ThreeBond Europe S.A.S.
BP 39105
95073 Cergy-Pontoise Cedex
Tel : +33 (0)1 34 32 39 60
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TB 1360

TECHNICAL DATA

ThreeBond 1360

High Temperature Resistance Anaerobic Resin

Three Bond 1360 hardens in fine gaps in metals and the absence of air. There is no loss in weight when hardening and a high bonding strength is obtained. Therefore, it demonstrates high performance as an adhesive and sealant for screws and for fitting.
The most special feature of Three Bond 1360 is having heat resistance up to a maximum of usable temperature of 200°C.

Characteristics

Item		Units	Results	Remarks
Appearance		-	Red, transparent	Visual
Viscosity		mPa·s	1 100	25°C
Specific Gravity		-	1.07	25°C
Curing Conditions	Room Temperature (20~25°)	Min	6~12	Workable Strength to reach 100 kgf·cm
		Hour	24	Final Strength
	Heat Cure (100°C)	min	45~60	-
	Heat Cure (120°C)		30~45	-
Recommended Clearance		mm	0.01~0.02	-
Maximum Clearance		mm	0.15	-

Bonding Strength with Steel (SS41)

1. Torque strength
   Test Condition: M10, P1.5, JIS class 2 bolt and nut, cleaned with trichloroethylene

   Leave at room temperature for 24 hours.

kg·cm

Break-away Torque	Prevailing Torque (90°)
200 ~ 250	200 ~ 250

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2. Compressive Bonding Strength
Test Condition: Diameter of shaft 6ϕ, l= 15mm, contact area 2.83 cm^2. This was washed with trichloroethylene.
Leave at room temperature for 24 hours.

kg/cm^2

Clearance (mm)	Bonding Strength
0.03	200 ~ 250

Handling Method

A. Cleaning of Adherent Material
Degrease the adherent material before applying TB1360. Degreasing can be done with organic solvent.

The surfactant in alkali may affect the curing speed and the subsequent bonding strength. Hence it is not recommended. However, in the event that this is the only cleaning method, it is essential to determine the necessity of it.

For bolts and nuts that are not degreased, wiping can reduce the amount of grease on the parts but the curing speed and strength will be affected.

B. Application and Assembly.
Three Bond 1360 can be applied directly from the bottle onto the screw threads. In the event of having to pour out the contents, use polyester or polypropylene containers only. Do not use metal containers and do not return unused portion into the original container to avoid contamination.

The best method is to use an auto-dispenser.
After assembling, it is necessary to wait for the initial strength to develop before using. If not, the material will break, sealing ability is reduced and the final torque strength is also low. This will not result in a good bonding strength.

C. Reactivity of Different Metals
Metals are protected with coatings. The following table shows the reactivity:

	Effect on curing speed	Surface Metals
Active metals	Accelerated	Steel, Nickel, Copper
Medium range	Slight acceleration	Zinc, Brass, Aluminium, Unichrome, Stainless Steel
Inactive metals	No acceleration	Zinc chromate treated, Black Steel

Besides, the environmental temperature (below 10°C) also affects the curing speed. Hence, it may be necessary to leave for a longer time or subject the parts to heating, if possible.

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D. Reworkability

After the parts are bonded with TB 1360, it is very difficult to detach. This is because it has good vibration resistance, heat resistance and chemical resistance. However when the parts are heated with the burner to temperature above 250°C, it is easy to detach. Otherwise, immerse the parts into dimethylformamide for 24 hours, so that the polymer will swell and make it easy to detach. However, dimethylformamide will affect health and plastic parts adversely.

1. Set time of different adherent materials

Test Method: Apply TB1360 onto bolt and assemble with nut before leaving at 25°C. The breakaway torque is determined after 10 minutes. When the breakaway torque is equal or more than 5 kg·cm, the set-time is obtained.

