

## SR 8500

### Versatile epoxy system for composite applications

The **SR 8500 / SD 860x** epoxy system allows manufacturing of multiple kinds of composite parts that can work up to 70 oC continuously. Solvent and reactive diluent free, without any aromatic or CMR amines and very simple handling: One resin and two hardeners mixable in any proportions to achieve the desired reactivity. Curing at ambient temperature and post curing at 40 to 60 oC.C

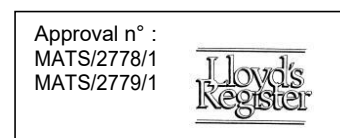
#### SD 8605

Can be used as an accelerator for hardener **SD 8601**.  
Reactivity adapted for the manufacturing of small parts.  
Good mechanical properties after ambient curing.



#### SD 8601

Reactivity adapted for manufacturing of large parts.  
Should be post cured at 40 oC before demoulding.



#### 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

		<b>SR 8500</b>
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

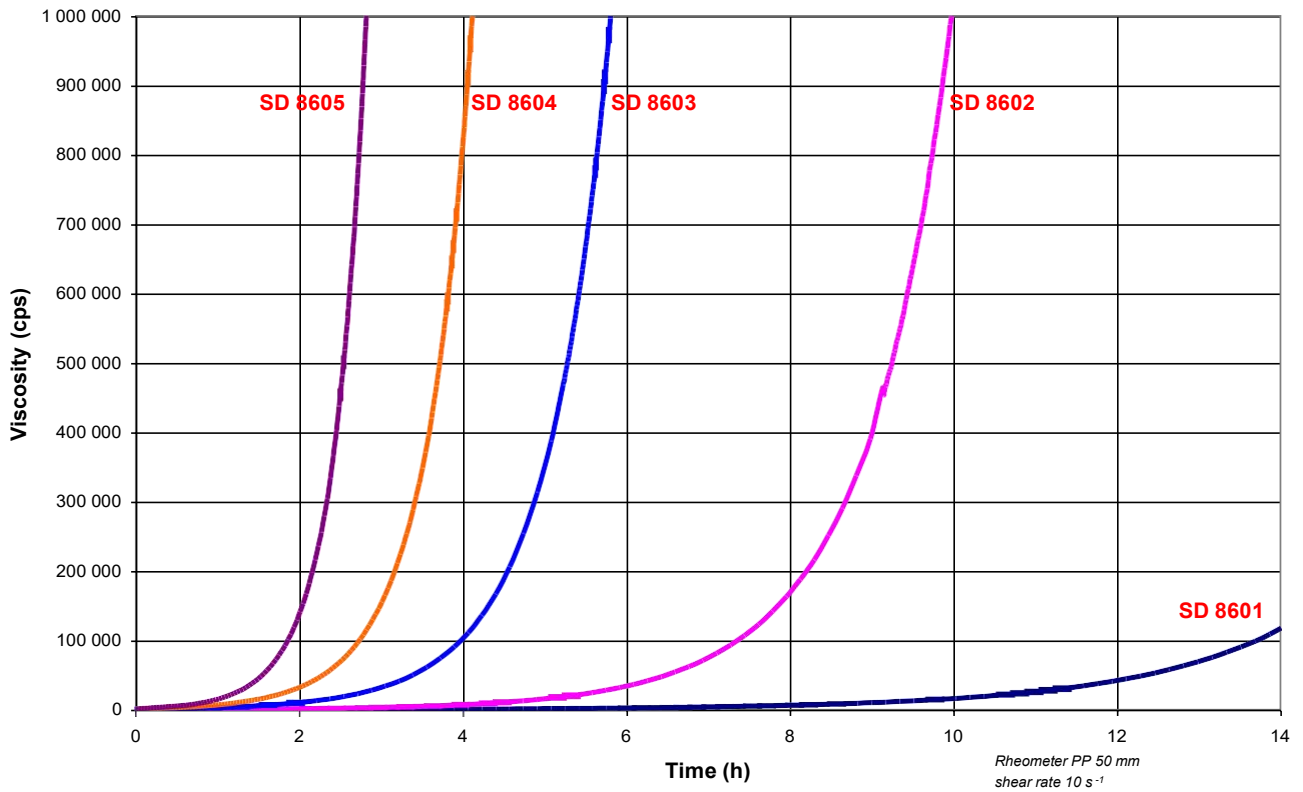
## SR 8500 / SD 860x mix properties

		SR 8500 / SD 8605	SR 8500 / SD 8604	SR 8500 / SD 8603	SR 8500 / SD 8602	SR 8500 / SD 8601
Weight ratio		<b>100 / 35</b>	<b>100 / 35</b>	<b>100 / 35</b>	<b>100 / 35</b>	<b>100 / 35</b>
Volume ratio		<b>100 / 40</b>	<b>100 / 40.9</b>	<b>100 / 41.7</b>	<b>100 / 42.5</b>	<b>100 / 43</b>
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

