



### Product Description

ND Microspheres® 1193 is a powerful pre-applied adhesive film for locking and sealing. ND Microspheres 1193 is factory pre-applied to either internal or external threads. It remains inert on the fastener until assembly of the threads mixes the resin. The resin fills the voids of the threads and cures to lock and seal the assembly. ND Microspheres 1193s and 1193sN are designed to perform at room temperature and under continuous service temperatures up to 149°C (300°F) or intermittently up to 204°C (400°F).

### Typical Applications

Microspheres 1193® prevents loosening through vibration to provide locking and sealing of threaded assemblies including but not limited to:

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

### Typical Properties

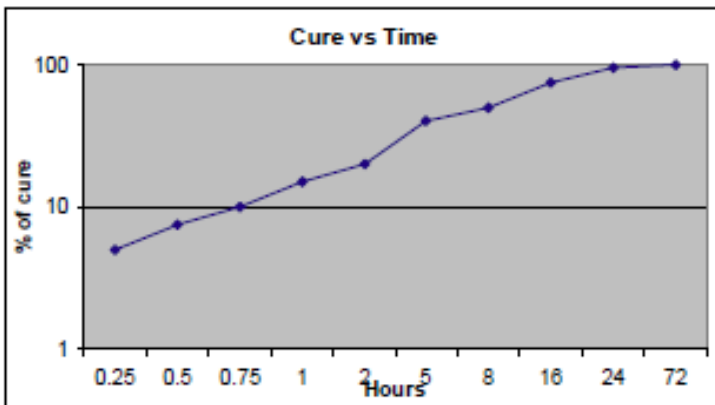
**Chemical Type**                      Microencapsulated Epoxy

**Available Colors**                      Orange, Neutral, Bright Orange

### Curing Performance (fastener assembly)

#### 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.



### Performance of Cured Material

	Typical Values
<b>Installation Torque</b>	0.55 N-m
<b>Breakaway Torque</b>	30 N-m
<b>Prevailing off-torque</b>	22 N-m
<b>k-Value</b>	Zinc Organic: 0.14 Zinc Plate: 0.19
<b>Temperature Range</b>	(-54°C to 150°C) -65°F to 300°F Intermittently up to 204°C (400°F)
<b>Cure time at 23°C</b>	72 Hours

Please note that installation, breakaway, and prevailing off-torque data are from test results conducted on an M-10 x 1.5 class 10.9 zinc organic finish bolts and M010 x 1.5 class 10 zinc nuts. Performance may vary depending on fastener finish.

### Environmental and Fluid Resistance

Environment	Temperature	% of Initial Strength
5W30 Synthetic Engine Oil	150°C	88%
Brake Fluid	150°C	94%
50/50 Long Life Coolant	100°C	109%
Transmission Fluid	150°C	104%
Gasoline	23°C	100%
Gasoline/Ethanol	23°C	108%
15w40 Axle Lube	150°C	110%
Cyclic Aging	-40°C to 150°C	261%
High Temperature Aging	150°C	84%
Hot Strength	150°C	57%

Heat age testing was conducted on M-10 x 1.5 zinc organic finish bolts and zinc plate nuts. Assembled fasteners were aged at 150°C for 168 hours and allowed to cool to room temperature before breakaway test. Immersion testing was conducted using M-10 x 1.5 Zinc organic finish bolts and zinc plate nuts. Assembled fasteners were submerged in each fluid for 168 hours at the temperature. Assemblies were allowed to cool to room temperature before breakaway test.

### General Information

#### Storage

Fasteners coated with product are 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.

#### Note

The data are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is recommended that the product be tested in the application for which it is to be used.

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