SR 1280 / SD 477X
Laminating Epoxy Resin System

DNV-GL class program DNVGL-CP-0089 approuved (TAK00001GV)

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

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

Profile:
Implementation from 15 °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, infusion, tooling, casting, laminates…

Epoxy resin SR 1280

Appearance		liquid
Color		colourless
Gardner color		≤ 2
Viscosity (mPa.s)	@ 15 °C	6850 ± 1350
	@ 20 °C	3410 ± 690
	@ 25 °C	1770 ± 370
	@ 30 °C	1100 ± 220
Density	@ 20 °C	1,1530
Refractive index	@ 25 °C	1,556 ± ,002
Storage (months)	@ Ta	24

Hardener(s)

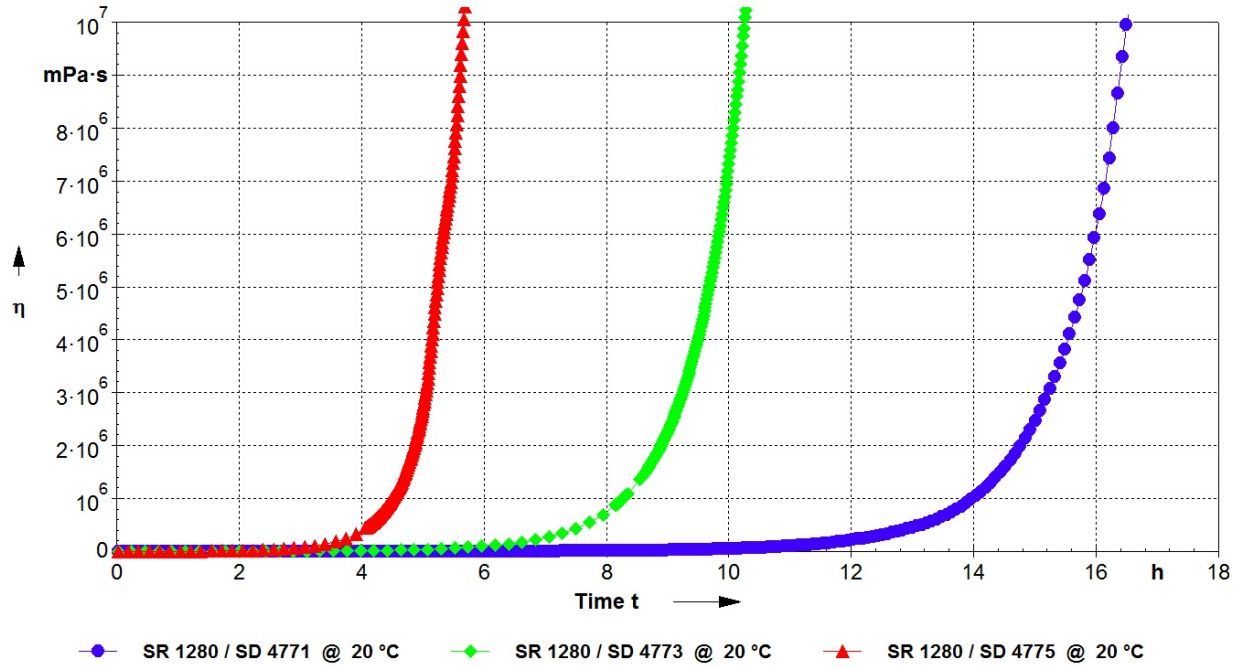
		SD 4775	SD 4773	SD 4771
Appearance		liquid	liquid	liquid
Color		light yellow	yellow	colourless
Gardner color		≤ 5	≤ 4	≤ 1
Reactivity level		Ultra slow	Standard	Ultra slow
Viscosity (mPa.s)	@ 15 °C	275 ± 55	51 ± 10	13 ± 3
	@ 20 °C	190 ± 40	41 ± 8	11 ± 2
	@ 25 °C	133 ± 27	31 ± 6	9 ± 2
	@ 30 °C	93 ± 17	24 ± 5	7 ± 1
Density	@ 20 °C	1,0100	0,9780	0,9440
Refractive index	@ 25 °C	1,4979 ± ,002	1,4779 ± ,002	1,459 ± ,002
Storage (months)	@ Ta	24	24	24

