

SR 1122 / SD 2310 & SD 2319 Fire Resistant Epoxy System

SR 1122 / SD 231x is a fire retardant epoxy system, halogen free, formulated for hand lay up and vacuum compaction.
Combined with SGi128 / SD 228 gelcoat, many achievements have reached a class A fire classification according to ASTM E84

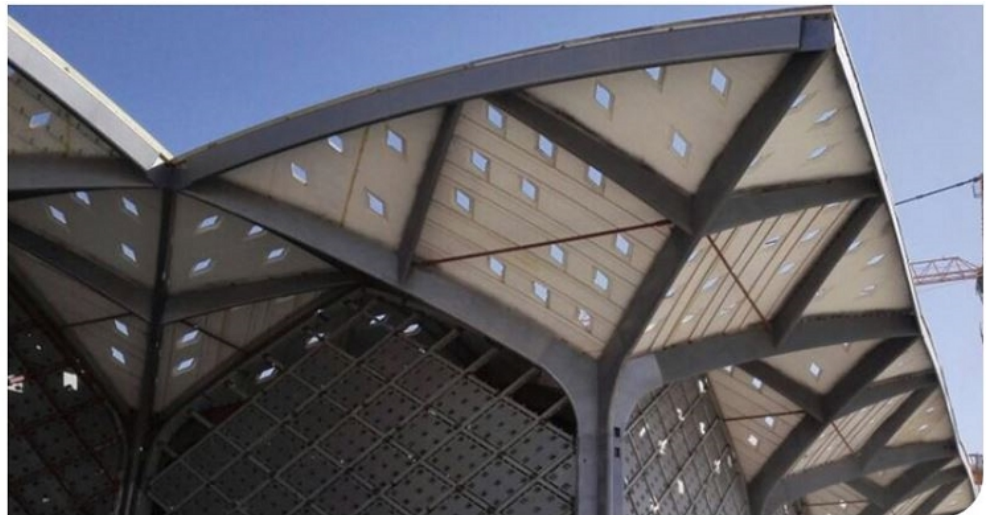
		SD 2319	SD 2310
Reactivity level		Fast	Ultra slow
Initial viscosity (mPa.s)	@ 20 °C	7300	1400
	@ 30 °C	3200	550
Pot Life (500 g)	@ 20 °C	15 min	06 h 25
	@ 30 °C	9 min	01 h 51
Mixing ratio	By weight	100 / 22	100 / 22
	By volume	100 / 30	100 / 30
Maximum strength	N/mm ²	48	51
% Elongation at max strength	%	1,1	1,7
TG1 max onset	°C	104	94
Gel Time	@ 20 °C	03 h 00	21 h 40
	@ 30 °C	01 h 40	11 h 20
Time to reach 400 mPa.s	@ 20 °C	43 min	10 h 50
	@ 30 °C	38 min	06 h 30
Demold time	@ 20 °C	09 h 00	65 h 00
	@ 30 °C	05 h 00	34 h 00

Epoxy system **SR 1122**:

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

Guidelines

- No filtering
- Use a stirrer with high shear to homogenize resin part prior to use



Epoxy resin SR 1122

Appearance		liquid
Color		white
Viscosity (mPa.s)	@ 15 °C	84000 ± 16800
	@ 20 °C	32000 ± 6400
	@ 25 °C	14000 ± 2800
Density	@ 20 °C	1,2940
Storage (months)	@ Ta	36

Hardener(s)

