



Medium Voltage XLPE insulation – Silane

- **Description**

ZARLINK™ XL4421 is a cross linkable natural polyethylene compound based on Supercure technology and a one-part Silane cross linkable insulation system, specially designed for insulation applications.

Polyethylene is used to manufacture compounds using the SILOXAN one-component system, a Silane crosslinking system developed by KABELMETAL ELECTRO GmbH. This process utilizes a special system that allows the additives and Silane to be homogeneously compounded with polyethylene pellets. The resulting compound is thermoplastic in nature that can be extruded, using normal extruding equipment and conditions, into the finished product. Curing of the finished product is done in the presence of moisture.

- **Applications**

ZARLINK™ XL4421 is intended for insulation of XLPE medium voltage (MV) AC cables with rated voltages up to 33 kV ($U_m = 36$ kV).

The values are voltages between phases as defined in IEC 60183.

- **Specifications**

ZARLINK™ XL4421 is expected to meet the applicable requirements included in the below mentioned standards provided it is processed using sound material handling, extrusion and crosslinking practices as well as appropriate testing procedures. This applies up to the maximum recommended voltage level indicated in "Applications" section above since some standards cover wider voltage ranges.

IEC 60502-2

VDE 0271 - 0273

BSI 6622

ANSI/ICEA S-108-720

ANSI/ICEA S-93-639

- **Special Features**

ZARLINK™ XL4421 is a ready-to-use natural compound. Thanks to its inherent properties, ZARLINK™ XL4421 provides very good electrical performance. It offers excellent scorch resistance and long production runs. ZARLINK™ XL4421 cleanliness level is assured through the Borealis quality management system.

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- Physical Properties**

Data should not be used for specification work

Property	Typical Value	Test Method
Density (Base Resin)	0.93 gr/cm ³	ISO 1183
Melt Flow Rate (190°C , 2.16 kg)	1~ 2 gr/10 min	ISO 1133
Elongation at Break (250 mm/min)	>300 %	IEC 60811-401
Tensile Strength (250 mm/min)	15 N/mm ²	IEC 60811-401
Hot set test (200°C , 20N/cm ²) Elongation under load	60 %	IEC 60811-507
Permanent Elongation	5%	“
Retention of Tensile strength after aging (240h , 135°C)	>= 25 %	IEC 60811-1-2
Brittleness temperature	< -76 °C	ASTM D 746
Environment stress crack resistance (50°C) Igepal 10%) F20	>96 h	IEC 60811-4-1/B
Hardness , Shore D (1s)	52	ISO 868

- Electrical Properties**

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Property	Typical Value	Test Method
Dielectric Constant (50Hz)	< 2.3	IEC60250
DC Volume Resistivity (23°C)	10 P Ohm.cm	IEC 60093
Dissipation Factor (50 Hz)	< 0.0005	IEC 60250
Dielectric Strength	➤ 22kV/mm	IEC 60243

- Processibility of Compounds**

To produce a good and reliable cable, it is essential to ensure careful and very clean handling of the insulation material. Hence all material handling should preferably be conducted in closed systems and in clean room conditions.

- Crosslinking**

Can be cross-linked by immersion in hot water or exposed to low pressure steam at a temperature of 90°C .It is good practice to purge stranded aluminum conductors with air or nitrogen during crosslinking to prevent conductor corrosion. The time period needed and maximum temperature will depend on e.g. the thickness of insulation, type of semiconductive screen and reel size.



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* Processing conditions and precaution

(1) Extrusion Equipment

- (a) L/D ratio 20/1-26/1. PVC or PE extruders are suitable with 3-3.5 compression ratio.
- (b) For tube extrusion, the recommended Draw Down ratio is <1.5:1.
- (c) Screen mesh: at most 40/60; Stainless steel screen is recommended.
- (d) Cooling water temperature to be > 30°C.

2) Typical temperature Setting °C

Feed	Compression	Metering	Neck	Die Head	Die
150-160	160 – 180	180 – 200	190 – 210	210 – 230	240-280

3) Preheating

- (a) Under normal conditions, preheating is unnecessary.
- (b) Preheating (60°C/1 hrs.) during cold weather may be required to increase line speed.

4) Start Up

- (a) Ensure extruder is thoroughly cleaned.
- (b) The temperature of the exiting material is measured at the mouth of the extruder (180 – 200°C).
- (c) Stop the screw and fix the die onto the extruder.
- (d) Connect the conductor to the capstan.
- (e) Turn on the screw speed and increase it significantly for a few seconds while allowing the material to bleed.
- (f) Slowly turn up the line speed until it reaches desired speed.

DO NOT LEAVE THE MELT IN THE EXTRUDER FOR MORE THAT 20 MINS!

• Packaging

Package: Aluminum bags (25 kg)
Small Bins (550 kg)

• Storage

ZARLNK™ XL4421 has a shelf life of 12 months from delivery date if stored in unopened original packages, under dry and clean conditions at temperatures between 10 - 30 °C.

Before use, material shall be conditioned indoors (production room) to reach ambient temperature. It is also recommended to ensure proper stock rotation by First In – First Out principle.