Bolt	Nut	Set Time (min)
Steel (SS41)	Steel (SS41)	40 ~ 70
Steel (SS41)	Chrome	50 ~ 70
Steel (SS41)	Zinc	50 ~ 70
Steel (SS41)	Zinc Chromate	70 ~ 90
Steel (SS41)	Black Steel	70 ~ 90
Steel (SS41)	Brass	20 ~ 40
Steel (SS41)	Aluminium	80 ~ 100
Steel (SS41)	Nickel	70 ~ 90
Zinc	Zinc	50~ 70
Brass	Brass	15 ~ 35
Aluminium	Aluminium	70 ~ 90

2. Bonding Strength to Different Materials

Test Method: Apply TB1360 onto bolt and assemble with nut before determining the strength.
Test Condition: Bolt M10 x P1.5 (SS41)
Nut Thickness 8 mm (SS41)
Wash with trichloroethylene
Tightening torque = 0 kg·cm
Curing time and temperature: 25±1°C x 24h; 100°C x 45min

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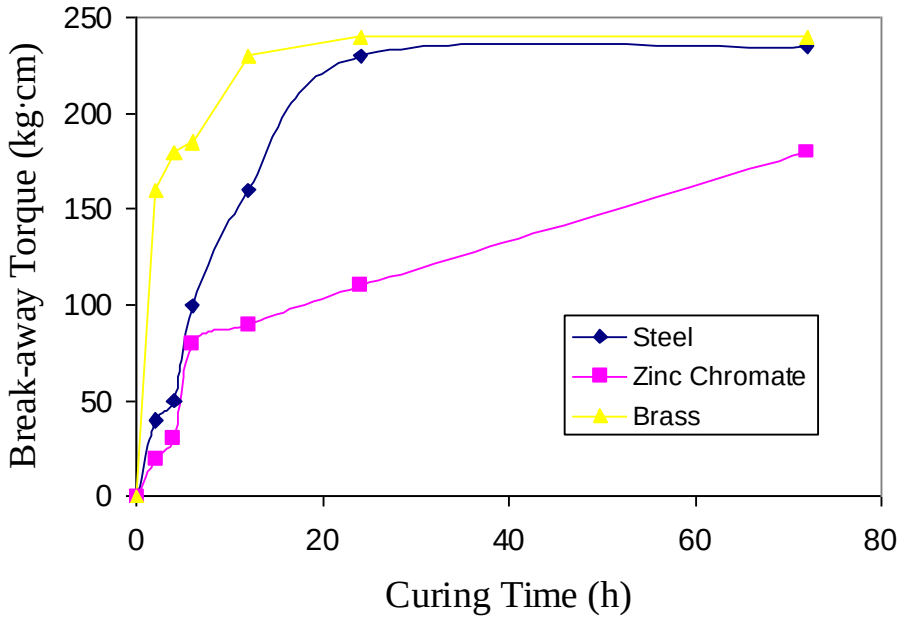
Material		Curing Condition			
		25°C x 24h		100°C x 45 min	
Bolt	Nut	Break-away Torque	Prevailing Torque	Break-away torque	Prevailing Torque
Steel	Steel	230	225	190	230
Steel	Chrome	140	160	150	170
Steel	Zinc	145	160	140	180
Steel	Zinc Chromate	135	180	80	190
Steel	Black Steel	140	100	140	200
Steel	Brass	235	180	140	210
Steel	Aluminium	140	100	160	195
Steel	Nickel	150	170	130	230
Zinc	Zinc	230	240	210	240
Brass	Brass	220	90	90	100
Aluminium	Aluminium	100	110	120	100

