

## SR 8500

### Versatile epoxy system for composite applications

The **SR 8500 / SD 860x** system allows to manufacture a multiple kinds of composite parts that can work up to 70 °C continuously.

Solvent and reactive diluent free, without any aromatic or CMR amines.

Very simple handling : One resin and two hardeners mixable in any proportions to achieve the wanted reactivity.

Cure at ambient temperature and post cure at 40 to 60 °C

#### SD 8605

Fast hardener and **SD 8601** accelerator.

Reactivity adapted for the manufacturing of small parts.

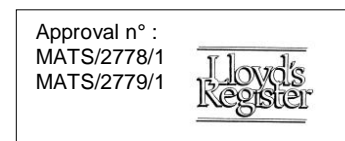
Good mechanical properties after ambient curing.

#### SD 8601

Ultra Slow Hardener.

Reactivity adapted for big part manufacturing

Should be post cured at 40 °C before un moulding



#### Application

- Hand laminating
- Injection
- Filament winding
- Cold or Hot press moulding
- Casting
- Adhesive

See page 5 for more details about the solutions given by **SR 8500**

#### Epoxy resin SR 8500

		SR 8500
Aspect		Liquid
Colour		Clear
Viscosity (mPa.s)	15 °C	24 500 ± 3 000
Rheometer	20 °C	9 800 ± 1 000
CP 50 mm	25 °C	4 500 ± 800
Shear rate 10 s <sup>-1</sup>	30 °C	2 300 ± 400
	40 °C	750 ± 200
Density :	20 °C	1.176 ± 0.05
Picnometer		
ISO 2811-1		
Storage stability:		24 months, crystallization free

## Hardeners SD 860x

		SD 8605	SD 8604	SD 8603	SD 8602	SD 8601
Weight proportions <b>SD 8601</b> <b>SD 8605</b>		0 100	25 75	50 50	75 25	100 0
Aspect / colour:		Yellow liquid				Clear liquid
Reactivity		Fast	Intermediate reactivity			Ultra slow
Viscosity (mPa.s)						
Rheometer	15 °C	630 ± 100	220 ± 40	100 ± 20	40 ± 10	20 ± 4
CP 50 mm	20 °C	400 ± 80	160 ± 30	75 ± 15	30 ± 5	15 ± 3
Shear rate 10 s <sup>-1</sup>	25 °C	280 ± 50	100 ± 20	50 ± 10	25 ± 5	12 ± 2
	30 °C	200 ± 40	80 ± 15	40 ± 10	20 ± 4	10 ± 2
	40 °C	100 ± 20	50 ± 10	25 ± 5	15 ± 3	7 ± 2
Density Picnometer ISO 2811-1	20 °C	1.02 ± 0.01	0.990 ± 0.01	0.980 ± 0.01	0.960 ± 0.01	0.950 ± 0.01

