



NORD-LOCK®



NO MORE LOOSE BOLTS!

NORD-LOCK®

Wedge-locking technology



Swedish
Engineering

| | | | | | | |
|--|---|--|---|---|--|--|
| <p>METRIC STANDARD WASHER</p> <p>WNHTDDM</p> <p>DELTA PROTEKT® HARDENED STEEL EN 1.7182</p> | <p>IMPERIAL STANDARD WASHER</p> <p>WNHTDD</p> <p>DELTA PROTEKT® HARDENED STEEL EN 1.7182</p> | <p>METRIC LARGE OD WASHER</p> <p>WNHTLDM</p> <p>DELTA PROTEKT® HARDENED STEEL EN 1.7182</p> | <p>Nord-Lock® washers are pre-glued in pairs to facilitate first mounting.</p> | | | |
| <p>IMPERIAL LARGE OD WASHER</p> <p>WNHTLD</p> <p>DELTA PROTEKT® HARDENED STEEL EN 1.7182</p> | <p>STANDARD SC WASHER</p> <p>EN 14399: K2</p> <p>WNSCDD</p> <p>DELTA PROTEKT® HARDENED STEEL EN 1.7182</p> | <p>METRIC STANDARD WASHER</p> <p>316</p> <p>WN16DPM</p> <p>AISI 316L STAINLESS STEEL EN 1.4404</p> | | | | |
| <p>METRIC LARGE OD WASHER</p> <p>SMO 254</p> <p>WN25LPM</p> <p>SMO 254 STAINLESS STEEL EN 1.4547</p> | <p>METRIC X SERIES WASHER</p> <p>X Series</p> <p>WNXTDDM</p> <p>DELTA PROTEKT® HARDENED STEEL EN 1.7225</p> | <p>IMPERIAL X SERIES WASHER</p> <p>X Series</p> <p>WNXTDD</p> <p>DELTA PROTEKT® HARDENED STEEL EN 1.7225</p> | <p>X SERIES LARGE OD WASHER</p> <p>X Series</p> <p>WNXTLDM</p> <p>DELTA PROTEKT® HARDENED STEEL EN 1.7225</p> | <p>STANDARD WASHER KIT</p> <p>WNXAHT</p> <p>DELTA PROTEKT® HARDENED STEEL EN 1.7182</p> | <p>STANDARD WASHER KIT</p> <p>316</p> <p>WNXASS</p> <p>AISI 316L STAINLESS STEEL EN 1.4404</p> | <p>WHEEL NUT</p> <p>NL10DNM</p> <p>DELTA PROTEKT® CLASS 10</p> |



NORD-LOCK® WASHER MATERIAL / TYPE GUIDE

| APPLICATION PARAMETER | STEEL WASHERS | STAINLESS STEEL WASHERS | 254 SMO® WASHERS | INCONEL®/ HASTELLOY® C-276 WASHERS | INCONEL® 718 WASHERS |
|---------------------------|---|--|---|--|--|
| STEEL TYPE (EN) | 1.7182 | 1.4404 | 1.4547 | 2.4819 or equivalent | 2.4667 or equivalent |
| EXAMPLES OF APPLICATIONS | General steel applications | General stainless steel applications. Non-chlorine/acid environments | General salt water applications, pumps, chloride, heat exchangers, nuclear, desalination, food processing and medical equipment | General acidic environments, process and chemical industry, evaporators, offshore downhole tooling | Applications with high temperatures, gas turbines, turbo charges, incinerators |
| AVAILABLE FOR BOLT SIZES | M3-M130 | M3-M80 | M3-M39 | M3-M39 | M3-M39 |
| TREATMENT SURFACE COATING | Through hardened Delta Protekt® base coat (KL100) and top coat (VH302GZ) | Surface hardened | Surface hardened | Surface hardened | Surface hardened |
| WASHER HARDNESS* | ≥ 465 HV1 | ≥ 520HV0,05 | ≥ 600HV0,05 | ≥ 520HV0,05 | ≥ 620HV0,05 |
| CORROSION RESISTANCE | Minimum 1000 hours in salt spray test (according to ISO9227) | PREN 27** | PREN 45** | PREN 68** | PREN 29** |
| BOLT GRADES | Up to 12.9 | Up to A4-80 | Up to A4-80 | - | - |
| TEMPERATURE RANGE*** | -50°C to 200°C | -160°C to 500°C | -160°C to 500°C | -160°C to 500°C | -160°C to 700°C |

* In order to ensure the unique mechanical locking function of the Nord-Lock® washers, the hardness of the mating surfaces must be lower than the hardness of the Nord-Lock® washers (see table above).

