

-----Composite Systems for Wind Energy Technology-----

Epoxy Infusion System – Hardener SIN B17

Polynt's SIN B17 is the world's first Epoxy resin hardener based on anhydride chemistry that has been specially formulated for resin infusion at room temperature. Using SIN B17 combined with Bisphenol A epoxy resin, wind turbine blade manufacturers can create longer, lighter and stronger blades than ever before.

Key features include:

- Excellent transversal tensile strength and fatigue performance
- Very high heat deflection and glass transition temperature
- Low exotherm (7.2 J/g)
- Low resin mix viscosity, even at low temperatures
- Excellent fibre wetting properties
- Low sensitivity to humidity
- Shorter process cycle times
- Low toxicity
- Non-corrosive (lower handling and transport costs than Amine systems)

The low mix viscosity of SIN B17 makes the resin easy to pump, resulting in shorter process cycle times and improved blade quality. In addition, SINB17 increases transversal tensile strength and fatigue performance, allowing stronger, lighter, and longer blades.

Broadview Technologies can offer multiple product grades of SIN B17, allowing our users to customize the pot life, infusion time, reactivity, post cure time and melt stability.

Application

Production of large composite components, via or resin infusion and injection molding.

Mixing and Handling

Combine hardener SIN B17 and modified epoxy resin in a convenient 1:1 mix ratio. Hardener and resin must be homogeneously mixed by mechanical stirrer. In the final mixture, air absorption should be kept to a minimum. Mix the system components only before utilization; as soon as the material is mixed the reaction begins.

Caution: A large mixed product mass will develop substantial reaction heat (exothermic reaction) increasing system reactivity, whereas a small mass with greater thermal exchange reduces cross-linking speed. If the mixed system is left in a confined mixing vessel, the heat cannot be dispersed and the reaction will become uncontrollable.



Cured Matrix System Mechanical Properties

System: Hardener SIN B17 + Epoxy resin Bisphenol A + reactive diluent.

Mixing ratio by weight: 100g/100g

Cure in the mold: 4 h @ 40°C + 24 h @ ambient temperature.

Post cure in the mold: 24 h @ ambient temperature + 15 h @ 90°C.

Cured Matrix Properties	SIN B17	Dow Airstone 785H
Tensile Strength (Psi)	10,878	10,153
Heat Deflection Temperature C°	94	77
Elastic Modulus (Psi)	428,587	493,128
Flexural Strength (Psi)	17,500+	17,500+
Flexural Modulus (Psi)	400,000+	400,000+
Elongation at max. load, (%)	6.2	5.4
ΔH (J/g)	7.2	n/a
Barcol Hardness	34	n/a
Viscosity at 20 C° (Cp)	250-300	340
Viscosity at 25 C° (Cp)	170-220	250
Viscosity at 30 C° (Cp)	120-170	150
Gel Time @ 20 C° (hr)	>10 (film 1 mm)	n/a
Gel Time @ 30 C° (hr)	7-9 (film 1 mm)	n/a
Gel Time @ 40 C° (hr)	4-5 (film 1 mm)	n/a
Pot life @ 25 C° (min) (1 gal mass)	90 min	180 min



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Components Characteristics

Hardener SIN B17

Characteristic	Unit	Value
Appearance		Liquid
Color		Dark green
Density @ 25°C	g/ml	1.20-1.21
Viscosity @ 15°C	cP	200-210
Viscosity @ 20°C	cP	130-140
Viscosity @ 25°C	cP	90-100
Viscosity @ 30°C	cP	70-80

Epoxy Resin

Epoxy resin Bisphenol A (EE 185-195) modified with a bi-functional reactive diluent.

System Characteristics

Standard System

Hardener SIN B17: 100 by weight
Epoxy resin Bisphenol A + Reactive diluent: 100 by weight

System properties can vary depending on epoxy resin component.

Mixed System

Characteristic	Unit	Value
Appearance		Liquid
Color		Dark green
Initial System Viscosity @ 15°C	cP	400-450
Initial System Viscosity @ 20°C	cP	250-300
Initial System Viscosity @ 25°C	cP	170-220
Initial System Viscosity @ 30°C	cP	120-170



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Cured Laminate Properties

Glass fiber: 6 layer EBX 0-90° type CD 800 OCF.

Cure in the mold: 3 h @ 40°C + 24 h @ ambient temperature.

Post cure in the mold: 5 h @ 40°C + 24 h @ 75°C.

Glass fiber %	67.6
ΔH (J/g)	7.2
Tensile Strength (Psi)	65,702
Elastic Modulus (Psi)	3,937,775
Flexural Strength (Psi)	109,503
Flexural Modulus (Psi)	3,511,509
Elongation at max. load (%)	3.7
Flexural Deflection (mm)	5.7
Glass Transition (TMA) °C	82
Barcol Hardness	60

Packaging: Steel painted drums, IBC.

