.25 ± 0.15 mm
Foil shield:	AL/PET/AL foil, Bonded
Braid:	Tinned copper wire
Braid Coverage:	≥80%
Outer jacket:	LSZH SHF1
Outer Jacket OD:	10.30 ± 0.20 mm
Outer Jacket Color:	Grey (optional)

Environmental properties and Fire Performances

Temperature Range:	-30°C~70°C
Halogen acid gas, Degree of acidity of gases:	IEC 60754-1/2
Jacket, Insulation material:	IEC 60092-360
Smoke Emission:	IEC 61034-1/2
Flame Retardant:	IEC 60332-3-22
UV-resistant:	UL 1581

Electrical characteristics

Inner Conductor DC resistance:	≤9.0 Ω/km
Outer Conductor DC resistance:	≤9.0 Ω/km
Capacity:	52 ± 5 pF/m
Characteristic Impedance200MHz:	75 ± 3 Ω

Electrical Properties

Maximum attenuation is 3% higher Nominal attenuation																
Frequency (MHz):	5	55	211	270	350	400	500	600	750	870	1000	1450	1750	2050	2250	3000
Attenuation dB/100 m (Nom.):	1.4	3.36	6.90	7.50	8.50	9.10	10.20	11.20	12.70	13.51	15.0	18.50	20.50	22.50	24.0	28.0

Return Loss		
Frequency (MHz)	30~1000	1000~3000
Return Loss (dB)	≥20	≥15

RG59 Coaxial Cable LSZH-SHF1

Application: Shipboard installations, Maritime Environment, Fixed installations, Indoor & outdoor use, fixed installations, High data rates, Ships, High speed & Light craft.
Outer Jacket: LSZH
Outer Diameter: 6.15 ± 0.20 mm
Weight: 50 kg/km
Standards: IEC 60096-0-1, IEC 60332-1, IEC 60332-3-22 , IEC 60754-1/2, IEC 61034-1/2, UL 1581

Design & Construction

Conductor:	Bare copper
Conductor Size:	0.81 ± 0.025 mm
Insulation:	Foam Polyethylene
Insulation OD:	3.71 ± 0.15 mm
Foil shield:	AL/PET/AL foil, bonded
Braid:	Tinned copper wire
Braid Coverage:	≥80%
Outer jacket:	LSZH SHF1
Outer Jacket OD:	6.15 ± 0.20 mm
Outer Jacket Color:	Grey (optional)

Environmental properties and Fire Performances

Temperature Range:	-30°C~70°C
Halogen acid gas, Degree of acidity of gases:	IEC 60754-1/2
Jacket, Insulation material:	IEC 60092-360
Smoke Emission:	IEC 61034-1/2
Flame Retardant:	IEC 60332-3-22
UV-resistant:	UL 1581

Electrical characteristics

Inner Conductor DC resistance:	≤35.7 Ω/km
Outer Conductor DC resistance:	≤11.0 Ω/km
Capacity:	51 ± 5 pF/m
Characteristic Impedance200MHz:	75 ± 3 Ω

Electrical Properties

Maximum attenuation is 3% higher Nominal attenuation											
Frequency (MHz):	5	55	211	300	500	600	870	1000	1450	1750	2050
Attenuation dB/100 m (Nom.):	3.0	6.95	13.1	14.8	19.0	20.8	25.2	27.1	33.1	36.6	39.9

Return Loss			
Frequency (MHz)	5~470	470~1000	1000~2050
Return Loss (dB)	≥20	≥18	≥15

Feeder Cable 1/2" 50 Ω LSZH

Application: Shipboard installations, Maritime Environment, Fixed installations, High data rates. Indoor & outdoor use, Ships, High speed & Light craft. LSZH-SHF2
Outer Jacket: 17 ± 0.20 mm
Outer Diameter: 265 kg/km
Weight: IEC 60096-0-1, IEC 61196-1-100,IEC 60332-1, IEC 60332-3-22 , IEC 60754-1/2, IEC 61034-1/2, UL 1581, IEC 60092-360
Standards:

Design & Construction

Conductor:	Copper coated Al wire
Conductor Size:	4.8 ± 0.05mm
Insulation:	Cellular PE
Insulation OD:	12.1 ± 0.35mm
Screen:	Corrugated Cu-tube
Outer jacket:	SHF2
Outer Jacket OD:	17.0 ± 0.20 mm
Outer Jacket Color:	Black (optional)

Environmental properties and Fire Performances

Temperature Range:	-40°C~70°C
Halogen acid gas, Degree of acidity of gases:	IEC 60754-1/2
Jacket, Insulation material:	IEC 60092-360
Smoke Emission:	IEC 61034-1/2
Flame Retardant:	IEC 60332-3-22
UV-resistant:	UL 1581

