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## Advanced Materials

# Composite Resin Systems

## Selector Guide

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## Composite Resin Systems

Product designation	Wet Lay-up	RTM	Infusion	Filament Winding	Prepreg	Pultrusion	Pot Life @ 25°C 100g/min	Gel Time @ 80°C/min	Mix Ratio R/H/A <sup>1</sup>	Mixed Viscosity @ 25°C [cps]	Suggested Cure Schedule	Tg °C <sup>2</sup>	Flexural Strength ISO 178/Kpsi	Ultimate Flexural Elongation %	Fracture Properties K <sub>1c</sub> (psi/inch) G <sub>1c</sub> (inch-lb./inch <sup>2</sup> )	Comments/Applications
Araldite® CY 179 CH / Aradur® 917 / Accelerator DY 070		●●	●	●		●	> 2880	60 - 80	100/115/0.5 - 2	100 - 200	1 hr @ 100°C + 6 hrs @ 180°C	200 - 205	10.9 - 13.8	2.0 - 3.5	550 - 593 0.41 - 0.48	Hot curing. Low viscosity. Good temperature resistance.
Araldite® LY 1556 / Aradur® 3405	●●	●		●●			40 - 50	6 - 9	100/33	1500 - 1800	4 hrs @ 60°C + 6 hrs @ 80°C	92 - 98	15.9 - 18.1	9.0 - 11.0	714 - 879 0.74 - 0.97	Highly suitable for filament winding. GL approved. Extended pot life.
Araldite® LY 1556 / Hardener XB 3461	●●	●		●●			120 - 180	18 - 22	100/33	1800 - 2000	4 hrs @ 60°C + 6 hrs @ 80°C	80 - 85	18.8 - 19.7	7.5 - 10.0	824 - 989 1.00 - 1.17	Suitable for wet layup and filament winding. GL approved.
Araldite® LY 1564 SP / Aradur® 3416	●	●	●●	●			290 - 340	20 - 27	100/34	200 - 320	15 hrs @ 50°C	up to 87	17.4 - 19.6	5.2 - 5.6	1044 - 1154 1.48 - 1.77	Low viscosity and high flexibility. GL approved.
Araldite® LY 1564 SP / Aradur® 3485	●	●	●●	●			970 - 1050	40 - 55	100/37	200 - 320	15 hrs @ 50°C	up to 90	17.4 - 19.6	8.5 - 10	989 - 1077 1.14 - 1.48	Toughened epoxy. Formulated amine system. Low viscosity and high flexibility. Good for large parts.
Araldite® LY 1564 SP / Aradur® 3486	●	●	●●				560 - 620	33 - 43	100/34	200 - 300	15 hrs @ 50°C	up to 84	17.4 - 19.6	5.2 - 5.6	1044 - 1154 1.48 - 1.77	Low viscosity and high flexibility. Long pot life for production of very large parts.
Araldite® LY 1568 / Aradur® 3489	●	●	●●	●			850 - 950	43 - 46	100/28	200 - 300	4 hrs @ 80°C	76 - 79	17.4 - 18.8	9.0 - 10.0	636 - 727 0.84 - 1.06	Hardener can be blended with Aradur® 3491 or Aradur® 3492 to adjust reactivity.
Araldite® LY 1568 / Aradur® 3491	●	●	●●	●			750 - 850	39 - 41	100/28	200 - 300	4 hrs @ 80°C	74 - 77	17.4 - 18.8	9.0 - 10.0	590 - 690 0.71 - 0.94	Low viscosity. High elongation.
Araldite® LY 1568 / Aradur® 3492	●	●	●●	●			300 - 350	23 - 25	100/28	200 - 350	8 hrs @ 80°C	80 - 85	18.1 - 19.6	7.0 - 8.0	n/a n/a	Low-cure temperature. Excellent for infusion.
Araldite® LY 3297 / Aradur® 3298	●●	●●	●				120 - 135	18 - 26	100/40	320 - 380	8 hrs @ 80°C	92 - 98	18.1 - 18.8	7.0 - 8.0	934 - 1044 1.23 - 1.40	Laminating system with low viscosity and high flexibility.
Araldite® LY 3297 / Aradur® 3299	●	●●	●				40 - 50	10 - 16	100/40	350 - 400	8 hrs @ 80°C	94 - 100	17.8 - 18.6	9.0 - 12.0	879 - 989 1.11 - 1.28	High-reactivity laminating system with low viscosity and high flexibility.
