



POLARITE™ 103A IN RUBBER CABLE INSULATIONS

Polarite™ 103A has been specifically developed for use in high voltage power cable insulations based on EPR and EPDM rubbers. Polarite 103A imparts good insulating properties which are maintained both at high working temperatures and under wet conditions for the working life of the cable. Polarite 103A gives good insulating properties in other polymers such as crosslinked polyethylene and ethylene vinyl acetate copolymers.

The results obtained from the high voltage formulation given overleaf in Table 1 show these qualities.

Test specimens kept in water at 75°C and 90°C for up to 14 days showed very little increase in capacitance demonstrating a high level of stability in water. Tan delta is low, even at 90°C, thus maintaining low energy losses under high voltage conditions while volume resistivity is high and unaffected by contact with water.

The combination of calcined clay plus a selected vinyl functional surface treatment gives superior performance to the combination of calcined clay plus free silane added during compounding. **Polarite 103A** can eliminate the need for free silane in power cable formulations, giving both consistent electrical performance and easier inventory management.

Polarite 103A can also give extremely good properties in halogen free systems, and its performance in an eva high temperature insulation compound is shown in Table 2 overleaf.

PROPERTIES

	Initial	After Aging*
Tensile Strength (MPa)	12.6	9.3
Modulus at 100% (MPa)	10.0	6.8
Elongation at break (%)	200	200
Hardness (IRHD)	88	89
Tear Strength (Nmm ⁻¹)	51	-
Compression Set at 100°C (%)	7.7	-
Vol. Resistivity (after 24h in water)		
at 20°C (ohm.cm)	9.4 x 10 ¹³	
at 75°C (ohm.cm)	7.0 x 10 ¹¹	

* aged at 150°C for 7 days in air

TABLE 1

Formulation		
Vistalon MD 82/6		100
Low density polyethylene		5
90% red lead		6
Zinc oxide		5
Paraffin wax		5
Flectol H		1.5
Vinyl silane		1.0
Dicup R		2.5
Polarite 103A		120
Mechanical properties		
Tensile strength (MPa)		8.9
Elongation at break (%)		330
Hardness (IRHD)		72
Compression set at 120°C (%)		30
Electrical properties:		
Capacitance change at 3160 Vmm ⁻¹ in water		
	75°C	90°C
1-14 days	1.3	1.1
7-14 days	0.2	0.4
Relative permittivity		
	75°C	90°C
Initial value	2.79	2.75
14 days in water	2.85	2.84
Dissipation factor (Tanδ)		
	75°C	90°C
Initial value	0.007	0.011
14 days in water	0.010	0.013
Volume resistivity (ohm.cm)		
	75°C	90°C
Initial value	1.6 x 10 ¹⁵	6.0 x 10 ¹⁴
14 days in water	2.5 x 10 ¹⁵	9.6 x 10 ¹⁴

TABLE 2

Formulation	phr
EVA (Levapren 400)	100
Tribasic Lead Sulphate	5
Zinc Stearate	2
Permanax OD	1
Paraffin Wax	5
Rhenofit TAC/S	1.5
Perkadox 1440	3
Polarite 103A	100

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