

SR 8200 / SD 720x

Laminating epoxy system

The wide range of hardeners associated with **SR 8200** offers a large choice of reactivity, in order to produce small and big parts.

This system achieves a triple purpose: low toxicity – mechanical properties – cost.

During the application the low odour is remarkable.

The maximum temperature resistance being at least 90°C, the parts will require to be post cured to get parts able to work at a service temperature of 60°C to 70°C.

Fast hardener SD 7206

Fast hardening at low temperature. Low surface pollution and mechanical properties allowing un moulding small parts after one night at 20-25 °C. Excellent mechanical properties after post curing at 40 to 60 °C.

Hardeners SD 7204 & SD 7203

Specially formulated for hand laminating at ambient temperature, under press or small parts under vacuum.

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

Good mechanical properties at ambient temperature, excellent after post cure

Slow hardener SD 7201

Reactivity formulated for hand laminating, under press or medium to large parts under vacuum.

Requires a post-cure at 55°C to 60°C.

Designed for manufacturing of high performance composites and tooling with service temperature of 60°C to 70°C.

Epoxy resin SR 8200

Aspect / colour		Clear liquid
Viscosity (mPa.s)	15 °C	5600 ± 1 000
Rheometer	20 °C	2900 ± 600
CP 50 mm	25 °C	1600 ± 300
Shear rate 10 s ⁻¹	30 °C	900 ± 200
	40 °C	400 ± 100
Density	20 °C	1.175 ± 0.01
Pycnometer NF EN ISO 2811-1		
Storage		24 months, do not crystallize

Hardeners SD 720x

		SD 72067206	SD 7204	SD 7203	SD 7201
Reactivity		"ultra fast"	"fast"	"standard"	"slow"
Aspect / couleur		Yellow liquid	Yellow liquid	Yellow liquid	Clear to yellow liquid
Viscosity (mPa.s)	15 °C	1 100 ± 200	180 ± 40	190 ± 40	80 ± 20
Rheometer	20 °C	650 ± 120	120 ± 25	120 ± 25	60 ± 15
CP 50 mm	25 °C	400 ± 80	90 ± 20	90 ± 20	45 ± 10
Shear rate 10 s ⁻¹	30 °C	250 ± 50	70 ± 15	60 ± 15	35 ± 5
Density	20 °C	1.04 ± 0.01	1.00 ± 0.01	1.01 ± 0.01	0.95 ± 0.01
Pycnometer					
NF EN ISO 2811-1					

