



**BUREAU  
VERITAS**

## **IEC 61508 & 61511 Compatibility assessment For VECTOR VALVES – TRUNNION BALL VALVES**

**Ref.:** MG/BN/CB859/2402968/12/C/054/0

### **BUREAU VERITAS**

Has performed an assessment of the **TRUNNION BALL VALVES** design by **VECTOR VALVES** according to the standard IEC 61508 and IEC 61511.

Regarding IEC 61508 & 61511 requirements, functional safety management, systematic failure and random hardware failure calculation, Trunnion ball valves, for **opening function**, are suitable to be:

**Used in a SIL 3 SIS**  
**according to the IEC 61508 & 61511**  
**when used in a 1oo2 architecture**

As summary, mains safety characteristics are given hereafter:

- **Proof test interval 6 months**
- **Mean time to repair: 1 day**

To be used in a safety instrumented system as defined in the standards IEC 61508 & 61511, requirements in report from Bureau Veritas reference MG/JRC/CB859/2402968/12/R/013/0 shall be met. This report is fully part of the present certificate.

Main remarks are summarised hereafter:

- At system level, Trunnion ball valves (type A) are to be used with adequate safety actuators insuring a safety position on failure or loss of energy (pneumatic / power...) and adequate detection for external leaks;
- Trunnion ball valve used in a safety instrumented system shall be used in low demand mode;
- For each valve sold by Vector Valves the safety parameters given hereafter shall be defined:
  - o Maximal operating time: The time to move in the safe position;
  - o Performance criteria based on the sealing pressure and the maximal admissible torque

The present certificate is valid until the first modification.

The present certificate issued for VECTOR VALVES relates exclusively to the design of the above system. The present certificate is valid only for a system exclusively provided to and used by professionals. The present certificate is subject to the terms of BUREAU VERITAS

**BUREAU VERITAS**

*February, 28<sup>th</sup> 2012*

**Maxime Genet**  
RAMS Consultant

**Jean Roch Constans**  
Process industries operational responsible





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## **IEC 61508 & 61511 Compatibility assessment For VECTOR VALVES – TRUNNION BALL VALVES**

**Ref.:** MG/BN/CB859/2402968/12/C/054/0

**BUREAU VERITAS**

Has performed an assessment of the **TRUNNION BALL VALVES** design by **VECTOR VALVES** according to the standard IEC 61508 and IEC 61511.

Regarding IEC 61508 & 61511 requirements, functional safety management, systematic failure and random hardware failure calculation, Trunnion ball valves, for **closed function**, are suitable to be:

**Used in a SIL 3 SIS**  
**according to the IEC 61508 & 61511**  
**when used in a 1oo2 architecture**

As summary, mains safety characteristics are given hereafter:

- **Partial stroke test maximal interval : 1 month**
- **Proof test interval 6 months**

To be used in a safety instrumented system as defined in the standards IEC 61508 & 61511, requirements in report from Bureau Veritas reference MG/JRC/CB859/2402968/12/R/077/0 shall be met. This report is fully part of the present certificate.

Main remarks are summarised hereafter:

- At system level, Trunnion ball valves (type A) are to be used with adequate safety actuators insuring a safety position on failure or loss of energy (pneumatic / power...) and adequate detection for external leaks;
- Trunnion ball valve used in a safety instrumented system shall be used in low demand mode;
- For each valve sold by Vector Valves the safety parameters given hereafter shall be defined:
  - o Maximal operating time: The time to move in the safe position;
  - o Performance criteria based on the sealing pressure and the maximal admissible torque

The present certificate is valid until the first modification.

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**BUREAU VERITAS**

*February, 29<sup>th</sup> 2012*

**Maxime Genet**  
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Process industries operational responsible





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## IEC 61508 & 61511 Compatibility assessment For VECTOR VALVES – GATE VALVES

**Ref.:** BL/MG/CB859/2455169/12/C/301/0

**BUREAU VERITAS**

Has performed an assessment of the **GATE VALVES** design by **VECTOR VALVES** according to the standard IEC 61508 Ed2 and IEC 61511.

Regarding IEC 61508 & 61511 requirements, functional safety management, systematic failure and random hardware failure calculation, gate valves, for **Open or closed functions**, are suitable to be:

**Used in a SIL 3 SIS**  
**according to the IEC 61508 & 61511**  
**when used in a 1oo2 architecture**

As summary, mains safety characteristics are given hereafter:

→ **Proof test interval 1 year**

To be used in a safety instrumented system as defined in the standards IEC 61508 & 61511, requirements in report from Bureau Veritas reference BL/MG/CB859/2455169/12/R/298/0 shall be met. This report is fully part of the present certificate.

