GS POLYMERS
Polyurethane & Epoxy Products

Technical Data Sheet

E-BOND 1605 (E-Bond 1605-B30; E-Bond 1605-B50; E-Bond 1605-B90; E-Bond 1605-B120)

EPOXY STRUCTURAL ADHESIVE: Aircraft Cabin Sto-Bin/Panel adhesive
Anti-Yellowing White, Self-Extinguishing

GENERAL DESCRIPTION

E-BOND 1605 is an extrudable two-part, room temperature curing epoxy structural adhesive. It was developed to resist yellowing while requiring flame retardancy to meet UL94 V-0, 1.6mm and FST properties required by FAR 25.853. This adhesive system has four (4) work life speeds to choose from. Thus, allowing the user to choose a work life which wills suite the size of the panel being bonded. All four (4) work life speeds will cure rapidly enough to allow bonded assemblies to be handled within 4-16 hrs depending on the speed chosen.

E-BOND 1605 is a toughened adhesive, offering excellent adhesion to a variety of substrates: metal to metal, variety of plastics, FRP, composites, etc. while maintaining very good impact, thermal shock and chemical resistance.

E-BOND 1605 is halogen and antimony free.

E-BOND 1605 is formulated with non-abrasive fillers making it user-friendly for pumping equipment. In addition, does not contain REACH SVHC's and is RoHS compliant.

E-BOND 1605 Can be conveniently packaged in side-by-side 4:1 cartridges or in bulk. It is easily extruded from cartridges and dispensing equipment.

FEATURES

Meets FST Properties per FAR 25.853
Thixotropic, R.T. Curing
Anti-Yellowing and UV Resistance
Halogen and Antimony Free
Excellent adhesive properties
Excellent thermal shock resistance
SVHC free per REACH** requirements

APPLICATIONS

Aerospace Honeycomb Panels
Sub-Assembly bonding
FRP bonding
Metal to metal bonding
Plastic bonding
Composite bonding
Insert Bonding & Gap Filling

KEY FEATURES

E-Bond 1605 (Part A) Common to all speeds	Very Good Adhesive Strengths
Four (4) Work Life Speeds	Very Good Impact Resistant
Same user-friendly mix ratio, Easy mixing	Anti-yellowing Formula
Thixotropic Rheology	Flame Resistance to FAR 25.853

UN-CURED PROPERTIES, TYPICAL

Property	E-BOND 1605	-B30, -B50, -B90, -B120
Solids	100%	100%
Color	White	Off-White
Density (lb/gal)	11.8 – 12.1	9.7 – 10.0
Viscosity (cps), @ 77°F (25°C)	Thixotropic Paste	Soft Thixotropic Paste
Shelf Life*, stored @ 77°F (25°C)	12 months	12 months

***Shelf Life, ELLSWORTH Facility Storage:** *When stored sealed and unopened at 32°F/0°C or below, Shelf Life is 12 months from Date of Shipment (DOS) from an Ellsworth Facility.*

General Applications

E-BOND 1605 was developed for honeycomb construction panels generally found in aircraft cabins (interiors) e.g. Sto-Bins, Galleys, various aircraft interior compartments, inserts, panels, doors, etc.

PROPERTIES	E-Bond 1605-B30 30 mins "Mid-Range/Med"	E-Bond 1605-B50 50 mins SLOW	E-Bond 1605-B90 90 mins SLOW	E-Bond 1605-B120 120 mins SLOW
Mix Ratio, pbw (A:B) **Mix Ratio, pbv (A:B)**	100A : 20B 4 : 1			
Working Time, (mins)	30	50	90	120
RT*: Time to Shore D70 (hours), 10g	6-9	9-12	12-16	18-20
120°F: Time to Shore D70 (mins), 10g	< 60	< 90	< 120	< 150