3. Curing Speed



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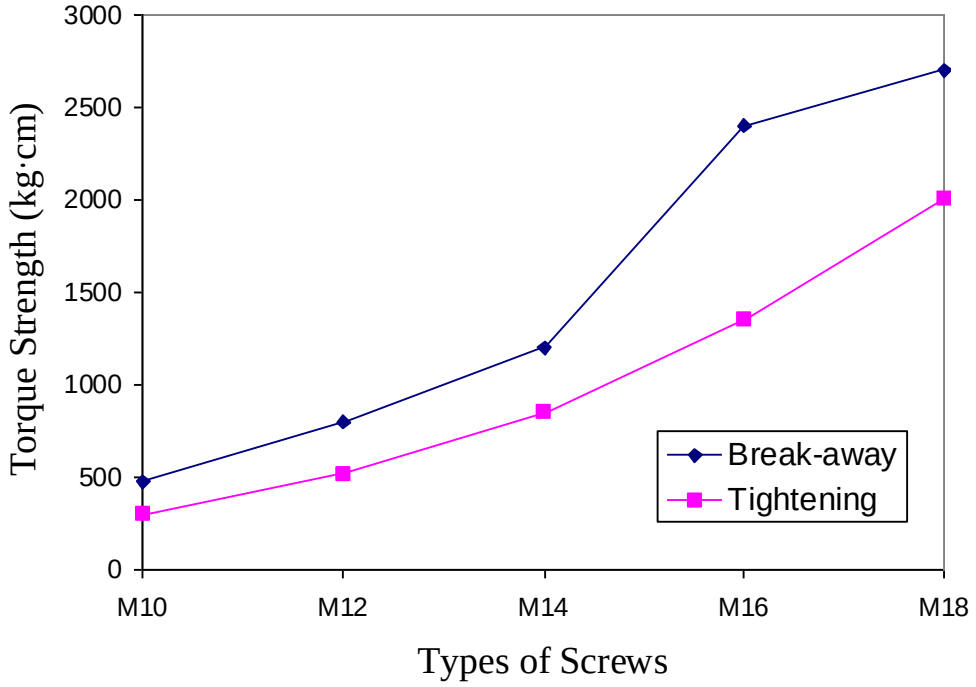
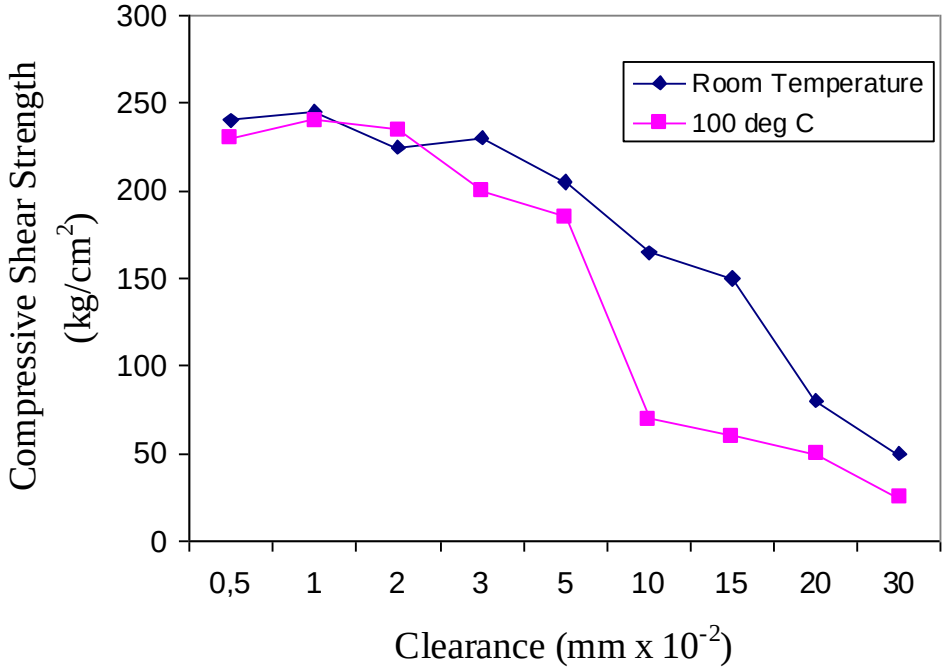
4. Suitable Tightening Torque vs Bonding Strength



