

## SR 1710 Injection / SD 330X

### Epoxy system for low pressure injection

- Two component epoxy system
- Specially designed for Resin Transfer Moulding processes (infusion, injection...)
- Very low viscosity
- Low reactivity hardener for large parts manufacturing.
- High mechanical properties, especially interlaminar shear strength.
- Excellent conservation of the mechanical characteristics in a wet environment.
- TG max = 140 °C

		<b>SD 3304</b>	<b>SD 3303</b>
Reactivity level		Medium	Standard
Initial viscosity (mPa.s)	@ 20 °C	530	330
	@ 30 °C	250	175
Pot Life (500 g)	@ 20 °C	01 h 58	02 h 54
	@ 30 °C	48 min	01 h 10
Mixing ratio	By weight	100 / 28	100 / 22
	By volume	100 / 35	100 / 27
Maximum strength	N/mm <sup>2</sup>	84	91
% Elongation at max strength	%	4,2	4,3
TG1 max onset	°C	139	141
Gel Time	@ 20 °C	12 h 30	17 h 30
	@ 30 °C	06 h 40	08 h 50
Optimal infusion time	@ 20 °C	01 h 40	03 h 45
	@ 30 °C	01 h 50	02 h 40
Latest flow under vacuum	@ 20 °C	07 h 05	10 h 25
	@ 30 °C	04 h 05	05 h 35
Earliest vacuum off time	@ 20 °C	19 h 06	27 h 06
	@ 30 °C	10 h 00	12 h 42
Demold time	@ 20 °C	37 h 30	52 h 30
	@ 30 °C	20 h 00	26 h 30

Specially formulated for processes by injection, infusion & RTM to produce high mechanical performance composite materials with high temperature resistance. Particularly suitable for tooling production.

Implementation from 20 °C with a hygrometry lower than 70%.

Curing at room temperature and a minimal post-curing : 16 h @ 60 °C before demolding.

Key strengths :

- Two component epoxy system
- Specially designed for Resin Transfer Moulding processes (infusion, injection...)
- Very low viscosity
- Low reactivity hardener for large parts manufacturing.
- High mechanical properties, especially interlaminar shear strength.
- Excellent conservation of the mechanical characteristics in a wet environment.
- TG max = 140 °C



## Epoxy resin SR 1710 Injection

Appearance		liquid
Color		yellow
Gardner color		≤ 3
Viscosity (mPa.s)	@ 15 °C	3025 ± 625
	@ 20 °C	1550 ± 350
	@ 25 °C	900 ± 200
	@ 30 °C	550 ± 150
Density	@ 20 °C	1,1500
Refractive index	@ 25 °C	1,5614 ± ,002
Storage (months)	@ Ta	24

