



Energy Solutions Wire Enamels and Lubricants

Product Overview

Voltatex[®], Voltron[®], Voltalube



Energy Solutions Wire Enamels

Voltatex® Product Overview

Chemical base	Thermal class (°C)	Productname	Solid content (1g/1h/180°C)	Viscosity DIN 53 015 DIN 53 019	Dimension range recommended ⁽⁹⁾
UL File No. E102069			[%]	[mPa·s] [23°C]	[Ø in mm]
POLYURETHANE WIRE ENAMEL					
POLYURETHANE	155	Voltatex® 6125	24.0 – 26.0	30 – 40	0.01 – 0.60
		Voltatex® 6129	28.0 – 30.0	60 – 80	
		Voltatex® 6135	34.0 – 36.0	150 – 350	0.30 – 1.00
		Voltatex® 6225	24.0 – 26.0	25 – 60	0.01 – 0.60
		Voltatex® 6424	23.0 – 25.0	35 – 55	0.01 – 0.30
	180	Voltatex® 6335 gold	34.0 – 36.0	400 – 600	0.30 – 1.00
POLYURETHANE (modified)	200	Voltatex® 6534	33.0 – 35.0	440 – 600	0.30 – 1.80
		Voltatex® 6540	38.0 – 41.0	2,300 – 2,900	0.30 – 1.80
		Voltatex® 6725	24.0 – 26.0	50 – 80	0.01 – 0.80
		Voltatex® 6727	26.0 – 28.0	80 – 120	0.01 – 0.80
		Voltatex® 6729	28.0 – 30.0	120 – 200	0.01 – 0.80
POLYESTERIMIDE WIRE ENAMEL					
THEIC modified POLYESTER	220	Voltatex® 7140 A	39.0 – 41.0	500 – 600	0.20 – 3.00
		Voltatex® 7145 A	44.0 – 46.0	1,600 – 2,000	0.30 – 5.00
POLYESTERIMIDE	200	Voltatex® 7225 AG	24.0 – 25.0	40 – 55	0.01 – 0.80
		Voltatex® 7236	35.0 – 37.0	300 – 600	0.30 – 2.50
		Voltatex® 7240	39.0 – 41.0	700 – 900	
THEIC modified POLYESTERIMIDE	200	Voltatex® 7325 A	23.0 – 25.0	35 – 50	0.01 – 0.80
		Voltatex® 7339 A	38.0 – 40.0	700 – 900	0.30 – >3.00
		Voltatex® 7338 AX	37.0 – 39.0	500 – 1,000	0.30 – >2.00
		Voltatex® 7340 AX	39.0 – 41.0	1,100 – 1,600	0.30 – >3.00
		Voltatex® 7342 AX	41.0 – 45.0	1,900 – 2,500	0.30 – 5.00
		Voltatex® 7329 B	27.5 – 29.5	70 – 90	0.01 – 0.80
		Voltatex® 7336 B	35.0 – 37.0	500 – 700	0.10 – 1.50
		Voltatex® 7338 B	37.0 – 39.0	650 – 950	0.10 – 1.50
		Voltatex® 7340 B	39.0 – 41.0	900 – 1,200	0.30 – >3.00
	Voltatex® 7342 B	41.0 – 44.0	1,200 – 2,200	0.30 – >3.00	
	180	Voltatex® 7433	32.0 – 34.0	800 – 1,100	0.50 – >5.00
	200	Voltatex® 7538	37.0 – 39.0	500 – 900	0.30 – >3.00
	220 ⁽⁹⁾	Voltatex® 7740	38.5 – 41.0	2,200 – 3,000 ⁽²⁾	0.20 – >3.00
200	Voltatex® 7735 FL	33.5 – 35.0	800 – 2,000	0.50 – >5.00	
POLYAMIDEIMIDE WIRE ENAMEL					
POLYAMIDEIMIDE	220	Voltatex® 8123	22.0 – 24.0	70 – 150	0.10 – 0.80
		Voltatex® 8132	31.0 – 33.0	500 – 1,000	0.30 – 5.00
		Voltatex® 8137	35.0 – 38.0	1,500 – 2,500	0.50 – 5.00
	240	Voltatex® 8227	25.0 – 29.0	1,700 – 2,700	0.50 – 5.00
POLYAMIDEIMIDE (modified)	-	Voltatex® 8227SL	25.5 – 27.5	1,800 – 2,800	0.50 – 5.00
POLYAMIDEIMIDE	220	Voltatex® 8327	26.0 – 28.0	2,100 – 2,900 ⁽²⁾	0.50 – 5.00
POLYAMIDEIMIDE (modified)	200	Voltatex® 8534	33.0 – 35.0	500 – 1,000	0.20 – >3.00
POLYAMIDE (Nylon)	-	Voltatex® 9511	10.0 – 12.0	480 – 620	-
POLYAMIDEIMIDE PRIMER					
POLYAMIDEIMIDE (modified)	180	Voltatex® 9127	26.0 – 28.0	1,300 – 1,900 ⁽²⁾	1.00 – 5.00
POLYVINYLFORMAL WIRE ENAMEL (FORMVAR)					
POLYVINYLFORMAL (modified)	105	Voltatex® 9218	17.0 – 23.0	3,500 – 5,500 ⁽²⁾	0.30 – >5.00
	120	Voltatex® 9224	23.0 – 25.0	4,000 – 6,000 ⁽²⁾	
SELFBONDING WIRE ENAMEL					
POLYAMIDE		Voltatex® 8611 C	10.0 – 12.0	300 – 400	0.03 – 0.50
		Voltatex® 8616 C	15.0 – 17.0	600 – 800	0.30 – 2.00
BUTYRAL		Voltatex® 8710	8.5 – 10.5	50 – 80	0.01 – 0.50
		Voltatex® 8718	16.5 – 18.5	500 – 700	0.20 – 1.00
EPOXY		Voltatex® 8816	15.0 – 17.0	300 – 600	0.30 – 3.00
IMPREGNATING VARNISHES FOR GLASS FIBRE COVERED & BRAIDED WIRES					
POLYURETHANE		Voltatex® 9848	47.0 – 49.0	500 – 1,000	-

