

SR 8200 Epoxy laminating system

Systems based on the resin SR 8200

SR 8200 is a new generation epoxy system suitable for small and large scale production. The system has been specially formulated to meet the growing demand for low toxicity system.

The main characteristics of these Epoxy systems are :

- Safer handling.
- Low fumes emission.
- Good mechanical and thermal properties.
- Competitive prices.
- Range of hardeners.

Fast hardeners SD 8206 / SD 8205

Suitable for Hand Lay Up, press moulding and for small parts by vacuum.

Fast hardening of the laminates at ambient temperature 20-30 °C.

Good mechanical properties at ambient temperature, excellent after post cure.

Slow hardeners SD 8203 / 8202

Suitable for Hand Lay Up, press moulding and for medium to large parts by vacuum.

Requires post cure at 60 °C. See schedule for curing.

Suitable for parts with service temperature up to 60-70 °C, high performance composites.

Polymerisation

The hardeners 8206 and 8205 have been developed to achieve excellent mechanical properties



after post cure at a moderate temperature.

Hardeners 8203 and 8202 must be post-cured for 16 hrs at 60 °C.

Temperature /Time rate : 10 °C / Hour.

	SD 8206 SD 8205	SD 8203	SD 8202
Time to wait at 20°C before curing	6 to 8 hours	12 hours	48 hours
Minimum curing cycle time	12 h at 40°C	12 h at 50°C	20 h at 50°C
Recommended curing cycle time	8 h at 20°C 8 h at 60°C	12 h at 20°C + 6 h at 40°C + 6 h at 60°C + 8 hours at 80°C	48 h at 20°C + 6 h at 40°C + 16 h at 60°C

Toxicity / Labelling regulation

Reference	Symbol	Danger	Risk phrase
SR 8200		Xi Irritant N Dangerous for the environment	36/38 - 51/53 43
SD 820x		C Corrosive	21/22 - 34 - 43

EEC Classification according to doc. 1 of directive 67 / 548 / EEC

Kits (kg)

Delivery units	Resin SR 8200	Hardeners SD 820x
314.4	240	8 x 9.3
39.3	30	9.3
15.72	12	2 x 1.86
3.93	3	0.93
1.31	1	0.31

Epoxy resin SR 8200

Appearance		Yellow liquid
Viscosity (m.Pas)	at 20 °C	3 200
	at 25 °C	1500
Density (g/cm ³)	at 20 °C	1.175
	at 25 °C	1.171