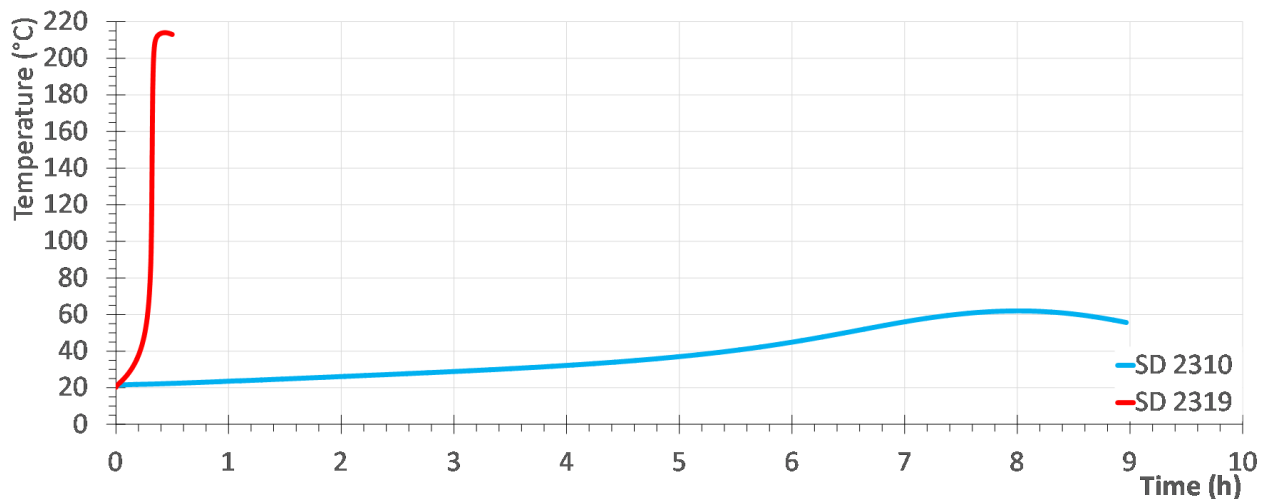
		SD 2319	SD 2310
Appearance		liquid	liquid
Color		light yellow	light yellow
Gardner color		≤ 5	≤ 1
Reactivity level		Fast	Ultra slow
Viscosity (mPa.s)	@ 15 °C	350 ± 70	11 ± 2
	@ 20 °C	230 ± 45	9 ± 2
	@ 25 °C	160 ± 32	8 ± 2
	@ 30 °C	110 ± 22	7 ± 1
Density	@ 20 °C	1,0000	0,9452
Storage (months)	@ Ta	24	24

Mixe(s) SR 1122 / SD 2310 & SD 2319

	SD 2319	SD 2310
Appearance	liquid	liquid
Color	white	white
Mixing ratio		
By weight	100 / 22	100 / 22
By volume	100 / 30	100 / 30
Initial viscosity (mPa.s) @ 20 °C	7300	1400
PP 50 mm / 10 s ⁻¹ @ 30 °C	3200	550
Density @ 20 °C	1,224	1,213

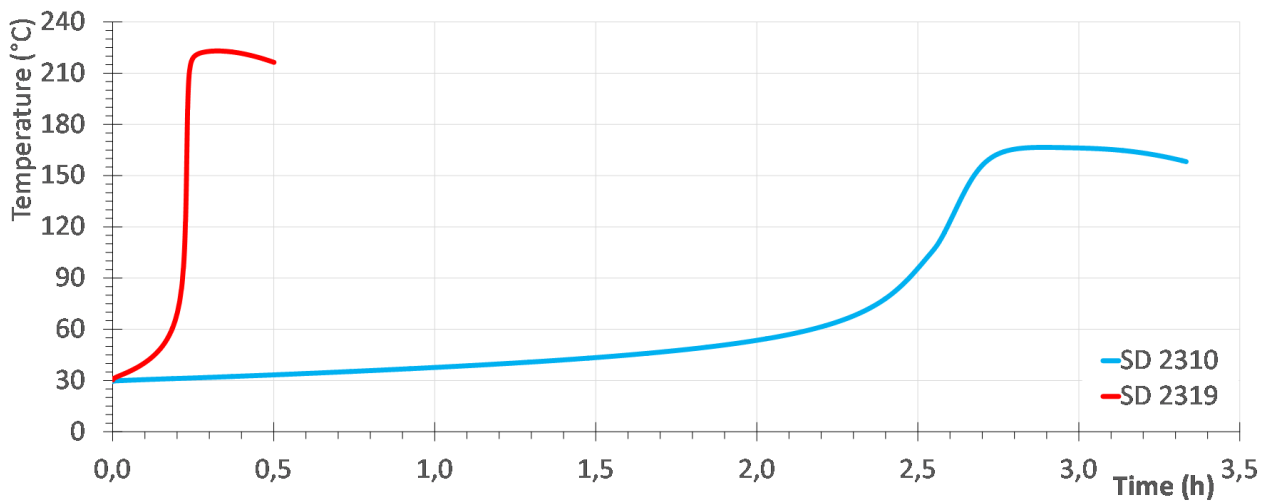
Reactivity @ 20 °C for 500 g SR 1122 / SD 2310 & SD 2319

	SD 2319	SD 2310
Exothermic temperature (°C)	214	62
Exothermic peak time	24 min	07 h 44
Time to reach 50 °C	15 min	06 h 25



