

·陆缆系统

Land cable system

·海缆系统

Subsea cable system

·海洋工程

Offshore Engineering



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# SUBSEA CABLES

宁波东方电缆股份有限公司  
 NINGBO ORIENT WIRES & CABLES CO.,LTD.

# 海底电缆

Subsea Cables

- **交流（光电复合）海缆**  
AC Subsea Cables Composite with O.F.
- **直流（光电复合）海缆**  
DC Subsea Cables Composite with O.F.
- **海底光缆**  
Subsea Optical Fibre Cable
- **附件产品**  
Accessories



# AC Subsea Cables Composite with O.F.

## 交流(光电复合)海缆

### AC 500kV海底(光电复合)电缆

AC 500kV Subsea Cables Composite with O.F.

执行标准Standard: CIGRE TB-490

主要应用于海底，为岛屿与岛屿之间、风电与大陆之间、岛屿与陆地之间等提供畅通的连接。

The product is mainly used in submarine for providing the smooth connection from islands to islands, from mainland to islands, from island to offshore platforms, between wind generators and so on.



单芯单层扁铜丝铠装  
Single core single layer with flat copper wire armored



单芯双层扁铜丝铠装  
Single core double layer with flat copper wire armored

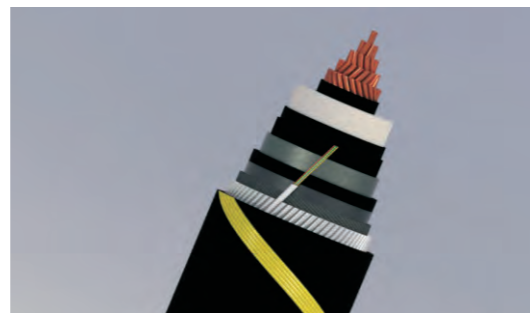
### AC 220kV海底(光电复合)电缆

AC 220kV Subsea Cables Composite with O.F.

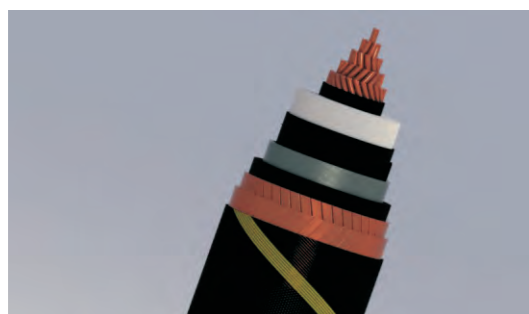
执行标准Standard: GB/T 32346、CIGRE TB-490

主要应用于海底，为岛屿与岛屿之间、风电与大陆之间、岛屿与陆地之间等提供畅通的连接。

The product is mainly used in submarine for providing the smooth connection from islands to islands, from mainland to islands, from island to offshore platforms, between wind generators and so on.



单芯圆钢丝铠装  
Single core with round steel wire armored



单芯双层扁铜丝铠装  
Single core double layer with flat non-magnetic alloy wire armored



三芯圆钢丝铠装  
Three cores with round steel wire armored

# AC Subsea Cables Composite with O.F.

## 交流(光电复合)海缆

### AC 110kV海底(光电复合)电缆

AC 110kV Subsea Cables Composite with O.F.

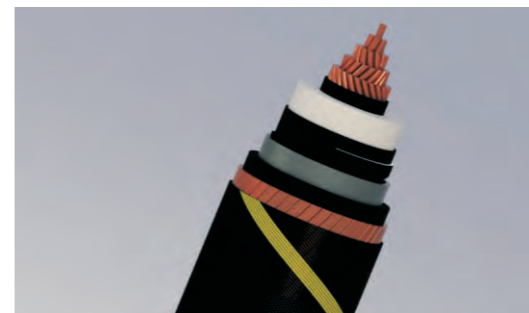
执行标准Standard: JB/T 11167、CIGRE TB-490

主要应用于海底或水底，为岛屿与岛屿之间、风电与大陆之间、岛屿与陆地之间、江河湖两岸之间等提供畅通的连接。

The product is mainly used in submarine or the bottom for providing the smooth connection from islands to islands, from mainland to islands, from island to offshore platforms, between wind generators and so on.



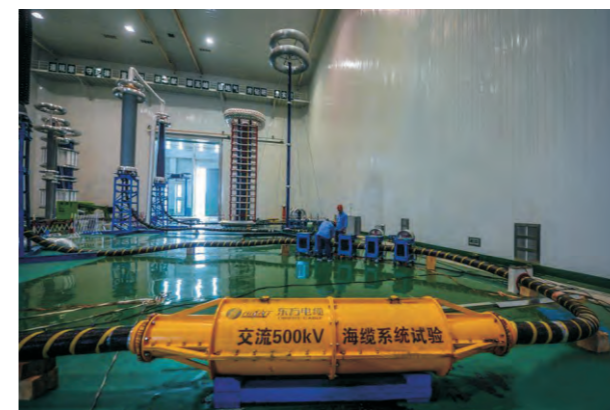
单芯圆钢丝铠装  
Single core with round steel wire armored



单芯单层扁铜丝铠装  
Single core single layer with flat copper wire armored



三芯圆钢丝铠装  
Three cores with round steel wire armored



2016年，超高压500kV交联聚乙烯绝缘光电复合海缆系统(包含工厂软接头、抢修接头、终端)圆满的通过了“双权威机构”的型式试验，突破六大核心技术，攻克500kV海缆系统难题。

500kV EHV XLPE insulation composite subsea cable (including factory joint, repair joint, termination) had been successfully passed the "Dual Authority" type test in 2016, through which broken 6 core technology and overcome 500kV subsea cable system problems.

# AC Subsea Cables Composite with O.F. 交流(光电复合)海缆

## AC 35kV及以下海底(光电复合)电缆

AC up to 35kV Subsea Cables Composite with O.F.

执行标准Standard: JB/T 11167、CIGRE TB-490

主要应用于海底或水底，为岛屿与岛屿之间、岛屿与陆地之间、岛屿与海上平台之间、海上平台与平台之间、海上风机与风机之间、海上风机与大陆或岛屿之间、江河湖两岸之间等提供畅通的连接。

The product is mainly used in submarine for providing the smooth connection from islands to islands, from mainland to islands, from islands to offshore platforms, between wind generators and so on.



普通三芯圆钢丝铠装  
Ordinary type, three cores with round steel wire armored



环保型三芯圆钢丝铠装  
Environment type, three-core with round steel wire armored

## 交流(光电复合)海缆主要技术参数

Main Technical Data of AC Subsea Cables Composite with O.F.