Storage: Store away from open flames and other potential ignition sources. Protect from moisture, store at temperature below 30C (86 F)

Shelf Life: 6 months from production date

Curing: Post curing treatment is recommended to get system stability and generate optimum mechanical properties. Suggested general post conditions: 10 – 15 hours @ 70°C (155 - 160 F)

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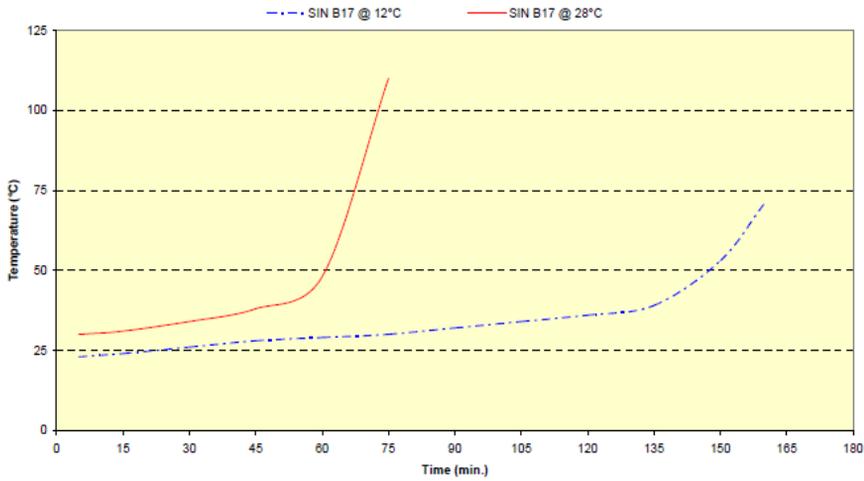
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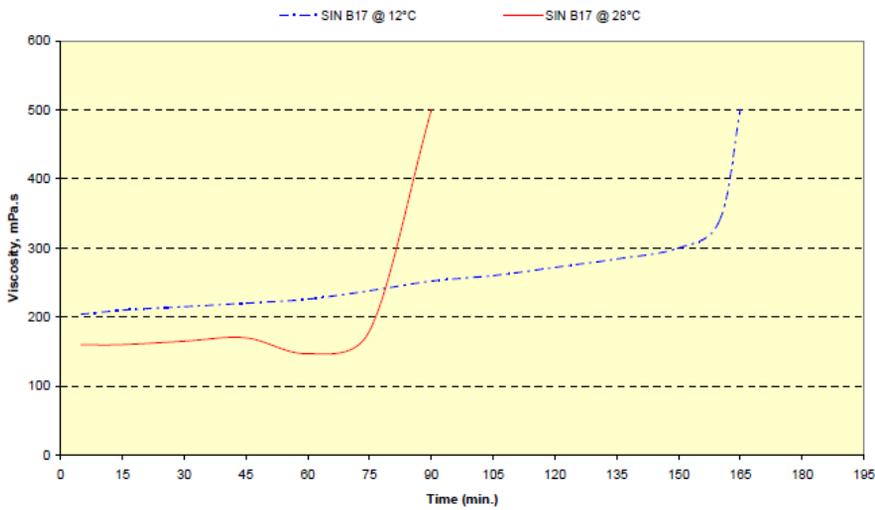
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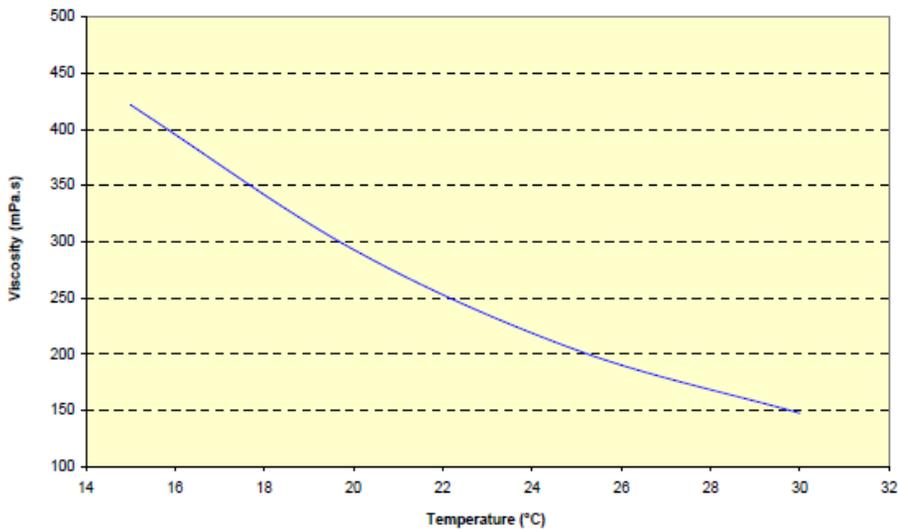
Exothermal profile infusion system SIN B17 @ different ambient temperature (Test mass 10 kg)



Viscosity infusion system SIN B17 @ different ambient temperature (Test mass 10 kg)



System Initial Mixed Viscosity



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