

## **SR 1124**

### **Fire resistant epoxy systems**

Epoxy system **SR 1124**:

- offers a very low viscosity with exceptional wetting-out properties for hand laminating.
- is a low density fire retardant system, intumescent and halogen free.
- has a low smokes opacity and toxicity.
- meets the stringent fire protection standards specified in construction and transportation.
- offers an exceptional fire resistance with SC FW16 coating (ASTM E84 class A) or with SGI 128 fire retardant epoxy gel-coat.

#### **Guidelines**

No filtering

Use a stirrer with high shear to homogenize resin part prior to use

## Fire resistant Epoxy resin SR 1124

Appearance	White viscous liquid	
Storage stability	2 years @ 20 °C Stir thoroughly before use	
Viscosity (mPa.s)	@ 15 °C	6900
+/- 20 %	@ 20 °C	4000
	@ 25 °C	2400
	@ 30 °C	1500
	@ 40 °C	700
Density	@ 20 °C	1.23
+/-0.01		
Refractive Index		1,5560
+/- 0.0005		

## Hardeners SD 893x

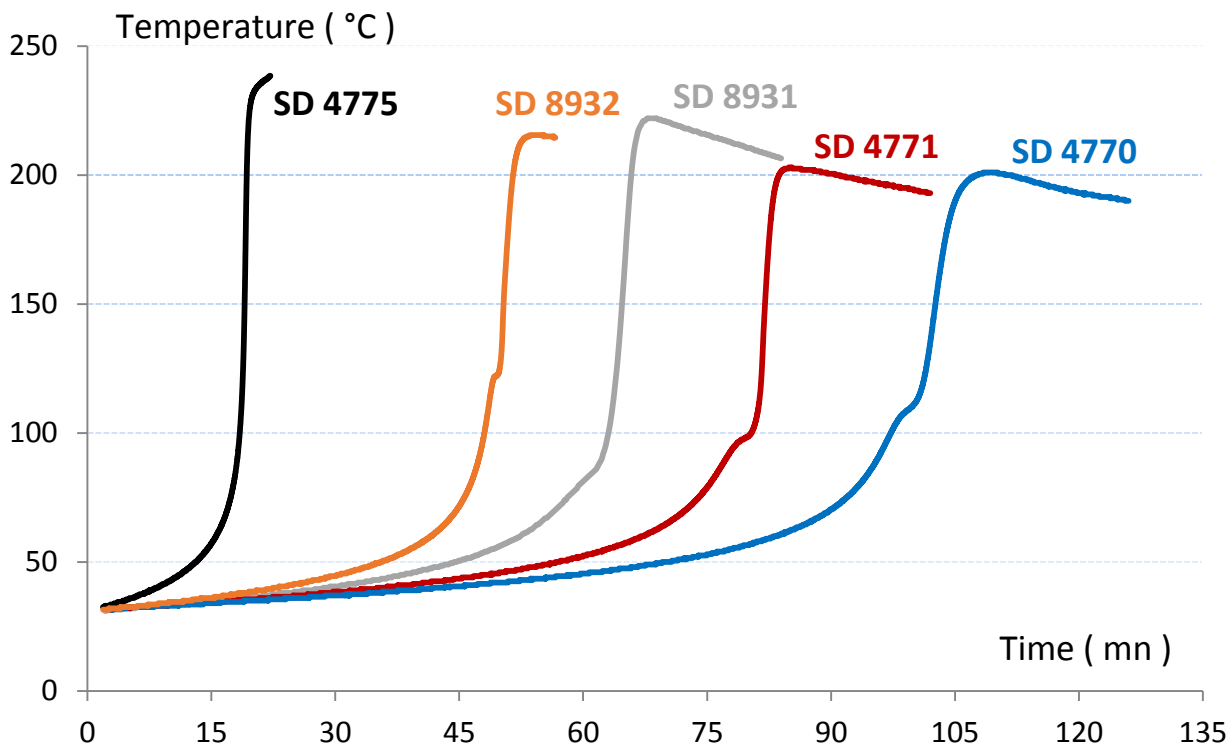
		SD 4775	SD 8932	SD 8931	SD 4771	SD 4770
Appearance				Liquid		
Color				Light yellow		
Color Gardner maximum		5	3	3	3	3
Reactivity		Fast	→			Mega slow
Viscosity (mPa.s)	@ 15 °C	285	33	42	13	13
+/- 20 %	@ 20 °C	190	25	32	11	11
	@ 25 °C	130	19	24	9	9
	@ 30 °C	95	15	19	7	7
	@ 40 °C	55	10	12	5	5
Density	@ 20 °C	1.01	0,94	0.95	0.94	0.94
+/- 0.01						
Refractive Index	@ 25 °C	1.4980	1,4819	1 ,4756	1.4590	1.4603
+/- 0.0005						

