SR 1126

Fire resistant epoxy laminating system

Auto extinguishing laminating epoxy system.
Low smokes and low toxicity smokes.
Bromine Free
With high temperature or fire, the system expands, produce solid char barrier that protects inner materials from heat and flames.
This system allows to get :

- **UL94 V0** and **FAR 25** laminates parts
- **AIRBUS** and **BOEING** standards concerning fumes and fume toxicity.

All details concerning FAR 25 and UL94 V0 approvals on last page of this data sheet
Good temperature resistance

Fast hardener SD 8205 / SD 8207

Suitable for manufacturing small to medium parts by hand lay-up, press moulding and vacuum bagging.
Unmoulding possible after 24 h at 25 °C
Suitable for parts with service temperature up to 60-70 °C, performance composites.
Ultra fast's SD 8207 is suitable for low temperature.

Slow hardeners SD 8203 and SD 8202

Suitable for manufacturing medium to large part by hand lay, press moulding and vacuum bagging.
Post cure at 40 °C minimum before unmoulding.
Suitable for parts with service temperature up to 60-70 °C, performance composites.

Ultra slow hardener SD 1305

Suitable for large parts, long pot life, hot process
Tg – onset / DSC = 130 °C
Post cure at 120 °C minimum

Epoxy resin SR 1126

Appearance		White viscous liquid
Storage		2 years @ 20 °C Stir thoroughly before use
Viscosity (m.Pas)	15 °C	15 000 ± 3 000
Rheometer	20 °C	9 000 ± 2 000
CP 50 mm	25 °C	6 000 ± 1 000
Shear rate 10 s^{-1}	30 °C	3 700 ± 700
	40 °C	1 800 ± 300
Density		
Picnometer	20 °C	1.28 ± 0.01
ISO 2811-1		

