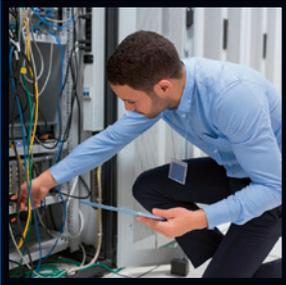# BELDEN

SENDING ALL THE RIGHT SIGNALS

DataTuff® Industrial Ethernet Solutions

Be certain.
Belden.

The Best Fit for Your Industrial Ethernet Application – from the Cabinet to the Machine

Be Certain. Belden Understands Industrial Ethernet.

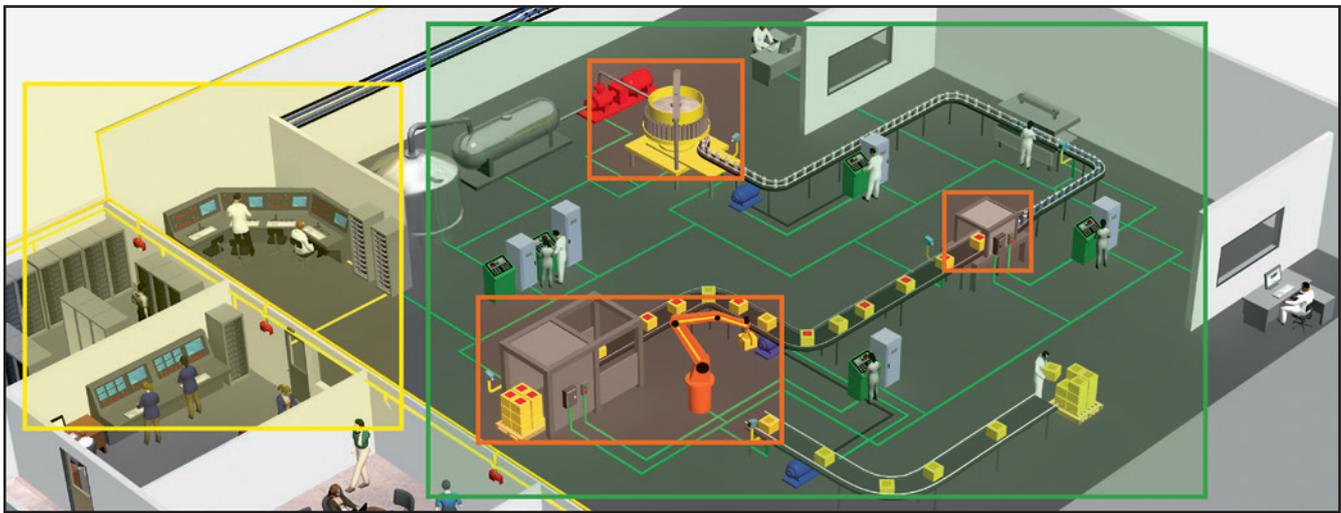Optimize your costs by guiding you to the best and most suitable technology for your needs.

The Belden product portfolio covers all areas of the industrial environment, from the cabinet, through the telecommunications room to the factory floor, and ending on the actual machine. The comprehensive DataTuff® Industrial Ethernet cable and connectivity range ensures the highest level of reliability, quality and performance. Specifiers can choose from products suitable for indoor and outdoor applications, for use underground, and for other harsh conditions. Cordsets come with RJ45 and IP20 protection.

The cabling meets all data rate requirements, ranging from 100 Mb/s, through 1 Gb/s, to 10 Gb/s.

How to Select the Right Industrial Ethernet Cable
DataTuff® Industrial Ethernet Cable Selector

Step1: Type of Application

First step is to identify the application of the cable, by understanding where are the cables needed, as of the picture below:

◻ Cabinet/Control Room and Permanent Installation   ◻ Factory Floor and Moderate Flexing   ◻ On-Machine and Continuous Flexing

Permanent Installation range is suitable for cabinets, control rooms and telecommunication rooms: enclosed environments, where vibration is limited. In these applications, a solid conductor is the right choice, future-proofed with high bandwidth capability.