***RT = Room Temperature, 77°F/25°C, 50% RH**

Mixed Handling Properties, typical

CURED Hardness vs. Time and Temp, typical

PROPERTIES	E-Bond 1605-B30 30 mins "Mid-Range/Med"		E-Bond 1605-B50 50 mins Medium		E-Bond 1605-B90 90 mins SLOW		E-Bond 1605-B120 120 mins SLOW	
Shore D, Cured: 60 mins @ temp (10 grams)	**120°F** 72-75D	**130°F** 75-80D	**120°F** 40-45D	**130°F** 68-72D	**120°F** 20-35D	**130°F** 68-72D	**120°F** 20-35D	**130°F** 68-72D
Shore D, Cured: 75 mins @ temp (10 grams)	**120°F** 85D+		**120°F** 55-60D	**130°F** 75D+	**120°F** 40-50D	**130°F** 75D+	**120°F** 40-50D	**130°F** 75D+
Shore D, Cured: 90 mins @ temp (10 grams)	**120°F** 85D+		**120°F** 70-75D	**130°F** 80D+	**120°F** 60-70D	**130°F** 80D+	**120°F** 60-70D	**130°F** 80D+
Shore D, Cured: 1hr RT* + 1hr @ 120°F (10 grams)	81D+		45D+		30D+		25D	
Ultimate Shore D, minimum (Full Cure: 7 days @ 77°F)	85D+		85D+		85D+		85D+	

***RT = Room Temperature, 77°F/25°C, 50% RH**

PHYSICAL PROPERTIES, TYPICAL

The following technical information should be considered typical only and not to be used for specification purposes. For specific applications contact the Ellsworth Technical Department.

Lap Shear Adhesive Properties vs. Time and Temp, typical

PROPERTIES	E-Bond 1605-B30 30 mins "Mid-Range/Med"	E-Bond 1605-B50 50 mins Medium	E-Bond 1605-B90 90 mins SLOW	E-Bond 1605-B120 120 mins SLOW
Lap Shear, Al-Al, 5.5hrs RT* Cure, (psi)**	ND	ND	ND	ND
Lap Shear, Al-Al, 6.5 hrs RT* Cure, (psi)**	ND	ND	ND	ND
Lap Shear, Al-Al, 10 hrs RT* Cure, (psi)**	>2000+	**SHORED D 65/60D** 1900	**ND**	**ND**
Lap Shear, Al-Al, 24hrs RT* Cure, (psi)**	3100+	3100+	3000+	3000+
Lap Shear, Al-Al, (psi) 40 minutes into pot-Life 24hr RT* Cure**	>3500+	>3100+	>3000+	>3000+
Lap Shear, Al-Al, (psi) 50 minutes into pot-Life 24hr RT* Cure**	>3000+	>3100+	>3000+	>3000+
Lap Shear, Al-Al, 7 days RT* Cure, (psi)**	>3500+	>3500+	>3500+	>3500+

***RT = Room Temperature, 77°F/25°C, 50% RH **Grit Blasted followed by acetone solvent wipe**
NOTE: Chemically treated surfaces have better adhesive strengths

Cured Adhesive Surface Appearance

PROPERTIES 10 mils Film Thickness Cured Overnight (16hrs)	E-Bond 1605-B30 30 mins "Mid-Range/Med"	E-Bond 1605-B50 50 mins SLOW "	E-Bond 1605-B90 90 mins SLOW	E-Bond 1605-B120 120mins SLOW
77°F (25°C), 50% RH	Non-Tacky Semi-Gloss	Non-Tacky Semi-Gloss	Non-Tacky Semi-Gloss	Non-Tacky Semi-Gloss
55-60°F (13-15°C), 70% RH	Non-Tacky Semi-Gloss	Non-Tacky Semi-Gloss	Non-Tacky Semi-Gloss	Non-Tacky Semi-Gloss

INSTRUCTIONS FOR USE

SIDE-BY-SIDE (SBS) CARTRIDGE:

The recommended method to ensure an accurate mix ratio when dispensing material from a 4:1 50ml, 200ml or 400ml side-by-side (SBS) tube/cartridge through a static mixer nozzle is as follows:

- **50 ml/cc SBS tube: use MA 06.3mm x 21S-element spiral mixing nozzle or equivalent**
- **200 & 400 ml/cc SBS cartridge: use MCX 10 x 24-element spiral mixing nozzle or equivalent**

1. Remove the nozzle tip-cap by twisting and pulling it off. Do not discard tip cap unless all the material in SBS tube is used. Save for reattachment to seal remaining material in the SBS tube.
2. Extrude enough material until there is an even flow of material from both openings. Discard this material extruded from the SBS tube.
3. Attach the mix static nozzle by twisting it on the nozzle tip. Extrude material until ~2-3 cm (~1 inch) of material has extruded. Discard this material extruded from the mixer.
4. Material can now be applied directly to the bonding surface.
5. When application is complete and there is still material remaining in the SBS tube, remove and discard the static mix nozzle.
6. Clean the tip-cap thoroughly to prevent cross contamination of the tip openings.
7. Attach tip-cap back onto the SBS tube.

TO MIX BY HAND:

Mix Ratio by Volume: **4** parts by volume **E-Bond 1605 Part A** to **1** part by volume **Part B** (**-B30, -B50, -B90, -B120**)
Mix Ratio by Weight: **100** parts by weight **E-Bond 1605 Part A** to **20** parts by weight **Part B** (**-B30, -B50, -B90, -B120**)

Pot-Life: Don't mix more than can be applied for:
-B30, *15-20 mins*; **-B50**, *20-40 mins*; **-B90**, *50-60 mins;* **-B120**, *70-100 mins*

Measure out components according to parts by weight or volume ratio into a non-reactive container (polyethylene, polypropylene, or metal de-rimmed can). Container should be about five times larger than the volume of the mixed material. Mix components very thoroughly, preferably with a metal spatula, scraping the sides and bottom of container to incorporate all material.

If working time allows, transfer material to a clean container without scraping sides or bottom before applying. Material should be used immediately.

Note: During application, do not scrape sides or bottom of the container used for mixing. Residual amounts of poorly mixed material may be incorporated. Such material may fail to cure completely, and may not achieve full physical properties.

Applying - Bonding surfaces should be clean, dry and properly prepared. For optimum surface preparation, contact Ellsworth Technical Department. The bonded parts should be held in contact until the adhesive is cured. Optimum bond line thickness is (.002" - .010" inches).

Curing - This adhesive may be cured as follows to achieve normal performance:

- Seven (7) days at R.T. (25°C/77°F)
- 1 - 3 hours at R.T. (25°C/77°F) plus 1-3 hours 49°C-60°C (120-140°F)
- Contact GS Polymers Technical Department for other curing options.

Cleanup - It is important to remove excess adhesive from the work area and application equipment. Denatured alcohol, isopropyl alcohol, acetone and many common industrial solvents are suitable for removing uncured adhesive. Consult the supplier's information for the safe and proper use of solvents.

Shelf Life / Storage Stability – When stored in their original sealed containers at a temperature between +2°C (36°F) and 40°C (104°F), E-Bond 1605 Part A and the curing agents (Part B; -B10, -B30, -B50) is twelve (12) months from date of shipment.

3687-B Grapevine Street, Mira Loma, CA 91752
951-360-0607 • www.gspolymers.com • sales@gspolymers.com

Notice to User:

The following is made in lieu of all warranties, expressed or implied. Sellers and manufacturers only obligation shall be to replace such quantity of product proved to be defective. Neither seller nor manufacturer shall be liable for any injury, loss or damage, direct or consequential, arising out of the use of or the inability to use the product. Before using, user shall determine the suitability of the product for his intended use, and user assumes all risks and liability whatsoever in connection therewith. The foregoing may not be altered except by an agreement signed by officers/owners of G.S. Polymers, Inc.

Original: 01-25-2017

Revision: 08-30-2019 replaces 03-13-2018