

TECHNICAL DATA SHEET



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Three Bond 1305 Anaerobic Adhesive - High Strength Studlock

1. Product Outline

Three Bond 1305 is a one-component, solvent free anaerobic reactive adhesive / sealant which has been specially developed for locking and sealing threaded parts with high strength when cured. Three Bond 1305 cures spontaneously with the exclusion of oxygen and in the presence of metallic, particularly ferrous ions.

2. Applications

- To permanently lock and seal stud bolts and various nuts that will not require subsequent disassembly.

3. Features

- Eliminates mechanical locking parts such as spring or toothed washers, nylon nuts etc.
- Reduces required fastening on torque.
- Screws of inferior accuracy can be used
- Completely seals against oil, water and most chemicals.
- Excellent vibration resistance.

4. Properties

Property	Result	Unit
Base	Methacrylate	
Colour	Green	
Viscosity at 25°C	600	mPa·s
Density at 25°C	1.10	g/cm ³
Fixturing time at 25°C (15%)	≤ 20	min
Final hardening at 25°C	≤ 24	H
Break-loose torque (M10xP1.5) tightening torque 0 Nm	30 ~ 35	Nm
Prevailing torque (M10 x P1.5) tightening torque 0 Nm	25 ~ 35	Nm
Shear strength pin and collar (0.02 mm gap)	25 ~ 35	N/mm ²
Optimum clearance	0.01 ~ 0.02	mm
Maximum clearance	0.3	mm
Maximum bolt size	M 20	
Effective temperature range	- 60 ~ 150	°C
Shelf life at 25°C	12	Months

5. Curing Performance

The setting speed will vary according to the type of surface finish encountered. Active surfaces such as iron, nickel and steel facilitate quick curing, semi-active surfaces such as aluminium, brass, stainless steel and zinc moderately quick curing, whilst inactive surfaces such as cadmium, chrome plate, zinc chromate and titanium are slow curing.

The gap between the parts to be bonded can also effect the cure speed. As the gap increases the time required to fully cure also increases. Thin bondlines, normally less than 0.01mm are fast curing. Bondlines of the specified optimum thickness will give normal cure times whilst larger gaps up to and beyond the maximum specified gap will require longer to cure and also for fixation. Several hours will be needed before parts exceeding the specified maximum gap are fixtured.

Temperature	% Cure	Cure Time
25°C	15%	10 ~ 20 min
25°C	50%	3 ~ 6 hr
25°C	100%	24 hr
80°C	100%	30 min
100°C	100%	20 min
120°C	100%	10 min

6. Bonding Strength

Shear Strength to Gap Size

Clearance	Shear strength
0.005 mm	30 N/mm ²
0.01 mm	30 N/mm ²
0.02 mm	29 N/mm ²
0.03 mm	27 N/mm ²
0.04 mm	25 N/mm ²
0.05 mm	20 N/mm ²
0.1 mm	15 N/mm ²
0.2 mm	11 N/mm ²
0.3 mm	10 N/mm ²

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Breakloose Torque by Fastener Size

Bolt size	Tightening Torque	Breakloose Torque
M 10	30 Nm	56 Nm
M 12	52 Nm	100 Nm
M 14	85 Nm	190 Nm
M 16	135 Nm	270 Nm
M 18	200 Nm	300 Nm

Breakloose Torque Vibration Resistance

Tightening Torque	Spring Washer	No Adhesive	TB 1305
10 Nm	Y	9 Nm	43 Nm
	N	5 Nm	45 Nm
30 Nm	Y	28 Nm	56 Nm
	N	19 Nm	55 Nm

M10 x P1.5; 2000cyc/min, 2mm, 4.5G, x 30 days.

7. Temperature Performance

The cured adhesive is effective over the temperature range of -60 ~ 150°C. At 150°C it will retain 30 ~ 50% of its original strength. After cooling to room temperature the original adhesion strength will be recovered.

Tests also indicate that exposure to high temperatures for long periods has no adverse effects. Bonds kept at 120°C for 3000 hours showed no decrease in bond strength after cooling to room temperature.