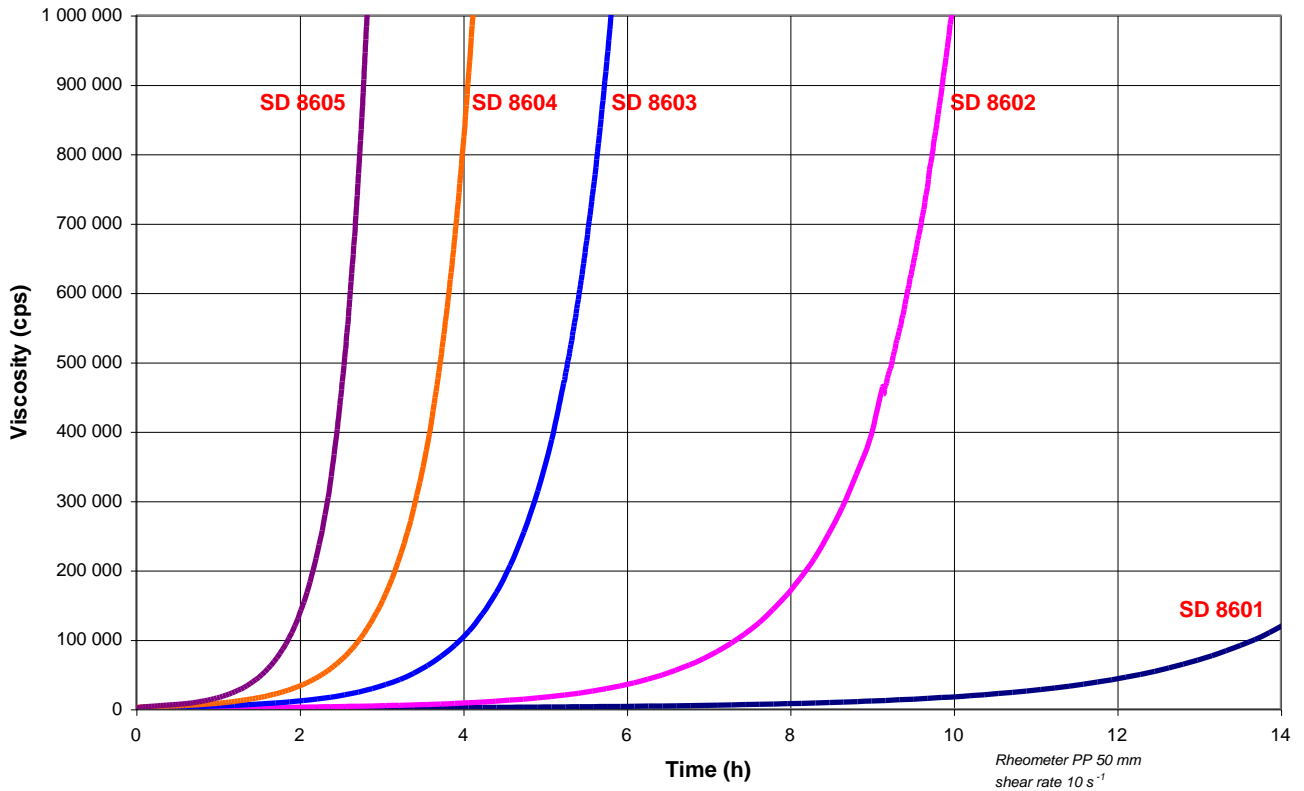
## SR 8500 / SD 860x mix properties

		SR 8500 / SD 8605	SR 8500 / SD 8604	SR 8500 / SD 8603	SR 8500 / SD 8602	SR 8500 / SD 8601
Weight ratio		100 / 35	100 / 35	100 / 35	100 / 35	100 / 35
Volume ratio		100 / 40	100 / 40.9	100 / 41.7	100 / 42.5	100 / 43
Mix viscosity						
Rheometer	20 °C	2 800 ± 450	2 200 ± 400	1 750 ± 350	850 ± 100	750 ± 150
PP 50 mm	25 °C	2 000 ± 400	1 600 ± 300	900 ± 200	640 ± 30	400 ± 80
Shear rate 10 s <sup>-1</sup>	30 °C	1 000 ± 200	900 ± 200	700 ± 150	380 ± 70	250 ± 50
	40 °C	550 ± 100	400 ± 80	350 ± 70	300 ± 60	100 ± 20

