

COMPLETE, RELIABLE CABLE SOLUTIONS  
AND SERVICES AT THE CORE OF ONSHORE  
COMPLEX OIL AND GAS PROJECTS



**Nexans**  
BRINGS ENERGY TO LIFE



## CHALLENGES TO THE OIL AND GAS INDUSTRY

**The oil and gas industry is continuing to reduce costs, improve efficiency, and exploit new fields. Non-conventional oil reserves, like the Alberta oil sands, and “heavy” oil in Saudi Arabia, Venezuela and Kuwait are becoming financially viable using new extraction techniques, including Enhanced Oil Recovery (EOR). Gas exploitation is equally innovative, including shale gas in the US and “sour” gas in Abu Dhabi.**

Downstream there is a continuing evolution in refineries and petrochemicals. Many producing countries are anxious to add value to their product instead of just selling “crude” and are building new state-of-the-art facilities for refining operations and the production of plastics. This includes the Middle East, India, China and Brazil.

At the same time big investments are being made in pipelines: Nord Stream, Kazakhstan-China, Yamal-Europe, Nabucco, the Trans-Saharan, etc. Continuing gas growth is also driving expenditure on compression stations, gas-to-liquid processing plants, and loading and unloading terminals.

Onshore facilities need energy and control cables which can operate under aggressive conditions (intense heat and cold), while protecting workers, infrastructure and the environment.

They also demand reliable telecommunications, often over long distances, to assure safe and efficient operations. “Smart wells” need remote management capability through sensor, instrumentation and control cables, and extended WANs and LANs.

### What you expect from a cable manufacturer:

- full range of cables for energy, control, and data
- special cables for exploration, exploitation, refineries and petrochemicals
- high-reliability and low-maintenance for continuous production
- cables that can operate in both Arctic and desert conditions
- technologies for pipelines, tanker LNG transfer, storage
- innovative solutions to meet the challenge of deep-well drilling
- multicultural technical services for international projects
- environmental friendliness and safety





# NEXANS KEEPS OIL AND GAS FLOWING BOTH UPSTREAM AND DOWNSTREAM

**Nexans is present at every level of oil and gas production, providing a wide range of energy and telecom cables for onshore exploration, production and distribution, as well as for refinery and petrochemical infrastructure.**

Our innovative technologies include lead-free energy cables and ultra-cold energy cables for extremely cold conditions. Nexans also provides high-speed fiber and copper backbones for data transfer and remote control applications. We have pioneered sheathings that resist sea salt, chemicals, and "mud" for both wellhead and refineries. To protect infrastructure and people, we have also developed advanced fire-performance products, and have been carefully tracking and improving materials for easy recycling.

For onshore projects, we are present from the very outset, contributing to the front-end design of cables and network planning. At the delivery end, we use our unique supply chain, global services and technical support to help international contractors and engineering firms meet the complex challenges of the hydrocarbon processing industry. For international megaprojects, we can draw on the manufacturing strengths of several plants worldwide.

**Nexans takes an integrated approach to your needs**

- cables for all applications, from exploration and production to transport and refining
- full range of LV/MV/HV power cables for wells, treatment plants, platforms and refineries
- simulation and network planning for entire oil and gas and refinery complexes
- advanced fiber/copper WANs and LANs for land installations
- standard and interconnective solutions for high availability worldwide
- high performance in tough conditions, including heat, cold, "mud," and oil
- installation expertise for remote land locations
- reduced weight and volume through XLPE cable designs
- training and Through-Life Support (TLS) from installation to maintenance
- superior fire-reaction and resistance to safeguard people and equipment





## EXTENDED VALUE PROPOSITION PLUG & PLAY SERVICES

**Nexans is now able to propose extended services to better serve its Customers. With this innovative new plug & play service, Nexans evolves from a key cable project player into a full solution integrated actor on the market.**

**The concept is to propose options to be chosen based on your level of knowledge, requirements, project complexity and the project timing.**

**Our value offer is organized around 4 main topics:**

- Early engineering services
- Procurement optimization
- Support construction efficiency through logistics, inventory & labor services
- Ensure post-project operations and follow-up

Under each topic you have access to plug & play services which are supporting a coherent Total Cost of Ownership approach.

### **Overall major benefits:**

- Simplify project management
- Consolidate information & product flow
- Anticipate material needs
- Deliver performance savings – Total Cost of Ownership
- Meet compliance & QA/QC standards
- Focus on safety

## EARLY ENGINEERING SERVICES

### Specification assistance

Properly translate the site conditions and process requirements into relevant cable specifications and define the optimized parameters considering:

- Operational parameters
- Electrical parameters
- Mechanical parameters
- Performance & protection parameters (temperature range, fire, moisture, oil, chemicals, source of damages, UV...)
- Installation parameters

### Most adapted technology and product selection assistance

Ensure compatibility between selected specified cables and accessories.

### Material Take off service

Build a reliable system and accurately calculate the required cable runs and accessories quantities.

