HUNTSMAN
Enriching lives through innovation

Advanced Materials

Epibond® 8000 FR A/B Flame-retardant Epoxy Structural Adhesive

KEY PROPERTIES

- **FST adhesive**
- **High shear and peel strength**
- **Service temperature up to 180°F (82°C)**
- **Very-low halogen content**
- **Curable from ambient to elevated temperatures**
- **Gap-filling thixotropic paste**
- **No SVHC as defined under REACH***

DESCRIPTION

Epibond® 8000 FR A/B is an extrudable two-component epoxy structural adhesive designed for applications requiring flame retardancy and FST properties required by FAR 25.853. This adhesive is suitable for bonding a wide variety of composite materials, metal and other dissimilar substrates. Epibond® 8000 FR A/B does not contain any halogenated nor antimony-based flame retardants additives. This adhesive has a convenient mix ratio, moderate work life and is easily extrudable from cartridges or dispensing equipment.

TYPICAL PROPERTIES

Property	Epibond® 8000 FR A Resin	Epibond® 8000 FR B Hardener	Mixed adhesive	Test Method
Color	Off-white	Light blue	Off-white	Visual
Specific gravity	1.4	1.3	1.3	ASTM D-891
Viscosity at 77°F(25°C), cps	Semi-Paste	Paste	Thixotropic Paste	ASTM D-2196
Gel time, 20 gm at 77°F (25°C), minute			65 - 70	ASTM D-2471

Mix ratio	Parts by weight	Parts by volume
Epibond® 8000 FR A Resin	100	2
Epibond® 8000 FR B Hardener	48	1

PROCESSING

Under normal temperature conditions according to the standard mix ratio this material has a working time of approximately 50 - 55 minutes.

Pretreatment

Substrates to be bonded should be properly surface treated and be free from contaminants.

Mixing

Mix both components thoroughly for several minutes until a homogeneous mixture is obtained, or dispense from a 2:1 200ml or 50ml dual barrel cartridge. For the 200 ml size, use an MC 10-mm dia. x 18-element spiral mixing nozzle or equivalent. For the 50ml, use an MC 06-mm dia. x 18- element spiral mixing nozzle or equivalent.

* Does not intentionally contain any Substances of Very High Concern (SVHC) for authorization as published

by the European Chemicals Agency (ECHA) pursuant to Article 59 REACH as of Dec. 19, 2012

Application:
The mixed adhesive should be spread with a spatula to the suitable pretreated dry joint surfaces. A layer of adhesive 0.004 to 0.012 inches (0.1 to 0.3 mm) thick will normally provide the maximum lap shear strength. This adhesive, however, has been designed to be effective in layers up to 0.12 in. (3mm). The components to be bonded should be assembled and clamped as soon as the adhesive has been applied. Even contact pressure throughout the joint area during cure will ensure optimum performance.

Mixed flow	**Units**		**IMS-LA-INST-005**
tested at 77°F (25°C)	inches	<1.0	
Extrusion rate 70 psi	g/min	65	**Dispensability with 1/8" nozzle ,**

Handling strength
Measured by lap shear strength with treated and primed Aluminum at RT in psi (MPa)

Cure time at 77°F (25°C), hour	Lap Shear Strength, psi (MPa)
3	185 (1.3)
4	1,835 (12.7)
5	2,010 (13.9)
Cure time at 135°F (57°C), minute	
30	2,780 (19.2)

Recommended cure cycle:
5 to 7 days at 77°F (25°C), or 1.5 hours at 135°F (57°C).

TYPICAL CURED ADHESIVE PROPERTIES
(Not for specification purposes)

Substrate:
Phosphoric acid anodized and primed aluminium
Cure Cycle:
1.5 hours at 135°F (57°C)

	Test	**Units**	**Results**	**Test method**
Tensile lap shear strength	Tested at 77°F (25°C)	psi (MPa)	3,900 (26.9)	ASTM D-1002
	Tested at 160°F (71°C)	psi (MPa)	2,400 (16.5)	"
	Tested at 180°F (82°C)	psi (MPa)	1,290 (8.9)	"
	Tested at 200°F (93·C)	Psi (MPa)	823 (5.7)	"
	Tested at 77°F (25°C) after 14 days at 160°F at 95% RH	psi (MPa)	2,275 (15.7)	"
Roller peel strength	Tested at 77°F (25°C)	pli (Nmm)	23 (4.0)	ASTM D-3167
Flammability	**60-sec vertical burn, honeycomb panel**			CFR 25.853, Appendix F, Part 1

