

SIL



Functional Safety Certificate

No. 6G250627.Q&TTC86

Certificate's Holder: Q&T Instrument Co.,Ltd.
No.1, Wangbai Road, Huanglong Industrial Zone, Kaifeng, Henan province, China

Manufacturer: Q&T Instrument Co.,Ltd.
No.1, Wangbai Road, Huanglong Industrial Zone, Kaifeng, Henan province, China

Product: Metal Tube Rotameter
Model(s): LZZ/D15, LZZ/D25, LZZ/D40, LZZ/D50, LZZ/D80, LZZ/D100, LZZ/D150

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 B 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 metal tube rotameter is a variable area flow meter that measures the flow rate based on the height of the metal tube float in the conical tube, and uses the pressure difference generated by the fluid through the gap between the float and the tube wall to balance the weight of the float. The larger the flow rate, the higher the float is supported, the larger the ring gap area.
*Is suitable to be safety function according to the description and the configuration defined in Annex I.

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

Date of issue 27 June 2025

Expiry date 26 June 2030

For online check:



Approver
Ente Certificazione Macchine
Legal Representative
Luca Bedonni



Ente Certificazione Macchine

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Annex I

No. 6G250627.Q&TTC86

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:

Product:	Metal Tube Rotameter
Model(s):	LZZ/D15, LZZ/D25, LZZ/D40, LZZ/D50, LZZ/D80, LZZ/D100, LZZ/D150

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	8.49E-04
1oo2 configuration	SIL3	Low	3.57E-05

5. IEC 61508 Failure Rates in FIT*

Failure Category	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}	SFF
Average	39	75	369	41	92.18%

Tests intervals=12months, MTTR=24h

*FIT=1 failure/10⁹ 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.