

# MOTION**OIL&GAS**



CABLE SOLUTIONS FOR ONSHORE, MARINE, OFFSHORE, SUBSEA

# MOTION **OIL&GAS** CABLE SOLUTIONS

ENGINEERING CAPABILITIES | PRODUCT OVERVIEW | TECHNICAL STANDARDS

MOTION**CABLES** is actively expanding its Oil & Gas product portfolio.

The engineering capabilities and cable families presented in this document reflect our current design, material, and manufacturing expertise, which is directly applicable to O&G requirements.

Certification for selected sector-specific standards is currently in progress.

This document is a technical capability overview for O&G applications.

# ABOUT MOTIONCABLES

**MOTIONCABLES** is an Italian manufacturer of special cables for industrial automation and motion control, headquartered in Melzo, near Milan.

The company operates as a technical partner to OEMs, system integrators, and engineering firms working in demanding industrial environments, rather than as a commodity supplier.

Our core positioning is built around one principle that applies equally to industrial automation and to Oil & Gas: in critical-service applications, the cable is not an accessory. It is part of the operating infrastructure. Cable failure can have consequences for process continuity, safety, and operating cost that far exceed the original procurement cost.

**MOTIONCABLES** is not a commodity supplier: it is a technical partner for critical-service cabling. The strongest positioning combines high-reliability transmission, construction discipline, careful material selection, and application-focused engineering

## AREAS OF SPECIALISATION

- ⊙ **SPECIAL APPLICATION CABLES:** purpose-built solutions for extreme mechanical loads, chemical exposure, high-dynamic reeling systems, and offshore environments
- ⊙ **INSTRUMENTATION AND CONTROL ENGINEERING:** controlled-capacitance, low-attenuation constructions with individually and overall-screened architectures for long-distance process signal transmission
- ⊙ **VFD AND POWER CABLE ENGINEERING:** experience in managing EMC, common-mode noise, and insulation system performance in variable-speed drive environments: directly transferable to ESP and topside VSD applications
- ⊙ **HYBRID AND INTEGRATED CONSTRUCTIONS:** One Cable Technology (OCT) capability combining power, signal, and data functions in a single mechanically stable construction
- ⊙ **TEMPERATURE MEASUREMENT SYSTEMS:** thermocouple extension and compensation cables to IEC 60584 for process accuracy across the full temperature range of Oil & Gas operations.

## KEY FACTS

|                            |                                                      |
|----------------------------|------------------------------------------------------|
| <b>Founded</b>             | 2012, Melzo (MI), Italy                              |
| <b>Core business</b>       | Special cables for industrial & process applications |
| <b>Employees</b>           | 65+                                                  |
| <b>Turnover (2025)</b>     | 27 M€                                                |
| <b>Design capability</b>   | Full in-house: from concept to production drawing    |
| <b>Certifications held</b> | CE, UL AWM, UL Listed, CSA, Lloyd's Register (LR)    |
| <b>Export markets</b>      | Europe, North America, CIS, Middle East              |
| <b>Languages</b>           | Italian, English, German, French, Spanish            |

# FOUR PILLARS OF PERFORMANCE

Across every application, industrial automation, process industry, Oil & Gas, MOTIONCABLES cable constructions are built on the same four performance foundations:

**01**

## **COPPER-BASED QUALITY**

High-quality copper conductors, bare and tinned, as the performance foundation of every construction.

**02**

## **MECHANICAL ROBUSTNESS**

Reinforced constructions for exposed routes, direct burial, and mechanically demanding service.

**03**

## **CHEMICAL RESISTANCE**

Oil-resistant, hydrocarbon-qualified jacket compounds for continuous exposure in aggressive process environments.

**04**

## **SAFETY-ORIENTED DESIGN**

Flame-retardant, fire-performance and LSZH variants where safety in cable grouping is a design constraint.



# ENGINEERING & PRODUCTION CAPABILITIES

## BUILT FOR COMPLEXITY: DESIGNED FOR RELIABILITY

MOTION**CABLES** operates an integrated engineering and production model in which design, material selection, manufacturing, and validation are managed under one roof.

This model is particularly suited to O&G projects, where application-specific requirements, small batch sizes, and long qualification cycles often make standard production runs impractical.

## ENGINEERING BEGINS WITH THE RIGHT QUESTIONS

Cable selection is a process driven by real electrical, chemical, and mechanical requirements.

Every construction element is defined according to the application.

MOTION**CABLES** speaks the language of project needs: from conductor cross-section through shielding architecture to outer sheath definition.

