ThreeBond

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Three Bond Co., Ltd.

Technical Data

ThreeBond 7797

Gold Label series multi-primer for instantaneous adhesives

1. Outline

ThreeBond 7797 is an instantaneous adhesive primer for facilitating bonding of hard-to-bond materials, such as polypropylene, polyethylene, polyacetal, polytetrafluoroethylene and silicone rubber.

(Hereinafter, ThreeBond is abbreviated to TB.)

2. Features

(1) This primer remarkably improves the adhesion to hard-to-bond materials (polypropylene, polyethylene, polyacetal, polytetrafluoroethylene and silicone rubber). Pretreatment of substrate surfaces with TB7797 before bonding with an instantaneous adhesive ensures strong adhesion.
(2) It dries quickly and has high workability.
(3) It can be easily applied with a brush, absorbent wadding, cloth or swab.
(4) It is applicable to all instantaneous adhesives of TB1700 Series and TB7700 Series

3. Use

● Pretreatment before bonding or securing hard-to-bond material (polypropylene, polyethylene, polyacetal, polytetrafluoroethylene and silicone rubber) parts with instantaneous adhesives

4. Properties and characteristics

4.1 Properties and characteristics

Table 1 Properties and general characteristics of TB7797

Test item	Substrate	Unit	Result	Test method
Appearance	-	-	Clear and transparent	3TS-201-01
Specific gravity (at 25°C)	-	-	0.67	3TS-213-01
Tensile shear bond strength (at 25°C and 50%RH for 24 hrs)	PE	MPa	5.0(*)	3TS-301-11
	PP		6.6(*)	
	POM		9.0(*)	
	PIFE		2.5 (*Deformation)	
	Silicone rubber		0.3(*)	

Note: (*) in the table indicates material failure of the substrates.

Tensile shear bond strength: TB7797 was applied to the surfaces of each material (surfaces to be bonded) with absorbent wadding and left for 2 min to volatilize the solvent. TB7784 was applied to one of the surfaces, and immediately the surface was bonded to the other surface. Then, the adhesive was cured at 25°C and 50%RH for 24 hours, and the tensile shear bond strength was measured.

(Rate of pulling: Silicone rubber (50 mm/min)
Other materials (10 mm/min))
PE: Polyethylene
PP: Polypropylene
POM: Polyacetal
PTFE: Polytetrafluoroethylene

4.2 Setting time

Table 2 Setting time when TB7797 is used

Substrate	Unit	Use of TB7784 and TB7797	Use of only TB7784	Test method
PE	sec	3	60 or more	3TS-220-04
PP		3	60 or more	
POM		5	30	
PIFE		5	60 or more	
Silicone rubber		3	60 or more	

Notes: In the test with "use of only TB7784" shown above, the substrates of each material were bonded without the primer at 25°C and 50%RH.
In the test with "use of TB7784 and TB7797," the surfaces of each material (surfaces to be bonded) were bonded with TB7784 at 25°C and 50%RH in 2 minutes after TB7797 was applied to the substrate surfaces.

4.3 Adhesion to various materials

Table 3 Tensile shear bond strength to various materials (MPa)

Substrate material	Tensile shear bond strength (MPa)	
	Use of TB7784 and TB7797	Use of only TB7784
Iron	8.2	15.3
Aluminum	11.8	16.1
SUS	8.1	15.4
Brass	7.8	11.5
Copper	9.6	13.3
Nickel	6.3	15.7
Zinc chromate	3.0	8.0
Hard PVC	6.5(*)	4.4(*)
PC (polycarbonate)	5.8(*)	6.9(*)
Phenol	6.6(*)	10.8(*)
Nylon 6	6.1(*)	7.5(*)
Nylon 6/6	13.1(*)	12.0(*)
ABS (acrylonitrile-butadiene-styrene resin)	6.7(*)	6.3(*)
Glass epoxy	14.6	18.8
PBT (polybutylene terephthalate)	11.5(*)	4.5
PET (polyethylene terephthalate)	9.3(*)	10.6(*)
PPO (polyphenylene oxide)	2.8	6.8
PPS (polyphenylene sulfide)	4.6	2.5
HIPS (high-impact polystyrene)	4.5(*)	4.4(*)
Acrylic	4.6(*)	8.7(*)
Liquid crystal polymer (Vectra ®)	3.8	2.0
Polyacetal	9.0(*)	1.3
PE (polyethylene)	5.0(*)	0.3
PP (polypropylene)	6.6(*)	1.2
PTFE (polytetrafluoroethylene)	2.5 (deformation)	0.3
Silicone rubber	0.3(*)	0.3(*)
NR (natural rubber)	0.4(*)	0.4(*)
CR (chloroprene rubber)	0.6(*)	0.6(*)
NBR (nitrile-based rubber)	0.9(*)	0.8(*)
SBR (styrene-butadiene rubber)	1.7(*)	1.7(*)
EPDM (ethylene propylene diene monomer)	0.7	0.8(*)

