

GLOBAL CABLE SOLUTIONS  
FOR HARSH ENVIRONMENT UPSTREAM  
APPLICATIONS, OFFSHORE TOPSIDE  
AND LAND DRILLING







## OIL & GAS CHALLENGES

**Today, energy demands are driving development in offshore and unconventional sources for oil & gas. This means that investment will be flowing into the sector. However, IOCs need to be rigorous in their capital spending.**

Offshore projects cost escalation can easily compromise the viability of new projects and oilfield expansion. That is why meticulous project execution, a value-enriching offer, advanced engineering skills and services are more important today than ever before.

Oil company planning budgets assume that increased spending will generate profits, but they want projects to start up on time and perform to expectation in constantly changing conditions.

That requires high-performance equipment, easier installation, turnkey electrical systems, and a host of services to guarantee end-to-end quality, especially in terms of supply chain commitments and engineering support.

Cables are at the very heart of improving performance and contribute to creating new capabilities.

Both offshore topside and land drilling installations are based on high-quality power, control and VFD cables that are reliable and energy-efficient under the toughest operating conditions. They also need advanced LANs, fieldbus and fiber-based technologies to meet digital oilfield applications and remote drilling operations.

### **What you expect from a cable manufacturer:**

- Full range of power, control and instrumentation cables
- Data cables to control multiple wellheads and mechanical systems
- Safety, high-reliability, and low-maintenance for nonstop production
- Cables that can operate in remote and extreme climatic conditions
- On Time Delivery to face emergency situations and to limit operational downtime
- Pre-cuts, pre-assembly and connectors to facilitate installation
- Multi-standard capability to deliver the right certified cable worldwide
- Specialized services and engineering support to meet project-specific requirements

# CREATING VALUE UPSTREAM

**To meet the needs of upstream development, Nexans implemented a program based on Four Pillars to create value for upstream oil & gas players. It provides the technology, quality and collaboration needed for future upstream growth:**

## Cable Performance

To increase operational safety on platforms, protect field assets, handle drilling muds, avoid operational downtime, allow drilling in arctic temperatures, protect against UV, and increase cable length between Variable Speed Drives and Motors:

- Fire-resistance performance exceeding IEC60331-1&2 and BS50200 / BS6387
- Mud-resistant cables certified for most mud types
- Halogen-free ICEFLEX™ cables operational down to -65°C
- UV-resistance up to 6 GJ/m<sup>2</sup>
- Superior EMC and dielectric performance for VFD cables

## Cable Installation

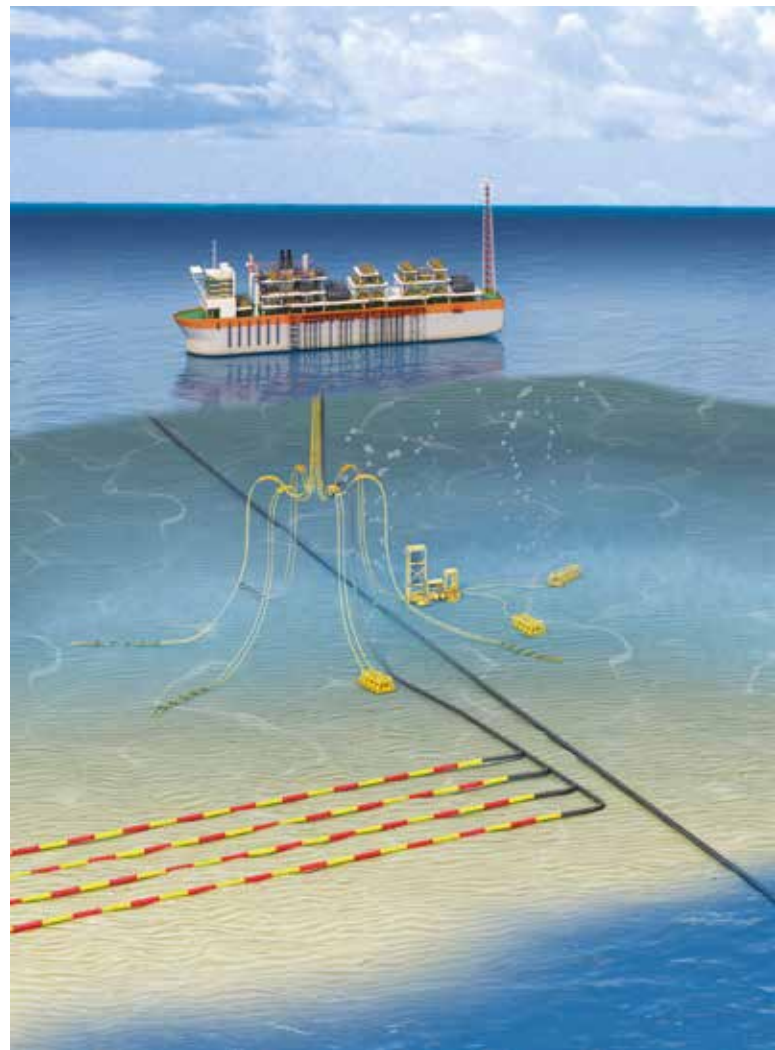
To facilitate easy bending and rerouting, less weight for overall topside weight reduction, easy handling and cable pulling, significantly reducing installation manpower:

- Increased and improved number of strands on cables
- 2-4% total cable-weight reduction for most projects
- Low-friction jacketing and easy strippability saving up to 10% manpower
- Reduced Maintenance Repair and Overhaul (MRO) costs

## Full Electrical System Offer

To increase flexibility, protection, strength, safety and connectivity through modular systems, special packages and complete kits:

- Expertise on connectivity
- Termination kits and cable gland solutions
- High-quality components and innovative solutions to protect service loops in the harshest environments
- Enhanced end-user safety



## Services and Quality

To shorten lead times, increase availability, reduce the number of cable type references, optimize sizing and routing, solve problems, eliminate scrap, provide testing, improve designs and assure certification:

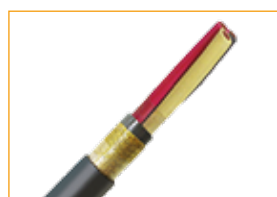
- 98% On Time Delivery and fast emergency handling
- Global inventory: US, China, Singapore, Middle East, UK, Norway
- One-stop shopping and tailor-made solutions
- Optimized cable lengths and tagging on reels
- On-site engineering and electrical system design review
- Testing, root cause analysis, statistical quality control, certification
- Ongoing partnership with Oil & Gas upstream engineers



Ultra-cold cables



LV/MV power control and instrumentation IEC



LV/MV power, control and instrumentation IEEE1580



HV power cables and accessories



Data cables



Bridles and assemblies



Service loops



Variable Frequency Drive cables



# NEXANS: THE ALL-IN-ONE CABLE PROVIDER CREATING



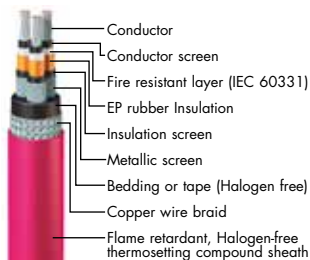
## SHIPLINK®- LV/MV power control and instrumentation IEC (NEK 606, BS6883, IEC60092-350 series)

Our Shiplink® IEC products include HFFR LV/MV power cables (0.6/1 kV) up to 30 kV as well as a full range of control and instrumentation cables. All products are provided with full product certification and technical support.

Our IEC cables offer resistance to ozone and UV, mud-resistance certified according to several drilling fluids, and EMC.

Shiplink®-type cables provide premium performance on:

- Fire-resistance: they can function for longer periods of time (up to 3h) and pass higher fire temperature tests (up to 1000° C) with water spray
- High durability for rough seas and severe climatic conditions & ultra-cold cable operability
- Easy installation through high flexibility, light weight, convenient strippability and handy pulling



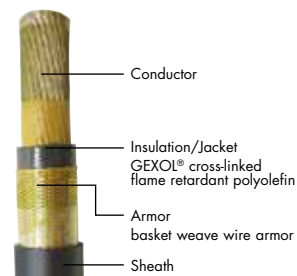
## GEXOL® IEEE 1580 Type P cables

Gexol® World Class Oil & Gas Cables are the industry's standard for premium power, control and instrumentation performance. Offshore applications challenge cable constructions with relentless heat, vibration, salt corrosion, drilling mud and mechanical stress. Gexol cables prove their value daily in the punishing operating environments of offshore drilling and petroleum facilities around the world.