注1: 环保型设计海底(光电复合)电缆设计功率的校正系数为1.1-1.2  
注3: 弯曲半径计算公式: 单芯--20D, 三芯--15D, D为电缆直径

注2: 工况设计条件: ①海底温度25℃, 热阻0.7 ②滩涂土壤温度25℃, 热阻1.0 ③陆地土地温度40℃, 热阻1.2 ④设计功率以登陆段工况要求设计  
注4: 以下数据仅供参考, 实际海缆设计需结合工程的环境和敷设等量身定制  
注5: 单芯海缆功率基于铜芯铠装

三芯8.7/15(10)kV										
规格 Spec.(mm <sup>2</sup> )	3×50	3×70	3×95	3×120	3×150	3×185	3×240	3×300	3×400	3×500
参考功率 Power (MVA)	3.0	3.6	4.3	4.8	5.4	6.0	6.8	7.6	8.4	9.3
参考外径 OD(mm)	81.3	84.5	88.3	92.7	96.6	100.4	105.8	112.1	119.8	126.6
参考重量 N.W (kg/m)	16.5	17.8	19.6	21.7	23.8	25.9	29.0	32.8	38.3	43.4

三芯12/20kV										
规格 Spec.(mm <sup>2</sup> )	3×50	3×70	3×95	3×120	3×150	3×185	3×240	3×300	3×400	3×500
参考功率 Power (MVA)	6.0	7.2	8.6	9.7	10.8	12.0	13.7	15.2	16.9	18.6
参考外径 OD(mm)	86.2	89.3	93.2	97.5	101.4	105.3	110.6	116.9	124.6	131.4
参考重量 N.W (kg/m)	17.9	19.4	21.3	23.3	25.5	27.6	30.8	34.7	40.3	45.6

# AC Subsea Cables Composite with O.F. 交流(光电复合)海缆

三芯26/35kV									
规格 Spec.(mm <sup>2</sup> )	3×70	3×95	3×120	3×150	3×185	3×240	3×300	3×400	3×500
参考功率 Power (MVA)	12.7	15.1	17.0	18.9	21.1	24.0	26.6	29.6	32.5
参考外径 OD(mm)	113.5	117.4	121.7	125.6	129.5	134.8	141.1	148.8	155.6
参考重量 N.W (kg/m)	28.0	30.2	32.4	34.8	37.2	41.0	45.2	51.1	56.9

三芯38/66kV											
规格 Spec.(mm <sup>2</sup> )	3×70	3×95	3×120	3×150	3×185	3×240	3×300	3×400	3×500	3×630	3×800
参考功率 Power (MVA)	25.5	29.5	33.1	36.6	40.5	49.3	55.2	59.8	65.0	73.4	84.2
参考外径 OD(mm)	137.7	142.5	143	145	148.3	152	156.7	163.4	168.3	177.2	186
参考重量 N.W (kg/m)	37.6	40.5	41	42.6	45.2	48.4	51.7	56.9	62.1	69.9	78.6

单芯64/110kV										
规格 Spec.(mm <sup>2</sup> )	1×240	1×300	1×400	1×500	1×630	1×800	1×1000	1×1200	1×1400	1×1600
参考功率 Power (MVA)	91	99	109	119	129	147	157	167	174	181
参考外径 OD(mm)	89.4	90.7	92.1	94.6	96.6	101.6	106.1	111.4	115.2	118.8
参考重量 N.W (kg/m)	18.4	19.4	20.6	22.2	24.2	28.1	31.4	35.0	38.2	41.3

三芯64/110kV							
规格 Spec.(mm <sup>2</sup> )	3×240	3×300	3×400	3×500	3×630	3×800	3×1000
参考功率 Power (MVA)	75	84	94	104	116	127	136
参考外径 OD(mm)	191.7	194.3	196.9	200.1	205.9	214.5	224.4
参考重量 N.W (kg/m)	70.6	73.6	77.9	83.9	106.9	116.5	127.8

单芯127/220kV									
规格 Spec.(mm <sup>2</sup> )	1×400	1×500	1×630	1×800	1×1000	1×1200	1×1400	1×1600	1×1800
参考功率 Power (MVA)	231	256	280	303	348	371	390	444	461
参考外径 OD(mm)	119.7	122.9	124.3	126.7	130.9	136.2	141.4	149.0	152.0
参考重量 N.W (kg/m)	36.1	38.4	40.1	42.6	48.7	53.1	57.4	68.9	72.3

三芯127/220kV								
规格 Spec.(mm <sup>2</sup> )	3×400	3×500	3×630	3×800	3×1000	3×1200	3×1400	3×1600
参考功率 Power (MVA)	183.7	203.5	216.8	231.3	242.0	248.1	254.2	259.1
参考外径 OD(mm)	242.1	245.9	251.2	257.2	263.0	273.2	280.2	287.5
参考重量 N.W (kg/m)	104.7	111.0	117.3	125.5	133.3	146.9	157.0	165.9

三芯190/330kV						
规格 Spec.(mm <sup>2</sup> )	3×630	3×800	3×1000	3×1200	3×1600	3×1800
参考功率 Power (MVA)	365.0	388.0	415.0	454.0	511.0	548.0
参考外径 OD(mm)	272.5	280.4	286.1	295.1	306.4	312.2
参考重量 N.W (kg/m)	134.3	146.0	151.0	163.0	185.0	196.0

单芯290/500kV						
规格 Spec.(mm <sup>2</sup> )	1×800	1×1000	1×1200	1×1400	1×1600	1×1800
参考功率 Power (MVA)	773	843	900	951	1055	1093
参考外径 OD(mm)	152.7	154.9	160.2	163.2	170.7	171.5
参考重量 N.W (kg/m)	62.4	65.4	70.3	73.6	86.6	88.7

# DC Subsea Cables Composite with O.F. 直流(光电复合)海缆

## 直流高压(光电复合)海底电缆

DC High Voltage Subsea Cables Composite with O.F.

执行标准Standard:  
GB/T 31489、CIGRE TB-496

主要应用于电力传输、多个交流电网互联和控制、不同电网并入，如海岛电网、海上平台、风力发电等、连接分散的小型发电厂、大距离供电、海上供电。

Mainly used in electric power transmission, multiple AC power grid interconnections and control, different power grids into, such as Island power, offshore, wind power, linking scattered small power plants, large distance power supply, power at sea.



