ThreeBond

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ThreeBond Co., Ltd.

Technical Data
ThreeBond 3020B
UV-curable resin (black type)

1. Product description

ThreeBond 3020B is a UV-curable resin that cures quickly under UV light with a wavelength of 200 to 400 nm. UV irradiation promotes curing and coloring of the resin to form a black cured material.

Hereinafter, ThreeBond is abbreviated to TB.

2. Features

(1) Cures by UV irradiation in several tens of seconds.
(2) Curing and coloring are promoted after UV irradiation.
(3) Excels in curability under UV-LED lamp and can cure even under high pressure mercury lamp.

3. Applications

- Coating of exteriors of electric and electronic components
- Coating and bonding of parts requiring masking effect
- Parts and uses requiring good appearance

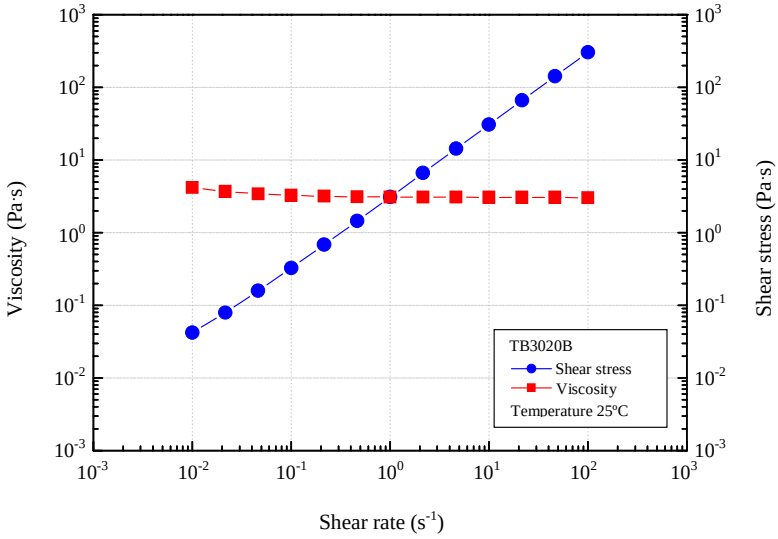
4. Properties

Table 1 Properties of TB3020B

Test item	Unit	Result	Test method	Remarks
Appearance (color)	-	Light yellow	3TS-2100-020	-
Viscosity	Pa·s	3.5	3TS-2F00-007	25ºC Shear rate: 38.3 (s^{-1}) Cone rotor angle: 3º Number of revolutions: 10 rpm
Specific gravity	-	1.05	3TS-2500-002	25ºC

