

SIL



Functional Safety Certificate

No. 0P191122.NSC08

Certificate's Holder: NUTORK CORP.

5th Floor, Building 4, No.530, Zhaojiajing Road,
Chedun Town, Songjiang District, Shanghai.

Product: Solenoid Valve

Model(s): SVxxx-Fx/Px-Cx

Standard: IEC 61508-1:2010, IEC 61508-2:2010

Explosion-proof electromagnetic reversing valve that is classified as a Type A safety-related element can be used up to SIL 3 as a single device according to IEC 61508. The 1oo2 construction gets up to SIL 3 and HFT equals to 1. The SFF > 62%, PFH=8.2*10⁻⁸ (h⁻¹).

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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Marco Morino

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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*

Failure Category	SVxxx-Fx/Px-Cx
λ_{sd}	0
λ_{su}	460
λ_{dd}	0
λ_{du}	262
λ_{Total}	722
SFF	>62%
PFH	$8.2 \cdot 10^{-8}$ (h ⁻¹)

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