Nexans

Submarine Technology

Introduction

Nexans Norway was established in 1915 and is today a leading supplier of submarine cables. We produce and install power cables and advanced umbilicals to transmit power and signals. Our product range also includes special-purpose cables for direct electrical heating of flow lines, for seismic surveys, for controlling remotely operated vehicles (ROV) and fiberoptic cables.

Nexans Norway is part of the Nexans group, one of the world's leading cable manufacturers, with industrial facilities in 40 countries and commercial activities worldwide. Nexans is listed on the Paris stock exchange.

Production Facilities

Nexans' expertise centre for high-voltage submarine power cables and umbilicals is the plant in Halden, in the south-east of Norway, which produces paper insulated high voltage cables, XLPE insulated cables, DEH solutions and umbilicals. The expertise centre conducts extensive research and development for all our submarine products.

The plant in Halden was established in 1974 and has been upgraded continuously in keeping up with developments in products for the offshore industry.

The high voltage laboratory located in the Halden plant is one of the largest and most advanced in Europe which features state-of-the-art test equipment for high-voltage components according to international standards. In addition we offer mechanical testing for all cables to verify our numerical simulation.

At our plant for custom submarine fiberoptic cables in Rognan, on the coast of northern Norway, we have been building specialized telecommunication cables for more than four decades.

The plant has deep water quay access, and produces submarine communication cables, ROV umbilicals, tethers, and seismic and oceanographic cables.

The tower in Nexans Halden factory has two XLPE lines for parallell production.

Our plant for custom submarine fiberoptic cables in Rognan.

Focus on HSEQ

Nexans' focus on health and safety meets the most demanding requirements in the oil and gas industries.

Our customers' challenges and our participation in large, complex projects often demand innovative solutions from our R&D team. Through our quality management system, we strive to achieve and maintain our quality standards by concentrating on verification and qualification testing, as well as conformance to recognized international standards.

Our testing includes mechanical, electrical and optical testing, and we provide additional third-party testing upon request.

Our written quality standards cover all aspects of our activities, from raw materials to process controls to finished products and documentation.

Nexans Norway is certified with ISO 9001, ISO14001 and OHSAS18001.

Umbilicals

Nexans is a world-leading manufacturer of umbilical systems. We perform every step in supplying such systems, from design, engineering, and manufacturing to testing, installation, and commissioning.

Nexans' umbilicals are used in all types of applications worldwide: interconnecting subsea installations, connecting subsea installations with fixed and floating platforms (semis) and FPSOs, and connecting subsea systems to shore.

We introduced the first steel-tube umbilical in 1993, and the first dynamic steel-tube umbilical in 1995. Since then, the company has supplied more than 3,000 km of umbilicals, including the 145-km long umbilical installed at Statoil's Snøhvit field, the longest in the world at the time. Nexans has thorough expertise in key building blocks of umbilical systems for advanced subsea applications, including fiberoptic cables, low-voltage signal cables, high-voltage power cables, and steel-tube technology.

A challenge for mature fields is often to maintain operations, as the integrity of the electrical systems deteriorate. In these circumstances an all-electric umbilical can be installed and secure future operations.

Nexans' broad cable expertise supports the market for subsea power distribution, with its need to operate subsea pumps and processing equipment. Nexans has pushed the technology envelope to realize complex power umbilicals, which combine high-voltage cables with the functions traditionally provided by electro/hydraulic umbilicals. This technology has been supplied to BP's King project, Statoil's Tyrihans project and Chevron's Jack & St.Malo project.

Recent references

The Jack & St. Malo Power Umbilicals were installed in August 2014 on Chevron's oil and gas fields in the Gulf of Mexico. With a water depth of about 2,400 meters, it represents the deepest installation Nexans ever has developed and delivered Power Umbilicals for.

Direct Electrical Heating

Direct Electrical Heating (DEH) is a flow assurance technology developed to safeguard the well stream through the pipeline to the platform. Nexans developed this technology in cooperation with Statoil and SINTEF more than 20 years ago. Nexans is the world leading supplier of DEH systems and has delivered approximately 90 % of the DEH systems in operation today.

Our DEH system is designed to heat the pipeline to a temperature above the onset of hydrate and/or wax formation in order to keep the well stream floating through the pipe. DEH system can be used for continuous heating or easily be switched on and off if needed.

The DEH system includes riser cable, feeder cable and piggyback cable plus mechanical and electrical accessories.

