



## Solutions for Offshore and Commercial Marine



EVERY CONNECTION COUNTS

## Designed, Built, and Tested for Extreme Performance in Extreme Environments

TE Connectivity helps you boost performance and increase reliability in one of the toughest application environments on Earth, whether it's corrosive salt spray on a wind-swept oil rig, the incredible hydrostatic pressures on umbilical cable on a 10,000 foot dive of a remotely operated vehicle (ROV), or the relentless drive to save space and weight even as you increase performance.

Offshore equipment must operate safely and reliably 24/7/365 under harsh conditions. Downtime is expensive, failures can be dangerous, and repairs can be difficult. At TE we are addressing the key issues in making offshore facilities more productive, reliable and safe.

### The Brands You Trust

**DEUTSCH:** DEUTSCH connectors offer high-performance connectivity for harsh environments, ready to weather the pressures, corrosive conditions, and extremes of subsea and downhole applications.

**Raychem:** Expertise in materials science and crosslinking allows Raychem cables and harnessing products to reduce weight and save space while maintaining or enhancing electrical, mechanical, or environmental performance.

**Rochester:** Your first choice for highly engineered cable to designed for such demanding industries as petroleum exploration and production, defense, oceanographic, and subsea applications.

**Subcom:** a full-service supplier of undersea communications systems and services for the oil, gas, and exploration industries, providing stable, secure, and reliable voice, data, and video.

# TAME A HARSH ENVIRONMENT



C-LITE FR CABLES



SeaLAN CABLE

**C-Lite FR cables are not only up to 50% smaller in size, but possess flame-resistant properties to maintain circuit integrity in a fire at temperatures to 1000°C.**

**Our Raychem brand waterblocked and non-waterblocked Ethernet cables are qualified to meet rigorous requirements of flammability, smoke emissions and halogen content. Waterblocked constructions meet severe waterblocking and humidity resistance requirements.**





## Key Benefits

- Fire-Hazard Reduction
- Space Constraints
- Weight Constraints
  
- Electromagnetic Interference (EMI) Protection
- Environmental Toughness
- Mechanical Reliability
  
- Flexibility
- Workability in Stripping, Soldering, and Bonding
- Power Management

## An Expansive Line of Solutions for Offshore and Marine

- Signal Connectors
- Power Connectors
- Fiber Optic Connectors
  
- Wet-Mateable Subsea Connectors
- Umbilical, Tether, MUX, and Other Subsea Cables
- Penetrators
  
- Topside Marine Wire and Cable
- Cable Management and Harnessing
- Terminal and Splices
  
- Cable Assemblies
- Relays and Contactors
- Telecommunication Services



OPTICAL CONNECTIVITY



FIBER-OPTIC CABLE ASSEMBLIES

**Our broad electro-optic capabilities in cable and interconnections include expanded-beam connectors that give unparalleled performance in rough and dirty environments. You'll also find an extensive line of best-of-brand, industry-standard connectors and cables in configurations to withstand any offshore hazard.**

**Noise immune and capable of long transmission distances, our fiber-optic cable assemblies support all industry-standard and specialized interfaces. We offer single-mode and multimode cables in standard tight-buffered configurations for protected applications, and in armored and loose-tube configurations for harsher environments.**

## TE Components . . . TE Technology . . . TE Know-how . . .

Get your product to market faster with a smarter, better solution.

**Go to: [DesignSmarterFaster.com](http://DesignSmarterFaster.com).  
Your best place to get started, today!**

Here you can get connected to the inner circle of TE AD&M's best thinkers. Working together early in your design review process, we can help you reach a better connectivity solution.

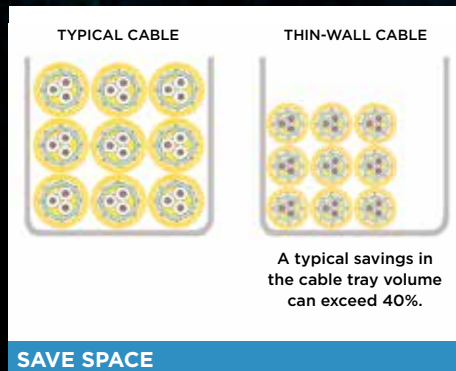


## Increasing Safety

We are an industry leader in the application of thin-wall insulation and jacketing to cables. You gain significant savings in space and weight without sacrificing mechanical reliability and strength or thermal stability. Plus, smaller cables have tighter bend radii for more flexible routing and efficient use of cable trays.

Storing and processing inherently inflammable products, oil drilling and refining platforms can be potential fire hazards. We help increase safety of personnel and protection of equipment with low-fire-hazard, low-smoke, zero-halogen cables that minimize toxic and corrosive gases.

