

CERTIFICAT

CERTIFICADO

СЕРТИФИКАТ

認證證書

CERTIFICATE

ZERTIFIKAT



Italia

# COMPLIANCE

with IEC EN 61508

Certificate No.: TUV IT 24 SIL 0510

CERTIFICATE OWNER: Atos S.p.A.  
Via alla Piana 57  
21018 Sesto Calende (VA)  
Italy

WE HEREWITH CONFIRM THAT SOLENOID POPPET VALVES TYPE:  
DLEH-2(3)\* AND XXXXXX DLEH-2(3)\*, DLEHM-3\* AND XXXXXX DLEHM-3\*

AND EX-PROOF VERSIONS TYPE:

DLAH-2(3)\* AND XXXXXX DLAH-2(3)\* INCLUDING /UL OPTION,

DLAHM-3\* AND XXXXXX DLAHM-3\* INCLUDING /UL OPTION,

AND STAINLESS STEEL EX-PROOF VERSIONS TYPE:

DLAHX(S)-3 AND XXXXXX DLAHX(S)-3 INCLUDING /UL OPTION,

DLAHMX(S)-3\* AND XXXXXX DLAHMX(S)-3\* INCLUDING /UL OPTION

MEET THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLES FOR THE

SAFETY FUNCTIONS:

*SIF1: "Switching of the single solenoid poppet valve on demand, by external energization signal"*

*SIF2: "Switching of the single solenoid poppet valve on demand, by external de-energization signal"*

Examination result: The above reported 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 24 SIL 0470 in its currently valid version, on which this Certificate is based

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

Official Report No.: R TUV IT 24 SIL 0470

Expiry Date December, 19<sup>th</sup> 2027

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

THE PRESENT DOCUMENT SUBSTITUTES AND REPEALS THE DOCUMENT C-IS-722261618-01

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

Milan, December, 20<sup>th</sup> 2024



TÜV ITALIA Srl

TÜV ITALIA Srl  
Industrie Service Division  
Managing Director

Alberto Carelli



Italia

## SUMMARY TABLE

<i>E/EE/EP safety-related system (final element)</i>	<b>Solenoid Valves DLAH-2(3)* and XXXXXX DLAH-2(3)* produced by Atos S.p.A.</b>			
<i>System type</i>	Type A			
<i>Systematic Capability</i>	SC3			
<i>Safety Function Definition</i>	<i>SIF1: "Switching of the single solenoid poppet valve on demand, by external energization signal"</i>		<i>SIF2: "Switching of the single solenoid poppet valve on demand, by external de-energization signal"</i>	
<i>Max SIL<sup>(1)</sup></i>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>
$\lambda_{TOT}$	6,946E-09		6,946E-09	
$\lambda_{NE}$	0,000E+00		0,000E+00	
$\lambda_{SD}$	0,000E+00		0,000E+00	
$\lambda_{SU}$	5,716E-09		5,835E-09	
$\lambda_{DD,PST}^{(2)}$	0,000E+00		0,000E+00	
$\lambda_{DU,FPT}$	1,231E-09		1,111E-09	
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	10%		10%	
<i>MRT</i>	0,25 h		0,25 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>H</sub>		Route 2 <sub>H</sub>	
<i>Systematic Safety Integrity</i>	Route 2 <sub>S</sub>		Route 2 <sub>S</sub>	
<b>Remarks</b>				
<p>(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of <math>PF_{D_{AVG}}</math> 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 an automatic Partial Stroke Test.</p>				

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) for Solenoid Valves Solenoid Valves DLAH-2(3)\* and XXXXXX DLAH-2(3)\* produced by Atos S.p.A.