The DEH system feature Nexans patented Break Detection System (BDS) based on fiber optics. The fiber optics can also be used for Distributed Temperature Sensing (DTS).

Nexans patented integrated protection system (IPS) and mechanical protection system (MPS) can further be used to protect the piggyback cable against trawling or dropped objects.

Nexans' DEH systems have been installed and operated successfully in the Norwegian Sea since the first delivery to Åsgard in 2000.

Our immaculate track record includes:
The worlds longest DEH cable 43 km prepared for the deepest installation to date - 1 070 m was delivered to the Chevrons' Lianzi project in 2014 and installed in 2015 offshore Congo and Angola.

First phase of the Shah Deniz DEH cables for BP's field in Azerbaijan were delivered in 2014. When in operation the Shah Deniz field will be the worlds largest and most complex DEH installation with 10 parallel heated pipelines (over 120 km) connected to the platform.

Installation of subsea junction box.

Recent references

Remotely Operated Vehicles

Nexans is an established supplier of underwater control cables to the international ROV market.

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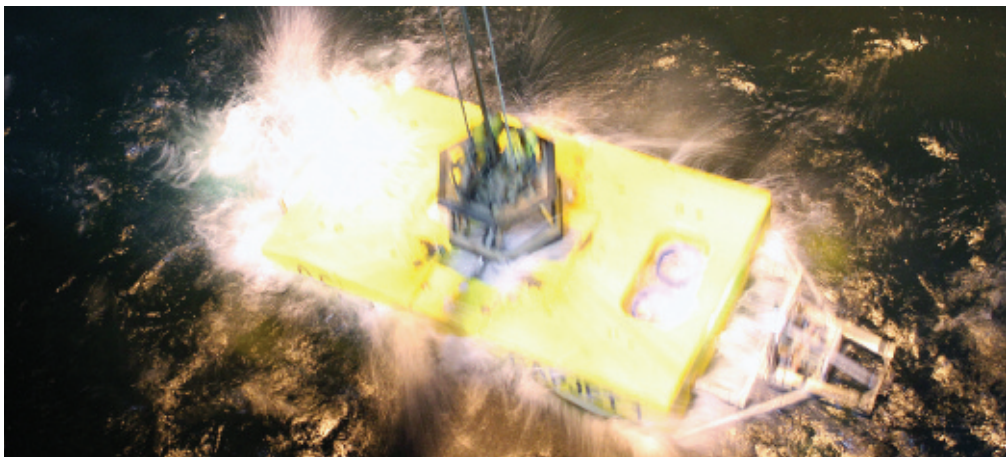
We focus on continuous improvement and innovation in materials and manufacturing processes. Our highly dynamic, torque-balanced, and compact cables are known for their reliability and robustness. Nexans supplies umbilicals and tethers to most of the major ROV manufacturers and operators.

We have designs for most standard ROVs, and develop systems for new applications to customer specifications. Our manufacturing capabilities include umbilicals for work- and observation class ROVs and trenchers, as well as deepwater umbilicals designed for dynamic applications down to 7,000 meters.



Nexans' ROV tether cables are light-weight, neutral, or buoyant for a variety of underwater applications. Our tethers are designed to be both flexible and durable.

To ensure their longevity, we advise and train users in the handling and maintenance of dynamic cables. Our experienced technicians and engineers regularly conduct courses for ROV operators.

Recent references

Seismic and Oceanography/Hybrid

Nexans supplies robust and reliable seismic and oceanographic cables to leading actors in the industry with a variety of cables for both towed and permanent bottom-laid systems.

Our bottom-laid systems include fiberoptic sensor array cables, backbone cables, and dynamic riser cables, and incorporate design elements from our standard fiberoptic submarine applications.

