Nycote® – the insulating coating ...

Where thick deposits impair the easy running properties of screws, Nycote® offers the ideal protection: from cataphoretic primers and paints applied during electrodeposition, particularly when using the cathodic principle.

The solution: Nycote®

Exhaustive testing has shown that Nycote® has characteristics which prevent cataphoretic primers or paints from adhering to threads.

Wherever the Nycote®-protective layer covers the thread, it is not possible for primers or paints to adhere to the surface.

Threaded components – both internal and external threads – are pre-coated using a special technique. They then go on to be processed in the accus - tomed way without problems on the production line, for example using welding machines.

Another benefit: This processing method also prevents the often trou - blesome adhesion of welding beads.

Fields of application

Wherever electrodeposition are used and threaded areas have to be covered over, it makes sense to use parts coated with Nycote®.

When using this method, the application of Nycote® on the coupling elements serves to cover the required threaded area: This effectively prevents paint deposits on the threads which would impair installation.

Another benefit of Nycote®: Improved screw sliding properties. Nycote® reduces the coefficient of friction during installation and guarantees a defined clamping force.
The process is ideally suited for the fast installation processes demanded by many branches of industry today.

Nycote® replaces the coats of wax or lubricant which are often applied to improve sliding properties.

Kerb Konus

Benefits of applying an insulating coat ...

Animation 1

Animation 2

Animation 3

How the Nycote®-coating works

Nycote® is a patent-protected coating method involving the application of insulating (non-conductive) Nycote®-powder on a heated threaded component. This forms a protective layer against unwanted deposits of primers, paints and other surfaces during electrodeposition.

The Nycote® thread coating is the lowcost alternative to most customary coverings. It generates a certain lubrication effect at the threads, reduces unwanted noises created during installation and prevents welding splashes from adhering to the surface.

When installing the threaded component, the Nycote® layer is rubbed off the supporting thread flanks, creating bright, metallic contact surfaces for outstanding electrical conductivity and defined screw connection strength.

The abraded material is pressed into the cavities of the thread coupling, particularly in the root area of the nut thread and at the crest of the screw thread.

Due to a chemical process, Nycote® does not adhere to the thread surfaces of the fastening element.
During coating, the Nycote®-powder is melted into the pores and cracks in the surface, so creating a mechanical bond: Strong enough to hold the coating on the surface of the threaded element and weak enough to guarantee its abrasion during the installation process.

The benefits at a glance

- Nycote® reduces the coefficient of friction, so allowing weld nuts and bolts to be more quickly installed and eliminating the need for subsequent oiling or greasing.
- The special sliding properties of Nycote® reduce the „chattering" noise produced by the screwing process, thus preventing the unpleasant high frequencies created when screwing metal on metal.
- Nycote® protects against unwanted deposits during electrodeposition, priming and coating, see animation 1.
- Nycote® prevents paint deposits during painting operations. During subsequent installation of the threa ded components, the coating is designed to rub off and so ensure a conductive screw connection, see animation 2.
- Nycote® reduces variance in the coef ficient of friction, in order to maintain the correct pretension force during installation.
- Nycote® prevents the often trouble - some adhesion of welding beads during the welding process both on the surface of welded bolts and also in the internal thread of welded nuts. Laborious and costly reworking operations are no longer required, see animation 3.

Application in the automotive engineering industry

All car manufacturers offer long warranty periods today as a purchase incentive. Good corrosion resistance is of instrumental importance here, which the automotive industry has addressed by developing new primers and paints.

These new primers present a number of problems. During electrodeposition, the pre-assembled body in white with all the necessary fastening elements passes through an immersion tank containing the primer, which adheres to each component by means of a cataphoretic process, including the fastening elements of any existing threads.

This coating is difficult to remove, and this process often involves costly reworking. However, clean threads are essential to correct and troublefree assembly.

The following automotive specifications are met:
VW TL 188
GM 6076 M
Ford WSS-M21P27-A1
Mercedes Benz MBN 10392
Fiat Chrysler PS.50015

... saves rework and costs

Coating with Nycote®-reduces variance in the coefficient of friction, achieving a defined degree of pretension.

Variance in the coefficient of friction today plays a co-determining role in the dimensioning of a screw connection in all currently used methods of screw tightening.

As in most cases a torque-controlled method of screw connection tighte - ning is used, the required pretension force F_V determined by the tighte - ning torque M_A .

This means that the pretension force F_V cannot be measured directly. It is calculated indirectly as a function of the tightening torque.

To simplify, a minimum pretension force F_V min. is required to ensure the reliable function of a screw connection. This F_V min. must be achieved even under adverse installation conditions, i.e. at maximum thread friction levels.

The diagrams indicate that with the same tightening torque but reduced coefficient of friction, the achieved pretension force F_V rises. This can lead to excess stress and failure of the screw connection.

Due to the relatively large variance in the coefficients of friction occurring with uncoated surfaces, it was formerly frequently necessary to resort to over- dimensioned screw connections.

The use of Nycote® prevents variance in the coefficient of friction and so reduces the need for overdimensioning. The result: benefits in terms of both weight and costs. At the same time, the use of Nycote® reduces the coefficient of friction in the thread.

Diagram (1) illustrates the results of a comparative test of ten screws coated with Nycote® and ten identical screws, oiled, with a bright steel finish.

