SR 1280 / SD 477X
Laminating Epoxy Resin System

Epoxy system for hand laminating, infusion, tooling, casting…
DNV-GL class program DNVGL-CP-0089 approuved (TAK00001GV)

		SD 4775	SD 4773	SD 4771
Reactivity level		Standard	Medium	Slow
Initial viscosity (mPa.s)	@ 20 °C	1 575	820	510
	@ 30 °C	695	480	250
Pot Life (500 g)	@ 20 °C	34 min	01 h 10	06 h 00
	@ 30 °C	15 min	26 min	01 h 40
Mixing ratio				
	By weight	100 / 27	100 / 27	100 / 27
	By volume	100 / 31	100 / 32	100 / 33
Maximum strength	N/mm^2	75	74	74
% Elongation at max strength	%	5	4,8	5,4
TG1 max onset	°C	98	95	101
Gel Time (1 mm)	@ 20 °C	05 h 40	10 h 00	20 h 50
	@ 30 °C	02 h 55	04 h 50	10 h 30
Optimal infusion time	@ 20 °C	-	30 min	02 h 55
	@ 30 °C	15 min	40 min	02 h 45
Latest flow under vacuum	@ 20 °C	02 h 30	04 h 40	11 h 50
	@ 30 °C	01 h 30	02 h 35	06 h 30
Earliest vacuum off time	@ 20 °C	10 h 00	15 h 24	30 h 30
	@ 30 °C	04 h 36	07 h 48	15 h 48
Demold time	@ 20 °C	17 h 00	30 h 00	62 h 30
	@ 30 °C	08 h 45	14 h 30	31 h 30

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…

To consult genuine DNV-GL certification scan this QR-Code :

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
Storage (months)	@ Ta	24

Hardener(s)

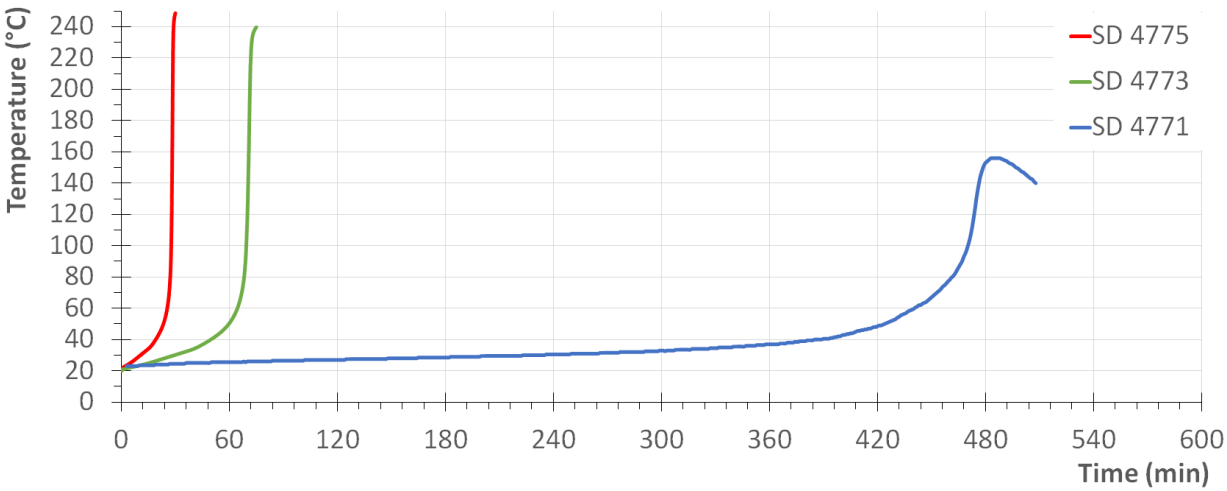
		SD 4775	SD 4773	SD 4771
Appearance		liquid	liquid	liquid
Color		light yellow	yellow	colourless
Gardner color		≤ 5	≤ 4	≤ 1
Reactivity level		Standard	Medium	Slow
Viscosity (mPa.s)	@ 15 °C	200 ± 40	51 ± 10	13 ± 3
	@ 20 °C	135 ± 30	41 ± 8	11 ± 2
	@ 25 °C	95 ± 20	31 ± 6	9 ± 2
	@ 30 °C	70 ± 15	24 ± 5	7 ± 1
Density	@ 20 °C	1,0010	0,9780	0,9440
Refractive index	@ 25 °C	1,4913 ± ,002	1,4779 ± ,002	1,459 ± ,002
Storage (months)	@ Ta	24	24	24

