ThreeBond

TB2202 Series

Technical Data

July 7, 1995
Three Bond Co., Ltd.

ThreeBond 2202, 2204, 2206 and 2206B
Low-temperature curing one-part epoxy resin

1. Outline

ThreeBond 2202, 2204, 2206 and 2206B are low-temperature curing one-part epoxy resins that can cure when heated at 60°C or more. These resins are provided with a trigger curing ability. With this ability, the resins can cure while they are left at normal temperatures (25°C or more) after a certain degree of heat is given to them at the initial stage of curing. (ThreeBond is abbreviated to TB hereinafter.)

2. Features

(1) Quick curing at low temperatures (60°C or more)

(2) Excellent adhesive properties

(3) Excellent heat resistance

(4) Trigger curing ability (mainly for bonding)

3. Uses

General bonding

Potting of electric parts

Sealing of electric parts

4. Description

		TB2202	TB2204	TB2206	TB2206B	
Appearance		Black liquid				JIS K 6833
Viscosity	Pa · s	13	28	100	140	JIS K 6833
Specific gravity		1.14	1.23	1.20	1.24	JIS K 6833
Standard curing conditions*		For bonding iron to iron: 60°C × 180 min. 70°C × 50 min. or 80°C × 20 min.				

* The curing conditions of TB2202, TB2204, TB2206 and TB2206B may change depending on the heat capacity of the substrate and peripheral parts and the method of application. It is recommended to check the bonding conditions using actual parts and determine the optimum curing conditions.

5. Characteristics

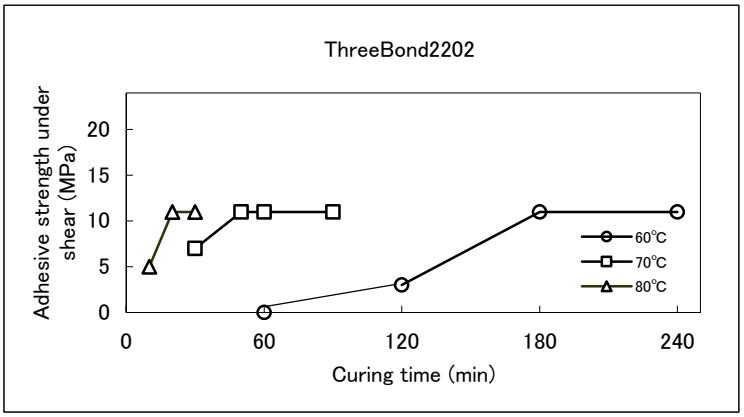
5.1 Physical characteristics of cured adhesives

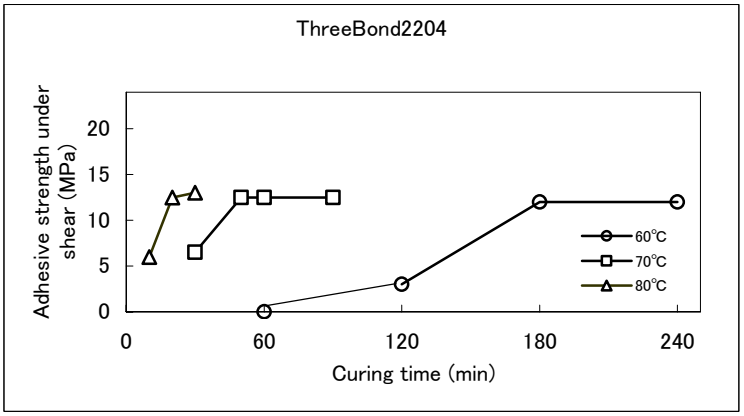
	Unit	TB2202	TB2204	TB2206	TB2206B	
Adhesive strength under shear	MPa (kgf/cm^2)	10.0 (102)	13.0 (132)	15.7 (160)	17.7 (180)	JIS K 6850
Peel strength	N/m (kgf/25 m)	157 (0.4)	392 (1.0)	785 (2.0)	1178 (3.0)	JIS K 6854
Hardness	JIS-D	88	89	87	89	JIS K 7215
Glass transition point	°C	105	105	107	102	Thermal expansion meter
Thermal expansion coefficient	1×10^{-5}/°C	7.4	6.9	9.8	8.7	Thermal expansion meter
Water absorption (boiling for 1 hr.)	%	+ 0.48	+ 0.47	+ 0.55	+ 0.50	JIS K 6911
Water absorption (P.C.T)	%	+ 2.8	+ 2.7	+ 2.9	+ 2.8	JIS K 6911
Volume resistivity	Ω · cm	1.30×10^{17}	1.67×10^{16}	1.37×10^{15}	5.62×10^{15}	JIS K 6911
Surface resistivity	Ω	1.46×10^{17}	2.01×10^{15}	1.50×10^{17}	1.50×10^{17}	JIS K 6911
Dielectric dissipation factor (1 MHz)	—	0.01671	0.01607	0.02960	0.03008	JIS K 6911
Dielectric constant (1 MHz)	—	3.46	3.65	3.92	3.80	JIS K 6911
Dielectric breakdown voltage	KV/mm	22	23	20	21	JIS K 6911

