Issued July 2011

SX409NT:CM401

Silane crosslinkable polyethylene for medium voltage power cable Insulation

This is a silane crosslinkable tree retardant polyethylene compound, curable by exposure to moist conditions, and possessing excellent extrusion properties at high output rates. The graft component SX409NT is mixed with a crosslinking catalyst masterbatch CM401 generally in the ratio 95:5.

The SX409NT:CM401 compound has been specifically developed for cables operating up to 36kV. The graft compound contains a non-staining stabiliser and an effective tree retarder, giving outstanding long term retention of dielectric strength.

This compound is typically used in conjunction SX 539 crosslinkable semi-conducting material for conductor and insulation shields. Strippable outer shields are possible using SX528.

Test	Test method	Unit	Typical value
Physical properties and mechanical properties			
Density	BS 2782 Pt. 6 Mtd 620A-D	g/cm^3	0.928
Melt flow rate (2.16kg at 190°C)	AEI Method	g/10min	0.6-0.9
Tensile strength	IEC 60811-1-1	N/mm^2	18
Elongation at break	IEC 60811-1-1	%	350
Typical ageing behaviour after 7 days at 135°C			
Tensile strength	IEC 60811-1-2	% variation	+4
Elongation at break	IEC 60811-1-2	% variation	-2
Thermo mechanical properties			
Cold bend at -70°C	IEC 60811-1-4 Mtd 151A	-	Pass
Cure assessment by hot set test (forced cured at 80°C in water)			
Elongation under load ($20N/cm^2$ at 200°C) greater than 100%			
Insulation thickness 3-6mm	IEC 60811-2-1	Hours	6-24
Insulation thickness 8mm	IEC 60811-2-1	Hours	190
Insulation thickness 15mm	IEC 60811-2-1	Hours	280
Electrical properties			
Volume resistivity at 20°C	IEC 60502	Ohm.cm	$>1 \times 10^{16}$
Dielectric strength at 20°C	IEC 80243	kV/mm	21
Power factor at 50Hz at 23°C	IEC 60250	-	0.0004
Permittivity at 50Hz at 23°C	IEC 60250	-	2.5

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SX409NT:CM401

Recommended processing and handling conditions

Extruder

Most modern thermoplastic extruders will process SX409NT:CM401 compounds particularly if a screw suitable for polyethylene extrusion is available.

Extruder temperature conditions

As a guide the following temperature profile is recommended:-

Zone 1	Zone 2	Zone 3	Zone 4	Head	Die
150°C	160°C	170°C	180°C	170°C	180°C

This profile will vary slightly depending on extruder type, head design and output.

Screw water temperature 60°C – 70°C

Recommended screen pack 30,100, 30 (mesh apertures per linear inch) or 600, 150, 600 micron

Head and tool design

The head and tools should be so designed as to allow streamlined flow without the possibility of stagnation of material (where pre-curing could take place). To obtain the optimum in physical properties in the case of tubing tools, it is generally recommended that a draw down ratio not greater than 3.5 is used.

Catalyst and colour masterbatches

CM401 catalyst masterbatch is normally added at 5% to 95% of SX409NT graft.

It is recommended that all masterbatches, including those containing the catalyst, should be thoroughly dried before use at 60°C for 6 hours or 80°C for 4 hours.

Storage and shelf life

SX409NT normally has shelf life of at least 6 months from the date of manufacture. The storage of silane crosslinkable compounds in cool dry conditions will maximise useful shelf life. Other precautions are:-

- Packaging should remain sealed.
- Avoid temperature above 25°C.
- Avoid storage outside and in direct sunlight.
- Use within 8 hours of opening packaging.

Form and packaging

Form – pellets

Packaging – The following possibilities are available:-

- Moisture resistant sacks containing 25kg.
- Boxes with a moisture resistant heat sealed liner containing approximately 125kg, 500kg or 1000kg.

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