Electrical characteristics

Conductor resistance:	≤ 1.6 Ω /km
Screen resistance:	≤ 2.4 Ω /km
Inductance:	0.19 [μH/m]
Peak RF voltage:	1.8 KV
Peak power rating:	32 KW
Insulation resistance:	10G Ω/km
Capacity:	76 pF/m
Impedance:	50 ± 2 Ω
Velocity factor:	88%
Min. bending radius:	60 mm

Electrical Properties

Frequency [MHz]	Nominal attenuation [dB/100m] max.105%	Power rating [kW]
30	1.66	6.9
50	2.01	5.3
88	2.51	4.0
100	2.65	3.7
200	3.58	2.6
300	4.31	2.1
400	4.93	1.8
450	5.1	1.7
500	5.49	1.6
700	6.48	1.3
800	7.10	1.3
900	7.30	1.25
1000	7.78	1.1
1400	9.24	0.9
1800	10.90	0.78
2000	11.50	0.76
2400	12.90	0.66
3000	14.50	0.58
3400	15.50	0.54
6000	21.5	0.39
8000	27.0	0.31

Feeder Cable 7/8" 50 Ω LSZH

Application:	Shipboard installations, Maritime Environment, Fixed installations, High data rates. Indoor & outdoor use, Ships, High speed & Light craft. LSZH-SHF2
Outer Jacket:	30 ± 0.20 mm
Outer Diameter:	470 kg/km
Weight:	IEC 60096-0-1, IEC 61196-1-100,IEC 60332-1, IEC 60332-3-22 , IEC
Standards:	60754-1/2, IEC 61034-1/2, UL 1581, IEC 60092-360

Design & Construction

Conductor:	Cu-tube
Conductor Size:	9.45 ± 0.1 mm
Insulation:	Cellular PE
Insulation OD:	23.2 ± 0.35 mm
Screen:	Corrugated Cu-tube
Outer jacket:	SHF2
Outer Jacket OD:	30.0 ± 0.20 mm
Outer Jacket Color:	Black (optional)

Environmental properties and Fire Performances

Temperature Range:	-40°C - 70°C
Halogen acid gas, Degree of acidity of gases:	IEC 60754-1/2
Jacket, Insulation material:	IEC 60092-360
Smoke Emission:	IEC 61034-1/2
Flame Retardant:	IEC 60332-3-22
UV-resistant:	UL 1581

Electrical characteristics

Conductor resistance:	≤1.3 Ω/km
Screen resistance	≤1.28 Ω/km
Peak RF voltage	3.3 KV
Peak power rating	92 KW
Insulation resistance	10 GΩ/km
Capacity:	74.2 pF/m
Impedance	50 ± 2 Ω
Frequency	Max 5000 MHZ
Velocity factor	88%
Min. bending radius	150 mm
Recommended clamping space	1 m

Electrical Properties

Frequency [MHz]	Nominal attenuation [dB/100m] max.105%	Power rating [kW]
50	0.70	11.0
88	1.00	8.5
100	1.12	8.0
200	1.50	5.6
300	1.90	4.5
450	2.40	3.6
500	2.50	3.4
700	2.95	2.8
800	3.00	2.6
900	3.40	2.5
1000	3.70	2.3
1400	4.45	1.9
1800	5.09	1.7
2000	5.20	1.6
2400	5.90	1.4
3000	6.90	1.2
3400	7.93	1.2
4000	8.50	1.0
5000	9.26	0.9

Part 3
FIBER OPTIC

STANDARD FIBER COLOUR CODE (TABLE A, EIA - TIA 598)

Table A

1 – Blue	7 – Red	13 – Blue (with black ring)	19 – Red (with black ring)
2 – Orange	8 – Black	14 – Orange (with black ring)	20 – Natural (with black ring)
3 – Green	9 – Yellow	15 – Green (with black ring)	21 – Yellow (with black ring)
4 – Brown	10 – Violet	16 – Brown (with black ring)	22 – Violet (with black ring)
5 – Grey	11 – Pink	17 – Grey (with black ring)	23 – Pink (with black ring)
6 – White	12 – Turquoise	18 – White (with black ring)	24 – Turquoise (with black ring)

