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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.

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### 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

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### 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

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### Standards

- UL-File-Nr.: E 101752 (M) Underwriters Laboratories 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
- Polybromited Diphenylether 2003/11/EU
- RoHS-compliant 2011/65/EU
- REACH-compliant 2006/121/EU
- 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):

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Class 130 C190HE

R150HE

Z130HE

Z150HE

Class 155 C290HE

CZ255HE

R201HE

R203HE

Z200HE

Class 180 R342HE

R342HE2

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### **Delivery forms**

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

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### **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!

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### **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

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### **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).

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### **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.

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## 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 manufacturer's instructions.

Mechanical	Unit of measure	Value	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	90 ± 10	IEC 60455-2 test method A acc. IEC 61033
Bond strength of twisted coils 155 °C	N	78 ± 10	IEC 60455-2 test method A acc. IEC 61033
Bond strength of twisted coils 180 °C	N	70 ± 10	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
Testing voltage	°C	IEC 60317-8/MW-35	222	IEC 60172
Testing voltage	°C	IEC 60317-8/MW 30	212	IEC 60172
Bond strength	°C	IEC 60317-8/MW 35	229	IEC 61033, method B, final point 22 N
Bond strength	°C	IEC 60317-8/MW 30	238	IEC 6103, method B, final point 22 N
Heat conductivity	W(m*k)^-1		0.23	based on DIN 501046

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Updated 02/19

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Chemical	Conditions	Value	Test method
Resistance	refrigerants/cooling machine oil systems R22, Shell 22-12	resistant	UL 984-41
Resistance	Transformer oil, distilled water, 5 % soap-flock-dilution	resistant	IEC 60455-2, test method acc. ISO 175
Impact on enamelled wires		compatible with all common enamelled wires	

Liquid phase	Unit of measure	Value	Test method
Gel time	min	8.7	reaction process at 100 °C acc. company standard Energy Solutions - 001^1)
Reaction time	min	9.9	reaction process at 100 °C acc. company standard Energy Solutions - 001^1)
Viscosity	mPas	900 ± 200	at 25 °C acc. DIN 53019

Electrical	Unit of measure	Value	Test method
Dielectric strength at 23 °C and 50 % r.h.	kV/mm	≥ 80	IEC 60455-2, test method acc. IEC 60243-1
Dielectric strength at 155 °C	kV/mm	≥ 80	IEC 60455-2, test method acc. IEC 60243-1

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Electrical	Unit of measure	Value	Test method
Dielectric strength at 23 °C after 96 h storage at 92 % r.h.	kV/mm	≥ 80	IEC 60455-2, test method acc. IEC 60243-1
Dielectric strength at 105 °C after 168 h oil immersion	kV/mm	≥ 90	IEC 60455-2, test method acc. IEC 60243-1
Specific volume resistance at 23 °C	Ω*cm	≥ 10 <sup>15</sup>	IEC 60455-2, test method acc. IEC 60093
Specific volume resistance at 155 °C	Ω*cm	≥ 10 <sup>10</sup>	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		≤ 30 × 10 <sup>-3</sup>	IEC 60455-2, test method acc. IEC 60250
Loss factor cross section 0.2=200 × 10 <sup>-3</sup>	°C	≥ 135	

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