

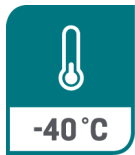
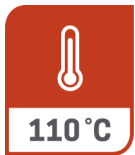


Rail

Multi-Conductor Control Cables

LSZH, XLPO, 600V, 110°C, Shielded & Un-Shielded for Rail Transit Applications

- EXTRAD® Irradiation Crosslinked LSZH XLPO Insulation and Jacket
- Wide Temperature Range, -40°C to 110°C
- Excellent Mechanical Properties
- Moisture and sunlight resistant
- Conformance to Applicable European and North American Rail Transit Standards
- Excellent fluid / oil resistance
- Halogen Free
- Available in AWG or metric conductors

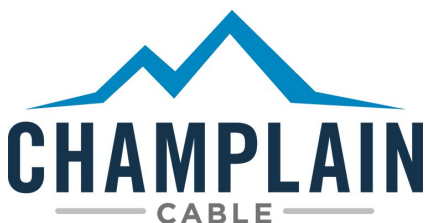


CABLE CONSTRUCTION:

- Conductor:** Flexible TC stranding, AWG or mm²
- Insulation:** EXTRAD irradiation cross-linked modified polyolefin
- Circuit ID:** Printed on each primary wire or colored/striped.
- Fillers:** Solid or fibrillated to provide a well-rounded cable
- Cable:** Components twisted <= 4in/10cm lay
- Binder:** Polyester tape, helically wrapped with overlap
- Shield:** Foil shield / tinned copper Braid (optional)
- Sheath:** LSZH irradiation cross-linked modified polyolefin
- Print:** As required. Includes part number, date of mfr., traceability



Custom designs available. Pairs, Triads, Mixed sizes, CANBUS, Ethernet, Specialty Data, Custom shielding, Additional components. Consult factory for details.





Rail

Multi-Conductor Control Cables

CONFORMANCE TO PERFORMANCE STANDARDS:

NFPA 130 - Standard for Fixed Guideway Transit and Passenger Rail Systems - 2017

Chapter 8 - Vehicles

Section 8.6.7.1 - Wiring, Electrical Insulation

Section 8.6.7.1.1.1

FT4/IEEE1202 - Flame Testing of Cables for use in Cable Tray - 2012

ANSI/UL 1685 - for total smoke released and peak smoke release rate



PR EN45545-2 - Requirements for fire behavior of materials and components on Railway Vehicles

Table 5, Requirement Set R15 (EL1A)

Test Method Reference T09.03 - Height of Charred Zone

EN 50305 - Railway applications - Railway rolling stock cables having special fire performance - Test methods

Section 9.1.1 Test for cable diameters between 6mm to 12mm ($6\text{mm} < D < 12\text{mm}$)

EN 60332-3-25 - Test for vertical flame spread of vertically mounted bunched wires and cables

Section 9.1.2 Test for cable diameters less than or equal to 6mm ($D \leq 6\text{mm}$)

EN 60332-3-25 - with variations described in EN50305 section 6.1.2 and Table 4. Test

Method Reference T13

EN 61034-2 - Measurement of smoke density of cables burning under defined conditions, Test Procedure and Requirements

Test Method Reference T15

EN 50305 - Railway applications - Railway rolling stock cables having special fire performance - Test methods

Section 9.2.3 and 9.2.4, Toxicity Index (ITC)

EN 50264—Railway Rolling Stock Power and Control Cables having Special Fire Performance

NFPA-502 2017 - Standard for Road Tunnels, Bridges, and Other Limited Access Highways - 2017 Edition

Chapter 12 - Electrical Systems

Section 12.2.1.4

MIL-DTL-24643 Section 4.8.23 - Acid Gas Equivalent $\leq 2\%$

MIL-DTL-24643C- Low Smoke Halogen-Free Cables for Shipboard Use

Section 3.3 - Materials

Section 4.8.24 - Halogen content - all components $< 0.2\%$

Section 4.8.23 - Acid Gas Equivalent $\leq 2\%$

Section 4.8.28 - Toxicity Index

Section 4.8.26 - Smoke Index

NES 711 - Determination of Smoke Index of Products of Combustion from Small Specimens of Material

NES 713 - Determination of Toxicity Index of Products of Combustion from Small Specimens of Material

