SR 1280 / SD 477x
Epoxy Resin Systems

Epoxy resin SR 1280:
Epoxy matrix
Without classified Toxic products (T)

Hardeners SD 477x:
Without classified Toxic products (T)
SD 4775: Intermediate, medium hardener
SD 4773:
SD 4772 / 4771 / 4770: Very / Ultra / Mega slow hardener

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

Applications:
Hand laminating, infusion, adhesive, tooling, casting, laminates…

Epoxy Resin SR 1280:

Appearance		Viscous liquid
Color		Clear
Gardner color		3 maximum
Chemical nature		Epoxy resin. Reaction product between bisphenol and epichlorhydrine.
Storage		Can crystallize at low temperature or after a long storage. Shelf life : 2 years @ 18 - 25°C
Color		Clear to yellow, Gardner < 3
Density	@ 20 °C	1.159 ± 0.005
Viscosities (mPa.s + 20 %)	@ 15 °C @ 20 °C @ 25 °C @ 30 °C @ 40 °C	6 380 ± 1 270 3 240 ± 650 1 780 ± 360 1 040 ± 210 410 ± 80
Refractive index ± 0.0005	@ 25 °C	1.5562

Base Hardeners SD 477x:

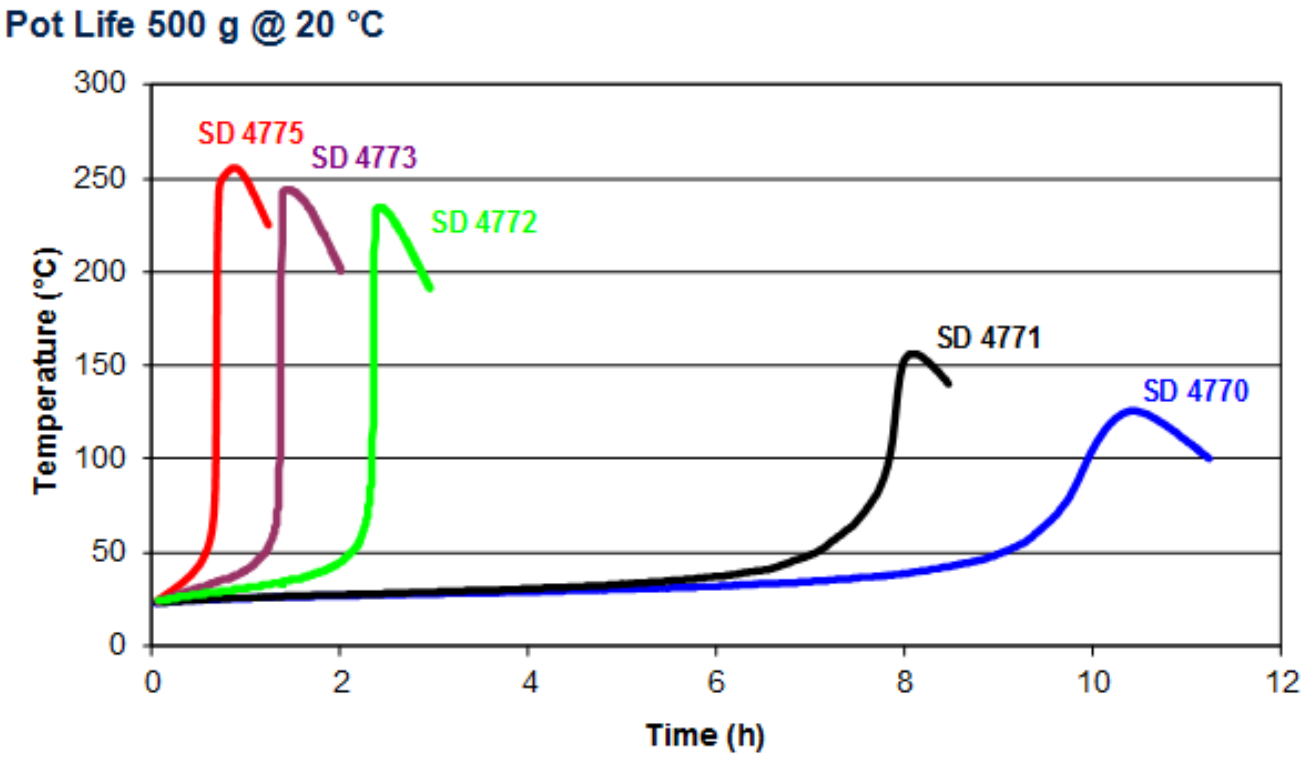
		SD 4775	SD 4773	SD 4772	SD 4771	SD 4770
Aspect / Color		Liquid / Clear to yellow				
Gardner color	maximum	5	4	3	3	3
Reactivity levels		Medium	Standard	Very slow	Ultra slow	Mega slow
Viscosities (mPa.s + 20 %)	@ 15 °C	285 ± 60	56 ± 11	13 ± 3		
	@ 20 °C	190 ± 40	41 ± 8	11 ± 2.5		
	@ 25 °C	130 ± 30	31 ± 6	9 ± 2		
	@ 30 °C	95 ± 20	24 ± 5	7 ± 1.5		
	@ 40 °C	55 ± 10	15 ± 3	5 ± 1		
Density (± 0.005)	@ 20 °C	1.010	0.9785	0.9270	0.944	0.944
Refractive index (± 0.0005)	@ 25 °C	1.4980	1.4779	1.4810	1.4590	1.4603

