



Certified Safety Brakes for Industry

**nexen**

[www.nexengroup.com](http://www.nexengroup.com)

# CERTIFIED SAFETY BRAKES FOR INDUSTRY



**NexSafe™ brakes are the first in the Industry to be certified for functional safety.**

**Models for Servo Motors, Guide Rails, Profile Rails, Guideways, and Carriage Assemblies, as well as NFPA and ISO Pneumatic Cylinders and Round Rails, Linear Rods, Round Shafts, Linear Guide Systems**

Safety measures are most effective when operators are not permitted to “opt out” or disengage them. Seatbelts and airbags are prime examples of this distinction. Commencing in 1968, the Motor Vehicle Safety Standard required automobile manufacturers to install seat belts. By 1995, all states except New Hampshire mandated the use of seatbelts. Even so, automobiles can be operated without proper engagement of seatbelts and many people choose not to use them, regardless of the safety benefits. Conversely, air bags are installed in all new vehicles and automatically activate in response to adverse events. Neither operators nor passengers have the ability to disengage a vehicle’s airbags. The National Highway Traffic Safety Administration estimates that airbags saved more than 50,000 lives between 1987 - 2017.

## **What is functional safety?**

Functional safety is about reducing the risk of human injury or death posed by the use of machinery in the face of operator error or mechanical failure. Building functional safety requires the design and fabrication of protective features that mitigate against the threat of worker injury. Protection systems should be designed to respond to human errors, hardware failures, operational or environmental stress.

## TESTIMONIALS

“Every automation project that includes potentially dangerous moving equipment should include a Nexen rail, rod or servo brake. Internal servo brakes were not designed to stop moving loads quickly; they can break. When safety matters, I consider NexSafe products an essential part of the total solution.”

**David Cary, Motion Product Manager, Steven Engineering, Inc.**

How do we measure and substantiate functional safety? Any manufacturer’s claim of functional safety must be independently certified to satisfy a recognized functional safety standard, such as ISO 13489, to merit credibility in the marketplace. Certified products can be accurately described as functionally safe at a particular safety integrity level or performance level in a specific range of applications. Certification may only be awarded by an independent, accredited organization with knowledge and expertise in electronics, electromechanical systems and probabilistic analysis.

### Earning Certification

Intertek is a multinational corporation headquartered in London engaged in providing assurance, inspection, product testing and certification. In July of this year, Intertek launched its Functional Safety Conformity Assessment Program for industrial automated machinery and robotics. The program offers manufacturers design evaluation, testing and certification with the Intertek Functional Safety (FS) Mark to signify compliance with rigorous standards for product safety and performance.



Under the Intertek program, applicable products are assessed against ISO 12100 and related safety standards, emphasizing risk assessment and reduction. Following evaluation, compliant products are certified, labeled with the Intertek FS Mark, and listed in Intertek’s Functional Safety directory.

The first products in North America to earn the FS Mark are the NexSafe™ Rail Brakes, Servomotor Brakes, and Rod Locks offered by Nexen Group, Inc.

“At a time of increasing trepidation over the threat to worker safety posed by complex production automation, Intertek’s Functional Safety Mark provides manufacturers successfully responding to such concerns with an independent source of credibility in the marketplace,” says Pierrick Balaire, global business line leader for energy and industrial manufacturing at Intertek. “We’re pleased to grant Nexen with this certification—the first of its kind in North America—and look forward to continuing to work with Nexen as it provides customers with high-quality products and greater peace of mind.”

## Certified Safety Brakes for Industry

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Obtaining the FS Mark was no small feat. Intertek did not merely review the NexSafe products, it examined Nexen's processes for design, procurement, manufacturing, quality, validation and product life cycle management. "Intertek looked at our NexSafe products from the design infancy stage all the way up through installation in the customer's application and the end of the product's service life," says Justin Hillukka, lead engineer for power transmission and custom products at Nexen.

"It was a ton of work," he continues. "The process was similar to obtaining ISO 9001 certification. We had to document how we satisfy various ISO and IEC (International Electrotechnical Commission) safety standards and Intertek made certain we're doing what we described."