NOTE: The present table is integral part of the Document: TUV IT 24 SIL 0510  
Date: December, 20<sup>th</sup> 2024



Italia

## SUMMARY TABLE

<i>E/EE/EP safety-related system (final element)</i>	<b>Solenoid Valves DLAH/UL-2(3)* and XXXXXX DLAH/UL-2(3)* produced by Atos S.p.A.</b>			
<i>System type</i>	Type A			
<i>Systematic Capability</i>	SC3			
<i>Safety Function Definition</i>	<i>SIF1: “Switching of the single solenoid poppet valve on demand, by external energization signal”</i>		<i>SIF2: “Switching of the single solenoid poppet valve on demand, by external de-energization signal”</i>	
<i>Max SIL<sup>(1)</sup></i>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>
$\lambda_{TOT}$	1,280E-08		1,280E-08	
$\lambda_{NE}$	0,000E+00		0,000E+00	
$\lambda_{SD}$	0,000E+00		0,000E+00	
$\lambda_{SU}$	1,053E-08		1,075E-08	
$\lambda_{DD,PST}^{(2)}$	0,000E+00		0,000E+00	
$\lambda_{DU,FPT}$	2,267E-09		2,047E-09	
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	10%		10%	
<i>MRT</i>	0,25 h		0,25 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>H</sub>		Route 2 <sub>H</sub>	
<i>Systematic Safety Integrity</i>	Route 2 <sub>S</sub>		Route 2 <sub>S</sub>	
<b>Remarks</b>				
(1) <i>The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD<sub>AVG</sub> 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.</i>				
(2) <i>Considering an automatic Partial Stroke Test.</i>				

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) for Solenoid Valves DLAH/UL-2(3)\* and XXXXXX DLAH/UL-2(3)\* produced by Atos S.p.A.

NOTE: The present table is integral part of the Document: TUV IT 24 SIL 0510  
Date: December, 20<sup>th</sup> 2024



Italia

## SUMMARY TABLE

<i>E/EE/EP safety-related system (final element)</i>	<b>Solenoid Valves DLAHX(S)-3 and XXXXXX DLAHX(S)-3, DLAHX(S)/UL-3 and XXXXXX DLAHX(S)/UL-3 produced by Atos S.p.A.</b>			
<i>System type</i>	Type A			
<i>Systematic Capability</i>	SC3			
<i>Safety Function Definition</i>	<i>SIF1: “Switching of the single solenoid poppet valve on demand, by external energization signal”</i>		<i>SIF2: “Switching of the single solenoid poppet valve on demand, by external de-energization signal”</i>	
<i>Max SIL<sup>(1)</sup></i>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>
$\lambda_{TOT}$	4,176E-09		4,176E-09	
$\lambda_{NE}$	0,000E+00		0,000E+00	
$\lambda_{SD}$	0,000E+00		0,000E+00	
$\lambda_{SU}$	3,436E-09		3,508E-09	
$\lambda_{DD,PST}^{(2)}$	0,000E+00		0,000E+00	
$\lambda_{DU,FPT}$	7,398E-10		6,682E-10	
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	10%		10%	
<i>MRT</i>	0,25 h		0,25 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>H</sub>		Route 2 <sub>H</sub>	
<i>Systematic Safety Integrity</i>	Route 2 <sub>S</sub>		Route 2 <sub>S</sub>	
<b>Remarks</b>				
(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of $PFDAVG$ 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) for Solenoid Valves DLAHX(S)-3 and XXXXXX DLAHX(S)-3, DLAHX(S)/UL-3 and XXXXXX DLAHX(S)/UL-3 produced by Atos S.p.A.

NOTE: The present table is integral part of the Document: TUV IT 24 SIL 0510  
Date: December, 20<sup>th</sup> 2024