Gexol® is a Nexans proprietary insulating material that is flame retardant, severe cold durable, drilling mud/oil resistant and has superior dielectric properties.

Our Gexol® Type P cables deliver premium performance:

- Extremely flexible
- Highest ampacity ratings – rated 110°C for continuous operation
- Excellent moisture resistance for more stable electrical properties over the life of the cable
- Produce less toxic and corrosive gases in fire conditions
- More resistant to vibration than Type MC, IEC-spec or commercial-grade cables.
- Suitable for use in Class I, Division 1 and Zone 1 environments (armored and sheathed).
- Available in four constructions:
  - Standard thermosetting jacket
  - Low Smoke Halogen-Free thermosetting jacket
  - Crush and Impact Resistant (CIR) thermoplastic jacket – standard
  - Crush and Impact Resistant (CIR) thermosetting jacket – arctic grade



# VALUE UPSTREAM

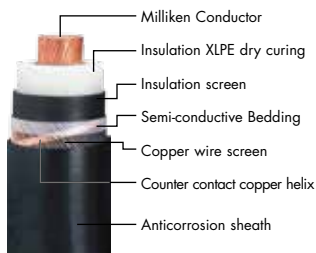
## HV power cables and accessories

Increasing energy demands on topside platforms necessitates more HV transformers. HV cables (up to 110 KV) are required to make secure links between transformer to switchgears and from subsea HV transmission cables to topside.

Overall cable length is usually short. In addition, high flexibility is critical, especially in dynamic sea conditions.

We offer:

- Broad experience in HV cables and accessories (terminations, etc.)
- Advanced design and technology, including customized solutions
- Support in design, installation and commissioning



Separable tee shape connector



Equipment bushing

## Data cables (LAN, fieldbus, coax and fiber)

These optimized data cables are not only capable of providing high-speed transmission, but are also flame-retardant, fire-resistant, UV- and mud-resistant.

Data transmission accuracy is assured through electromagnetic compatibility (EMC).

- Reliable data transmission in emergency situations
- High signal transmission efficiency based on an excellent shield design



LANmark Marine Cat 7 cable



GG45 Cat 7 connector



## Service loops

Nexans has been producing OEM-quality top drive service loops for land and offshore drilling applications since 1993. Our professionally engineered service loops are built to withstand hazardous operating conditions and dynamic stress.

- Potted or non-potted
- 300V – 15kV AC
- DC Power
- Instrumentation
- Composite Power & Control
- Thermocouple
- Fiber Optic
- Electro-Optic
- Quick disconnects



Nexans offers a standard line of loop packages for the leading global top drive manufacturers. For unusual operations, such as deep water offshore drilling, Nexans provides custom designs that deliver longer service life and higher drilling productivity.



## Offshore Bridles and Over Water Umbilicals

Each offshore bridle system presents unique engineering challenges that require experienced, innovative thinking to deliver a connecting apparatus that provides reliable service in extremely harsh, dynamic operating environments. Nexans systems are designed, produced and tested from start to finish at our state-of-the-art cable and bridle production facilities.

- 5/8/15kV assemblies
- Tender-to-platform bridles
- Ship-to-shore power
- Portable power generation
- Zone 1 (EX) rated cable assemblies

In support of these systems Nexans also provides customized receptacle stations and junction boxes, job-site installation, commissioning and field service





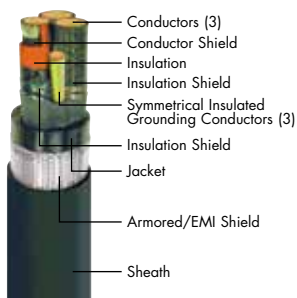


### Variable Frequency Drive cables

Nexans' VFD cables are designed to improve EMC protection and the operating performance of variable frequency drive systems used with bow and side thrusters, movable pod propulsion systems, winches, top drives, lifts and motors on platforms, drilling ships and FPSOs. Thanks to the excellent dielectric insulation materials, shielding design, triple grounding and outstanding braided flexibility, Nexans VFD cables have proven to be the best overall in independent tests of speed drives.