Mixe(s) SR 1280 / SD 477x

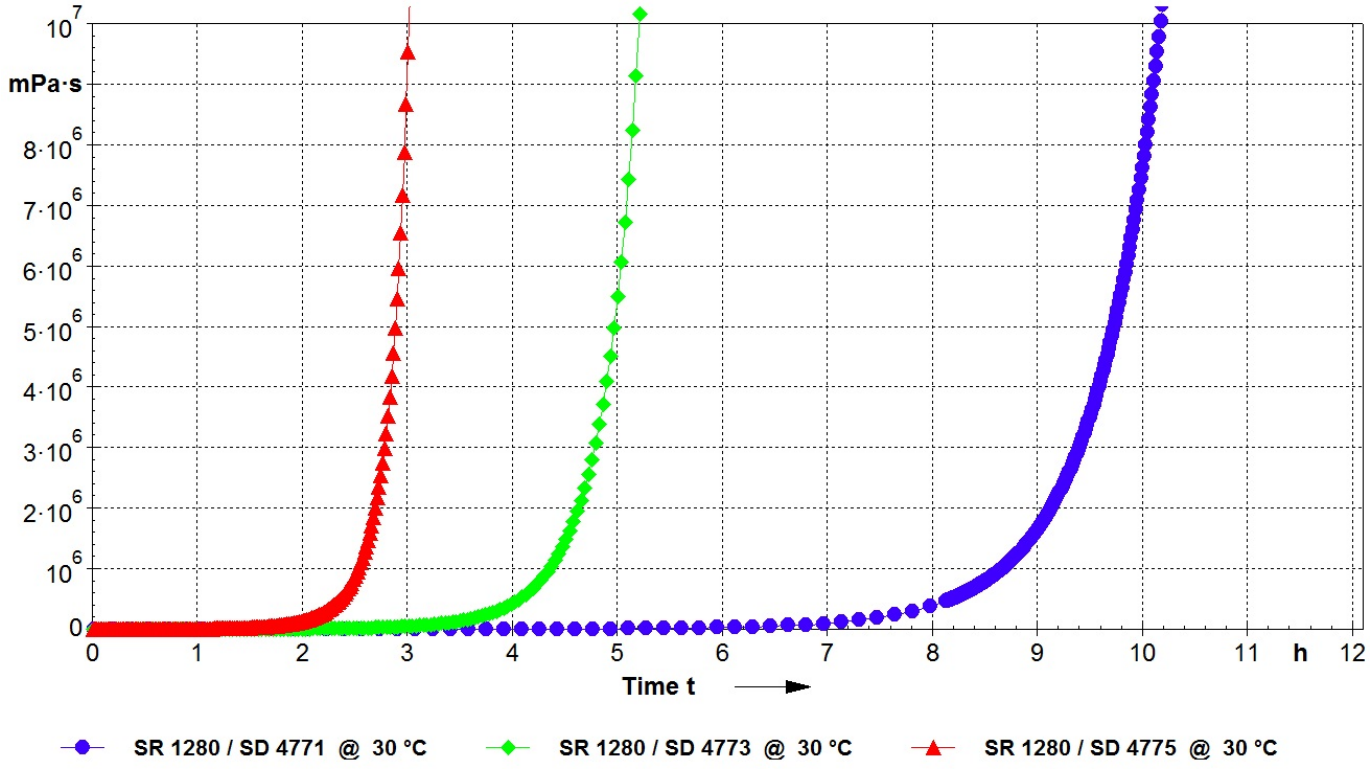
		SD 4775	SD 4773	SD 4771
Appearance		liquid	liquid	liquid
Color		clear	clear	clear
Mixing ratio				
	By weight	100 / 27	100 / 27	100 / 27
	By volume	100 / 31	100 / 32	100 / 33
Initial viscosity	@ 20 °C	1300	1000	800
PP 50 mm / 10 s^{-1} (mPa.s)	@ 30 °C	540	500	260
Density	@ 20 °C			

