

OPTICAL CABLE FOR RAILWAY COMMUNICATION



A FORTUNE 500 COMPANY SUMC GROUP

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As an important tool to ensure driving safety, realize information transmission and improve transportation efficiency, the railway communication network is constantly innovated along with the rapid development of modern railway technology. The main network of railway communication network is mostly composed of optical cable, so the structural design of special communication optical cable suitable for railway communication system is particularly important.

Compared with the conventional laying environment, the railway communication system has significant differences. The track often span thousands of kilometers, often facing the special laying environment of mountains, rivers, lakes, jungle, canyons and other on, and the optical cable buried near the track needs to withstand the sustained vibration caused by train operation. To sum up, the optical cable for railway communication needs to be designed according to local conditions to deal with complex and changeable use scenarios. The Company designs the following 6 kinds of optical cables according to the harsh environment in the railway communication system:

Navigate SIE owns two production bases with overall floorage of 78000 m². We have achieved annual fiber production capacity of 45 million Km* F to produce all range of cables. We have been deeply involved in optical communications for more than 30 years, and have strong optical fiber and cable design and production capabilities. The product performance ranks among the top in the world and our products are exported to many countries.



OPTICAL CABLE For Railway System

SPACEFLUX Yellow

Dimensions and Properties

Optical cable structure and performance parameters

General

Excellent production technology creates optical cables suitable for railway system



Duct, Direct buried

Characteristic

- > The semi-dry structure with single-armor and double-sheaths gives the optical cable excellent crush resistance. The semi-dry structure is convenient for construction, and the steel tape structure can be effectively rodent protected;
- > Excellent excess length control technology makes the optical cable possess excellent temperature performance;
- > HDPE sheath material with superb performance endows the optical cable with excellent properties of abrasion resistance and anti-vibration
- > Suitable for duct and direct-buried environments of railway communication systems.

Application

Suitable for duct and direct-buried environments of railway communication systems.

Physical	Fiber type	G652D
	Fiber count	288
	No. of fibers per tube	12
	Stranding no. tube/filler	9-0/15-0
	Inner sheath thickness	1.0mm(min. 0.8mm)
	Outer sheath thickness	2.0mm
	Cable D(±0.5mm)	21.3mm
	Cable weight (±15%)	350kg/km
	Operation temperature range	-40 °C to + 70 °C
	Installation temperature range	-20 °C to + 60 °C
	Transport and storage temperature range	-40 °C to + 70 °C
Droportion	Max. tensile load (installation)	2700N
Properties	Operation load	900N
	Crush resistance	4000N/10cm
	Minimal installation bending radius	25*D
	Minimal operation bending radius	12.5*D

*Note: D =cable diameter:

The nominal\minimum thickness of the outer jacket is 2.0mm\1.7mm.

Standards

IEC 60794-3-10 Outdoor cables- family specification for duct and directly buried optical telecommunication cable RoHS 2011/65/EU Restricting the use of certain hazardous substances in electrical and electronic equipment DIN EN 50125-3 Railway applications Environmental conditions for equipment Part3: Environmental conditions for signaling and telecommunicationfacilities DIN EN 13501-6 Classification with the results from the fire behavior tests of powercables and wires, control





SPACEFLUX GREEN 🗎

General

Excellent production technology creates optical cables suitable for railway system



Installation

Duct, Direct buried

Characteristic

> The semi-dry structure with double-armor and double-sheaths gives the optical cable excellent crush resistance. The crush can be up to 10000N/10cm. The semi-dry structure is convenient for construction, and the double steel tapes structure can be effectively rodent protected;

1.Outer sheath(LSZH) 2.Corrugated steel tape 3.Water blocking tape 4.Inner sheath(LSZH)

7.Water blocking yarns

9.Ripcord

5.Loose tube(PBT), fibers and jelly

6.Central strength member (FRP+PE coated)

8.Inlaid measuring tape (With meter marking)

- > Excellent excess length control technology makes the optical cable possess excellent temperature performance;
- > HDPE sheath material with superb performance endows the optical cable with excellent properties of abrasion resistance and anti-vibration:
- > Suitable for duct, direct-buried and underwater environments with high requirements on crush of railway communication system.

Application

Suitable for duct, direct-buried and underwater environments with high requirements on crush of railway communication system.

