



KLJ GROUP

XLPE COMPOUND



September 2022, Ed9

TECHNICAL INFORMATION

KLJ XL 01 HS

AMBIENT CURABLE SIOPLAS COMPOUND FOR INSULATION OF LOW VOLTAGE POWER CABLE

Description:

KLJ XL 01 HS/KLJ XL MB PT3 MD is a silane crosslinkable natural compound system designed for insulation of low voltage cables for high line speed.

This cable insulation compounding system, with a proper mixture of KLJ XL 01 HS (95 parts) and Catalyst master batch KLJ XL MB PT3 MD (5 parts), exhibit excellent thermo-oxidative stability. The combination is suitable for both copper and aluminum conductors. Sufficient anti-oxidant has been added to meet specific ageing requirements.

Application:

KLJ XL 01 HS/KLJ XL MB PT3 MD is designed for insulation of low voltage up to 1.1 kv.

Specification:

KLJ XL 01 HS/KLJ XL MB PT3 MD, in blend meets the applicable requirements as below when processed using sound extrusion and testing procedure:

IS 7098 Part I

IEC 60502 -1

The standards referred to above is a short selection of standards and does not cover all applicable standards. Contact your KLJ representative for additional information.

Special Features:

KLJ XL 01 HS/KLJ XL MB PT3 MD insulation system offers:

- Excellent processing properties
- Outstanding curing speed
- Excellent surface finish
- Free from heavy metal
- Consistent quality



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Technical Characteristics:

A) KLJ XL 01 HS

Properties	Unit	Test Method	KLJ Specification	Typical Value
Physical Properties				
Density	gm/cm ³	ASTM D 792	0.910- 0.925	0.920
Melt Flow Index (190°C, 2.16 kg Load)	gm/10min	ASTM D 1238	0.5 – 2.5	1.2
Melt Flow Index (190°C, 5.0 kg Load)	gm/10min	ASTM D 1238	3.0±0.5	3.5
Hardness (1 S)	Sh-D	ASTM D 2240	52±2	54
Hardness (15 S)	Sh-D	ASTM D 2240	50±2	51
Contamination (Visual)	No./kg	KLJ TM	<5	0

B) KLJ XL 01 HS/KLJ XL MB PT3 MD

Test Procedure: After mixing in proportion of 95:5 and extruded into a tape of 1.2 mm thickness, the tape is immersed in water at 95°C for 3 hours. The testing is carried out after conditioning this tape for further 3 hrs at ambient conditions.

Properties	Unit	Test Method	KLJ Specification	Typical Value
Physical Properties				
Tensile Strength at Break	MPa	IS 10810 Part 7	≥ 16	21
Elongation at Break	%	IS 10810 Part 7	≥ 450	550
Hot set at 200°C				
Hot Elongation after 15 min	%	IS 10810 Part 30	≤ 100	61
Permanent Set after 5 min	%	IS 10810 Part 30	± 10	0.4
Oven ageing at 135°C, 168 hours				
Tensile Strength at Break	%	IS 10810 Part 11	± 25	-5
Elongation at Break	%	IS 10810 Part 11	± 25	-7
Shrinkage @ 130°C / 1 hours	%	IS 7098	≤ 4	1.3
Water absorption @ 85±2°C / 14 days	mg/cm ²	IEC 60811-1-3	≤ 1	0.25
Moisture content	ppm		<100	10
Methanol wash	ppm	KLJ TM	≤ 100	50
Electrical Properties				
Volume Resistivity at 27°C	Ohm-cm	ASTM D 257	≥ 10 ¹⁴	3.0 x 10 ¹⁶
Volume Resistivity at 90°C	Ohm-cm	IEC 60093	≥ 10 ¹²	1.5 x 10 ¹⁴
Dissipation Factor @ 250 V/50 Hz, 25 °C	-	ASTM D 150	≤0.004	0.0001
Dielectric Constant @ 250 V/50 Hz, 25 °C	-	ASTM D 150	≤2.3	2.2
Dielectric withstand (1000 V/Sec. rise @+25 °C)	KV/mm	ASTM D 149	≥ 25	32
Insulation resistance constant at 90°C	MΩ.km	IS 10810 P 43	≥3.67	2000



