

## SR 1710 Injection / SD 882x

### Structural epoxy system for Resin Transfer Moulding



- 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.
- DNV-GL approved - TAK00001FV

		SD 8824	SD 8823	SD 8822
Reactivity level		Standard	Medium	Slow
Initial viscosity	@ 20 °C	260	320	425
	@ 30 °C	115	200	360
Pot Life	@ 20 °C	70		330
	@ 30 °C			
Mixing ratio	By weight	100 / 23	100 / 28	100 / 35
	By volume	100 / 28	100 / 34	100 / 43
Maximum strength	N/mm <sup>2</sup>	85	86	85
Elongation at max strength	%	5,4	5,1	4,5
TG1 max onset	°C	97	98	99
Gel Time	@ 20 °C	540	740	1 080
	@ 30 °C	285	378	520
Demold time	@ 20 °C	1 620	2 700	4 500
	@ 30 °C	855	1 134	1 560
Latest flow under vacuum	@ 20 °C	60	25	
	@ 30 °C	80	78	60
Earliest vacuum off time	@ 20 °C	660	900	1 500
	@ 30 °C		450	

**Profile:**

Implementation from 20 °C and with a hygrometry of less than 70%.

Choose the hardener according to ambient temperature, implementation and size of the part to be made.

Cure at Ambient temperature and post cure at 40 to 100 °C

**Applications:**

Hand laminating, RTM, infusion, injection, tooling, casting, laminates...

## 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)

		SD 8824	SD 8823	SD 8822
Appearance		liquid	liquid	liquid
Color		colourless	light yellow	colourless
Gardner color		≤ 4	≤ 3	≤ 3
Reactivity level		Standard	Medium	Slow
Viscosity (mPa.s)	@ 15 °C	7 ± 2	12 ± 2	26 ± 5
	@ 20 °C	6 ± 2	9 ± 3	20 ± 4
	@ 25 °C	5 ± 2	8 ± 3	16 ± 3
	@ 30 °C	4 ± 2	7 ± 2	13 ± 3
Density	@ 20 °C	0,9440	0,9420	0,9370
Refractive index	@ 25 °C	1,498 ± ,002	1,4844 ± ,002	1,471 ± ,002
Storage (months)	@ Ta	24	24	24

### Mixe(s) SR 1710 Injection / SD 882x

	SD 8824	SD 8823	SD 8822
Appearance	liquid	liquid	liquid
Color	light yellow	light yellow	light yellow
Mixing ratio			
By weight	100 / 23	100 / 28	100 / 35
By volume	100 / 28	100 / 34	100 / 43
Initial viscosity @ 20 °C	260	320	425
PP 50 mm / 10 s <sup>-1</sup> (mPa.s) @ 30 °C	115	200	360
Density @ 20 °C	1,1485	1,1483	1,1479