*Other colours on request

Table B

No. OF FIBRE	STANDARD COLOURS OF LOOSE TUBE (EIA - TIA 598)	
2	1 – Blue (With 2 OF) 2 – Filler 3 – Filler	4 – Filler 5 – Filler 6 – Filler
4	1 – Blue (With 2 OF) 2 – Orange (With 2 OF) 3 – Filler	4 – Filler 5 – Filler 6 – Filler
8	1 – Blue (With 4 OF) 2 – Orange (With 4 OF) 3 – Filler	4 – Filler 5 – Filler 6 – Filler
12	1 – Blue (With 4 OF) 2 – Orange (With 4 OF) 3 – Green (With 4 OF)	4 – Filler 5 – Filler 6 – Filler
24	1 – Blue (With 6 OF) 2 – Orange (With 6 OF) 3 – Green (With 6 OF)	4 – Brown (With 6 OF) 5 – Filler 6 – Filler
48	1 – Blue (With 12 OF) 2 – Orange (With 12 OF) 3 – Green (With 12 OF)	4 – Brown (With 12 OF) 5 – Filler 6 – Filler
60	1 – Blue (With 12 OF) 2 – Orange (With 12 OF) 3 – Green (With 12 OF)	4 – Brown (With 12 OF) 5 – Grey (with 12 OF) 6 – Filler
72	1 – Blue (With 12 OF) 2 – Orange (With 12 OF) 3 – Green (With 12 OF)	4 – Brown (With 12 OF) 5 – Grey (with 12 OF) 6 – White (with 12 OF)

*Other colours on request

Table C

STANDARD TIGHT COLOUR CODE (EIA - TIA 598)			
1 – Blue	7 – Red	13 – Blue (with black ring)	19 – Red (with black ring)
2 – Orange	8 – Black	14 – Orange (with black ring)	20 – Natural (with black ring)
3 – Green	9 – Yellow	15 – Green (with black ring)	21 – Yellow (with black ring)
4 – Brown	10 – Violet	16 – Brown (with black ring)	22 – Violet (with black ring)
5 – Grey	11 – Pink	17 – Grey (with black ring)	23 – Pink (with black ring)
6 – White	12 – Turquoise	18 – White (with black ring)	24 – Turquoise (with black ring)

*Other colours on request

Part Number F-M-YY-A-O-XX-S -F-ZZ

F: Optical Fiber
M: Type of fiber
YY: Tight buffer or loose tube
A: Armor
O: Outer Jacket
XX: Number of fibers
S: Strengthen Element
F: Fire Property
ZZ: Sheath Color

M	Type of Fiber	YY	Tight Buffer or Loose Tube	A	Armor	O	Outer Jacket	S	Strengthen Element	F	Fire Property	ZZ	Sheath Color
1	SM/ITU-T G652D	AI	Tight buffer	null	Unarmored	I	SHF1	null	No Strengthen Element	null	Flame Retardant	BK	Black
2	SM/ITU-T G657A1	QF	Loose tube	C	① Galvanized Steel Wire Braid	U	SHF2	F	Dielectric	F	Fire Resistant	RD	Red
3	SM/ITU-T G657A2			C	② Corrugated Steel Tape	B	SHF2 MUD	G	Heavy Metallic			GR	Gray
4	SM/ITU-T G657B3			O	Tinned Copper Wire Braid	V	PVC	H	Heavy Dielectric			OR	Orange
5	OM1			A	Dielectric	R	PUR	M	Metallic			BL	Blue
6	OM2											GN	Green
7	OM3											BR	Brown
8	OM4											PU	Purple

AICI
Tight buffered, metallic armored fiber optic cable

Application: Optical fiber cable for industry environments. The cable is suitable for both indoor and outdoor use. Continuous submergence in water is not recommended. Outer sheath of UV-oil- and weather resistant material. The 0.9mm tight buffer is enforced by water block glass yarn and encased within a inner jacket. A metallic armor is applied over the inner sheath and an outer jacket completes the overall cable design. Good mechanical and environmental performance, high capacity data communication transmission. Small diameter, multi core number, high compressive, light weight, convenient operation, simple construction, conducive to the comprehensive wiring.

Standards: IEC 60794, IEC 60754-1/2, IEC 60092-360 , IEC 61034-1/2, UL 1581, IEC 60811, IEC 60332-3-22

Design & Construction

Fibers: Tight-buffered 0.9 mm
Bedding: Water blocking material
Color code: Individually colored fibers
Inner-jacket: SHF1
Armor: Alt.1: Galvanized steel wire braid – GSWB
Alt.2: Corrugated steel tape
Outer jacket: SHF1
Outer jacket color: Black (As per request)

Environmental properties and Fire Performances

Halogen acid gas, degree of acidity of gases: IEC 60754-1/2
Jacket, insulation material: IEC 60092-360
Smoke emission: IEC 61034-1/2
Fire retardant: IEC 60332-3-22
Oil resistance: IEC 60811
UV-resistant: UL 1581

Mechanical environmental performance

Bending radius (N/10cm)-Long-term: 15D, 25D (Corrugated armor)
Bending radius (N/10cm)-Short-term: 10D, 15D (Corrugated armor)
Temperature (°C)-Operation: -40°C~70°C (SHF1)
Temperature (°C)-Installation: -10°C~70°C
UV-Resistant: Yes