Italia

## SUMMARY TABLE

<i>E/EE/EP safety-related system (final element)</i>	<b>Solenoid Valves Valves DLAHM-3* and XXXXXX DLAHM-3*, DLAHM/UL-3* and XXXXXX DLAHM/UL-3*, DLAHMX(S)-3 and XXXXXX DLAHMX(S)-3, DLAHMX(S)/UL-3 and XXXXXX DLAHMX(S)/UL-3 produced by Atos S.p.A.</b>			
<i>System type</i>	Type A			
<i>Systematic Capability</i>	SC3			
<i>Safety Function Definition</i>	<i>SIF1: "Switching of the single solenoid poppet valve on demand, by external energization signal"</i>		<i>SIF2: "Switching of the single solenoid poppet valve on demand, by external de-energization signal"</i>	
<i>Max SIL<sup>(1)</sup></i>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>
$\lambda_{TOT}$	5,445E-08		5,445E-08	
$\lambda_{NE}$	0,000E+00		0,000E+00	
$\lambda_{SD}$	0,000E+00		0,000E+00	
$\lambda_{SU}$	1,497E-08		1,680E-08	
$\lambda_{DD,PST}^{(2)}$	0,000E+00		0,000E+00	
$\lambda_{DU,FPT}$	1,388E-08		8,401E-09	
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	10%		10%	
<i>MRT</i>	0,25 h		0,25 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>H</sub>		Route 2 <sub>H</sub>	
<i>Systematic Safety Integrity</i>	Route 2 <sub>S</sub>		Route 2 <sub>S</sub>	
<b>Remarks</b>				
<p>(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of <math>PF_{D_{AVG}}</math> 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 an automatic Partial Stroke Test.</p>				

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) for Solenoid Valves Solenoid Valves Valves DLAHM-3\* and XXXXXX DLAHM-3\*, DLAHM/UL-3\* and XXXXXX DLAHM/UL-3\*, DLAHMX(S)-3 and XXXXXX DLAHMX(S)-3, DLAHMX(S)/UL-3 and XXXXXX DLAHMX(S)/UL-3 produced by Atos S.p.A. produced by Atos S.p.A.

NOTE: The present table is integral part of the Document: TUV IT 24 SIL 0510  
Date: December, 20<sup>th</sup> 2024



Italia

## SUMMARY TABLE

<i>E/EE/EP safety-related system (final element)</i>	<b>Solenoid Valves DLEH-2(3)* and XXXXXX DLEH-2(3)* produced by Atos S.p.A.</b>			
<i>System type</i>	Type A			
<i>Systematic Capability</i>	SC3			
<i>Safety Function Definition</i>	<i>SIF1: “Switching of the single solenoid poppet valve on demand, by external energization signal”</i>		<i>SIF2: “Switching of the single solenoid poppet valve on demand, by external de-energization signal”</i>	
<i>Max SIL<sup>(1)</sup></i>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>
$\lambda_{TOT}$	4,670E-09		4,670E-09	
$\lambda_{NE}$	0,000E+00		0,000E+00	
$\lambda_{SD}$	0,000E+00		0,000E+00	
$\lambda_{SU}$	1,284E-09		1,441E-09	
$\lambda_{DD,PST}^{(2)}$	0,000E+00		0,000E+00	
$\lambda_{DU,FPT}$	1,191E-09		7,205E-10	
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	10%		10%	
<i>MRT</i>	0,25 h		0,25 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>H</sub>		Route 2 <sub>H</sub>	
<i>Systematic Safety Integrity</i>	Route 2 <sub>S</sub>		Route 2 <sub>S</sub>	
<b>Remarks</b>				
(1) <i>The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD<sub>AVG</sub> 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.</i>				
(2) <i>Considering an automatic Partial Stroke Test.</i>				

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) for Solenoid Valves DLEH-2(3)\* and XXXXXX DLEH-2(3)\* produced by Atos S.p.A.

NOTE: The present table is integral part of the Document: TUV IT 24 SIL 0510  
Date: December, 20<sup>th</sup> 2024



Italia

## SUMMARY TABLE

<i>E/EE/EP safety-related system (final element)</i>	<b>Solenoid Valves DLEHM-3* and XXXXXX DLEHM-3* produced by Atos S.p.A.</b>			
<i>System type</i>	Type A			
<i>Systematic Capability</i>	SC3			
<i>Safety Function Definition</i>	<i>SIF1: "Switching of the single solenoid poppet valve on demand, by external energization signal"</i>		<i>SIF2: "Switching of the single solenoid poppet valve on demand, by external de-energization signal"</i>	
<i>Max SIL<sup>(1)</sup></i>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>
$\lambda_{TOT}$	1,673E-08		1,673E-08	
$\lambda_{NE}$	0,000E+00		0,000E+00	
$\lambda_{SD}$	0,000E+00		0,000E+00	
$\lambda_{SU}$	4,600E-09		5,162E-09	
$\lambda_{DD,PST}^{(2)}$	0,000E+00		0,000E+00	
$\lambda_{DU,FPT}$	4,266E-09		2,581E-09	
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	10%		10%	
<i>MRT</i>	0,25 h		0,25 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>H</sub>		Route 2 <sub>H</sub>	
<i>Systematic Safety Integrity</i>	Route 2 <sub>S</sub>		Route 2 <sub>S</sub>	
<b>Remarks</b>				
(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of $PFDAVG$ 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) for Solenoid Valves DLEHM-3\* and XXXXXX DLEHM-3\* produced by Atos S.p.A.

