

VESTALITE® P 341

(PRELIMINARY)

GENERAL DESCRIPTION

VESTALITE® P 341 is a polyurethane-based resin intended for prepreg impregnation. It gives room temperature stable, dry and non-tacky prepregs, which can be formed thermoplastically at 70 - 100°C and cured at temperatures between 150 and 180°C. Due to high adhesion and flexibility of the resin the resulting prepregs are particularly suitable for local reinforcement of metal structures by a fast prepreg compression molding (PCM) process.

APPLICATION

Re-reinforcement patches for stiffening metallic structural automotive parts.

BENEFITS

- Non-toxic material with no VOC
- Storage at ambient temperature and atmospheric humidity
- Easy handling without release papers
- Automated pre-forming without binder
- Excellent mechanical properties, especially toughness and ductility
- High adhesion on automotive steel and aluminum grades
- No adhesive application required
- Pre-curing and/or post-curing outside forming tool allows for short cycle times (~1 min at 180°C)
- Low exothermic reaction which can be specifically stopped and re-started
- Post-curing can be integrated into dip coating process

PRODUCT DATA

VESTALITE® P 341 Resin System	Value	Unit	Standard
Solids	60 - 65	%	Calculated
Color	0 - 1,0	Gardner	DIN EN ISO 4630
Viscosity at 23°C	300 - 4.000	mPa*s	ISO 3219, OECD 114
Exothermic Peak	200	°C	DSC [10K/min]
Geltime at 180°C	200 - 300	s	Geltimer (Plate)
Shelf Life at 23°C	8	week	
at -18°C	> 1	year	

RESIN PROPERTIES AFTER PREPREG STEP

VESTALITE® P 341 Resin System	Value	Unit	Standard
Tack	zero		
Volatiles	< 5	%	Weight Constancy
Exothermic Peak	190 - 200	°C	DSC [10K/min]
Shelf Life at 23°C	25	week	
at -18°C	>>1	year	
Curing Conditions at 140°C	20*	min	
at 160°C	60		
at 170°C	45		
at 190°C	30		

*only ~ 80% conversion. Reaction times by isothermal DSC measurements; do not include time for heat transfer into material (dependent on equipment)

RHEOLOGICAL BEHAVIOUR OF PREPREG MATRIX

Temperature rate [K/min]	Minimum melt viscosity [Pa s]	Temperature [°C]
2	0.5	130 - 150
5	1	150 - 170

ADHESION

Substrate	Material number	Surface treatment	Lap shear strength* [MPa]
Steel HDT580X DP 600	1.0936	Z140 (Hot dip galvanized 140g/m ²)	21 ± 2.0
Steel DC 01 ZE 25/25	1.0330	electrolyt. galvanized + Cathoguard 580 coating	16.8 ± 0.3
Steel HC340LA	1.0548	untreated	20.3 ± 1.5
Aluminium 6016		untreated	18.0 ± 1.1
Aluminium 6016		300µm PU resin as primer	15.4 ± 2.6
Aluminium 6016		300µm PU resin as primer after 5d, 50°C, 100% rel. humidity	8.3 ± 1.7

*according to standard DIN EN 65148

LAMINATE PROPERTIES

NEAT FORMULATION

Neat Resin properties		Value	Unit	Standard
Tensile Modulus	E_t	3150	MPa	DIN EN ISO 527-2
Tensile Stress at Break	σ_{tB}	65	MPa	DIN EN ISO 527-2
Tensile Strain at Break	ϵ_{tB}	2.1	%	DIN EN ISO 527-2
Flexural Modulus	E_f	3000	MPa	DIN EN ISO 178
Flexural Strength	σ_{fB}	95	MPa	DIN EN ISO 178
Flexural Strain at Break	ϵ_{fB}	4.2	%	DIN EN ISO 178
Glass Transition Temperature (DSC)	T_g	110	°C	DIN EN ISO 11357-2
Chemical Shrinkage		0.7	%	pVT Method
CTE < T_g (20 - 100 °C)	α	70	ppm/k	TMA [1K/min]
> T_g (120 - 190°C)		190		
Density	ρ	1.13	g/cm ³	OECD 109

LAMINATE PROPERTIES

Glass Fiber Reinforced Laminates*		Value	Unit	Standard
Interlaminar Shear Strength (ILSS)	τ_M	80	MPa	DIN EN ISO 14130
Carbon Fiber Reinforced Laminates**				
Interlaminar Shear Strength (ILSS)	τ_M	75	MPa	DIN EN ISO 14130
0° Tensile Strength		1029	MPa	DIN EN ISO 527-4
0° Tensile Modulus		51	GPa	DIN EN ISO 527-4
0° Tensile Strain		1.8	%	DIN EN ISO 527-4
0° Compression Strength		647	MPa	DIN EN ISO 14126
0° Compression Modulus		51	GPa	DIN EN ISO 14126
0° Compression Strain		1.5	%	DIN EN ISO 14126
45° Shear Strength		67	MPa	DIN EN ISO 14129
45° Shear Modulus		3.9	GPa	DIN EN ISO 14129
Flexural Strength		930	MPa	DIN EN ISO 14125
Flexural Modulus		55	GPa	DIN EN ISO 14125

*Reinforcement: Glass Fiber; 80% UD linen fabric; 223g/m²; Fiber Volume Content: 55 ± 2%

**Reinforcement: Carbon Fiber; ±0/90° Crossply NCF; 304g/m²; Fiber Volume Content: 50± 2%

SAFETY AND HANDLING

For the most current Safety and Handling information, please refer to the Material Safety Data Sheet of VESTALITE® P 312 Resin.



Marl, March 4, 2019; This data sheet replaces all former issues.

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