



The manufacturer
may use the mark:



Revision 1.0 January 22, 2021
Surveillance Audit Due
January 31, 2024



Certificate / Certificat Zertifikat / 合格証

PEKOS 2005085 P0007 C007

exida hereby confirms that the:

**Top Entry Floating Ball valves with
soft & metal seat up to 4" / DN100**

**PEKOS GROUP
Montmeló (Barcelona), Artea (Vizcaya)
Spain**

Have been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-7

and meets requirements providing a level of integrity to:

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type A, Route 2_H Device

**PFD_{AVG} and Architecture Constraints
must be verified for each application**

Safety Function:

The Ball Valve will move to the designed safe position per the actuator design within the specified safety time.

Application Restrictions:

The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.




Evaluating Assessor


Certifying Assessor

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type A, Route 2_H Device

**PFD_{AVG} and Architecture Constraints
must be verified for each application**

Top Entry Floating Ball
valves
with soft & metal seat
up to 4" / DN100

Systematic 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.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated.

Random Capability:

The SIL limit imposed by the Architectural Constraints must be met for each element. This device meets *exida* criteria for Route 2_H.

IEC 61508 Failure Rates in FIT*

[V1] Top Entry Floating Ball valves with soft seat up to 4" / DN100
[V2] Top Entry Floating Ball valves with metal seat up to 4" / DN100

Application	Fully closed			Tight shut off			Fully Open		
	λ_{Safe}	λ_{DD}	λ_{DU}	λ_{Safe}	λ_{DD}	λ_{DU}	λ_{Safe}	λ_{DD}	λ_{DU}
[V1] Clean service	0	0	398	0	0	1516	166	0	232
[V1] Clean Service with PVST	0	151	247	0	151	1365	166	151	81
[V1] Severe service	0	0	756	0	0	2993	332	0	425
[V1] Severe Service with PVST	0	273	483	0	273	2720	332	274	151
[V2] Clean service	0	0	325	0	0	735	76	0	249
[V2] Clean Service with PVST	0	162	163	0	162	573	76	162	87
[V2] Severe service	0	0	548	0	0	1312	152	0	397
[V2] Severe Service with PVST	0	257	291	0	257	1055	152	258	139

*FIT = 1 failure / 10⁹ hours
PVST = Partial Valve Stroke Test of a final element Device

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 element must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are a mandatory part of certification:

Assessment Report: PEKOS 15/05-012-C R007 V2 R1

Safety Manual: Safety manual PEKOS GROUP DC 77-02-04 Rev 4



64 N Main St
Sellersville, PA 18960



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PEKOS 2005085 P0007 C008

exida hereby confirms that the:

**Top Entry Full Trunnion Ball valves with
soft & metal seat up to 30" / D750**

**PEKOS GROUP
Montmeló (Barcelona), Artea (Vizcaya)
Spain**

Have been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-7

and meets requirements providing a level of integrity to:

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type A, Route 2_H Device

**PFD_{AVG} and Architecture Constraints
must be verified for each application**

Safety Function:

The Ball Valve will move to the designed safe position per the actuator design within the specified safety time.

Application Restrictions:

The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.




Evaluating Assessor


Certifying Assessor

PEKOS 2005085 P0007 C008

Systematic Capability: SC 3 (SIL 3 Capable)**Random Capability: Type A, Route 2_H Device****PFD_{AVG} and Architecture Constraints
must be verified for each application****Systematic 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.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated.

Random Capability:

The SIL limit imposed by the Architectural Constraints must be met for each element. This device meets *exida* criteria for Route 2_H.

IEC 61508 Failure Rates in FIT***[V1] Top Entry Full Trunnion Ball valves soft seat up to 30" / DN750****[V2] Top Entry Full Trunnion Ball valves metal seat up to 30" / DN750**

Application	Fully closed			Tight shut off			Fully Open		
	λ_{Safe}	λ_{DD}	λ_{DU}	λ_{Safe}	λ_{DD}	λ_{DU}	λ_{Safe}	λ_{DD}	λ_{DU}
[V1] Clean service	0	0	650	0	0	1932	226	0	425
[V1] Clean Service with PVST	0	275	375	0	275	1657	226	276	149
[V1] Severe service	0	0	1027	0	0	3517	410	0	617
[V1] Severe Service with PVST	0	408	619	0	408	3109	410	408	209
[V2] Clean service	0	0	625	0	0	1907	266	0	359
[V2] Clean Service with PVST	0	260	365	0	260	1647	266	260	99
[V2] Severe service	0	0	1002	0	0	3492	450	0	552
[V2] Severe Service with PVST	0	415	587	0	414	3078	450	414	138

*FIT = 1 failure / 10⁹ hours

PVST = Partial Valve Stroke Test of a final element Device

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 element must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are a mandatory part of certification:

Assessment Report: PEKOS 15/05-012-C R007 V2 R1**Safety Manual:** Safety manual PEKOS GROUP DC 77-02-04 Rev 4

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Top Entry Full
Trunnion Ball valves
with soft & metal seat
up to 30" / D750