海 缆
SUBMARINE CABLE

长飞宝胜海洋工程有限公司
YOFC Baosheng Marine Engineering Company Ltd.

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长飞公司简介

YOFC Company Profile

长飞光纤光缆股份有限公司（以下简称“长飞公司”）成立于1988年5月，是专注于光纤光缆产业链及综合解决方案领域的科技创新型企业，也是全球领先的光纤预制棒、光纤、光缆供应商。

长飞公司于2014年12月10日在香港联交所挂牌上市（股票代码：06869.HK），2018年7月20日在上海证券交易所挂牌上市（股票代码：601869.SH），是中国光纤光缆行业唯一一家也是湖北省首家A+H两地挂牌上市的企业。

长飞公司主要生产和销售通信行业广泛采用的各种标准规格的光纤预制棒、光纤、光缆，基于客户需求的各类特种光纤、光缆，以及射频同轴电缆、配件等产品，公司拥有完备的集成系统、工程设计服务与解决方案，为世界通信行业及其他行业（包括公用事业、运输、石油化工、医疗等）提供各种光纤光缆产品及综合解决方案，在全球70多个国家和地区提供优质的产品与服务。

自成立以来，通过技术引进、消化、吸收与再创新，长飞公司探索出了一条振兴民族产业的成功之路，自主掌握PCVD、OVD、VAD三种预制棒制造工艺，是国家认定企业技术中心、全国首批智能制造试点示范企业、全国制造业单项冠军示范企业，入选全国首批工业互联网平台集成创新应用试点示范项目，荣获国家科技进步二等奖（3次）、全国质量奖、欧洲质量奖等权威奖项，获得400余项中国专利和多项欧洲、美国、日本等国外发明专利，并成为光纤光缆制备技术国家重点实验室的依托单位以及国际电联ITU-T和国际电工IEC标准制定的重要成员之一。

秉持“智慧联接 美好生活”的使命，长飞公司以“客户 责任 创新 共赢”为企业核心价值观，在棒纤缆业务内涵增长、技术创新与智能制造、国际化地域拓展、相关多元化以及资本运营协同成长五大方面积极布局，致力于成为信息传输与智慧联接领域的领导者！

Yangtze Optical Fibre and Cable Joint Stock Limited Company (also known as ‘YOFC’) is established in Wuhan, Hubei Province in May 1988. It’s a technologically innovative enterprise specializing in optical fibre preforms, optical fibres, optical fibre cables and integrated solutions. It is also a global leading supplier of optical fibre preforms, optical fibres and optical fibre cables.

YOFC was listed in the Hong Kong Stock Exchange on December 10, 2014(Stock Code: 06869.HK), and listed on the Shanghai Stock Exchange on July 20, 2018 (Stock Code: 601869.SH), and is the only A&H shares company in China’s optical fibre and cable industry as well as the first one in Hubei Province.

YOFC mainly produces and sells different types of optical fibre preforms, optical fibres and optical fibre cables that widely installed in telecommunications industry, customized specialty optical fibres and optical fibre cables, RF coaxial cables and accessories. YOFC also provides the integrated systems, project design and services. In addition, YOFC is equipped with a full series of optical fibres , optical fibre cables and solutions, providing a variety of different products and solutions for world’s telecommunications industry and other industries (e,g. Public utility, Transportation, Oil & Chemistry and Medication etc.) and offering its products and services to over 70 countries and regions around the world.

Through introduction, digestion, absorption and re-innovation since its establishment, YOFC has carried out a way to successfully revitalize national industry. YOFC has mastered 3 types of optical fibre preform manufacturing technology (PCVD/OVD/VAD), and honored many awards & reputations such as National Enterprise Technical Center, National First Batch Smart Manufacturing Pilot Enterprise, Industrial Internet Platform Integrated Innovative Application Pilot Demonstration Project, the Second Class National Science and Technology Progress Award(3 times), the China Quality Award, the European Quality Award，etc. In addition, YOFC has obtained over 400 national-granted patents and several foreign invention patents from Europe, US and Japan, and was nominated the support organization for State Key Laboratory in optical fibre and optical fibre cable manufaction technology. It’s also one of the significant members in ITU-T and IEC in setting international standards.

Adhering to the mission of ‘Smart Link Better Life’, YOFC devotes itself to becoming the leader in information transmission and smart links through its core value ‘Client Focus Accountability Innovation Stakeholder Benefits’, and builds its strategies in the following 5 aspects: Organic growth strategy of the preform, optical fibre and cable business; Strategy for technological innovation and smart manufacturing; Strategy for internationalization and expansion of business scope; Related diversification strategy; Capital operation strategy for synergy in development.

海缆业务简介

Submarine Cable Business

长飞宝胜海缆有限公司、长飞宝胜海洋工程有限公司（以下简称“长飞宝胜公司”），位于江苏省扬州市，2018年1月，由宝胜科技创新股份有限公司（股票代码：600973.SH）与长飞光纤光缆股份有限公司（股票代码：06869.HK，601869.SH）共同投资成立，具备国际影响力和竞争力的海缆基地，占地面积40万平方米，拥有201.68米高立塔及可停靠5万吨级海缆船的深水码头。

长飞宝胜公司致力制造和销售海底电缆、光纤复合海底电缆、海底光缆、动态缆和脐带缆等，并可提供电缆接头、终端等全套附件。公司主要生产和检测设备分别进口于芬兰、瑞士、德国等国家，其中三层共挤、连续挤铝/挤铅、立式成缆铠装等关键设备保证海缆、超高压等产品的高品质。同时，公司拥有全屏蔽高压实验室，装备有局放、耐压、冲击、变频串联谐振等电缆测试系统，实现了对电缆性能试验与检测的有力保障。

基于宝胜和长飞两家集团的技术资源和销售网络，作为新时代电网建设和海洋工程开发事业强有力的支持者，长飞宝胜公司将为客户提供工程设计、制造、安装、服务等一体化、系统化、集成化的产品与服务，致力为国内外电网输配电系统和海底电力配送、信号传输及海洋工程开发提供更加卓越的产品和服务。

YOFC Baosheng Submarine Cable Co., Ltd., YOFC Baosheng Marine Engineering Company Ltd(Hereinafter referred to as YOFC Baosheng Co.). Our company is located in Yangzhou City, Jiangsu Province, established by Baosheng Science and Technology Innovation Co., Ltd. (600973.SH) and Yangtze Optical Fibre and Cable Joint Stock Limited Company(06869.HK，601869.SH) in January 2018. YOFC Baosheng Co. has the marine cable base which is provided with international influence and competitiveness. It covers an area of 400,000 sqm with a 201.68 meter-high tower. It also has a deep water pier，which can hold 50,000-ton submarine cable ship.

