



# GREENONE

## High Biomass Carbon content

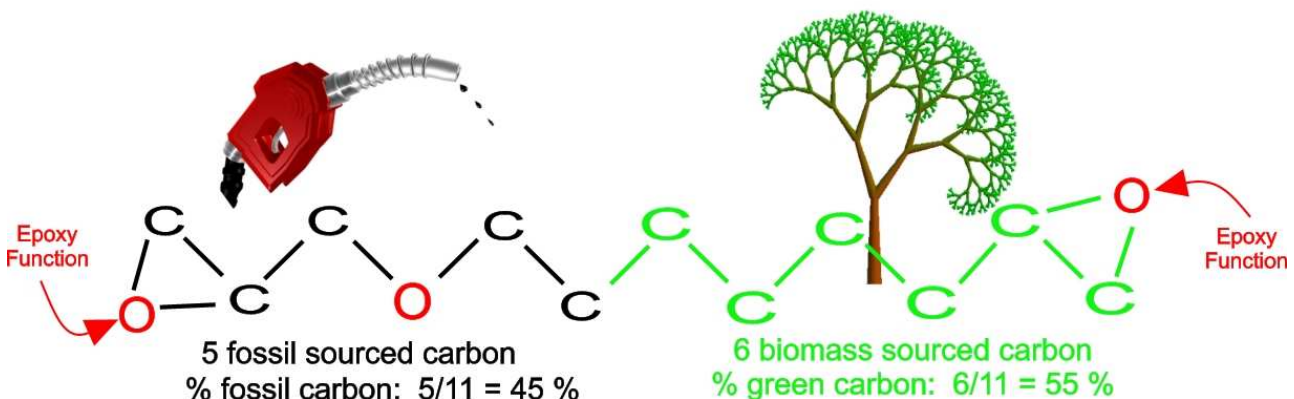
**SICOMIN** has researched on the means to decrease the impact of its activity on global warming, proposing today a range of products formulated in this spirit.

**GREENPOXY 55** is our first epoxy resin to be formulated with a high percentage of biomass carbon content. **SICOMIN**'s point of view is that it is the carbon assessment, rather than the modified molecules, which is the most representative quality measure.

The formulation of an epoxy system is a compromise between various usual characteristics. "Traditional" organic chemistry offers a vast choice of raw materials, while the "green" sourced raw materials are still rare.

**GREENPOXY 55** is an epoxy resin with a single hardener, where 55 % of the molecular structure is of plant origin. Modification of the reactivity will be possible, but might reduce the percentage of "green" components within the product.

**GREENPOXY 55** has 55 % of its molecular structure originating from plants. We measure this percentage according to the origin of carbons which the molecule contains. The fictitious molecule illustrated below contains 11 carbons, 6 being from biomass origin. It thus contains 55 % of "green" carbon.



**GREENPOXY 55** associated with **SD Glass One** has an average viscosity enabling the manufacturing of various clear parts

### Applications

- Hand lamination for tooling or industrial parts
- RTM processes (infusion, injection...)
- Filament winding
- Hot or cold press
- Casting
- Bonding



## GREENPOXY 55 Resin

		GREENPOXY 55
Aspect / colour		Yellow liquid
Viscosity (mPa.s) Rheometer CP 50 mm Shear rate 10 s <sup>-1</sup>	15 °C	6 000 ± 1 000
	20 °C	3 000 ± 500
	25 °C	1 700 ± 300
	30 °C	950 ± 150
	40 °C	400 ± 70
% Green Carbon		55 ± 2
Coulour (Gardner) ISO 4630		3 max
Density NF EN ISO 2811-1	20 °C	1.152 ± 0.01

## SD Glass One Hardener

		SD Glass One
Aspect / colour		Clear liquid
Typical reactivity		Fast
Viscosity (mPa.s) Rheometer CP 50 mm Shear rate 10 s <sup>-1</sup>	15 °C	80 ± 15
	20 °C	60 ± 10
	25 °C	40 ± 8
	30 °C	30 ± 5
% Green carbon		0
Coulour (Gardner) ISO 4630		2 max
Density NF EN ISO 2811-1	20 °C	0.95 ± 0.01

