

## SR GreenPoxy 28 / SH 166 / SA 7900C

Biobased epoxy system for filament winding

**SR GreenPoxy 28 / SH 166 / SA 7900C** is a biobased epoxy–anhydride system with accelerator, specially designed for hot processing methods such as filament winding and hot compression.

- Low viscosity: excellent impregnation of all types of reinforcements.
- Long pot life, with reactivity adjustable according to the accelerator SA 7900C content.
- Excellent mechanical and thermal performance.
- Glass transition temperature (Tg) 140 °C after post-curing.

<b>SR GreenPoxy 28 / SH 166 / SA 7900C</b>			
<b>Mixing ratio</b>	By weight	100 / 90 / 1	100 / 90 / 2
<b>Initial viscosity (mPa.s)</b>	25 °C	1 025	1 150
	80 °C	27	31
	140 °C	6	6
<b>Density (kg/L)</b>	20 °C	1.20	
<b>T<sub>g</sub>2 (°C)</b>		140	
<b>Gel time</b>	80 °C	1 h 30	55 min
	120 °C	7 min	4 min
	140 °C	3 min	2 min

## Resin

		<b>SR <i>GreenPoxy 28</i></b>
<b>Aspect and color</b>		Viscous liquid
<b>Gardner color</b>		≤ 2
<b>Viscosity</b> (mPa.s)	20 °C	23 500
	25 °C	9 750
	30 °C	4 590
<b>Density</b> (kg/L)	20 °C	1.17
<b>Biobased carbon content (%)</b>		28
<b>Shelf life</b>	23 °C	24 months

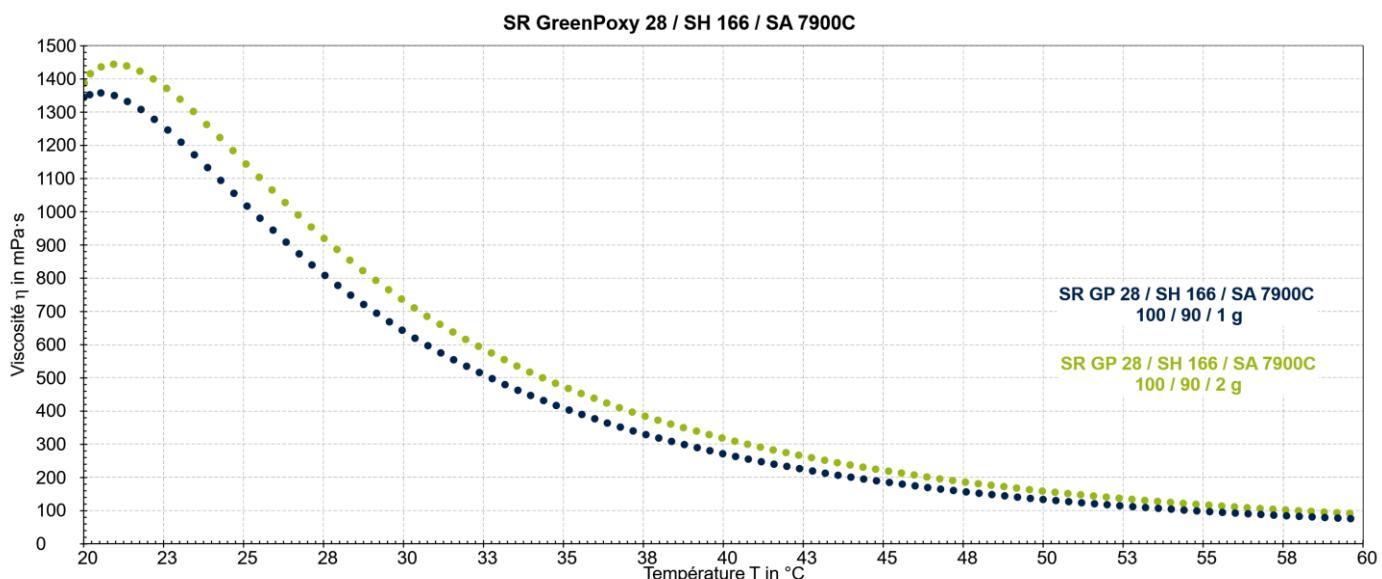
## Hardener

		<b>SH 166</b>
<b>Aspect et color</b>		Yellow liquid
<b>Gardner color</b>		< 2
<b>Viscosity</b> (mPa.s)	20 °C	92
	25 °C	65
	30 °C	48
<b>Density</b> (kg/L)	20 °C	1.23
<b>Shelf life</b>	23 °C	24 months

## Mixtures SR GreenPoxy 28 / SH 166 / SA 7900C

		<b>SR GreenPoxy 28 / SH 166 / SA 7900C</b>	
<b>Mixing ratio</b>	By weight	100 / 90 / 1	100 / 90 / 2
<b>Initial viscosity</b> (mPa.s)	25 °C	1 000	1 150
	80 °C	27	31
	120 °C	8	11
	140 °C	6	6
<b>Gel time</b>	80 °C	1 h 30	55 min
	120 °C	7 min	4 min
	140 °C	3 min	2 min
<b>Density</b> (kg/L)	20 °C	1.20	1.20

