

# ThreeBond

PRODUCT SERIES GUIDE

2400 SERIES | PRE-APPLIED COATINGS



# ThreeBond

## 2400 SERIES PRE-APPLIED COATINGS

Precoated fastener  
locking agents



ThreeBond pre-applied (MEC) material utilizes microencapsulation technology to coat threaded fasteners, providing powerful locking and sealing characteristics. ThreeBond handles the entire process of coating fasteners - manufacturing the coating material, preparing the fastener for coating and applying the MEC to the fastener at our Ohio facility. Our Ohio facility is ISO 9001 and ISO 14001 certified.

### BENEFITS OF USING MEC COATING

**Eliminate errors:** line workers can be certain the adhesive is on the part, in the correct location and correct amount.

**Eliminate physical locking mechanisms:** such as cotter pins and lock washers.

**Reduce chance of skin irritation:** dry to the touch

**Reduce component costs** and assembly time

**Easy to use** with automation equipment

**Environmentally friendly**

**Anti-tampering agent:** leaves a colored residue if the fastener is removed.



## LOCKING AGENT RELATED PRODUCTS

### PRECOATED BOLTS

This processing technique provides fasteners with the sealing and locking function by applying micro-capsulated adhesive on the threaded parts of the bolt in a special process. When the fastener is assembled, the micro-capsule is ruptured and it adheres as a result of a polymerization reaction.



**Main Uses:** Screws that require sealing and locking

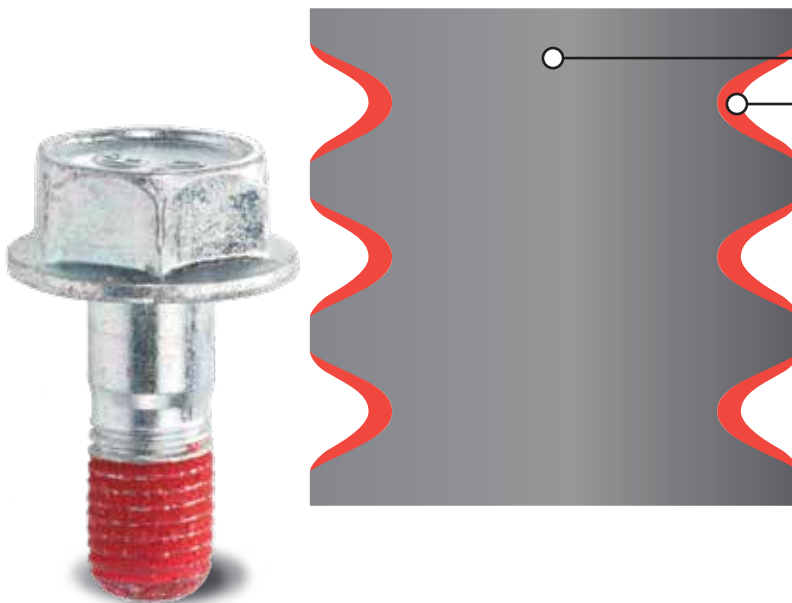
### PRECOATED NUTS

This processing technique provides nuts with same locking and sealing function by coating the inner threads of the nuts. When the nut is assembled, the micro-capsule is ruptured and it adheres as a result of a polymerization reaction.



