Huntsman Advanced Materials
We are a leading global supplier of synthetic and formulated polymer systems for customers requiring high-performance materials which outperform the properties, functionality and durability of traditional materials. Over 2300 associates at 13 locations worldwide work to fulfill this promise day by day.

More than 9000 companies around the world use Huntsman Advanced Materials technologies in key markets such as adhesives and inks, aerospace, automotive, coatings, construction, electronics, medical, marine, power transmission and distribution, sports equipment and wind power generation.

Wind market
As a global partner and innovator working in collaboration with all major wind energy equipment manufacturers, Huntsman Advanced Materials has all the right technologies and high-performance products the industry requires. Our products are used in applications ranging from plugs and patterns, to complete composite turbine production as well as assembly and repair. Our range includes standard products as well as custom-made solutions formulated to answer specific project requirements.

Global presence – 13 manufacturing sites

Concept and Design by Ramstein Ehinger Associates AG

HUNTSMAN
Enriching lives through innovation

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Advanced Materials

Renewable energy efficiency

Tooling, composites, adhesives and repair solutions
Wind selector guide

Tooling systems

Master model / plug

	Color	Minimum cure schedule	Density	Shore hardness D	Coefficient of thermal expansion	Deflection temperature	Compressive strength	Flexural strength
Norm				ISO 868	ISO 11359	ISO 75	ISO 604	ISO 178
Unit			g / cm³		10^{-6} K^{-1}	°C	MPa	MPa
Seamless modeling pastes								
RenPaste® SV 4503-1 / Ren® HV 4503-1	brown	machinable after 1 day (RT* cure)	0.75 – 0.8	55 – 60	101 (3 days at RT*)	42 (3 days at RT*) 54 (8 h at 80 °C)	11.5 (3 days at RT*)	11 (3 days at RT*)
RenPaste® 4666 Resin / Ren® 4666 Hardener	light grey	machinable after 1 day (RT* cure)	0.95 – 1.0	60 – 65	75 – 80 (7 days at RT*)	52 (7 days at RT*) 72 (RT* cure + 8 h at 60 °C) 82 (RT* cure + 8 h at 80 °C)	20 (7 days at RT*)	19 (7 days at RT*)

* Room temperature 23 °C
Note: Machine applied

Mould production with infusion and wet lay-up processes (heat resistance up to 120 °C)

	Color	Pot life	Gel time thin layer	Density	Shore hardness D	Deflection temperature
Conditions		25 °C, 250 ml	23 °C			
Norm					ISO 868	ISO 75
Unit		min	min	g / cm³		°C
Surface coat						
XD 4615 / Ren® HY 5159	black	25 – 30	60 – 70	1.3	80 – 90	120
XD 4623 / Ren® HY 5159	green	30	60 – 70	1.16	80 – 85	120
Coupling layer						
RenGel® P99 / Ren® HY 5159	grey	30	120 – 130	1.5	90	120

	Color	Viscosity	Pot life	Density	Cure cycle	T_g	Flexural strength	Process
Conditions		25 °C	100 ml					
Norm							ISO 178	
Unit		mPa·s	min	g / cm³		°C	MPa	
Back construction								
RenLam® LY 113 / Ren® HY 98	clear to pale yellow	300	90 – 100 (500 ml)	1.1	8 h at 60 °C + 4 h at 120 °C	125	100 – 110	wet lay-up / infusion
Araldite® LY 1564 / Aradur® 22962	clear	400 – 600	110 – 150	1.1	4 h at 80 °C 1 h at 80 °C + 2 h at 150 °C	100 – 110 128 – 138	124 – 132	infusion
Araldite® LY 1564 / Aradur® 2954	clear	500 – 700	480 – 600	1.1	4 h at 80 °C 1 h at 80 °C + 8 h at 140 °C	99 – 105 143 – 148	120 – 124	infusion

Mould production with infusion and wet lay-up processes (heat resistance up to 180 °C)

