

SR *InfuGreen* 810 / SD 882X

Green Epoxy systems for Injection and Infusion



InfuGreen 810 is a two-component epoxy system Bio-sourced and shipbuilding certified by Det Norske Veritas - (TAK00000HU)..
It has been specially formulated for resin transfer processes, such as injection or infusion.

		SD 8824	SD 8823	SD 8822
Reactivity level		Standard	Medium	Slow
Initial viscosity (mPa.s)	20 °C	290	290	215
	30 °C	118	125	105
Pot Life (500 g)	20 °C	01 h 25	02 h 15	04 h 40
	30 °C	27 min	38 min	01 h 10
Mixing ratio	By weight	100 / 22	100 / 26	100 / 31
	By volume	100 / 27	100 / 32	100 / 39
Maximum strength	N/mm ²	60	66	70
% Elongation at max strength	%	5	5,2	5
Tg max onset	°C	82	90	98
Gel Time (1 mm)	20 °C	07 h 10	10 h 00	15 h 00
	30 °C	03 h 40	05 h 05	07 h 50
Optimal infusion time	20 °C	02 h 15	02 h 40	03 h 00
	30 °C	01 h 25	01 h 55	02 h 25
Latest flow under vacuum	20 °C	04 h 50	06 h 30	08 h 40
	30 °C	02 h 35	03 h 30	04 h 50
Earliest vacuum off time	20 °C	10 h 10	14 h 40	21 h 40
	30 °C	05 h 00	07 h 40	12 h 00
Demold time	20 °C	21 h 30	30 h 00	45 h 00
	30 °C	11 h 00	15 h 15	23 h 30

InfuGreen 810 is a two-component epoxy system Bio-sourced and shipbuilding certified by Det Norske Veritas - Germanischer Lloyd (TAK00000HU).. It has been specially formulated for resin transfer processes, such as injection or infusion.

- This system has a very low viscosity at ambient temperature.
- Different hardeners allow the production of small to very large parts.
- Cured system gives a temperature resistance up to 100 °C (Tg onset)

SR InfuGreen 810 Epoxy resin is produce with about 38 % of carbon from plant origin and has a lower environmental impact than standard Epoxy systems.

The bio-based Carbon content of our resin is certified by an independent laboratory using Carbon 14 measurements (ASTM D6866 or XP CEN/TS 16640).

This percentage is function of the carbon origin contained in the epoxy molecule.

To consult genuine DNV-GL certification scan this QR-Code :

To produce very thick composite parts refer to "**SR InfuGreen 810 / SD 477X**" data sheet.



Epoxy resin SR InfuGreen 810

Appearance		liquid
Color		colourless
Gardner color		≤ 1
Viscosity (mPa.s)	15 °C	2500 ± 500
	20 °C	1350 ± 250
	25 °C	830 ± 170
	30 °C	500 ± 100
Density	20 °C	1,16
Bio-based Carbon content (%)		37 ± 4
Storage (months)	23 °C	24

Hardener(s)

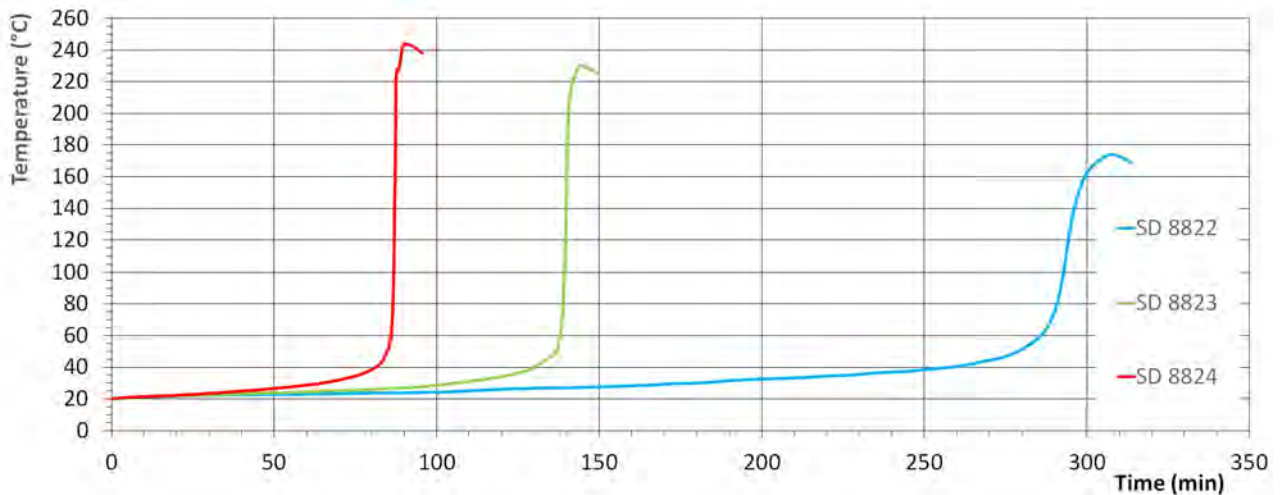
		SD 8824	SD 8823	SD 8822
Appearance		liquid	liquid	liquid
Color		colourless	light yellow	colourless
Gardner color		≤ 4	≤ 3	≤ 3
Reactivity level		Standard	Medium	Slow
Viscosity (mPa.s)	15 °C	7 ± 2	12 ± 2	26 ± 5
	20 °C	6 ± 2	9 ± 3	20 ± 4
	25 °C	5 ± 2	8 ± 3	16 ± 3
	30 °C	4 ± 2	7 ± 2 NC ± NC	13 ± 3
Density	20 °C	0,94	0,94	0,94
Storage (months)	23 °C	24	24	24