01

### UNDERSTAND CONDITIONS

Assess route environment, operating loads, chemical exposure, and installation method.

02

### IDENTIFY PROTECTIONS

Determine mechanical protection level: unarmoured, or direct-burial rated.

03

### SELECT SCREENING

Choose shielding architecture: OS, IS/OS, TCWB, or foil+drain based on EMC and signal requirements

04

### MATCH CONSTRUCTION

Define the insulation and sheath material system for the application, and align conductor cross-sections with the required electrical duty.



## ENGINEERING DEPTH

- ⊙ **APPLICATION-DRIVEN DESIGN:**  
every construction begins with a detailed analysis of the operating environment: mechanical loads, thermal cycles, chemical exposure, electrical requirements, and installation constraints. There is no standard configuration applied generically
- ⊙ **MATERIAL ENGINEERING:**  
insulation compounds, jacket materials, conductor geometries, and shielding systems are selected and qualified for each application rather than taken from a fixed matrix
- ⊙ **COPPER-BASED CONSTRUCTION ENGINEERING:**  
MOTIONCABLES Oil & Gas constructions are built around high-quality copper conductors: bare copper conductors and tinned copper drain wires not aluminium conductor positioning.
- ⊙ **HYBRID CONSTRUCTION CAPABILITY:**  
proprietary expertise in integrating power conductors, instrumentation pairs, data lines, and fibre optics within a single mechanically stable construction
- ⊙ **CONTROLLED ELECTRICAL CHARACTERISTICS:**  
impedance, capacitance per unit length, and attenuation are specified and validated where the application requires it, not simply declared

## OUR CERTIFICATIONS



## DESIGN & SPECIFICATION

Our engineering team works directly from application datasheets, installation standards, and end-user specifications. The design phase covers:

- ⊙ conductor sizing
- ⊙ insulation material selection
- ⊙ shielding architecture
- ⊙ jacket compound
- ⊙ bending radius
- ⊙ temperature class
- ⊙ compliance with applicable electrical and mechanical standards.

## MATERIALS COMPETENCY

MOTIONCABLES maintains active working knowledge of a broad range of insulation and jacket compounds relevant to demanding process environments:

- ⊙ **Cross-linked polyethylene (XLPE):** low capacitance, high thermal rating, reduced corona effect
- ⊙ **LSZH (Low Smoke Zero Halogen):** fire performance, reduced toxic gas emission
- ⊙ **SHF2 compounds:** marine-grade halogen-free jacket materials per IEC 60092

## SHIELDING & EMC ARCHITECTURE

For instrumentation, control, and data cables used in electrically noisy environments, such as offshore platforms and process plants, MOTIONCABLES designs shielding architectures matched to the application, including individual pair or triad shields, overall shields, and combined individual-plus-overall arrangements.

## PRODUCTION CAPABILITIES

- ⊙ Fine wire drawing and stranding: from instrumentation cross-sections to large power conductors
- ⊙ Multi-layer extrusion for complex insulation and jacket systems including XLPE, PVC, LSZH, and specialised compounds
- ⊙ Braiding and spiral shielding: bare copper, tinned copper, aluminium/polyester foil, and combined architectures
- ⊙ Controlled twisting for multi-pair instrumentation constructions with defined capacitance characteristics
- ⊙ Small-series and prototype production for qualification and engineering evaluation phases

# CONSTRUCTION & MATERIAL SYSTEMS

## MATERIAL SYSTEMS SELECTED FOR ACTUAL OPERATING CONDITIONS

Insulation and sheath systems are selected according to operating conditions, environmental exposure, and installation method. Temperature performance is a function of cable design, insulation system, and sheath material. MOTIONCABLES constructions cover the full range of Oil & Gas operating conditions:

| APPLICATION CONTEXT                              | TEMPERATURE RANGE          | TYPICAL CONSTRUCTION BASIS                           |
|--------------------------------------------------|----------------------------|------------------------------------------------------|
| <b>Fixed installation — standard</b>             | –30°C to +70°C             | XLPE/PVC or PVC-based instrumentation constructions  |
| <b>Flexing / dynamic installation</b>            | –5°C to +50°C              | Flexible XLPE or PVC with oil-resistant jacket       |
| <b>Extended thermal — selected constructions</b> | up to –50°C / +125°C       | MotionTherm compound or XLPE with specialised jacket |
| <b>Cryogenic / LNG service</b>                   | down to –200°C             | PTFE insulation, stainless-steel overbraid or armour |
| <b>High-temperature process / fired heaters</b>  | thermocouple circuits only | Mineral insulation or PTFE thermocouple extension    |

