



ENDRIES™

# UNDERSTANDING NYLON INSERT LOCKNUTS

## UNDERSTANDING NYLON INSERT LOCKNUT DESIGN

- These type of locknuts feature a hex nut with a nylon-filled collar at its back end.
- The collar forms a tight frictional fit around the mating screw or bolt to prevent movement when it is subjected to vibration.
- DuPont 66 or Zytel 101 resin nylon are typical materials for the nylon insert
- The typical working temperature of these materials is -70°F to 250°F
- Many domestic lock nut manufacturers can be traced back to the color of their nylon insert
- Nylon insert lock nut manufacturers have historically used the strength designation of Grade A, B, and C, established by the Industrial Fastener Institutes standard IFI-100/107, to designate the three different strength levels that these nuts can be manufactured to.
- End users typically order lock nuts using the more common industry standard strength levels (also called the SAE strength levels) of Grade 2, 5 and 8.
- In 2008, ANSI published a new nylon insert lock nut standard and introduced another grade designations for this style of lock nut: NE2, NE5 and NE8.

Bolt Strength Level	Lock Nut Strength Level
Grade 2	Grade A, 2, or NE2
Grade 5	Grade B, 5, or NE5
Grade 8	Grade C, 8, or NE8





## DIAGNOSING NYLON INSERT LOCKNUT FAILURES

There are only six visual symptoms on why a nylon insert with appear to have failed:

- **Brittleness – cracking, soft, dust-like residue where the nylon breaks off**
  - Less than 1% of all issues
  - Exposure to cold working temperatures below -70°F
  - Low humidity environment over extended period; prior to installation
- **Pig-Tailing – pieces of the nylon have curled and / or are breaking off**
  - About 1% of all issues fall under pig-tailing
  - Usually as a result of a burr or nick on the mating part which is cutting into the nylon insert
- **Undersized Inner Diameter – nylon mushrooms or expands upward**
  - Approximately 8% of issues
  - Mushrooms or expands to compensate for the width of the mating end
- **Off-Center – the nylon is not correctly centered inside the nut**
  - Very rare to identify and typically not an issue
  - The mating end threads are pushed against the nylon while being torqued and are securely locked as the nylon material tries to return to its original form.
- **Melting During Installation – the nylon literally melts or pops out of the nut**
  - 90% of issues are the result of melting or popping out
  - Most cases are due to the End User's installation practices of installing too fast and too far down on the mating end. Impact Wrenches typically run at 5000 to 10000 RPM and are often used in assembly.
  - When the nut is driven at high speeds, the nut body literally out runs the nylon ring resulting in the ring being ripped from the nut as the nut runs away from the ring.

## INSTALLATION REQUIREMENTS

- Installing Nylon Insert Locknuts should not exceed the Prevailing Torque of the 1st On by the Industrial Fastener Institute (IFI) Prevailing Torque Requirements
  - For Example; a 5/8-11 nylon insert locknut has a 420 in-lb (35 ft-lb) maximum prevailing torque for 1st On install.
- Nylon Insert Locknuts are NOT designed to be effectively installed at ultra-high speeds.
  - The friction from the nylon insert produces heat, and can cause the insert to melt or pop out at high speeds
  - Instead of using Impact Wrenches, consider using a Nutrunner. Most Nutrunners run at a speed of 700 – 1200 RPM



[www.endries.com](http://www.endries.com)  
[sales@endries.com](mailto:sales@endries.com)  
800.852.5821



**ENDRIES™**