

MOTION**CLEANLINE**



CABLE SOLUTIONS FOR THE FOOD & BEVERAGE INDUSTRY



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 Centre, 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 centre 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.

ICONS

RESISTANCE TO ENVIRONMENTAL AND AGGRESSIVE CHEMICAL THREATS

									
OIL RESISTANT O-II	OIL RESISTANT O-III	OIL RESISTANT O-IV	FLAME RETARDANT	FIRE RESISTANT	TEMPOR. OUTDOOR	MECHANICAL CRUSH	HALOGEN FREE	LOW SMOKE EMISSIONS	NON -TOXIC FUMES
									
COLD RESISTANT	ABRASION RESISTANT	EMC PROTECTED	WATER RESISTANT	UV RESISTANT	MICROBE RESISTANT	OZONE RESISTANT	MUD RESISTANT		

ELECTRICAL PROPERTIES

			
OPERATING VOLTAGE	INSULATION RESISTANCE	MAX. SHORT CIRCUIT. TEMPERATURE	TEST VOLTAGE

Use the icons for a fast summary and a general idea of the related product features. More details on product characteristics are available in the proper sections of each product page.

RELIABILITY FOR CHALLENGING HYGIENIC ENVIRONMENTS

MOTION**CLEANLINE**® cables are engineered for intensive washdowns, continuous sanitization, and food safety.

The line was created to address a real-world challenge: in modern Food & Beverage facilities, the environment is often more critical than the electrical load. Frequent washdowns, aggressive detergents, steam, and thermal cycles accelerate the degradation of standard cables.

The MOTION**CLEANLINE**® platform enables the deployment of all MOTIONCABLES families across the entire production line, tailoring only the construction and materials to the specific environmental conditions.

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WHY CABLES FAIL IN FOOD & BEVERAGE

THE CABLE AS THE WEAK LINK IN PRODUCTION CONTINUITY

The complexity and demands of the **Food & Beverage** industry are unique, fundamentally centred on strict hygiene and cleanliness requirements. This imperative extends to every installed electrical component, which must never harbour germs or impurities that could contaminate products.

Therefore, cables, connectors, and conduit glands used in food production must be designed to withstand the operational realities of the sector:

- ⦿ **Chemical Loads:** Daily washdowns utilize aggressive, corrosive agents, often consuming up to 30% of machine operation time.
- ⦿ **Thermal Extremes:** Components must function reliably across a range of temperatures, from refrigeration to heating processes.
- ⦿ **Mechanical Stress:** Cables must maintain integrity despite constant handling, damp conditions, and high-pressure jets.

Our Food & Beverage Cables are certified to the highest quality standards, including **FDA**, **ECOLAB®**, and **EHEDG**. This certification verifies their resistance to chemical, thermal, and mechanical stresses, ensuring seamless operation and full compliance with critical hygiene protocols.

INDICATIVE ACCELERATED AGING FORMULA

$$\text{SERVICE LIFE} \approx f(\text{C} \cdot \text{T} \cdot \text{t} \cdot \text{N})$$

WHERE:

C = DETERGENT CONCENTRATION

T = TEMPERATURE

t = CONTACT TIME

N = NUMBER OF CYCLES

HYGIENIC DESIGN REQUIREMENTS

- ⦿ Continuous, smooth surface.
- ⦿ Absence of micro-cracks.
- ⦿ Dimensional stability after washdown.
- ⦿ Verified chemical compatibility.



**DAIRY
PROCESSING &
TECHNOLOGY**



**MEAT &
FISH
PROCESSING**



**BAKING
&
CONFECTIONERY
PROCESSING**



**BOTTLING
PLANTS**



**PHARMACY &
COSMETICS**

MOST COMMON CABLES FAILURE IN FOOD & BEVERAGE

Identifying the **root cause** is **essential** for prevention. Cable failures do not occur by chance; rather, they **result from an incorrect match** between the jacket material and the operating conditions. Here you have the most common failures:

SWELLING

The outer sheath is undergoing **delamination** due to **oil** and **grease absorption**.



