

EINGEGANGEN

Certificate no: DTM1520895/2  
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23 Juni 2015



# Inspection Certificate

Project:

Client: **Zwick Armaturen GmbH,  
Ennepetal / Germany**

Office: **Dortmund**

Client's Order Number:

Date: **23 June 2015**

Order Status: **complete**

Inspection Dates

First: **17 June 2015**

Final: **17 June 2015**

This certificate is issued to **the above client, that a surveyor to Lloyds's Register did, at their request, attend a test laboratory in Herford/Germany, for the purpose of testing and inspecting the product listed below.**

**Description:** Fire type-testing of Butterfly Valves

**Type:** TRI-CON Model A1 8" ANSI150  
**Pressure Rating:** Class 150  
**Nominal Bore:** 8"  
**Manufacturer's Drawing:** ZUSA1G548

**Body/Bonnet Material:** ASTM A216 WCB  
**Disc Material:** ASTM A216 WCB  
**Stem Material:** ASTM A276 Type 431  
**Sealing Elements:** Carbon Fibre / Graphite / ASTM A582 Type 303


**Test Requirements:** DIN EN ISO 10497:2010-06 and API 607, 6<sup>th</sup> edition

**Qualified Sizes:** 8" and above, DN 200 and above  
**Qualified Pressure Ratings:** Class 150, Class 300, PN 10, PN 16, PN 25 and PN 40

**Conclusion:** All test results are satisfactory and fulfil the requirements of DIN EN ISO 10497:2010-06 and API 607, 6<sup>th</sup> edition, in every respect.

For further details please refer the attached test report IBB-1304, dated 17.06.2015.

EN/Fbe

  
For G. Milke: R. Spriesterbach  
Surveyor to Lloyd's Register EMEA

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## TEST Report

### Flame - resistance tests according to DIN EN ISO 10497 Report IBB-1304 / LRDTM 1520895/2

This report confirms the testing of a representative valve in compliance with the DIN EN ISO 10497, 2010, and with API 607, 6th edition.

<b>Manufacturer</b>	Zwick GmbH Egerstr. 1 58256 Ennepetal
<b>Test Valve</b>	Butterfly Valve TRI-CON Model A1 8" ANSI150 Flange end connections, handwheel operated Nominal bore: 8" Pressure rating: Class 150 Body/Bonnet material: ASTM A216 WCB Stem material: ASTM A276 Type 431 Seal material: Carbon Fibre / Graphite / ASTM A582 Type 303 Disc: ASTM A216 WCB Drawing number: ZUSA1G548 Operation device: Handwheel
<b>Date of Testing</b>	17 June 2015
<b>Test Report</b>	5 pages
<b>Qualified sizes</b>	DN 200 and above 8" and above
<b>Qualified pressure ratings</b>	Class 150, Class 300 PN 10, PN 16, PN 25, PN 40
<b>Testing location</b>	Laboratory of Dr.-Ing. T. Bäumer GmbH, Altensenner Weg 75, D - 32052 Herford
<b>Test requirements</b>	The tests were carried out strictly in accordance with DIN EN ISO 10497, 2010, and with API 607, 6th edition
<b>Participants</b>	Mr. G. Milke                      Lloyds Register, EMEA Mr. Dr. T. Bäumer              Dr.-Ing. T. Bäumer GmbH

## Test examination

The water filled valve was subjected to fire for 30 minutes at a temperature between 750 °C and 1000 °C and a pressure of e.g. 14,5 barg. After the burn period the through-seat-leakage was determined and after a cool down period the external leakage was measured. Then the valve was opened, and the external leakage was determined.

## Instrumentation

Temperature: 5 Thermocouples, Ni Cr Ni, accuracy 1 K.

Pressure: Pressure transmitter, accuracy 0,5 %.

PC-system: AD converter board, software for measuring, Personal Computer

The measuring devices are controlled by an accredited calibration service.

Body cavity set relief pressure and setting: - barg

## Test results

Time of test start (ignition of burners): 11.40 am

### Temperatures and pressure during burn period

Time [s]	p [barg]	T <sub>Fire1</sub> [°C]	T <sub>Fire2</sub> [°C]	T <sub>Cal1</sub> [°C]	T <sub>Cal2</sub> [°C]	T <sub>Cal3</sub> [°C]
.0	14.5	494.3	475.8	66.8	66.1	70.5
30.0	14.5	721.9	738.7	116.3	122.3	125.1
60.0	14.5	794.5	793.3	168.8	178.6	184.4
90.0	14.5	862.2	803.3	233.2	239.9	249.8
120.0	14.5	914.5	809.9	301.2	301.4	316.3
150.0	14.5	926.8	836.7	369.7	363.6	379.9
180.0	14.5	934.1	837.9	437.6	421.4	437.6
210.0	14.5	929.9	829.7	499.3	474.3	489.6
240.0	14.5	954.2	813.6	552.3	519.3	534.1
270.0	14.5	931.8	863.3	596.7	559.6	575.4
300.0	14.5	897.4	807.7	632.7	591.8	607.4
330.0	14.5	885.4	780.2	659.8	618.5	633.0
360.0	14.5	923.2	805.9	680.6	641.9	653.1
390.0	14.5	919.2	795.5	702.4	663.1	673.5
420.0	14.5	942.2	844.6	717.2	682.8	690.3
450.0	14.5	938.0	846.7	732.7	701.3	705.6
480.0	14.5	885.4	792.5	746.0	717.6	719.9
510.0	14.5	856.1	802.7	752.2	726.8	730.6

