

PLS 405

Product Data Sheet

Silane Crosslinkable, Black, Polyethylene Overhead Power Cable Insulation Compound

DESCRIPTION

PLS 405 is a silane grafted polyethylene insulation compound. It is designed to be used, at a rate of 89% with 11 wt.% of Plascom's PLS 425 catalyst masterbatch. The extruded combination contains 2.5 wt. % of a well dispersed carbon black to render excellent resistance against UV degradation, a stabilisation package to impart long term thermo-oxidative and photo-oxidative degradation resistance to the finished cable and is faster crosslinkable on exposure to hot water / low pressure steam or ambient.

Specifications

PLS 405 insulated conductors, when manufactured employing sound extrusion practices and strict process control, will comply with the requirements of the following standard:-

ICEA-S-66-524

Application

PLS 405 is for use by cable manufacturers requiring best performance properties for low voltage, silane crosslinked overhead or weather service drop cable insulation. It is also recommended for use where a crosslinked, weather resistant cable jacket is required. **PLS 405** must be used with PLS 425 catalyst / antioxidant and carbon black masterbatch to ensure the required UV and thermal aging resistance is achieved.

Packaging

PLS 405 is manufactured in pellet form and is available in the following packages:-

- lined, palletised Octabins 600 kg net

Octabins contain heat-sealed liners to prevent moisture ingress. The palletised package is stretch wrapped for environmental protection. The Octabins may be stacked two high provided the lower packages are unopened and the stretch wrapping is intact. Packages damaged during handling should not be stacked.

Processing

PLS 405 requires very precise process control in order to maximise manufacturing efficiency and optimise the final physical and electrical properties of the insulated cable. It will process well on a wide variety of extruders but, as a general guide, extruders having an L:D of less than 25:1 and a compression ratio between 2 and 3 are recommended. A temperature profile rising from about 160°C at zone 1 to about 250°C at the die (when flame is applied). Without flame, the die temperature has to be maintained at 300°C. Screw cooling about 75°C, will suffice for most applications. Pre-drying of the catalyst masterbatch and colour masterbatches is strongly advised. However, do not attempt to pre-dry PLS 405. When small diameter wires are being manufactured, particularly with larger extruders, the material residence time may be excessive. To minimise scorch in such circumstances it is good practice to maintain as low a temperature profile as possible, consistent with the power requirements and pressure limits of the extruder. Flaming of the die is advised to maximise surface gloss in all cases. **PLS 405** may be utilized in either pressure or tube-on extrusion, although some pressure extrusion configurations may compromise final mechanical properties. Precise processing conditions will vary depending on the extruder type, die tooling, conductor size and line speed employed. Please contact Plascom to determine your specific requirements.

Physical & Electrical Typical Properties

Test	Typical Value ⁽¹⁾	Unit	Test Method
Melt Flow Rate (190/2.16)	1.0	dg/min	ASTM D 1238
Density (Conditioning ISO 1183 - D)	920	kg/m ³	ASTM D 1505
Final Composition Properties^{(2)(2a)}			
Carbon Black Content ⁽²⁾	2.5 ±.5	Wt.%	ASTM D 1603
Tensile Strength at Break ^(2a)	20	MPa	IEC 60811-1-1
Elongation at Break ^(2a)	600	%	IEC 60811-1-1
Aged Tensile Strength at Break ⁽²⁾⁽³⁾	>90	% Retain	IEC 60811-1-2
Aged Elongation at Break ⁽²⁾⁽³⁾	>90	% Retain	IEC 60811-1-2
Hot Set ^{(2a)(4)} (Elongation/Set)	80/0	%	IEC 60811-2-1
Dielectric Strength ⁽²⁾ (short pulse)	>22	kV/mm	IEC 60243
DC Volume Resistivity ⁽²⁾	1 x 10 ¹⁵	Ω cm	ASTM D 257
Dielectric Constant ⁽²⁾	2.3	at 60 Hz	ASTM D 150
Dissipation Factor ⁽²⁾	0.0004	at 60 Hz	ASTM D 150

Note:

1. Values may differ when tests are performed on extruded insulation. Typical values should not be used for specification purposes.
2. Determined on 2mm pressed sheet (PLS 405:PLS425, 89:11) cured at 90°C in water for 4 hours.
- 2a. Determined on 0.8mm extruded tape (PLS 405:PLS 425, 89:11) cured at 80°C in water for 3 hours.
3. Test condition 135°C, 7 days
4. Test condition 200°C, 20 N/cm², 15 min.

Health and Safety

PLS 405 may be bulk handled and conveyed using equipment designed for conventional polyethylene pellets. The conveying system should be adequately grounded to prevent accumulation of static charge and equipped with suitable filtration to prevent dust hazards within the factory and local environment. By its nature PLS 405 is moisture sensitive so the use of high humidity conveying air should be avoided. The material must be used within a short time after exposure to humidity in order to minimize the risk of scorching during extrusion. PLS 405 should be used directly from its packaging. Under no circumstances should it be pre dried - even in dehumidified hot air.

PLS 405 must be stored unopened in a dry, stable temperature environment for optimum performance. A temperature range of 10 °C to 35 °C is recommended. Under ideal conditions a shelf life of more than 6 months can be expected. Irreversible damage may occur to the compound if it is not stored in appropriate conditions.

Third Party Materials

Insofar as materials not supplied by Plascom are used in conjunction with, or instead of Plascom materials, it is the responsibility of the customer to obtain all relevant data pertaining to their use and to satisfy himself as to their suitability. No liability whatsoever can be accepted by Plascom for use of their materials in conjunction with any other material.