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Voltatex® 4201 1-component-resin

Voltatex® 4201 is a low emission, ready-to-use impregnating 1K dip resin, based on unsaturated polyesterimide resins.

Attributes

- single component
- low emission
- minimum exposure in the working area
- no classification as dangerous goods

The cured resin compound is characterised by:

- very good adhesion
- high thermomechanical strength, also when sustained loading is applied
- hard and tough

Application

Suitable for:

- insulation systems of thermal class 220 (R)
- electric motors, also large-scale machines
- high speed rotors
- transformers, especially with thick wires and shaped conductors

Standards

- UL-File-Nr.: E 101752 (M) Underwriters Laboritories Inc., USA
- Isolation-system temperature of thermal class 220 (R) acc. to IEC 60085:2007
- Temperature Index in acc. with IEC 60455-3-5, Type 220, testing method in acc. with IEC 60216
- Temperature class acc. to UL 1446:

Twisted Pair	ASTM D2307	MW 30:200
		MW 35:220
Helical Coil	ASTM D2519	MW 30:240
		MW 35:220

Insulation-system acc. to UL 1446 (IEC 61858):

Class 130	C190HE
	R150HE
	Z130HE
	Z150HE

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Updated 06/24

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Class 155	C290HE
	CZ255HE
	R201HE
	R203HE
	Z200HE
Class 180	R342HE
	R342HE2

Delivery forms

The dip resin is delivered in 25 kg one-way-cans.

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 daylight!

Hardening

Voltatex® 4201 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 2 h
	at 150 °C 1 h
Trickle Process	at 130 °C 15-30 min
	at 150 °C 10-15 min

Protection

Voltatex® 4201 is biologically inactive and safe to health. Implement normal protective measures when processing the liquid dip resin: See the Material safety data sheet (MSDS).

Processing

The impregnating resin can be applied by using all kind of conventional dip and bake equipment, continuous and vacuum dip process, VPI process and trickle feed process is also possible. Unlimited tank stability with resin Voltatex® 4201 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® 4201 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

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manufacturer’s instructions.

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Mechanical	Unit of measure	Value	Test method
Bond strength of twisted coils room temperature	N	170 - 270	IEC 60455-2 test method A acc. IEC 61033
Bond strength of twisted coils 130 °C	N	60 - 85	IEC 60455-2 test method A acc. IEC 61033
Bond strength of twisted coils 155 °C	N	40 - 60	IEC 60455-2 test method A acc. IEC 61033
Bond strength of twisted coils 180 °C	N	35 - 50	IEC 60455-2 test method A acc. IEC 61033
Shore D hardness room temperature		78 ± 5	IEC 60455-2 test method acc. ISO 868

Thermal	Unit of measure	Condition	Value	Test method
Temperature index	°C		220	IEC 60455-3-5, test method acc. IEC 60216
Thermal conductivity	W(m*k)^-1		0.23	based on DIN 501046
Bond strength	°C	IEC 60317-8/MW 30	238	IEC 6103, method B, final point 22 N
Bond strength	°C	IEC 60317-8/MW 35	229	IEC 61033, method B, final point 22 N
Testing voltage	°C	IEC 60317-8/MW 30	212	IEC 60172
Testing voltage	°C	IEC 60317-8/MW-35	222	IEC 60172

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Chemical	Unit of measure	Conditions	Value	Test method
Resistance		refrigerants/cooling machine oil systems R22, Shell 22-12	resistant	UL 984-41
Impact on enamelled wires			compatible with all common enamelled wires	
VOC acc. 31. BImSchV	%		5.8	2010/75/EU
Resistance		Transformer oil	resistant	Company Standard, Energy Solution 017

Electrical	Unit of measure	Value	Test method
Dielectric strength at 23 °C and 50 % r.h.	kV/mm	≥70	IEC 60455-2, test method acc. IEC 60243-1
Dielectric strength at 155 °C	kV/mm	≥65	IEC 60455-2, test method acc. IEC 60243-1
Dielectric strength at 23 °C after 96 h storage at 92 % r.h.	kV/mm	≥70	IEC 60455-2, test method acc. IEC 60243-1
Dielectric strength at 105 °C after 168 h oil immersion	kV/mm	≥80	IEC 60455-2, test method acc. IEC 60243-1

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Electrical	Unit of measure	Value	Test method
Specific volume resistance at 23 °C	Ω*cm	≥10^14	IEC 60455-2, test method acc. IEC 60093
Specific volume resistance at 155 °C	Ω*cm	≥ 10^10	acc, IEC 60455-2, test method acc. IEC 60093
Creep resistance		CTI 600 M	acc. IEC 60455-2, test method acc. 6.2 IEC 60112
Dielectric constant at 23 °C between 50 Hz and 1 MHz		4.0 ± 0.5	acc. IEC 60455-2, test method acc. IEC 60250
Loss factor at 23 °C from 50 Hz and 1 MHz		≤30x10^-3	IEC 60455-2, test method acc. IEC 60250
Loss factor cross section 0.2=200x10^-3	°C	≥135	

Liquid phase	Unit of measure	Conditions	Value	Test method
Gel time	min	at 100 °C	7-13	company standard Energy Solutions-001
Reaction time	min	at 100 °C	8-15	company standard Energy Solutions-001
Viscosity	mPas	at 25 °C	900 ± 200	acc. DIN 53019

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