LAPP

Food & Beverage Equipment Application Guide

How to select cables, connectors and cable accessories based on the food contact zone where they will be installed.





Cable and Connector Application Guide for Food and Beverage Equipment

Selecting the right connectivity solutions for food and beverage systems is about more than just electrical performance. It's an important part of your facility's hygiene and compliance strategy. Whether you're processing raw meat, bottling dairy or handling consumer-packaged beverages, the selection process begins with a simple question: Which food zone are you in?

The industry categorizes these environments into three areas – the Food Contact Zone, Splash Zone and Non-Food Zone. Each one has its own regulatory and physical requirements, from the high-pressure, chemical washdowns of primary processing areas, to the standard industrial requirements of the warehouse floor. Choosing a cable or connector that isn't rated for its specific zone can lead to material degradation, microbial growth and costly production downtime.

This guide is designed to simplify the selection process. By matching our LAPP product lines to the specific demands of each zone, we'll help you meet the highest global standards while maintaining maximum system uptime.



Zone 1: Food Contact Zone

This is the most demanding environment, necessitating the highest certifications and material requirements. Cables face direct food exposure, aggressive cleaning agents, high-pressure washdowns and wide temperature swings. Examples of machinery include conveyors, mixing vessels, ovens, fillers and cappers.

Power and Control Cables

- TPE outer sheaths for resistance to bio-oils, detergents and hot water
- Smaller OD for tight routing in densely packed equipment
- High flexibility for complex processing layouts

VFD and Servo Cables

- ECOLAB-approved and IP69K-rated for washdown survival
- Available in Slim, 1XL, 2XL and other configurations to match motor requirements

Tray Cables

- UL tray-rated with ECOLAB approval and IP69K certification
- Suitable for high-moisture washdown areas

Cable Glands (Hygienic Design)

Zone 1 cable glands follow DIN EN 1672-2 and carry EHEDG certification:

- Rounded geometry with no crevices or flat surfaces
- Stainless steel V4A (grade 1.4404)
- Very low manufacturing tolerances to eliminate gaps
- Blue sealing material for visual identification
- IP 68 (10 bar) and IP 69 protection ratings
- Tested against ECOLAB-certified cleaning agents
- Suitable for direct contact with foodstuffs

Conduit

- FDA-approved PVC construction
- Smooth interior and exterior surfaces to prevent microbial adhesion
- Liquid-resistant design to protect enclosed cables

LAPP Products for Zone 1

Function	Product	Key Features
Power and control	ÖLFLEX®	TPE outer sheath; resistant to bio-oils, detergents, hot water; smaller OD
VFD cables	ÖLFLEX® VFD (Slim, 1XL, 2XL, TGK, ZeroCM)	ECOLAB approved; IP69K rated
Servo cables	ÖLFLEX® CONNECT SERVO	ECOLAB approved; IP69K rated
Tray cables	ÖLFLEX® Tray II, Tray K	UL tray-rated; ECOLAB approved; IP69K rated
Cable glands	SKINTOP® HYGIENIC	EHEDG certified; stainless steel V4A (1.4404); IP 68/IP 69; blue sealing; DIN EN 1672-2
Conduit	SILVYN®	FDA approved; ECOLAB certified; smooth inside and out; food-safe PVC
Cable marking	FLEXIMARK®	Stainless steel plates and numbered rings

Zone 2: Splash Zone

This zone includes the same cleaning agents and washdown cycles as Zone 1. Components are not designed to contact food, but splashed or aerosolized product can reach Zone 2 surfaces and become a contamination source if not properly cleanable. Examples of equipment include motor housings, sensor junction boxes and cable trays above processing lines.

Power and Control Cables

- Same TPE-jacketed, chemically resistant cables recommended for Zone 1
- Standard industrial cables acceptable only in fully enclosed, spray-protected locations (e.g., sealed control enclosures)

Communication and Data Cables

- Industrial Ethernet: Cat 5e through Cat 7 with washdown-rated jackets
- Fieldbus cables: PROFIBUS, DeviceNet, CAN-Bus, ASi-Bus in shielded configurations
- Fiber optic cables for long runs, high bandwidth or EMI-heavy environments

Cable Glands and Connectors

- Stainless steel cable glands with smooth, crevice-free surfaces
- Compact designs for tight panel spaces
- Industrial connectors with corrosion-resistant housings (nickel-plated zinc die-cast)
- Quick-disconnect connectors for faster maintenance and equipment changeover