# DC Subsea Cables Composite with O.F. 直流(光电复合)海缆

## 直流(光电复合)海缆主要技术参数

Main Technical Data of DC Subsea Cables Composite with O.F.

注1: 工况设计条件: 海床滩涂敷设, 土壤温度28℃, 埋设深度1.0m, 热阻1.2 W/m  
注3: 以下数据仅供参考, 实际海缆设计需结合工程的环境和敷设等量身定制

注2: 弯曲半径计算公式:  $20D$ ,  $D$ 为电缆直径

±30kV														
规格 Spec.(mm <sup>2</sup> )	1×95	1×120	1×150	1×185	1×240	1×300	1×400	1×500	1×630	1×800	1×1000	1×1200	1×1600	
参考功率 Power (MVA)	并排敷设 Abreast Installation	17.1	19.5	21.9	25.2	29.1	33.3	38.7	44.4	51.3	59.1	67.5	74.4	87.0
	定距敷设 Parallel Installation	19.8	22.8	25.5	29.1	34.5	39.3	45.3	52.5	61.2	70.5	80.4	88.2	104.4
参考外径 OD(mm)	68.1	69.7	71.5	73.2	75.7	78.2	81.8	84.9	88.6	93.2	97.7	103.0	110.4	
参考重量 N.W(kg/m)	10.8	11.4	12.1	12.8	14.0	15.2	17.0	18.8	21.0	23.8	26.9	30.3	36.3	
±160kV														
规格 Spec.(mm <sup>2</sup> )	1×300	1×400	1×500	1×630	1×800	1×1000	1×1200	1×1600	1×2000	1×2500				
参考功率 Power (MVA)	并排敷设 Abreast Installation	159	184	213	246	285	324	357	421	481	549			
	定距敷设 Parallel Installation	181	210	243	283	328	376	412	492	562	643			
参考外径 OD(mm)	104.7	106.1	111.2	112.9	115.3	119.8	127	134.5	137.5	147.7				
参考重量 N.W(kg/m)	26.9	25.6	29.4	30.1	32.4	35.8	42.1	48.7	51.8	62.4				
±200kV														
规格 Spec.(mm <sup>2</sup> )	1×300	1×400	1×500	1×630	1×800	1×1000	1×1200	1×1600	1×2000	1×2500				
参考功率 Power (MVA)	并排敷设 Abreast Installation	212	246	284	328	380	432	476	562	642	732			
	定距敷设 Parallel Installation	242	280	324	378	438	502	550	656	750	858			
参考外径 OD(mm)	112.6	111.2	115.7	119.4	121.8	126.3	131.5	139.4	145.4	152.2				
参考重量 N.W(kg/m)	29.7	28.4	31.8	34.4	36.8	40.4	44.3	51.3	57.4	65.0				
±250kV														
规格 Spec.(mm <sup>2</sup> )	1×400	1×500	1×630	1×800	1×1000	1×1200	1×1600	1×2000	1×2500					
参考功率 Power (MVA)	并排敷设 Abreast Installation	307	355	410	475	540	595	702	802	915				
	定距敷设 Parallel Installation	350	405	472	547	627	687	820	937	1072				
参考外径 OD(mm)	130.5	133.7	131.8	136.4	140.9	146.1	153.6	160.0	166.8					
参考重量 N.W(kg/m)	37.7	40.0	40.1	43.7	47.5	51.7	58.7	65.4	73.3					
±320kV														
规格 Spec.(mm <sup>2</sup> )	1×800	1×1000	1×1200	1×1600	1×2000	1×2500	1×3000							
参考功率 Power (MVA)	并排敷设 Abreast Installation	608.0	691.2	761.6	899.2	1027.2	1171.2	1388.8						
	定距敷设 Parallel Installation	700.8	803.2	880.0	1049.6	1200.0	1372.8	1572.5						
参考外径 OD(mm)	149.9	154.4	155.1	162.6	169.0	175.8	184.9							
参考重量 N.W(kg/m)	50.6	54.6	56.5	63.8	70.6	78.7	91.5							
±400kV														
规格 Spec.(mm <sup>2</sup> )	1×800	1×1000	1×1200	1×1600	1×2000	1×2500	1×3000							
参考功率 Power (MVA)	并排敷设 Abreast Installation	760	864	952	1124	1284	1464	1586.8						
	定距敷设 Parallel Installation	876	1004	1100	1312	1500	1716	1964.8						
参考外径 OD(mm)	152.4	157.0	158.2	165.2	171.6	178.4	188.4							
参考重量 N.W(kg/m)	52.8	56.8	58.6	65.1	73.1	81.9	93.3							
±535kV														
规格 Spec.(mm <sup>2</sup> )	1×800	1×1000	1×1200	1×1600	1×2000	1×2500	1×3000							
参考功率 Power (MVA)	并排敷设 Abreast Installation	950	1080	1190	1405	1605	1830	2155						
	定距敷设 Parallel Installation	1095	1255	1375	1640	1875	2145	2421						
参考外径 OD(mm)	154.9	159.6	161.3	167.6	174.1	180.8	190.3							
参考重量 N.W(kg/m)	55.3	59.6	61.2	68.2	75.3	85.6	96.7							

# Subsea Optical Fibre Cable

## 海底光缆

执行标准Standard: GB/T 18480

主要用于深海和浅海区域通信。通常敷设于远距离岛屿之间、大陆与岛屿之间、跨海等重要场所。

- 精确的光纤余长控制，保证光缆具有很好的机械性能和温度特性；
  - 松套管内充满特殊纤膏，对光缆进行有效保护；
  - 适应海底的复杂环境；
  - 材料强度高的松套管和轧纹钢带纵包，使光缆具有很好抗侧压性能；
  - 单双层铠装，适应于不同海底环境的使用；
- 最大纤芯数：144，光纤类型可依据客户要求。

Mainly used in deep and shallow sea communication. laid between islands, from island to the mainland, and other sea projects.

- Precision control of fibre excess length to ensure the mechanical properties of optical fibre cables and temperature characteristics.
- It has good features for anti-compression.
- Jelly-filled can protect the cable.
- Cable can be single steel wire armouring or double steel wire armouring.
- To meet the complex environment of submarine.
- Max. Cores:144.



