

Belden IndustrialTuff® Cables

Introduction

Tough Cables for Tough Environments

Today, more than ever, manufacturing productivity depends upon seamless data communication and automation systems. And both depend upon high-performance cabling solutions.

Depend on Belden

Belden has developed the world's most comprehensive line of industrial cabling solutions for applications like yours: whether you are networking your factory floor or your process equipment and devices to their controllers...and on to the control room, or relaying data between the control room, the engineering department, and remote manufacturing sites—or, all of the above. From your petrochemical, automotive manufacturing, pharmaceutical, power generation, pulp and paper, metals, food and beverage, or general manufacturing plant to your corporate headquarters—and everywhere in between—Belden has your cabling solution.

Most importantly you can have the peace-of-mind that is inherent with the use of Belden products since all Belden cables are manufactured in ISO 9001:2000 certified facilities to the industry's highest standards of quality, using the most advanced equipment, systems, controls and processes available.

Belden cables give you the performance you need day after dependable day.

Innovative Technology

Bonded-Pair™ Cable

Many DataTuff® Industrial Ethernet cables feature Belden's patented bonded-pair technology. Bonded-pairs provide *Installable Performance*®—superior electrical performance even after the stresses of installation. Bonded-pairs exhibit the most robust and reliable electrical performance in the industry.

Shielding

Effective cable shielding for protection from noise interference remains critical with evolving industrial technology. Belden's shielding designs and testing methods ensure signal integrity and a dependable cable in the presence of electrical noise.

Belden's exclusive patented Beldfoil® design, with its aluminum/polyester foil, was the first shield to offer 100 percent cable protection against radiated emission and ingress at audio and radio frequencies.

Armoring

Belden's innovative armoring technology delivers maximum physical protection in harsh environments. Additional benefits include reduced cost of conduit, easier installation and re-routing, plus additional shielding.

Belden has the capability to protect data, electronic, instrumentation and control cables with interlocking steel or aluminum armor as well as continuous corrugated aluminum armor. Smooth or corrugated protective metal tapes are also available.

Insulation and Jacket

Belden formulates many of its own insulation and jacket compounds. As a result, they provide superior performance under a variety of hostile environmental conditions. See "Technical Information" on pages 125–126 for further details.

Intrinsically Safe Wiring

In accordance with NEC Article 504, intrinsically safe cables are colored blue for easy identification. Belden offers several industrial cables in intrinsically safe blue to meet your requirements for intrinsically safe wiring. Contact the NEC and/or your local inspector for specific guidelines.

Custom Capabilities

Most of our industrial cables are available from stock. Many of these are available off the shelf from distributors. If you have a new or unusual application or you cannot find an Industrial cable in this catalog section that meets your technical requirements, contact Technical Support at 1-800-BELDEN-1.

Overall Jacket

Prefix	Material
1	PVC
3	CPE
4	TPE
5	HDPE
6	Oil Res. II
7	Haloarrest® (LSZH)

Armor

Prefix	Material
2	Aluminum Interlock
3	Steel Interlock
4	Aluminum Belclad®
5	Steel Belclad
6	Copper Belclad
8	Continuous Armor

Example: 343016 is cable part no. 3016 with CPE outer jacket and aluminum Belclad armoring.

UL Instrumentation Cable

300V Power-Limited Tray Cables

18 AWG Pairs

- UL PLTC, ITC
- Sunlight Res
- Oil Res

- NEC: CMG
- CEC: CMG FT4
- IEEE 1202/383
- ICEA T-29-520

Part No.	Pairs	Color Code	Pull Tension (Max)	Bend Radius (Min)		OD (Nom)		Jacket Thickness	
			Lbs	Inch	mm	Inch	mm	Inch	mm

18 AWG • Unshielded

Stranded (19 x 30) TC Conductors • PVC Insulation • PVC Jacket									
9409	1	E2	19	2.25	57.15	.230	5.84	.037	.94

18 AWG • Overall Beldfoil® Shielding

Stranded (19 x 30) TC Conductors • PVC Insulation • PVC Jacket									
9318	1	E2	60	2.25	57.15	.233	5.92	.037	.94
9552	2	E2	65	3.70	93.98	.368	9.34	.042	1.07
9553	3	E2	145	4.10	104.14	.411	10.44		
9554	4	E2	187	4.50	114.30	.447	11.35		
9556	6	E2	270	5.00	127.00	.497	12.62	.053	1.35
9559	9	E2	395	5.80	147.32	.579	14.71		
9563	11	E2	478	6.75	171.45	.665	16.89		
9565	15	E2	640	7.50	190.50	.739	18.77	.063	1.60

18 AWG • Individually Beldfoil Shielded Pairs

Stranded (19 x 30) TC Conductors • PVC Insulation • PVC Jacket									
9368	2	E2	125	3.75	95.25	.378	9.60	.042	1.07
9369	3	E2	220	4.25	107.95	.423	10.74		
3029A	4	E1	296	4.50	114.30	.461	11.71		
9388	4	E2	296	4.60	116.84	.461	11.71	.053	1.35
9389	6	E2	440	5.25	133.35	.538	13.67		
9390	9	E2	666	6.50	165.10	.652	16.56		
9391	11	E2	815	7.25	184.15	.729	18.52	.064	1.63
9392	15	E2	1100	8.00	203.20	.808	20.52		

