

Certificate

No. V 423 2013 C2 – Rev. 01

Manufacturer: **Value Valves Co., Ltd**
No. 9, Chung Shan Road
Tu-Cheng Industrial District
New Taipei City, Taiwan 236

Product: **Triple offset butterfly valve**

Typen, type series **VF-8 series (see back side)**

Use: **Shut off flow mediums and ensure internal and external tightness**

Test result: **The above mentioned appliances are suitable for use in safety related systems up to and including SIL 2 with a hardware fault tolerance of HFT = 0 and up to and including SIL 3 with a minimum hardware fault tolerance of HFT = 1 according to IEC 61508-1.**

For detailed results see report V 423 2013 S1 / 2013-05-24.

Summary of test results see back side of this certificate.

The suitability for certain fields of application can only be assessed by additional evaluation of further components of the subsystem according IEC 61508-1.

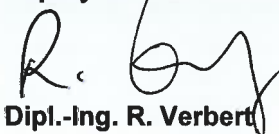
This certificate is valid until 2018-05

Cologne, 2013-05-24
Instructor



M. Eng. C. Li

Test Centre for Energy Appliances
Deputy of Test Centre



Dipl.-Ing. R. Verbert

TÜV Rheinland Energie und Umwelt GmbH, Am Grauen Stein, D-51105 Köln, Germany

Zertifikat Nr.	V 423 2013 C2
Hersteller	Value Valves Co., Ltd No. 9, Chung Shan Road Tu-Cheng Industrial District New Taipei City, Taiwan 236

Type list:

VF-8 valves series					
VF-870	VF-876	VF-880	VF-886	VF-890	VF-896
VF-873	VF-877	VF-883	VF-887	VF-893	VF-897
VF-875	VF-878	VF-885	VF-888	VF-895	VF-898

Device specific values:

Probability of dangerous failure on demand	PFD _{spec}	Failure/demand	3,72E-05
Test interval	T _i	y	1
Confidence niveau	1- α	%	90
Safe failure fraction	SFF	%	91,3
Hardware fault tolerance	HFT	[-]	0
Diagnostic coverage	DC	%	0
Type of sub system	IEC 61508-2, 7.4.4.1.2		Type A
Mode of Operation	IEC 61508-4, 3.5.16		Low Demand Mode
Assumed demands per year	f _{np}	demand/y	10
Interval for closing test		y	1
Derived Values			
Demand/hour	f _{np}	demand/h	1,14E-03
Meantime between demands		h	8,76E+02
Dangerous failure rate	λ_D	1/h	4,25E-08
		FIT	42,47
MTBF dangerous failures	MTBF _D	h	2,35E+07
		y	2688,17
Safe failure rate	λ_S	1/h	4,05E-07
		FIT	404,54
Total failure rate	$\lambda_S + \lambda_D$		4,47E-07
		FIT	447,01
MTBF total		h	2,24E+06
MTBF total		y	255,38
Dangerous detected	λ_{DD}	1/h	0,00E+00
Dangerous undetected	λ_{DU}	1/h	4,25E-08
Safe detected	λ_{SD}	1/h	0,00E+00
Safe undetected	λ_{SU}	1/h	4,05E-07
Average probability of failure on demand	PFD _{avg}	Failure/demand	1,86E-04

Test result

It is the opinion of the Test Laboratory that the devices of the type series examined are suitable for use in safety-related systems in an operating mode with low demand rate (Low Demand Mode according to DIN EN 61508 up to and including SIL 2. For the continued validity of the certificate the test result has to be confirmed after a period of five years.

Useful life time under operation conditions

This statement applies to new actuators and for deployment thereof for a period of time of maximum 9 years before being used for the first time and provided that all safety-relevant operating conditions as stated by the manufacturer are complied with.

Qualitätsmanagement / Quality Management

These statements are bound to the proven and verified deployment of safety-related quality management according ISO 9001 and PED 97/23/EC of the manufacturer.

