

MOTION**XP**



SINGLE, MULTI, QUAD-CORE CABLES FOR
COMPACT DYNAMIC IN HARSH ENVIRONMENT



MOTION**CABLES**: LEADING THE WAY IN **SPECIAL CABLE** **SOLUTIONS**

MOTION**CABLES** specializes in the design, manufacturing, and qualification of high-performance special cables, particularly focusing on applications requiring constant movement, extreme environmental resistance, and maximum data integrity.

Our mission goes beyond mere compliance; we provide products validated to operate reliably under the most severe real-world conditions, including combined and extreme stress scenarios.

This commitment is rooted in MOTION**TECHCORE**, our dedicated Research & Test Center, where an engineering-driven approach ensures that every cable is tested and classified before shipment.

By subjecting our cables to over 60 rigorous tests, from dimensional checks and material analysis to dynamic movement (e.g., drag chain, torsion) and system-level validation, we guarantee a product that maintains its performance throughout its planned operational life.

MOTION**CABLES** thus acts as a technical partner, providing not just components, but verified solutions that directly enhance system reliability and reduce the overall total cost of ownership (TCO) for the customer.

KEY ADVANTAGES OF MOTIONCABLES

MOTION**CABLES** leverages its MOTION**TECHCORE** research center to deliver verified, high-performance special cables, offering the following key benefits:

GUARANTEED LONG-TERM RELIABILITY

Products are qualified through accelerated aging and dynamic testing (millions of cycles) to ensure stable performance over the full operational life, minimizing unscheduled downtime.

PERFORMANCE CLASSIFICATION

Cables are objectively categorized into four classes (Electrical, Dynamic, Environment, Safety) based on real-world test data, enabling quick and precise selection for specific application needs.

SYSTEM FUNCTIONALITY ASSURANCE

Validation includes the entire system (Drive–Cable–Motor), confirming reliable performance and compatibility within the customer's actual industrial environment.

SUPERIOR ENVIRONMENTAL RESISTANCE

Proven resistance to oils, chemicals, temperature extremes, UV, and salt fog, ensuring cable integrity in harsh and contaminated settings (e.g., machine tools, offshore).

REDUCED TOTAL COST OF OWNERSHIP (TCO)

High durability, predictable life expectancy, and validated technical parameters simplify design and maintenance, leading to fewer failures and lower inventory costs.



MOTION**XP** CABLE SOLUTIONS

CABLES ENGINEERED FOR EXTREME MOTION AND HARSH ENVIRONMENTS

The MOTION**XP**® line is engineered to confront the most severe conditions in modern industry: continuous motion, high mechanical stress, chemically aggressive environments, and temperature extremes.