Mixe(s) SR 1280 / SD 477x DNV/LR

		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 (mPa.s)	@ 20 °C	1 575	820	510
PP 50 mm / 10 s^{-1}	@ 30 °C	695	480	250
Density	@ 20 °C			

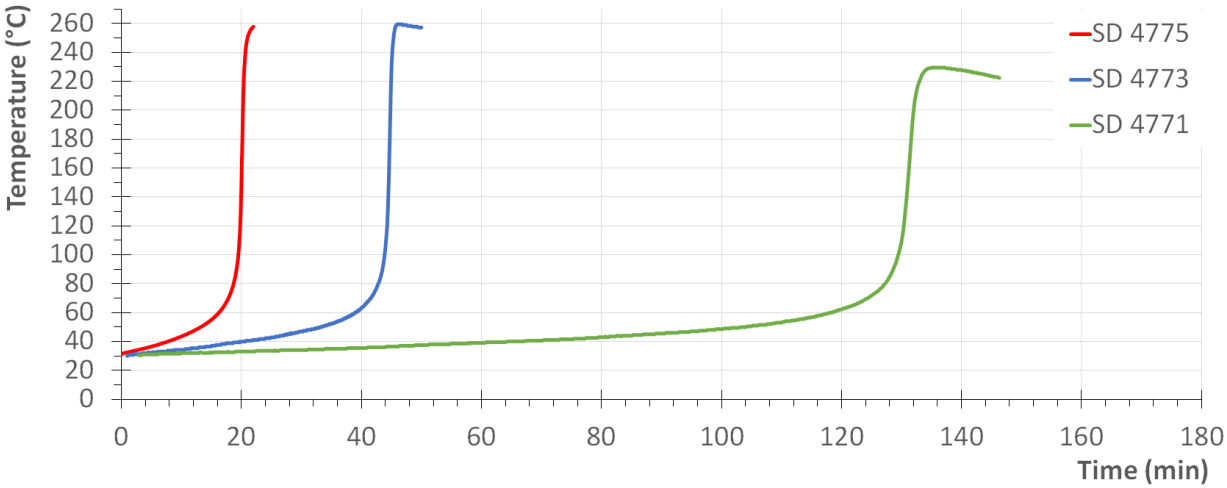
Reactivity @ 20 °C for 500 g SR 1280 / SD 477x DNV/LR

	SD 4775	SD 4773	SD 4771
Exothermic temperature (°C)	255	240	170
Exothermic peak time	50 min	01 h 25	06 h 50
Time to reach 50 °C	34 min	01 h 10	06 h 00



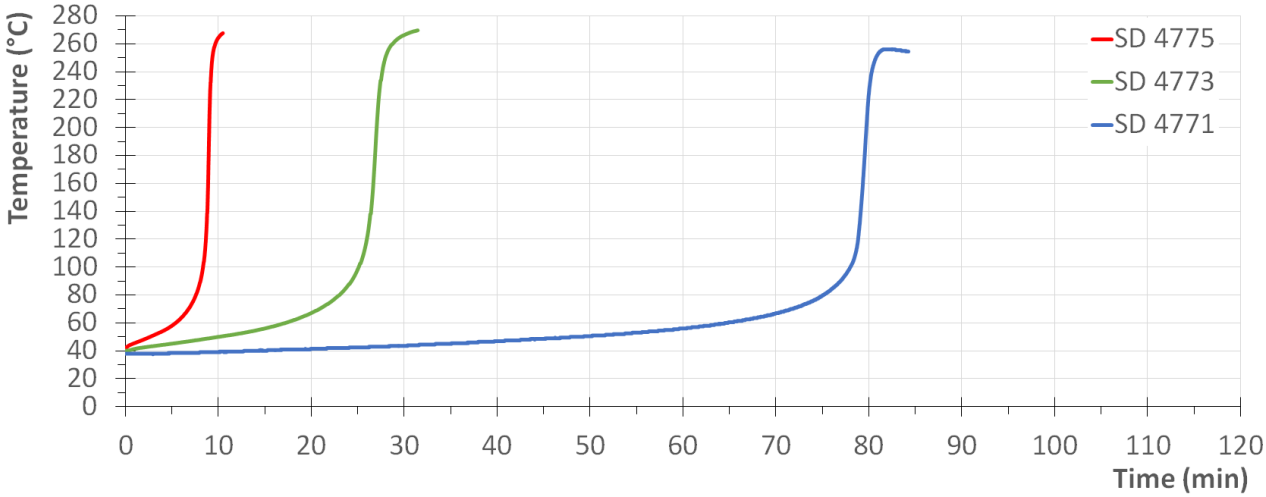
Reactivity @ 30 °C for 500 g SR 1280 / SD 477x DNV/LR

