ECCOBOND® 285
Thermally Conductive, Epoxy Paste Adhesive

Key Feature:	Benefit:
• Thermal conductivity	• Dissipation of heat from bonded components
• Thixotropic paste	• No flow or sag even on vertical surfaces
• Wide variety of catalysts available	• Versatility of resin system
• Low coefficient of thermal expansion	• Low stress on bonded components

Product Description:

ECCOBOND 285 is a highly filled, thermally conductive, thixotropic, non-sag paste epoxy adhesive that can be used with a variety of catalysts. It features low coefficient of thermal expansion and good bond strength. When cured with CATALYST 23 LV, ECCOBOND 285 can be used at cryogenic temperatures and has good thermal cycling properties.

Applications:

ECCOBOND 285 is designed for bonding metals and ceramic substrates in heat sink applications or any application that requires a thermally conductive adhesive for thermal management. It is also useful for any application that requires a thixotropic paste adhesive and low stress bonds.

Instructions For Use:

Thoroughly read the information concerning health and safety contained in this bulletin before using. Observe all precautionary statements that appear on the product label and/or contained in individual Material Safety Data Sheets (MSDS).

To ensure the long term performance of the bonded assembly, complete cleaning of the substrates should be performed to remove contamination such as oxide layers, dust, moisture, salt, and oils which can cause poor adhesion or corrosion in a bonded part. For information on proper substrate preparation, refer to the reprint “Good Adhesive Bonding Starts With Surface Preparation” available from Emerson & Cuming.

Some filler settling is common during shipping and storage. For this reason, it is recommended that the contents of the shipping container be thoroughly mixed prior to use. Power mixing is preferred to ensure a homogeneous product.

Accurately weigh resin and hardener into a clean container in the recommended ratio. Weighing apparatus having an accuracy in proportion to the amounts being weighed should be used.

Blend components by hand, using a kneading motion, for 2-3 minutes. Scrape the bottom and sides of the mixing container frequently to produce a uniform mixture. If possible, power mix for an additional 2-3 minutes. Avoid high mixing speeds which could entrap excessive amounts of air or cause overheating of the mixture resulting in reduced working life.

Apply the adhesive to all surfaces to be bonded and join together. In most applications only contact pressure is required.

Properties of Material As Supplied:

Property	Test Method	Unit	Value
Chemical Type			Epoxy
Appearance	Visual		Thixotropic black paste
Density	ASTM-D-792	g/cm^3	2.40

Choice of Curing Agents			
Curing agent	Catalyst 9	Catalyst 11	Catalyst 23 LV
Description	General purpose with good chemical resistance and physical strength.	Long pot life, excellent chemical resistance, good physical and chemical properties at elevated temperatures.	Low color, low viscosity, long pot life. Excellent, thermal shock and impact resistance. Excellent low temperature properties and adhesion to glass.
Type of cure	Room	Heat	Room
Viscosity Pa.s cP	0.080 to 0.105 80 to 105	0.035 to 0.060 @ 65 °C 35 to 60 @ 65 °C	0.020 to 0.030 20 to 30

Properties of Material As Mixed:

Property	Test Method	Unit	Value		
			Catalyst 9	Catalyst 11	Catalyst 23 LV
Mix Ratio - Amount of Catalyst per 100 parts of ECCOBOND 285		By Weight By Volume	3.5 8.5	4.0 9.9	7.3 17.0
Working Life (100 g @ 25°C)	ERF 13-70		45 minutes	4 hours	60 minutes
Density	ASTM-D-792	g/cm^3	2.27	2.27	2.18

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Cure Schedule:
Cure at any one of the recommended cure schedules. For optimum performance, follow the initial cure with a post cure of 2-4 hours at the highest expected use temperature. Alternate cure schedules may also be possible. Contact your Emerson & Cuming Technical Representative for further information.