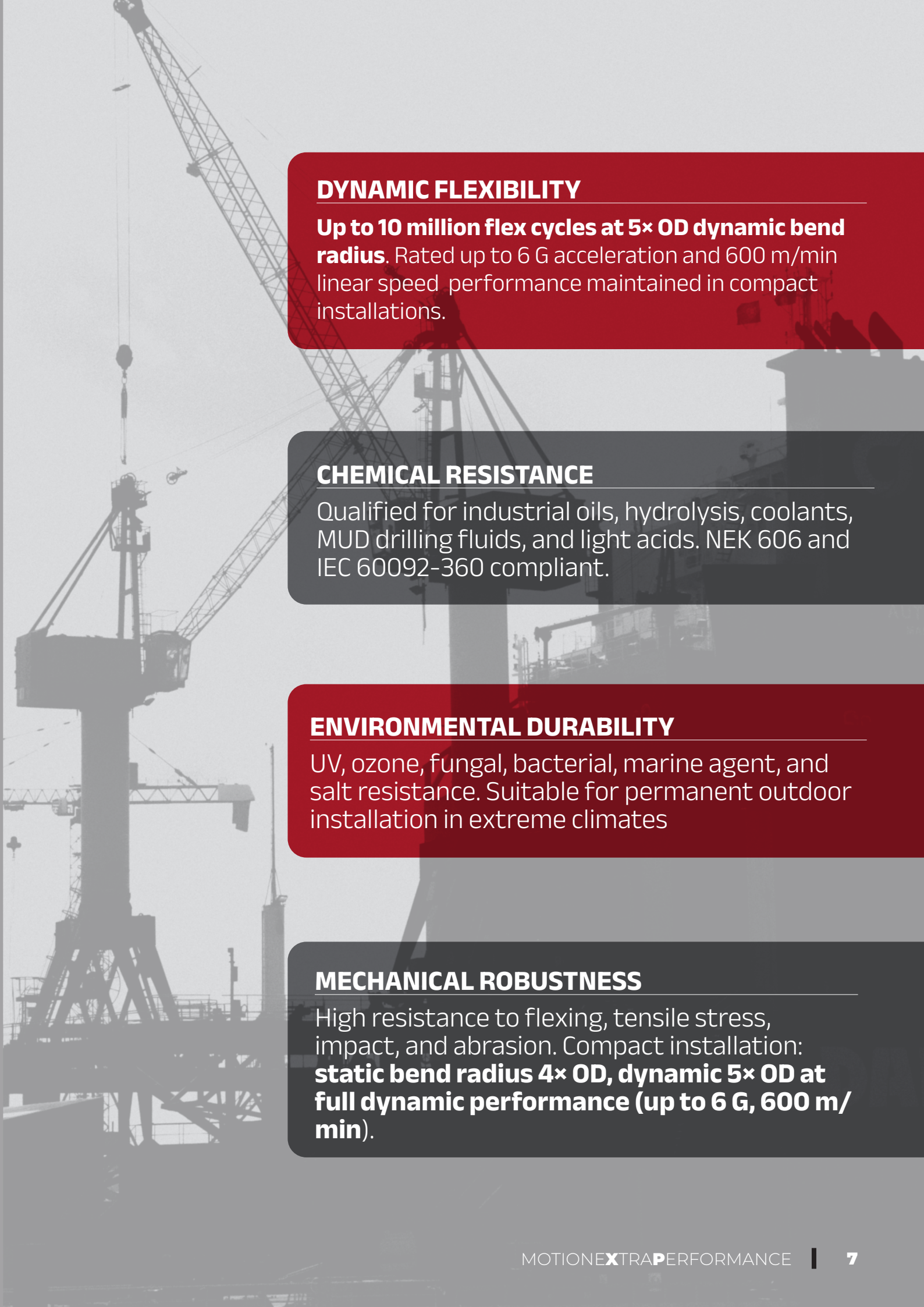
Each cable is the result of advanced engineering design, featuring carefully selected materials and optimised geometries to ensure dynamic flexibility, robustness, and long-term electrical stability. MOTION**XP**® cables are not built to pass tests — they are validated to perform reliably in the conditions on which tests are modelled.

Tested at MotionTechCore

All MOTIONXP**® cables are validated at the MotionCables Research & Test Center, which integrates state-of-the-art electrical, mechanical, and environmental testing systems. The outcome is not just a compliant product — it is a validated one, with measurable and repeatable performance over time**

WHERE MOTIONXP**® WORKS**

From offshore Oil & Gas platforms to underground mining operations, from steel mill environments to advanced industrial robotics, MOTION**XP**® cables are the dependable choice wherever electrical and mechanical reliability is critical for safety and operational continuity.



DYNAMIC FLEXIBILITY

Up to 10 million flex cycles at 5× OD dynamic bend radius. Rated up to 6 G acceleration and 600 m/min linear speed performance maintained in compact installations.

CHEMICAL RESISTANCE

Qualified for industrial oils, hydrolysis, coolants, MUD drilling fluids, and light acids. NEK 606 and IEC 60092-360 compliant.