MICRO-CRACKING

The outer jacket is undergoing **micro-cracking** due to **bacterial proliferation** following chemical or mechanical stress.



HARDENING

The outer sheath is experiencing **embrittlement** and subsequent cracking due to **plasticizer loss** resulting **from thermal shock**.



DEFINITION OF FOOD & BEVERAGE ZONES

EXPLORE THE 3 ZONES IN FOOD & BEVERAGE PRODUCTION AND MACHINERIES.

ZONE	RISK	ENVIRONMENT	CABLE FAMILY & GOAL
1 HDZ*	High	Product Contact CIP/SIP	ULTRAGUARD® Maximum Resistance
2 SPLASH	Medium	Splashes, Aerosols	POWERSHIELD® Chemical/Dynamic Balance
3 TECHNICAL	Low	Technical Zones	TECHLINE® Robustness & Cost

* Hygienic Designed Zones

It is the zone that dictates the level of protection, not the type of cable. The cable family does not change; rather, the MOTION**CLEANLINE**® construction adapts to the environment. The same cable family spans the entire production process, allowing a single servo or bus cable to cross multiple hygienic zones.

MOTION**CLEANLINE**®

guarantees functional continuity by tailoring the jacketing and materials. The correct selection relies on three independent variables:

- ⊙ **Hygienic Zone.**
- ⊙ **Chemical Profile**
(pH, Temperature, time, cycles).
- ⊙ **Mechanical Profile**
(static, flexing, torsion).

ZONE 1 - HDZ

DIRECT / INDIRECT
CONTACT.
HARD WASHDOWNS

REQUIREMENTS

- ⊙ Hygienic design standards (e. g. EHEDG, DIN EN ISO 14159 or DIN EN 1672-2) should be followed.
- ⊙ Recommended to use FDA approved materials and materials that can withstand cleaning agents (chemicals, acids, alkalis, hot water).
- ⊙ Consider the following factors:
 - temperature range;
 - chemical resistance;
 - mechanical strength;
 - flexibility.

APPLICATIONS

- ⊙ For direct and permanent contact with food.
- ⊙ Electrical equipment or components that need to be washed as part of regular maintenance.

