

Solutions for the Food & Beverage Industry

**Meeting the Needs
of Harsh Industrial
and Mission-critical
Environments**

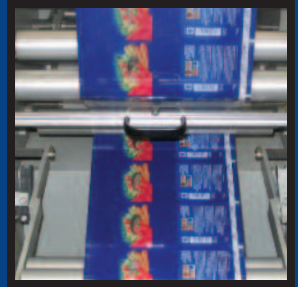




Belden® Products Are Designed
To Meet the Specific Needs of the
Food & Beverage Industry.

**Belden's Signal Transmission Solutions
Increase the Reliability Factor at Every Critical
Stage of Your Food or Beverage Process.**





Belden 'Connects' with the Food & Beverage Industry

Can You Afford Downtime?

If a cabling system component or Ethernet switch fails in a food or beverage processing facility, the repair or labor costs alone could be 15-20 times the cost of the component itself and, depending on the circumstances, some consumables may even need to be scrapped. Downtime in the food and beverage industry can reach an astounding 500 hours annually, and can lead to overall costs that some studies put in the range of \$20,000 to \$30,000 per hour.

Unfortunately, in this industry certain factors encourage system failure and downtime. For example, only the semiconductor industry matches this sector in its stringent need for product cleanliness, yet complying with the high levels of product hygiene mandated by the FDA means communication network components must often be subjected to environmental extremes. Switches and cabling systems have to withstand the potentially destructive effects of the extreme temperatures and humidity associated with high pressure jet-spray wash-downs – possibly caustic – so common in the industry. The process of sterilization can also be a harsh one for cables and switches.

In addition, components may be exposed to organic acids, as well as other aggressive chemicals. Some have to endure exposure to cooking fats, or possibly the combustible dust found in flour and grain storage and processing areas. Still others may have to withstand antibacterial cleansing solutions and disinfectants, the elevated temperatures of baking areas, and the general assault of corrosion, shock and abrasion. Without a doubt, the environment within a food or beverage processing facility can be harsh.

These environmental challenges can wreak havoc on mission-critical networks tasked with conveying signals between measuring instruments and control devices. Yet, the control networks for pasteurization, cleaning, cooling and refrigeration systems, all essential functional blocks in food and beverage processing, must continue to work reliably – or the cost could include not only downtime but also the delay in shipping perishable foods.



Belden Offers Maximum Uptime and 99.999% Component Reliability

Reliance on Belden's switches, connectivity and cabling products in your facility will help ensure that doesn't happen. Belden's industrial products are designed, manufactured and tested specifically for harsh environments and mission-critical operations. We understand the design issues associated with extreme applications.

Belden's reliable industrial-grade solutions will ensure non-stop operation of PLCs, variable frequency drives, instrumentation, thermocouples, motors, pumps, ovens and conveyors, to name just a few items that may be exposed to harsh conditions on the plant floor. Belden's products provide the network reliability you require. They also ensure uninterrupted operation of your plant security system network, a growing concern today in the food and beverage industry.

And rest assured, Belden switches, connectivity and cabling products are designed to comply with applicable standards of the industry. They're manufactured according to the most stringent statistical process control methods.

Belden can be your key to zero downtime – and peace of mind.

Belden Provides End-to-end Ethernet

Belden also offers high-performance, highly-reliable end-to-end Ethernet systems called *Complete Industrial Solutions*. These systems consist of Ethernet switches and networking devices and connectivity and cabling components

Belden Means Five 9s Reliability, Ensuring Complete Peace of Mind.

for use in process control and data acquisition. And, these products are backed by Belden's Ethernet expertise and extensive array of services related to system design, verification and technical support – in addition to extended product warranties.

Belden is your optimal Ethernet solution.

