

## UL Control Cable

### 600V Type TC Cables — Overview

#### Introduction

Belden offers a wide selection of UL-rated 600V Tray Cable for a variety of control applications.

Multi-conductor versions are available as standards from 18 to 1 AWG. 1/0 through 4/0 are also available as custom made constructions. These are unshielded and shielded versions that come with various insulation and jacket combinations.

These TC cables are installed in cable trays, ducts and conduit and can be used in direct burial applications. They are extensively used in manufacturing facilities, especially in the process industries such as petrochemical, steel, pulp and paper, cement and mining.

These flexible, space efficient cables can be substantially more economical than traditional wiring methods.

#### Construction

Soft annealed bare or tinned copper conductors, with various insulation and jacketing options as seen in chart below.

#### Application

These cables are suitable for installation in wet or dry locations. Cable jackets are resistant to sunlight, moisture and vapor penetration. The cables can be used in raceways (supported by messenger wire), outdoor applications and direct burial applications.

#### Unshielded

Cabled non-shielded conductors provide a minimal O.D. allowing greater tray and conduit fill. Non-shielded control cable may be utilized when recommended by the equipment manufacturer and used in a metallic conduit.

#### Overall Shield

Recommended for use in control applications where signals are transmitted in excess of 100 millivolts, except in areas where high voltage and current sources create excessive noise interference. The Beldfoil® shield with drain wire provides 100% coverage for maximum shield effectiveness. Copper tape shield available upon request.

Only 2-conductor round constructions can be shielded. Flat constructions cannot be shielded.

#### Tray Cable Construction Options

UL Listed for MC and TC				
Insulation/Jacket	Max. Temp Rating		Flame Tests	Ratings*
	Wet	Dry		
PVC-Nylon/PVC (THHN or THWN) 14 AWG & larger	75°C	90°C	UL 1685 FT4/IEEE 1202/383 ICEA T-29-520	ICEA S-73-532 ICEA S-95-658 ICEA S-61-402
PVC-Nylon/PVC (TFN or TFFN) 16 & 18 AWG	NA	90°C	UL 1685 FT4/IEEE 1202/383 ICEA T-29-520	ICEA S-73-532 ICEA S-95-658 ICEA S-61-402
XLPE/PVC or CPE (XHHW-2) 14 AWG & larger	90°C	90°C	UL 1685 FT4/IEEE 1202/383 VW-1 rated singles ICEA T-29-520	ICEA S-73-532 ICEA S-95-658 ICEA S-66-524
XLPE/PVC or CPE (RFH-2) 16 & 18 AWG	75°C	75°C	UL 1685 FT4/IEEE 1202/383 VW-1 rated singles ICEA T-29-520	ICEA S-73-532 ICEA S-95-658 ICEA S-66-524
FRPO/PVC 18 AWG & larger	—	75°C	UL 1685	
TPE/TPE	75°C	90°C	UL 1685	
FRPO/PVC	75°C	90°C	UL 1685	
XLPE/Haloarrest® (XHHW-2) 14 AWG & larger	90°C	90°C	UL 1685 FT4/IEEE 1202/383 ICEA T-29-520	TC-LS
XLPE/Haloarrest (RFH-2) 16 & 18 AWG	75°C	75°C	UL 1685 FT4/IEEE 1202/383 ICEA T-29-520	TC-LS
FEP/PVC	90°C	90°C	UL 1685	

CPE = Chlorinated Polyethylene • FEP = Fluorinated Ethylene-propylene • FRPO = Flame-retardant Polyolefin • PVC = Polyvinyl Chloride • TPE = Thermoplastic Elastomer • XLPE = Cross-linked Polyethylene

\*Applicable to TC-rated cables only.

#### Ground Wire

- Non-insulated, bare copper ground wires are included for constructions 8 through 1 AWG. Non-insulated, bare copper, full sized ground wires may be requested on other constructions.
- All shielded PVC-Nylon/PVC constructions include full sized ground (drain) wires.

#### Color Code

Multi-conductor control cables (10 AWG to 18 AWG) are printed alpha-numerically in addition to being color coded per ICEA Table E2.

8 AWG and larger are black and numbered per ICEA Method 4.

Refer to Technical Information Section for ICEA color code charts.

