



Revision 2.0 June 18, 2020 Surveillance Audit Due July 31, 2023

# Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C001

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<sub>H</sub> Device

PFD<sub>AVG</sub> 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



PEKOS 1505012 P0007 C001

# Systematic Capability: SC 3 (SIL 3 Capable) Random Capability: Type A, Route 2<sub>H</sub> Device

PFD<sub>AVG</sub> and Architecture Constraints must be verified for each application

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

### **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

	Fully closed			Tight shut off			Fully Open		
Application	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{DU}$	$\lambda_{\text{Safe}}$	$\lambda_{DD}$	$\lambda_{DU}$	$\lambda_{\text{Safe}}$	$\lambda_{DD}$	λου
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

<sup>\*</sup>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<sub>avg</sub> 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 R0

Safety Manual: Safety manual PEKOS GROUP DC 77-02-04 Rev 3







Revision 2.0 June 18, 2020 Surveillance Audit Due July 31, 2023

# Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C002

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<sub>H</sub> Device

PFD<sub>AVG</sub> 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



PEKOS 1505012 P0007 C002

Systematic Capability: SC 3 (SIL 3 Capable)
Random Capability: Type A, Route 2<sub>H</sub> Device

PFD<sub>AVG</sub> and Architecture Constraints must be verified for each application

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

### 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

	Fully closed			Tigh	t shut	off	Fully Open		
Application	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$
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

<sup>\*</sup>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 R0

Safety Manual: Safety manual PEKOS GROUP DC 77-02-04 Rev 3







Revision 2.0 June 18, 2020 Surveillance Audit Due July 31, 2023

# Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C003

exida hereby confirms that the:

Floating Ball valves with soft seat 3-way 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<sub>H</sub> Device

PFD<sub>AVG</sub> 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



PEKOS 1505012 P0007 C003

Systematic Capability: SC 3 (SIL 3 Capable)
Random Capability: Type A, Route 2<sub>H</sub> Device

PFD<sub>AVG</sub> and Architecture Constraints must be verified for each application

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

### 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

	Fully closed			Tigh	t shut	off	Fully Open		
Application	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$
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

<sup>\*</sup>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 R0

Safety Manual: Safety manual PEKOS GROUP DC 77-02-04 Rev 3







Revision 2.0 June 18, 2020 Surveillance Audit Due July 31, 2023



# Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C004

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<sub>H</sub> Device

PFD<sub>AVG</sub> 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

PEKOS 1505012 P0007 C004

Systematic Capability: SC 3 (SIL 3 Capable)
Random Capability: Type A, Route 2<sub>H</sub> Device

PFD<sub>AVG</sub> 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

	Fully closed			Tigh	t shut	off	Fully Open		
Application	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$
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

<sup>\*</sup>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 $_{\rm avg}$  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 R0

Safety Manual: Safety manual PEKOS GROUP DC 77-02-04 Rev 3



**Full Trunnion Ball** 

up to 30" / DN750

**Guided Ball valves** 

up to 12" / DN300

with soft seat

valves with soft seat

64 N Main St Sellersville, PA 18960

T-002 V6R1





Revision 2.0 June 18, 2020 Surveillance Audit Due July 31, 2023

# Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C005

exida hereby confirms that the:

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

## 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<sub>H</sub> Device

PFD<sub>AVG</sub> 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



PEKOS 1505012 P0007 C005

Systematic Capability: SC 3 (SIL 3 Capable)
Random Capability: Type A, Route 2<sub>H</sub> Device

PFD<sub>AVG</sub> 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

	Fully closed			Tigh	t shut	off	Fully Open		
Application	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$
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

<sup>\*</sup>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 R0

Safety Manual: Safety manual PEKOS GROUP DC 77-02-04 Rev 3



**Full Trunnion Ball** 

metal-to-metal seat

up to 30" / DN750

valves with

64 N Main St Sellersville, PA 18960

T-002, V6R1





Revision 2.0 June 18, 2020 Surveillance Audit Due July 31, 2023

# Certificate / Certificat Zertifikat / 合格証

PEKOS 1505012 P0007 C006

exida hereby confirms that the:

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

## 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<sub>H</sub> Device

PFD<sub>AVG</sub> 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



PEKOS 1505012 P0007 C006

Systematic Capability: SC 3 (SIL 3 Capable)
Random Capability: Type A, Route 2<sub>H</sub> Device

PFD<sub>AVG</sub> 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

	Fully closed			Tigh	t shut	off	Fully Open		
Application	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$
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

<sup>\*</sup>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<sub>avg</sub> 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 R0

Safety Manual: Safety manual PEKOS GROUP DC 77-02-04 Rev 3



**Full Trunnion Ball** 

soft & metal seat

up to 24" / DN600

valves with

3-way

64 N Main St Sellersville, PA 18960

T-002, V6R1





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<sub>H</sub> Device

PFD<sub>AVG</sub> 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



PEKOS 2005085 P0007 C007

Systematic Capability: SC 3 (SIL 3 Capable)
Random Capability: Type A, Route 2<sub>H</sub> Device

PFD<sub>AVG</sub> 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<sub>H</sub>.

#### 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

	Fully closed			Tigh	t shut (	off	Fully Open		
Application	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	λ₀υ	$\lambda_{\text{Safe}}$	$\lambda_{DD}$	λ <sub>DU</sub>	$\lambda_{\text{Safe}}$	$\lambda_{DD}$	λου
[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<sub>avg</sub> 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

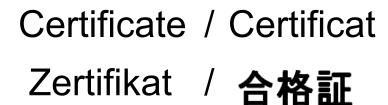
Safety Manual: Safety manual PEKOS GROUP DC 77-02-04 Rev 4







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



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<sub>H</sub> Device

PFD<sub>AVG</sub> 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



PEKOS 2005085 P0007 C008

Systematic Capability: SC 3 (SIL 3 Capable)
Random Capability: Type A, Route 2<sub>H</sub> Device

PFD<sub>AVG</sub> 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<sub>H</sub>.

#### 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

	Fully closed			Tigh	nt shut	off	Fully Open		
Application	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{\text{DD}}$	$\lambda_{\text{DU}}$	$\lambda_{\text{Safe}}$	$\lambda_{DD}$	$\lambda_{DU}$
[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<sub>avg</sub> 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

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