YOFC Baosheng Co. is committed to manufacturing and selling submarine cables, fiber composite submarine cable, Submarine cable, dynamic cable and umbilical cable, etc. We can also provide cable accessories, terminals and other complete accessories The main production and testing equipment are imported from Finland, Switzerland, Germany and other countries. Among them, three layers of co-extrusion, continuous extrusion of aluminum /lead, vertical cabled armor and other key equipment ensure the high quality of submarine cable, ultra-high pressure products. At the same time the company has full-shielded high-pressure test chamber, equipped with such cable test system as PD, pressure, shock, frequency series resonant to guarantee the cable performance testing and detection.

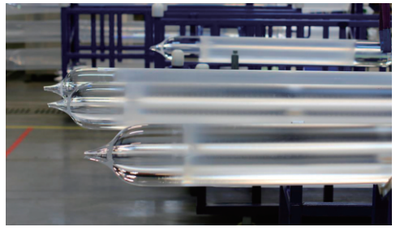
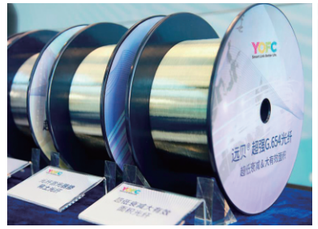
Based on the technical resources and sales network of Baosheng Group and YOFC Group, YOFC Baosheng Co. will provide customers with comprehensive, systematic and integrated products and services from engineering design, manufacture, installation, as the strong supporter of grid construction and ocean engineering development in the new era. We are committed to provide more excellent products and services for domestic and international power transmission and distribution systems and submarine power distribution, signal transmission and marine engineering development.

重要荣誉

Important Honor

“千淘万漉虽辛苦，吹尽狂沙始到金。”在三十多年的发展历程中，长飞公司在品牌发展路线的指引下，保持了持续稳健的发展势头，牢牢巩固了全球光纤光缆领域品牌的领先地位。

“No pain,no gain.” In the course of over 30 years development , under the guideline of the brand development , YOFC is keeping a sustained and steady development trend , and firmly consolidating the brand leadership in the global optical fibre and cable industry.

- 三次荣获 “国家科学技术进步二等奖”
- 同时掌握PCVD、OVD和VAD三种预制棒制备技术
- 获得国内外专利 400余项，主持或参与起草各类行业标准 166 项
- 承担了国家 973 计划、863 计划、科技重大专项国家重点研发计划等国家级项目、课题30 余项

- Awarded with the Second Prize of National Scientific and Technological Progress Award for 3 times
- Mastered the technology of PCVD,OVD and VAD
- Obtained over 400 patents at home and abroad, and leaded or participated in the drafting of 166 industry standards
- Undertook more than 30 national projects and tasks including 973 Project, 863 Project, Science and Technology Major Project etc.



创新平台

Innovation Platform

光纤光缆制备技术国家重点实验室

State key Labaratory of Optical Fibre and Cable Manufacture Technology

国家认定企业技术中心

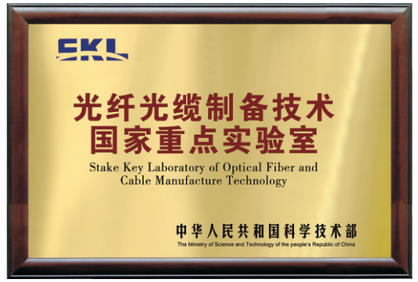
National Enterprise Technical Centre

国家技术创新示范企业

National Technology Innovation Demonstration Enterprise

智能制造试点示范企业

Intelligent Manufacturing Pilot Model Enterprise



拉丝机 Rod Breakdown Machine

可进行铜丝、铝丝、铝合金丝的圆、异型线拉丝生产。单丝直径稳定、均一，退火控制精确，可有效恢复拉丝过程中破损的金属晶格，降低电阻率。在提高产品性能的同时，本台设备配有2套高速拉丝系统，可同时进行两根铜杆的拉丝生产，结合全自动装盘系统，整个设备生产效率为国产设备4倍以上。

It can produce round or special–shaped of copper wire, aluminum wire, aluminum alloy wire.The diameter of monofilament is stable and uniform,and the annealing control is precise,which can effectively restore the damaged metal lattice in the rod breakdown process and reduce the electrical resistivity. While improving the product performance, this equipment is equipped with two sets of high–speed rod breakdown system, which can be used for producing two copper rods at the same time. Combined with the automatic pan loading system, the efficiency of the whole equipment is more than 4 times that of the domestic equipment.

高速框绞机 High–speed Rigid Strander

用于海底电缆和高压电缆导体生产，最大截面达3500mm^2，是目前国际上最先进的导体绞合设备，产品生产过程工艺参数保持恒定不变。

It is used for the conductor production of submarine cable and high voltage cable,the largest cross section is up to 3500mm², which is the most advanced conductor integration equipment in the world currently,the technological parameters in the product production process remain constant.

VCV、CCV三层共挤交联生产线

用于生产750kV及以下交联聚乙烯绝缘线芯，最大导体截面达3500mm^2，是目前国际上最先进的设备，生产产品具有最优的交联度和最佳的圆整度，可达99%接近完美圆整度，减少了偏心和椭圆造成的电场畸变， 保证了大截面、大长度海底电缆和超高压电缆的优越性能。

VCV, CCV Triple Extruded Cross-linked Production Lines

For the production of up to 750kV XLPE insulated wire core, the Max conductor. cross–sectional area is 3500mm^2, the line is currently the most advanced equipment, its products have the optimal cross–linking and the best roundness, up to 99% perfect roundness, reducing the eccentric and elliptical distortion caused by the ovals, It ensures the superior performance of submarine cable and ultra–high voltage cable with large section and long length.

大长度连续生产——绝缘 高速 稳定

我们拥有201.68米的全球最高立塔及海缆专用挤出流道，生产中可做到更高偏心度控制和更好交联控制。

Long-term continuous operation——Insulation High-speed Stable

We have a 201.68 meter–high tower, the highest in the world and submarine cable special extrusion runner, achieving higher eccentricity control and better cross–linking control in production.

挤铅挤塑联合生产线

用于生产海底电缆铅护套和非金属护套，最大挤出铅套直径200mm，挤出套管表面光滑、厚度均匀。

Combined Production Line of Lead Extrusion and Plastic Extrusion

It is used for submarine cable lead sheath and non–metallic sheath.The maximum diameter of extruded lead sheath is 200mm.The extrusion casing has smooth surface and uniform thickness.

