

SR 1710 Injection / SD 882x

Structural epoxy system for Resin Transfer Moulding



Description

Two component epoxy system, specially designed for Resin Transfer Molding process, vacuum infusion, injection, etc. It may also be used in hand layup (for flat surface molds or molds with no vertical surfaces). It exhibits very high mechanical properties, especially interlaminar shear strength. This system has a very low viscosity, and low reactivity for manufacturing of large parts. It also exhibits excellent retention of the mechanical characteristics in a wet environment. Temperature resistance: Tg1 max = 100 °C

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)

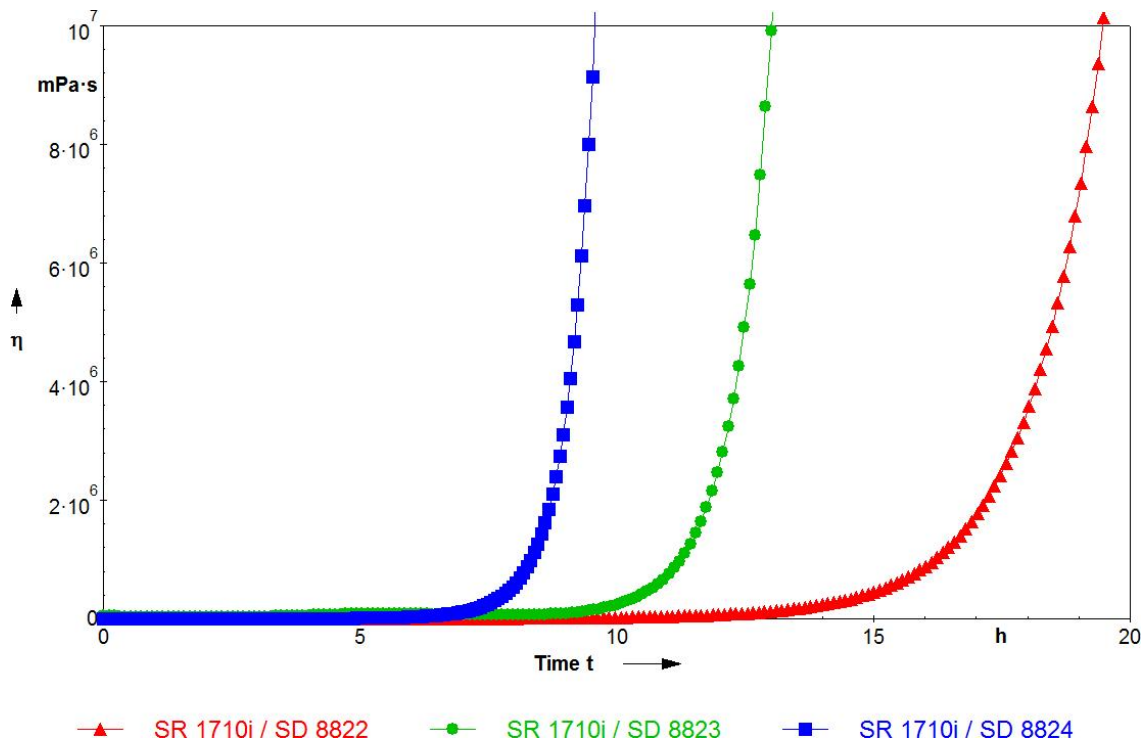
		SD 8824	SD 8823	SD 8822
Appearance		liquid	liquid	liquid
Color		colourless	light yellow	colourless
Gardner color		≤ 4	≤ 3	≤ 3
Reactivity level		Standard	Medium	Slow
Viscosity (mPa.s)	@ 15 °C	7 ± 2	12 ± 2	26 ± 5
	@ 20 °C	6 ± 2	9 ± 3	20 ± 4
	@ 25 °C	5 ± 2	8 ± 3	16 ± 3
	@ 30 °C	4 ± 2	7 ± 2	13 ± 3
Density	@ 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