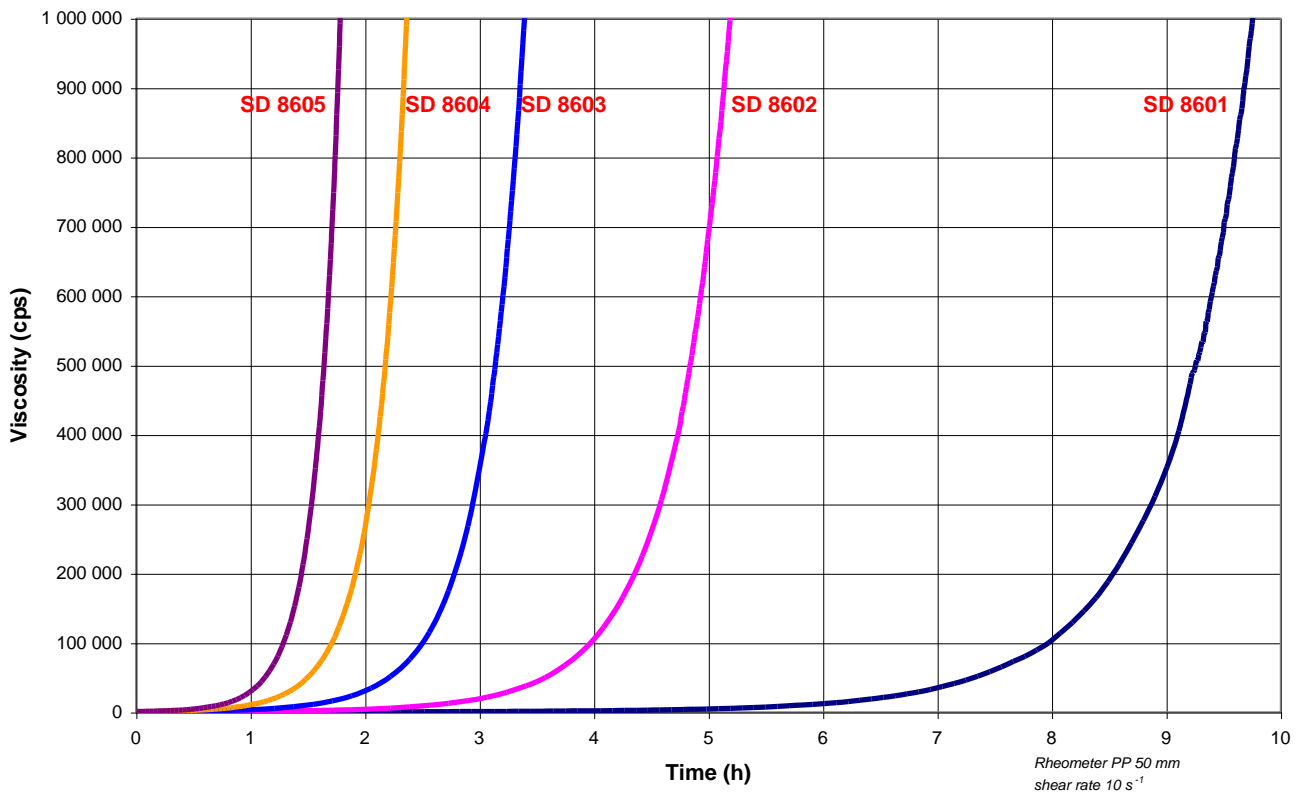
## SR 8500 / SD 860x mass reactivity

		SR 8500 / SD 8605	SR 8500 / SD 8604	SR 8500 / SD 8603	SR 8500 / SD 8602	SR 8500 / SD 8601
Exothermic peak (°C) on 500 g mix:						
	30°C	255	262	245	234	132
	25°C	246	250	240	217	80
	20°C	237	236	205	130	33
Time to reach exothermic peak on 500 g mix						
	30°C	27'	33'	41'	1 H 10'	4 H 00
	25°C	29'	38'	1 H 00	1 H 57'	8 H 50'
	20°C	39'	1 H 00	1 H 55'	4 H 50'	15 H 10'
Time to reach 50 °C on 500 g mix						
	30°C	10'	21'	26'	52'	3 H 00
	25°C	17'	28'	44'	1H 38'	7 H 25'
	20°C	31'	44'	1 H 35'	4 H 15'	nm

