SynFlex Elektro GmbH
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Voltatex® 4230 1-component-resin

Voltatex® 4230 is a low emission, ready-to-use impregnating, yellowish 1K dip resin based on unsaturated polyesterimide resins.

Attributes

- single component
- low emission
- minimum exposure in the working area
- excellent impregnating result and high efficiency due to structural-viscose behaviour

The cured resin compound is characterised by:

- low tendency to crack
- very good adhesion
- good elasticity
- high thermal and mechanical strength, even under extreme long-term stress

Application

- electric motors, also for large drives
- transformers, especially with thick wires and shaped conductors
- suitable for: insulation systems of thermal class 220 (R)

Standards

- Insulating systems up to thermal class H acc. to IEC 60085
- Temperature index according to IEC 60455-3-5: Type 220
- UL listed, file no.: E 101752 (M)
- UL approved with enamelled Cu wire

Temperature class according

Twisted Pair	ASTM D2307	MW 30:200
		MW 35:220
Helical Coil	ASTM 2519	MW 30:240
		MW 35:220

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Electrical insulation systems according to UL 1446 (IEC 61858):

Class 130	C190HE
	R150HE
	Z130HE
	Z150HE
Class 155	C290HE
	CZ255HE
	R201HE
	R203HE
	Z200HE
Class 180	R342HE
	R342HE2

Delivery forms

Voltatex® 4230 is supplied in one-way-cans containing 25 kg. Additionally 1000 kg containers (returnable) are available (not for oversea export).

Storage

The resin can be stored for up to 3 months at max. 25 °C if sealed correctly in original containers. Opened containers have to be resealed and protected against direct daylight!

Hardening

Voltatex® 4230 is a low emission product, nevertheless to minimize evaporation of reactive components during curing; the impregnated objects should be heated up to curing temperature 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):
at 130 °C: 2h
at 150 °C: 1h

Protection

Cured Voltatex® 4230 is biologically inactive and not dangerous to health. When processing the liquid resin, please refer to the Material Safety Data Sheet (MSDS) for Voltatex® 4230.

Processing

The impregnating resin can be applied by using:

- all kind of conventional dip & bake equipment
- continuous and vacuum dip processes
- VPI process

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Voltatex® 4230 generally offers specific advantages such as very low evaporation losses in impregnating tanks, high resin retention on impregnated objects and low draining losses while curing. Related to the structural-viscose behaviour the resin requires convection prior to the impregnating process in order to provide a reasonable penetration into the winding.

Unlimited tank stability with resin Voltatex® 4230 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® 4230 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 manufacturer’s instructions.

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Mechanical	Unit of measure	Values	Test method
Bond strength of twisted coils room temperature	N	240 ± 30	IEC 60455-2, test method A acc. IEC 61033
Bond strength of twisted coils 130 °C	N	80 ± 15	IEC 60455-2, test method A acc. IEC 61033
Bond strength of twisted coils 155 °C	N	70 ± 15	IEC 60455-2, test method A acc. IEC 61033
Bond strength of twisted coils 180 °C	N	55 ± 10	IEC 60455-2, test method A acc. IEC 61033
Shore D hardness room temperature		80 ± 5	IEC 60455-2, test method acc. ISO 868
Water absorption	%	0.3-0.7	IEC 60455-2, test method 1 acc. ISO 62 after 96h at 23 °C

Thermal	Unit of measure	Values	Test method
Temperature index	°C	220	IEC 60455-3-5, test method acc. IEC 60216
Bond strength IEC 60317-8	°C	MW 30: 238	IEC 61033, method B, final point 22 N
Bond strength IEC 60317-13	°C	MW 35: 229	IEC 61033, method B, final point 22 N
Testing voltage IEC 60317-8	°C	MW 30: 212	IEC 60172
Testing voltage IEC 60317-13	°C	MW 35: 222	IEC 60172

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Thermal	Unit of measure	Values	Test method
Thermal conductivity	W(m*k)^-1	0.23	acc. DIN 51046

Chemical	Unit of measure	Conditions	Values	Test method
Resistance		transformer oil, distilled water, 5 % soap-dilution	resistant	IEC 60455-2, test method acc. ISO 175
Resistance		Hexane, methanol, actone, xylene	resistant	company standard Energy Solutions 019
VOC acc. 31. BImSchV	%		4.8	2010/75/EU

Electrical	Unit of measure	Condition	Values	Test method
Dielectric strength at 23 °C and 50 % r.h.	kV/mm		100-125	IEC 60455-2, test method acc. IEC 60243-1
Dielectric strength at 155 °C	kV/mm		75-110	IEC 60455-2, test method acc. IEC 60243-1
Dielectric strength at 23 °C after 96 h storage at 92 % r.h.	kV/mm		75-100	IEC 60455-2, test method acc. IEC 60243-1
Dielectric strength at 105 °C after 168 h oil immersion	kV/mm		95-145	IEC 60455-2, test method acc. IEC 60093

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Electrical	Unit of measure	Condition	Values	Test method
Specific volume resistance at 155 °C	Ω*cm		10^9 - 10^11	IEC 60455-2, test method acc. IEC 60093
Specific volume resistance	Ω*cm	at 180 °C	10^9 - 10^11	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		typ. value	CTI 275M - 0.4	IEC 60455-2, test method acc. IEC 60112
Dielectric constant at 23 °C between 50 Hz and 1 MHz			4.0 ± 0.5	IEC 60455-2, test method acc. IEC 60250
Loss factor cross section 0.2=200x10^-3	°C		110-150	IEC 60455-2, test method acc. IEC 60250, between 50 Hz and 1 MHz

Liquid phase	Unit of measure	Conditions	Values	Test method
Viscosity	mPas	at 25 °C	700-1300	acc. DIN 53019
Reaction process gel time	min	100 °C	9.5-15.0	company standard Energy Solutions-001
Reaction process reaction time	min	100 °C	10.0-16.0	company standard Energy Solutions-001

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Liquid phase	Unit of measure	Conditions	Values	Test method
Impact on enamelled wires			Compatible with common enamelled wires	acc. IEC 60851-4

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