Mechanical Property

No. of fiber	Inner sheath OD (mm)	Outer sheath OD (mm)	Tensile (N)	Crush (N/10cm)	Cable weight (kg.km)
4	4.8 ± 0.2	8.5 ± 0.5	700	2000	100
8	5.0 ± 0.3	9.5 ± 0.5	800		122
12	5.5 ± 0.4	10.5 ± 0.5	1200		146
24	7.5 ± 0.5	12.0 ± 0.5	1700		183

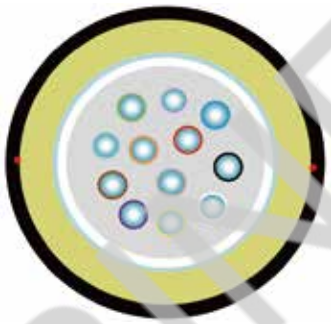
Transmission Property

Standard Designation				Maximum Attenuation (dB/km)					Fiber Diameter (μm)	OFL Bandwidth		EMB at 850nm (MHz·km)
IEC 60793-2-50	IEC 60793-2-10	IEC 11801	ITU-T	850 nm	1300 nm	1310 nm	1550 nm	1625 nm		850 nm (MHz·km)	1350 nm (MHz·km)	
B1.3	—	OS2	G652D	—	—	0.4	0.3	0.25	8.6-9.5	—	—	—
B6_a1	—	—	G657A1	—	—	0.4	0.3	0.25	8.6-9.5	—	—	—
B6_a2	—	—	G657A2	—	—	0.35	0.25	0.25	8.2-9.0	—	—	—
B6_b3	—	—	G657B3	—	—	0.35	0.25	0.35	8.0-8.8	—	—	—
—	A1a.3	OM4	—	3.2	1.2	—	—	—	50±2.5	≥3500	≥500	500
—	A1a.2	OM3	—	3	1	—	—	—	50±2.5	≥1500	≥500	2000
—	A1a.1	OM2	—	3	1	—	—	—	50±2.5	≥500	≥500	4700
—	A1b	OM1	—	3.2	1.2	—	—	—	62.5±2.5	≥200	≥500	200

QFAI
Loose tube dielectric armored fiber optic cable

Application: The cable is suitable for the oil and offshore industry and other harsh environments. Outer sheath of UV-and weather resistant material. Color-coded optical fibers contained in loose tube. This tube is filled with gel to prevent the ingress of water, a mica tape is wrapped over the loose tube for fire protection condition. A water blocking dielectric armor is applied and an outer jacket completes the overall cable design. Good mechanical and environmental performance, high capacity data communication transmission.

Standards: IEC 60794, IEC 60754-1/2, IEC 60092-360 , IEC 61034-1/2, UL 1581, IEC 60332-3-22, IEC 60811, IEC 60331-25



Design & Construction

Fibers:	Loose tube
loose tube diameter:	Φ2.8 mm up to 12 fibers Normal Φ3.5 mm above 12 fibers
Color code:	Individually colored fibers
Fire resistant layer(Option) :	Mica Tape
Armor:	Glass Yarn
Outer jacket:	SHF1
Outer jacket color:	Black (As per request)

Environmental properties and Fire Performances

Halogen acid gas, degree of acidity of gases:	IEC 60754-1/2
Jacket, Insulation material:	IEC 60092-360
Smoke emission:	IEC 61034-1/2
Flame retardant:	IEC 60332-3-22
Oil resistance	IEC 60811
Fire resistant:	IEC 60331-25
UV-resistant:	UL 1581

Mechanical environmental performance

Bending radius(N/10cm)-Long-term:	15 D
Bending radius(N/10cm)-Short-term:	10 D
Temperature(°C)-Operation:	-40°C~70°C (SHF1)
Temperature(°C)-Installation:	-10°C~60°C
UV-resistant:	Yes

Mechanical Property

No. of fiber	Inner sheath OD (mm)	Tensile (N)	Crush (N/10cm)	Cable weight (kg.km)
4	8.8 ± 0. 5	2000	3000	55
8				
12				
24	9.5 ± 0. 5			71

Transmission Property

Standard Designation				Maximum Attenuation (dB/km)					Fiber Diameter (μm)	OFL Bandwidth		EMB at850 nm (MHz·km)
IEC 60793-2-50	IEC 60793-2-10	IEC 11801	ITU-T	850 nm	1300 nm	1310 nm	1550 nm	1625 nm		850 nm (MHz·km)	1350 nm (MHz·km)	
B1.3	—	OS2	G652D	—	—	0.4	0.3	0.25	8.6-9.5	—	—	—
B6_a1	—	—	G657A1	—	—	0.4	0.3	0.25	8.6-9.5	—	—	—
B6_a2	—	—	G657A2	—	—	0.35	0.25	0.25	8.2-9.0	—	—	—
B6_b3	—	—	G657B3	—	—	0.35	0.25	0.35	8.0-8.8	—	—	—
—	A1a.3	OM4	—	3.2	1.2	—	—	—	50±2.5	≥3500	≥500	500
—	A1a.2	OM3	—	3	1	—	—	—	50±2.5	≥1500	≥500	2000
—	A1a.1	OM2	—	3	1	—	—	—	50±2.5	≥500	≥500	4700
—	A1b	OM1	—	3.2	1.2	—	—	—	62.5±2.5	≥200	≥500	200

