

Technical Data Sheet Nuts N' Bolts[®] 431

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Product Description

Hernon[®] Nuts N' Bolts[®] 431 is a wicking anaerobic used for preassembled equipment and structures where penetration into fastener connection points is required. This product allows very simple preventive maintenance by permitting thread locking without dismantling equipment. The product "wicks" into voids by capillary action. Use **Nuts N' Bolts[®] 431** to seal pores or pinhole porosity in welded seams, tanks, castings, or metal parts. 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

- Air compressor fasteners
- Refrigeration safety valves, compressor coils
- Emission control valve screws
- Fasteners on equipment for shipment
- Calibration & adjustment screws
- Tamper proofing assemblies
- Bicycles, motorcycles
- Children's swings, toys
- Gun smithing

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 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 |

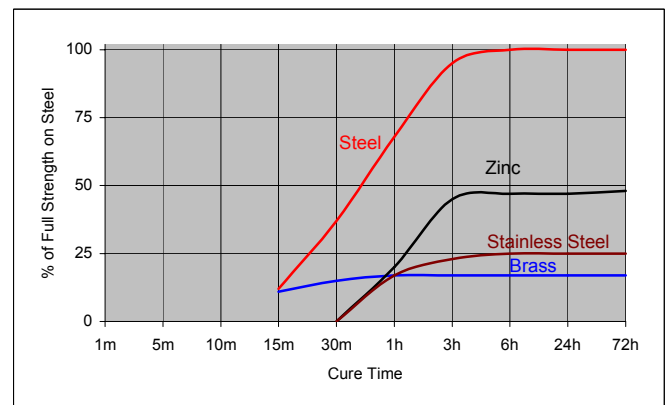
Typical Properties (Cured)

| 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 |

Typical Curing Performance

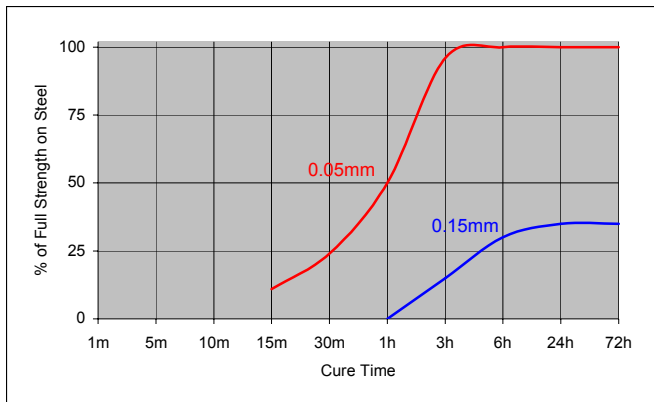
Cure Speed vs. Substrate

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.



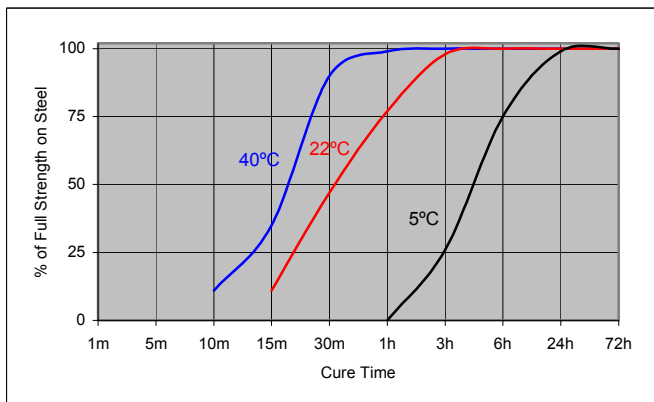
Typical Cured Performance

Cured and tested at 22°C on M10 steel nuts and bolts according to ISO 10964.

| Cure | Torque | N•m (in-lb) |
|---------|---|-------------|
| 24 Hrs. | 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) |

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.

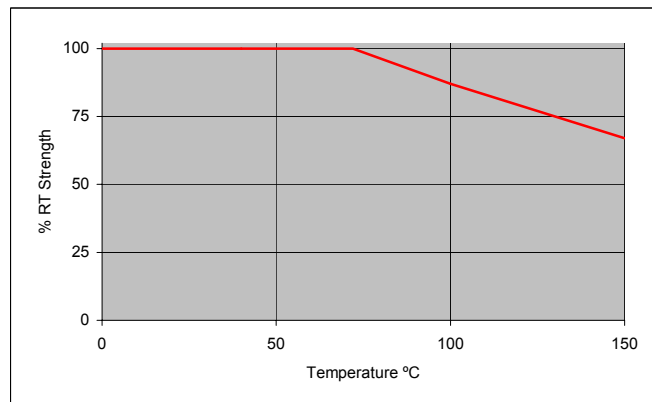


Typical Environmental Resistance

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

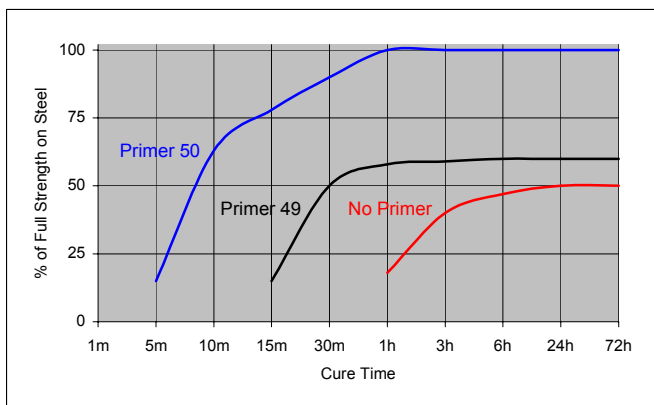
Hot Strength

Tested at temperature



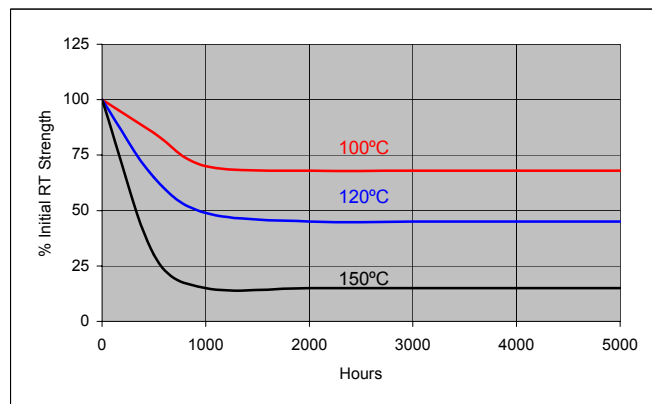
Cure Speed vs. Primer

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.



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 |

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 Quality Standard.

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.