



# GREENPOXY 55

## 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 system 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 system 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.

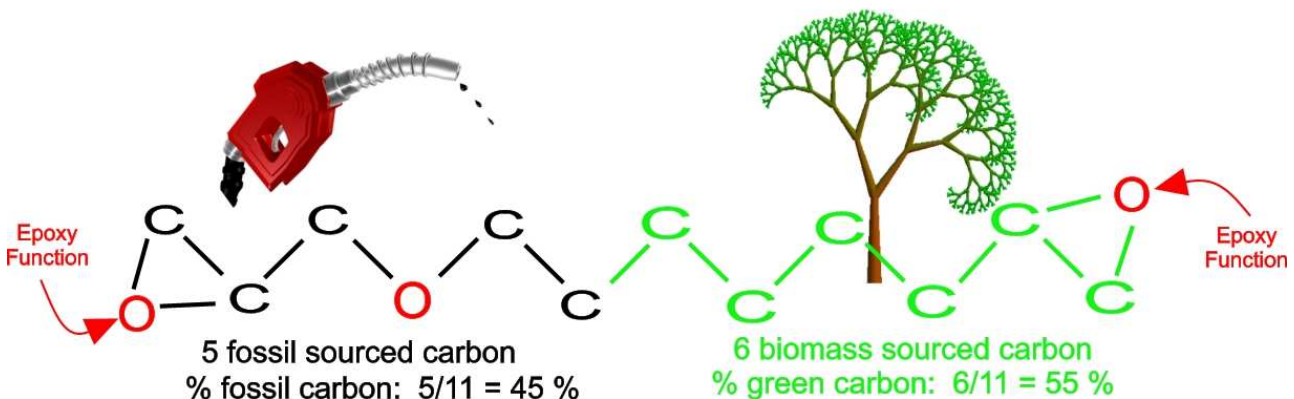
**GREENPOXY 55** has 55 % of its molecular structure originating from plants.

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.

The hardener **GP 505** follows the same logic and contains a maximum rate of carbon coming from the biomass.



**GREENPOXY 55** has an average viscosity enabling the manufacturing of various 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)	15 °C	6 000 ± 1 000
<i>Rheometer CP 50 mm</i>	20 °C	3 000 ± 500
<i>Shear rate 10 s<sup>-1</sup></i>	25 °C	1 700 ± 300
	30 °C	950 ± 150
	40 °C	400 ± 70
% Green Carbon		55 ± 2
Coulour (Gardner) <i>ISO 4630</i>		3 max
Density	20 °C	1.152 ± 0.01
<i>NF EN ISO 2811-1</i>		

## GP 505 Hardener

		GP 505
Aspect / colour		Reddish yellow liquid
Typical reactivity		Fast
Viscosity (mPa.s)	15 °C	2600 ± 520
<i>Rheometer CP 50 mm</i>	20 °C	1700 ± 340
<i>Shear rate 10 s<sup>-1</sup></i>	25 °C	1100 ± 220
	30 °C	750 ± 150
	40 °C	380 ± 80
% Green carbon		58 ± 3
Coulour (Gardner) <i>ISO 4630</i>		17 max
Density	20 °C	0.99 ± 0.01
<i>NF EN ISO 2811-1</i>		