Conduit

- FDA-approved conduit recommended for any exposed run
- Standard industrial conduit acceptable only for fully protected, enclosed routes



LAPP Products for Zone 2

Function	Product	Key Features
Power and control	ÖLFLEX®	TPE outer sheath; chemical resistant
VFD and servo cables	ÖLFLEX® VFD, ÖLFLEX® CONNECT SERVO	ECOLAB approved; IP69K rated
Industrial ethernet	ETHERLINE® (Cat 5e, Cat 7)	Washdown approved; tray-rated; patch cords and RJ45-to-M12 available
Data and signal	UNITRONIC®	Twisted pair, shielded and bus system cables (DeviceNet, PROFIBUS, CAN-Bus, ASi-Bus)
Fiber optic	HITRONIC®	EMI immune; long-distance data transmission
Connectors	EPIC® ULTRA	Nickel-plated zinc die-cast; corrosion resistant; quick disconnect
Cable glands	SKINTOP® INOX	Stainless steel; smooth surfaces; compact; corrosion resistant
Conduit	SILVYN®	FDA approved; ECOLAB certified; smooth surfaces

Zone 3: Non-Food Zone

This is a standard industrial environment and can include warehousing, hallways and utility rooms. No food product is present, and there is no regular washdown exposure. Cable selection follows NEC and NFPA 79 requirements.



Applicable Electrical Codes

Application Level	Governing Codes
Industrial infrastructure — main power distribution	NEC 330, 725, 727, 800
Industrial platform — processing lines	NFPA 79, NEC 310, 400, 670
Industrial machines	NFPA 79

LAPP Products for Zone 3

Function	Product	Key Features
Power and control	ÖLFLEX®	Standard industrial grades; UL listed
Communication	ETHERLINE®	Cat 5e to Cat 7; stationary to continuous flex
Data and signal	UNITRONIC®	Standard industrial data and bus cables
Connectors	EPIC®	Rectangular, circular and pin-and-sleeve options
Cable glands	SKINTOP®	Standard strain relief and sealing
Conduit	SILVYN®	Standard industrial cable protection
Cable marking	FLEXIMARK®	Stainless steel plates and numbered rings for traceability

Cabling by Equipment Location

Select zone-appropriate material grades based on where the equipment sits, then match the cable type to the application point.

Control Enclosures — Main Control Box and Control Board	
Function	**LAPP Product**
Power and control	ÖLFLEX®
Internal wiring	ÖLFLEX® single core
Communication	ETHERLINE®, UNITRONIC®
Panel/machine interface	EPIC® remote access ports
Strain relief	SKINTOP®



Cable Trays	
Function	**LAPP Product**
Power and control	ÖLFLEX®
Communication	ETHERLINE®
Cable protection	SILVYN®

Motors, Drives and Cable Tracks	
Function	**LAPP Product**
Power and control	ÖLFLEX®, ETHERLINE®, UNITRONIC®
Drive-to-motor supply	ÖLFLEX® CONNECT SERVO
Feedback (encoder/resolver)	ÖLFLEX® CONNECT SERVO
Power/control disconnect	EPIC®
Bundled assemblies	ÖLFLEX® CONNECT CHAIN

Robot Base	
Function	**LAPP Product**
Control system	ÖLFLEX®, ETHERLINE®, HITRONIC®
Power supply	ÖLFLEX®
Signal transmission	ETHERLINE®
Power/control/data interface	EPIC®, ÖLFLEX® CONNECT CABLES
Strain relief	SKINTOP®
Cable protection	SILVYN®

Robot Arms	
Function	**LAPP Product**
Tool control	ÖLFLEX®
Camera/vision system	ETHERLINE®
Sensor/actuator	ÖLFLEX®, UNITRONIC®
Servo power and feedback	EPIC® circular
Strain relief	SKINTOP®
Cable protection	SILVYN®