REQUIREMENTS

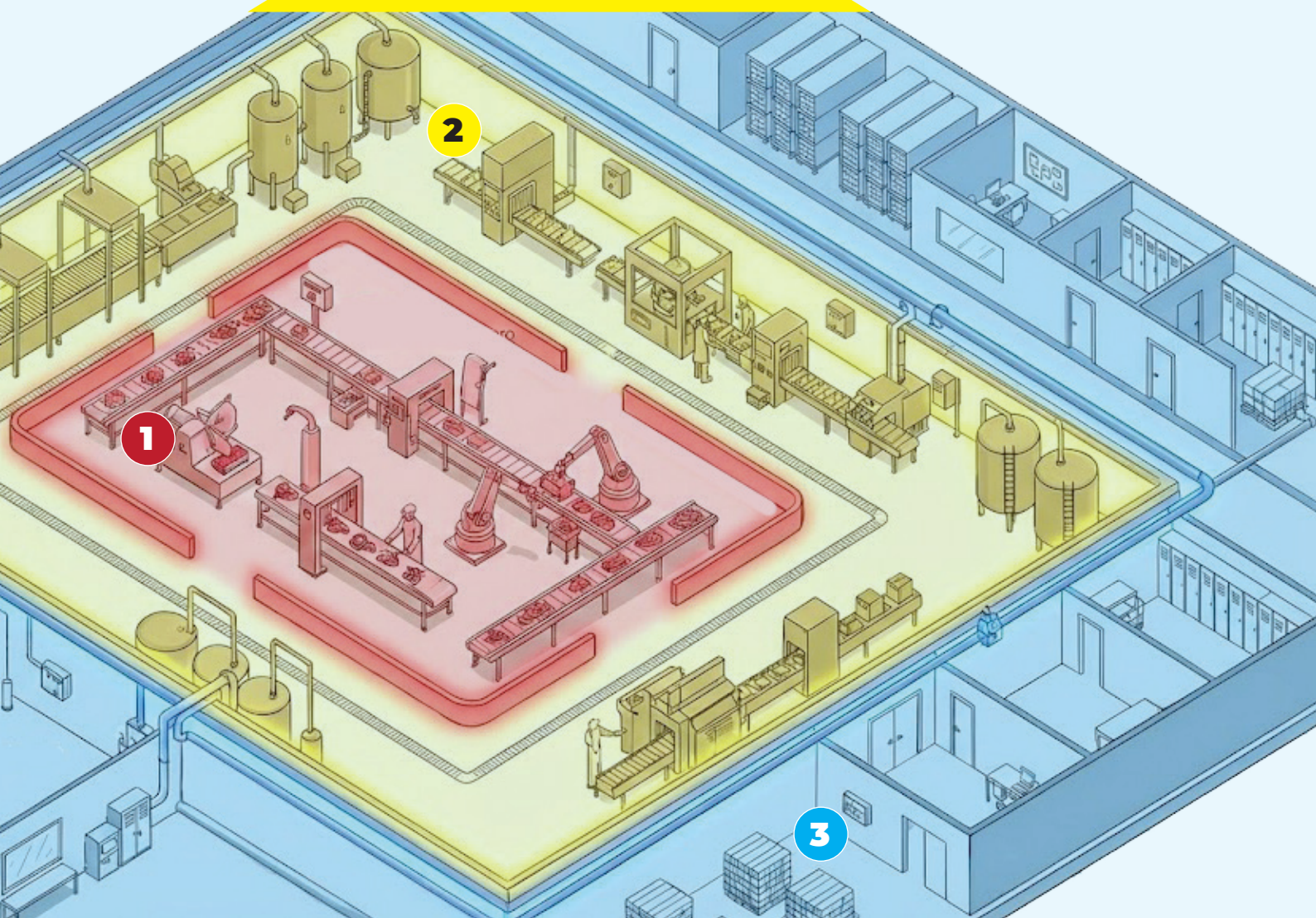
- ⦿ Assess the risk of food returning to the manufacturing process
- ⦿ Recommended to use materials that are able to withstand chemicals, acids, alkalis, hot water.
- ⦿ Consider the following factors:
 - temperature range
 - chemical resistance
 - mechanical strength,
 - flexibility.

APPLICATIONS

- ⦿ For direct and permanent contact with food.
- ⦿ In or near the food manufacturing process.
- ⦿ Drips or splashes of food could return to the food manufacturing process, causing contamination.
- ⦿ Areas that need to be washed down.

ZONE 2 - SPLASH

SPLASH ZONE - AEROSOL
AND SPRAYS



ZONE 3 - TECHNICAL

DRY ZONES
LOCKER ROOMS
FINAL PALLETIZING

APPLICATIONS

- ⦿ Conveyor belt for packaged products.

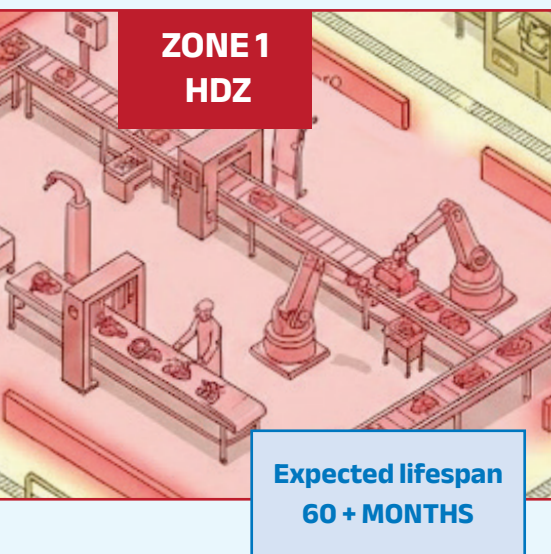
REQUIREMENTS

- ⦿ Consider the following factors: temperature range, chemical resistance, mechanical strength, flexibility.