Araldite® LY 3505 / Aradur® 3405	●●	●		●			26 - 36	5 - 11	100/35	1000 - 1200	4 hrs @ 60°C + 6 hrs @ 80°C	87 - 92	19.6 - 22.5	7.0 - 9.0	879 - 989 0.86 - 1.08	Laminating system without reactive diluent.
Araldite® LY 3505 / Hardener XB 3403	●●	●		●			600 - 720	36 - 48	100/35	300 - 400	4 hrs @ 60°C + 6 hrs @ 80°C	78 - 83	15.9 - 18.8	10.5 - 13.0	1044 - 1154 1.43 - 1.60	Long pot life enables the construction of very large parts.
Araldite® LY 3505 / Hardener XB 3404-1	●●	●		●			80 - 100	11 - 18	100/35	550 - 800	4 hrs @ 60°C + 6 hrs @ 80°C	76 - 81	18.1 - 21.0	6.5 - 9.5	879 - 1044 0.91 - 1.14	Pot life can be adjusted using XB 3405 or XB 3403 hardeners.
Araldite® LY 3598 / Aradur® 3498	●	●●					40 - 70	7 - 10	100/21	400 - 900	30 mins @ 100°C	87 - 93	14.5 - 15.9	7.0 - 8.5	1868 - 2088 5.1 - 6.3	Nano toughened for high-performance sports and industrial applications.
Araldite® LY 5052 / Aradur® 5052	●●	●	●				110 - 160	14 - 17	100/38	500 - 700	8 hrs @ 80°C	114 - 122	16.8 - 17.7	8.5 - 13.4	846 - 912 1.09 - 1.20	Good for aerospace and industrial composites, tooling, and aircraft repair.
Araldite® LY 556 / Aradur® 917 / Accelerator DY 070			●	●●		●●	5700 - 6300	140 - 160	100/90/0.5 - 2	600 - 900	4 hrs @ 80°C + 8 hrs @ 140°C	148 - 153	18.1 - 19.6	6.0 - 8.5	615 - 659 0.50 - 0.55	Anhydride-cured. Acid resistant.
Araldite® LY 556 / Aradur® HY 906 / Accelerator DY 070			●	●●		●●	> 600	100	100/95/0.5 - 2	ca. 1100	30 mins @ 110°C + 30 mins @ 170°C + 30 mins @ 200°C	165 - 175	20.3 - 21.7	5.5 - 6.5	530 0.53	Anhydride-cured. Good for high-performance composite parts.
Araldite® LY 556 / Hardener XB 3473		●●		●		●	1920 - 2220	> 600	100/23	5200 - 6000	2 hrs @ 120°C + 4 hrs @ 180°C	185 - 194	15.9 - 17.4	5.5 - 6.5	769 - 934 1.08 - 1.25	Suitable for high-performance composite parts.
Araldite® LY 556 / Aradur® 5021 / Hardener XB 3403					●●		410 - 460	210 - 240	100/25/12	3900 - 4400	10 hrs @ 90°C	105 - 111	21.2 - 22.6	6.0 - 7.0	769 - 934 0.71 - 1.00	Prepreg system with a long shelf life and curable from 80°C on.
Araldite® LY 556 / Aradur® 5021 / Hardener XB 3471					●●		380 - 430	200 - 230	100/25/14	3800 - 4300	10 hrs @ 90°C	105 - 111	21.8 - 23.2	6.0 - 8.0	769 - 879 0.74 - 0.91	Prepreg system with a long shelf life and curable from 80°C on.
Araldite® LY 556 / Aradur® 22962	●	●		●●			120 - 180	20 - 30	100/23	1800 - 2000	15 mins @ 120°C + 2 hrs @ 150°C	134	18.9 - 19.7	3.0 - 4.0	747 - 857 0.80 - 1.00	Excellent flexibility and high reactivity.
Araldite® LY 564 / Aradur® 2954	●	●●	●	●		●	480 - 600	35 - 45	100/35	500 - 700	1 hr @ 80°C + 8 hrs @ 140°C	143 - 148	17.4 - 18.0	6.5 - 7.5	758 - 835 0.85 - 1.03	Low viscosity. Long pot life at elevated temperatures. Excellent hot/wet properties.
Araldite® LY 564 / Aradur® 22962	●	●●	●●	●		●	110 - 150	20 - 30	100/25	400 - 600	15 mins @ 120°C + 2 hrs @ 150°C	130 - 140	18.0 - 19.11	9.0 - 11.0	879 - 1033 1.20 - 1.48	Low viscosity. Long pot life at elevated temperatures. Excellent hot/wet properties.