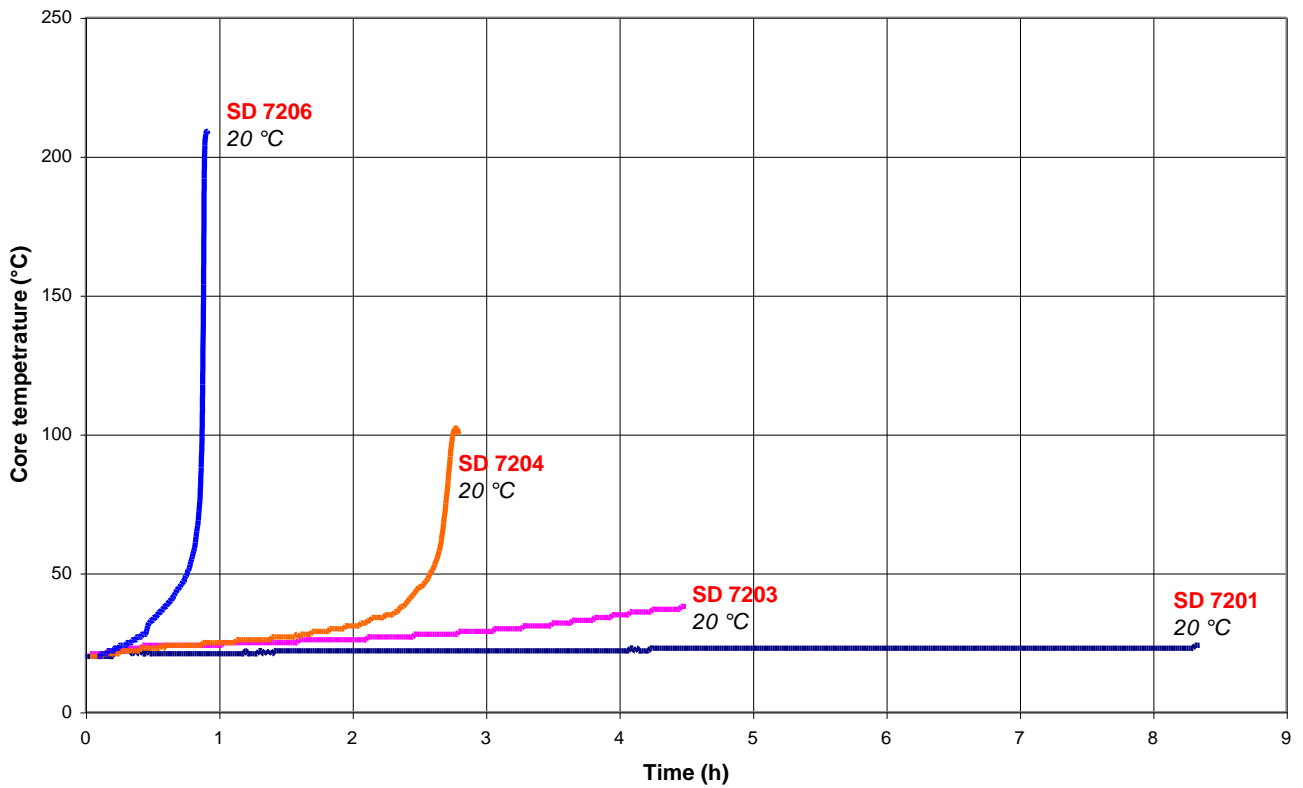
SR 8200 / SD 720x mix properties

		SR 8200 / SD 7206	SR 8200 / SD 7204	SR 8200 / SD 7203	SR 8200 / SD 7201
Weight ratio		100 / 37 g	100 / 37 g	100 / 37 g	100 / 37 g
Volume ratio		100 / 42 ml	100 / 44 ml	100 / 43 ml	100 / 46 ml
Mix viscosity	20 °C	1200 ± 250	1100 ± 150	1050 ± 200	790 ± 150
Rheometer	25 °C	850 ± 200	700 ± 150	620 ± 100	520 ± 100
PP 50 mm	30 °C	700 ± 100	470 ± 100	430 ± 100	380 ± 100
Shear rate 10 s ⁻¹					

