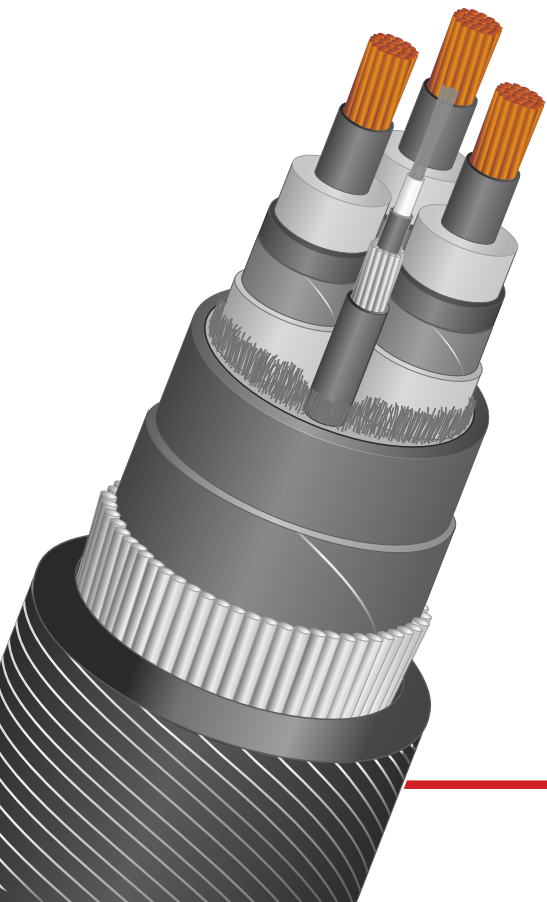


**SUBMARINE** INTERCONNECTIONS &  
TURNKEY SOLUTIONS



**FULGOR S.A.**

HELLENIC CABLE INDUSTRY



 **CABLEL<sup>®</sup>**

**HELLENIC CABLES**

G R O U P



With a wide portfolio of reliable and competitive cable solutions for international customers, the Cablel Hellenic Cables Group is one of the largest cable producers in Europe. The Group manufactures power, telecommunication and submarine cables, as well as enamelled wires and compounds.

The Cablel Hellenic Cables Group represents the cable production and marketing sector of Viohalco SA. The Company started its activities in 1950 as a Viohalco plant and in 1973 was incorporated as an independent subsidiary under the name Hellenic Cables, expanding its production and trade operations. Today, the Cablel Hellenic Cables Group consists of Hellenic Cables S.A. which operates three plants in Viotia, Greece that produce cables, enamelled wires and plastic and elastomer compounds; the Fulgor S.A. plant in Corinth, Greece, which manufactures power cables, power and fibre optic submarine cables and copper wires; Icme Ecab S.A., a power and telecommunication cable manufacturer in Bucharest, Romania and Lesco Ltd Blagoevgrad, Bulgaria which manufactures wooden reels and pallets.

With a strong export orientation and focus on development of value added products, such as high and extra-high voltage cables and submarine cables, the Group implements significant investments towards enriching its product portfolio and enhancing its sustainability profile. The Company implemented a EUR 60 million approximately investment plan for the manufacture of high-voltage submarine cables in Fulgor's plant.

The Company's wide product range, which is sold internationally under the Cablel® trademark, extends to PVC, EPR and XLPE insulated power cables (rated up to 500kV), marine and low smoke halogen free cables, fire resistant cables, telecommunication, signal and data cables with copper conductors or optical fibres, as well as fire retardant halogen free plastic and elastomer compounds and enamelled wires. Wires and cables are supplied to a variety of international standards, such as VDE, CEI, ICEA, NF, SEN, BS, UL, NEMA, JIS, ASTM, DIN and ELOT. Many of the Company's products are certified by BASEC, VDE, IMQ, NF-USE, NETWORK RAIL, KEMA, DNV and UL.

All Cablel® enamelled wires are manufactured and tested to the IEC 60317-0-1 standard; customers may also request any other recognised international standard.

