

Inspection Certificate



Certificate No **968/INS 216.00/19**

Client / Certificate Owner Beijing Research Center of CNOOC China Ltd.
Building B, CNOOC Plaza, No.6 Taiyanggong south street
Chaoyang District
Beijing
P.R. China

Product Final Element
Combination of trunnion mounted ball valves and actuators

Type designation Ball Valve: Suzhou Douson 12" / class 1500
Actuator: Wuxi Force & Torque P series

Standards applied for inspection IEC 61508-2:2010 (in extracts)

Inspection Results The scope of this inspection is the reliability calculation according to the requirements of IEC 61508 / SIL 2 of the final element combination subsystem consisting out of already certified trunnion mounted ball valves and actuators,

Result: The reliability data of the final element combination comply with the requirements of relevant standards.
The instructions of the Safety Manuals and the individual certifications must be considered before and during any use in safety related applications.

Inspection Period 2018-11-01 - 2019-10-01

Cologne, 2019-10-25

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Inspection Body of TÜV Rheinland Industrie Service GmbH -
Business Area Energy Systems and Automation
Business Field Automation - Functional Safety, www.tuvasi.com

Holder: CNOOC Beijing Research Centre
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Chaoyang District, Beijing
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Ball Valve: Suzhou Douson 12" / class 1500
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Results of Inspection

Mode of Operation		Low Demand Mode	
Hardware Fault Tolerance	HFT	0	
Lambda Dangerous confidence level of calculation $1-\alpha = 95\%$	λ_D	5.99 E-07 / h	599 FIT
Lambda Dangerous Undetected assumed Diagnostic Coverage DC = 0 %	λ_{DU}	5.99 E-07 / h	599 FIT
Average Probability of Failure on Demand 1oo1 assumed Proof Test Interval $T_1 = 1$ year	$PFD_{avg}(T_1)$	2.62 E-03	

Origin of values

The stated values are the results of an inspection of the combination of the already certified components.

Periodic Tests and Maintenance

The given values require periodic tests and maintenance as described in the Safety Manuals.

The operator is responsible for the consideration of specific external conditions (e.g. ensuring of required quality of media, max. temperature, time of impact), and adequate test cycles.

The lifetime is 10 years.