ASTM D470-13 - Section 13, Immersion Testing

NYCT specifications TSC Dec 2009, Table 3-20 and TC rev7, Table 3-23

Lubricating oil MIL-L-23699, Hydraulic Fluid MIL-H-5606, Gasoline, Water



Rail

Multi-Conductor Control Cables

Product Number	No. of Cond.	Size (TC)		Strand	Conductor Diameter (nom)		Insulated Conductor Diameter (nom)		Cable Diameter (nom)		Net Weight		OPTIONAL Shield (s)		Shielded Net Weight	
		AWG	mm ²		in	mm	in	mm	lb/1000ft	kg/100m	in	mm	lb/1000ft	kg/100m		
EXRAD-CCR-2C24(s)	2	24	0.25	7/32	0.024	0.61	0.046	1.17	0.134	3.4	10.4	1.6	0.167	4.3	2.1	3.2
EXRAD-CCR-3C24	3	24	0.25	7/32	0.024	0.61	0.046	1.17	0.150	3.8	12.1	1.8	0.175	4.5	2.0	3.0
EXRAD-CCR-4C24	4	24	0.25	7/32	0.024	0.61	0.046	1.17	0.161	4.1	14.4	2.2	0.189	4.8	1.8	2.7
EXRAD-CCR-5C24	5	24	0.25	7/32	0.024	0.61	0.046	1.17	0.177	4.5	17.8	2.7	0.205	5.2	2.2	3.3
EXRAD-CCR-6C24	6	24	0.25	7/32	0.024	0.61	0.046	1.17	0.197	5.0	20.8	3.1	0.224	5.7	2.6	3.9
EXRAD-CCR-7C24	7	24	0.25	7/32	0.024	0.61	0.046	1.17	0.209	5.3	26.2	3.9	0.236	6.0	3.3	4.9
EXRAD-CCR-12C24	12	24	0.25	7/32	0.024	0.61	0.046	1.17	0.256	6.5	41.6	6.2	0.283	7.2	5.2	7.8
EXRAD-CCR-25C24	25	24	0.25	7/32	0.024	0.61	0.046	1.17	0.354	9.0	86.6	12.9	0.390	9.9	10.8	16.1
EXRAD-CCR-2C22	2	22	0.35	19/34	0.030	0.76	0.052	1.32	0.156	4	14.6	2.2	0.185	4.7	1.8	2.7
EXRAD-CCR-3C22	3	22	0.35	19/34	0.030	0.76	0.052	1.32	0.165	4.2	16.9	2.5	0.193	4.9	2.1	3.2
EXRAD-CCR-4C22	4	22	0.35	19/34	0.030	0.76	0.052	1.32	0.181	4.6	20.2	3.0	0.207	5.3	2.5	3.8
EXRAD-CCR-5C22	5	22	0.35	19/34	0.030	0.76	0.052	1.32	0.197	5.0	24.9	3.7	0.224	5.7	3.1	4.6
EXRAD-CCR-6C22	6	22	0.35	19/34	0.030	0.76	0.052	1.32	0.217	5.5	29.1	4.3	0.244	6.2	3.6	5.4
EXRAD-CCR-7C22	7	22	0.35	19/34	0.030	0.76	0.052	1.32	0.232	5.9	36.7	5.5	0.260	6.6	4.6	6.8
EXRAD-CCR-12C22	12	22	0.35	19/34	0.030	0.76	0.052	1.32	0.283	7.2	58.2	8.7	0.311	7.9	7.3	10.9
EXRAD-CCR-25C22	25	22	0.35	19/34	0.030	0.76	0.052	1.32	0.378	9.6	121.3	18.1	0.413	10.5	15.2	22.6
EXRAD-CCR-2C20	2	20	0.50	19/32	0.038	0.96	0.056	1.42	0.173	4.4	20.8	3.1	0.189	4.8	2.6	3.9
EXRAD-CCR-3C20	3	20	0.50	19/32	0.038	0.96	0.056	1.42	0.181	4.6	24.1	3.6	0.209	5.3	3.0	4.5
EXRAD-CCR-4C20	4	20	0.50	19/32	0.038	0.96	0.056	1.42	0.197	5.0	28.8	4.3	0.213	5.4	3.6	5.4
EXRAD-CCR-5C20	5	20	0.50	19/32	0.038	0.96	0.056	1.42	0.217	5.5	35.5	5.3	0.244	6.2	4.4	6.6
EXRAD-CCR-6C20	6	20	0.50	19/32	0.038	0.96	0.056	1.42	0.236	6.0	41.6	6.2	0.256	6.5	5.2	7.8
EXRAD-CCR-7C20	7	20	0.50	19/32	0.038	0.96	0.056	1.42	0.256	6.5	52.4	7.8	0.283	7.2	6.6	9.8
EXRAD-CCR-12C20	12	20	0.50	19/32	0.038	0.96	0.056	1.42	0.299	7.6	83.1	12	0.319	8.1	10.4	15.5
EXRAD-CCR-25C20	25	20	0.50	19/32	0.038	0.96	0.056	1.42	0.413	11	173.2	25.8	0.445	11.3	21.7	32.3



All dimensions and weights are nominal and subject to variation within industry best-practice.