5. Flow curves

5.1 Flow curves

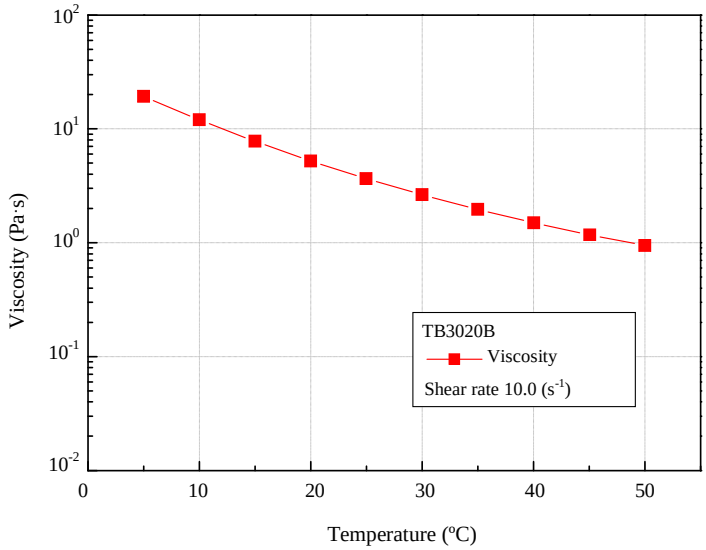


Measuring device: HAAKE MARS III

Geometry: C35/1

Fig. 1 Flow curves of TB3020B

5.2 Temperature-viscosity curve



Measuring device: HAAKE MARS III

Geometry: C35/1

Fig. 2 Temperature-viscosity curve of TB3020B

6. Characteristics

6.1 Characteristics of cured resin (UV-LED)

Table 2 Characteristics of TB3020B after curing

Test item	Unit	Result	Test method	Remarks
Appearance (cured resin)	-	Black	3TS-2100-023	-
Thick film curability	mm	1.5	3TS-3160-001	-
Cure shrinkage	%	6.3	3TS-2600-001	φ32, 1.5g
Hardness	-	D54	3TS-2B00-010	Type D, 25ºC
Water absorption	%	1.0	3TS-2530-003	Boiling for 2 hours
Light transmittance	%	2.0	3TS-2940-003	Film thickness: 0.15 mm, wavelength: 550 nm
Tensile strength	MPa	21.5	3TS-4190-002	-
Elongation	%	189		-

* Curing conditions: 100 mW/cm^2 × 60 sec, UV-LED, dominant wavelength 365 nm

6.2 Characteristics of cured resin (high pressure mercury lamp)

Table 3 Characteristics of TB3020B after curing

Test item	Unit	Result	Test method	Remarks
Appearance (cured resin)	-	Black	3TS-2100-023	-
Thick film curability	mm	1.3	3TS-3160-001	-
Cure shrinkage	%	6.3	3TS-2600-001	φ32, 1.5g
Hardness	-	D53	3TS-2B00-010	Type D, 25ºC
Water absorption	%	1.0	3TS-2530-003	Boiling for 2 hours
Light transmittance	%	0.9	3TS-2940-003	Film thickness: 0.15 mm, wavelength: 550 nm
Tensile strength	MPa	23.1	3TS-4190-002	-
Elongation	%	168		-

* Curing conditions: 30 kJ/m^2 × 2, High-pressure mercury lamp, Main wavelength: 365 nm, Irradiation distance: 15 cm

6.3 Electrical characteristics (UV-LED)

Table 4 Electrical characteristics of TB3020B

Test item		Unit	Result	Test method
Volume resistivity		Ω·m	3.3×10^7	3TS-5200-001
Surface resistivity		Ω	6.8×10^{10}	3TS-5200-002
Dielectric constant	1kHz	-	8.5	3TS-5220-001
	1MHz	-	4.3	
Dielectric loss tangent	1kHz	-	0.43	
	1MHz	-	0.051	
Dielectric breakdown strength		kV/mm	13.6	3TS-5230-001

* Curing conditions: 100 mW/cm^2 × 60 sec, UV-LED, dominant wavelength 365 nm

6.4 Electrical characteristics (high pressure mercury lamp)

Table 5 Electrical characteristics of TB3020B

Test item		Unit	Result	Test method
Volume resistivity		Ω·m	3.0×10^7	3TS-5200-001
Surface resistivity		Ω	7.1×10^{10}	3TS-5200-002
Dielectric constant	1kHz	-	8.2	3TS-5220-001
	1MHz	-	4.4	
Dielectric loss tangent	1kHz	-	0.42	
	1MHz	-	0.052	
Dielectric breakdown strength		kV/mm	14.0	3TS-5230-001

* Curing conditions: 30 kJ/m^2 × 2, High-pressure mercury lamp, Main wavelength: 365 nm, Irradiation distance: 15 cm

6.5 Lap shear strength (UV-LED)

Table 6 Lap shear strength of TB3020B

Substrate 1	Substrate 2	Unit	Result	Test method	Remarks
Glass	Glass	MPa	6.6	3TS-4100-013	-
	Acryl		7.0		VH000
	PC		7.1		PANLITE® L1225Y
	Glass epoxy		6.7		KEL-GEF®
	ABS		6.2		ABS-N-WN
	LCP		5.3		VECTRA® E130i
	Iron		8.8		JIS,G,3141(SPCC-SD)
	Aluminum		2.8		JIS,H,4000(A1050P)
	SUS304		8.6		JIS,G,4305
	SUS430		7.9		JIS,G,4305
PC	PC		2.6		PANLITE® L1225Y
Acryl	Acryl		1.4		VH000