THE PRODUCT TO MATCH THE PROCESS

THREE LEVELS FOR EVERY APPLICATION

The MOTION**CLEANLINE**® series is strategically divided into **three specialized product lines**, each meticulously engineered to meet the unique requirements and stringent standards of the food & beverage industry. By addressing the specific challenges of different production zones—from processing to packaging—MOTION**CLEANLINE**® ensures maximum reliability and hygiene compliance, as explored in detail below.



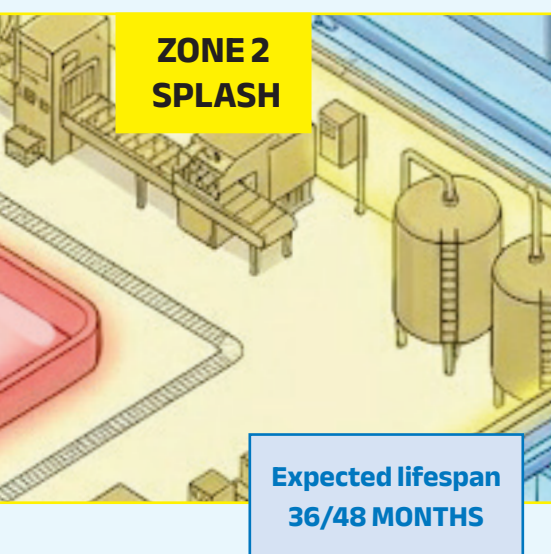
FOCUS PRODUCT:

MOTION**CLEANLINE**® **ULTRAGUARD**®

In the **HDZ**, **cables** are subjected to extreme stress. UltraGuard® is engineered for:

- ⦿ **Severe Washdown:** Resistance to >100 bar washdowns and steam.
- ⦿ **CIP/SIP:** Compatible with sterilization and sanitization cycles.
- ⦿ **Surfaces:** Ultra-smooth, non-porous jackets, stable at high temperatures.

Ultra-resistant, non-porous jackets materials stable up to +125 °C, high-cleanability ultra-smooth surface.



FOCUS PRODUCT:

MOTION**CLEANLINE**® **POWERSHIELD**®

In the **Splash zone**, **cables** are exposed to detergents, humidity, temperature fluctuations, and moderate mechanical stresses:

- ⦿ **Optimal balance** between chemical resistance, dynamic performance, and long-term durability.
- ⦿ **Smooth**, easy-to-clean surface.
- ⦿ **Materials resistant** to common detergents.

Applications: Filling, cutting, dosing, primary packaging.

Design consistency with the UltraGuard and TechLine families.



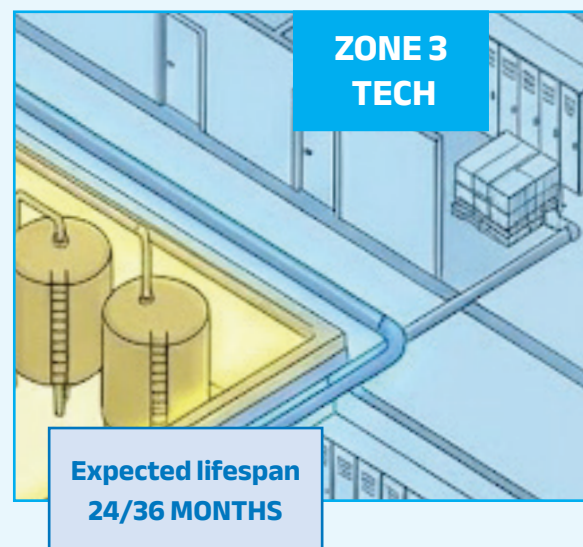
FOCUS PRODUCT:

MOTION**CLEANLINE®** **TECHLINE®**

In the **Tech zone, cables** main stresses are mechanical, dynamic, and installation-related, with a focus on reliability and cost optimization:

- ⊙ **Ensure mechanical robustness**, electrical reliability, and installation flexibility.
- ⊙ **High abrasion resistance**. Good flexibility for dynamic installations.
- ⊙ Optimized **performance/cost ratio**.