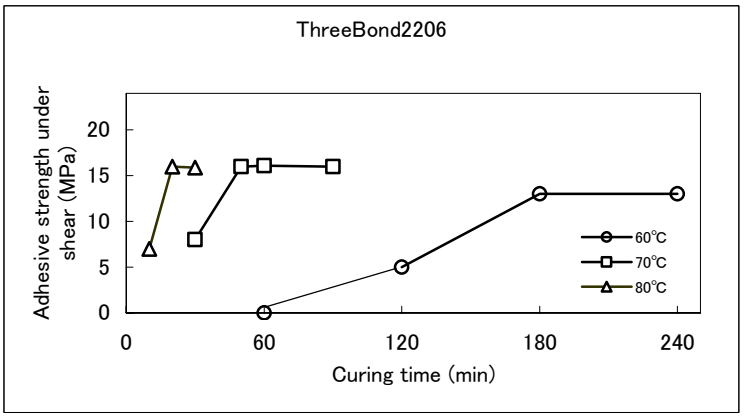
Curing conditions: 70°C × 50 min.

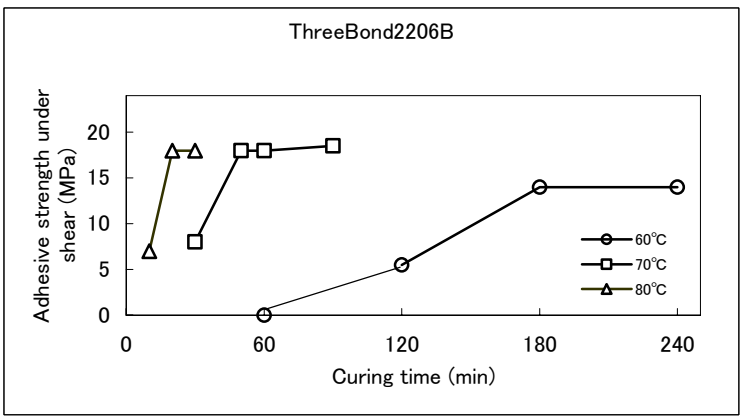
* The adhesive strength under shear and the peel strength were measured with iron-iron test pieces. The above characteristics were obtained when the adhesives were cured at 70°C for 50 min. If the curing temperature and/or the curing time are changed, the characteristic values will change.

5.2 Relations between adhesive strength and curing temperature and times









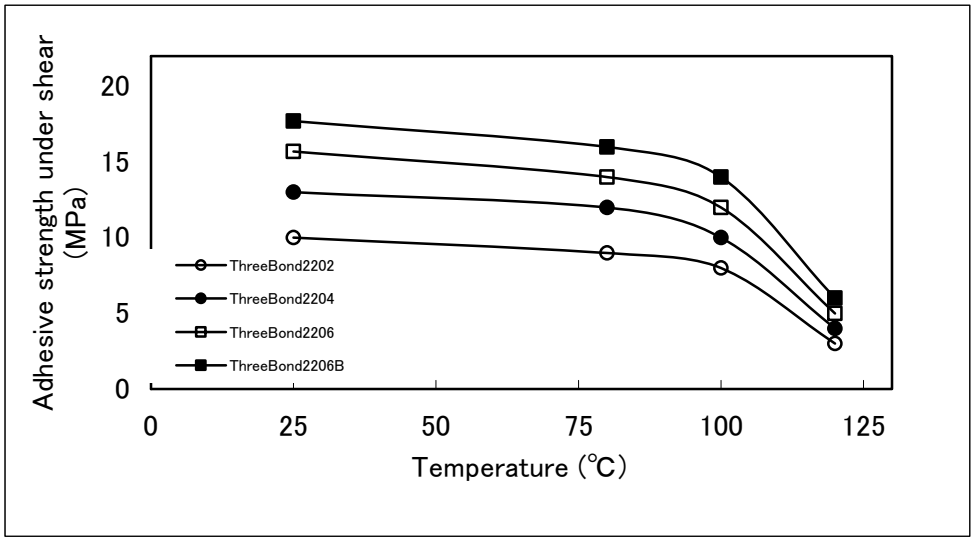
5.3 Adhesive strength under shear on various materials