单层铠装浅海光缆  
Single Armored Shallow Sea Optical Fiber



双层铠装浅海光缆  
Double Armored Shallow Sea Optical Fiber



深海光缆  
Deep-Sea Optical Fiber



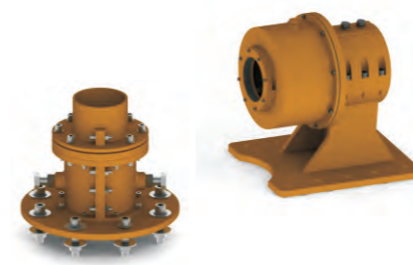
深海光缆  
Deep-Sea Optical Fiber

# Accessories

## 附件产品

### 锚固

#### Anchoring



机械性固定电缆铠装，确保负载通过电缆结构安全承载。

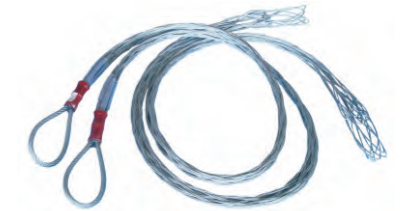
锚固系统可分为石油平台锚固装置和陆上锚固装置。石油平台锚固装置适用于海洋石油平台、钻井等平上海底电缆的悬挂、固定。陆上锚固装置适用于铁塔等装置上海底电缆和陆上电缆的悬挂、固定。

Mechanically fixed the cable armor to ensure that through cable structure is safe load carrying capacity.

Anchoring system can be divide into oil platform anchoring device and land anchoring device. Petroleum Anchoring device applied to offshore oil platforms, drilling platform of subsea cable of suspension, fixed. Land anchoring device applied to tower unit of subsea cables and overland cable of suspension and fixed.

### 网套

#### Metal Pulling Net



网套的钢丝网有足够的灵活性跟随电缆轨迹，且足够牢固以确保运输敷设时的安全拉拽。

Flexible enough, strong enough to ensure the transport safely and pulling.

### 光纤接线箱

#### Optical Fiber Junction Box



保护海底光缆和内部光纤管理系统之间的过度。适用于光电复合缆中光缆受损后的抢修，具有操作简单、可靠性高等特点。

To Protect the transition optical fiber and optical fiber management system. Applied to urgently repair the fiber of optical composite submarine cable after damaged and it is simple to operate and reliability.

用于保护和固定近海风电场集电海缆的创新设计和开发，采用进口高等级聚氨酯和分离式壳体，提供海缆在单桩塔筒式无J形管情况下的便捷安装解决方案。

To protect and fix the subsea cables in the monopole turbine, the design has been optimized by using separated shell to easy installation.

### 倒刺

#### CPS(Cable Protection System)



### 海缆终端接线箱

Termination Junction Box

提供海底电缆中电部分与平台上(或陆上)电缆之间有效对接。箱体内有加热干燥系统，以更好为箱体内提供一个干燥的环境。箱体的各个进线口都有良好的填料函保护。

Providing the effectively combination between cable electric part and platforms and overland cable. Tank heating and drying system in order to better provided a dry environment. Junction box in various inlets has good protection.



### 抢修接头

Repair Joint

为海底电缆在经受不正常损坏后，可以快速进行光和电的修复。适用于各海缆受损后的抢修，具有操作简单，可靠性高等特点。

To provide quickly repair of optical and electrical when subsea cable abnormal damaged. For other urgently repair after damaged and it is simple to operate and reliability.

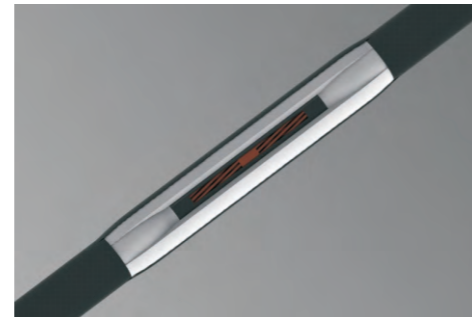
### 熔接头

In-field Joint Technology for Land Cable

是革新于传统预制接头的另一种高质高效接头方式。导体放热焊接、绝缘层熔融修正等使它拥有与本体配合度更高、使用寿命更长、运行参数更可靠等特点，能有效还原电缆本体应有特性。

It is a new developed jointing technology, which has much better performance comparing to the traditional prefabricated joint.

These joints represent a virtual reinstatement of the original cable structure, minimising local changes in core dimensions. In-field joints on power cores may be provided in case of accidental cable damage and/or project needs so as to minimize the numbers of joints and enhance the safety for long term operation.



### 海缆托盘

Packing Carousel

根据不同规格不同长度的海缆进行量身定制。主要用于海底电缆在离开公司码头后，进行快捷方便的吊装移动。

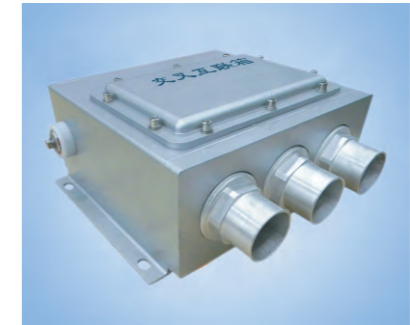
To design according to the different specifications for different length of subsea cable. Mainly used in lifting and transferring the subsea cable after leaving the company port.

### 接地箱

Grounding Box

接地箱按使用功能可以分为直接接地箱和保护接地箱，按相数分为三相和单相接地箱。不同电压等级不同规格海缆有相应的接地箱匹配。

Grounding box can be divided into directly and protectively box for using functions, also divided into three-phase and single-phase. Different voltage grade for different grounding of specification.

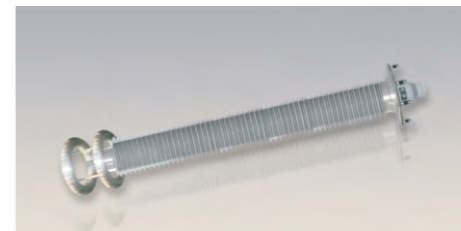


### 海缆终端

Cable Termination

根据不同电压等级不同海缆规格，有相应的电缆终端进行匹配。应用于海底电缆使用的特殊场合，有良好的防盐蚀、防潮、防污秽等特点。

Match the exactly terminations in accordance with different voltages and specifications of subsea cable. Applied to special occasions of subsea cables using, it has characteristic of anti-salt corrosion, moisture-proof and anti dirty etc.