Technical know-how is combined with continual investment in state-of-the-art machinery, to ensure levels of efficiency and quality which meet the strictest standards. The Company's Quality Management System is certified to ISO 9001:2008, its Environmental Management System to ISO 14001:2004 and its Occupational Health and Safety to OHSAS 18001:2007. Cablel Hellenic Cables Group has the necessary expertise to develop and offer turnkey solutions that meet specific demands of its customers.

Commitment to quality and sustainable development has been a key factor in enabling Cablel Hellenic Cables Group to establish a strong market position internationally.

The Company's highly experienced technical and managerial staff have a strong commitment to innovation, technological excellence and outstanding quality, which ensures that users of Cablel® products have made a reliable choice.

The Cablel Hellenic Cables Group aims to constantly improve its offering and respond swiftly to changes in customer requirements around the world with reliable and safe products, based on environmentally-friendly technologies. At the same time, the Group places strong emphasis on the development of its people and the creation of value for its shareholders, partners and the communities in which it operates. Looking ahead, the Group plans additional investments in technology and innovative cable solutions, as a way of contributing to the creation of a sustainable future for its stakeholders.



# FULGOR S.A.

HELLENIC CABLE INDUSTRY

## SUBMARINE INTERCONNECTIONS & TURNKEY SOLUTIONS

FULGOR S.A., was established in 1957 and is a member of the HELLENIC CABLES GROUP OF COMPANIES since July 2011. The company strongly contributes to the Group's export orientation and enhances its portfolio of high value added products.

The company's manufacturing plant covers an area of 220,000 sq.m., by the sea, at Soussaki, Corinth. The company owns a private dock and provides facilities for the direct loading of submarine cables on board laying or transportation vessels.