装备优势
Equipment Advantage

立式成缆和钢丝铠装生产线

用于大长度海底电缆的成缆和铠装，可生产220kV 3×2500mm²及以下三芯大长度海底电缆，是目前国际上最先进的设备，产品生产过程工艺参数保持恒定不变，长期连续运行可靠性高。

Vertical Laying up and Steel Wire Armoring Machine

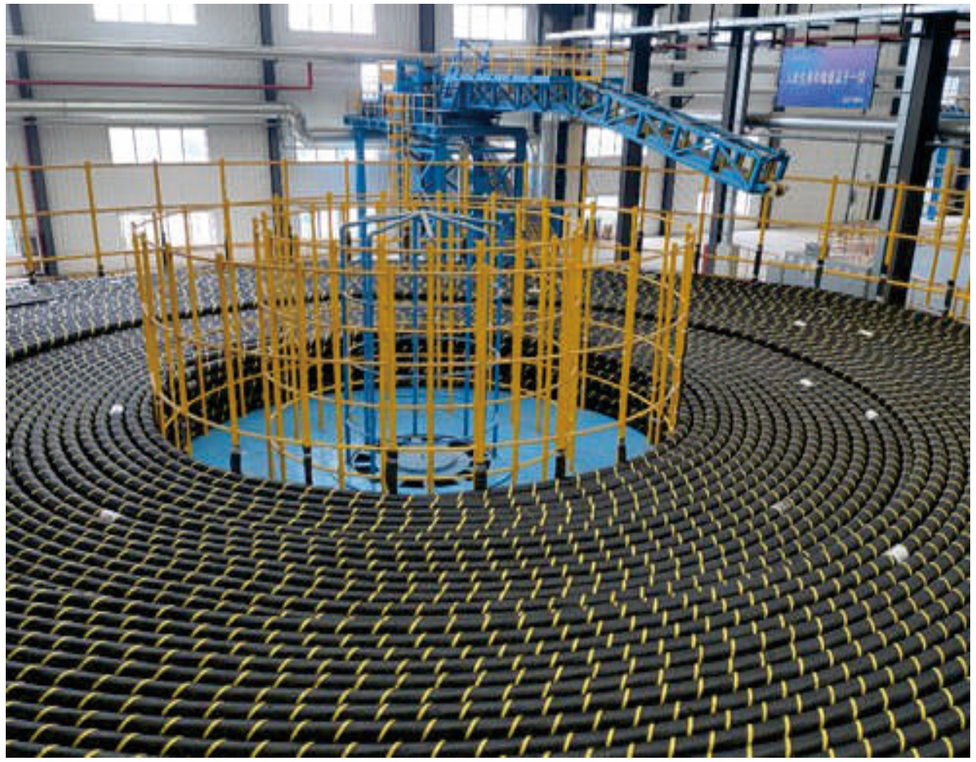
For the laying up and armoring of large length submarine cable, it can produce up to 220kV 3×2500mm² three core large length submarine cable. It is the most advanced equipment in the world at present. The process parameters keep constant and ensure high reliability during long–term continuous operation.

大容量托盘及大型智能联体托盘去气系统

托盘直径最大40米，满足大长度海底电缆单根无接头，提高供电稳定性；托盘采用变频调速，可根据收、放线速度智能调节；精确的温度控制系统，确保交联线芯去气效果达到最好，可满足超大长度交联电缆去气需求。

Large-capacity Tray and Large Smart Linkage Tray Gas Removing System

Tray diameter is up to 40 meters, and meet the single large length submarine cable without a connector or reduce the cable connector, in order to improve power supply stability; Tray utilizes frequency control, and achieves automatic adjustment according to take up and pay off speed; Accurate temperature control system ensures the gas removing effect of cross-linking core, to meet the needs of extra-large length cross-linked cable.



装备优势
Equipment Advantage

国际最先进的检测试验设备 The Most Advanced Testing Equipment

海缆检测室总占地约3500余平，分为海光缆检测室、海电缆力学性能实验室、海电缆电性能实验室、中压试验大厅、高压试验大厅。试验大厅占地4095平，建筑物长90米、宽45.5米、高33米，与生产车间完全独立，隔绝了生产设备产生的电气干扰。超高压试验大厅为国内最高规格，可进行750kV交流海缆及±525kV直流海缆的电气性能测试。检测室拥有多种高、精、尖的大型试验设备和仪器，具备对750kV及以下海底光电复合电缆、陆上电力电缆、电缆附件等电缆、光缆全系列及其配套产品的各项检测能力，可进行局放、耐压、雷冲、透水、光纤衰减等检测试验。

Submarine cable testing room covers an area of about 3500 square, and is divided into the fiber optic cable testing room,marine cable mechanical properties laboratory,marine cable electrical performance laboratory, medium voltage test hall, high voltage test hall.The test hall covers an area of 4095 square, which is 90 meters long, 45.5 meters wide, 33 meters high, completely independent of the production workshop,so that isolate the electrical interference of the production equipment. The ultra-high voltage test hall is the highest specification in China,which can test the electrical performance of 750KV AC submarine cable and ±525KV DC submarine cable. There are a variety of high, fine, sharp large test equipment and instruments in the test room,with the detection ability of 750kV and below the submarine photoelectric composite cable,land power cable,electricity accessories and other cables,the whole series of optical cable and its supporting products,which can carry on partial discharge, withstand voltage, lightning surge, water permeability, fiber optical attenuation and other detection tests.

装备优势
Equipment Advantage

软接头绝缘互熔技术 Mutual soluble Technology of Flexible Joint

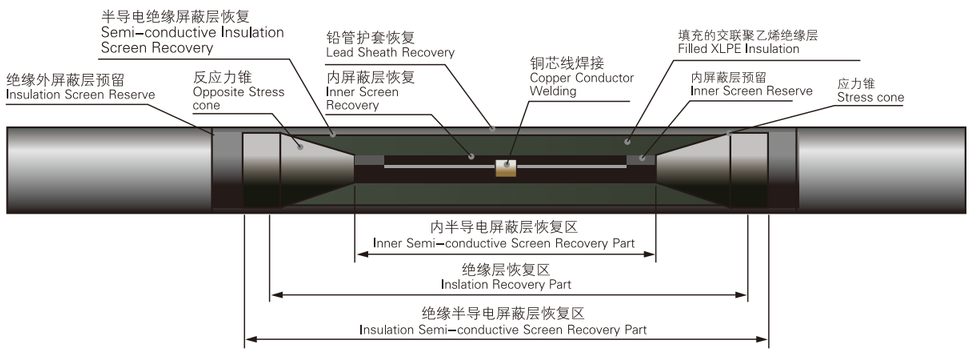
我们拥有经验丰富的技术专家团队，拥有具有自主知识产权的模具、温控系统及独立的移动式净化室（1000级）；有能力完成500kV及以下交流海缆软接头的独立制作。绝缘与电缆本体熔融结合，彻底消除界面影响，电场分布与原电缆等值均匀。电气性能、机械性能、弯曲性能和使用寿命与本体一致。

We have a team of experienced technical experts, with the mold, temperature control system and independent mobile purification room (1000 level) of independent intellectual property rights; We have the ability to complete the independent manufacture of 500kV and the below AC submarine cable soft joints. The insulation is melted and combined with the cable body,completely eliminate the influence of the interface, and the electric field distribution is equivalent to the original cable. Electrical performance, mechanical performance, bending performance and service life are consistent with the body.