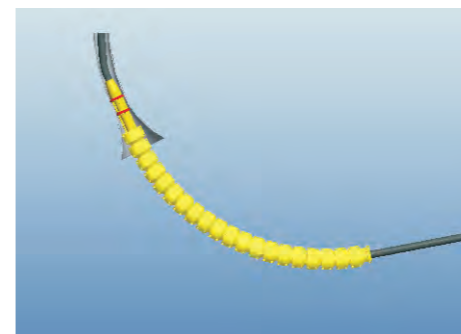


### 限弯器

Bending Restrictor

弯曲限制器为静态限弯装置，是由多个相同结构的组件组合而成，组件两两之间相互咬合锁紧，起到限制电缆或管道弯曲的作用。当外部载荷作用于这些元件时，它们可以连接，锁在一起，形成一个平滑的弯曲半径，即锁紧半径，锁紧半径一般要等于或大于柔性管的最小弯曲半径，防止其过度弯曲。

Bending restrictor is for static bending restrict, which is formed by the combination of multiple components with the same structure, it is locked together between 2 components, for limiting cable or pipe bending. The bending restrictor can be locked together to form a smooth bend radius when external loads acting on these components. The locked radius is generally equal to or greater than the flexible tube minimum bending radius to prevent excessive bending.



## Typical Cases of Subsea Cable 海底电缆典型业绩



**浙江舟山500千伏联网输电工程/500kV**  
Zhejiang Zhoushan 500kV Interconnection Power Transmission Project



**莆田平海湾海上风电场项目/220kV**  
Putian Pinghai Bay Offshore Wind Farm Project



**龙源福建莆田南日岛海上风电场项目/220kV**  
Longyuan Fujian Putian Nanri Island Offshore Wind Farm Project



**三峡新能源阳西沙扒一~五期海上风电项目/220kV**  
Three Gorges Yangxi Shapa Offshore Wind Power Project



**三峡新能源江苏大丰300MW海上风电项目/220kV**  
Three Gorges Jiangsu Dafeng 300MW Offshore Wind Power Project



**浙江舟山鱼山220kV输电工程/220kV**  
Zhejiang Zhoushan Yushan 220kV Power Transmission Project



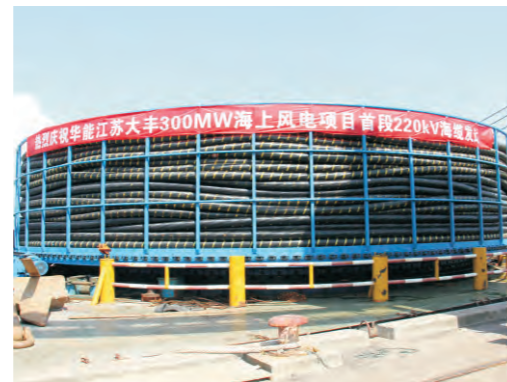
**国华五期竹根沙H1#海上风电场项目/220kV**  
Guohua Phase V Zhugensha H1# Offshore Wind Farm Project



**粤电阳江沙扒海上风电项目/220kV**  
Yudean Yangjiang Shapa Offshore Wind Power Project



**国华东台四期(H2) 300MW海上风电场项目/220kV**  
Guohua Dongtai Phase IV (H2) 300MW Offshore Wind Farm Project



**华能江苏大丰300MW海上风电项目/220kV**  
Huaneng Jiangsu Dafeng 300MW Offshore Wind Power Project



**秦皇岛32-6、曹妃甸11-1油田群岸电应用工程/220kV**  
Qinhuangdao 32-6, Caofeidian 11-1  
oil field group shore power application project



**舟山多端柔性直流输电示范工程/±200kV**  
Zhoushan Multi-terminal DC Flexible Transmission Demonstration Project



# Typical Cases of Subsea Cable 海底电缆典型业绩



**大型风电场柔性直流输电接入技术与开发示范工程/±160kV**  
Large Scale Wind Farm DC Flexible Transmission Access  
Technology R&D Demonstration Project



**110kV泗礁输变电工程/110kV**  
110kV Sijiao Power Transmission and Transformation Project



**霞浦浮鹰岛风电场项目/110kV**  
Xiapu Floating Eagle Island Wind Farm Project



**浙江华电台州玉环一期300MW海上风电项目/66kV**  
Zhejiang Huadian Station Yuhuan Phase I 300MW Offshore Wind Power Project



**广东华电阳江青洲三500MW海上风电项目/35kV**  
Guangdong Huadian Qingzhou Three 500MW Offshore Wind Farm Project



**越南BINH DAI海上风电项目/35kV**  
Vietnam BINH DAI Offshore Wind Power Project

# Subsea Cable Installation Vessel & Specialized Wharf 海缆敷设船及专用码头



## 东方海工01

国内首制带动力及DP-2定位系统的敷缆船

主要技术性能参数/Main Technical Performance Parameter  
总长Total length: 84.80 m  
垂线间长Length between perpendiculars: 84.80 m  
型宽Molded breadth: 28.00 m  
型深Molded depth: 5.50 m  
设计吃水Designed draft: 3.60 m  
结构吃水Structural draft: 3.70m  
载货量(设计吃水)Cargo capacity (designed draft): 3500 t  
压载舱Ballast tank: 4280 m<sup>3</sup>  
淡水舱Fresh water tank: 230 m<sup>3</sup>



## Subsea Cable performance List (Typical)

### 海底电缆业绩清单(典型)

序号 S/N	产品名称 Description	型号规格 Type & Size	长度(km) Length	业主单位 Project Owner
★多年来, 东方电缆积累了大量的海底电缆业绩。其中, 500kV海底电缆36公里, 高压海底电缆约4700公里, 中低压海底电缆约3300公里, 直流海底电缆约100公里, 累计长度超8000公里。				
1	500kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×1800+24B	36	国网浙江省电力公司
2	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×630+3×48B	18.3	国电象山海上风电有限公司
3	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×1000+2×48B	454.2	广东华电福新阳江海上风电有限公司
4	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+3×36B	237	华能浙江苍南海上风电有限责任公司
5	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+2×48B 3×1000+2×48B	770.4	三峡新能源阳江发电有限公司
6	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×630+3×36B 3×400+3×36B	393	中国电建集团华东勘测设计研究院有限公司
7	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+3×36B	70.6	福建莆田闽投海上风电有限公司
8	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×1000+3×36B	181.5	中广核工程有限公司
9	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+2×48B 3×630+2×48B	217.8	江苏海上龙源风力发电有限公司
10	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+3×36B	141	国家能源集团东台海上风电有限责任公司
11	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×630+2×36B	36.6	中广核工程有限公司
12	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+2×48B	132	广东粤电阳江海上风电有限公司
13	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+2×48B	282	三峡新能源阳江发电有限公司
14	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×1600+2×16B 1×1600+3×12B	71.7	福建龙源海上风力发电有限公司
15	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+2×36B	334.5	华能盐城大丰新能源发电有限责任公司
16	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+2×36B	300	国华(江苏)风电有限公司
17	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+2×36B	148.3	三峡新能源盐城大丰有限公司
18	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+3×36B	70.6	福建中闽海上风电有限公司
19	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×630+2×24B	32.7	国电电力浙江舟山海上风电开发有限公司

