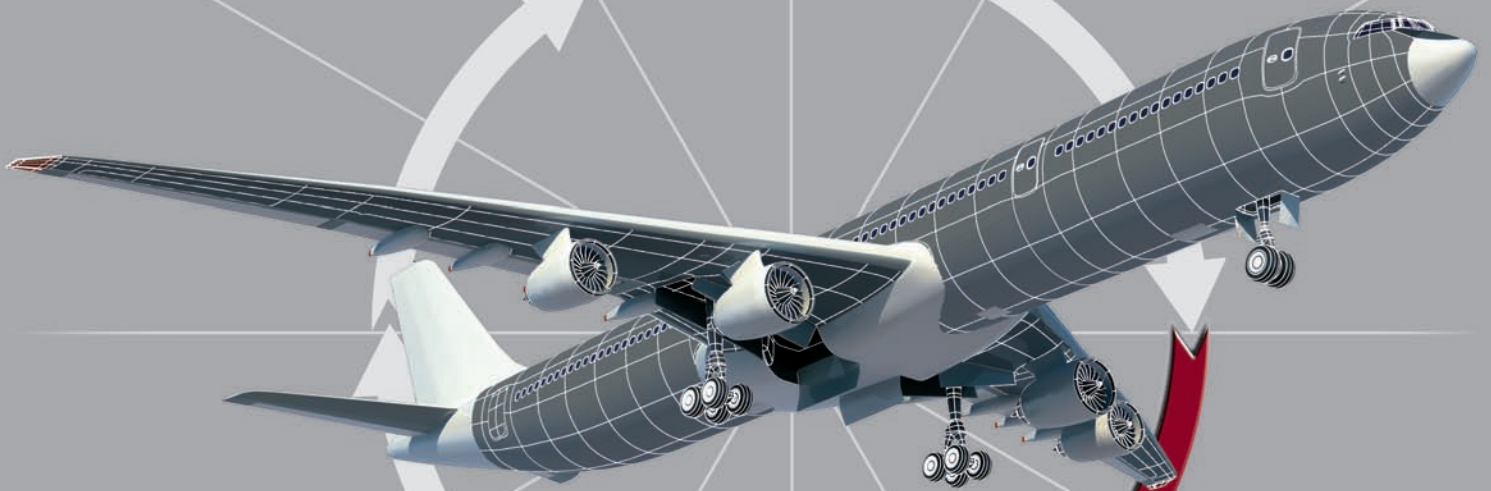


**HUNTSMAN**

Enriching lives through innovation

# Aerospace Parts Manufacturing and Repair Selector guide



As the aerospace industry gains an increasing awareness of the benefits of composites materials, Huntsman Advanced Materials products are at the forefront of technology, offering a range of resin systems for fiber reinforcement, adhesives and syntactics. Many products are included as approved repair materials in manufacturers' structural repair manuals and service bulletins.

## Syntactics

Product designation	Selected specifications	Work Life	Curing Class	Typ. Service Temp.	Compressive Strength	Density	CTE	Characteristics
Conditions		RT			RT		below Tg	
Unit		(min)	(°C)	(°C)	(psi)	(g/cc)	(ppm/°C)	

### Ultra low density

#### One-component syntactic

Epocast® 1610-A1	BMS 5-28, Ty 10	30 days	127	93	2 400	0.50	30	1-part, flame retardant
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#### Two-component syntactics

Araldite® 1641 A/B	MSRR 1076	180	100	65	1 885	0.50		2-part, pumpable, non-sag, long work life
Epocast® 1628 A/B	BMS 5-28, Ty 28	> 60	RT	71	2 800	0.50	43	Extrudable, non-sag, flame retardant
Epocast® 1629 A/B	BMS 5-28, Ty 9	30-80	RT	71	3 000	0.50	≈ 41	Flame retardant
Araldite® 1644 A/B	AIMS 10-03-001	30	RT	80	4 350	0.55		High compressive strength

