



NSW[®] Offshore and Special Cables

Cables for the future, delivered today



NORDDEUTSCHE SEEKABELWERKE GMBH (NSW)

The submarine competence center within the General Cable Group

NSW was founded in 1899 by Felten & Guillaume and the Deutsch-Atlantische Telegraphengesellschaft. Siemens became one of its major shareholders in 1931 and acquired the remaining stock in 1995. In 2000 NSW became a subsidiary of Corning Cable Systems. Since 2007 NSW has been a 100-percent member of the General Cable Corporation (NYSE:BGC) and became the competence center for submarine cables in the General Cable Group.

The General Cable Corporation is one of the Fortune 500 companies, a world leader in developing, designing, manufacturing, marketing and selling copper, aluminium and

glass-fiber cables plus products in the energy, industrial and telecommunication sectors.

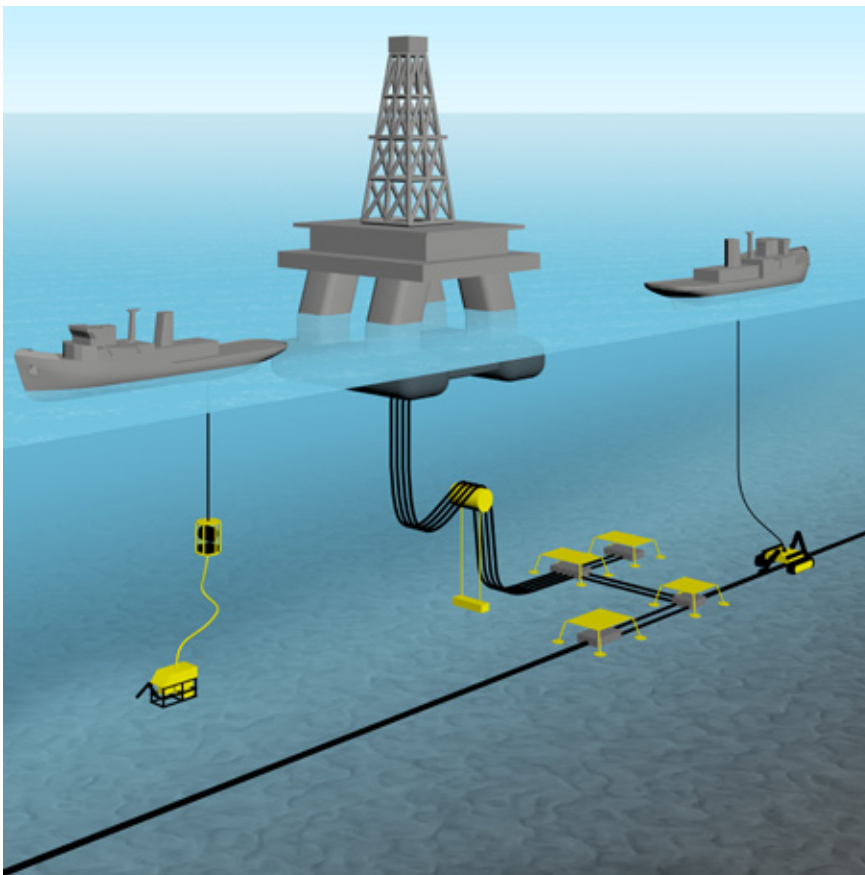
NSW benefits not only from General Cable's profound expertise but also from its global reach in the wire and cable industry. Quality, state-of-the-art technology and customer focus are General Cable's top priorities.

NSW has been manufacturing underwater cables since 1899. A century of experience in armored and non-armored cables for carrying power, signals, communications and fiber-optic applications has formed the foundation for a forward-looking organization committed to innovation and unrivalled customer service.

NSW's research-and-development and product management teams work in close cooperation with General Cable's experts for power transmission as well as leading engineering companies to create state-of-the-art solutions for many of the world's leading electric utilities and the oil and gas industry.

NSW Offshore Cables – Product Overview

NSW manufactures a large variety of cables for the offshore industry. The major groupings will be described in the following pages.



NSW[®] UMBILICALS

The challenges and potential of the offshore industry continue to grow apace. At the same time, our customers (ROV System manufacturers) have very special requirements. As a consequence, tailor-made solutions are needed in most cases. As the recognized experts in offshore cables, NSW can offer these solutions by meeting stringent industry requirements. Developed on a case-by-case basis, our cables are reliable and cost-effective even under extreme conditions. Over the years, NSW has adapted new materials such as special metal alloys, high-density cross-linked polymers, thermoplastics and synthetic yarn to improve the elasticity and operational reliability of its cables.

