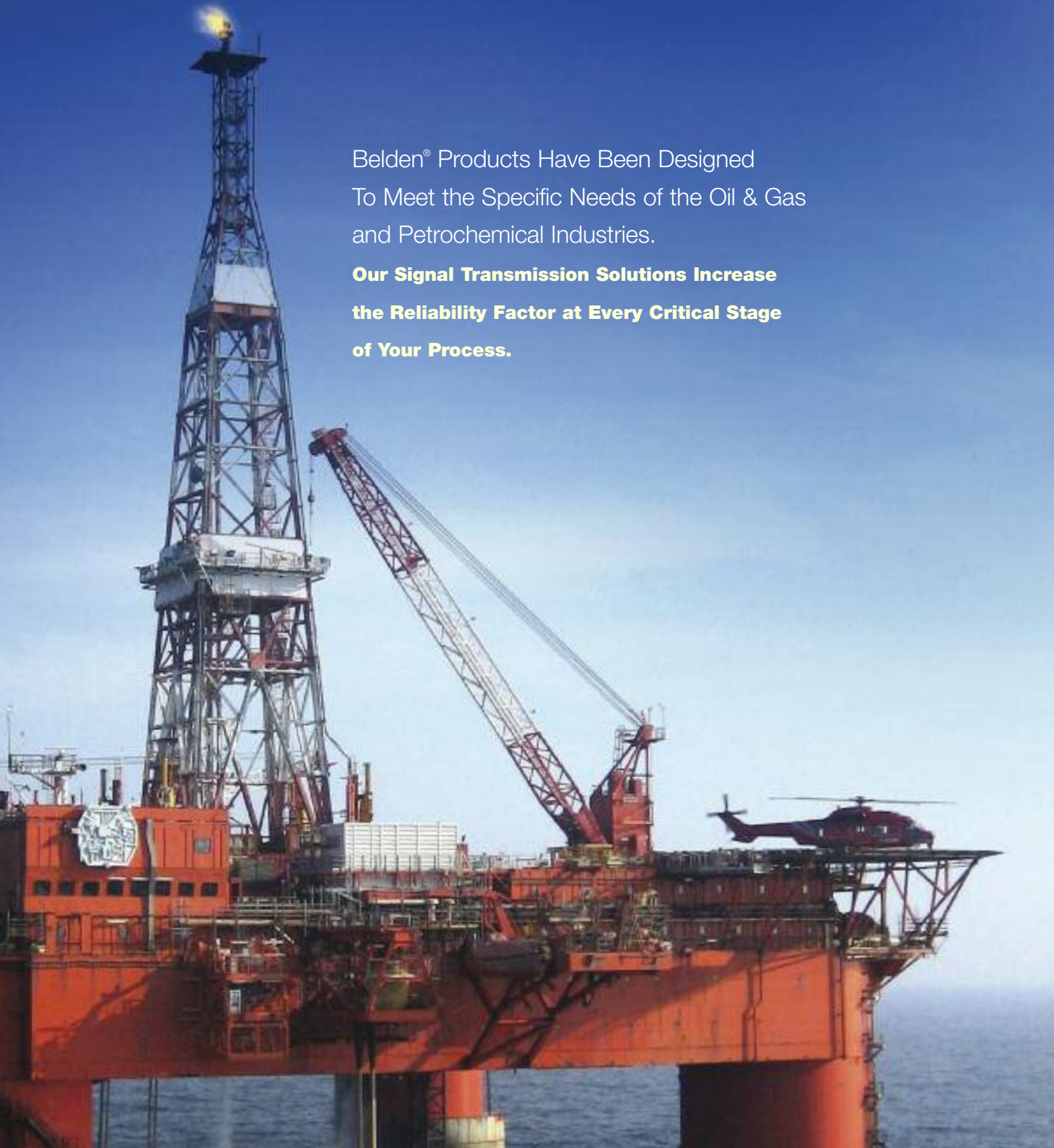**BELDEN**
SENDING ALL THE RIGHT SIGNALS

Solutions for the Oil & Gas and Petrochemical Industries

Meeting the Needs of Harsh Industrial and Mission-critical Environments

Belden® Products Have Been Designed To Meet the Specific Needs of the Oil & Gas and Petrochemical Industries.

Our Signal Transmission Solutions Increase the Reliability Factor at Every Critical Stage of Your Process.