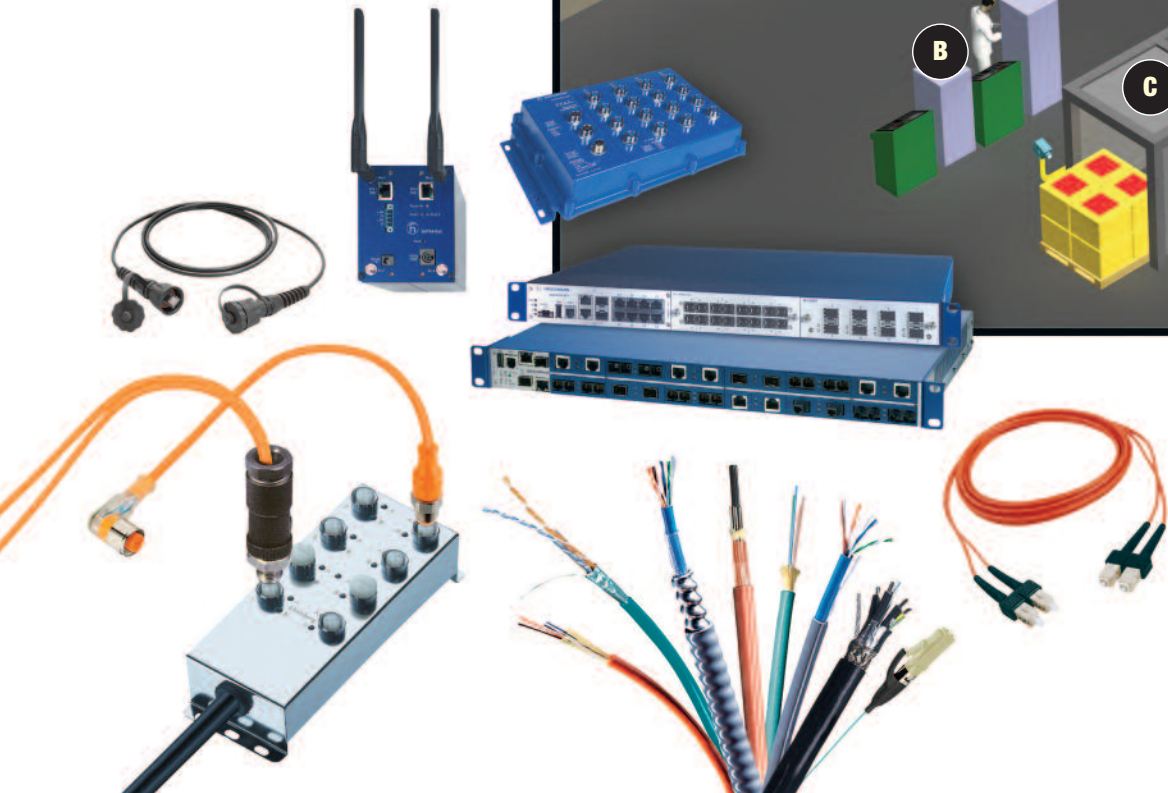
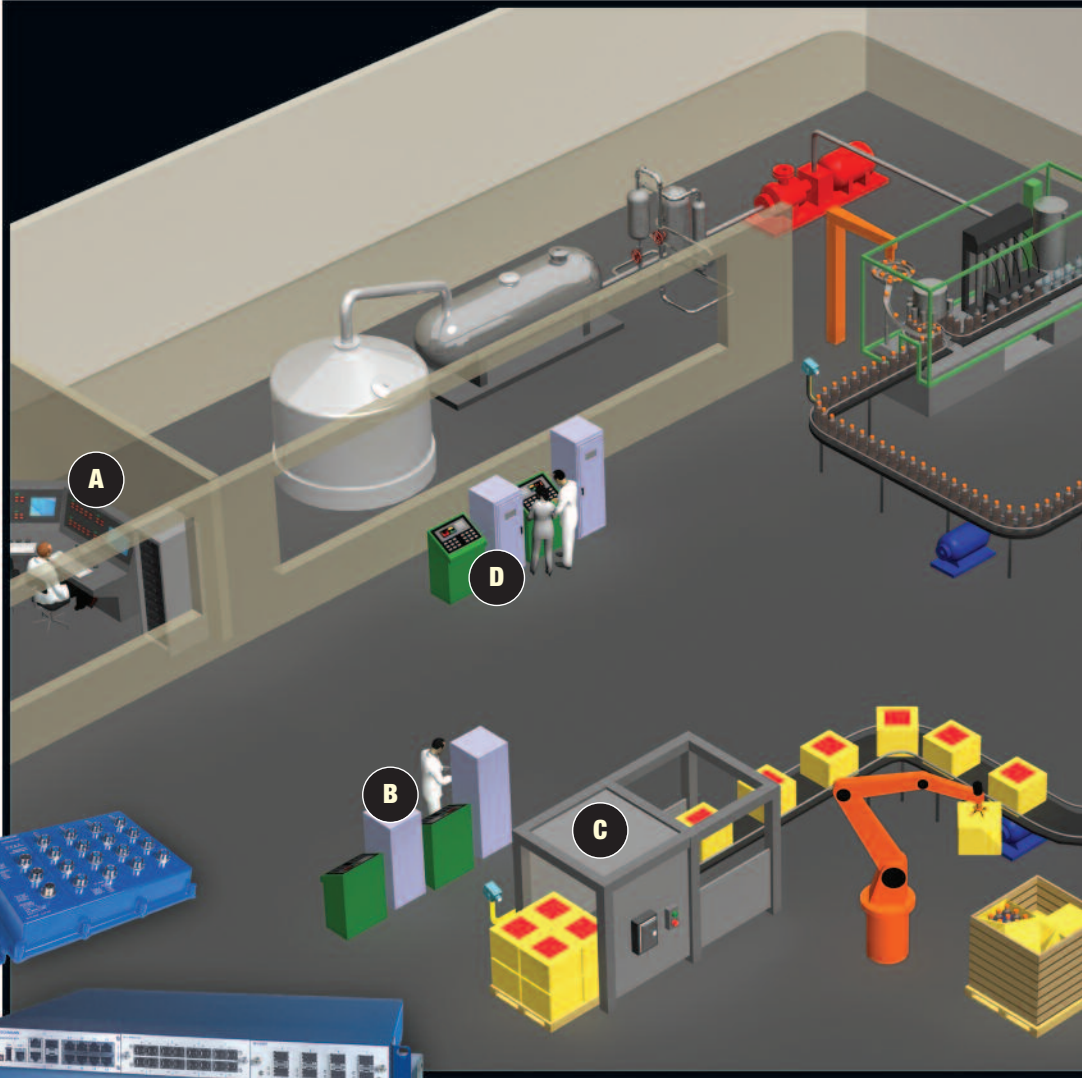
Look to Belden for Your Signal Transmission Needs