With a tightening torque of M_A=20, the Nycote®-coated screws demons- trate
a variance in the pre-tension force F_V of 1.5 kN (bandwidth of the blue dia- gram at a torque of 20 Nm). In the case of the uncoated screws, a vari - ance of 11 kN results – in other words a value almost eight times higher.

The same test, performed using corres - ponding nuts - diagram (2) - indicates a variance in pretension force of only 2.6 kN at a tightening torque of M_A= 22 Nm, while the bright nuts demonstrate a variance of 10.4 kN.

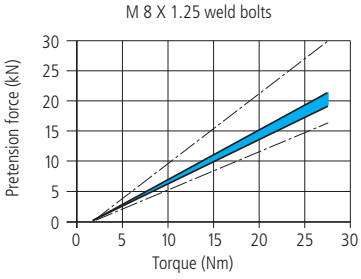


Diagram (1)

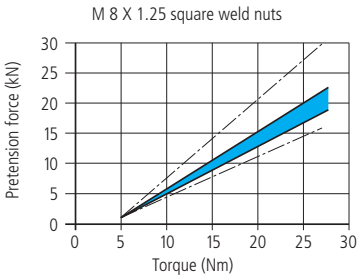
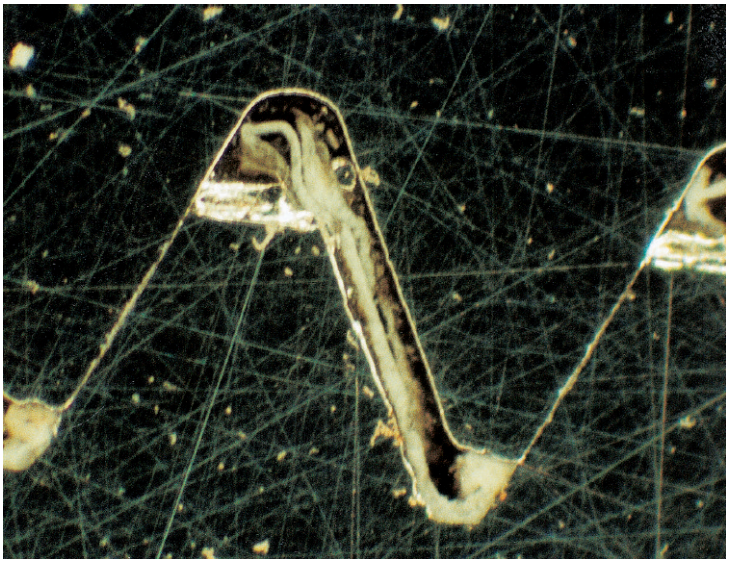


Diagram (2)



Kerb Konus

Nycote®
Insulating plastic coating

Nycote®
Works Standard
910/911/912/913

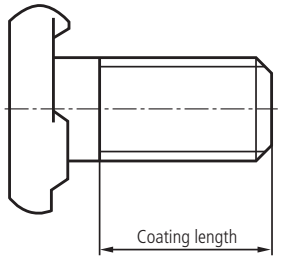
Application

For protection against cathodically applied electrodeposition coatings (cataphoretic primers and paints) using the KTL technique. This involves high layer thicknesses which can impair the easy running properties of threads.

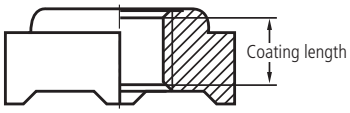
At the same time, coating with Nycote® exerts a favourable influence on the coefficient of friction occurring in threaded components and prevents the frequently occurring adhesion of weld splashes.

Using Nycote®, previously essential cover-up or reworking operations are now eliminated.

Coating of bolt thread WN 910/911/912:
The head remains free of coating.



Coating of nut thread WN 913:
The thread chamfer remains by require free of coating to ensure troublefree welding.



Spray transitions at the start and end of the coating is immanent to the system and do not affect the function.

Tests

1. Prior to coating, the easy running properties of the nut or bolt are tested using a 6H gauge plug or a 6g gauge ring by means of random testing.

2. During the coating process, a test of the easy-running properties is performed using KKV test bolts / KKV test nuts at defined intervals and in defined piece numbers. KKV test bolts / nuts mean that the core diameter has been produced to mean tolerance.

3. Final testing is performed using a standard commercially available true-to-gauge screw or nut.

4. In addition, parts can be cathodically immersion painted in order to test that no paint adheres to the coated nut or to the bolt.

A surface treatment of parts prior to Nycote® coating is not necessary. The parts should be delivered in a bright/oiled condition. After coating they are returned in a bright condition or with a short-term corrosionprotection (oil).

Nycote® can be applied to galvanized surfaces. The necessary heating process of the threaded parts to the melting temperature of the powder can take an optical and functional impairment of the surface. The corrosion protection effect of the galvanized layer may be compromised under certain circumstances. Consequently the user should clarify all details before placing an order.

Mechanical stress of the coating, in particular during handling, can take in spot damage to the closed layers, in particularly in the case of bolt threads. This generally does not result in any functional impairment.

The coating must be present on the contact surfaces of the thread flanks. In terms of functionality, a full coating on the thread tips or on the thread base is not necessary and, thus, defects in this area are admissible.

Nycote® is not wear-resistant and, due to the handling in the further process chain, may rub off, in particular on the thread tips. Nycote® is generally suitable for resistance welding (projection welding). Due to higher temperature, other welding process are to be tested and confirmed by means of trials before.

The coated parts should be stored by dry conditions and at room temperature.