

## **SR 1700**

### **High performance epoxy laminating system**

High modulus, high resistance systems

Low water absorption of cured systems

Excellent adhesion on all types of reinforcements (glass, aramid, carbon, polyester...)

The SD 2801 and the SD 2806 hardeners can be mixed in any proportions to achieve the required reactivity

The fast hardeners offer good mechanical properties at ambient temperature;

SD 2803 and SD 2801 requires a minimum post-cure temperature of 55°C

Developed for: naval and aerospace structures and automotive prototypes...

#### **Fast hardeners SD 2806 & SD 2805**

Fast laminate hardening fo ambient temperature from 10 to 40 °C. Can be slowed down by SD 2801.

Good mechanical properties achived after room temperature curing, awesome after post curing.

#### **Standard hardener SD 2803**

Medium reactivity hardener, long working time.

Reactivity adapted for the laminating of medium thickness composites.

Good mechanical properties, items can be released after 24 hours at 18°C

Mechanical properties optimised by post-curing at 50-55°C

Designed for the manufacture of parts with a service temperature up to 60-70°C, high performance composites.

#### **Ultra slow hardener SD 2801**

Specially formulated for laminating medium and big size parts under vacuum.

Requires a post cure at 40 °C minimum. Can be accelerated by SD 2806.

Dedicated to high performance composite tool manufacturing, working at 60-70 °C continuously.

#### **Slow hardener SD 7820**

Slow hardener, very low viscosity allowing fast reinforcements wet out.

Laminates requiring 6 to 8 hours of working time.

Adapted to the production of parts with a service temperature up to 120°C.

Items can be handled and extracted from moulds after 12 hours at 40°C or 8 h at 60°C

## SR 1700 epoxy resin physical properties

		<b>SR 1700</b>
Aspect / colour		Yellow liquid
Viscosity (mPa.s)	15 °C	3 800 ± 400
Rheometer	20 °C	1 950 ± 200
CP 50 mm	25 °C	1 100 ± 150
Shear rate 10 s <sup>-1</sup>	30 °C	640 ± 100
	40 °C	250 ± 100
Density	20 °C	1.16 ± 0.01
Picnometer ISO 2811-1		
Storage		No crystallisation Avoid long storage periods at temperatures over 40 °C

## SD 280x & SD 7820 hardeners physical properties

		<b>SD 2806</b>	<b>SD 2805</b>	<b>SD 2803</b>	<b>SD 2801</b>	<b>SD 7820</b>
Reactivity		<b>Very fast</b>	<b>Rapide</b>	<b>standard</b>	<b>Very slow</b>	<b>Slow</b>
Aspect / colour		Yellow liquid	Liquide Jaune	Yellow liquid	Clear liquid	Clear liquid
Viscosity (mPa.s)	15 °C	450 ± 100	300 ± 50	200 ± 40	80 ± 15	120 ± 20
Rheometer	20 °C	300 ± 60	200 ± 40	140 ± 30	60 ± 10	80 ± 15
CP 50 mm	25 °C	200 ± 40	140 ± 25	100 ± 20	45 ± 10	60 ± 15
Shear rate 10 s <sup>-1</sup>	30 °C	140 ± 30	100 ± 20	80 ± 15	35 ± 5	45 ± 10
Density (g/cm <sup>3</sup> )	20 °C	1.07 ± 0.01	1.04 ± 0.01	1.00 ± 0.01	0.95 ± 0.01	0.96 ± 0.01
Picnometer ISO 2811-1						

