ThreeBond

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Three Bond Fine Chemical Co., Ltd.

Technical Data

ThreeBond 2270J

High-heat-dissipation, one-component, heat-curable epoxy-compound resin

1. Product description

ThreeBond 2270J is a one-component, heat-curable epoxy-compound resin having high thermal conductivity. Unlike two-component type resins, it does not require troublesome operations, such as mixing. It has low linear expansion coefficient and cure shrinkage and is suitable for bonding and potting where durability is required.

Hereinafter, ThreeBond is abbreviated to TB.

2. Features

(1) One-component, heat-curable adhesive
(2) High thermal conductivity
(3) Low linear expansion coefficient and cure shrinkage
(4) Excellent low temperature curability and durability

3. Applications

Bonding and potting of electronic components requiring heat dissipation

4. Properties

Table 1 Properties of TB2270J

Test item	Unit	Result	Test method	Remarks
Appearance	-	White	3TS-2100-020	-
Viscosity	Pa·s	150	3TS-2F00-007	Shear rate:1.0[s^{-1}]
Specific gravity	-	2.86	3TS-2500-002	25°C

5. Characteristics

5.1 Characteristics of cured material

Table 2 Characteristics of TB2270J after curing

Test item	Unit	Result	Test method	Remarks
Hardness	-	D96	3TS-2B00-004	-
Thermal conductivity	W/m·k	4.2	3TS-4750-002	
Specific gravity of cured resin	-	2.90	3TS-2500-003	4-g circular (30 in diam.) cured material
Cure shrinkage	%	1.4	3TS-2600-001	-
Lap shear strength	MPa	6.7	3TS-4100-011	Al/Al (A1050P)
		9.0		Fe/Fe (SPCC-SD)
Water absorption	%	0.6	3TS-2530-003	Boiling for 2 hrs 4-g circular (30 in diam.) cured material
Volume resistivity	Ω·m	1.5×10^{13}	3TS-5200-001	-
Surface resistivity	Ω	5.3×10^{14}	3TS-5200-002	-
Dielectric breakdown strength	KV/mm	19	3TS-5230-001	-
Dielectric constant	-	8.0	3TS-5220-001	1MHz
Dielectric loss tangent	-	0.014		
Glass transition temperature	°C	117	3TS-4740-001	TMA method
Linear expansion coefficient (α_1)	$\times10^{-6}$/°C	11		20 to 40°C
Ditto (α_2)		58		160 to 180°C
Storage modulus (E')	GPa	32	3TS-4730-001	25°C
Loss modulus (E'') peak	°C	118		DMA method, 1 Hz
Loss tangent (tan δ) peak	°C	134		DMA method, 1 Hz

