Polyolefin Polyethylene

Visico™ LE4421/LE4432

Description

Visico LE4421/LE4432 is a silane crosslinkable black compound system designed for insulation of low voltage energy cables and covering/insulation of overhead cables.

Visico LE4421 is a low density polyethylene, copolymerised with vinyl silane. LE4432 is a crosslinking catalyst masterbatch specially designed to be used with Visico base resins. The system crosslinks quickly in sauna or in hot water.

Cable insulation with a proper mixture of Visico LE4421 (90 parts) and LE4432 (10 parts) exhibits excellent thermo-oxidative stability. The combination is suitable for both copper and aluminum conductors. The final product contains nominal 2,5% of fine size carbon black ensuring excellent weatherability.

Applications

Visico LE4421/LE4432 is designed for:

Covering/insulation of overhead cables.

Insulation of low voltage energy cables, range up to 6 kV

Specifications

Visico LE4421/LE4432 in combination meets the applicable requirements as below when processed using sound extrusion and testing procedure:

IEC 60502-1
ICEA S-105

Canadian Standards Association C22.2 No. 38 Cable Type RW-90 Outdoor
ANSI/ICEA S-70-547

The standards referred to above is a selection and is not complete coverage of all applicable standards. Contact your Borealis representative for additional information.

Special Features

Visico LE4421/LE4432 insulation system offers:

Excellent processing properties
Low scorch allowing long runs and more frequent tooling changes
Excellent surface finish

Less smell, more consistent quality (no volatiles)
Good curing speed
No drying prior to extrusion
Excellent storage stability

Physical Properties

Property	Typical Value Data should not be used for specification work	Test Method
Density (Base Resin)	923 kg/m³	ISO 1183-1, Method A
Density (Masterbatch)	1040 kg/m³	ASTM D 792
Melt Flow Rate (190 °C/2,16 kg) [1]	1,0 g/10min	ISO 1133
Tensile Strain at Break (250 mm/min)	> 200 %	IEC 60811-501
Tensile Strength (250 mm/min)	> 15 MPa	IEC 60811-501
Change of Tensile Properties After Ageing (168 h, 121 °C) [2]	<= 20 %	IEC 60811-401
Brittleness temperature	< -76 °C	ASTM D 746

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Environmental Stress Crack Resistance (50 °C, Igepal 10 %, F20)		> 96 h	IEC 60811-406
Hardness, Shore D (1 s)		50	ISO 868
Hot Creep Test (150 °C, 0,20 MPa)	Elongation under load	60 %	ICEA T-28-562
	Permanent deformation	0 %	

[1] Base Resin
[2] These values are based on sufficient crosslinked/cured Visico. If Visico is not sufficiently crosslinked the material will continue to crosslink during the ageing procedure and a larger change between values before and after ageing may occur.

Electrical Properties

Property	Typical Value Data should not be used for specification work	Test Method
Dielectric constant (60 Hz)	< 2,5	ASTM D 150
DC Volume Resistivity	> 10 PΩcm	ASTM D 257
Dielectric Strength	> 20 kV/mm	IEC 60243

Processing Techniques

Visico LE4421/LE4432 are suitable for most equipment designed for PVC/PE extrusion.

Extrusion

Typically the following process conditions are used:

Barrel 1	145 °C 295 °F
Barrel 2	165 °C 330 °F
Barrel 3	170 °C 340 °F
Barrel 4	170 °C 340 °F
Die head	175 °C 350 °F

The temperature of the melted polymer during extrusion should preferably not exceed 200 °C. Having the above set temperature profile, a stable extrusion process and a cable having smooth glossy appearance should be achieved. On-size pressure or draw down tube-on tooling is preferred. The use of a gradient cooling bath will improve the cable insulation physical properties further.

Conductor preheating up to 100°C is recommended when producing cables with a conductor up to 16 mm² for good mechanical properties.

Crosslinking

These products can be crosslinked by immersion in hot water or exposed to low pressure steam at a temperature up to 90°C .This time period may be varied due to the humidity, thickness of insulation, reel size and temperature.

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Packaging

Visico LE4421 - Base material is protected from moisture ingress
Package: Octabins
Smallbins
LE4432 - Catalyst master batch is protected from moisture ingress
Package: Bags
Smallbins

Storage

Visico LE4421/LE4432 has excellent storage stability. Visico LE4421 and LE4432 can be stored for 18 months after production, at 10-30°C (50-85°F) in unopened original packages, without significant deterioration in the quality of the material. Visico LE4421 and LE4432 should be stored in dry conditions and protected from direct sunlight. Improper storage can initiate degradation, which results in odour generation and colour changes and can have negative effects on the physical properties of this product. LE4432 is sensitive to moisture and is therefore delivered with low moisture content, ready to be used. Pre-drying is not recommended, as it will destroy the drying agent that has been added to prevent the material to take up moisture. The bags must be properly resealed between uses, as even short periods of storage in humid conditions may cause scorch during extrusion.

Safety

Please see our "Safety data sheet" / "Product safety information sheet" for details on various aspects of safety, recovery and disposal of the product. For more information, contact your Borealis representative.

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