### Reactivity @ 20 °C on 500 g SR 1710 Injection / SD 882x

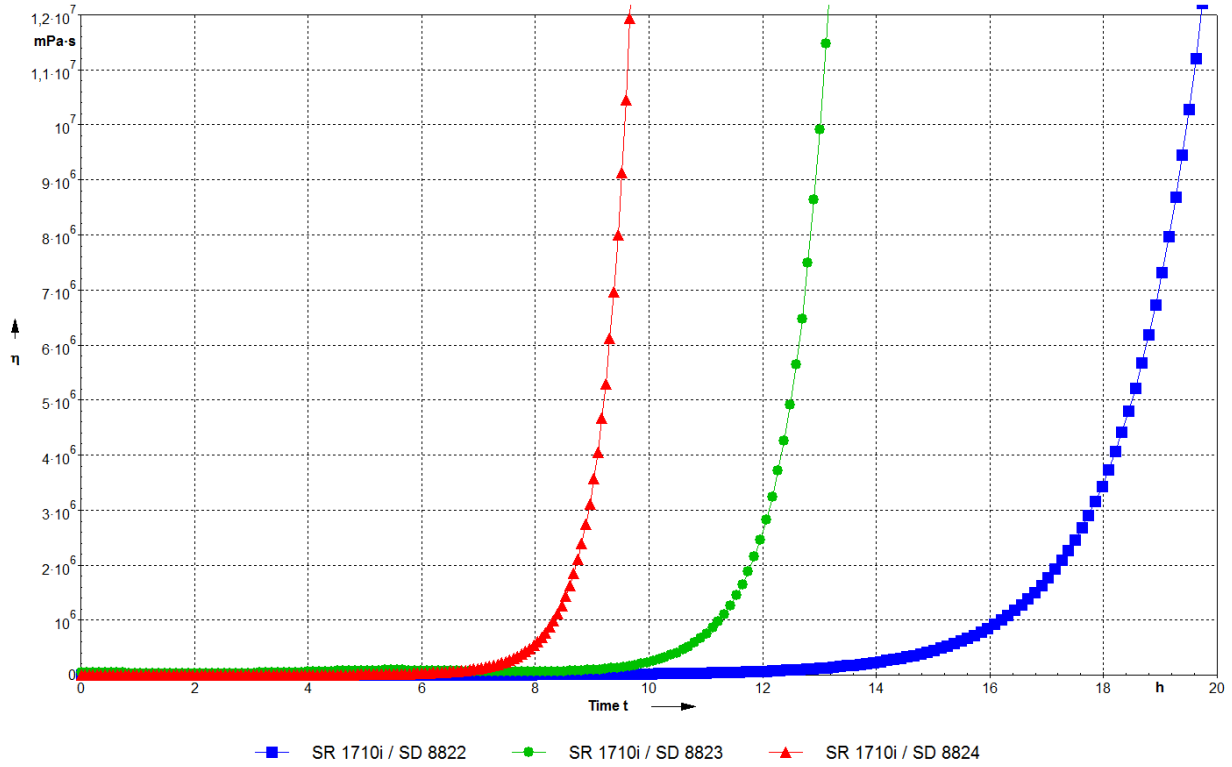
	SD 8824	SD 8823	SD 8822
Exothermic temperature (°C)	215		180
Exothermic peak time (min)	160		360
Time to reach 50 °C (min)	70		330

### Reactivity @ 25 °C on 500 g SR 1710 Injection / SD 882x

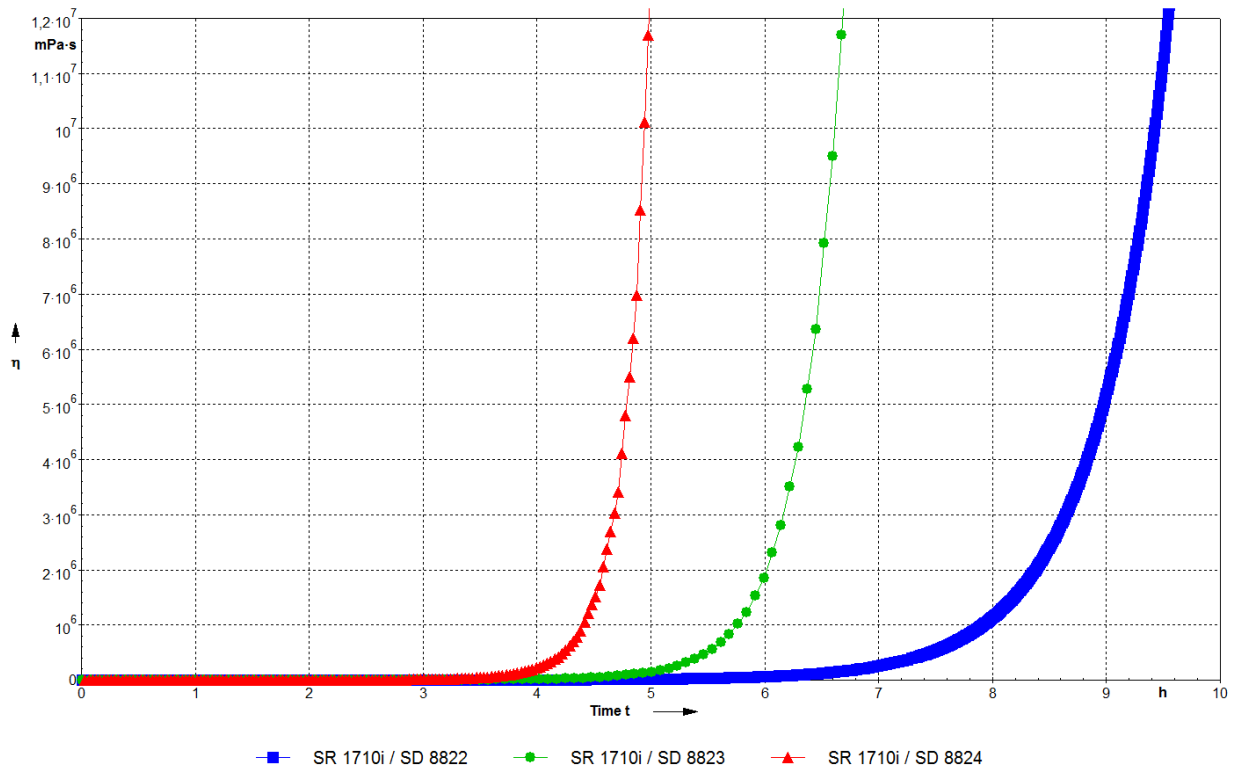
	SD 8824	SD 8823	SD 8822
Exothermic temperature (°C)	215		215
Exothermic peak time (min)	80		150
Time to reach 50 °C (min)	150		130