Hardeners SD xxxx

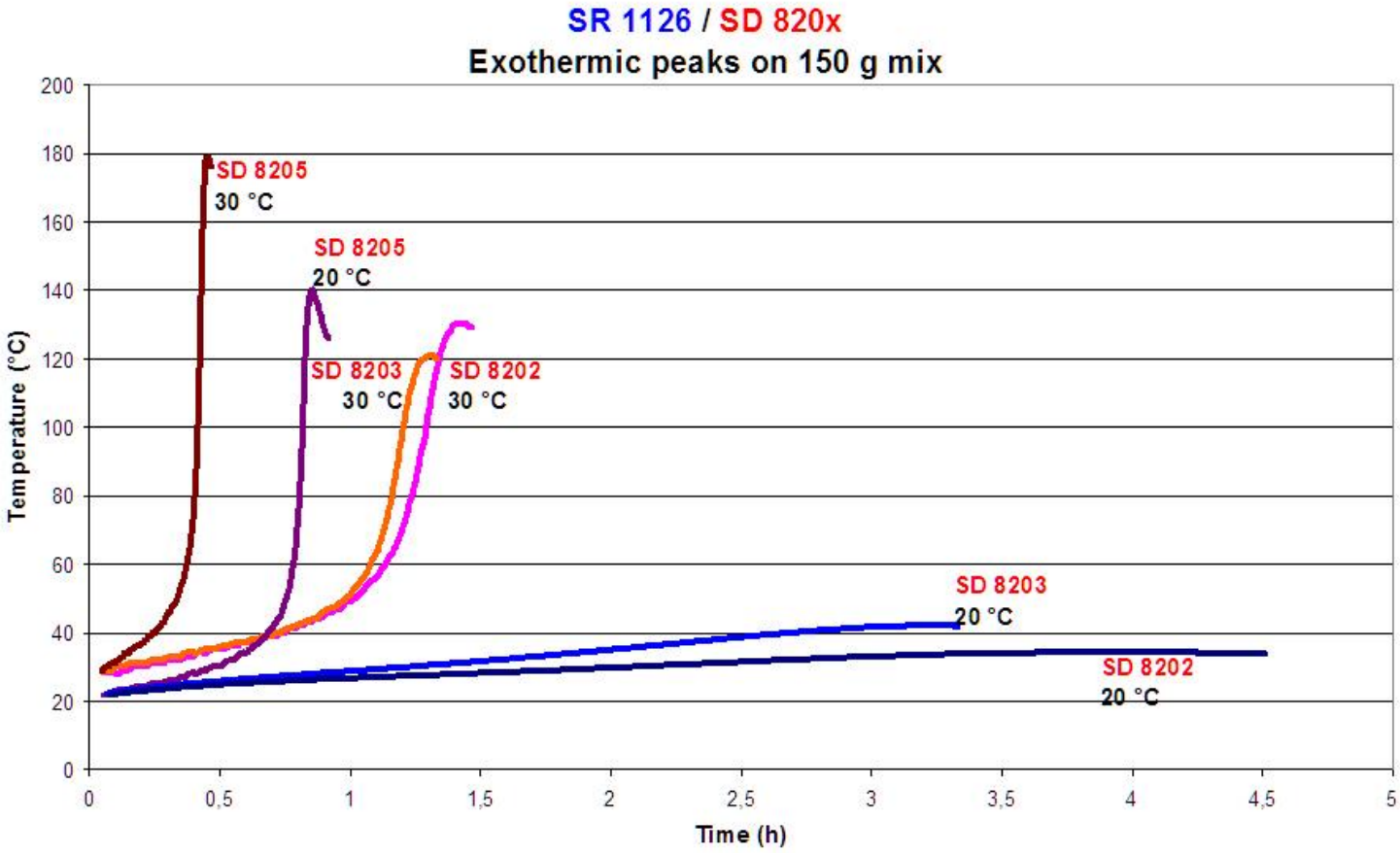
		SD 8207	SD 8205	SD 8203	SD 8202	SD 1305
Appearance / colour		Yellow liquid	Yellow liquid	Yellow liquid	Light yellow liquid	Yellow to red liquid
Reactivity		Ultra fast	Fast	Standard	Slow	Ultra slow
Viscosity (mPa.s) Rheometer CP 50 mm Shear rate 10 s^{-1}	15 °C	590 ± 120	210 ± 40	80 ± 15	50 ± 15	426 ± 80
	20 °C	380 ± 80	140 ± 30	60 ± 10	38 ± 10	278 ± 50
	25 °C	250 ± 50	100 ± 20	45 ± 10	28 ± 10	173 ± 30
	30 °C	180 ± 36	70 ± 30	30 ± 5	22 ± 5	110 ± 20
	40 °C	90 ± 18	40 ± 10	20 ± 5	14 ± 5	55 ± 10
Density Picnometer ISO 2811-1	20 °C	0,990 ± 0.005	1.040 ± 0.005	0.980 ± 0.005	0.960 ± 0.005	0.990 ± 0.005

SR 1126 / SD xxxx mix properties

		SR 1126 / SD 8207	SR 1126 / SD 8205	SR 1126 / SD 8203	SR 1126 / SD 8202	SR 1126 / SD 1305
Weight ratio		**100 g / 20 g**	**100 g / 20 g**	**100 g / 20 g**	**100 g / 20 g**	**100 g / 18 g**
Volume ratio		**100 / 26 ml**	**100 / 25 ml**	**100 / 26 ml**	**100 / 27 ml**	**100 / 23 ml**
Mix viscosity Rheometer PP 50 mm Shear rate 10 s^{-1}	- 5 °C	53 000				
	5 °C	19 000				
	20 °C		2 700± 500	2 100 ± 400	1 250 ± 250	4 200 ± 800
	30 °C		1 500 ± 300	1 000 ± 200	770 ± 150	2 000 ± 400
	40 °C		850 ± 150	600 ± 100	500 ± 100	850 ± 150
	50 °C					620 ± 120
	60 °C					350 ± 70
	70 °C					300 ± 50
	80 °C					220 ± 40