#### Specifications

- UL Subject 1277 Type TC
- XLPE/Haloarrest jacketed cables are UL 1277 TC-LS rated
- UL Subject 1424 (per outline for NPLF requirements dated May 3, 1979)
- UL 1685 (UL 1581) Vertical Flame Test comparable to IEEE 383-1974 (70,000 BTU/hr) Flame Test

- Approved for cable tray use in Class 1, Division 2 areas, per NEC Articles 340, 318 and 501, and for Class 1 circuits as permitted in Article 725
- PVC-Nylon/PVC, XLPE/PVC and XLPE/CPE constructed cables meet IEEE 1202/IEEE 383-2003/FT4 (70,000 BTU/hr) Flame Test

#### TC-ER Rated Cables

As an option, Belden offers all PVC-nylon/PVC, XLPE/PVC and XLPE/CPE jacketed tray cables with a TC-ER (Exposed Run) rating, formerly referred to as Open Wiring.

Per NEC Article 336, a TC-ER rated cable may be installed in an industrial establishment between a cable tray and the utilization equipment or device. A TC-ER rated cable must meet the crush and impact requirements of UL Type MC cable. By eliminating the need for metal conduit and/or armor, using a TC-ER rated cable results in savings in both installation and maintenance.

Standard lengths may be subject to tolerance. Custom lengths may be available upon request. Contact the Belden Electronics Division Customer Service Department for additional information. 1-800-BELDEN-1

**UL Control Cable**

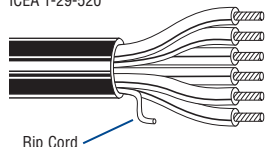
600V Type TC Cables

Industrial Grade Sunlight- and Oil-Resistant Jackets

Description	Part No.	No. of Cond.	Color Code	Standard Lengths		Weight		Jacket Thickness		Nominal OD		Maximum Pull Tension		Minimum Bend Radius	
				Ft.	m	Lbs./1000'	kg/km	Inch	mm	Inch	mm	Lbs.	N	Inch	mm

**18 AWG Multi-conductor** Stranded (7x26) Bare Copper Conductors**PVC/Nylon Insulation and PVC Jacket Constructions** (See chart below for other options)

