CERTIFICAT ◆ CERTIFICADO ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ ZERTIFIKAT

Italia

COMPLIANCE

with IEC EN 61508 and IEC EN 61511

Certificate No.: TUV IT 23 SIL 0293

CERTIFICATE OWNER: **BFE S.r.l.**
via Tonale 70/A
24061 Albano S. Alessandro (BG)
Italy

WE HEREWITH CONFIRM THAT

FLOATING BALL VALVES

TRUNNION BALL VALVES

GLOBE VALVES

GATE VALVES

MEET THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLES

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 Valves were found to meet the standard defined requirements of the safety levels detailed in the following table) according to IEC EN 61508 and IEC EN 61511, under fulfillment of the conditions listed in the Report R TUV IT 23 SIL 0261 in its currently valid version, on which this Certificate is based**
Examination parameters:	**Construction/Functional characteristics and reliability and availability parameters of the above Valves**
Official Report No.:	**R TUV IT 23 SIL 0261**
Expiry Date	**October, 25th 2026**

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

Reference Standard	**IEC EN 61508:2010 Part 2, 4, 6, 7** **IEC EN 61511:2016 Part 1, 2, 3**

Milan, October, 26th 2023

TÜV Italia Srl Industrie Service Italia

TÜV ITALIA Srl

TÜV ITALIA Srl
Industrie Service Division
Managing Director

Alberto Carelli

Italia

SUMMARY TABLE

E/EE/EP safety-related system (final element)	**Floating Ball Valves produced by BFE S.r.l.**	
System type	Type A	
Systematic Capability	SC3	
Safety Function Definition	*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"*
Max SIL(1)	**SIL3**	**SIL3**
λ_{TOT}	1,829E-09	1,829E-09
λ_{NE}	4,376E-10	6,256E-10
λ_{S}	0,000E+00	0,000E+00
$\lambda_{DD,PST}$(2)	3,710E-10	8,855E-10
$\lambda_{DU,FPT}$	1,020E-09	3,177E-10
β and β_D factor	10%	10%
MRT	8 h	8 h
Hardware Safety Integrity	Route 2_H	Route 2_H
Systematic Safety Integrity	Route 2_S	Route 2_S

Remarks

(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.

(2) Considering an automatic Partial Stroke Test.

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) and IEC EN 61511 (Chapters: 1, 2, 3) for Floating Ball Valves produced by BFE S.r.l.

NOTE: The present table is integral part of the Document: TUV IT 23 SIL 0293
Date: October, 26th 2023

Italia

SUMMARY TABLE

E/EE/EP safety-related system (final element)	**Trunnion Ball Valves produced by BFE S.r.l.**	
System type	Type A	
Systematic Capability	*SC3*	
Safety Function Definition	*SIF1: "Correct switching on demand (open to closed) and tight for closing phase, in low demand mode of operation"*	*SIF1: "Correct switching on demand (open to closed) and tight for closing phase, in low demand mode of operation"*
Max SIL(1)	**SIL3**	**SIL3**
λ_{TOT}	8,963E-09	8,963E-09
λ_{NE}	2,145E-09	2,145E-09
λ_{S}	0,000E+00	0,000E+00
$\lambda_{DD,PST}$(2)	1,819E-09	1,819E-09
$\lambda_{DU,FPT}$	5,000E-09	5,000E-09
β and β_D factor	10%	10%
MRT	8 h	8 h
Hardware Safety Integrity	Route 2_H	Route 2_H
Systematic Safety Integrity	Route 2_S	Route 2_S

Remarks

(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.

(2) Considering an automatic Partial Stroke Test.

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) and IEC EN 61511 (Chapters: 1, 2, 3) for Trunnion Ball Valves produced by BFE S.r.l.

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Date: October, 26th 2023

Italia

SUMMARY TABLE

E/EE/EP safety-related system (final element)	**Globe Valves produced by BFE S.r.l.**	
System type	Type A	
Systematic Capability	SC3	
Safety Function Definition	*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"*
Max SIL(1)	**SIL3**	**SIL3**
λ_{TOT}	1,443E-08	1,443E-08
λ_{NE}	3,453E-09	4,937E-09
λ_{S}	0,000E+00	0,000E+00
$\lambda_{DD,PST}$(2)	2,928E-09	6,987E-09
$\lambda_{DU,FPT}$	8,050E-09	2,507E-09
β and β_D factor	10%	10%
MRT	8 h	8 h
Hardware Safety Integrity	Route 2_H	Route 2_H
Systematic Safety Integrity	Route 2_S	Route 2_S

Remarks

(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.

(2) Considering an automatic Partial Stroke Test.

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) and IEC EN 61511 (Chapters: 1, 2, 3) for Globe Valves produced by BFE S.r.l.

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SUMMARY TABLE

E/EE/EP safety-related system (final element)	**Gate Valves produced by BFE S.r.l.**	
System type	Type A	
Systematic Capability	SC3	
Safety Function Definition	*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"*
Max SIL(1)	**SIL3**	**SIL3**
λ_{TOT}	2,720E-08	2,720E-08
λ_{NE}	6,508E-09	9,305E-09
λ_{S}	0,000E+00	0,000E+00
$\lambda_{DD,PST}$(2)	5,519E-09	1,317E-08
$\lambda_{DU,FPT}$	1,517E-08	4,725E-09
β and β_D factor	10%	10%
MRT	8 h	8 h
Hardware Safety Integrity	Route 2_H	Route 2_H
Systematic Safety Integrity	Route 2_S	Route 2_S

Remarks

(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.

(2) Considering an automatic Partial Stroke Test.

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) and IEC EN 61511 (Chapters: 1, 2, 3) for Gate Valves produced by BFE S.r.l.

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