Intertek reviewed Nexen's design documentation for its NexSafe products, posing inquiries such as: Is the design process robust? Did Nexen's engineers consider every failure mode? Intertek also examined Nexen's procurement procedures to ensure Nexen exerts sufficient control over the quality of incoming parts and materials for its NexSafe products.

Intertek assessed Nexen's manufacturing processes to make sure Nexen is building its NexSafe products according to specifications. In addition, Intertek reviewed Nexen's assembly and factory acceptance testing procedures. Are sensors functional? Do the locks and brakes provide the specified amount of holding force?

Intertek examined literature prepared for the NexSafe products to ensure Nexen isn't making false or exaggerated claims. For example, a key specification for NexSafe products is the B10d value. Machine designers need to know the B10d value for any component subject to wear that will be used in a safety-related circuit. "Intertek made sure we had validation and verification for all of our B10d values," says Hillukka.

Earning Intertek's Functional Safety Mark is not a once-and-done endeavor. "We will be audited once a year on our functional safety products," says Hillukka. "Intertek wants to be sure we continue to conform to their certification standards."

### **NexSafe Certification Specifics**

Intertek has certified NexSafe Rail Brakes, Servomotor Brakes, and Rod Locks to ISO 13849-1, a standard intended to help engineers design and integrate safety-related parts of control systems or machines. The standard includes a system for classifying the risk a machine poses and a system for ranking the safety control systems used to mitigate that risk. The greater the risk, the higher the requirements of the safety systems.

Risk is defined in terms of five performance levels (PLa through PLe), based on the severity of a potential injury, the frequency and duration of exposure to that hazard, and the possibility of avoiding that hazard. PLa is the lowest level. The machine might cause a bruise, but workers are rarely exposed to that part of the machine, and only for short time. It's possible for workers to avoid the dangerous exposure. PLe is the highest level. The machine could kill a worker, and workers are exposed to the machine frequently and for long periods of time. Avoiding exposure to the machine is hardly possible.



✓ CAT 4 PL e  
✓ SIL 3

Certificate NO. FS-CRT-0006  
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**Certified Safety Rail Brakes**




✓ CAT 4 PL e  
✓ SIL 3

Certificate NO. FS-CRT-0008  
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**Certified Safety Servomotor Brakes**




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✓ SIL 3

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**Certified Safety Rod Locks**



Safety control systems are ranked in five category levels (B through 4). Category B is a lowest. Safety-related controls systems and components must be designed, built and integrated in accordance with relevant standards so that they can withstand the expected application. Basic safety principals shall be used. If a fault occurs, it could lead to the loss of a safety function. Category 4 is the highest. A fault in any safety component cannot lead to the loss of the safety function, and any faults must be detected in time to prevent the loss of a safety function.

NexSafe certified-safety devices are capable of achieving all five performance levels and all five category levels. By selecting NexSafe components, machine builders can trust that the reliability delivered by Nexen will enable them to achieve a particular safety performance level.

“Nexen products can cover the whole range of safety applications—categories B through 4 and performance levels a through e,” says Hillukka. “There are no high-risk applications for which we would not seek certification.”

**Time-tested technology, Industry 4.0 ready**

Nexen has manufactured thousands of Rail Bakes, Servomotor Bakes and Rod locks for a wide range of applications. NexSafe builds on that experience, retaining form, fit, and functionality, while seeking enhanced safety. With spring-engaged, air-released functionality, NexSafe devices default to the locked position, making them ideal for holding a load in position or for emergency stopping situations. They can be used in any orientation. Industry 4.0 is a standard option all on NexSafe devices.