Certification Quick Reference				
Certification	**What It Confirms**	**Zone 1**	**Zone 2**	**Zone 3**
FDA compliance	Food-safe materials	Recommended	Recommended	Not required
ECOLAB approval	Cleaning agent resistance	Recommended	Recommended	Not required
IP69K	High-pressure washdown sealing	Recommended	Recommended	Not required
EHEDG	European hygienic design	Recommended	Optional	Not required
NSF/ANSI 169	North American food equipment safety	Recommended	Optional	Not required
UL tray rating	Tray installation performance	Recommended	As needed	As needed
DIN EN 1672-2	Hygienic design for cable glands	Recommended	Optional	Not required

What to Verify with our Application Experts

Before specifying cables for Zone 1 or Zone 2 applications, it's important to confirm:

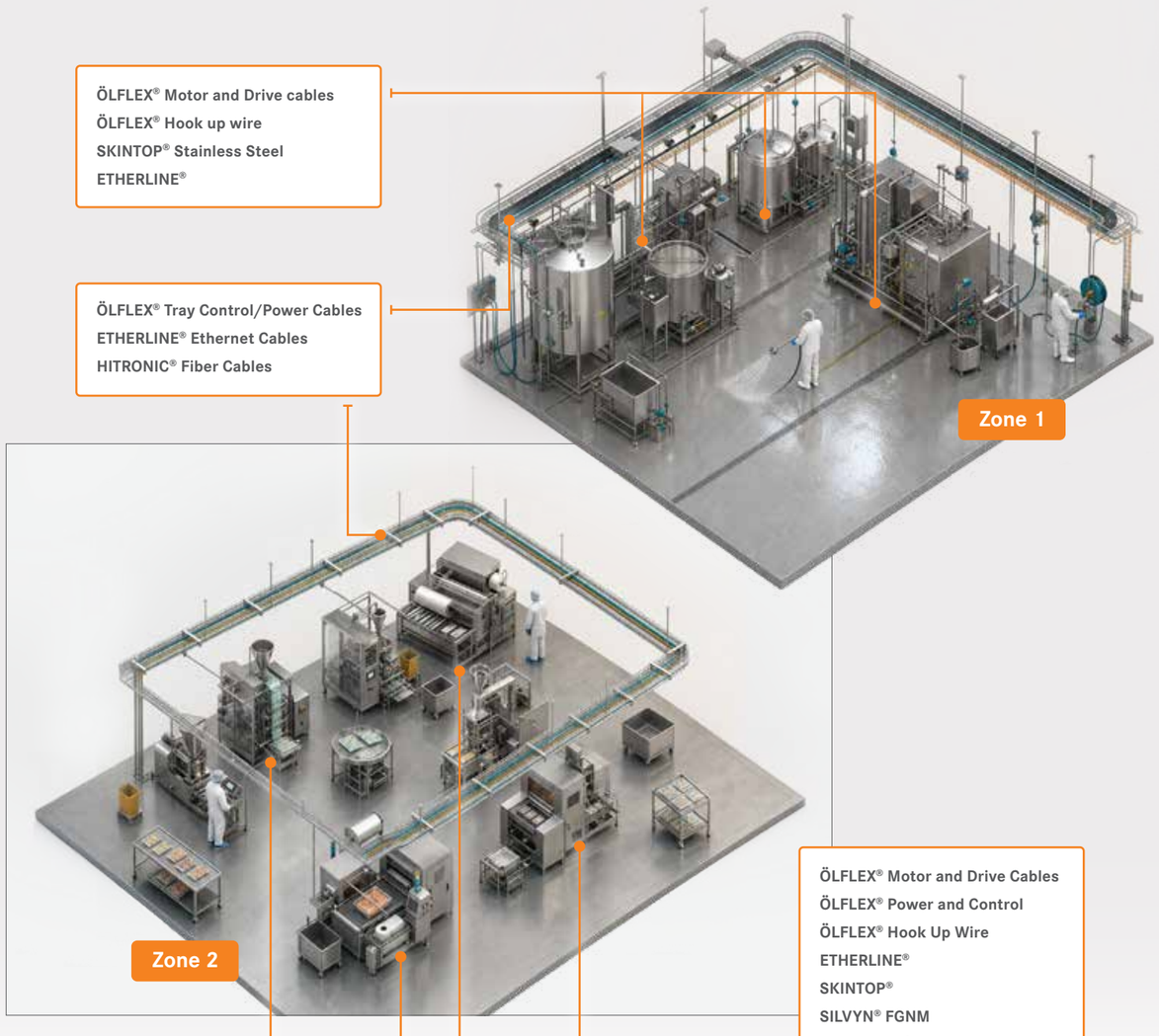
- Chemical compatibility with the cleaning agents and sanitizers used in your facility.
- Testing breadth: look for programs covering 100+ cleaning agents and 700+ additional substances (oils, fats, emulsions).
- Continuous-flex testing for cables in moving applications like cable tracks and robotic arms.
- Temperature range testing covering your full operational range – from cold storage to pasteurization.
- In-house lab capability for evaluating agents not already on the manufacturer's tested list.