540.0	14.5	873.4	790.0	755.4	735.4	739.6
570.0	14.5	858.2	794.3	761.5	745.0	749.3
600.0	14.5	860.3	784.5	762.2	750.6	755.2
630.0	14.5	877.1	786.2	768.6	757.6	757.4
660.0	14.5	891.9	793.8	775.1	762.8	762.8
690.0	14.5	901.1	804.8	778.7	767.8	768.9
720.0	14.5	883.1	866.0	783.7	773.2	776.0
750.0	14.5	893.2	823.3	785.7	778.8	784.1
780.0	14.5	862.1	827.4	792.5	783.8	793.0
810.0	14.5	887.9	804.1	793.8	788.0	795.4
840.0	14.5	887.2	843.8	797.9	791.4	801.8
870.0	14.5	877.1	872.8	805.2	797.9	811.8
900.0	14.5	889.7	842.9	801.6	800.5	817.4
930.0	14.5	877.6	847.6	808.1	805.0	822.8
960.0	14.5	878.2	837.9	808.2	808.6	824.0
990.0	14.5	879.4	872.3	812.0	813.2	828.2
1020.0	14.5	898.9	899.3	811.9	815.9	829.9
1050.0	14.5	909.4	853.4	807.7	815.5	832.9
1080.0	14.5	870.4	836.5	813.7	819.3	840.0
1110.0	14.5	892.7	843.9	814.7	821.9	838.1
1140.0	14.6	902.4	846.3	817.7	825.2	840.8
1170.0	14.5	869.6	875.0	819.1	827.5	852.1
1200.0	14.5	864.7	845.5	820.9	827.7	853.1
1230.0	14.5	874.5	899.0	822.8	830.0	855.4
1260.0	14.6	858.2	860.6	821.3	831.4	859.2
1290.0	14.6	904.1	839.2	820.0	829.8	852.8
1320.0	14.6	879.9	845.1	824.1	833.8	854.3
1350.0	14.5	823.2	816.7	825.6	833.6	860.3
1380.0	14.5	854.8	857.4	825.2	830.8	860.8
1410.0	14.5	893.8	850.7	827.3	831.6	855.8
1440.0	14.5	880.4	848.9	833.8	836.1	859.1
1470.0	14.5	881.7	856.9	837.3	838.2	861.7
1500.0	14.5	865.3	868.9	841.0	841.9	867.1
1530.0	14.5	883.7	909.1	839.3	842.7	867.8
1560.0	14.5	885.2	859.5	834.8	840.2	872.2
1590.0	14.5	879.9	882.9	830.9	836.2	872.9
1620.0	14.5	912.0	877.5	832.7	835.1	874.7
1650.0	14.6	859.4	886.0	837.8	836.9	879.2
1680.0	14.5	844.2	888.8	833.1	831.3	878.0
1710.0	14.5	890.2	863.3	833.5	830.8	872.1
1740.0	14.5	831.4	813.1	843.3	835.4	883.4
1770.0	14.5	848.9	859.4	839.1	833.6	884.3
1800.0	14.5	848.7	852.2	845.1	839.2	900.4

**Time required for valve to cool down to 100 °C:** 8 min  
**Test valve unseated:** Yes  
**Test valve moved to the fully open position:** Yes

	Leakage [ml/DN/min]	Allowable leakage [ml/DN/min]
<b>Through-seat-leakage in burning phase:</b>	0,2	16,0
<b>External leakage in burning and cooling phase:</b>	0,0	4,0
<b>Through-seat-leakage after cool down phase:</b>	0,0	1,6
<b>External leakage after unseating the valve:</b>	0,0	1,0

### Comments on the results

The test valve is an asymmetric Butterfly Valve. Because it is intended for one-directional installation, the tests were carried out only for one flow direction.

### Conclusion

The test valve fulfilled the test requirements according to DIN EN ISO 10497, 2010, and API 607, 6th edition. Only allowable through-seat-leakages and external leakages were observed during the tests.

Herford, 17 June 2015

Lloyd's Register



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Mr. Dr. T. Bäumer  
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