Belden 'Connects' with the Oil & Gas and Petrochemical Industries

It's hard to imagine industrial environments that impose more harsh or severe working conditions on active device and media installations than those in the oil, gas and petrochemical industries.

At one time or another, the signaling components at these facilities will have to withstand the destructive effects of temperature extremes, humidity/moisture, dust, mud, oil, and solvents, and the potentially corrosive effects of chemicals.

As if those weren't enough, add to the list ultraviolet radiation caused by extensive sunlight, electromagnetic interference, and the ever-present danger of fire and explosion.

Belden Means Reliability

Belden's wide range of cabling, connectivity and active devices were purposefully designed to stand up to all of these environmental challenges, and to continue performing dependably in any segment of the petroleum-related industry.

In the oil industry, Belden products will excel:

- In the "upstream" stages of the oil industry — those offshore/onshore areas associated with exploration, extraction and production of crude oil or natural gas
- And in the "mid-to-downstream" stages, for example, in pipelines, tank farms and refineries

In the natural gas industry, Belden's media and active devices will perform superbly:

- At pipelines, compressor stations, LNG plants, and gas-to-liquid processing plants
- At tanker transports, and loading and unloading terminals

And in the refining and petrochemical industry, Belden's industrial solutions will excel:

- From the separation systems to the production plants — and everywhere in between

Belden meets these mission-critical needs with an exceptional group of high quality, highly interoperable industrial-grade products — making Belden uniquely qualified to be your single-source supplier of completely matched industrial-grade solutions comprised of cables, connectivity and active devices.

Reliability Is the Issue At-hand

An on-going and critical concern for the oil, gas and petrochemical industries is the reliable and continuing flow of signals in the presence of factors that can shut the flow down. In fact, an enormous amount of information is generated in these industries, including data from spreadsheets, maps, daily drilling results, reports, charts, and manuals, to name a few.

Uncorrupted data has to be reliably available to devices and users throughout the system. But to safely process the massive amounts of data, an enormous amount of reliable bandwidth from Ethernet networks is demanded. That means the physical components of the system must be robust enough to survive field operations.

And keep in mind that if an Ethernet switch or a cabling system fails in a mission-critical environment, the real price will be far more than just the replacement cost of the components – it will quite possibly mean
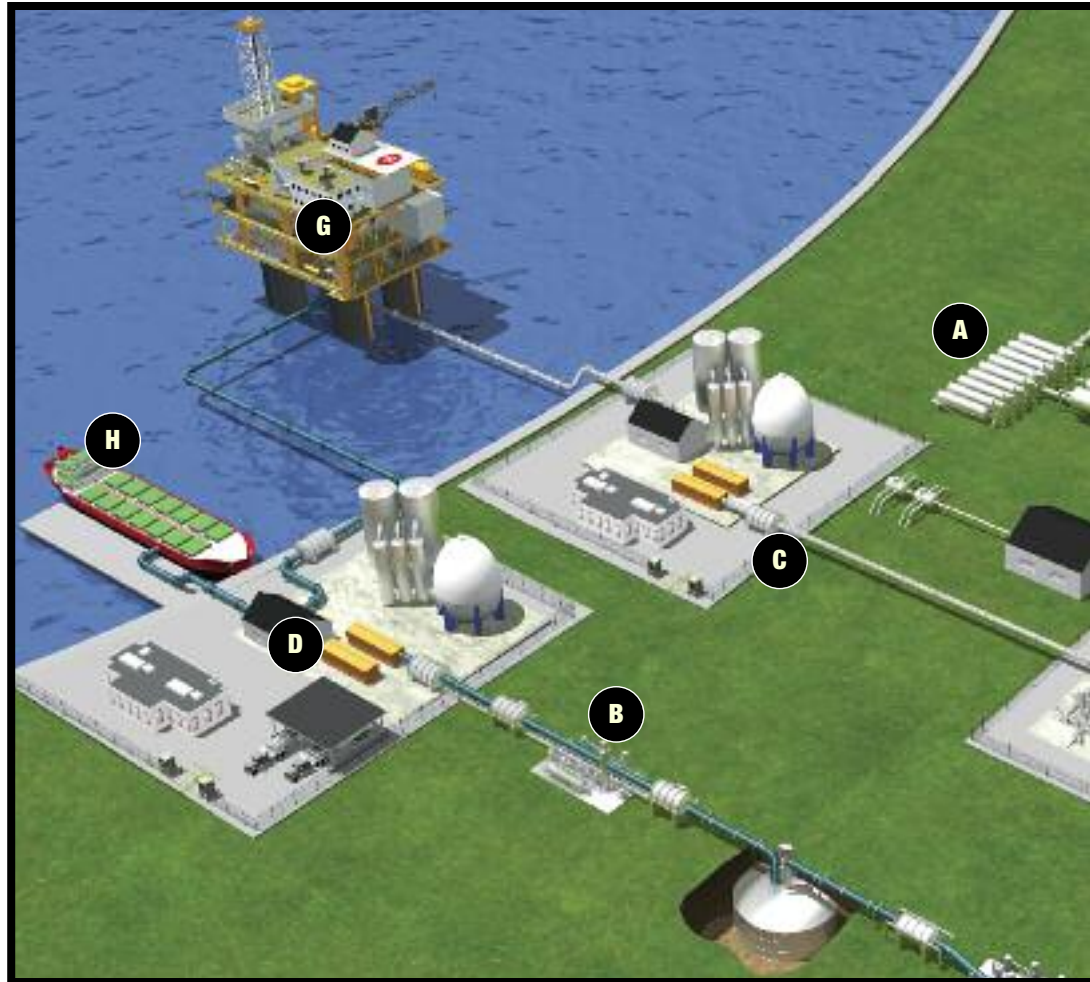
unplanned downtime, an increased risk of repetitive repairs, and a lowering of the level of safety in a facility. Disruptions in the flow of information or of control signals in networks might even mean delays in oil recovery.

