

SIL



Functional Safety Verification

No. 0P171123.NTO87

Certificate's Holder:

NUTORK CORP.
No.158, Lane 1888, Daye Road, Fengxian Area,
Shanghai, China

**Product:
Model(s):**

Pneumatic and Hydraulic Actuator
NKD-XXX, NKS-XXX-XX, NSFXX-XXXX-DA,
NSFXX-XXXX-SRX, NSFXX-XXXX-DA-H,
NSFXX-XXXX-SRX-H.

Standard:

Has been assessed per the relevant requirements of:
IEC 61508 Parts 1-7:2010,
IEC 61511-1:2003+Carr.1:2004
And meets requirements providing a level of integrity to:
Systematic Capability: SC 3 (SIL 3 Capable)
Random Capability: Type A Element
SIL 2 @ HFT= 0; SIL 3@ HFT=1; Route 2H

***Safety function:**

Pneumatic and Hydraulic Actuator with configurable safety functions:
Stay put or Emergency shut-down (ESD) open or close on demand.

***Specific requirements:** The instructions of the associated Installation and Operating Manual shall be considered.

Verification Mark:



The Verification Mark can be affixed on the product. It is NOT permitted to alter the Verification Mark in any way

Remark: This SIL Verification of Compliance has been issued on a voluntary basis. ECM confirms that a Test Report is existent for the above listed product(s) and found to meet the requirements of above standards for application in safety related system up to Safety Level of SIL 3.

The unit must be properly designed into a Safety Instrument Function as per the requirements in the Safety Manual. The Verification Mark shown above can be affixed on the product. It is NOT permitted to alter the Verification Mark in any way. In addition the Verification's Holder is NOT allowed to transfer the Verification to third parties. This certificate can be checked for validity at www.entecerma.it

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Annex I

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1. SC 3 (SIL 3 Capability):

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer

2. A Safety instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated

3. Random Capability:

The SIL limit imposed by the Architectural Constraints for each element.

4. IEC 61508 Failure Rates in FIT*

For product used in a final element assembly, SIL must be verified for the specific application using the following failure rate data.

Failure rates for the product in FIT*

Model	Failure Category	λ_{sd}	λ_{su}	λ_{dd}	λ_{du}
	Stay put	0	86	0	5
	ESD Open	220	120	76	3
	ESD Close	206	133	95	3

5. SIL Verification: The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD_{avg} considering redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each subsystem must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

* FIT = 1 failure / 10E9 hours