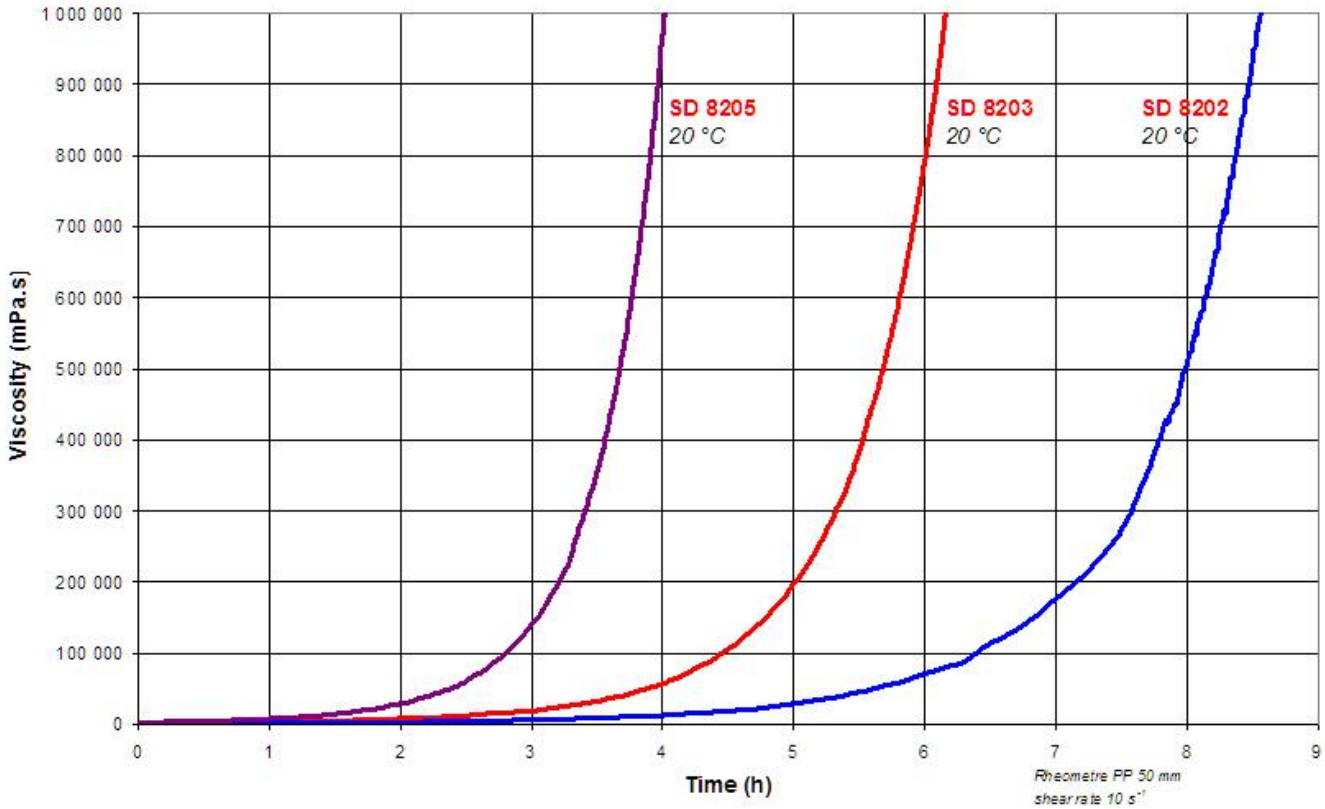
SR 1126 / SD 820x mass reactivity

	SR 1126 / SD 8205	SR 1126 / SD 8203	SR 1126 / SD 8202
Exothermic peak (°C) with 150 g mix			
30 °C	179 °C	121 °C	130 °C
20 °C	140 °C	42 °C	34 °C
Time to reach exothermic peak with 150 g mix			
30 °C	27'	1 h 18'	1 h 24'
20 °C	51'	3 h	3 h 20'
Time to reach 50 °C with 150 g mix			
30 °C	20'	59'	1 h
20 °C	46'	-	-