Curing conditions: 100°C for 40 min

5.2 Flow curves

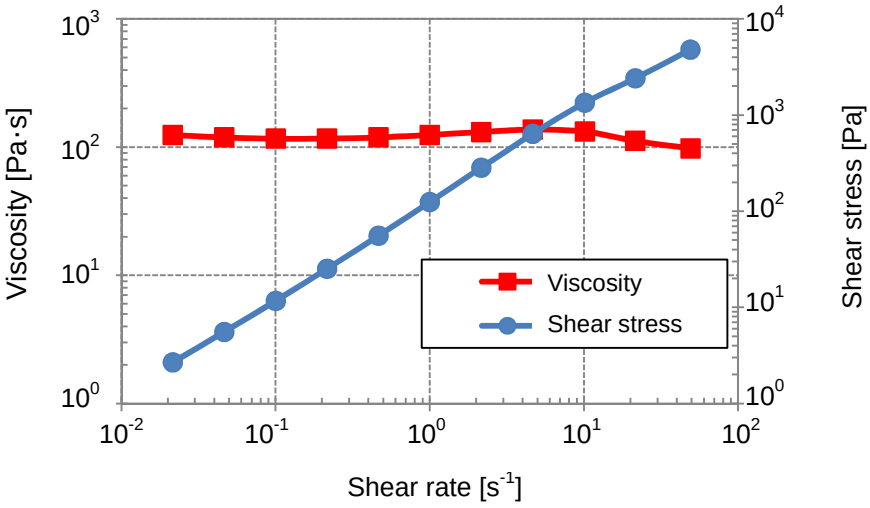

Fig.1 Flow curves of TB2270J

Measuring temperature: 25°C

Measuring conditions: 3TS-4200-001

Measuring device: HAAKE RS600 Cone: C35/2

5.3 Temperature-viscosity curve

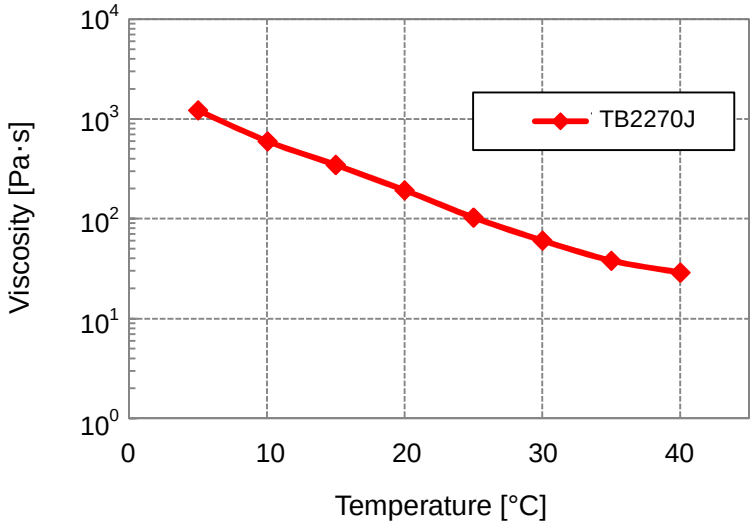

Fig.2 Temperature-viscosity curve of TB2270J

Shear rate: 1.0 [s^{-1}]

Measuring conditions: 3TS-4200-003

Measuring device: HAAKE RS600 Cone: C35/2

5.4 Curing behavior

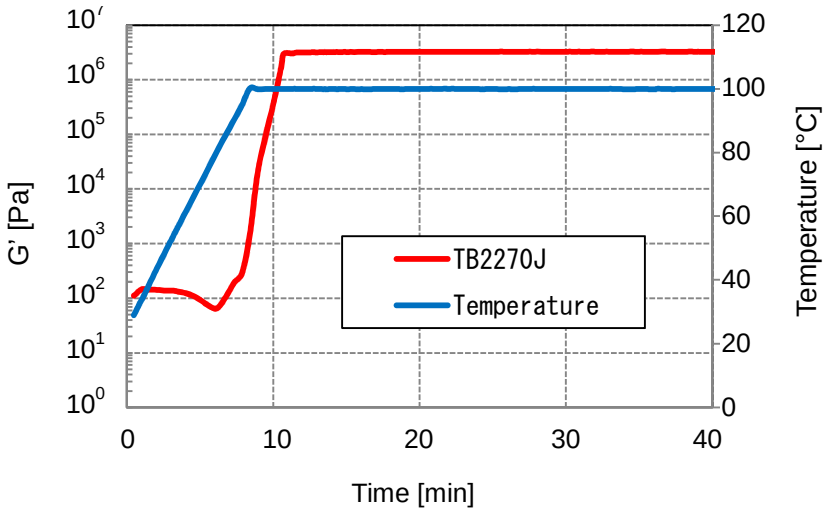

Fig.3 Curing behavior of TB2270J

Measuring device: HAAKE RS600 Cone: P25

Temperature conditions: 25°C -> 100°C Rate of temperature rise: 10°C/min

Frequency: 1.0Hz Distortion: 1.0%

Sample thickness (gap): 1.0mm

6. Durability

6.1 Heat resistance

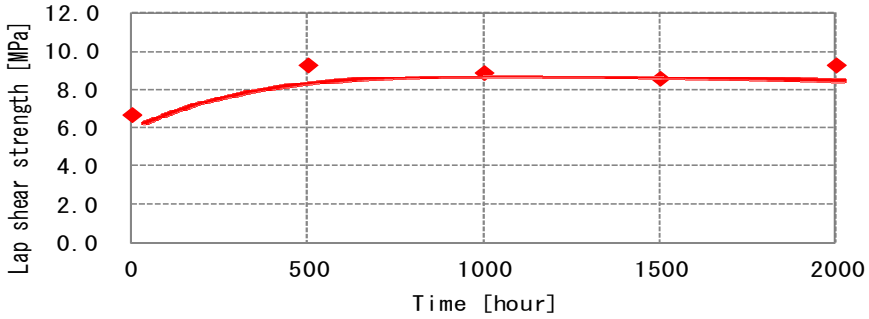

Fig.4 Heat resistance (lap shear strength) of TB2270J

Curing conditions: 100°C for 40 min Environmental conditions: 25°C

Measuring conditions: 3TS-4100-011 Material: Al/Al (A1050P)

6.2 Moisture resistance

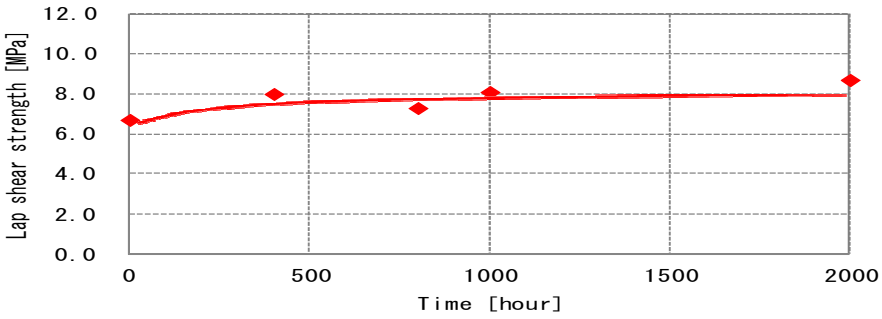

Fig.5 Moisture resistance (lap shear strength) of TB2270J

Curing conditions: 100°C for 40 min Environmental conditions: 85°C, 85%RH

Measuring conditions: 3TS-4100-011 Material: Al/Al (A1050P)