主要过程控制 Main Process Control

导体恢复——导体屏蔽恢复——绝缘恢复——绝缘屏蔽恢复——金属套恢复——非金属套恢复。

conductor recovery – conductor shield recovery – insulation recovery – insulation shield recovery – metal sleeve recovery – non–metal sleeve recovery.



软接头示意图

产品特征 Product Characteristics

项目 Item	免维护接头（FMJ） Maintenance–free Joints（FMJ）	普通电缆接头 Common Cable Joints
结构尺寸 Structure size	导体、内屏蔽、绝缘及外屏蔽结构材料和尺寸与本体一致 Conductor, inner shield, insulated and outer shielding structure material and size are in consistent with the cable	绝缘与屏蔽结构采用其他材料代替，尺寸偏大 Insulation and shielding structure adopts other materials instead, the size is too large
导体连接 Conductor connection	银纤焊技术，等直径、低电阻、焊接处拉断力可达本体95% Silver soldering technique, equal diameter, low resistance, tensile force of welding position can be up to 95% of the cable	整体压接，电阻偏大，抗拉强度低 Overall press–fit, resistance is large, tensile strength is low
绝缘制法 Insulation production method	模注工艺，FMJ与电缆本体熔融结合，彻底消除界面，电场分布与原电缆等值均匀 Die–casting process, FMJ and the cable melt to fusion, completely eliminating the interface, the electric field distribution are uniform with the original cable	预制件装配，与电缆本体间存在可活动界面，界面极化、空间电荷积聚导致电场畸变问题 Preform assembly, there exist movable interface with the cable. Interface polarization and space charge accumulation cause electric field distortion problem
电气性能 Electrical performance	与本体一致 Consistent with the cable	能达到使用要求 Meet the requirement
机械性能 Mechanical performance	与本体一致 Consistent with the cable	差 Poor
弯曲性能 Bending performance	与本体一致 Consistent with the cable	差 Poor
使用寿命 Service life	与本体一致 Consistent with the cable	故障率高、易发热、易受潮、易老化 High failure rate, easy to heat, easy to damp, easy to aging

不锈钢管激光焊接生产线

进口不锈钢光单元生产线，稳定的光纤余长和纤膏填充率保障了光纤的传输性能，该生产线具备大长度连续稳定生产能力，最高可满足单管144芯光单元的生产。

Stainless steel tube laser welding production line

Imported stainless steel optical unit production line, stable optical fiber residual length and paste filling rate ensure the transmission performance of the optical fiber, the production line has ability to product a large length with continuity and stability , the highest can achieve the production of single tube 144 core optical unit.

内铠和铜管氩弧焊联动生产线

内层12+12+12钢丝铠装机，既可单动进行钢丝铠装，又可与氩弧焊设备组成串联生产，以满足内铠钢丝铠装后加铜管焊接的海底光缆生产需求。长期连续运行可靠性高。

Inner armor and copper tube argon arc welding joint production line

The inner 12+12+12 steel wire armoring machine not only can conduct single steel wire armor,but also can product with argon arc welding equipment in series, to meet the production demand of submarine cable with copper tube welding after inner steel wire armor. Long–term continuous operation has high reliability.

装备优势
Equipment Advantage

挤塑生产线

用于生产海底光缆绝缘层和护套层。通过设备智能化，自动反馈生产外径。并结合产品制造工艺，精准控制螺杆转速，降低产品外径波动，提高大长度连续生产的稳定性。

Extrusion production line

Used for producing insulation layer and sheath layer of submarine optical cable. Through intelligent equipment, automatic feedback production outside diameter. Combined with the product manufacturing process, precise control screw speed, reduce the product diameter fluctuation, improve the stability of large length continuous production.

外铠生产线

18+24+24铠装机，最大支持66根钢丝铠装，并配有PP绳绞合装置及沥青涂敷装置。该设备可根据铠装层绞合节距不同，通过无极变速，匹配相应的转速。设备运行稳定，钢丝预成型良好，具备大长度铠装生产能力。

Outer armor production line

18+24+24 wire armor machine, maximum support 66 steel wire armor, and equipped with PP rope stranding device and asphalt coating device. The equipment can match the corresponding speed through CVT according to the different stitching pitch of the armored layer. The equipment runs stably, the steel wire preforms well, and has the production capacity of large length armored.

装备优势
Equipment Advantage

储缆池

用于海底光缆半成品和成品的中转存储。储缆池底部有电机，可带动缆池旋转，减少导缆作业时对海底光缆的扭转，保证产品质量。单个缆池最大直径达9.5米，可满足大长度海底光缆的生产需要。

Cable storage pool

Used for transfer storage of submarine optical cable semi–finished products and finished products. There is a motor at the bottom of the cable storage pool, which can drive the cable pool to rotate, so as to reduce the torsion of the submarine cable during the cable guiding operation, and ensure the product quality. The maximum diameter of a single cable pool is 9.5 meters, which can meet the production needs of large–length submarine cable.

码头 Quay

质量与售后
Quality and After–sales

质量控制 Quality Control

自主设计制造测试装置，可根据海缆实际敷设环境、运行工况等进行海缆全性能测试。产品品质优于国家标准及业内水平。

Independently design and manufacture test equipment, the full performance test of the submarine cable can be carried out according to the actual laying environment and operating conditions of the submarine cable. Product quality is superior to national standards and

服务&支持 Service and Support

长飞海缆公司为客户提供从项目设计、生产、敷设、安装、预调试到后期维护、技术培训等全方位的支持。我们从业主的角度出发，通过严谨的设计论证，达到项目的质量、性能与资金投入的完美平衡。经验丰富的安装、维修队伍对于突发情况第一时间给予响应并提供解决方案与人员、设备协助。

YOFC Submarine Cable Company provides customers with all–round support from project design, production, laying, installation, pre–debug to post–maintenance and technical training. From the perspective of the proprietor, we have achieved a perfect balance between project quality, performance and capital investment through rigorous design demonstration. Experienced installation and maintenance teams respond to emergency situations and provide solutions and personnel, equipment assistance.