Moderate Flexing range is aimed at the factory floor and work areas where there are raised levels of vibration, and cables are likely to be exposed to oil, chemicals, rough handling, abrasion, UV radiation, temperature variations, and electronic noise (EMI and RFI).

Continuous Flexing range is for use on the machine itself, where vibration and temperatures are high to very high, and the need is for highly flexible cabling resistant to trailing and torsion, as well as a high level of connectivity protection against liquids.

Step 2: Data Rates Requirements

Data Rates	Up to 100 Mb/s	Up to 1 Gb/s	Up to 10 Gb/s
Channel Class ISO/IEC 11801	Class D	Class D	Class E
Belden Recommended Cable Category	**Cat 5e (2 pr)**	**Cat 5e (4 pr)**	**Cat 7**
Belden Recommended Patch Cord Category	**Cat 5e (2 pr)**	**Cat 5e (4 pr)**	**Cat 6$_A$**

Step 3: Type of Jacketing

Function	PVC	FRNC[1]	TPE	PUR[1]
Oil Resistance	**	**	***	***
Abrasion Resistance	**	*	***	****
Continuous Flex	**	*	****	****
Specific Attributes	General purpose, good mechanical strength	Flame retardant, low smoke when burned	Excellent for flexing applications and very good resistance to oils and coolants	Outstanding resistance to abrasion, high flex and high tolerance to solvents
Cost of Installation	$	$$	$$$	$$$
Type of Application	**Permanent Installation** / **Moderate Flexing**	**Permanent Installation** / **Moderate Flexing**	**Continuous Flexing**	**Moderate Flexing** / **Continuous Flexing**

Legend: * = Fair, ** = Good, *** = Excellent, **** = Outstanding

[1] The FRNC and PUR jackets are also LSNH

Step 4: Unshielded vs Shielded

Function	Unshielded Cables	Shielded Cables
Protection in noisy environment (with high EMI)	Lower	Higher
Ease of Installation	Higher	Lower
Cost of Installation	Lower	Higher

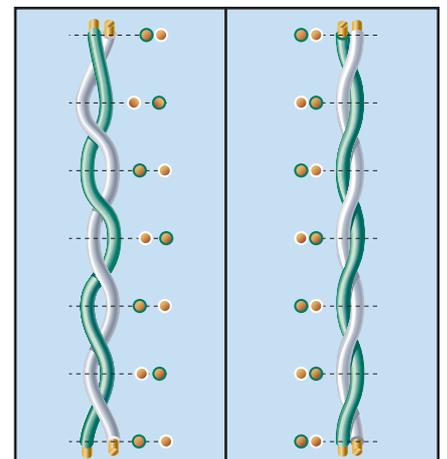## Step 5: Bonded vs Twisted Pair (Nonbonded-Pair)

Belden's Patented Bonded-Pair Technology:

- No gaps between the conductor pairs means that the conductor-to-conductor spacing, or centricity, is always uniform
- With a uniform centricity, the cable offers excellent and consistently reliable electrical performance
- Installable Performance® is achieved – the affixing of the insulation of the cable pairs and the uniform centricity translate to superior electrical performance, even after the cable has been subjected to the bending, pulling and twists inherent in the installation process

Function	Bonded-Pair	Twisted Pair (Nonbonded-Pair)
Performance after bending, pulling and twists inherent in the installation process	Higher	Lower
Electrical Stability	Higher	Lower

