SynFlex Elektro GmbH
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Voltatex® 4204 1-component impregnating resin

Voltatex® 4204 is a low emission, environmentally friendly, ready-to-use impregnating, yellowish 1K dip resin based on unsaturated polyesterimide resins.

Attributes

- single component
- low emission
- very low viscosity
- environmentally friendly
- minimum exposure in the working area
- no risk of fire or explosion
- based on renewable raw materials

The cured resin compound is characterised by:

- very low tendency to crack
- very good adhesion

Application

- electric motors
- generators, also for large drives
- transformers
- in particular for mica tape insulated flat rolled litz wires
- suitable for: insulation systems of thermal class 180 (H)
- suitable for applications in medium and high voltage area

Standards

- UL approved, file no.: E 101752 (M) Unterwriters Laboritories Inc., USA
- Temperature Index 180 (H) in acc. with IEC 60085
- UL 1446 approved:

Twisted Pair	ASTM D2307	MW 35:180
		MW 80:155
Helical Coil	ASTM D2519	MW 35:200
		MW 80:180

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Delivery forms

Voltatex® 4204 is supplied in one-way-cans containing 25 kg or 200 kg.

Storage

The resin can be stored for up to 8 months at max. 25 °C if sealed correctly in original containers. Opened containers have to be resealed and protected against direct sunlight!

Hardening

Voltatex® 4204 is a low emission product, nevertheless to minimize evaporation of reactive components during curing; the impregnated objects should be heated up to curing tempera-ture in the shortest possible time. The air flow in the curing oven should also be kept to the minimum permitted by safety considerations.

Curing times:

Dip & Bake Process	130 °C 0.5-1 h
	150 °C 15-30 min.
Trickle Feed Process	130 °C 15-20 min.
	150 °C 10-15 min.

Protection

Cured Voltatex® 4204 is biologically inactive and not dangerous to health. When processing the liquid resin, please refer to the Material Safety Data Sheet (MSDS) for Voltatex® 4204.

Processing

The impregnating resin can be applied by using

- all kind of conventional dip & bake equipment
- continuous, vacuum dip and VPI processes
- dip & roll equipment
- trickle feed machines

Unlimited tank stability with resin Voltatex® 4204 can be achieved as long as the material is kept below 25 °C and at least 20 % of the tank content is used and replaced with fresh resin per month.

Cleaning

Cured Voltatex® 4204 is almost insoluble. Therefore, application equipment should be regularly cleaned with cleaner Voltatex® T050. All equipment cleaning and maintenance should be carried out in accordance with the equipment manufacturers instructions.

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Mechanical	Unit of measure	Values	Test method
Bond strength of twisted coils room temperature	N	200 ± 40	IEC 60455-2, test method A acc. IEC 61033
Bond strength of twisted coils 155 °C	N	57 ± 10	IEC 60455-2, test method A acc. IEC 61033
Shore D hardness room temperature		70 ± 5	IEC 60455-2, test method acc. ISO 868
Water absorption	%	0.6	Company standard Energy Solutions-015, acc. ISO 62
Glass transition temperature	°C	55-75	DSC-method
Volume shrinkage	%	Company standard Energy Solutions-003	

Chemical	Unit of measure	Conditions	Values	Test method
Resistance		solvent vapours	under test	IEC 60455-2, test method acc. ISO
VOC acc. 31. BImSchV	%		0.8	2010/75/EU
Resistance		Distilled water, transformer oil	resistant	company standard Energy Solutions - Voltatex® 019

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Electrical	Unit of measure	Typ. values	Test method
Dielectric strength at 23 °C and 50 % r.h.	kV/mm	60-85	IEC 60455-2, test method acc. IEC 60243-1
Dielectric strength at 155 °C	kV/mm	55-80	IEC 60455-2, test method acc. IEC 60243-1
Dielectric strength at 23 °C after 96 h storage at 92 % r.h.	kV/mm	35-75	IEC 60455-2, test method acc. IEC 60243-1
Dielectric strength at 105 °C after 168 h oil immersion	kV/mm	70-110	IEC 60455-2, test method acc. IEC 60243-1
Specific volume resistance at 180 °C	Ω*cm	10^11-10^12	IEC 60455-2, test method acc. IEC 60093
Specific volume resistance after 7 d water immersion	Ω*cm	10^14-10^16	IEC 60455-2, test method acc. IEC 60093
Creep resistance		CTI 600 M	IEC 60455-2, test method acc. IEC 60112
Dielectric constant at 23 °C between 50 Hz and 1 MHz		3.9 ± 0.4	IEC 60455-2, test method acc. IEC 60250-1
Loss factor at 155 °C and 50 Hz		140x10^-3 - 200x10^-3	IEC 60455-2
Loss factor cross section 0.2=200x10^-3	°C	150-180	IEC 60250, between 50 Hz and 1 MHz

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Liquid phase	Unit of measure	Conditions	Values	Test method
Impact on enamelled wires			compatible with all common magnet wires	IEC 60851-4
Viscosity	mPas	at 25 °C	315 ± 25	DIN 53019
Viscosity	mPas	at 40 °C	130 ± 25	DIN 53019
Reaction process gel time	min	100 °C	9.6	company standard Energy Solutions-014
Reaction process reaction time	min	100 °C	11.6	company standard Energy Solutions-014

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