Certificate – Сертификат – 證明書 – Certificat – 증명서 – شهادة

SIL

Functional Safety Certificate

No. 6G240605.ZNVTT11

Certificate's Holder: ZHEJIANG NSV VALVE CO.,LTD.
SANQIAO INDUSTRIAL ZONE, OUBEI STREET, YONGJIA, ZHEJIANG, CHINA

Manufacturer: ZHEJIANG NSV VALVE CO.,LTD.
SANQIAO INDUSTRIAL ZONE, OUBEI STREET, YONGJIA, ZHEJIANG, CHINA

Product: BALL VALVE

Model(s): FLOATING BALL VALVES (Q41 SERIES),
TRUNNION MOUNTED BALL VALVES (Q47 SERIES)

Standard: Has been assessed per the relevant requirements of:
IEC 61508:2010 Parts 1-7

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 2_H
PFD_{AVG} and Architecture Constraints must be verified each application

* Safety Function:
The ball valve is a form of quarter-turn valve which uses a floating / trunnion mounted ball with a through hole to open and close, the valve can be driven by manual (lever or gear box) or by actuators(pneumatic or electric) for either on/off or control applications at Oil & Gas pipeline.The Ball Valve will move to the designed safe position per the actuator design within the specified safety time.
* Is suitable to be safety function according to the description and the configuration defined in Annex I.

Verification Mark:

ENTE CERTIFICAZIONE MACCHINE – SIL VERIFIED – let's be your partner – Compliance Approved

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

Date of issue 05 June 2024

Expiry date 04 June 2029

For online check:

Approver
Ente Certificazione Macchine
Legal Representative
Luca Bedonni

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Annex I

No. 6G240605.ZNVTT11

1. 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. The product version of hardware components used for validation and type tests are the following:

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3. Acceptable environmental constraints for the system are recalled in the safety Manual. These elements must be checked for each integration operation of the product.

4. Hypothesis used for calculations are presented here under:
   - The mode of operation is Low demand, which means less than 1 trip demand each year;

Component architecture	SIL Capability	Demand frequency	PFD
1oo1 configuration	SIL2	Low	6.84E-04
1oo2 configuration	SIL3	Low	2.28E-05

5. IEC 61508 Failure Rates in FIT*

Failure Category	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}	SFF
Average	11	194	25.45	9.14	96.2%
Tests intervals=12months, MTTR=24h					

**FIT=1 failure/10^9 hours*

6. The Safety Integrated Level of the safety function using the product shall be calculated taking into account the characteristics of the whole system.

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