SR 1280 / SD 470x Mixes :

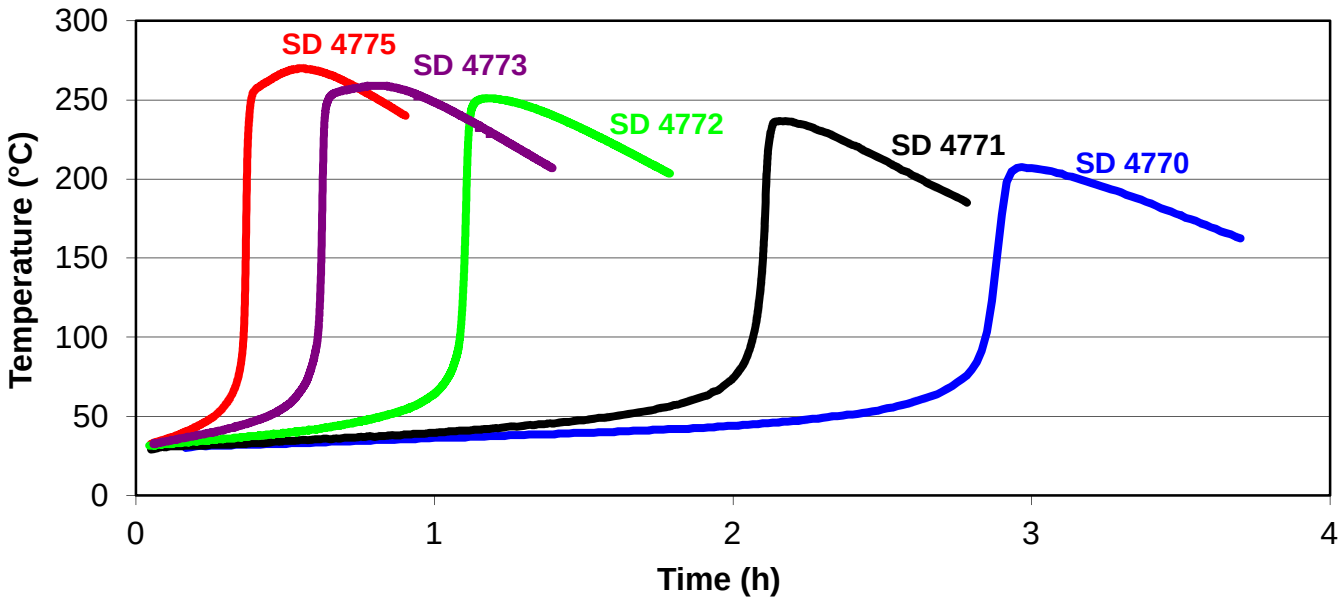
		SR 1280 / SD 4775	SR 1280 / SD 4773	SR 1280 / SD 4772	SR 1280 / SD 4771	SR 1280 / SD 4770
Mixing ratio: Quantity by weigh		**100 g / 27 g**				
Quantity by volume		**100 ml / 31 ml**	**100 ml / 32 ml**	**100 ml / 33 ml Or 3 / 1**		
Viscosities (mPa.s + 20 %)	@ 20 °C	1 300 ± 260	1 000 ± 200	800 ± 160		
	@ 30 °C	540 ± 110	500 ± 100	260 ± 50		
	@ 40 °C	270 ± 55	170 ± 35	105 ± 20		

Reactivities on 500 g Mix SR 1280 / SD 470x:

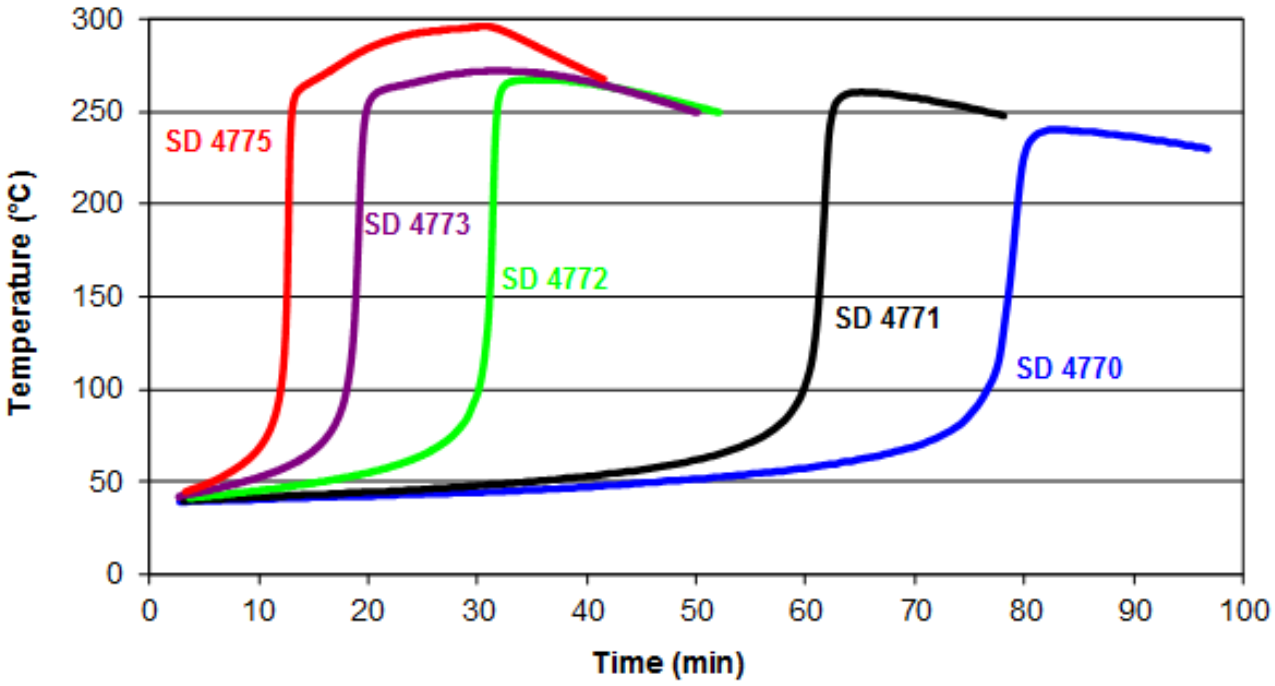
	SR 1280 / SD 4775	SR 1280 / SD 4773	SR 1280 / SD 4772	SR 1280 / SD 4771	SR 1280 SD 4770
Exothermic temperature (°C):					
@ 20 °C	255	240	240	170	130
@ 30 °C	270	260	250	230	210
@ 40 °C	300	270	270	260	240
Time to reach exothermic peak:					
@ 20 °C	50’	1 h 25’	2 h 25’	6 h 50’	10 h 25‘
@ 30 °C	32’	46’	1 h 10’	2 h 15’	3 h
@ 40 °C	29’	30’	34’	1 h 20’	1 h 20’
Time to reach 50 °C:					
@ 20 °C	34’	1 h 10	2 h 10’	6 h 00	9 h
@ 30 °C	15’	26’	49’	1 h 40’	2 h 20
@ 40 °C	5’	8’	15’	50’	45’