Applications: Conveying, End-of-line palletizing, Electrical cabinets, Technical and Service areas.



CHEMICAL VALIDATION & ECOLAB® TESTING WITH REAL DETERGENTS

Compatibility is not theoretical.

All MOTION **CLEANLINE®** jackets are **ECOLAB®** certified via immersion tests using real detergents, acids, and sanitizers. Verified parameters:

- ⦿ Absence of swelling.
- ⦿ Hardening.
- ⦿ Cracking.
- ⦿ Mass variation.

CHEMICAL RESISTANCE CLASSIFICATION

CLASS I – NOT SUITABLE



The material is incompatible with the chemical medium considered. Contact causes significant and rapid degradation, resulting in a loss of mechanical and/or structural properties.

Use: not permitted

CLASS II – LIMITED SUITABILITY



The material exhibits partial compatibility. It is permitted exclusively for short, discontinuous contact and at low concentrations, in the absence of significant thermal or mechanical stress.

Use: Prior application verification is required

CLASS III – SUITABLE



The material is generally compatible with the chemical medium under standard operating conditions. Limited alterations may occur over the long term without compromising the application's functionality.

Use: permitted under normal design criteria

CLASS IV – HIGHLY SUITABLE



The material exhibits high chemical resistance. It is compatible even in cases of prolonged contact, high concentrations, and severe operating conditions.

Use: fully compliant without significant restrictions



IMPORTANT TECHNICAL NOTE

The chemical compatibility assessment is based on standard test conditions. Factors such as temperature, concentration, exposure time, mechanical stress, and combinations of chemical agents may affect the material's behaviour.

According the below table, here you have the correct reference in terms of chemical compatibility of the MOTION**CLEANLINE**® product families:

PRODUCT FAMILIES	ACIDS	ALKALINE AGENTS	OXIDIZING AGENTS	STEAM
TECHLINE®				
POWERSHIELD®				
ULTRAGUARD®				

MECHANICAL AND DYNAMIC PERFORMANCES

PRODUCT FAMILIES	 MIN. BENDING RADIUS	 MAXIMUM SPEED	 MAXIMUM ACCELERATION	 MIN. BENDING CYCLES
	mm	m/min	m/sec ²	n°
TECHLINE®	12 x Ø	180	0.5	1.000.000
POWERSHIELD®	10 x Ø	240	10	5.000.000
ULTRAGUARD®	7.5 x Ø	300	15	10.000.000

SAFETY PERFORMANCES

PRODUCT FAMILIES	 FLAME RETARDANT	 HALOGEN FREE	 NON-FLAME PROPAGATION	 LOW SMOKE EMISSIONS
TECHLINE®				
POWERSHIELD®				
ULTRAGUARD®				

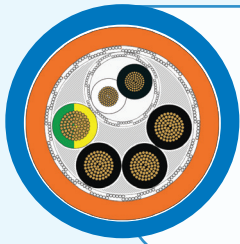
REGULATORY COMPLIANCE AND CERTIFICATIONS

PRODUCT FAMILIES	ECOLAB®			
TECHLINE®	✓	✓	✓	Upon Request
POWERSHIELD®	✓	✓	✓	✓
ULTRAGUARD®	✓	✓	✓	✓

MOTION**CLEANLINE**® streamlines plant validation by supporting major international standards:

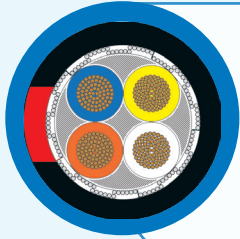
- ⦿ **FDA 21 CFR 177** for materials
- ⦿ **UL/CSA** for export to North America.




