



Kkalpana Industries (India) Limited

An ISO 9001:2015 company
TECHNICAL DATA

Silane Grafted XLPE Flame Retardant Compound : KI - XL - 03 / 03 FR / XL - 04

DESCRIPTION :

A low density Cross – Linkable Polyethylene Compound where Cross-Linking involves grafting of Silane as well as Flame retardant properties by improving the Limiting Oxygen Index.

This product consists of 3 components i.e. Grafted Polymer (KI-XL-03), FR additive package (03 FR) & Catalyst Master Batch for Low Voltage Power Cables (LT Applications).

Such system allows the compound to be extruded as a normal thermoplastic in a conventional PE (or even PVC) extrusion line, thus obviating the need of an expensive continuous vulcanizing (CV) extrusion line. The cross linking the step is subsequently carried out by immersion in hot water, or exposure to steam. In each case, curing time is to be optimized as a function of thickness of insulation, concentration of catalyst and temperature.

The limiting Oxygen Index of normal PE is very poor i.e. 20.5%. KIL has developed this special formulation with a reasonable improvement in LOI to a level of 24%. This improvement helps in achieving the desired results with regard to Flammability Test, Fire survival Test conducted on a resulting insulated cable as per IEC 332 Part 3 category B.

TYPICAL PROPERTIES

A) KI-XL-03

Property	Unit	Typical Value	Test Method
Density	gm / cm ²	0.923 - 0.925	ASTM D-792
MFI@190 °C, 2.16 kg load	gm / 10 Min	0.6 - 2.0	IS-18010 (Part 23) / ASTM-D-1238
Contamination (Visual)	No./Kg	< 20	KIIL

B) KI-XL-03 / 03 FR / XL-04 Combination

Mixed at 130 °C at 75:25:5 Parts for 3 minutes, compression molded to a sheet of 1.5mm thickness, and cured by immersion in water at 95 °C for 3 hours; conditioning for 3 hours.

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Property	Unit	Typical Value	Test Method
Density	gm / cm ³	1.05	ASTM-D-792
Tensile Strength	MPa	> 13	ASTM-D-638
Elongation at break	%	> 300	ASTM-D-638
Hot set at 200 °C			
a) Hot Elongation after 15 min.	%	< 100	IS-10810 Part-30 / IEC 60811-507
b) Permanent Set after after 5 min	%	< 5	IS-10810 Part-30 / IEC 60811-507
Oven ageing at 135 °C, 168 hours			
a) Variation in Tensile Strength	%	± 25	IS-10810 Part-11 / IEC 60811-401
b) Variation in Elongation at Break	%	± 25	IS-10810 Part-11 / IEC 60811-401
Volume Resistivity @ 25°C	Ohm-cm	> 1 X 10 ¹⁵	ASTM-D-257
Dissipation factor @ 250V / 50 Hz, 25°C	-	< 0.004	ASTM-D-150
Dielectric Constant @ 250V / 50Hz, 25°C	-	> 2.3	ASTM-D-150
Limiting Oxygen Index (Normal)	%	23 - 24	ASTM-D-2863

PROCESSING GUIDELINES:

It is recommended to dry the catalyst master batch at 60°C in an air oven in 4-6 cm layers for 8-12 hours. The grafted Polymer should never be pre heated.

The Grafted Polymer FR compound and catalyst master batch should be manually mixed at 75:25:5 Parts at room temperature, just before consumption. Mixing in large quantities should be avoided, since such leftover premix cannot be stored and consumed at a later date.

During extrusion, following temperature profile is suggested as a general guideline.

Position	Temperature (°C)
Barrel Zones	150 – 180 °C
Head	180 °C
Die	190 - 195 °C

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Ensure that the screw, barrel and tools are thoroughly cleaned.

Start at slightly lower temperature profile. Allow the frictional heat to built up to the desired temperature and remain steady thereafter.

Flush with virgin LDPE (Film Grade). Adjust eccentricity and wall thickness after inserting conductor.

Replace LDPE with KI-XL 03 / 03 / FR / XL 04 premix. Increase line speed to optimum. Adjust temperature to obtain a smooth surface finish.

Avoid thermal shock by sudden cooling. Keep sufficient distance between die-head and water through to allow air-cooling. Avoid inlet water being too cold.

It is important that extruder should not be kept idle for more than 15 minutes when filled with KI-XL 03 / 03 FR / XL 04 Compound.

During tubing extrusion built up of stress should be avoided, size of core point should be carefully selected to keep the draw down ratio (DDR) below 2:1 in case of small sizes. For higher sizes of core, DDR may be increased slightly. It is also recommended that the land be in place, with its length approximately same as that of the finished diameter of the core.

PACKAGING :

Moisture Barrier Multilayer bag of 25 Kg.

20' FCL will take palletized 11 MT & 40' will take 24.75 MT.

STORAGE:

The shelf life of the product is 90 days (In case of Export packaging the shelf life is guaranteed for 180 days instead of 90 days) from the date of production, subject to following conditions:

- Storage temperature not generally exceeding 25 °C
- Away from direct sunlight and weathering.
- Closed and unbroken bags.
- Uses of compound within 3-4 hours of after bags are open.
- No mixing of leftovers from previous runs.

The information given in the document is believed to be reliable and is given in the good faith but without warranty. The user should test the product to ascertain the suitability for the intended use. Product specification or the whole document is subject to change without any prior notice.

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