

DNV GL UK Ltd Certificate No.: FSPA-003-187050-PH
 Place and date: ABD 18/07/2017
 Revision No.: 1

FUNCTIONAL SAFETY CERTIFICATE

DNV GL UK Ltd Certificate No.:
 FSPA-003-187050-PH

Initial date:
 18th July 2017

Valid:
 18th July 2017 – 17th July
 2022

This certificate consists of 4 pages

This is to certify that the Functional Safety Capability of

DN65-DN100 Pneumatically Actuated Globe Valve

Manufactured by:

Parker Hannifin, 9 President Way, Sheffield, S4 7UD, United Kingdom

have been assessed by **DNV GL UK Ltd**, and found to confirm to the Functional safety standards and sub-clauses:

BS EN 61508:2010 PART 1, CLAUSE 6
BS EN 61508:2010 PART 2, CLAUSE 7

When assessed using;
 The CASS Scheme for Functional Safety Capability

The Product and its associated data contained herein can be considered for use in the design of safety functions up to and including

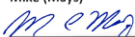
SIL 2*

When used in accordance with BS EN 61508 and the scope of this certificate.

* The Safety Integrity Level (SIL) relates to the complete safety System, not the individual elements, therefore this certificate only demonstrates the capability of the product to be implemented into a safety system of a required integrity level as defined in BS EN 61508.

For DNV GL UK Ltd:

Mike (Mays)



EI & C Principal Engineer
 Functional Safety Eng (TÜV Rheinland, #8956/14, SIS)

Mike Mays
Assessment Manager for the
Project



Place and date:
Aberdeen
18th July 2017

For DNV GL UK Ltd:



Andrew Derbyshire
Technical Manager

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Product Details

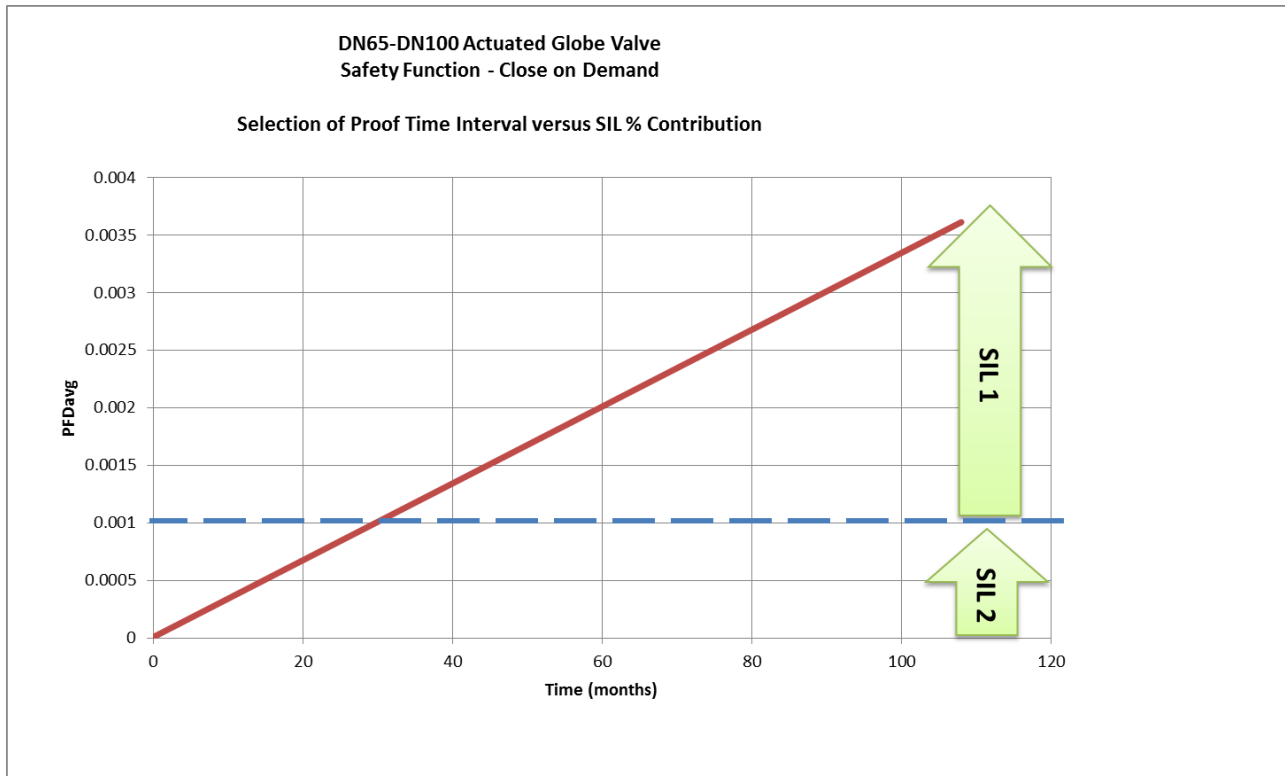
DN65-DN100 Globe Valve Inc. Single acting spring return pneumatic Actuator	Safety Function 1 – Close on Demand <small>(Fail Close Actuator)</small>	Safety Function 2 – Open on Demand <small>(Fail Open Actuator)</small>
Architectural constraints:	Type A HFT= 0 SFF = 79.65%	Type A HFT= 0 SFF = 81.23%
Random hardware failures:	$\lambda_{DU} = 9.14E-08$ $\lambda_{DD} = 0$ $\lambda_S = 3.58E-07$	$\lambda_{DU} = 8.52E-08$ $\lambda_{DD} = 0$ $\lambda_S = 3.69E-07$
Values used to determine the Probability of failure on demand ^[4] :	Proof Test interval – 8760Hrs MTTR – 72 Hrs	Proof Test interval – 8760Hrs MTTR – 72 Hrs
Probability of failure on demand:	$PFD_{AVG} = 4.07E-04$ <small>Based on a yearly proof test</small>	$PFD_{AVG} = 3.79E-04$ <small>Based on a yearly proof test</small>
Hardware Safety integrity Compliance ^[1] :	Route 1H	
Systematic Safety integrity Compliance ^[2] :	Route 1S	
Systematic Capability achieved:	SC 2	
Overall SIL Capability Achieved ^[3] :	SIL 2 <small>Based on a yearly proof test</small>	SIL 2 <small>Based on a yearly proof test</small>
Demand mode:	Low	Low