## Reactivity on 1 mm thick layer

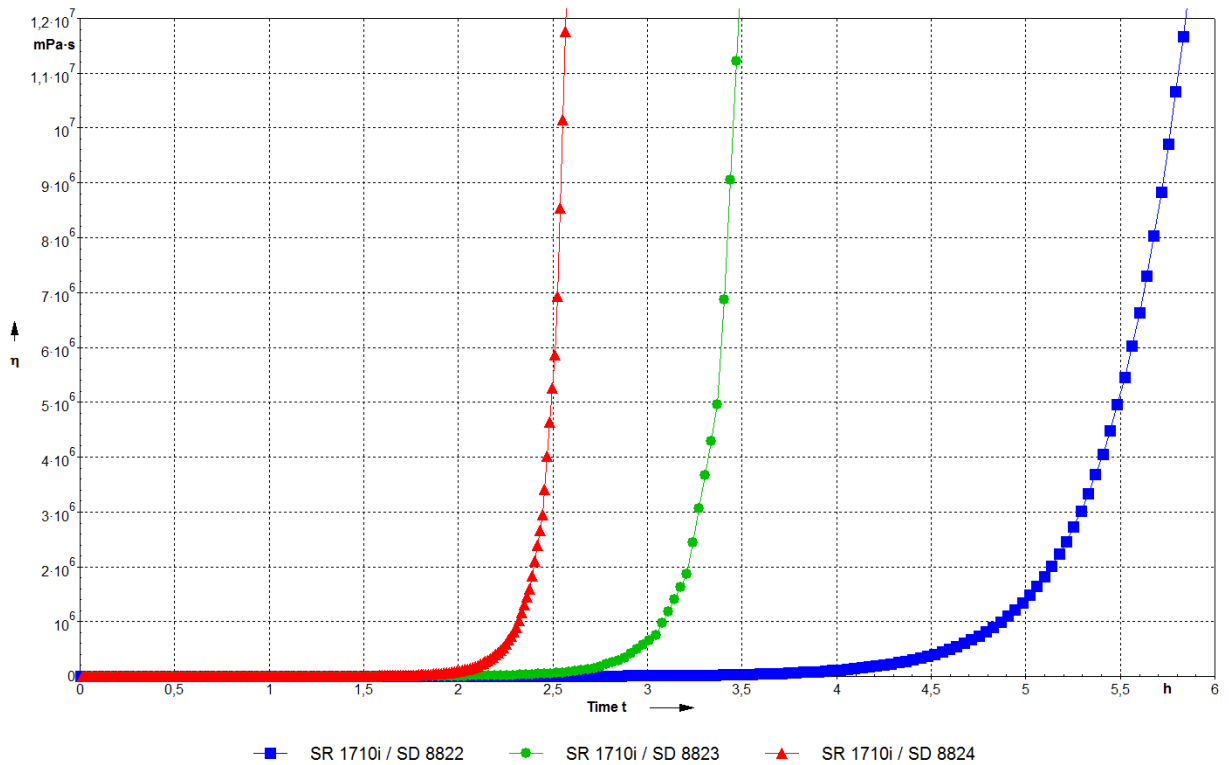
@ 20 °C



@ 30 °C



@ 40 °C



## Mechanical properties on cast resin :

		SR 1710 Injection / SD 8824			SR 1710 Injection / SD 8823		
Curing cycles		24 h @ Ta + 24 h @ 40 °C	24 h @ Ta + 16 h @ 60 °C	24 h @ Ta + 8 h @ 80 °C	24 h @ Ta + 24 h @ 40 °C	24 h @ Ta + 16 h @ 60 °C	24 h @ Ta + 8 h @ 80 °C
<b>Tensile</b>							
Modulus	N/mm <sup>2</sup>	3 430	3 050	3 100	3 490	3 330	3 330
Maximum strength	N/mm <sup>2</sup>	78	85	83	81	86	85
Breaking Strength	N/mm <sup>2</sup>	77	84	82	80	81	84
Elongation at max strength	%	2,8	4,8	5,4	3,4	4,5	5,1
Elongation at break	%	3	5,3	5,9	3,6	5,3	5,6
<b>Flexion</b>							
Modulus	N/mm <sup>2</sup>	3 390	3 350	3 280	3 600	3 460	3 340
Maximum strength	N/mm <sup>2</sup>	127	129	134	134	138	137
Breaking Strength	N/mm <sup>2</sup>			129	104	110	127
Elongation at max strength	%	5	5,7	6,3	4,8	5,5	6,1
Elongation at break	%	6,8	8,3	7,6	7,8	8,6	7,8
<b>Shear</b>							
Breaking Strength	N/mm <sup>2</sup>	53	54	55	53	53	54
<b>Compression</b>							
Modulus	N/mm <sup>2</sup>						
Yield strength	N/mm <sup>2</sup>	113	115	112	117	116	113
Offset compression yield	%	13,9	13,7	17,3	12,8	13,1	15,1
<b>Charpy impact strength</b>							
Resilience	kJ/m <sup>2</sup>	54	36	13	26	34	39
<b>DSC glass transition</b>							