### Low density

#### Two-component syntactics

Epocast® 167 A/B	BMS 5-28, Ty 1	50-70	RT	60	6 000	0.70	52	Pourable, moisture resistant
Epocast® 169 A / 9615	SS-9587, Ty 1	90-120	RT	71	2 000	0.68		Sandable, machinable
Araldite® 252 A/B	ASNA 4072, iss A	60	RT	70	5 075	0.65		Gap filling, sandable, low outgas, high temp stable, flame retardant
Epocast® 1615 A/B	BMS 5-28, Ty 15	15	RT	60	6 000	0.70	38	Short work life, flame retardant
Epocast® 1617 A/B	BMS 5-28, Ty 17	60-90	RT	65	5 500	0.70	50	1 hr work life, flame retardant
Epocast® 1618 D/B	BMS 5-28, Ty 18, Cl 1	10-20	RT	≈70	5 000	0.70	55-60	Fast set, pumpable, flame retardant
Epocast® 1619 A/B	BMS 5-28, Ty 19	20-50	RT	55	5 500	0.70	48	Pourable, flame retardant
Epocast® 1626 A/B	BMS 5-28, Ty 26, Cl 1	60	RT	70	2 500	0.65	78	Impact resistant, mod flex, strong lap shear/peel, non- flow
Epocast® 1626 C/D	BMS 5-28, Ty 26, Cl 2	7	RT	70	2 500	0.68	89	Impact resistant, mod flex, strong lap shear/peel, non- flow
Epocast® 1633 products	BMS 5-28, Ty 18, Cl 2; AIMS 08-08-001-04	2-5	RT	71	6 500	0.73		Fast set, 4 colors, DB cartridges, flame retardant
Epocast® 1638 A/B	FAR 25.583 (60-sec)	12-25	RT	82	7 600	0.70		Fast set, 60-sec flame retardant, high compressive strength

#### One-component frozen syntactics

Epocast® 1614-A1 products	BMS 5-28, Ty 14; RMS 027, Ty XI	480	121 or 177	177	14 500	0.75	35-40	Very high temp strength, flame retardant
Epocast® 1661	PW 36757-2	480	121 or 177	177	9 000	0.60		Patty form, very high temp strength, flame retardant

RT : Room Temperature = 73.4±3.6°F

## Syntactics (following )

Product designation	Selected specifications	Work Life	Curing Class	Typ. Service Temp.	Compressive Strength	Density	CTE	Characteristics
Conditions		RT			RT		below Tg	
Unit		(min)	(°C)	(°C)	(psi)	(g/cc)	(ppm/°C)	

### Medium density

#### Two-component syntactics

CG 1305 Resin / Hardener	BMS 5-28, Ty 7, Cl 1	> 60	RT	177	8 500-9 000	0.90	56	Pourable, v high temp strength, flame retardant
Epocast® 1652 A/B	GM4006; GMS4005, Ty 1, Cl B; SS9587, Ty 2	30-60	RT	177	9 000	0.80		Paste, high temp strength
Epocast® 1656 A/B	GM4006, Ty 1, Cl B	50-90	RT	121	8 000	0.80		Paste, long work life, high temp strength
Epocast® 1657 A/B	GMS4005, Ty 1, Cl A, B, & C	35-60	RT	82	18 000	0.77		Pumpable 2:1 vol ratio, v high strength
Epocast® 8623 A / 9861	DHMS P1.30 Gr 2 Iss G AMD 3&8; DSC 561-2, Iss A	40-60	RT	100	5 000	0.70		Long work life, extrudable, high shear strength, flame retardant
Epocast® 89537 A/B	BMS 5-28, Ty 7, Cl 2	70	RT	177	8 500-8 800	0.90		Non-sag, high strength, flame retardant

### High density

#### Two-component syntactics

Epocast® 1511 A/B	BMS 5-28, Ty 3	40-60	RT	93	10 000	1.25	62	Non-flow, long work life, high strength
Epocast® 1636 A/B	BMS 5-28, Ty 6 & 21	120	RT	177	15 000-28 000	1.72	56	Very long work life, very high strength, flame retardant