产品标准
Product Standard

国际标准

- CIGRE–21–02–Electra–189　额定电压大于30kV（Um=36 kV）到150 kV（Um=170 kV）海底电缆的测试方法介绍
- CIGRE–21–02–Electra–219　额定电压250kV及以下直流挤出绝缘电力电缆推荐测试标准
- ELECTRA–171–1997–CIGRE　海底电缆机械性能试验推荐标准
- IEC 60502　额定电压1kV（Um=1.2 kV）至30 kV（Um=36kV）挤出绝缘电力电缆及其附件
- IEC 60840　额定电压30kV（Um=36 kV）至150 kV（Um=170kV）挤出绝缘电力电缆及其附件：试验方法和要求
- IEC 62067　额定电压150kV（Um=170 kV）至500kV（Um=550kV）挤出绝缘电力电缆及其附件：试验方法和要求
- ITU–T:G.971　海底光缆系统的一般特性
- ITU–T:G.972　关于海底光缆系统术语的定义
- ITU–T:G.973　无中继海底光缆系统的特性
- ITU–T:G.974　再生式海底光缆系统的特性
- ITU–T:G.975　海底通信系统前向纠错
- ITU–T:G.976　适用于海底光缆系统的试验方法
- ITU–T:G.978　海底光缆特性

国家标准

- GB/T 32346　额定电压220kV（Um=252 kV）交联聚乙烯绝缘大长度交流海底电缆及附件
- JB/T 11167　额定电压10kV（Um=12 kV）至110 kV（Um=126kV）交联聚乙烯绝缘大长度交流海底电缆及附件
- GB/T 12706　额定电压1kV（Um=1.2 kV）到35 kV（Um=40.5kV）挤包绝缘电力电缆及附件
- GB/T 11017　额定电压110kV（Um=126kV）交联聚乙烯绝缘电力电缆及其附件
- GB/T 18890　额定电压220kV（Um=152kV）交联聚乙烯绝缘电力电缆及其附件
- GB/T 22078　额定电压500kV（Um=550kV）交联聚乙烯绝缘电力电缆及其附件
- GB/T 18480　海底光缆规范
- GJB 4489　海底光缆通用规范
- JB/T 10181　电缆载流量计算

International Standard

- CIGRE–21–02–Electra–189 Recommendations for Testing of Submarine Cables with Rated Voltages from 30 kV (Um = 36 kV) to 150 kV (Um = 170 kV)
- CIGRE–21–02–Electra–219 Recommendations for Testing DC Power Cables Systems for Power Transmission at a Rated Voltage up to 250 kV
- ELECTRA–171–1997–CIGRE Recommendations for Mechanical Tests on Submarine Cables
- IEC 60502 Power Cables with Extruded Insulation and Their Accessories for Rated Voltages from 1 kV (Um = 1.2 kV) to 30 kV (Um = 36 kV)
- IEC 60840 Power Cables with Extruded Insulation and Their accessories for Rated Voltages from 30 kV (Um = 36 kV) up to 150 kV (Um = 170 kV): test methods and requirements
- IEC 62067 Power Cables with Extruded Insulation and Their Accessories for Rated Voltages above 150 kV (Um = 170 kV) to 500 kV (Um = 550 kV): test methods and requirements
- ITU–T: G.971 General Features of Optical Fibre Submarine
- ITU–T: G.972 Definition of Terms Relevant to Optical Fibre
- ITU–T: G.973 Characteristics of Repteaterless Optical Fibre Submarine Cable Systems
- ITU–T: G.974 Characteristics of Regenerative Optical Fibre Submarine Cable Systems
- ITU–T: G.975 Forward Error Correction for High Bit–Rate DWDM Submarine Systems
- ITU–T: G.976 Test Methods Suitable for Optical Fibre Submarine Cable Systems
- ITU–T: G.978 Characteristics of Optical Fibre Submarine Cable

National Standard

- GB/T 32346 Long–length AC submarine cables with cross–linked polyethylene insulation and their accessories for rated voltage of 220 kV(Um=252 kV)
- JB/T 11167 Long–length AC submarine cables with cross–linked polyethylene insulation and their accessories for rated voltage from 10kV(Um=12 kV)to 110 kV(Um=126kV)
- GB/T 12706 Power cables with extruded insulation and their accessories for rated voltages from 1kV（Um=1.2 kV）to 35 kV（Um=40.5kV）
- GB/T 11017 Power cables with cross–linked polyethylene insulation and their accessories for rated voltage of 110 kV（Um=126 kV） Part 1: Test methods and requirements
- GB/T 18890 Power cables with cross–linked polyethylene insulation and their accessories for rated voltage of 220kV（Um=152kV） Part 1: Test methods and requirements
- GB/T 22078 Power cables with cross–linked polyethylene insulation and their accessories for rated voltage of 500kV（Um=550kV） Part 1: Test methods and requirements
- GB/T 18480 Submarine cable specifications
- GJB 4489 Submarine cable general specifications
- JB/T 10181 Ampacity Calculation of cables

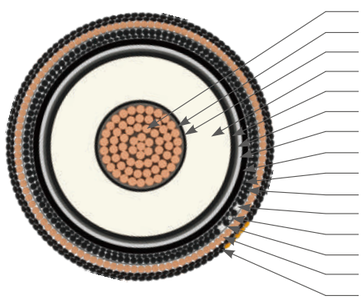
交联聚乙烯绝缘单芯海底（光电复合）电缆

- 执行标准：GB/T 32346–2015、JB/T 11167–2011、CIGRE TB–490、CIGRE 623
- 工作电压：750kV及以下
- 最大截面：3500mm^2
- 适用范围：适用于工频49~61赫兹、额定电压64/110kV(Um=126kV)、127/220kV(Um=252kV)、290/500kV(Um=550kV)中性点直接地输电系统。主要用于大陆与海岛、海岛与海岛、大陆与海洋石油平台之间的大功率电力输送，以及智能电网控制信号传送和通信信号的传输。

Single–Core (Optical Fiber Composite) Submarine Cable with XLPE Insulation

- Executive Standard : GB/T 32346–2015、JB/T 11167–2011、CIGRE TB–490、CIGRE 623
- Operating Voltage : 750kV and below
- Maximum Cross Section : 3500mm^2
- Scope of Application : Applicable to neutral–grounded transmission system whose frequency is 49~61Hz and rated voltage is 64/110kV(Um=126kV) , 127/220kV(Um=252kV) 290/500kV(Um=550kV). Mainly used for high–power transmission, including mainland to island, island to island, mainland to offshore oil platform, as well as the smart grid control signal transmission and communication signal

产品结构图 Product Structure



1.阻水铜导体 1.Water–blocking copper conductor
2.导体包带 2.Conductor tape
3.半导电导体屏蔽 3.Semi–conducting conductor screen
4.XLPE绝缘 4.XLPE insulation
5.半导电绝缘屏蔽 5.Semi–conducting insulation screen
6.半导电阻水带 6.Semi–conducting water blocking tape
7.合金铅护套 7.Lead alloy sheath
8.半导电PE护套 8.Semi–conducting PE sheath
9.内衬层 9.Inner bedding
10.填充棒 10.Filler rod
11.保护丝 11.Protective wire
12.光缆 12.Optical fiber
13.包带 13.Tape
14.扁铜丝铠装 14.Flat copper wire armor
15.外被层 15.Outer serving

290/500kV交联聚乙烯绝缘单芯光纤复合海底电缆
Single–core optical fiber composite submarine cable with XLPE insulation for voltage of 290/550kV

