TEST Report

Flame - resistance tests according to DIN EN ISO 10497
Report IBB-1842

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

Manufacturer	Friedrich Krombach GmbH Postfach 1130 57202 Kreuztal
Test Valve	Ball Valve Type KFO9136 DN 8" Class 300 Flange end connections, Handwheel operated Nominal bore: DN 8" Pressure rating: Class 300 Body/Bonnet material: 1.0619 Stem material: 1.4021 Ball material: 1.4571 + Hardfacing Ball seal material: 1.4571 + Hardfacing Operation device: Handwheel Drawing number: KFO8403/798(a)
Date of Testing	21 June 2017
Test Report	5 pages
Qualified sizes	DN 200 and above 8" and above
Qualified pressure ratings	Class 300, Class 400, Class 600 PN 40, PN 63, PN 100
Testing location	Laboratory of Dr.-Ing. T. Bäumer GmbH, Altensenner Weg 75, D - 32052 Herford
Test requirements	The tests were carried out strictly in accordance with DIN EN ISO 10497, 2010, and API 607, 6th edition
Participants	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. 37,2 barg. After the burn period the through-seat-leakage was determined and after a cool down period the external leakage and the through-seat-leakage were 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.

Test results

Time of test start (ignition of burners): 10.50 am

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]
.0	37.4	19.7	20.8	24.8	27.0	26.9
30.0	37.3	240.8	279.8	25.9	28.5	28.8
60.0	37.4	593.3	705.8	51.4	53.2	61.0
90.0	37.3	795.6	781.0	99.8	102.4	120.8
120.0	37.2	852.9	793.7	156.7	164.8	187.9
150.0	37.4	847.7	804.7	218.0	234.6	259.2
180.0	37.3	875.9	845.8	282.8	309.6	331.3
210.0	37.2	855.6	882.1	343.2	380.0	396.1
240.0	37.2	907.8	891.3	399.8	443.0	457.9
270.0	37.3	928.4	902.0	454.1	496.1	513.5
300.0	37.4	937.5	923.2	506.6	541.6	560.5
330.0	37.3	940.5	913.0	552.9	579.8	602.7
360.0	37.3	969.1	929.5	592.3	612.2	630.8
390.0	37.4	945.3	928.0	629.7	641.9	665.2
420.0	37.3	929.4	908.7	659.9	667.7	689.6
450.0	37.2	942.5	905.2	684.9	690.8	708.7
480.0	37.3	956.1	897.8	708.0	710.6	725.8
510.0	37.4	946.0	918.1	726.8	728.3	740.3
540.0	37.3	936.0	937.5	743.3	743.1	754.2
570.0	37.4	946.7	941.6	759.3	756.9	768.1

600.0	37.4	952.0	929.7	773.0	766.8	777.8
630.0	37.3	950.3	943.9	786.5	777.6	790.1
660.0	37.2	975.4	943.4	795.9	786.1	798.2
690.0	37.2	959.1	944.8	804.8	795.2	807.2
720.0	37.4	970.3	947.1	814.9	803.6	815.7
750.0	37.3	988.3	910.2	822.4	810.1	820.7
780.0	37.3	981.3	931.7	830.8	817.3	826.0
810.0	37.4	986.4	925.5	836.4	822.2	830.2
840.0	37.2	957.8	921.8	845.2	826.9	836.6
870.0	37.3	956.9	925.5	846.4	830.1	840.3
900.0	37.3	956.1	938.1	846.5	832.3	843.6
930.0	37.4	878.7	925.8	845.7	837.6	849.7
960.0	37.3	904.6	904.1	840.8	841.9	850.6
990.0	37.2	906.9	917.0	837.4	842.4	850.0
1020.0	37.4	924.6	926.5	838.4	839.6	851.2
1050.0	37.3	933.7	939.7	836.0	837.8	850.7
1080.0	37.3	920.7	924.8	834.2	838.0	853.8
1110.0	37.4	929.3	914.8	832.5	839.2	854.9
1140.0	37.2	946.3	888.4	830.5	836.7	854.5
1170.0	37.3	913.0	895.9	830.3	835.1	853.0
1200.0	37.4	942.8	906.4	825.4	832.2	850.1
1230.0	37.3	963.8	902.6	829.0	831.4	850.9
1260.0	37.2	920.3	921.7	829.4	832.4	852.7
1290.0	37.3	921.8	905.8	827.4	830.9	852.8
1320.0	37.4	940.5	896.6	825.0	831.6	852.1
1350.0	37.2	980.9	888.9	818.9	830.3	848.3
1380.0	37.3	971.2	907.4	829.4	833.4	853.3
1410.0	37.2	949.0	909.8	833.9	835.2	854.2
1440.0	37.3	931.4	923.5	836.9	833.4	853.7
1470.0	37.2	940.8	909.3	834.5	833.0	854.3
1500.0	37.3	966.0	888.8	829.5	831.0	851.3
1530.0	37.2	946.4	909.5	833.3	832.7	855.8
1560.0	37.3	954.7	906.1	832.9	834.9	857.2
1590.0	37.3	978.7	904.4	830.8	836.1	856.2
1620.0	37.4	960.2	907.0	833.5	838.1	858.5
1650.0	37.3	970.4	909.8	833.0	837.8	857.5
1680.0	37.3	968.3	909.9	840.7	838.1	862.5
1710.0	37.4	973.7	914.1	843.4	838.4	862.2
1740.0	37.3	934.7	912.9	842.1	841.9	865.4
1770.0	37.4	965.7	916.3	844.1	844.4	867.6
1800.0	37.4	946.5	905.7	847.8	843.8	868.1