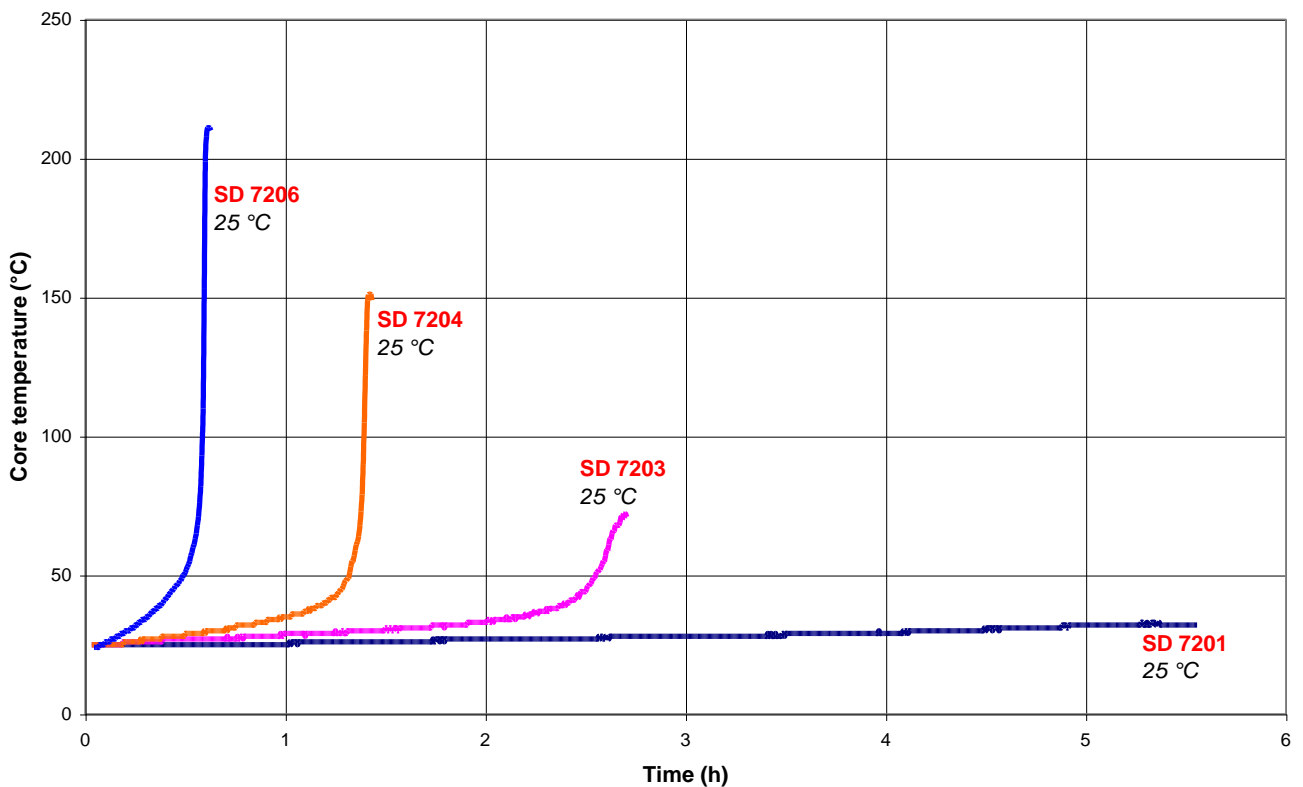
SR 8200 / SD 720x mix reactivity

		SR 8200 / SD 7206	SR 8200 / SD 7204	SR 8200 / SD 7203	SR 8200 / SD 7201
Exothermic temperature on 100 g mix:					
	30 °C	> 200 °C	200 °C	150 °C	90 °C
	25 °C	> 200 °C	150 °C	70 °C	30 °C
	20 °C	> 200 °C	100 °C	40 °C	25 °C
Time to reach exothermic peak on 100 g mix :					