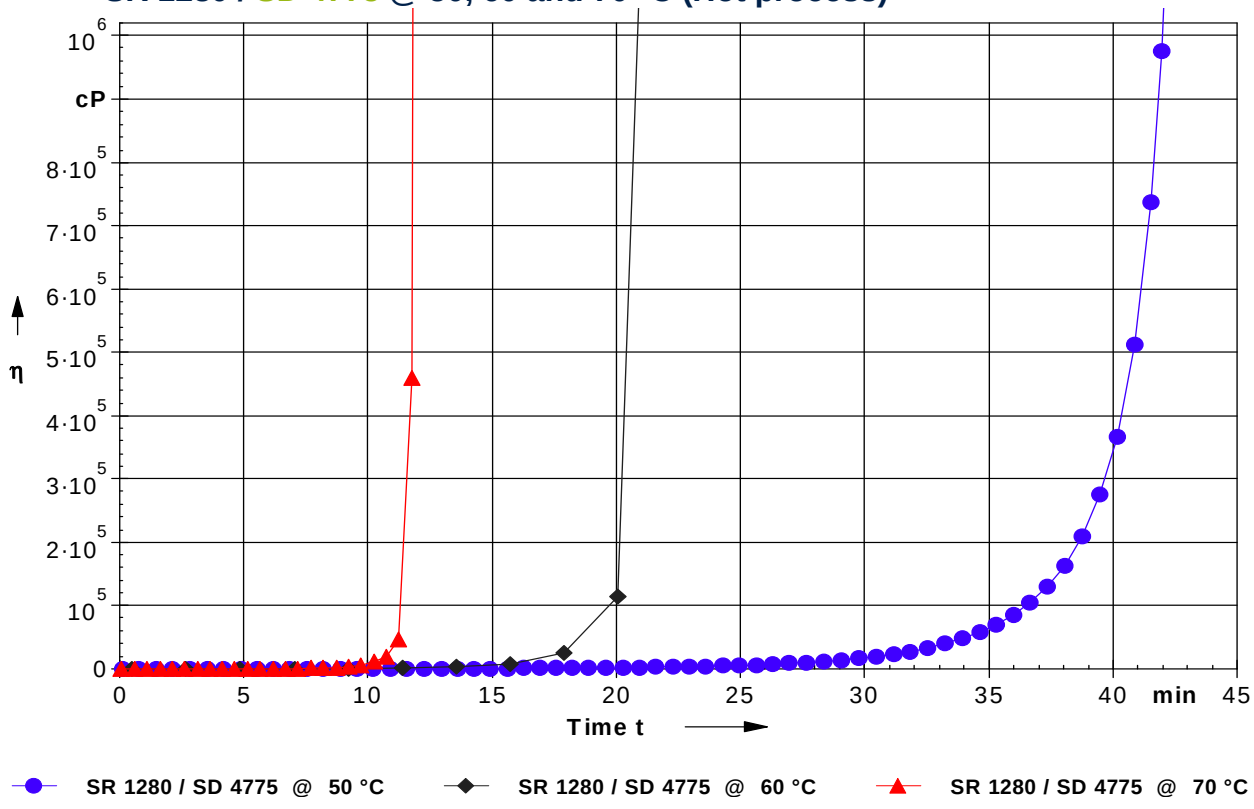
Pot Life 500 g @ 30 °C



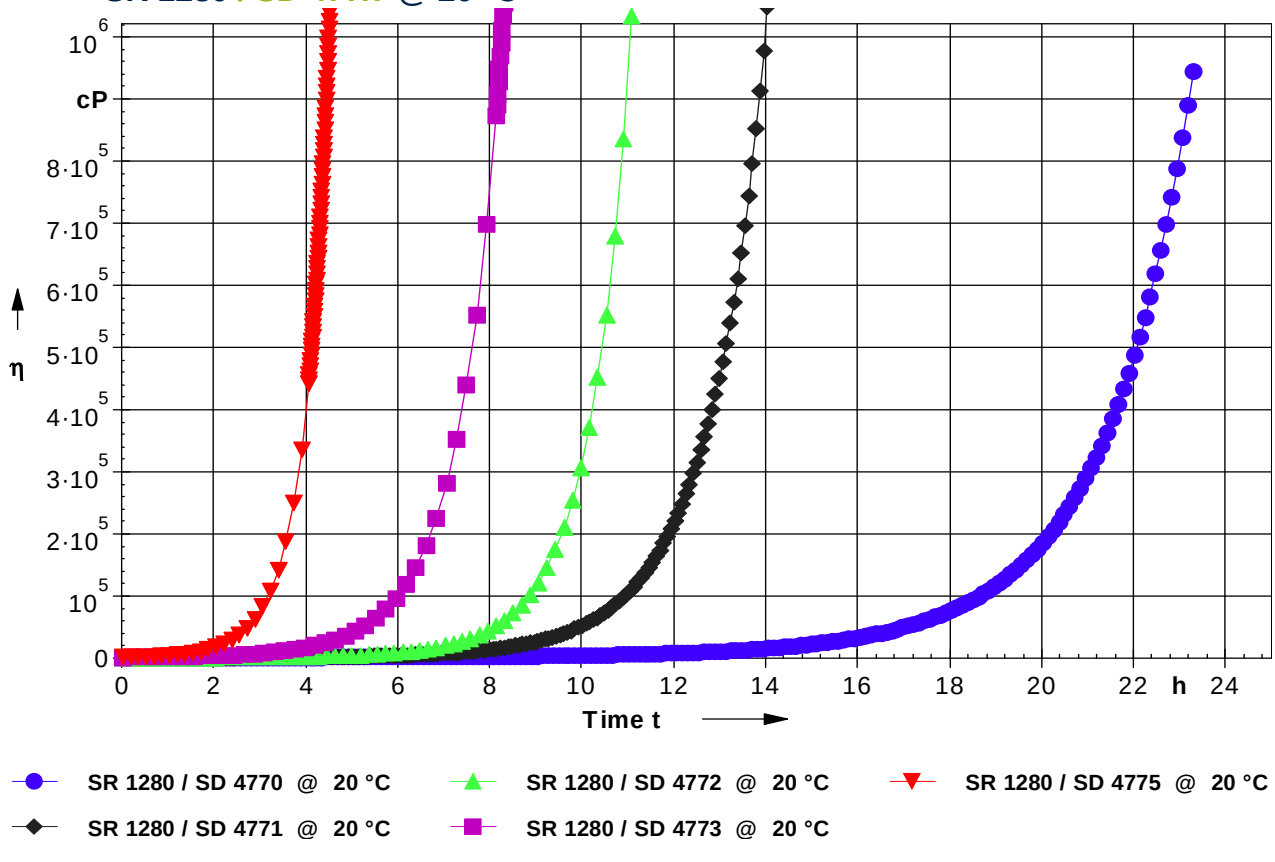
Pot Life 500 g @ 40 °C



