exida® CERTIFICATION

CERTIFICATE

PEKOS 090168 P0006 C01

exida Certification S.A. hereby confirms that the

PEKOS Floating Ball Valves

PEKOS group

Montmeló (Barcelona), Zaratamo (Vizcaya), Spain

Has been assessed according to the relevant requirements of

IEC 61508

Parts 1 - 2, and meets requirements providing a level of integrity to

Systematic Integrity : SIL 3 Capable

Random Integrity : Type A device, PFD_{AVG} and architecture constraints must be verified for each application

Safety Function

The valve will move to the designed safe position within the specified safety time.

Application Restrictions

The unit must be properly designed into a Safety Instrumented Function per the requirements in the Installation, Operations and Maintenance and Safety Manuals for the respective valve type.

Assessor

Certifying Assessor

Date: 8 September 2009

exida Certification SA, Nyon, Switzerland

CERTIFICATE / CERTIFICAT / ZERTIFIKAT / 認証

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Systematic Integrity: SIL 3 Capable

SIL 3 Capability

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.
For a Floating Ball Valve used in final element assembly, SIL must also be verified for the specific application using the following failure data:

Summary for the Floating Ball Valves :

V1 - Floating Ball valves with soft seat up to 8“ / DN200
V2 - Floating Ball valves with metal-to-metal seat up to 8“ / DN200
V3 - Floating Ball valves with soft seat 3-way up to 8“ / DN200

	Type A device, IEC 61508 failure rates in FIT [:=10^{-9}/h]								
	Full Stroke			Tight Shutoff			Open to trip		
Valve and application	λ_{safe}	λ_{dd}	λ_{du}	λ_{safe}	λ_{dd}	λ_{du}	λ_{safe}	λ_{dd}	λ_{du}
V1 Clean service	1002	0	520	81	0	1441	1186	0	336
V1 Clean service with PVST	1002	224	296	81	224	1217	1186	224	112
V2 Clean service	2017	0	555	672	0	1900	2202	0	370
V2 Clean service with PVST	2017	247	308	672	247	1653	2202	247	123
V3 Clean service	1518	0	644	117	0	2045	1792	0	370
V3 Clean service with PVST	1518	249	395	117	249	1796	1792	249	121

PVST - Partial Valve Stroke Test

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD_{AVG} considering 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 minimum hardware fault tolerance (HFT) requirements.

The following documents are mandatory parts this certificate:

PEKOS 0901-68-C R004 V1R1 Assessment report.
Safety manual PEKOS group DC 77-02-04 Rev 0

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The holder of this certificate may use this mark.

exida®
CERTIFICATION

CERTIFICATE

PEKOS 090168 P0006 C02

exida Certification S.A. hereby confirms that the

PEKOS Full Trunnion Ball Valves

PEKOS group

Montmeló (Barcelona), Zaratamo (Vizcaya), Spain

Has been assessed according to the relevant requirements of

IEC 61508

Parts 1 - 2, and meets requirements providing a level of integrity to

Systematic Integrity : SIL 3 Capable

Random Integrity : Type A device, PFD_{AVG} and architecture constraints must be verified for each application

Safety Function

The valve will move to the designed safe position within the specified safety time.

Application Restrictions

The unit must be properly designed into a Safety Instrumented Function per the requirements in the Installation, Operations and Maintenance and Safety Manuals for the respective valve type.

Assessor

Certifying Assessor

Date: 8 September 2009

exida Certification SA, Nyon, Switzerland

CERTIFICATE / CERTIFICAT / ZERTIFIKAT / 認証

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Systematic Integrity: SIL 3 Capable

SIL 3 Capability

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.
For a Full Trunnion Ball Valve used in final element assembly, SIL must also be verified for the specific application using the following failure data:

Summary for the Full Trunnion Ball Valves :

V1 - Full Trunnion Ball valves with soft seat up to 20“ / DN500
V2 - Full Trunnion Ball valves with metal-to-metal seat up to 20“ / DN500
V3 - Full Trunnion Ball valves with soft seat 3-way up to 12“ / DN300

	Type A device, IEC 61508 failure rates in FIT [:=10^{-9}/h]								
	Full Stroke			Tight Shutoff			Open to trip		
Valve and application	λ_{safe}	λ_{dd}	λ_{du}	λ_{safe}	λ_{dd}	λ_{du}	λ_{safe}	λ_{dd}	λ_{du}
V1 Clean service	1650	0	626	614	0	1662	1834	0	442
V1 Clean service with PVST	1650	292	334	614	292	1370	1834	292	150
V2 Clean service	2092	0	644	1103	0	1633	2276	0	460
V2 Clean service with PVST	2092	303	341	1103	303	1330	2276	303	157
V3 Clean service	1782	0	726	381	0	2127	2056	0	452
V3 Clean service with PVST	1782	298	428	381	298	1829	2056	298	154

PVST - Partial Valve Stroke Test

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD_{AVG} considering 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 minimum hardware fault tolerance (HFT) requirements.

The following documents are mandatory parts this certificate:

PEKOS 0901-68-C R004 V1R1 Assessment report.
Safety manual PEKOS group DC 77-02-04 Rev 0

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