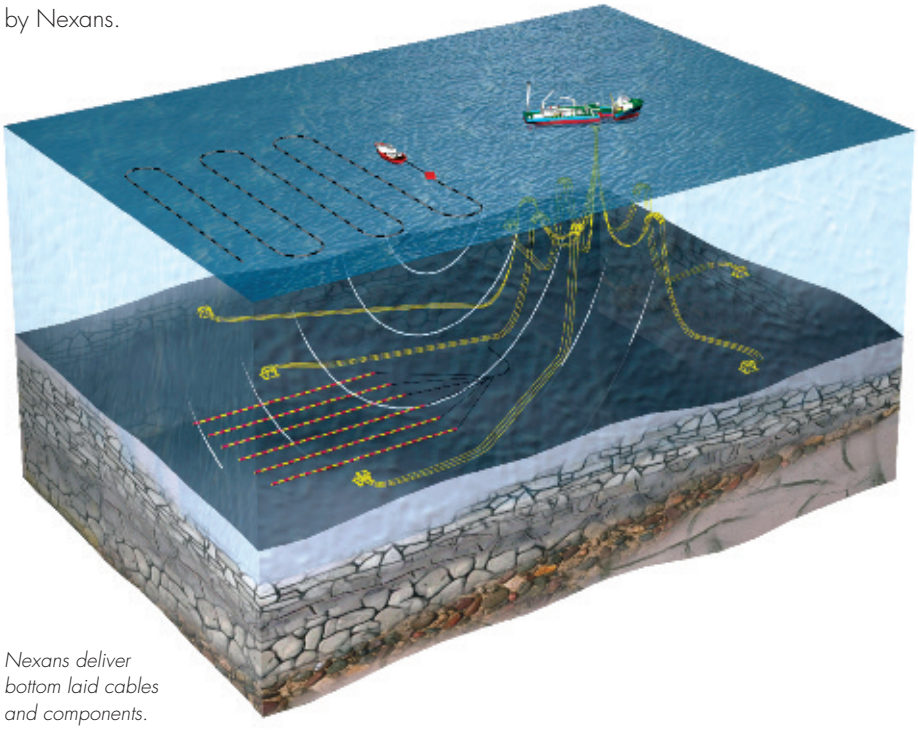
We deliver both complete systems and separate cables. The world's record fiberoptic riser cable for a bottom-laid system, with 768 fibers, was delivered by Nexans.

Our towed systems include airgun cables and lead-in cables, which are part of our standard product line. For termination and fairing of both airgun and lead-in cables, we deliver solutions developed both in-house and in cooperation with other specialists in the industry.

Nexans' design and manufacturing expertise in hybrid subsea cables responds to the oil and gas industry's increasing focus on cost-effective operation of installations and greater utilization of reserves.

Our composite platform cables are also used for interplatform and shore-to-platform signal and power applications. We also deliver fire and mud-resistant fiberoptic topside cables that meet the most stringent IEC requirements. Nexans designs and delivers a complete system of components and accessories for these solutions, including personnel for offshore installation, assistance and training.

Recent references



Nexans deliver bottom laid cables and components.

Submarine Power Cables

Skagerrak 4, the new 130 km long subsea high voltage connection between Denmark and Norway, was handed over to Statnett and Energinet in 2014.

Installation of power cable, Horns Rev 1, in Denmark.

Highly reliable cable solutions are required all over the world to cross fjords and connect countries, wind farms and offshore oil and gas installations. Nexans has made the highest standards in engineering design, quality assurance, testing, and manufacturing the key criteria for our operations.

We have in-house capability to design and deliver turnkey solutions, from R&D to completely installed and commissioned cable systems, including engineering of all required cable laying operations and cable protection work.

Our factories specialize in manufacturing long lengths optimized to suit the load capacity of our dedicated cable-laying vessel, the C/S Nexans Skagerrak.

Nexans offers a full range of cable solutions for HVDC and HVAC applications, and works together with customers to push technology forward. Our production facilities have been developed to meet customers' needs with solutions for deeper waters, higher voltages and longer lengths.

Our product development is dedicated to creating long lasting subsea power cable systems, designed to withstand high mechanical stresses during laying and operating, especially when the cable system is to be installed at deep waters. Strict requirements for reliability, presupposes solutions that are based on long operating experience and extensive testing in the form of mechanical and electrical tests. We deliver complete solutions combining fiber and power in one cable.