### INSULATION AND SHEATH PORTFOLIO

- ⊙ **PVC-based constructions:** cost-effective standard constructions for controlled industrial environments
- ⊙ **XLPE/PVC combinations:** improved thermal performance and dielectric stability with standard outer sheath
- ⊙ **XLPE/LSZH variants:** for enclosed or confined spaces where low smoke and zero halogen behaviour is specified
- ⊙ **PUR constructions:** high mechanical resistance, oil-resistant, for dynamic and exposed applications
- ⊙ **Specialised compounds:** MotionTherm and MotionGum formulations for extreme thermal applications; MUD-resistant compounds under qualification.

### CONDUCTOR SYSTEMS

- ⊙ **Bare copper:** standard IEC 60228 Class 5 (flexible) and Class 6 (extra-flexible) for fixed and dynamic installations
- ⊙ **Tinned copper:** for enhanced corrosion resistance in marine, offshore, and high-humidity environments

### SHIELDING SYSTEMS

- ⊙ **AL/PE foil + tinned copper drain wire:** overall screen for instrumentation: 100% coverage, clean termination, signal stability
- ⊙ **Individual pair screen + overall screen (IS/OS):** for highest signal separation and system-level interference protection.
- ⊙ **Tinned copper braid:** for mechanical robustness of shield in dynamic applications.
- ⊙ **Combined foil + braid:** for maximum shielding effectiveness across a wide frequency range.

# STANDARD & QUALIFICATION STATUS

## CURRENT STATUS AND QUALIFICATION ROADMAP

The table below summarises the current certification status of MOTIONCABLES O&G solutions and the qualification roadmap for sector-specific



### ACTIVE CERTIFICATION

**CE (LVD / RoHS)** - Directives 2014/35/EU - 2011/65/EU - Tutti i prodotti

**IEC 60228 / 60332 / 60811** - IEC International Standards Current conductors, flame, mechanical

**UL 758 / UL 1277 / UL 1063** Nord America AWM, TC-ER, power & control

**Lloyd's Register** Marine & Offshore - Marine and dynamic application

**ISO 4892 / ISO 1817 / ISO 846** Outdoor /UV, hydrolysis, biological resistance

**IEC 60092-360** Marine / Offshore Mud and synthetic fluid resistance

**NEK 606** Oil & Gas / Offshore Norway

**ATEX / IECEx** - Engineering support available - Qualification for project specification



### IN PROGRESS



### ON PROJECT

For projects requiring standards or certifications not listed above, MOTIONCABLES can assess qualification feasibility and define a qualification plan. Engineering samples for third-party testing are available on request.

# WHY OIL & GAS

## THE RATIONALE BEHIND OUR APPROACH

MOTION**CABLES** is known for industrial automation cables: servo drives, robotics, motion control. Oil & Gas is a different world: different standards, longer qualification cycles, and a risk culture that is rightly conservative about new suppliers.

MOTION**CABLES** is not entering O&G as a generic new entrant. It is extending proven engineering capabilities into a sector that demands more stringent qualification and application-specific execution..

## THE TECHNICAL OBSERVATION

The most demanding cable applications in modern industrial automation share a set of requirements with Oil & Gas that is more substantial than sector classifications suggest:

| AUTOMATION REQUIREMENT                                                                    | O&G PARALLEL                                                                                                    |
|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>High-torsion robotics: cables withstand millions of combined mechanical cycles</b>     | <b>Offshore reeling systems and dynamic cable runs subject to continuous mechanical loading</b>                 |
| <b>Extreme thermal range: -50°C to +125°C in dynamic applications</b>                     | <b>Surface and subsea O&amp;G environments span comparable operating temperature ranges</b>                     |
| <b>Chemical resistance: oils, solvents, alkaline cleaners, qualified jacket compounds</b> | <b>MUD resistance and hydrocarbon immersion are chemically demanding but not categorically different</b>        |
| <b>EMC and signal integrity: instrumentation in electrically noisy drive environments</b> | <b>Process control signals in O&amp;G installations face the same class of electromagnetic interference</b>     |
| <b>VFD power engineering: controlled EMC, insulation under high dv/dt conditions</b>      | <b>Variable speed drives for pumps, compressors, and ESP systems present identical engineering requirements</b> |

## THE STRUCTURAL OBSERVATION

O&G installations increasingly incorporate automated systems (subsea control modules, topside automation, process instrumentation, ESP, and variable speed drives) that require the same cable engineering disciplines as MOTION**CABLES**' core competence. The boundary between the two disciplines is narrower than it appears from outside.

