Certificate / Certificat
Zertifikat / 合格証

OHL 1407085 P0037 C001.1

exida hereby confirms that the :

Ball Valve series BBF

Böhmer GmbH
Sprockhövel, Germany

Has 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:

Valid until December 1, 2018.
Rev 1.1 March 2016

Evaluating Assessor

Certifying Assessor

ANSI Accredited Program
PRODUCT CERTIFICATION
#1004

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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

Ball Valve series BBF

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*, Ball Valve series BBF

	without PVST				with PVST			
Variant	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
V1	0	0	0	488	0	0	172	316
V2	0	0	0	1263	0	0	172	1091
V3	0	237	0	364	235	2	172	192
V4	0	0	0	947	0	0	283	664
V5	0	0	0	2178	0	0	283	1895
V6	0	459	0	601	454	5	283	318

V1 Close on Trip, Full Stroke, Clean Service
V2 Close on Trip, Tight Shutoff, Clean Service
V3 Open on Trip, Clean Service
V4 Close on Trip, Full Stroke, Severe Service
V5 Close on Trip, Tight Shutoff, Severe Service
V6 Open on Trip, Severe Service

* 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 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: Boehmer14/07-085-C R001 V1 R0

Safety Manual: Boehmer Safety Manual V1 R0

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