TG1 onset	°C	67	84	97	70	88	96
TG1 max onset	°C			97			98
<b>DTMA glass transition</b>							
TG tan delta	°C						
TeiG onset G'	°C						
TmG midpoint G'	°C						
TefG endpoint	°C						
TG peak G''	°C						



## Mechanical properties on cast resin :

		SR 1710 Injection / SD 8822		
Curing cycles		24 h @ Ta + 24 h @ 40 °C	24 h @ Ta + 16 h @ 60 °C	24 h @ Ta + 8 h @ 80 °C
<b>Tensile</b>				
Modulus	N/mm <sup>2</sup>	3 650	3 680	3 470
Maximum strength	N/mm <sup>2</sup>	70	85	85
Breaking Strength	N/mm <sup>2</sup>	70	85	83
Elongation at max strength	%	2,2	3,1	4,5
Elongation at break	%	2,2	3,1	4,8
<b>Flexion</b>				
Modulus	N/mm <sup>2</sup>	3 740	3 720	3 380
Maximum strength	N/mm <sup>2</sup>	115	136	137
Breaking Strength	N/mm <sup>2</sup>			133
Elongation at max strength	%	3,5	5,2	5,8
Elongation at break	%	3,5	7,3	6,5
<b>Shear</b>				
Breaking Strength	N/mm <sup>2</sup>	53	54	56
<b>Compression</b>				
Modulus	N/mm <sup>2</sup>			
Yield strength	N/mm <sup>2</sup>	113	116	116
Offset compression yield	%	14,6	14,4	15,5
<b>Charpy impact strength</b>				
Resilience	kJ/m <sup>2</sup>	17	25	19
<b>DSC glass transition</b>				
TG1 onset	°C	67	87	95
TG1 max onset	°C			99
<b>DTMA glass transition</b>				
TG tan delta	°C			
TeiG onset G'	°C			
TmG midpoint G'	°C			
TefG endpoint	°C			
TG peak G''	°C			