#### High strength, one component frozen syntactics

Epocast® 938 A2	BMS 5-28, Ty 12, Cl 1&2, & Ty 13 (QPL pending)	1 000	121 or 177	177	25 000	1.40	30-35	Very high temp, high strength & long RT work life, flame retardant
Epocast® 1627	BMS 5-28, Ty 27	1 400	83, 121 or 177	177	30 000	1.80	20-22	Very low CTE, very high temp strength, core reinforcing

RT : Room Temperature = 73.4±3.6°F

## Adhesives

Product designation	Selected specifications	Mixed Viscosity	Work Life	Curing Class	Typ Service Temp.	Lap Shear Strength	T-Peel	Characteristics
Conditions		RT	RT			Al/Al		
Unit		(cp)	(min)	(°C)	(°C)	(psi)	(pli)	

### Epoxy adhesives

Araldite® 204	ABR2-0048	3 500 000	-	120 or 150 or 170	90	1 740 / 1 450	-	1-part foaming adhesive, fills voids (for core-splicing), extrudable paste
Araldite® / Epibond® 420 A/B	ASNA 4125, Iss B / BMS 5-107	35 000-45 000 (semi-paste)	60-70	RT	82	3 500-5 100 / 580	22	Very high shear & peel strengths, bonds most metals, wood, rubber, composites, plastics
Araldite® 2011 A/B	ABR2-1079; DAN 1284-01	45 000 (non-sag paste)	120	RT	60	3 625 / 1 160	28 (roller)	Long open time, high shear/peel strength, dynamic load bearing, electrically insulating, pumpable
Araldite® 2013 A/B	ABP 5-1158, Iss 2	Thixotropic paste	65	RT	60	3 000 / 700 <sup>1</sup>	23 (roller)	Metallic appearance, gap-filling to 5 mm, good chemical & weather resistance, bonds to metal, ceramic, rubber & plastic
Araldite® 2014 A/B	ABP2-3094; ABR2-0714	90 000	40	RT	120	2 400 / 2 400	17 (roller)	High temperature, chemical & water resistant, gap-filling, bonds to wide variety of substrates
Araldite® 2015 A/B	ABR2-1081	Thixotropic (non-sag paste)	35	RT	80	3 500 / 1 050 <sup>1</sup>	25 (roller)	Toughened, non-sag, gap-filling to 10 mm, high shear & peel strength