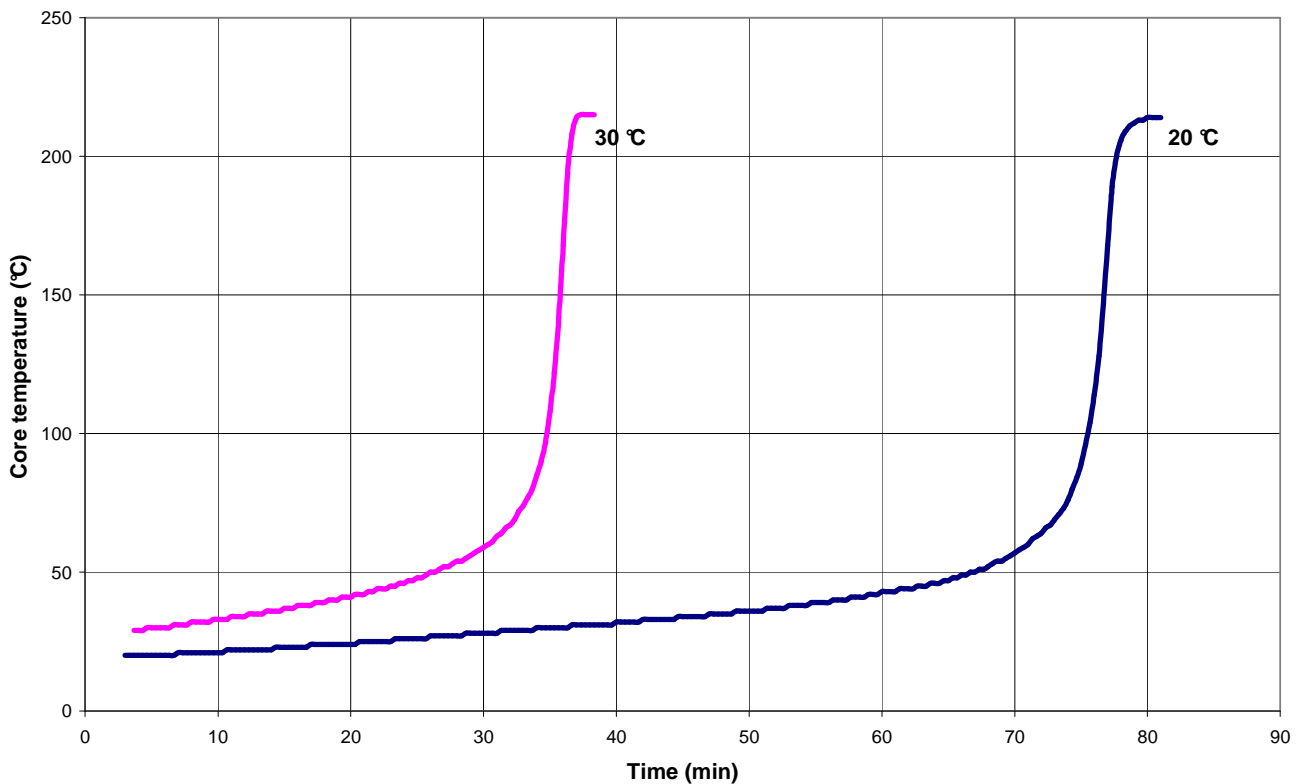
## GREENPOXY 55 / GP 505 mix properties

		GREENPOXY 55 / GP 505
Weight ratio		100 / 40 g
Volume ratio		100 / 50 ml 2 / 1
% Green carbon		> 55 %
Mix viscosity (mPa.s)		
<i>Rheometer CP 50 mm</i>	20 °C	2 700 ± 500
<i>Shear rate 10 s<sup>-1</sup></i>	30 °C	1 300 ± 250