Breakloose Torque at Temperature

Temperature	Tightening Torque 0 Nm	Tightening Torque 20 Nm
-30°C	36 Nm	52 Nm
25°C	34 Nm	50 Nm
80°C	33 Nm	44 Nm
100°C	25 Nm	39 Nm

8. Handling and Precautions

Cleaning of Works

Whilst the presence of a small amount of oil on the fitting surfaces does not effect the practical bonding strength, in order to fully utilise the performance of the adhesive, it is recommended to eliminate oil and dirt from the work. Oil and grease can be effectively removed by cleaning with organic solvent, although the use of hydrocarbon cleaners and light oils should be avoided due to residual deposits.

Surface Finish

Rougher surfaces generally produce higher bond strengths. For surface finishes below 0.15µm, cleanliness is extremely important to obtain a high strength. Surface finishes above 3.2µm create excessive gaps, which reduces the bond strength. The recommended finish range is 0.3 ~ 2.0µm.

Priming

Where cure speed is unacceptably long, or large gaps are present, the use of primer TB3095C is recommended to improve the cure speed. This also ensures reliable curing of the adhesive. Primer can be spray, brush or dip applied and must be dry before adhesive is applied. Assembly must then take place within 3 minutes otherwise the parts will require cleaning and retreating.

Applying the Adhesive

The Three Bond 1300 series adhesives may be applied directly from the container. It may be applied with a brush from a holding container although the transfer of remaining fluid to the stock container should be avoided so as to avoid contamination. A range of automatic precision dispensing machines is available. Please consult your local engineer for further details

- When locking threaded parts ensure at least 5 threads are wetted, otherwise inadequate or variable bond strength may occur.
- Excess adhesive coming out of joints does not set and therefore should be wiped off with a cloth.

Assembly

Parts should be assembled taking care to ensure the adhesive wets the entire area to be bonded. Threaded parts must be tightened within 5 minutes. Allow assemblies to cure as recommended and parts should be fixtured (15% strength) before they are disturbed. Larger gaps require longer cure times and at temperatures below 10°C the adhesive will take too long to cure and not reach sufficient bond strength.

Disassembly Procedure

TB1305 forms a high strength permanent bond when cured. If parts cannot be disassembled at room temperature, the bond can be weakened by the application of heat (300 ~ 350°C). The parts should be disassembled whilst at temperature. There are no solvents available to dissolve the cured adhesive in bonded joints. Once disassembled, cured adhesive can be removed mechanically or with methylene chloride. It should be noted that this substance will erode plastics and is harmful. Wiping with an organic solvent will remove the uncured adhesive outside the joint.

Solvent Resistance

Chemical resistance to commonly used fluids and gases such as water, water-glycol mixtures, diesel, gasoline, engine oil and hypoid oil is excellent. In most cases it is recommended to test the adhesive in the presumed application before production, particularly where high temperatures are involved. The adhesive is not recommended for sealing against strong acids, hydroxides, chlorine, oxygen and ozone.

Effect on Plastics

Uncured fluid adhesive before setting may effect some plastics. It is recommended to carry out a preliminary test when contact is expected. Plastics such as polycarbonate, ABS, acryl resin, styrol as well as natural rubber are readily effected. Others such as polyamide and polymethylene oxide show good compatibility.

Safety

Three Bond 1300 series anaerobic products have been proven to be safe to handle as long as normal hygienic practices are observed. Repeated or prolonged skin contact may cause irritation. Contact with skin in such conditions should be avoided by using gloves or barrier creams. If there is a possibility of product splashing into the eyes it is recommended that eye protection is provided. For further information see the relevant Material Safety Data Sheet.

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9. Storage

Since the adhesive sets through chemical reaction, storing it at high temperatures may shorten the service life. If stored in a cool place, well ventilated and not in direct sunlight in its original container the adhesive will remain usable for its specified shelf life. If kept in refrigerated area at -5-8°C the life is extended to a year or longer.

10. Packaging

50g, 250g and 1kg bottles; special packing available on request.