

A large industrial refinery or chemical plant at sunset. The sky is a mix of orange, pink, and purple. The facility is filled with tall distillation columns, complex piping, and scaffolding, all illuminated by numerous lights. A prominent red and white striped chimney is visible on the right side.

15 kV Medium Voltage Armoured Cables

September 29, 2020

By: Isaac Müller, P. Eng., Applications Engineer



ATTENTION

AUDIENCE PARTICIPATION

- **Questions can be asked at any time using the chat function on the webinar screen**
- **Any unanswered questions will be followed up through email**
- **This presentation will be emailed to all registrants**

INTRODUCTION

Who is Isaac Müller, P.Eng.?



- Applications Engineer, Nexans Canada Inc.
- Active Canadian Electrical Code Member
- Chair of Section 4 (conductors)
- Vice-Chair of Section 12 (wiring methods)
- Voting member of the Committee on Canadian Electrical Code, Part I, representing wire and cable manufacturing

Nexans is a global leader with a long legacy in Canada



1911

**Started with Canada Wire
in Toronto, ON**

3 Plants

**Montreal, QC, Fergus, ON
& Weyburn, SK**

750+ Products

**Residential, Commercial,
Industrial & Utility**

Nexans is your Armoured Cable Specialist

- Wide variety of armoured cable constructions to meet your residential, commercial and industrial needs
 - 14 AWG to 1000 kcmil
 - Various conductor counts
 - Copper or aluminum conductors
- Aluminum interlocked armour (AIA)
- Continuously welded and corrugated aluminum sheath armour (CORFLEX®)
- Rated 600 V to 15 kV
- Marked HL for hazardous locations
- Marked sunlight resistant (where jacketed) for direct exposure to sunlight





Industry Education

Our Previous Webinars

- **Connected Drums - Nexans Canada's Reel Tracking Solution** – click [here](#) to watch it
- **DriveRx® VFD Cable 2.0** – click [here](#) to watch it
- **CORFLEX®** – click [here](#) to watch it
- **2019 Nexans in Canada** – click [here](#) to watch it
- **2018 Canadian Electrical Code Changes** – click [here](#) to watch it
- **Prior VFD webinar** – click [here](#) to watch it

Services We Offer



- Full technical support for products manufactured
- Electrical and physical cable properties calculations (i.e. impedances, dimensions)
- Conductor ampacity and temperature calculations
- Post installation product support
- Custom engineered solutions to optimize a project from conception to energization
- Overhead line calculations, including conductor ampacity, temperature, impedance, as well as sag and tension

AGENDA



- EPR vs TR-XLPE
- What is FIREX® 15 kV MV Armoured?
- Applications
- Advantages & Limitations
- Why use FIREX® 15 kV MV Armoured?
- Cable Comparisons
- Target Installations
- Summary
- Q&A

EPR vs TR-XLPE

EPR = Ethylene Propylene Rubber

TR-XLPE = Tree Retardant Cross-Linked Polyethylene

Characteristic	TR-XLPE	EPR
Key Characteristic	Very high insulation resistance	Highly flexible, smaller minimum bending radius
Dielectric Strength	High	Good
Dielectric Constant	Low (typically 2.3)	High (typically 2.8 to 3.2)
Mechanical Durability	Very tough – cut resistant	Abrasion resistant
Low-Temperature	Very good down to -40°C	Very good down to -60°C
Flame Spread	Poor	Fair
High Temperature	Good – Typically 90°C	Very good – Typically 105°C
Cost	Generally lower cost than EPR	Generally higher cost than TR-XLPE
Weight	Less than EPR	Greater than TR-XLPE



What is FIREX® 15 kV MV Armoured Cables?