For decades, Belden has been the leader in the arena of robust products for control, data, instrumentation and power, products that can serve reliably in mission-critical industrial environments. Food and beverage processing plants need to operate uninterrupted, without downtime and with no sacrifice in the operational cleanliness so critical to manufacturing products for human consumption.

Your goal is consistent and predictable operation, reliable to the 99.999% level. Achieving that goal demands products with a proven reputation for reliability – products from Belden.

**From Product Inception to its Operation Throughout
the Plant Floor, Belden Sends All the Right Signals**

Belden's incomparable products mean zero downtime and maximum peace of mind.





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

A Control Room

Cables: DataTuff® Industrial Ethernet cable and protocol cables, TrayOptic®/FiberExpress® fiber optic cable, IBDN copper LAN cable and lead wire.

Connectivity: DataTuff IP20 Industrial Ethernet cordsets, IBDN copper patch cords and patch panels, FiberExpress fiber patch cords, patch panels, adapter strips and Optimax® field-installable connectors.

Ethernet Switches and Networking Devices: MACH100, MACH1000 and MACH4000 switches, and EAGLE VPN/firewall appliances.

B Packing/Palletizing (Cabinets)

Cables: DataTuff Industrial Ethernet cable and protocol cables and FiberExpress fiber optic cable.

Connectivity: DataTuff IP20 Industrial Ethernet cordsets, FiberExpress linking panel and Optimax field-installable connectors, bulkhead pass-through connectors, panel-mount receptacles and control cabinet interface distribution boxes.

Ethernet Switches and Networking Devices: MICE family switches, OpenRail compact switches, Fieldbus repeaters, FiberExpress connectivity manager, in-cabinet centralized IP20 compact fieldbus stations and BAT IP67 wireless Ethernet devices.

Cables Management: Enclosures

C Packing/Palletizing (Factory Floor)

Cables: DataTuff Industrial Ethernet cable and protocol cables, UL/CSA instrumentation cable, DataTuff Industrial Ethernet Cat 5e continuous flex cable, Belden Infinity® flexible automation cable and UL/CSA power and control cable.

