



Office: Rotterdam

Date: 14 September 2009

This certificate is issued to DIAC ( Dependable Industrial Automation Consultancy ) In order to certify that the undersigned Surveyor has carried out on DIAC's request a review of report no: DIAC-VLVT-2008-110-R1-SILCLASS\_V\_NT.DOC, September 2009 dealing with Safety integrity Level-SIL: Classification assessment of the following products:

- Valve Technologies V1 & NEXTECH(TM ) Series Ball Valve Series Assembly for process duties until/including pressure class API 20,000, sizes 0,25" until/including 42", and are classified per IEC 61508 as type A equipment

In order to assess compliance with IEC 61508 a performance assessment has been carried out of the V1 (TM ) Floating Ball Valve Series and NEXTECH (TM ) Trunnion Ball Valve Series assembly.

This assessment investigates the SIL's up to which the V1 & NEXTECH (TM ) Ball Valve Series assembly within the scope of assessment can realistic be applied in safety related applications.

The review was based on verifying the compliance with IEC 61508 with regard to the following aspects:

- method used
- consistency throughout the report
- clearness of communication evidence
- justification of evidence & source references

The IEC 61508's first premises is that there is equipment Intended to provide a function, there is a system which controls It, and between them they pose a risk. The standard's second premises is that " safety functions" are to be provided to reduce the risk posed by the " Equipment Under Control " (EUC) and It's control system.

Any system which is designated to implement the required safety functions necessary to achieve a safe state for the EUC and which are intended to achieve the necessary safety integrity for the required safety function are classified as safety related systems.

Safety integrity is defined as the likelihood of a safety related system satisfactorily performing the required safety functions under all stated conditions, within a stated period of time and a safety integrity level (SIL) as a discrete level for specifying the safety integrity requirements of the safety functions.

We hereby confirm that the above is reflected in the DIAC report no. DIAC-VLVT-2008-100-R1-SILCLASS\_V\_NT.DOC, September 2009, as a result of the method applied, demonstrated consistency, clearness of communicated evidence and the justification of evidence and source references

Results are such that the SIL-3 actuated ValvTech V1& NEXTECH (TM ) Ball Valve Series assembly is confirmed to be capable to perform at SIL-3 in a single valve configuration and is confirmed to be capable to perform at SIL-4 in a Double Valve configuration taking into account conservative Severe Duty failure, taking into account conservative failure data at a half year Proof Test Interval Time for Unclean Severe Duty services. ( one year using selected components and/or full design Safety Analysis Reliability - SAR)

The recommendations as laid down in the DIAC report are to be followed.

  
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REPORT REFERENCE: DIAC-VLVT-2008-110-R1-SILCLASS\_V\_NT.DOC. Security Class: Confidential

TITLE: SIL Classification ValvTechnologies V1 & NEXTECH Series Ball Valves

**SUMMARY.** This report summarises the Safety Integrity Level (SIL) performance assessment of the V1 & NEXTECH(TM) Ball Valve Series Assembly for process service duties until/ including pressure class API 20,000, sizes 0.25" until/ including 42" (as per individual model applicable).

**DIAC-VLVT-2008-110: SIL Classification ValvTechnologies V1 & NEXTECH Series Ball Valves**

Component	SFF		DCF	PFD- Average probability	HFT	Type	MTBF- D [year]	Failure Rates - Full Stroke				
	[-]	[-]						Dangerous [1/h]	Dangerous detected [1/h]	Dangerous undetected [1/h]	Safe SD+SU [1/h]	
Manufacturer, Model No., Duty Description												
Actuator: SIL-3 Spring Return Minimum Performance Values	90.0%	90.0%		1.00E-04	0	A	5000	2.28E-08	2.05E-08	2.28E-09		Note(2) 2.05E-07
ValvTechnologies V1, ERV, XACT												Note(1)
Min: Unclean Severe Duty	91.9%	91.9%		3.91E-04	0	A	1280	8.92E-08	8.20E-08	7.22E-09		-
Average: Normal Duty	91.9%	91.9%		1.67E-04	0	A	3000	3.81E-08	3.50E-08	3.06E-09		-
Max: Clean Duty	91.9%	91.9%		8.62E-05	0	A	5800	1.97E-08	1.81E-08	1.59E-09		-
ValvTechnologies NEXTECH												Note(1)
Min: Unclean Severe Duty	93.9%	93.9%		3.91E-04	0	A	1280	8.92E-08	8.37E-08	5.44E-09		-
Average: Normal Duty	93.9%	93.9%		1.67E-04	0	A	3000	3.81E-08	3.57E-08	2.32E-09		-
Max: Clean Duty	93.9%	93.9%		8.62E-05	0	A	5800	1.97E-08	1.85E-08	1.20E-09		-
Final Element Assembly Total												Note(3)
SIL-3 Spring Return Actuator actuated ValvTechnologies V1 or NEXTECH Unclean Severe Duty	91.9%	91.9%		4.91E-04	0	A	1018	1.12E-07	1.03E-07	9.07E-09		2.05E-07
Proof Test Interval Time (for PFD): 1 [year] SFF: Safe Failure Fraction, DCF: Diagnostic Coverage Factor, HFT: Hardware Fault Tolerance Note(1): Ball Valve does not feature Flow Tending to Open/ FTclose, hence no Safe Failure for Ball Valve Note(2): Failure Rate - Safe is based upon SFF and Failure Rates DD and -DU. Note(3): Failure Rate - Safe actuated Ball Valve Assy equal to FR-Safe of Actuator												

The SIL-3 actuator actuated ValvTech V1 & NEXTECH(TM) Ball Valve Series assembly is confirmed to be capable to perform at SIL-3 in a Single Valve configuration and is confirmed to be capable to perform at SIL-4 in a Double Valve configuration taking into account conservative Severe Duty failure data at a half year Proof Test Interval Time for Unclean Severe Duty services (one year using selected components and/ or full design SAR)

**Recommendation**

It is strongly recommended to closely consult ValvTechnologies, Inc. to finalise issues with regard to installation, commissioning, operation, maintenance and safety-related proof testing or any other deployment relevant matter.

DOCUMENT HISTORY: Version R1: Final Report

**DISTRIBUTION:**

ValvTechnologies, Inc. 1 original, 2 copies, 1 electronic copy PDF  
 Lloyd's EMEA, Rotterdam 1 copy (archive)  
 Dependable Industrial Aut. Cons.bv. 1 copy (project work file), 1 copy for formal Registration

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