TC = Tinned Copper • PVC = Polyvinyl Chloride

Belden Color Code Charts

Color Code Chart E1
ICEA S-73-532

Cond. No.	Base Color	Tracer	Tracer
1	Black	—	—
2	White	—	—
3	Red	—	—
4	Green	—	—
5	Orange	—	—
6	Blue	—	—
7	White	Black	—
8	Red	Black	—
9	Green	Black	—
10	Orange	Black	—
11	Blue	Black	—
12	Black	White	—
13	Red	White	—

Cond. No.	Base Color	Tracer	Tracer
14	Green	White	—
15	Blue	White	—
16	Black	Red	—
17	White	Red	—
18	Orange	Red	—
19	Blue	Red	—
20	Red	Green	—
21	Orange	Green	—
22	Black	White	Red
23	White	Black	Red
24	Red	Black	White
25	Green	Black	White
26	Orange	Black	White

Cond. No.	Base Color	Tracer	Tracer
27	Blue	Black	White
28	Black	Red	Green
29	White	Red	Green
30	Red	Black	Green
31	Green	Black	Orange
32	Orange	Black	Green
33	Blue	White	Orange
34	Black	White	Orange
35	White	Red	Orange
36	Orange	White	Blue
37	White	Red	Blue
38	Black	White	Green
39	White	Black	Green

Cond. No.	Base Color	Tracer	Tracer
40	Red	White	Green
41	Green	White	Blue
42	Orange	Red	Green
43	Blue	Red	Green
44	Black	White	Blue
45	White	Black	Blue
46	Red	White	Blue
47	Green	Orange	Red
48	Orange	Red	Blue
49	Blue	Red	Orange
50	Black	Orange	Red

Pair cables are Black, White, and Numbered.
Triad cables are Black, White, Red, and Numbered.

Color Code Chart
E2 ICEA S-73-532

Cond. No.	Base Color	Tracer
1	Black	—
2	Red	—
3	Blue	—
4	Orange	—
5	Yellow	—
6	Brown	—
7	Red	Black
8	Blue	Black
9	Orange	Black
10	Yellow	Black

Cond. No.	Base Color	Tracer
11	Brown	Black
12	Black	Red
13	Blue	Red
14	Orange	Red
15	Yellow	Red
16	Brown	Red
17	Black	Blue
18	Red	Blue
19	Orange	Blue
20	Yellow	Blue

Cond. No.	Base Color	Tracer
21	Brown	Blue
22	Black	Orange
23	Red	Orange
24	Blue	Orange
25	Yellow	Orange
26	Brown	Orange
27	Black	Yellow
28	Red	Yellow
29	Blue	Yellow
30	Orange	Yellow

Cond. No.	Base Color	Tracer
31	Brown	Yellow
32	Black	Brown
33	Red	Brown
34	Blue	Brown
35	Orange	Brown
36	Yellow	Brown

Pair cables are Black, Red, and Numbered.
Triad cables are Black, Red, Blue and Numbered.
Colors repeat after 36 conductors.
There are no Green or White conductors or stripes.

Color Code Chart M4
ICEA Method 4: All Conductors Black and Numbered ICEA S-73-532

Cond. No.	Conductor Printing
1	"1-ONE-1"
2	"2-TWO-2"
3	"3-THREE-3"
4	"4-FOUR-4"
5	"5-FIVE-5"
6	"6-SIX-6"
7	"7-SEVEN-7"
8	"8-EIGHT-8"
9	"9-NINE-9"
10	"10-TEN-10"
11	"11-ELEVEN-11"
12	"12-TWELVE-12"
13	"13-THRITEN-13"

Cond. No.	Conductor Printing
14	"14-FOURTEEN-14"
15	"15-FIFTEEN-15"
16	"16-SIXTEEN-16"
17	"17-SEVENTEEN-17"
18	"18-EIGHTEEN-18"
19	"19-NINETEEN-19"
20	"20-TWENTY-20"
21	"21-TWENTY-ONE-21"
22	"22-TWENTY-TWO-22"
23	"23-TWENTY-THREE-23"
24	"24-TWENTY-FOUR-24"
25	"25-TWENTY-FIVE-25"
26	"26-TWENTY-SIX-26"

Cond. No.	Conductor Printing
27	"27-TWENTY-SEVEN-27"
28	"28-TWENTY-EIGHT-28"
29	"29-TWENTY-NINE-29"
30	"30-THIRTY-30"
31	"31-THIRTY-ONE-31"
32	"32-THIRTY-TWO-32"
33	"33-THRITY-THREE-33"
34	"34-THIRTY-FOUR-34"
35	"35-THIRTY-FIVE-35"
36	"36-THIRTY-SIX-36"
37	"37-THIRTY-SEVEN-37"
38	"38-THIRTY-EIGHT-38"
39	"39-THIRTY-NINE-39"

Cond. No.	Conductor Printing
40	"40-FORTY-40"
41	"41-FORTY-ONE-41"
42	"42-FORTY-TWO-42"
43	"43-FORTY-THREE-43"
44	"44-FORTY-FOUR-44"
45	"45-FORTY-FIVE-45"
46	"46-FORTY-SIX-46"
47	"47-FORTY-SEVEN-47"
48	"48-FORTY-EIGHT-48"
49	"49-FORTY-NINE-49"
50	"50-FIFTY-50"