## Hardener(s)

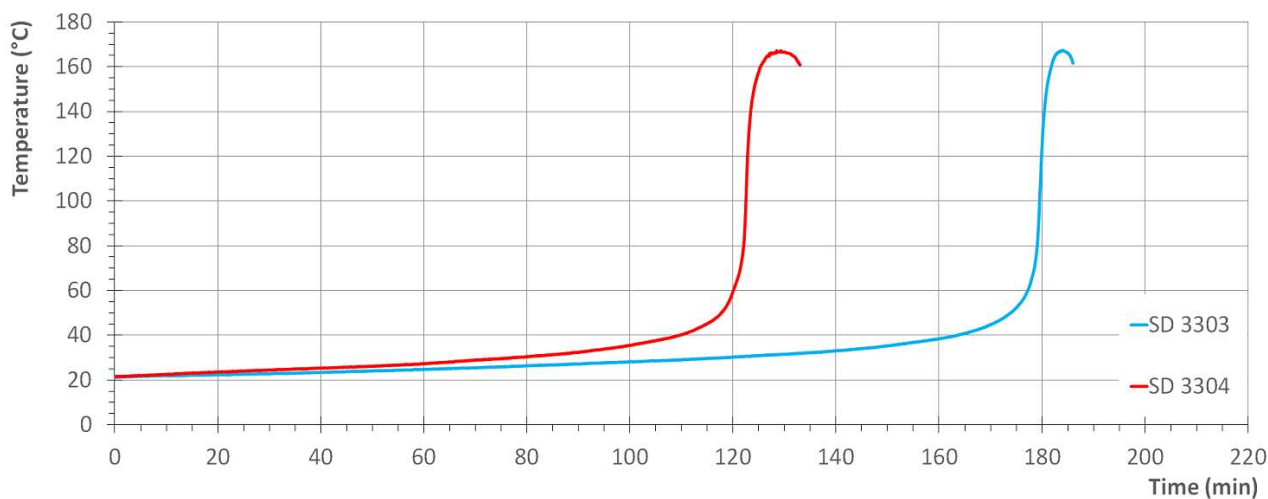
		<b>SD 3304</b>	<b>SD 3303</b>
Appearance		liquid	liquid
Color		colourless	colourless
Gardner color			≤ 3
Pt/Co Color Index		≤ 40	
Reactivity level		Medium	Standard
Viscosity (mPa.s)	@ 15 °C	28 ± 5	10 ± 2
	@ 20 °C	21 ± 4	8 ± 2
	@ 25 °C	16 ± 3	7 ± 3
	@ 30 °C	13 ± 3	6 ± 2
	@ 40 °C	9 ± 2	4 ± 1
Density	@ 20 °C	0,9230	0,9395
Refractive index	@ 25 °C		1,4839 ± ,002
Storage (months)	@ Ta	24	24

## Mixe(s) SR 1710 Injection / SD 330X

	SD 3304	SD 3303
Appearance	liquid	liquid
Color	colourless	yellow
Mixing ratio		
By weight	100 / 28	100 / 22
By volume	100 / 35	100 / 27
Initial viscosity (mPa.s) @ 20 °C	530	330
PP 50 mm / 10 s <sup>-1</sup> @ 30 °C	250	175
Density @ 20 °C	1,15	

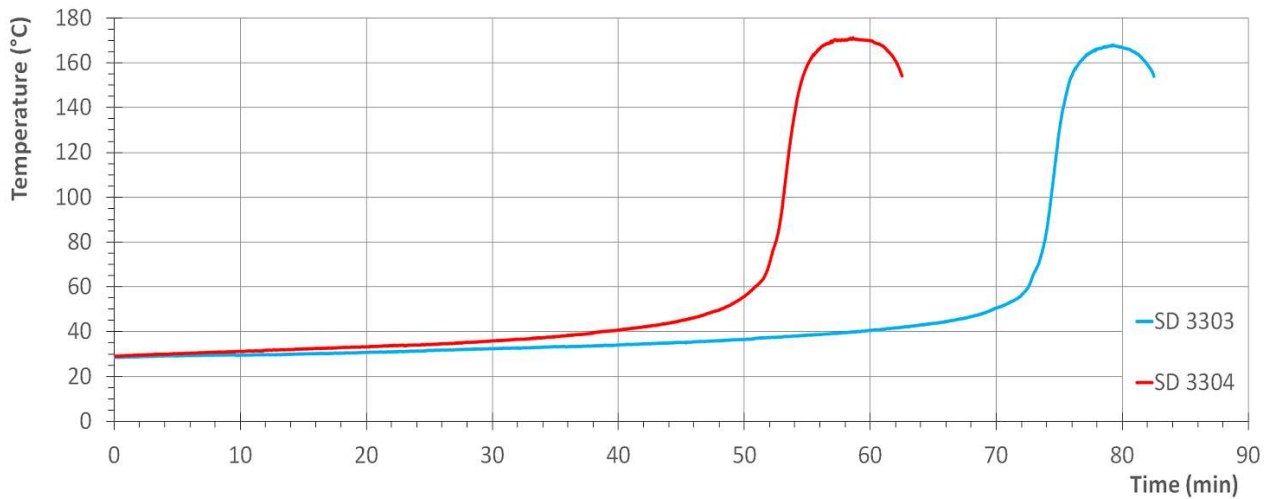
## Reactivity @ 20 °C for 500 g SR 1710 Injection / SD 330X

