

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

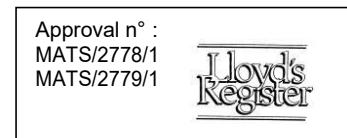
SD 8605

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

		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 ⁻¹	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 SD 8601 SD 8605		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 ⁻¹	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

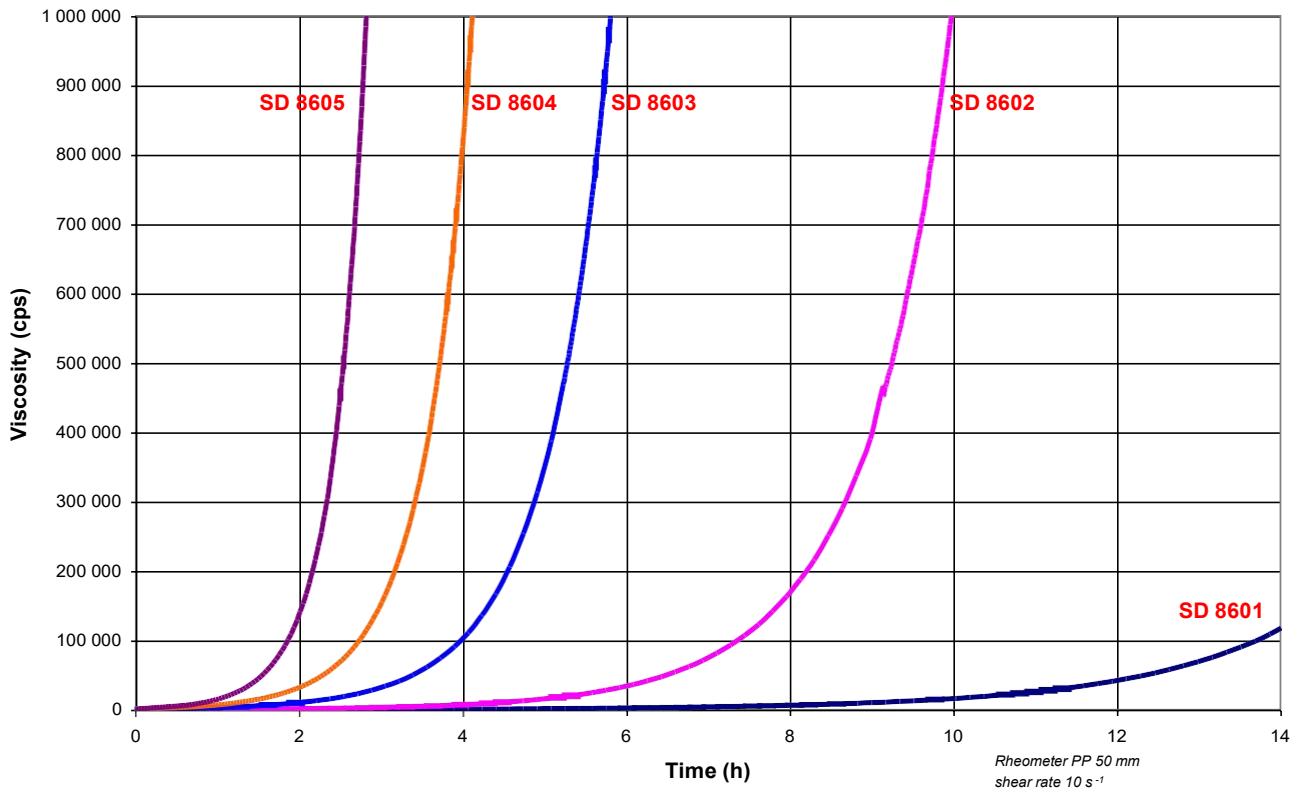
SR 8500 / SD 860x mix properties

		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 ⁻¹	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