## PROCUREMENT OPTIMIZATION

### Centralized management

A unique vendor to talk to, combining manufacturing, technical, logistics, cable & accessories management expertise in a full efficient TCO approach:

- Optimize a complex equation taking into account the material cost, the required lead time, the technical compliance and the T&Cs
- Improve vendor management cost
- Quickly respond to change the order request from construction or engineering
- Source any additional material as per project (cable tray, sensors...)

### Vendor selection

Select reliable partners & monitor vendor performance.



## SUPPORT CONSTRUCTION EFFICIENCY

### Inventory & logistics

#### Global cable management and inventory services

- On time delivery and ready to be installed systems considering right cuts & right accessories
- Adjust inventory needs and delivery based on updates of construction schedule
- Optimize onsite storage usability versus space constraints
- Minimize scrap and surplus
- Manage drum returns

#### Use pre-terminated Nexans cables

Gain installation time and limit the exposure to harsh environment.

### Labor

#### Advanced expediting & inventory services for cable management

Maximize workers' productivity by avoiding downtime:

- Use advanced expediting & inventory services for cable management
- Benefit from rental of generator and power equipment supply

#### Installation training courses and supervision

Ensure workers' qualification & certification.

#### Tooling & equipment for cable laying

Ensure workers' efficiency by supplying or renting the materials.

#### PPE supply, OHSAS18001, OHS policies

Guarantee safe work environment & conditions.

### Installation quality & warranty

#### Certify installation quality

- Training on installation basics,
- Supervision by Nexans expert,
- In depth technical training support.

#### Rapidly access expertise in case of technical issue

Onsite technical support is proposed in short timeframe if any installation issue is faced.

#### Spare parts management & safety stock

The spare parts availability is managed through safety stocks.

#### Documentation management service

Organize all required technical and quality documentation.

### Project management & monitoring

#### Optimize trade working capital and financial needs

By using advanced cable and inventory management solutions.

#### Monitor progress & budget

Propose customized reporting and «Customer facing» project management solution.

## ENSURE POST-PROJECT OPERATIONS AND FOLLOW-UP

### Provide specific trainings

Maintain the process performance and quality of the installation to avoid damageable breakdown in production.

### Pool of experts available within 48 hours

Get qualified technicians to site in emergency mode in case of critical issues.

### Documentation library

Reach the key technical and quality information on products during the maintenance operations by accessing to a library on installed products through a database using bar & QR coding.

### Long term spare parts management & safety stock

Ensure spare parts availability all along the installation lifetime.

# COMPLETE CABLE SOLUTIONS FOR MAXIMUM SAFETY AND

## 1. EXPLORATION

### Seismic data acquisition cables, terrestrial



Nexans' precision copper and optical cables for sensors and geophones are sturdy, reliable, waterproof and light, with low cross-talk for higher accuracy.

> Special seismic products are often based on mutual specifications in a technological partnership with worldwide geophysics companies. We developed lightweight, mobile onshore cable which can be used in water up to 50 m, and can be installed in desert, Arctic, lagoon or swamp environments.

## 2. ENERGY

### High-voltage energy cables



Nexans manufactures paper-insulated and XLPE-insulated cables with copper conductors of up to 2,500 mm<sup>2</sup> for voltages

up to 525 kV AC for all onshore applications. Our composite solutions add fiber optic cable for secure telecommunications.

> Nexans was recently awarded a 380 kV XLPE underground cable system for the 4 km-long high-voltage AC system for the Yanbu Refinery in Saudi Arabia (an Aramco/Conoco Phillips project). Chosen because of our many successfully 400 kV cable systems in the Middle East and elsewhere, Nexans will supply cables, terminations, joints, and provide installation services for construction and commissioning.

### Medium and low-voltage energy cables



Nexans provides power cables for local distribution and all low-voltage wellhead and refinery functions, including 1 kV to 10 kV

cables used to power all drills, pumps, compressors, separators, meters, utility systems, etc.

> Nexans provided all of the MV/LV power cables to the first oil refinery built in Vietnam



## 3. INSTRUMENTATION AND CONTROL

### Instrumentation and compensation cables



Fire-safe, "mud-resistant" LV and MV cables are used for control and instrumentation at wellheads and manifolds/gathering

systems. IEEE 45 Type P versions exist for land rig.

> Light-blue sheathed Intrinsically Safe (IS) cables are available for installing separate power circuits to ensure the safety of electrical equipment where flammable materials are present. The PVC outer jacket is resistant to oil and gas, as well as being flame-resistant.

### Foundation Fieldbus cables



This single pair GR 485 0.34mm<sup>2</sup> copper cable with a polyethylene insulation and a grey polyvinyl chloride screen limits voltage, current

and power in an electrical circuit to values according to Intrinsic Safety. It uses 31.25 kbit/s for industrial control systems

> This LAN cable, conforming to the protocol used in the oil and gas industry, will eventually replace instrumentation cables in all places where flammable materials are present (Hazardous Areas): e.g. crude oil and its derivatives, alcohols, natural and synthetic process gases, etc.



