

BENEFITS

- Nord-Lock X-series washers secure bolted joints exposed to severe vibration and dynamic loads, reduce slackening and compensate for preload loss.
- Reliable locking, even for joints with short clamp length
- Locking function not affected by lubrication
- Achieves accurate preload with defined and uniform friction
- High corrosion resistance (minimum 1,000 hours in salt spray test according to ISO 9227, corresponding to C4 high or C5 medium according to ISO 12944-6)
- Reusable (depending on conditions of use)
- One solution to cover multiple design challenges
- CE marked (ETA-19/0813)

APPLICATIONS

Nord-Lock X-series washers are the optimum choice when you are facing extreme challenges that require extra protection. Nord-Lock X-series washers keep bolted joints secure when facing multiple challenges, including:

- Material expansion and contraction during thermal cycling
- Settlements due to paint or powder-coating
- Relaxation on soft metals, composites and polymers
- Slackening due to multiple clamped parts
- Joints with short clamp length
- Loss of preload in gasketed joints

WANT TO LEARN MORE?

Ask your Nord-Lock representative for case stories and details on how X-series can secure your challenging joints. Find your local Nord-Lock representative and contact us today to arrange a visit: www.nord-lock.com/contact

TESTED AND CERTIFIED

The Nord-Lock X-series washers have been rigorously tested and approved by independent institutes as well as certification authorities.

Nord-Lock X-series perform better than alternative solutions in compensating for slackening under static conditions and preventing fastener rotation when the joint is exposed to vibration in dynamic applications.



NORD-LOCK GROUP

Nord-Lock Group is a global leader in bolting and engineering solutions. Our innovative technologies and industry-leading expertise secures millions of critical applications across the globe.

Our brands are all at the forefront of their respective technologies: Nord-Lock® wedge-locking washers, Superbolt® mechanical tensioners, Boltight® hydraulic tensioners, Expander® System pivot pins, and Energy Bolting safety-critical fasteners.

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NORD-LOCK
GROUP

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NORD-LOCK® X-SERIES

**ONE SOLUTION FOR MULTIPLE
DESIGN CHALLENGES**



NORD-LOCK®
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THE CHALLENGE

DESIGN TRENDS AND NEW REQUIREMENTS DEMAND NEW CAPABILITIES

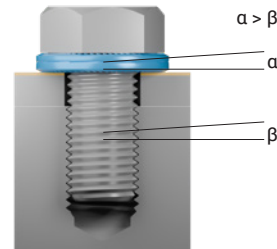
Bolted joints are vulnerable to spontaneous loosening from vibration and dynamic loads, and slackening due to settlement and relaxation—both leading to preload loss and compromised safety.

- Vibration and dynamic loads
- Thermal cycling
- Slackening (settlement, creep, relaxation)
- Painted or powder-coated surfaces
- Soft materials
- Multiple clamped parts
- Short clamp length
- Gasketed joints

THE SOLUTION

HOW NORD-LOCK X-SERIES WORK

Utilizing a unique multi-functional design, Nord-Lock X-series washers combine Nord-Lock wedge-locking technology with compensation against settlements.



A pair of Nord-Lock X-series washers has cam faces on one side and serrations on the other. When tightened, the serrations embed into the mating surfaces. Because the cam angle (α) is greater than the thread pitch (β), a wedge effect is created. As a result, movement can occur only across the cam faces, maintaining preload and preventing loosening. The conical shape of the washers also compensates for settlements and reduces slackening, maintaining preload even under demanding conditions.

CHALLENGING CONDITIONS



Vibration and dynamic loads

The wedge-locking technology in Nord-Lock X-series washers has been proven as the most secure solution to prevent spontaneous bolt loosening.



Thermal cycling

Thermal cycling accelerates creep and relaxation of materials, leading to preload loss. The NLX greatly reduces the pace of preload losses.

CHALLENGING MATERIALS



Painted or powder coated surfaces

Surface treatments are often soft substances which can cause preload loss. Nord-Lock X-series washers compensate against this.



Soft materials

Maintaining preload in soft materials is difficult due to slackening. Nord-Lock X-series washers make it possible to use advanced technologies like polymers and sandwich composites without compromising safety.