NEC: TC, NPLF  
FT4/IEEE 1202/383  
ICEA S-73-532  
ICEA S-95-658  
ICEA S-61-402  
ICEA T-29-520

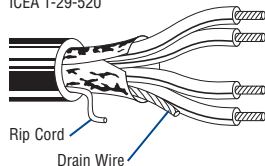


Rip Cord

<b>27916A</b> <sup>†</sup>	2	E2	Bulk	Bulk	33.0	49.1	.045	1.14	.180 x .266	4.57 x 6.76	44	195.8	2.7	68.58
<b>27325A</b> <sup>††</sup>	2	E2	Bulk	Bulk	34.0	50.6	.045	1.14	.270	6.86	44	195.8	2.7	68.58
<b>27334A</b>	3	E2	Bulk	Bulk	45.0	67.0	.045	1.14	.280	7.11	66	293.7	2.8	71.12
<b>27326A</b>	4	E2	Bulk	Bulk	52.0	77.4	.045	1.14	.310	7.87	88	391.6	3.1	78.74
<b>27335A</b>	5	E2	Bulk	Bulk	62.0	92.3	.045	1.14	.330	8.38	110	489.5	3.3	83.82
<b>27600A</b>	6	E2	Bulk	Bulk	72.0	107.2	.045	1.14	.350	8.89	132	587.4	3.5	88.90
<b>27327A</b>	7	E2	Bulk	Bulk	79.0	117.6	.045	1.14	.350	8.89	154	685.3	3.5	88.90
<b>27601A</b>	8	E2	Bulk	Bulk	89.0	132.5	.045	1.14	.390	9.83	176	783.2	3.8	96.52
<b>27336A</b>	9	E2	Bulk	Bulk	104.0	154.8	.045	1.14	.410	10.41	198	881.1	4.1	104.14
<b>27328A</b>	10	E2	Bulk	Bulk	111.0	165.2	.060	1.52	.450	11.43	220	979.0	4.5	114.30
<b>27602A</b>	11	E2	Bulk	Bulk	—	—	.060	1.52	.450	11.43	242	1076.9	4.5	114.30
<b>27329A</b>	12	E2	Bulk	Bulk	127.0	189.0	.060	1.52	.450	11.43	264	1174.8	4.5	114.30
<b>27603A</b>	13	E2	Bulk	Bulk	142.0	211.3	.060	1.52	.470	11.94	286	1272.7	4.7	119.38
<b>27604A</b>	14	E2	Bulk	Bulk	—	—	.060	1.52	.480	12.19	308	1370.6	4.8	121.92
<b>27605A</b>	15	E2	Bulk	Bulk	175.0	260.4	.060	1.52	.510	12.95	330	1468.5	5.1	129.54
<b>27606A</b>	16	E2	Bulk	Bulk	167.0	248.5	.060	1.52	.500	12.70	352	1566.4	5.0	127.00
<b>27607A</b>	17	E2	Bulk	Bulk	—	—	.060	1.52	.570	14.48	374	1664.3	5.7	144.78
<b>27608A</b>	18	E2	Bulk	Bulk	196.0	291.7	.060	1.52	.570	14.48	396	1762.2	5.7	144.78
<b>27609A</b>	19	E2	Bulk	Bulk	202.0	300.6	.060	1.52	.570	14.48	418	1860.1	5.7	144.78
<b>27610A</b>	20	E2	Bulk	Bulk	214.0	318.5	.060	1.52	.600	15.24	440	1958.0	5.9	149.86
<b>27611A</b>	25	E2	Bulk	Bulk	258.0	384.0	.060	1.52	.660	16.76	550	2447.5	6.6	167.64
<b>27612A</b>	30	E2	Bulk	Bulk	300.0	446.5	.060	1.52	.690	17.53	660	2937.0	6.6	167.64
<b>27613A</b>	37	E2	Bulk	Bulk	360.0	535.8	.080	2.03	.740	18.80	814	3622.3	7.4	187.96
<b>27614A</b>	50	E2	Bulk	Bulk	511.0	760.5	.080	2.03	.910	23.11	1100	4895.0	9.1	231.14
<b>27632A</b>	60	E2	Bulk	Bulk	627.0	933.1	.080	2.03	.960	24.38	1320	5874.0	9.6	243.84

**18 AWG Multi-conductor** Stranded (7x26) Bare Copper Conductors • Overall Beldfoil® Shield (100% Coverage) with Drain Wire**PVC/Nylon Insulation and PVC Jacket Constructions** (See chart below for other options)

NEC: TC, NPLF  
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ICEA S-73-532  
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ICEA S-61-402  
ICEA T-29-520



Rip Cord

Drain Wire

<b>27325AS</b>	2	E2	Bulk	Bulk	34.0	50.6	.045	1.14	.270	6.86	67	298	2.70	68.58
<b>27334AS</b>	3	E2	Bulk	Bulk	45.0	67.0	.045	1.14	.280	7.11	90	400	2.80	71.12
<b>27326AS</b>	4	E2	Bulk	Bulk	60.0	89.3	.045	1.14	.300	7.62	112	498	3.10	81.28

E2 = Refer to Technical Information section for color code.

<sup>†</sup> Flat construction; overall shield not available.<sup>††</sup> Twisted Conductors.

Bulk = 5000 ft. or 10,000 ft. put-up one piece, ±10%. Check length available for specific construction.

**Conductor, Insulation and Jacket Options**

To Specify:		
<b>12345</b>	<b>A</b>	<b>S</b>
Start with core Part No.	add Conductor, Insulation, Jacket type	add "S" for optional Beldfoil Shield

Note: To specify TC-ER (Exposed Run) rated control cable, simply replace the second digit of the part number from a Z to an 8.  
For example: 2Z080A with TC-ER rating becomes 28080A.

Bare	Tinned	Insulation/Jacket
<b>A</b>	<b>B</b>	PVC-Nylon/PVC
<b>C</b>	<b>D</b>	XLPE/PVC
<b>E</b>	<b>F</b>	FRPO/PVC
<b>G</b>	<b>H</b>	XLPE/TPE
<b>K</b>	<b>L</b>	TPE/TPE
<b>M</b>	<b>N</b>	PVC-Nylon/Oil Res II
<b>Q</b>	<b>R</b>	XLPE/CPE
<b>S</b>	<b>T</b>	XLPE/Haloarrest®