



COMPLIANCE

with IEC EN 61508:2010

Certificate No.: C-IS-722163008-01

**CERTIFICATE OWNER
and MANUFACTURER:**

ATOS S.p.A.
Via alla Piana, 57
21018 – SESTO CALENDE (VA) - ITALY

WE HEREWITH CONFIRM THAT THE SOLENOID VALVES

DLOH 2 with explosion proof Multicertification (Atex Group II, IECEx, Russian) or Atex and IECEx mining certified solenoids
 DLOH 3 with explosion proof Multicertification (Atex Group II, IECEx, Russian) or Atex and IECEx mining certified solenoids
 DLOH 2 UL with UL-1002 certified solenoids
 DLOH 3 UL with UL-1002 certified solenoids

Valid also for special codes XXXXXXXX DLOH -*

DLAHX(S)-3 with explosion proof Multicertification (Atex Group II, IECEx, Russian) [ex DLOHX(S)-3]

Valid also for special codes XXXXXXXX DLAHX -*

DLAH 2A(C) with explosion proof Multicertification (Atex Group II, IECEx, Russian) or Atex and IECEx mining certified solenoids

DLAH 3A(C) with explosion proof Multicertification (Atex Group II, IECEx, Russian) or Atex and IECEx mining certified solenoids

Valid also for special codes XXXXXXXX DLAH -*

DLAHM 3A(C) with explosion proof Multicertification (Atex Group II, IECEx, Russian) or Atex and IECEx mining certified solenoids

Valid also for special codes XXXXXXXX DLAHM -*

DLEH 2A(C) with conventional threaded solenoids

DLEH 3A(C) with conventional threaded solenoids

Valid also for special codes XXXXXXXX DLEH -*

DLEHM 3A(C) with conventional threaded solenoids

Valid also for special codes XXXXXXXX DLEHM -*

MEET THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLES

FOR THE SAFETY FUNCTION:

SIF 1: "Switching of the single solenoid poppet valve on demand, by external energization signal"

SIF 2: "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 (T-IS-722163008-01) according to IEC EN 61508:2010, under fulfillment of the conditions listed in the Report R-IS-722163008-01 Rev.1 dated June, 18th 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 Solenoid Valves

Official Report No.:

R-IS-722163008-01 Rev.1

Expiry Date

June, 17th 2021

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-258751-01

Reference Standard

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

Sesto San Giovanni, June, 18th 2018

TÜV ITALIA Srl

TÜV ITALIA Srl
Industry Service Division
Technical Manager



Paolo Marcone

Paolo Marcone

SUMMARY TABLE T – IS – 722163008-01

<i>E/EE/EP safety-related system (final element)</i>	SOLENOID VALVES produced by ATOS S.p.A.					
<i>System type</i>	Type A					
<i>Class</i>	DLAH-2(3) ATEX (ex DLOH-2(3)) and XXXXXX DLAH-2(3) DLAHM-3 ATEX and XXXXXX DLAHM-3 DLEH-2(3) and XXXXXX DLEH-2(3) DLEHM-3 and XXXXXX DLEHM-3		DLAH-2(3) / UL (ex DLOH-2(3) / UL) and XXXXXX DLAH-2(3) / UL		DLAHX(S)-3 ATEX Stainless steel (ex DLOHX(S)-3) and XXXXXX DLAHX(S)-3	
<i>Systematic Capability</i>	SC3					
<i>Safety Function Definition</i>	<i>Switching of the single solenoid poppet valve on demand, by external energization signal</i>					
<i>Max SIL⁽¹⁾</i>	SIL2 with HFT=0	SIL3 with HFT=1	SIL2 with HFT=0	SIL3 with HFT=1	SIL2 with HFT=0	SIL3 with HFT=1
λ_{TOT}	1,217E-08		3,332E-08		2,738E-08	
λ_S	9,539E-09		2,612E-08		2,147E-08	
$\lambda_{D,FPT}$	3,820E-09		1,046E-08		8,598E-09	
β and β_D factor	10%		10%		10%	
<i>MRT</i>	0,25		0,25		0,25	
<i>Hardware Safety Integrity</i>	Route 2 _H		Route 2 _H		Route 2 _H	
<i>Systematic Safety Integrity</i>	Route 2 _S		Route 2 _S		Route 2 _S	
Remarks						
<i>(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.</i>						

SIL classification according to Standard IEC EN 61508:2010 (Chapters: 2, 4, 6, 7) for Solenoid Valves produced by ATOS S.p.A. – SIF 1

T – IS – 722163008-01

NOTE: The present table is integral part of the Documents: from C-IS-722163008-01

Date: June, 18th 2018

SUMMARY TABLE

T – IS – 722163008-01

<i>E/EE/EP safety-related system (final element)</i>	SOLENOID VALVES produced by ATOS S.p.A.					
<i>System type</i>	Type A					
<i>Class</i>	DLAH-2(3) ATEX (ex DLOH-2(3)) and XXXXXX DLAH-2(3) DLAHM-3 ATEX and XXXXXX DLAHM-3 DLEH-2(3) and XXXXXX DLEH-2(3) DLEHM-3 and XXXXXX DLEHM-3		DLAH-2(3) / UL (ex DLOH-2(3) / UL) and XXXXXX DLAH-2(3) / UL		DLAHX(S)-3 ATEX Stainless steel (ex DLOHX(S)-3) and XXXXXX DLAHX(S)-3	
<i>Systematic Capability</i>	SC3					
<i>Safety Function Definition</i>	<i>Switching of the single solenoid poppet valve on demand, by external de-energization signal</i>					
<i>Max SIL⁽¹⁾</i>	SIL2 with HFT=0	SIL3 with HFT=1	SIL2 with HFT=0	SIL3 with HFT=1	SIL2 with HFT=0	SIL3 with HFT=1
λ_{TOT}	1,217E-08		3,332E-08		2,738E-08	
λ_S	9,274E-09		2,539E-09		2,087E-08	
$\lambda_{D,FPT}$	2,893E-09		7,922E-09		6,511E-09	
β and β_D factor	10%		10%		10%	
<i>MRT</i>	0,25		0,25		0,25	
<i>Hardware Safety Integrity</i>	Route 2 _H		Route 2 _H		Route 2 _H	
<i>Systematic Safety Integrity</i>	Route 2 _S		Route 2 _S		Route 2 _S	
Remarks						
<i>(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.</i>						

