



The manufacturer
may use the mark:



Revision 1.1 February 8, 2017
Surveillance Audit Due
March 31, 2020



ANSI Accredited Program
PRODUCT CERTIFICATION
#1004

Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C001.1

exida hereby confirms that the:

**Floating Ball valves with soft seat
up to 8" / DN200**

**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 1505012 P0007 C001.1

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*

Floating Ball valves with soft seat up to 8" / DN200

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}
Clean service	0	0	492	0	0	1413	185	0	307
Clean Service with PVST	0	207	285	0	207	1206	185	207	100
Severe service	0	0	881	0	0	2723	369	0	512
Severe Service with PVST	0	350	531	0	350	2373	369	350	162

*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 V1 R1

Safety Manual: : Safety manual PEKOS GROUP DC 77-02-04 Rev 2

**Floating Ball valves
with soft seat
up to 8" / DN200**



64 N Main St
Sellersville, PA 18960



Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C002.1

exida hereby confirms that the:

**Floating Ball valves with
metal-to-metal seat up to 8" / DN200**

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.

The manufacturer
may use the mark:



Revision 1.1 February 8, 2017
Surveillance Audit Due
March 31, 2020



ANSI Accredited Program
PRODUCT CERTIFICATION
#1004



Peter L.
Evaluating Assessor

Stevan J. Chase
Certifying Assessor

PEKOS 1505012 P0007 C002.1

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*

Floating Ball valves with metal-to-metal seat up to 8" / DN200

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}
Clean service	0	0	576	0	0	1876	219	0	357
Clean Service with PVST	0	238	338	0	238	1638	219	238	119
Severe service	0	0	984	0	0	3586	423	0	561
Severe Service with PVST	0	380	604	0	380	3206	423	380	181

*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 V1 R1

Safety Manual: : Safety manual PEKOS GROUP DC 77-02-04 Rev 2

Floating Ball valves with metal-to-metal seat up to 8" / DN200



64 N Main St
Sellersville, PA 18960



Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C003.1

exida hereby confirms that the:

**Floating Ball valves with soft seat
3-way up to 8" / DN200**

The manufacturer
may use the mark:



**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**

Revision 1.1 February 8, 2017
Surveillance Audit Due
March 31, 2020

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 1505012 P0007 C003.1

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*

Floating Ball valves with soft seat 3-way up to 8" / DN200

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}
Clean service	0	0	628	0	0	2029	274	0	354
Clean Service with PVST	0	237	391	0	237	1762	274	237	117
Severe service	0	0	1137	0	0	3939	549	0	588
Severe Service with PVST	0	398	739	0	398	3541	549	398	190

*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 V1 R1

Safety Manual: : Safety manual PEKOS GROUP DC 77-02-04 Rev 2

Floating Ball valves with soft seat 3-way up to 8" / DN200



64 N Main St
Sellersville, PA 18960



Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C004.1

exida hereby confirms that the:

**Full Trunnion Ball valves with soft seat
up to 30" / DN750
Guided Ball valves with soft seat
up to 12" / DN300**

**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.



Peter L.
Evaluating Assessor

Stewart J. Chase
Certifying Assessor

The manufacturer
may use the mark:



Revision 1.1 February 8, 2017
Surveillance Audit Due
March 31, 2020



ANSI Accredited Program
PRODUCT CERTIFICATION
#1004

PEKOS 1505012 P0007 C004.1

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*

Full Trunnion Ball valves with soft seat up to 30" / DN750
Guided Ball valves with soft seat up to 12" / DN300

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}
Clean service	0	0	625	0	0	1926	261	0	364
Clean Service with PVST	0	243	382	0	243	1683	261	243	121
Severe service	0	0	1034	0	0	3636	466	0	568
Severe Service with PVST	0	386	648	0	386	3250	466	386	182

*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 V1 R1

Safety Manual: : Safety manual PEKOS GROUP DC 77-02-04 Rev 2

Full Trunnion Ball valves with soft seat up to 30" / DN750

Guided Ball valves with soft seat up to 12" / DN300



64 N Main St
Sellersville, PA 18960



Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C005.1

exida hereby confirms that the:

**Full Trunnion Ball valves with
metal-to-metal seat up to 30" / DN750**

The manufacturer
may use the mark:



**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**

Revision 1.1 February 8, 2017
Surveillance Audit Due
March 31, 2020

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 1505012 P0007 C005.1

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*

Full Trunnion Ball valves with metal-to-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}
Clean service	0	0	656	0	0	1957	233	0	423
Clean Service with PVST	0	279	377	0	279	1678	233	279	144
Severe service	0	0	1065	0	0	3667	438	0	627
Severe Service with PVST	0	421	644	0	421	3246	438	421	206

*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 V1 R1

Safety Manual: : Safety manual PEKOS GROUP DC 77-02-04 Rev 2

Full Trunnion Ball valves with metal-to-metal seat up to 30" / DN750



64 N Main St
Sellersville, PA 18960



Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C006.1

exida hereby confirms that the:

**Full Trunnion Ball valves with
soft & metal seat 3-way up to 24" / DN600**

The manufacturer
may use the mark:



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**

Revision 1.1 February 8, 2017
Surveillance Audit Due
March 31, 2020

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 1505012 P0007 C006.1

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*

Full Trunnion Ball valves with soft & metal seat 3-way up to 24" / DN600

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}
Clean service	0	0	675	0	0	2076	274	0	401
Clean Service with PVST	0	265	410	0	265	1811	274	265	136
Severe service	0	0	1184	0	0	3986	549	0	635
Severe Service with PVST	0	426	758	0	426	3560	549	426	209

*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 V1 R1

Safety Manual: : Safety manual PEKOS GROUP DC 77-02-04 Rev 2



64 N Main St
Sellersville, PA 18960

Full Trunnion Ball valves with soft & metal seat 3-way up to 24" / DN600