	Color	Pot life	Density	Shore hardness D	Demoulding time	Cure cycle	T_g
Conditions		25 °C					
Norm				ISO 868			
Unit		h	g / cm³		h		°C
Surface coat							
RenGel® SW 5200 / Ren® HY 5212	black	10 (500 ml)	1.5	90	14 at 40 – 50 °C	12 h at 40 °C + 2 h at 80 °C + 2 h at 100 °C + 2 h at 120 °C + 2 h at 140 °C + 2 h at 160 °C + 2 h at 180 °C + 12 h at 200 °C	200
RenGel® SW 5200 / Ren® HY 5213	black	4.5 (250 ml)	1.6	90	14 at 40 – 50 °C	12 h at 40 °C + 2 h at 80 °C + 2 h at 100 °C + 2 h at 120 °C + 2 h at 140 °C + 2 h at 160 °C + 12 h at 180 °C	170 – 180

	Color	Viscosity	Pot life	Density	Demoulding time	Cure cycle	T_g	Flexural strength
Conditions		25 °C	25 °C, 500 ml					
Norm								ISO 178
Unit		mPa·s	h	g / cm³	h		°C	MPa
Back construction								
RenLam® LY 5210 / Ren® HY 5212	amber	2 000	12	1.1	14 at 40 – 50 °C	12 h at 40 °C + 2 h at 80 °C + 2 h at 100 °C + 2 h at 120 °C + 2 h at 140 °C + 2 h at 160 °C + 2 h at 180 °C + 12 h at 200 °C	230 – 238	88
RenLam® LY 5210 / Ren® HY 5213	amber	1 800	2 – 2.5	1.1	14 at 40 – 50 °C	12 h at 40 °C + 2 h at 80 °C + 2 h at 100 °C + 2 h at 120 °C + 2 h at 140 °C + 2 h at 160 °C + 12 h at 180 °C	170 – 180	126
Araldite® LY 8615 / Aradur® 8615	amber	550	18 (100 ml)	1.1	24 at 40 °C	24 h at 40 °C + 2 h at 60 °C + 2 h at 80 °C + 2 h at 100 °C + 2 h at 120 °C + 2 h at 140 °C + 2 h at 160 °C + 3 h at 180 °C	ca. 220	ca. 100

Composite resin systems

With wet lay-up process

	Pot life	Mix viscosity	Glass transition temperature*	Flexural strength*	Ultimate flexural elongation*	Key features
Conditions	RT / 100 ml	25 °C	DSC, 10 K/min	25 °C	25 °C	
Norm			IEC 1006	ISO 178	ISO 178	
Unit	min	mPa·s	°C	MPa	%	
Araldite® LY 3505 / XB 3403	600 – 720	300 – 400	78 – 83	110 – 130	10.5 – 13.0	reactivity can be adjusted on demand
Araldite® LY 3505 / Aradur® 3405	26 – 36	1000 – 1200	87 – 92	135 – 155	7.0 – 9.0	
Araldite® LY 1556 / Aradur® 3405	40 – 50	1500 – 1800	92 – 98	130 – 145	9.0 – 11.0	higher viscosity for vertical application

* Cure schedule 4 h at 60 °C + 6 h at 80 °C
Note: Further systems are available upon request