QFCI
Single loose tube metallic armored fiber optic cable

Application: The cable is suitable for the oil and offshore industry and other harsh environments. Outer sheath of UV-and weather resistant material. Color-coded optical fibers contained in loose tube. This tube is filled with gel to prevent the ingress of water, and a mica tape is wrapped over the loose tube for fire protection condition, reinforced and protected by water blocking glass strength yarns and encased within an inner jacket A metallic armor is applied over the inner jacket and an outer jacket completes the overall cable design. Good mechanical and environmental performance, high capacity data communication transmission.

Standards: IEC 60794, IEC 60754-1/2, IEC 60092-360 , IEC 61034-1/2, IEC 60331-25, UL 1581, IEC 60811, IEC 60332-3-22

Design & Construction

Fibers:	Loose tube
loose tube diameter:	Normal Φ2.8 mm up to 12 fibers
Color code:	Normal Φ3.5 mm above 12 fibers
Fire resistant layer (Option):	Individually colored fibers
Peripheral strength element:	Mica Tape
Inner jacket:	Water blocking yarn
Armor:	SHF1
Outer jacket:	Alt.1: Galvanized steel wire braid – GSWB
Outer Jacket Color:	Alt.2: Corrugated steel tape

Environmental properties and Fire Performances

Halogen acid gas, degree of acidity of gases:	IEC 60754-1/2
Jacket, insulation material:	IEC 60092-360
Smoke emission:	IEC 61034-1/2
Flame retardant:	IEC 60332-3-22
Oil resistance	IEC 60811
Fire resistant:	IEC 60331-25
UV-resistant:	UL 1581

Mechanical environmental performance

Bending radius(N/10cm)-Long-term:	20D, 25D (Corrugated armor)
Bending radius(N/10cm)-Short-term:	15D, 15D (Corrugated armor)
Temperature(°C)-Operation:	-40°C~70°C (SHF1)
Temperature(°C)-Installation:	-10°C~60°C
UV-resistant:	Yes

Mechanical Property

No. of fiber	Outer sheath OD (mm)	Tensile (N)	Crush (N/10 cm)	Cable weight (kg.km)
4	Φ10.5 ± 0.5	2000	3000	124
6				
8				
12				
24	12.0±0.5			135

Transmission Property

Standard Designation				Maximum Attenuation (dB/km)					Fiber Diameter (μm)	OFL Bandwidth		EMB at850 nm (MHz·km)
IEC 60793-2-50	IEC 60793-2-10	IEC 11801	ITU-T	850 nm	1300 nm	1310 nm	1550 nm	1625 nm		850 nm (MHz·km)	1350 nm (MHz·km)	
B1.3	—	OS2	G652D	—	—	0.4	0.3	0.25	8.6-9.5	—	—	—
B6_a1	—	—	G657A1	—	—	0.4	0.3	0.25	8.6-9.5	—	—	—
B6_a2	—	—	G657A2	—	—	0.35	0.25	0.25	8.2-9.0	—	—	—
B6_b3	—	—	G657B3	—	—	0.35	0.25	0.35	8.0-8.8	—	—	—
—	A1a.3	OM4	—	3.2	1.2	—	—	—	50±2.5	≥3500	≥500	500
—	A1a.2	OM3	—	3	1	—	—	—	50±2.5	≥1500	≥500	2000
—	A1a.1	OM2	—	3	1	—	—	—	50±2.5	≥500	≥500	4700
—	A1b	OM1	—	3.2	1.2	—	—	—	62.5±2.5	≥200	≥500	200

QFCI/B
Multi loose tube metallic armored fiber optic cable

Application: The cable is suitable for the oil and offshore industry and other harsh environments. Outer sheath of UV-and weather resistant material. Color-coded optical fibers contained in color-coded loose tube. This tube is filled with gel to prevent the ingress of water and a mica tape is wrapped over each loose tube for fire protection condition. The loose tubes stranded around a central strength member to ensure optimum performance and long life. A metallic armor is applied over the inner jacket and an outer jacket completes the overall cable design. Good mechanical and environmental performance, high capacity data communication transmission.