Mix (es) SR 1710 Injection / SD 882x

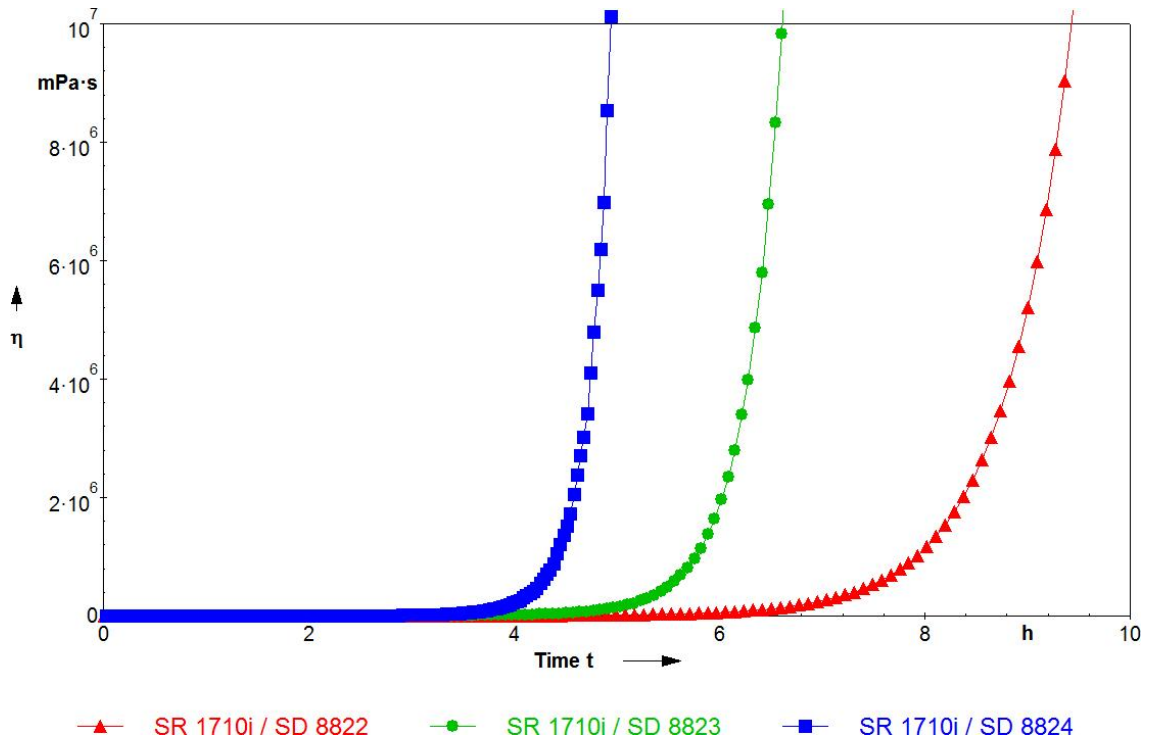
	SD 8824	SD 8823	SD 8822
Appearance	liquid	liquid	liquid
Color	light yellow	light yellow	light yellow
Mixing ratio			
By weight	100 / 23	100 / 28	100 / 35
By volume	100 / 28	100 / 34	100 / 43
Initial viscosity @ 20 °C	139000	200	0
PP 50 mm / 10 s ⁻¹ (mPa.s) @ 30 °C	115	200	0
Density @ 20 °C	1,1485	1,1483	1,1479