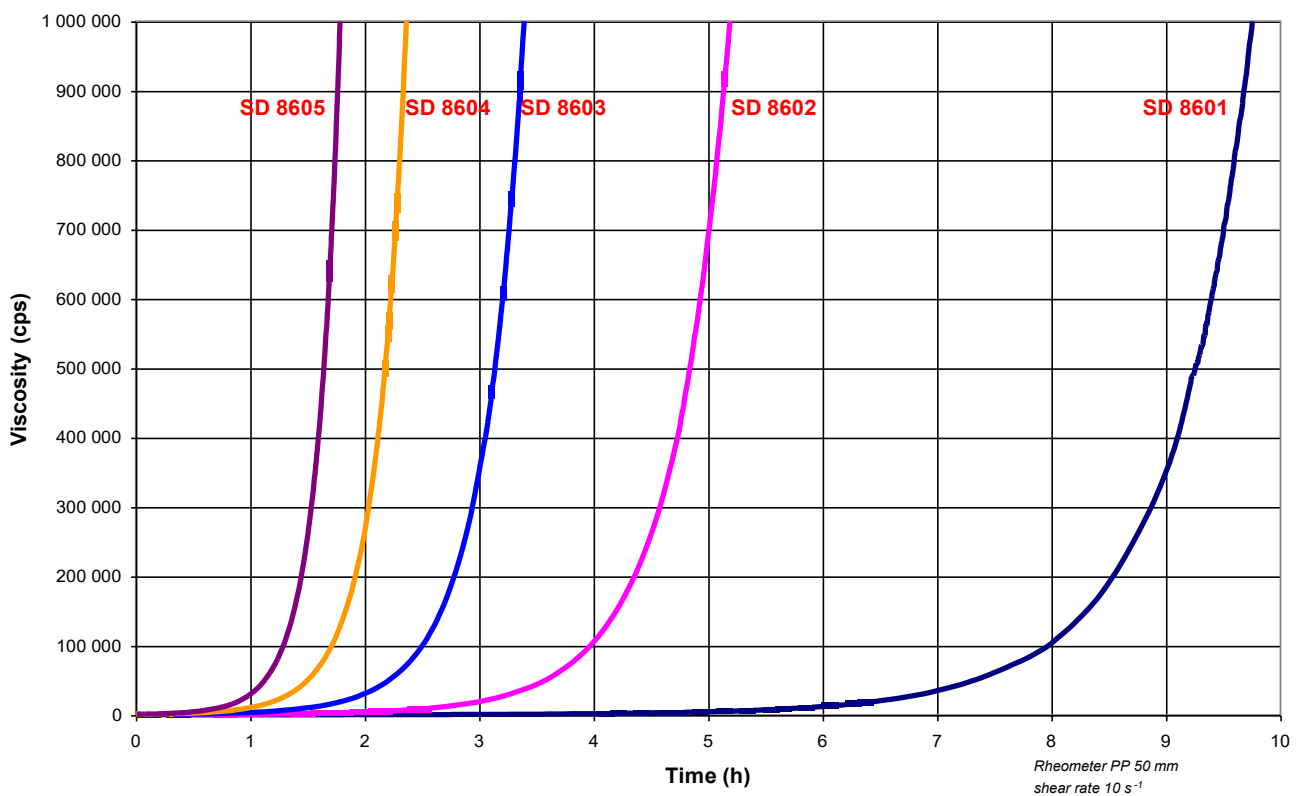
SR 8500 / SD 860x mass reactivity

		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