## Initial mix viscosity



## Post-curing

The mechanical properties on an epoxy system can be optimized through the implementation of a post-curing cycle. The Sicomin laboratory uses predefined cycles to create technical data sheets and facilitate the comparison of different systems. These experimental cycles can be adapted to the specific target application, taking into account the following parameters:

- Selected epoxy system ( $T_g2$ )
- Available heating methods
- Dimensions and sampling of the piece
- Nature of the tooling (thermal conductivity of the material)

Many system can provide good mechanical properties after curing at room temperature ( $>18^\circ\text{C}$ ) for 24 to 48 hours before demolding. However, mechanical properties improve rapidly with a slightly higher temperature, around  $40^\circ\text{C}$ , for several hours.

Epoxy systems with high  $T_g$  and slow hardeners imperatively require post-curing at higher temperature. The post-curing can start immediately after the exothermic peak, but it can also begin later, after the assembly of different components and before finishing operations. If the nature of the models and tooling is not suitable for high temperatures, we recommend carrying out the initial steps up to a maximum admissible temperature, then, after cooling and demolding, continuing the cycle with suitable former.

For a conventional epoxy system, we recommend a step-by-step cycle of  $20^\circ\text{C}$  each for a duration of 4 hours.

Example for an epoxy system with a  $T_g2$  of  $100^\circ\text{C}$ :

4 h at  $40^\circ\text{C}$  + 4 h at  $60^\circ\text{C}$  + 4 h at  $80^\circ\text{C}$  + cooling at room temperature before demolding.

There are many epoxy systems with short, high temperature curing cycles that do not fit into this post-curing scheme (pultrusion, hot press, pre-preg). For these systems, the initial curing achieves maximum mechanical performance without post-curing.

We invite you to contact our technical department for any questions on this subject.

## Mechanical properties on cast resin

		<b>SR GreenPoxy 28 / SH 166 / SA 7900C</b>	
<b>Mixing ratio</b>	By weight	100 / 90 / 1	100 / 90 / 2
<b>Post-curing cycle*</b>	4 h 80 °C + 8 h 140 °C		
<b>Tensile</b>			
Modulus	N/mm <sup>2</sup>	3 300	3 200
Maximum strength	N/mm <sup>2</sup>	85	66
Breaking strength	N/mm <sup>2</sup>	85	66
Elongation at max. strength	%	4.2	2.5
Elongation at break	%	4.2	2.5
<b>Flexion</b>			
Modulus	N/mm <sup>2</sup>	3 000	2 900
Maximum strength	N/mm <sup>2</sup>	143	132
Breaking strength	N/mm <sup>2</sup>	143	132
Elongation at max. strength	%	5.9	5.6
Elongation at break	%	5.9	5.6
<b>Shear</b>			
Breaking strength	N/mm <sup>2</sup>	50	56
<b>Compression</b>			
Yield strength	N/mm <sup>2</sup>	116	112
Offset compression yield	%	17.3	18.2
<b>Charpy impact strength</b>			
Resilience	kJ/m <sup>2</sup>	50	56
<b>Glass transition</b>			
T <sub>g</sub> 1	°C	135	140
T <sub>g</sub> 2	°C		140

\*These post-curing cycles are applied after a 24 hour ambient temperature hardening period, allowing to surpass gel point and the exothermic peak.

Mechanical tests are carried out on samples of pure cast resin, without prior degassing, between steel plates.

**Measurements are carried out following norms:****Physical properties**

Gardner color	NF EN ISO 4630
Viscosity	NF EN ISO 3219 - Rheometer, geometry cone/plate 50 mm - 2 ° at 10 s <sup>-1</sup>
Liquid density	ISO 2811-1 - Pycnometer
Powder density	NF EN ISO 1183-3 – Helium pycnometer
Foam density	NF EN ISO 845
Biobased carbon content	ASTM D68166-16 – Some values are theoretically calculated

**Reactivity**

Gel time	Time sweep G' = G'' - Rheometer, geometry plate/plate 50 mm, gap 1 mm
Pot life	Mean time to reach 50 °C or limit time for use

**Thermal properties**

Glass transition	NF EN ISO 11357-2 - Ramp from -5 to 180 °C at 20 °C/min The T <sub>g</sub> values are recorded at the midpoint using the tangent method. T <sub>g1</sub> : 1 <sup>er</sup> pass T <sub>g2</sub> : 2 <sup>nd</sup> pass
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**Mechanical properties**

Tensile	ISO 527-2
Flexion	ISO178
Compression	ISO 604 ou NF EN ISO 844 (foams)
Charpy impact strength	NF EN ISO 179-1
Shear	ASTM D732-17 (Punch tool)
Toughness	ISO 13586:2000

**Legal notes :**

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