Reactivity on 1 mm thick layer

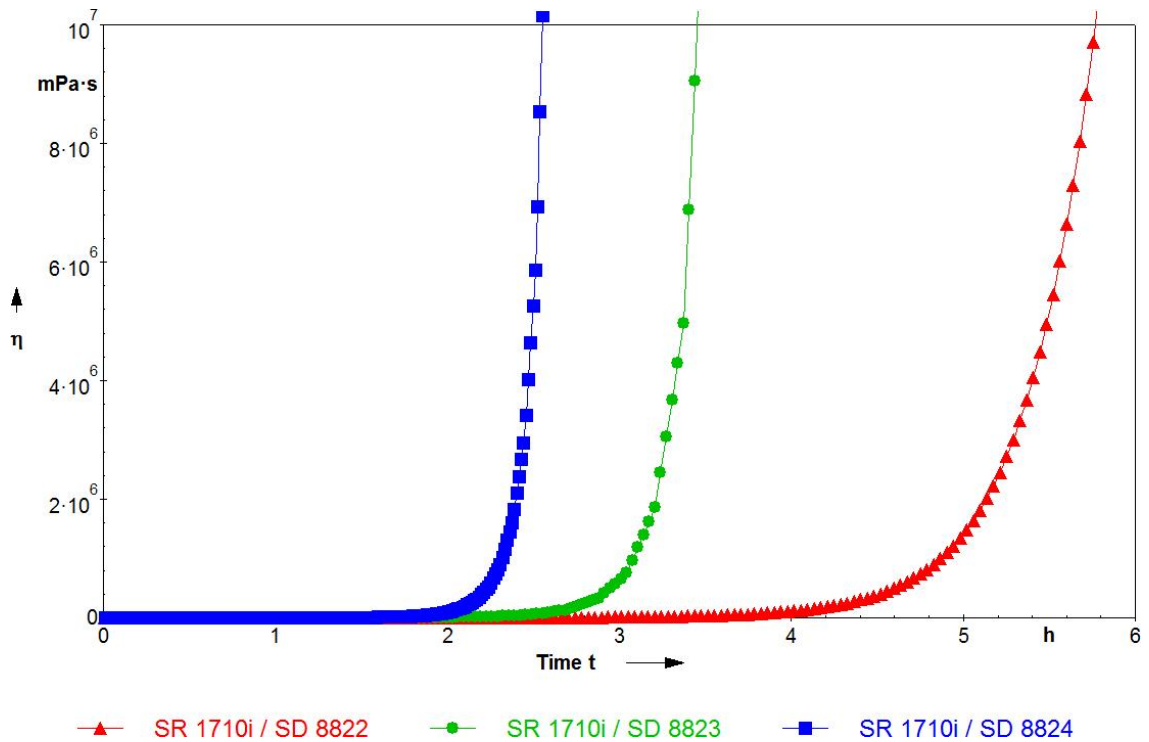
@ 20 °C



@ 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
Tensile							
Modulus	N/mm ²	3 430	3 050	3 100	3 490	3 330	3 330
Maximum strength	N/mm ²	78	85	83	81	86	85
Breaking Strength	N/mm ²	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
Flexion							
Modulus	N/mm ²	3 390	3 350	3 280	3 600	3 460	3 340
Maximum strength	N/mm ²	127	129	134	134	138	137
Breaking Strength	N/mm ²			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
Shear							
Breaking Strength	N/mm ²	53	54	55	53	53	54
Compression							
Modulus	N/mm ²						
Yield strength	N/mm ²	113	115	112	117	116	113
Offset compression yield	%	13,9	13,7	17,3	12,8	13,1	15,1
Charpy impact strength							
Resilience	kJ/m ²	54	36	13	26	34	39
DSC glass transition							
TG1 onset	°C	67	84	97	70	88	96
TG1 max onset	°C			97			98
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 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
Tensile				
Modulus	N/mm ²	3 650	3 680	3 470
Maximum strength	N/mm ²	70	85	85
Breaking Strength	N/mm ²	70	85	83
Elongation at max strength	%	2,2	3,1	4,5
Elongation at break	%	2,2	3,1	4,8
Flexion				
Modulus	N/mm ²	3 740	3 720	3 380
Maximum strength	N/mm ²	115	136	137
Breaking Strength	N/mm ²			133
Elongation at max strength	%	3,5	5,2	5,8
Elongation at break	%	3,5	7,3	6,5
Shear				
Breaking Strength	N/mm ²	53	54	56
Compression				
Modulus	N/mm ²			
Yield strength	N/mm ²	113	116	116
Offset compression yield	%	14,6	14,4	15,5
Charpy impact strength				
Resilience	kJ/m ²	17	25	19
DSC glass transition				
TG1 onset	°C	67	87	95
TG1 max onset	°C			99
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 1710 Injection / SD 8824			SR 1710 Injection / SD 8823		
Matrix		3300 (twill glass 2/2 300 g/m ²)			3300 (twill glass 2/2 300 g/m ²)		
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
Tensile							
Modulus	N/mm ²						
Maximum strength	N/mm ²						
Breaking Strength	N/mm ²						
Elongation at max strength	%						
Elongation at break	%						
Flexion							
Modulus	N/mm ²	28 500	30 000		29 900		
Maximum strength	N/mm ²	745	778		774		
Breaking Strength	N/mm ²						
Elongation at max strength	%	3,3	3,2		3,1		
Elongation at break	%						
Toughness							
G1c interlaminar (J/m ² -CBT)							
Shearing in flexion							
Shear strength	N/mm ²	61	61		58		
Charpy impact strength							
Resilience	kJ/m ²	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 ²)		
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
Tensile				
Modulus	N/mm ²			
Maximum strength	N/mm ²			
Breaking Strength	N/mm ²			
Elongation at max strength	%			
Elongation at break	%			
Flexion				
Modulus	N/mm ²		25 700	
Maximum strength	N/mm ²		690	
Breaking Strength	N/mm ²			
Elongation at max strength	%		3,2	
Elongation at break	%			
Toughness				
G1c interlaminar (J/m ² -CBT)				
Shearing in flexion				
Shear strength	N/mm ²		63	
Charpy impact strength				
Resilience	kJ/m ²		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 st scan at 20 °C/min
	T_{G1} maximum or Onset: 2 nd 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)

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