They reduce high-frequency noise emission and bearing current effects, with minimal effective capacitance per unit, while geometric arrangement ensures identical coupling capacitance.

- Increased critical cable length between drives and motors thanks to superior dielectric constant of the insulation material
- Minimal interference for communications, data and control equipment
- Extremely short lead times and On Time Delivery
- Reduced ageing and longer lifetime of insulation materials

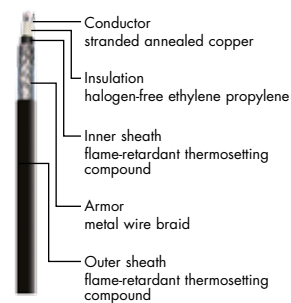


### ICEFLEX® Ultra-cold cables

This ultra-cold cable meets the arctic challenge. It is the first oil & gas cable on the market qualified for extremely low temperatures in accordance with NEK606 and IEC60092-350.

Highly flexible and resistant down to  $-65^{\circ}\text{C}$ , while ensuring advanced fire performance.

- Unique halogen-free solution for arctic drilling and production operation



### Services and engineering support

Nexans offers a full set of services and support all along the supply chain, including On Time Delivery and fast emergency delivery, high availability of a wide range of products worldwide, full certification, and customized solutions that consolidate cables and save pulling and installation costs. We deliver cable with “zero-tolerance” on committed lengths. Beyond routine tests, our quality systems include statistical control procedures, root cause analysis and 8D problem solving.

We invested heavily to build up our engineering capability for front-end electrical system design, internal drawings and innovations.

Our partnership continues with Nexans engineers’ presence on rigs, reviewing drive installations, safe handling procedures, cable placement, and operational modifications.

- 98% OTD and emergency backup capability
- Hybrid solutions for installation and operational efficiency
- Optimization of cable type, sizing and routing
- Quick problem-solving based on international expertise
- 10% scrap saving due to accurate cable cutting and logistics
- Advanced preventative pre-testing and failure analysis for corrective action
- Full technical support before, during and after installation





## A SERVICE COMMITMENT TO UPSTREAM VALUE

### GLOBAL EXPERTISE

Our long experience in on/offshore oil & gas worldwide makes us a unique problem solver. Our Four Pillar Value Proposition fully covers cable performance, installation, complete systems and long-term services and support.

### LOCAL PRESENCE

Understanding your supply chain and international commitments makes us highly responsive in terms of local stocking locations and emergency response. We also offer counseling in design, installation and maintenance.

### ENGINEERING PARTNERSHIP

As a team-based organization, we take a systematic approach to problem solving based on resident and visiting engineers who interface with their industry counterparts on the drilling and production rigs before, during and after installation.

### TECHNICAL LEADERSHIP

We constantly innovate to support upstream operations by improving energy/data cables and service loops in terms of fire-, mud- and weather-resistance, ultra-cold behavior and increasing EMC for variable frequency drives.

Nexans brings energy to life through an extensive range of cables and cabling solutions that deliver increased performance for our customers worldwide. Nexans' teams are committed to a partnership approach that supports customers in four main business areas: Power transmission and distribution (submarine and land), Energy resources (Oil & Gas, Mining and Renewables), Transportation (Road, Rail, Air, Sea) and Building (Commercial, Residential and Data Centers). Nexans' strategy is founded on continuous innovation in products, solutions and services, employee development, customer training and the introduction of safe, low-environmental-impact industrial processes. In 2013, Nexans became the first cable player to create a Foundation to introduce sustained initiatives for access to energy for disadvantaged communities worldwide. Nexans is an active member of Europacable, the European Association of Wire & Cable Manufacturers, and a signatory of the Europacable Industry Charter. The Charter expresses its members' commitment to the principles and objectives of developing ethical, sustainable and high-quality cables. We have an industrial presence in 40 countries and commercial activities worldwide, employing close to 26,000 people and generating sales in 2015 of 6.2 billion euros. Nexans is listed on NYSE Euronext Paris, compartement A.

### Nexans

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