



Italia

COMPLIANCE

with IEC EN 61508:2010

Certificate No.: C-IS-722159412

CERTIFICATE OWNER: DAFRAM S.p.A.
 Contrada Montedoro 13,
 62010, Urbisaglia (MC) - Italy

**WE HEREWITH CONFIRM THAT
 THE BALL VALVES
 MEET THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLE
 FOR THE SAFETY FUNCTIONS:**

SIF1: "correct switching on demand (open to closed) and tight for closing phase, in low demand mode of operation".

SIF2: "correct switching on demand (closed to open), in low demand mode of operation".

Examination result: The above reported Ball Valves were found to meet the standard defined requirements of the safety levels detailed in the following table (T-IS-722159412) according to IEC EN 61508, under fulfillment of the conditions listed in the Report R-IS-722159412 Rev.1 dated March, 28th 2018 in its currently valid version, on which this Certificate is based

Examination parameters: Construction/Functional characteristics and reliability and availability parameters of the above mentioned Ball Valves

Official Report No.: R-IS-722159412 Rev.1

Expiry Date March, 27th 2021

IT IS TO BE INTENDED THAT THE ABOVE OFFICIAL REPORT AND ITS ANNEXES ARE AN INTEGRAL PART OF THIS DOCUMENT

Reference Standard IEC EN 61508:2010 Part 2, 4, 6, 7

Sesto San Giovanni, March, 28th 2018



TUV ITALIA Srl
 Industry Service Division
 Director

Paolo Marcone
 Paolo Marcone

SUMMARY TABLE T – IS – 722159412

<i>E/EE/EP safety-related system (final element)</i>	Trunnion Ball Valves produced by DAFRAM S.p.A.	
<i>System type</i>	Type A	
<i>Systematic Capability</i>	SC3	
<i>Safety Function Definition</i>	<i>SIF1: "Correct switching on demand (open to closed) and tight for closing phase, in low demand mode of operation"</i>	<i>SIF2: "Correct switching on demand (closed to open), in low demand mode of operation"</i>
<i>Max SIL⁽¹⁾</i>	SIL3	SIL3
λ_{TOT}	6,228E-09	6,228E-09
λ_{NE}	1,490E-09	2,131E-09
λ_S	0,000E+00	0,000E+00
$\lambda_{DD,PST}^{(2)}$	3,370E-09	3,671E-09
$\lambda_{DU,FFT}$	1,368E-09	4,262E-10
<i>MRT</i>	24 h	24 h
<i>Hardware Safety Integrity</i>	Route 2 _H	Route 2 _H
<i>Systematic Safety Integrity</i>	Route 2 _S	Route 2 _S
Remarks		
<p>(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD_{AVG} considering the redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each subsystem must be checked to assure compliance with the minimum hardware fault tolerance (HFT) requirements.</p> <p>(2) Considering a Partial Stroke Testing</p>		

SIL classification according to Standard IEC EN 61508:2010 for Trunnion Ball Valves produced by DAFRAM S.p.A.

<i>E/EE/EP safety-related system (final element)</i>	Floating Ball Valves produced by DAFRAM S.p.A.	
<i>System type</i>	Type A	
<i>Systematic Capability</i>	SC3	
<i>Safety Function Definition</i>	<i>SIF1: "Correct switching on demand (open to closed) and tight for closing phase, in low demand mode of operation"</i>	<i>SIF2: "Correct switching on demand (closed to open), in low demand mode of operation"</i>
<i>Max SIL⁽¹⁾</i>	SIL3	SIL3
λ_{TOT}	4,390E-09	4,390E-09
λ_{NE}	1,050E-09	1,502E-09
λ_S	0,000E+00	0,000E+00
$\lambda_{DD,PST}^{(2)}$	2,375E-09	2,588E-09
$\lambda_{DU,EPT}$	9,641E-10	3,004E-10
<i>MRT</i>	24 h	24 h
<i>Hardware Safety Integrity</i>	Route 2 _H	Route 2 _H
<i>Systematic Safety Integrity</i>	Route 2 _S	Route 2 _S
Remarks		
<p>(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD_{AVG} considering the redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each subsystem must be checked to assure compliance with the minimum hardware fault tolerance (HFT) requirements.</p> <p>(2) Considering a Partial Stroke Testing</p>		

SIL classification according to Standard IEC EN 61508:2010 for Floating Ball Valves produced by DAFRAM S.p.A.