To ensure that your information flows reliably when and where it has to, Belden offers you an impressive array of products for hardened networks – all specially engineered and matched for duty in harsh environments. And our demanding quality control program ensures that all of our industrial-grade products pass stringent tests to ensure their suitability in field applications.

Additionally, Belden offers decades of experience in HVAC/lighting and climate control cabling products, flexible automation cables, sound and security cabling products for alarm, access control and CCTV camera systems, Category 6 and 5e networking products for your administration/office environment, a broad range of NEMA 12 free-standing and wall-mount enclosures, and a comprehensive line of cable management products.

From Exploration, Extraction and Production Sites to the Pipelines, Storage Tanks and Refineries, Belden Sends All the Right Signals

Belden provides the indoor and outside plant optical fiber and copper signal transmission systems that mean maximum reliability, maximum uptime.

See **www.belden.com/industrial** for more product information.

B **Metering Stations**

Cables: TrayOptic/Fiber*Express* fiber optic/DataTuff copper, instrumentation & control, FOUNDATION Fieldbus, Profibus, RS-485, security/access control, CCTV cameras.

Connectivity: DataTuff IP67/IP20 cord sets, modular jacks, plug kits, surface mount boxes and faceplates.

Ethernet Switches and Networking Devices: MACH1000, PowerMICE and OpenRail backbone switches; OpenRail and OCTOPUS control level switches; Fieldbus OZD fiber converters, EAGLE security firewall/VPN appliance. BAT wireless system.

C **Pumping/Compressor Stations**

Cables: TrayOptic/Fiber*Express* fiber optic/DataTuff copper, VFD, instrumentation & control, RS-485, FOUNDATION Fieldbus, Profibus and all protocols, security/access control, CCTV cameras, wireless systems.

Connectivity: DataTuff IP67/IP20 cord sets, modular jacks, plug kits, surface mount boxes and faceplates.

Ethernet Switches and Networking Devices: MACH1000, PowerMICE and OpenRail backbone switches; OpenRail and OCTOPUS control level switches; Fieldbus OZD fiber converters, EAGLE security firewall/VPN appliance. BAT wireless system.

D **LNG Processing Plants**

Cables: TrayOptic/Fiber*Express* fiber optic/DataTuff copper, instrumentation & control (pump control), FOUNDATION Fieldbus, Profibus and all protocols, VFD (gas compression), security/access control, CCTV cameras, Category 6/5e networking cables (administration/office).

Cable Management: Outside plant stainless steel enclosures, networking enclosures.

Connectivity: DataTuff IP67/IP20 cord sets, modular jacks, plug kits, surface mount boxes and faceplates.