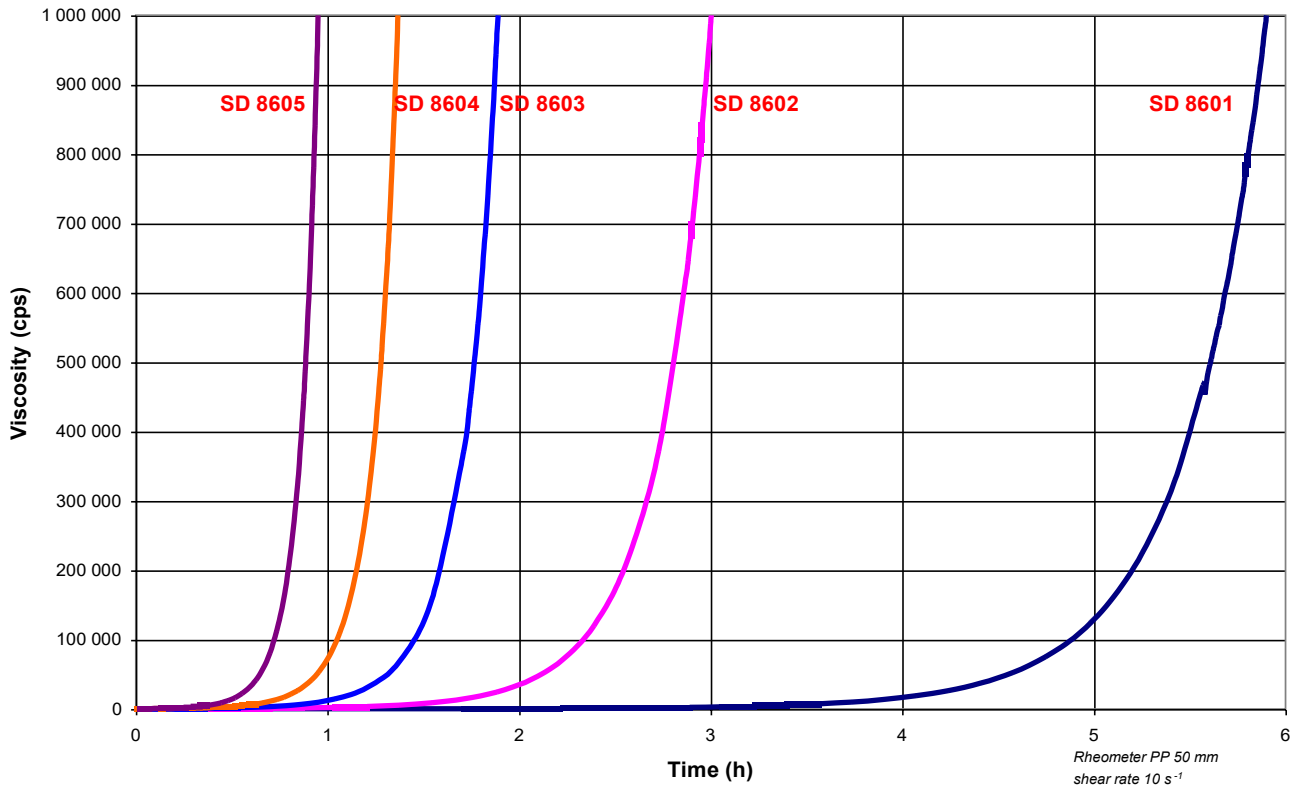
SR 8500 / SD 860x – 1 mm film viscosity evolution
- at 20 °C