## Subsea Cable performance List (Typical)

### 海底电缆业绩清单(典型)

序号 S/N	产品名称 Description	型号规格 Type & Size	长度(km) Length	业主单位 Project Owner
20	220kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×500 1×500+12B	20.7	国网浙江省电力公司舟山电力局
21	220kV海底电缆 Subsea Cable	1×1600	59.8	国网浙江省电力公司舟山供电公司
22	220kV海底电缆 Subsea Cable	3×630	213.3	中海石油(中国)有限公司
23	±200kV光电复合柔性直流海缆 DC Flexible Subsea Cable Composite with O.F.	1×300+2×24B 1×1000+2×24B		舟山市启明电力物资有限公司
24	±200kV光电复合柔性直流海缆 DC Flexible Subsea Cable Composite with O.F.	1×500 1×500+24B	83.7	中国电力技术装备有限公司
25	±160kV光电复合柔性直流海缆 DC Flexible Subsea Cable Composite with O.F.	1×500+2×18B 1×500		中国能建广东院
26	110kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×500+2×12B 1×500	102.9	国网浙江省电力公司舟山电力局
27	110kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×630+2×12B 1×630	41.3	舟山市电力物资供应公司
28	110kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×800+12B		广东电网公司湛江电力公司
29	110kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×1000+24B+4A	27.9	广东电网公司汕头电力公司
30	110kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×1000+24B+2A	30.3	广东电网公司江门电力公司
31	110kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×300+1×16B	31.9	龙源(莆田)风力发电有限责任公司
32	110kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×300+1×36B+1×18B		霞浦县浮鹰岛风电有限公司
33	110kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×630+2×12B		浙江舟山启明电力集团公司物资分公司
34	110kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×500+2×12B 1×500	40.2	浙江舟山启明电力建设有限公司
35	110kV光电复合海底电缆 Subsea Cable Composite with O.F.	1×630+2×12B 1×630	42.5	国网浙江省电力公司舟山电力局
36	110kV海底电缆 Subsea Cable	1×500	48.8	浙江舟山启明电力建设有限公司
37	110kV海底电缆 Subsea Cable	1×500	83.7	舟山市电力物资供应公司
38	66kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×800+2×36B ...	241.8	浙江玉环华电风力发电有限公司
39	±50kV直流海缆 DC Subsea Cable	1×300+5B		嵊泗县电力公司
40	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+36B ...	55.5	国电象山海上风电有限公司

## Subsea Cable performance List (Typical) 海底电缆业绩清单(典型)

序号 S/N	产品名称 Description	型号规格 Type & Size	长度(km) Length	业主单位 Project Owner
41	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×300+2×36B ...	150.5	 广东华电福新阳江海上风电有限公司
42	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+64B+8A ...	89.8	 福建莆田天投海上风电有限公司
43	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×300+36B ...	79.9	 国家能源集团东台海上风电有限责任公司
44	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×70+36B	70.4	 中广核工程有限公司
45	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+2×36B ...	87.7	 广东粤电阳江海上风电有限公司
46	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+64B+8A ...	80	 福建中闽海上风电有限公司
47	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+2×48B ...	136.5	 国家电力投资集团有限公司物资装备分公司
48	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×240+3×24B 3×500+3×24B	34.7	 中海石油(中国)有限公司湛江分公司
49	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+36B ...	62	 中广核工程有限公司
50	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+2×36B ...	95.5	 中节能(阳江)风力发电有限公司
51	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+2×36B ...	113	 三峡新能源阳江发电有限公司
52	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+2×24B ...	109	 射阳龙源风力发电有限公司
53	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×300+2×24B	44	 国网浙江省电力公司温州供电公司
54	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+2×48B ...	150	 中广核工程有限公司
55	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+34B+2A ...	78.8	 华能国际电力股份有限公司江苏分公司
56	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+2×36B ...	189.3	 华能盐城大丰新能源发电有限责任公司
57	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+36B ...	90.1	 三峡新能源阳江发电有限公司
58	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×400+36B ...	64.6	 国电电力浙江舟山海上风电开发有限公司
59	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×300+24B ...	57.7	 江苏广恒新能源有限公司东台分公司
60	35kV光电复合海底电缆 Subsea Cable Composite with O.F.	3×500+32B ...	37.3	 南方海上风电联合开发有限公司
61	35kV海底电缆 Subsea Cable	3×500 ...	313.5	 三峡新能源阳江发电有限公司

## Subsea Cable performance List (Overseas) 海底电缆业绩清单(海外)

序号 S/N	产品名称 Description	型号规格 Type & Size	业主单位 Project Owner
1	1kV海底电缆 Subsea Cable	4x50	英国PORTNEY LP
2	11kV海底电缆 Subsea Cable	3x300	 科麦奇石油有限公司 Kerr-McGee Petroleum
3	11kV海底电缆 Subsea Cable	3/0AWG (85)+1AWG(42.4)	 孟加拉BRB
4	11kV海底电缆 Subsea Cable	3x70	 新加坡REPLAN
5	11kV海底电缆 Subsea Cable	3x185	 孟加拉BREB BANGLADESH RURAL ELECTRIFICATION BOARD
6	12kV光电复合海底电缆 Subsea Cable Composite with O.F.	3x33.6 + 12B	 美国FRY'S ELECTRONICS
7	15kV海底电缆 Subsea Cable	3x185	 CACT操作者集团 CNOOC/ENI/ Chevron
8	15kV海底电缆 Subsea Cable	1x33.6	 加拿大NB Power Energie NB Power
9	20kV海底电缆 Subsea Cable	3x53.49	 印尼中海油 CNOOC Indonesia
10	20kV海底电缆 Subsea Cable	3x53.49	 印尼中海油 CNOOC Indonesia
11	20kV海底电缆 Subsea Cable	3x53.49	 印尼中海油 CNOOC Indonesia
12	20kV海底电缆 Subsea Cable	3x53.49	 印尼中海油 CNOOC Indonesia
13	20kV光电复合海底电缆 Subsea Cable Composite with O.F.	3x107.22+3x4Cx2.08	 印尼Pertamina PT. Pertamina
14	28kV光电复合海底电缆 Subsea Cable Composite with O.F.	AL/TR-XLPE/CTS/CCSWA	 加拿大Nelson City of Nelson
15	30kV光电复合海底电缆 Subsea Cable Composite with O.F.	1x185+48B	 尼加拉瓜 CELEC CELEC Nicaragua
16	33kV海底电缆 Subsea Cable	1×185	 孟加拉国家电气委员会 REB Bangladesh
17	33kV海底电缆 Subsea Cable	1×185	 孟加拉MM
18	33kV海底电缆 Subsea Cable	1×185	 孟加拉BREB BANGLADESH RURAL ELECTRIFICATION BOARD
19	33kV海底电缆 Subsea Cable	3×500	 英国SSE Scottish Hydro Electric Power Distribution plc.
20	35kV海底电缆 Subsea Cable	3×400 ...	 中国电建集团华东勘测设计研究院有限公司 HUADONG ENGINEERING CORPORATION LIMITED
21	66kV海底电缆 Subsea Cable	1×300	 恒逸实业(文莱)有限公司 HENGYI INDUSTRY SDN BHD

