ZERTIFIKAT ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Italia

# CERTIFICATE

## according to IEC EN 61508

**Certificate No.: TUV IT 24 SIL 0349**

**CERTIFICATE OWNER:** **Chaoda Valves Group Co., Ltd.**
***Registered Address:*** **Jiangbei Street, Oubei, Yongjia, PC: 325105, Zhejiang Province, P. R. China**
***Manufacturing Address:*** **Wuxing Industry Zone, Oubei, Yongjia, PC: 325105, Zhejiang Province, P. R. China**

**WE HEREWITH CONFIRM THAT**

**CD SERIES TRUNNION 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 CD Series Trunnion Ball Valves were found to meet the standard defined requirements of the safety levels detailed in the following table according to IEC EN 61508, under fulfillment of the conditions listed in the Report R TUV IT 24 SIL 0319, on which this Certificate is based**

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

**Official Report No.:** **R TUV IT 24 SIL 0319**

**Expiry Date** **February, 22nd 2027**

**THE PRESENT DOCUMENT SUBSTITUTES AND REPEALS THE DOCUMENT C-IS-722233004-01**

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

**Milan, February, 23rd 2024**

**TÜV ITALIA Srl**

TÜV Italia Srl Industrie Service — TÜV SÜD — Italia

**TÜV ITALIA Srl**

Industrie Service Division
Managing Director

*Alberto Carelli*

# SUMMARY TABLE

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| | | |
|---|---|---|
| ***E/EE/EP safety-related system (final element)*** | **CD Series Trunnion Ball Valves produced by Chaoda Valves Group Co., Ltd.** | |
| ***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** |
| $\lambda_{TOT}$ | 2,909E-09 | 2,909E-09 |
| $\lambda_{NE}$ | 6,961E-10 | 9,953E-10 |
| $\lambda_{S}$ | 0,000E+00 | 0,000E+00 |
| $\lambda_{DD,PST}$(2) | 5,903E-10 | 1,409E-09 |
| $\lambda_{DU,FPT}$ | 1,623E-09 | 5,054E-10 |
| ***β and $\beta_D$ 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 61508:2010 CD Series Trunnion Ball Valves produced by Chaoda Valves Group Co., Ltd.*

NOTE: The present table is integral part of the Document TUV IT 24 SIL 0349
Date: February, 23rd 2024