Twisted Pair (Nonbonded-Pair)   Bonded-Pair

Permanent Installation

Product Image	Data Rates	Cat-egory	Conductor (Stranding)		No. of Pairs	Jacket				Shielding		Design		Part. No.
			Solid	Stranded		PVC	FRNC	TPE	PUR	Shielded	Unshielded	Twisted Pair	Bonded Pair	
INDUSTRIAL ETHERNET														
	100 Mb/s	Cat 5e	AWG 24 (1)	–	2	✓	–	–	–	Foil Braid >80%	–	✓	–	**72001E**
						–	✓	–	–	Foil Braid >80%	–	✓	–	**72001NH**
	100 Mb/s	Cat 5e	AWG 24 (1)	–	2	✓	–	–	–	–	✓	–	✓	**7932A** *EtherNet/IP*
	1 Gb/s	Cat 5e	AWG 24 (1)	–	4	✓	–	–	–	Foil Braid >80%	–	✓	–	**74001E**
						–	✓	–	–	Foil Braid >80%	–	✓	–	**74001NH**
	1 Gb/s	Cat 5e	AWG 24 (1)	–	4	✓	–	–	–	–	✓	–	✓	**7923A** *EtherNet/IP*
						–	✓	–	–	–	✓	–	✓	**7935A** *EtherNet/IP*
	1 Gb/s	Cat 5e	AWG 24 (1)	–	4	✓	–	–	–	✓	–	–	✓	**7929A**
	10 Gb/s	Cat 7	AWG 23 (1)	–	4	✓	–	–	–	Foil Braid >65%	–	✓	–	**74004E**
						–	✓	–	–	Foil Braid >65%	–	✓	–	**74004NH**
PROFINET														
	100 Mb/s	Cat 5e	AWG 22 (1)	–	Quad	✓	–	–	–	Foil Braid >85%	–	✓	–	**70006E**
						–	✓	–	–	Foil Braid >85%	–	✓	–	**70006NH**

Moderate Flexing

Product Image	Data Rates	Category	Conductor (Stranding)		No. of Pairs	Jacket				Shielding		Design		Part No.
			Solid	Stranded		PVC	FRNC	TPE	PUR	Shielded	Unshielded	Twisted Pair	Bonded Pair	
INDUSTRIAL ETHERNET														
	100 Mb/s	Cat 5e	–	AWG 26 (7)	2	✓	–	–	–	Foil Braid >80%	–	✓	–	**72002E**
						–	✓	–	–	Foil Braid >80%	–	✓	–	**72002NH**
						–	–	–	✓	Foil Braid >80%	–	✓	–	**72002PU**
	1 Gb/s	Cat 5e	–	AWG 26 (7)	4	✓	–	–	–	Foil Braid >80%	–	✓	–	**74002E**
						–	✓	–	–	Foil Braid >80%	–	✓	–	**74002NH**
						–	–	–	✓	Foil Braid >80%	–	✓	–	**74002PU**
	1 Gb/s	Cat 5e	–	AWG 24 (7)	4	✓	–	–	–	–	✓	–	✓	**7924A**
	10 Gb/s	Cat 7	–	AWG 26 (7)	4	–	–	–	✓	Foil Braid >65%	–	✓	–	**74005PU**
PROFINET														
	100 Mb/s	Cat 5e	–	AWG 22 (7)	Quad	✓	–	–	–	Foil Braid >85%	–	✓	–	**70007E**
						–	✓	–	–	Foil Braid >85%	–	✓	–	**70007NH**
						–	–	–	✓	Foil Braid >85%	–	✓	–	**70007PU**

Continuous Flexing

Product Image	Data Rates	Category	Conductor (Stranding)		No. of Pairs	Jacket				Shielding		Design		Part No.
			Solid	Stranded		PVC	FRNC	TPE	PUR	Shielded	Unshielded	Twisted Pair	Bonded Pair	
INDUSTRIAL ETHERNET														
	1 Gb/s	Cat 5e	–	AWG 24 (32) Trailing[1]	4	–	–	✓	–	Foil Braid >85%	–	–	✓	**7938A**
	1 Gb/s	Cat 5e	–	AWG 26 (19) Trailing[2]	4	–	–	–	✓	Foil Braid >80%	–	✓	–	**74003PU**
				AWG 26 (19) Torsion[2]	4	–	–	–	✓	Foil Braid >80%	–	✓	–	**74009PU**
PROFINET														
	100 Mb/s	Cat 5e	–	AWG 22 (19) Trailing[2]	Quad	–	–	–	✓	Foil Braid >85%	–	✓	–	**70008PU**
				AWG 22 (19) Torsion[2]	Quad	–	–	–	✓	Foil Braid >85%	–	✓	–	**70009PU**

1 = 10 million cycles
2 = > than 2 million cycles

How to Select the Right Industrial Ethernet Connectivity
DataTuff® Industrial Ethernet Connectivity Selector

After specification of the related Ethernet Protocol, the selection of a suitable patch cord
is the same as for the Bulk cable (Step 1-5).