- 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

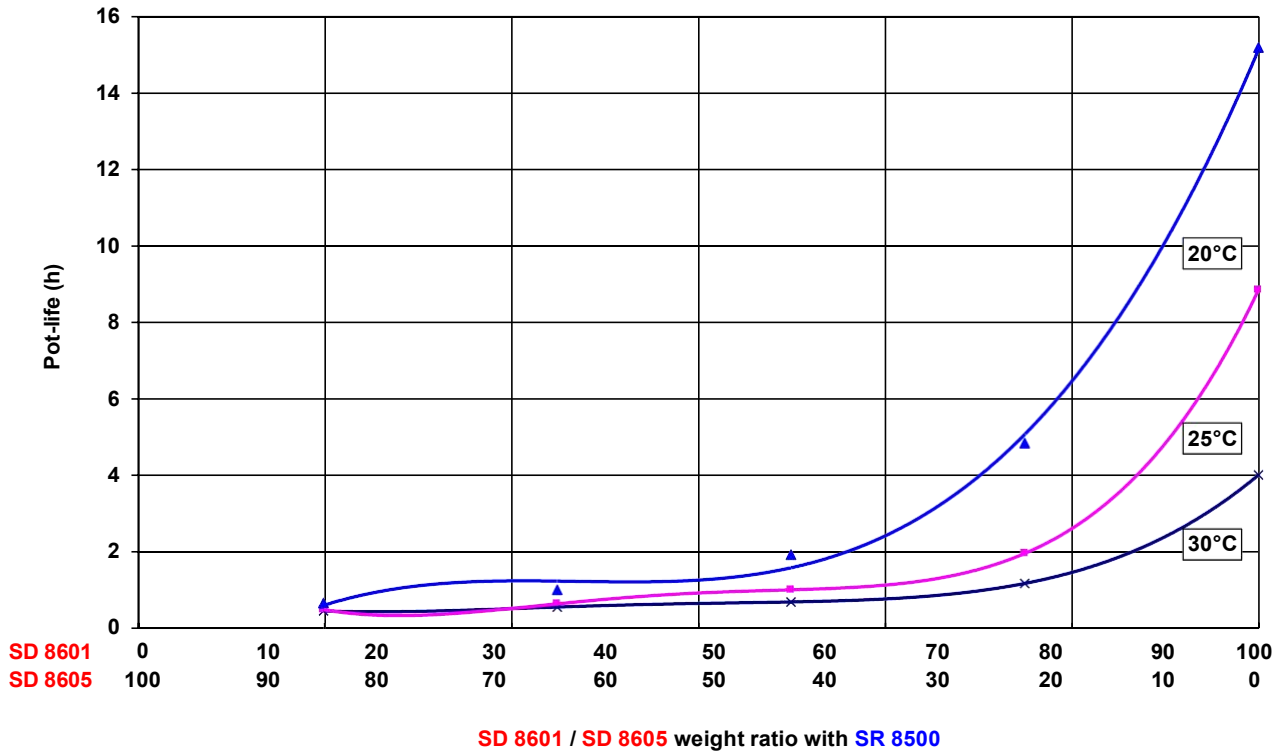
- SR 8500 / SD 7160 or SD 1213

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

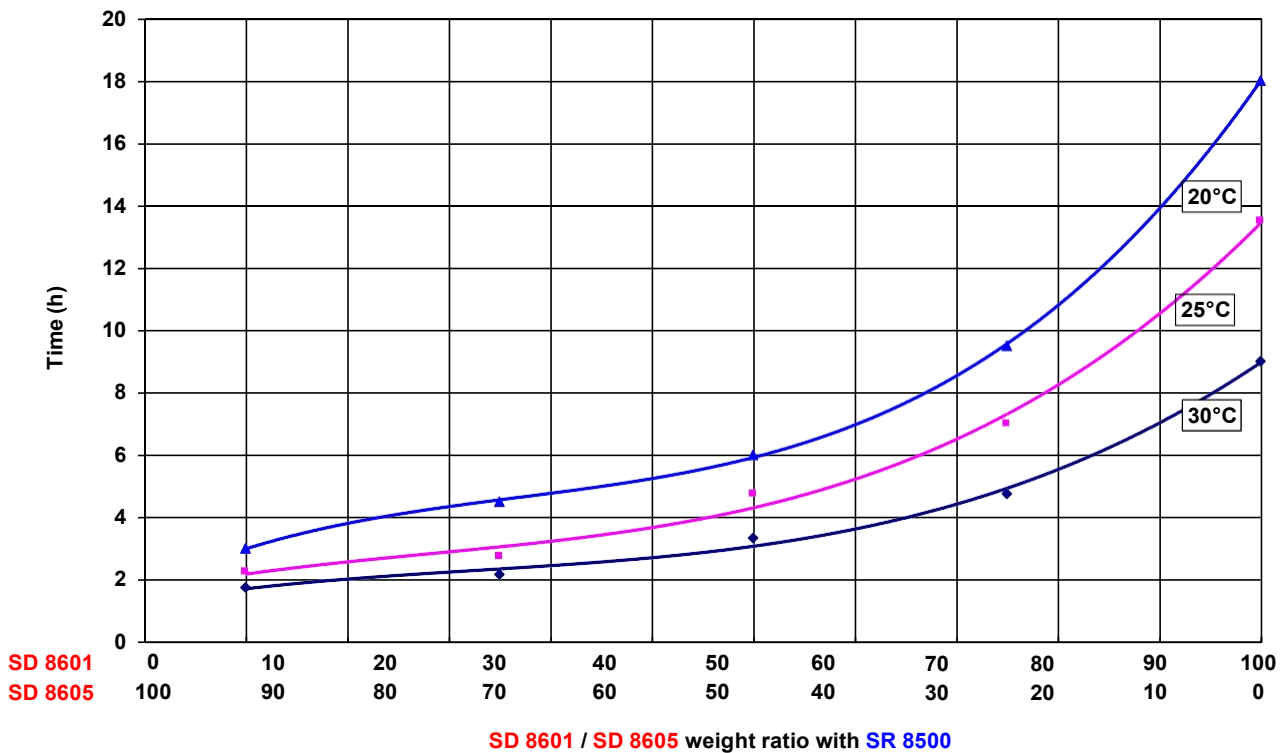
SR 8500 : Other combinations

	State	Hardeners	Weight ratio	Tg (°C) maximum	Possible applications
SR 8500	Liquid	SD 2705	100 / 20	110	Fast laminating hardener, very good mechanical and chemical resistance
		SD 8203	100 / 31	120	Laminates for tooling up to 100 °C
		SD 8202	100 / 31	123	
SR 8500 TH2	Slightly thixotropic	SD 8203	100 / 30.5	120	Vertical laminates with better thermal resistance
		SD 8202	100 / 30.5	123	
SR 8500 Gel	Black or Clear gel	SD 1249.17	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	
Tension											
Modulus of elasticity	N/mm ²	3390	3350	3250	3070	2800	3580	3500	3300	3390	3320
Maximum resistance	N/mm ²	42	54	77	76	69	72	82	80	80	85
Resistance at break	N/mm ²	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
Flexion											
Modulus of elasticity	N/mm ²	3540	3400	3300	3280	3050	3630	3570	3510	3445	3210
Maximum resistance	N/mm ²	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
Compression											
Compressive yield strength	N/mm ²		104		98	91					
Offset compressive yield	%		5.6		6.2	7.4					
Charpy impact strength											
Resilience	kJ/m ²	9	22	47	54	65	20	25	33	20	32
Glass Transition / DSC											
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	
Tension							
Modulus of elasticity	N/mm ²	3420	3250	3150	3680	3620	3350
Maximum resistance	N/mm ²	75	79	80	50	85	83
Resistance at break	N/mm ²	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
Flexion							
Modulus of elasticity	N/mm ²	3400	3330	3200	3650	3550	3280
Maximum resistance	N/mm ²	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
Compressive							
Compressive yield strength	N/mm ²			109			114
Offset compressive yield	%			11.5			10.2
Charpy impact strength							
Resilience	kJ/m ²	25	28	35	15	27	30
Glass Transition / DSC							
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		
	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	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	
Flexion										
Modulus of elasticity	N/mm ²	27 800	28 000	27 600	26900	26 100	23 200	25 000	25 600	25 900
Maximum resistance	N/mm ²	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
Bending delamination										
Shear load at break	N/mm ²	51	53	55	53	55	54	59	56	56
Impact (Choc Charpy)										
Resilience	kJ/m ²	186	183	189	200	205	190	205	205	210
Water Absorption										
	% weight	+ 0.19	+ 0.17	+ 0.15	+ 0.28	+ 0.27	+ 0.28	+ 0.27	+ 0.28	+ 0.26
Glass Transition										
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/m²