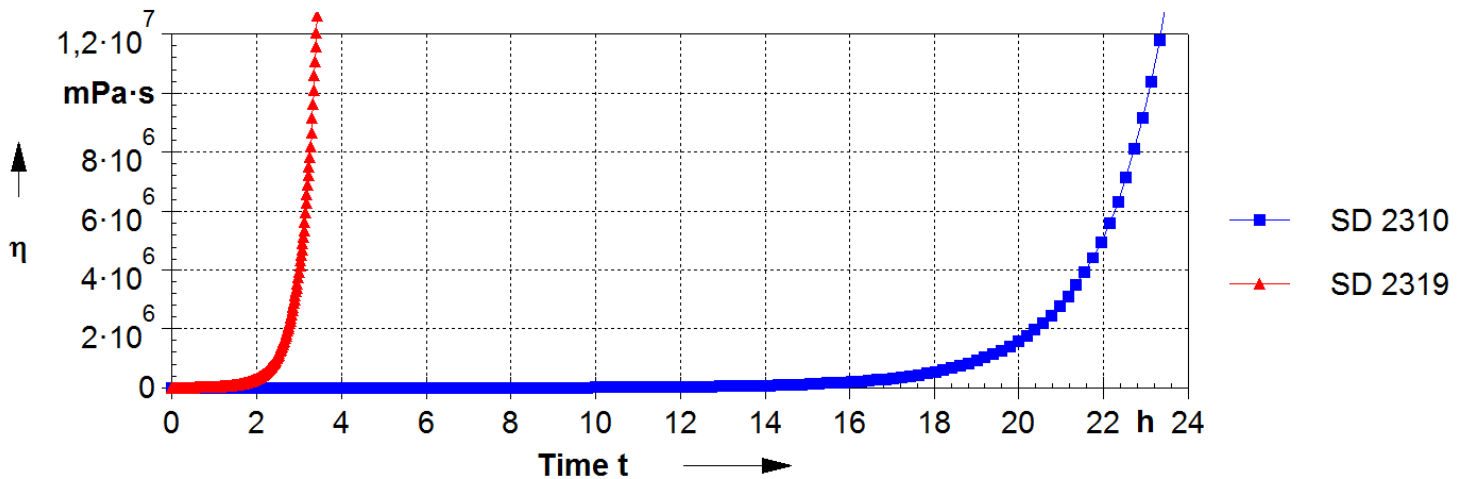
Reactivity @ 30 °C for 500 g SR 1122 / SD 2310 & SD 2319

	SD 2319	SD 2310
Exothermic temperature (°C)	223	167
Exothermic peak time	17 min	02 h 52
Time to reach 50 °C	9 min	01 h 51