	Curing conditions	TB2202	TB2204	TB2206	TB2206B
Hard PVC Mitsubishi Plastics, Inc. Hishi Plate HP-302A	60°C × 180 min	2.0 (20.0)	2.1 (21.0)	3.1 (32.0)	2.9 (30.0)
	70°C × 60 min	2.2 (22.0)	2.4 (24.0)	2.8 (28.0)	2.9 (30.0)
	80°C × 20 min	Not measured owing to deformation			
6.6 nylon Mitsuboshi Engineering 1022B	60°C × 180 min	1.4 (14.0)	1.6 (16.0)	2.5 (25.0)	2.0 (20.0)
	70°C × 50 min	1.5 (15.0)	1.5 (15.0)	2.2 (22.0)	2.1 (21.0)
	80°C × 20 min	1.3 (13.0)	1.6 (16.0)	2.1 (21.0)	2.3 (23.0)
ABS Tsutsunaka Plastic Industry Co., Ltd. JSR-82	60°C × 180 min	6.1 (62.0)	5.9 (60.0)	6.9 (7.0)	6.7 (68.0)
	70°C × 50 min	6.7 (68.0)	6.9 (70.0)	7.1 (72.0)	7.2 (73.0)
	80°C × 20 min	7.3 (74.0)	7.3 (74.0)	7.8 (79.0)	7.9 (80.0)
Polyacetal Mitsubishi Gas Chemical Co., Inc. Jupital F-10	60°C × 180 min	0.5 (5.0)	0.4 (4.0)	0.7 (7.0)	0.7 (7.0)
	70°C × 50 min	1.2 (12.0)	1.2 (12.0)	1.4 (14.0)	1.6 (16.0)
	80°C × 20 min	0.9 (9.0)	1.0 (10.0)	1.5 (15.0)	1.5 (15.0)
Polystyrene Shin-Kobe Electric Machinery Co., Ltd.	60°C × 180 min	0.7 (7.0)	0.7 (7.0)	1.0 (10.0)	1.1 (1.0)
	70°C × 50 min	1.0 (10.0)	0.9 (9.0)	1.2 (12.0)	1.3 (13.0)
	80°C × 20 min	1.1 (11.0)	1.1 (11.0)	1.2 (12.0)	1.3 (13.0)
Polycarbonate Mitsubishi Gas Chemical Co., Inc. Jupilon NE-2000	60°C × 180 min	1.0 (10.0)	1.0 (10.0)	1.0 (10.0)	1.5 (15.0)
	70°C × 50 min	1.0 (10.0)	1.0 (10.0)	1.8 (18.0)	1.6 (16.0)
	80°C × 30 min	1.1 (11.0)	1.0 (10.0)	1.4 (14.0)	1.5 (15.0)
Acrylic plastics Mitsubishi Rayon Co., Ltd. Acrylite R001	60°C × 180 min	1.1 (11.0)	1.0 (10.0)	1.4 (14.0)	1.4 (14.0)
	70°C × 50 min	0.9 (9.0)	0.9 (9.0)	1.3 (13.0)	1.4 (14.0)
	80°C × 20 min	1.0 (10.0)	0.9 (9.0)	1.2 (12.0)	1.4 (14.0)
Phenol Risho Kogyo Co., Ltd. PS-1131	60°C × 180 min	5.9 (60.0)	5.9 (60.0)	6.5 (66.0)	6.7 (68.0)
	70°C × 50 min	5.8 (59.0)	5.4 (55.0)	6.4 (65.0)	6.7 (68.0)
	80°C × 20 min	5.4 (55.0)	5.3 (54.0)	5.6 (57.0)	5.6 (57.0)