Time required for valve to cool down to 100 °C:	9 min
Test valve unseated:	Yes
Test valve moved to the fully open position:	Yes

	Leakage [ml/DN/min]	Allowable leakage [ml/DN/min]
Through-seat-leakage in burning phase:	0,9	16,0
External leakage in burning and cooling phase:	0,0	4,0
Through-seat-leakage at low pressure:	0,0	1,6
External leakage after unseating the valve:	0,0	1,0

Comments on the results

The test valve is an asymmetric Ball Valve. Because it is intended for one-directional installation, the tests were carried out only for one flow direction (sealing element in valve inlet).

Conclusion

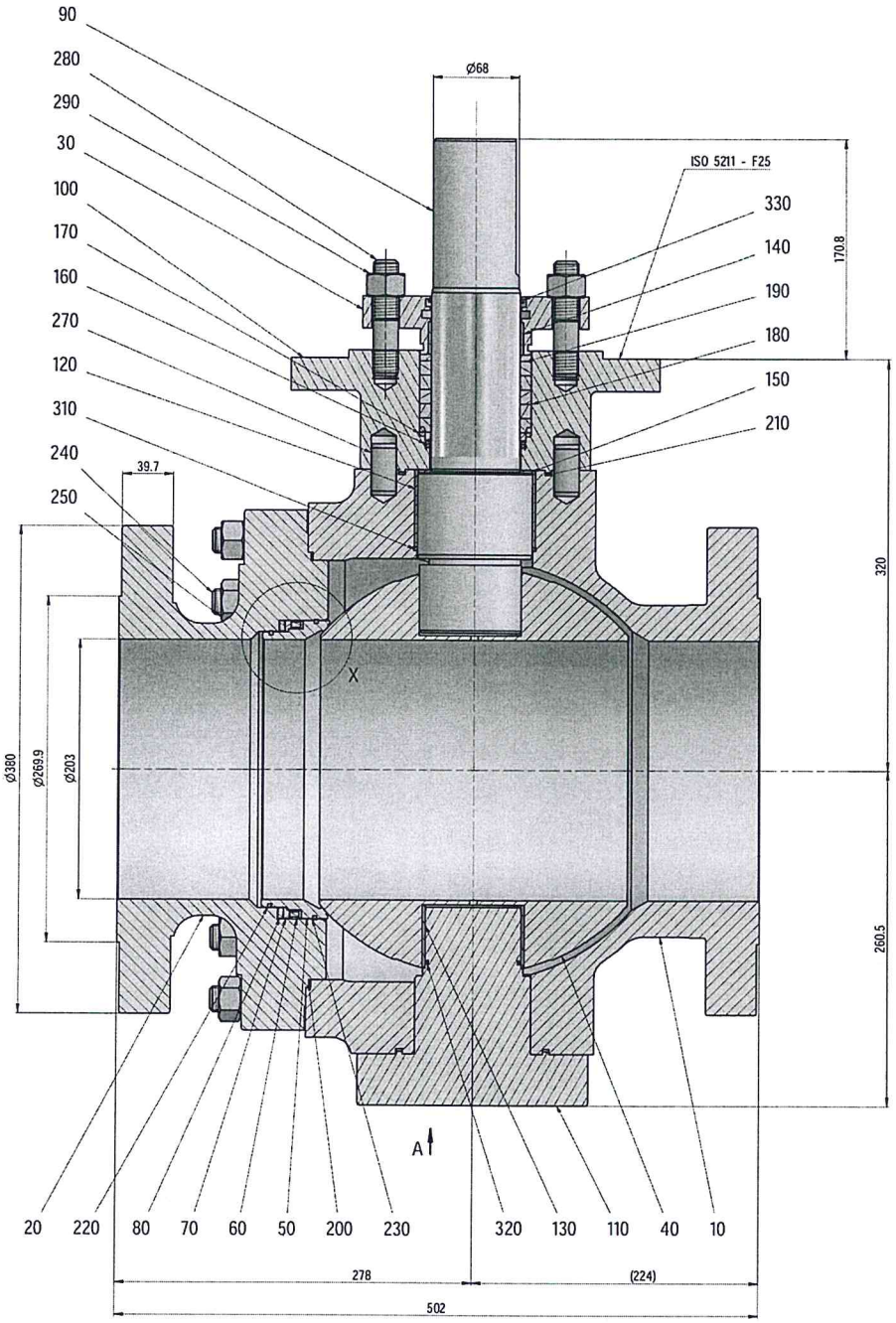
The test valve fulfilled the test requirements according to DIN EN ISO 10497, 2010, and API 607, 6th edition. Only allowable through-seat-leakages and external leakages were observed during the tests.