Main remarks are summarised hereafter:

- At system level, Gate valves (type A) are to be used with adequate safety actuators insuring a safety position on failure or loss of energy (pneumatic / power...) and adequate detection for external leaks;
- Gate valve used in a safety instrumented system shall be used in low demand mode;
- For each valve sold by Vector Valves the safety parameters given hereafter shall be defined:
  - o Maximal operating time: The time to move in the safe position;
  - o Performance criteria based on the sealing pressure and the maximal admissible torque
  - o The safety manual for Gate valve (reference SIL3-G-SM-0-20120712) shall be provided for each valve user.

The present certificate is valid until the first modification.

The present certificate issued for VECTOR VALVES relates exclusively to the design of the above system.  
The present certificate is valid only for a system exclusively provided to and used by professionals. The present certificate is subject to the terms of BUREAU VERITAS

**BUREAU VERITAS**

July, 12<sup>th</sup> 2012

  
**Maxime Genet**  
RAMS Consultant

  
**Jean Roch Constans**  
Process industries operational responsible





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## **IEC 61508 & 61511 Compatibility assessment For VECTOR VALVES – GLOBE-CONTROL VALVES**

**Ref.:** LD/MG/CB859/2455169/13/C/101/0

**BUREAU VERITAS**

Has performed an assessment of the **GLOBE-CONTROL VALVES** design by **VECTOR VALVES** according to the standard IEC 61508 Ed2 and IEC 61511.

Regarding IEC 61508 & 61511 requirements, functional safety management, systematic failure and random hardware failure calculation, Globe-control valves, for **Open or closed functions**, are suitable to be:

**Used in a SIL 2 SIS  
according to the IEC 61508 & 61511  
when used in a 1oo1 architecture**

As summary, main safety characteristics are given hereafter:

→ **Proof test interval : 1 year**

→ **Maximal MTTR (Mean Time To Repair) : 24 hours**

To be used in a safety instrumented system as defined in the standards IEC 61508 & 61511, requirements in report from Bureau Veritas reference LD/MG/CB859/2455169/13/R/098/0 shall be met. This report is fully part of the present certificate.

Main remarks are summarised hereafter:

- At system level, globe-control valves (type A) are to be used with adequate safety actuators insuring a safety position on failure or loss of energy (pneumatic / power...) and adequate detection for external leaks;
- Globe-control valve used in a safety instrumented system shall be used in low demand mode;
- For each valve sold by Vector Valves the safety parameters given hereafter shall be defined:
  - o Maximal operating time: The time to move in the safe position;
  - o Performance criteria based on the design pressure and temperature, the shut-off pressure required to size the actuator and the maximal admissible thrust;
- The Safety Manual and the Operation and Maintenance Manual for globe-control valves shall be provided to the customer.

The present certificate is valid until the first modification.

The present certificate issued for VECTOR VALVES relates exclusively to the design of the above system. The present certificate is valid only for a system exclusively provided to and used by professionals. The present certificate is subject to the terms of BUREAU VERITAS.

**BUREAU VERITAS**

*July, 30<sup>th</sup> of 2013*

**Lucas Duboc**  
RAMS Consultant

**Maxime Genet**  
RAMS assessment responsible





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## IEC 61508 & 61511 Compatibility assessment For VECTOR VALVES – FLOATING BALL VALVES

**Ref.:** MG/BL/CB859/2455169/12/R/183/0

**BUREAU VERITAS**

Has performed an assessment of the **FLOATING BALL VALVES** design by **VECTOR VALVES** according to the standard IEC 61508 Ed2 and IEC 61511.

Regarding IEC 61508 & 61511 requirements, functional safety management, systematic failure and random hardware failure calculation, Floating ball valves, for **Open or closed functions**, are suitable to be:

**Used in a SIL 3 SIS**  
**according to the IEC 61508 & 61511**  
**when used in a 1oo2 architecture**

As summary, mains safety characteristics are given hereafter:

→ **Proof test interval 1 year**

To be used in a safety instrumented system as defined in the standards IEC 61508 & 61511, requirements in report from Bureau Veritas reference BL/MG/CB859/2455169/12/R/134/0 shall be met. This report is fully part of the present certificate.

Main remarks are summarised hereafter:

- At system level, Floating ball valves (type A) are to be used with adequate safety actuators insuring a safety position on failure or loss of energy (pneumatic / power...) and adequate detection for external leaks;
- Floating ball valve used in a safety instrumented system shall be used in low demand mode;
- For each valve sold by Vector Valves the safety parameters given hereafter shall be defined:
  - o Maximal operating time: The time to move in the safe position;
  - o Performance criteria based on the sealing pressure and the maximal admissible torque
- The safety manual for floating ball valve (reference SIL3-BF-SM-0) shall be provided for each valve user.

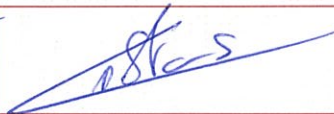
The present certificate is valid until the first modification.

The present certificate issued for VECTOR VALVES relates exclusively to the design of the above system. The present certificate is valid only for a system exclusively provided to and used by professionals. The present certificate is subject to the terms of BUREAU VERITAS

**BUREAU VERITAS**

April , 27<sup>th</sup> 2012

  
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