



Offshore Cables



Application

Every offshore platform requires an extensive, integrated power, instrumentation & control and communication system that excels at three core characteristics:

1. It performs under the most demanding working conditions.
2. It preserves human safety.
3. It protects the environment.

Over the last 25 years, Prysmian **Technergy™** Offshore, has provided cabling solutions for more than a hundred projects world wide that satisfies these conditions. **Technergy™** Offshore delivers a tailored, single-stop source for

Benefits

> Technical Competence

Prysmian's know-how is built on a pyramid of excellence: considerable international expertise, permanent collaboration with universities and research institutes and strong innovation activities. Our commitment is underlined by our R&D expenditure which is in excess of 3% of the annual turnover and by our exclusively in-house production processes.

Prysmian's international teams of experts provide proactive solutions to problems for every customer need, in both topside and underwater applications.

> A Complete Range of Customised Products: Topside and Underwater

Prysmian's **Technergy™** Offshore cable range incorporates a broad variety of power cables - from 1 kV up to 20 kV - all of which comply with the main international standards (BS, NEK, IEC, IEEE, etc.).

Telecommunications, instrumentation and control, special bus, coaxial, radiating and Cat. 5 and 6 cables are part of our standard product range.

State-of-the-art dynamic and hybrid umbilicals and composite electro-optical underwater cables as well as a broad variety of accessories, glands and terminations are also available.

Prysmian also offers fully customised solutions for special applications and provides all the necessary technical support for our customers at every stage of their projects.

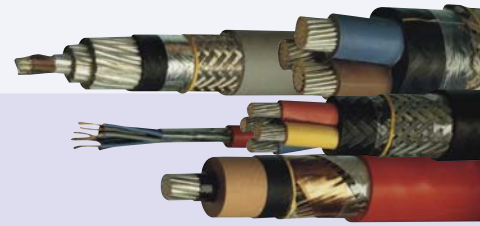
> Ease of Installation and Handling

Installation and cable handling on a platform (topside) or on a ship (FPSO) is always difficult, time consuming and expensive.

Prysmian's **Technergy™** Offshore cables are flexible, easy to peel and to pull, with a reduced bending radius (down to 4x diameter) and with high tensile strength.

Cable diameter tolerances exceeding the requirements of recognised standards are achieved through reliable process controls and state-of-the-art manufacturing equipment, thus allowing reduced installation times.

FROM FPSOs TO PLATFORMS



all power and communication network cabling needs for such harsh and critical environments.

Prysmian **Technergy™** Offshore cables are designed and engineered with the close cooperation of the main international O&G operators, and are manufactured with the most advanced material and technologies from Prysmian laboratories. Prysmian Technergy™ Offshore are harmonized cabling solutions suitable for any type of offshore application such as FPO, FPSO, Drilling Ship, Topside and FSU. The range encompass products for upstream, downstream and processing, land based power generation and marine uses as well.

Technergy™ Offshore range offer O&G companies, contractors, engineers, installers, OEMs and component manufacturers, the following benefits:



> Prysmian Innovation: Technology for Longer Life

The exposure to aggressive substances and vapours, solvent penetration and sea contamination constantly threaten the integrity and the lifetime of offshore cables. Prysmian **Technergy™** Offshore cables' chemical resistant properties (low gas permeability, hydrocarbon, mud and moisture resistance) are critical to a longer fault free lifetime.

Prysmian's **Technergy™** Offshore cables have: high working temperatures, very high short circuit temperatures, outstanding mechanical resistance and low deformation under load conditions, all substantially exceeding the standard requirements.

AFUMUD™ sheathing compound has been especially developed to withstand harsh environments and extreme temperatures, from the Poles to the Equator. This special sheathing means our cables are also extremely resistant to marine salt and UV rays and range of chemicals used on offshore platforms.

> The Safest Choice in Fire Hazard

Prysmian **Technergy™** Offshore cables promote increased human and material safety, both in normal working conditions and in the event of fire: low toxicity, reduced smoke emissions and fire propagation resistance are key features of the Technergy range.

Additionally, for emergency and vital circuits, to cope with continuous operation during a fire, an optional fire resistant design (up to 1000 °C) is offered in accordance with IEC, BS and IEEE.

> Contract Management

Central co-ordination and a network of Prysmian technically skilled sales offices provide our customers with local and easy-to-reach points of contact.

Due to the multinational manufacturing presence of Prysmian and controlled production planning, we ensure sufficient production capacity even for large and very long-term projects.