We are extending proven capability into a new application context, with full acknowledgement that O&G qualification demands more than technical competence alone.

*We are not claiming to replace established O&G cable suppliers. We are offering engineering capability, application flexibility, and a qualification-oriented approach to firms who need a technical partner rather than a catalogue.*

# CABLE SOLUTIONS FOR OIL & GAS ENVIRONMENTS

MOTIONCABLES approaches Oil & Gas cabling through five capability families. Each family describes a class of engineered solutions. Constructions within each family are defined through technical dialogue and validated to the requirements of the specific application. There are no standard codes in this section — specifications are the starting point.

## INSTRUMENTATION & CONTROL CABLES

Signal integrity and process continuity in demanding environments

MOTIONCABLES instrumentation and control cables are designed to maintain signal integrity and process continuity in harsh operating environments, including long-distance routes, electrically noisy installations, and chemically aggressive process areas.

Low-energy signals must remain electrically stable across long distances, in electromagnetically noisy environments, under mechanical stress, and across the full thermal and chemical range of the installation. Signal integrity is the primary design constraint, not a secondary specification. This means working to defined capacitance per unit length, and shielding effectiveness across the relevant frequency range.

Overall-screened instrumentation constructions based on AL/PE tape over tinned copper drain wire deliver cleaner signal paths and greater operational confidence in dense industrial installations. MOTIONCABLES specifies shielding as an engineered performance layer — not a commodity option.

## LOW VOLTAGE POWER CABLES

Robust power continuity in harsh Oil & Gas and process-industry environments

MOTIONCABLES low-voltage power cables are designed for motor supply, auxiliary power, and power distribution in applications where long-term reliability under mechanical, chemical, and thermal stress is essential.

From motor supply cables on topside automation systems to power distribution in onshore processing plants, each application combines a specific electrical requirement with a specific set of mechanical and environmental constraints. MOTIONCABLES designs to the intersection of these requirements, not to a default standard.

For VFD-fed motors, cable construction directly affects motor bearing currents, common-mode noise, and EMC compliance. MOTIONCABLES has extensive experience in VFD cable engineering: this expertise applies directly to offshore and onshore VSD installations for pumps and compressors.

## DATA & COMMUNICATION CABLES

Transmission reliability and signal stability for critical information flow

Modern plants depend on accurate, uninterrupted information flow. Process control, safety systems, and plant management infrastructure all depend on data circuits that maintain transmission reliability under the mechanical, chemical, and electromagnetic conditions of the installation. Data integrity directly supports process control and plant efficiency.

MOTION**CABLES** data and communication cables are designed for transmission reliability, signal stability, and industrial robustness in real operating environments rather than in laboratory-only conditions.

## THERMOCOUPLE EXTENSION & COMPENSATION CABLES

Temperature-measurement accuracy for process-critical applications

MOTION**CABLES** thermocouple and extension cables form part of a broader measurement-reliability platform for process industries. The emphasis is on transmission quality, durability, and dependable temperature-signal continuity in demanding industrial areas.

Temperature measurement accuracy in Oil & Gas process control depends on the entire signal chain from junction to instrument. Extension and compensation cables are the element most frequently underspecified in this chain — and the one whose degradation most commonly introduces systematic measurement error without triggering an obvious alarm.

**Measurement error introduced by incorrect thermocouple extension cable is systematic and temperature-dependent. It will not show up as a cable failure — it will show up as a process anomaly. Correct alloy matching and construction qualification are not optional.**

## HYBRID & INTEGRATED SOLUTIONS

Multiple functions in a single engineered construction

Reducing cable count on offshore platforms, onshore facilities, and subsea installations has direct consequences for weight, space, installation time, connector count, and long-term maintenance cost. Hybrid cable constructions integrating two or more functional elements in a single mechanically stable construction, address this objective directly.

MOTION**CABLES** has developed significant expertise in hybrid cable design through its One Cable Technology (OCT) platform for industrial automation. The engineering disciplines involved (mechanical compatibility of dissimilar elements, electrical isolation between functions, controlled impedance, and construction stability) transfer directly to Oil & Gas hybrid requirements.