# EFFICIENCY



## Control (room) and power cables



Single and multi-pair hybrid cables monitor sensors and activate control, safety and bleed valves to regulate oil, water and gas flow, and

measure and control temperature, operate production separators and gas compressors, and supervise metering, storage and export activities.

> For command and control centers, Nexans provides Halogen-Free or Fire-Retardant/HFFR protection for equipment plant and personnel, while ALSECURE® Premium and ALSECURE® Plus assure fire-resistance by continuing to operate during a fire.

## HYPRON® lead-free cables



This new generation of power and control cables is especially designed for refineries and petrochemical installations in moist areas

where corrosive aromatic hydrocarbons are present. HYPRON® offers an alternative to conventional lead-covered cable and is an environmentally-friendly solution.

> Nexans has delivered HYPRON® cables for the control room of Gasco's ABICS refinery in Abu Dhabi, and instrumentation cables for the Shell Pearl GTL in Qatar. HYPRON® power cables are also used for BASF refineries in Germany and Belgium and to CEPSA in Spain.



# ... FOR MAXIMUM SAFETY AND EFFICIENCY

## 4. TELECOMMUNICATIONS

### Communication cables



These 10, 25, 50 or 100 pair copper cables with waterproof polyethylene insulation, with or without lead sheathing, are used for

extensive inter-building connectivity.

> *Non-polyethylene versions without lead are used for internal networks in non-hazardous areas.*

### Optical fiber backbones



Pipelines between distant points provide a convenient and protected infrastructure (Right-Of-Way) for long distance optical fiber

backbones.

> *In remote deserts, optical fiber cables safely attached to pipelines can provide the remote control of pumping stations, and full network management.*

### Terrestrial Local Area Networks



Copper and/or fiber LANs can provide remote monitoring, control, maintenance, real-time drilling data,

videoconferencing, etc. They are also ideal for the multiple needs of refineries and petrochemical plants.

> *Nexans supplied data and telecommunications cables for Yemgas' new LNG terminal in the Arabian Gulf port of Balhaf, which includes a gas liquefaction plant and loading facilities.*



## 5. SPECIAL CABLES

### Transfer lines for liquefied gas



Nexans CRYOFLEX® transfer lines consist of concentric, flexible, vacuum-insulated corrugated tubes for carrying liquefied gases between

shuttle tankers, LNG carriers and onshore LNG receiving terminals. Super-sized 65 cm diameter CRYODIN® now make it possible to increase transfer capacity nine times.

> *Not only do these flexible tubes resist stress, strain, and corrosion, the outer sheath functions as an emergency insulation in the case of an inner tube puncture, an important safety feature.*

### ICEFLEX® cables



This energy cable, available in both rubber and thermoplastic versions remains highly flexible at extremely low temperatures

(-65° C), while offering Halogen-Free Flame (or Fire)-Retardant/HFFR protection.

> *Responding to a request from the Russian oil and gas market in the High Arctic, Nexans developed a cable which is perfectly suited to all exploration, extraction and transportation applications in ultra-cold conditions. It neither cracks nor breaks during vibration, operational stress, and also resists atmospheric agents (ozone, UV).*

### Electrical submersible pump cables



Nexans produces an entire family of round and flat cables for electric submersible pumps (ESP) which are widely used for

industrial pumping and down boreholes to provide an efficient form of "artificial lift" for extracting oil or water, or for powering water/oil separators which re-inject water into the reservoir.

> *These rugged cables, which can be up to 3 km long, are resistant to oil penetration and high temperatures (up to 400° C) and can withstand up to 3000 psi pressure, making them a low-maintenance, cost-effective solution for many wells.*



### Earthing wire



For protection against short circuits and fire in flammable environments, Nexans copper cables (earthing wire) connects all metallic

poles, masses and buildings, assuring that a uniform earth/ground potential prevails everywhere.

> French refineries and petrochemical plants regularly use Nexans green/yellow H07VK (450/750 V) as grounding wire for their installations.

### Accessories



For all energy and telecom needs, joints and terminations, pressure systems, pumping plants, pull-in heads, branching

units, amplifiers, switches, etc. .

> All of Nexans accessories are customized for the oil and gas extraction and refining/processing environment, especially in Hazardous Areas.



## A SERVICE COMMITMENT THAT GOES A LONG WAY

### GLOBAL EXPERTISE

Our long experience in oil and gas worldwide makes us a unique problem solver. We deliver everything from off-the-shelf items to customized solutions and complete turnkey systems. Our leadership in international standards and interconnectivity makes it easier for you to respond to new projects, and pursue strategic goals.

### LOCAL PRESENCE

Through close partnerships with local oil and gas producers, refineries, petrochemical plants and installers, we complement your national capacities. Understanding your supply chain and

culture makes us high responsive in terms of delivery logistics. We also offer counseling in terms of design, installation and maintenance.

### INNOVATION

We are constantly innovating to support your oil and gas activities. We are improving energy cables and upgrading telecommunications cables, thus increasing the flow of information between wellheads, manifolds, processing plants, storage and export activities. Fire safety, environmental-friendliness and recycling are also top priorities.

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.

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