Dimensions and Properties

Optical cable structure and performance parameters

	Fiber type	G652D
Physical	Fiber count	288
	No. of fibers per tube	12
	Stranding no. tube/filler	9-0/15-0
	Inner sheath thickness	1.0mm(min. 0.8mm)
	Outer sheath thickness	2.0mm
	Cable D(±0.5mm)	22.7mm
	Cable weight (±15%)	480kg/km
	Operation temperature range	-40 °C to + 70 °C
	Installation temperature range	-20 °C to + 60 °C
	Transport and storage temperature range	-40 °C to + 70 °C
	Max. tensile load(installation)	4000N
roperties	Operation load	900N
	Crush resistance	10000N/10cm
	Minimal installation bending radius	25*D
	Minimal operation bending radius	12.5*D

*Note: D =cable diameter:

The nominal\minimum thickness of the outer jacket is 2.0mm\1.7mm.

Standards

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SPACEFLUX Bule 🗎

General

Excellent production technology creates optical cables suitable for railway system



Characteristic

- > The semi-dry structure with single-armor, double-sheaths and glass yarns gives the optical cable excellent crush resistance while greatly improving the tensile stress. The tensile stress can be up to 7KN. The semi-dry structure is convenient for construction, and the steel tape structure can be effectively rodent protected;
- > Excellent excess length control technology makes the optical cable possess excellent temperature performance;
- > HDPE sheath material with superb performance endows the optical cable with excellent properties of abrasion resistance and anti-vibration:
- > Suitable for duct and direct-buried environments with high requirements on tensile stress of railway communication systems.

Application

Suitable for duct and direct-buried environments with high requirements on tensile stress of railway communication systems.

Dimensions and Properties

Optical cable structure and performance parameters

- Physical -	Fiber type	G652D
	Fiber count	288
	No. of fibers per tube	12
	Stranding no. tube/filler	9-0/15-0
	Inner sheath thickness	1.0mm(min. 0.8mm)
	Outer sheath thickness	2.0mm(min. 1.7mm)
	Cable D(±0.5mm)	21.6mm
	Cable weight (±15%)	360kg/km
	Operation temperature range	-40 °C to + 70 °C
	Installation temperature range	-20 °C to + 60 °C
	Transport and storage temperature range	-40 °C to + 70 °C
	Max. tensile load (installation)	7000N
roperties	Operation load	900N
	Crush resistance	5000N/10cm
	Minimal installation bending radius	25*D
-	Minimal operation bending radius	12.5*D

*Note: D =cable diameter:

The nominal\minimum thickness of the outer jacket is 2.0mm\1.7mm.

Standards

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SPACEFLUX Red

General

Excellent production technology creates optical cables suitable for railway system



Characteristic

- > The semi-dry structure with single-armor, double-sheaths and glass yarns gives the optical cable excellent crush resistance while greatly improving the tensile stress. The tensile stress can be up to 15KN. The semi-dry structure is convenient for construction, and the steel tape structure can be effectively rodent protected;
- > Excellent excess length control technology makes the optical cable possess excellent temperature performance;
- > HDPE sheath material with superb performance endows the optical cable with excellent properties of abrasion resistance and anti-vibration:
- > Suitable for duct, direct buried and self-supporting aerial environments with high requirements on tensile stress of railway communication systems.

Application

Suitable for duct, direct burial and self-supporting environments with high requirements on tensile stress of railway communication systems.

Dimensions and Properties

Optical cable structure and performance parameters

Fiber type	G652D
Fiber count	288
No. of fibers per tube	12
Stranding no. tube/filler	9-0/15-0
Inner sheath thickness	1.0mm(min.0.8)
Outer sheath thickness	2.0mm
Cable D(±0.5mm)	22.5mm
Cable weight (±15%)	385kg/km
Operation temperature range	-40 °C to + 70 °C
Installation temperature range	-20 °C to + 60 °C
Transport and storage temperature range	-40 °C to + 70 °C
Max. tensile load (installation)	15000N
Crush resistance	5000N/10cm
Minimal installation bending radius	25*D
Minimal operation bending radius	12.5*D
	Fiber type Fiber count No. of fibers per tube Stranding no. tube/filler Inner sheath thickness Outer sheath thickness Outer sheath thickness Cable D(±0.5mm) Cable weight (±15%) Operation temperature range Installation temperature range Transport and storage temperature range Max. tensile load (installation) Crush resistance Minimal installation bending radius Minimal operation bending radius

*Note: D =cable diameter:

The nominal\minimum thickness of the outer jacket is 2.0mm\1.7mm.