## Blends Epoxy SR 1124 / SD xxxx

		SR 1124 / SD 4775	SR 1124 / SD 8932	SR 1124 / SD 8931	SR 1124 / SD 4771	SR 1124 / SD 4770
Appearance		White liquid				
Mixing ratio by weight				<b>100 / 23</b>		
Mixing ratio by volume		100 / 28	100 / 30	100 / 30	100 / 30	100 / 30
Viscosity (m.Pas)	@ 20 °C	1620	1400	1100	610	530
+/- 20 %	@ 30 °C	950	600	600	455	410
	@ 40 °C	560	300	350	225	158
Density mix	@ 25 °C			1.17		
+ / - 0.02						

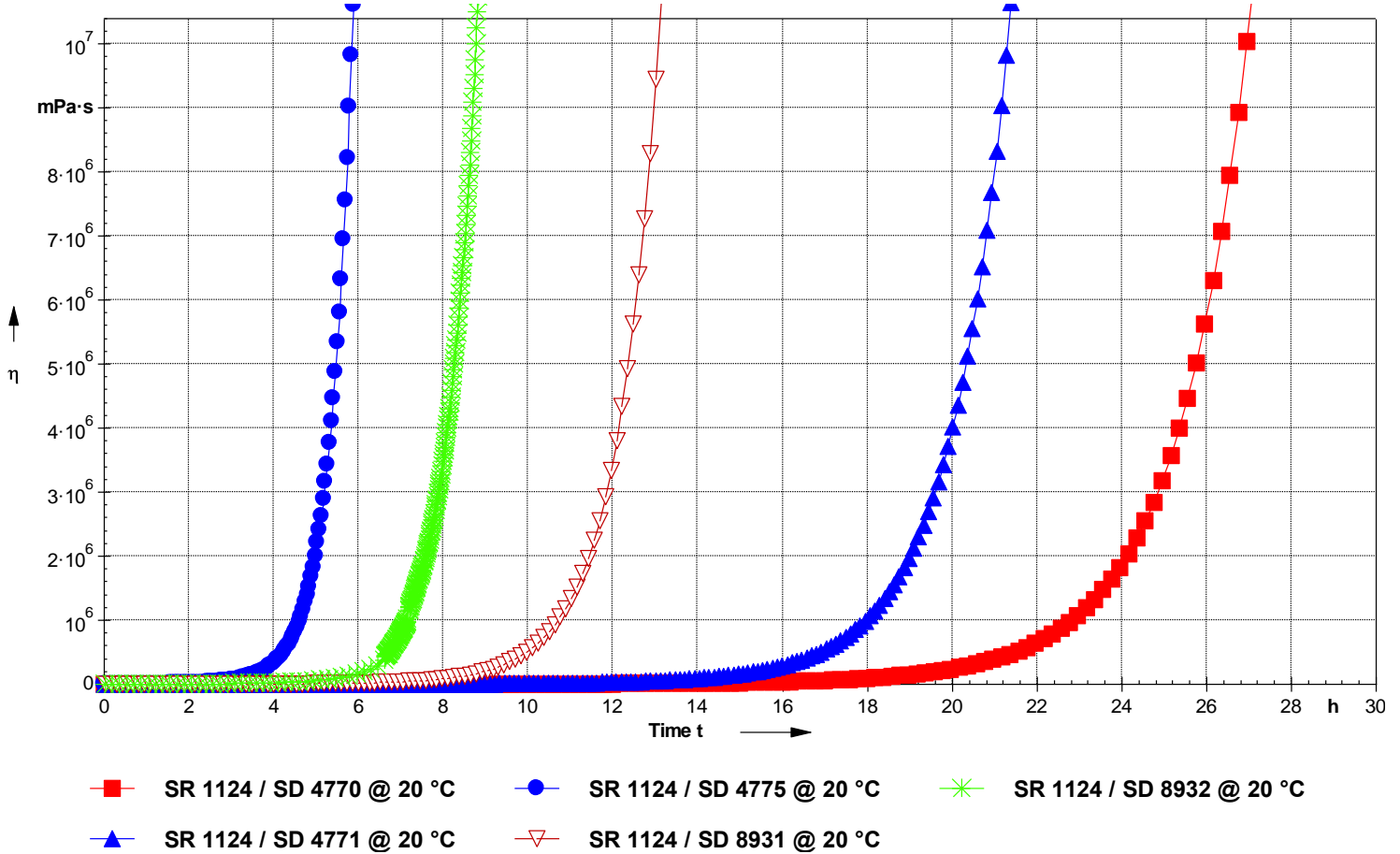
**Mass reactivity 500 g @ 30 °C**

	SR 1124 / SD 4775	SR 1124 / SD 8932	SR 1124 / SD 8931	SR 1124 / SD 4771	SR 1124 / SD 4770
Exothermic peak on 500 g mix (°C) : @ 30 °C	240	215	220	200	200
Time to reach exothermic peak : @ 30 °C	22'	53'	1 h 15'	1 h 40'	1 h 50'
Time to reach 50 °C on 500 g mix @ 30 °C	13'	35'	45'	55'	1 h 10'