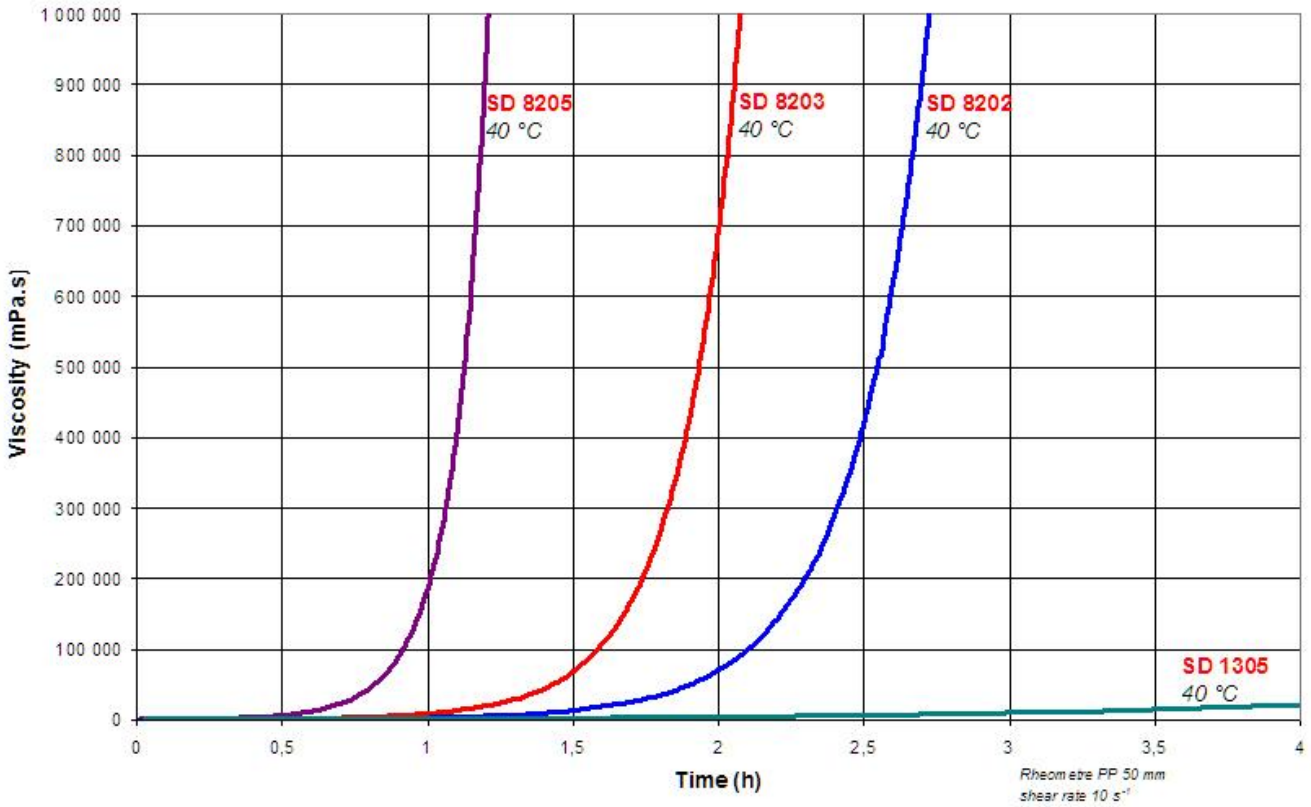


Reactivity – Viscosity evolution on a 1 mm film

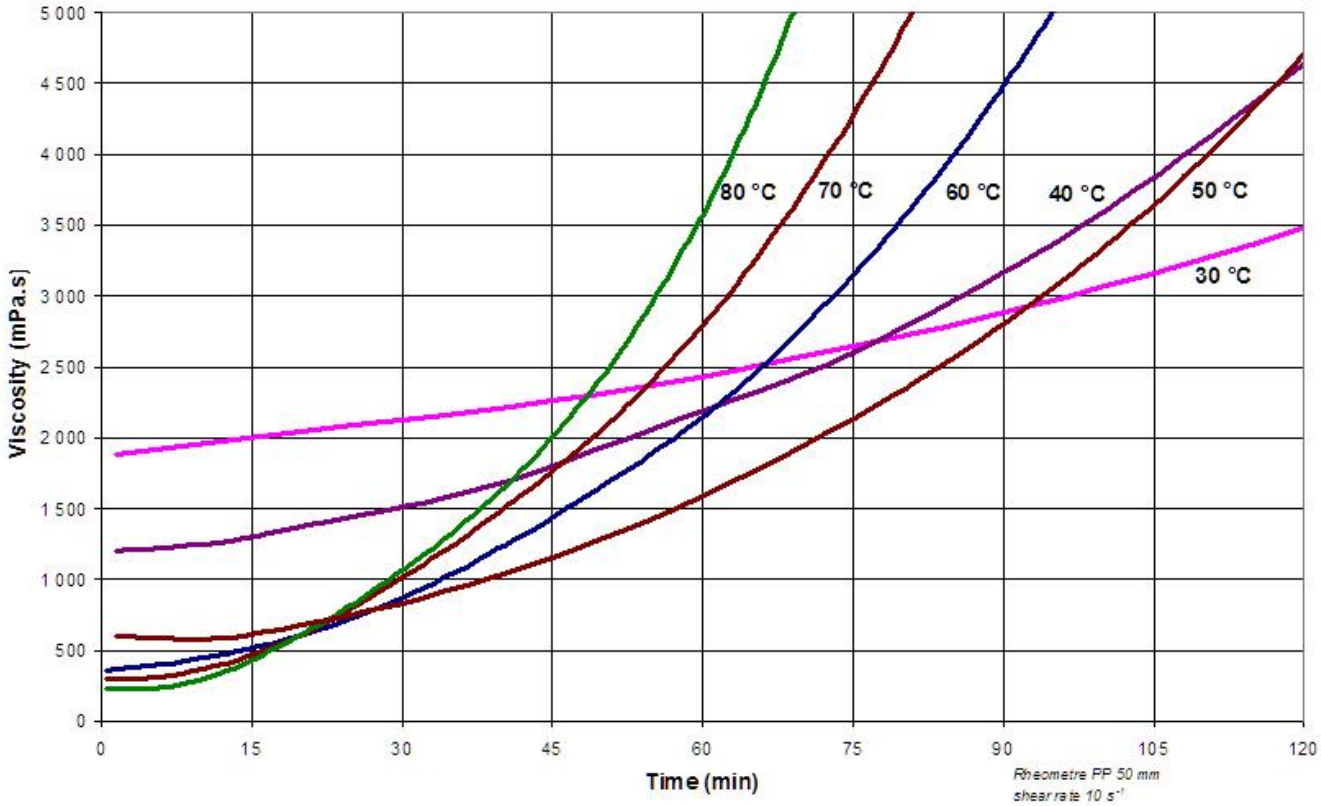
- **at 20 °C**



- **at 30 °C**


Viscosity (mPa.s)
1 000 000
900 000
800 000
700 000
600 000
500 000
400 000
300 000
200 000
100 000
0
0
0,5
1
1,5
2
2,5
3
3,5
4
Time (h)
SD 8205
40 °C
SD 8203
40 °C
SD 8202
40 °C
SD 1305
40 °C
Rheometre PP 50 mm
shear rate 10 s-1

- **at 40 °C**


Viscosity (mPa.s)
5 000
4 500
4 000
3 500
3 000
2 500
2 000
1 500
1 000
500
0
0
15
30
45
60
75
90
105
120
Time (min)
80 °C
70 °C
60 °C
40 °C
50 °C
30 °C
Rheometre PP 50 mm
shear rate 10 s-1

SR 1126 / SD 1305 – film reactivity in warm conditions
Post curing recommendations

	SR 1126 / SD 8205	**SR 1126 / SD 8203**	**SR 1126 / SD 8202**	**SR 1126 / SD 1305**
Minimum post cure	12 h 40 °C	24 h 40 °C	24 h 40 °C	1 h 100 °C + 2 h 120 °C
Recommended post cure	8 h ambient + 6 h 60 °C	12 h ambient + 6 h 40 °C + 4 h 60 °C + 4 h 80 °C	12 h ambient + 6 h 40 °C + 4 h 60 °C + 4 h 80 °C	1 h 100 °C 4 h 140 °C

