



Italia

# COMPLIANCE

with IEC EN 61508:2010

Certificate No.: C-IS-269080-02

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

**WE HEREWITH CONFIRM THAT**  
**THE TRUNNION BALL VALVES SERIES:**  
**APT2 – SAT/APT3 – SAT CRIO – 3WAY**  
**MEET THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLE**  
**FOR THE SAFETY FUNCTIONS:**

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

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

**Examination result:** The above reported TRUNNION BALL VALVES were found to meet the standard defined requirements of the safety levels detailed in the following table (T – IS – 269080 – 02) according to IEC EN 61508:2010, under fulfillment of the conditions listed in the Report R-IS-269080-02 Rev.1 dated April, 21<sup>st</sup> 2016 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 TRUNNION BALL VALVES

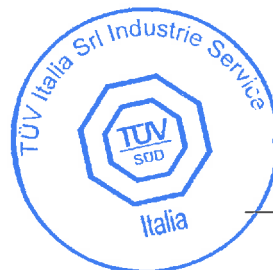
**Official Report No.:** R-IS-269080-02 Rev. 1

**Expiry Date** May, 02<sup>nd</sup> 2019

**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 DOCUMENTS C-IS-260464-02**

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

**Sesto San Giovanni, April, 21<sup>st</sup> 2016**



**TÜV ITALIA Srl**  
Industry Service Division  
Director

*Paolo Marcone*  
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**Paolo Marcone**



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## SUMMARY TABLE T – IS – 269080 – 02

<i>E/EE/EP safety-related system (final element)</i>	TRUNNION BALL VALVES produced by PENTA S.r.l.	
<i>System type</i>	Type A	
<i>Safety Function Definition</i>	<i>Complete switching on demand (open to closed / closed to open) in low demand mode of operation</i>	<i>Complete switching on demand (open to closed) and sealing in closed position in low demand mode of operation</i>
<i>Max SIL<sup>(1)</sup></i>	<b>SIL3</b>	<b>SIL3</b>
<i>Additional requirements for the max SIL classification</i>	<i>Execution of Automatic Partial Stroke Test with time interval not higher than 9 months and Full Proof Test with time interval not higher than 12 months</i>	<i>Execution of Automatic Partial Stroke Test with time interval not higher than 9 months and Full Proof Test with time interval not higher than 12 months</i>
$\lambda_{TOT}$	3,579E-07	5,248E-07
$\lambda_{SU}$	2,255E-07	3,924E-07
$\lambda_{SD}$	0,000E+00	0,000E+00
$\lambda_{DD,PST}$	1,178E-07	8,148E-08
$\lambda_{DU,FPT}$	1,459E-08	5,058E-08
<b>PF<sup>D(2)</sup></b>	<b>4,670E-04</b>	<b>4,904E-04</b>
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	5%	5%
<i>MRT</i>	8 h	8 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 an entire SIF must be verified with the calculation of the PFDavg considering the architectural constraints (Route 2H), proof test interval, any automatic diagnostics and the failure rates of all products included in the SIF.</p> <p>(2) PFD of reference calculated on the basis of a Full Proof Test and Automatic Partial Stroke test with time interval reported in the line Additional requirements for the max SIL classification. This time intervals are considered by TÜV as reasonably consistent with the implementation of the equipment for safety related-applications, with reference to the overall range of results shown in the report, where other possible combination of time intervals adequate for a classification up to SIL 2 or SIL3 are reported. Note that, concerning Full Proof Tests, time intervals for higher than 36 months are considered by TÜV as not adequate and consistent for equipment for safety related applications.</p>		

SIL classification according to Standards IEC EN 61508:2010 (Chapters: 2, 4, 6, 7) for Trunnion Ball Valves produced by PENTA S.r.l.



T – IS – 269080 – 02

NOTE : The present table is integral part of the document C–IS–269080-02  
Date : April, 21<sup>st</sup> 2016