With infusion process

	Pot life	Mix viscosity	Glass transition temperature*	Flexural strength*	Ultimate flexural elongation*	Key features
Conditions	RT / 100 ml	25 °C	DSC, 10 K/min	25 °C	25 °C	
Norm			IEC 1006	ISO 178	ISO 178	
Unit	min	mPa·s	°C	MPa	%	
Araldite® LY 1564 / Aradur® 3486	560 – 620	200 – 300	80 – 84	118 – 130	10.5 – 12.5	high toughness
Araldite® LY 1564 / Aradur® 3416	290 – 340	200 – 320	80 – 85	118 – 130	10.0 – 12.0	
Araldite® LY 1564 / Aradur® 3487	130 – 160	220 – 320	81 – 86	118 – 130	10.0 – 12.0	
Araldite® LY 1568 / Aradur® 3489	850 – 950	200 – 300	77 – 80	120 – 130	9.0 – 10.0	low exotherm
Araldite® LY 1568 / Aradur® 3491	750 – 850	200 – 300	74 – 80	120 – 130	9.0 – 10.0	
Araldite® LY 1568 / Aradur® 3492	300 – 350	250 – 350	80 – 85	125 – 135	7.0 – 7.5	

* Cure schedule 8 h at 80 °C

With filament winding process

	Pot life	Mix viscosity	Glass transition temperature*	Flexural strength*	Ultimate flexural elongation*	Key features
Conditions	RT / 100 ml	25 °C	DSC, 10 K/min	25 °C	25 °C	
Norm			IEC 1006	ISO 178	ISO 178	
Unit	min	mPa·s	°C	MPa	%	
Araldite® LY 1135-1 A / Aradur® 917 / Accelerator DY 070	95 – 115	600 – 900	143 – 150	130 – 150	7.0 – 8.5	high T_g for winded parts

* Cure schedule 4 h at 80 °C + 8 h at 140 °C

With prepreg process

	B-staging	Shelf life	Glass transition temperature*	Flexural strength*	Ultimate flexural elongation*	Description
Conditions	RT / 100 ml	23 °C	DSC, 10 K/min	25 °C	25 °C	
Norm			IEC 1006	ISO 178	ISO 178	
Unit	time / °C	mPa·s	°C	MPa	%	
Araldite® LY 1556 / Aradur® 1571 / Accelerator 1573 / XB 3403	24 h / 23	> 6 weeks	105 – 115	125 – 140	7.0 – 10.0	easy B-staging
XU 3508 / Aradur® 1571 / Accelerator 1573 / XB 3403	24 h / 23	> 1 month	116 – 125	110 – 120	5.5 – 8.0	toughened prepreg with easy B-staging

* Cure schedule 2 – 4 h at 120 °C

Note: All systems are Germanische Lloyd (GL) approved

Blade assembly

	Description	Mix ratio (pbv)	Pot life	Recommended cure schedule	LSS*	Typical cured T_g**	Key features
Conditions			23 °C, 500 g				
Unit			min		MPa	°C	
Araldite® AW 4856 / Hardener HW 4856	EP system GL approved	100 : 50	240 – 280	5 h at 70 °C	22 – 25	73 – 79	low exotherm, low shrinkage, high fracture toughness resistance
Araldite® AW 4856 / Hardener HW 4856 fast	EP system	100 : 50	40 – 60	5 h at 70 °C	22 – 25	73 – 79	fast handling
Araldite® AW 4871 / Hardener HW 4871	EP system	100 : 46	200 – 260	5 h at 70 °C	22 – 25	69 – 75	high fracture toughness resistance, easy pumping
Araldite® AW 4870 / Hardener HW 4870	EP system	100 : 50	50 – 55	5 h at 70 °C	27 – 29	72 – 78	easy pumping, fast handling
Arathane® 3427 PO / Arathane® 3304 IS	PU system	100 : 45	100 – 120 (100 g)	2 h at 60 °C	10 – 12	40 – 50	for spare assembly

* On epoxy composite – LLS = Lap Shear Strength
** Cured in standard blade cycle after initial fixing of shear webs at 25 °C, IEC 1006, DSC, 10 K/min