Type of Connector

DataTuff® RJ45

Type of Protection

For safety, electrical equipment must be protected from any external interference. This is
ensured by enclosures which protect the electrical equipment from contact with dangerous
parts and prevent ingress of solid foreign objects, dust, humidity and water.

Ingress Protection Class	IP20
Solid Protection	Protection against contact with the fingers and solid foreign bodies with Ø>12mm
Liquid Protection	No protection against water

Length Selection Table for CAxxx* Patch Cords

1 m	3 m	5 m	10 m	25 m
.00C01	.00C03	.00C05	.00C10	.00C25

Example: for Belden DataTuff® Industrial Ethernet CA00600 patch cord, 25 m, the part number is: **CA00600.00C25**

Permanent Installation

Data Rates	Patch Cord Category	Conductor (Stranding)		No. of Pairs	Jacket				Shielding		Design		Connectivity				Part. No.
		Solid	Stranded		PVC	FRNC	TPE	PUR	Shielded	Unshielded	Twisted Pair	Bonded Pair	Plug End 1	Protection End 1	Plug End 2	Protection End 2	
INDUSTRIAL ETHERNET																	
100 Mb/s	Cat 5e	AWG 24 (1)	–	2	✓	–	–	–	Foil Braid >80%	–	✓	–	RJ45	IP20	RJ45	IP20	CA00641
					–	✓	–	–	Foil Braid >80%	–	✓	–	RJ45	IP20	RJ45	IP20	CA00642
1 Gb/s	Cat 5e	AWG 24 (1)	–	4	✓	–	–	–	Foil Braid >80%	–	✓	–	RJ45	IP20	RJ45	IP20	CA00600
					✓	–	–	–	–	✓	–	✓	RJ45	IP20	RJ45	IP20	E501001*
					✓	–	–	✓	–	–	–	✓	RJ45	IP20	RJ45	IP20	E505001*
					–	✓	–	–	Foil Braid >80%	–	✓	–	RJ45	IP20	RJ45	IP20	CA00643
10 Gb/s	Cat 6$_A$	–	AWG 26 (7)	4	✓	–	–	–	Foil Braid >65%	–	✓	–	RJ45	IP20	RJ45	IP20	CA00664
					–	✓	–	–	Foil Braid >65%	–	✓	–	RJ45	IP20	RJ45	IP20	CA00665
PROFINET																	
100 Mb/s	Cat 5e	AWG 22 (1)	–	Quad	✓	–	–	–	Foil Braid >85%	–	✓	–	RJ45	IP20	RJ45	IP20	CA00656
					–	✓	–	–	Foil Braid >85%	–	✓	–	RJ45	IP20	RJ45	IP20	CA00658

*Version in 1 m length. For different length options please contact Customer Service.