The highly sophisticated IT systems implemented in all the manufacturing sites provide real time order processing and tracking.

Full sets of project documentation (data sheets, drawings, certificates, manuals, etc) are provided within the standard scope of supply.

Long term partnerships (e.g. product traceability, product replacement) are also offered by Prysmian.

About us

Prysmian is a world leader in the energy and telecommunication cables industry with a strong market position in higher added value market segments.

It is organised in two business sectors - Energy Cables & Systems (submarine and underground cable systems for power transmission and distribution, cabling solutions for residential and infrastructure buildings and cabling systems for signalling, control and power feeding for a wide range of industrial applications) and Telecom Cables & Systems (optical fibres, optical cables and copper cables for voice, video and data transmission). The Prysmian Group has a global presence in 34 countries with 54 plants, 7 international R&D Centers and more than 12,000 employees.

Specialising in the development of bespoke products and systems, Prysmian's main competitive strengths include: focus on research and development, ability to innovate in terms of both products and processes, and the use of advanced proprietary technologies.



Prysmian's TECHNERGY integrated cabling solutions™ is one of the world's most comprehensive and technologically advanced answers to industry, infrastructure, contractors and OEM's specific requirements.

TECHNERGY integrated cabling solutions™ are designed and structured into twelve different product lines. Each of these offer tailored designs and added value solutions to the most diverse functional and environmental requirements in the following fields:

- > Trains
- > Marine
- > Oil & Gas
- > Plant & Petrochem
- > Mining & Tunnelling
- > Defence
- > Cranes & Mobile Equipments
- > Electro-Mechanical
- > Data & Communication
- > Transportation Infrastructures
- > Building & Civil Engineering
- > Power Plants

To find out more about the TECHNERGY integrated cabling solutions™, Prysmian Cables and Systems invites you to visit the web site: www.prysmian.com



Cable families at a glance

> According to NEK 606/IEC 60092-300 (series)

Product Family	General Description	Use and Installation
TEOF RU	Unarmoured 1 kV power and control cables	1 kV general power cables.
TEOF RFOU	Armoured (tinned copper) 1 kV power and control cables	1 kV general power cables where mechanical and/or electrical protection is needed.
TEOF BU	Fire Resistant Unarmoured 1 kV power and control cables	1 kV power cables for applications where the cables should function in the event of fire.
TEOF BFOU	Fire Resistant Armoured (tinned copper) 1 kV power and control cables	1 kV general power cables where mechanical and/or electrical protection is needed and for applications where the cables should function in the event of fire.
TEOF RU (i)	Pair/triple twisted cables for Telecommunication and instrumentation Individually screened (Copper backed polyester), Unarmoured 250 V	Telecommunication and instrumentation cables for applications where very strong protection is needed against cross talk, but where protection against outer disturbances, both mechanical and electrical is less critical.
TEOF RFOU (i)	Pair/triple twisted cables for Telecommunication and instrumentation Individually screened (Copper backed polyester), Armoured (tinned copper) 250 V	Telecommunication and instrumentation cables for applications where very strong protection is needed against cross talk and where mechanical and/or electrical protection is required.
TEOF RU (c)	Pair/triple twisted cables for Telecommunication and instrumentation Overall screened (Copper backed polyester), Unarmoured 250 V	Telecommunication and instrumentation cables for applications where protection against external electrical disturbance is critical.
TEOF RFOU (c)	Pair/triple twisted cables for Telecommunication and instrumentation Overall (Copper backed polyester), Armoured (tinned copper) 250 V	Telecommunication and instrumentation cables for applications where protection against external electrical disturbance is critical and where mechanical protection is required.
TEOF BU (i)	Fire Resistant pair/triple twisted cables for Telecommunication and instrumentation Individually screened (Copper backed polyester), Unarmoured 250 V	Telecommunication and instrumentation cables for applications where very strong protection against cross talk, but where protection against outer disturbances, both mechanical and electrical is less critical and where the cables should function in the event of fire.
TEOF BFOU (i)	Fire Resistant pair/triple twisted cables for Telecommunication and instrumentation Individual screened (Copper backed polyester), Armoured (tinned copper) 250 V	Telecommunication and instrumentation cables for applications where very strong protection is needed against cross talk, where mechanical and/or electrical protection is required and where the cables should function in the event of fire.
TEOF BU (c)	Fire Resistant pair/triple twisted cables for Telecommunication and instrumentation Overall screened (Copper backed polyester), Armoured (tinned copper) 250 V	Telecommunication and instrumentation cables for applications where very protection against external electrical disturbance is critical, and where the cables should function in the event of fire.
TEOF BFOU (c)	Fire Resistant pair/triple twisted cables for Telecommunication and instrumentation Overall screened (Copper backed polyester), Armoured (tinned copper) 250 V	Telecommunication and instrumentation cables for applications where protection is needed against external electrical disturbances, where mechanical protection is required and where the cables should function when exposed to fire.
TEOF VFDF-RFOU	Screened/Armoured (Cu/PET tape + tinned copper braid) 1kV power and control cable	1 kV general power cable used in Variable Frequency Drive applications.
TEOF UX	Single core insulated conductor	Power cable used in switchboard, earth conductors and wiring in various application.
TEOF RFOU 6/10 kV - 8,7/15 kV	Armoured Radial field MV power cables	Main power supply when medium voltage is needed.