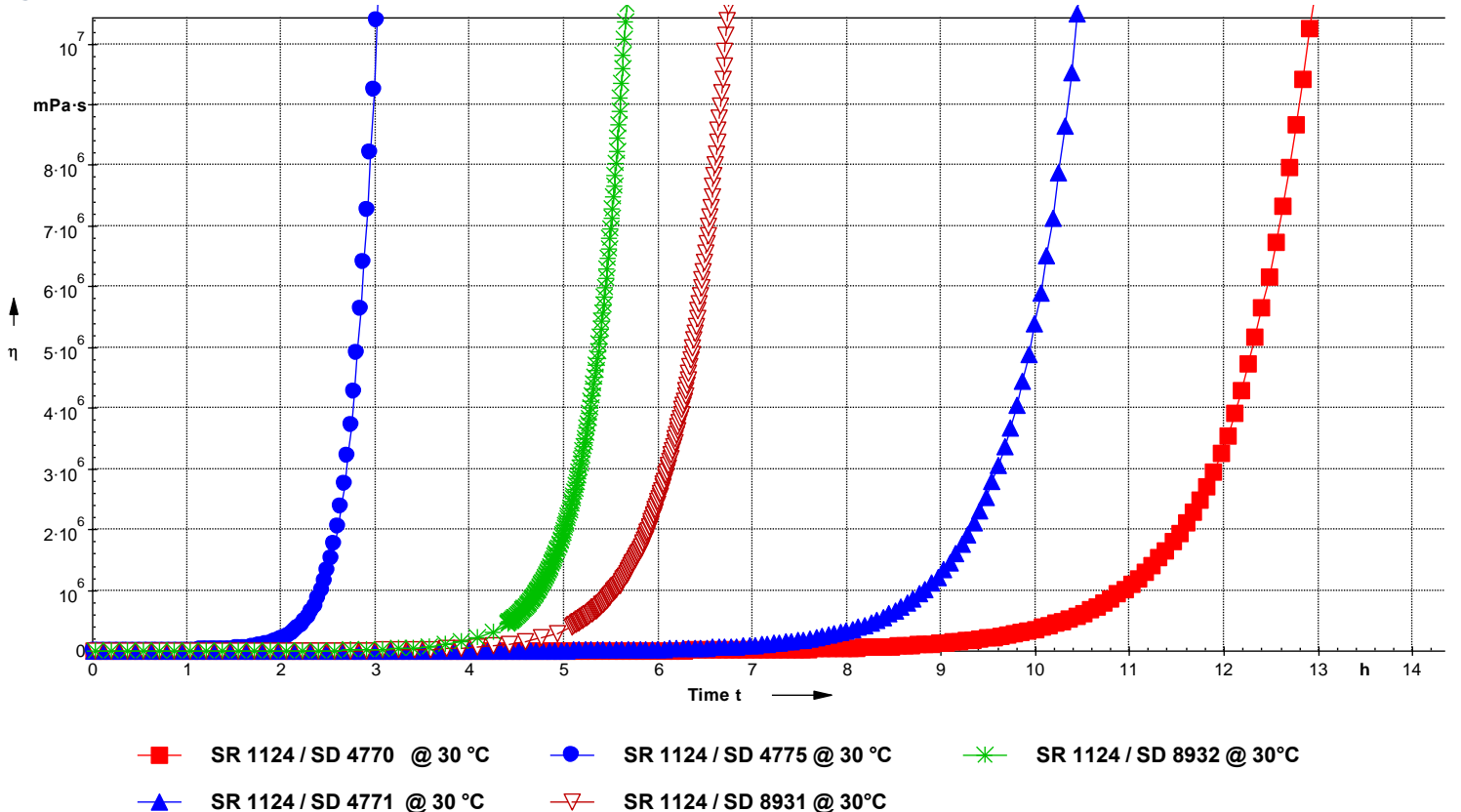


**Increase of viscosity on 1 mm film @ 20, 30 and 40 °C**

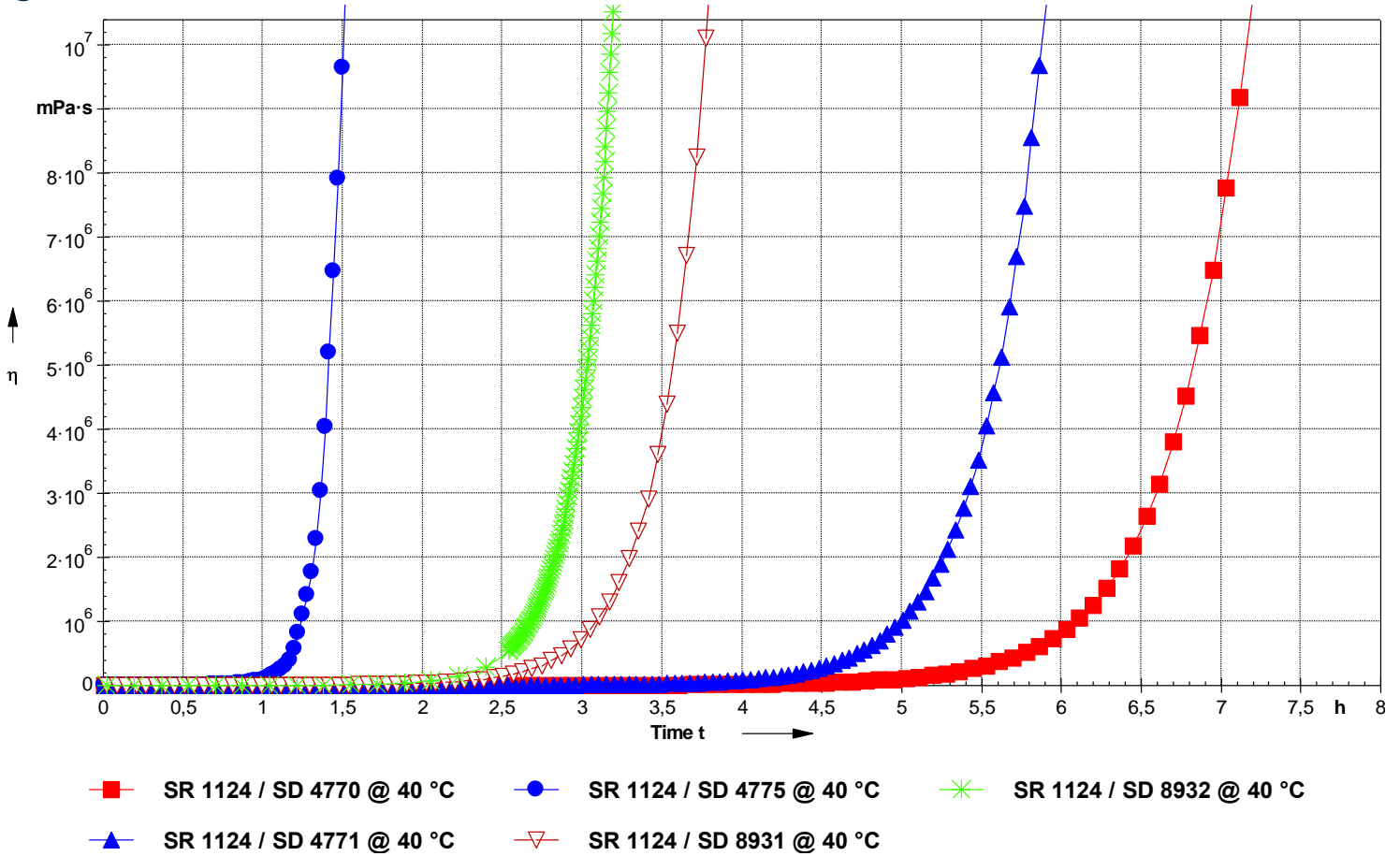
**@ 20 °C**



**@ 30 °C**



@ 40 °C



## Mecanical properties on cast resin

		SR 1124 / SD 4775		
Curing schedule		2 days at 30 °C 24 hrs 40 °C	2 days at 30 °C 16 hrs 60 °C	2 days at 30 °C 4 hrs 60 °C 4 h 80 °C
<b>Tensile</b>				
Modulus of elasticity	N/mm <sup>2</sup>	3 700	3 700	3 600
Maximum resistance	N/mm <sup>2</sup>	53	53	56
Resistance at break	N/mm <sup>2</sup>	53	53	56
Elongation at max.load	%	1.6	1.8	2.1
Elongation at break	%	1.6	1.8	2.1
<b>Flexion</b>				
Modulus of elasticity	N/mm <sup>2</sup>	3 800	3 500	3 500
Maximum resistance	N/mm <sup>2</sup>	79	90	87
Elongation at max. load	%	2.1	2.7	2.7
Elongation at break	%	2.1	2.7	2.7
<b>Compression</b>				
