HUNTSMAN

Enriching lives through innovation

Advanced Materials

Adhesives, syntactics and laminating solutions for high performance

Aerospace selector guide

Rely on us with confidence

Rely on us with confidence

For more than 60 years, as a global provider, Huntsman Advanced Materials has developed innovative solutions and high performance materials for the fabrication, assembly and repair of interior and exterior aircraft components.

Huntsman's versatile adhesives and syntactics are used by aircraft manufacturers who serve commercial airlines and general aviation troughout the world. Many of the epoxies and polyurethanes are flame retardant and exhibit the low flame, smoke and toxicity characteristics required to comply with regulations such as FAR 25.853 that govern materials used in large civil aircraft.

In our efforts to develop innovative solutions for the aerospace market, we strive to meet the high product standards set forth by the industry and federal regulations that govern the performance properties of materials used in aircraft, such as: strength, weight, tougheness, flexibility, low coefficient of thermal expansion, high resistance to corrosion and fatigue, flame retardancy, halogen-free formulations, noise and vibrational damping.

We deliver more than just products

Our Research & Development team continuously experiment with new chemistries and technologies to fullfill today's requirements, anticipate tomorrow's needs and comply with ever more stringent health, safety and environmental regulations.

Our process control from raw material qualification to the delivery of finished products enables us to produce advanced materials known for their quality and reliability.

Araldite®

The brand serving worldwide aerospace industry for more than 60 years.

Aircraft manufacturers' specifications

Our products are extensively qualified to meet aircraft manufacturers' specifications and are used in every new airborne design in the airplane life cycle, from designers, formulators and prepreggers to part manufacturers in large civil aircrafts, helicopters, regional jets, aerospace engines, general aviation.

Syntactics

Huntsman Araldite® and Epocast® epoxy syntactics, together with pre-cured Eposert® syntactic provide solutions for edge sealing, forming and bonding of honeycomb, metallic and plastic insert potting applications and for honeycomb reinforcement and repairs.

Syntactics for honeycomb reinforcement

Reinforcement of sandwich composites where high loading is required can be made by two means. Epocast® products can be applied directly into the honeycomb or pre-cured and molded to the desired insert dimension. Huntsman also offers a unique range of pre-formed and cured inserts available under the Eposert® brand that can be installed rapidly in a honeycomb core before fasteners are added.

These low-density inserts are well suited to aircraft manufacturing techniques and repair applications for reinforcing composite floor panels, galley walls, bulkheads and lavatory cabinets. Epocast® solutions meet stringent requirements of numerous aircraft specifications. The table below shows the main products used in sandwich structures reinforcement.

Syntactics for honeycomb edge sealing

Aircraft manufacturers and repair stations use these materials to fabricate and refurbish cabin components such as overhead baggage bins, floor panels and lavatory cabinets as well as flight control surfaces, nacelles and landing gear doors. Huntsman edge sealing syntactics are produced in a range of densities to meet the handling and performance requirements of customers.

Suitable products for edge sealing include: Araldite® 1644-A/B ultra-low density syntactic, Epocast®1617-A/B and 1618-B/D low-density syntactics and Epocast® 89537-A/B and 1652-A/B medium density syntactics. Huntsman also supplies a one-component epoxy designated Epocast®1610-A1 ultra-low density syntactic. The majority of Huntsman edge sealing materials are self-extinguishing and feature easy to apply viscosities, sag-resistance for use on vertical surfaces and high strength.

Syntactics for insert potting or bonding

Medium and low-density grades of Epocast® epoxy syntactic and Uralane® 5774-A/C polyurethane adhesive comprise the range of products for insert potting, providing a dependable reinforcement for honeycomb composite panels before inserting fasteners. Typical applications include composite floor panels, galley walls, bulkheads or lavatory cabinets.

The most conventional type of insert are metallic ones and in this case several Epocast® syntactics can be used such as the fast curing and self-extinguishing Epocast® 1618- B/D.