Voltatex®	Conductor diameter ⁽⁴⁾	Flexibility and adherence	Solderability temperature / soldering time	Dissipation factor recommended ⁽⁸⁾	Cut through temperature tested (Lüscher)	Heat shock (1xd)		
	[Ø in mm]	[1xd]	[°C / sec]	[°C]	[°C]	[1xd] [°C]		
6125	0.10	5 % ⁽⁵⁾	320 / <4.0 ⁽⁶⁾	135 - 160	220	175 ⁽⁵⁾		
6129	0.10	5 % ⁽⁵⁾	375 / <1.0 ⁽⁶⁾					
6135	0.65	5 %	375 / <1.0 ⁽⁶⁾					
6225	0.10	15 %	375 / <1.0 ⁽⁶⁾	135 - 160	230	175		
6424	0.06	5 %	375 / 0.5 ⁽⁶⁾	150 - 160	230	-		
6335 gold	0.65	10 %	375 / <2.5 ⁽⁶⁾	130 - 150	230	190		
6534	0.65	5 %	375 / <2.5 ⁽⁶⁾	170 - 190	240	190		
6540								
6725	0.10	10 % ⁽⁵⁾	375 / <4.5 ⁽⁶⁾	170 - 190	260	210 ⁽⁵⁾		
6727	0.65	5 %	375 / <6.0 ⁽⁶⁾					
6729								
7140 A	1.00	15 %	-	165 - 180	400	240 ⁽⁹⁾		
7145 A								
7225 AG	0.10	20 % ⁽⁵⁾	470 / <3.5 ⁽⁷⁾	185 - 205	320	220 ⁽⁵⁾		
7236	0.65	15 %	470 / <6.5 ⁽⁷⁾	185 - 205	320	200		
7240								
7325 A	0.30	20 %	-	190 - 215	360	220		
7339 A	1.00	15 %						
7338 AX	1.00	15 %						
7340 AX	1.00	15 %						
7342 AX	1.00	15 %						
7329 B	0.30	20 %						
7336 B	0.65	20 %						
7338 B								
7340 B								
7342 B	0.65	25 %						
7433	1.00	15 %						
7538	0.65	15 %						
7740	1.00	5 %			-	190 - 220	380	200
7735 FL							380	180
8123	0.30	15 %			-	260 - 290	400	300
8132	1.00	10 %	-	260 - 290	400	300		
8137	1.00	10 %	-	260 - 290	400	300		
8227	1.00	10 %	-	260 - 300	400	300		
8227SL	-	-	-	-	-	-		
8327	1.00	10 %	-	240 - 280	380	300		
8534	1.00	5 %	-	260 - 290	400	300		
Can be applied as overcoat on thermosetting and solderable enamelled wire without reducing their solderability								
9127	1.00	30 %	-	100 - 130	300	300		
9218	1.00	30 %	-	100 - 120	230	-		
9224	1.00	10 %	-	110 - 130	240	160		
		Layer thickness	Baking conditions	Bond strength	Resoftening temp.			
8611 C	0.315	29µ + 17µ	1 h at 170°C	2.2 N	210°C			
8616 C								
8710	0.315	30µ + 17µ	1 h at 140°C	1.6 N	108°C			
8718								
8816	0.315	30µ + 17µ	1 h at 180°C	1.8 N	140°C			