Notes: (*) in the table indicates material failure of the substrates.
In the test with "use of TB7784 and TB7797," the substrates were bonded by the method stated in 4.1. In the test with "use of only TB7784," the substrates were bonded only with TB7784 at 25°C and 50%RH. In both cases, after the bonded test pieces were cured at 25°C and 50%RH for 24 hours, the tensile shear bond strength was measured at room temperature.
Test method:
Tensile shear bond strength (3TS-301-11)
Rate of pulling: Rubber elastomers (50 mm/min)
Others (10 mm/min)

4.4 Strength of various grades of instantaneous adhesives

Table 4 Tensile shear bond strength of various grades of adhesives to polypropylene (MPa)

Product name	Grade	With use of TB7797	Without primer
TB1701	For metal	6.7(*)	0.5
TB1724D	Low odor and low whitening	5.2(*)	0.6
TB1747	For general use	7.1(*)	0.3
TB1757	High moisture resistance	6.7(*)	0.4
TB1773E	Light curing	6.1(*)	0.9
TB1786	Rapid curing	6.8(*)	0.9
TB7737	Ultrahigh peel strength and impact strength	6.7(*)	0.3
TB7784	Ultrarapid curing	6.6(*)	1.2

Notes: (*) in the table indicates material failure of the substrates.
The tests were conducted with polypropylene substrates. In the test "without primer," the substrates were bonded with each adhesive at 25°C and 50%RH. In the test "with use of TB7797," the substrates were bonded by the method stated in 4.1. In both cases, after the bonded test pieces were cured at 25°C and 50%RH for 24 hours, the tensile shear bond strength was measured at room temperature.
Test method:
Tensile shear bond strength (3TS-301-11)
Rate of pulling: 10 mm/min

5. Durability

5.1 Change in strength after exposure to various environmental conditions

Table 5 Tensile shear bond strength after exposure to various conditions (MPa)

Exposure conditions		PE	PP	POM	PIFE	Silicone rubber
80°C	250h	4.7(*)	6.2(*)	3.0(*)	2.5 (*:Deformation)	0.2(*)
60°C95%RH	250h	4.6(*)	6.6(*)	2.6(*)	2.5 (*:Deformation)	0.3(*)
Heat cycle (-40°Clh - 60°Clh)	60 cycles	4.9(*)	6.6(*)	7.4(*)	2.5 (*:Deformation)	0.2(*)

Notes: (*) in the table indicates material failure of the substrates.
The tests were conducted with TB7784 and TB7797. The substrates were bonded by the method stated in 4.1. After the bonded test pieces were cured at 25°C and 50%RH for 24 hours, they were exposed to the conditions for the specified time. Then, the tensile shear bond strength was measured after they were returned to room temperature.
Test method:
Tensile shear bond strength (3TS-301-11)
Rate of pulling: Silicone rubber (50 mm/min)
Others (10 mm/min)

5.2 Chemical strength

Table 6 Tensile shear bond strength after immersion in various chemicals (MPa)

Chemical	Immersion temperature	PE	PP	POM	PIFE	Silicone rubber
Tap water	40°C	4.8(*)	6.3(*)	7.9(*)	2.5 (*: Deformation)	0.3(*)
Engine oil	40°C	4.9(*)	6.6(*)	7.9(*)	2.5 (*: Deformation)	0.2(*)
Gasoline	25°C	4.2(*)	6.0(*)	8.6(*)	2.5 (*: Deformation)	0.2 (*2)
Kerosine	25°C	4.6(*)	6.2(*)	7.6(*)	2.6 (*: Deformation)	0.1 (*2)
Methanol	25°C	4.6(*)	6.6(*)	7.2(*)	2.6 (*: Deformation)	0.3(*)

Notes: (*) in the table indicates material failure of the substrates.
(*2) indicates that the silicone rubber itself swelled largely to material failure.
The tests were conducted with TB7784 and TB7797.
The substrates were bonded by the method stated in 4.1. After the bonded test pieces were cured at 25°C and 50%RH for 24 hours, they were immersed in the chemicals for 250 hours. Then, the tensile shear bond strength was measured after they were returned to room temperature.
Test method:
Tensile shear bond strength (3TS-301-11)
Rate of pulling: Silicone rubber (50 mm/min)
Others (10 mm/min)

6. Usage

(1) Remove moisture, oil, rust and other contaminants from the surfaces to be bonded or secured.