### Submarine & Power Cables ●



### Power Cables ●



### Telecommunication & Data Cables ●



### Rubber & Plastic Compounds ●



### Enamelled Wires ●

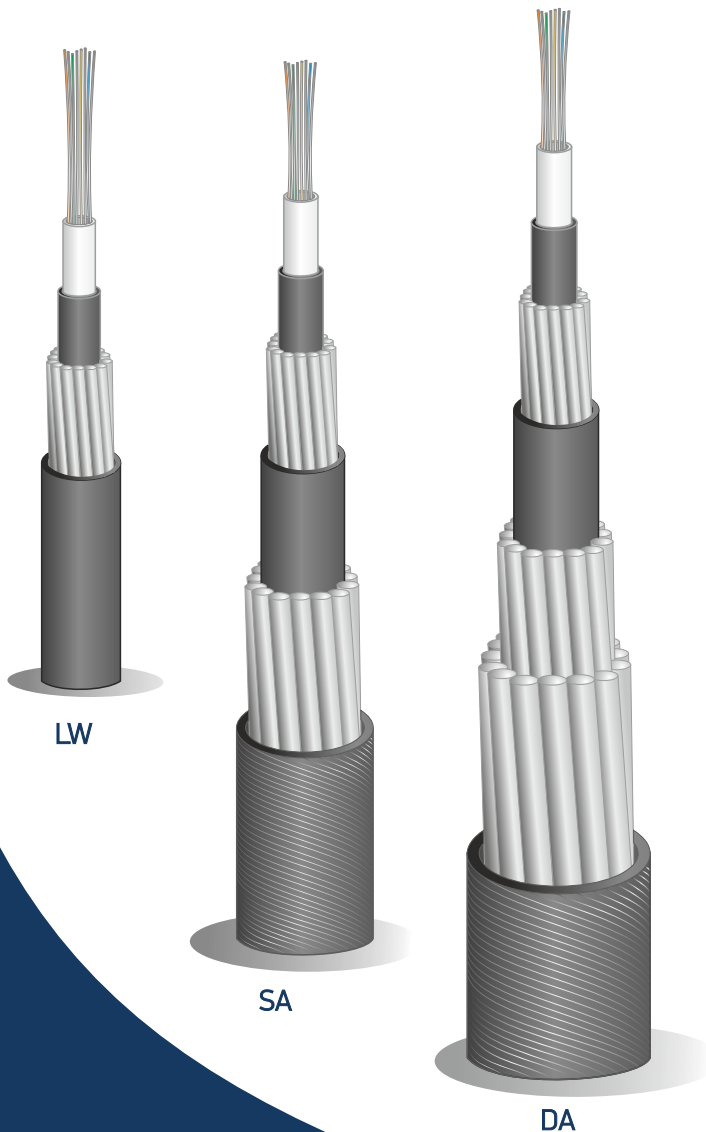


## OPTICAL FIBRE SUBMARINE CABLES FOR REPEATERLESS LINKS

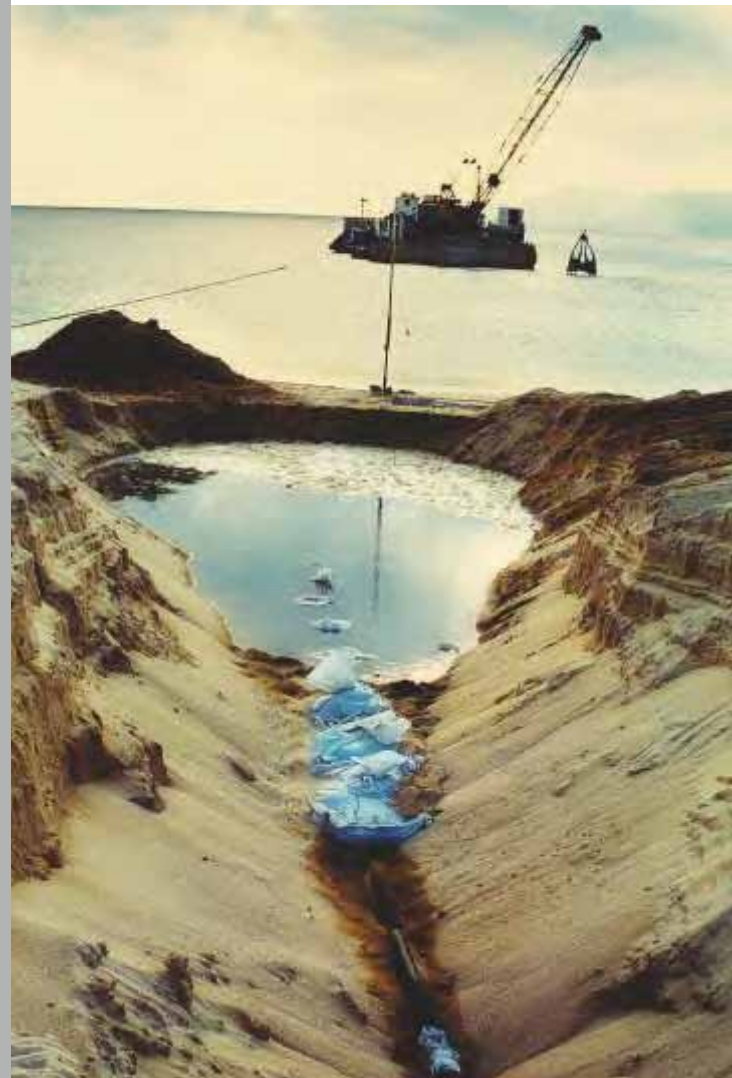
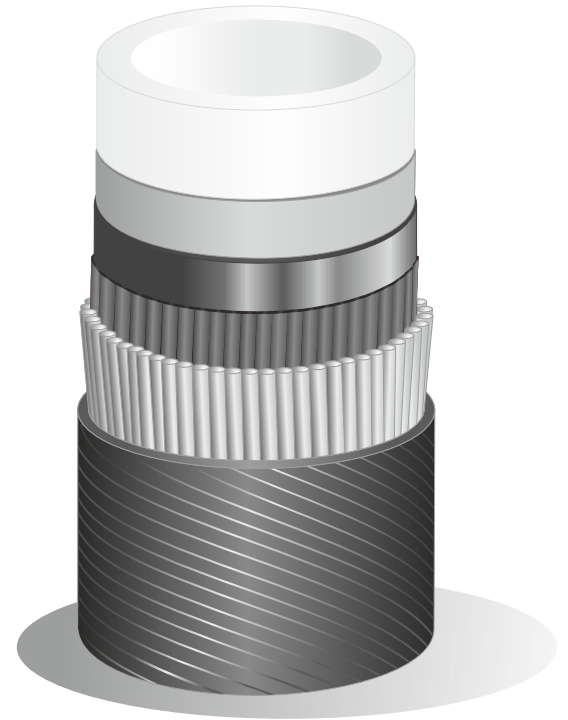
Since 1992, FULGOR SA has manufactured more than 2,200 km of optical fibre submarine cables with various core structures and types of armouring. The company has installed, as a “turnkey” project contractor for repeaterless links, 1,000 km of these cables.

