SR *GreenCast* 160 / SD 7160

Clear Casting Resin System

SR *GreenCast* 160 is an epoxy system with enhanced UV resistance compared to standard epoxy resin, designed for production by casting of decorative objects, bottle prototypes, jewellery, river tables...

Very low reactivity allowing high thicknesses up to 10 cm at 20 °C, obtaining a high clarity polymer, colourless and with good brightness, cures at room temperature, almost odourless, 2:1 ratio and very easy mixing.

		SD 7160
Reactivity level		Slow
Initial viscosity (mPa.s)	20 °C	280
	30 °C	140
Pot Life (500 g)	20 °C	-
	30 °C	-
Mixing ratio		
	By weight	100 / 42
	By volume	100 / 50
Density		1,13
Tg max onset	°C	61
Gel Time (1 mm)	20 °C	48 h 20
	30 °C	24 h 20
Demold time	20 °C	96 h 00
	30 °C	72 h 00

SR *GreenCast* 160 resin is out coming from the latest innovations in bio-based chemistry.
SR *GreenCast* 160 resin is produced with a high content of carbon from plant origin.
The bio-based Carbon content of our system is certified by an independent laboratory using Carbon 14 measurements (ASTM D6866 or XP CEN/TS 16640)

This is a significant technological advance on the following points:
Clarity, color, performance and guaranty of available industrial tonnages.

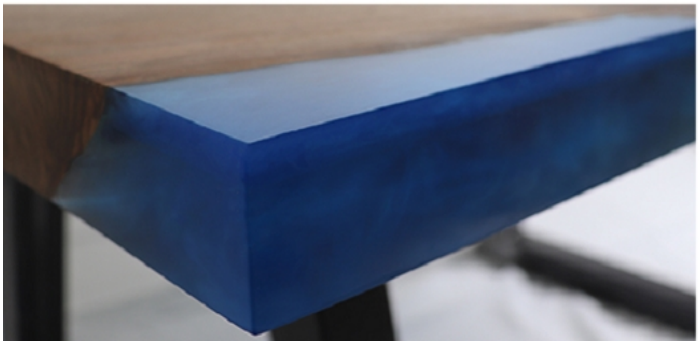
SR *GreenCast* 160 is an epoxy resin which has 37% of its molecular structure coming from plant origin.
This percentage is function of the carbon origin contained in the epoxy molecule.
The final rate of the mix bio-based carbon content will depend on the hardener choice.

SR *GreenCast* 160 is an epoxy system with enhanced UV resistance, designed for production by casting of decorative objects, bottle prototypes, jewellery, river tables...

- Very low reactivity allowing high thicknesses up to 10 cm(1) at 20 °C.
- Obtaining a high clarity polymer, colourless and with good brightness.
- Cures at room temperature
- Almost odourless.
- 2:1 ratio and very easy mixing.
- Excellent degassing.
- Excellent impact and thermal shock resistance.
- Good UV resistance compared to standard epoxy resin

(1) castings made from thermally insulating materials should not exceed 5 cm in thickness at 20 ° C.

GreenPoxy®



Epoxy resin SR Green Cast 160

Appearance		liquid
Color		colourless
Gardner color		≤ 0
Viscosity (mPa.s)	15 °C	1445 ± 335
	20 °C	830 ± 190
	25 °C	508 ± 117
	30 °C	323 ± 77
Density	20 °C	1,17
Storage (months)	23 °C	24

Hardener(s)

