
BLS XL 1101 / BLS XL 1105 SILANE CROSSLINKABLE PE COMPOUND

CROSSLINKABLE BY EXPOSURE TO AMBIENT/MOISTURE FOR LOW VOLTAGE AERIAL BUNCHED CABLE INSULATION

BLS XL 1101 is a Linear Low-Density Polyethylene based silane grafted compound containing a permanent scorch retarder ensuring safe processing with the active natural curing crosslinking catalyst. **BLS XL 1101** is cross linkable by exposure to ambient/moisture when used with **BLS XL 1105**, which is UV resistant, Carbon Black Catalyst Masterbatch, in the ratio **BLS XL 1101** (93 part) and **BLS XL 1105** (7 part) for thickness of insulation between 1.2 mm to 1.7 mm. For lower and higher thickness, the dosage of catalyst needs to be reduced or increased depending on the thickness respectively.

BLS XL 1105 is Black Catalyst MB accelerates the crosslinking reaction of **BLS XL 1101** in open atmosphere at normal temperature ($\geq 30^{\circ}\text{C}$) and humidity ($\geq 60\%$ RH) condition even without the use of hot water or steam. Use of hot water or steam will accelerate the crosslinking process fast.

In order to prevent premature crosslinking, the grafted compound and the black catalyst masterbatch should be stored separately and mixed only when used, usually in the ratio of 93:7.

SPECIFICATIONS COMPLYING - IEC 60502 XLPE, IEC 60092/351, IS 14255, BS 7655 GP8, BS 7870-5, IS 7098-1

TYPICAL PROPERTIES

BLS XL 1101

Properties	Unit	Test Method	Typical Value
Physical Properties			
Density	gm/cm ³	ASTM D 792	0.922
Melt Flow Index (190°C, 2.16 kg Load)	gm/10min	ASTM D 1238	1.1 \pm 0.2
Hardness (1 S)	Sh-D	ASTM D 2240	53 \pm 1

BLS XL 1101/BLS XL 1105

Molding Procedure: After mixing in proportion of 93:7 and extruded into a tape/sheet of 1.2 mm thickness, the tape is immersed in water at $90 \pm 5^{\circ}\text{C}$ for 2-3 hours. The testing is carried out after conditioning this tape for further 3 hrs at ambient conditions.

Properties	Unit	Test Method	Typical Value
Physical Properties			
Tensile Strength at Break	MPa	IS 10810 Part 7	21
Elongation at Break	%	IS 10810 Part 7	550
Hot Set, 15 min. at 200°C, 0.2N/mm ²			
Elongation under load	%	IS 10810 Part 30	80
Permanent Set after 5 min cooling	%	IS 10810 Part 30	8

TECHNICAL DATA SHEET

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Properties	Unit	Test Method	Typical Value
Oven ageing at 135°C, 168 hours			
Tensile Strength at Break	%	IS 10810 Part 11	+12
Elongation at Break	%	IS 10810 Part 11	-8
Shrinkage @ 130°C / 1 hours	%	IS 7098	1.3
Water absorption @ 85±2°C / 14 days	mg/cm ²	IEC 60811-1-3	0.25
Moisture content	ppm		80
Electrical Properties			
Volume Resistivity at 27°C	Ohm-cm	ASTM D 257	1.5 x 10 ¹⁶
Volume Resistivity at 90°C	Ohm-cm	IEC 60093	1.2 x 10 ¹⁴
Dissipation Factor @ 250 V/50 Hz, 25 °C	-	ASTM D 150	0.0001
Dielectric Constant @ 250 V/50 Hz, 25 °C	-	ASTM D 150	2.2
Dielectric withstand (1000 V/Sec. rise @+25 °C)	KV/mm	ASTM D 149	32

PROCESSING METHOD

BLS XL 1101 silane grafted base compound must be added with **BLS XL 1105** Carbon Black Catalyst Masterbatch, 7% by weight, depending on insulation thickness and blended just before use. For best results dosing the both components directly in the extruder hopper is suggested.

The silane pre-grafted base compound & the carbon black catalyst masterbatch are sensitive to moisture; open bags must be used immediately. It is recommended to pre-dry the carbon black catalyst masterbatch at 75±5° C for 3-4 hours before using it in production.

BLS XL 1101 can be processed with standard XLPE/PE/PVC extruders having a L/D ratio of 22:1 to 26:1 and an adequate barrel temperature control.

Preheating of conductor to 110°C is recommended.

The following temperature profile is suggested as a starting point:

Zone 1	140-160°C	Collar	170-190°C
Zone 2	150-170°C	Head	170-190°C
Zone 3	160-180°C	Die	180-220°C
Zone 4	160-180°C		

Curing can be done in the following ways:

- By exposure in ambient temperature at 30-35°C, 60-80% RH for some days.
- By immersion in hot water at 90°C for 4-5 hours or more.

In all cases curing time depends on insulation thickness and the ambient conditions of temperature and relative humidity and also on reel size. Natural curing process can be accelerated by applying a flame on the extruded wire/cable as it comes out of the die and immersing the wire/cable in first cooling trough having hot water of about 90°C for 5-10 metre length.

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Further in case of dry weather spraying of water on the cable drums is recommended for accelerating the natural curing process. In case of low ambient temperature cables can be placed in a hot room for accelerating the natural curing process.

STORAGE

The product should be stored under the following conditions:

- Closed and sealed bag
- Ambient temperature not exceeding 30°C
- Avoid direct exposure to sunlight and weathering

The product could undergo irreversible alterations due to extended period of storage. BLS Polymers Ltd. suggests using the products within 6 months for Domestic & 8 months for Export customers from the production date printed for best results.

PACKAGING

BLS XL 1101 is available in 25 kg moisture resistant bags.

BLS XL 1105 is packed in 25 kg moisture resistant bags and also available in 5 kg pouch and collated into 20 kg moisture resistant bags.

SAFETY

The product is not classified as a hazardous preparation. Dust and fines from the product carry a risk of dust explosion. All equipment should be properly earthed. Inhalation of dust should be avoided as it may cause irritation of the respiratory system. Small amounts of fumes might be generated during processing of the product. Proper ventilation is therefore required.

Please refer to our MSDS for details on various aspects of safety, recovery, disposal and handling of the product.

We offer our Technical Services for further information and suggestion in using the product from the beginning and also for any need during the course of the product use.

Disclaimer:

The information contained herein may include typical properties and processing parameters of the grade or its typical performances when used in respective applications. The values given above are based on analysis of representative samples and not the actual product supplied. It is the customer's responsibility to inspect and test our grades in order to satisfy itself as to the suitability of the products for customers' particular application. The customer is solely responsible for all determinations regarding any use of material or product and any process in its area of interest. BLS assumes no obligation or liability for any loss, damage or injury directly or indirectly suffered or incurred as a result of using any of the information or product given in this document. The information and data presented herein is true and accurate to the best of our knowledge. No warranty or guarantee expressed or implied, is made regarding performance or otherwise. This information and data may not be considered as a suggestion to use our products without taking into account existing patents, or legal provisions or regulations, whether national or international. The user of any information and/or data is advised to obtain the latest details from any of the offices of the company or its authorized agents, as the information and/or data is subject to change based on the research and development work undertaken by the company.