Mechanical properties on cast resin:

		SR 1126 / SD 8205			SR 1126 / SD 8203		
Curing schedule		4 days 30 °C	24 h 23 °C + 24 h 40 °C	24 h 23 °C + 16 h 60 °C	4 days 30 °C	24 h 23 °C + 24 h 40 °C	24 h 23 °C + 16 h 60 °C
Tension							
Modulus of elasticity	N/mm^2	4580	4380	4250	3800	3200	3600
Maximum resistance	N/mm^2	34	35	35	23	33	31
Resistance at break	N/mm^2	34	35	35	23	33	31
Elongation at max. load	%	0.7	0.8	0.8	0.7	0.9	0.9
Elongation at break	%	0.7	0.8	0.8	0.7	0.9	0.9
Flexion							
Modulus of elasticity	N/mm^2	4780	4700	4500	3900	4000	3600
Maximum resistance	N/mm^2	67	66	70	54	75	75
Elongation at max. load	%	1.5	1.5	1.6	1.3	2.1	2.3
Elongation at break	%	1.5	1.5	1.7	1.4	2.1	2.4
Compression							
Compressive yield strength	MPa				91		
Offset compressive yield	%				5.8		
Charpy impact strength							
Resilience	kJ/m^2	4	6	6	5	4	6
Glass transition							
Tg1	°C	62	70	80	63	70	85
Tg1 max.	°C			81			90

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 on cast resin:

		SR 1126 / SD 8202			SR 1126 / SD 1305		
Curing schedule		4 days 30 °C	24 h 23 °C + 24 h 40 °C	24 h 23 °C + 16 h 60 °C		1 h 100 °C + 4 h 140 °C	
Tension							
Modulus of elasticity	N/mm^2	4420	4330	3890		3750	
Maximum resistance	N/mm^2	34	35	36		52	
Resistance at break	N/mm^2	34	35	36		52	
Elongation at max. load	%	0.8	0.8	0.9		1.8	
Elongation at break	%	0.8	0.8	0.9		1.8	
Flexion							
Modulus of elasticity	N/mm^2	4700	4800	4200		3950	
Maximum resistance	N/mm^2	64	66	78		71	
Elongation at max. load	%	1.4	1.4	2.1		1.9	
Elongation at break	%	1.4	1.4	2.1		1.9	
Charpy impact strength							
Resilience	kJ/m^2	5	5	6		10	
Glass transition							
Tg1	°C	60	69	93		130	
Tg1 max.	°C			93		130	

Laminate mechanical properties

		SR 1126 / SD 8203		
Reinforcement		3300	3300	3300
Number of layers		15 layers	15 layers	15 layers
Processing		vacuum - 0.4 bar	vacuum - 0.4 bar	vacuum - 0.4 bar
Weight fibre content	%	60	60	60
Post-curing		4 jours 30 °C	24 h Ta + 24 h 40 °C	24 h Ta + 16 h 60 °C
Flexion				
Modulus of elasticity	N/mm^2	15 900	16 000	15 900
Maximum resistance	N/mm^2	370	380	400
Elongation at max. resistance	%	2.6	2.7	2.8
Elongation at break	%	2.7	2.6	2.9
Shear strength				
Shear stress	N/mm^2	25	27	26
Charpy impact strength				
Resilience	kJ/m^2	177	180	173
Glass Transition / DSC				
Tg 1	°C	58	68	88
Tg 1 max	°C		91	93