Standards

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SPACEFLUX Purple

General

Excellent production technology creates optical cables suitable for railway system



Installation

Duct, Direct buried

Characteristic

- > The semi-dry structure with flat FRP armor and double-sheaths gives the optical cable excellent crush resistance while greatly improving the tensile stress. The semi-dry structure is convenient for construction. All structures are non-metallic, which can effectively avoid the impact of lightning, and the flat FRP armor can be effectively rodent protected;
- > Excellent excess length control technology makes the optical cable possess excellent temperature performance;
- > HDPE sheath material with superb performance endows the optical cable with excellent properties of abrasion resistance and anti-vibration;
- > Suitable for duct, direct burial, self-supporting aerial and underwater environments with high requirements on tensile stress and crush of railway communication systems.

Application

Suitable for duct, direct burial, self-supporting aerial and underwater environments with high requirements on tensile stress and crush of railway communication systems.

Dimensions and Properties

Optical cable structure and performance parameters

Physical	Fiber type	G652D
	Fiber count	288
	No. of fibers per tube	12
	Stranding no. tube/filler	9-0/15-0
	Inner sheath thickness	1.0mm(min. 0.8mm)
	Flat FRP dimension *No.	(1mm*3mm)*17
	Outer sheath thickness	2.0mm
	Cable D(±0.5mm)	21.9mm
	Cable weight (±15%)	335kg/km
	Operation temperature range	-40 °C to + 70 °C
	Installation temperature range	-20 °C to + 60 °C
	Transport and storage temperature range	-40 °C to + 70 °C
Properties	Max. tensile load (installation)	5000N
	Crush resistance	5000N/10cm
	Minimal installation bending radius	25*D
	Minimal operation bending radius	12.5*D

*Note: D =cable diameter;

The nominal\minimum thickness of the outer jacket is 2.0mm\1.7mm.

Standards

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SPACEFLUX Black



General

Excellent production technology creates optical cables suitable for railway system



Installation

Duct, Direct burial, Self-supporting and underwater environments

Characteristic

- > The semi-dry structure with steel wire armor and double-sheaths gives the optical cable excellent crush resistance while greatly improving the tensile stress. The tensile stress can be up to 50KN, and the crush can be up to 10000N/10cm. The semi-dry structure is convenient for construction, and the steel wire armor can be effectively rodent protected;
- > Excellent excess length control technology makes the optical cable possess excellent temperature performance;
- > HDPE sheath material with superb performance endows the optical cable with excellent properties of abrasion resistance and anti-vibration;
- > Suitable for duct, direct burial, self-supporting aerial and underwater environments with high requirements on tensile stress and crush of railway communication systems.

Application

Suitable for duct, direct burial, self-supporting aerial and underwater environments with high requirements on tensile stress and crush of railway communication systems.

Dimensions and Properties

Optical cable structure and performance parameters

	Fiber type	G652D
	Fiber count	288
	No. of fibers per tube	12
	Stranding no. tube/filler	9-0/15-0
Physical	Steel wire diameter*No.	1.2mm*42
FilySical	Inner sheath thickness	1.0mm(min. 0.8mm)
	Outer sheath thickness	2.0mm
	Cable D(±0.5mm)	22.5mm
	Cable weight (±15%)	530kg/km
	Operation temperature range	-40 °C to + 70 °C
	Installation temperature range	-20 °C to + 60 °C
	Transport and storage temperature range	-40 °C to + 70 °C
Descrition	Max. tensile load	50000N
Properties	Operation load	900N
	Crush resistance	10000N/10cm
	Minimal installation bending radius	25*D
	Minimal operation bending radius	12.5*D

*Note: D =cable diameter;

The nominal\minimum thickness of the outer jacket is 2.0mm\1.7mm.

Standards

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Spaceflux Yellow Ju 🗎

General

Excellent production technology creates optical cables suitable for railway system



Installation

Duct, Direct buried

Characteristic

- > The semi-dry structure with single-armor and double-sheaths gives the optical cable excellent crush resistance. The semi-dry structure is convenient for construction, and the steel tape structure can be effectively rodent protected;
- > Excellent excess length control technology makes the optical cable possess excellent temperature performance;
- > HDPE sheath material with superb performance endows the optical cable with excellent properties of abrasion resistance and anti-vibration.
- > Suitable for duct and direct-buried environments of railway communication systems.

Application

Suitable for duct and direct-buried environments of railway communication systems.

