Certificate no: **DTM 0613124/1**

Lloyd's Register

Inspection Certificate

Project: ---

Client: **Klinger Fluid Control GmbH**
Gumpoldskirchen / Austria

Office: **Dortmund**

Clients Order Number: **119301**

Date: **08 January 2007**

Order Status: **incomplete**

Inspection Dates
First: **07 December 2006**
Final: **07 December 2006**

This certificate is issued to **the above client to certify that a surveyor to Lloyd's Register did, at their request, attend the testing laboratory of Dr.-Ing. T. Bäumer – Ingenieurbüro -, Herford / Germany for the purpose of inspecting the product listed below.**

Description:	**Flame resistant test of -1- Ball Valve**	
Type:	**KHI**	
Nominal bore:	**DN 200**	
Pressure rating:	**PN 25**	
Manufacturer's drawing:	**wSK21093.0-0000**	
Materials:	**Body/flanged end piece material:**	**1.0619**
	Operating stem material:	**1.4104**
	Ball material:	**0.7040**
	Sealing elements:	**1.4436**
	Stem seal material:	**Graphite (K35-C)**
Test requirements:	**DIN EN ISO 10497, 2004**	
Qualified pressure ratings:	**Class 150 / Class 300**	

The flame resistance tests have been carried out at the independent laboratories of Dr.-Ing. Bäumer.

Conclusion: **All test results, witnessed by the Lloyd's Register Surveyor, were found to be satisfactory and fulfil the requirements of DIN EN ISO 10497, 2004 in every respect.**
For details please refer to the attached signed and stamped test reports (4 pages).

Remarks: **Ball valve DN 200 pressure rating PN 25 also covers DN 200 and larger.**

M. Nowak
Surveyor to Lloyd's Register EMEA

E&T/PRu

A member of the Lloyd's Register Group

Form 1123 (2005.02)

Dr.-Ing. T. Bäumer

Ingenieurbüro

Strömungs- und Geräuschtechnik
Armaturen und Apparate
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TEST Report

Flame - resistance tests according to DIN EN ISO 10497

Report Hc-397

This report confirms the successful testing of a representative valve in compliance with the DIN EN ISO 10497, 2004.

Manufacturer	Klinger Fluid Control GmbH Am Kanal 8 - 10 A – 2352 Gumpoldskirchen
Test Valve	Ball -Valve, KHI, flange end connections, Gear opened Nominal bore: DN 200 Pressure rating: PN 25 Weight: 150 kg Bore: Full bore Body/flanged end piece material: 1.0619 Operating stem material: 1.4104 Ball material: 0.7040 Sealing elements: 1.4436 Stem seal material: Graphite (K35-C) Drawing number: wSK21093.0-0000 Operation device: Gear, auma G80.3-F14-N
Date of Testing	07 December 2006
Test Report	4 pages
Qualified sizes	DN 200 and larger
Qualified pressure ratings	Class 150, Class 300 PN 25, PN 40
Testing location	Laboratory of consultant engineer Dr.-Ing. T. Bäumer, Altensenner Weg 75, D - 32052 Herford
Test requirements	The tests were carried out strictly in accordance with DIN EN ISO 10497, 2004 The tests are in conformity with API 607, 5th edition, and British Standard BS 6755 Part 2
Participants	Mr. M. Nowak Lloyds Register, EMEA Mr. Dr. T. Bäumer Ingenieurbüro Dr.-Ing. T. Bäumer

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Test examination

The water filled ball valve was subjected to fire for 30 minutes at a temperature between 750 °C and 1000 °C and a pressure of e.g. 18,5 barg. After the burn period the through-seat-leakage was determined and after a cool down period the external leakage was measured. Then the ball valve was opened, and the external leakage was determined.

Instrumentation

Temperature: 4 Thermocouples, Ni Cr Ní, 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: 37,5 barg

Test results

Time of test start (ignition of burners): 1.20 p.m.