# DO MORE WITH LESS: HIGH-TEMPERATURE, THIN-WALL TECHNOLOGY



**TE's thin-wall technology can save as much as 40% in cable trays. Such savings result in smaller trays, more cables per tray, lighter supports, and smaller cable glands. And higher temperature ratings mean higher current densities, increased safety and improved long-term reliability.**

**TE's thin-wall technology reduces installed costs up to 15%. Not only do the reduced size and weight make installation faster and easier, you realize additional savings in smaller, lighter trays, racks, and other cable management hardware. What's more, resistance to hot diesel fuels, oils, grease, drilling fluids, and mechanical abuse means long-term reliability and lower maintenance costs.**



## Count on the Benefits of Our Thin-Wall Technology

### Size Reduction

- Lighter Supports
- Smaller Glands
- Improved Static and Dynamic Bend Radius

- More Efficient Use of Cable Trays

### Easier Use

- Optimized Cable Routing
- Easier Installation Handling

### Weight Reduction

- Lower Deck Loads
- Better Fuel Efficiency

### Flexible Integration

- More Power in a Fixed Space
- Non-Melting Insulation

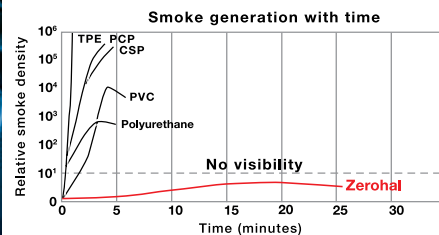
TYPICAL CABLE



THIN-WALL CABLE



SAVE WEIGHT



INCREASE SAFETY



HARNESSING COMPONENTS

With more than 475 km of cabling on a typical large offshore platform, there are potential savings of up to 105 tons topside by using C-Lite cable throughout the platform. When you include the weight savings from smaller cable glands, trays, and transits—total savings add up to approximately 165 tons.

Our thin-wall technology includes low-smoke and zero halogen wire and cable—which emit low levels of toxic gases and generate considerably lower levels of smoke to assist in maintaining visibility in an emergency.

Our application-matched tubing, molded parts, adhesives, backshells, and other harnessing components give you everything you need to build cable assemblies as rugged as your application.



## Making Toppides Safer and More Productive

Count on TE connectors to make topside operations safer. TE DEUTSCH connectors specifically designed for such applications as FPSO are available for power, optics, and signals. Explosion proof connectors maintain circuits in severe environments, while allowing dry, splash, or wet mating.

Connectors are available in a wide range of sizes and contact configurations, for a variety of temperature ranges, and environmental or hermetic sealing.

# CONNECTING PERFORMANCE WITH RELIABILITY



9316 SERIES CONNECTORS



EXPLOSION-PROOF CONNECTORS

**A workhorse family for a wide range of topside and subsea applications, 9316 connectors are available in seven shell sizes for power, signal, coaxial, and optical contacts. The connectors are available with a range of voltage, current, and temperature ratings, with a pressure rating up to 10,800 psi, and in explosion-proof and hermetic versions.**

**Our MOD, MSD, MPD, 9316, and Showet series connectors are explosion-proof connectors suited to topside application in hazardous environments such as FPSO turrets. Offering robust splash-zone-mateable connections, explosion-proof connectors are available with electrical, optical, and hybrid options.**

## Connectivity Solutions for Topside Applications

- Platforms
- Drilling Rigs
- Floating Production, Storage and Offloading
- Explosion proof
- Seismic Streamers
- Skids
- Dry Trees
- Buoys



9323 SERIES CONNECTORS

Designed for seismic streamers, these dry-mateable connectors feature titanium shells and are available in 1500 V and 500 V versions for currents up to 13 A.



P6-MD300 SERIES CONNECTORS

Make power connections with the splash-zone capable, explosion-proof P6-MD300 series. Rated to 6 kV and 300 A, the connector uses quick-connect/disconnect coupling for reliable operation.



HYBRID CONNECTORS

Combine optical and copper connectivity in a single shell. Supporting both signals and control copper cabling and single-mode and multimode optical fibers, hybrid connectors are available in several configurations to allow you to replace multiple connectors with one.



## From Rig Mast to Sea Bottom

We offer standard and custom umbilical and tether cables for ROVs with an expertise in matching dynamic mechanical needs with electrical power, control, and instrumentation requirements. Our innovations in thin-wall cables, armoring, buoyancy, and other critical parameters mean smaller, lighter cables—by 15% to 30%—that allow longer lengths on your current winching equipment.

Count on TE for wide-ranging interconnection solutions. We speak your language, have wide and deep experience solving the tough problems in offshore exploration and production, and work closely with customers to ensure the best solution.