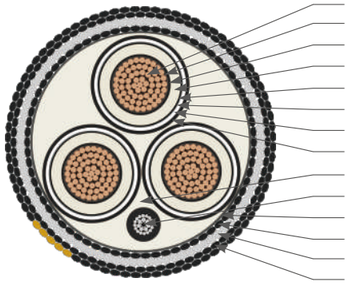
交联聚乙烯绝缘三芯海底（光电复合）电缆

- 执行标准：GB/T 32346–2015、JB/T 11167–2011、CIGRE TB–490、CIGRE 623
- 工作电压：500kV及以下
- 最大截面：3500mm^2
- 适用范围：适用于工频49~61赫兹，额定电压26/35kV(Um=40.5kV)、36/66（Um=72.5kV）、64/110kV(Um=126kV)、127/220kV (Um=252kV)、190/330kV（Um=363kV）、290/500kV（Um=550kV）中性点直接地输电系统。主要用于大陆与海岛、海岛与海岛、大陆与海洋石油平台之间的大功率电力输送，以及智能电网控制信号传送和通信信号的传输。

Three–Core (Optical Fiber Composite) Submarine Cable with XLPE Insulation

- Executive Standard : GB/T 32346–2015、JB/T 11167–2011、CIGRE TB–490、CIGRE 623
- Operating Voltage : 500kV and below
- Maximum Cross Section : 3500mm^2
- Scope of Application : Applicable to neutral–grounded transmission system whose frequency is 49~61Hz and rated voltage is 26/35kV（Um=40.5kV）,36/66（Um=72.5kV）,64/110kV（Um=126kV）,127/220kV （Um=252kV）,190/330kV（Um=363kV）,Mainly used for high–power transmission between mainland and island, island and island, mainland and offshore oil platform, as well as the smart grid control signal

产品结构图 Product Structure



1.阻水铜导体	1.Water–blocking copper conductor
2.导体包带	2.Conductor tape
3.导体屏蔽	3.Conductor screen
4.XLPE绝缘	4.XLPE insulation
5.绝缘屏蔽	5.Insulation screen
6.半导电阻水带	6.Semi–conducting water barrier
7.合金铅护套	7.Lead alloy sheath
8.半导电PE护套	8.Semi–conducting PE sheath
9.填充	9.Filler
10.光缆	10.Optical fiber
11.包带	11.Tape
12.内衬层	12.Inner bedding
13.镀锌钢丝铠装	13.Galvanized steel wire armor
14.外被层	14.Outer serving

127/220kV交联聚乙烯绝缘三芯光纤复合海底电缆
Three–core optical fiber composite submarine cable with XLPE insulation for voltage of 127/220kV

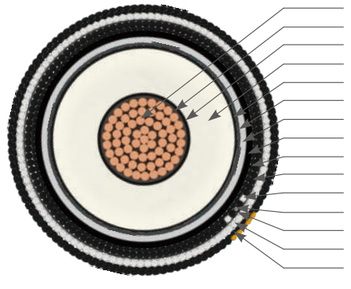
交联聚乙烯绝缘直流海底（光电复合）电缆

- 执行标准：GB/T 31489–2015、CIGRE TB–496、CIGRE 623
- 工作电压：±525kV及以下
- 最大截面：3500mm^2
- 适用范围：主要用于VCS换流技术的直流输电系统中，作为系统线路电能传输载体，主要用于工业电示范工程、远海风力发电、不同交流系统的并网互联、岛屿及大陆之间海底电力传输、沿海城市增容、大型海上石油平台电力传送，以及智能电网控制信号传送和通信信号的传输。

XLPE Insulated D.C (Optical Fiber Composite) Submarine Cable

- Executive Standard : GB/T 31489–2015、CIGRE TB–496、CIGRE 623
- Operating Voltage : ±525kV and below
- Maximum Cross Section : 3500mm^2
- Scope of Application : Applicable to D.C. transmission system of VCS converter technology, as the carrier of system circuit power transmission, this cable mainly used for industrial electrical demonstration project, offshore wind power, grid interconnection of different communication systems, power transmission between mainland and island, capacity expansion of coastal city, mainland and offshore oil platform, as well as the smart grid control signal transmission and communication signal transmission.

产品结构图 Product Structure



1.阻水铜导体	1.Water–blocking copper conductor
2.导体包带	2.Conductor tape
3.半导电导体屏蔽	3.Semi–conducting conductor screen
4.XLPE绝缘	4.XLPE insulation
5.半导电绝缘屏蔽	5.Semi–conducting insulation screen
6.半导电阻水带	6.Semi–conducting water blocking tape
7.合金铅护套	7.Lead alloy sheath
8.半导电PE护套	8.Semi–conducting PE sheath
9.内衬层	9.Inner bedding
10.填充棒	10.Filler rod
11.保护丝	11.Protective wire
12.光缆	12.Optical fiber
13.包带	13.Tape
14.钢丝铠装	14.Steel wire armor
15.外被层	15.Outer serving

500kV以下交联聚乙烯绝缘直流光纤复合海底电缆
XLPE Insulated D.C. Optical Fiber Composite Submarine Cable up to 500kV

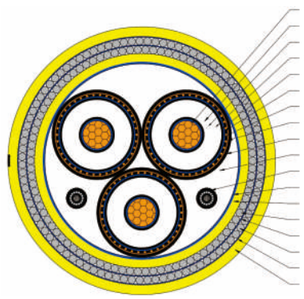
动态海底电缆

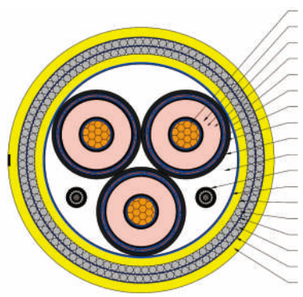
- 执行标准：CIGRE TB 862、CIGRE TB 490、IEC 60840、JB/T 11167
- 产品概述：海洋动态缆作为连接水上浮体与水下装备系统的关键设备，可广泛应用于海洋油气和海洋能源（风能、光能、波浪能等）开发。海洋动态缆为高度定制化产品，技术含量高，本公司可以根据客户实际需求，提供66kV及以下不同规格的海洋动态电缆，适用于各种复杂的海洋工况环境，保障其在安装和在位运行过程中的安全运行。
- 产品特性：海洋动态缆具备超抗水树性、高柔顺性、抗疲劳、抗拉伸、抗扭转等特性。

Marine Dynamic Cable

- Executive Standard：CIGRE TB 862、CIGRE TB 490、IEC 60840、JB/T 11167
- Product Overview：As the key equipment connecting the offshore floating platform and the underwater production system, the marine dynamic cables can be widely used in the fields of offshore oil & gas and marine energy (wind energy, solar energy, wave energy, etc.). Marine dynamic cables are highly customized products with high technical content. Baosheng Submarine Cable Company can provide marine dynamic cables with different specifications of 66kV and below according to the actual needs of customers, which are suitable for various complex marine working conditions and ensure the safety during installation, operation and maintenance.
- Product Characteristics：Water tree resistance, High flexibility, Fatigue resistance, Tensile resistance, Torsion resistance.