**Main Uses:** Nuts that require locking

### CROSS-SECTION VIEW OF A MEC-PROCESSED PART



**Cross-Section of the Bolt  
Processed Adhesive Agent**

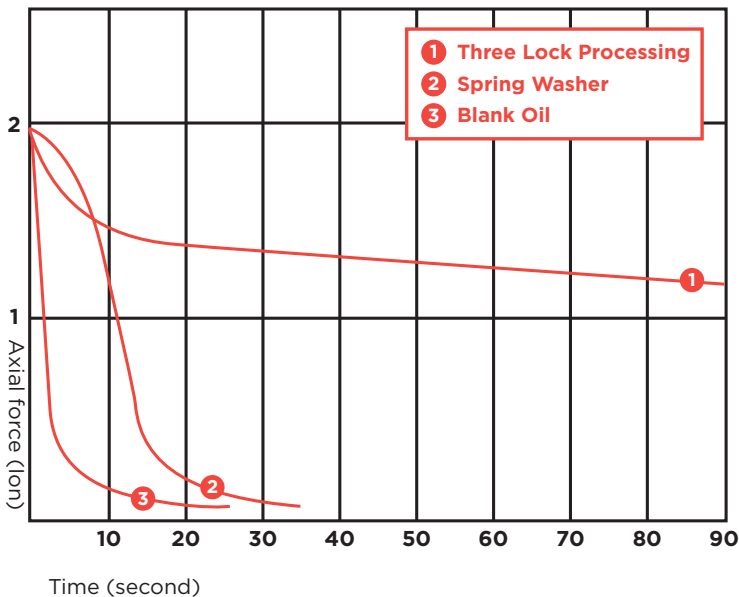
With the surface of the threaded part processed by the micro-encapsulated high-reactive adhesive agent, the fastener is coated with the sealant and locking agent.

## PRE-APPLIED MEC PRODUCTS

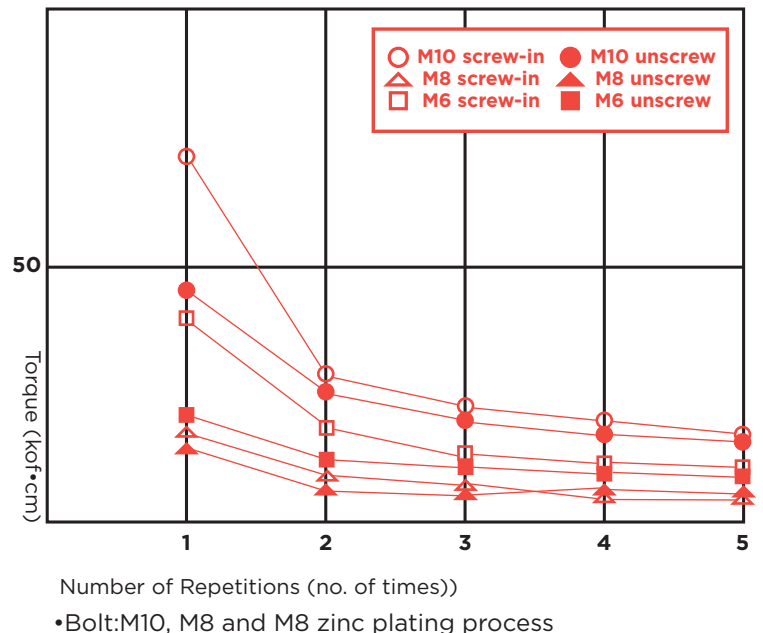
Classification	Part Number	Color	Applicable Dimension	Critical Temperature of Heat Resistance		Curing Speed (20-25°C)		Main Characteristics
				LOCKING	SEALING	WORKING	FINAL	
LOW STRENGTH	2458	Green	M3 or larger	100°C	170°C	0.5-1h	24h	General Screws low adhesive force type easy removal
MEDIUM STRENGTH	2418	Yellow	M3 or larger	150°C	170°C	0.5-1h	24h	General Screws low tightening resistance axial force type 2488 used for nuts
	2468	Red	M3 or larger	100°C	170°C	0.5-1h	24h	
	2488	Aqua	M3 or larger	130°C	N/A	0.5-1h	24h	
HIGH STRENGTH	2448	Blue	M2-M40	160°C	170°C	0.5-1h	24h	General screws high adhesive force
	2448B	Orange	M2-M40	160°C	170°C	0.5-1h	24h	General screws high adhesive force high heat resistance
	2478	Aqua	M3 or larger	130°C	170°C	0.5-1h	24h	