Recent references

Submarine Fiber Solutions

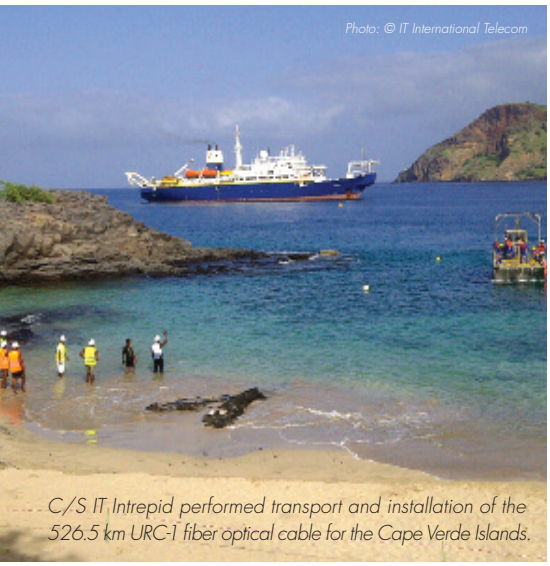
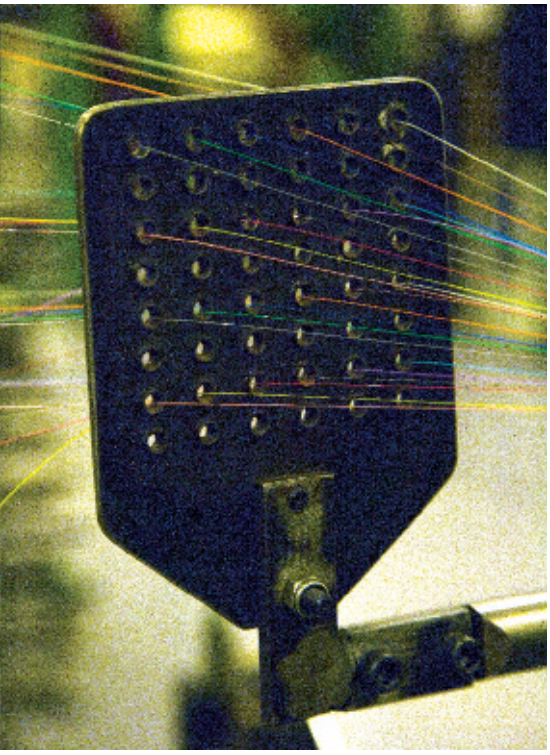


Photo: © IT International Telecom

C/S IT Intrepid performed transport and installation of the 526.5 km URC-1 fiber optical cable for the Cape Verde Islands.



Nexans' fiberoptic submarine cables are designed for both repeaterless and repeatered systems and have almost unlimited capacity over long distances.

In over two hundred projects worldwide, Nexans has supplied more than 35,000 km of cable and gained a solid technological foundation. Nexans' fiberoptic cables link islands, countries, continents, platforms, and FPSOs, run along and crossing fjords and rivers. Our customers include telecommunications providers, oil and gas companies, and the public sector.

Nexans' steel tube technology is unique in the industry, and delivers three main advantages: first, it provides a more robust cable system; second, it extends the design lifetime; and third, it simplifies sealing and termination.

Our number one unrepeatered cable, URC-1, is used for systems with lengths up to 500 km in which the optical signal can be a remotely optically pumped special fiber (ROPA). The second repeatered optical cable, ROC-2, is used for systems up to 10,000 km long and down to 8,000 m water depth, typically for transatlantic and transpacific connections. The ROC-2 can also be equipped with power and signal feeding to subsea installations, scientific sensors, seismic arrays, etc.

For a total solution, Nexans provides many accessories to secure and fasten the cables, including hang-offs, cable clamps, J-tube seals, elastomer protection sleeves, flexible steel hose, cable coiling frames, and more. For cable network and repair, we supply branching units, wet-mateable connectors, ROPA boxes, cable joints for submarine, topside and onshore use, and terminations for wetmateable connectors and optical distribution frames (ODFs).

Recent references

Installation services

Being critical elements in any submarine transmission system, it is extremely important that cables and umbilicals are installed properly. With reference from more than 1,500 submarine installations, Nexans has the knowledge and equipment to optimize safe installation and protection services.

The C/S Nexans Skagerrak

C/S Nexans Skagerrak, one of the world's most advanced laying vessels, is purpose-built to install large-sized cables and umbilicals, both in respect of total weight and length. With its purpose built large diameter (29 m OD) turntable capable of loading 7,000 tons of cable and its unique cable capstan system, it can offer an efficient tool for demanding projects.

Nexans CAPJET trenching system

Nexans CAPJET trenching system has buried more than 8,000 km of cables, umbilicals and pipelines since it was first introduced. Originally developed for power cable trenching in shallow water, the CAPJET system has been continuously developed to bury cables, steel and flexible flowlines and large diameter oil and gas transport pipelines at water depths down to 1,500 m. The CAPJET system is based on the principle of fluidizing sea-bottom materials, and uses water jetting for both trenching and propulsion.

The CAPJET system has been subsequently enhanced with special features as the rock-cutting module, designed for harder soil conditions.

Installation of the Belwind project was carried out with Nexans' cable laying vessel C/S Nexans Skagerrak. Nexans' Capjet system was used for trenching the cable that was delivered in the summer of 2010.

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