ENVIRONMENTAL DURABILITY

UV, ozone, fungal, bacterial, marine agent, and salt resistance. Suitable for permanent outdoor installation in extreme climates

MECHANICAL ROBUSTNESS

High resistance to flexing, tensile stress, impact, and abrasion. Compact installation: **static bend radius 4× OD, dynamic 5× OD at full dynamic performance (up to 6 G, 600 m/min).**

ELECTRICAL & MATERIAL SPECIFICATIONS

Every construction element in MOTIONXP® is selected for the specific failure modes of dynamic industrial environments, not for general industrial duty. The material system is defined by the application, not by the minimum compliant specification.

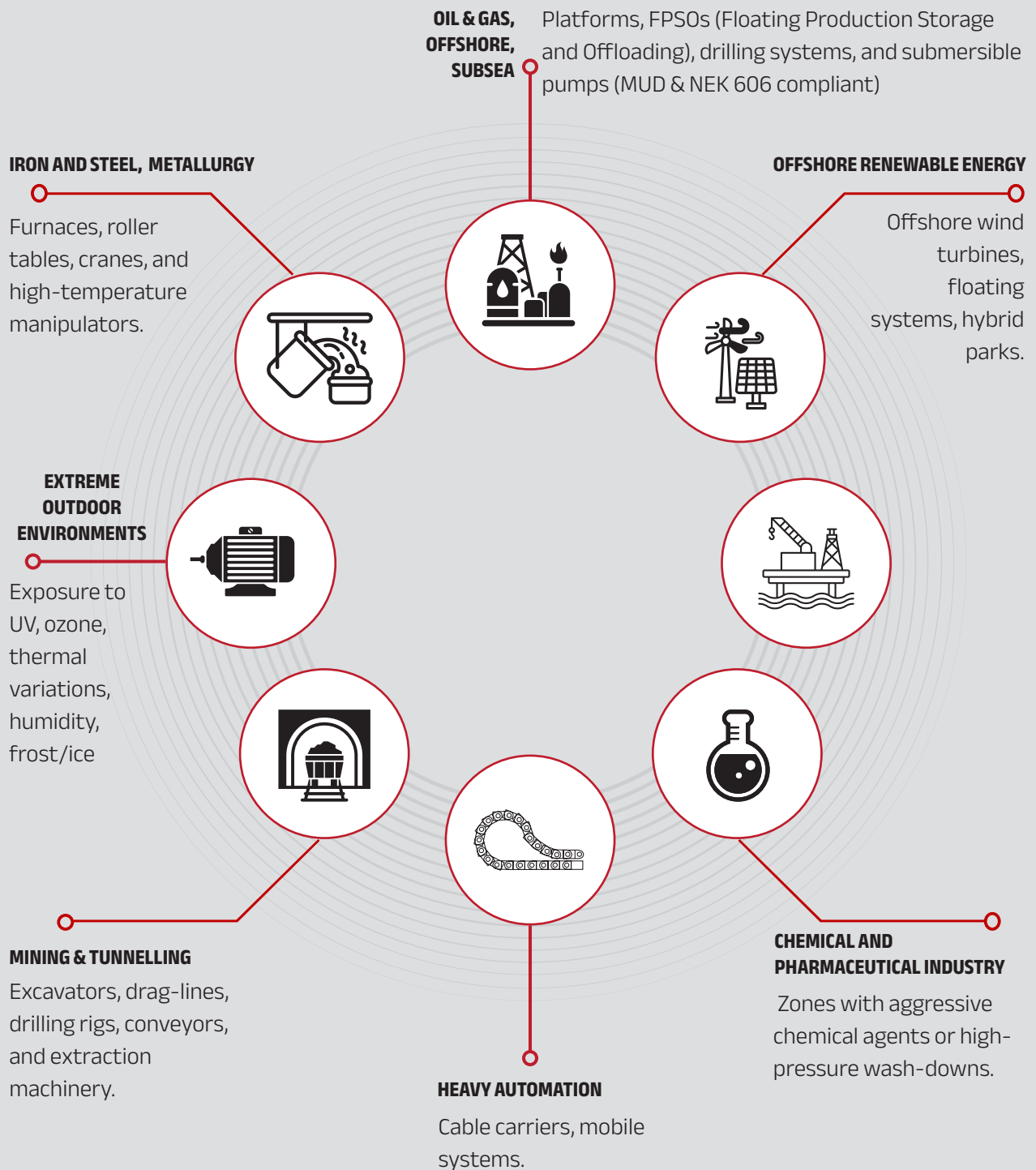
CHARACTERISTIC	TECHNICAL SPECIFICATION
Conductor	Flexible Copper Class 6 – Extra-flexible (IEC 60228)
Insulation	XLPE – Low capacitance and high thermal stability
Outer Jacket	PUR FRHF or TPE-U Heavy Duty – High mechanical and chemical resistance
Nominal Voltage	0.6 / 1 kV
Operating Temperature	–50 °C to +90 °C (peaks +105 °C)
Dynamic Acceleration	Up to 6 G
Linear Speed	Up to 600 m/min
Static Bending Radius	4 × Outer Diameter
Dynamic Bending Radius	5 × Outer Diameter
Mechanical Resistance	High resistance to Flexing, Tensile Stress, Impact, and Abrasion
Chemical Resistance	Industrial Oils, Hydrolysis, Coolants, MUD (Drilling Fluid), Light Acids
Environmental Resistance	UV, Ozone, Fungi, Bacteria, Marine Agents, and Salt
Flame Properties	IEC 60332-1-2 / UL VW-1 / LSZH optional