* Curing conditions: 100 mW/cm^2 × 60 sec, UV-LED, dominant wavelength 365 nm

6.6 Lap shear strength (high pressure mercury lamp)

Table 7 Lap shear strength of TB3020B

Substrate 1	Substrate 2	Unit	Result	Test method	Remarks
Glass	Glass	MPa	8.0	3TS-4100-013	-
	Acryl		7.6		VH000
	PC		7.1		PANLITE® L1225Y
	Glass epoxy		7.8		KEL-GEF®
	ABS		6.8		ABS-N-WN
	LCP		4.7		VECTRA® E130i
	Iron		9.4		JIS,G,3141(SPCC-SD)
	Aluminum		3.4		JIS,H,4000(A1050P)
	SUS304		9.0		JIS,G,4305
	SUS430		8.0		JIS,G,4305
PC	PC		3.7		PANLITE® L1225Y
Acryl	Acryl		1.5		VH000

* Curing conditions: 30 kJ/m^2 × 2, High-pressure mercury lamp, Main wavelength: 365 nm, Irradiation distance: 15 cm

6.7 Dynamic viscoelastic properties

Table 8 Dynamic viscoelastic properties of TB3020B

Test item	Unit	Result	Test method	Remarks
Storage modulus (E')	Pa	5.5×10^8	3TS-4730-001	25ºC
Loss modulus (E")	ºC	-2		Peak top value
Loss tangent (tanδ)	ºC	61		Peak top value

* Curing conditions: 100 mW/cm^2 × 60 sec, UV-LED, dominant wavelength 365 nm

* Measuring condition: 1 Hz

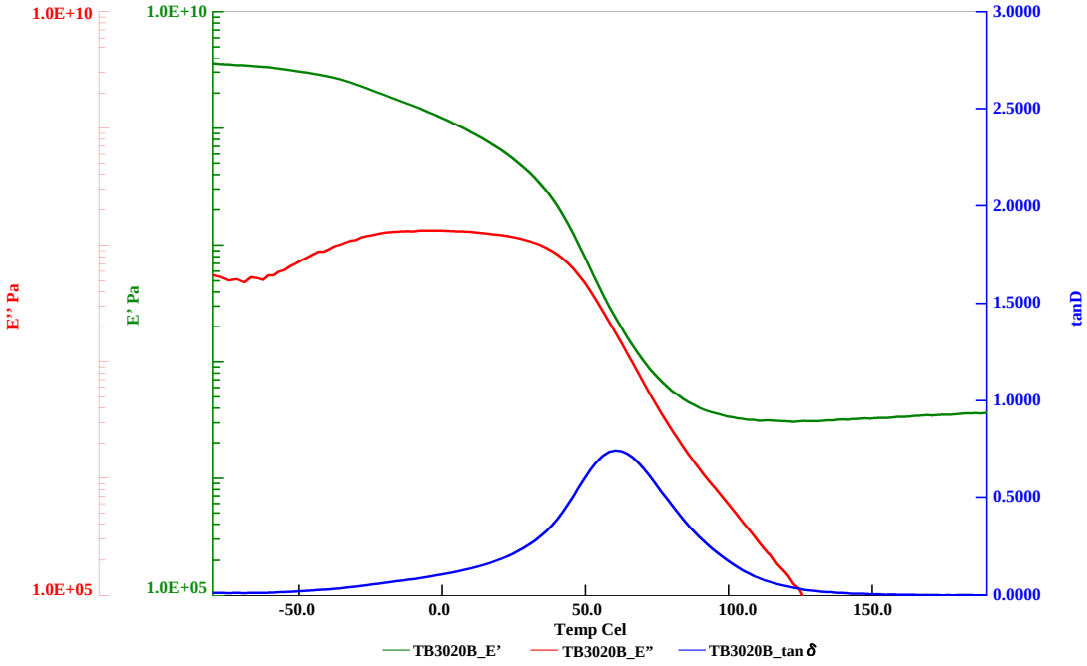


Fig. 3 Results of DMA measurement of TB3020B

6.8 Thermomechanical analysis

Table 9 Thermomechanical properties of TB3020B

Test item	Unit	Result	Test method	Remarks
α_1	ppm/ºC	77	3TS-4740-001	-80 to -30ºC
α_2	ppm/ºC	200		70 to 120ºC