Ethernet Switches and Networking Devices: MACH4000, MACH1000, PowerMICE, and OpenRail backbone switches; OpenRail and OCTOPUS control level switches; Fieldbus OZD fiber converters; EAGLE security firewall/VPN appliance. BAT wireless system.

A **Separator Station**

Cables: TrayOptic®/Fiber*Express*® fiber optic/DataTuff® copper, FOUNDATION Fieldbus, Profibus, RS-485, instrumentation and control.

Connectivity: DataTuff IP67/IP20 cord sets, modular jacks, plug kits, surface mount boxes and faceplates.

Ethernet Switches and Networking Devices: MACH1000, PowerMICE and OpenRail backbone switches; OpenRail and OCTOPUS control level switches; Fieldbus OZD fiber converters. BAT wireless system.

E **Transportation/Storage**

Cables: Instrumentation & control, VFD.

Connectivity: DataTuff IP67/IP20 cord sets, modular jacks, plug kits, surface mount boxes and faceplates.

Ethernet Switches and Networking Devices: MACH1000, PowerMICE and OpenRail backbone switches; OpenRail and OCTOPUS control level switches, Fieldbus OZD fiber converters. BAT wireless system.

F **Refining Facilities**

Cables: TrayOptic/Fiber*Express* fiber optic/DataTuff copper, FOUNDATION Fieldbus, Profibus and all protocols, instrumentation and control; commercial-grade Category 6/5e networking cables (administration/office).

Connectivity: DataTuff IP67/IP20 cord sets, modular jacks, plug kits, surface mount boxes and faceplates.

Ethernet Switches and Networking Devices: MACH4000, MACH1000 backbone switches; OpenRail and OCTOPUS control level switches; Fieldbus OZD fiber converters. BAT wireless system.

G **Offshore Rig/Control Room**

Armored Data Cables: TrayOptic/Fiber*Express* fiber optic/copper, RS-485, Profibus, MODBUS, Industrial Ethernet; sound, security and CCTV cameras.

Connectivity: DataTuff IP67/IP20 cord sets, modular jacks, plug kits, surface mount boxes and faceplates.

Ethernet Switches and Networking Devices: MACH4000, MACH1000, PowerMICE and OpenRail backbone switches; OpenRail and OCTOPUS control level switches; Fieldbus OZD fiber converters. BAT wireless system.

H **Shipboard**

Cables: ABS-approved fiber optic/copper cables, most with low smoke zero halogen jackets.

Connectivity: DataTuff IP67/IP20 cord sets, modular jacks, plug kits, surface mount boxes and faceplates.

Ethernet Switches and Networking Devices: MACH1000, PowerMICE and OpenRail backbone switches; OpenRail and OCTOPUS control level switches; Fieldbus OZD fiber converters. BAT wireless system.

Belden Can Be Your Single Source for Industrial-grade and Mission-critical Signal Transmission Solutions

Quality, reliability and interoperability are the hallmarks of the Belden Industrial Solutions line.

Built-to-perform Industrial Ethernet Switches and Networking Devices

The Hirschmann™ line of Industrial Ethernet switches and networking devices has earned a solid reputation in industry for ruggedness and reliability. Key product families for the petrochem-related industries are:

OpenRail DIN Rail Mounted Switches

- Broad line of Class 1 Div 2 rated, modular and compact switches with Ethernet port densities ranging from 4 to 28 ports; MS and RS series feature speeds up to 1 Gigabit and ring redundancy

MACH1000 and MACH4000 Switches

- Modular rack-mount switches for control room (MACH4000) and extreme environmental/high temperature applications (MACH1000)

RSR Switches

- DIN rail-mount switches for extreme environmental applications (-40ºC to +85ºC)

BAT Wireless Access Points/Clients

- Complete line of 802.11 a/b/g access points, clients, related antennas and accessories

EAGLE Firewall and VPN Appliance

- Provides a firewall and VPN (virtual private network) to control access to the network, providing assurance protection of industrial data communications

OCTOPUS Family of IP67 Switches

- Broad line of IP67 managed or unmanaged switches with Ethernet port densities ranging from 5 to 24 ports

Ethernet and Fieldbus Media Converters

- Broad line of Ethernet, Profibus, MODBUS+, Genius and RS-485 media converters; Class 1 Div 2 rated.