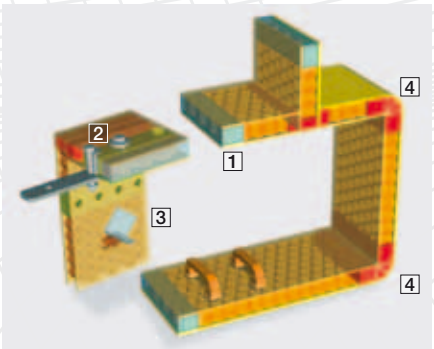
The latest designs often include thermoplastic inserts (such as polyamide-imide based ones); in this case standard epoxy syntactics cannot be used. In response to this, Huntsman has developed Uralane® 5774-A/C, a two component polyurethane adhesive.

Syntactics for honeycomb reinforcement

Ultra-low density 0.5-0.55	Low density 0.6-0.75	Medium density 0.8-0.9	High density >1	
Epocast® 1610-A1	Epocast® 1614-A1*		Epocast® 1627-2 Epocast® 938-A2 Epocast® 927-1GB	1K
		Epocast® 89537 A/B CG 1305-R/H*	Epocast® 1636 A/B	2K

* Available as Eposert®

Syntactics for honeycomb edge sealing and insert potting or bonding



1. Edge sealing
2. Inserts potting
3. Honeycomb reinforcement
4. Honeycomb forming and bonding

Adhesives

Huntsman has developed a comprehensive range of extensively qualified adhesives providing solutions to engineers facing a wide variety of design issues. Araldite®, Epibond® and Uralane® adhesives provide superior joining and bonding solutions for plastics, metals, composite materials and other substrates.

Epoxy adhesives

> excellent adhesion to metals and thermoset composites
> high strength and high stiffness
> high creep resistance
> high fatigue resistance
> high temperature resistance
> excellent chemical resistance and long-term durability

Polyurethane adhesives

> excellent adhesion to most composite materials and plastics
> good adhesion to metals
> mechanical properties from rigid to flexible
> high fatigue resistance
> good long-term durability

Laminating solutions for manufacturing, and maintenance and repair (MRO)

Huntsman offers a range of laminating systems qualified for parts manufacturing and/or maintenance & repair applications. Those systems allow from fast operation in both exterior and interior applications up to more structural demanding repair operations.

Structural repair solution

Epocast® 52 can be highlighted as the first repair system qualified by CACRC (Commercial Aircraft Composite Repair Committee).

Syntactics

Ultra low density

Product designation	Selected specifications	Work life	Curing class[1]	Typical service temperature	Typical compressive strength	Density	
Conditions		RT			RT		
Norms					ASTM D-695		
Unit		min	°C	°C	MPa	g/cm³	
One-component pre-mix frozen syntactic							
Epocast® 1610-A1	BMS 5-28, type 10	30 days	120	90	15	0.50	
Epocast® 1661	PWA 36757-2	8 h	180	180	60	0.60	
Two-component syntactic							
Epocast® 1629-A/B	-	70	RT	70	20	0.48	
Araldite® 1641-A/B	MSRR 1076	180	100	90	15	0.50	
Araldite® 1644-A/B	AIMS 10-03-001	30	RT	80	30*	0.55	