- recommended
- highly recommended

<sup>1</sup> Mix ratio stated is in order of Resin/Hardener/Accelerator

<sup>2</sup> DSC, 10K/min, IEC 1006

## Composite Resin Systems (continued)

Product designation	Wet Lay-up	RTM	Infusion	Filament Winding	Prepreg	Pultrusion	Pot Life @ 25°C 100g/min	Gel Time @ 80°C/min	Mix Ratio R/H/A <sup>1</sup>	Mixed Viscosity @ 25°C [cps]	Suggested Cure Schedule	Tg °C <sup>2</sup>	Flexural Strength ISO 178/Kpsi	Ultimate Flexural Elongation	Fracture Properties K <sub>1c</sub> (psi/inch) G <sub>1c</sub> (inch-lb./inch <sup>2</sup> )	Comments/Applications
Araldite® LY 564 / Aradur® 917 / Accelerator 960-1		●	●	●●		●●	4800 - 5400	30 - 40	100/98/3	450 - 700	4 hrs @ 80°C + 4 hrs @ 120°C	122 - 130	20.3 - 21.7	6.0 - 7.0	648 - 769 0.57 - 0.71	Hot curing. Good for industrial composites.
Araldite® LY 564 / Hardener XB 3403		●●	●●	●●		●	900 - 1000	40 - 50	100/36	50 - 80 @ 40°C	10 hrs @ 60°C	70	15.2 - 16.7	10.0 - 12.0	1044 - 1154 1.48 - 1.71	Low viscosity and high flexibility.
Araldite® LY 564 / Hardener XB 3458		●●					13 - 17	2 - 4	100/20	220 - 320 @ 40°C	10 mins @ 80°C + 20 mins @ 100°C	92 - 102	18.1 - 20.3	6.5 - 9.0	1319 - 1649 2.39 - 2.96	Low viscosity and high flexibility.
Araldite® LY 8601 / Aradur® 8602	●	●	●●				200	70 mins @ 25°C	100/25	175	3 days @ 25°C	57	11.0	n/a	n/a n/a	Designed for room temperature infusion.
Araldite® LY 8604 / Aradur® 8604	●	●	●●				220	120 mins @ 25°C	100/15	370	2 days @ 25°C	73	11.4	n/a	n/a n/a	Remains transparent after cure. Excellent toughness.
Araldite® LY 8605 / Aradur® 8605	●	●	●●				480 - 580	540 mins @ 25°C	100/35	700	16 hrs @ 49°C 2 hrs @ 121°C 3 hrs @ 150°C	153	12.2	n/a	n/a n/a	Intermediate temperature properties with low cure. Can be used up to 300°F with additional heat cure.
Araldite® LY 8615 / Aradur® 8615	●	●	●●	●		●	1080	ca. 35	100/50	ca. 550	90 mins @ 80°C + 1 hr @ 150°C + 3 hrs @ 180°C	ca. 220	ca. 14.5	ca. 4.0	747 0.68	Epoxy infusion system. Excellent hot/wet properties.
Arathane® 3520 PO / Arathane® 3521 IS		●●				●●	n/a	n/a	100/140	425 - 525	die 1 160°C - 180°C die 2 185°C - 200°C	n/a	Para. 137 Perp. 19	4.8 1.6	n/a n/a	Warm to hot curing PUR system.
RenLam® LY 5210 / Aradur® 2954	●●	●	●				420 - 540	n/a	100/53	700 - 900	23 hrs/25°C + 12 hrs/40°C + 2 hrs/60°C then equal stages to 200°C for 14 hrs	ca. 220	n/a	n/a	n/a n/a	Excellent fiber wet-out. High-heat laminating system.
RenLam® LY 5210 / HY 5212	●●	●	●				720	ca. 55	100/40	2000	24 hrs/25°C + 12 hrs/40°C + 2 hrs/100°C + 2 hrs/120°C + 2 hrs/140°C + 2 hrs/160°C + 2 hrs/180°C + 2 hrs/200°C	238	12.8	n/a	n/a n/a	Long pot life. High-heat laminating system.
Resin XB 3585 / Aradur® 2954	●	●●				●	430 - 500	30 - 37	100/33	300 - 400 @ 40°C	1 hr @ 80°C 4 hrs @ 120°C	131	18.5 - 20.3	6.5 - 8.5	659 - 769 0.66 - 0.83	Reactive diluent-free RTM system.
Resin XB 3585 / Hardener XB 3458	●	●●					14 - 18	2 - 4	100/19	450 - 550 @ 40°C	10 mins @ 80°C + 20 mins @ 100°C	100 - 110	17.4 - 20.3	5.0 - 7.0	1154 - 1319 1.60 - 1.85	Highly reactive system for industrial composites and repair.
Resin XB 9721 / Hardener XB 3473		●		●●		●	4800 - 5700	80 - 100/120°C	100/38	14000 - 17000	2 hrs/120°C + 2 hrs/160°C + 2 hrs/200°C + 4 hrs/220°C	232 - 238	15.2 - 18.1	3.0 - 4.2	670 - 736 0.54 - 0.57	Amine-cured matrix system offering high temperature resistance.
Resin XU 3508 / Aradur® 5021 / Hardener XB 3403					●●		350 - 400	60 - 105	100/22/12	3600 - 4200	4 hrs @ 120°C	120 - 126	17.0 - 17.7	7.0 - 9.0	1978 - 2143 5.42 - 6.6	Prepreg system with a long shelf life and curable from 80 °C on.
Resin XU 3508 / Aradur® 5021 / Hardener XB 3471					●●		350 - 400	60 - 105	100/22/12	3600 - 4200	4 hrs @ 120°C	126 - 132	17.4 - 18.1	7.0 - 12.0	1813 - 1923 4.56 - 5.42	Prepreg system with a long shelf life and curable from 80 °C on.
Resin XU 3508 / Aradur® 917 / Accelerator DY 070				●●		●●	480 @ 40°C	25 mins @ 100°C	100/90/0.5 - 2	300 @ 40°C	1.5 hrs @ 80°C 3 hrs @ 150°C	135	17.8	n/a	1064 2.3	Anhydride-cured matrix system with extremely long pot life.
XU 9509 / Aradur® HY 906 / Accelerator® DY 070		●		●●		●●	240	60 - 200 @ 180°C	100/107/0.5 - 2	500 - 1500	1 hr @ 125°C + 2 hrs @ 220°C	205	12.2	n/a	758 1.12	Liquid anhydride-cured matrix system for high-temperature applications.