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Granules Size: The granules size of Grafted compound and catalyst master batch as per below, The measurement of granule’s size shall be done in 2-direction (X & Y) as shown below:



Grade Name	Dimension in “X” direction	Dimension in “Y” direction
KLJ XL 01 HS	2.42mm (Min) & 3.08mm (Max)	3.44mm (Min) & 4.02mm (Max)
KLJ XL MB PT3 MD	2.37mm (Min) & 2.80mm (Max)	3.36mm (Min) & 3.80mm (Max)

Processing Guidelines:

It is recommended to pre-heat the Catalyst Master Batch and Colour Master Batch (if any) at 80°C in hot air oven in 4-6 cm layers for 2-4 hours. The Grafted Polymer should never be pre-heated.

The Grafted Polymer and Catalyst Master batch should be mixed at a ratio 95:5 at room temperature without shearing, just before consumption. For thin wires lower dosage can work & need to be set depending on the size. Mixing in large quantities should be avoided, since any leftover premix cannot be stored.

It is essential that extruder should not be kept idle when filled with KLJ XL-01 HS / KLJ XL MB PT3 MD premix. It should be kept running at a low RPM if it is needed to be stopped for any reason like changeover of size etc.

Typically the following process condition is used:

Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Head	Die
160±10°C	175±10°C	180±10°C	190±10°C	200±10°C	205±10°C	210±10°C

This system is designed for processing with both, Pressure or Tube-on tooling. 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 bonding and mechanical properties.

Ambient Cross Linking Data:

The above extruded product can be cross-linked by keeping in ambient condition. Results will vary under different ambient condition.

Relative Humidity %	Temperature °C	Thickness mm	Time to reach 100% Hot Elongation, days
50	23	0.7	2
50	23	1.0	5
50	23	1.2	7



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The time period of curing may vary case to case depending on other variables viz. cross section of cable, thickness of insulation, humidity level (Min. 50 – 60%), exposure outdoor condition, sun light, reel size and temperature etc.

For an insulation thickness above 1.2 mm, the time needed for optimum cross-linking should be ascertained by small trial runs; bulk production should be taken up only after getting satisfactory results.

Storage:

- KLJ-XL-01HS can be stored for 180 (In case of export packaging the shelf life is for 240 days instead of 180 days) from date of manufacturing, however it is suggested to use within 90 days from the date of receipt. Shelf life is subject to storage in original intact packing, in cool and dry place, away from sunlight and weathering, storage temperature not generally exceeding 35°C.
- Use the compound immediately, may be within 1 to 2 hours, of opening the bag.

Packaging:

KLJ XL 01 HS (Base Grafted Compound):

Form: Granules.

Package: 25 kg aluminium multilayer bag and 550 kg Octabin with aluminium liner with Top & Bottom discharge as required by the customer.

KLJ XL MB PT3 MD (Catalyst Master Batch):

Form: Granules.

Package: 25 kg aluminium multilayer bag and in smaller aluminium pouch, if required.

Safety:

This compound is not classified as dangerous preparation.

The products are supplied in the form of free-flowing granules of approx. 2-3 mm size and can be readily handled with commercially available equipment. Handling and transport of the products may generate some dust and fines, which constitute a potential hazard for dust explosion. All metal parts in the system should, therefore, be properly grounded. Properly designed equipment and good housekeeping will reduce the risk. Inhalation of any type of dust should be avoided as it may cause irritation of the respiratory system.

The product is intended for industrial use only. MSDS is available on request.

For technical service & further information and assistance:

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Disclaimer: The data given above are for the guidelines purpose only. Above compound is suitable to run on different machines; however some adjustments may be required on individual machine. All properties are tested as per ASTM/IS/IEC standards. Any data may change without prior information. The customers are advised to check the quality, prior to commercial use. There is no guarantee and/or warrantee what so ever, after processing.