MATERIAL SELECTION RATIONALE

- ⦿ **Class 6 extra-flexible copper conductors:** the highest flexibility class under IEC 60228, chosen specifically for dynamic and continuous-motion applications. Standard Class 5 conductors fatigue faster under repeated bending and torsion cycles.
- ⦿ **XLPE insulation:** cross-linked polyethylene provides dielectric stability across the full operating temperature range and resists deformation under sustained mechanical loads. Low capacitance supports signal integrity in multi-core control configurations.
- ⦿ **PUR FRHF jacket:** polyurethane with flame-retardant halogen-free compound. The PUR compound delivers superior abrasion resistance, oil resistance, and flexibility at low temperatures compared to PVC, while the FRHF formulation addresses safety requirements in enclosed or poorly ventilated spaces.
- ⦿ **TPE-U Heavy Duty alternative:** thermoplastic elastomer jacket for applications requiring maximum flexibility in combination with exceptional chemical resistance, particularly relevant for continuous dynamic movement at temperature extremes.

DEMANDING OPERATING ENVIRONMENTS

MOTIONXP® cables are designed for operation in harsh environments where electrical and mechanical reliability is critical for safety and operational continuity. Primary applications:



VALIDATED: NOT JUST TESTED

MOTION**CABLES** draws a deliberate distinction between testing and validation. Testing confirms that a cable meets a specification under defined conditions. Validation confirms that a cable will perform reliably in the real operating environment — under combined stresses, over time, in conditions that laboratory tests model but do not fully replicate.

Every MOTION**XP**® cable is validated at the MOTION**CABLES** Research & Test Center (MOTION**TECHCORE**), which integrates electrical, mechanical, environmental, and chemical testing systems in a single facility.