Currently in production are Light Weight (LW), Single Armoured (SA) and Double Armoured (DA) designs, which include at the center of the cable an optical core made of an hermetically sealed stainless steel tube, which contains up to 48 single mode optical fibres. The optical fibres are placed loosely inside the tube with excess length and are surrounded by a filling compound (jelly) which includes an hydrogen scavenger. Over the optical core successive protective layers are applied. For maintenance purposes the cables are qualified to the Universal Quick Joint (UQJ).

More information on the installed repeaterless optical fibre submarine links are included in the company web site: [www.fulgor.com](http://www.fulgor.com)



## POLYETHYLENE SUBMARINE WATER PIPE WITH STEEL ARMOUR





## MEDIUM & HIGH VOLTAGE SUBMARINE CABLES

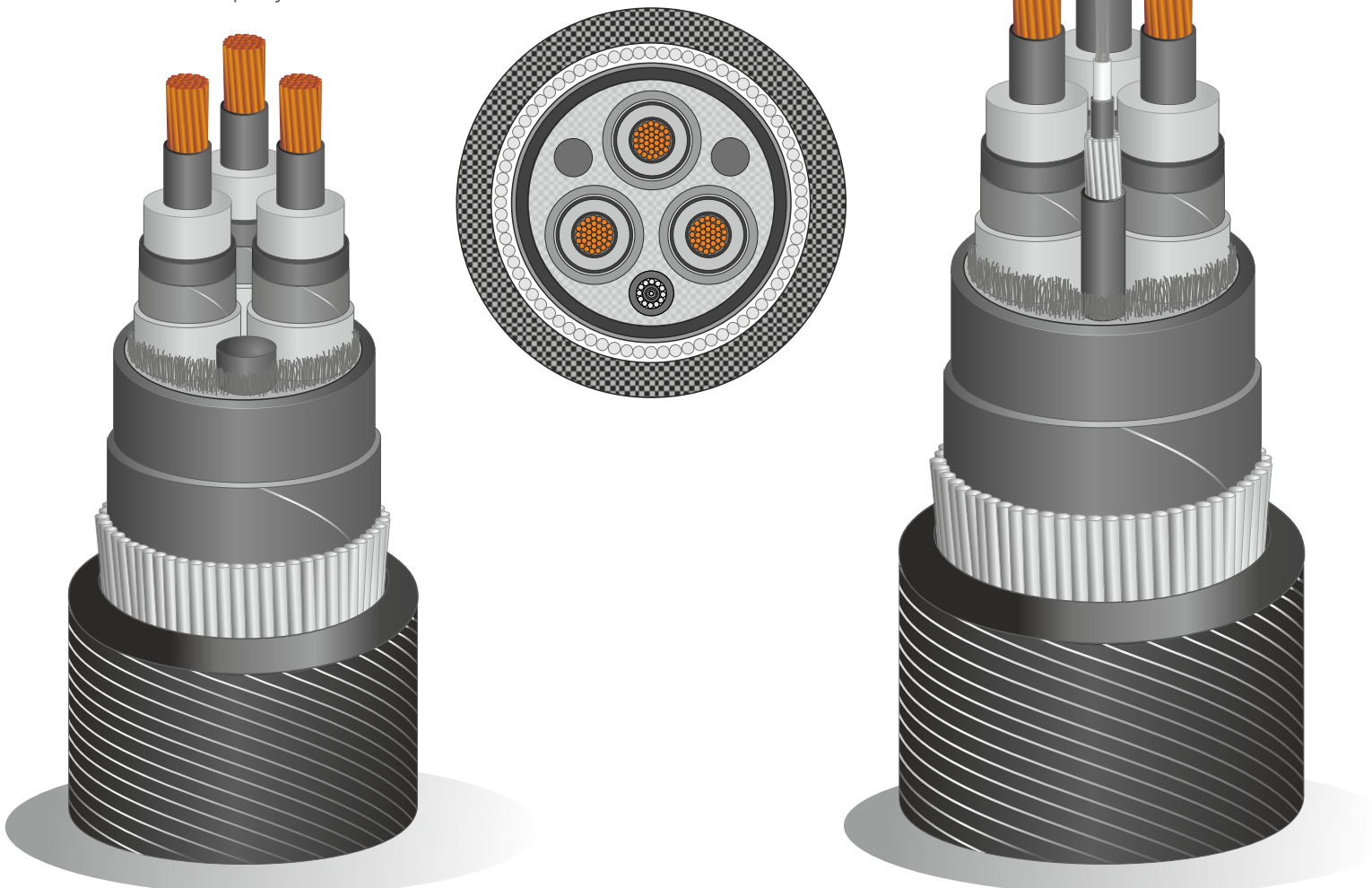
Currently in our production range are Medium Voltage AC submarine cables with rated maximum operating phase-to-phase voltage up to 42 kV and HV AC submarine cables with rated maximum operating phase-to-phase voltage up to 170 kV. The MV AC submarine cables are three-core armoured cables with copper or aluminium conductors with cross-linked polyethylene (XLPE) insulation, copper wire screen with or without laminated core sheath or lead sheath as a radial metallic water barrier insulated with oil impregnated paper tapes, lead sheathed (PILC) or EPR insulated “wet type” without a radial metallic sheath as radial water barrier. The High Voltage AC submarine cables are three-core armoured cables with copper or aluminium conductors, XLPE insulation and lead sheath over each insulated core as a radial metallic water barrier.