Impregnating varnish without cresylic acid solvent is used for types of glass braided copper wire or strip, single or binned. High resistance against thermal stress, excellent electrical and mechanical properties, diluent Voltatex® 9959

Voltatex®	Temperature index acc. IEC 172	UL listed (Underwrites Laboratories)	Special characteristics and applications
	[°C]	File No. E102069	
6125	174 ⁽⁵⁾	yes	Excellent solderable; soldering temperature >320°C; conform to IEC 60317-20.
6129			
6135			
6225			
6424			
6335 gold	155 ⁽¹⁾		Excellent solderability at temperature of ≥ 375 °C; high cut through temperature; high application speed.
	155 ⁽¹⁾		Excellent solderability at temperature of ≥ 320 °C; Pin-hole and crazing resistance to JIS.
6534	195		Solderable magnet wire; pin-hole and crazing resistant; conform to IEC 60317-51.
6540	210	yes	Solderable magnet wire; pin-hole and crazing resistant; conform to IEC 60317-51.
6725			
6727			
6729			
7140 A	220	yes	THEIC modified Polyester basecoat for aluminium and copper wires.
7145 A			
7225 AG	217 ⁽⁵⁾	yes	Solderable above 450 °C, hot staking process possible, good elasticity, good dielectric and mechanical properties, conform to IEC 60317-23.
7236	217		
7240	217		
7325 A	205	yes	THEIC Polyesterimide for fine wires.
7339 A			Voltatex® 7339 A with improved viscosity / solid content ratio and wide application range.
7338 AX			Improved heat shock and flexibility, ballasts for fluorescent lamps and hermetic units.
7340 AX			
7342 AX			
7329 B	215	yes	Among others ballasts for fluorescent lamps and hermetic units with improved heat shock. Practice has shown excellent flexibility results.
7336 B			
7338 B			
7340 B			
7342 B			
7433	187 ⁽⁹⁾	yes	Rectangular and heavy round conductors, combined with PAI topcoat ⁽¹¹⁾ is possible.
7538	215	no	Polyesterimide basecoat for aluminium wires (test data are based on copper wire).
7740	213 / 222 ⁽⁹⁾	yes	For round conductor, outstanding resistance to partial discharges. ⁽¹⁰⁾
7735 FL			Specially developed for rectangular conductor, outstanding resistance to partial discharges. ⁽¹³⁾
8123	230	yes	Both overcoat and single coat, mainly used as a topcoat in combination with a polyester or polyesterimide basecoat.
8132			
8137			
8227	240	yes	
8227SL	–	–	Self-lubrication effects, mainly used as a last topcoat layer with low coefficient of friction.
8327	232	yes ⁽¹²⁾	Both overcoat and single coat for both rectangular and e.g. round conductors.
8534	200	yes	Overcoat and single coat with outstanding resistance to partial discharges. ⁽¹³⁾
Provides exceptionally fine finishes with minimum friction factor.			
9127	186	no	Primer for heavy round and rectangular conductor, superior adherence and flexibility. With excellent mechanical properties. Heavy round and rectangular conductors for use in:
9218	105	no	superconductor application
9224	120	no	hermetic application; transformer oil resistant acc. to IEC60 851-4
Bond topcoat over polyesterimide or polyurethane basecoat			
Bonding wire enamel without cresylic acid solvent, bond topcoat over Polyurethane.			
Bond topcoat, Epoxy based, cresol free. For round and rectangular wires.			