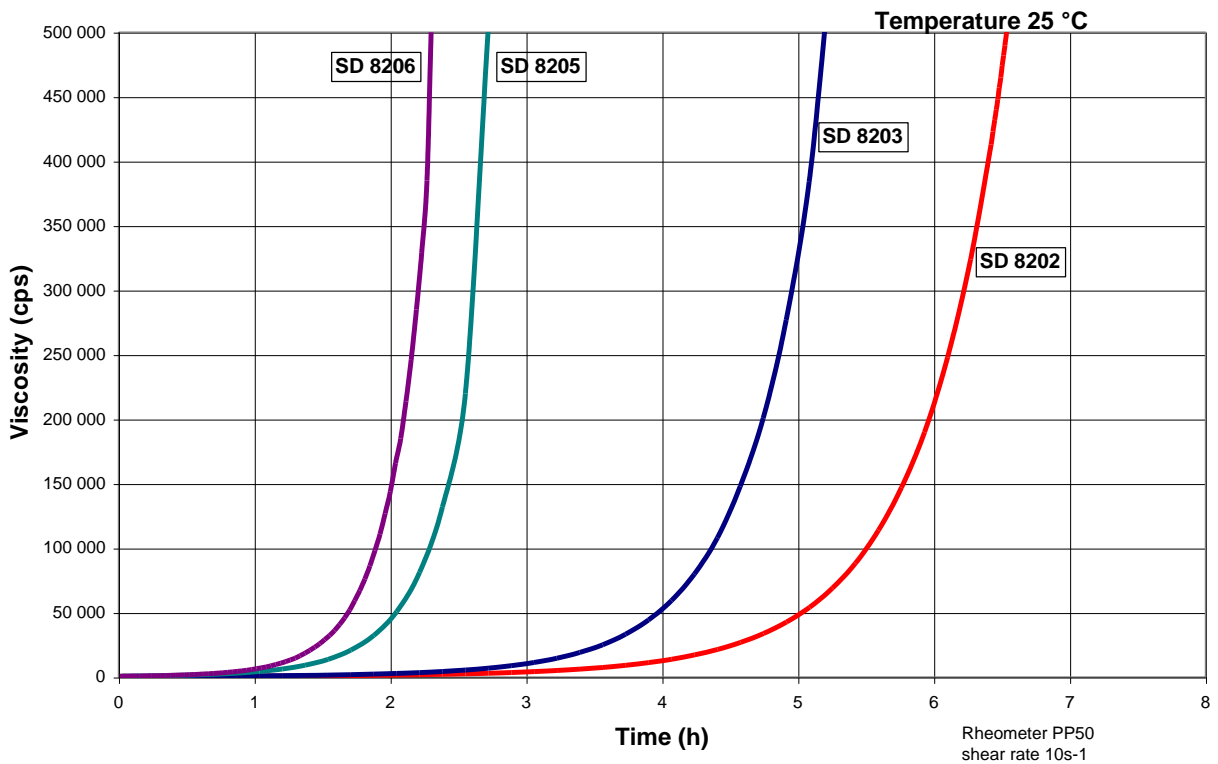
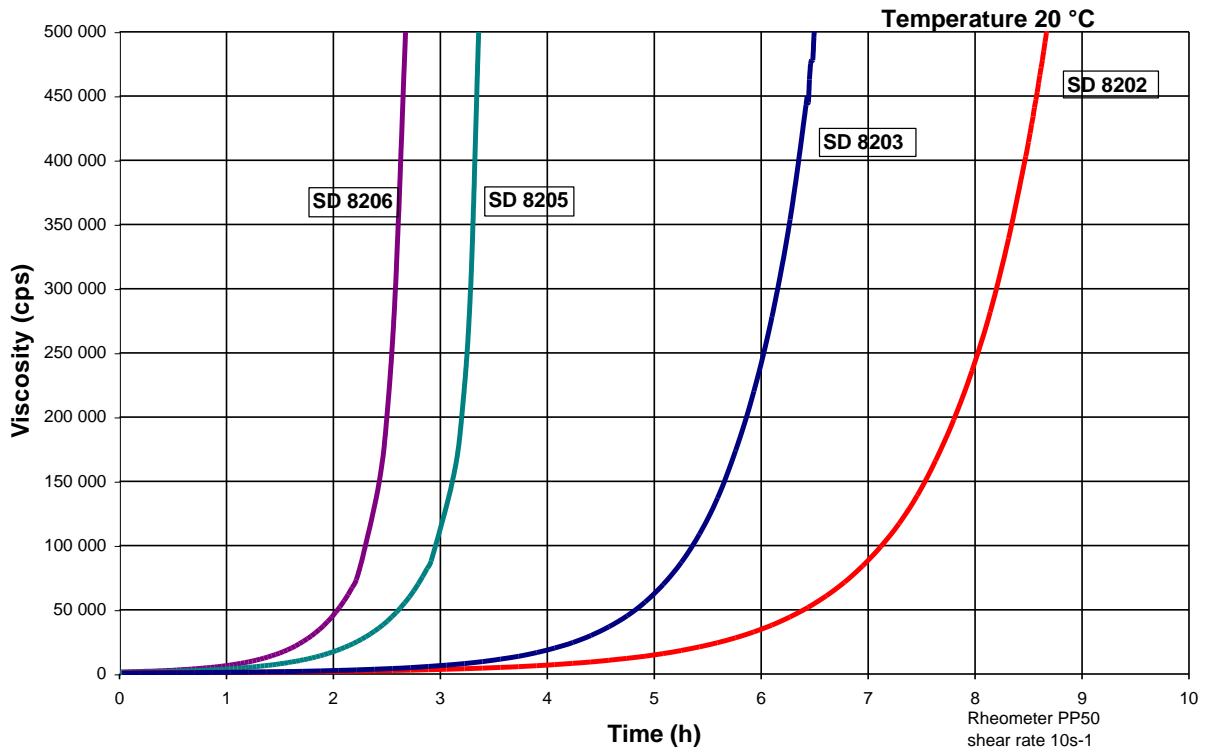
Hardeners SD 820.

Hardener		SD 8206	SD 8205	SD 8203	SD 8202
Réactivity type		"fast"	"standard"	"slow"	"very slow"
Appearance / colour		Yellow liquid	Yellow liquid	Yellow liquid	Yellow liquid
Viscosity (m.Pas)	at 20 °C	300	180	70	35
	at 25 °C	260	140	50	30
Viscosity of mix (m.Pas)	at 20 °C	1 130	890	670	520
	at 25 °C	760	670	480	385
Density (g/cm ³)	at 20 °C	1.058	1.039	0.982	0.961
	at 25 °C	1.061	1.038	0.977	0.960
Quantity by weight, 100 g. of SR 8200 to:		31 g	31 g	31 g	31 g
Quantity by volume, 100ml. of SR 8200 to:		34 ml	35 ml	37 ml	38 ml

Reactivity of mixes SR 8200 / SD 820.

