

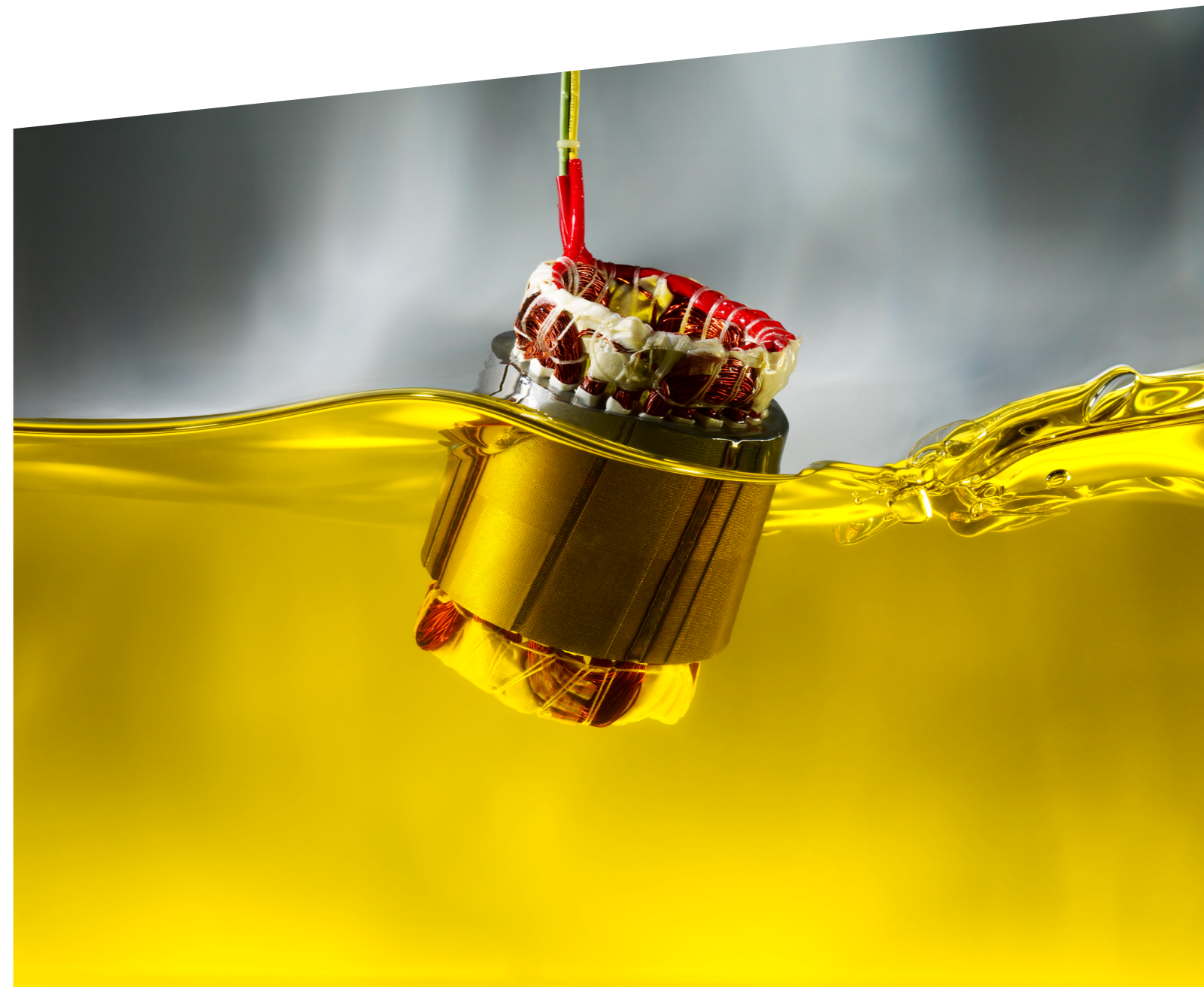


# Energy Solutions Impregnating Resins

Voltatex® Product Overview

Low emission/ monomer-free/ epoxide

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# Energy Solutions - Impregnating Resins

## Voltatex® Product Overview

Product Voltatex®	Key Characteristics	Thermal Class (IEC 60085)	UL-Recognition	Viscosity <sup>(1)</sup> [mPas/cP]	Gel Time [min]	Curing Loss <sup>(2)</sup> [%]	Typical Curing Time
4200	Unsat PEI, one component, low emission, VOC-free	220 (R)	✓	1800-2700	7.0-13.0@ 100°C	≈1.2	1h @ 150°C
4201	Unsat PEI, one component, low emission	220 (R)	✓	700-1100	7.0-13.0@ 100°C	≈2.4	1h @ 150°C
4202	Modified unsat, PE, one-component, low emission, VOC-free	180 (H)	✓	1900-2600	9.0-15.0@ 100°C	≈2.2	1h @ 160°C
4204	Unsat PEI, one component, low emission, VOC-free	180 (H)	✓	265-365	7.0-12.0@ 100°C	≈1.1	30 min @ 150°C
4210	Modified unsat, PE, one-component, low emission, VOC-free	180 (H)	(✓)	700-1100	6.0-12.0@ 100°C	≈0.6	1h @ 150°C
4224 L	Unsat PEI, one component, low emission, VOC-free	180 (H)	✓	800-1200	8.0-14.0@ 100°C	≈1.4	30min @ 150°C
4224 M	Unsat PEI, one component, low emission, VOC-free	180 (H)	✓	1200-2000	8.0-14.0@ 100°C	≈1.1	30min @ 150°C
4224 H	Unsat PEI, one component, low emission, VOC-free	180 (H)	✓	2800-3800	8.0-14.0@ 100°C	≈0.8	30min @ 150°C
4230	Unsat PEI, one component, low emission	220 (R)	✓	700-1300	11.0-17.0@ 100°C	≈1.4	1h @ 150°C
4240	Unsat PEI, one component, low emission, VOC-free	180 (H)	✗	2300-3500	10.0-16.0@ 100°C	≈1.2	15min @ 150°C
4241	Unsat PEI, one component, low emission, VOC-free	180 (H)	✗	900-1600	15.0-25.0@ 100°C	≈1.3	15min @ 150°C
4250	Unsat PEI, one component, low emission, VOC-free	220 (R)	✓	1900-2600	7.5-13.5@ 100°C	≈1.7	1h @ 150°C
4302 M	Unsat PEI, one component, low emission, VOC-free	180 (H)	✗	5500-7700	10.0-16.0@ 100°C	≈0.5	1h @ 150°C
4303	Unsat PEI, one component, low emission, VOC-free	180 (H)	✓	700-1100	9.0-15.0@ 100°C	≈0.5	1h @ 150°C
4310	Unsat PEI, one component, low emission	180 (H)	✓	800-1200	4.5-7.5@ 100°C	≈2.0	15min @ 150°C
4401	Epoxy, one-component, VOC-free, anhydride-free	180 (H)	✓	2000-4000 @ 20°C	5.0-15.0@ 155°C	≈1.0	1h @ 165°C
4411	Epoxy, two-component, VOC-free, anhydride-free	180 (H)	✗	300-500 (mixture)	20.0-25.0@ 55°C	0	24h @ 25°C