Low density

Product designation	Selected specifications	Work life	Curing class[1]	Typical service temperature	Typical compressive strength	Density	
Conditions		RT			RT		
Norms					ASTM D-695		
Unit		min	°C	°C	MPa	g/cm³	
One-component pre-mix frozen syntactic							
Epocast® 1614-A1	BMS 5-28, type 14, classes 1 and 2	8 h	120 - 180	180	100	0.75	
Two-component syntactic							
Araldite® 252-A/B	ASNA 4072, issue A	60	RT	70	35	0.65	
Epocast® 1626-A/B	BMS 5-28, type 26	60	RT	70	-	0.65	
Epocast® 1626-C1/D2	BMS 5-28, type 26, SMS 116201, type 3	10	RT	70	-	0.65	
Epocast® 169-A/9615	SS-9587, type 1	90 - 120	RT	70	15	0.68	
Epocast® 169-A/9646	-	25 - 40	RT	70	55	0.68	
Epocast® 167-A/B	BMS 5-28, type 1	50 - 70	RT	90	40	0.70	
Epocast® 1617-A/B	BMS 5-28, type 17, RMS 027, type 5, class 3	60 - 90	RT	70	40	0.70	
Epocast® 1618-D/B	BMS 5-28, type 18, class 1	15	RT	90	35	0.70	
Epocast® 1619-A/B	BMS 5-28, type 19	20 - 50	RT	70	40	0.70	
Epocast® 1633-A/B	BMS 5-28, type 18, class 2, AIMS 08-08-001-04	2 - 5	RT	70	45	0.73	

* ISO 604

** Eposert® = Preformed, cured syntactics. Other Eposert types can be made available on request

RT: Room Temperature = 23±2°C

CTE: Coefficient of Thermal Expansion

1: for RT curing class post-cure will improve performance

	Flame retardant properties	Available in		Key characteristics / applications	Packaging / Supply form				
		EU	US		Bulk	Cartridge	Semkit	Patty	Eposert®**
	●	●	●	can be co-cured with composites, for insert potting, no mark-off	●				
	●		●	in patty form, used for engine blade protection				●	
	●		●	soft paste, extrudable, resists slump on vertical surfaces, easily sandable	●				
		●	●	vibration damping, non-sagging	●		●		
		●	●	no slump, quick setting	●				

	Flame retardant properties	Available in		Key characteristics / applications	Packaging / Supply form				
		EU	US		Bulk	Cartridge	Semkit	Patty	Eposert®**
	●	●	●	structural syntactic, high compression strength		●		●	●
	●	●		easily sandable, gap filling	●				
		●	●	toughened, impact and vibration resistant	●		●		
			●	faster version of Epocast® 1626-A/B		●			
			●	pourable, easy handling, woodlike product, sandable, machinable	●				
			●	non-flow paste, easy handling, woodlike product, sandable, machinable	●				
			●	pourable, good moisture resistance, ideal for repair and edge filling applications	●				
	●	●	●	easy to handle, sealing for honeycomb structures, insert bonding, floor panel applications	●				
	●	●	●	pumpable, quick-setting	●		●		
	●	●	●	pourable, resistance to water, fungus and most aircraft fluids	●				
	●	●	●	easily extruded, non-flowing after application		●			

Syntactics

Medium density

Product designation	Selected specifications	Work life	Curing class[1]	Typical service temperature	Typical compressive strength	Density	
Conditions		RT			RT		
Norms					ASTM D-695		
Unit		min	°C	°C	MPa	g/cm³	
Two-component syntactic							
Epocast® 1656-A/B	GM 4006, type 1, class B	50 - 90	RT	120	55	0.80	
Epocast® 1652-A/B	GM 4006, type 1, class B, SS-9587, type 2, GMS 4005	30 - 60	RT	180	55	0.80	
Epocast® 89537-A/B	BMS 5-28, type 7, class 2	70	RT	180	60	0.90	
CG 1305-R/H	BMS 5-28, type 7, class 1	> 60	RT	180	60	0.90	

High density

Product designation	Selected specifications	Work life	Curing class[1]	Typical service temperature	Typical compressive strength	Density	
Conditions		RT			RT		
Norms					ASTM D-695		
Unit		min	°C	°C	MPa	g/cm³	
One-component pre-mix frozen syntactic							
Epocast® 938-A2	BMS 5-28, type 12, classes 1 and 2, type 13, RMS 027, type X, SMS 116201	18 h	120 - 180	180	150	< 1.4	
Epocast® 927-1	RMS 027, type XV	> 24 h	120 - 180	180	125	1.15	
Epocast® 1627-2	BMS 5-28, type 27	24 h	120 - 180	180	200	1.80	
Two-component syntactic							
Epocast® 1511-A/B	BMS 5-28, type 3	40 - 60	RT	70	70	1.25	
Epocast® 1636-A/B	BMS 5-28, type 6	120	RT	180	100	1.72	
Epocast® 1635-A/B	BMS 5-28, type 31	> 60	RT	180	100	1.80	