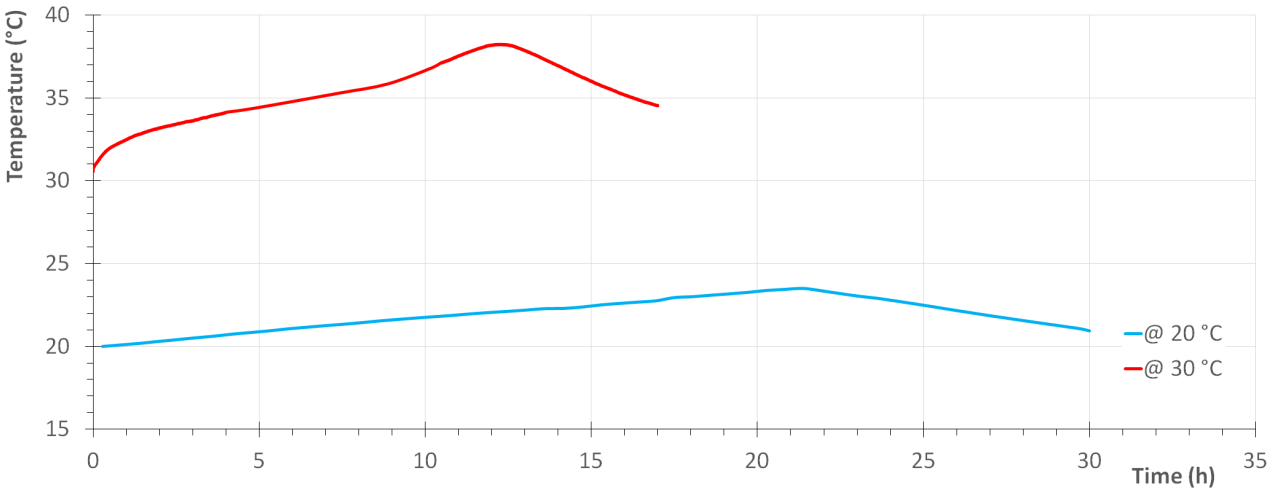
		SD 7160
Appearance		liquid
Color		colourless
Gardner color		≤ 1
Pt/Co Color Index		≤ 50
Reactivity level		Slow
Viscosity (mPa.s)	15 °C	180 ± 30
	20 °C	125 ± 20
	25 °C	90 ± 15
	30 °C	70 ± 10
Density	20 °C	0,97
Storage (months)	23 °C	24

Mixe(s) SR GreenCast 160 / SD 7160

		SD 7160
Appearance		liquid
Color		colourless
Mixing ratio		
	By weight	100 / 42
	By volume	100 / 50
Density	20 °C	1,13
Initial viscosity (mPa.s)	20 °C	280
	30 °C	140