Dimensions and Properties

Optical cable structure and performance parameters

Prove a province of the second of the sec														
Phose No. of fibers per tube 8 12 12 24 24 48 60 72 96 144 288 Stranding no. tube/filler 1/5 1/5 6/0 2/4 6/0 4/2 5/1 6/0 8/0 12/0 9/0-15/0 FRP diameter (including PE coated)±0.1mm 2.4 2.4 2.4 2.4 2.4 2.4 6/0 8/0 12/0 9/0-15/0 Lose tube diameter(mm) 2.4 2.4 2.4 2.4 2.4 2.4 2.4 FRP+PE FRP+P	-	Fiber count	8	12	12	24	24	48	60	72	96	144	288	
Attanding no. tube/filler 1 / 5 6/0 2/4 6/0 4/2 5/1 6/0 8/0 1/20 9/0-15/0 FRP diameter (including PE coated)±0.1mm 2.4 </td <td>No. of fibers per tube</td> <td>8</td> <td>12</td> <td>12</td> <td>24</td> <td>24</td> <td>48</td> <td>60</td> <td>72</td> <td>96</td> <td>144</td> <td>288</td>		No. of fibers per tube	8	12	12	24	24	48	60	72	96	144	288	
FRP diameter (including PE coated)±0.1mm 2.4		Stranding no. tube/filler	1 / 5	1/5	6/0	2/4	6/0	4/2	5/1	6/0	8/0	12/0	9/0-15/0	
Physical -2.2 Inner sheath thickness(mm) -1.7 (-1.7) Outer sheath thickness(mm) -2.7 (-1.7) Outer sheath thickness(mm) -2.7 (-1.7) Installation temperature range -2.7 (-1.7) Installation temperature range -4.0 (-1.7) Max. tensile load -2.7 (-1.7) Installation bending radius -2.7 (-1.7) Installation bending r		FRP diameter (including PE coated)±0.1mm	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	FRP+PE coated 3.9	FRP+PE coated 6.9	FRP+PE coated 4.6	
Inner sheath thickness(mm) 2(min. 1.5) Outer sheath thickness(mm) 2(min. 1.7) Cable D(±0.3mm) 16.3 <th>Physical</th> <td>Loose tube diameter(mm)</td> <td colspan="11">Loose tube diameter(mm) 2.25</td>	Physical	Loose tube diameter(mm)	Loose tube diameter(mm) 2.25											
Outer sheath thickness(mm) 2(min. 1.7) Cable D(±0.3mm) 16.3 16.3 16.3 16.3 16.3 16.3 16.3 17.8 20.8 23.4 Cable Weight (kg/km±15%) 230	Fliysical	Inner sheath thickness(mm) 1.7(min. 1.5)												
Cable D(±0.3mm) 16.3 16.3 16.3 16.3 16.3 16.3 16.3 16.3 16.3 16.3 17.8 20.8 23.4 Cable weight (kg/km±15%) 230		Outer sheath thickness(mm)		2(min. 1.7)										
Cable weight (kg/km±15%) 230 <td></td> <td>Cable D(±0.3mm)</td> <td>16.3</td> <td>16.3</td> <td>16.3</td> <td>16.3</td> <td>16.3</td> <td>16.3</td> <td>16.3</td> <td>16.3</td> <td>17.8</td> <td>20.8</td> <td>23.4</td>		Cable D(±0.3mm)	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	17.8	20.8	23.4	
Operation temperature range -40 °C to + 75 °C Installation temperature range -20 °C to + 60 °C Transport and storage temperature range -40 °C to + 75 °C Max. tensile load 2700N Max. tensile load 2700N Crush resistance 3000N/10cm Minimal installation bending radius 25*D Minimal operation bending radius 25*D		Cable weight (kg/km±15%)	230	230	230	230	230	230	230	230	270	365	410	
Installation temperature range -20 °C to + 60 °C Transport and storage temperature range -40 °C to + 75 °C Max. tensile load 2700N 4000N Crush resistance 3000N/10cm Minimal installation bending radius 25*D Minimal operation bending radius 25*D		Operation temperature range	Operation temperature range -40 °C to + 75 °C											
Transport and storage temperature range -40 °C to + 75 °C Max. tensile load 2700N 4000N Crush resistance 3000N/10cm Minimal installation bending radius 25*D Minimal operation bending radius 25*D		Installation temperature range	nperature range -20 °C to + 60 °C											
Max. tensile load 2700N 4000N Crush resistance 3000N/10cm Minimal installation bending radius 25*D Minimal operation bending radius 25*D		Transport and storage temperature range				-	40 °C to -	+ 75 °C						
Crush resistance 3000N/10cm Minimal installation bending radius 25*D Minimal operation bending radius 25*D	Properties	Max. tensile load			2700N					40	00N			
Minimal installation bending radius 25*D Minimal operation bending radius 25*D		Crush resistance	Crush resistance 3000N/10cm											
Minimal operation bending radius		Minimal installation bending radius	Minimal installation bending radius 25*D											
		Minimal operation bending radius												

*Note: D =cable diameter:

The nominal\minimum thickness of the outer jacket is 2.0mm\1.7mm.