Rail

Multi-Conductor Control Cables

Product Number	No. of Cond.	Size (TC)		Strand	Conductor Diameter		Insulated Conductor Diameter		Cable Diameter		Net Weight		OPTIONAL Shield (s) Diameter		Shielded Net Weight	
		AWG	mm ²		in	mm	in	mm	lb/1000ft	kg/100m	in	mm	lb/1000ft	kg/100m		
EXRAD-CCR-2C18(s)	2	18	1.0	19/30	0.050	1.26	0.070	1.77	0.201	5.1	30.2	4.5	0.220	5.6	3.8	5.6
EXRAD-CCR-3C18	3	18	1.0	19/30	0.050	1.26	0.070	1.77	0.213	5.4	37.5	5.6	0.236	6.0	4.7	7.0
EXRAD-CCR-4C18	4	18	1.0	19/30	0.050	1.26	0.070	1.77	0.228	5.8	42.9	6.4	0.256	6.5	5.4	8.0
EXRAD-CCR-5C18	5	18	1.0	19/30	0.050	1.26	0.070	1.77	0.262	6.7	57.0	8.5	0.276	7.0	7.1	10.6
EXRAD-CCR-6C18	6	18	1.0	19/30	0.050	1.26	0.070	1.77	0.287	7.3	65.7	9.8	0.307	7.8	8.2	12.3
EXRAD-CCR-7C18	7	18	1.0	19/30	0.050	1.26	0.070	1.77	0.315	8.0	70.4	11	0.335	8.5	8.8	13.1
EXRAD-CCR-12C18	12	18	1.0	19/30	0.050	1.26	0.070	1.77	0.358	9.1	115.1	17.2	0.390	9.9	14.4	21.5
EXRAD-CCR-25C18	25	18	1.0	19/30	0.050	1.26	0.070	1.77	0.504	12.8	217.3	32	0.531	13.5	27.2	40.5
EXRAD-CCR-2C16	2	16	1.5	19/29	0.056	1.42	0.085	2.17	0.236	6.0	42.2	6.3	0.256	6.5	5.3	7.9
EXRAD-CCR-3C16	3	16	1.5	19/29	0.056	1.42	0.085	2.17	0.248	6.3	51.0	7.6	0.268	6.8	6.4	9.5
EXRAD-CCR-4C16	4	16	1.5	19/29	0.056	1.42	0.085	2.17	0.272	6.9	63.0	9.4	0.291	7.4	7.9	11.8
EXRAD-CCR-5C16	5	16	1.5	19/29	0.056	1.42	0.085	2.17	0.307	7.8	77.8	12	0.327	8.3	9.7	14.5
EXRAD-CCC-6C16	6	16	1.5	19/29	0.056	1.42	0.085	2.17	0.333	8.5	94.5	14	0.354	9.0	11.8	17.6
EXRAD-CCR-7C16	7	16	1.5	19/29	0.056	1.42	0.085	2.17	0.358	9.1	110.6	17	0.394	10.0	13.8	20.6
EXRAD-CCR-12C16	12	16	1.5	19/29	0.056	1.42	0.085	2.17	0.437	11	173.8	25.9	0.476	12.1	21.7	32.4
EXRAD-CCR-25C16	25	16	1.5	19/29	0.056	1.42	0.085	2.17	0.610	16	348.3	51.9	0.650	16.5	43.5	64.9
EXRAD-CCR-2C14	2	14	2.5	41/30	0.071	1.80	0.108	2.75	0.287	7.3	65.7	9.8	0.307	7.8	8.2	12.3
EXRAD-CCR-3C14	3	14	2.5	41/30	0.071	1.80	0.108	2.75	0.307	7.8	81.8	12	0.323	8.2	10.2	15.3
EXRAD-CCR-4C14	4	14	2.5	41/30	0.071	1.80	0.108	2.75	0.343	8.7	101.9	15	0.358	9.1	12.7	19.0
EXRAD-CCR-5C14	5	14	2.5	41/30	0.071	1.80	0.108	2.75	0.370	9.4	121.4	18	0.406	10.3	15.2	22.6
EXRAD-CCR-6C14	6	14	2.5	41/30	0.071	1.80	0.108	2.75	0.417	11	149.5	22	0.449	11.4	18.7	27.9
EXRAD-CCR-7C14	7	14	2.5	41/30	0.071	1.80	0.108	2.75	0.453	12	168.8	25.2	0.492	12.5	21.1	31.5
EXRAD-CCR-12C14	12	14	2.5	41/30	0.071	1.80	0.108	2.75	0.531	14	299.1	45	0.571	14.5	37.4	55.8
EXRAD-CCR-25C14	25	14	2.5	41/30	0.071	1.80	0.108	2.75	0.748	19.0	623.0	92.9	0.787	20.0	77.9	116