

### Product Description

Fasteners coated with ND Microspheres 593S, a powerful pre-applied adhesive film, provides excellent locking and sealing properties for various applications. ND Microspheres 593S is factory applied to either internal or external threads, remaining inert on the fastener until assembly of the threads bursts resin containing microcapsules and allowing for mixing of reactive components present in the pre-applied film. Assembly of fasteners coated with ND Microspheres 593S with a mating component to create a joint fills the voids of the threads and cures to lock and seal the assembly.

### Typical Applications

Fasteners coated with ND Microspheres 593S prevent loosening through vibration to provide locking and sealing of threaded assemblies including but not limited to the following types of applications:

- Ring gear bolts
- Head bolts
- Intake manifold bolts
- Transmission bolts

### Properties of Unassembled Fasteners Coated with ND Microspheres 593S

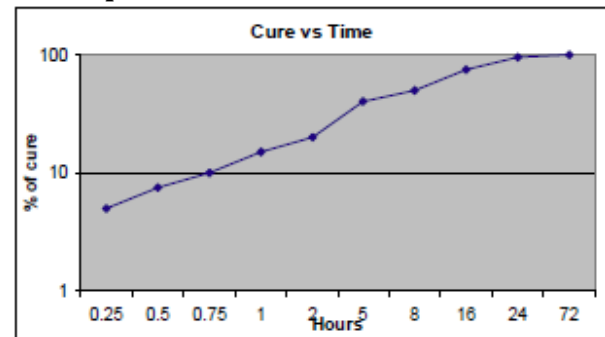
Chemical Type	Microencapsulated Epoxy
Color	Blue, Pink, Green, Yellow, Red, Grey, Turquoise, Black

### Properties of Assembled Fasteners Coated with ND Microspheres 593S

Installation Torque	0.55 Nm
Breakaway Torque	30 Nm
Prevailing Off-Torque	22 Nm
Temperature Range	-65°F to 300°F (-54°C to 150°C)
Cure Time at 23°C	72 Hours
k-Value	Zinc Organic: 0.14 Zinc Plate: 0.19

Note: Installation, breakaway, and prevailing off-torque data are from test results conducted on an M-10x1.5 class 10.9 zinc organic finish bolts and M-10x1.5 class 10 zinc nuts. Performance may vary depending on fastener size and finish.

### Cure speed



The graph shows the rate of cure of an M-10 nut and bolt plated with various finishes. The breakaway strength was determined using industrial procedures.

### Environmental and Fluid Resistance

	Temp	% Initial Strength
SW30 Synthetic Oil	150°C	88
Brake Fluid	150°C	94
50/50 Coolant	100°C	109
Transmission Fluid	150°C	104
Gasoline	23°C	100
Gasoline / Ethanol	23°C	108
15W40 Axel Lube	150°C	110
Cyclic Aging	-40°C to 50°C	261
Heat Age	150°C	84
Hot Strength*	150°C	57

Note: Heat age and immersion testing were conducted on M-10 x 1.5 zinc organic finish bolts and a zinc plate nuts. Assembled fasteners were aged at the temperature listed above for 168 hours and allowed to cool to room temperature before breakaway test.

### Shelf Life & Storage

Unassembled fasteners coated with ND Microspheres 593S are recommended to be stored in a cool and dry location at temperatures between -10°C to 35°C. Optimal storage is 25±4°C with 50% or below relative humidity. Please consult the SDS for ND Microspheres 593S Applied for further information regarding proper handling.

### Special Note

The data contained on this data sheet is representative of the performance of fasteners coated with ND Microspheres 593S. Given that actual conditions may vary, it is recommended that testing should be conducted by the end user to determine suitability for their application.