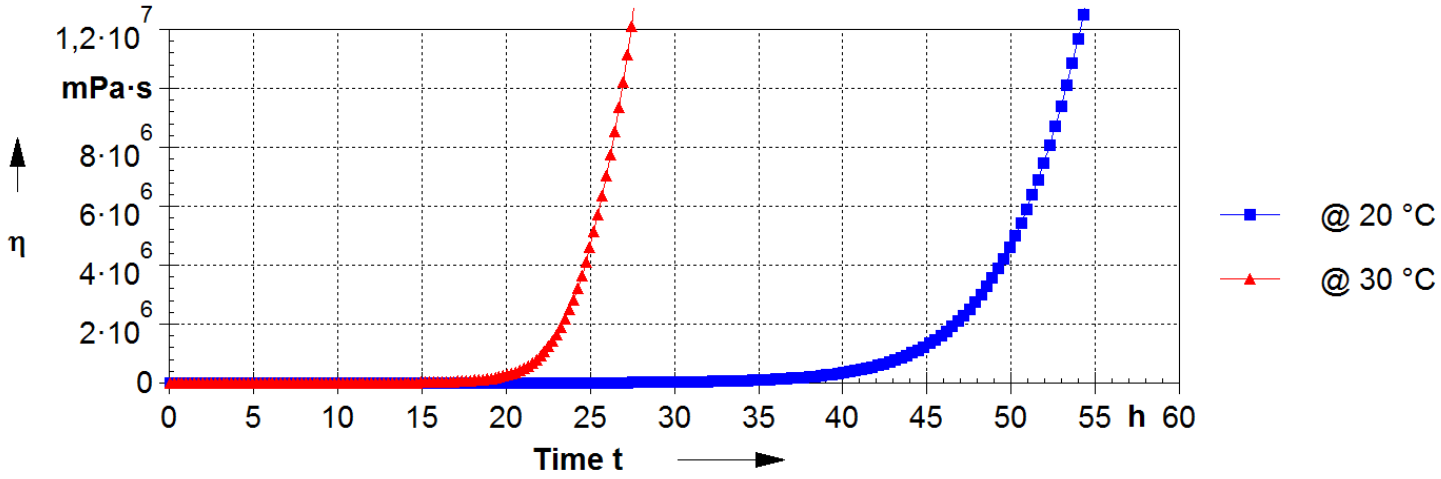
Reactivity for 500 g

	20 °C	30 °C
Exothermic temperature (°C)	23,5	38
Exothermic peak time	21 h 30	12 h 00
Time to reach 50 °C	-	-



Reactivity on a 6 mm thick cast

20 & 30 °C



Post-curing

The thermomechanical values of an epoxy system can be optimized by implementing a post-curing cycle. The Sicomin laboratory provides several predefined post cure cycles on its data sheets allowing users to compare systems. These experimental cycles are adaptable to your specific applications, taking the following parameters into account:

- Selected epoxy system (Tg max)
- Available heat source
- Room Dimension and Sampling
- Nature of the tooling (thermal conductivity of material)

Many systems can provide good mechanical properties after curing at room temperature and from 18°C for 24 to 48 hours before demolding.
The mechanical properties progress very quickly with a slightly higher temperature of around 40°C for several hours.
Epoxy systems with high Tg and slow and extra-slow hardeners imperatively require post-curing at a higher temperature. It is possible to start the cycle as soon as the exothermic peak passes, but also to start post-curing later after assembly of the various components and before the finishing operations. If the nature of the models and tools is not suitable for high temperatures, we recommend carrying out the first stages up to the maximum admissible temperature then, after cooling and demoulding, continuing the cycle on a suitable former.
For a conventional epoxy system, we recommend carrying out a cycle in steps of 20°C for 4 hours.

Example for an epoxy system Tg max 100°C:
4 hrs at 40°C + 4 hrs at 60°C + 4 hrs at 80°C + cooling to room temperature before unmoulding.

There are many short cycle, high temperature epoxy systems that do not fit into this post-cure scheme (pultrusion, hot press, pre-preg). For these systems, initial curing provides maximum thermomechanical performance without post-curing.

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

Mechanical properties on cast resin :

		SR Green Cast 160 / SD 7160		
		7 days TA	48 h TA + 24 h 40 °C	48 h TA + 16 h 60 °C
Tensile				
Modulus	N/mm^2	620	1 500	2 150
Maximum strength	N/mm^2	11,5	26	38
Breaking Strength	N/mm^2			
Elongation at max strength	%	5,9	3,3	3,1
Elongation at break	%	50	27,8	19
Flexion				
Modulus	N/mm^2	780	1 200	1 940
Maximum strength	N/mm^2	20	32	59
Breaking Strength	N/mm^2			
Elongation at max strength	%	6,2	5,5	4,9
Elongation at break	%	15	15	15
Shear				
Breaking Strength	N/mm^2	17,5	25	30
Compression				
Modulus	N/mm^2			
Yield strength	N/mm^2	30	25	65
Offset compression yield	%	12,1	10,8	10,7
Charpy impact strength				
Resilience	kJ/m^2	84	67	58
DSC glass transition				
Tg onset	°C	45	50	58
Tg max onset	°C			61
DTMA glass transition				
Tg tan delta	°C			
TeiG onset G’	°C			
TmG midpoint G’	°C			
TefG endpoint	°C			
TG peak G ‘’	°C			

These curing cycles are applied after a 24-hour hardening period at room temperature, allowing the reaction to freeze and exotherm bevond.