## GREENPOXY 55 / SD Glass One mix properties

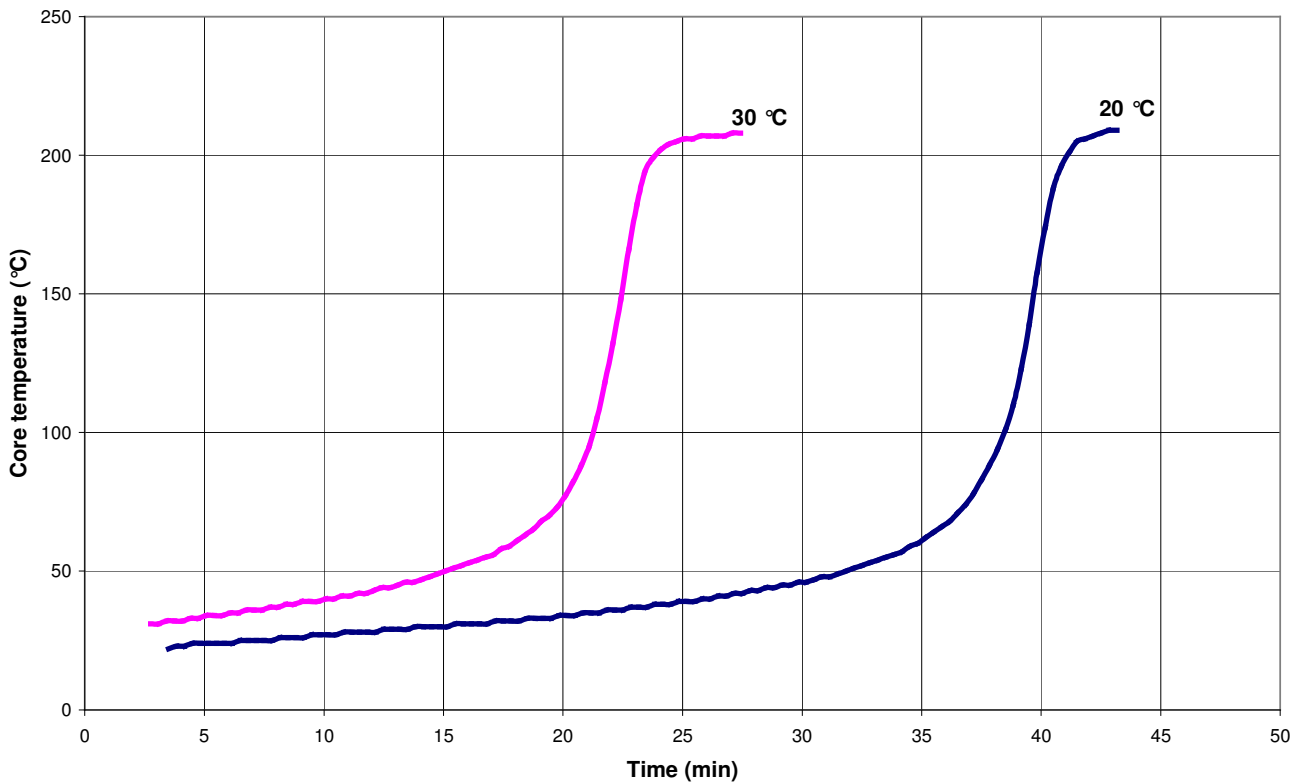
		GREENPOXY 55 / SD Glass One
Weight ratio		100 / 38 g
Volume ratio		100 / 50 ml 2 / 1
% Green carbon		40 %
Mix viscosity (mPa.s) Rheometer CP 50 mm Shear rate 10 s <sup>-1</sup>	20 °C	1 300 ± 250
	30 °C	800 ± 150
	40 °C	200 ± 40