* Curing conditions: 100 mW/cm^2 × 60 sec, UV-LED, dominant wavelength 365 nm

* Measuring condition: 2nd run

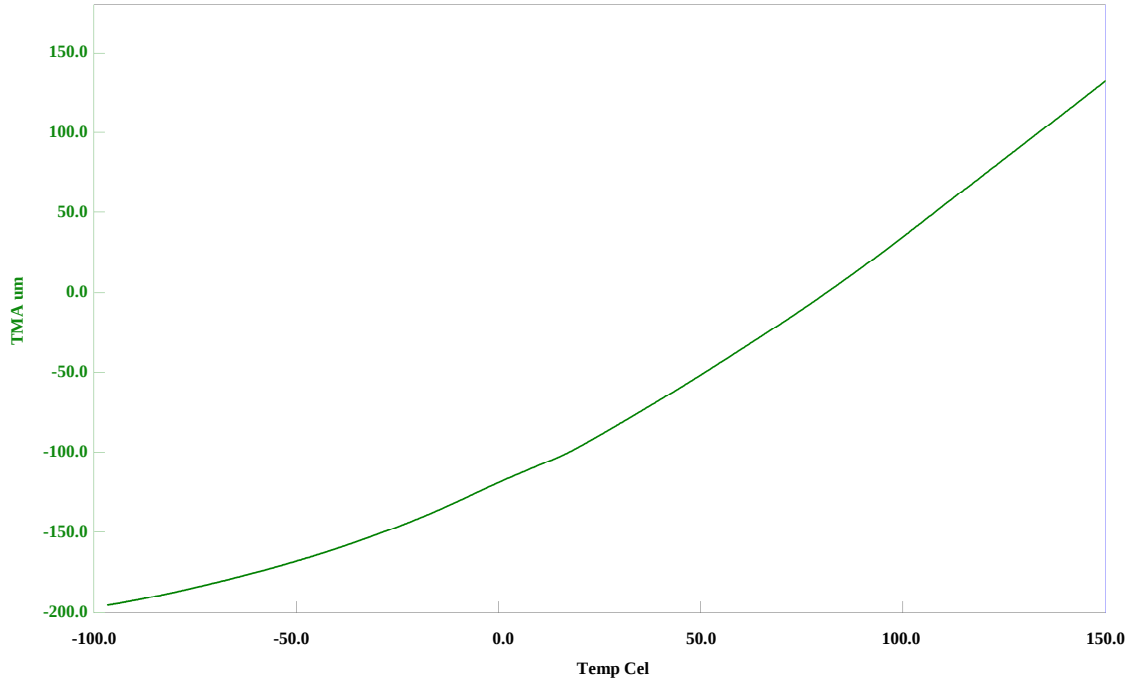


Fig. 4 Results of TMA measurement of TB3020B

7. Directions for use

(1) Do not inhale or ingest. Harmful to health. Do not inhale or ingest.

(2) Harmful to the health. Do not directly touch nor inhale vapor. Wear appropriate protective clothing, such as a mask, goggles and gloves (impervious), and use the resin in a place equipped with a local exhaust system.

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

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

(5) If it adheres to the skin, it may cause inflammation. Immediately wipe with cloth or paper, and wash the affected area with soap and water.

(6) If any bodily abnormality occurs, discontinue use, and get medical attention. People who have allergies or susceptible skin should avoid handling it.

(7) Keep out of reach of children.

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

(9) Some materials may deteriorate if TB3020B is used. The effects of the adhesive on the substrates must be confirmed by the operator in advance. Refrain from using the adhesive if any detrimental effects are observed.

(10) The curing speed varies depending on the type of light source and irradiation distance. Therefore, sufficiently confirm the curing speed prior to use. Particularly, the curing speed is greatly affected by the adhesive temperature

and substrate surface temperature owing to changes in temperature and humidity in the room.

(11) Some gas can be generated during application and curing with UV light. Forcibly ventilate the working area and the UV irradiation area.

(12) If the product is transferred to another container, confirm whether or not there is an adverse effect on the curability prior to use. Do not return the product left unused to the container.

(13) For hazard and toxicity information, see the safety data sheet (SDS).

8. Storage

To prevent deterioration and contamination, fit the cap tightly, and store it indoors in a dark dry place at -5 to 25ºC away from sunlight, fire and heat sources.

9. Disposal

When disposing of this product, entrust it to an industrial waste disposal company with expertise.

Do not burn the product. It may generate toxic gas when burnt.

10. Precautions

For Industrial Use Only (Do not use for household purposes.)

This trial product has been developed for general industrial use. Before using the trial product, you 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 trial product.
  If the properties and usage of this trial product are unknown, do not use.
- For detailed safety information of the trial 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.

11. Registered trademark