## Adhesives (following)

Product designation	Selected specifications	Mixed Viscosity	Work Life	Curing Class	Typ Service Temp.	Lap Shear Strength	T-Peel	Characteristics
Conditions		RT	RT			Al/Al		
Unit		(cp)	(min)	(°C)	(°C)	(psi)	(pli)	
<b>Epoxies adhesives</b>								
Araldite® AV 4415 / HV 4416; XD 4510 / XD 4511	KIWA potable water; FPI Europe	Non-flow paste	90	40-150	180	2 500 / 2 500	9-34 (roller)	V high temperature & good chemical resistance, gap-filling, bonds to wide range of substrates
Epibond® 104 A / 9831	AS 2149009-R; BS 201-AA	Paste	3-4	RT	93	2 000-2 800 / 600-1 000 <sup>2</sup>	-	Quick-set to long work life with 3 hardeners (by increasing gel time), non-flow paste, gap-filling
Epibond® 104 A / 946			20					
Epibond® 104 A / 104 B			30-40					
Epibond® 156 A/B	Motorola 11-14235 ACL	Soft paste	20-50	RT	121	2 000 / 1 950	-	RT cure, low shrinkage, good electrical insulator, good for smoothing, filling (e.g. laminates, edges, radomes)
Epibond® 1210 A/B	LAC 40-4093, CI B	Semi-paste	50-75	RT	93	2 500 / 300	-	Low outgassing for spacecraft, flexibility can be varied
Epibond® 1210 A / 9861	LAC 30-4639-0200	Semi-paste	35-60	RT	149	2 800 / 2 500 <sup>2</sup>	-	Low outgassing (spacecraft), good high temperature properties
Epibond® 1217 A/B	HMS 16-1068, CI 8B	Paste	4-8	RT	66	2 500 / 500	-	Fast set, translucent, 1:1 mix ratio
Epibond® 1534 A/B	BMS 5-126, Ty 2, CI 1	2 000	120	RT	82	3 000 / 575	-	Long work life, low viscosity, high strength, good fluid resistance
Epibond® 1539 A/B	BMS 5-126, Ty 6, CI 1	Paste	120	RT	82	2 500 / 800	-	Bonds to plastic, metal, fiberglass reinforced composite
Epibond® 1544 products	BMS 5-126, Ty IV, CI 1 or 4, Gr B	Semi-paste	10-20	RT	93	2 600 / 600	-	RT cure, early green strength, gap filling, flame retardant
Epibond® 1546 A/B	-	Semi-paste	5-7	RT	60	3 000 / -	9 (T); 18 (roller)	Very fast cure, good peel strength, 1:1 mix ratio (w/w or v/v, cartridge dispensed)
Epibond® 1559 products	Airbus SIL 53-035, App4; SS-8640	80 000	6	RT	70	2 900 / 3 00 <sup>1</sup>	-	Fast RT or low temp cure, flame retardant, 1:1 mix ratio
Epibond® 1565 A/B	Boeing D800-10411-1 PPD6-1	25 000 (non-sag paste)	720	177	150-177	1000 / -	-	Long work life, high temperature performance, thixotropic paste
Araldite® 1570 A/B	AIMS 10-04-006	220 000	60	RT	80	2 400 / 600	-	Polyolefin bonding, flame retardant (FAR 25.856)
Epibond® 1590 A/B	AIMS 10-09-001	70 000	30	40-100	177	5 800 / 3 400 <sup>3</sup>	24-33 (roller)	Toughened, low sag, 177°C performance
Epibond® 1590-3mm A/B	AIMS 10-07-002	2 000 000	50	70	80	4 550 / 3 230	16.4 (roller)	Gap-filling to 3mm, high strength, good environmental stability
Epibond® 1590 FST A/B	DANs 1199-01 & 1187-01	120 000	60	RT	120	3 200 / 1 600	22 (roller)	Meets FAR 25.853 flame resistance criteria including smoke density & heat release, good hot/wet mechanical performance
Epocast® 1635 A/B	BMS 5-28, Type 31 (QPL pending)	Semi-paste	60	93	177	2 500-3 000 <sup>4</sup> / 2 500-3 000 <sup>2,4</sup>	-	Dynamic fatigue resistance for miss-drilled hole filling, high temperature lap shear & compressive strength
Epibond® 8543 C/B	BMS 5-123, Ty1, CI3	Non-sag paste	3	7-RT	83	2 000 / 500	-	Very fast set, 1:1 mix ratio

## Adhesives (following)

Product designation	Selected specifications	Mixed Viscosity	Work Life	Curing Class	Typ Service Temp.	Lap Shear Strength	T-Peel	Characteristics
Conditions		RT	RT			Al/Al		
Unit		(cp)	(min)	(°C)	(°C)	(psi)	(pli)	