MOTION **SERVO**

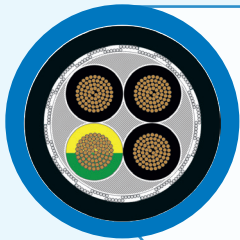
Servo continuity across all zones without changing system architecture

Code	S-UT
Outer Sheath	FlexCore®
Environment	Dry or protected technical areas, subject to primarily mechanical and dynamic stresses.
Applications	Servo cables for end-of-line palletizers, material handling systems, and service areas, focusing on robustness, ease of installation, and cost optimization.


MOTION **BUS**

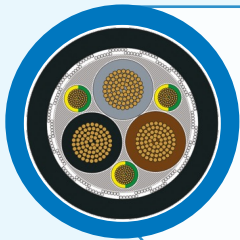
EMC shielding always guaranteed

Code	B-UT
Outer Sheath	FlexCore®
Environment	Standard industrial environments, electrical cabinets, and technical areas.
Applications	Network and field-bus connections for automation and control systems.


MOTION **POWER**

Also available in reinforced and multi-conductor versions

Code	P-UT
Outer Sheath	FlexCore®
Environment	Dry or protected technical areas.
Applications	Power supply for electrical cabinets, lines, and auxiliary systems.


MOTION **VFD**

EMC shielding mandatory for all versions

Code	V-UT
Outer Sheath	FlexCore®
Environment	Standard industry and technical areas.
Applications	VFD cables for inverters installed in cabinets or protected zones.


MOTION **CONTROL**

Wide variety of configurations and cross-sections

Code	C-UT
Outer Sheath	FlexCore®
Environment	Dry and technical environments.
Applications	Control, signalling, and auxiliary wiring.

APPROVALS & CERTIFICATIONS


UPON REQUEST

CHEMICALS RESISTANCE

ACID DETERGENTS



ALKALINE DETERGENTS



OXIDANTS / SANITIZERS



OILS / GREASES



STEAM / HEAT



2

POWERSHIELD®**SPLASH ZONE, AEROSOL AND SPRAYS**

Code	S-UP
Outer Sheath	Durashield®
Environment	Splash Zones subject to aerosols and frequent washdowns, with exposure to detergents and humidity, but without direct food contact.
Applications	Servo cables for process machines adjacent to the HDZ (filling, dosing, cutting), where a balance between chemical resistance, flexibility, and durability is required.

Code	B-UP
Outer Sheath	Durashield®
Environment	Splash Zones subject to vibrations, splashes, and electromagnetic disturbances.
Applications	Process communication networks (Ethernet, Profinet, EtherCAT) installed on machines and production lines.

Code	P-UP
Outer Sheath	Durashield®
Environment	Splash Zones with the presence of detergents, oils, and greases.
Applications	Power supply for process machines, ensuring chemical resistance and reliability over time.

Code	V-UP
Outer Sheath	Durashield®
Environment	Splash Zones with dynamic loads and electromagnetic interference.
Applications	Connection of drives and inverters on food production lines.

Code	C-UP
Outer Sheath	Durashield®
Environment	Splash Zones with humidity and detergents.
Applications	Control and signal cables for process machines and automation.



1

ULTRAGUARD®**DIRECT / INDIRECT CONTACT, HARD WASHDOWNS**

Code	S-UG
Outer Sheath	HygienicGuard®
Environment	Critical hygiene areas subject to intensive washdowns, CIP/SIP cycles, alkaline and oxidizing detergents, high temperatures, and thermal shocks
Applications	Servo cables for drives installed in near to or in direct / indirect contact with food products, where maximum dynamic reliability is required

Code	B-UG
Outer Sheath	HygienicGuard®
Environment	HDZ environments with strong exposure to humidity, detergents, and stringent EMC requirements
Applications	Bus and Industrial Ethernet cables for reliable communication in critical food areas, featuring effective shielding and easily sanitizable surfaces.