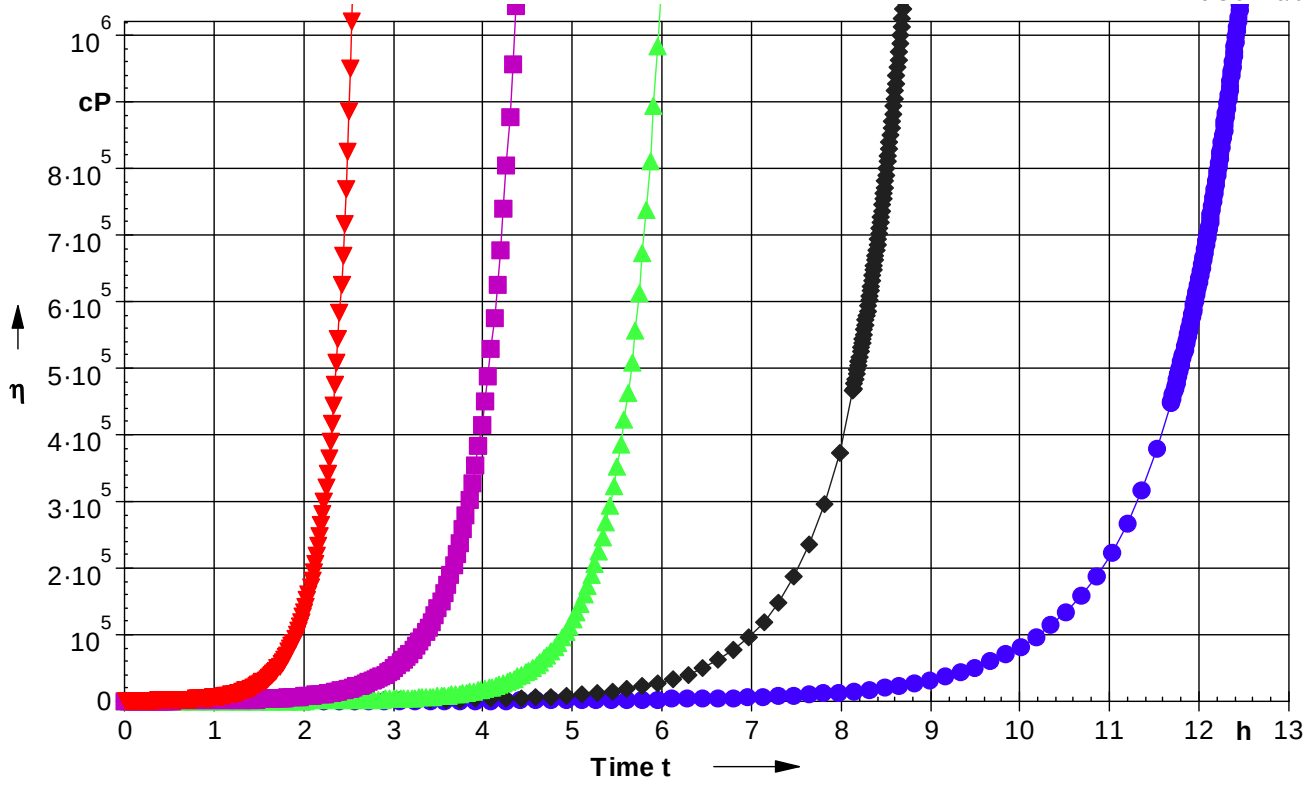
Reactivity – 1 mm film viscosity evolution with the temperature
SR 1280 / SD 4775 @ 50, 60 and 70 °C (Hot process)



