



Italia

# COMPLIANCE

with IEC EN 61508:2010

Certificate No.: C-IS-241079-01

**CERTIFICATE OWNER:** EMERSON PROCESS MANAGEMENT VIRGO VALVES S.r.l.  
Via Sicilia 96  
20020, Magnago (MI) - Italy

**WE HEREWITH CONFIRM THAT  
THE TRITORK TRIPLE OFFSET VALVES  
MEET THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLE  
FOR THE SAFETY FUNCTION:**

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

**Examination result:** The above reported TriTork Triple Offset Valves were found to meet the standard defined requirements of the safety levels detailed in the following table (T-IS-246987-01 and T-IS-246987-02) according to IEC EN 61508:2010, under fulfillment of the conditions listed in the Report R-IS-241079-01 Rev.1 dated March, 18<sup>th</sup> 2014 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 TriTork Triple Offset Valves

**Official Report No.:** R-IS-241079-01 Rev.1

**Expiry Date** March, 17<sup>th</sup> 2017

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-241079-01

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

Sesto San Giovanni, June, 12<sup>th</sup> 2014

TÜV ITALIA Srl

TÜV ITALIA Srl  
Industry Service Division  
Director

Gennaro Oliva







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## SUMMARY TABLE T – IS – 246987 – 01

<i>E/EE/EP safety-related system (final element)</i>	TriTork Triple Offset valves produced by EMERSON PROCESS MANAGEMENT VIRGO VALVES S.r.l.					
<i>Type</i>	A		A		A	
<i>Environment / Application<sup>(1)</sup></i>	Water - Ambient		Gas - Cryogenic		Oil - Ambient	
<i>Safety Function Definition</i>	"Correct switching on demand (open to closed and closed to open) and tight for closing phase, in low demand mode of operation"					
<i>Max SIL claimable</i>	SIL 2 (with HFT = 0)	SIL 3 (with HFT = 1)	SIL 2 (with HFT = 0)	SIL 3 (with HFT = 1)	SIL 2 (with HFT = 0)	SIL 3 (with HFT = 1)
<i>Additional requirements for the max SIL classification</i>	Execution of Partial Stroke Test with time interval not higher than 12 months and Full Functional Proof Test with time interval not higher than 36 months		Execution of Partial Stroke Test with time interval not higher than 2 months and Full Functional Proof Test with time interval not higher than 12 months		Execution of Partial Stroke Test with time interval not higher than 12 months and Full Functional Proof Test with time interval not higher than 36 months	
$\lambda_{TOT}$	8,603E-07		2,639E-05		4,399E-06	
$\lambda_{SD}$	0,000E+00		0,000E+00		0,000E+00	
$\lambda_{SU}$	7,696E-07		2,361E-05		3,934E-06	
$\lambda_{DD}$	0,000E+00		0,000E+00		0,000E+00	
$\lambda_{DU}$	9,076E-08		2,784E-06		4,640E-07	
$\lambda_{FPT}$	1,764E-08		5,410E-07		9,017E-08	
$\lambda_{PST}$	7,313E-08		2,243E-06		3,739E-07	
<i>PFD<sup>(2)</sup></i>	5,520E-04		4,007E-03		2,822E-03	
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	10%		10%		10%	
<i>MTTR</i>	8 h		8 h		8 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>H</sub>		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>		Route 2 <sub>S</sub>	

**Remarks**

- (1) Category identified according to specific environment and application, in particular for fluid type and temperature range. Refer to product safety manual for detailed information on the categories.
- (2) PFD of reference calculated on the basis of a Full Functional Proof Test with time interval reported in the line Additional requirements for the max SIL classification for HFT = 0 configuration. 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 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.

SIL classification according to Standards IEC EN 61508:2010 (Chapters: 2, 4, 6, 7) for TriTork Triple Offset Valves produced by EMERSON PROCESS MANAGEMENT VIRGO VALVES S.r.l.

T – IS – 246987 – 01

NOTE : The present table is integral part of the Documents: from C–IS–246987-01

Date : June, 12<sup>th</sup> 2014



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## SUMMARY TABLE T – IS – 246987 – 01

<i>E/EE/EP safety-related system (final element)</i>	TriTork Triple Offset valves produced by EMERSON PROCESS MANAGEMENT VIRGO VALVES S.r.l.					
<i>Type</i>	A		A		A	
<i>Environment / Application<sup>(1)</sup></i>	Gas - Ambient		Gas - High		Other	
<i>Safety Function Definition</i>	<i>"Correct switching on demand (open to closed and closed to open) and tight for closing phase, in low demand mode of operation"</i>					
<i>Max SIL claimable</i>	SIL 2 (with HFT = 0)	SIL 3 (with HFT = 1)	SIL 2 (with HFT = 0)	SIL 3 (with HFT = 1)	SIL 1 (with HFT = 0)	SIL 2 (with HFT = 1)
<i>Additional requirements for the max SIL classification</i>	<i>Execution of Partial Stroke Test with time interval not higher than 1 month and Full Functional Proof Test with time interval not higher than 9 months</i>		<i>Execution of Partial Stroke Test with time interval not higher than 1 month and Full Functional Proof Test with time interval not higher than 9 months</i>		<i>Execution of Partial Stroke Test with time interval not higher than 1 month and Full Functional Proof Test with time interval not higher than 6 months</i>	
$\lambda_{TOT}$	4,948E-05		5,038E-05		1,177E-04	
$\lambda_{SD}$	0,000E+00		0,000E+00		0,000E+00	
$\lambda_{SU}$	4,426E-05		4,507E-05		9,180E-05	
$\lambda_{DD}$	0,000E+00		0,000E+00		0,000E+00	
$\lambda_{DU}$	5,221E-06		5,315E-06		2,592E-05	
$\lambda_{FFT}$	1,014E-06		1,033E-06		1,720E-05	
$\lambda_{PST}$	4,206E-06		4,283E-06		8,724E-06	
<i>PF<sub>D</sub><sup>(2)</sup></i>	4,868E-03		4,956E-03		4,085E-02	
<i><math>\beta</math> and <math>\beta_D</math> factor</i>	10%		10%		10%	
<i>MTTR</i>	8 h		8 h		8 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>H</sub>		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>		Route 2 <sub>S</sub>	

**Remarks**

- (1) Category identified according to specific environment and application, in particular for fluid type and temperature range. Refer to product safety manual for detailed information on the categories.
- (2) PFD of reference calculated on the basis of a Full Functional Proof Test with time interval reported in the line Additional requirements for the max SIL classification for HFT = 0 configuration. 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 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.

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