## Reactivity – mass exotherm

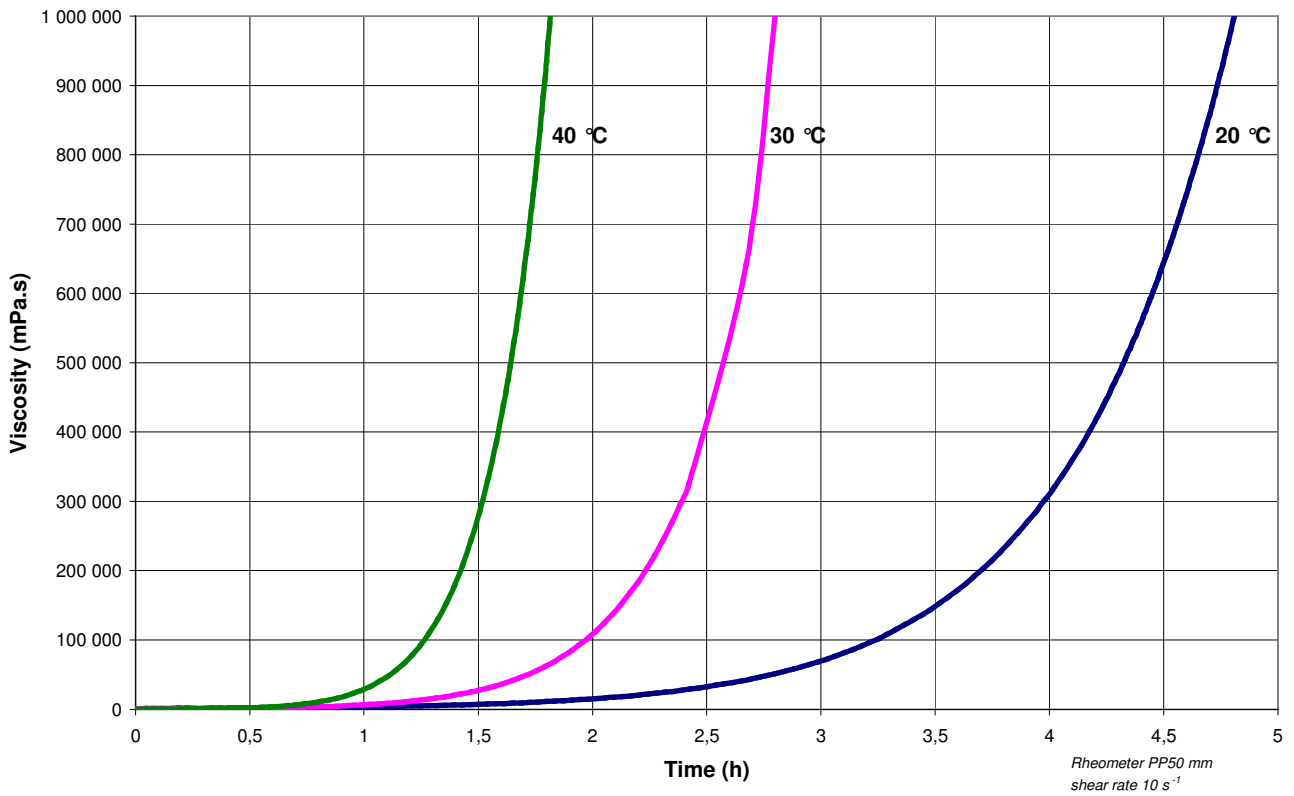
### GREENPOXY 55 / SD Glass One

Exothermic peak on 500 g mix :	
20 °C	> 215 °C
30 °C	> 215 °C
Time to reach exothermic peak on 500 g mix :	
20 °C	43'
30 °C	27'
Time to reach 50 °C on 500 g mix :	
20 °C	31'
30 °C	15'





## Reactivity – 1 mm film viscosity evolution





## Mechanical properties on pure cast resin

		GREENPOXY 55 / SD Glass One	GREENPOXY 55 / SD Glass One	GREENPOXY 55 / SD Glass One
<b>Curing cycle</b>		7 days 23 °C	24 h 23 °C + 24 h 40 °C	24 h à 23 °C + 8 h 60 °C
<b>Tension</b>				
Modulus of elasticity	N/mm <sup>2</sup>	2647	2550	2588
Maximum resistance	N/mm <sup>2</sup>	57	57	63
Resistance at break	N/mm <sup>2</sup>	57	37	49
Elongation at max. load	%	2.8	3.4	4.0
Elongation at break	%	2.9	9.6	7.2
<b>Flexion</b>				
Modulus of elasticity	N/mm <sup>2</sup>	2800	2810	2887
Maximum resistance	N/mm <sup>2</sup>	84	93	95
Elongation at max. load	%	3.9	4.5	4.7
Elongation at break	%	4.5	14.2	14.5
<b>Charpy impact strength</b>				
Resilience	kJ/m <sup>2</sup>	16.8	9.1	9.3
<b>Glass transition</b>				
Tg1	°C	51	55	66
Tg1 max.	°C			68

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

Measures undertaken according to the following norms :

Tension:

NF T 51-034

Flexion :

NF T 51-001

Charpy impact strength:

NF T 51-035

Glass transition DSC :

ISO 11357-2 : 1999 -5 °C to 180 °C under nitrogen gaz

Tg1 or Onset : 1st point at 20 °C/mn

Tg1 maximum or Onset : second passage

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