Standards

IEC 60794-3-10 Outdoor cables- family specification for duct and directly buried optical telecommunication cable RoHS 2011/65/EU Restricting the use of certain hazardous substances in electrical and electronic equipment DIN EN 50125-3 Railway applications Environmental conditions for equipment Part3: Environmental conditions for signaling and telecommunicationfacilities DIN EN 13501-6 Classification with the results from the fire behavior tests of powercables and wires, control





Spaceflux White

General

Excellent production technology creates optical cables suitable for railway system



Installation

Duct, Direct buried

Characteristic

- > The semi-dry structure is convenient for construction, all structures are non-metallic, which can effectively avoid the impact of lightning;
- > Excellent excess length control technology makes the optical cable possess excellent temperature performance;
- > HDPE sheath material with superb performance endows the optical cable with excellent properties of abrasion resistance and anti-vibration.
- > Suitable for duct environments of railway communication systems.

Application

Suitable for duct environments of railway communication systems.

Dimensions and Properties

Optical cable structure and performance parameters

	Fiber count	8	12	12	24	24	48	60	72	96	144	
	No. of fibers per tube	8	12	2	12	4	12	12	12	12	12	
	Stranding no. tube/filler	1/5	1/5	6/0	2/4	6/0	4/2	5/1	6/0	8/0	12/0	
	FRP diameter (including PE coated)±0.1mm	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	FRP+PE coated 3.9	FRP+PE coated 6.9	
Physical	Loose tube diameter(mm)					2.25						
riiysicai	Outer sheath thickness(mm)	2(min. 1.7)										
	Cable D(±0.3mm)	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	12.7	15.7	
	Cable weight (kg/km±15%)	95	95	95	95	95	95	95	95	120	185	
	Operation temperature range	-40 °C to + 75 °C										
	Installation temperature range	-20 °C to + 60 °C										
	Transport and storage temperature range	-40 °C to + 75 °C										
	Max. tensile load					2700N						
Properties	Crush resistance				25	00N/10cr	n					
	Minimal installation bending radius					20*D						
	Minimal operation bending radius	10*D										

*Note: D =cable diameter:

The nominal\minimum thickness of the outer jacket is 2.0mm\1.7mm.

• Standards

IEC 60794-3-10 Outdoor cables- family specification for duct and directly buried optical telecommunication cable RoHS 2011/65/EU Restricting the use of certain hazardous substances in electrical and electronic equipment DIN EN 50125-3 Railway applications Environmental conditions for equipment Part3: Environmental conditions for signaling and telecommunication facilities

DIN EN 13501-6 Classification with the results from the fire behavior tests of powercables and wires, control and communication cables





Spaceflux Black X



General

Excellent production technology creates optical cables suitable for railway system



Installation

Duct, Direct burial, Self-supporting and underwater environments

Characteristic

- > The semi-dry structure with steel wire armor and double-sheaths gives the optical cable excellent crush resistance while greatly improving the tensile stress. The tensile stress can be up to 50KN, and the crush can be up to 13000N/10cm. The semi-dry structure is convenient for construction, and the steel wire armor can be effectively rodent protected;
- > Excellent excess length control technology makes the optical cable possess excellent temperature performance;
- > HDPE sheath material with superb performance endows the optical cable with excellent properties of abrasion resistance and anti-vibration;
- > Suitable for duct, direct burial, self-supporting aerial and underwater environments with high requirements on tensile stress and crush of railway communication systems.

Application

Suitable for duct, direct burial, self-supporting aerial and underwater environments with high requirements on tensile stress and crush of railway communication systems.

Dimensions and Properties

Optical cable structure and performance parameters

	Fiber count	24
	No. of fibers per tube	4
	Stranding no. tube/filler	6/0
	Loose tube diameter	2.0mm
Physical	Inner sheath thickness	1.7mm(min. 1.5)
Physical	Outer sheath thickness	1.5mm(min. 1.3)
	Cable D(±0.3)	16mm
	Cable weight (±15%)	320kg/km
	Operation temperature range	-25 °C to + 60 °C
	Installation temperature range	-20 °C to + 60 °C
	Transport and storage temperature range	-25 °C to + 60 °C
Properties	Max. tensile load	3500N
	Crush resistance	2500N/10cm
	Minimal installation bending radius	25*D
	Minimal operation bending radius	12.5*D

*Note: D =cable diameter;

The nominal\minimum thickness of the outer jacket is 2.0mm\1.7mm.

Standards

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DIN EN 13501-6 Classification with the results from the fire behavior tests of powercables and wires, control and communication cables









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