Standards: IEC 60794, IEC 60754-1/2, IEC 60092-360 , IEC 61034-1/2, UL 1581, IEC 60811, IEC 60332-3-22, IEC 60331-25, NEK 606

Design & Construction

Fiber:	Loose tube
Strength member:	Centre steel wire or dielectric central core
loose tube diameter:	Normal Φ2.2 mm
Color code:	Individually colored fibers
Fire resistant layer(Option):	Mica tape
Peripheral strength element:	Water blocking yarn, when necessary
Inner jacket:	SHF1
Armor:	Alt.1: Galvanized steel wire braid – GSWB Alt.2: Corrugated steel tape
Outer jacket:	QFCI: GSWB or Corrugated steel tape + SHF1 QFCB: GSWB or Corrugated steel tape + SHF2-MUD
Outer jacket color:	Black (As per request)

Environmental properties and Fire Performances

Halogen acid gas, degree of acidity of gases:	IEC 60754-1/2
Jacket, insulation material:	IEC 60092-360
Smoke emission:	IEC 61034-1/2
Flame retardant:	IEC 60332-3-22
Oil resistance:	IEC 60811
Mud resistance:	NEK 606
Fire resistant:	IEC 60331-25
UV-resistant:	UL 1581

Mechanical environmental performance

Bending radius (N/10cm)-Long-term:	20D, 25D (Corrugated armor)
Bending radius (N/10cm)-Short-term:	15D, 15D (Corrugated armor)
Temperature (°C)-Operation:	-40°C~70°C (SHF1)
Temperature (°C)-Installation:	-40°C~80°C (SHF2, SHF2 MUD)
UV-resistant:	-10°C~60°C

Mechanical Property

No. of fiber	No. of tubes x fibers per tube +Fillers	Inner sheath OD (mm)	Outer sheath OD (mm)	Tensile (N)	Crush (N/10 cm)	Cable weight (kg.km)
4	2x2+2	10.1 ± 0.5	13.5 ± 0.5	2000	3000	260
8	2x4+4					
12	3x4+3					
24	4x6+2					
48	4x12+2					

Transmission Property

Standard Designation				Maximum Attenuation (dB/km)					Fiber Diameter (μm)	OFL Bandwidth		EMB at850 nm (MHz·km)
IEC 60793-2-50	IEC 60793-2-10	IEC 11801	ITU-T	850 nm	1300 nm	1310 nm	1550 nm	1625 nm		850 nm (MHz·km)	1350 nm (MHz·km)	
B1.3	—	OS2	G652D	—	—	0.4	0.3	0.25	8.6-9.5	—	—	—
B6_a1	—	—	G657A1	—	—	0.4	0.3	0.25	8.6-9.5	—	—	—
B6_a2	—	—	G657A2	—	—	0.35	0.25	0.25	8.2-9.0	—	—	—
B6_b3	—	—	G657B3	—	—	0.35	0.25	0.35	8.0-8.8	—	—	—
—	A1a.3	OM4	—	3.2	1.2	—	—	—	50±2.5	≥3500	≥500	500
—	A1a.2	OM3	—	3	1	—	—	—	50±2.5	≥1500	≥500	2000
—	A1a.1	OM2	—	3	1	—	—	—	50±2.5	≥500	≥500	4700
—	A1b	OM1	—	3.2	1.2	—	—	—	62.5±2.5	≥200	≥500	200

Part 4
BUS CABLE

CanBus S/FTP LSZH-SHF1

Application: Shipboard installations, Maritime Environment, Fixed or portable installations, Indoor/outdoor use, fixed installations, High data rates, Ships, High speed & Light craft. CAN Bus communication.
Outer Jacket: LSZH
Outer Diameter: 10.5 ± 0.20 mm for 1 Pair, 12.0 ± 0.20 mm for 2 Pairs, 16.0 ± 0.20 for 4 Pairs
Weight: 110 kg/km for 1 Pair, 160 kg/km for 2 Pairs, 235 kg/km for 4 Pairs
Standards: IEC 60092-1, IEC 60332-3-22 , IEC 60754-1/2, IEC 61034-1/2, IEC 60794, IEC 60092-360

Design & Construction

Conductor:	Stranded Tinned copper with 1 Pair, 2 Pairs, 4 Pairs
Conductor Size:	0.75 mm^2
Insulation:	Foam Polyethylene
Insulation OD:	3.5 ± 0.3 mm
Conductor Color Code:	White X Blue, White X Orange, White X Green, White X Brown
Foil shield between pairs:	Aluminum/Polyester Foil
Braid:	Tinned copper wire
Braid Coverage:	≥80%
Outer jacket:	LSZH SHF1
Jacket Thickness:	1.1 mm (Nom)
Outer Jacket OD:	10.5 ± 0.20 mm for 1 Pair, 12.0 ± 0.20 mm for 2 Pairs, 16.0 ± 0.20 for 4 Pairs
Outer Jacket Color:	Purple (optional)

