ASSESSMENT REPORT

DNV MES Certificate No.:	Initial date:	*Valid:*
E-KX-IV/23/10439933/12260 Rev o	**21st July 2023**	***20th July 2026***

This certificate consists of 3 pages

This is to certify that the Functional Safety Capability of

BUTTERFLY VALVES

Manufactured by:

HAWA Valve (India) Pvt. Ltd., R-16, Belapur Rd, Sector 8, MIDC Industrial Area, Rabale, Navi Mumbai, Maharashtra, India.

have been assessed by **DNV MES**, and found to confirm the Functional safety standards and sub-clauses:

IEC 61508:2010 PART 1 TO 7

When assessed using;
The CASS Scheme for Functional Safety Capability

The Product and its associated data contained herein can be considered for use in the design of safety functions up to and including.

SIL 3

When used in accordance with the scope and conditions of this certificate.

*The Safety Integrity Level (SIL) relates to the complete safety System, not the individual elements, therefore this certificate only demonstrates the capability of the product to be implemented into a safety system of a required integrity level as defined above.

Place: Pune
Date: 2023-07-21

Gaus Ibrahim Sindgi
[PED Lead Auditor & ASME AI]

Product Details

Safety function under consideration	Open on trip OR Close on trip
Product Name	BUTTERFLY VALVE
Architectural Constraints	Type A / HFT: 0 / SFF: 95.53%
Values used to demonstrate achieved PFD[4]	As per Table 1
Random Hardware Failure Rates (FIT)	(λ_{DD}=553.19, λ_{DU}=98.55, λ_{SD}= 178.70, & λ_{SU}= 1374.45)

Table 1: PFD average values of actuated valves with and without PVST

		PFD_{avg} Values (With PVST)				
		Test Interval Frequency (Months)				
		6	**12**	**24**	**36**	**48**
PST Frequency (Months)	**1**	3.18E-03	4.82E-03	8.11E-03	1.14E-02	1.47E-02
	2	4.72E-03	6.36E-03	9.64E-03	1.29E-02	1.62E-02
	3	6.25E-03	7.89E-03	1.12E-02	1.45E-02	1.77E-02
	6	NR	1.25E-02	1.58E-02	1.91E-02	2.24E-02
	9	NR	1.71E-02	2.04E-02	2.37E-02	2.70E-02
	12	NR	NR	2.50E-02	2.83E-02	3.16E-02

PFD_{avg} Values (Without PVST)				
Test Interval Frequency (Months)				
6	**12**	**24**	**36**	**48**
1.086E-02	2.172E-02	4.345E-02	6.517E-02	8.690E-02

Probability of Failure on Demand	As detailed in table 1.
Hardware Safety Integrity Compliance [1]	Route 1_H
Systematic Safety Integrity Compliance [1]	NA as per clause 7.4.2of IEC 61508 Part 2.
Systematic Capability [2]	SC 3
Overall SIL Capability Achieved [3]	Minimum SIL 2, Maximum SIL 3 as detailed in table 1.

Information supporting the failure data:

1. Functional specification	As detailed in SIL Safety case
2. Environmental Limits	NA
3. Lifetime / Replacement Limits	15 Years
4. Maintenance Requirements	As detailed in Operation & Maintenance manual
5. Diagnostic Coverage	0%
6. Diagnostic Test interval	As detailed in table 1.
7. Evidence of use in similar conditions	--
8. Associated Drawings	GAD-Butterfly Valve

Conditions of Safe Use:

1. User shall comply with the detail contained in the manufacturer user manual as well as the information provided above.
2. Selection of this equipment for use in a safety application shall only be made by a competent person.
3. The collection of any data associated with this equipment during operations shall be collected and reported to the manufacturer
4. The product should be tested at regular intervals to identify any malfunctions in accordance with the product safety manual.

Conditions of Report:

1. This certificate is based on the assessment carried out by DNV MES as recorded in assessment report SIL assessment report.
2. Printed copies of the certificates are not a controlled version.
3. This report is based on the contract, DNV SFA No: 1910718 Dated 2023-04-29, Hawa Valves PO No: GEN001645 Dated 19-04-2023, agreed between DNV MES and HAWA Valve (India) Pvt. Ltd.
4. HAWA Valve (India) Pvt. Ltd. shall ensure the Management of Functional Safety is maintained.
5. DNV MES shall be notified of any changes to the product that may impact this certificate during the period of validity.
6. The use of this certificate is subject to the 'certificate agreement' for Functional Safety Certification.
7. This certificate remains the property of DNV MES and shall be returned upon request.

Other valid terms and conditions are found in the DNV MES Frame Agreement.

END OF REPORT