All above mentioned cables are manufactured in very long continuous lengths, without the need of factory joints or with the absolute minimum number of factory joints, as apply today in the subsea cable industry. The factory joints are flexible splices performed on each core under the continuous protective layers of the cable and consist an integral part of the cable. Accessories are available for terminating and connecting the onshore/offshore cables to the submarine cables (hang-off assemblies, protection systems, onshore-submarine cable transition joints, terminations, repair joints).

## COMPOSITE MEDIUM AND HIGH VOLTAGE XLPE INSULATED SUBMARINE CABLES WITH INTEGRATED OPTICAL FIBRES

The first composite power/optical fibre submarine cable was manufactured and installed by FULGOR in 1995.

The construction of composite power /optical fibre submarine cables is similar to the construction of standard submarine power cables, including in their structure one or more optical units. The optical units are stranded during the manufacturing of the cable between the outer interstices created by the insulated conductors of the cable. For relatively short distances multimode fibres may be used. For long distances single mode fibres are used.





## TURNKEY SOLUTIONS

In 1972, FULGOR S.A. undertook its first "turnkey" project for the supply and installation of 20kV submarine power cables to interconnect several islands in the Aegean Sea on behalf of DEI (the Public Power Corporation of Greece). Since then, the company is using its own specialized assets, trained personnel and well proven subcontractors and has successfully completed a large number of "turnkey" projects, mainly in Greece and in other European countries.

The capabilities of the company in submarine cable projects include the following:

- The design and engineering of the system.
- The cable route survey.
- The design and manufacturing of the suitable cable types, according to cable route survey results.
- The loading and transportation of the cables to the project site.
- The installation of the cables with the use of specialized cable laying vessels.
- The protection of the cables along the cable route by simultaneous or post-lay burial.
- The installation and protection of the land cable segments.
- The supply and installation of repair joints, transition joints and cable terminations.
- The supply and installation of the terminal equipment
- The testing and commissioning of the system.
- The project management.
- The training of the customer personnel in the operation of the system.
- The provision of maintenance and repair solutions to the customer.