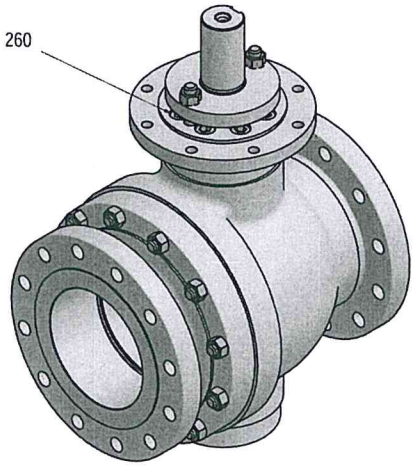
Herford, 21 June 2017

Dr.-Ing. T. Bäumer
GmbH

Mr. Dr. T. Bäumer
Consultant engineer

Änderung / Change note			
Index	Benennung/Description	Datum/Date	Gepr./Appr.
-	first issue		
a	Pos.320 changed	23.02.2017	Jablonski





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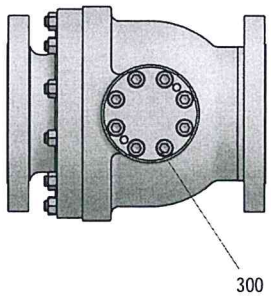

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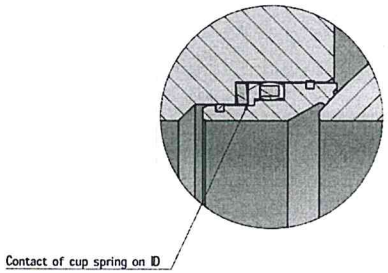