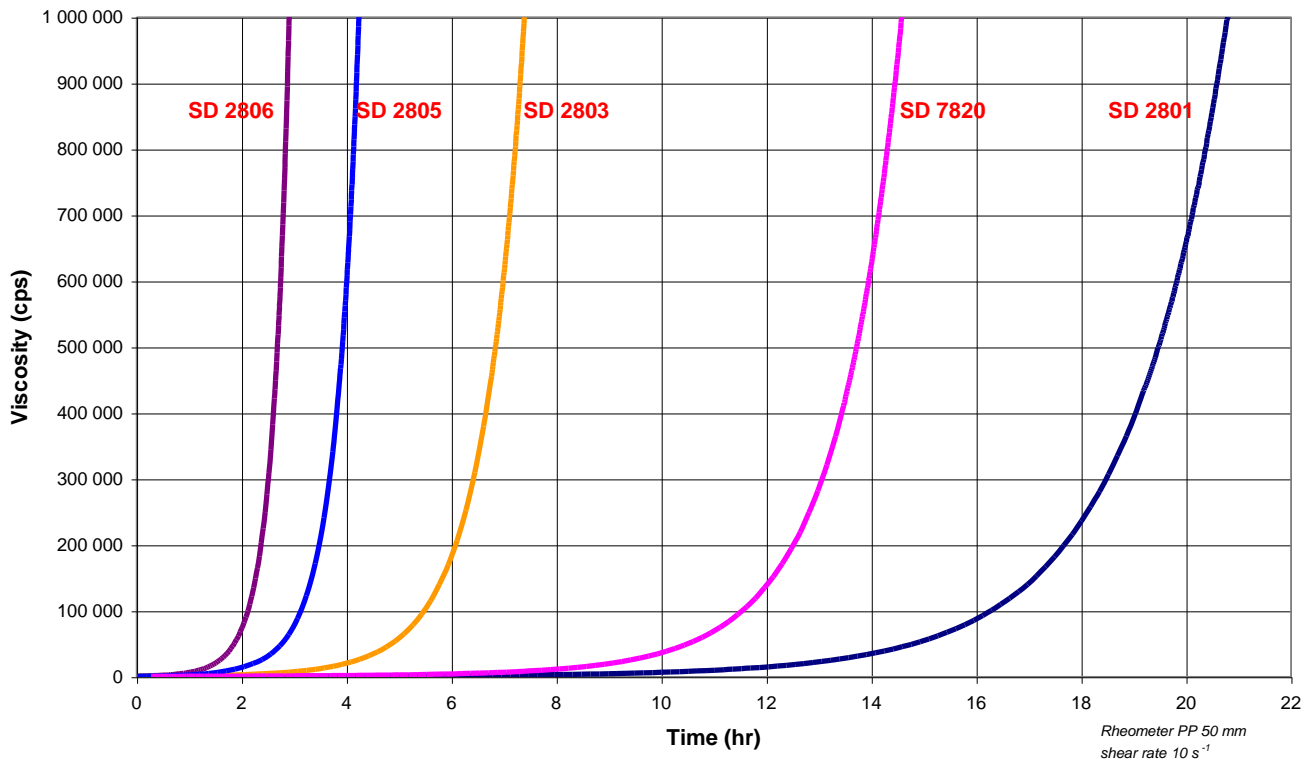
## SR 1700 / SD 280x & SD 7820 mix properties

		<b>SR 1700 / SD 2806</b>	<b>SR 1700 / SD 2805</b>	<b>SR 1700 / SD 2803</b>	<b>SR 1700 / SD 2801</b>	<b>SR 1700 / SD 7820</b>
Weight ratio		<b>100 / 39 g</b>	<b>100 / 39 g</b>	<b>100 / 39 g</b>	<b>100 / 39 g</b>	<b>100 / 36 g</b>
Volume ratio		<b>100 / 43 ml</b>	<b>100 / 44 ml</b>	<b>100 / 45 ml</b>	<b>100 / 48 ml</b>	<b>100 / 43 ml</b>
Mix viscosity						
Rheometer	20 °C	940 ± 100	800 ± 100	700 ± 100	510 ± 100	750 ± 150
PP 50 mm	30 °C	360 ± 50	330 ± 50	300 ± 50	260 ± 50	250 ± 50
Shear rate 10 s <sup>-1</sup>	40 °C					150 ± 30
	50 °C					60 ± 10
	60 °C					40 ± 10
	70 °C					30 ± 5