Temperatures and pressure during burn period

Time [s]	p [barg]	T_{Fire1} [°C]	T_{Fire2} [°C]	T_{Cal1} [°C]	T_{Cal2} [°C]	T_{Cal3} [°C]
.00	18.50	11.9	19.4	20.9	26.9	19.4
30.00	18.50	467.9	52.4	23.9	37.4	52.4
60.00	18.50	638.9	91.4	47.9	83.9	91.4
90.00	18.50	775.4	133.4	74.9	131.9	133.4
120.00	18.50	791.9	782.9	100.4	182.9	182.9
150.00	18.58	800.9	752.4	131.9	232.4	232.4
180.00	18.50	872.9	763.4	182.9	283.4	283.4
210.00	18.50	859.4	772.9	256.4	329.9	332.9
240.00	18.50	926.9	777.9	298.4	371.9	377.9
270.00	18.58	913.4	781.4	337.4	410.9	421.4
300.00	18.58	842.9	781.9	371.9	446.9	461.9
330.00	18.58	913.4	782.4	400.4	478.4	502.4
360.00	18.58	949.4	778.4	428.9	506.9	538.4
390.00	18.58	958.4	772.9	452.9	532.4	572.9
420.00	18.58	950.9	761.4	476.9	556.4	601.4
450.00	18.58	974.9	786.9	500.9	575.9	626.9
480.00	18.58	976.4	767.9	521.9	595.4	647.9
510.00	18.58	947.9	787.4	541.4	610.4	667.4
540.00	18.58	940.4	762.4	550.4	625.4	682.4
570.00	18.58	977.9	777.4	572.9	637.4	697.4
600.00	18.55	979.4	770.9	587.9	649.4	710.9
630.00	18.58	967.4	761.4	601.4	659.9	721.4
660.00	18.55	935.9	770.4	614.9	668.9	730.4

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690.00	18.55	998.9	774.9	625.4	676.4	734.9
720.00	18.58	977.9	780.9	634.4	683.9	740.9
750.00	18.55	911.9	782.4	641.9	689.9	742.4
780.00	18.55	935.9	782.4	649.4	694.4	742.4
810.00	18.55	935.9	783.9	653.9	698.9	743.9
840.00	18.55	931.4	783.9	658.4	703.4	743.9
870.00	18.55	947.9	783.9	662.9	707.9	743.9
900.00	18.55	925.4	783.9	667.4	710.9	743.9
930.00	18.55	911.9	780.9	670.4	713.9	740.9
960.00	18.63	883.4	779.4	671.9	716.9	739.4
990.00	18.63	868.4	779.4	673.4	718.4	739.4
1020.00	18.63	887.9	776.4	674.9	719.9	736.4
1050.00	18.63	863.9	773.4	674.9	722.9	733.4
1080.00	18.61	866.9	771.9	676.4	725.9	731.9
1110.00	18.61	857.9	770.4	676.4	727.4	730.4
1140.00	18.61	787.4	765.9	677.9	727.4	725.9
1170.00	18.64	851.9	758.4	676.4	727.4	718.4
1200.00	18.58	854.9	752.4	677.9	728.9	712.4
1230.00	18.57	889.4	786.4	680.9	728.9	706.4
1260.00	18.38	820.4	781.9	680.9	730.4	701.9
1290.00	18.38	817.4	778.9	679.4	730.4	698.9
1320.00	18.38	814.4	774.4	677.9	730.4	694.4
1350.00	18.59	794.9	768.4	676.4	728.9	688.4
1380.00	18.44	781.4	762.4	676.4	727.4	682.4
1410.00	18.39	754.4	777.9	673.4	725.9	677.9
1440.00	18.42	803.9	761.9	670.4	722.9	671.9
1470.00	18.41	839.9	788.9	668.9	724.4	668.9
1500.00	18.38	812.9	784.4	667.4	722.9	664.4
1530.00	18.40	806.9	778.4	667.4	721.4	658.4
1560.00	18.40	845.9	775.4	665.9	719.9	655.4
1590.00	18.37	782.9	767.9	664.4	718.4	667.9
1620.00	18.40	811.4	761.9	662.9	716.9	661.9
1650.00	18.40	808.4	757.4	661.4	715.4	657.4
1680.00	18.40	788.9	752.9	659.9	713.9	652.9
1710.00	18.40	774.9	786.9	658.4	710.9	666.9
1740.00	18.40	794.9	779.4	658.4	709.4	659.4
1770.00	18.40	781.4	774.9	658.4	707.9	654.9
1800.00	18.36	774.9	766.9	641.9	692.9	656.9

Time required for valve to cool down to 100 °C: 10 min

Test valve unseated: Yes

Test valve moved to the fully open position: Yes

Opening torque applied to valve stem: 23 Nm
(Measured with a torque wrench)

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	Leakage [ml/DN/min]	Allowable leakage [ml/DN/min]
Through-seat-leakage in burning phase:	0,0	4,0
External leakage in burning and cooling phase:	0,8	1,0
Through-seat-leakage at low pressure:	1,2	1,6
External leakage in the open position:	0,0	1,0

Comments on the results

The test valve is an symmetric ball 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, 2004. Only allowable through-seat-leakages and external leakages were observed during the test.

Herford, 07 December 2006

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