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

Measures undertaken according to the following norms:

Mechanical tests:	
Tension:	*NF EN ISO 527-2:2012*
Flexion:	*NF EN ISO 178:2011*
Compression:	*NF EN ISO 604:2004 or NF EN ISO 844:2014 (foam product)*
Charpy impact strength:	*NF EN ISO 179-1:2010*
Shear Strength:	*ASTM D732–17 (Punch Tool)*
Interlaminar shrinkage strength:	*ASTM D5528-13*
Toughness (GIC et KIC) :	*ISO 13586:2000*
Water absorption:	*Internal. Polymerization according to cycle, machining, weighing, time spent in distilled water at 70 °C / 48 hours, weighing 1 hour after emerging,*
Bonding Strength Double lap shear:	*ASTM D3528-96* *ADH = adhesive failure* *COH = cohesive failure* *TLC = thin-layer cohesive failure* *FT = fiber-tear failure.* *LFT = light-fiber-tear failure*
Thermal tests:	
Glass transition DSC:	*NF EN ISO 11357-2:2014 -5°C to 180 °C under nitrogen gas* *T_{G1} or Onset: 1st scan at 20 °C/min* *T_{G1} maximum or Onset: 2nd scan at 20 °C/min*
Glass transition DTMA:	*Temperature ramp 0 °C to 180 °C @ 2°C/min under normal atmosphere* *NF EN ISO 11357-1:2016 T_G onset G'* *ASTM D4065-12 T_G peak G''*
Physical tests:	
Gardner color:	*NF EN ISO 4630:2016 Visual method*
Refractive index:	*NF ISO 280:1999*
Viscosity:	*NF EN ISO 3219:1994 Rheometer 50 mm, shear 10 s^{-1}*
Density on liquids:	*ISO 2811-1:2016 Pycnometer*
Density on solid:	*NF EN ISO 1183-3:1999 Helium Pycnometer*
Density on foam:	*NF EN ISO 845:2009*
Gel time:	*Cross G' G'' Rheometer CP50 - Shear rate 10 s^{-1}*
Green Carbone content:	*ASTM D6866-16 or XP CEN/TS 16640 Avril 2014*
TA:	*Ambient temperature (20 to 25 °C)*
NC:	*No information Communicated*
NB:	*No Breaking (maximum flexion deformation : 15 %)*

Table 1st page:

Pot Life:	*Time to reach 50 °C or time limit for use*
Gel time:	*Intersection of tangents on the viscosity curve of 1 mm thick layer*
Release time:	*Time required to obtain sufficient mechanical strength to release*
Minimum Vacuum Time:	*Time in which vacuum can be applied (25000 mPa.s)*
Maximum Vacuum time:	*Limit time below which a vacuum can be applied (G'G " crossing)*
Optimum Infusion time:	*Time to reach 400 mPa.s*
Max Infusion Time:	*Time to reach 25000 mPa.s*
Vacuum cut-off time:	*Time to reach G'G " crossover + 20%*

LEGAL NOTES:
Information given in writing or verbally, in the context of our technical assistance and our trials, does not engage our responsibility. Information is given in good faith based on SICOMIN's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with SICOMIN's recommendations. We advise users of SICOMIN products to check by some practical trials that they are suitable for the intended processes and applications. The customer's storage, the use, the implementation and the transformation of the supplied products are not under SICOMIN's control and entirely under the sole responsibility of the user.
SICOMIN reserves the right to change the properties of its products. All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data and tolerance may vary due to circumstances beyond our control.
If our responsibility should nevertheless be involved, it would be, for all the damages, limited to the value of the goods supplied by us and processed by the customer. We guaranty the non-reproachable quality of our products, in the general context of sales and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

Mix

SR Green Cast 160	Resin part + Hardener part (kg)	Resin part (kg)	Hardener part (kg)
SD 7160			