### Polyurethane adhesives

Araldite® 2040 A/B	-	50 000 (non-sag)	15	RT	82	300 <sup>5</sup> / 120 <sup>5</sup>	-	Flexible, 1:1 mix ratio, bonds to plastic and primed metal, long open time, good electrical resistance
Araldite® 2026 A/B	-	10 000	3-4	RT	80	2 900 / 450	45 (roller)	Transparent; flexible; bonds to variety of substrates; good chemical, water, weather & heat resistance; high peel strength; 1:1 mix ratio
Uralane® 5772 A/B	GD 0-73668, Ty 1	Semi-paste	15-20	RT	121	2 100 / 6 50 <sup>4</sup>	50	Good heat resistance, high shear & peel strength
Uralane® 5773 A/B	GD 0-73668, Ty 2	Semi-paste	25-45	RT	121	2 500 / 900 <sup>3</sup>	35	High temp, high strength, good bonds for different thermal expansion materials
Uralane® 5774 A/C	BMS 5-105, Ty 5; LES 1359; AIMS 10-04-001	Semi-paste	15-25	RT	82	2 200 / 1 300	35	Impact resistant, high shear & peel strength, flame retardant, 2:1 mix ratio
Uralane® 5776 A/B	-	Semi-paste	35-45	RT	82	800 / 240	28	Long work life, high peel strength, bonds metal & plastics, flame retardant
Uralane® 5777 A/B	GD 0-73668, Ty 3	Semi-paste	10-12	RT	82	2 200 / 1 000	36	Fast setting, high shear & peel strength to metals & plastic, flame retardant, meter-mix dispensable
Uralane® 5759 G/D	BMS 5-105, Ty III	Thixotropic, sprayable	4-8	RT	83	700 / 300	10	Sprayable, thixotropic liquid, flame retardant, fast green strength, bonds to most engineering plastics
Uralane® 5779 products	BMS 5-105, Ty VI	Non-flow paste	8-15	RT	71	1 200 / -	-	UV & humidity resistant, flame retardant, 1:1 mix ratio, available in colors

### Methacrylic adhesives

Araldite® 2021 A/B	-	45 000	2-3	10-RT	100	3 625 / 2 465	62 (roller)	Toughened; very fast cure; gap-filling; high shear & peel strength; resistant to heat, chemicals, water; bonds to metals, composites, plastics; 1:1 mix ratio
Araldite® 2022 A/B	-	60 000	10	10-RT	100	3 050 / 1 300	23 (roller)	Toughened; fast cure; gap-filling; wets poor surfaces; high shear strength, elongation; resistant to heat, water, chemicals (esp. gas, oil); bonds to metals, composites, plastics; 1:1 mix ratio
Araldite® 2024 A/B	-	180 000	4-5	10-RT	100	2 650 / 1 150	34 (roller)	Toughened; very fast cure; gap-filling; flexible; high impact & peel strength in dynamic environments; very resistant to high temperature, chemicals, water; bonds to metals, composites, plastics
Agomet® F330		15-20	days	RT	130	4 800 / 4 800	34	No-mix processing (A and B applied separately to mating parts); fast cure; tolerant of non-ideally cleaned surfaces; temperature and chemical resistant; bonds to most metals and plastics

RT : Room Temperature = 73.4±3.6°F • <sup>1)</sup> @70°C, RT cure • <sup>2)</sup> @93°C • <sup>3)</sup> @121°C • <sup>4)</sup> etched-primed Al • <sup>5)</sup> on polycarbonate