# SUBSEA CABLE SOLUTIONS



UMBILICAL AND TETHER CABLE



SEISMIC CABLE

**Heavy-lift umbilical cables, neutrally buoyant tether cables, and heavy tether cables are available for all lifting applications in offshore and marine environments. The integration of our thin-wall technology offers reduced weight and diameter to allow longer lengths on current handling equipment, or greater power capability in a fixed cable size.**

**We offer state-of-the-art seismic streamer lead-in, sensor, and VSP cables for both towed and static systems. We have the ability to produce high-data-rate capability cores in rugged, high-strength, custom-designed armor packages.**





## Subsea Cabling Solutions

- Downhole Wireline
- Electro-Optical Tow Cables
- Fiber-Optic Assemblies
- MUX/BOP Cables
- ROV Umbilical
- ROV Tether Cables
- Side-Scan Sonar Cables
- Single and Multiconductor CTD and Instrumentation Cables



DOWNHOLE CABLE



STEEL-LIGHT CABLE



UMBILICAL POWER CONNECTORS

Our rugged downhole cables are designed to provide telemetry, control and power connectivity while withstanding elevated temperatures, high pressures and corrosive environments. Noncorrosive metal cladding and waterblocking agents ensure cables remain isolated from hazardous well gases and fluids.

To create robust optical assemblies without adding unnecessary weight, STEEL-LIGHT cables use strands of plow steel concentrically arranged around the fiber buffer to provide protection to the fiber while maintaining flexibility. The steel strands are precisely sized to protect the fiber from breakage and attenuation-inducing hydrostatic pressures.

These wet-mate power connectors, for use down to 3000 meters, are rated up to 18/30(36) kV and up to 1600 A. With the different options available for penetration, they can be used in a large range of applications, including subsea transformers, circuit breakers, and termination of umbilicals.

## Reliability That Goes Deep

TE DEUTSCH connectors for subsea applications provide robust connectivity to withstand the harsh environments encountered. Our broad range of connectors and penetrators are designed to meet specific needs, while giving you the flexibility to configure the exact connector you need.

Our range of connectors covers not only optical, signal, and power, but hybrid connectors mixing these capabilities in a single unit.

# SUBSEA CONNECTOR SOLUTIONS



DOWNHOLE CONNECTIVITY



SUBSEA CONNECTIVITY

## See Our Full Product Lineup

For additional products for the Offshore and Commercial Marine Markets, visit our internet site at: [www.te.com/offshore](http://www.te.com/offshore) or [www.deutsch.net](http://www.deutsch.net) for DEUTSCH connectors.

**For high-pressure, high-temperature downhole applications, signal and optical wet-mateable connectors offer multiple contacts and are capable of withstanding pressures up to 30,000 psi and temperatures up to 205°C.**

**D3000 series connectors are high performance choices for optical and electrical applications requiring up to 12 channels and the ability to withstand depths to 4500 m.**



## Connectivity Solutions for Subsea Applications

### Subsea

- X-Mas Trees
- Subsea Control Module (SCM)
- Transformers
- Circuit Breakers
- Electrical Submersible Pumps
- Variable Speed Drives
- Compressors
- Separators
- Seabed Seismic
- Multiphase Pumps
- Pipe Heating

### Downhole

- Measurement/Logging While Drilling
- Distributed Temperature Sensing
- Pressure/Temperature Gauge
- In-Tool
- Electrical Submersible Pumps



TUBING HANGER FEEDTHROUGH CONNECTORS



POWER CONNECTIVITY



PENETRATORS

For tubing hanger feedthrough systems requiring a connector capable of withstanding high temperatures and high pressures, THFT electrical connectors are rated to 16,500 psi and 177°C. The 4-contact connector offers 500 V, 5 A operation. THFT optical connectors support three channels at pressures to 15,000 psi.

We offer a range of power connectors rated for depths up to 3000 m and pressures of 15,000 psi. Those connectors are designed for wet and dry mate applications, giving several options to the system integrators on the subsea layouts. Those connectors are rated 6/10 (12) kV or 18/30 (36) kV and up to 1600 A. They can be used either for subsea power distribution in oil and gas applications or subsea power generation in renewable energies.

Supporting combinations of power, signal, and optics, our penetrators provide reliable transitions from outside subsea pressures to the inside of equipment, including magnetic bearings. They can be installed in any environment (MEG, dry or wet gas, or oil) and are capable of withstanding challenging environmental conditions, such as temperature up to 177°C, pressure up to 15,000 psi and rapid gas decompression.



2 Lydiard Fields, Swindon Wiltshire, SN5 8UB, United Kingdom  
Tel: +44(0) 1793 616700 • Fax: +44(0)1793 644304  
uksales@is-rayfast.com • www.is-rayfast.com



EVERY CONNECTION COUNTS