

TECHNICAL INFORMATION



HFX 505

December 2009

GRAFTED HALOGEN FREE, FLAME RETARDANT AND LOW SMOKE EMISSION
COMPOUND, CURABLE BY EXPOSURE TO MOISTURE
FOR CABLE INSULATION AND SHEATING

Description

This product is a LSFOH silane grafted compound for cable insulation and sheating, **Cross-linkable** by heat and moisture by previous addition of a suitable catalyst masterbatch (SIOPLAS method). It is highly recommended to store separately the grafted compound and the catalyst, as prescorching may take place during the reactive extrusion.

The properties of this compound meet the requirements of VDE 0266 type HX11 & HXM1, EN 50363-0 type EI5 & M2, VDE 0207 part 23 type HJ1, BS 50363-5:2005 type EI5

Technical characteristics of the silane grafted compound:

Property	Test method	Unit	Typical Value
Density	ISO 1183	gr/cm ³	1.50
Hardness at 15"	ISO 868	Shore D	46
Tensile strength	ISO 527	N/mm ²	13.0
Elongation at break	ISO 527	%	200
Oxygen Index	ISO 4589	% O ₂	37
Melt Flow Index (150°C/21.6Kg)	ISO 1133	gr/10 min	3.0
Volume resistivity 20 °C (Alternating Polarity Method)	ASTM D257 Electrodes	Ωcm	5 x 10 ¹⁴
HCl & HBr gas evolution	EN 50267-2-1	%	< 0.5
HF gas evolution	EN 60684-2	%	< 0.1

The typical values reported in the table, have been obtained from measurements made on granules, extruded samples or pressed plates

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Processing

The grafted silane compound is dry blended in a separate step with a crosslinking catalyst master batch (3-5% CAT 100 or 1-3% CAT 103), in a traditional single screw extrusion process.

A temperature profile for the reactive extrusion is given below, are however indicative, and may depend on the equipment design used.

A general rule-of-thumb for processing silane grafted compounds with the catalyst masterbatch, is that the faster the material is extruded or molded the better the results will be. Time at temperature should be kept to a minimum to avoid processing issues such as prescorching.

Zone 1	Zone 2	Zone 3	Zone 4	Collar	Head	Die
120 - 140	120 - 140	130 - 150	130 - 150	130 - 150	130 - 150	150 - 180

The extrudate is most of the time cooled down at ambient conditions or into a water bath, which provides the moisture necessary for crosslinking. The reaction is fast but diffusion of moisture in the material is a limiting factor. For this reason, hot water bath or low pressure steam autoclave can be used to speed up crosslinking. Generally speaking curing time is insulation thickness dependant, for example a 1mm wall section may take 4-6 hours in extreme moisture conditions. In case of self curing, time depends on the specific ambient temperature and humidity.

Technical characteristics after the crosslinking process:

Property	Test method	Unit	Typical Value
Tensile strength	ISO 527	N/mm ²	14.0
Elongation at break	ISO 527	%	190
Water absorption 24 hrs at 100 °C	IEC 60811	mg/cm ²	< 5
Hot set test 200 °C, 15mins, 0.2 N/mm ² Elongation under load Permanent elongation after cooling	IEC 60811	% %	20 0
Hot set test 250 °C, 15mins, 0.2 N/mm ² Elongation under load Permanent elongation after cooling	IEC 60811	% %	30 5
Shrinkage 1h at 100 °C	IEC 60811	%	< 2
Knife penetration test at 100 °C, k = 1.0	IEC 60811	%	< 50
Volume resistivity 20 °C (Alternating Polarity Method)	ASTM D257 Electrodes	Ωcm	3 x 10 ¹⁴

The typical values reported in the table have been obtained from measurements made on extruded samples or pressed plates

Storage

The grafted compound must be stored at ambient temperature (not exceeding 30 °C) in moisture resistant bags, in order to avoid exposure to sunlight and water absorption. The crosslinkable product should be used within six months from the production date and within few hours if the bags are opened.

Packaging

HAX HFX 505 is available in 25 Kg or bigger aluminum bags.

Our technical service is at your disposal, for further information and assistance.

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