Mixe(s) SR InfuGreen 810 / SD 882x

		SD 8824	SD 8823	SD 8822
Appearance		liquid	liquid	liquid
Color		light yellow	light yellow	light yellow
Mixing ratio				
	By weight	100 / 22	100 / 26	100 / 31
	By volume	100 / 27	100 / 32	100 / 39
Initial viscosity (mPa.s)	20 °C	290	290	215
	30 °C	118	125	105
Density	20 °C	1,17	1,16	1,15

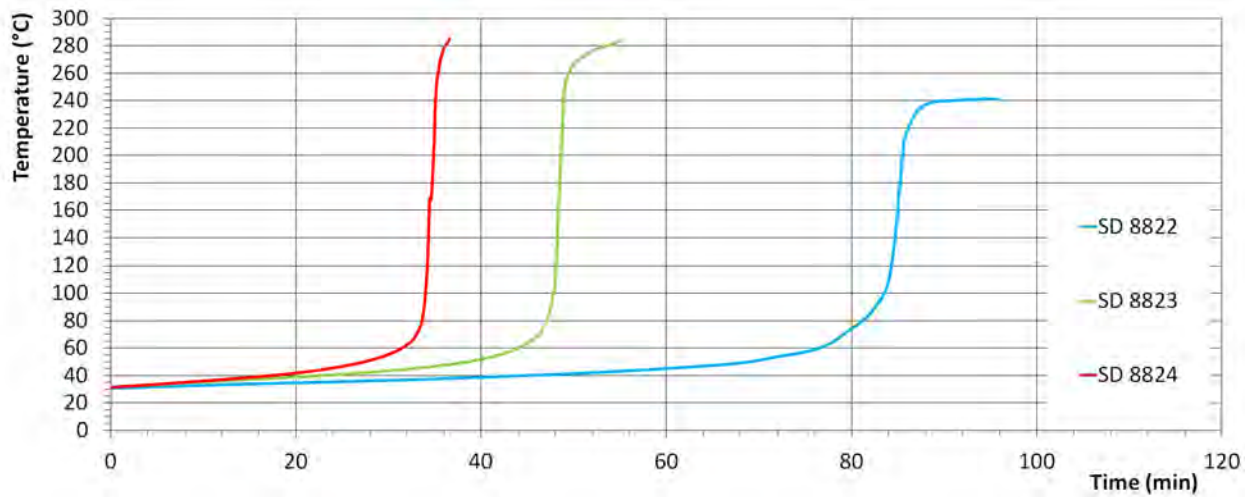
Reactivity 20 °C for 500 g SR InfuGreen 810 / SD 882x

	SD 8824	SD 8823	SD 8822
Exothermic temperature (°C)	244	230	174
Exothermic peak time	01 h 30	02 h 25	05 h 05
Time to reach 50 °C	01 h 25	02 h 15	04 h 40



