



Safe wheels secure productivity

For industrial off-road vehicles

NORD-LOCK®

A loose wheel nut jeopardises productivity and safety



An off-road vehicle is responsible for handling large amounts of valuable material. For your customers, every unplanned stop means costly productivity delays. In order to maximise operating time, every aspect of your vehicle should be durable and reliable in withstanding the severe forces it faces during operation. To date, there has been no simple and cost effective way to effectively eliminate unintentional loosening of wheel nuts.

A widespread and dangerous problem

A wheel that falls off its axle puts productivity and safety at risk. Off-road accidents involving dislodged wheels result in damaging of industrial equipment, personal injuries and, even worse, fatalities. According to a 2008 report from the U.S. Bureau of Labor Statistics entitled *Census of Fatal Occupational Injuries*, 2,053 workers died in vehicle-related crashes and transportation incidents. According to their earlier reports, wheels and tyre rims caused fatalities to 85 workers from 1992 to 2002, an average of 8.5 such fatalities per year over that period.

Wheel detachment is one of the possible causes of such accidents. Loosening wheel nuts is the main reason for wheel detachment.

Loose wheel nuts are costly

Even in cases where loose wheel nuts do not lead to dislodged wheels, they are still costly for the owner of the vehicle. Loosening wheel nuts result in unbalanced wheels and increased drag, which affects fuel consumption. It also causes premature wear on both the wheel assembly and the tyre, which increases the rate at which spare parts need to be replaced. The risk of unplanned stops also increases, as does the need to spend operational time checking and re-tightening wheel nuts.

The above mentioned consequences of loosening wheel nuts decrease productivity and negatively affect operating and service costs for vehicle owners. Furthermore, incidents result in a poor safety record and can damage company image.



The simple way to make wheels safe

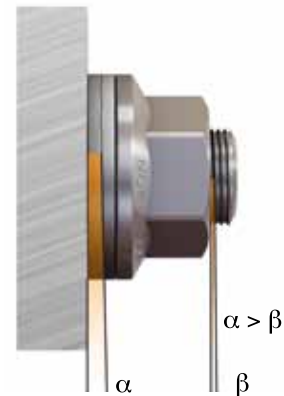
Now there is a simple and cost effective way to ensure that your vehicle has safe wheels. When assembled correctly, the new Nord-Lock wheel nut is a superior solution that eliminates the risks of unintentional loosening. In addition, this solution will increase the competitiveness of your vehicle and enhance your safety profile.

The Nord-Lock wheel nut

Based on our patented wedge-locking technology, the Nord-Lock wheel nut secures wheels by maintaining a high clamp force even under severe operating conditions. A tightened Nord-Lock wheel nut cannot loosen by itself.

Nord-Lock's technology has been used to secure millions of bolted applications exposed to strong vibrations and high dynamic loads for over 25 years worldwide. The Nord-Lock wheel nut safely secures wheels on heavy vehicles. In an independent comparative test, the Nord-Lock wheel nut proved its outstanding performance compared with conventional wheel nuts*.

The Nord-Lock wheel nut secures wheel assemblies by using tension instead of friction. The difference in cam angle 'α' is bigger than 'β' creates a wedge effect that prevents any unintentional loosening.



* Independent comparative testing of different wheel nuts was performed in 2009 by IMA, a leading material testing and research institute in Germany. More information available through www.safe-wheels.com.

Yes, I want to evaluate the Nord-Lock wheel nut

-Contact **Nord-Lock International AB** by Phone (+46 40 100 390) or by E-mail (info@nord-lock.com)

-Complete the contact form online at **www.safe-wheels.com**

-Complete the contact form below and return it by Fax to +46 40 240 851 or by Post to:

NORD-LOCK International AB, Rådmansgatan 10, 211 46 Malmö, Sweden

Please send me more information about wheel loosening and Nord-Lock

I want to meet a Nord-Lock representative

Name: _____

Company: _____

Address: _____

State/Country: _____

Phone: _____

E-mail: _____



Extreme operating conditions test, off-road

The wheel joints of an 8-wheeled truck were secured with marked Nord-Lock wheel nuts. The test was performed in winter conditions in a stone quarry. The following maneuvers were performed to maximize the load on the axles and wheel joints:

- Driving at accelerated speeds over uneven surfaces
- Entire vehicle weight was carried by: the rear axle only, the front axle only, and each side
- Vehicle slid down the hill repeatedly

Test vehicle data:

Truck:	MAN TGS 35.480
Power output:	600 bhp
Gears:	32 gears
Drive chain:	8-wheel drive with all axles lockable

Result

The Nord-Lock wheel nut safely secured all wheel joints with no signs of rotation, even under severe conditions.

Advantages of the Nord-Lock wheel nut

- Unique wedge-locking technology ensures that wheel nuts do not loosen
- Improves driver productivity while reducing operating and service costs
- Suits flat faced steel rims and regular tools
- Easy to install and remove
- Reusable and durable
- Prelubricated

For more information, go to:

www.safe-wheels.com or fill in the reply card.



When safety really matters

Nord-Lock bolt securing systems are designed to secure fasteners in extreme conditions. We have over 25 years of experience of collaborating with our customers to achieve effective bolt security. We have an international team of sales engineers who visit our clients locally. We will help you optimize your bolted joints in order to minimize overall cost and maximize safety.

Our premium bolt securing systems give effective security throughout an assembly's lifetime, resulting in:

- No bolt loosening caused by vibration and dynamic loads
- Minimized cost of maintenance, repair and overhaul
- Significantly reduced risk of lost production or operation due to bolt failure

NORD-LOCK International AB

Radmansgatan 10, 211 46 Malmö, Sweden

Tel: +46 40 100 390, Fax: +46 40 240 851, Email: info@nord-lock.com

NORD-LOCK®
Bolt securing system