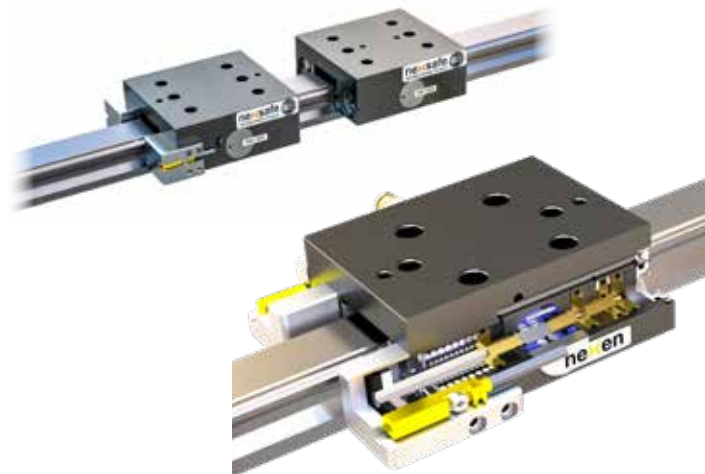
**Rail Brakes** grip and hold profile guide rails in linear motion systems. NexSafe rail brakes mount to all major manufacturers of linear devices such as: guide rails, profile rails, guideways, and carriage assemblies. They are intended to complement, rather than replace, the linear bearings or carriages that ride on the rails to support a load. In the engaged state, multiple compression springs push on a piston-and-wedge assembly

to engage friction facings directly onto the center of the guide rail. If air pressure is lost, the unit will default to the brake-engaged state. When air pressure is applied, a piston will push back on the wedge assembly, disengaging the friction facing from the rail. Piston-and-

wedge assemblies are located on each side of the rail, and the brake geometry is designed to match the rail's shape. Rail brakes can be equipped with sensors to detect engagement and disengagement.

**Guide rail brakes with mounted sensors are ideal for E-stop and redundant safety braking applications such as:**

- Gantry axis braking
- Industrial door open/close locking
- Medical equipment and hospital beds
- Primary and secondary packaging
- Window and door manufacturing



**nexsafe**   
Certified Safety Products

**Servomotor Brakes** have been developed for braking on the shaft end of a servomotor or between a motor and gear reducer. In the engaged state, compression springs push on a friction-material backing plate to wedge itself against the shaft, holding it in position. If air pressure is lost, the unit will default to the brake-engaged state. When air pressure is applied, the piston will push back on the friction material, allowing the shaft to rotate. These low-inertia brakes have an integral clamping collar and backup keyway. They produce zero-backlash, meet IP67 standards, and can be equipped with sensors to detect engagement, disengagement and wear of the friction material.



“Some servomotors come with electric brakes. However, they are typically not very robust,” says Hillukka. “They don’t have the capability to hold as much torque as a Nexen servomotor brake.”

**Servomotor brakes stop the load(s) quickly and enhance safety with bidirectional braking capabilities in applications including:**

- Automotive parts
- Cyclical operations
- Food production (IP67) and packaging
- Gantry routing
- Robotics
- Semiconductors



**TESTIMONIALS**

“We have been using Nexen SBP-5 Servo brakes on our carriage assembly, and are very excited to now be able to share with our customers that these products are now safety certified.”

**Carl L., Bretting Manufacturing**

## Certified Safety Brakes for Industry



**Rod Locks** can operate on round rails, linear rods, round shafts, and linear guide systems, or they can be mounted directly to an NFPA and ISO pneumatic cylinder. Rod locks are designed to grip and hold the piston rod of a pneumatic cylinder or a guide rod with extremely low backlash. They can also be stacked for additional clamping force. In the



engaged state, several compression springs push on a piston, causing a clamping collar to lock onto the rod. If air pressure is lost, the unit will default to the lock-engaged state. When air pressure is applied, the piston will push back against the springs, releasing the clamping collar. A large clamping area prevents wear on the piston rod. They meet IP67 standards and can be equipped with sensors to detect engagement and disengagement.

**Rod Locks are used for applications that require precise holding, fast engagement, and high cycle rates over millions of cycles, such as:**

- Automotive production
- Cyclical operations
- Food production (IP67)
- Gantry routing
- Platen presses



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For more information, call the Nexen Group 800-843-7445 or visit [www.nexengroup.com](http://www.nexengroup.com).

Justin Hillukka is Lead Mechanical Engineer of Power Transmission and Custom Products at Nexen Group. Justin has been with Nexen for 6+ years and has been a key contributor to Nexen's continuing innovation leading many new product design projects from concept through release to market.

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