## Laminating systems

Product designation	Selected specifications	Mixed Viscosity	Work Life	Curing Class	Typ. Service Temp	Characteristics
		RT	RT			
		(cp)	(min)	(°C)	(°C)	
Araldite® 501 A/B	ANSA 4047, iss B	3 000-4 000	90	RT	120	Long work life, very low viscosity
Epocast® 35 A / 927	BMS 8-214, Ty 1	7 000	240-300	83 or 121	149	Long work life, high strength, high temperature performance
Epocast® 35 A / 9216	–	3 800	60	RT + serv temp	205	Low viscosity, very high temperature resistance
Epocast® 50 A1 / 946	BMS 8-201, Ty IV	2 400	20	RT	80	Short work life, for fiberglass laminate repair, flame retardant
Epocast® 50 A1 / 9816	BMS 8-201, Ty III	2 400	65	RT	80	Long work life, fiberglass laminate floor panel assembly, flame retardant
Epocast® 52 A/B	SAE-AMS 2980; BMS 8-301, Cl1, Gr2; AIMS 08-01-002-01; AIMS 08-02-002-01	5 500	240-300	93	150	Carbon fiber laminate repair, long work life, high strength/ high temp performance
Epocast® 54 A/B	AIMS 04-27-000-01	8 000	15-25	RT	80	Flame retardant (FAR 25.853)
Araldite® LY 5052 / Aradur® 5052	German aircraft authority	800	130	RT + 50 or 100	100	Transparent, low viscosity
Araldite® LY 5210 / Aradur® 5212	–	2 000	720	120-200	200	Very high temperature resistance, good wetting, long open time
RenLam® 1700-1 / Ren® 1700-1	–	2 000	20	RT	60	Unfilled, thixotropic, good wet-out
RenLam® 177-114 / Ren® 1700-1	–	800	38	RT	60	Unfilled, very low viscosity
RenLam® 5052 / Ren® 5052	–	600	110	RT + 50 or 100	130	Unfilled, low viscosity, high mechanicals, aerospace qualified
RenLam® 1710 / Ren® 1710	–	3 500	22	RT	60	Filled, white, general use
Epocast® 5A-21 / B-10	–	4 000	45	RT	60	Filled, green, high strength system
RenLam® 4005 / Ren® 1500	–	1 900	55	RT + 66 + 93 + 121 + 150	150	Unfilled, good wet-out
Epocast® 45 A/B	–	4 000-8 500	50-100	RT+ 66+ 93+ 149+ 177	177	–
RenLam® 4014 / Ren® 1500	–	5 300	55	RT + 66 + 93 + 121 + 150	150	Filled, general purpose, gray
RenLam® 4017 / Ren® 1510	–	8 000	90	RT + 93 + 121 + 150 + 177	177	Filled, black, long work life
RenLam® 1310 / Ren® 1510	–	9 000	120	RT + 93 + 121 + 150 + 190	177-205	Unfilled, black, high temperature performance

RT : Room Temperature = 73.4±3.6°F

## Infusion systems

Product designation	Mixed Viscosity	Gel Time Hot Plate	Glass Transition Temp.	Recommended Cure Schedule	Characteristics
Conditions	RT	14 Oz. @ R.T.	Neat E' DMA onset		
Norm		T-cam	ASTM D-4065		
Unit	(cps)	(min)	(°F)	(hr)	
RenInfusion® 8601 / Ren® 8601	175	132	140	3 days @ RT min 2 days @ RT De-mold	RT use, low Tg, high elongation
RenInfusion® 8601 / Ren® 8602	175	70	145	3 days @ RT min 2 days @ RT De-mold	RT use, 140°F Tg
RenInfusion® 8603 / Ren® 8603	240	78	166	2 days @ RT 1 day @ RT De-mold	RT use, RT cure, 180°F Tg
RenInfusion® 8604 / Ren® 8604	370	120	164	2 days @ RT min 1 day @ RT De-mold	RT use, RT cure, 175°F Tg
RenInfusion® 8605 / Ren® 8605	700	480 *	307	20 @ RT + 2 @ 250°F + 3 @ 350°F	300°F use
RenInfusion® 8610	10 000 or 400 @ 140°F	-	275	16 @ 200°F + 4 @ 350°F or 4 @ 250°F + 4 @ 350°F	250°F use, one-comp., RT stable, latent to 150°F
RenInfusion® 8612	5 000 or 400 @ 125°F	-	200	16 @ 200°F + 2 @ 300°F or 16 @ 200°F + 4 @ 250°F	Toughened, 200°F use, one-comp., RT stable, latent to 150°F
RenInfusion® 8613 / Ren® 8613	430	25 hrs *	381	40 @ RT + 4 @ 250°F + 3 @ 375°F	300-350°F use
RenInfusion® 8615 / Ren® 8615	550	18 hrs *	422	24 @ RT + 4 @ 250°F + 3 @ 375°F	350-400°F use

RT : Room Temperature = 73.4±3.6°F • \* 4 oz. mass

## Main resins for composites (base raw materials for formulators)

Product designation	Tg (DMA) (°C)	Relative Thermal Stability	Characteristics
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### Bifunctional epoxy resins

