Italia

# COMPLIANCE

## with IEC EN 61508

**Certificate No.: TUV IT 22 SIL 0118**

**CERTIFICATE OWNER:** **Elettromeccanica Delta S.p.A.**
**Via Trieste 132**
**31030 Arcade (TV)**
**Italy**

**WE HEREWITH CONFIRM THAT**

**SAFETY SOLENOID VALVES FOR GAS**

**TYPE VMR – VMR OTN – VML – VMM – VMR-60 – VML-60**

**MEET THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLES**

**FOR THE SAFETY FUNCTION:**

***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 Safety Solenoid 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 22 SIL 0089 Rev.1 dated September, 16th 2022, on which this Certificate is based** |
| **Examination parameters:** | **Construction/Functional characteristics and reliability and availability parameters of the above Safety Solenoid Valves** |
| **Official Report No.:** | **R TUV IT 22 SIL 0089 Rev.1** |
| **Expiry Date** | **September, 18th 2025** |

**IT IS TO BE INTENDED THAT THE ABOVE OFFICIAL REPORT AND ITS ANNEXES ARE AN INTEGRAL PART OFTHIS DOCUMENT**
**THE PRESENT DOCUMENT SUBSITUTES AND REPEALS THE DOCUMENTS C-IS-722161852**

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

**Sesto San Giovanni, September, 19th 2022**

**TÜV ITALIA Srl**

TÜV Italia Srl Industrie Service
Italia

**TÜV ITALIA Srl**
Industry Service Division
Managing Director

*Alberto Carelli*



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CERTIFICATE ◆ CERTIFICADO ◆ 認證證書 ◆ ZERTIFIKAT ◆ CERTIFICATE

# SUMMARY TABLE

| | | |
|---|---|---|
| ***E/EE/EP safety-related system (final element)*** | **Safety Solenoid Valves produced by Elettromeccanica Delta S.p.A.** | |
| ***System type*** | Type A | |
| ***Systematic Capability*** | *SC3* | |
| ***Size (Class)*** | **10 ≤ DN ≤ 150**<br>**VMR** | **8 ≤ DN ≤ 15**<br>**VMR OTN** |
| ***Safety Function Definition*** | *Gas flow shut off further to coil de-energization* and absence of internal and external leakages***<br>** Power voltage below 15% of the minimum nominal voltage of the coil power (ref. EN 161:2013 chapter 7.101)*<br>*** As defined in the EN 161:2013 which recalls the EN 13611:2021 chapters 3.5-3.6 and 7.2* | |
| ***Max SIL(1)*** | **SIL2 with HFT = 0**<br>**SIL3 with HFT = 1** | **SIL2 with HFT = 0**<br>**SIL3 with HFT = 1** |
| $B_{10d}$(2) | 15.493.262 | 11.939.617 |
| $\lambda_{TOT}$ | 9,506E-09 | 6,784E-09 |
| $\lambda_S$ | 5,633E-09 | 4,020E-09 |
| $\lambda_{DU,FPT}$ | 3,873E-09 | 2,764E-09 |
| ***β and $\beta_D$ factor*** | 10% | 10% |
| ***MRT*** | 0,43 h | 0,43 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 to assure compliance with the minimum hardware fault tolerance (HFT) and probabilistic ($PFH_d$) requirements.*

(2) *The $B_{10d}$ value has been calculated assuming average values coming from most of current applications. Please use the following formula for calculation in a specific condition:*

$$PFH_d = \lambda_d = \frac{0,1}{B_{10d}} \times n_{op}$$

(3) *Portion of failure rate related to dangerous failure modes that can be detected only by means of periodical Full Proof Testing (FPT).*

*SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) for Safety Solenoid Valves produced by Elettromeccanica Delta S.p.A.*

NOTE: The present table is integral part of the Document: TUV IT 22 SIL 0118
Date: September, 19th 2022