Environmental properties and Fire Performances

Halogen acid gas, Degree of acidity of gases:	IEC 60754-1/2
Jacket, Insulation material:	IEC 60092-360
Smoke Emission:	IEC 61034-1/2
Flame Retardant:	IEC 60332-3-22
UV-resistant:	UL 1581

Electrical characteristics

Impedance:	120 Ω
DC Resistance:	26 Ω/Km max. @ 20°C
Capacitance:	38.0 PF/m
Velocity of Propagation:	75% (nom)
Operating Temperature:	-35°C~80°C
UV Resistance:	Yes

Electrical Properties

Frequency (MHz):	0.1	1	5	10	20
Attenuation dB/100m (Nom.):	0.4	1	2.6	3.8	5.5

CanBus S/FTP LSZH-SHF1- Fire Resistant

Application:	Shipboard installations, Maritime Environment, Fixed or portable installations, Indoor/outdoor use, fixed installations, High data rates, Ships, High speed & Light craft. CAN Bus communication.
Outer Jacket:	LSZH
Outer Diameter:	10.5 ± 0.20 mm for 1 Pair, 12.0 ± 0.20 mm for 2 Pairs, 16.0 ± 0.20 for 4 Pairs
Weight:	110 kg/km for 1 Pair, 160 kg/km for 2 Pairs, 235 kg/km for 4 Pairs
Standards:	IEC 60092-1, IEC 60332-3-22, IEC 60331, IEC 60754-1/2, IEC 61034-1/2, IEC 60092-360, UL 1581

Design & Construction

Conductor:	Stranded Tinned copper with 1 Pair, 2 Pairs, 4 Pairs
Conductor Size:	0.75 mm^2
Insulation:	Foam Polyethylene + Fire Resistant Tape
Insulation OD:	3.5 ± 0.3mm
Conductor Color Code:	White X Blue, White X Orange, White X Green, White X Brown
Foil shield between pairs:	Aluminum/Polyester Foil
Braid:	Tinned copper wire
Braid Coverage:	≥80%
Outer jacket:	LSZH SHF1
Jacket Thickness:	1.1 mm (Nom)
Outer Jacket OD:	10.5 ± 0.20 mm for 1 Pair, 12.0 ± 0.20 mm for 2 Pairs, 16.0 ± 0.20 for 4 Pairs
Outer Jacket Color:	Purple (optional)

Environmental properties and Fire Performances

Halogen acid gas, Degree of acidity of gases:	IEC 60754-1/2
Jacket, Insulation material:	IEC 60092-360
Smoke Emission:	IEC 61034-1/2
Fire Resistany:	IEC 60331
Flame Retardant:	IEC 60332-3-22
UV-resistant:	UL 1581

Electrical characteristics

Impedance:	120 Ω
DC Resistance:	26 Ω/Km max. @ 20°C
Capacitance:	38.0 PF/m
Velocity of Propagation:	75% (nom)
Operating Temperature:	-35°C~80°C
UV Resistance:	Yes

Electrical Properties

Frequency (MHz):	0.1	1	5	10	20
Attenuation dB/100m (Nom.):	0.4	1	2.6	3.8	5.5

ProfiBus PA LSZH-SHF1

Application:	Shipboard and offshore installations, Maritime Environment, fixed installations, High data rates, Ships, High speed & Light craft. Profibus PA industrial communication, ISA/SP-50 Fieldbus* Type A, Harsh Environments. UV resistant.
Outer Jacket :	LSZH
Outer Diameter:	9.4 ± 0.20 mm
Weight:	120 kg/km
Standards:	IEC 61158-2, IEC 60092-360 IEC 60332-3, IEC 60754-1/2, IEC 61034-1/2
Bending Radius	8D

Design & Construction

Conductor:	Stranded tinned Copper AWG 18/7 (0.8 mm²)
Conductor Size:	1.05 mm/7 x 0.4 mm
Insulation:	Foam Polyethylene
Insulation OD:	3.20 ± 0.15 mm
Conductor Color Code:	Green & Red
Foil shield:	Aluminum/Polyester Foil
Braid:	Tinned copper wire
Braid Coverage:	≥80%
Outer jacket:	LSZH SHF1
Jacket Thickness:	1.3 mm (Nom)
Outer Jacket OD:	9.4 ± 0.20 mm
Outer Jacket Color:	Black (optional)

Environmental properties and Fire Performances

Halogen acid gas, Degree of acidity of gases:	IEC 60754-1/2
Jacket, Insulation material:	IEC 60092-360
Smoke Emission:	IEC 61034-1/2
Flame retardant:	IEC 60332-3-22
UV Resistance:	UL 1581