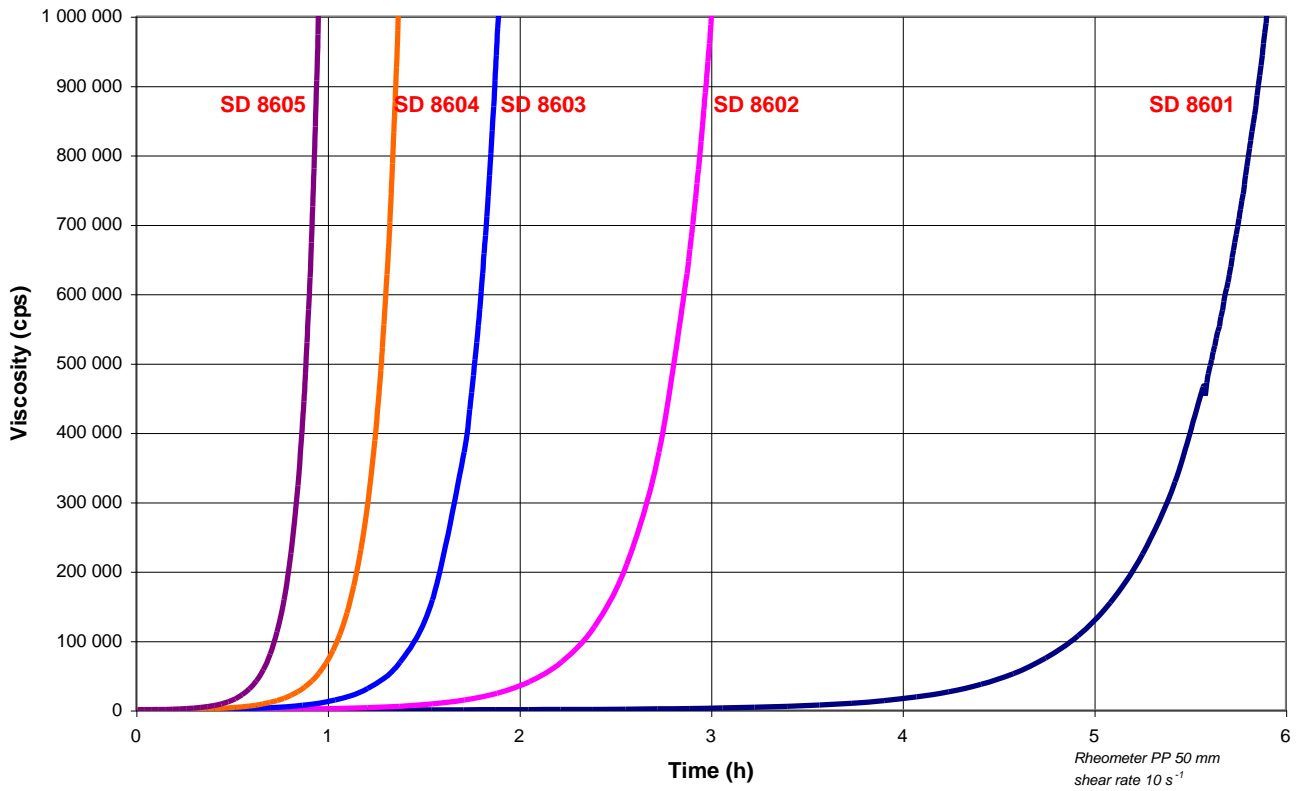
**SR 8500 / SD 860x – 1 mm film viscosity evolution**  
- at 20 °C



- at 30 °C



- at 40 °C



### Conditions of application

Ambient temperature: From 15°C to 40°C

Hygrometry: Below 80%

Temperature of the substrate: 5°C over the dew point

## SR 8500 based formulations

### - SR 8500 TH2 :

Version : Thixotropic  
 Colour : Translucent, slightly opalescent  
 Application : Vertical multiaxial lamination  
 Weight ratio : **SR 8500 TH2 / SD 860x:** 100 / 34.5  
**SR 8500 TH2 / SD 7160** 100 / 46

### - SR 8500 Gel :

Version : Thixotropic  
 Colour : Clear or black  
 Application : Structural bondings for foams and honeycombs  
 Apply with toothed spatula on vertical surface or ceiling  
 Weight ratio : **SR 8500 Gel / SD 860x :** 100 / 33

### - CA 85 :

Version : Filled  
 Colour : White  
 Application : high thickness castings, Structure wedging, harden under water, fire resistant.  
 Weight ratio : **CA 85 / SD 8451** 100 / 25 Slow  
**CA 85 / SD 860x** 100 / 17.5 -  
**CA 85 / SD 7160** 100 / 24 Ultra slow  
**CA 85 / SD 1213** 100 / 24 Ultra lent, low exothermic

### - SR 8500 / SZ 8525 :

Application: Fast process at high temperature, fully cured after 10 min at 100 °C, clear laminates for sport goods