⁽¹⁾ estimated

⁽²⁾ measuring temperature: 25 °C

⁽³⁾ depend on process condition

⁽⁴⁾ under normal test conditions on pilot equipment

⁽⁵⁾ tested on conductor diameter 0.30mm

⁽⁶⁾ composition of the solder bath: Sn/Pb = 60/40

⁽⁷⁾ composition of the solder bath: Pb/Sn = 92/8

⁽⁸⁾ depend on wire diameter and process conditions

⁽⁹⁾ with PAI Voltatex® topcoat

⁽¹⁰⁾ preferably top coated with Voltatex® 8227

⁽¹¹⁾ preferably top coated with Voltatex® 8327

⁽¹²⁾ 180 in combination with basecoat Voltatex® 7433

⁽¹³⁾ as occur e.g. in inverter fed motors mainly used in combination with Voltatex® 7740

Energy Solutions Wire Enamels

Voltron® Systems



CR Systems	Wire Enamel	Ratio of WE	Passes*	Magnet Wire Range	Mechanical Stability	Chemical Stability	Corona Resistance
Voltron® System 1210	Voltatex® 7740 base coat	100 %	> 10	standard round: 0.3 - 2.00 mm	+	+	+++
Voltron® System 1220	Voltatex® 7740 base coat	85.0 % +/- 2.5 %	> 10	standard round: 0.3 - 2.00 mm	++	++	++
	Voltatex® 8227 top coat	15.0 % +/- 2.5 %	> 3				
Voltron® System 1230	Voltatex® 7740 base coat	70.0 % +/- 5.0 %	> 8	standard round: 0.3 - 2.00 mm	++	++	+
	Voltatex® 8227 top coat	30.0 % +/- 5.0 %	> 3				
Voltron® System 1321	Voltatex® 9127 primer	7.5 % +/- 2.5 %	1 - 2	heavy round: > 2.00 mm	+++	++	+
	Voltatex® 7740 base coat	77.5 % +/- 5.0 %	> 7				
	Voltatex® 8227 top coat	15.0 % +/- 5.0 %	> 2				
Voltron® System 1421	Voltatex® 9127 primer	7.5 % +/- 2.5 %	1 - 2	rectangular / square	+++	++	+
	Voltatex® 7735FL base coat	77.5 % +/- 5.0 %	> 7				
	Voltatex® 8227 top coat	15.0 % +/- 5.0 %	> 2				
Voltron® System 2230	Voltatex® 7740 base coat	70.0 % +/- 5.0 %	> 7	standard round: 0.3 - 2.00 mm	++	+++	+++
	Voltatex® 8534 top coat	30.0 % +/- 5.0 %	> 3				
Voltron® System 2240	Voltatex® 8534 base coat	100 %	> 15	standard round: 0.3 - 2.00 mm	+++	++	+++
Voltron® System 3230	Voltatex® 7340AX base coat	70.0 % +/- 5.0 %	> 7	standard round: 0.3 - 2.00 mm	+++	++	+
	Voltatex® 8534 top coat	30.0 % +/- 5.0 %	> 3				

Energy Solutions Lubricants

Voltalube Product Overview

Name	Type	Evaporation rate (Ether=1)	Minimum storage temperature	Slipping coefficient (μH) ca.	Stickiness
Voltalube A 0.15 %	premium blend wax	3.3	10 °C	0.1	++
Voltalube A 0.30 %	premium blend wax	3.3	10 °C	0.1	++
Voltalube A 0.30 % 100/140	premium blend wax	9	10 °C	0.1	++
Voltalube B 1.0 %	paraffin wax	20	10 °C	0.11	++
Voltalube B 2.0 %	paraffin wax	20	10 °C	0.11	++
Voltalube C 1.5 %	premium blend wax	20	10 °C	0.1	++
Voltalube D3000	premium blend wax	20	15 °C	0.1	++
Voltalube D4000	premium blend wax	50	15 °C	0.1	++
Voltalube E (0.15 - 10 %)	ester wax	400	15 °C	0.09	+++
Voltalube F 0.5 %	premium blend wax	20	15 °C	0.1	++

Voltalube Lubricants are recommended for copper and aluminium wires of 0,01 to 1,00 mm. In our product range you find fast drying and medium evaporating lubricants. If there is enough time to dry (the distance between application of lubricant and winding is long enough) there are advantages for the medium drying products; less evaporation into environment, less concentration of flammable gas.

Dosage and concentration: Apply with felt rollers, felt, sponge, spraying or capillarity system. The application felt stays wet due to the optimized evaporation of the lubricant. The dosage brings appr. 5 mg/m² lubricant onto the wire. If slidability is too poor and cannot be adjusted with the dosage system, higher wax concentration are needed. For good slidability and windability the friction value of the wire has to be lower than 0.13. Without lubricant values are between 0.15 and 0.35.

If stored above the mentioned minimum storage temperature, lubricant may become cloudy and unsuitable for its intent purpose. If this happens, store at recommended storage temperature until product becomes clear again. Do not use cloudy lubricants.

Further information can be taken from the material safety data sheet.
All information, expressed or implied, is provided without warranty.

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