VALIDATION & TESTING SUMMARY – MOTIONCABLES RESEARCH & TEST CENTER

TEST PARAMETER	MOTIONCABLES TEST METHOD	TYPICAL MOTIONXP® RESULT
Dynamic Cycles in Cable Carrier	Continuous Flex Test at 5×Ø	≥ 10 million cycles (no visible cracking)
Torsion Tests	±90°/m at 60 cycles/min	Passed – mechanical and electrical integrity confirmed
MUD Resistance	IEC 60092-360 / NEK 606	Compliant – “Severe” level
Oil and Hydrolysis Resistance	IEC 60811-2-1 / ISO 1817	Excellent
UV Resistance	ISO 4892-2 (720 h)	No surface degradation
Cold Bend / Cold Impact	IEC 60811-504 / –40°C	Passed
Tensile and Impact Tests	IEC 60811-506	Passed
Flame Test	IEC 60332-1-2 / UL VW-1 / FT1	Passed
100% Electrical Tests	Automatic Continuity Test and Insulation Resistance	Compliant with EN 50395 IEC 60502-1 / UL 758
HALT (Highly Accelerated Life Test)	Multi-stress: Torsion, Heat, etc.	Passed – L50 life margin >2× standard

TESTING METHODOLOGIES

⦿ **Dynamic flex and torsion tests**

Continuous flex testing at 5× OD with in-line electrical monitoring confirms cycle life ≥10 million cycles without visible cracking. Torsion tests at ±90°/m at 60 cycles/min confirm mechanical and electrical integrity under combined torsional loads.

⦿ **HALT: Highly Accelerated Life Test**

Multi-stress protocol combining torsion, heat, and electrical loading to determine thermal and mechanical endurance limits. The L50 life margin target is at least 2× the declared specification — meaning the declared figure is well inside the actual performance envelope.

⦿ **Chemical resistance testing**

Oil immersion (IEC 60811-404:2018 / ISO 1817), MUD resistance (IEC 60092-360 / NEK 606), hydrolysis, ozone, UV (ISO 4892-2, 720 h), and biological resistance (ISO 846).

⦿ **Thermal and climatic cycling**

Cyclic thermal tests from −60°C to +180°C. Cold bend and cold impact at −40°C per IEC 60811-504.

⦿ **100% automated electrical tests**

Every cable undergoes automated continuity testing, insulation resistance measurement, and conductor resistance verification before shipment.

⦿ **Flame testing**

IEC 60332-1-2, UL VW-1, and FT1 as applicable to the construction.

⦿ **Dimensional and metallography checks**

Conductor cross-section, insulation wall thickness, jacket thickness, and stranding geometry verified on every production batch.

Standard dynamic cables typically require 7,5–10× OD bending radius for million-cycle service life. **MOTIONXP delivers comparable dynamic performance at 4× OD static / 5× OD dynamic, enabling installation in compact cable carriers, tight routing, and space-constrained machine designs where standard cables cannot fit.**

MOTIONXP

4 x OD
STATIC

5 x OD
DYNAMIC

Vs

OTHER CABLES

10 x OD
STATIC

7,5 x OD
DYNAMIC

COMPLIANCE & CERTIFICATION FRAMEWORK

MOTIONXP® cables are qualified to the standards applicable to their primary operating sectors.

The certification framework covers European, North American, and international requirements, providing the documentation needed for project qualification files across all major markets.

STANDARD / BODY	REFERENCE	SCOPE OF APPLICATION
CE	Directives 2014/35/EU – 2011/65/EU 2015/863/EU (RoHS 3)	European low voltage and RoHS conformity
IEC 60228 / 60332 / 60811	IEC International Standards	Conductors, mechanical tests, flame test
NEK TS 606 / IEC 60092-360	Oil & Gas / Offshore	MUD resistance, synthetic oils, and drilling fluids
UL 758 — AWM Style 21209, 90 °C, 1000 V	North America	AWM / TC-ER / Power & Control cables
CSA C22.2 N°210 / N°239	Canada	AWM / Industrial Power
Lloyd's Register	Marine & Offshore	Marine and dynamic certification
ISO 4892 / ISO 1817 / ISO 846	Outdoor Environments	UV, hydrolysis, biological resistance



DOCUMENTATION FOR PROJECT QUALIFICATION

For all the projects, cable approval is a formal process that requires documentation beyond the product data sheet. MotionCables provides:

- ⦿ **Certified test reports** with full test data and degradation curves.
- ⦿ **Material traceability documentation** (conductor, insulation, jacket batch records).
- ⦿ **Third-party certification** documents (Lloyd's, UL, others as applicable).
- ⦿ **Conformity declarations** for CE, RoHS, and REACH.
- ⦿ **Project-specific qualification** packages built to the documentation structure required by the project plan.