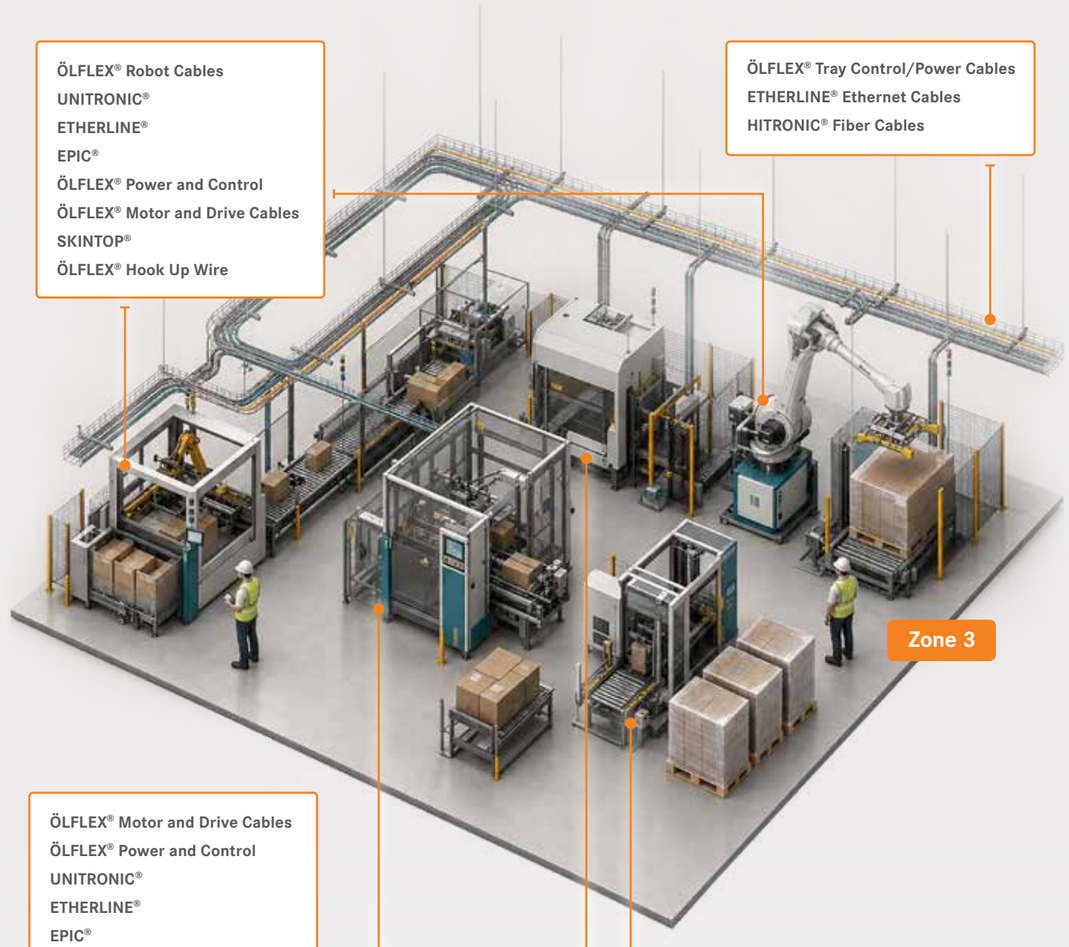


LAPP Connectivity Solutions for Food & Beverage Production

See where LAPP products fit across three key food contact zones in a typical plant.

Food and beverage plants put cables and connectors to the test with daily washdowns, harsh cleaning agents, temperature swings and constant motion. LAPP's complete portfolio of cables, connectors, glands and protection systems keeps lines running reliably and hygienically, from processing to packaging to end-of-line and palletizing.





For more information or to connect with your local LAPP representative, please visit ***lapp.com.***

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