- recommended
- highly recommended

<sup>1</sup> Mix ratio stated is in order of Resin/Hardener/Accelerator

<sup>2</sup> DSC, 10K/min, IEC 1006

## Structural Bonding Systems

Product designation	Gel Time @ 80° C/min	Mix Ratio	Mix Viscosity	Consistency	Suggested Cure Schedule	Lapshear Strength	Impact/Toughness	Max Service Temp	Comments/Applications
Arathane® 3427 PO / Arathane® 3304 IS	10 - 15	100/40 by wt 100/45 by vol	Paste	Thixotropic paste	7 days @ 73°F or 16 hrs @ 104°F	3300	Charpy Impact 9.6 ft - lbs/in <sup>2</sup>	180	Tough, high shear, non-slumping PUR paste for wind blade bonding.
Araldite® AW 4856 / HW 4856	25 - 35	100/42 by wt 100/50 by vol	Paste	Thixotropic paste	5 hrs @ 158°F	4000	K <sub>1c</sub> [v in <sup>3</sup> /in <sup>2</sup> ] 3352 G <sub>1c</sub> [ln <sup>3</sup> /in <sup>2</sup> ] 8.84	210	Toughened epoxy adhesive for blade assembly.

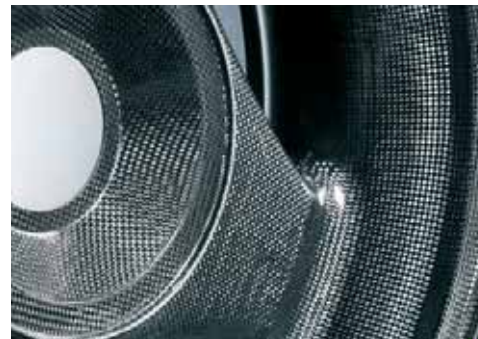
## Composites Market

With recognized expertise in research, development and processes, we offer a unique and wide range of innovative, high-value thermosets, combined with strong technical support, to the industries using fiber reinforcement technologies. Our solutions open new possibilities in design and systems integration with high strength-to-weight and stiffness-to-weight ratios as well as superior mechanical and thermal performance.

## About Huntsman Advanced Materials

Huntsman Advanced Materials is 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 2,300 associates at 13 locations worldwide work to fulfill this promise every day.

We enjoy a long heritage of pioneering technological excellence and offer a unique and wide range of innovative and tailor-made solutions to more than 9,000 customers in over 90 different countries. We maintain leading positions in our key markets through product differentiation, technical support and customer focus. The primary markets we serve include coatings, construction, electronics, adhesives and inks, medical, marine, power transmission and distribution, general industry, aerospace, wind power generation, automotive and sports equipment.



## Huntsman's Commitment to REACH & Sustainability

Huntsman is committed to supporting global health, safety and environmental efforts, including new REACH regulations. We have set up teams of experts in each business area to coordinate our response to complex REACH requirements. We are working with customers to ensure that their applications are REACH compliant. We have also established web-based portals for our customers and suppliers to act as a conduit through which we communicate REACH-related updates.

In addition to our REACH activities, Huntsman is equally dedicated to Sustainable Chemistry. We have established a strategic business unit wholly devoted to the research and development of new chemistries and processes to help address the world's most pressing environmental needs. By leveraging our core competencies we can develop sustainable products that benefit our customers, consumers and the planet as a whole.