Typical objectives include reducing cable count, installation time, connector interfaces, and long-term maintenance complexity

**Hybrid cable design involves genuine engineering trade-offs. MOTIONCABLES does not offer a standard hybrid range for Oil & Gas: each construction is designed to the specific functional requirements, physical constraints, and termination strategy of the application.**

# CUSTOM CABLES

## DEVELOPMENT FOR O&G

Many O&G applications involve non-standard cable requirements: project-specific constructions defined by the engineering contractor or end operator, hybrid cables combining power, control, and data in a single jacket, or constructions required to meet a specific combination of international standards for a particular market.

MOTION**CABLES**' engineering and production structure is designed for this type of work.

We do not require large minimum order quantities for development runs, and our engineering team works directly with the customer's technical specification from the first contact.



### STEP 1: SPECIFICATION REVIEW

Analysis of customer datasheet, applicable standards, installation requirements.



### STEP 2: CONSTRUCTION DESIGN

Conductor sizing, insulation selection, shielding architecture, jacket specification.



### STEP 3: MATERIALS SOURCING

Conductor alloys, compound selection and shielding materials from qualified suppliers.



### STEP 4: PROTOTYPE PRODUCTION

Small-run prototype cables for customer review and testing.



### STEP 5: QUALIFICATION TESTING

Electrical, mechanical, and environmental tests to applicable standards.

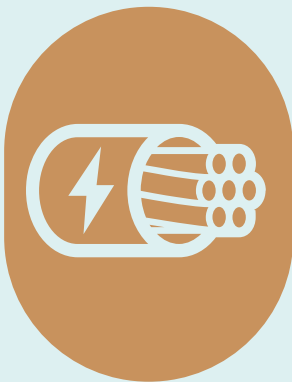


### STEP 6: SERIAL PRODUCTION

Transfer to production with full traceability and test documentation.

# QUALITY, TESTING & TRACEABILITY

In Oil & Gas procurement, documentation is not optional: it is a contractual requirement. Every cable shipped from a MOTIONCABLES production run is accompanied by full test documentation, with test results traceable to the specific cable length, reel, and production batch.



## ROUTINE TESTS (PER REEL / PER DELIVERY)

- ⦿ **Conductor resistance:** per IEC 60228 Class 2 / Class 5
- ⦿ **Insulation resistance:** at ambient and elevated temperature
- ⦿ **High voltage withstand:** AC or DC spark test per applicable standard
- ⦿ **Continuity and identification:** all cores verified
- ⦿ **Dimensional check:** outer diameter, insulation wall thickness per drawing



## TYPE TEST (PER CONSTRUCTION QUALIFICATION)

- ⦿ **Flame propagation:** IEC 60332-1-2 (single cable) and IEC 60332-3 (cable bundles)
- ⦿ **Smoke density:** IEC 61034-1/2
- ⦿ **Halogen content:** IEC 60754-1/2 (acid gas emission, HCl content)
- ⦿ **Oil and fuel resistance:** EN 50363-4-1 / IEC 60811 series
- ⦿ **Cold bend and cold impact:** IEC 60811-400 series
- ⦿ **Tensile strength and elongation:** conductor and insulation
- ⦿ **Capacitance, inductance, impedance:** for instrumentation and signal cables

## DOCUMENTATION PACKAGE



Standard supply documentation for O&G projects includes:

- ⦿ **Material Test Report (MTR):** conductor, insulation, jacket materials
- ⦿ **Routine Test Certificate:** electrical test results per reel
- ⦿ **Dimensional Inspection Report:** cross-section drawing and measured values
- ⦿ **Certificate of Conformity:** compliance statement to applicable standards
- ⦿ **Drum / reel label:** with complete cable designation, length, and batch reference

## WORKING WITH MOTIONCABLES

We welcome technical enquiries from engineering contractors, procurement teams, and end operators working on O&G projects at any stage: from early specification through to project execution. Our preferred mode of engagement is a technical discussion with the customer's engineer, based on the actual installation requirements.

### WHAT TO SEND US

- ⦿ **Cable specification or datasheet:** including applicable standards and any project specification
- ⦿ **Installation environment:** topside / subsea, indoor / outdoor, temperature range, chemical exposure
- ⦿ **Required certifications:** Lloyd's Register, IECEx, ATEX zone classification, national approvals
- ⦿ **Estimated quantities:** metres per type, delivery schedule
- ⦿ **Project details:** EPCI contractor, end operator, country of installation

### RESPONSE COMMITMENT

MOTIONCABLES engineering team will respond to technical enquiries within two working days with a preliminary assessment of technical feasibility and the applicable certification path. For standard configurations, commercial quotations are typically issued within five working days.





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