Item	Qty	Benennung	Designation	Carbon Steel	Stainless Steel
10	1	Gehäuse	Body	ASTM A216 WCB / 1.0619	ASTM A351 CF8M / 1.4408
20	1	Gehäusedeckel	Body Cover	ASTM A216 WCB / 1.0619	ASTM A351 CF8M / 1.4408
30	1	Stopfbuchsbrille	Gland	A105 / 1.0460	A276 Gr. 316Ti/1.4571
40	1	Schaltkugel	Ball	A182 Gr. 316Ti /1.4571 +Hard facing	A182 Gr. 316Ti /1.4571 +Hard facing
50	1	Kugeldichtring	Seat Ring	A182 Gr. 316Ti /1.4571 +Hard facing	A182 Gr. 316Ti /1.4571 +Hard facing
60	1	Dichtelement	Seal Element (Seat)	PTFE+Graphite	PTFE+Graphite
70	1	Druckring	Pressure Ring	1.4571 / 1.4581	1.4571 / 1.4581
80	1	Tellerfeder	Cup Spring	Inconel X718 / 2.4668	Inconel X718 / 2.4668
90	1	Schaltwelle	Stem	1.4021	A182 F51/1.4462
100	1	Distanzhülse	Bonnet	A105 / 1.0460	A276 Gr. 316Ti/1.4571
110	1	Lagerzapfen	Trunnion	A105 / 1.0460	A276 Gr. 316Ti/1.4571
120	1	Radiallager	Bearing	CS+PTFE	SS+PTFE
130	1	Radiallager	Bearing	CS+PTFE	SS+PTFE
140	1	Radiallager	Bearing	CS+PTFE	SS+PTFE
150	1	Axiallager	Axial Bearing	CS+PTFE	SS+PTFE
160	1	Dichtring	Sealing Ring (Stem)	PTFE-Compound	PTFE-Compound
170	1	Stützring	Supporting Ring	1.4571	1.4571
180	5	Stopfbuchsring	Packing Ring	Graphite	Graphite
190	1	Stützring	Supporting Ring	Graphite	Graphite
200	1	Gehäusedichtring	Gasket	Graphite	Graphite
210	2	Gehäusedichtring	Gasket	Graphite	Graphite
220	1	Abstreifband	Wiper Ring	Graphite	Graphite
230	1	Abstreifband	Wiper Ring	Graphite	Graphite
240	12	Stiftschraube	Stud Bolt	A193 Gr. B7 Zinc plated	A193 Gr. B7 Zinc plated
250	12	Sechskantmutter	Hex. Nut	A194 Gr. 2H Zinc plated	A194 Gr. 2H Zinc plated
260	8	Zylinderschraube	Cyl. Screw	A193 Gr. B7 Zinc plated	A193 Gr. B7 Zinc plated
270	2	Stift	Pin	1.4571	1.4571
280	2	Stiftschraube	Stud Bolt	A193 Gr. B7 Zinc plated	A193 Gr. B7 Zinc plated
290	2	Sechskantmutter	Hex. Nut	A194 Gr. 2H Zinc plated	A194 Gr. 2H Zinc plated
300	8	Zylinderschraube	Cyl. Screw	A193 Gr. B7 Zinc plated	A193 Gr. B7 Zinc plated
310	1	Abstreifer	Bearing Protector	Graphite	Graphite
320	1	Abstreifer	Bearing Protector	Graphite	Graphite
330	1	O-Ring	O-Ring	FKM	FKM

Änderungen im Zuge der Weiterentwicklung vorbehalten!
The parts are subject to change by technical innovation!

Schutzvermerk ISO 16016 beachten!
Pay attention to protection note ISO 16016

Fertigungshinweise / Assembly notes

Gewicht / weight: ca. 286,10 kg

Grenzabmaße für Winkelmaße Limiting size for angular dimensions	Normal Nominal dim.	bis/to 10	über/up 10 bis/to 50	über/up 50 bis/to 120	über/up 120 bis/to 400	über/up 400
	Maß/Deviation	±1°	±0°30'	±0°20'	±0°10'	±0°5'

Oberflächenkanten Surface edges R0.3 R0.8

Allgemeintoleranzen nach DIN ISO 2768-mK / General tolerances to DIN ISO 2768-mK	Normal Nominal dim.	1 bis/to 6	über/up 6 bis/to 30	über/up 30 bis/to 120	über/up 120 bis/to 400	über/up 400 bis/to 1000	über/up 1000 bis/to 2000	über/up 2000 bis/to 4000
	Maß/Deviation	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

	Datum	Name
gezeichnet	05.01.17	Jablonski
geprüft	14.01.17	Roth
freigegeben		

FRIEDRICH KROMBACH GmbH Armaturenwerke D-57074 Kreuztal Postfach 1130

CRANEo

Maßstab: 1:2

FK-Kugelhahn
FK.Ball-Valve
Type: KF09136 DN8" Class300

Zeichnungs-Nr.: KF08403/798(a)

Torque table		
Pos.	Description	Torque
250	Cover	276 Nm
260	Bonnet	139 Nm
290	Gland	85 Nm
300	Trunnion	139 Nm