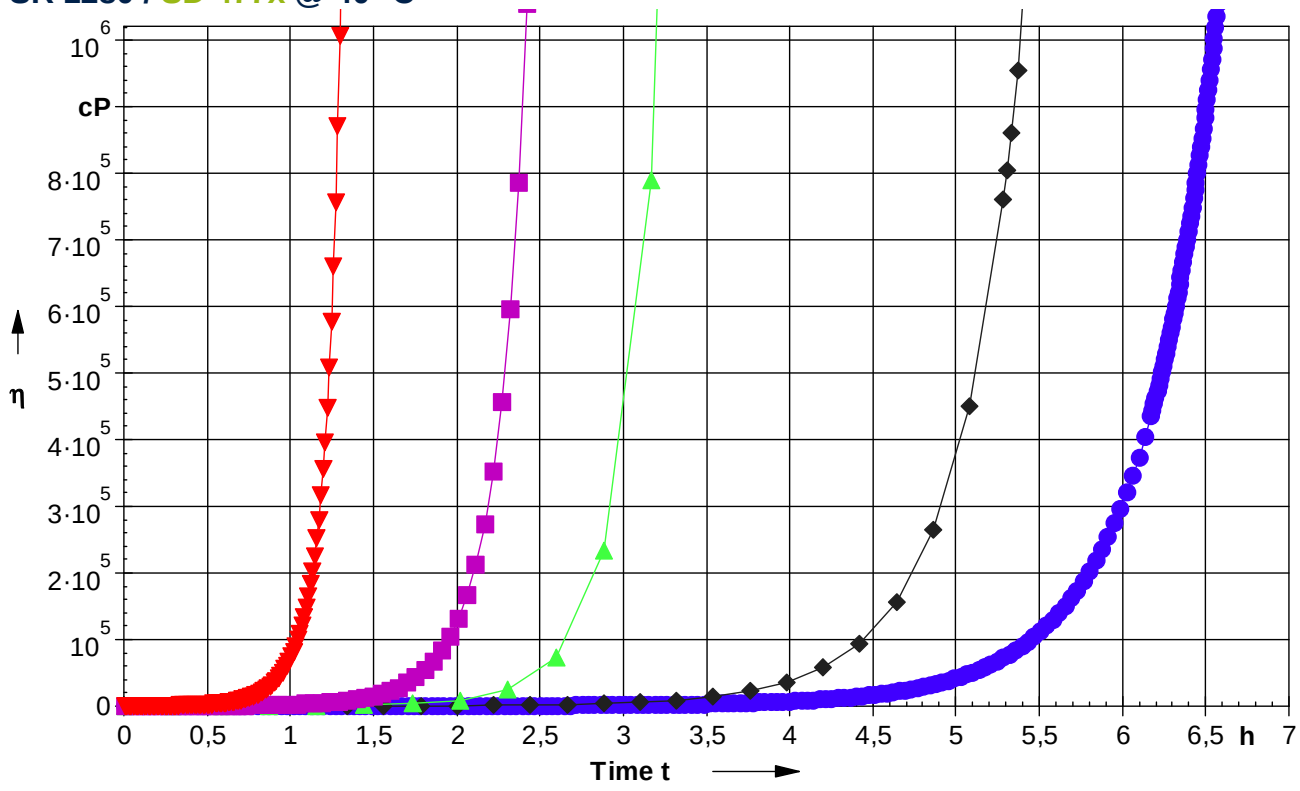
SR 1280 / SD 477x @ 20 °C



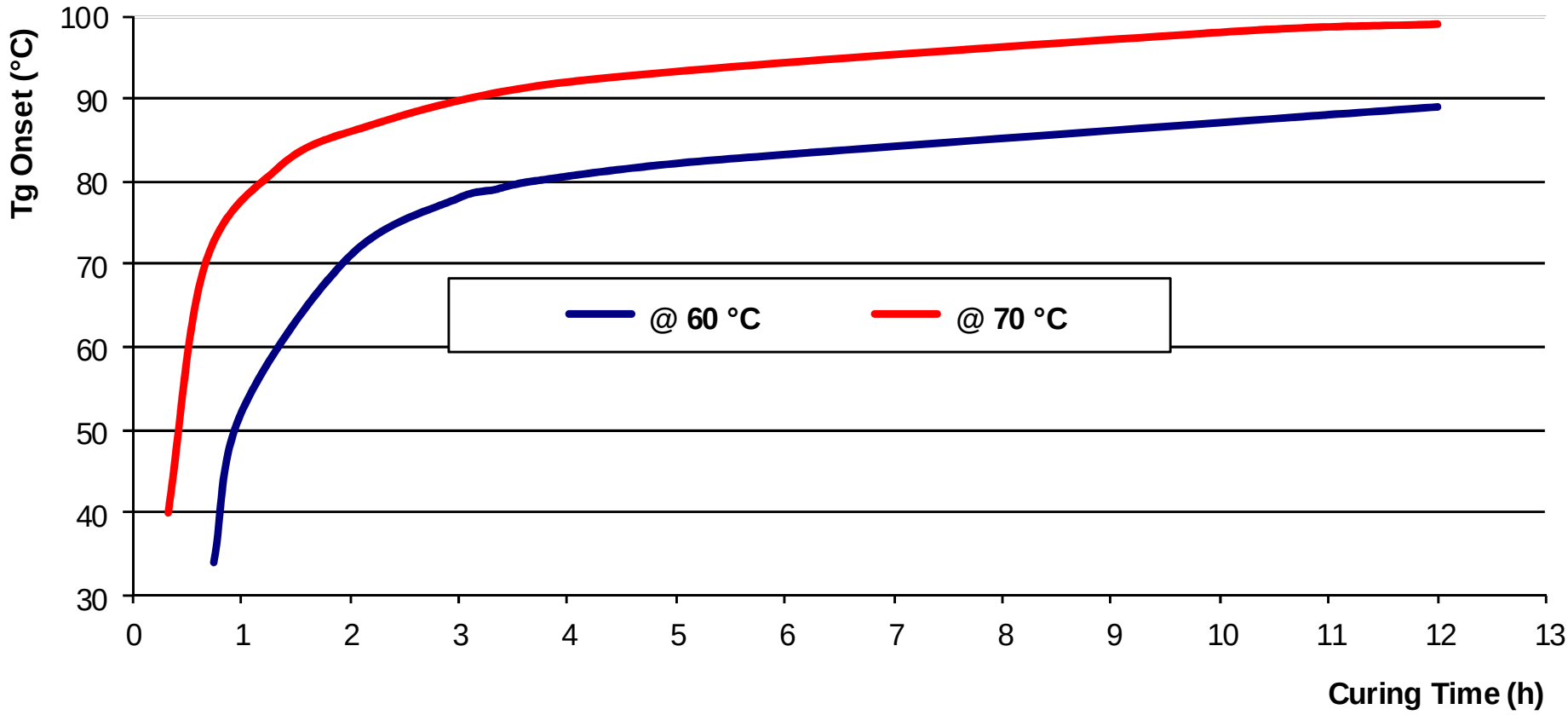
SR 1280 / SD 477x @ 30 °C



SR 1280 / SD 477x @ 40 °C



Kinetic: Curing Time / T_G Onset
SR 1280 / SD 4775 100 / 27 g



Mechanical Properties Of Pure Resin

Systems		**SR 1280 / SD 4775**			**SR 1280 / SD 4773**			
Cure		Ambient + 24 h 40 °C	Ambient + 8 h 60 °C	Ambient + 4 h 80 °C	Ambient + 24 h 40 °C	Ambient + 20 h 50 °C	Ambient + 8 h 60 °C	Ambient + 4 h 80 °C
Tension								
Modulus of elasticity	N/mm²	3400	3230	3050	3450	3200	3300	3100
Maximum resistance	N/mm²	82	78	75	80	77	78	74
Resistance at break		81	77	70	75	73	77	73
Elongation at max. resistance	%	3.9	4.9	5.0	4.0	4.4	4.3	4.8
Elongation at break	%	4.3	5.8	6.0	4.5	5.8	4.7	4.8
Flexion								
Modulus of elasticity	N/mm²	3400	3200	2900	3500	3300	3100	2800
Maximum resistance	N/mm²	127	127	125	116	114	113	106
Elongation at max. resistance	%	5.0	5.6	6.5	4.6	5.0	5.7	6.1
Shear strength	N/mm²	52	52	53	50	50	52	51
Compression								
Compression yield strength	N/mm²	110	107	104	122	118	112	109
Offset compression yield	%	7.2	8.5	10.3	7.7	7.9	8.5	9.8
Charpy impact strength								
Resilience	KJ/m²	25	25	23	26	27	32	18
Glass Transition								
DSC – T_{G1} Onset	°C	69	90	100	68	81	87	96
DSC – T_{G1} Onset max	°C			98				95