[1] According to BS EN 61508:2010 Part 2 Clause 7.4.2 & 7.4.4

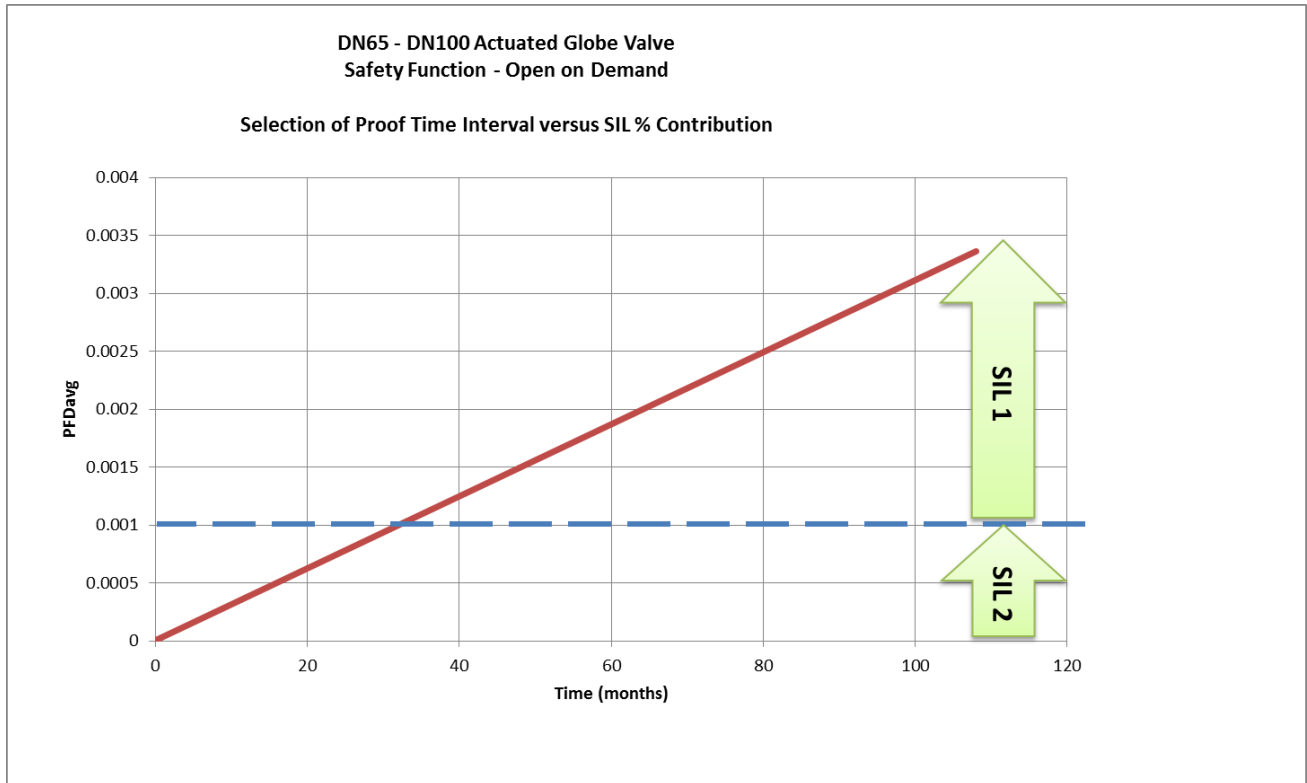
[2] According to BS EN 61508:2010 Part 4 Clause 3.5.9

[3] Lowest SIL indicated

[4] According to BS EN 61508 Part 2 section 7.4.2 & 7.4.4



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Information supporting the failure data

- | | |
|--|---|
| 1. Product ID | dn65-dn100 Actuated Globe Valve |
| 2. Functional specification | See Product Manual |
| 3. Environmental Limits | -196°C - +80°C |
| 4. Lifetime / Replacement Limits | See maintenance manual |
| 5. Maintenance Requirements | See maintenance manual |
| 6. Diagnostic Coverage | No Diagnostics on these simple devices |
| 7. Diagnostic Test interval | N/A; No diagnostics available |
| 8. Evidence of use in similar conditions | N/A; Route 1H considered |
| 9. Associated Drawings | CNM90*****PA*****TO*****CNMB0*****PA***** |

Conditions of Safe Use

1. User shall comply with the detail contained in the manufacturer user manual as well as the information provided above.
2. Selection of this equipment for use in a safety application shall only be made by a competent person.
3. The collection of any data associated with this type for equipment during operations shall be collected and reported to the manufacturer
4. The product should be tested at regular intervals to identify any malfunctions in accordance with the product safety manual.

Conditions of Certificate

1. This certificate is based on the assessment carried out by DNV GL UK Ltd as recorded in assessment report 1156B01L-6, Rev 0 & 1156B01L-7, Rev 0.
2. Printed copies of the certificates are not a controlled version.

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3. This certificate is based on the project, PP187050, agreed between DNV GL UK Ltd and Parker Hannifin.
4. Parker Hannifin shall ensure the Management of Functional Safety is maintained.
5. DNV GL UK Ltd shall be notified of any changes to the product that may impact on this certificate during the period of validity.
6. The use of this certificate is subject to the terms defined at the back of report 1156BO1L-6, Rev 0.
7. This certificate remains the property of DNV GL UK Ltd and shall be returned upon request.

Other valid terms and conditions are found in the DNVGL Frame Agreement.

END OF CERTIFICATE