5. Compressive Shear Strength vs Clearance



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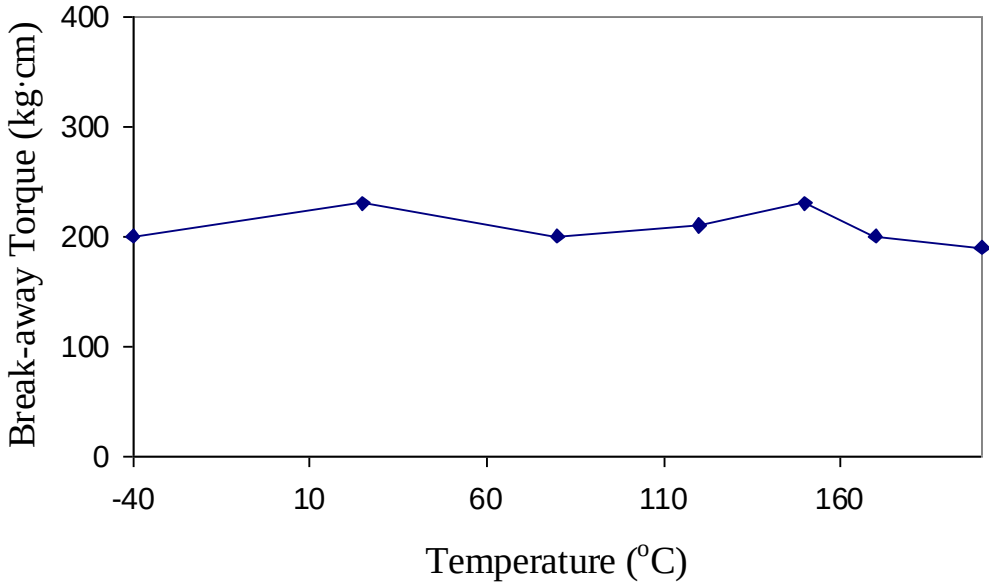
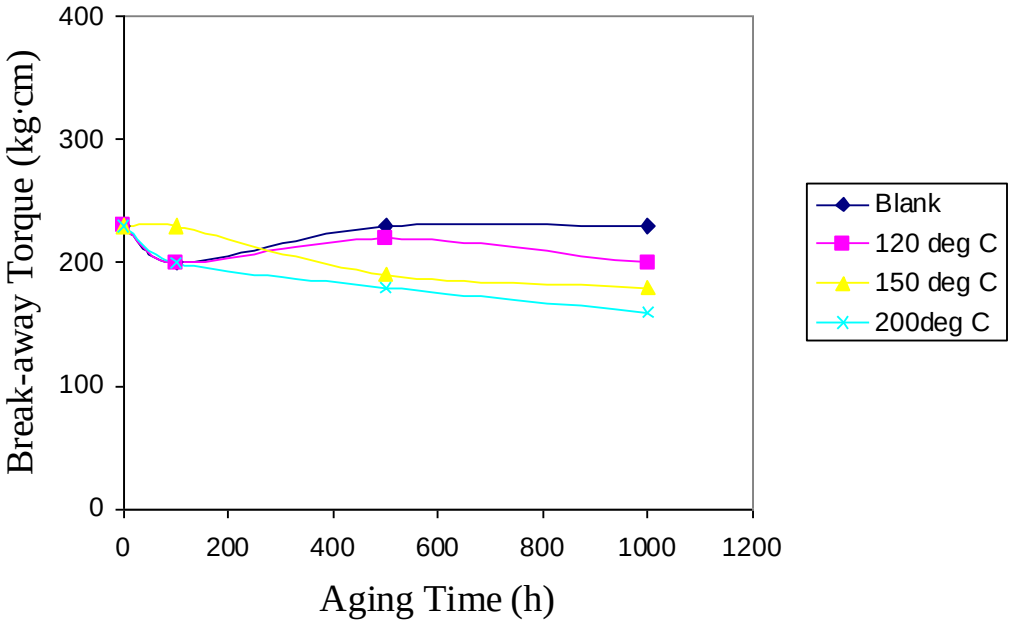
6. Heat Resistance