A list of the "turnkey" projects which have been successfully completed by the company is provided in the company web site: [www.fulgor.com](http://www.fulgor.com)



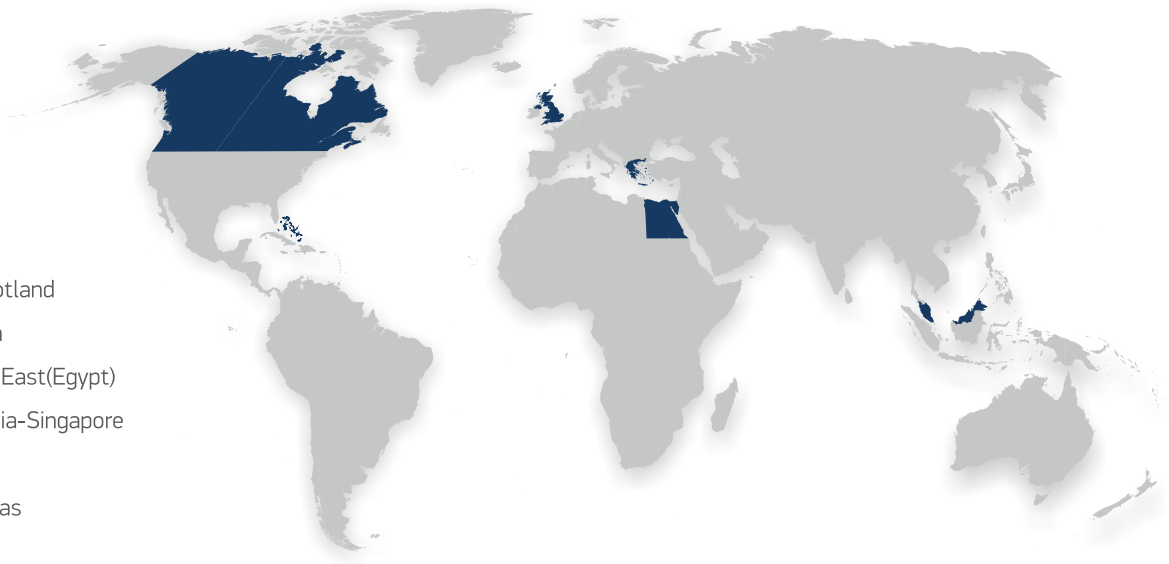
## FUTURE OUTLOOK

FULGOR S.A. is currently expanding its submarine cable production capabilities to include the manufacture of static and dynamic type HVAC and HVDC XLPE insulated submarine cables and PE flexible submarine pipes, in order to participate in national and international "turnkey" submarine cable and subsea pipe interconnections and offshore projects.

- **High Voltage DC XLPE insulated Submarine Cables**  
80 to 320 kV single core armoured cables with lead sheath

- **Submarine pipes**

Flexible static and dynamic submarine polyethylene pipes with steel armour, in long continuous lengths, for the supply of water and other fluids, with nominal diameter from 50 to 250 mm and operating pressure up to 1 MPa.



- UK-Scotland
- Canada
- Middle East(Egypt)
- Malaysia-Singapore
- Greece
- Bahamas

# SUBMARINE CABLE INTERCONNECTIONS

**FULGOR S.A.**  
HELLENIC CABLE INDUSTRY



- Medium Voltage Submarine Cable Interconnections
- Optical Fibre Submarine Cable Interconnections
- Projects under construction



Since 1972, FULGOR S.A. has manufactured more than 1,000 km of medium voltage up to 33kV and high voltage up to 150kV submarine cables.



**HELLENIC CABLES S.A.**  
HELLENIC CABLE INDUSTRY S.A.

**FULGOR S.A.**  
HELLENIC CABLE INDUSTRY

**ICME ECAB S.A.**  
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