Typical examples of cables we produce for the offshore industry are:

NSW[®] Underwater Vehicle Umbilicals

- Steel wire armored umbilicals
- Aramid reinforced umbilicals
- Standard, light & buoyant umbilicals

NSW[®] Power & Control Umbilicals

- Submarine power & signal cables
- BOP mux umbilicals
- Open range cables
- Electro-mechanical umbilicals
- Inspection cables

NSW[®] Geophysical-Seismic Umbilicals

- Airgun umbilicals
- OBS umbilicals
- Lead-in umbilicals



LOW, MEDIUM AND HIGH-VOLTAGE CABLE TYPES

Industry demand in the oil and gas sector for broadband communication has been high due to following factors:

- Exploration in deep water areas
- Substantial increase in real time data generation and transmission to other locations
- Requirement for deployment of more sophisticated process control systems in the offshore environment
- Increase in automation to reduce manning cost on offshore rigs
- Better communication between offshore and onshore locations
- Improvement of working conditions for personnel on offshore rigs

NSW can offer a wide range of different technologies to meet these requirements. Almost all traditional communication media cables like twisted pairs and quads (shielded or un-shielded), coaxial, triads and others can be offered. Typical cross-sections are available between 2.5 mm² and 35 mm² for voltages up to 3.3 kV with various armoring types like galvanized steel wires, synthetic yarn braiding or other reinforcements.

The industry's demand for gas and water-tight conductors can be met with a special filling compound in the strands of the conductor.

Fiber-optic cables continue to play more and more of a key role in the oil and gas industry. NSW is able to offer a lightweight but very rugged fiber-optic cable with unique features.

The key element is a longitudinally welded central copper tube assuring optimal protection of the fibers against hydrogen ingress. Up to 144 fibers are available, with a high fiber excess length that is not connected to the outer structure of the cable. This prevents damage to the fibers during cable handling and ensures continuing excellent optical properties of the fibers throughout the entire service life. The compact design and small reliable bending radius further improve cable handling.



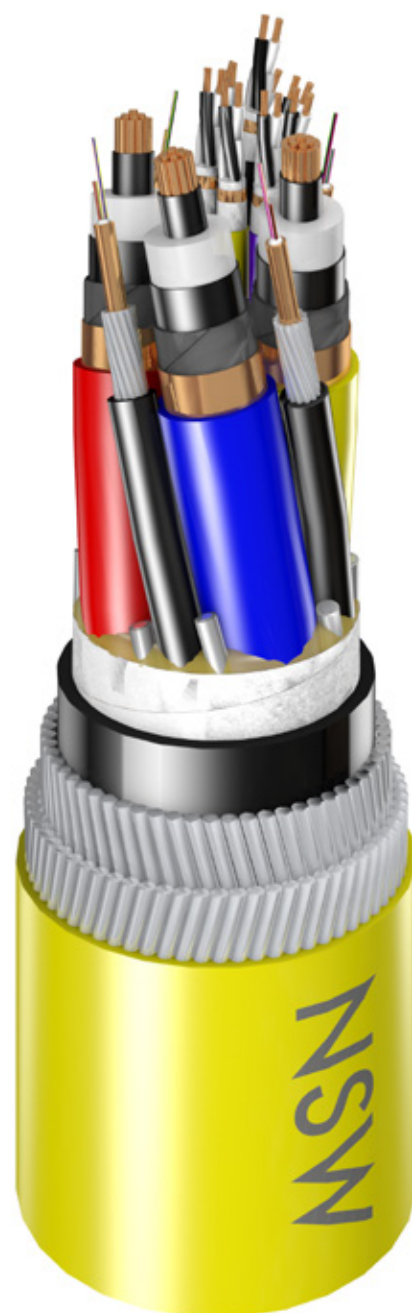
NSW® OFFSHORE CABLES FOR THE OIL AND GAS INDUSTRY

The offshore oil and gas sector has always looked towards the future constantly driving forward and developing technologies to extract oil and gas resources from ever deeper and more challenging environments while continuing to extend the life of mature fields. Likewise NSW constantly strives to provide solutions for the special control and communications requirements of advanced offshore technology, in particular offshore oil fields.

Our customers are facing more-stringent requirements. The distances are growing, water depths progressively increasing. Listed below are only a few of the com-

ponents on which we are working together with our customers. NSW relishes this continuing challenge and the associated extreme requirements for cables in terms of electrical and mechanical stresses.

With our new enhanced capabilities we are able to supply solutions with combinations of fiber-optics, LV and MV as well as HV applications up to 270 kV AC. Our fully qualified splicing technology, based on extrusion molding for all voltage levels, armoring capacity with a capability for armoring 138 wires in one layer, sophisticated extrusion lines and several thousand tons of turntable capacity give NSW an unrivalled capability.