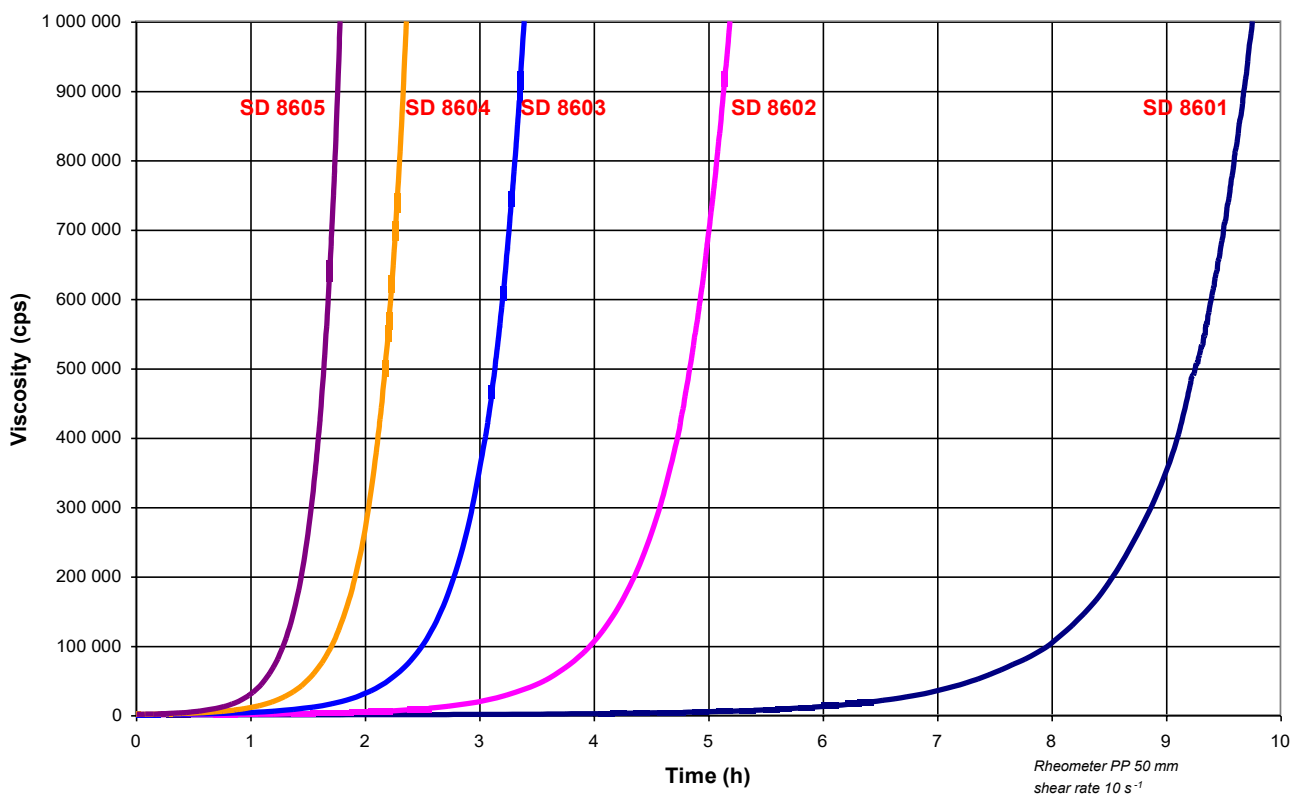
## SR 8500 / SD 860x mass reactivity

		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