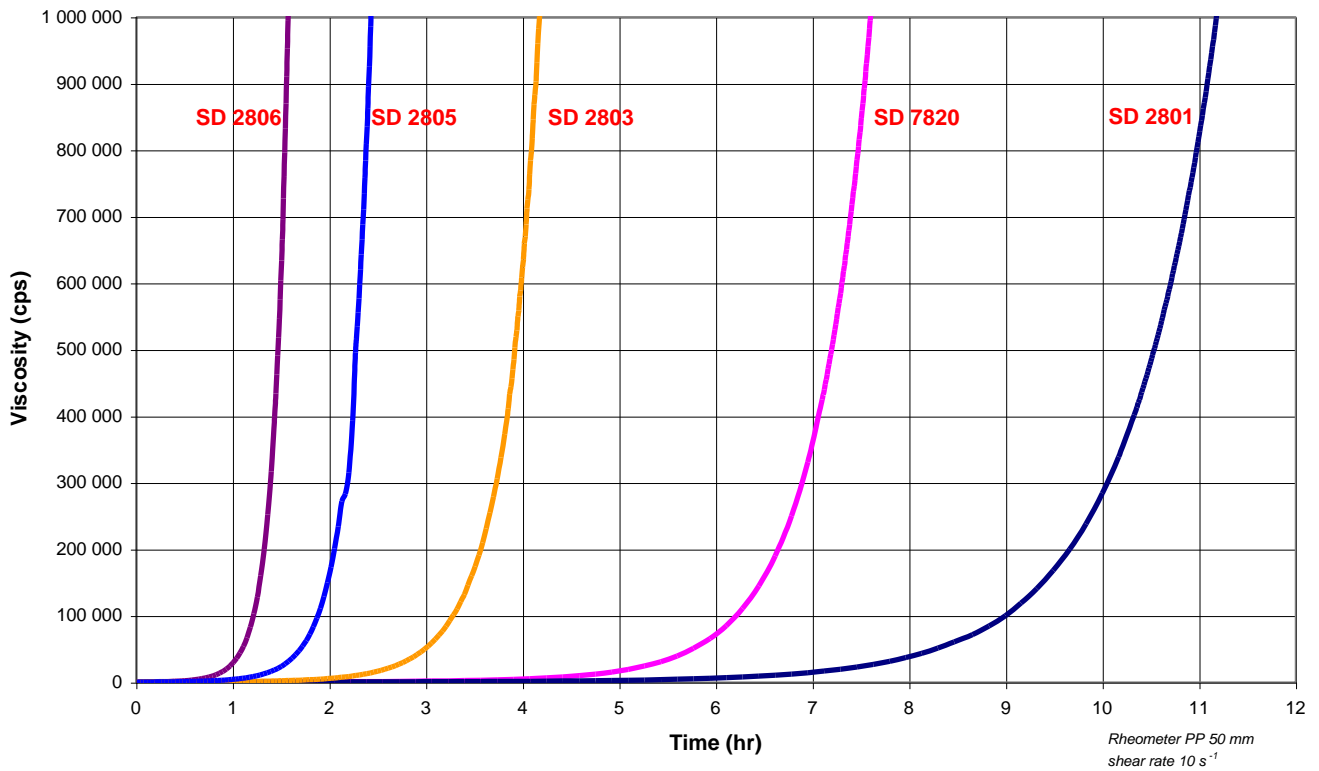
## Mass reactivity

	<b>SR 1700 / SD 2806</b>	<b>SR 1700 / SD 2805</b>	<b>SR 1700 / SD 2803</b>	<b>SR 1700 / SD 2801</b>	<b>SR 1700 / SD 7820</b>
Exothermic peak on 500 g mix (°C) :					
30 °C	> 210 °C	> 210 °C	> 210 °C	> 210 °C	> 210 °C
20 °C	> 210 °C	> 210 °C	200 °C	37 °C	140 °C
Time to reach exothermic peak :					
30 °C	14'	23'	42'	2 h 35'	1 h 20'
20 °C	23'	36'	1 h 58'	14 h	9 h 30'
Time to reach 50 °C on 500 g mix :					
30 °C	11'	18'	30'	2 h	1 h
20 °C	27'	42'	2 h 10'	na	8 h 45'