Based on Bisphenol F Araldite® PY 306 US Araldite® GY 281 Araldite® GY 282 Araldite® GY 285	170*	•	Extremely low viscosity and high purity resin
Based on Bisphenol A Araldite® LY 1556 Tactix® 123	185*	•	Standard resin for aerospace use High purity resin

### Multifunctional epoxy resins

Based on Phenol / Cresol Novolac Araldite® EPN 1179, 1180 Araldite® ECN 1299, ECN 1280, ECN 1273	200*	•	Used as an up-grader in epoxy formulations to improve all properties (thermal, mechanical and chemical resistance)
Based on Dicyclopentadiene Tactix® 556	235*	•	High moisture resistant resin
Based on Diaminodiphenylmethane Araldite® MY 720 Araldite® MY 721 Araldite® MY 9512 Araldite® MY 9612 Araldite® MY 9634 Araldite® MY 9655 Araldite® MY 9663	250*	•	High performance multifunctional resins, with a wide choice of viscosity specifications. Lowest viscosity available with MY 721. Suitable for continuous use in moist environment up to 120°C

## Main resins for composites (base raw materials for formulators) (following)

Product designation	Tg (DMA) (°C)	Relative Thermal Stability	Characteristics
Based on Aminophenol <b>Araldite® MY 0500</b> <b>Araldite® MY 0510</b> <b>Araldite® MY 0600</b>	250*	•	High Tg and low viscosity resins can be used for viscosity adjustments of multifunctional resin formulations, or to help the blending of tougheners. Also are frequently used in adhesive formulations to upgrade thermal performance of liquid epoxy resins
Based on Trisphenol <b>Tactix® 742</b> <b>Tactix® 695</b>	325*	•	Highest thermal stability epoxy (recommended for long-term thermal aging > 120°C). Resin stable storage at room temperature
<b>Benzoxazines</b>			
<b>XU 3560**</b> <b>LMB 6452</b> <b>LMB 6493</b> <b>LMB 6490</b>	165	••	Very high modulus, extremely low shrinkage and low moisture pick-up thermoset resin, having great synergy with epoxy resin (Tg increase to 200°C). Thermal stability between multifunctional epoxy and bismaleimides
<b>Bismaleimides</b>			
<b>Matrimid® 5292 A</b> <b>Matrimid® 5292 B</b>	295	••	Widely used curable thermoset resin system with excellent long-term thermal stability. Continuous use in moist environment up to 180°C
<b>Cyanate Esters</b>			
<b>AroCy® L10</b> <b>AroCy® XU 371</b> <b>AroCy® 782</b> <b>AroCy® 787</b> <b>AroCy® XU 366</b> <b>AroCy® XU 378</b>	260-295	••	Very low moisture absorption and low products, associated with excellent dielectric properties and thermal performance. Large range of resins available (aspects, Tg, final properties like toughness)
<b>Polyamide-imides</b>			
<b>Rhodefal® 200</b> <b>Rhodefal® 311</b>	280	•••	Exceptional chemical resistance and thermal stability combined with a strong adhesion to metals and a good dielectric rigidity. Suitable for continuous use up to 220°C. Used for the preparation of enamel varnishes, protection varnishes, and high temperature impregnation varnishes. Products are supplied in solvent

\*when cured with Aradur® 976-1 (4,4'-DDS).\*\*EINECS registration pending

## Special tougheners for composites (base raw materials for formulators)

### Polyimides

<b>Matrimid® 5218</b> <b>Matrimid® 9725</b>	300	•••	Soluble thermoplastic polyimide, fully imidized, designed for extreme temperature applications (continuous use > 230°C). Also used as high temperature toughener in epoxy and for the preparation of gas separation membranes. Micronized powder available
<b>Flexibilizer DY 965</b>	-	•••	Recommended for the preparation of high impact resistant epoxy resin systems