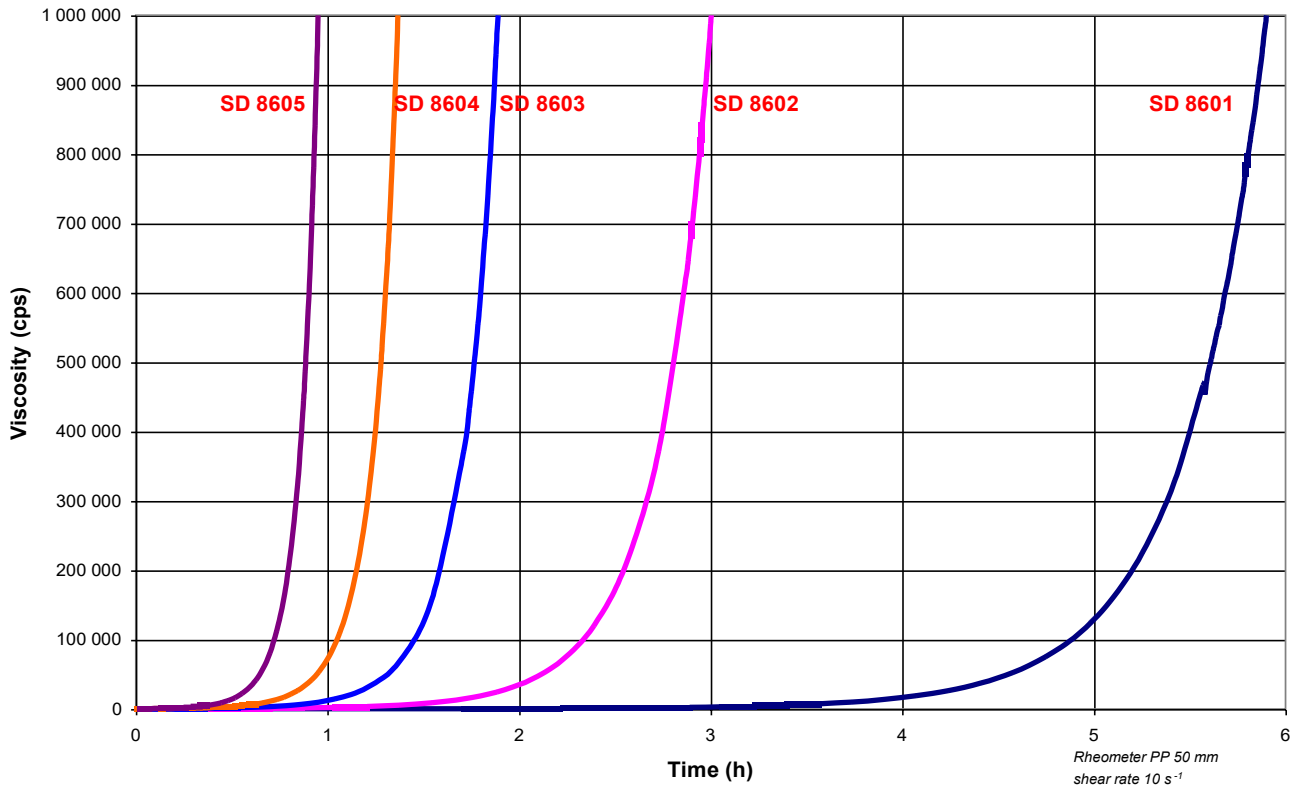
**SR 8500 / SD 860x – 1 mm film viscosity evolution**  
- at 20 °C



