

ENHANCED CABLE SOLUTIONS
AND SERVICES FOR THE WORLD'S NAVY





CHALLENGES TO NAVAL SHIPBUILDING

Faced with reductions in overall defense spending, the world's navies have seen fleet size shrink while governments are anxious to procure new, sophisticated platforms and broaden their spectrum of naval capabilities – including carriers, submarines and surface combatants – to achieve a more “balanced” fleet. Meanwhile, developing countries have ordered greater numbers of specialized smaller vessels to serve their coastal needs.

Among the major NATO navies, there are fewer ships today than in 2000, but they are larger, more sophisticated and more expensive. Numbers are being traded for capability. In addition, military operations now include evacuation, disaster relief, humanitarian aid, sea-based land operations, Special Forces deployment, and pirate/drug/human-trafficking policing.

The United States, with a decreasing fleet size, is increasingly focused on the Asia-Pacific region, and moving away from specialized ships towards “do-everything” platforms, while continuing to rely on aircraft carriers and nuclear submarines for blue-water power projection far from home. Meanwhile, China, South Korea, India and Japan are continuing to develop their own naval power, often driven by territorial disputes and shipping security concerns. Also, economic progress has allowed Turkey, Vietnam, Australia and Brazil to enhance their naval roles.

Economic and geopolitical changes have given rise to technological developments in naval shipbuilding to support stealth capability, enemy detection, and precision-strike weapon systems. In addition, two technology drivers are transforming warship architecture: propulsion and powering (especially all-electric drive systems), and digitalization, which includes big data, communications, sensors and robotics. In fact, unmanned drones may soon result in the emergence of a new class of warship. All of these recent trends, and technical drivers are highly cable-dependent, since cables provide the vital energy, sinew and nerve systems essential to successful naval operations.

What naval contractors and their suppliers expect of a cable manufacturer:

- A full range of cables to cover increasing warship complexity
- Ability to meet all naval specifications, plus international interoperability
- Expertise in energy and advanced telecommunications
- Responsibility for system and subsystem development
- Innovations for defense electronics and Network-centric Warfare
- Quality and reliability to increase the life cycle of platforms
- Combat survival through electronic discretion, fire-safety, shock-resistance, redundancy
- Approved supplier status, product availability, on-time delivery, maintenance training
- Modular solutions to facilitate faster installation and easy upgrades





NEXANS REINFORCES WARSHIP CAPABILITIES

For the integrated onboard environment, Nexans provides a wide range of quality cables from a single source, which fully conform to the world's strict naval standards.

Wherever possible we apply proven commercial and interoperable solutions for easier procurement, maintenance and repair. Since every warship is made-to-order, we often customize our cables, e.g. smaller and lighter cables so that ship speeds and armament loads can be optimized.

To keep pace with the information revolution, we constantly innovate to improve data speeds, protect vital combat & control systems, reduce crew size, while ensuring high operational efficiency and survival under actual battle conditions.

High performance cables:

- resistance to heat, cold, humidity, oil, vibration, shock, corrosion
- advanced fiber and copper LANs for next generation naval telecommunications
- a complete range of power cables for all warship energy needs
- reduced weight and volume through advanced designs and materials
- expertise in connectivity at all levels, and provider of fully-integrated systems
- global presence and fast delivery worldwide

Compliance with world standards:

- ABS, BV, CCS, DNV.GL, LRS, RINA approved
- ISO 9001 quality standards
- Qualified Products List (QPL)
- German VG
- American Mil-Dtl-24643, Mil-Dtl-24640, Mil-PRF-8508.5045, Mil-Dtl-17
- Japanese JIS specifications
- advanced fire-performance (IEC 60332-3-22 Cat A), low-smoke (IEC 61034), halogen-free and low toxicity (IEC 60754-1 & -2) as well as Fire resistant cables for circuit integrity (IEC 60331).



TODAY'S EXPANDING DEEPWATER PORTS...

POWER

Energy cables for propulsion



1.8/3 kV up to 8.7/15 kV. In cooperation with shipyards, Nexans has raised the voltage rate, which increases power capacity, but not conductor cross-section.

> Kukdong, a Nexans company, is fully outfitting a 1,800 ton submarine being built by Hyundai Heavy Industries (Korea) according to VG-95218 German standards

LV power distribution and control cables



Halogen-Free Fire-Retardant (HFFR) Low Voltage cables 0.6/1 kV provide onboard power distribution. For harsh environments and

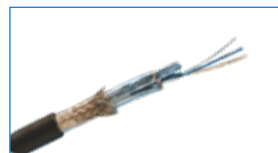
contact with aggressive liquids MGSGO 0.6/1 kV power cables are designed according to VG 95218-60. These products are built with flexible materials from the conductor to the sheath for easier pulling and connection. A lightweight version, LMGSGO, was developed for small cross-section distribution or control cables.

