

Adhesive locking elements

Prehistoric evidence of the usage of glue like compounds for fastening illustrates that this is not a new idea. However, it was not until the 1940's that the development of techniques and chemicals made the use of fastener adhesive locking a practical and economical reality. The adhesives currently in use consist of two part compounds which harden in the absence of air. The two parts of these adhesives are kept from interacting by encapsulating one or both parts in very small capsules, microns in diameter. The other part of the compound is the medium in which the spheres are mixed or suspended. The action of installation of the fastener into its mating part crushes and mixes the capsules and the curing process begins. Dependent upon the compound and formulation strength, the hardening begins within a couple of minutes. The adhesive is about 60% hardened within the hour and is completely hardened within 24 hours. While there is some use of liquid adhesives which are applied to fasteners on line, the mess and environmental concerns have made the pre-applied adhesive coatings method the undisputed leader.

PRECOTE® adhesive compounds, applied at NYLOK®, meet all industry and governmental standards. Several different formulations are available to tailor the part to the customers specifications and special conditions such as high heat applications or extremes in moisture or sealing.

Adhesive patched nuts display low installation torque as the compound is soft and mixing occurs during installation. Breakaway torques can be as strong as the breaking point of some soft steels and can be modified to meet customers requirements.

Prevailing off torque of adhesive parts, once the bond is broken, is less than plastic patch parts. Some second time hardening may occur as not all of the encapsulated capsules crush and mix the first time but what torque values are obtainable are happenstance numbers. Breakaway values, could be quite high and in the case of larger sizes (5/8" M16) make the parts almost unremoveable. The quick hardening of the adhesive also limits adjustment of the installed fastener to within five minutes of installation. Heat and humidity can cause premature hardening of the adhesive, thereby limiting the shelf life and storage conditions of pre-applied adhesive fasteners to inside areas away from furnaces and heaters.

Because the adhesive is soft and fills the thread interspaces completely when smeared and mixed by the fasteners, long rundowns are not recommended.



P-80=Pink P-30=Yellow P-5=White P-85=Turquoise

The ideal condition is for the bolt end to be tightened to a flush condition with the nut face so the adhesive coatings are in full contact within the threads. No more than 1-2 threads protrusion are suggested for normal designs and at 4 threads of protrusion the joint strength may be reduced as much as 90%. This reduction is due to the wipeout of the adhesive by the fastener during installation.

Another design consideration when using adhesive locking features is the number of threads available for coating. Standard nuts have few internal threads available for adhesive. Since many specifications require one thread to be free of adhesive on each side for assist in starting, and there are only 4 threads total in the 1/4, M6, 5/16 and M8 nuts, only 2 threads are available for adhesive and high breakaway torques.



Poor

Better

Best



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