Compressive yield strength	N/mm <sup>2</sup>	102	98	97
Offset compressive yield	%	13	16	17
<b>Shear strength</b>				
Maximum resistance	N/mm <sup>2</sup>	45	42	43
<b>Charpy impact strength</b>				
Resilience	kJ/m <sup>2</sup>	7	8	7
<b>Glass transition</b>				
Tg1 / Tg1 maximum DSC	°C	73	83	80 / 81
DTMA - pic Tan δ	°C	69	85	89
DTMA - T <sub>efG</sub> onset – G' (TG1 onset)	°C	61	75	76
DTMA - T <sub>mG</sub> – G'	°C	65	79	85
DTMA - T <sub>efG</sub> – G'	°C	71	90	94
DTMA - T <sub>G</sub> pic G''	°C	63	78	78

		<b>SR 1124 / SD 8932</b>		
<b>Curing schedule</b>		AT 8 hrs 23 °C 24 hrs 40 °C	AT 8 hrs 23 °C 16 hrs 60 °C	AT 8 hrs 23 °C 4 hrs 60 °C 4 hrs 80 °C
<b>Tensile</b>				
Modulus of elasticity	N/mm <sup>2</sup>	3800	3600	3400
Maximum resistance	N/mm <sup>2</sup>	46	46	44
Resistance at break	N/mm <sup>2</sup>	46	46	44
Elongation at max.load	%	1.3	1.4	1.4
Elongation at break	%	1.3	1.4	1.4
<b>Flexion</b>				
Modulus of elasticity	N/mm <sup>2</sup>	3800	3600	3400
Maximum resistance	N/mm <sup>2</sup>	68	73	76
Elongation at max. load	%	1.7	2.0	2.3
Elongation at break	%	1.7	2.0	2.3
<b>Compression</b>				
Compressive yield strength	N/mm <sup>2</sup>	95	97	96
Offset compressive yield	%	10	15	16
<b>Shear strength</b>				
Maximum resistance	N/mm <sup>2</sup>	40	46	45
<b>Charpy impact strength</b>				
Resilience	kJ/m <sup>2</sup>	5	6	7
<b>Glass transition</b>				
Tg1 / Tg1 maximum DSC	°C	75	93	102 / 102
DTMA - pic Tan δ	°C	73	92	105
DTMA - T <sub>eiG</sub> onset – G' (TG1 onset)	°C	61	78	93
DTMA - T <sub>mG</sub> – G'	°C	67	86	100
DTMA - T <sub>efG</sub> – G'	°C	74	95	108
DTMA - T <sub>G</sub> pic G''	°C	64	82	95

