Certificate / Certificat
Zertifikat / 合格証

BRA 1705031 C001

exida hereby confirms that the:

Tri Lok Butterfly Valves with Series 98 Actuators

Bray International, Inc.
Houston, Texas - USA

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

PFH/PFD_{avg} and Architecture Constraints must be verified for each application

Safety Function:

The Tri Lok Valve will move to the designated safe position per the Series 98 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 3.0 October 28, 2022
Surveillance Audit Due
October 1 , 2025

ANAB
ANSI National Accreditation Board
ACCREDITED
ISO/IEC 17065
PRODUCT CERTIFICATION BODY
#1004

exida Certification

Evaluating Assessor

Certifying Assessor

Certificate / Certificat / Zertifikat / 合格証

BRA 1705031 C001

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

Tri Lok Butterfly Valves with Series 98 Actuators

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*, Clean Service

Single Acting, Spring Return	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
Full Stroke	0	166	0	913
Tight Shut-Off	0	166	0	1478
Open on Trip	0	269	0	810
Full Stroke with PVST†	164	2	445	468
Tight Shut-Off with PVST	164	2	445	1033
Open on Trip with PVST	266	3	445	365
Double Acting, Single Piston	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
Full Stroke	0	0	0	1004
Tight Shut-Off	0	0	0	1569
Open on Trip	0	103	0	901
Full Stroke with PVST	0	0	512	492
Tight Shut-Off with PVST	0	0	512	1057
Open on Trip with PVST	102	1	512	389

For Double Acting, Double Piston and Severe Service applications, consult the FMEDA Report.

* FIT = 1 failure / 10^9 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 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: BRA 17/05-031 R002 V3 R1 (or later)

Safety Manual: SM-1005 S98 & SM-1003 Tri Lok

80 N Main St
Sellersville, PA 18960