Connectivity: DataTuff IP67 Industrial Ethernet cordsets; field attachable connectors and distribution boxes, splitters and connectors for sensor/actuator applications.

Ethernet Switches and Networking Devices: On-machine IP67 managed and unmanaged Industrial Ethernet switches, centralized modular IP67 Fieldbus systems, e2c 67 decentralized IP67 I/O systems, LioN-Link I/O systems and LioN-M/LioN-S I/O modules.

D PLCs/Controls

Cables: DataTuff Industrial Ethernet cable and protocol cables, UL/CSA instrumentation cable, UL/CSA power and control cable and VFD cable.

Connectivity: DataTuff IP67 Industrial Ethernet cordsets.

Ethernet Switches and Networking Devices: MICE family switches, OpenRail compact switches, Fieldbus repeaters, FiberExpress connectivity manager, in-cabinet centralized IP20 compact fieldbus stations and BAT IP67 wireless Ethernet devices.

E Production Line Equipment (Filling/Capping/Labeling)

Cables: DataTuff Industrial Ethernet cable and protocol cables, UL/CSA instrumentation cable and UL/CSA power and control cable

Connectivity: On-machine IP 67/68/69K distribution boxes, splitters, cordsets and connectors with stainless steel hardware, PVC cable and inserts for sensor/actuator applications, field attachable connectors, UL/CSA DIN valve connectors and UL/CSA power connectors.

Ethernet Switches and Networking Devices: OCTOPUS control level switches, OpenRail compact switches and BAT IP67 wireless Ethernet devices.

F Production Line Equipment (Cabinets)

Cables: DataTuff Industrial Ethernet cable and protocol cables and FiberExpress fiber optic cables.

Connectivity: DataTuff IP20 Industrial Ethernet cordsets, FiberExpress linking panel and Optimax field-installable connectors, bulkhead pass-through connectors, panel-mount receptacles and control cabinet interface distribution boxes.

Ethernet Switches and Networking Devices: MICE family switches, OpenRail compact switches, Fieldbus repeaters, FiberExpress connectivity manager, in-cabinet centralized IP20 compact Fieldbus stations and BAT IP67 wireless Ethernet devices.

G Conveyor System

Cables: VFD cable, Industrial Ethernet Cat 5e continuous flex cable and UL/CSA instrumentation cable.

Connectivity: MicroFX connectors, field attachable connectors and on-machine IP 67/68/69K distribution boxes, splitters, cordsets and connectors with or without stainless steel hardware, PVC cable and inserts for sensor/actuator applications.

Ethernet Switches and Networking Devices: On-machine OCTOPUS control level switches, LioN-S I/O modules and BAT IP67 wireless Ethernet devices.

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

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

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 the industry for ruggedness and reliability. Key product families for the food and beverage arena are:

MACH100, MACH1000 and MACH4000 Switches for Backbone Applications

- Modular workgroup switches (MACH100), modular rack-mount switches for control room (MACH4000) and extreme environmental and high temperature applications (Über-Rugged™ MACH1000)

OpenRail Compact and Modular DIN Rail Mounted Ethernet Switches for Backbone and Control-level Applications

- Broad line of hardened managed switches (also available as unmanaged)
- Modular MS series has up to 28 ports, the Compact RS up to 26 ports (in a 4.5" footprint)
- Thousands of copper/fiber media connection configurations options - even hot-swap using the MS modular switches
- RSR Über-Rugged compact DIN rail switches for extreme environmental applications (-40°C to +85°C)

Spider Family and RS Series of Unmanaged Field-Level Switches

- Unmanaged, yet feature-rich DIN rail mount field-level switches

OCTOPUS Family of IP67 Switches

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

BAT Wireless Access Points/Clients

- Complete line of DIN rail mount and IP67 802.11 a/b/g/n 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

Fiber Optic Repeaters

- Extends the range of fieldbus signals beyond the limitations of copper

Network Management Software

- System software to map, commission, manage and maintain the network

Outstanding Media Performance

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

TrayOptic®/FiberExpress® Optical Fiber Cables

- Heavy duty TrayOptic Indoor/Outdoor loose tube, laser-optimized cables in single-mode or multimode constructions
- Tight-buffered single-mode or multimode fiber cable