** Eposert® = Preformed, cured syntactics. Other Eposert types can be made available on request

RT: Room Temperature = 23±2°C

CTE: Coefficient of Thermal Expansion

1: for RT curing class post-cure will improve performance

	Flame retardant properties	Available in		Key characteristics / applications	Packaging / Supply form				
		EU	US		Bulk	Cartridge	Semkit	Patty	Eposert®**
		●	●	thick paste consistency	●				
		●	●	low exotherm, core splicing, used in helicopter blades	●		●		
	●	●	●	with glass fiber reinforcement, non sagging up to 12.5 mm	●				
	●	●	●	pourable, good handling	●		●		●

	Flame retardant properties	Available in		Key characteristics / applications	Packaging / Supply form				
		EU	US		Bulk	Cartridge	Semkit	Patty	Eposert®**
	●	●	●	structural syntactic designed for reinforcing honeycomb structures		●			
		●	●	structural syntactic designed for reinforcing honeycomb structures		●			
		●	●	low CTE		●		●	
		●	●	non-flow, repair of wing sections, edge filling	●				
	●	●	●	aluminium-filled, easy to handle, machinable	●				
		●	●	miss-drilled hole refiller, fatigue resistant	●				

Adhesives

Epoxy adhesives

Product designation	Selected specifications	Mixed viscosity	Work life	Curing class[1]	
Conditions		RT	RT		
Norms					
Unit		mPa·s	min	°C	
One-component					
Araldite® 204	ABR 2-0048, issue 1	3 500 000		120	
Two-component					
Araldite® 1570 FST A/B	AIMS 10-04-006	300 000	60	RT	
Araldite® 1592 A/B		thixotropic	100	RT	
Araldite® 2011	AIMS 10-04-020	viscous liquid	100	RT	
Araldite® 2013	ABR 5-1158, issue 2	paste	65	RT	
Araldite® 2015	ABR 2-0181	non-sag paste	35	RT	
Araldite® 420-A/B	ASNA 4215, issue B	viscous liquid	60	RT	
Araldite® AV 138M-1/HV 998	MSRR 9332	thixotropic	35	RT	
Epibond® 1217-A/B	HMS 16-1068, CL 8B	paste	4 - 8	RT	
Epibond® 420-A/B	BMS 5-107	semi-paste	70	RT	
Epibond® 8543-C/B	BMS 5-123, type 1, class 3	non-sag paste	3	RT	
Epibond® 1539-A/B	BMS 5-126, type 6, class 1	paste	120	RT	
Epibond® 1534-A/B	BMS 5-126, type 2, class 1	2 000	120	RT	
Epibond® 1536-A/B	BMS 5-126, type 3, class 1	2 500	120	RT	
Epibond® 104-A/B	BS 201	paste	30 - 40	RT	
Epibond® 1210-A/9615A	LAC 30-4639-0100	paste	50 - 75	RT	
Epibond® 1210-A/B	LAC 40-4093, class B	soft paste	50 - 75	RT	
Epibond® 1544-A/C	BMS 5-126, type 4, class 1, grade 2	semi-paste	10	RT	
Epibond® 156-A/B		soft paste	20 - 50	RT	
Epibond® 1559-1-A/B	qualification in progress	70 000	6	RT	
Epibond® 1210-A/9861	LAC 30-4639-0200	semi-paste	35 - 60	RT	
Epibond® 1565-A/B	Boeing D800-10411-1, PPD6-1	25 000	720	177	