7. Thermal Aging

(a) Bolt and nut method



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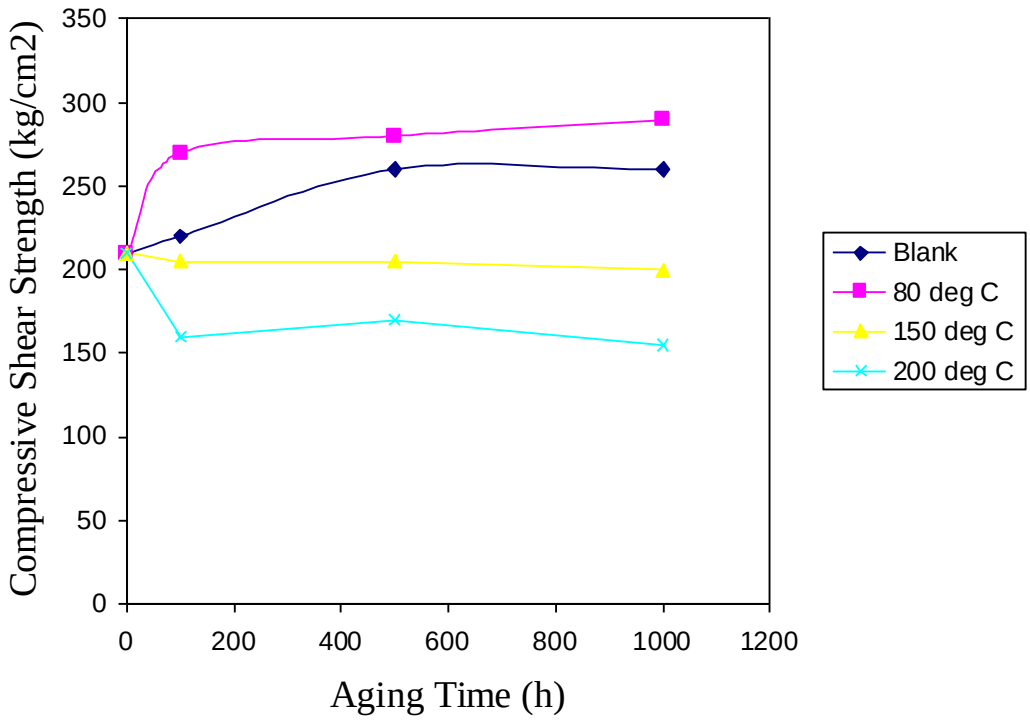
(b) Compression method



8. Heat Cycle Experiment

Test Method	Material	No of Heat Cycles					
		5		10		20	
		Breakaway torque	Prevailing torque	Breakaway torque	Prevailing torque	Breakaway torque	Prevailing torque
a. Bolt and nut method (kg·cm)	Steel (SS41)	230	220	200	230	180	220
	Zinc Chromate	55	260	50	260	50	260
b. Compressive shear strength (kg/cm^2)	Steel (SS41)	Compressive Strength		Compressive Strength		Compressive Strength	
		220		185		180	

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9. Chemical Resistance

Immersion fluid	Bolt material	Torque kg·cm	
		Breakaway	Prevailing
Blank (90 ~ 100°C)	Fe	220	240
	Zn Cr	50	240
Water (90 ~ 100°C)	Fe	120	170
	Zn Cr	110	250
Ethylene Glycol (90 ~ 100°C)	Fe	190	120
	Zn Cr	50	230
Gear Oil (90 ~ 100°C)	Fe	160	120
	Zn Cr	70	220
Engine Oil (90 ~ 100°C)	Fe	200	150
	Zn Cr	50	220
Turbine Oil (90 ~ 100°C)	Fe	200	140
	Zn Cr	50	200
Blank (40 ~ 50°C)	Fe	220	250
	Zn Cr	50	240
Light Oil (40 ~ 50°C)	Fe	190	190
	Zn Cr	60	200
Gasoline (Fuel D) (40 ~ 50°C)	Fe	190	230
	Zn Cr	60	230

Fe Steel
Zn Cr Zinc Chromate

10. Weathering Ability

Condition	Material of bolt and nut	Torque (kg·cm)	
		Breakaway	Prevailing
Weather Meter 1000h	Steel	250	300
	Zinc Chromate	40	180
Normal temperature 1000h	Steel	270	270
	Zinc Chromate	20	30

Shelf Life

Three Bond 1360 9 months when stored unopened at 10~25°C.

Packaging

Three Bond 1360 Available in sizes of 50g and 250g

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Disclaimer

For Industrial Use Only

(Do not use for household purposes)

- The data contained in this report are obtained from experimental results, based on our test methods. We cannot assume absolute responsibility for accuracy and safety. Before using this product, use your own judgement to determine whether or not this product meets the requirements of the application and objectives. This includes the burden of responsibility and hazardous danger. The extent of the guarantee provides replacement for products, which are clearly unsatisfactory.

- We assume responsibility for neither injury nor property damages resulting from the misuse of this product.

- We do not assume responsibility without written notice or contract.

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