## TEST RESULTS

### 1 VIBRATION TEST



### 2 REPETITIVE TORQUE TEST



## TEST RESULTS

### Fixing Strength with Various Materials

Bolt Material	Unit	2458	2418	2468	2488	2448	2448B	2478
Plain Steel	N-m	38.2	49.8	45.4	43.1	62.6	64.6	52.5
Zinc Chromate	N-m	37.4	49.1	44.9	44.9	67	70.7	52.3
Brass	N-m	27	26.2	28.8	36.5	38.3	37.8	29.6
Aluminum	N-m	20.6	26.8	24.8	22.4	36.4	40.9	22.3
Unichrome	N-m	36.3	50.2	45.8	41.5	72	66.5	48.4
Nickel	N-m	37.3	50.4	42.2	40.8	73.9	65.1	52.8
Chrome	N-m	32.9	50.3	43.4	42.5	67.8	62.1	49.8
Black Oxide	N-m	33.5	46.1	43.8	40.8	62.4	64.1	42.5
Stainless	N-m	31.9	47.8	42.6	41.1	64.6	66.8	45.5

### Chemical Resistance Test

Chemical	Condition	Unit	2458	2418	2468	2488	2448	2448B	2478
NaOH 10%aq	25°C x 7 Days	N-m	41.8	50.5	45	40.3	65.4	66.8	48.6
Gas Oil	40°C x 7 Days	N-m	47.1	44.1	50.7	41.2	61.1	77.2	52
Gasoline	40°C x 7 Days	N-m	47.5	46	50.9	43.5	58.8	75.9	48.3
n-Hexane	40°C x 7 Days	N-m	44.8	45.6	48.3	41.9	66.2	77.1	47.7
Methanol	40°C x 7 Days	N-m	46.6	49.2	50.1	44.2	63.4	75.9	49.9
Water	100°C x 7 Days	N-m	45.3	48.9	46.9	42	59.9	70.4	53.7
Ethylene Glycol	100°C x 7 Days	N-m	48.2	45.5	45.1	42.3	62.6	70.5	48.5
Ethylene Glycol 50% aq.	100°C x 7 Days	N-m	47.6	44	46.4	40.3	62.7	72.9	51.6
Engine Oil	100°C x 7 Days	N-m	47.9	42.7	45.5	40.2	59.6	73.4	50.4
Turbine Oil	100°C x 7 Days	N-m	45.4	42.7	43.8	41.2	60.7	73.4	49.3
ATF	100°C x 7 Days	N-m	46.4	42.1	45.4	41.3	55.5	78.8	52.4
Gear Oil	100°C x 7 Days	N-m	46.7	44.1	47.8	39.5	59.8	71.3	49.8

## TEST RESULTS

### Breakloose Torque at Each Size

Bolt Size	Tightening Torque (N-m)	2458	2418	2468	2488	2448	2448B	2478
M3 P0.35	1	1	1.1	1.1	1.1	1.5	1.4	1.1
M4 P0.37	2	2	2.2	2.2	2.1	3.3	3	2.3
M6 P1.0	8	8.2	10.2	9.6	9.9	13.4	12.6	12.1
M8 P1.25	15	15.4	19.5	20	18.9	26.3	22	21.8
M10 P1.25	30	36.7	49.4	45.3	44.5	68	68	56.6
M10 P1.5	30	37.4	49.1	44.9	44.9	70.3	70.7	52.3
M12 P1.25	50	62.6	81.4	75	65.6	93.2	95.6	81.8
M12 P1.5	50	58.2	80.7	71	63.2	101	101.2	79.6
M12 P1.75	50	51	77.1	63	63	100	95.6	69
M14 P2.0	90	89	128.8	108	110.8	168.8	157.8	120.4

### Breakloose Torque at Each Temperature

Test Temperature (°C)	Unit	2458	2418	2468	2488	2448	2448B	2478
25	N-m	37.4	49.1	44.9	44.9	70.3	70.7	52.3
40	N-m	35.7	n/a	36.4	n/a	n/a	n/a	44.3
60	N-m	32.6	45.6	33.5	37.5	52.2	54.4	38.9
80	N-m	32	42.9	31.6	36.4	50.3	52	37.5
100	N-m	30.8	40.5	30.1	34.7	46.8	47.6	34.1
120	N-m	26	38.3	26.9	33.4	37	42	31
150	N-m	20.4	33.2	22.9	17.5	31.6	38	30.1
180	N-m	19.5	26.2	18.4	21.1	21.4	21	21.1