	SD 4775	SD 4773	SD 4771
Exothermic temperature (°C)	270	260	230
Exothermic peak time	32 min	46 min	02 h 15
Time to reach 50 °C	15 min	26 min	01 h 40



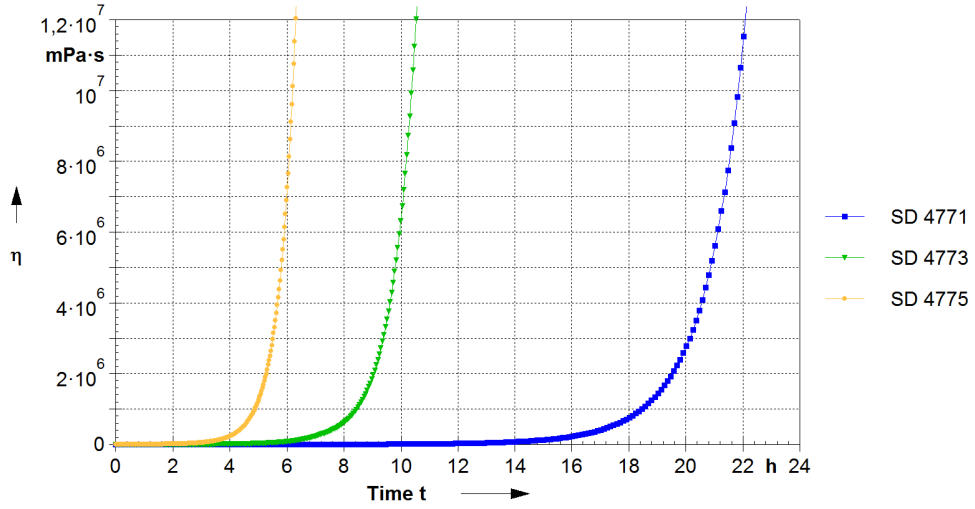
Reactivity @ 40 °C for 500 g SR 1280 / SD 477x DNV/LR

	SD 4775	SD 4773	SD 4771
Exothermic temperature (°C)	300	270	260
Exothermic peak time	29 min	30 min	01 h 20
Time to reach 50 °C	5 min	8 min	35 min

