ELANTAS
Electrical Insulation

Product Information

Electrical Insulation System
Finishing Varnish

Elmotherm® FS190
Elmotherm® FS190OXYDROT

Anti-tracking, air-drying varnish available also as red pigmented version.
Good moisture and chemical resistance.

Product description

Elmotherm® FS190 is a single component, finishing varnish based on an alkyd modified resin with a thermal rating of 155°C.
The product consists of a polymeric binder, the so-called solid content and a solvent mixture.
It is designed for protection of windings and components in applications where high adhesion and good moisture and chemical resistance are required.
For thinning of this varnish Verduennung® 225 or Thinner® D107 should be used. This product is available also as red pigmented version (Elmotherm® FS190OXYDROT).
Polymerization is initiated by the effect of atmospheric oxygen and proceeds as a rapid chain-reaction until a three-dimensionally cross linked, duroplastic cured material is produced.
The product fulfils the directive 2011/65/UE and 2002/95/CE (RoHS).
The raw materials of the product are pre-registered according to directive to CE 1907/2006 and s.m.i. (REACH).
The product does not contain polycyclic aromatic hydrocarbons and substances listed in the SVHC Candidate List.

Areas of application

Preferred applications for the varnishes Elmotherm® FS190 are:

- transformers
- drive in chemical industry
- general use

Properties of cured resin

The tough-hard material displays very good elasticity. Moreover, windings impregnated with the varnishes Elmotherm® FS190 show good resistance to the effects of liquid chemicals and their vapours and the high temperature index of 155°C.

Flow time

Elmotherm® FS190 is produced with a flow time of 95-115 sec measured with Ford 4 cup (acc. ASTM D1200) at 25°C.
Elmotherm® FS190OXYDROT is produced with a flow time of 28-38 sec measured with ISO6 cup (acc. ISO2431) at 23°C.
The paint contained in the can is ready for use.
In this application the regular maintenance of flow time within the allowed applications lets to achieve better results with regard to the content and the filling of the windings.
Verduennung® 225 or Thinner® D107 would be available for cleaning pieces painted with the varnish.

Processing methods

The varnishes can be applied by dipping or brushing with the flow time when delivered.
Spraying will also be possible, before using varnishes the parts should be dry, clean and free from grease, then it is recommended to add 10-20% of Verduennung® 225 or Thinner® D107.
In this case it will be advantageous to preheat the objects up to 50-60°C for faster drying of a second layer can be applied already after 10-20 minutes.
The protective action can be incomplete due to the so-called spray shadows, then some parts of the objects will not be coated.
During the storage and the processing the temperature of the varnish should not exceed 25°C, in addition it has to be protected from humidity and solar radiations. The content of the started containers has to be processed quickly.
Drying of the varnish should be normally at room temperature, time can be shortened with the support of heat, e.g. with hot air at 90-100°C.
It will be necessary to follow the instructions of the Material Safety data sheet (MSDS) for varnish and thinner.

Storage and stability

Due to the experience in practice the stability of the varnishes Elmotherm® FS190 and thinners is limited to 12 months in original packaging and in a dried and controlled environment.

Main properties

Property	FS190	FS190OXYDROT
Color	Clear brownish	Red oxide
Content of binder (1,5g/2h/130°C), ISO 3251	43-45%	57-60%
Density at 23°C, DIN 51757	860-920 g/l	1090-1150 g/l

Drying condition

Surface	23 °C	80°C
Touch-dry	20 min	4 min
Non slip	2 h	1 h
Fully dried	24 h	2 h

Mechanical properties in dried condition

Test criterion	Condition	Value	Unit
Bond strength, Elantas test following IEC 61083 (helical coil)	23°C 155°C 180°C	> 50 - -	N
Mandrel test (3 mm) Elantas test following IEC 60464-3	23 °C	180	°

Temperature Index

Test criterion	Condition	Value
Proof voltage Elantas test following IEC 60172 (twisted pair)	1000 V	-

Dielectric properties in dried condition

Test criterion	Condition	Value	Unit
Volume resistivity after water immersion Elantas test following IEC 60464 part 2	Initial value 7 d storing	$>10^{16}$ $>10^{15}$	Ω × cm
Volume resistivity , at elevated temperature Elantas test following IEC 60464 part 2	155°C 180°C	- -	Ω × cm
Electrical strength, after water immersion Elantas test following IEC 60464 part 2	Initial value 24 h storing	>100 >100	KV/mm
Electrical strength, at elevated temperature Elantas test following IEC 60464 part 2	155 °C 180 °C	- -	KV/mm
Temperature at relative permittivity tang °= 0,1 Elantas test following IEC 60250	50 Hz 1 KHz 10 KHz	- >200 >235	°C

Effect of chemicals liquid, including water

Test criterion	Condition	Value	Unit
Resistance to vapour of solvents Elantas test following IEC 60464 part 2	Xylene Methanol Hexane	resistant resistant resistant	- - -
Water absorption Elantas test following IEC 62	at 23 °C 0,5 h at 100 °C	<5 <10	mg mg
Resistance to liquids after storing Elantas test following IEC 175	Ammonia solution 10 % Acetic acid 5 % Sodium hydroxide 1% Hydrochloric acid 10 % Sulforic acid 30 % Iso-octane Toluol Transformer oil Solution of detergent	<50 <20 <10 <5 <20 <10 <20 <15 <10	mg

Manufacturing site : ELANTAS Europe S.r.l. via San Martino 6, 15028 Quattordio (AL), Italy
www.elantas.com