SIL classification according to Standard IEC EN 61508:2010 (Chapters: 2, 4, 6, 7) for Solenoid Valves produced by ATOS S.p.A. – SIF 2

T – IS – 722163008-01

NOTE: The present table is integral part of the Documents: from C-IS-722163008-01

Date: June, 18th 2018



COMPLIANCE

with IEC EN 61508:2010

Certificate No.: C-IS-722163008-02

CERTIFICATE OWNER **ATOS S.p.A.**
and MANUFACTURER: **Via alla Piana, 57**
21018 – SESTO CALENDE (VA) - ITALY

WE HEREWITH CONFIRM THAT THE SOLENOID VALVES

- **DHA*** with explosion proof Multicertification (Atex Group II, IECEx, Russian) or Atex and IECEx mining certified solenoids
Valid also for special codes XXXXXX DHA*
- **DHA / UL*** with UL-1002 certified solenoids
Valid also for special codes XXXXXX DHA / UL*
- **DHAX(S)** with explosion proof Multicertification (Atex Group II, IECEx, Russian)
Valid also for special codes XXXXXX DHAX(S) [DHA*/*]

MEET THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLES

FOR THE SAFETY FUNCTION:

SIF 1: "Switching of the single or double solenoid spool valve on demand, by external energization signal"

SIF 2: "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 (T-IS-722163008-02) according to IEC EN 61508:2010, under fulfillment of the conditions listed in the Report R-IS-722163008-02 Rev.1 dated June, 18th 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 Solenoid Valves

Official Report No.: R-IS-722163008-02 Rev. 1

Expiry Date June, 17th 2021

**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-258751-02**

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

Sesto San Giovanni, June, 18th 2018

TÜV ITALIA Srl

TÜV ITALIA Srl
 Industry Service Division
 Technical manager



Paolo Marcone

 Paolo Marcone

SUMMARY TABLE T – IS – 72216300-02

<i>E/EE/EP safety-related system (final element)</i>	SOLENOID VALVES produced by ATOS S.p.A.					
<i>System type</i>	Type A					
<i>Class</i>	DHA* and XXXXXX DHA*		DHA / UL* and XXXXXX DHA / UL*		DHAX(S) ATEX Stainless steel and XXXXXX DHAX(S)	
<i>Systematic Capability</i>	SC3					
<i>Safety Function Definition</i>	<i>Switching of the single or double solenoid spool valve on demand, by external de-energization signal</i>					
<i>Max SIL⁽¹⁾</i>	SIL2 with HFT=0	SIL3 with HFT=1	SIL2 with HFT=0	SIL3 with HFT=1	SIL2 with HFT=0	SIL3 with HFT=1
λ_{TOT}	5,039E-09		1,081E-08		2,577E-08	
λ_S	4,755E-09		1,020E-08		2,432E-08	
$\lambda_{D,EPT}$	2,837E-10		6,084E-10		1,451E-09	
<i>β and β_D factor</i>	10%		10%		10%	
<i>MRT</i>	0,25		0,25		0,25	
<i>Hardware Safety Integrity</i>	Route 2 _H		Route 2 _H		Route 2 _H	
<i>Systematic Safety Integrity</i>	Route 2 _S		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>						

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) for Solenoid Valves produced by ATOS S.p.A – SIF 2

SUMMARY TABLE T – IS – 72216300-02

<i>E/EE/EP safety-related system (final element)</i>	SOLENOID VALVES produced by ATOS S.p.A.					
<i>System type</i>	Type A					
<i>Class</i>	DHA* and XXXXXX DHA*		DHA / UL* and XXXXXX DHA / UL*		DHAX(S) ATEX Stainless steel and XXXXXX DHAX(S)	
<i>Systematic Capability</i>	SC3					
<i>Safety Function Definition</i>	<i>Switching of the single or double solenoid spool valve on demand, by external energization signal</i>					
<i>Max SIL⁽¹⁾</i>	SIL2 with HFT=0	SIL3 with HFT=1	SIL2 with HFT=0	SIL3 with HFT=1	SIL2 with HFT=0	SIL3 with HFT=1
λ_{TOT}	5,039E-09		1,081E-08		2,577E-08	
λ_s	3,448E-09		7,394E-09		1,763E-08	
$\lambda_{DU,FFT}$	1,591E-09		3,413E-09		8,138E-09	
<i>β and β_D factor</i>	10%		10%		10%	
<i>MRT</i>	0,25		0,25		0,25	
<i>Hardware Safety Integrity</i>	Route 2 _H		Route 2 _H		Route 2 _H	
<i>Systematic Safety Integrity</i>	Route 2 _S		Route 2 _S		Route 2 _S	
Remarks						
<i>(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.</i>						

SIL classification according to Standard IEC EN 61508 (Chapters: 2, 4, 6, 7) for Solenoid Valves produced by ATOS S.p.A – SIF 1

T – IS – 72216300-02

NOTE: The present table is integral part of the Documents: from C-IS-72216300-02

Date: June, 18th 2018