1: for RT curing class post-cure will improve performance

2: packaging not qualified

RT: Room Temperature = 23±2°C

PS: Polystyrene

PC: Polycarbonate

	Typical service temperature	Typical lap shear strength (Al/Al)		Available in		Key characteristics / applications	Packaging	
		RT	80°C	EU	US		Bulk	Cartridge
		ASTM D - 1002 or ISO 4587						
	°C	MPa						
	90	15	10	●	●	foaming	●	●
	60	15	5	●	●	self extinguishing adhesive : FAR/JAR/CS 25, app. F, part 1 and 5	●	●[2]
	140	30	20	●	●	high temperature toughened structural adhesive, particularly suitable for composites bonding		
	60	25	8	●	●	tough		●
	60	20	5	●	●	non sagging up to 5 mm		●
	80	20	10	●	●	non sagging up to 10 mm, tough		●
	70	35	5	●	●	tough adhesive	●	●
	120	15	15	●		low out-gassing, gap-filling properties, high chemical resistance, good fatigue behaviour	●	
	65	15	3	●	●	translucent, fast setting	●	●
	65	25	n.a.	●	●	tough adhesive, good peel strength	●	●
	80	15	3	●	●	fast setting, 1:1 mixing ratio	●	
	80	15	5		●	high performance composite bonding	●	
	80	20	5		●	Good properties in the presence of distilled water, salt water, JP-4, hydraulic fluids, etc	●	●
	80	15	5		●	1:1 mixing ratio, specifically formulated for bonding GFRP together or to other materials	●	
	90	15	5		●	good gap-filling properties, high compressive strength	●	
	90	15	n.a.	●	●	ideal for spacecraft applications with low out-gassing	●	
	90	15	2	●	●	flexible bond line	●	
	90	20	n.a.		●	self-extinguishing, early green strength, gap-filling properties	●	
	120	15	15		●	good electrical properties	●	
	120	20	n.a.		●	structural adhesive		●
	150	20	15	●	●	ideal for spacecraft applications with low out-gassing	●	
	170	7	n.a.		●	long work life, high temperature performance	●	

Adhesives

Polyurethane adhesives

Product designation	Selected specifications	Mixed viscosity	Work life	Curing class[1]	
Conditions		RT	RT		
Norms					
Unit		mPa·s	min	°C	
Uralane® 5754-A/B		6 000	12 - 18	RT	
Uralane® 5759-G/D	BMS 5-105, type 3	paste, sprayable	4 - 8	RT	
Uralane® 5772-A/B	GD 0-73668, type 1	semi-paste	15 - 20	RT	
Uralane® 5773-A/B	GD 0-73668, type 2	semi-paste	25 - 45	RT	
Uralane® 5774-A/C	BMS 5-105, type 5, AIMS 10-01-001, LES 1359	semi-paste	15 - 25	RT	
Uralane® 5776-A/B	BS 201	semi-paste	35 - 45	RT	
Uralane® 5779-A/B	BMS 5-105, type 6	non-flow paste	8 - 15	RT	
Uralane® 5779-A80/B	BMS 5-105, type 6	non-flow paste	8 - 15	RT	

1: for RT curing class post-cure will improve performance
RT: Room Temperature = 23±2°C
PS: Polystyrene
PC: Polycarbonate

Laminating systems for manufacturing, maintenance and repair

Product designation	Selected specifications	Typical mixed viscosity	Work life	
Conditions		RT	RT	
Unit		mPa.s	min	
Epocast® 50-A1/946	BMS 8-201, type 4	2 400	20	
Epocast® 50-A1/9816	BMS 8-201, type 3	2 400	65	
Epocast® 54-A/B	AIMS 04-27-000-01	8 000	15 - 25	
Araldite® LY 5052 / Aradur® 5052	AIMS 08-01-001, AIMS 08-02-001	800	130	
Araldite® 501-A/B	ASNA 4047, issue B	3 500	90	
Epocast® 35-A/ 927	BMS 8-214	7 000	4 - 5	
Epocast® 52-A/B	AIMS 08-01-002-01, AIMS 08-02-002-01, BMS 8-301, AMS 2980	5 500	≥ 3.5 h	