NOTE: The present table is integral part of the Document: TUV IT 24 SIL 0510  
Date: December, 20<sup>th</sup> 2024



Italia

# COMPLIANCE

with IEC EN 61508

Certificate No.: TUV IT 24 SIL 0511

**CERTIFICATE OWNER:** Atos S.p.A.  
Via alla Piana 57  
21018 Sesto Calende (VA)  
Italy

**WE HEREWITH CONFIRM THAT EX PROOF SOLENOID VALVES TYPE:**

**DHA\* AND XXXXXX DHA\*, INCLUDING /UL OPTION**

**DHAL8\* AND XXXXXX DHAL8\*, INCLUDING /UL OPTION**

**AND STAINLESS STEEL VERSIONS TYPE:**

**DHAX(S)\* AND XXXXXXX DHAX(S)\*, INCLUDING /UL OPTION**

**DHAX(S)L8 AND XXXXXXX DHAX(S)L8, INCLUDING /UL OPTION**

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

**FOR THE SAFETY FUNCTIONS:**

**SIF1: "Switching of the single or double solenoid spool valve on demand, by external energization signal"**

**SIF2: "Switching of the single or double solenoid spool valve on demand, by external de-energization signal"**

**Examination result:** The above reported 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 24 SIL 0471 in its currently valid version, on which this Certificate is based

**Examination parameters:** Construction/Functional characteristics and reliability and availability parameters of the above Solenoid Valves

**Official Report No.:** R TUV IT 24 SIL 0471

**Expiry Date** December, 19<sup>th</sup> 2027

**IT IS TO BE INTENDED THAT THE ABOVE OFFICIAL REPORT AND ITS ANNEXES ARE AN INTEGRAL PART OF THIS DOCUMENT  
THE PRESENT DOCUMENT SUBSTITUTES AND REPEALS THE DOCUMENT C-IS-722261618-02**

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

Milan, December, 20<sup>th</sup> 2024



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

*Alberto Carelli*





Italia

## SUMMARY TABLE

<i>E/EE/EP safety-related system (final element)</i>	<b>Solenoid Valves DHA* and XXXXXX DHA*, DHAL8* and XXXXXX DHAL8* produced by Atos S.p.A.</b>			
<i>System type</i>	Type A			
<i>Systematic Capability</i>	SC3			
<i>Safety Function Definition</i>	<i>SIF1: "Switching of the single or double solenoid spool valve on demand, by external energization signal"</i>		<i>SIF2: "Switching of the single or double solenoid spool valve on demand, by external de-energization signal"</i>	
<i>Max SIL<sup>(1)</sup></i>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>
$\lambda_{TOT}$	5,380E-09		5,380E-09	
$\lambda_{NE}$	0,000E+00		0,000E+00	
$\lambda_{SD}$	0,000E+00		0,000E+00	
$\lambda_{SU}$	3,674E-09		4,921E-09	
$\lambda_{DD,PST}^{(2)}$	0,000E+00		0,000E+00	
$\lambda_{DU,FPT}$	1,706E-09		4,591E-10	
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	10%		10%	
<i>MRT</i>	0,25 h		0,25 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>H</sub>		Route 2 <sub>H</sub>	
<i>Systematic Safety Integrity</i>	Route 2 <sub>S</sub>		Route 2 <sub>S</sub>	
<b>Remarks</b>				
<p>(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of <math>PFDAVG</math> 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 an automatic Partial Stroke Test.</p>				

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) for Solenoid Valves DHA\* and XXXXXX DHA\*, DHAL8\* and XXXXXX DHAL8\* produced by Atos S.p.A.

