



Certificate / Certificat Zertifikat / 合格証

PBM 1111013 C002

exida hereby confirms that the:

TN Series Ball Valves

**IMI Critical Engr PBM LLC
Irwin, PA - USA**

The manufacturer
may use the mark:



Revision 2.1 March 31, 2022
Surveillance Audit Due
April 1, 2025

Have been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-2

and meets requirements providing a level of integrity to:

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type A, Route 2_H Device

**PFH/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

PBM 1111013 C002

Systematic Capability: SC 3 (SIL 3 Capable)**Random Capability: Type A, Route 2_H Device****PFH/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.

Versions:

Valve Types	Description and Application
Option 1	TN Series Trunnion Ball Valve – Clean Service
Option 2	TN Series Trunnion Ball Valve – Severe Service

IEC 61508 Failure Rates in FIT¹

Device	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
Full Stroke, Clean Service	0	0	0	586
Tight Shut Off, Clean Service	0	0	0	1207
Open on Trip, Clean Service	0	117	0	469
Full Stroke, Severe Service	0	0	0	1078
Tight Shut Off, Severe Service	0	0	0	2565
Open on Trip, Severe Service	0	262	0	809

¹ FIT = 1 failure / 10⁹ hours

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFH/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: PBM 11/10-013 R005 V2R1 (or later)

Safety Manual: FRM011, Rev 1 (or later)



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