Project-specific qualification

For projects requiring standards or certifications not listed above, MotionCables can assess qualification feasibility and define a qualification plan.

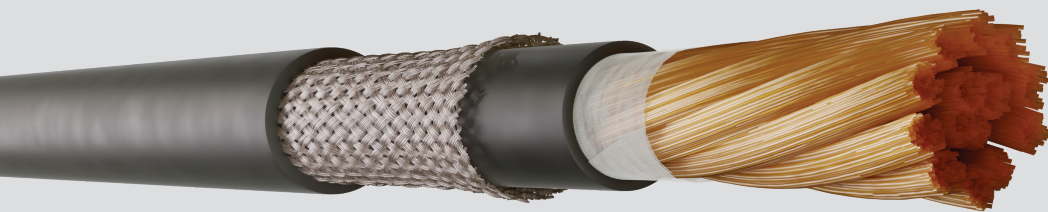
Engineering samples for third-party testing are available on request.

Timing for preliminary feasibility assessment: 2 working days.



THREE FAMILIES. ONE ENGINEERING LOGIC

The MOTION**XP**® platform is structured around **three families**, each addressing a specific class of application. All share the same material foundation and construction discipline, and differ in configuration and cross-section range to match the electrical duty of the installation.

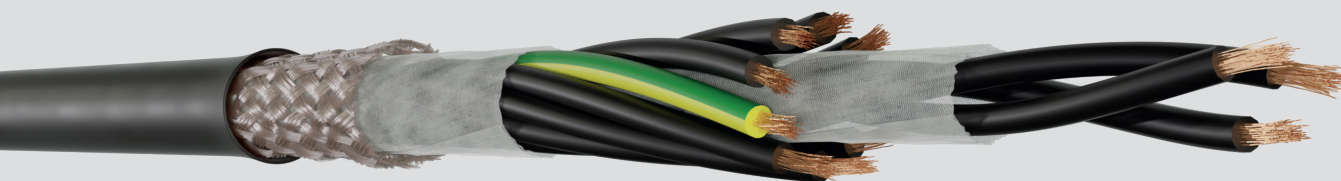


MOTIONWIRE XP® SINGLE-CORE POWER CABLES

POWER CONNECTIONS · ENERGY DISTRIBUTION · MOTOR AND INVERTER SUPPLY LINES.

MOTION**WIRE XP**® single-core power cables are engineered for flexible power connections, energy distribution networks, and motor and inverter supply lines in dynamic industrial environments. Available as shielded and unshielded versions, they cover cross-sections from 4 to 400 mm², addressing everything from small motor supply to large power distribution in offshore and heavy industrial installations.

MOTIONWIRE XP®	Single-core Power Cables	4 ÷ 400 mm ²	Single conductor	Shielded / Unshielded
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MOTIONMULTIWIRE XP® MULTI-CORE & CONTROL CABLES

CONTROL WIRING · SIGNALS · SENSORS · ACTUATORS IN DYNAMIC ENVIRONMENTS.

MOTION**MULTIWIRE XP**® covers control and signal cabling in demanding dynamic applications. From 2 to 48 insulated cores in cross-sections from 0.50 to 2.50 mm², these cables are designed for applications where signal integrity must be maintained under continuous mechanical movement, chemical exposure, and temperature cycling.

MOTIONMULTIWIRE XP®	Multi-core and Control Bundles	0,50 ÷ 2,50 mm ²	2 ÷ 48 Insulated conductors	Shielded / Unshielded
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MOTIONPOWER XP® FOUR-CORE POWER CABLES WITH EARTH

MOTOR POWER SUPPLY · INVERTERS · MOBILE SYSTEMS · HEAVY DYNAMIC INSTALLATIONS.