Reactivity on 1 mm thick layer

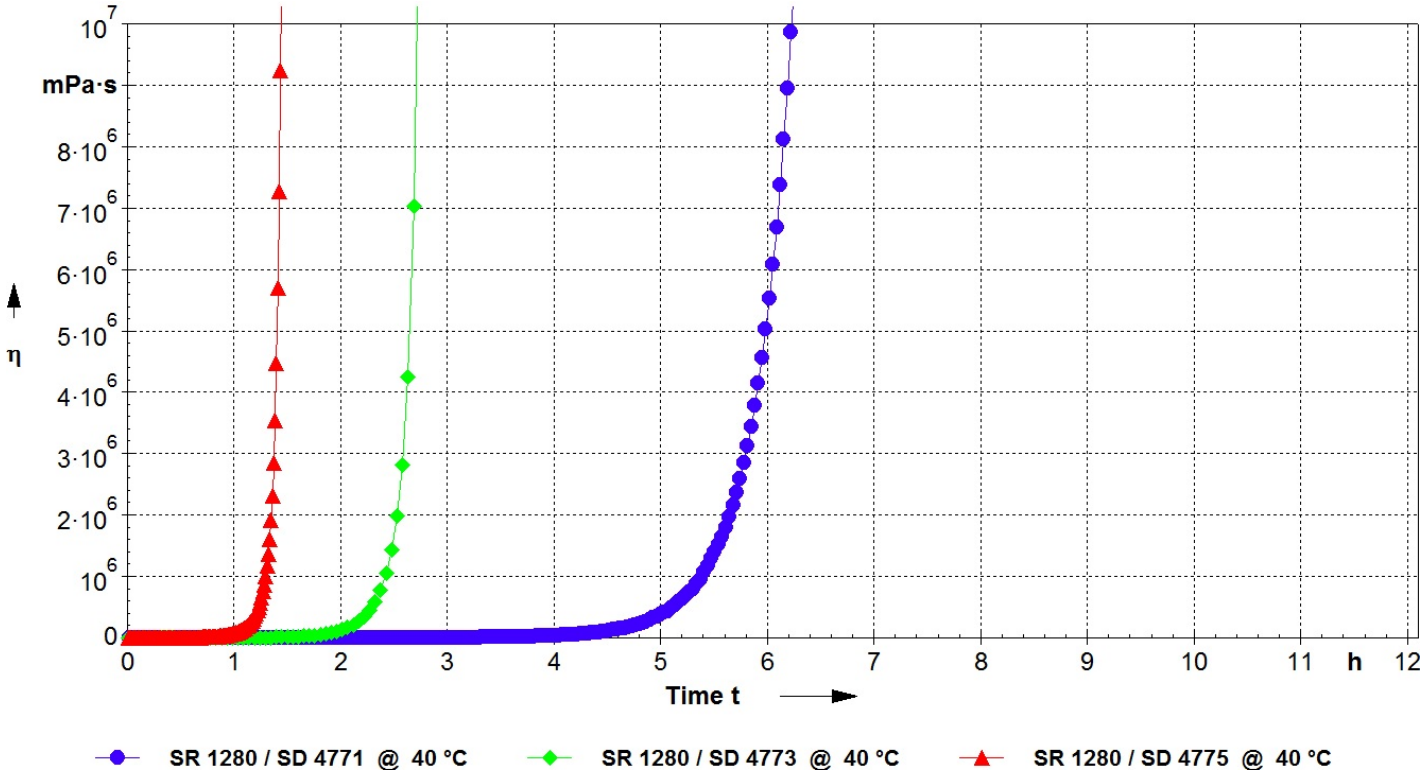
@ 20 °C



@ 30 °C


mPa·s
Time t
h
SR 1280 / SD 4771 @ 30 °C
SR 1280 / SD 4773 @ 30 °C
SR 1280 / SD 4775 @ 30 °C

@ 40 °C


mPa·s
η
Time t
h
SR 1280 / SD 4771 @ 40 °C
SR 1280 / SD 4773 @ 40 °C
SR 1280 / SD 4775 @ 40 °C

Mechanical properties on cast resin :