- Single or three conductors with TR-XLPE 105°C crosslinked polyethylene insulation
 - Stocked as 15 kV 133%, 105°C Dry / 90°C Wet, -40°C Installation
 - 5 kV and 8 kV, 100% or 133% available
 - 15 kV 100% available
-
- CSA certified under CSA C68.10, rated 5 kV to 15 kV and are shielded
 - These cables are NOT CSA type TECK90 cables
 - CSA type TECK90 cables are CSA certified under CSA C22.2 No. 131 “Type TECK90 cable”, and are limited to 5 kV
 - CSA C22.2 No. 174 – Hazardous Locations



APPLICATIONS

- Services, feeders and branch circuits
- Indoors or outdoors
- Exposed or concealed
- Cable tray
- Raceway
- Direct burial
- Concrete encasement

A photograph of two business professionals, a man on the left and a woman on the right, both giving a thumbs-up gesture. The man is wearing a dark blue suit jacket, a light blue checkered shirt, and a blue and white striped tie. The woman is wearing a light blue button-down shirt. The background is plain white.

ADVANTAGES

- TR-XLPE is a tough, deformation resistant insulation system, lighter in weight and lower cost than EPR
- Cost effective alternative to unarmoured cable
- Maximum operating temperature of 105 degrees Celsius – optimum use of conductor material

LIMITATIONS

- Larger minimum bending radius for the insulated conductors than EPR alternative
 - Overall cable requires comparable space
 - Requires slightly more space within equipment
- Tools are required to cut the armour → i.e. hacksaw to cut the armour



Why Use FIREX® MV Armoured?

- Decades of proven reliability
 - *Originally developed for mining applications*
- Stocked, cost effective alternative to unarmoured MV cables with EPR
- Suitable for installation and use in:
 - *Hazardous locations – Class I, Division 1 and Class II, Division 1*
 - *Direct buried or concrete encased*
 - *Indoor or outdoor – marked FT4 and Sunlight Resistant*
- Termination and splicing kits are commonly available



Cable Comparison – 3c 500 kcmil (copper) 15 kV

Conductor Size (AWG)	Overall Diameter					Cable Weight				
	FIREX MV Armoured		Airguard MV		Difference	FIREX MV Armoured		Airguard MV		Difference
	in	mm	in	mm		lb/kft	kg/km	lb/kft	kg/km	
2	2.44	62	2.21	56.1	110.41%	2639	3927	3203	4767	82.39%
1	2.51	63.8	2.28	57.9	110.09%	2885	4293	3539	5267	81.52%
1/0	2.59	65.8	2.36	59.9	109.75%	3189	4746	3898	5801	81.81%
2/0	2.68	68.1	2.45	62.2	109.39%	3575	5320	4335	6451	82.47%
3/0	2.78	70.6				4074	6063			
4/0	2.89	73.4	2.73	69.3	105.86%	4627	6886	5726	8521	80.81%
250	3.01	76.5	2.85	72.4	105.61%	5150	7664	6355	9457	81.04%
350	3.29	83.6	3.18	80.8	103.46%	6614	9843	8072	12012	81.94%
500	3.55	90.2	3.44	87.4	103.20%	8377	12466	10149	15103	82.54%
750			3.83	97.3				13556	20173	
1000			4.2	106.7				16912	25168	

CONCLUSION:

FIREX® MV armoured cable is much lighter compared to MV unarmoured cable.

A photograph of a construction site featuring several tall buildings under construction. The buildings are covered in scaffolding and have a blue-tinted facade. Two large yellow tower cranes are visible against a clear blue sky. The text 'TARGET INSTALLATIONS' is overlaid in white with a red underline.

TARGET INSTALLATIONS

- MV installations within buildings → require FT4
- Direct burial (such as service entrance)
- Cost effective alternative to unarmoured cables with EPR
- Hazardous Locations (HL) → Class I, Division 1 and Class II, Division 1

SUMMARY



- **What:** FIREX[®] MV armoured power cables are rated 5 kV to 15 kV and are shielded, using TR-XLPE insulation
- **Where:** Typical applications include within buildings, large service entrance direct buried, in cable tray, or open air
- **Why:** Cost effective alternative to unarmoured MV cables with EPR
- **Cable comparisons:** Much lighter and more cost effective option
- **How:** Various target Installations

Any
Questions

Chat

[type question here]

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Webinar ID: 725-323-619

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