> According to IEC 60092-300 (series) Light Duty

TEOF LD Low Voltage	Armoured (tinned copper) 1 kV power and control cable	1 kV general power cable used where mechanical and electrical protection is needed for Light Duty applications
TEOF LD Instrumentation	Pair/triple twisted cables for Telecommunication and instrumentation Overall screened (copper backed polyester) Armoured, 250 V	Telecommunication and instrumentation cables for applications where protection against external electrical disturbance is critical and where mechanical protection is required in Light Duty applications



> According to BS 6883/BS 7197

Product Family	General Description	Use and Installation
TEOF	Unarmoured 1 kV power and control cables	General 1 kV power cables
TEOF G	Galvanized steel wire braid armoured 1 kV power and control cables	General 1 kV power cables where mechanical and/or electrical protection is needed.
TEOF FR	Fire Resistant unarmoured 1 kV power and control cables	1 kV power cables for applications where the cables should function in the event of fire.
TEOF G FR	Galvanized steel wire braid armoured Fire Resistant 1 kV power and control cables	1 kV general power cables where mechanical and/or electrical protection is needed and for applications where the cables should function in the event of fire.
TEOF TI	Pair/triple twisted cables for Telecommunication and instrumentation Individually screened (Aluminum backed polyester), unarmoured 60 & 250 V	Telecommunication and instrumentation cables for applications where very strong protection is needed against cross talk but where protection against outer disturbances, both mechanical and electrical, is less critical.
TEOF TIG	Pair/triple twisted cables for Telecommunication and instrumentation Individually screened (Aluminum backed polyester), Galvanized steel wire braid armoured 60 & 250 V	Telecommunication and instrumentation cables for applications where very strong protection is needed against cross talk and where mechanical and/or electrical protection is required.
TEOF TO	Pair/triple twisted cables for Telecommunication and instrumentation Overall screened (Aluminum backed polyester), unarmoured 60 & 250 V	Telecommunication and instrumentation cables for applications where protection against external electrical disturbance is critical.
TEOF TOG	Pair/triple twisted cables for Telecommunication and instrumentation Overall screened (Aluminum backed polyester), Galvanized steel wire braid armoured 60 & 250 V	Telecommunication and instrumentation cables for applications where protection against external electrical disturbances critical where a mechanical protection is required.
TEOF TIG FR	Fire Resistant Pair/triple twisted cables for Telecommunication and instrumentation Individual screened (Aluminum backed polyester), Armoured (Galvanized steel) 60 & 250 V,	Telecommunication and instrumentation cables for applications where very strong protection is needed against cross talk, where mechanical and/or electrical protection is required, where the cables should function in the event of fire.
TEOF TOG FR	Fire Resistant Pair/triple twisted cables for Telecommunication and instrumentation Overall screened (Aluminum backed polyester), Galvanized steel wire braid armoured 60 & 250 V	Telecommunication and instrumentation cables for applications where protection is needed against external electrical disturbances, where mechanical protection is required, and where the cables should function in the event of fire.
TEOF SB	Single core insulated conductor	Power cable used in switchboards, earth conductors and wiring in various applications.
TEOF G 6/10kV - 8,7/15kV - 12/20kV	Galvanized steel wire braid armoured radial field or non radial field, MV power cable	Main power supply when medium voltage is needed.