产品结构图 Product Structure





注：本图仅供参考，动态缆截面结构根据项目实际需求进行定制。
Note: This picture is for reference only, and the cross-sectional structure of the marine dynamic cable is customized according to the actual needs of the project.

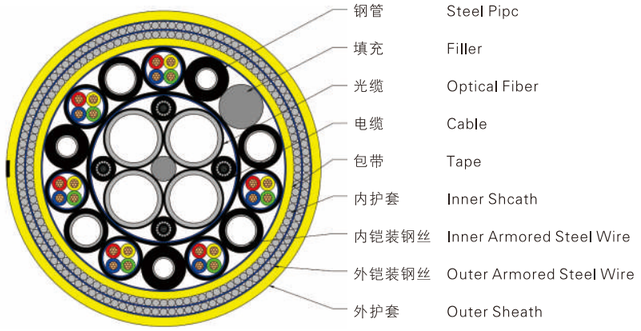
脐带缆

- 执行标准：ISO 13628-5、API 17E、GB/T 21412.5、GB/T 12706、API 17B、DNV F201
- 产品概述：海洋脐带缆作为水下控制系统的关键组成部分，连接着上部设施和水下海底装备，主要用于传输电力、传递信号、输送液压动力以及化学药剂等，主要应用于海洋油气开发、深海装备及海洋科学探测等领域。本公司可以根据客户需求，提供不同类型的脐带缆产品，包括钢管脐带缆、软管脐带缆、铠装脐带缆和无铠装脐带缆，满足复杂海洋环境的应用，保障其在安装和在位运行过程中的安全运行。
- 产品特性：海洋脐带缆具备抗疲劳、抗扭转、高强度、抗冲击、抗压溃和抗腐蚀性等特性。

Umbilicals

- Executive Standard：ISO 13628-5、API 17E、GB/T 21412.5、GB/T 12706、API 17B、DNV F201
- Product Overview：Umbilical cable is an important industrial equipment for marine oil and gas development. It has the function of connecting underwater production systems and sea surface control systems to provide power, hydraulic power, chemical agents and data signal which is necessary for normal operation of underwater production systems.. It is mainly used in the fields of offshore oil and gas development, deep-sea equipment and marine scientific exploration. Baosheng Submarine Cable Company can provide different types of umbilicals according to customers' requirements, including steel tube umbilical, thermoplastic hose umbilical, armored and unarmored umbilicals, which can meet the application of complex
- Product Characteristics：Fatigue resistance, Torsion resistance, High strength, Impact resistance, Crush resistance, Corrosion resistance

产品结构图 Product Structure



注：本图仅供参考，脐带缆截面结构根据项目实际需求进行定制。
Note: This picture is for reference only, and the cross-sectional structure of the umbilical cable is customized according to the actual needs of the project.

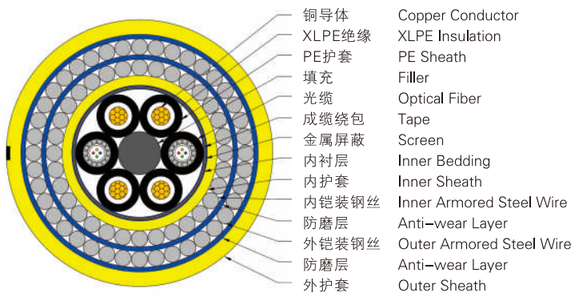
海工装备缆

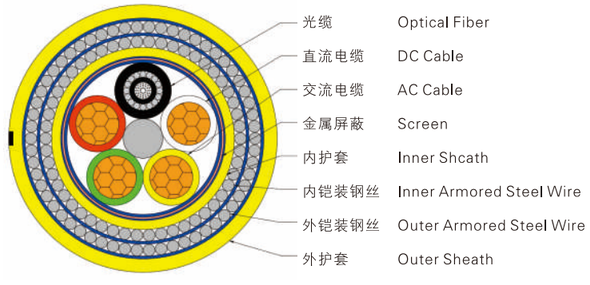
- 执行标准：IEC 60502、ISO 13628–5、GB/T 12706、API 17B、DNV F201
- 产品概述：海工装备缆由多根独立的电力电缆和通讯光缆集束而成，主要为水下作业装备传输电力及传递控制信号，广泛应用于水下机器人，海洋科学试验和测试装备用缆。海工装备缆属于高度定制化产品，本公司可以根据客户实际需求，提供各种类型的海工装备缆，满足水中作业工况的需要。
- 产品特性：海洋装备缆具备高柔顺性、重量轻、防扭结、抗拉伸、抗扭转等特性。

Marine Dynamic Cable

- Executive Standard：IEC 60502、ISO 13628–5、GB/T 12706、API 17B、DNV F201
- Product Overview：The marine equipment cable is composed of multiple independent power cables and communication optical cables. It mainly transmits power and transmits signals for underwater operation equipment. This type of cable can be widely used in underwater ROV, equipment for marine science experiments and tests. Marine equipment cables are highly customized products. Baosheng Submarine Cable Company can provide various types of marine engineering equipment cables according to the actual needs of customers to meet the needs of underwater working conditions.
- Product Characteristics：High flexibility, Low weight, Non–Kinking, Tensile resistance, Torsion resistance.

产品结构图 Product Structure





注：本图仅供参考，海工装备缆截面结构根据项目实际需求进行定制。
Note: This picture is for reference only, and the cross–sectional structure of the marine equipment cable is customized according to the actual needs of the project.

产品介绍 Product Introduction
海底光缆 Submarine Optical Fiber Cable

深海（有中继）光缆系列

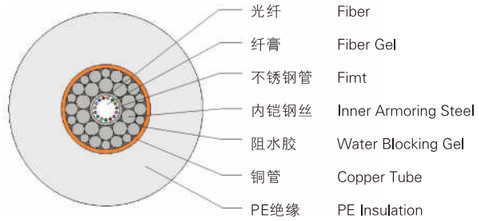
- 执行标准：GB/T 18480　GJB 4489　IEC 60794　ITU–T G.976
- 适用范围：敷设于海洋、江河，用于洲际、大陆与岛屿、岛屿与岛屿及海上作业设备间的通信及数据信息传输，具有传输容量大、连续长度长等特点。适用于超长距离，高速率，最大8000米水深的跨洋系统，最大可连接16纤对中继器。
- 最大敷设水深：8000m