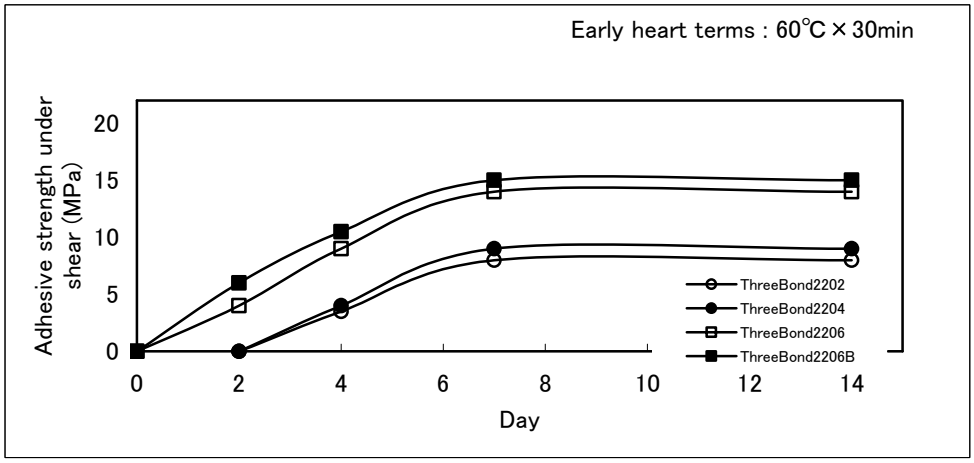
Unit: MPa (kgf/cm^2)

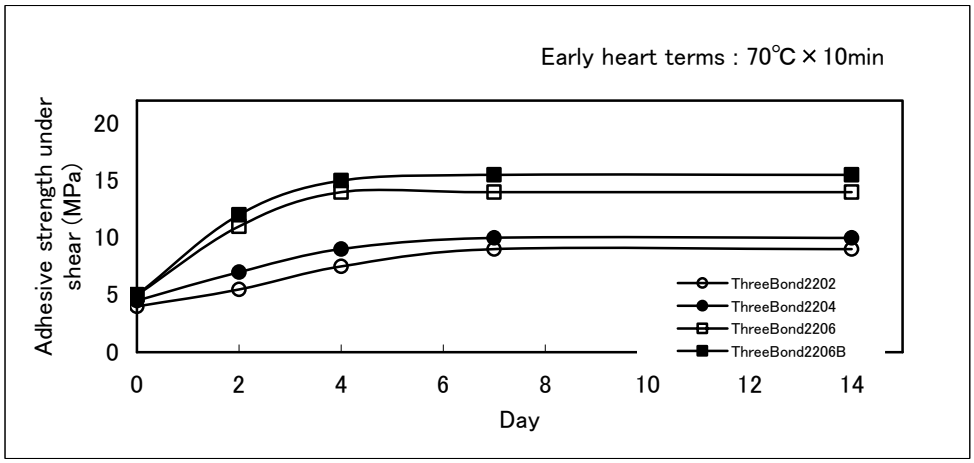
Note: The curing conditions for some plastic materials are different from those shown above depending on heat capacity. The adhesives applied to plastic materials of various manufacturers considerably vary in adhesive strength. Give sufficient consideration to the usage of the adhesive.

5.4 Relations between adhesive strength and various temperatures



5.5 Trigger curing ability





* Iron-iron test pieces which is left at 25℃ atmosphere is measured in regulation time. Trigger curing ability changes conditions a lot by the usage, material, etc. It is recommended to check the bonding conditions using actual parts and determine the optimum curing conditions.

6. Instructions for use

(1) TB2202, TB2204, TB2206 and TB2206B are one-part epoxy resins. If they are stored at high temperatures or for a long time, the resin viscosity may increase, or the filler may sediment. Store them in a refrigerator (at 5 to 10°C), and use them up as soon as possible after unpacking them.

(2) Like general epoxy resins, TB2202, TB2204, TB2206 and TB2206B can cause skin irritation depending on constitution if they are kept in contact with the skin for a long time. If any of them adheres to the skin, wipe it off with paper or cloth, and wash the skin with soap and water. If it enters the eyes, wash the eyes with fresh water, and immediately consult a doctor.

(3) TB2202, TB2204, TB2206 and TB2206B are not designated as hazardous materials under the Fire Defense Law. However, when handling them, take special care to flammable substances as when handling general adhesives.

7. Disposition

Ask a disposal contractor having special knowledge to dispose of this product.

It can generate toxic gas. Do not incinerate it.

8. Safety precautions

For industrial use (It is not intended for household use.)

Before using the product, approve the following conditions of sale.

(1) This technical information gives experimental values obtained by our specified test methods. We cannot thoroughly guarantee the correctness and perfectness of the data.

The user should determine whether the product is appropriate to the use and purpose before using it, and take all responsibilities for danger caused by it. The guarantee applies only to replacement of apparently defective product.

(2) We are not liable to injuries and damages caused by improper handling of this product.

(3) We do not take responsibility for any matter not mentioned herein unless otherwise mutually agreed in the contract.