(2) Apply TB7797 uniformly to the surfaces of a hard-to-bond material (PE, PP, POM, PTFE or silicone rubber) using absorbent wadding, a brush or the like).
(When substrates of different materials, for example, PE and iron, are bonded, do not apply the primer to the substrate of a material, such as iron, which can be bonded without a primer. If the primer is applied to such a material, cure strain may be caused, thereby reducing the strength. Apply TB7797 only to the substrate of a hard-to-bond material.)

(3) After applying TB7797, leave the substrates (for approx. 1 to 2 min) until the solvent volatilizes. After the solvent volatilizes, apply an adhesive, and bond the substrates as quickly as possible (desirably within 10 min). Although the effect of the primer lasts for about 30 minutes, the substrates should be bonded as soon as possible after the adhesive dries to reliably bond them.
(When substrates of different materials are bonded, apply an adhesive to the substrate, for example the iron substrate, to which TB7797 has not been applied. To bond substrates of the same materials, apply an adhesive to one of the substrates, and bond them as soon as possible.)

(4) The time required to bond slightly varies depending on the kind of substrates and surface conditions. In most cases, the adhesive interlocks within about 2 seconds to 1 minute and develops the practical strength after 15 minutes to 2 hours.

7. Storage

Store the product in a dark place at -5 to 25°C avoiding direct sunlight. After using, store it with the cap tightly fitted to prevent deterioration and entry of foreign matter. Do not store it in the place where instantaneous adhesives are stored. Before using it, return it to room temperature.

8. Disposal

After the primer has all been used, ask an authorized disposal firm to dispose of the container as industrial waste.

9. Applicable laws

(1) Fire Defense Law: Fourth class, first type petroleum product. Hazard class II. Primer containing n-hexane. Flammable

(2) Labor Safety and Sanitation Law: n-hexane 95% or more

10. Instructions for use

- Use and store the product out of reach of children.
- It is flammable. Do not use it near fire.
- It irritates the eyes, skin and respiratory organs.
- When using it, wear appropriate protective clothing, such as a mask, gloves (impervious) and goggles. Use it in a well-ventilated outdoor area or in a place equipped with a local exhaust system.
- If it gets in the eyes, wash them with clean water for about 15 minutes, and get medical attention.
- If it adheres to the skin, wipe it away with a cloth, and wash the skin with soap.
- If any abnormality is found in the body, stop using the sealant, and get medical attention.
- Do not use it on the human body.
- People who have allergies or sensitive skin should avoid using it.
- To prevent dew condensation, unseal the container after it returns to room temperature.
- Ascertain in advance whether or not it affects the parts to be treated with it. If any problem occurs, do not use it.
- Some materials may deteriorate if this product is used.
- If an instantaneous adhesive is applied to the substrate before the solvent volatilizes after this primer is applied to the substrate, the instantaneous adhesive may cure quickly. The degree of this phenomenon varies depending on the grade of the adhesive to be used. Sufficiently check the curing condition prior to use.
- For hazard and toxicity information not mentioned herein, see the material safety data sheet (MSDS).

11. Cautions

For industrial use only **(Do not use it for household products.)**

This product has been developed for general industrial use. Before using it, you must accept the following terms.

- **The technical data given herein are not guaranteed values, but examples of actual measurements obtained by our specified test methods.**
  We do not guarantee that the uses introduced herein do not conflict with any intellectual property right.
- **Users are asked to evaluate the validity and safety of the use of the product for the relevant purpose in advance and bear all responsibilities and hazards involved in its use.**
  Never use the product for medical implants that will be implanted or injected into the body or 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 and use of the relevant product are unknown, never use it.
- **For detailed information on safety of the product, see the material safety data sheet (MSDS).**
  To obtain the MSDS, contact our sales department or customer service office.
- **Information in this technical document is subject to change without notice.**