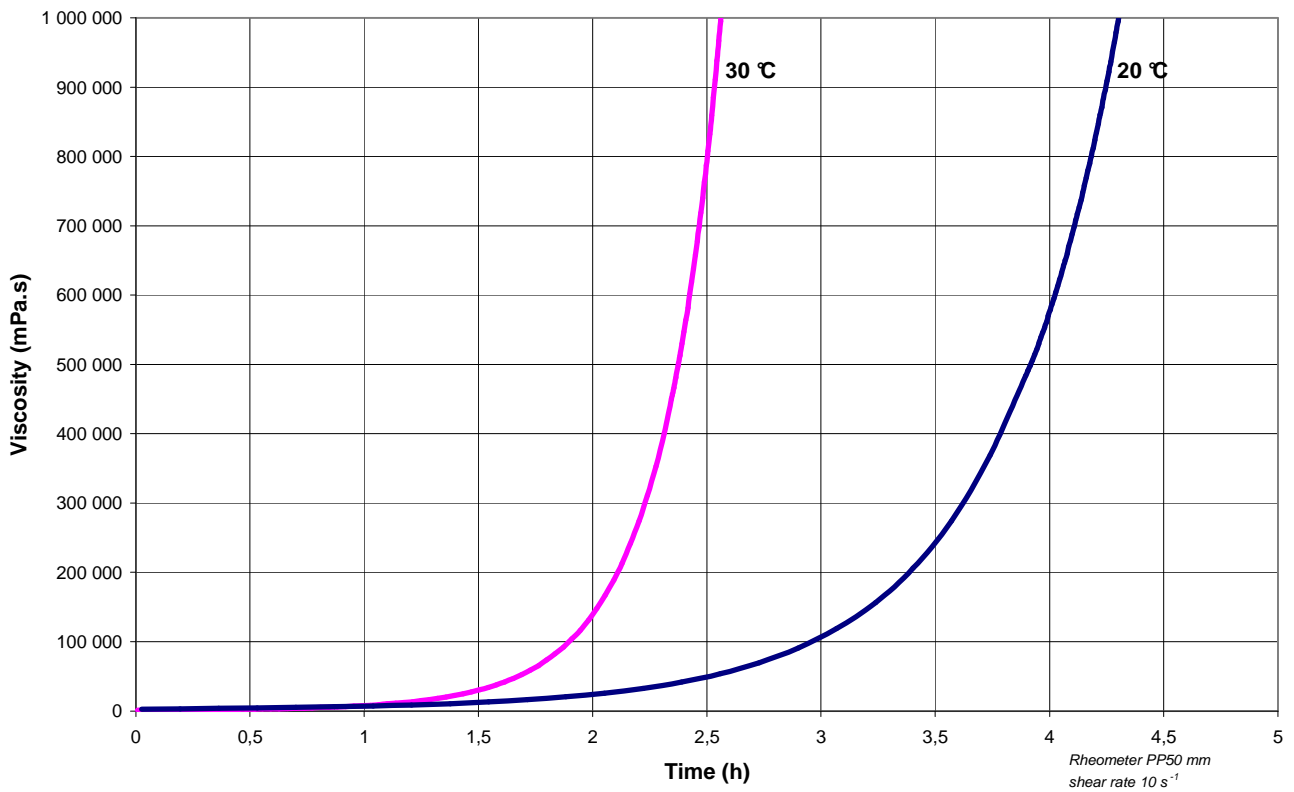
## Reactivity – mass exotherm

		GREENPOXY 55 / GP 505
Exothermic peak on 500 g mix :		
20 °C		> 215 °C
30 °C		> 215 °C
40 °C		
Time to reach exothermic peak on 500 g mix :		
20 °C		1 h 20'
30 °C		37'
40 °C		
Time to reach 50 °C on 500 g mix :		
20 °C		1 h 10'
30 °C		26'
40 °C		





## Reactivity – 1 mm film viscosity evolution





## Mechanical properties on pure cast resin

		GREENPOXY 55 / GP 505	GREENPOXY 55 / GP 505	GREENPOXY 55 / GP 505
<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>		2100	
Maximum resistance	N/mm <sup>2</sup>		52	
Resistance at break	N/mm <sup>2</sup>		42	
Elongation at max. load	%		3.9	
Elongation at break	%		8.2	
<b>Flexion</b>				
Modulus of elasticity	N/mm <sup>2</sup>		1960	
Maximum resistance	N/mm <sup>2</sup>		73	
Elongation at max. load	%		5.1	
Elongation at break	%		14	
<b>Charpy impact strength</b>				
Resilience	kJ/m <sup>2</sup>		5	
<b>Water absorption</b>				
	%		0.9	
<b>Glass transition</b>				
Tg1	°C		64	74
Tg1 max.	°C			69

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

Water absorption: Internal. Polymerisation according to cycle, machining, weighing, time spent in distilled water at 70 °C / 48 hours, weighing 1 hour after emerging,

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