

SIL



Functional Safety Certificate

No. 6G230801.Q&TQU05

Certificate's Holder: Q&T INSTRUMENT CO., LTD.
No.1 Wangbai Road, Xiangfu District, Kaifeng City Henan Province, China

Product: Coriolis Mass Flow Meters
Model(s): QTCMF

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 3@ HFT=1, SIL 2 @ HFT= 0; Route 2_H
PFD_{AVG} and Architecture Constraints must be verified each application

*Safety function:

The working principle of a Coriolis mass flow meter is to use the physical characteristics of the fluid, such as pressure, temperature, density, etc., to measure, calculate, and control the flow rate, thereby achieving accurate detection of the flow rate.

* 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 07 August 2023

Expiry date 31 July 2028

For online check:



Approver
Ente Certificazione Macchine
Legal Representative
Luca Bedonni



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Annex I



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1. The use of the product must obey the required rules to conservation of SIL3 properties, these rules are recalled in the §6 of the Assessment Report reference: [SIL Capability assessment report].

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

Product:	Coriolis Mass Flow Meters
Model(s):	QTCMF

3. Acceptable environmental constraints for the system are recalled in the safety Manual (Ref: [SIL-SM-02]). 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	8.43E-04
1oo2 configuration	SIL3	Low	1.67E-03

5. IEC 61508 Failure Rates in FIT*

Failure Category	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}	SFF
Average	0	2342	1319	189	95.09%
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.