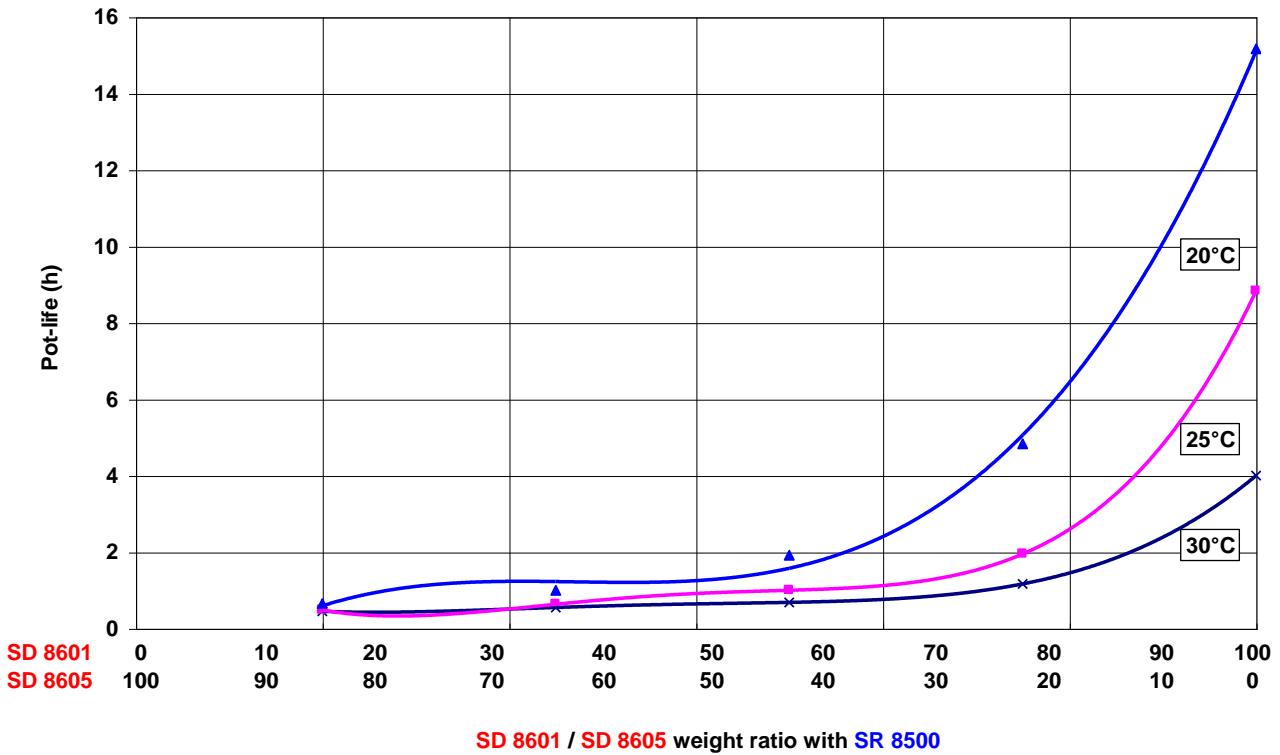
### - SR 8500 / SD 7160 or SD 1213

Application : Translucent cast, high thickness laminates  
 Weight ratio : **SR 8500 / SD 7160** 100 / 47 Ultra slow  
**SR 8500 / SD 1213** 100 / 47 Ultra slow, low exothermic