Temperature °C	Cure Time		
	Catalyst 9	**Catalyst 11**	**Catalyst 23 LV**
25	16-24 hrs		16-24 hrs
45	4-6 hrs		4-6 hrs
65	1-2 hrs		2–4 hrs
80		8-16 hrs	
100		2-4 hrs	
120		30-60 min	

Properties of Material After Application:

Property	Test Method	Unit	Value		
			Catalyst 9	Catalyst 11	Catalyst 23 LV
Tensile Lap Shear Strength aluminum to aluminum @ 25°C aluminum to aluminum @ 100°C aluminum to aluminum @ -55°C	ASTM D-1002	 mPa psi mPa psi mPa psi		 14.5 2,100 9.7 1,400 12.4 1,800	
Coefficient of Thermal Expansion	ASTM-D-3386	10^{-6}/°C		29	
Glass Transition Temperature	ASTM-D-3418	°C		112	
Thermal Conductivity	ASTM-D-2214	W/m.K Btu-in/hr-ft^2-°F	1.44 10	1.44 10	1.22 8.5
Temperature Range of Use		°C	-40 to +130	-55 to +155	-65 to +105
Outgassing(1) TML CVCM	ASTM-E-595	 % %	 0.29 0.00	 0.28 0.01	
Dielectric Strength	ASTM-D-149	kV/mm V/mil	17.7 450	17.7 450	17.7 450
Dielectric Constant @ 1 mHz	ASTM-D-150	-		5.8	
Dissipation Factor @ 1 mHz	ASTM-D-150	-		0.02	
Volume Resistivity @ 25°	ASTM-D-257	Ohm-cm	10^{15}	10^{15}	10^{15}

(1) per NASA Reference Publication 1124. Sample tested was cured for 7 days @ 25°C using Catalyst 9, 8 hours @ 82°C using Catalyst 11.

Storage and Handling:
The shelf life of ECCOBOND 285 is 12 months at 25°C. For best results, store in original, tightly covered containers. Storage in cool, clean and dry areas is recommended. Usable shelf life may vary depending on method of application and storage conditions.
Certain resins and hardeners are prone to crystallization. If crystallization does occur, warm the contents of the shipping container to 50-60°C until all crystals have dissolved. Be sure the shipping container is loosely covered during the warming stage to prevent any pressure build-up. Allow contents to cool to room temperature before continuing.

Health and Safety:
The ECCOBOND 285, like most epoxy compounds, possesses the ability to cause skin and eye irritation upon contact. Certain individuals may also develop an allergic reaction after exposure (skin contact, inhalation of vapors, etc.) which may manifest itself in a number of ways including skin rashes and an itching sensation. Handling this product at elevated temperatures may also generate vapors irritating to the respiratory system.

Good industrial hygiene and safety practices should be followed when handling this product. Proper eye protection and appropriate chemical resistant clothing should be worn to minimize direct contact. Consult the Material Safety Data Sheet (MSDS) for detailed recommendations on the use of engineering controls and personal protective equipment.

This information is only a brief summary of the available safety and health data. Thoroughly review the MSDS for more complete information before using this product.

Attention Specification Writers:
The values contained herein are considered typical properties only and are not intended to be used as specification limits. For assistance in preparing specifications, please contact Emerson & Cuming Quality Assurance for further details.

Medical Implantable Disclaimer

"In the event this product is intended by you for use in implantation in the human body, you are hereby advised that Henkel Corporation (or Emerson & Cuming) has not performed clinical testing of these materials for implantation in the human body nor has Henkel Corporation (Emerson & Cuming) sought, nor received, approval from the FDA for the use of these material in implantation in the human body. It is YOUR responsibility, as a manufacturer of any such device, to ensure that all materials and processes relating to the manufacture of any medical device fully comply with all applicable federal, state and local laws, rules, regulations and requirements as well as any such laws, rules, regulations, directives or other orders of any foreign country where such product is sold. If you have not undertaken the necessary investigations to ensure compliance you are advised NOT TO USE this product in the manufacture of any device which is to be implanted in the human body. No representative of ours has any authority to change the foregoing provisions."

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