	Outside or inside burn:			"
	Flame extinguish time	sec	<10	
	Burn length	inches	<1	
	Drip extinguish time	sec	<1	
	12-sec vertical burn on neat resin (0.25" x 3" x 12")			"
	Flame extinguish time	sec	0.3	
	Burn length	inches	0	
	Drip extinguish time	sec	No drip	
	50-sec vertical burn on neat resin (0.25" x 3" x 12")			"
	Flame extinguish time	sec	1.75	
	Burn length	inches	1.3	
	Drip extinguish time	sec	No drip	
FST Properties	**Flammability, 60- sec vertical burn on neat resin (0.5" x 0.5" x 12" bar)**			FAR 25.853 Appendix F
	Flame extinguish time	sec	10	
	Burn length	inches	2.7	
	Drip extinguish time	sec	No drip	
	Smoke density at 4-minutes			ASTM E-662
	Specific optical density	Ds	97 Max. avg. smoke density	
	Toxic gas concentrations of smoke at 4-minutes			
	HCN	ppm	25	
	CO – Ref	ppm	85	
	NOx	ppm	80	
	HF	ppm	10	
	HCl	ppm	1.5	
		ppm	5.0	

NEAT RESIN PROPERTIES

Tensile strength at 77°F (25°C)	psi (MPa)	5,260 (36.3)	ASTM D-638
E-Modulus	ksi (MPa)	497 (3,426.7)	
Elongation at break	%	2.5	
Flexural strength at 77°F (25°C)	psi (MPa)	9,050 (62.4)	ASTM D-790
Flexural modulus	ksi (MPa)	432 (2,978.5)	

	Compressive strength at 77°F (25°C)	psi (MPa)	16,300 (112.4)	ASTM D-695
	Tg by DSC	°F (°C)	162.5 (72.5)	ASTM D-3418
	Tg by DMA	°F (°C)	158 (70)	ASTM D-7028
	Shore D hardness		85	ASTM D-2250
	Shear modulus G' at 77°F (25°C)	Ksi (MPa)	218 (1,506)	ASTM D-5279
	140°F (60°C)	Ksi (MPa)	118 (814.4)	
	158°F (70°C)	Ksi (MPa)	30.6 (211.4)	
	176°F (80°C)	Ksi (MPa)	37.1 (5.4)	
DECOMPOSITION TEMPERATURE BY TGA	**Td (2%)**	°F (°C)	518 (270)	IPC-TM-650
	Td (5%)	°F (°C)	577 (303)	

Halogen content (Determined by Energy Dispersion X-ray Fluorescence)

	Resin	**Hardener**
Chlorine	< 1,000 ppm	< 150 ppm
Bromine	Not detectable	Not detectable

STORAGE

When stored in their original sealed containers at a temperature within +2°C and +40°C (+36°F and 104°F), Epibond® 8000 FR A Resin and Epibond® 8000 FR B Hardener have a twelve months shelf-life from date of manufacture. Tightly reseal containers after each use

HANDLING PRECAUTIONS

Caution

Use a ventilation hood if possible, or appropriate NIOSH approved respiratory. Do not use this product until the MSDSs have been read and understood. To protect against any potential health risks presented by our products, the use of proper personal protective equipment (PPE) is recommended. Eye and skin protection is normally advised. Respiratory protection may be needed if mechanical ventilation is not available or is insufficient to remove vapors. For detailed PPE recommendations and exposure control options consult the product MSDS or a Huntsman EHS representative.

HUNTSMAN

Enriching lives through innovation

IMPORTANT LEGAL NOTICE

Huntsman Advanced Materials warrants only that its products meet the specifications agreed with the user. Typical properties, where stated, are to be considered as representative of current production and should not be treated as specifications.

The manufacture of materials is the subject of granted patents and patent applications; freedom to operate patented processes is not implied by this publication.

While all the information and recommendations in this publication are, to the best of Huntsman Advanced Material's knowledge, information and belief, accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, WHETHER EXPRESS OR IMPLIED, INCLUDING BUT WITHOUT LIMIATION, AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

The behaviour of the products referred to in this publication in manufacturing processes and their suitability in any given end-use environment are dependent upon various conditions such as chemical compatibility, temperature, and other variables, which are not known to Huntsman Advanced Materials. It is the responsibility of the user to evaluate the manufacturing circumstances and the final product under actual end-use requirements and to adequately advise and warn purchasers and users thereof.

Products may be toxic and require special precautions in handling. The user should obtain Safety Data Sheets from Huntsman Advanced Materials containing detailed information on toxicity, together with proper shipping, handling and storage procedures, and should comply with all applicable safety and environmental standards.

Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent on manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.

Except where explicitly agreed otherwise, the sale of products referred to in this publication is subject to the general terms and conditions of sale of Huntsman Advanced Materials LLC or of its affiliated companies including without limitation, Huntsman Advanced Materials (Europe) BVBA, Huntsman Advanced Materials Americas Inc., and Huntsman Advanced Materials (Hong Kong) Ltd.
Huntsman Advanced Materials is an international business unit of Huntsman Corporation. Huntsman Advanced Materials trades through Huntsman affiliated companies in different countries including but not limited to Huntsman Advanced Materials LLC in the USA and Huntsman Advanced Materials (Europe) BVBA in Europe.

Epibond is a registered trademark of Huntsman Corporation or an affiliate thereof in one or more, but not all, countries.

Huntsman Advanced Materials
10003 Woodloch Forest Drive
The Woodlands, Texas 77380

Tel: 888-564-9318
Fax: 281-719-4047
www.huntsman.com/advanced_materials