NOTE: The present table is integral part of the Document: TUV IT 24 SIL 0511  
Date: December, 20<sup>th</sup> 2024



Italia

## SUMMARY TABLE

<i>E/EE/EP safety-related system (final element)</i>	<b>Solenoid Valves DHA/UL* and XXXXXX DHA/UL*, DHAL8/UL* and XXXXXX DHAL8/UL* produced by Atos S.p.A.</b>			
<i>System type</i>	Type A			
<i>Systematic Capability</i>	SC3			
<i>Safety Function Definition</i>	<i>SIF1: "Switching of the single or double solenoid spool valve on demand, by external energization signal"</i>		<i>SIF2: "Switching of the single or double solenoid spool valve on demand, by external de-energization signal"</i>	
<i>Max SIL<sup>(1)</sup></i>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>
$\lambda_{TOT}$	1,116E-08		1,116E-08	
$\lambda_{NE}$	0,000E+00		0,000E+00	
$\lambda_{SD}$	0,000E+00		0,000E+00	
$\lambda_{SU}$	7,622E-09		1,021E-08	
$\lambda_{DD,PST}^{(2)}$	0,000E+00		0,000E+00	
$\lambda_{DU,FPT}$	3,539E-09		9,524E-10	
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	10%		10%	
<i>MRT</i>	0,25 h		0,25 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>H</sub>		Route 2 <sub>H</sub>	
<i>Systematic Safety Integrity</i>	Route 2 <sub>S</sub>		Route 2 <sub>S</sub>	
<b>Remarks</b>				
(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of $PFDAVG$ 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) for Solenoid Valves DHA/UL\* and XXXXXX DHA/UL\*, DHAL8/UL\* and XXXXXX DHAL8/UL\* produced by Atos S.p.A.

NOTE: The present table is integral part of the Document: TUV IT 24 SIL 0511  
Date: December, 20<sup>th</sup> 2024



Italia

## SUMMARY TABLE

<i>E/EE/EP safety-related system (final element)</i>	<b>Solenoid Valves Stainless Steel DHAX(S)* and XXXXXXXX DHAX(S)* including /UL option, DHAX(S)L8 AND XXXXXXXX DHAX(S)L8 including /UL option produced by Atos S.p.A.</b>			
<i>System type</i>	Type A			
<i>Systematic Capability</i>	SC3			
<i>Safety Function Definition</i>	<i>SIF1: "Switching of the single or double solenoid spool valve on demand, by external energization signal"</i>		<i>SIF2: "Switching of the single or double solenoid spool valve on demand, by external de-energization signal"</i>	
<i>Max SIL<sup>(1)</sup></i>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>	<b>SIL2 with HFT=0</b>	<b>SIL3 with HFT=1</b>
$\lambda_{TOT}$	3,922E-09		3,922E-09	
$\lambda_{NE}$	0,000E+00		0,000E+00	
$\lambda_{SD}$	0,000E+00		0,000E+00	
$\lambda_{SU}$	2,679E-09		3,588E-09	
$\lambda_{DD,PST}^{(2)}$	0,000E+00		0,000E+00	
$\lambda_{DU,FPT}$	1,244E-09		3,347E-10	
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	10%		10%	
<i>MRT</i>	0,25 h		0,25 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>H</sub>		Route 2 <sub>H</sub>	
<i>Systematic Safety Integrity</i>	Route 2 <sub>S</sub>		Route 2 <sub>S</sub>	
<b>Remarks</b>				
<i>(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD<sub>AVG</sub> 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.</i>				
<i>(2) Considering an automatic Partial Stroke Test.</i>				

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) for Solenoid Valves Stainless Steel DHAX(S)\* and XXXXXXXX DHAX(S)\* including /UL option, DHAX(S)L8 AND XXXXXXXX DHAX(S)L8 including /UL option produced by Atos S.p.A.

NOTE: The present table is integral part of the Document: TUV IT 24 SIL 0511  
Date: December, 20<sup>th</sup> 2024