1: for RT curing class post-cure will improve performances
RT: Room Temperature = 23±2°C

	Typical service temperature	Typical lap shear strength (Al/Al)		Available in		Key characteristics / applications	Packaging	
		RT	80°C	EU	US		Bulk	Cartridge
		ASTM D - 1002 or ISO 4587						
	°C	MPa						
	80	4	1		●	ideal for PS,PC,acrylic, without surface preparation	●	
	80	5	2	●	●	sprayable adhesive, for most plastics, flame retardant	●	●
	120	15	n.a.	●	●	high peel strength	●	
	120	17	7 (at 120°C)		●	heat-resistant bonds between materials with different thermal expansion coefficients	●	
	80	15	10	●	●	high peel strength, impact resistant, flame retardant	●	●
	80	5	2		●	high peel strength	●	
	70	8	n.a.	●	●	UV & humidity resistant, flame retardant, 1:1 mixing ratio, white colour	●	●
	70	8	n.a.	●	●	UV & humidity resistant, flame retardant, 1:1 mixing ratio, beige colour	●	●

	Curing class[1]	Typical service temperature	Available in		Key characteristics/ applications
			EU	US	
	°C	°C			
	RT	90	●	●	
	RT	90	●	●	easy-to-handle, for the production of flame-retardant composites
	RT	90	●	●	
	RT	100	●	●	translucent, fast setting
	RT	120	●	●	good mechanical strength
	80 - 120	150		●	good high-temperature properties
	70 - 90	180	●	●	good hot-wet strength, listed in PRI-QPL-AMS 2980 for composite repair, CACRC qualified (Commercial Aircraft Composite Repair Commitee)

With innovation

Every day, all over the world, our Technical Competence centers engage in intensive research and development focusing on one goal : to deliver innovative solutions by working hand-in-hand with our business partners. Together through a continual exchange of ideas, supported by an experienced team of sales and technical specialists, we strive to deliver innovative solutions.

We track both new market expectations and changing regulations. Protection of the environment, as well as health and safety are paramount concerns, playing an integral part in our development projects.

By providing certified technologies, combined with high quality and reliability, our chemists and experts bring enhanced value to our customers, ensuring their success.

With customer intimacy

We market a unique product portfolio and a broad range of forward-looking solutions for our customers. Customers and partners benefit from an advanced level of service in:

> product development and quality
> product trials in-house and with customers
> customer seminars and training
> trouble-shooting and problem-solving

Partnership with our customers is more than simply «putting them first». It requires long-term commitment to forging close relationships that create synergies of knowledge, security and adaptability to create a successful, shared future.

With care

Sustainability is a fundamental part of our corporate and business strategy. We see a better world in which our innovations help reduce consumption of natural resources and improve the quality of life for people everywhere. We are identifying the long-term trends that affect our markets and looking to see how products and applications can play a part in supporting and providing solutions to the challenges those markets face.

We value your challenge

Huntsman Advanced Materials

Our Advanced Materials division is a leading global chemical solutions provider with a long heritage of pioneering technologically advanced epoxy, acrylic and polyurethane-based polymer products.

Our capabilities in high-performance adhesives and composites, delivered by more than 2 300 associates, serve over 3 000 global customers with innovative, tailor-made solutions and more than 1 500 products which address global engineering challenges.

Global presence – 13 manufacturing sites

Mobile Apps from Huntsman Advanced Materials

Download our mobile App and easily find the product to fulfill your need.

Available on the App Store

ANDROID APP ON Google play

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Enriching lives through innovation

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OUR COMMITMENT TO SUSTAINABILITY

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