		SR 1280 / SD 4775			SR 1280 / SD 4773		
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	3 400	3 200	3 050	3 450	3 300	3 100
Maximum strength	N/mm^2	82	78	75	80	78	74
Breaking Strength	N/mm^2	81	77	70	75	77	73
Elongation at max strength	%	3,9	4,9	5	4	4,3	4,8
Elongation at break	%	4,3	5,8	6	4,5	4,7	4,8
Flexion							
Modulus	N/mm^2	3 400	3 200	2 900	3 500	3 100	2 800
Maximum strength	N/mm^2	127	127	125	116	113	106
Breaking Strength	N/mm^2						
Elongation at max strength	%	5	5,6	6,5	4,6	5,7	6,1
Elongation at break	%						
Shear							
Breaking Strength	N/mm^2	52	52	53	50	52	51
Compression							
Modulus	N/mm^2						
Yield strength	N/mm^2	110	107	104	122	112	109
Offset compression yield	%	7,2	8,5	10,3	7,7	8,5	9,8
Charpy impact strength							
Resilience	kJ/m^2	25	25	23	26	32	18
DSC glass transition							
TG1 onset	°C	69	90	100	68	87	96
TG1 max onset	°C			98			95
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 1280 / SD 4771		
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	3 300	3 100	2 800
Maximum strength	N/mm^2	73	74	74
Breaking Strength	N/mm^2	69	71	70
Elongation at max strength	%	3,2	4,2	5,4
Elongation at break	%	3,4	5,1	6
Flexion				
Modulus	N/mm^2	3 250	3 150	280
Maximum strength	N/mm^2	115	116	117
Breaking Strength	N/mm^2			
Elongation at max strength	%	4,4	5,3	6,2
Elongation at break	%			
Shear				
Breaking Strength	N/mm^2	48	48	49
Compression				
Modulus	N/mm^2			
Yield strength	N/mm^2	100	100	99
Offset compression yield	%	8,8	9,1	10,2
Charpy impact strength				
Resilience	kJ/m^2	17	39	21
DSC glass transition				
TG1 onset	°C	71	89	103
TG1 max onset	°C			101
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 1280 / SD 4775			SR 1280 / SD 4773		
Matrix		15 layers of 2/2 300 g/m² twill glass (Mf = 68 %)					
Reinforcement							
Number of layers							
Process							
Reinforcement rate by weight	%	69 %			69 %		
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						
Maximum strength	N/mm^2						
Breaking Strength	N/mm^2						
Elongation at max strength	%						
Elongation at break	%						
Toughness							
G1c interlaminar (J/m²-CBT)							
Shearing in flexion							
Shear strength	N/mm^2	51	50	52	52	52	54
Charpy impact strength							
Resilience	kJ/m^2						
Water absorption	% Weight						

Mechanical properties on laminate :

		SR 1280 / SD 4771		
Matrix				
Reinforcement				
Number of layers				
Process				
Reinforcement rate by weight	%	69 %		
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			
Maximum strength	N/mm^2			
Breaking Strength	N/mm^2			
Elongation at max strength	%			
Elongation at break	%			
Toughness				
G1c interlaminar (J/m^2-CBT)				
Shearing in flexion				
Shear strength	N/mm^2	51	48	50
Charpy impact strength				
Resilience	kJ/m^2			
Water absorption	% Weight			

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:	*1st 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^{-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)*	

LEGAL NOTES:

Information given in writing or verbally, in the context of our technical assistance and our trials, does not engage our responsibility. Information is given in good faith based on SICOMIN's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with SICOMIN's recommendations. We advise users of SICOMIN products to check by some practical trials that they are suitable for the intended processes and applications. The customer's storage, the use, the implementation and the transformation of the supplied products are not under SICOMIN's control and entirely under the sole responsibility of the user.

SICOMIN reserves the right to change the properties of its products. All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data and tolerance may vary due to circumstances beyond our control.

If our responsibility should nevertheless be involved, it would be, for all the damages, limited to the value of the goods supplied by us and processed by the customer. We guaranty the non-reproachable quality of our products, in the general context of sales and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.