		SR 1126 / SD 8202	SR 1126 / SD 1305	
Reinforcement		3300	3300	3300
Number of layers		15 layers	15 layers	15 layers
Processing		vacuum - 0.4 bar	press	press
Weight fibre content	%	57	63	66
Thickness	mm	4.6	4.0	3.6
Density		1.71	1.79	1.91
Post-curing		24 h Ta + 16 h 60 °C	1 h 100 °C 4 h 140°C	1 h 100 °C 4 h 140 °C
Flexion				
Modulus of elasticity	N/mm^2	18 800	18 000	21 300
Maximum resistance	N/mm^2	470	305	280
Elongation at max. resistance	%	2.9	1.8	1.4
Elongation at break	%	3.2	2.2	2.1
Shear strength				
Shear stress	N/mm^2	39	35	32
Charpy impact strength				
Resilience	kJ/m^2	175	85	65
Glass Transition / DSC				
Tg 1	°C	88	128	128
Tg 1 max	°C	93	130	130

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
Reinforcement 3300:	Twill 2/2 E Glass, weight 300 g/m2

Fire resistance certifications

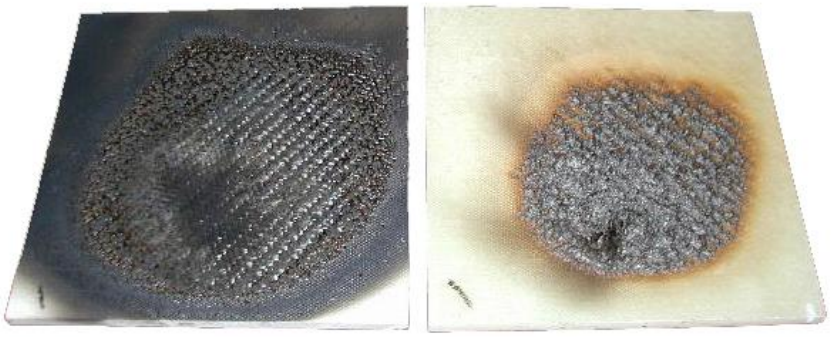
Standards	**UL 94**, 5th edition / Oct, 1996 July,10 1998	**FAR 25** FAR 25-853 (a) Vertical (12s) et horizontal
Laboratory	LNE– France	CEAT - DGA
Test / report:	D100086/Cemat/67/AC	M-08/8150/127/A
Samples	E glass laminate **SR 1126** / **SD 8203** 1.4 mm thick, 57 % glass weight	E glass laminate **SR 1126** / **SD 8203** 1.7 mm thick, 55 % glass weight
Classification	UL 94 V0 / vertical	FAR 25

Smoke certification:

Standards	**AIRBUS** NBS smoke chamber ABD 031 document, issue F Method : AITM 2.0007	**BOEING** NBS smoke chamber Boeing D6-51377 document Method: BSS 7238
Laboratory	CEAT – DGA 07/2008	CEAT – DGA 07/2008
Test / report:	MT-08 / 8150155 / P1 / A	MT-08 / 8150155 / P1 / A
Samples	E glass laminate **SR 1126** / **SD 8202** 2.3 mm thick, 58 % glass weight	E glass laminate **SR 1126** / **SD 8202** 2.3 mm thick, 58 % glass weight
Classification	Flaming test : DS max = 56 < 200 No flaming test : DS max. = 12.3 < 200	Flaming test : DS max. 56 < 200

Smoke toxicity certification:

Standards	**AIRBUS** Document ABD 031, issue F Method : AITM 3.0005	**BOEING** Document Boeing D6-51377 Method: BSS 7239
Laboratory	CEAT - DGA	CEAT - DGA
Test / report:	MT-08 / 8150155 / P1 / A	MT-08 / 8150155 / P1 / A
Samples	E glass laminate **SR 1126** / **SD 8202** 2.3 mm thick, 58 % glass weight	E glass laminate **SR 1126** / **SD 8202** 2.3 mm thick, 58 % glass weight
Gas after 4 minutes	HF : 0 ppm HCL : 0 ppm SO2: 0 ppm HCN: traces CO: 113 ppm / 1000 NOx: 9 ppm / 100	HF : 0 ppm HCL : 0 ppm SO2: 0 ppm HCN: traces NOx: 9 ppm / 100



E glass / Epoxy laminates after fire tests:
Brominated Epoxy / **SR 1126** Epoxy