

Technical Data Sheet Nuts N' Bolts[®] 431

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Product Description

Hernon[®] Nuts N' Bolts[®] 431 is a single component anaerobic thread locking adhesive. It is recommended where specific viscosity, shear strength and cure speed are necessary. **Nuts N' Bolts[®] 431** is a low viscosity penetrating material for locking already assembled bolts and studs. This is specially formulated for pre-assembled fasteners; it works by capillary action and it simplifies preventive maintenance. Curing occurs only when adhesive is confined between mating surfaces. The cured adhesive is a thermoset plastic suitable for temperatures up to 400°F (204°C), and exposure to most solvents.

Product Benefits

- Prevents loosening of threaded parts
- Prevents rusting of threads
- Seals against leakage
- Cures without cracking or shrinking
- Easily applied with **Hernon[®]** application equipment
- Low inventory-fits wide range of bolt sizes
- Single component-no mixing
- No curing outside of joint
- Can be applied after assembly

Typical Applications

- Locking instrumentation screws.
- Locking electrical connector set screws
- Locking carburetor screws
- All small to medium size fasteners
- Wheel rim weld sealing
- Sealing die cast aluminum parts

Typical Properties (Uncured)

Property	Value
Chemical Type	Methacrylate Ester
Appearance	Green fluorescent liquid
Specific Gravity	1.06
Viscosity @ 25°C, cP	15
Flash Point	See MSDS

Typical Properties (Cured)

Property	Value
Coefficient of thermal expansion, ASTM D696, mm/(m°K)	0.1
Coefficient of thermal conductivity, ASTM C177, W / m°K	0.1
Temperature Range, °F	-65 to 400

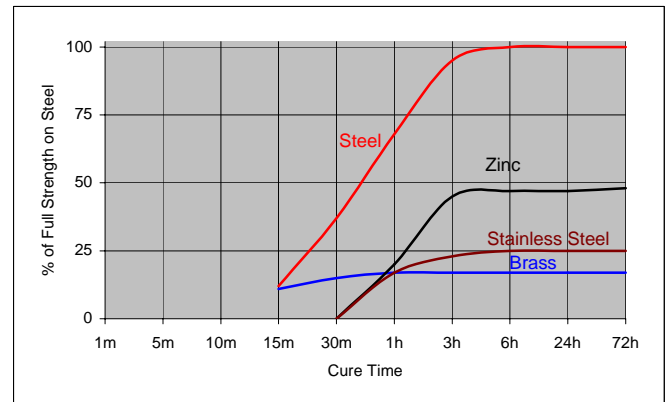
Performance Testing

Each batch of **Nuts N' Bolts[®] 431** is tested to the lot requirements of MIL-S-46163A (Type III Grade R), and to the detail requirements of ASTM D5363 (AN0261).

Typical Curing Performance

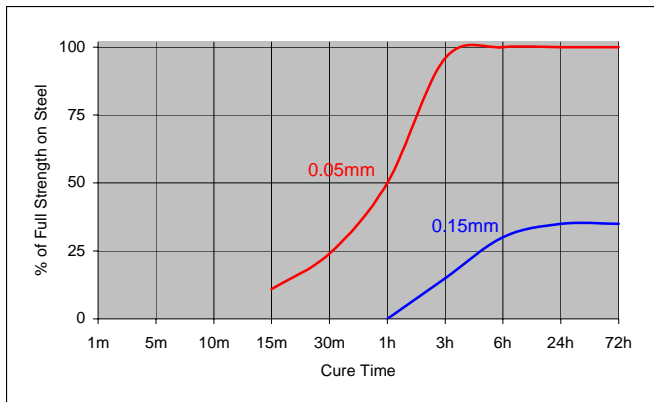
Cure Speed vs. Substrate

The rate of cure will depend on substrate used. The graph below shows the breakaway strength developed with time on M10 steel nuts and bolts compared to different materials and tested according to ISO 10964.



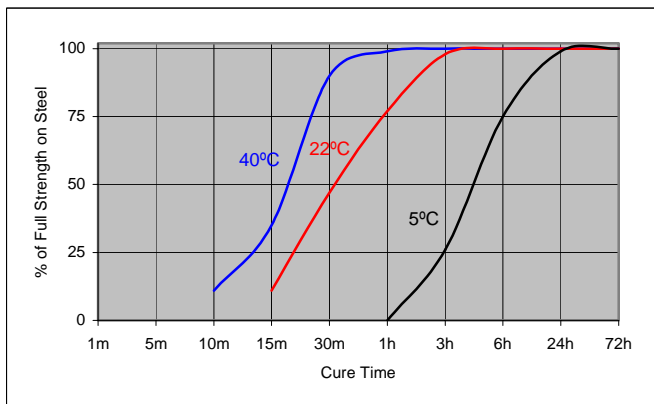
Cure Speed vs. Bond Gap

The rate of cure will depend on the bondline gap. Gaps in threaded fasteners depends on thread type, quality and size. The following graph shows shear strength developed with time on steel pins and collars at different controlled gaps and tested according to ISO 10123.



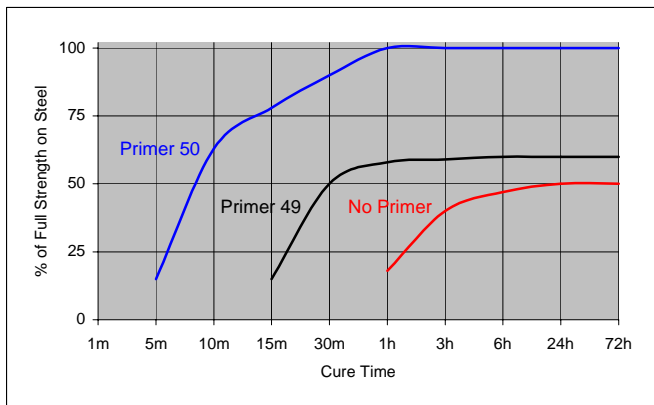
Cure Speed vs. Temperature

The rate of cure will depend on the ambient temperature. The graph shows the breakaway strength developed with time at different temperatures on M10 steel nuts and bolts and tested according to ISO 10964.