Systems	8200 / 8206	8200 / 8205	8200 / 8203	8200 / 8202
Exothermic temperatures (°C) for 100 g. mix				
at 30 °C	240 – 250	240 – 250	140 – 150	130 – 140
at 25 °C	220 – 240	220 – 240	130 – 140	80 – 90
at 20 °C	200 - 220	200 - 220	30 - 40	20 - 30
Time to achieve exothermic peak for 100 g mix :				
at 30 °C	22 mn	28 mn	1 h 45'	2 h 00'
at 25 °C	35 mn	47 mn	2 h 20'	3 h 40'
at 20 °C	50 mn	70 mn	4 h 40'	5 h 20'
Time to achieve 50 °C for 100 g mix:				
at 30 °C	16 mn	20 mn	1 h 27'	1 h 45'
at 25 °C	28 mn	40 mn	2 h 05'	3 h 00'
at 20 °C	44 mn	68 mn	na	na
500 microns dust free film :				
at 30 °C	1 h 30'	2 h 00'	3 h 30'	5 h 00'
at 25 °C	2 h 00'	2 h 30'	5 h 15'	7 h 30'
at 20 °C	3 h 00'	4 h 00'	6 h 30'	8 h 30'

Reactivity – 1 mm film viscosity evolution



Mechanical properties of pure resin:

Cure Schedule	SR 8200 / SD 8206				SR 8200 / SD 8205				
	10 days at 20 °C	4 days at 30 °C	24 h Ta + 24h 40°C	24 h Ta + 6 h 60 °C	10 days at 20 °C	4 days at 30 °C	24 h Ta + 24 h 40 °C	24 h Ta + 6 h 60 °C	
Tensile									
Modulus of elasticity	N/mm ²	3600	3470	3390	3170	3600	3440	3360	3150
Maximum resistance	N/mm ²	65	71	85	86	64	67	84	84
Resistance at break	N/mm ²	65	71	80	81	64	67	77	81
Elongation at max. resistance	%	1.8	2.5	3.6	4.4	1.7	2.2	3.6	4.2
Elongation at break	%	1.8	2.5	3.9	5.7	1.7	2.2	3.8	4.6
Flexion									
Modulus of elasticity	N/mm ²	3800	3750	3640	3480	3800	3730	3640	3470
Maximum resistance	N/mm ²	115	126	128	129	112	123	128	129
Elongation at max. load	%	3.0	4.4	4.7	5.6	3.0	3.9	4.7	5.5
Elongation at break	%	5.0	8.4	9.2	7.8	4.9	5.3	8.7	7.7
Compression									
Compressive yield strength	N/mm ²				110				112
Offset compressive yield	%				9.6				10
Charpy impact strength	KJ/m ²	15	20	30	32	13	18	28	38
Resilience									
Water absorption 48 h/70°C	%				+ 0.75				+ 0.78
Glass Transition / DSC									
Tg 1	°C	48	60	67	84	47	59	66	82
Tg 1 max	°C				93				92

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

Measures undertaken according to Afnor norms :

Tension: NF T 51-034

Flexion : NF T 51-001

Choc Charpy: NF T 51-035

Glass transition DSC : Tg1: 1st point à 10°C / mn, Tg 1 max.: 2nd passage 180°C

Mechanical properties of pure resin:

		SR 8200 / SD 8203				SR 8200 / SD 8202			
		4 days at 30 °C	24 h Ta + 24 h 40°C	24 h Ta + 16 h 60°C	24 h Ta 6 h 50 °C 8 h 80 °C	14 days at 20 °C	24 h Ta + 24 h 40°C	24 h Ta + 20 h 50°C	24 h Ta + 16 h 60°C
Cure Schedule									
Tensile									
Modulus of elasticity	N/mm ²	3380	3160	2970	2900	3520	3350	3190	2990
Maximum resistance	N/mm ²	51	78	82	84	53	67	82	81
Resistance at break	N/mm ²	51	78	78	80	53	65	82	74
Elongation at max. resistance	%	1.6	3.4	4.2	5.2	1.6	2.4	3.9	4.4
Elongation at break	%	1.6	3.5	4.6		1.6	2.4	4.1	5.8
Flexion									
Modulus of elasticity	N/mm ²	3680	3530	3250	3090	3700	3620	3300	3300
Maximum resistance	N/mm ²	90	120	126	123	97	117	123	125
Elongation at max. resistance	%	2.4	4.3	5.6	6.1	2.5	4.1	5.0	5.4
Elongation at break	%	2.4	5.8	9.6	9.9	2.5	7.7	10.2	8.7
Compression									
Compressive yield strength	N/mm ²		110	110	108				
Offset compressive yield	%		8.3	9.8	10.6				
Charpy impact strength	KJ/m ²	13	17	28	40	13	18	24	25
Resilience									
Water absorbtion 48 h/70°C	%			+ 0.74					
Glass Transition / DSC									
Tg 1	°C	59	68	87	101	63	69	76	84
Tg 1 max	°C				106				100

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

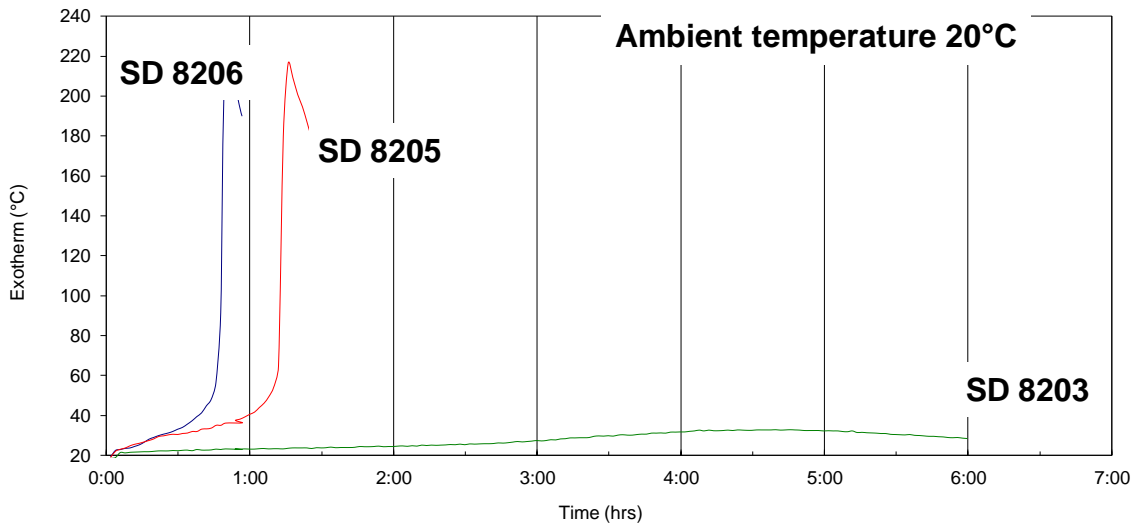
Measures undertaken according to Afnor norms :