NSW ® NETSOUNDER CABLES

One of our specialized cable applications is in the fishing industry. The deep-sea fishing industry of the present day utilizes advanced technologies because the smallest failures can have expensive repercussions. NSW as widely recognized cable experts offer durable, reliable and cost-effective solutions with quality and adaptability based on many years of experience.

NSW has a wide range of cable types for all needed applications. These include both conventional coaxial cables with a load at failure of about 19 kN and double-reinforced cables with a load at failure of about 70 kN. Besides its use as conductor for data transmissions and for securing the trawler electronics, this unusually strong cable is also used for lifting the headrope of the fishing net achieving a much larger net opening.



QUALITY ASSURANCE

Quality Management at NSW

The criteria for production and environmental management systems contained in the ISO 9001/14001 standards apply throughout the world, and of course NSW cables and jointing technologies possess the full range of quality approvals (Electra, IEC, ISO Certificates).

Out of conviction, NSW has also implemented quality standards in its company processes and expanded them to the comprehensive management system BS OHSAS 18001. Consequently, the synergies created by a total system can be employed in the interests of our customers.

Independent companies carry out regular inspections to check compliance with the requirements of the standards. The certification documents of the DNV GL Business Assurance Zertifizierung und Umweltgutachter GmbH attest that NSW uses an active and well-functioning quality and environmental management system.

Measuring and Testing at NSW

A wide range of measuring and test equipment with fully trained staff experienced in all the relevant measuring methods and test standards is available. NSW works to national and international test standards. In addition NSW makes use of independent test bodies and certified laboratories.

In order to assure the quality of NSW products, we procure only the purest of raw materials. In addition, our facilities are fully equipped for handling all mechanical, chemical, electrical, optical and performance testing. Specialist staff monitor and test all components at both pre-established and random stages of the manufacturing process.

A typical QC program includes:

- QA acceptance testing for all incoming raw materials
- Component inspection/testing during manufacture
- Full electro/optical HV/LV characteristic testing
- Special tests if required, e.g. bending/cycle/pull/break
- Issue of full certification and documentation on completion





ENERGY

Markets: Transmission, Distribution, Generation
Products: Underground Cable, Substation Cable, Overhead Conductor & Cable



RENEWABLE ENERGY

Markets: Solar, Hydro, Wind
Products: Panel Wire, Cu & AL PV Wire, Tower Wire & Cable, Collection System Cable, Industrial Cable, Utility Cable



CONSTRUCTION

Markets: Residential, Commercial, Institutional
Products: Building Wire, Portable Cord, Industrial Cable



INDUSTRIAL

Markets: Food & Beverage, Automation, Water/Wastewater, Pulp & Paper
Products: Control Cable, Instrumentation Cable, Power Cable, Automation Cable, Portable & Temporary Power Cord, Solar Cable



TELCO

Markets: Independent Telephone Operating Companies (ITOCs), Regional Bell Operating Companies (RBOCs)
Products: Air Core Cable, Filled Core Cable, Wire Products, Central Office Cable, Optical Cable, Indoor/Outdoor Telephone Cable, Drop wire Cable



ENTERPRISE & COMMUNICATIONS

Markets: Commercial/Residential Buildings, Data Centers, Education, Finance, Federal/Government, Healthcare, AV, Manufacturing
Products: Datacom Cable, Fiber Optic Cable, Electronics Cable, Telecommunications Cable



OIL, GAS & PETROCHEMICAL

Markets: Upstream, Downstream, Midstream
Products: Offshore Cable, Subsea Cable, Onshore Cable



MARINE

Markets: Shipyards building, Ships & Other floating vessels
Products: Power, Control Instrumentation & Communication Cables



NUCLEAR

Markets: Nuclear Power Plants
Products: Power, Instrumentation, Control



MINING

Markets: Surface, Underground
Products: Portable & Trailing Mining Cable, Mine Power Feeder Cable, Industrial Cable



TRANSPORTATION

Markets: Automotive, Agricultural Equipment, Rail & Transit, Heavy Duty & Industrial Trucks, Bus
Products: Rolling Stock Cable, Signalling Cable, On-Vehicle Data Communications, Control & Power Wire and Cable, Battery Cable, Primary Wire, Electric Vehicle (EV) Products, Wire Harnesses and Assemblies



MILITARY

Markets: On Land, At Sea, In the Air
Products: Communications Wire & Cable (Cu & Fiber), Shore to Ship Power Cable, Wire Harnesses & Assemblies

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