MOTIONPOWER XP® is the four-core power cable designed for motor supply, inverter connections, and mobile systems under heavy dynamic loads. The symmetrical 4G construction ensures balanced current distribution and controlled EMC behaviour, making it the preferred solution for VFD-fed motors and other power-intensive dynamic applications from 4 to 240 mm².

MOTIONPOWER XP®	Four-core Power Cables with Ground	4 ÷ 240 mm ²	4G symmetrical	Shielded / Unshielded
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THE TECHNICAL PARTNER ARGUMENT

There is no shortage of cable suppliers active in the heavy industrial sectors.

Most will provide a product that meets the specification on paper. The question that matters in practice is different: when the application is non-standard, when the environment is more aggressive than anticipated, when a failure occurs in a location where replacement is difficult, who do you call, and what do they actually know?

FORTY YEARS INSIDE INDUSTRIAL AUTOMATION

MOTION**CABLES** has been engineering cables for demanding dynamic applications for over forty years. The experience is not adjacent to the problem: it is the problem. Every MOTIONXP® construction reflects accumulated knowledge of how cables fail in real service, and what construction choices prevent those failure modes.

1

VALIDATION, NOT JUST COMPLIANCE

MOTION**TECHCORE** runs **HALT** protocols, combined stress tests, and chemical immersion sequences designed to find failure modes before deployment. The L50 target of at least 2× the declared specification means customers are not buying a cable at the edge of its performance: they are buying one with a confirmed margin.

2

APPLICATION ENGINEERING, NOT CATALOGUE SELECTION

When you bring a technical problem to MOTION**CABLES**, you speak with engineers who understand cable construction, failure mechanics, and installation constraints. Not with account managers who relay questions. This matters most when the application is at the edge of what standard products cover, which is precisely where MOTION**XP**® is most often specified.

3

4

TRACEABILITY AND DOCUMENTATION AS STANDARD

Material traceability, batch documentation, test certificates, and conformity declarations are standard deliverables, not premium options. For projects requiring extended documentation packages for qualification files, MOTION**CABLES** builds documentation structures to project specification



5

RESPONSE SPEED IN URGENT SCENARIOS

Integrated engineering and production means that design changes, material substitutions, and qualification sample requests are handled without the delays of multi-tier supply chains. For emergency replacement scenarios, this structural advantage has direct operational value.



MOTIONXP[®] is the synthesis of power, endurance, and reliability. Engineered to tackle the most difficult industrial environments, these cables offer electrical stability, long dynamic life, and maximum protection against mechanical, thermal, and chemical agents. From offshore to advanced robotics, they represent the definitive choice for those who demand extreme performance and total safety.

TALK TO OUR ENGINEERS

MOTION**CABLES** is not a catalogue supplier. When you bring a technical problem, you speak with engineers, not with commercial intermediaries. The most productive starting point is a conversation about the application and the environment, not a product enquiry.

WHAT TO BRING TO THE CONVERSATION

- ⊙ **Application type and installation environment:** offshore / onshore / subsea / mobile.
- ⊙ **Operating conditions:** temperature range, chemical exposure, mechanical loads, cycle profile.
- ⊙ **Electrical requirements:** voltage class, current, number of cores, signal or control function.
- ⊙ **Applicable standards** and project specification references.
- ⊙ **Installation constraints:** routing, bend radius, cable tray loading, armour requirements.
- ⊙ **Qualification requirements:** third-party certification, documentation package, approval timeline.

WHAT WE WILL PROVIDE

- ⊙ **Engineering assessment** of the application and proposed construction.
- ⊙ **Construction specification** for engineering review.
- ⊙ **Qualification sample** production for testing and approval.
- ⊙ **Certified test reports** from MotionTechCore.
- ⊙ **Complete documentation** package for project qualification file.
- ⊙ **Preliminary feasibility** assessment within 2 working days.



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