FiberExpress Optical Fiber Connectivity Components

- Single-mode and multimode patch cords
- Rack-mount and wall-mount patch panels
- Single-mode and multimode Universal or Ultra adapter strips
- Optimax® field-installable connectors for a fast, secure and reliable LC, SC or ST Compatible optical fiber termination (single-mode or multimode)
- Breakout kits (single-mode and multimode)
- Pigtails (single-mode)
- Connectivity manager
- Linking panel (FiberExpress bar)

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

- Unshielded and shielded Bonded-Pair and Nonbonded-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
- Category 5e shielded twisted pair continuous flex cable (tested to 10 million flex cycles)



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 FOUNDATION Fieldbus

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

Encoder and Signal Cables

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

RS-485/EIA-485 Cables

- Shielded, twisted pair, PLTC cables: 28 AWG, 25-pair, stranded

PROFIBUS Cables

- 150-ohm twinax (twisted pair) cables for PROFIBUS DP applications
- 18 AWG stranded tinned copper conductor cable for PROFIBUS PA applications

Instrumentation and Control Cables

- Hundreds of UL/CSA cables for every conceivable device/control application
- 300V power-limited tray cables; also available PLTC-ER cables with Exposed Run rating
- 600V tray cables; also available TC-ER cables with Exposed Run rating

VFD Cables

- 1000V UL flexible motor supply cables in gauge sizes from 16-4/0
- 600V Interlocked Aluminum or Steel Interlocked Armor versions

Belden Infinity® Flexible Cables

- Control, data, video and power cables designed for rigorous speeds and continuous motion

Lead Wire

- EPDM, high-temperature hook up/lead wire (UL AWM Styles 3340 and 3374)

Thermocouple Cable and Wire

- Unshielded- and shielded-pair thermocouple extension cables
- Unshielded, high temperature FEP thermocouple wire

Specialty Cable and Wire

- High-temperature, chemical- and oil-resistant cable for custom applications

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

LAN Cabling Systems

- FiberExpress fiber optic end-to-end systems; IBDN copper end-to-end systems; enclosures and racks

Durable Connectivity Components

The Lumberg Automation™ connectivity line rounds out the Belden media and switch offering and includes:

Cordsets

- Mini (7/8", 1" and 1-1/8"), Micro (M12) and Pico (M8) single- and double-ended overmolded cordsets with various configurations; 2-19 poles

Receptacles

- Mini (7/8", 1" and 1-1/8"), Micro (M12) and Pico (M8) female and male front panel-mount receptacles with various thread sizes

Actuator/Sensor Connectors

- M8, M12, 7/8" and M23 (IP69K) connectors; chemical and oil resistant, vibration and shock resistant

Power Connectors

- Vibration safe with max voltage of 400V, max current of 16A

Field Attachable Connectors

- Mini (7/8", 1" and 1-1/8"), Micro (M12), M23 and Pico (M8) female and male field attachable connectors used to modify cable runs with integrated quick disconnect connectors

Distribution/Junction Boxes

- Mini (7/8", 1" and 1-1/8"), Micro (M12) and Pico (M8) distribution boxes with various configurations; 4-, 6-, 8-, 10-, or 12-ports, one or two signals per port

Rectangular DIN Valve Connectors

- Form types A, B and C

I/O Systems and Modules

- Centralized e2c 20 in-cabinet (IP20) or e2c 67 (IP67) enclosure-less modular/compact fieldbus systems for DeviceNet and Profibus-DP applications
- Decentralized I/O fieldbus modules (LioN-Link, LioN-M, LioN-S) and associated overmolded cordsets, receptacles, and field attachable connectors for DeviceNet, CANopen, Profibus, and AS-Interface applications

MicroFX Connectors with Integrated Fiber Optic Connections

- Switches, cordsets and field attachables, cable plugs and adaptors.

These Belden products have been designed, tested, proven and warranted to work together and they can be trusted to provide outstanding performance at every level/segment of the food and beverage industry. What's more, Belden provides the four key service and support areas that are critical to your success: *Network design, training, technical support and system performance.*

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

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