Moderate Flexing

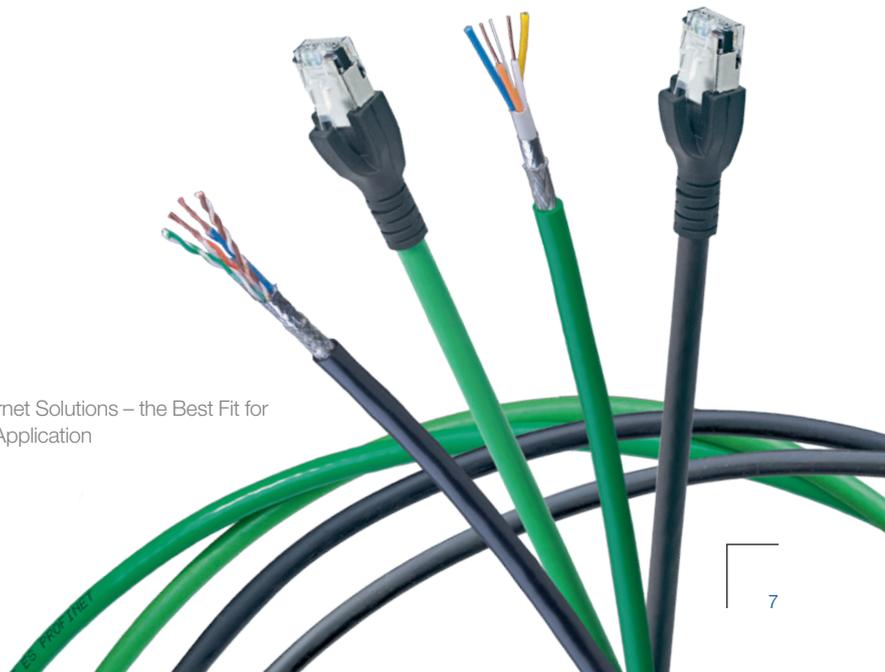| Data Rates	Patch Cord Category	Conductor (Stranding)		No. of Pairs	Jacket				Shielding		Design		Connectivity				Part. No.
		Solid	Stranded		PVC	FRNC	TPE	PUR	Shielded	Unshielded	Twisted Pair	Bonded Pair	Plug End 1	Protection End 1	Plug End 2	Protection End 2	
INDUSTRIAL ETHERNET																	
100 Mb/s	Cat 5e	–	AWG 26 (7)	2	✓	–	–	–	Foil Braid >80%	–	✓	–	RJ45	IP20	RJ45	IP20	**CA00660**
100 Mb/s	Cat 5e	–	AWG 26 (7)	2	–	✓	–	–	Foil Braid >80%	–	✓	–	RJ45	IP20	RJ45	IP20	**CA00661**
100 Mb/s	Cat 5e	–	AWG 24 (7)	2	–	–	✓	–	Foil Braid >65%	–	–	✓	RJ45	IP20	RJ45	IP20	**900 002 884***
1 Gb/s	Cat 5e	–	AWG 26 (7)	4	✓	–	–	–	Foil Braid >80%	–	✓	–	RJ45	IP20	RJ45	IP20	**CA00613**
1 Gb/s	Cat 5e	–	AWG 24 (7)	4	✓	–	–	–	–	✓	–	✓	RJ45	IP20	RJ45	IP20	**900 001 898***
1 Gb/s	Cat 5e	–	AWG 24 (7)	4	✓	–	–	–	✓	–	–	✓	RJ45	IP20	RJ45	IP20	**E507001***
1 Gb/s	Cat 5e	–	AWG 26 (7)	4	–	✓	–	–	Foil Braid >80%	–	✓	–	RJ45	IP20	RJ45	IP20	**CA00630**
10 Gb/s	Cat 6$_A$	–	AWG 26 (7)	4	–	–	–	✓	Foil Braid >65%	–	✓	–	RJ45	IP20	RJ45	IP20	**CA00652**
PROFINET																	
100 Mb/s	Cat 5e	–	AWG 22 (7)	Quad	✓	–	–	–	Foil Braid >85%	–	✓	–	RJ45	IP20	RJ45	IP20	**CA00730**
100 Mb/s	Cat 5e	–	AWG 22 (7)	Quad	–	✓	–	–	Foil Braid >85%	–	✓	–	RJ45	IP20	RJ45	IP20	**CA00735**

*Version in 1 m length. For different length options please contact Customer Service.

R301602

DataTuff® Industrial Ethernet Ruggedized RJ45 Plug Kit – suitable for use in IP20 unsealed installations

DataTuff® Industrial Ethernet Solutions – the Best Fit for your Industrial Ethernet Application

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