	SD 3304	SD 3303
Exothermic temperature (°C)	167	167
Exothermic peak time	02 h 08	03 h 03
Time to reach 50 °C	01 h 58	02 h 54



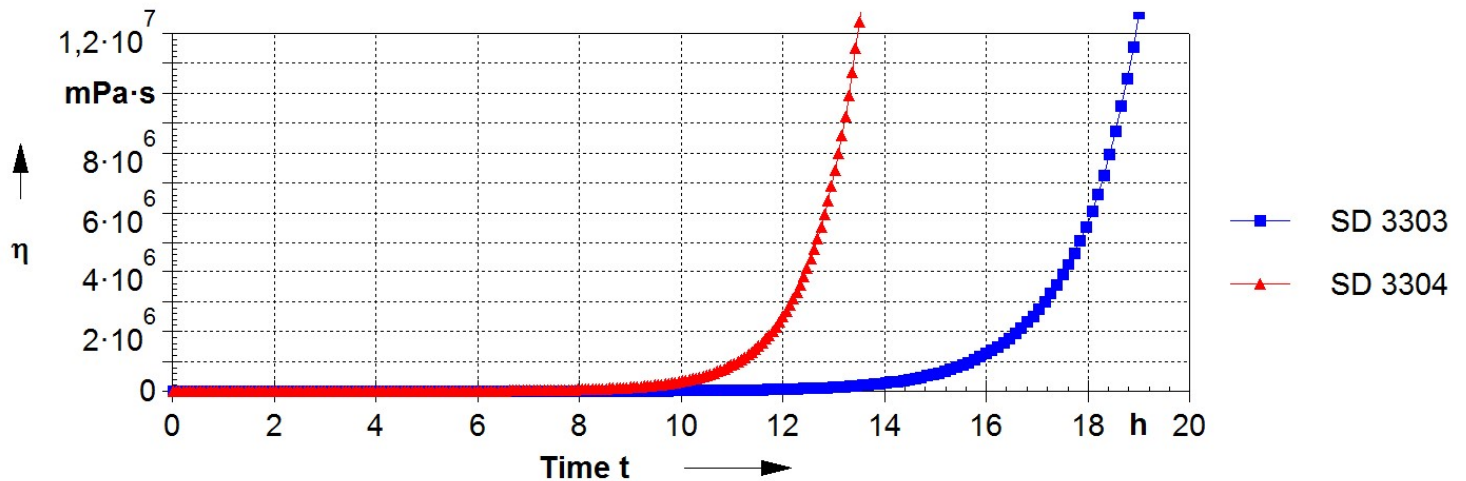
### Reactivity @ 30 °C for 500 g SR 1710 Injection / SD 330X

	SD 3304	SD 3303
Exothermic temperature (°C)	171	168
Exothermic peak time	58 min	01 h 19
Time to reach 50 °C	48 min	01 h 10