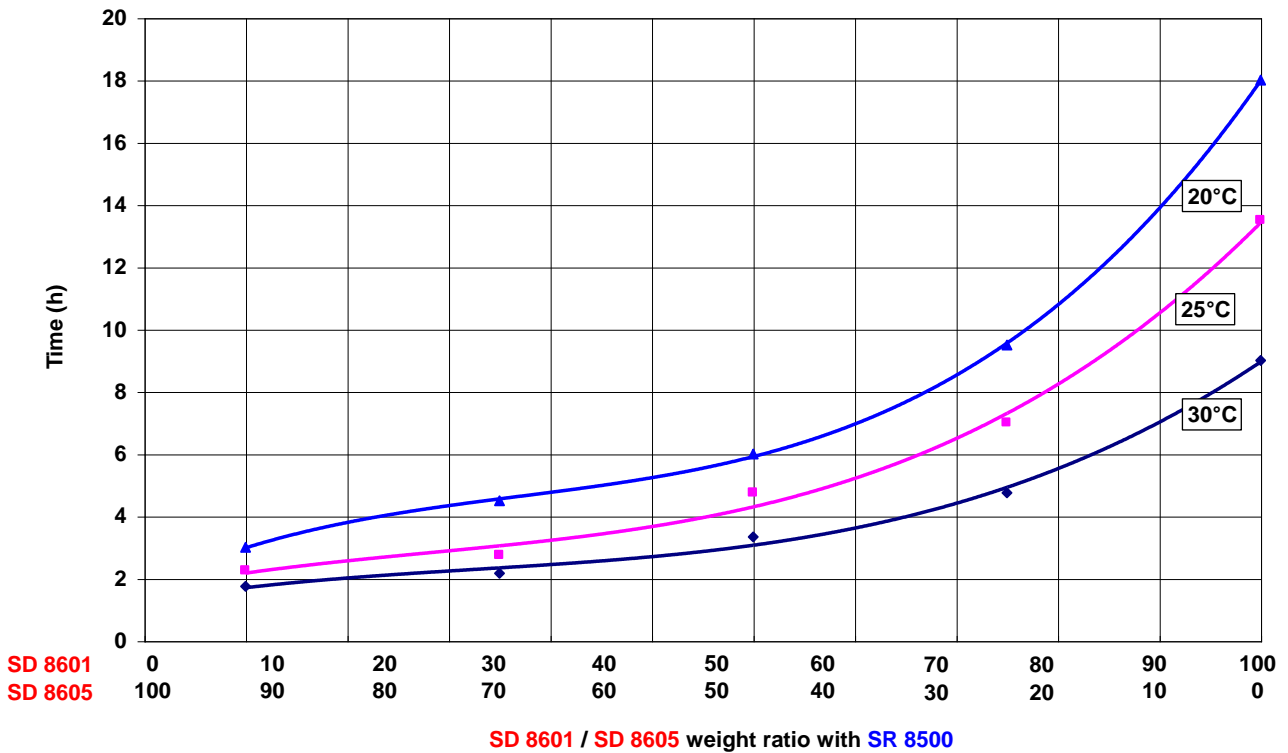
## SR 8500 : Other combinations

	State	Hardeners	Weight ratio	Tg (°C) maximum	Possible applications
<b>SR 8500</b>	Liquid	<b>SD 2705</b>	100 / 20	110	Fast laminating hardener, very good mechanical and chemical resistance
		<b>SD 8203</b>	100 / 31	120	Laminates for tooling up to 100 °C
		<b>SD 8202</b>	100 / 31	123	
<b>SR 8500 TH2</b>	Slightly thixotropic	<b>SD 8203</b> <b>SD 8202</b>	100 / 30.5 100 / 30.5	120 123	Vertical laminates with better thermal resistance
<b>SR 8500 Gel</b>	Black or Clear gel	<b>SD 1249.17</b>	100 / 44	100	Gel for structural bondings, fast hardening, for service temperature < 80°C

500 g mix exothermic peak vs. SD 8601 / SD 8605 ratio



Dust free time on 0.5 mm film vs. SD 8601 / SD 8605 ratio



## Mechanical properties of pure resin

Curing Schedule	SR 8500 / SD 8601					SR 8500 / SD 8605					
	14 days 23°C	24 h 23°C + 24 h 40°C	24 h 23°C + 15 h 50°C	24 h 23°C + 16 h 60°C	24 h 23°C + 8 h 80°C	7 days 23°C	24 h 23°C + 24 h 40°C	24 h 23°C + 20 h 50°C	24 h 23°C + 8 h 60°C	24 h 23°C + 16 h 60°C	
<b>Tension</b>											
Modulus of elasticity	N/mm <sup>2</sup>	3390	3350	3250	3070	2800	3580	3500	3300	3390	3320
Maximum resistance	N/mm <sup>2</sup>	42	54	77	76	69	72	82	80	80	85
Resistance at break	N/mm <sup>2</sup>	42	54	71	72	64	72	80	77	78	83
Elongation at max. resistance	%	1.2	1.7	3.4	3.9	4.0	2.3	3.5	3.3	3.6	4.9
Elongation at break	%	1.2	1.7	4.0	4.7	4.8	2.3	3.7	3.9	4.2	5.7
<b>Flexion</b>											
Modulus of elasticity	N/mm <sup>2</sup>	3540	3400	3300	3280	3050	3630	3570	3510	3445	3210
Maximum resistance	N/mm <sup>2</sup>	69	102	118	120	112	119	128	128	127	124
Elongation at max. resistance	%	1.8	3.5	4.8	5.3	5.4	4.1	4.9	5.3	5.5	5.8
Elongation at break	%	1.8	8.4	9.0	9.1	10.7	4.2	6.7	7.5	7.2	5.6
<b>Compression</b>											
Compressive yield strength	N/mm <sup>2</sup>		104		98	91					
Offset compressive yield	%		5.6		6.2	7.4					
<b>Charpy impact strength</b>											
Resilience	kJ/m <sup>2</sup>	9	22	47	54	65	20	25	33	20	32
<b>Glass Transition / DSC</b>											
Tg 1	°C	51	61	71	76	87	58	67	75	79	82
Tg 1 max	°C			83	84	87				91	91