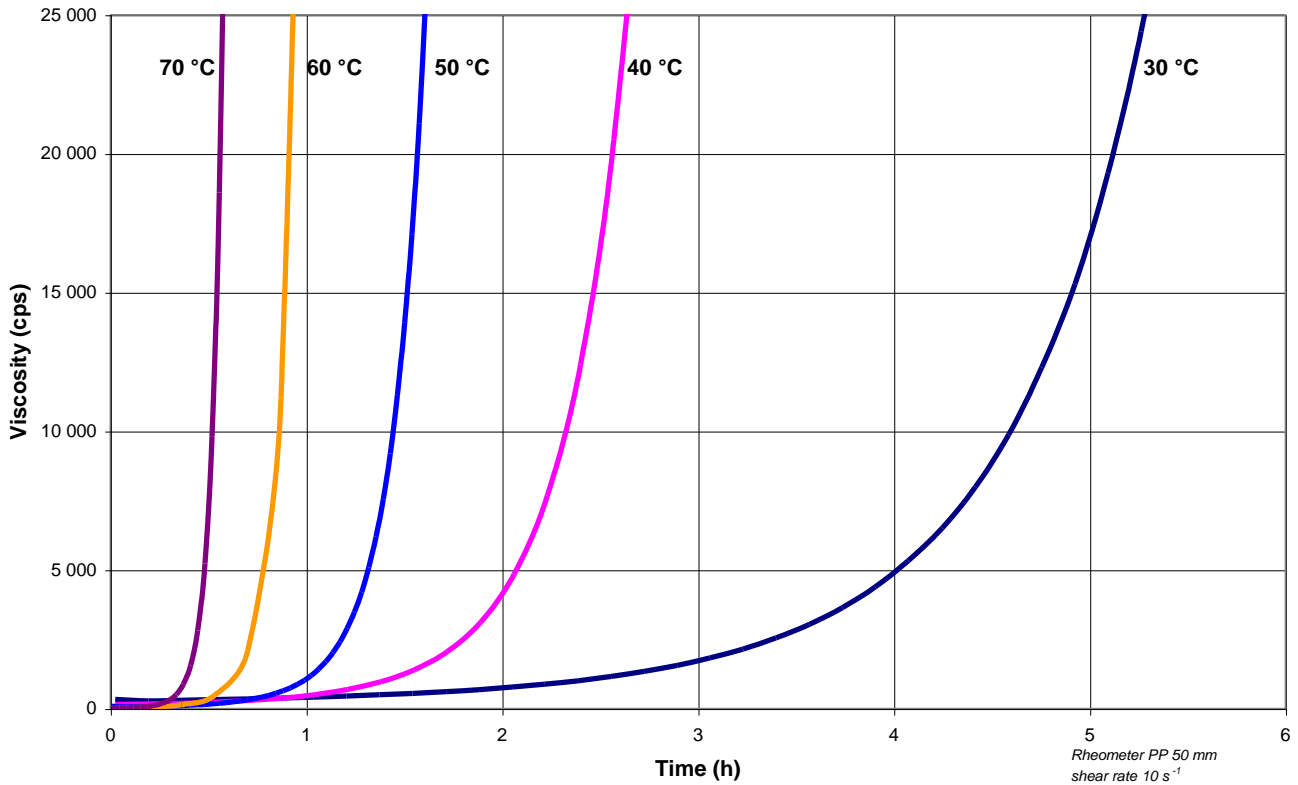
**Reactivity – 1 mm film viscosity evolution**  
- at 20 °C



- at 30 °C



## SR 1700 / SD 7820 hot film reactivity



## Mechanical properties on pure cast resin

		SR 1700 / SD 2806			
Curing schedule		10 days at 23 °C	24 h 23 °C + 24 h 40°C	24 h 23 °C + 16 h 60° C	24 h 23 °C + 8 h 80 °C
<b>Tensile</b>					
Modulus of elasticity	N/mm <sup>2</sup>	4100	3800	3750	3700
Maximum resistance	N/mm <sup>2</sup>	83	88	90	95
Resistance at break	N/mm <sup>2</sup>	83	88	89	91
Elongation at maximum resistance	%	3.1	3.4	3.8	4.3
Elongation at break	%	3.1	3.4	4.5	5.6
<b>Flexion</b>					
Modulus of elasticity	N/mm <sup>2</sup>	4150	3800	3800	3900
Maximum resistance	N/mm <sup>2</sup>	130	134	138	142
Elongation at maximum resistance	%	4.2	4.8	5.5	5.6
Elongation at break	%	4.7	6.1	7.6	8.0
<b>Charpy Impact strength</b>					
Resilience	kJ/m <sup>2</sup>	12	14	14	14
<b>Glass transition</b>					
Tg1	°C	56	70	82	87
Tg1 max.	°C				89

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

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 pure cast resin

		SR 1700 / SD 2805			
		10 days at 23 °C	24 h 23 °C + 24h 40°C	24 h 23 °C + 16 h 60° C	24 h 23 °C + 8 h 80 °C
<b>Curing schedule</b>					
<b>Tensile</b>					
Modulus of elasticity	N/mm <sup>2</sup>	4100	3700	3600	3500
Maximum resistance	N/mm <sup>2</sup>	75	86	88	90
Resistance at break	N/mm <sup>2</sup>	75	86	87	91
Elongation at maximum resistance	%	3.0	3.5	3.8	4.3
Elongation at break	%	3.0	3.8	4.6	5.4
<b>Flexion</b>					
Modulus of elasticity	N/mm <sup>2</sup>	4000	3700	3600	3500
Maximum resistance	N/mm <sup>2</sup>	128	133	138	140
Elongation at maximum resistance	%	3.1	4.9	5.4	5.5
Elongation at break	%	3.4	6.0	7.3	7.5
<b>Charpy Impact strength</b>					
Resilience	kJ/m <sup>2</sup>	12	14	14	14
<b>Glass transition</b>					
Tg1	°C	56	70	82	87
Tg1 max.	°C				90