> Other Specific Applications

TEOF Profibus	Screened copper twisted pairs	For feeding data to various systems or field devices according to EN 50170-2 or EN 20254 (Interbus).
TEOF Interbus	Single and multi element COAXial cables (50 and 75 Ohm)	Video and data transmission for system applications.
TEOF Umbilicals	Armoured high pressure hydraulic control hoses + electrical power and control cables (optional optical fiber control core can be provided)	Hydraulic control of sea bottom equipment (WCT), chemical injection and electrical monitoring of well data (pressure and temperature) for water depths up to 2000 m.
TEOF Electro-Optical	Armoured low or medium voltage power cores + Multi fiber optical core	Power distribution and two-way communication between production units, submarine or down well pumps power and monitoring, for water depths up to 2000 m.

Quality commitment



Prysmian has a built-in multi-step quality assurance program, covering the production process from cable design and raw material purchases to final inspection and testing documentation.

The quality system of Prysmian has been assessed and approved, and is audited regularly, by **Lloyd's Register of Quality Assurance to the ISO 9001 and ISO 14001 Quality System Standards.**

The **ISO 14001** is the environment quality standard.



> APPROVALS

Prysmian works closely with major classification societies. Our cable factories have approvals for their cables at:

Lloyd's Register of Shipping (LRS)
Det Norske Veritas (DNV)
Registro Italiano Navale (RINA)
American Bureau of Shipping (ABS)
Bureau Veritas (BV)

References offshore project

Project name	Customer
AGC Azerbaijan	AIOC - Halliburton
Aries & Carina	Total Fina Elf - J. McDermott
Barracuda P43	Petrobras - Halliburton
Bayu Undan	Phillips Petroleum
Caratinga P48	Petrobras - Halliburton
Clair phase I	BP - Mustang engineering
Erha	MSE Malaysia
Rig 185	Global Santa Fe
Sable Module	Flare
Sabratha	Agip - Hyundai Heavy Industries

Service

TECHNICAL CONSULTING

- > Technical literature and specs (also available on line)
- > Specification writing service available on request
- > Design assistance with Contractors and Engineers, both on site and from our technical help desk
- > Tailored cabling solutions
- > International call center and sales consulting network
- > Quick budgeting service to Contractors during the tendering phase
- > Short lead-times (with reliable delivery)
- > Long term products availability
- > International distributor network
- > Technical training available on request

ACCESSORIES

Prysmian can also offer a wide range of cable accessories. Hazardous environment flameproof cable glands, cable connectors and tooling, cable joints and terminations.



UMBILICALS

In response to the needs of floating production system technology, Prysmian has developed electro-optical submarine cables and umbilicals. Prysmian has been producing umbilical cables and accessories since the early 80s. Today Prysmian can meet your full requirements for the supply of submarine cables, umbilicals, flexible pipes and accessories for offshore installations.



MARINE

Marine cables can be found in our family of offshore products. They have been specifically designed for on-board installations, and work in damp or wet situations, inside machinery compartments and where harmful vapours may be present.



ARGENTINA

Prysmian Energía Cables y Sistemas
 de Argentina S. A.
 Fábrica La Rosa, Av. da Argentina 6784
 1439 Capital Federal
 tel. +54 11 46302000
 fax +54 11 46302100

AUSTRALIA

Prysmian Power Cables & Systems
 Australia PTY LTD
 1 Heathcote Road
 Locked Bag 7042, Liverpool Business Centre 1871
 NSW
 tel. +61 2 96000 777
 fax +61 2 96000 747

AUSTRIA

Prysmian OEKW GmbH
 Lembockgasse 47A, 1230 Wien
 tel. +43 1 866770
 fax +43 1 86677109

BRAZIL

Prysmian Energia Cabos e Sistemas do Brasil S. A.
 Av. Alexandre de Gusmao 145
 09110-900 Santo André - SP
 tel. +55 11 49984000
 fax +55 11 49984811

CHINA

Prysmian Tianjin Cables Co. Ltd.
 513, Huang He Road, Nankai District
 Tianjin, 300112
 tel. +86 22 2753 9679
 fax +86 22 2753 3485

EGYPT

Prysmian Cables & Systems
 8 Abd El Azim Aoudallah st. Hegaz sq.
 Heliopolis - Cairo
 tel. +20 2 2418557
 fax +20 2 6381327

FINLAND

Prysmian Cables & Systems Oy
 P.O. Box 13
 FIN-02401 Kirkkonummi
 tel. +358 10 77551
 fax +358 9 2982204

FRANCE

Prysmian Energie Cables et Systèmes France s.a.
 19, Avenue de la Paix - BP 712
 Paron - 89100, Sens Cedex
 tel. +33 3 86957769
 fax +33 3 86957781