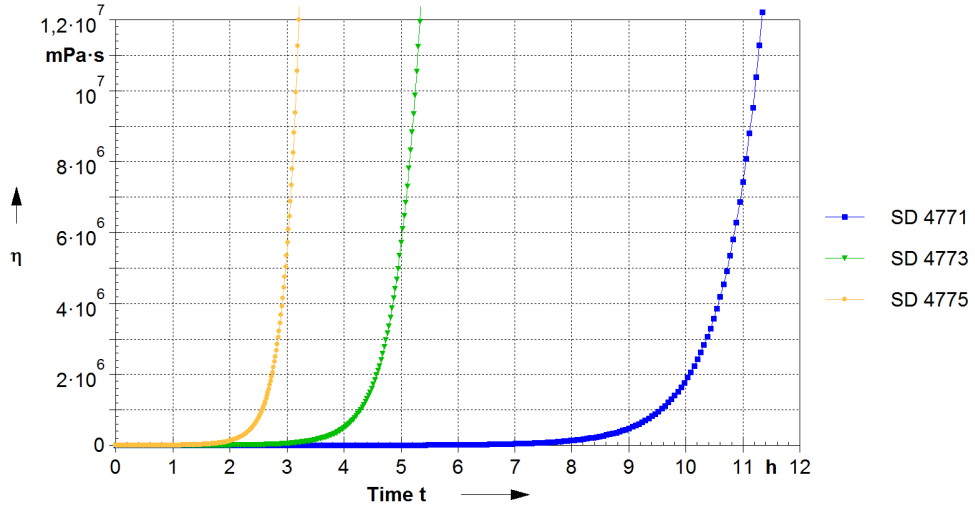


1 mm thick layer reactivity

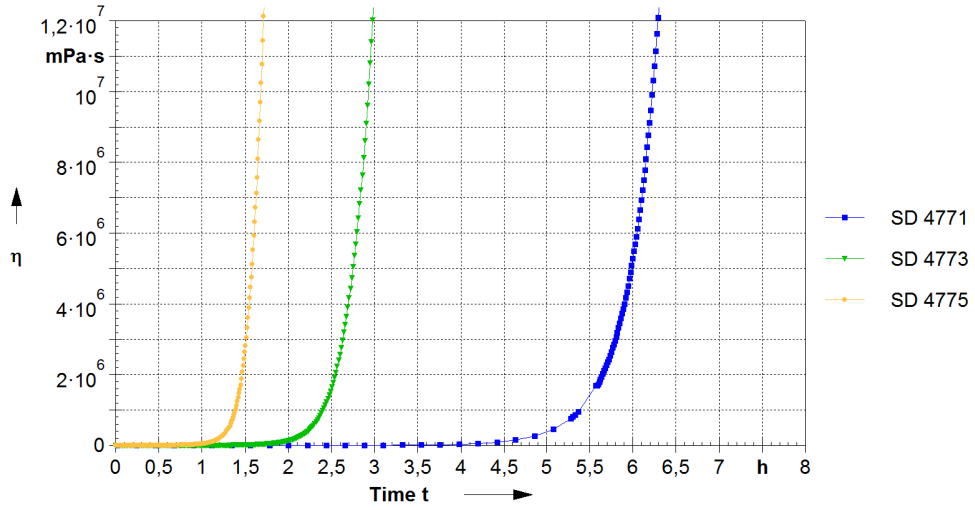
@ 20 °C



@ 30 °C



@ 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	2 900	3 200	2 900	3 500	3 100	2 800
Maximum strength	N/mm^2	121	127	125	116	113	106
Breaking Strength	N/mm^2	110	110	110		73	
Elongation at max strength	%	6,35	5,6	6,5	4,6	5,7	6,1
Elongation at break	%	8,5	8,2	8,5		4,8	
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		Epoxy			Epoxy		
Reinforcement		Glass Twill 2/2 300 g/m²			Glass Twill 2/2 300 g/m²		
Number of layers		15			15		
Process		Hand lay-up under vacuum			Hand lay-up under vacuum		
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		Epoxy		
Reinforcement		Glass Twill 2/2 300 g/m²		
Number of layers		15		
Process		Hand lay-up under vacuum		
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/m²-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,*
Bonding Strength Double lap shear:	*ASTM D3528-96* *ADH = adhesive failure* *COH = cohesive failure* *TLC = thin-layer cohesive failure* *FT = fiber-tear failure.* *LFT = light-fiber-tear failure*
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)*
NC:	*No information Communicated*
NB:	*No Breaking (maximum flexion deformation : 15 %)*

Table 1st page:

Pot Life:	*Time to reach 50 °C or time limit for use*
Gel time:	*Intersection of tangents on the viscosity curve of 1 mm thick layer*
Release time:	*Time required to obtain sufficient mechanical strength to release*
Minimum Vacuum Time:	*Time in which vacuum can be applied (25000 mPa.s)*
Maximum Vacuum time:	*Limit time below which a vacuum can be applied (G'G " crossing)*
Optimum Infusion time:	*Time to reach 400 mPa.s*
Max Infusion Time:	*Time to reach 25000 mPa.s*
Vacuum cut-off time:	*Time to reach G'G " crossover + 20%*

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Mix

SR 1280	Resin part + Hardener part (kg)	Resin part (kg)	Hardener part (kg)
SD 4775	4,70 24,13 254	3,7 19 200	1 5,13 18
SD 4773	4,70 24,13 254	3,7 19 200	1 5,13 18
SD 4771	4,70 24,13 254	3,7 19 200	1 5,13 18