	30 °C	16'	1 h	1 h 28'	3 h 34'
	25 °C	37'	1 h 25'	2 h 41'	6 h 40'
	20 °C	54'	2 h 45'	4 h 26'	8 h
Time to reach 50 °C on 100 g mix:					
	30 °C	12'	51'	1 h 09'	2 h 56'
	25 °C	29'	1 h 19'	2 h 33'	na
	20 °C	46'	2 h 35'	na	na

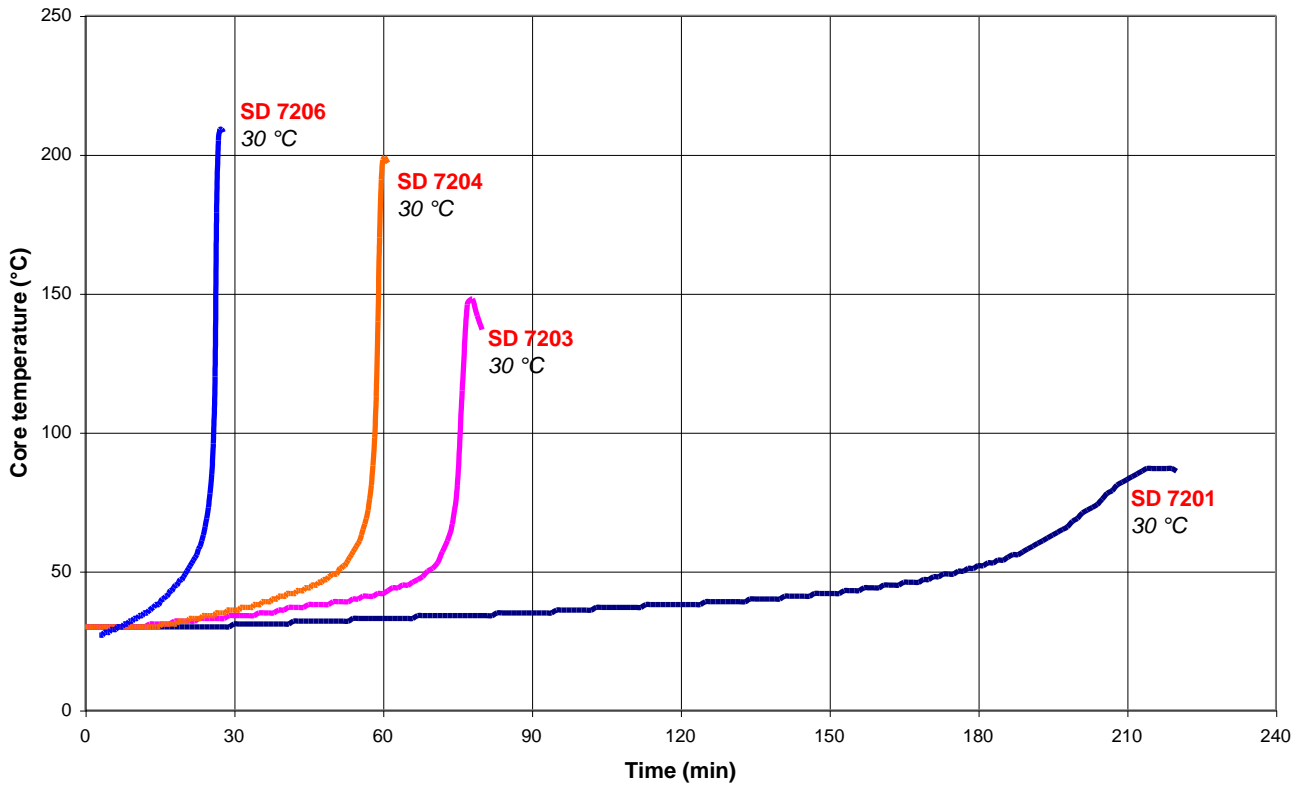
**Mass reactivity – core temperature evolution for 100 g mix
- 20°C**