# 深海脐带缆

Umbilical System

- **水下生产系统脐带缆**  
Subsea Production System Umbilical
- **海洋动态电缆**  
Dynamic power cable
- **装备用脐带缆**  
Subsea Umbilical for Equipment
- **综合生产脐带缆**  
Integrated Production Umbilical



# Subsea Production System Umbilical

## 水下生产系统脐带缆

执行标准Standard: ISO 13628-5

API RP 17B, API Spec 17 J.

API-RP2A, API-RP2SK

API RP 17L2, ASME IX

BS EN 10257-2

DNV RP C203, DNV RP F109

IEC 60228: 2004

IEC 60502



分为软管脐带缆和钢管脐带缆两大类。为水下生产系统提供电力，信号控制，液压和化学药剂通道等连接。

Umbilical system can be divided into two categories: hose umbilical and steel tube umbilical. Umbilical can provided power, signal control and chemical channel for the subsea production system.

东方电缆可根据ISO13628-5等相关规范对脐带缆进行从原材料接收测试，出厂测试，系统集成测试和认证测试等全列测试。其中认证测试包括，拉伸与拉扭平衡测试,弯曲刚度，测试，抗测压测试，拉弯组合测试和在位疲劳测试等。

FAT, SIT test will be done according to ISO13628-5. Some key Qualification such as tension and torsion balance test, bend stiffness test, crush test and fatigue test for dynamic application will also be done according customer's specification.

东方脐带缆产品已经得到DNV等船级社的认证，相关认证包括体系审核，设计文件审查和独立计算，工艺文件审核,制造过程监造和测试验证等。东方电缆可根据客户需求对指定脐带缆进行单独认证。

Orient Umbilical Cable has been certified by DNV, the relative certification including system audit, design documents review and independent calculation, process audit, supervision and test verification of the manufacturing process. Orient Cable can separate certified Umbilical according to customer demand.



# Dynamic Power Cable

## 海洋动态电缆

执行标准Standard: AEIC CS8-07

ANSI/CEA S-97-682-2007

ANSI/CEA T-24-380-2007

API RP 2RD API STD 2RD

API 14FZ BS 5099

CIGRE Electra 189 CIGRE Electra 171 CENELEC HD 605 S2

DNV RP-C203 DNV RP F401

DNV CN 30.2

ICEA S-93-639 IEC 60502-1

IEC 60502-2

ISO 13628-6 (API 17F)



为浮式平台与平台，浮式平台与水下设施及浮式平台与岸上设施提供中高压电力连接。

The production is mainly used in providing MV/HV power connection between FPSO and platform, FPSO and subsea facilities and FPSO and onshore facilities.

东方电缆可提供客户定制化的交流和直流动态缆系统解决方案。其特殊导体设计可有效提供抗动态疲劳性能。同时，采用TR-XLPE和EPR绝缘材料，具有良好的抗水树性能和机械柔顺性。特殊的双层铠装钢丝角度设计，能实现拉扭平衡，提高动态应用的稳定性。

Orient cable's typically dynamic power cable design contains three power core phases for AC transition and single power core for AC. Each phase comprises a large copper consists of small OD in order to get a high fatigue performance. Both EPR and TR-XLPE can be used as insulation layer. Two Anti-angle armor wire will be used as strength element, torsion balance design will be considered.

作为一个成熟的动态缆系统解决方案提供者，东方电缆和其核心子供应商还可为客户提供从定制化柔性牵引头，上部终端，中水浮块，中水浮筒，防弯器，限弯器，水下终端，水下分配器到水下飞线等一些列产品。

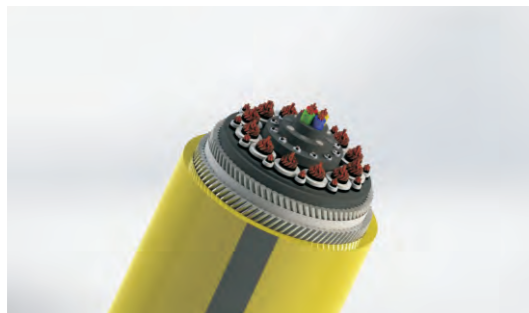
东方电缆可根据ISO13628-5等相关规范对海洋动态缆进行从原材料接收测试，出厂测试，系统集成测试和认证测试等全列测试。其中认证测试包括，拉伸与拉扭平衡测试，弯曲刚度测试,抗测压测试，拉弯组合测试和在位疲劳测试等。

The acceptance test will be done according to the ISO 13628-5 for the key Umbilical component, such as steel tube, electrical cable etc. When finish the umbilical manufacture the FAT and Qualification tests will be done, which includes: fatigue test, tension and torsion balance test, combined tension and bending test, crush test etc.

As a dynamic power cable solution, Orient cable and it's qualified sub-supply can supply the dynamic power cable system with a pull in head cover, Topside termination, distributed buoyancy modules, Bend stiffener with connector, seabed Techer clamp and mudmat, Subsea termination Bend Restrictor, and electric Flying Lead.