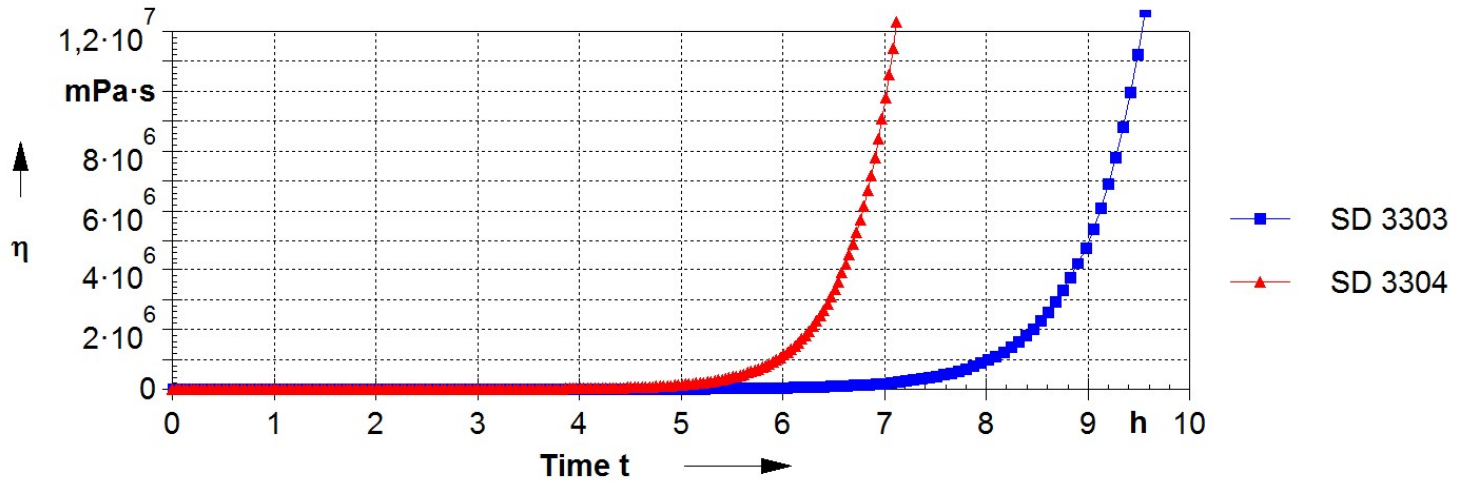


### Reactivity on 1 mm thick layer

@ 20 °C



@ 30 °C



## Mechanical properties on cast resin :

		SR 1710 Injection / SD 3304			SR 1710 Injection / SD 3303		
Curing cycles		24h @ TA +16h @ 60°C	+16h @ 60°C +4h @ 80°C	+16h @ 60°C +4h @ 80°C +4h @ 120°C	24h @ TA +16h @ 60°C	+16h @ 60°C +4h @ 80°C	+16h @ 60°C +4h @ 80°C +4h @ 120°C
<b>Tensile</b>							
Modulus	N/mm <sup>2</sup>	3 560	3 550	3 200	3 780	4 040	3 700
Maximum strength	N/mm <sup>2</sup>	69	77	84	87	93	91
Breaking Strength	N/mm <sup>2</sup>	69	74	84	87	86	91
Elongation at max strength	%	2,3	3,1	4,2	3,5	4,8	4,3
Elongation at break	%	2,3	3,6	4,2	3,5	7	4,3
<b>Flexion</b>							
Modulus	N/mm <sup>2</sup>	3 420	3 320	3 080	3 320	3 260	3 050
Maximum strength	N/mm <sup>2</sup>	145	143	141	149	154	154
Breaking Strength	N/mm <sup>2</sup>	116	123	139	122	129	154
Elongation at max strength	%	5,5	6	7	6,1	6,4	7,2
Elongation at break	%	8,1	8,2	8,1	8,6	9,3	7,2
<b>Shear</b>							
Breaking Strength	N/mm <sup>2</sup>	57	56	59	60	61	62
<b>Compression</b>							
Modulus	N/mm <sup>2</sup>						
Yield strength	N/mm <sup>2</sup>	120	121	126	125	126	131
Offset compression yield	%	14,6	14,4	18,7	14,1	15,9	20,1
<b>Charpy impact strength</b>							
Resilience	kJ/m <sup>2</sup>	28	23	22	38	26	12
<b>DSC glass transition</b>							
TG1 onset	°C	93	99	142	95	106	143
TG1 max onset	°C			139			141
<b>DTMA glass transition</b>							
TG tan delta	°C						
TeiG onset G'	°C						
TmG midpoint G'	°C						
TefG endpoint	°C						
TG peak G''	°C						

**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 <sub>G1</sub> or Onset: 1 <sup>st</sup> scan at 20 °C/min
	T <sub>G1</sub> maximum or Onset: 2 <sup>nd</sup> 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 <sub>g</sub> onset G'
	ASTM D4065-12 T <sub>g</sub> 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 <sup>-1</sup>
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 <sup>-1</sup>
Green Carbone content:	ASTM D6866-16 or XP CEN/TS 16640 Avril 2014	

<b>TA:</b>	Ambient temperature (20 to 25 °C)
<b>NC:</b>	No information Communicated
<b>NB:</b>	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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