GERMANY

Prysmian Kabel und Systeme GmbH
 Austraße 99
 96465 Neustadt bei Coburg
 tel. +49 9568 895 1000
 fax +49 30 3675 6000

HONG KONG

Prysmian Cable Systems Pte. Ltd.
 Unit A, 18/F, China Overseas Building
 139 Hennessy Road
 Wanchai, Hong Kong
 tel. +85 2 2827 8308
 fax +85 2 2827 7212

HUNGARY

Prysmian MKM Magyar Hungarian Cable
 Works Co. Ltd.
 Barázda u. 38
 H-1116 Budapest
 tel. +36 1 3822222
 fax +36 1 3822202

INDONESIA

PT. Prysmian Cables Indonesia
 Gedung BRI II, Suite 1502
 Jln. Jend Sudirman No 44-46
 Jakarta 10210
 tel. +62 264 351222
 fax +62 264 351780

ITALY

Prysmian Cavi e Sistemi Energia Italia Srl
 Viale Sarca 222, 20126 Milano
 tel. +39 02 6449 8108
 fax +39 02 6440 8108

MALAYSIA

Prysmian Cable Systems Pte. Ltd.
 Power Cable Malaysia Sdn Bhd
 Lot 2 Jalan Kawat 15/18
 40702 Shah Alam, Selangor Darul Ehsan
 tel. +60 3 5518 4528
 fax +60 3 5511 9590

NETHERLANDS

Prysmian Cables and Systems B.V.
 Schieweg 9, 2627 AN Delft
 P.O. Box 495, 2600 AL Delft
 The Netherlands
 tel. +31 15 260 5260
 fax +31 15 261 3808

NORTH AMERICA

Prysmian Cables & Systems North America
 700 Industrial Drive
 Lexington, SC 29072 - USA
 tel. +1 803 9511130
 fax +1 803 9511092

NORWAY

Prysmian Kabler og Systmer AS
 P.O.Box 1384, N - 1401 Ski
 tel. +47 64 915713
 fax +47 64 915714

ROMANIA

Prysmian Cabluri si Sisteme SA
 Soseaua Draganesti, Km. 4 - 0500 Slatina
 tel. +40 49 435699
 fax +40 49 433484

RUSSIA

Prysmian Cables and Systems
 6th street 8 Marta, 6a, bldg 1
 Moscow 125167
 tel. +7 095 9337036
 fax +7 095 9337035

SINGAPORE

Prysmian Cable Systems Pte. Ltd.
 No 4 Tuas Avenue 12. 3rd Storey
 639047 Singapore
 tel. +65 6862 9866
 fax +65 6862 9877

SLOVAKIA

Prysmian Kablo s.r.o.
 Trnavska cesta 50
 821 02 Bratislava
 tel. +421 2 4949 1215
 fax +421 2 4949 1248

SPAIN

Prysmian Cables y Sistemas S.L.
 Carretera C-15, Km. 2
 08800 Vilanova i la Geltrú (Barcelona)
 tel. +34 93 811 6181
 fax +34 93 811 6011

SWEDEN

Prysmian Kablar och System AB
 Turebergs Allé 2
 SE-19162 Sollentuna
 tel. +46 8 260416
 fax +46 8 260413

THAILAND

Prysmian Cable Systems Pte Ltd.
 555 RASA Tower 11th Floor
 Phaholyothin Road, Lard Yao
 Chatuchak - Bangkok 10900
 tel. +66 2 937 0316
 fax +66 2 937 0318

TURKEY

Türk Prysmian Kablo ve Sistemleri A.S.
 Büyükdere Caddesi No 117
 34394 Gayrettepe
 Istanbul
 tel. +90 212 3551500
 fax +90 212 2175810

U.A.E. (Dubai)

Prysmian Cables and Systems Middle East
 P.O. Box 72125, Dubai
 tel. +971 4 345 7870
 fax +971 4 345 7101

UK

Prysmian Cables and Systems Ltd.
 Chickenhall Lane
 Eastleigh
 Hampshire, SO50 6YU
 tel. +44 2380 295555
 fax +44 2380 295111

World Wide Excellence Center

tel. +39 02 6449 8108, fax +39 02 6440 8108

Head Office

Prysmian Cavi e Sistemi Energia Srl - Viale Sarca 222, 20126 Milano, Italy - tel. +39 02 6449 1, fax +39 02 6449 2931 - www.prysmian.com