Cure Speed vs. Primer

When cure speed is unacceptably long (because of substrate, temperature or gap), performance may be improved by treating the surface with **Hernon® EF® Primer 49 or 50**. The graph below shows breakaway strength developed with time using **EF® Primer 49 and 50** on M10 zinc dichromate steel nuts and bolts and tested according to ISO 10964.



Typical Cured Performance

Tested on M10 steel nuts and bolts according to ISO 10964.

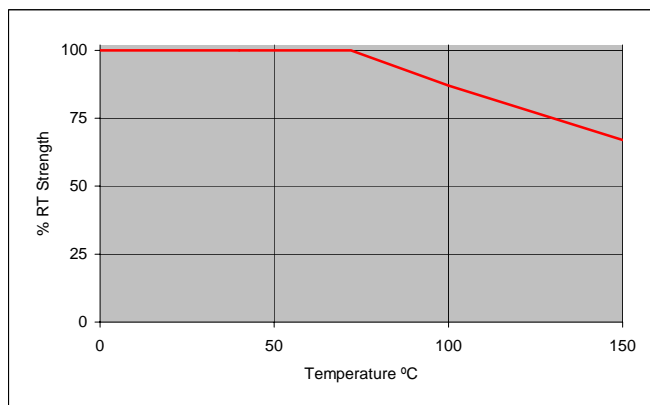
RT Cure	Torque	N•m (in-lb)
24 Hours	Breakaway	10.2 (90)
	Prevailing	29.4 (260)
	Breakloose Pretorqued to 5 N•m (45 in-lbs)	30.5 (270)
	Maximum Prevailing Pretorqued to 5 N•m (45 in-lbs)	39.5 (350)

Typical Environmental Resistance

Cured for 1 week @ 22°C
Breakloose Torque, ISO 10964, pretorqued to 5 N•m
M10 zinc phosphate nuts and bolts

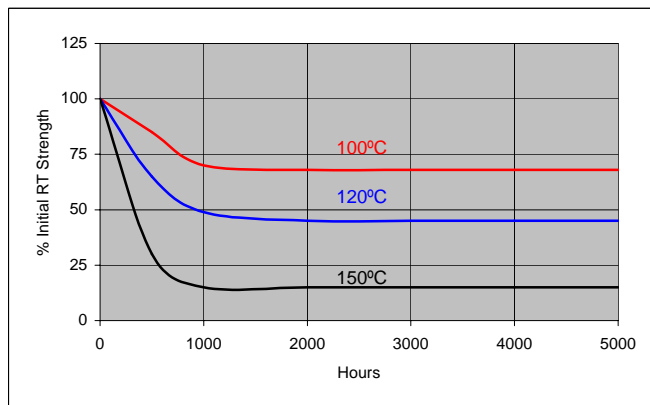
Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated - Tested at (22°C).



Chemical/Solvent Resistance

Aged under condition indicated - Tested at 72°F (22°C).

Chemical/Solvent	Temp	% of Initial Strength			
	(°C)	100h	500h	1000h	5000h
Water Glycol 50/50	87	90	90	90	90
Brake fluid	22	90	90	85	85
Ethanol	22	80	80	80	80
Leaded Gasoline	22	90	90	90	90
Motor Oil	125	85	85	50	50
Acetone	22	85	85	85	85

General Information

This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials.

For safe handling information on this product, consult the Material Safety Data Sheet (MSDS).

Where aqueous washing systems are used to clean the surfaces before bonding, it is important to check for compatibility of the washing solution with the adhesive. In some cases these aqueous washes can affect the cure and performance of the adhesive.

This product is not normally recommended for use on plastics (particularly thermoplastic materials where stress cracking of the plastic could result). It is recommended to confirm compatibility of the product with such substrates.

Directions For Use

For best performance surfaces should be clean and free of grease. Nuts N' Bolts® 431 should be applied to the bolt in sufficient quantity to fill all engaged threads.

Disassembly and Cleanup

To aid in disassembly anaerobic compounds can be weakened by heating to at least 500°F (260°C). Once disassembled, cured adhesive can be removed with Hernon® Gasket Remover 30.

Storage

Nuts N' Bolts® 431 should be stored in a cool, dry location in unopened containers at a temperature between 46°F to 82°F (8°C to 28°C) unless otherwise labeled. Optimal storage is at the lower half of this temperature range. To prevent contamination of unused material, do not return any material to its original container.

Dispensing Equipment

Hernon® offers a complete line of semi and fully automated dispensing equipment. Contact Hernon® Sales for additional information.

These suggestions and data are based on information we believe to be reliable and accurate, but no guarantee of their accuracy is made. HERNON MANUFACTURING, INC. shall not be liable for any damage, loss or injury, direct or consequential arising out of the use or the inability to use the product. In every case, we urge and recommend that purchasers, before using any product in full scale production, make their own tests to determine whether the product is of satisfactory quality and suitability for their operations, and the user assumes all risk and liability whatsoever, in connection therewith. Hernon's Quality Management System for the design and manufacture of high performance adhesives and sealants is registered to the ISO9001:2000 Quality Standard.