# Subsea Umbilical for Equipment 装备用脐带缆

执行标准Standard: ISO 13628-8/API 17D  
 ISO 13628-5 IEC 60793-2  
 IEC 60794-1-1 IEC 60794-1-2  
 IEC 60811 IEC 60840  
 IEEE 400 IEEE Standard 82-1994  
 DNV RP C203, DNV RP F109

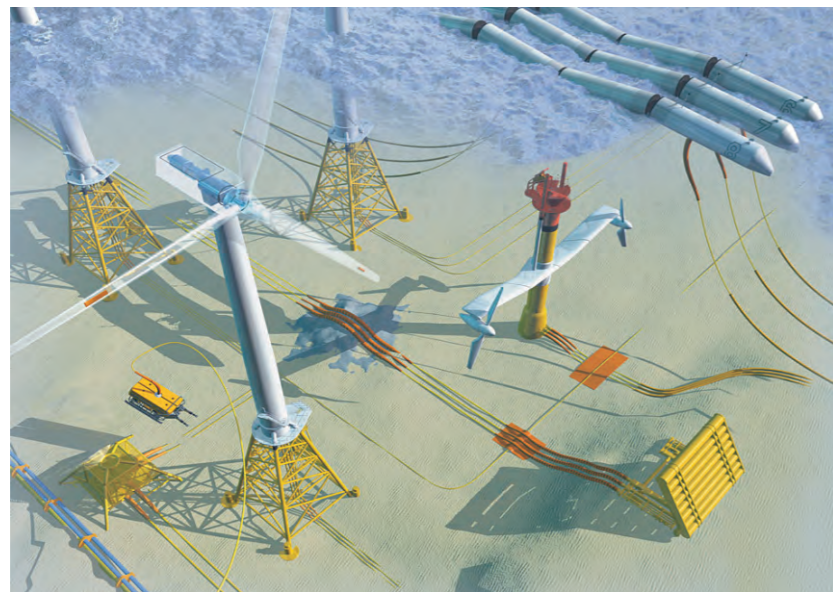


与绞车一起为水下挖沟机、ROV等设备提供电力和信号控制连接。

Together with winch provided power and signal control connecting for subsea trencher and ROV equipment.

东方电缆的水下装备用脐带缆主要为挖沟机，ROV等水下设施提供电力和信号控制等连接。脐带缆可根据客户需求进行多种加强方式设计，主要包括高碳钢丝铠装，芳纶编织，芳纶铠装和钢绞线加强等，以实现高强度、高柔顺性和轻量化的要求。同时，东方电缆所设计装备用脐带缆具备良好的抗疲劳性能，可满足使用过程中足绞车的循环收放需求。

Orient Cable subsea equipment used umbilical mainly provided power and signal control connection for trencher and ROV. Umbilical can be designed according to customer requirements which mainly including high carbon steel wire armour, aramid fiber preparation, aramid armour and steel wire armored strengthening etc. to achieve strength, high flexibility and lightweight requirements. Meanwhile, the umbilical designed by Orient Cable has good fatigue performance during circulation and meet the needs of using process midleg winch.



# Integrated Production Umbilical 综合生产脐带缆

执行标准Standard: ISO 13628-5  
 API RP 17B, API Spec 17 J.  
 API-RP2A, API-RP2SK  
 API RP 17L2, ASME IX  
 BS EN 10257-2  
 DNV RP C203, DNV RP F109  
 IEC 60228: 2004  
 IEC 60502



为水下生产系统提供液动力，电力，信号控制和化学药剂，气举，油气输送通道等连接。

Provide hydraulic power, electric power, signal control and chemical reagents, gas lift, oil and gas transmission channel for subsea production system.



# Typical Cases of Umbilical System

## 海洋脐带缆典型案例

# Typical Cases of Umbilical System

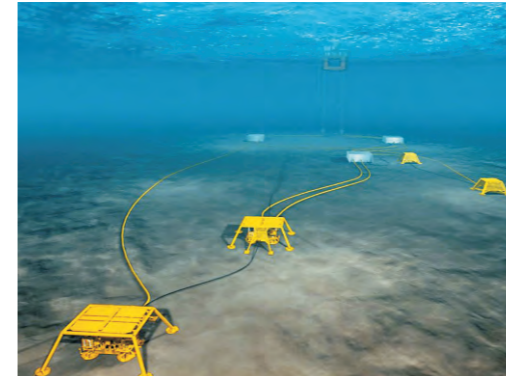
## 海洋脐带缆典型案例



**印尼BLT脐带缆**  
Indonesia BLT Umbilical



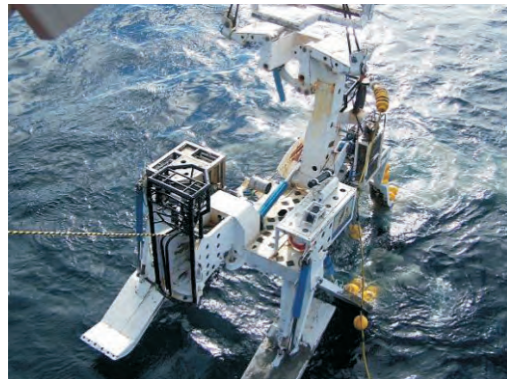
**印尼Banyu脐带缆**  
Indonesia Banyu Umbilical



**文昌9-2/9-3/10-3气田群开发项目脐带缆**  
Wenchang 9-2/9-3/10-3 Gas Field Development Project



**流花29-2项目脐带缆**  
Umbilical Cable of Lihua 29-2 Project



**CNOOC海洋挖沟机脐带缆**  
CNOOC Offshore Trencher Umbilical



**伊朗SP19水下生产系统脐带缆**  
Iran SP19 Subsea Production System Umbilical



**马来西亚MISC项目脐带缆**  
Umbilical for Malaysia MISC Project



**陆丰22-1项目脐带缆**  
Umbilical Cable of Lufeng 22-1 Project



**流花4-1电飞缆抢修/流花11-1深水动态缆**  
LH4-1 Flying Leads Repair/LH11-1 Dynamic Cable



**渤中25-1软管脐带缆**  
BZ 25-1 Hose Umbilical



**CACT南海发现号FPSO与HZ21A平台动态缆**  
CACT South Sea Discovery FPSO and HZ21A Platform Dynamic Umbilical



**三峡广东浮式海上风电项目动态缆**  
Dynamic Cable of the CTG Guangdong Floating offshore Wind Power Project

# Partners

## 合作伙伴

### 电力、能源 Power and energy



### 石化 Petrescence



### 铁路 Railway



### 钢铁 Steel



### 船舶、港口 Ship and port



### 建筑 Building



### 通讯 Communication



### 海外 Overseas



愿景：  
成为拥有自主知识产权  
具备世界先进水平  
具有国际核心竞争力的现代企业