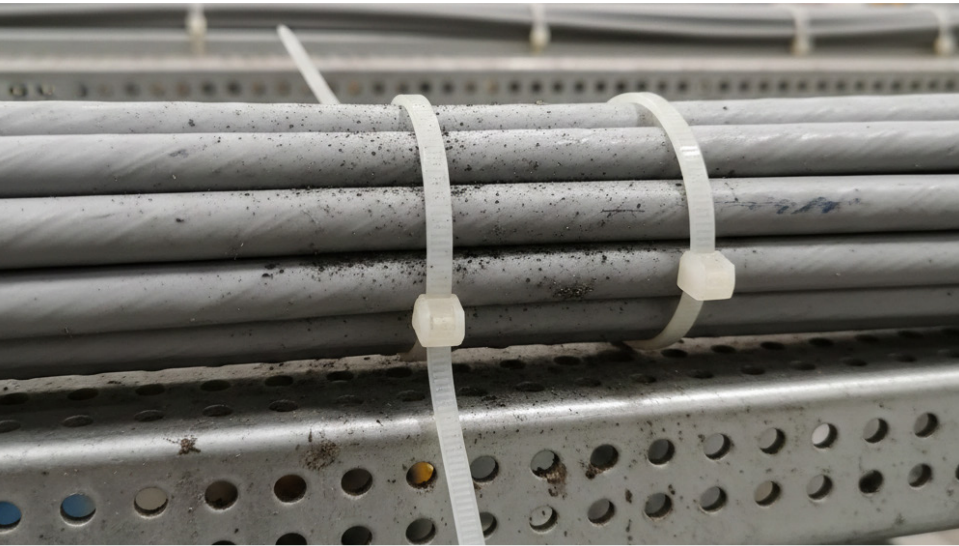
Code	P-UG
Outer Sheath	HygienicGuard®
Environment	Critical food zones subject to aggressive washdowns and high hygiene requirements
Applications	Power cables for motors and machines installed in HDZ areas, featuring certifiable materials and long operational life

Code	V-UG
Outer Sheath	HygienicGuard®
Environment	HDZ environments with combined hygiene and EMC requirements
Applications	Cables for inverters and drives installed in proximity to the food process.

Code	C-UG
Outer Sheath	HygienicGuard®
Environment	Areas subject to frequent cleaning and stringent hygiene requirements
Applications	Control signals, I/O, and sensors in critical food environments.



INSTALLATION GUIDELINES



Standard plastic straps and cable bundling are prohibited in hygienic areas.

Tight straps can compromise the outer sheath, creating difficult-to-clean recesses where pathogens proliferate. Cables should instead be routed with adequate spacing to allow for full wash-down and drainage.



CLAMPING:

Utilize smooth metallic clamps, correctly positioned to guarantee proper layout and facilitate liquid runoff.

ROUTING:

Open cable trays are recommended to avoid liquid stagnation and pooling.

Inspection: All cabling areas must be designed to allow easy visual inspection.

OPTIMIZATION:

The use of OCT (One Cable Technology) is strongly advised to substantially reduce cable density within the trays.

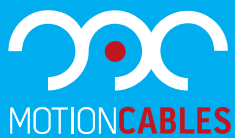
INSTALLATION & MAINTENANCE GUIDELINES

- ⊙ **Avoid tight cable routing:**
Leave space for cleaning.
- ⊙ **Minimize cable slack:**
Reduces accumulation points.
- ⊙ **Use hybrid configurations when possible:**
Fewer connections equals better hygiene.
- ⊙ **Install in hygienic zones with sufficient slope:**
Prevents water pooling.
- ⊙ **Periodically check the jacket surface:**
Ensures hygiene and integrity.

LONG-TERM ADVANTAGES

- ⊙ **Superior lifespan:**
Resists extreme cleaning cycles without degradation.
- ⊙ **Reduced downtime:**
Fewer failures, greater production continuity.
- ⊙ **Certified hygiene:**
Compliant with industry standards.
- ⊙ **Operational savings:**
Faster cleaning times, less detergent usage.
- ⊙ **Product safety:**
Contamination risk minimized.





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