Mechanical Properties Of Pure Resin

Systems		**SR 1280 / SD 4772**			
Cure		Ambient + 24 h 40 °C	Ambient + 20 h 50 °C	Ambient + 16 h 60 °C	Ambient + 8 h 80 °C
Tension					
Modulus of elasticity	N/mm²	3200	3200	3200	3100
Maximum resistance	N/mm²	56	75	80	77
Resistance at break		56	74	8	73
Elongation at max. resistance	%	1	2.1	3.6	3.7
Elongation at break	%	1	2.1	3.9	3.8
Flexion					
Modulus of elasticity	N/mm²	3300	3300	3200	3000
Maximum resistance	N/mm²	100	115	112	112
Elongation at max. resistance	%	3.7	5	5.3	5.6
Shear strength	N/mm²	51	52	54	50
Compression					
Compression yield strength	N/mm²	110	113	121	115
Offset compression yield	%	9.0	10.5	10.0	13.2
Charpy impact strength					
Resilience	KJ/m²	18	13	20	13
Glass Transition					
DSC – T_{G1} Onset	°C	67	73	82	90
DSC – T_{G1} Onset max	°C				90

Systems		**SR 1280 / SD 4771**			**SR 1280 / SD 4770**		
Cure		Ambient + 24 h 40 °C	Ambient + 8 h 60 °C	Ambient + 8 h 80 °C	Ambient + 24 h 40 °C	Ambient + 16 h 60 °C	Ambient + 8 h 80 °C
Tension							
Modulus of elasticity	N/mm²	3290	3110	2800	3100	2900	2800
Maximum resistance	N/mm²	73	74	74	69	76	74
Resistance at break		69	71	70	66	74	73
Elongation at max. resistance	%	3.2	4.2	5.4	3.2	4.7	5.3
Elongation at break	%	3.4	5.1	6.0	3.3	5.4	5.6
Flexion							
Modulus of elasticity	N/mm²	3250	3150	2800	3100	2800	2700
Maximum resistance	N/mm²	115	116	117	113	118	117
Elongation at max. resistance	%	4.4	5.3	6.2	4.3	5.7	6.5
Shear strength	N/mm²	48	48	49	49	50	50
Compression							
Compression yield strength	N/mm²	100	100	99	101	101	101
Offset compression yield	%	8.8	9.1	10.2	7.7	8.4	9.0
Charpy impact strength							
Resilience	kJ/m²	17	39	21	21	29	29
Linear Shrinkage	%		1,6				
Glass Transition							
DSC – T_{G1} Onset	°C	71	89	103	66	87	93
DSC – T_{G1} Onset max	°C			101			95
DMTA – T_G Ult.	°C	113	113	113			

Tests carried out on samples of pure cast resin, without prior degassing, between steel plates.
Measures undertaken according to the following norms:

Tension:	*ISO 527 - 2*
Flexion:	*ISO 178*
Charpy impact strength:	*NF T 51-035*
Shear Strength:	*ASTM D 732 - 93*
Compression:	*ISO 604*
Water absorption:	*Internal. Polymerization according to cycle, machining, weighing, time spent in distilled water at 70 °C / 48 hours, weighing 1 hour after emerging,*

Glass transition DSC: *ISO 11357-2: 1999 -5°C to 180 °C under nitrogen gas*
T_{G1} or Onset: 1st point at 20 °C/min *T_{G1} maximum or Onset: second passage*

Glass transition DTMA: *ISO 11357-1 - T_G onset G'* *Temperature ramp 0 °C to 180 °C @ 2°C/min*
ASTM D4065 - T_G peak G''

Physical tests according standard:

Gardner color:	*NF EN ISO 4630*	*Visual method*
Refractive index:	*NF ISO 280*	
Viscosity:	*NF EN ISO 3219*	*Rheometer 50 mm, shear 10 s^{-1}*
Density:	*NF EN ISO 2811-1*	*Pycnometer*
Gel time:	*Cross G' G''*	*Rheometer CP50 - Shear rate 10 s^{-1}*
Green Carbone content:	*ASTM D6866 or XP CEN/TS 16640 Avril 2014*	

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