Outstanding Media Performance

To ensure optimum performance, the following families of field-proven cabling components are offered.

TrayOptic/FiberExpress Optical Fiber Cables Components

- Heavy-duty TrayOptic Indoor/Outdoor laser-optimized cables: 2- to 72-fiber constructions
- Tight-buffered single-mode or multimode FiberExpress cables: 2- or 6-fiber constructions

FiberExpress Optical Fiber Connectivity Components

- Duplex FiberExpress single-mode and multimode patch cords
- FiberExpress Rack-mount and Wall-mount patch panels
- FiberExpress single-mode and multimode Universal Optical adapter strips
- Optimax® field-installable connectors for a fast, secure and reliable LC, SC or ST Compatible optical fiber termination (single-mode or multimode)

DataTuff® Category 6, Enhanced 5e and 5e Industrial Ethernet Copper Cables

- Unshielded and shielded Bonded-Pair cables with heavy-duty, oil- and UV-resistant jackets; many are Ethernet/IP compliant; upjacketed and armored versions are available for the most extreme areas

DataTuff Connectivity Components – as complements to UTP or FTP Cable Constructions

- Category 5e RJ45 cordsets for IP67 or IP20 installations
- Category 5e RJ45/IP67 jacks
- Category 5e RJ45/IP67 plug kits
- IP67 surface mount boxes with stainless steel covers
- IP67 stainless steel faceplates

DataBus Cables for PROFIBUS

- 150-ohm twisted pair cables, including high-flex and continuous armor versions for PROFIBUS DP/factory automation
- Twisted pair cable with an IS Blue PVC jacket for PROFIBUS PA/process automation EIA-485/RS-485 Cables
- Twisted pair, PLTC cables for plenum and non-plenum installations

DataBus® Cables for FOUNDATION Fieldbus

- 1-pair and multi-pair Type A , Type B and High Speed cables

VFD Cables

- 1000V UL flexible motor supply cables in gauge sizes from 16-4/0
- Interlocked Armor with aluminum or steel versions

Encoder and Signal Cables

- 1-4 pairs for power supply, encoder and signal applications

RS-485 Cables

- Twisted pair, PLTC cables for plenum and non-plenum installations

Instrumentation and Control Cables

- Hundreds of UL/CSA cables for every conceivable device/control application, including:
  - A broad range of 300V Instrumental Cables
  - 600V Instrumentation Tray Cables
  - Thermocouple Extension Wire and Cables
  - 600V Control Cables
  - 600V Teck-style Cables
  - 600V Type MC Metal Clad Cables
  - Custom-designed products

Additionally, Belden cables can be customized to meet your unique needs, utilizing any number of construction features, such as:

  - Armoring: Aluminum Interlock, Steel Interlock, and Continuous Corrugated Aluminum
  - Armor Tapes: Corrugated Copper, Aluminum, and Steel
  - Jackets: PVC, CPE, TPE, PE, Fluorocopolymer, Oil Res II, Haloarrest® Low Smoke Zero Halogen, and Polyurethane
  - Shielding: Overall Beldfoil®, Duofoil®, TC Braid, TC Double Braid, and Individual Beldfoil Copper Tape Shields
  - Insulations: Datalene®, XLPE, FEP, Polypropylene, Foam FEP, HDPE, PVC, TPE, and PVC-Nylon
  - Conductors: Solid and Stranded conductors, either tinned or bare copper

Durable Connectivity Products

The Lumberg Automation™ connectivity line aptly complements Hirschman IP67 switches with cordsets that are extremely durable and able to withstand the harsh industrial environmental conditions of shock, vibration, dust and washdown.

- Double-ended Ethernet/IP and PROFINET (D-Coding), and MODBUS TCP RJ45 and M12 Cordsets with PVC High-flex Shielded or Unshielded Cables and Moderate-flex Shielded Cables.

These Belden products have been designed to work together and they can be trusted to provide outstanding performance at every level/segment of the oil & gas and petrochemical industries. What's more Belden provides 'Competence' in the four key service and support areas that are critical to your success: *Network design, training, technical support and system performance (warranties).*

For more information go to:
www.belden.com/industrial
to see what we can do for you.

BELDEN
SENDING ALL THE RIGHT SIGNALS

GLOBAL LOCATIONS

For worldwide Industrial Sales and Technical Support, visit:
www.belden.com/industrial

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