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

Compression: NF T 51-101

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

## Mechanical properties of pure resin

Curing Schedule	SR 8500 / SD 8602			SR 8500 / SD 8603			
	24 h 23°C + 24 h 40°C	24 h 23°C + 15 h 50°C	24 h 23°C + 16 h 60°C	7 days 23°C	24 h 23°C + 24 h 40°C	24 h 23°C + 16 h 60°C	
<b>Tension</b>							
Modulus of elasticity	N/mm <sup>2</sup>	3420	3250	3150	3680	3620	3350
Maximum resistance	N/mm <sup>2</sup>	75	79	80	50	85	83
Resistance at break	N/mm <sup>2</sup>	74	78	79	50	83	81
Elongation at max. resistance	%	3.2	3.5	3.8	1.3	3.6	3.6
Elongation at break	%	3.5	3.8	4.6	1.3	3.9	4.6
<b>Flexion</b>							
Modulus of elasticity	N/mm <sup>2</sup>	3400	3330	3200	3650	3550	3280
Maximum resistance	N/mm <sup>2</sup>	115	118	122	93	123	124
Elongation at max. resistance	%	4.0	4.8	5.5	2.5	4.7	5.5
Elongation at break	%	8.3	8.5	8.8	2.5	8.1	8.3
<b>Compressive</b>							
Compressive yield strength	N/mm <sup>2</sup>			109			114
Offset compressive yield	%			11.5			10.2
<b>Charpy impact strength</b>							
Resilience	kJ/m <sup>2</sup>	25	28	35	15	27	30
<b>Glass Transition / DSC</b>							
Tg 1	°C	64	72	78	51	65	81
Tg 1 max	°C			86			88



## Mechanical properties of laminates

Matrix Reinforcement material Number of layers Process Weight of reinforcement (Wf)		SR 8500 / SD 8601			SR 8500 / SD 8602		SR 8500 / SD 8603		SR 8500 / SD 8604	
		3300 15 Press 74			3300 15 Press 73		3300 15 Press 73		3300 15 Press 73	
Cure Schedule		24 h 40 °C	16 h 60°C	8 h 80°C	24 h 40°C	16 h 60°C	24 h 40°C	16 h 60°C	24 h 40°C	16 h 60°C
<b>Flexion</b>										
Modulus of elasticity	N/mm <sup>2</sup>	27 800	28 000	27 600	26900	26 100	23 200	25 000	25 600	25 900
Maximum resistance	N/mm <sup>2</sup>	662	668	675	685	680	615	660	675	665
Maximum elongation	%	2.9	2.9	2.9	3.2	3.2	3.3	3.2	3.2	3.2
<b>Bending delamination</b>										
Shear load at break	N/mm <sup>2</sup>	51	53	55	53	55	54	59	56	56
<b>Impact (Choc Charpy)</b>										
Resilience	kJ/m <sup>2</sup>	186	183	189	200	205	190	205	205	210
<b>Water Absorption</b>										
	% weight	+ 0.19	+ 0.17	+ 0.15	+ 0.28	+ 0.27	+ 0.28	+ 0.27	+ 0.28	+ 0.26
<b>Glass Transition</b>										
Tg 1	°C	64	76	85	67	82	74	83	68	84
Tg 1 max.	°C			87		87		88		91

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

Measures undertaken according to Afnor norms :

Flexural: 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 a cycle, weighing, time spent in water distilled à 70 °C / 48 hours, weighing 1 hr after removal, drying 24 hr / 40°C, weighing, mechanical tests on 10 samples

Reinforcement : 3300: E Glass, 2/2 Twill, 300 g/m<sup>2</sup>