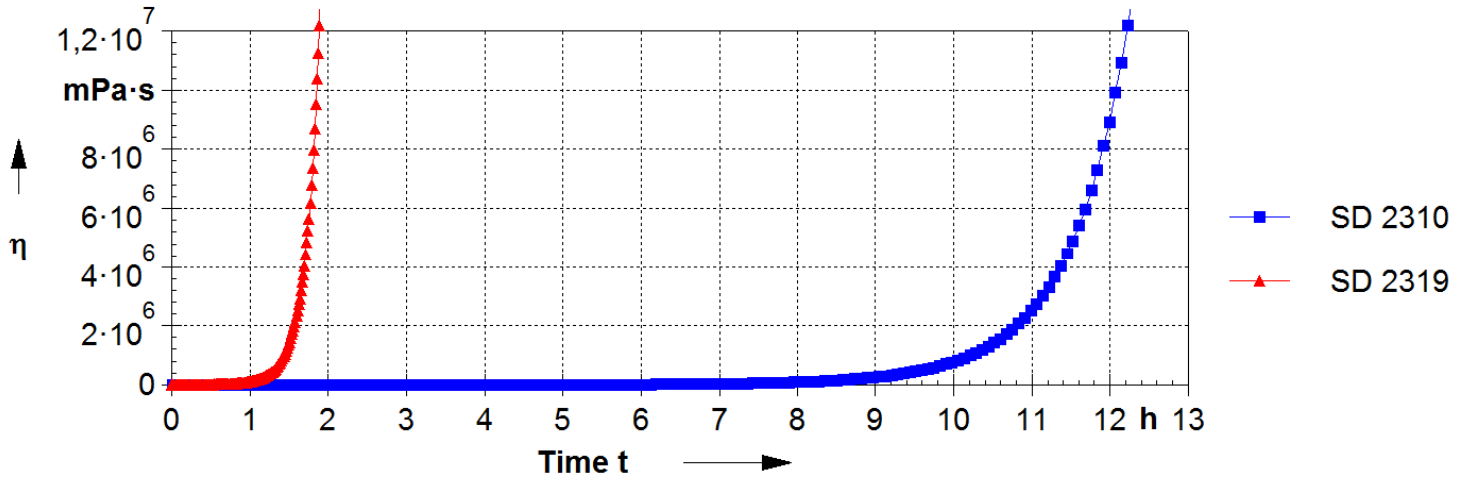


Reactivity on 1 mm thick layer

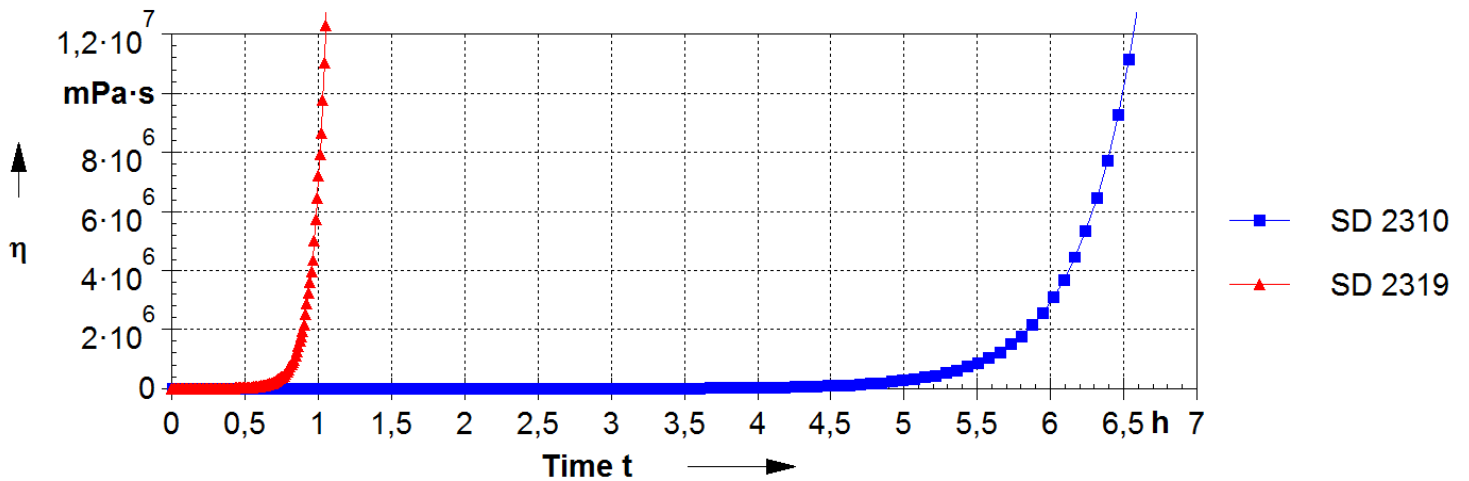
@ 20 °C



@ 30 °C



@ 40 °C



Mechanical properties on cast resin :

		SR 1122 / SD 2319			SR 1122 / SD 2310		
Curing cycles		24h TA + 9h 55 °C	24h TA + 16h 55 °C	48h TA °C + 4h 60 °C + 4h 80 °C	24h TA + 9h 55 °C	24h TA + 16h 55 °C	48h TA °C + 4h 60 °C + 4h 80 °C
Tensile							
Modulus	N/mm ²	4 460	4 170	3 850	3 950	3 870	3 480
Maximum strength	N/mm ²	47	49	48	48	49	51
Breaking Strength	N/mm ²	47	49	48	48	49	51
Elongation at max strength	%	1,1	1,2	1,1	1,5	1,6	1,7
Elongation at break	%	1,1	1,2	1,1	1,5	1,6	1,7
Flexion							
Modulus	N/mm ²	4 070	4 060	3 840	3 700	3 680	3 480
Maximum strength	N/mm ²	89	78	83	81	81	78
Breaking Strength	N/mm ²	89	78	83	81	81	78
Elongation at max strength	%	2,4	2	2,3	2,4	2,4	2,4
Elongation at break	%	2,4	2	2,3	2,4	2,4	2,4
Shear							
Breaking Strength	N/mm ²	47	49	49	38	39	42
Compression							
Modulus	N/mm ²						
Yield strength	N/mm ²	114	115	114	89	93	92
Offset compression yield	%	12,3	12,5	16,6	11	11,2	12,9
Charpy impact strength							
Resilience	kJ/m ²	10	9	11	9,1	8,7	10
DSC glass transition							
TG1 onset	°C	86	89	106	78	83	91
TG1 max onset	°C	100	102	104	87	88	94
DTMA glass transition							
TG tan delta	°C						
TeiG onset G'	°C						
TmG midpoint G'	°C						
TefG endpoint	°C						
TG peak G''	°C						