** PREN (Pitting Resistance Equivalent Number) = %Cr + ³/₃x%Mo + ¹⁶/₁₆x%N. The table figures are valid for base material. A higher PREN indicates better corrosion resistance.

*** Temperature recommendations are based on information from tests and the raw material supplier. The locking function is not affected within the specification.



SUPERBOLT™

PART OF THE NORD-LOCK GROUP

Superbolt™ tensioners are designed as direct replacements for conventional nuts and bolts. These devices can be threaded onto a new or existing bolt, stud, threaded rod or shaft.

THE SUPERBOLT™ PRINCIPLE

The main thread serves to position the tensioner on the bolt or stud against the hardened washer and the loadbearing surface. Once it is positioned, actual tensioning of the bolt or stud is accomplished with simple hand tools by torqueing the jackbolts that encircle the main thread.

The jackbolts transfer the preload evenly into the main thread and, onto the joint. The main thread is tightened in pure tension. The multi-jackbolt tensioners offer you simple and cost-effective tightening for large size bolts.

- 1** By tightening the jackbolts, a strong thrust (axial) force is generated. This thrust force is directed against a hardened washer. Jackbolts have a small friction diameter and can create a high thrust force with relatively little torque input.
- 2** The loads are transferred through the nut body which is positioned on the main thread by hand.
- 3** A hardened washer is used to transfer the force while protecting the flange face.
- 4** The thrust (axial) force of jackbolts and the opposite reaction force of the main bolt head create a strong clamping force on the flange.
- 5** The thrust (axial) force from the jackbolt creates an equally strong reaction force in the main bolt.






Expander[®]

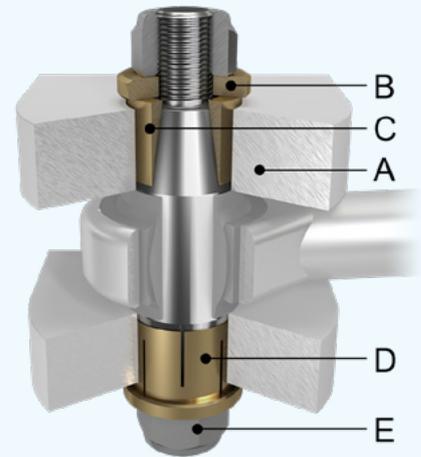
A permanent solution for pivot wear

Expander[®] offers an advanced, cost-effective solution that permanently prevents pivot wear. With Expander[®], repairs can be carried out directly in the worn mountings without welding and line-boring.

THE EXPANDER[®] SYSTEM

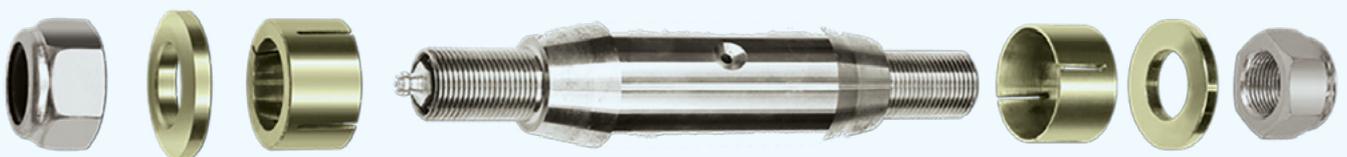
The assembly includes an axle tapered at both ends, two expansion sleeves, two tension washers and two fasteners. When the fasteners are torqued, the tension washers push the expansion sleeves up the tapered part of the pin, locking the system into the lug ears and eliminating movement that causes pivot wear.

The double-sided locking mechanism provides increased stability, security and a backlash-free joint. Installation can be easily done in the field, reducing downtime and cost.



- A** Expander[®] System is installed directly into the existing mounting without expensive welding and line-boring.
- B** Upon tightening the fasteners, the washer presses the slotted expansion sleeve up the tapered ends of the pin.
- C** The sleeves expand, conform with the wear pattern and lock the system in the lug ears.
- D** Once retorqued according to the instructions, the system will lock from both sides and significantly increase stability.
- E** Easy to remove and reinstall compared to regular straight pins.

Conventional pins have axial locking only, but the Expander[®] System consists of both radial and axial locking. This gives a stronger box construction to the whole machine pivot. The sleeves expand over both ends of the tapered axle and lock securely even in worn lug holes. If the hole has been worn oval, the Expander[®] System fills out the ovality and ensures a secure solution without any preparatory machining.



SUPERBOLT[™] and EXPANDER[®] can be ordered on request.