

SIL



Functional Safety Certificate

No. 0P211208.KVCW25

Technical Construction File No. TCF-AR-KC-SIL-01

Certificate's Holder: KACE VALVES (HANGZHOU) CO., LTD.
No. 16, Kanghui Road, Gongshu District, Hangzhou, P. R. China

Product: Floating Ball Valves
Model(s): F1, F2, F1M, F2M, FE1, FC1, FC2, FV3, FV6, FX1, FX2, FX1M, FX2M, FW1, FW2, ML, MT, MY, MML, MMT, MMY, DL, GFM, 80M, 80RM

Standard: Has been assessed per the relevant requirements of:
IEC 61508:2010 Ed2- Parts 1, 2, 4
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 for each application.
* Safety Function:
Open or close on demand.
* Application Restrictions:
The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.
* 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 10 December 2021

Expiry date 07 December 2026

**Service Manager
Luca Bedonni**



**Deputy Manager
Amanda Payne**



Ente Certificazione Macchine

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Annex I

No. 0P211208.KVCW25

Technical Construction File No. TCF-AR-KC-SIL-01

- The use of the product [F, M, D, G, 80 series Floating Ball Valves] must obey the required rules to conservation of SIL3 properties, these rules are recalled in the §6 of the Assessment Report reference: [TCF-AR-KC-SIL-01].
- The product version of hardware components used for validation and type tests are the following:

Component	Model
Floating ball valve of spilt body, soft seated, full bore/reduced bore	F1, F2
Floating ball valve of spilt body, metal seated, full bore/reduced bore	F1M, F2M
Floating ball valve of top entry body, soft seated, full bore	FE1
Floating ball valve of split body, soft seated, full bore/reduced bore, cryogenic	FC1, FC2
Floating ball valve of split body, soft seated, V-Port 30°/ V-Port 60°	FV3, FV6
Floating ball valve of split body, soft seated, extended bonnet, full bore/reduced bore	FX1, FX2
Floating ball valve of split body, metal seated, extended bonnet, full bore/reduced bore	FX1M, FX2M
Floating ball valve of welded body, soft seated, full bore/reduced bore	FW1, FW2
Floating ball valve of soft seated, 3-Way "L/T/Y" Port	ML, MT, MY
Floating ball valve of metal seated, 3-Way "L/T/Y" Port	MML, MMT, MMY
Floating ball valve of soft seated, 3-Way "L" Port, casting body	DL
Floating Ball of split body, metal seated (severe service)	GFM
Floating ball valve of three-piece body, metal Seated, NPT, BW, socket welding end, full bore/reduced bore	80M, 80RM

- Acceptable environmental constraints for the system are recalled in the safety Manual [SM-KC-01]. These elements must be checked for each integration operation of the product.
- The SIL3 capable certified Safety Instrumented Function of product [F, M, D, G, 80 series Floating Ball Valves] is (are) the following:
 - SF1: Open or close on demand.
- Hypothesis used for mode of operation is the following:
 - The mode of operation is Low demand, which means less than 1 trip demand each year.

Component architecture	Safety Function	SIL Capacity	Probability of Failure on Demand
1oo1 configuration	SF1	SIL 2	8.47E-04
1oo2 configuration	SF1	SIL 3	8.55E-05

Test Intervals	MTTR	SFF	Undetected Dangerous Failure Rate (λ_{Du})
12 months	24 h	N/A	1.92E-07
12 months	24 h	N/A	N/A

- The Safety Integrated Level of the safety function using the product [F, M, D, G, 80 series Floating Ball Valves] shall be calculated taking into account the characteristics of the complete system supporting the safety function.