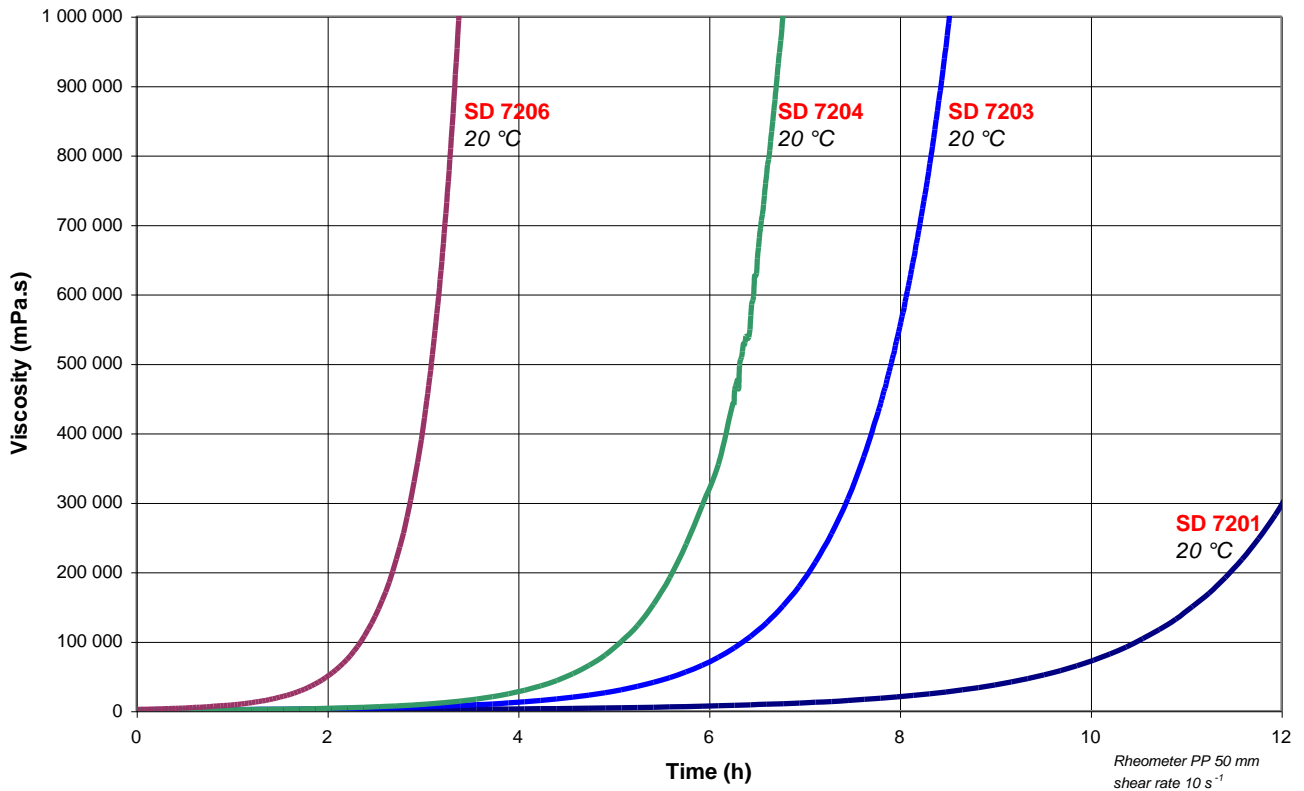
- 25°C



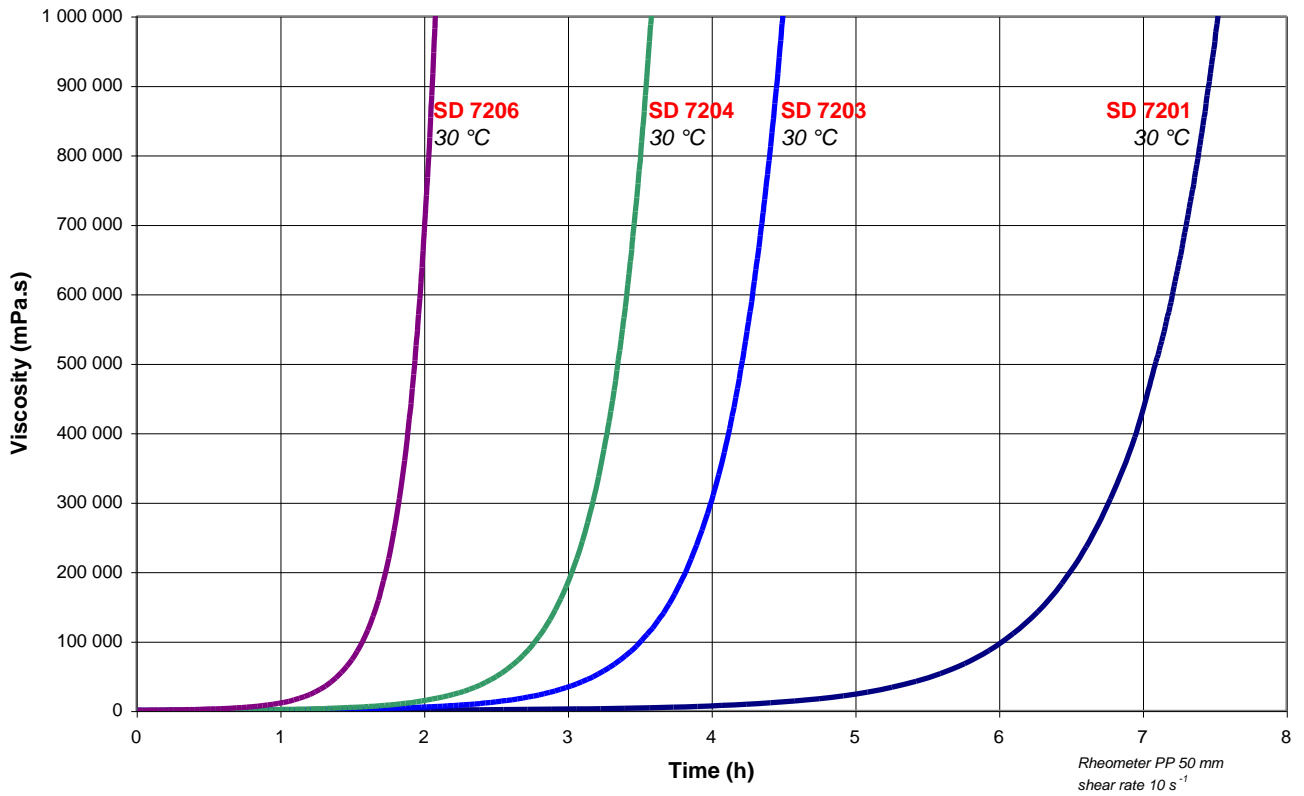
- 30°C



**Reactivity – 1 mm film viscosity evolution
- 20°C**



- 30°C



Mechanical properties of pure resin :