Electrical characteristics

Impedance:	100 Ω
Conductor Resistance:	≤23 Ω/km
Attenuation:	≤0.3 dB/100 m @ 39 kHz
Capacitance:	48.0 PF/m
UV Resistance:	Yes
Voltage Rating:	300 V
Operating Temperature:	-35°C~80°C
Insulation resistance:	≥1 GΩ/km

ProfiBus DP LSZH-SHF1

Application:	Shipboard and offshore installations, Maritime Environment, fixed installations, High data rates, Ships, High speed & Light craft. ProfiBus DP LAN, Harsh Environments, UV resistant.
Outer Jacket :	LSZH
Outer Diameter:	8.4 ± 0.20 mm for 1 Pair, 9.5 ± 0.20 mm for 2 Pairs
Weight:	91 kg/km for 1Pair, 140 kg for 2 Pairs
Standards:	IEC 61158-2, IEC 60092-360 IEC 60332-3 , IEC 60754-1/2, IEC 61034-1/2
Bending Radius:	8D

Design & Construction

Conductor:	Stranded tinned Copper AWG 22/7 (0.35 mm²), 1 Pair and 2 Pairs
Conductor structure:	7 x 0.25 mm
Insulation:	Foam Polyethylene
Insulation OD:	2.60 ± 0.15 mm
Conductor Color Code:	Green & Red, Blue & Brown
Foil shield:	Aluminum/Polyester Foil
Braid:	Tinned copper wire
Braid Coverage:	≥80%
Outer jacket:	LSZH SHF1
Jacket Thickness:	1.3mm (Nom)
Outer Jacket OD:	8.4 ± 0.20 mm for 1 Pair, 9.5 ± 0.20 mm for 2 Pairs
Outer Jacket Color:	Purple (optional)

Environmental properties and Fire Performances

Halogen acid gas, Degree of acidity of gases:	IEC 60754-1/2
Jacket, Insulation material:	IEC 60092-360
Smoke Emission:	IEC 61034-1/2
Flame retardant:	IEC 60332-3-22
UV Resistance:	UL 1581

Electrical characteristics

Impedance:	150 Ω
Attenuation:	45 dB/Km max.@16.0 MHz
Capacitance:	28.0 PF/m
UV Resistance:	Yes
Voltage Rating:	300 V
Operating Temperature:	-35°C~80°C

Electrical Properties

Frequency (MHz):	1	4	16
Attenuation dB/km (Nom.):	3	22	45

RS485/422 SFTP LSZH-SHF1

Application: Shipboard installations, Maritime Environment, Fixed or portable installations, fixed installations, Industrial communication high data rates, Ships, High speed & Light craft. RS422 RS485.
Outer Jacket : LSZH
Outer Diameter: 7.0 ± 0.20 mm for 1 pair, 11.0 ± 0.20 mm for 2 Pairs, 11.5 ± 0.20 mm for 4 pairs
Weight: 65 kg/km for 1 pair, 110 kg/km for 2 pairs, 120 kg/km for 4 pairs
Standards: IEC 61158-2, IEC 60092-360 IEC 60332-3 , IEC 60754-1/2, IEC 61034-1/2, IEC 60331-23
Bending Radius 8D

Design & Construction

Conductor: Stranded tinned Copper AWG 22/7 (0.35 mm²), 1 Pair, 2 Pairs, 4 Pairs
Conductor Structure: 7/0.25 ± 0.01 mm
Insulation: Foam Polyethylene
Insulation OD: 2.13 ± 0.15 mm
Fire Barrier Mica tape (Option)
Conductor Color Code: White X Blue, White X Orange, White X Green, White X Brown
Foil shield: Aluminum/Polyester Foil
Braid: Tinned copper wire
Braid Coverage: ≥80%
Outer jacket: LSZH SHF1
Outer Jacket OD: 7.0 ± 0.20 mm for 1 pair, 10.5 ± 0.20 mm for 2 Pairs, 11.5 ± 0.20 mm for 4 pairs
Outer Jacket Color: Purple (optional)

Environmental properties and Fire Performances

Halogen acid gas, Degree of acidity of gases: IEC 60754-1/2
Jacket, Insulation material: IEC 60092-360
Smoke Emission: IEC 61034-1/2
Flame retardant: IEC 60332-3-22
Fire resistant: IEC 60331-23
UV resistant: UL1581

Electrical characteristics

Impedance: 120 Ω
DC Resistance: 55 Ω/Km max. @ 20°C
Capacitance: 35.0 PF/m
Resistance unbalance: ≤5%
Voltage Rating: 300 V
Operating Temperature: -30°C~75°C
UV Resistance: Yes

Electrical Properties

Frequency (MHz):	1	10	100	200	500	1000
Pairs	1pair	1pair	2 pairs, 4pairs			
Attenuation dB/100m (Nom.)	1.7	5.0	0.55	0.80	1.2	1.8

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