- 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

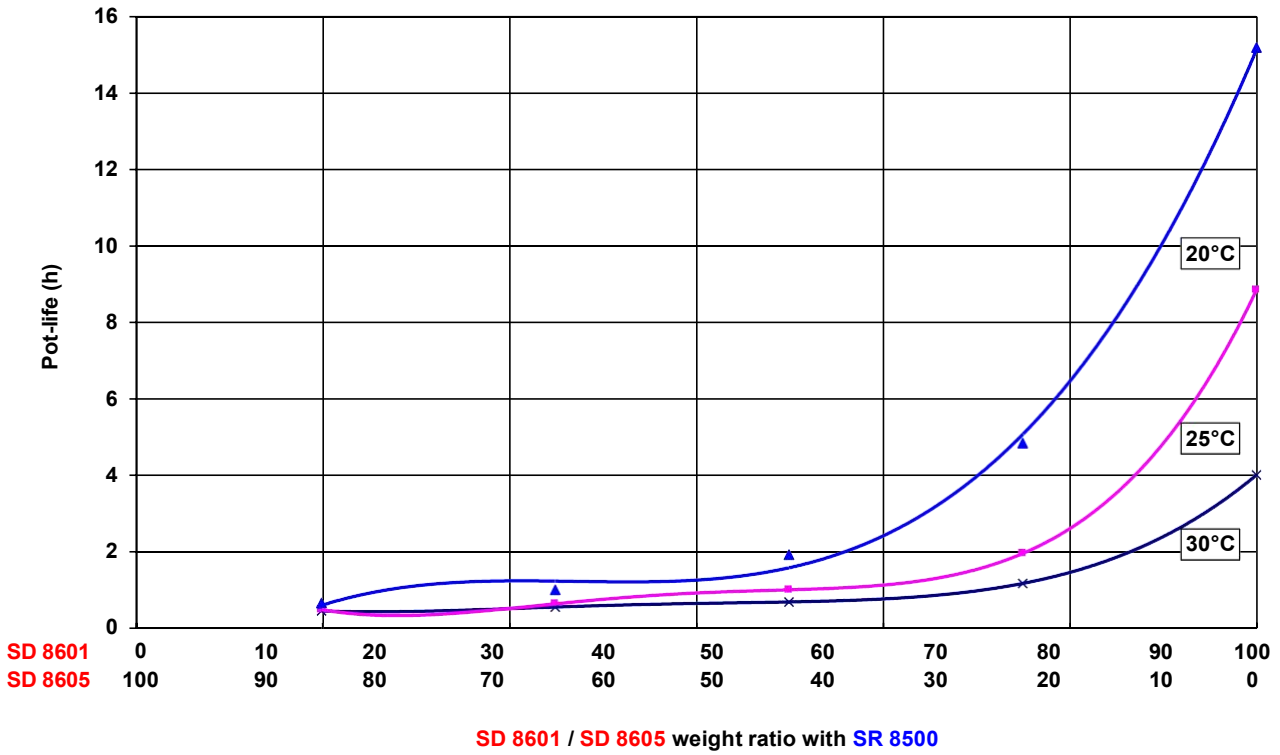
### - SR 8500 / SD 7160 or SD 1213

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

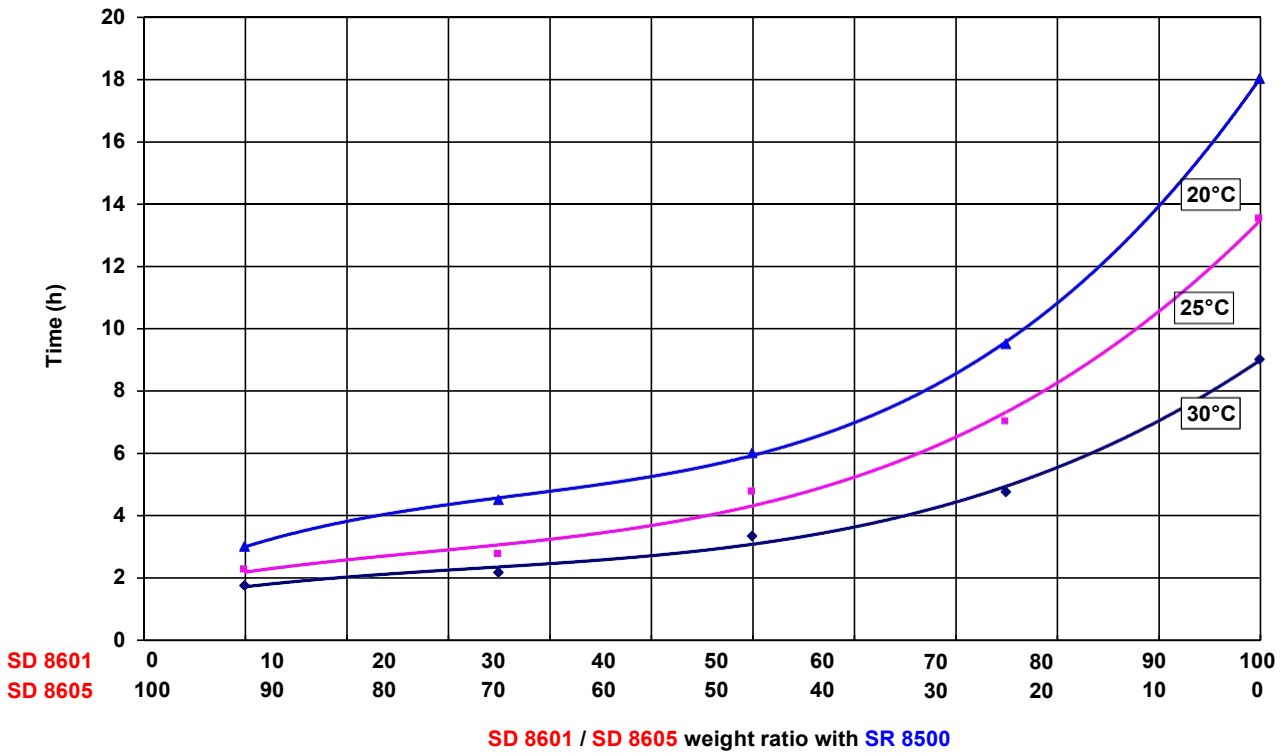
## SR 8500 : Other combinations

	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>	100 / 30.5	120	Vertical laminates with better thermal resistance
		<b>SD 8202</b>	100 / 30.5	123	
<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		SR 8500 / SD 8601			SR 8500 / SD 8602		SR 8500 / SD 8603		SR 8500 / SD 8604	
		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
Reinforcement material		3300			3300		3300		3300	
Number of layers		15			15		15		15	
Process		Press			Press		Press		Press	
Weight of reinforcement (Wf)		74			73		73		73	
Cure Schedule		24 h 40 °C			24 h 40°C		24 h 40°C		24 h 40°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>