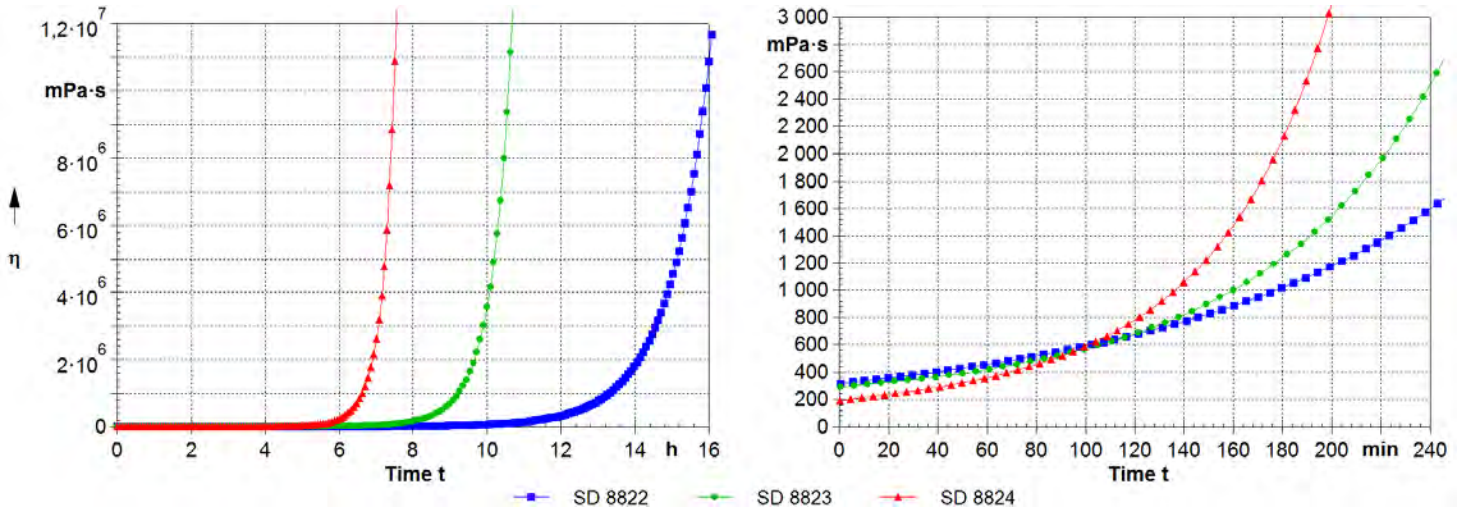
Reactivity 30 °C for 500 g SR InfuGreen 810 / SD 882x

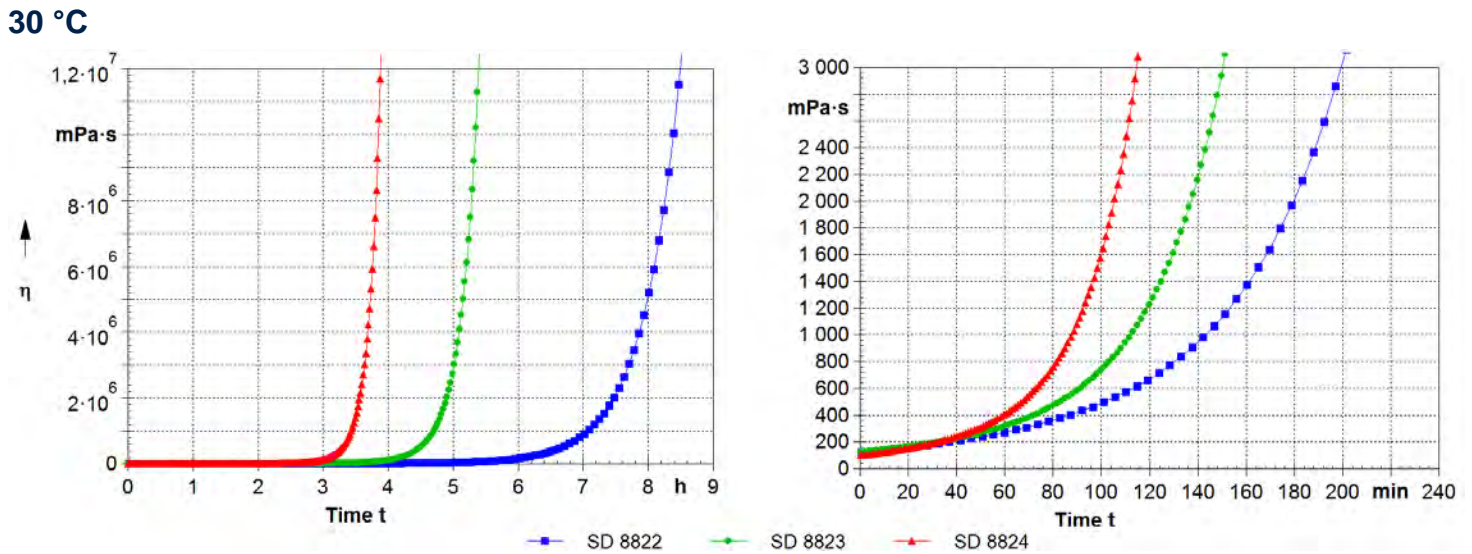
	SD 8824	SD 8823	SD 8822
Exothermic temperature (°C)	285	280	240
Exothermic peak time	37 min	52 min	01 h 30
Time to reach 50 °C	27 min	38 min	01 h 10