Deep Sea Repeatered Submarine Cable Series

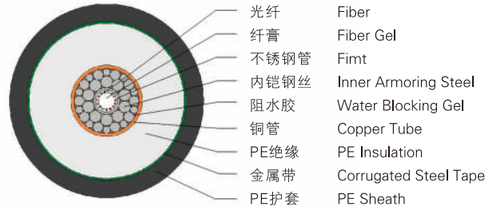
- Executive Standard : GB/T 18480　GJB 4489　IEC 60794　ITU–T G.976
- Scope of Application : It is laid in the ocean and rivers and is used for communication and data transmission between intercontinental, continental and island, island and island and offshore operations equipment. It has the characteristics of large transmission capacity and long continuous length.Applicable to long haul, high speed, maximum 8000 meters water depth optical transmission ystem, with repeaters of up to 16 Fps.
- Maximum Laying Depth : 8000m

产品结构图 Product Structure

1)产品型号： BYROC–1 LW Product Model

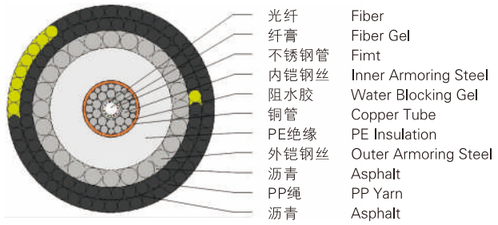


2)产品型号： BYROC–1 LWP Product Model

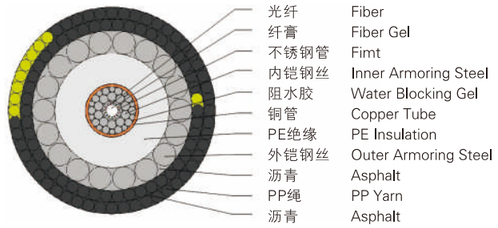


产品介绍 Product Introduction
海底光缆 Submarine Optical Fiber Cable

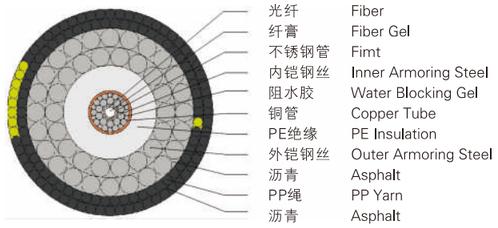
3)产品型号： BYROC–1 SAL Product Model



4)产品型号： BYROC–1 SA Product Model



5)产品型号： BYROC–1 DA Product Model



深海（无中继）光缆系列

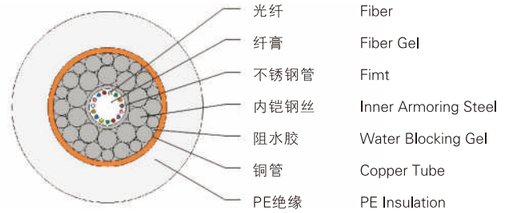
- 执行标准：GB/T 18480 GJB 4489 IEC 60794 ITU–T G.976
- 适用范围：敷设于海洋、江河，用于洲际、大陆与岛屿、岛屿与岛屿及海上作业设备间的通信及数据信息传输，具有传输容量大、连续长度长等特点。适用于大容量，最大8000米水深的跨洋系统，100Gb/s单跨距可超500km。

Deep Sea Unrepeatered Submarine Cable Series

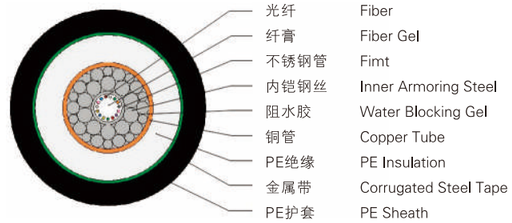
- Executive Standard : GB/T 18480 GJB 4489 IEC 60794 ITU–T G.976
- Scope of Application : It is laid in the ocean and rivers and is used for communication and data transmission between intercontinental, continental and island, island and island and offshore operations equipment. It has the characteristics ofarge transmission capacity and long continuous length.Applicable to large apacity, maximum 8000 meters water depth optical transmission system. The transmission distance can exceed 500 km for 100 Gb/s single span system.
- Maximum Laying Depth : 8000m

产品结构图 Product Structure

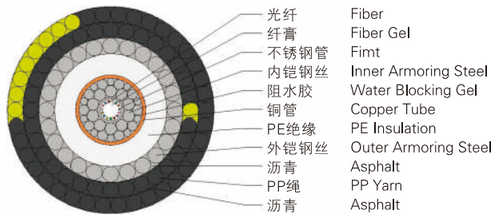
1)产品型号： BYUOC–1 LW Product Model



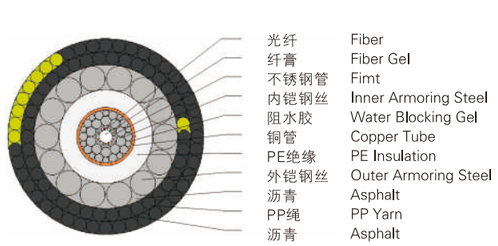
2)产品型号： BYUOC–1 LWP Product Model



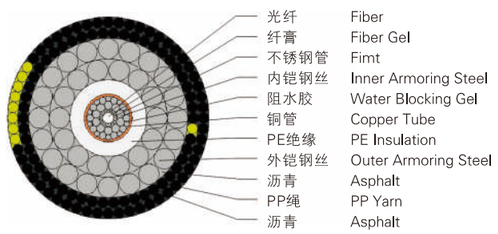
3)产品型号： BYUOC–1 SAL Product Model



4)产品型号： BYUOC–1 SA Product Model

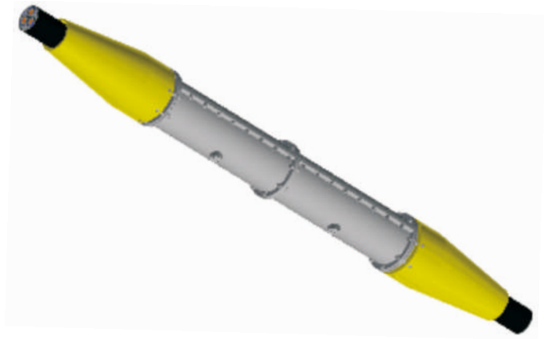


5)产品型号： BYUOC–1 DA Product Model

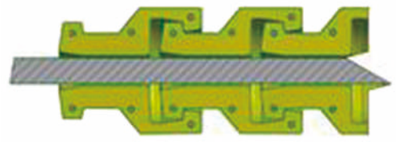


配套附件 Matching Accessories

可根据项目需要，为客户提供海缆的全系列配套附件的选型及安装
According to the needs of the project, we can provide customers with the selection and installation of a full range of accessories for submarine cables.



中间接头
Intermediate joint



弯曲限制器
Bending limiter

牵引头
Traction head

终端
Terminal

锚固装置
Anchoring device