> Our VG cables are installed onboard of all kinds of vessels, like frigates, minesweepers, torpedo boats, submarines and corvettes worldwide (Australia, Thailand, RSA, New Zealand, Argentina, Peru, Colombia, Brazil, Korea, Indonesia, Portugal, India, Norway and Germany).



INSTRUMENTATION & CONTROL

Instrumentation cables



Thin and ultra-thin-wall instrumentation cables as described in standards VG 95218-62 to -66. These products offer different levels

of electromagnetic protection to avoid signal disturbances for sensors, measurement devices or control panels. These products are designed to offer the right chemical protection in case of liquid leakage.

Multipair 0.22 mm² cable was used by Naval Group on the Mistral Class Landing Helicopter Dock (LHD), the most employed asset within the French navy. All cables are tested for twisting, bending, recoil, etc.

... DEPEND ON RELIABLE CABLE SOLUTIONS



Sensor measurement and fieldbus cables



These HFFR cables control all essential industrial functions, like motors, rudder, and hydraulic systems. They have controlled impedance, and

transmit an extremely precise digital signal.

> *Foam-skin insulation allows air or gas to be injected, optimizing the size of the cable for important weight and volume gains. Nexans also supplied these cables for the Mistral Class LHD.*





COMBAT SYSTEMS AND NAVIGATION

Maritime Local Area Networks



Copper and fiber cabling systems and robust ruggedized Ethernet switches to handle navigation, telecommunications, combat

management and directions systems (CMS/CDS) and Command Support System (CSS) for Network-centric Warfare.

COMMUNICATION

Thin-wall LV cables



Halogen-Free Fire-Resistant cables provide efficient energy for equipment, conveniences, cabin wall outlets, public address

systems, automatic doors, lighting, etc.

> This type of cable is currently being installed on Horizon frigates, Mistral LHDs and Barracuda nuclear-powered attack submarines (SSNs).

Coaxial cables



Coaxial Navy cables are determined for reliable high frequency data transmission (communication equipment, radar, instrumentation), video

signal transmission or weapon equipment throughout the vessel.

> Nexans supplies a wide range of coaxial cables to the Electric Boat Division of General Dynamics for use onboard the latest generation of attack submarines being built in cooperation with Newport News Shipbuilding. The German Navies 5 K 130 Corvettes and Republic of Korea Navy's Ul-San Class (FFX-Future Frigate) are also equipped with Nexans coaxial cables.

Degaussing cables



Special cables used to demagnetize the ship's hull as it cuts through the water, thus reducing the threat from mines.

> Nexans provides degaussing cables for Northrup Grumman Ship Systems, as part of the US Navy's Aegis (guided missile frigate) shipbuilding program and for Hyundai Heavy Industry as a part of the Republic of Korea Navy's new shipbuilding program.



SERVICES TO SUPPORT YOUR NAVAL DEFENSE

GLOBAL EXPERTISE

The fact that cables are our core business means that we have the expertise and family of products to meet the tough demands of navies worldwide. Working closely with naval prime contractors and their suppliers, we support all functions and systems for the smooth integration of modern technologies.

LOCAL PRESENCE

Since naval shipbuilding and procurement is increasingly international, it requires a company with broad

geographical presence. Nexans supplies distributors for the US Navy, and leading international shipbuilders with primary and replacement cables wherever they are needed.

TECHNICAL LEADERSHIP

Nexans is already developing next-generation solutions to integrate warship and combat systems, to provide efficient communications for attack and self-defense, to assure easy maintenance at sea, and to protect crews and equipment.

As a global leader in advanced cabling and connectivity solutions, Nexans brings energy to life through an extensive range of best-in-class products and innovative services. For over 120 years, innovation has been the company's hallmark, enabling Nexans to drive a safer, smarter and more efficient future together with its customers. Today, the Nexans Group is committed to facilitating energy transition and supporting the exponential growth of data by empowering its customers in four main business areas: Building & Territories (including utilities, smart grids, mobility), High Voltage & Projects (covering offshore wind farms, submarine interconnections, land high voltage), Telecom & Data (covering data transmission, telecom networks, hyperscale data centers, LAN), and Industry & Solutions (including renewables, transportation, Oil & Gas, automation, and others). The Group's commitment to developing ethical, sustainable and high-quality cables drives its active involvement within several leading industry associations, including Europacable, The National Electrical Manufacturers Association (NEMA), International Cablemakers Federation (ICF) or CIGRE to mention a few. Nexans employs more than 26,000 people with industrial footprint in 34 countries and commercial activities worldwide. In 2017, the Group generated 6.4 billion euros in sales. For more information, please consult: www.nexans.com

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