Reactivity on 1 mm thick layer

20 °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 unmounting.

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 InfuGreen 810 / SD 8824			SR InfuGreen 810 / SD 8823		
		16h TA + 24h 40°C	16h TA + 16h 60°C	16h TA + 8h 80°C	16h TA + 24h 40°C	16h TA + 16h 60°C	16h TA + 8h 80°C
Tensile							
Modulus	N/mm ²	3 040	2 790	2 640	3 080	2 850	2 700
Maximum strength	N/mm ²	68	65	60	70	68	66
Breaking Strength	N/mm ²	57	57	52	68	63	62
Elongation at max strength	%	3,6	4,4	5	3,6	4,3	5,2
Elongation at break	%	5,3	5,9	9,5	4	5,5	7,6
Flexion							
Modulus	N/mm ²	3 070	2 780	2 610	3 260	2 950	2 780
Maximum strength	N/mm ²	109	107	101	114	114	111
Breaking Strength	N/mm ²	64	87	68	58	83	91
Elongation at max strength	%	4,6	5,7	6	4,4	5,5	6,2
Elongation at break	%	12,6	9,3	13,5	12,5	9,9	9,9
Shear							
Breaking Strength	N/mm ²	43	42	41	46	45	45
Compression							
Modulus	N/mm ²						
Yield strength	N/mm ²	91	87	82	96	92	90
Offset compression yield	%	12,3	11,9	14,9	11,8	13,7	16,4
Charpy impact strength							
Resilience	kJ/m ²	99	86	89	96	72	56
DSC glass transition							
Tg onset	°C	71	85	82	67	81	92
Tg max onset	°C			82			90
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 beyond.

Mechanical properties on cast resin :

		SR InfuGreen 810 / SD 8822		
		16h TA + 24h 40°C	16h TA + 16h 60°C	16h TA + 8h 80°C
Tensile				
Modulus	N/mm ²	3 160	3 090	2 730
Maximum strength	N/mm ²	71	74	70
Breaking Strength	N/mm ²	70	68	69
Elongation at max strength	%	3,1	4,2	5
Elongation at break	%	3,2	5,1	5,6
Flexion				
Modulus	N/mm ²	3 250	3 010	2 770
Maximum strength	N/mm ²	116	116	114
Breaking Strength	N/mm ²	71	98	109
Elongation at max strength	%	4,6	5,4	6,4
Elongation at break	%	9,8	7,4	7,8
Shear				
Breaking Strength	N/mm ²	47	47	45
Compression				
Modulus	N/mm ²			
Yield strength	N/mm ²	104	99	93
Offset compression yield	%	11,3	12,8	14,6
Charpy impact strength				
Resilience	kJ/m ²	84	70	77
DSC glass transition				
Tg onset	°C	69	85	98
Tg max onset	°C			98
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 beyond.

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: 1 st 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 InfuGreen 810	Resin part + Hardener part (kg)	Resin part (kg)	Hardener part (kg)
SD 8824	243,92 28,58 7,06 1,43	1 x 200 1 x 23,4 1 x 5,78 1 x 1,17	3 x 14,64 1 x 5,18 1 x 1,28 1 x 0,26
SD 8823	252,02 29,49	1 x 200 1 x 23,4	2 x 17,34 1 x 6,09
SD 8822	262,4 30,66 7,57 1,53	1 x 200 1 x 23,4 1 x 5,78 1 x 1,17	4 x 15,6 1 x 7,26 1 x 1,79 1 x 0,36