✓ = listed  
 (✓) = pending  
 ✗ = not listed  
<sup>(1)</sup> Measured at 25°C, unless otherwise specified  
<sup>(2)</sup> Emissions acc. DIN EN 60455-3-5

Shelf Life <sup>(3)</sup>	Product Description	Typical Application	Dip & Bake (atmospheric)	Vacuum Process	VPI	Hot Dipping	Resistance Heating Process	UV-Curable	Trickle	Roll-Dip
suitable for:										
8 months	Outstanding thermal endurance, resistant to refrigerants	(H)EV-Motors, (Wind) Generators, Industrial Motors	(✓)	✓	✓	✓	✓	✗	✓	✓
8 months	Viscosity-reduced version of Voltatex® 4200 including ≤ 5% VT	(H)EV-Motors, (Wind) Generators, Industrial Motors	✓	✓	✓	(✓)	(✓)	✗	✓	✓
8 months	Suitable for traction motors up to 3.3 kV, very good dielectric properties	Electric-Motors, Traction Motors, Transformers, (Wind) Generators	(✓)	✓	✓	✓	✓	✗	✓	✓
8 months	Very low viscosity and tendency to crack, excellent penetration of taped conductors (VPI)	(H)EV-, Industrial- and Traction Motors, (Wind)Generators, Designs > 1000V	✓	✓	✓	✓	✓	✗	✓	✓
6 months	Low viscosity and tendency to crack, good stability against oil and humidity	(H)EV-Motors up to 1000 V, (Wind)Generators, Industrial Motors	✓	✓	✓	✓	✓	✗	✓	✓
12 months	Thermally conductive (≈ 0.5 - 0.6 W/(m·K) <sup>-1</sup> ), partial discharge resistant, fast curing	Designs with increased needs of cooling, PD resistance	(✓)	(✓)	(✓)	✓	✓	✗	(✓)	✓
12 months	Thermally conductive (≈ 0.8 W/(m·K) <sup>-1</sup> ), partial discharge resistant, fast curing	Designs with increased needs of cooling, PD resistance	(✓)	(✓)	(✓)	(✓)	✓	✗	(✓)	✓
12 months	Thermally conductive (≈ 1.2 W/(m·K) <sup>-1</sup> ), partial discharge resistant, fast curing	Gelcoating, Hairpin Insulation	✗	✗	✗	✓	✗	✗	(✓)	✗
5 months	Viscosity-reduced and thixotropic version of Voltatex® 4200 including ≤ 5% VT	Electric Motors, (Wind) Generators, Large Drives, Transformers	✓	✓	✓	(✓)	(✓)	✗	✗	(✓)
8 months	Highly thixotropic gelcoat, high film build, thermal conductivity ≈ 0.5 W/(m·K) <sup>-1</sup>	Gelcoating, Hairpin Insulation	(✓)	✗	✗	(✓)	(✓)	✗	✓	✗
8 months	Viscosity-reduced flexible version of Voltatex® 4240	Gelcoating, Hairpin Insulation	(✓)	✗	✗	(✓)	(✓)	✗	✓	✗
8 months	UV-curable version of Voltatex® 4200	(H)EV-Motors, (Wind) Generators, Industrial Motors	(✓)	(✓)	(✓)	(✓)	✓	✓	(✓)	(✓)
12 months	Monomer free resin, low odour, very low cracking*	(Wind) Generators, Large Drives	✗	(✓)	(✓)	✓	✓	✗	✗	✗
8 months	Monomer free resin, low odour, low viscosity	Electric Motors, (Wind) Generators Large Drives	✓	✓	✓	✓	✓	✗	✓	✓
4 months	High bond strength, excellent thermo-mechanical endurance	Power Tools	✗	✗	✗	✗	✗	✗	✓	✓
12 months @ ≤ 20°C	Accelerated curing (1 h @ 160 - 165 °C)	Low Voltage Traction Motors, Electric Motors	✓	✓	✓	✓	✓	✗	✓	✓
12 months	Ambient curing or at mild elevated temperatures	Stators and Rotors for Electric Motors	✗	✗	✗	✗	✗	✗	✓	✗

✓ = recommended  
 (✓) = conditionally recommended (please consult us)  
 ✗ = not recommended  
<sup>(3)</sup> Valid at ≤ 25°C, unless otherwise specified