		SR 1700 / SD 2803			
		10 days at 23 °C	24 h 23 °C + 24 h 40°C	24 h 23 °C + 16 h 60° C	24 h 23 °C + 8 h 80 °C
<b>Cure schedule</b>					
<b>Tensile</b>					
Modulus of elasticity	N/mm <sup>2</sup>	3900	3400	3400	3350
Maximum resistance	N/mm <sup>2</sup>	65	70	90	85
Resistance at break	N/mm <sup>2</sup>	65	70	87	84
Elongation at maximum resistance	%	2.5	2.7	4.2	4.4
Elongation at break	%	2.5	2.7	5.1	5.2
<b>Flexion</b>					
Modulus of elasticity	N/mm <sup>2</sup>	3900	3450	3550	3600
Maximum resistance	N/mm <sup>2</sup>	110	118	137	138
Elongation at maximum resistance	%	3.1	4.9	5.4	5.8
Elongation at break	%	3.3	9.6	8.0	7.5
<b>Charpy Impact strength</b>					
Resilience	kJ/m <sup>2</sup>	11	13	15	15
<b>Glass transition</b>					
Tg1	°C	55	70	89	99
Tg1 max.	°C				101

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Tension: NF T 51-034

Flexion : NF T 51-001

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 pure cast resin

Cure schedule		SR 1700 / SD 2801		
		24 h 23 °C + 24 h 40°C	24 h 23 °C + 16 h 60° C	24 h 23 °C + 8 h 80 °C
<b>Tensile</b>				
Modulus of elasticity	N/mm <sup>2</sup>	3050	3200	3100
Maximum resistance	N/mm <sup>2</sup>	65	78	80
Resistance at break	N/mm <sup>2</sup>	64	76	80
Elongation at maximum resistance	%	3	3.7	4.4
Elongation at break	%	3	4.1	4.6
<b>Flexion</b>				
Modulus of elasticity	N/mm <sup>2</sup>	3248	3460	3320
Maximum resistance	N/mm <sup>2</sup>	108	121	123
Elongation at maximum resistance	%	4.6	5.1	5.5
Elongation at break	%	6.3	6	6.9
<b>Charpy Impact strength</b>				
Resilience	kJ/m <sup>2</sup>	18	16	15
<b>Glass transition</b>				
Tg1	°C	67	83	97
Tg1 max.	°C			98

Cure schedule		SR 1700 / SD 7820				
		14 days at 23 °C	24 h 23 °C + 24h 40 °C	24 h 23 °C + 16 h 60 °C	24 h 23 °C + 8 h 80 °C	24h 23°C + 16h 60°C + 2h 80°C + 2h 100°C + 2h 120°C + 4 h 140 °C
<b>Tensile</b>						
Modulus of elasticity	N/mm <sup>2</sup>	3550	3200	3200	3100	3050
Maximum resistance	N/mm <sup>2</sup>	30	62	86	93	76
Resistance at break	N/mm <sup>2</sup>	30	62	84	93	76
Elongation at maximum resistance	%	0.9	2.1	3.8	5.4	4
Elongation at break	%	0.9	2.1	4.1	6.4	4
<b>Flexion</b>						
Modulus of elasticity	N/mm <sup>2</sup>	3600	3600	3500	3380	3000
Maximum resistance	N/mm <sup>2</sup>	68	113	136	137	120
Elongation at maximum resistance	%	1.8	3.4	5.4	6.5	7
Elongation at break	%	1.8	3.4	6.9	8.0	7
<b>Charpy Impact strength</b>						
Resilience	kJ/m <sup>2</sup>	2	21	25	23	12
<b>Glass transition</b>						
Tg1	°C	50	67	88	108	134
Tg1 max.	°C				140	140

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Flexion : NF T 51-001

Charpy impact strength: NF T 51-035

Glass transition DSC : ISO 11357-2 : 1999 -5°C to 180°C under nitrogen gaz

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