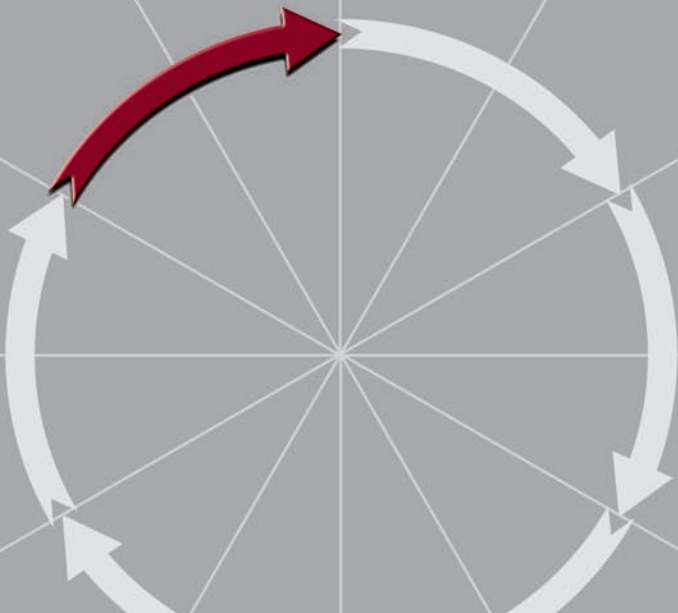
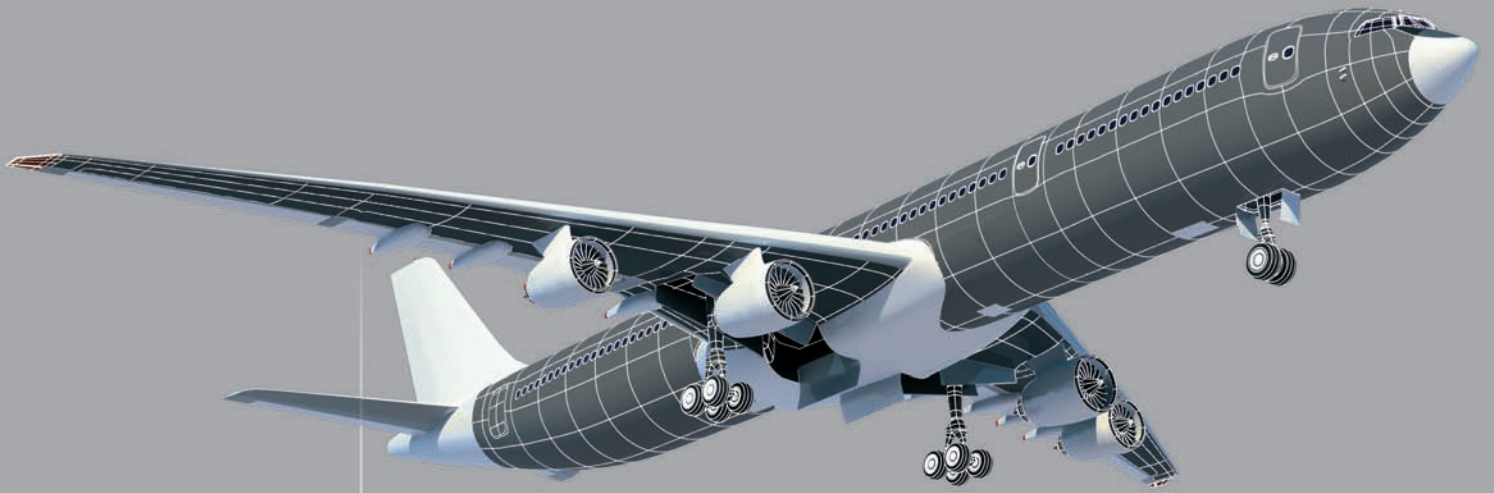
## High performance hardeners (base raw materials for formulators)

Product designation	ASSAY (%)	Melting Point (°C)	Mean particle size (µm)	Comments
<b>Aradur® 976-1</b>	> 99	175	-	4.4' DDS
<b>Aradur® 9664-1</b>	> 98	175	< 70	Micropulverised 4.4' DDS
<b>Aradur® 9719-1</b>	> 98	170	< 60	Micropulverised 3.3' DDS



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