Assembly of load bearing

	Description	Mix ratio (pbv)	Pot life	Recommended cure schedule	LSS*	Typical cured T_g**	Gap filling	Key features
Conditions			23 °C, 500 g					
Unit			min		MPa	°C	mm	
Araldite® 2014-1	EP system	2 : 1	50 – 65	ambient cure or 4 h at 60 °C	15 – 18	79 – 85	5	bonding tip, control shaft components, high temperature and chemical resistance, ideal for metals
Araldite® 2015	EP system GL approved	1 : 1	45 – 60	ambient cure or 4 h at 60 °C	15 – 18	67 – 80	10	bonding of lightning conductor, monitor sensors, ideal for dissimilar substrates
Araldite® AV 138M-1 / Hardener HV 998	EP system	100 : 40	40 – 55	ambient cure or 4 h at 60 °C	15 – 18	79 – 85	5	tip control shaft and vibration damper bonding
Araldite® AV 4076-1 / Hardener HV 5309-1	EP system GL approved	1 : 1	50 – 65	ambient cure or 4 h at 60 °C	20 – 24	67 – 80	5 – 10	steel insert bonding
Araldite® AW 5047-1 / Hardener HW 5067	EP system	100 : 45	65 – 80	1 h at 80 °C	20 – 22	70 – 80	< 0.5	liquid system for vertical bolt and aluminium end ring bonding, temperature resistant
Araldite® AW 4510 / Hardener HW 4511	EP system	2 : 1	85 – 100	2 h at 110 °C	14 – 16	110 – 125	10	high temperature application

* On epoxy composite – LLS = Lap Shear Strength
** Cured in standard blade cycle after initial fixing of shear webs at 25 °C, IEC 1006, DSC, 10 K/min

Fast assembly and repair

	Description	Repair			Mix ratio	Pot life		Recommended cure schedule	LSS*	Typical cured T_g**	Gap filling	Key features
		plugs	composite modules	blades								
Conditions						23 °C, 100 g						
Unit					pbv	min			MPa	°C	mm	
Araldite® 2021	MMA system	O	O	O	1 : 1	3 – 7		1 h at ambient cure	20 – 22	65 – 80	3 – 5	very fast setting, tough adhesive for rapid fixing and filling of small voids
Araldite® 2022	MMA system	O	O	O	1 : 1	8 – 15		2 h at ambient cure	20 – 22	65 – 80	3 – 5	medium open time and fast curing tough adhesive for field / workshop operations
Araldite® 2047	MMA system	O	O	O	10 : 1	8 – 15		2 h at ambient cure	10 – 14	70 – 80	3 – 5	rapid attachment of parts, multipurpose adhesive, ideal for dissimilar substrates
Araldite® 2048	MMA system	O	O		10 : 1	6 – 12		1 h at ambient cure	20 – 22	65 – 75	5 – 8	rapid attachment of parts, high flexibility and gap filling adhesive
Arathane® 4497 PO / Arathane® 3304 IS	PU system	O	O	O	100 : 52	8 – 15		2 h at 60 °C	15 – 18	40 – 50	3 – 5	fast setting, filling holes
Araldite® 2029	PU system	O	O	O	1 : 1	40		12 h at ambient cure 2 h at 60 °C	20 – 24	25 – 35	3 – 5	long open time adhesive, filling holes
Araldite® LY 1564 / XB 3458	EP system			O	100 : 20	13 – 17		7 days at 23 °C 15 min at 80 °C	n / a	58 – 66 88 – 96	n / a	wet lay-up repair process, good toughness resistance
Araldite® LY 3297 / Aradur® 3298	EP system			O	100 : 40	120 – 135		7 days at 23 °C 1 day at 23 °C + 4 h at 90 °C	n / a	54 – 59 92 – 98	n / a	wet lay-up repair process, longer handling time
Araldite® LY 3297 / Aradur® 3299	EP system			O	100 : 40	40 – 50		7 days at 23 °C 1 day at 23 °C + 4 h at 90 °C	n / a	54 – 59 99 – 105	n / a	

* On aluminium – LLS = Lap Shear Strength
** Cured in standard blade cycle after initial fixing of shear webs at 25 °C, IEC 1006, DSC, 10 K / min