Certificate

No. V 423 2013 C4 – Rev. 01

Manufacturer: **Value Valves Co., Ltd**
No. 9, Chung Shan Road
Tu-Cheng Industrial District
New Taipei City, Taiwan 236

Product: **Double eccentric butterfly valve**

Typen, type series **VF-9 series (see back side)**

Use: **Shut off flow mediums and ensure internal and external tightness**

Test result: **The above mentioned appliances are suitable for use in safety related systems up to and including SIL 2 with a hardware fault tolerance of HFT = 0 and up to and including SIL 3 with a minimum hardware fault tolerance of HFT = 1 according to IEC 61508-1.**

For detailed results see report V 423 2013 S3 / 2013-05-24.

Summary of test results see back side of this certificate.

The suitability for certain fields of application can only be assessed by additional evaluation of further components of the subsystem according IEC 61508-1.

This certificate is valid until 2018-05

Cologne, 2013-05-24
Instructor


M. Eng. C. Li

Test Centre for Energy Appliances
Deputy of Test Centre


Dipl.-Ing. R. Verbert

TÜV Rheinland Energie und Umwelt GmbH, Am Grauen Stein, D-51105 Köln, Germany

Zertifikat Nr.	V 423 2013 C4
Hersteller	Value Valves Co., Ltd No. 9, Chung Shan Road Tu-Cheng Industrial District New Taipei City, Taiwan 236

Type list:

VF-9 valves series							
VF-910	VF-940	VF-913	VF-943	VF-916	VF-946	VF-917	VF-947
VF-920	VF-950	VF-923	VF-953	VF-926	VF-956	VF-927	VF-957
VF-930	VF-960	VF-933	VF-963	VF-936	VF-966	VF-937	VF-967

Device specific values:

Probability of dangerous failure on demand	PFD _{spec}	Failure/demand	8,63E-06
Test interval	T _i	y	1
Confidence niveau	1- α	%	90
Safe failure fraction	SFF	%	91,3
Hardware fault tolerance	HFT	[-]	0
Diagnostic coverage	DC	%	0
Type of sub system	IEC 61508-2, 7.4.4.1.2		Type A
Mode of Operation	IEC 61508-4, 3.5.16		Low Demand Mode
Assumed demands per year	f _{np}	demand/y	10
Interval for closing test		y	1
Derived Values			
Demand/hour	f _{np}	demand/h	1,14E-03
Meantime between demands		h	8,76E+02
Dangerous failure rate	λ_D	1/h	9,85E-09
		FIT	9,85
MTBF dangerous failures	MTBF _D	h	1,02E+08
		y	11592,94
Safe failure rate	λ_S	1/h	1,03E-07
		FIT	103,34
Total failure rate	$\lambda_S + \lambda_D$		1,13E-07
		FIT	113,18
MTBF total		h	8,84E+06
MTBF total		y	1008,59
Dangerous detected	λ_{DD}	1/h	0,00E+00
Dangerous undetected	λ_{DU}	1/h	9,85E-09
Safe detected	λ_{SD}	1/h	0,00E+00
Safe undetected	λ_{SU}	1/h	1,03E-07
Average probability of failure on demand	PFD _{avg}	Failure/demand	4,31E-05

Test result

It is the opinion of the Test Laboratory that the devices of the type series examined are suitable for use in safety-related systems in an operating mode with low demand rate (Low Demand Mode according to DIN EN 61508 up to and including SIL 2. For the continued validity of the certificate the test result has to be confirmed after a period of five years.

Useful life time under operation conditions

This statement applies to new actuators and for deployment thereof for a period of time of maximum 9 years before being used for the first time and provided that all safety-relevant operating conditions as stated by the manufacturer are complied with.

Qualitätsmanagement / Quality Management

These statements are bound to the proven and verified deployment of safety-related quality management according ISO 9001 and PED 97/23/EC of the manufacturer.