6.3 Heat cycle resistance

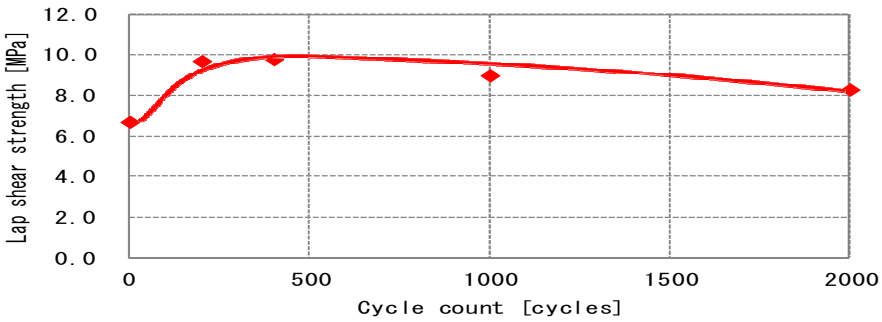

Fig.6 Heat cycle resistance (lap shear strength) of TB2270J

Curing conditions: 100°C for 40 min

1 cycle: (-40°C × 30min + 125°C × 30min)

Measuring conditions: 3TS-4100-011 Material: Al/Al (A1050P)

7. Usage

(1) To prevent dew condensation, unseal and use the resin after it has reached room temperature.

(2) Completely remove dust, oil and other contaminants from the surfaces to be coated with the resin.

8. Directions for use

(1) Before using, sufficiently confirm whether the method of application and the purpose are appropriate.

(2) The filler may settle or the resin may increase in viscosity if it is stored at high temperature or for a long time. Therefore, store it in a refrigerator (-5 to 10°C), and use it after it has reached room temperature. (If it is unsealed before it reaches room temperature, dew condensation may occur, and nonconformities, such as gelation, may be caused when the dew gets into contact with the resin.) After unsealing, use it up as soon as possible.

(3) Some materials may deteriorate if this product is used. The effects of the adhesive on the substrates must be confirmed by the operator prior to production. Refrain from using this adhesive if any detrimental effects are observed.

(4) The curing conditions depend on the thermal capacities of the substrate and peripheral parts and the application method. It is recommended to confirm the curing state on the actual parts in advance and determine the optimum curing conditions.

(5) When heated, it generates heat through curing reaction. Take care not to burn yourself.

(6) Due to the properties of the resin, slight discoloration may occur during curing.

(7) Use suitable protective equipment, such as a mask, goggles and gloves (impervious). Use in a well-ventilated outdoor area or in a place equipped with a local exhaust system.

(8) Harmful to health. Do not directly touch nor inhale fumes.

(9) If swallowed, do not induce vomiting. Immediately rinse the mouth, and get medical attention.

(10) If in eyes, repeatedly and sufficiently rinse with clean water, and get medical attention.

(11) If on skin, wipe away with a cloth, and wash with soap.

(12) If any bodily abnormality occurs, discontinue use, and get medical attention.

(13) Persons with allergies or sensitive skin should avoid using it.

(14) This product is not designated as a hazardous material under the Fire Service Act. However, as with general adhesives, take precautions against fires.

(15) Keep out of reach of children.

(16) For detailed hazard information of the product, see the Safety Data Sheet (SDS).

9. Storage

(1) Store with the cap tightly fitted to prevent deterioration and contamination.

(2) Store in an indoor dark dry place at -5 to 10°C avoiding fire, heat sources and direct sunlight.

10. Disposal

Ask an authorized industrial waste disposal firm to dispose of the product and its empty container as industrial waste.

11. Laws and regulations

Fire Service Act: Non-hazardous material

12. Precautions

For Industrial Use Only

(Do not use for household purposes.)

This product is developed for general industrial use. Before using this product, the user must accept the following terms:

- The technical data given herein are not guaranteed values, but examples of experimental values obtained by our specified test methods.
  We do not guarantee that the uses described herein do not conflict with any intellectual property right.
- Before using this product, confirm the appropriateness and safety of the use for the application in question, and bear all responsibilities and risks involved in the use.
  Never embed or inject into bodies nor use as a medical implant that may be left in the body.
- We are not liable for personal injury or property damage caused by improper handling of this product.
  If the properties or usage of the product to be used are unclear, never use it.
- For detailed safety information of the product, see the Safety Data Sheet (SDS).
  To obtain the SDS, contact our sales office or customer service center.
- Information in this document is subject to change at our own discretion.