Tension: NF T 51-034

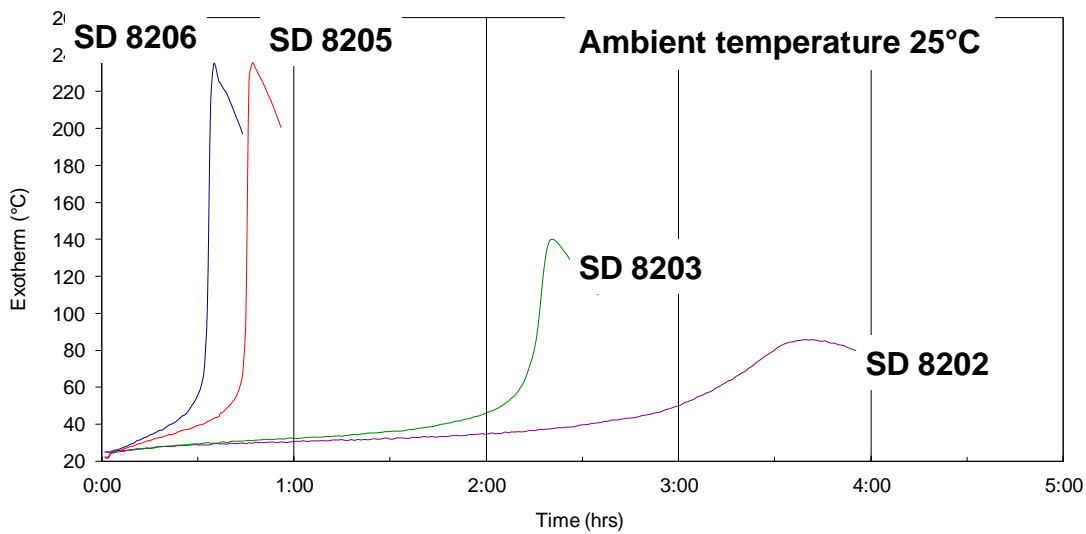
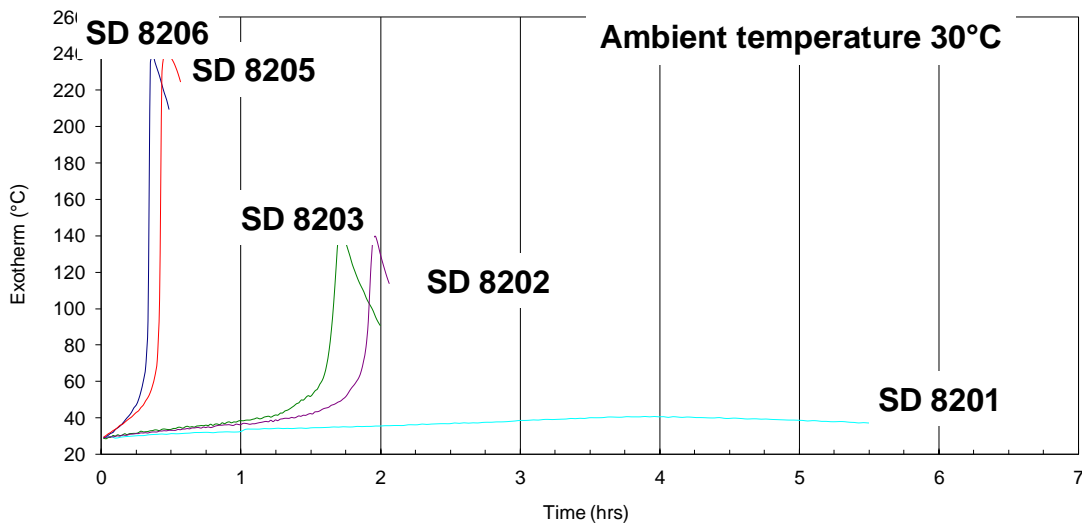
Flexion : NF T 51-001

Choc Charpy: NF T 51-035

Glass transition DSC : Tg1: 1st point à 10°C / mn, Tg 1 max.: 2nd passage 180°C



SR 8200 / Reactivity on 100 g. mix



Mechanical properties of laminates :

Ref labo		820/185	820/185	820/195	820/263
Samples		SD 8206	SD 8205	SD 8203	SD 8202
SR 8200 / SD 820x		3300	3300	3300	3300
Reinforcement material		15	15	15	15
Number of layers		Press	Press	Press	Press
Method		75	75	75	75
Weight of reinforcement	%	8 h 60 °C	8 h 60°C	16 h 60°C	16 h 60°C
Cure Schedule					
Flexion					
Modulus	N/mm ²	27 200	27 200	25 900	26 800
Maximum resistance	N/mm ²	690	690	680	700
Maximum elongation	%	3.15	3.17	3.20	3.16
Bending delaminating					
Shear load at rupture	N/mm ²	63	63	61	60
Impact (Charpy shock)					
Resilience	KJ/m ²	200	190	190	195
Water Absorption	%			+0.17	+0.16
48 hr distilled water at 70°C					
Glass Transition					
Tg 1	°C	81	81	88	84
Tg1 max.	°C	92	92	106	103

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

Measures undertaken according to Afnor norms :

Flexion: NF T 57-105

Flexural Delamination: NF T 57-104

Impact : NF T 57-108

Glass transition : DSC 1° point at 10°C / mn

Water absorption : Internal. Polymerisation according to a cycle, weighting, time spent in distilled water à 70 °C / 48 hours, weighting 1 hr after removal, drying 24 hr / 40°C, weighing, mechanical tests on 10 samples

Reinforcement : Ref 3300, E Glass, Twill of 2/2, 300 g/m²

The informations that we give by writing or verbally, in the context of our technical assistance and our trials, do not engage our responsibility. We advice the users of SICOMIN's epoxy system, to verify by some practical trials if our products are suitable for the envisaged processes and applications. The use, the implementation and the transformation of the supplied products, are not under our control and your responsibility only will respond for it.

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 implement by you. We guaranty the non-reproachable quality of our products, in the general context of sales and delivery.