		SR 8200 / SD 7206				SR 8200 / SD 7204			
		10 days 23 °C	24 h 23°C. + 24h 40°C	24 h 23°C + 16 h 60°C	24 h 23°C + 8 h 80 °C	10 days 23 °C	24 h 23°C + 24h 40°C	24 h 23°C + 16 h 60°C	24 h 23°C + 8 h 80 °C
Tensile									
Modulus of elasticity	N/mm ²	3500	3240	3040	2950	3016	3070	2840	2760
Maximum resistance	N/mm ²	47	79	87	84	44	67	78	75
Resistance at break	N/mm ²	47	79	81	77	44	67	75	72
Elongation at max. resistance	%	1.3	3	5	5	1.7	2.7	4.4	4.2
Elongation at break	%	1.3	3	6	8	1.7	2.7	5	4.6
Flexion									
Modulus of elasticity	N/mm ²	3800	3500	3500	3300	3484	3070	3130	2790
Maximum resistance	N/mm ²	99	118	135	123	69	104	118	114
Elongation at max. load	%	3	4	6	6	2.0	4.3	5.6	6.1
Elongation at break	%	3	6	12	12	2.1	5.5	9.3	10.4
Charpy impact strength									
Resilience	kJ/m ²	12	20	28	34	10	14	24	36
Glass transition									
Tg1	°C	50	69	89	91	55	72	86	93
Tg1 max.	°C				94				94

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

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 on pure resin :

		SR 8200 / SD 7203				SR 8200 / SD 7201			
		10 days 23 °C	24 h 23 °C + 24h 40°C	24 h 23°C + 16 h 60° C	24 h 23°C + 8 h 80 °C	4 days 30 °C	24 h 23°C + 24h 40°C	24 h 23°C + 16 h 60°C	24 h 23°C + 6 h 50 °C + 8 h 80 °C
Tensile									
Modulus of elasticity	N/mm ²	2900	3010	2900	2640	2720	2980	2810	2800
Maximum resistance	N/mm ²	39	70	69	70	36	71	73	74
Resistance at break	N/mm ²	39	70	67	70	36	71	71	73
Elongation at max. resistance	%	1.5	3.0	3.6	4.3	1.5	3.4	3.8	4.7
Elongation at break	%	1.5	3.1	4.1	4.5	1.5	3.5	4.0	5.3
Flexion									
Modulus of elasticity	N/mm ²	3438	3200	3070	2570	3229	3120	2720	2490
Maximum resistance	N/mm ²	69	104	117	108	60	109	107	104
Elongation at max. load	%	2.0	3.6	5.5	6.4	1.8	4.7	5.8	6.5
Elongation at break	%	2.1	3.8	9.2	8.4	1.9	8.7	8.4	8.8
Charpy impact strength									
Resilience	kJ/m ²	7	12	16	30	5	15	33	27
Glass transition									
Tg1	°C	59	71	87	89	59	68	87	93
Tg1 max.	°C				92				93

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

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

SR 8200 based laminate mechanical properties

Samples Matrix		SR 8200 / SD 7206	SR 8200 / SD 7204	SR 8200 / SD 7203	SR 8200 / SD 7201
Reinforcement material		3300	3300	3300	3300
Number of layers		15	15	15	15
Method		Press	Press	Press	Press
Weight of reinforcement	%	68	68	66	72
Cure Schedule		8 h 60 °C	8 h 60 °C	8 h 60 °C	16 h 60 °C
Flexion					
Modulus	N/mm ²	25 700	24 930	25 740	26 350
Maximum resistance	N/mm ²	734	655	670	650
Maximum elongation	%	3.2	3	3	2.9
Shear strength					
Shear load at rupture	N/mm ²	60	56	55	51
Charpy impact strength					
Resilience	kJ/m ²	217	186	190	196
Water absorption					
	%	0.10	0.18	0.12	0.10
Glass transition					
Tg 1	°C	90	94	92	93
Tg1 max.	°C	94	94	92	93

Tests carried out in accordance with the following norms:

Flexion :	NF T 57-105
Shear:	NF T 57-104
Charpy Impact Strength:	NF T 57-108
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
Water absorption:	Internal. Polymerisation according to cycle, machining, weighting, time spent in distilled water at 70 °C / 48 hours, weighting 1 hour after emerging, drying 24 h at 40°C, weighting, mechanical tests on 10 samples
Reinforcement 3300:	Twill 2/2 E Glass, weight 300 g/m ²

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