## Mechanical properties on laminate :

		SR 1710 Injection / SD 8824			SR 1710 Injection / SD 8823		
Matrix		3300 (twill glass 2/2 300 g/m <sup>2</sup> )			3300 (twill glass 2/2 300 g/m <sup>2</sup> )		
Reinforcement		15			15		
Number of layers		Infusion			Infusion		
Process		74 %			74 %		
Reinforcement rate by weight	%						
Post curing	→	24 h @ Ta + 24 h @ 40 °C	24 h @ Ta + 16 h @ 60 °C	24 h @ Ta + 8 h @ 80 °C	24 h @ Ta + 24 h @ 40 °C	24 h @ Ta + 16 h @ 60 °C	24 h @ Ta + 8 h @ 80 °C
<b>Tensile</b>							
Modulus	N/mm <sup>2</sup>						
Maximum strength	N/mm <sup>2</sup>						
Breaking Strength	N/mm <sup>2</sup>						
Elongation at max strength	%						
Elongation at break	%						
<b>Flexion</b>							
Modulus	N/mm <sup>2</sup>	28 500	30 000		29 900		
Maximum strength	N/mm <sup>2</sup>	745	778		774		
Breaking Strength	N/mm <sup>2</sup>						
Elongation at max strength	%	3,3	3,2		3,1		
Elongation at break	%						
<b>Toughness</b>							
G1c interlaminar (J/m <sup>2</sup> -CBT)							
<b>Shearing in flexion</b>							
Shear strength	N/mm <sup>2</sup>	61	61		58		
<b>Charpy impact strength</b>							
Resilience	kJ/m <sup>2</sup>	223	222		216		
Water absorption	% Weight	0,13	0,15		0,21		

## Mechanical properties on laminate :

		SR 1710 Injection / SD 8822		
Matrix		3300 (twill glass 2/2 300 g/m <sup>2</sup> )		
Reinforcement		15		
Number of layers		Infusion		
Process		74 %		
Reinforcement rate by weight	%			
Post curing	→	24 h @ Ta + 24 h @ 40 °C	24 h @ Ta + 16 h @ 60 °C	24 h @ Ta + 8 h @ 80 °C
<b>Tensile</b>				
Modulus	N/mm <sup>2</sup>			
Maximum strength	N/mm <sup>2</sup>			
Breaking Strength	N/mm <sup>2</sup>			
Elongation at max strength	%			
Elongation at break	%			
<b>Flexion</b>				
Modulus	N/mm <sup>2</sup>		25 700	
Maximum strength	N/mm <sup>2</sup>		690	
Breaking Strength	N/mm <sup>2</sup>			
Elongation at max strength	%		3,2	
Elongation at break	%			
<b>Toughness</b>				
G1c interlaminar (J/m <sup>2</sup> -CBT)				
<b>Shearing in flexion</b>				
Shear strength	N/mm <sup>2</sup>		63	
<b>Charpy impact strength</b>				
Resilience	kJ/m <sup>2</sup>		210	
Water absorption	% Weight		0,17	

**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,

**Thermal tests:**

Glass transition DSC:	NF EN ISO 11357-2:2014 -5°C to 180 °C under nitrogen gas
$T_{G1}$ or Onset:	1 <sup>st</sup> 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 <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	

TA: Ambient temperature (20 to 25 °C)

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