		<b>SR 1124 / SD 8931</b>		
<b>Curing schedule</b>		AT 8 hrs 23 °C 24 hrs 40 °C	AT 8 hrs 23 °C 16 hrs 60 °C	AT 8 hrs 23 °C 4 hrs 60 °C 4 hrs 80 °C
<b>Tensile</b>				
Modulus of elasticity	N/mm <sup>2</sup>	3700	3600	3400
Maximum resistance	N/mm <sup>2</sup>	44	48	43
Resistance at break	N/mm <sup>2</sup>	44	48	43
Elongation at max.load	%	1.3	1.6	1.4
Elongation at break	%	1.3	1.6	1.4
<b>Flexion</b>				
Modulus of elasticity	N/mm <sup>2</sup>	3600	3400	3400
Maximum resistance	N/mm <sup>2</sup>	66	67	76
Elongation at max. load	%	1.8	1.9	2.3
Elongation at break	%	1.8	1.9	2.3
<b>Compression</b>				
Compressive yield strength	N/mm <sup>2</sup>	90	91	89
Offset compressive yield	%	11	16	15
<b>Shear strength</b>				
Maximum resistance	N/mm <sup>2</sup>	42	47	46
<b>Charpy impact strength</b>				
Resilience	kJ/m <sup>2</sup>	5	5	6
<b>Glass transition</b>				
Tg1 / Tg1 maximum DSC	°C	72	87	95 / 98
DTMA - pic Tan δ	°C	70	87	99
DTMA - T <sub>efG</sub> onset – G' (TG1 onset)	°C	59	75	87
DTMA - T <sub>mG</sub> – G'	°C	65	82	95
DTMA - T <sub>efG</sub> – G'	°C	74	91	104
DTMA - T <sub>G</sub> pic G''	°C	61	78	89



		<b>SR 1124 / SD 4771</b>			
<b>Curing schedule</b>		2 days at 30 °C 24 hrs 40 °C	2 days at 30 °C 16 hrs 55 °C	2 days at 30 °C 16 hrs 60 °C	2 days at 30 °C 4 hrs 60 °C 4 hrs 80 °C
<b>Tensile</b>					
Modulus of elasticity	N/mm <sup>2</sup>	3 800	3 400	3600	3 300
Maximum resistance	N/mm <sup>2</sup>	51	52	53	50
Resistance at break	N/mm <sup>2</sup>	51	52	53	50
Elongation at max.load	%	1.7	1.7	1.9	1.9
Elongation at break	%	1.7	1.7	1.9	1.9
<b>Flexion</b>					
Modulus of elasticity	N/mm <sup>2</sup>	3 600	3 700	3 700	3 400
Maximum resistance	N/mm <sup>2</sup>	75	76	84	79
Elongation at max. load	%	2.1	2.1	2.3	2.5
Elongation at break	%	2.1	2.1	2.3	2.5
<b>Compression</b>					
Compressive yield strength	N/mm <sup>2</sup>	95	93	95	85
Offset compressive yield	%	12	12	13	13
<b>Shear strength</b>					
Maximum resistance	N/mm <sup>2</sup>	42	43	42	41
<b>Charpy impact strength</b>					
Resilience	kJ/m <sup>2</sup>	6	15	13	15
<b>Glass transition</b>					
Tg1 / Tg1 maximum DSC	°C	67	74	82	85 / 83
DTMA - pic Tan δ	°C	66	78	82	88
DTMA - T <sub>eiG</sub> onset – G' (TG1 onset)	°C	58	70	73	78
DTMA - T <sub>mG</sub> – G'	°C	62	74	79	82
DTMA - T <sub>efG</sub> – G'	°C	70	82	87	93
DTMA - T <sub>G</sub> pic G''	°C	59	71	75	80