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# SUMMARY TABLE

| | | |
|---|---|---|
| ***E/EE/EP safety-related system (final element)*** | **Safety Solenoid Valves produced by Elettromeccanica Delta S.p.A.** | |
| ***System type*** | Type A | |
| ***Systematic Capability*** | *SC3* | |
| ***Size (Class)*** | **10 ≤ DN ≤ 80**<br>**VML** | **20 ≤ DN ≤ 80**<br>**VMM** |
| ***Safety Function Definition*** | *Gas flow shut off further to coil de-energization* and absence of internal and external leakages***<br>** Power voltage below 15% of the minimum nominal voltage of the coil power (ref. EN 161:2013 chapter 7.101)*<br>*** As defined in the EN 161:2013 which recalls the EN 13611:2021 chapters 3.5-3.6 and 7.2* | |
| ***Max SIL(1)*** | **SIL2 with HFT = 0**<br>**SIL3 with HFT = 1** | **SIL2 with HFT = 0**<br>**SIL3 with HFT = 1** |
| $B_{10d}$(2) | 13.967.717 | 14.643.604 |
| $\lambda_{TOT}$ | 7,029E-09 | 2,514E-08 |
| $\lambda_S$ | 4,165E-09 | 1,490E-08 |
| $\lambda_{DU,FPT}$ | 2,864E-09 | 1,024E-08 |
| ***β and $\beta_D$ factor*** | 10% | 10% |
| ***MRT*** | 0,56 h | 0,60 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 to assure compliance with the minimum hardware fault tolerance (HFT) and probabilistic ($PFH_d$) requirements.*

(2) *The $B_{10d}$ value has been calculated assuming average values coming from most of current applications. Please use the following formula for calculation in a specific condition:*

$$PFH_d = \lambda_d = \frac{0,1}{B_{10d}} \times n_{op}$$

(3) *Portion of failure rate related to dangerous failure modes that can be detected only by means of periodical Full Proof Testing (FPT).*

*SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) for Safety Solenoid Valves produced by Elettromeccanica Delta S.p.A.*

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# SUMMARY TABLE

| | | |
|---|---|---|
| ***E/EE/EP safety-related system (final element)*** | **Safety Solenoid Valves produced by Elettromeccanica Delta S.p.A.** | |
| ***System type*** | Type A | |
| ***Systematic Capability*** | *SC3* | |
| ***Size (Class)*** | **10 ≤ DN ≤ 100**<br>**VMR-60** | **10 ≤ DN ≤ 80**<br>**VML-60** |
| ***Safety Function Definition*** | *Gas flow shut off further to coil de-energization* and absence of internal and external leakages***<br>** Power voltage below 15% of the minimum nominal voltage of the coil power (ref. EN 161:2013 chapter 7.101)*<br>*** As defined in the EN 161:2013 which recalls the EN 13611:2021 chapters 3.5-3.6 and 7.2* | |
| ***Max SIL(1)*** | **SIL2 with HFT = 0**<br>**SIL3 with HFT = 1** | **SIL2 with HFT = 0**<br>**SIL3 with HFT = 1** |
| ***$B_{10d}$(2)*** | 2.707.146 | 2.231.310 |
| **$\lambda_{TOT}$** | 7,921E-08 | 6,889E-08 |
| **$\lambda_{S}$** | 4,694E-08 | 4,082E-08 |
| **$\lambda_{DU,FPT}$** | 3,227E-08 | 2,806E-08 |
| ***β and $\beta_D$ factor*** | 10% | 10% |
| ***MRT*** | 0,43 h | 0,56 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 to assure compliance with the minimum hardware fault tolerance (HFT) and probabilistic ($PFH_d$) requirements.*

*(2) The $B_{10d}$ value has been calculated assuming average values coming from most of current applications. Please use the following formula for calculation in a specific condition:*

$$PFH_d = \lambda_d = \frac{0,1}{B_{10d}} \times n_{op}$$

*(3) Portion of failure rate related to dangerous failure modes that can be detected only by means of periodical Full Proof Testing (FPT).*

*SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) for Safety Solenoid Valves produced by Elettromeccanica Delta S.p.A.*

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