



# COMPLIANCE

with IEC EN 61508

Certificate No.: C – IS – 722194241-01

**CERTIFICATE OWNER:** PENTA S.r.l.  
 Via G. Boccaccio, 23  
 25080 – Molinetto di Mazzano (BS) - Italy

**WE HEREWITH CONFIRM THAT  
 FLOATING BALL VALVES SERIES**

**AP60 / 64 / 68 / 606 / 609 / 615 – AP50 / 54 / 58 / 506 / 509 / 515 – AP10NU-NB /  
 10HP / 11NU-NB – AP20P – P40 – SAT – SAT3 – SAT CRIO**

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

**FOR THE SAFETY FUNCTIONS:**

*“correct switching on demand (open to closed), and tight for closing phase, in low demand mode of operation”*

*“correct switching on demand (open to closed), in low demand mode of operation”*

*“correct switching on demand (closed to open), in low demand mode of operation”*

**Examination result:** The above reported Floating Ball Valves were found to meet the standard defined requirements of the safety levels detailed in the following table (T-IS-722194241-01) according to IEC EN 61508, under fulfillment of the conditions listed in the Report R-IS-722194241-01 Rev.1 dated April, 17<sup>th</sup> 2019 in its currently valid version, on which this Certificate is based

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

**Official Report No.:** R-IS-722194241-01 Rev.1

**Expiry Date** April, 16<sup>th</sup> 2022

**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-2690080-01**

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

**Sesto San Giovanni, April, 17<sup>th</sup> 2019**



**TÜV ITALIA Srl**  
 Industry Service Division  
 Technical Manager

*Paolo Marcone*  
 Paolo Marcone

# SUMMARY TABLE

## T – IS – 722194241-01



Italia

<i>E/EE/EP safety-related system (final element)</i>	<b>Floating Ball Valves produced by PENTA S.r.l.</b>
<b>System type</b>	Type A
<b>Systematic Capability</b>	SC3
<b>Safety Function Definition</b>	<i>SIF1: "Correct switching on demand (open to closed) and tight for closing phase, in low demand mode of operation"</i>
<b>Max SIL<sup>(1)</sup></b>	<b>SIL3</b>
$\lambda_{TOT}$	1,925E-07
$\lambda_{NE}$	4,605E-08
$\lambda_s$	0,000E+00
$\lambda_{DD,PST}^{(2)}$	8,786E-08
$\lambda_{DU,FPT}$	5,856E-08
<b><math>\beta</math> and <math>\beta_D</math> factor</b>	10%
<b>MRT</b>	8 h
<b>Hardware Safety Integrity</b>	Route 2H
<b>Systematic Safety Integrity</b>	Route 2s
<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>PFD_{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 Testing.</p>	

*SIL classification according to Standard IEC EN 61508:2010 (Chapters: 2, 4, 6, 7) for Floating Ball Valves produced by PENTA S.r.l. – SIF1*

# SUMMARY TABLE

## T – IS – 722194241-01



Italia

<i>E/EE/EP safety-related system (final element)</i>	<b>Floating Ball Valves produced by PENTA S.r.l.</b>
<b>System type</b>	Type A
<b>Systematic Capability</b>	SC3
<b>Safety Function Definition</b>	<i>SIF2: "Correct switching on demand (open to closed), in low demand mode of operation"</i>
<b>Max SIL<sup>(1)</sup></b>	<b>SIL3</b>
$\lambda_{TOT}$	1,925E-07
$\lambda_{NE}$	1,355E-07
$\lambda_S$	0,000E+00
$\lambda_{DD,PST}^{(2)}$	3,905E-08
$\lambda_{DU,FPT}$	1,792E-08
<b><math>\beta</math> and <math>\beta_D</math> factor</b>	10%
<b>MRT</b>	8 h
<b>Hardware Safety Integrity</b>	Route 2 <sub>H</sub>
<b>Systematic Safety Integrity</b>	Route 2 <sub>S</sub>
<b>Remarks</b>	
<p><i>(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of <math>PFD_{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.</i></p> <p><i>(2) Considering an automatic Partial Stroke Testing.</i></p>	

*SIL classification according to Standard IEC EN 61508:2010 (Chapters: 2, 4, 6, 7) for Floating Ball Valves produced by PENTA S.r.l. – SIF2*

# SUMMARY TABLE

## T – IS – 722194241-01



Italia

<i>E/EE/EP safety-related system (final element)</i>	<b>Floating Ball Valves produced by PENTA S.r.l.</b>
<b>System type</b>	Type A
<b>Systematic Capability</b>	SC3
<b>Safety Function Definition</b>	<i>SIF3: "Correct switching on demand (closed to open), in low demand mode of operation"</i>
<b>Max SIL<sup>(1)</sup></b>	<b>SIL3</b>
$\lambda_{TOT}$	1,925E-07
$\lambda_{NE}$	5,585E-08
$\lambda_S$	0,000E+00
$\lambda_{DD,PST}^{(2)}$	9,320E-08
$\lambda_{DU,FPT}$	3,343E-08
<b><math>\beta</math> and <math>\beta_D</math> factor</b>	10%
<b>MRT</b>	8 h
<b>Hardware Safety Integrity</b>	Route 2 <sub>H</sub>
<b>Systematic Safety Integrity</b>	Route 2 <sub>s</sub>
<b>Remarks</b>	
<p><i>(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of <math>PFD_{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.</i></p> <p><i>(2) Considering an automatic Partial Stroke Testing.</i></p>	

*SIL classification according to Standard IEC EN 61508:2010 (Chapters: 2, 4, 6, 7) for Floating Ball Valves produced by PENTA S.r.l. – SIF3*