Mechanical properties on laminate :

		SR 1122 / SD 2319			SR 1122 / SD 2310		
Matrix		SR 1122 / SD 2310			SR 1122 / SD 2310		
Reinforcement		glass UD 600 g/m ²			glass UD 600 g/m ²		
Number of layers		4			4		
Process		Hand lay up under vacuum			Hand lay up under vacuum		
Reinforcement rate by weight	%	64 %			64 %		
Post curing	→	24h TA + 9h 55 °C	24h TA + 16h 55 °C	48h TA °C + 4h 60 °C + 4h 80 °C	24h TA + 9h 55 °C	24h TA + 16h 55 °C	48h TA °C + 4h 60 °C + 4h 80 °C
Tensile							
Modulus	N/mm ²					34 200	34 200
Maximum strength	N/mm ²					700	
Breaking Strength	N/mm ²					700	
Elongation at max strength	%					2,4	
Elongation at break	%					2,4	
Flexion							
Modulus	N/mm ²					24 700	
Maximum strength	N/mm ²					730	
Breaking Strength	N/mm ²					730	
Elongation at max strength	%					2,6	
Elongation at break	%					2,6	
Toughness							
G1c interlaminar (J/m ² -CBT)							
Shearing in flexion							
Shear strength	N/mm ²					34	
Charpy impact strength							
Resilience	kJ/m ²						
Water absorption	% Weight						

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

Measures undertaken according to the following norms:

Mechanical tests:

Tension:	NF EN ISO 527-2:2012
Flexion:	NF EN ISO 178:2011
Compression:	NF EN ISO 604:2004 or NF EN ISO 844:2014 (foam product)
Charpy impact strength:	NF EN ISO 179-1:2010
Shear Strength:	ASTM D732-17 (Punch Tool)
Interlaminar shrinkage strength:	ASTM D5528-13
Toughness (GIC et KIC) :	ISO 13586:2000

Water absorption: Internal. Polymerization according to cycle, machining, weighing, time spent in distilled water at 70 °C / 48 hours, weighing 1 hour after emerging,

Bonding Strength Double lap shear:	ASTM D3528-96
	ADH = adhesive failure
	COH = cohesive failure
	TLC = thin-layer cohesive failure
	FT = fiber-tear failure.
	LFT = light-fiber-tear failure

Thermal tests:

Glass transition DSC:	NF EN ISO 11357-2:2014 -5°C to 180 °C under nitrogen gas
	T _{G1} or Onset: 1 st scan at 20 °C/min
	T _{G1} maximum or Onset: 2nd scan at 20 °C/min

Glass transition DTMA:	Temperature ramp 0 °C to 180 °C @ 2°C/min under normal atmosphere
	NF EN ISO 11357-1:2016 T _g onset G'
	ASTM D4065-12 T _g peak G''

Physical tests:

Gardner color:	NF EN ISO 4630:2016	Visual method
Refractive index:	NF ISO 280:1999	
Viscosity:	NF EN ISO 3219:1994	Rheometer 50 mm, shear 10 s ⁻¹
Density on liquids:	ISO 2811-1:2016	Pycnometer
Density on solid:	NF EN ISO 1183-3:1999	Helium Pycnometer
Density on foam:	NF EN ISO 845:2009	
Gel time:	Cross G' G''	Rheometer CP50 - Shear rate 10 s ⁻¹
Green Carbone content:	ASTM D6866-16 or XP CEN/TS 16640 Avril 2014	

TA:	Ambient temperature (20 to 25 °C)
NC:	No information Communicated
NB:	No Breaking (maximum flexion deformation : 15 %)

Table 1st page:

Pot Life:	Time to reach 50 °C or time limit for use
Gel time:	Intersection of tangents on the viscosity curve of 1 mm thick layer
Release time:	Time required to obtain sufficient mechanical strength to release
Minimum Vacuum Time:	Time in which vacuum can be applied (25000 mPa.s)
Maximum Vacuum time:	Limit time below which a vacuum can be applied (G'G'' crossing)
Optimum Infusion time:	Time to reach 400 mPa.s
Max Infusion Time:	Time to reach 25000 mPa.s
Vacuum cut-off time:	Time to reach G'G'' crossover + 20%

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