Polyethylene

Visico™ FR4450 / LE4433

Silane Crosslinkable Insulation Compound

Description

Visico FR4450 / LE4433 is a scorch retardant, moisture-crosslinking polyethylene compound for low voltage insulation.

FR4450/LE4433 is a black, zero halogen, moisture-induced crosslinking polyethylene compound that is designed for use as low voltage wire insulation and jacketing. The combination of a VISICO FR4450 base resin, and the LE4433 catalyst, provides a highly scorch retardant compound with excellent thermal stability and good flame retardant properties. FR4450/LE4433 contains a patented scorch retardant additive (SRA) that increases the processing window for a moisture crosslinking compound and minimizes the tendency for premature crosslinking in the extruder, head or die.

A finished compound that is composed of 93 parts of FR4450 mixed with 7 parts of LE4433 is recognized by Underwriters Laboratories as VISICO FR4450/LE4433 93/7. FR4450/LE4433 is designed to reduce normal PE flame spread characteristics and achieve an HB-1 flame rating on 14 AWG wires and larger. LE4433 also provides, in addition to catalyst, a stabilization package containing suitable antioxidants, a metal deactivator and fine particle size carbon black for UV weather resistance. Properly mixed, during the extrusion process, FR4450/LE4433 exhibits excellent thermal stability to oxidation.

Applications

Visico FR4450 / LE4433 is recommended for use as insulation and sheath for low voltage control cables and power cables up to 6kv in rating.

Specifications

UL 44

Physical Properties

Property		Typical Value Data should not be used for specification work	Test Method
Density (Visico FR4450)		1100 kg/m³	ASTM D 792
Density (LE4433)		940 kg/m³	ASTM D 792
Melt Flow Rate (190 °C/2,16 kg)		0,7 g/10min	ASTM D 1238
Tensile Strain at Break		> 300 %	ASTM D 412
Tensile Strength		15 MPa	ASTM D 412
Tensile Strength		2.350 psi	ASTM D 412
Hot Creep Test (150 °C, 0,20 MPa)	Elongation under load	< 50 %	ICEA T-28-562
	Permanent deformation	< 5 %	

Electrical Properties

Property	Typical Value Data should not be used for specification work	Test Method
Dielectric constant (50 Hz)	< 3	ASTM D 150
Volume Resistivity	> 10 PΩcm	ASTM D 257

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Dielectric Strength	> 22 kV/mm	ASTM D 149
Dissipation Factor	< 0,003	ASTM D 150

Combustion Properties

Property	Typical Value Data should not be used for specification work	Test Method
Oxygen Index	32 %	ASTM D 2863
Corrosivity of Combustion Fumes	15 µS/cm pH > 4,3	IEC 60754-2
Horizontal Flame Test (14 AWG-30 mil)	Pass	UL 44

Processing Techniques

Following parameters should be used as guidelines:

FR4450/LE4433 are typically mixed directly in the extruder hopper using a volumetric or gravimetric masterbatch feeder. Most equipment designed for PVC or PE extrusion is equally suitable for FR4450/LE4433.

Typically the following process conditions are used:

Barrel 1	140 °C 284 °F
Barrel 2	140 °C 284 °F
Barrel 3	150 °C 302 °F
Barrel 4	160 °C 320 °F
Barrel 6	170 °C 338 °F

Crosslinking

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

Drying

Unopened packages of Visico FR4450 should not require drying however if the moisture level of opened packages rises to more than 400 ppm then drying for 4 hrs at 60°C in a dehumidifying type dryer is recommended. LE4433 should always be used from a fresh package and partially used packages resealed to prevent water ingress and potential pre-crosslinking during the extrusion step.

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Packaging

Visico FR4450 - Base material
Package: Smallbins
LE4433 - Catalyst master batch
Package: Bags
Smallbins

Storage

Visico FR4450 / LE4433 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 (50 - 85 °F).

More information on storage is found in our "Safety data sheet" / "Product safety information sheet".

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