		<b>SR 1124 / SD 4770</b>		
<b>Curing schedule</b>		2 days at 30 °C 24 hrs 40 °C	2 days at 30 °C 16 hrs 60 °C	2 days at 30 °C 4 hrs 60 °C 4 hrs 80 °C
<b>Tensile</b>				
Modulus of elasticity	N/mm <sup>2</sup>	3 600	3 300	3 200
Maximum resistance	N/mm <sup>2</sup>	50	46	49
Resistance at break	N/mm <sup>2</sup>	49	46	47
Elongation at max.load	%	1.7	1.6	1.9
Elongation at break	%	1.7	1.6	1.9
<b>Flexion</b>				
Modulus of elasticity	N/mm <sup>2</sup>	3 600	3 500	3 400
Maximum resistance	N/mm <sup>2</sup>	72	73	76
Elongation at max. load	%	2	2	2.3
Elongation at break	%	2	2.1	2.3
<b>Compression</b>				
Compressive yield strength	N/mm <sup>2</sup>	95	97	89
Offset compressive yield	%	14	13	13
<b>Shear strength</b>				
Maximum resistance	N/mm <sup>2</sup>	41	41	39
<b>Charpy impact strength</b>				
Resilience	kJ/m <sup>2</sup>	5	5	7
<b>Glass transition</b>				
Tg1 / Tg1 maximum DSC	°C	66	79	82 / 82
DTMA - pic Tan δ	°C	64	81	85
DTMA - T <sub>eiG</sub> onset – G' (TG1 onset)	°C	55	72	71
DTMA - T <sub>mG</sub> – G'	°C	60	77	81
DTMA - T <sub>efG</sub> – G'	°C	66	84	90
DTMA - T <sub>G</sub> pic G''	°C	57	73	73

**Laminate mechanical properties :**

Epoxy system : **SR 1124 / SD 8932**  
 Reinforcement : E Glass fabric, Twill 2/2, 300 g / m<sup>2</sup> Ref 3300  
 Process: Hand laminate + press

Number of glass layers		15	15
Glass fiber content by % weight		60	65
Cure		24 hrs Ambient + 16 hrs 60 °C	24 hrs Ambient + 4 hrs 60 °C + 4 hrs 80 °C
<b>Flexural</b>			
Modulus of elasticity	N/mm <sup>2</sup>	15 500	19 300
Maximum resistance	N/mm <sup>2</sup>	450	550
Elongation at max. load	%	3	3
<b>Bending delamination</b>			
Shear load at rupture	N/mm <sup>2</sup>	46	36
<b>Impact (Choc Charpy)</b>			
Resilience	KJ/m <sup>2</sup>	178	176
<b>Glass transition / DSC</b>			
Tg 1 / Tg1 maximum	°C °C	86	99 / 103

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

Measures undertaken according to the following norms:

Tension : Iso 527 - 2  
 Flexion : Iso 178  
 Charpy impact strength: NF T 51-035  
 Shear Strength ASTM D 732 - 93  
 Compressive ISO 604  
 Water absorption: Internal. Polymerisation according to cycle, machining, weighing, time spent in distilled water at 70 °C / 48 hours, weighing 1 hour after emerging,  
 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  
 Glass transition DTMA: ISO 11357-1 - TG onset G' Temperature ramp 0°C to 180 °C @ 2°C/min  
 ASTM D4065 - TG peak G''

Physical tests according standard ::

Gardner color: NF EN ISO 4630 Visual method  
 Refractive index : NF ISO 280  
 Viscosity: NF EN ISO 3219 Rheometer 50 mm, shear 10s<sup>-1</sup>  
 Density: NF EN ISO 2811-1 Pyknometer  
 Gel time : Cross G' G'' / rheometer CP50 - Shear rate 10 s<sup>-1</sup>  
 GreenCarbon content: ASTM D6866 or XP CENTS 16640 Avril 2014

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