



X-Olene® - Okoseal® Shielded VFD



UL Type TC-ER (XHHW-2) and cUL Type CIC-TC* 600/1000V VFD Power and Control Tray Cable

Three Copper Conductors, 90°C Wet or Dry

With Three Symmetrical Grounding Conductors and One Copper Shield Tape

For Cable Tray Use - Sunlight Resistant - For Direct Burial

*cUL CIC-TC-ER sizes 1-4/0 AWG



- A Bare, Stranded Copper Conductors
- B X-Olene Insulation
- C Bare, Stranded Copper Grounding Conductors
- D Fillers, as necessary
- E Binder Tape
- F Copper Tape Shield
- G Black Okoseal Jacket

Insulation

X-Olene® is Okonite's trade name for its cross-linked polyethylene, with high dielectric strength insulation.

Assembly and Coverings

The three insulated conductors with three bare grounding conductors located in the outer interstices are cabled together per UL 1277 with fillers as needed and a binder tape overall. A 5 mil bare copper tape is helically wrapped over the cabled assembly with a 25% overlap. Extruded over the tape shield is a sunlight-resistant, flame retardant, black Okoseal® (PVC) jacket which has excellent resistance to acids and most chemicals and is rated for low temperature applications.

Applications

X-Olene shielded Type TC-ER cables are used to supply power to motors from variable frequency drives, where an economical design is desired. These cables can also be used for other power, lighting, control or signal circuits; indoors or outdoors; in cable trays, raceways, direct burial, or where supported by messenger wire; for Class 1 circuits as permitted in Article 725 of the NEC; and in cable trays in Class I, Division 2 hazardous locations in industrial establishments where the conditions of maintenance and supervision assure that only qualified persons will service the installation. Cables marked TC-ER may also be used between a cable tray and the utilization equipment or device, when installed in accordance with NEC 336.10(7).

Specifications

Conductors: Uncoated soft copper per ASTM B-3. Sizes smaller than 8 AWG are compressed-stranded per ASTM B-8. Sizes 8 AWG and larger are compact stranded per ASTM B-496.

Insulation: X-Olene per ICEA S-95-658/ NEMA WC70 and UL 44, Listed UL Type XHHW-2.

Conductor Identification: Sizes 14, 12 and 10 AWG color-coded insulation per ICEA S-73-532/NEMA WC57 Method 1, Table E-2 color sequence. Sizes 8 AWG and larger black insulation with surface printing of numbers and colors per ICEA S-73-532/NEMA WC57 Method 3, Table E-2.

Grounding Conductor(s): Three bare soft copper per ASTM B-3. Sizes 10 AWG and smaller are compact stranded per ASTM B-8, and sizes 8 AWG and larger are compact stranded per ASTM B-496. Meets or exceeds requirements of NEC Table 250.122.

Shield: A 5 mil bare copper tape is helically applied with 25% minimum overlap.

Jacket: The Okoseal (PVC) compound meets and exceeds the requirements of UL 1277 as tested in accordance with UL 1581.

Product Features

- Insulated conductors are UL Listed Type XHH/XHHW-2.
- 90°C continuous rating in wet and dry locations.
- 130°C emergency overload rating.
- 250°C short circuit rating.
- Three symmetrical grounding conductors and a helically applied copper tape provide a relatively low resistance return path, adequate for VFD and other modern AC drive/motor applications.
- Type TC-ER VFD cables are quality control inspected to meet or exceed applicable industry standards.
- Thermal stability at elevated temperatures.
- Mechanically rugged.
- High dielectric strength.
- Small diameter, lightweight.
- Minimum installation temperature of -40°C.

Applicable Standards

- UL Listed per Standard 1277 as Type TC-ER cable per E60422.
- UL Listed for cable tray use, direct burial and sunlight resistant.
- Vertical Tray Flame Tests: IEEE 383-1974, Sizes 2 AWG and larger also pass FT4/IEEE 1202.
- CSA C22.2 No. 239 Type CIC (Control and Instrumentation Cable) for sizes 4/0 AWG and smaller.
- CSA C22.2 No. 230 Type TC-ER for sizes 1-4/0 AWG.
- CSA C22.2 No. 230 Type TC for sizes smaller than 1 AWG.

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Product Data Section 4: Sheet 30

Catalog Number	Conductor Size AWG / kcmil	Insulation Thickness - mils	Grounding Conductor(s) AWG	Jacket Thickness - mils	Jacket Thickness - mm	Approx. O.D. - Inches	Approx. O.D. - mm	Approx. Cross-Sectional Area (sq. in.)†	Approx. Net Weight lbs./1000'	Approx. Ship Weight lbs./1000'	90°C Wet or Dry NEC Ampacity (1)*	75°C Wet NEC Ampacity (1)*
202-31-6414	14(7X)	30	3#18	45	1.14	0.411	10.44	0.13	128	151	15	15
202-31-6412	12(7X)	30	3#16	45	1.14	0.450	11.43	0.16	170	193	20	20
202-31-6410	10(7X)	30	3#14	45	1.14	0.501	12.73	0.20	239	262	30	30
112-31-6408	8(7X)	45	3#14	60	1.52	0.648	16.46	0.33	353	392	55	50
112-31-6406	6(7X)	45	3#12	60	1.52	0.726	18.44	0.41	496	535	75	65
112-31-6404	4(7X)	45	3#12	60	1.52	0.821	20.85	0.53	676	740	95	85
112-31-6402	2(7X)	45	3#10	80	2.03	0.984	24.99	0.76	1017	1081	130	115
112-31-6401	1(19X)	55	3#10	80	2.03	1.106	28.09	0.96	1253	1333	145	130
112-31-6410	1/0(19X)	55	3#10	80	2.03	1.186	30.12	1.10	1476	1565	170	150
112-31-6412	2/0(19X)	55	3#10	80	2.03	1.274	32.36	1.27	1776	1892	195	175
112-31-6414	4/0(19X)	55	3#8	80	2.03	1.490	37.85	—	2669	2812	260	230
112-31-6420	250(37X)	65	3#8	80	2.03	1.637	41.58	—	3065	3242	290	255
112-31-6425	350(37X)	65	3#7	110	2.79	1.900	48.26	—	4308	4574	350	310
112-31-6430	500(37X)	65	3#6	110	2.79	2.153	54.69	—	5906	6296	430	380
112-31-6440	750(61X)	80	3#5	110	2.79	2.578	65.48	—	8530	9157	535	475
112-31-6450	1000(61X)	80	3#4	140	3.56	2.968	75.39	—	11367	12129	615	545

Okonite's web site, www.okonite.com contains the most up to date information.

† Cross-sectional area for calculation of cable tray fill in accordance with NEC Section 392.22.

(1) Ampacities

Ampacities are based on Table 310.16 of the National Electrical Code for XHHW-2 conductors rated 90°C, in a multi-conductor cable, at an ambient temperature of 30°C (86°F). The ampacities shown also apply to cables installed in cable tray in accordance with NEC Section 392.80.

*Current limited to 15, 20 and 30 amps per Section 240.4(D) of the NEC for #14, #12 and #10 AWG, respectively.