

FIRE SAFE TEST CERTIFICATE
ACCORDING TO :
API 6FA Third Edition April 1999

Valve type:

BALL VALVE SIDE ENTRY TRUNNION

Size 2" Class 2500 LBS

Material Stainless Steel

BHDT GmbH
Quality Manager
Mr. Gerhard Waltl



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1. SCOPE :

API 6FA cover the requirements for testing and evaluating the performance of valves when exposed to fire.

The burn period of 30 min. has been established on the basis that it represents the maximum time required to extinguish fire.

The most important test conditions are:

- 1) The valve shall be filled with liquid and tested in the closed position.
- 2) The test liquid shall be water
- 3) The valve shall be tested with the stem and bore in the horizontal position.
- 4) Gaseous fuel shall be used for test.
- 5) Valve shall be tested at pressure shown in table 1.

TABLE 1. TEST PRESSURE DURING FIRE TEST

VALVE TYPE	HIGH PRESSURE TEST	LOW PRESSURE TEST
DN 2" CLASS 2500 RF	310,3 \pm 10% bar (31,03 MPa)	// \pm 10% bar (// MPa)

- 6) The valve shall be enveloped in flame having a temperature of 761°C to 980°C average of two thermocouples.
The average must reach 761°C within two minutes from ignition.
No reading shall be below 704°C.
- 7) The average temperature of the calorimeter cubes shall be 650°C within 15 min of starting the burn period. No reading shall be below 565°C.
- 8) The flame thermocouples and the calorimeters shall be located as per figure 1 (for valves with DN \leq 6") and figure 2 (for valves with DN \geq 8") of API 6FA.
- 9) Piping upstream of the test valve larger than 25 mm (one inch) nominal pipe size must be enveloped in flame for a distance of at least 152 mm (6 inches)
- 10) The total burn period will be 30 minutes from ignition.
- 11) The test system, excluding the test valve, may be adjusted during the test period to keep the test within specified limits.

2. VALVE TYPE :

The most important features of tested ball valve are:

- | | |
|------------------------|---------------------|
| A) NOMINAL DIAMETER | DN 2" |
| B) ANSI CLASS | 2500 RF |
| C) END CONNECTIONS | ANSI B16.5 |
| D) BALL VALVE TYPE | SIDE ENTRY TRUNNION |
| E) SEAT SEAL | SOFT SEATED |
| F) DESIGN CONSTRUCTION | ANSI 16.34 - API 6D |

3. MATERIAL LIST :

- | | |
|---------------------|----------------------------|
| A) BODY AND CLOSURE | ASTM A479 Gr.316 |
| B) SEAT | ASTM A479 Gr.316+ DEVLON V |
| C) BALL | ASTM A479 Gr.316 |
| D) STEM | ASTM A479 Gr.316 |
| E) GASKET | Graphite |
| F) O-RING | FKM AED |

4. ASSEMBLY DRAWING :

DRAWING Nr KV50SZU0001_DNV

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Inspector
Mr. Roberto Mastantuono
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5. HYDROSTATIC, PNEUMATIC TEST RESULTS :

<i>TEST PRESSURE ACCORDING API 6D</i>		
<i>PHASE</i>	<i>PRESSURE TEST</i>	<i>TIME OF TEST</i>
HYDRAULIC SHELL TEST	625 BAR	120 SEC.
HYDRAULIC SEAT A TEST	460 BAR	120 SEC
HYDRAULIC SEAT B TEST	460 BAR	120 SEC
OPERATIONAL TEST	460 BAR	//
PNEUMATIC SEAT A TEST	6 BAR	120 SEC.
PNEUMATIC SEAT B TEST	6 BAR	120 SEC.
TEST RESULTS : SATISFACTORY		

6. ANTI STATIC DEVICE TEST RESULTS :

<i>TEST PERFORMED ACCORDING TO</i>	<i>RESULT</i>
API 6D and BS 5351	SATISFACTORY

7. TORQUE MEASUREMENT :

DURING HYDROSTATIC TEST	445 Nm
AFTER COOL DOWN PERIOD	514Nm
MAXIMUM ALLOWABLE	584 Nm

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8. TEMPERATURE MEASUREMENT :

TIME Second	FLAME TEMPERATURE THERMOCOUPLE			CALORIMETERS CUBE TEMPERATURE			
	T1 (°C)	T2 (°C)	AVERAGE (°C)	C1 (°C)	C2 (°C)	C3 (°C)	AVERAGE (°C)
0	21	18	20	25	20		23
30	264	259	262	159	139		149
60	326	321	324	221	201		211
90	577	572	574	472	452		462
120	775	770	773	670	650		660
150	805	800	803	700	680		690
180	821	816	818	716	696		706
210	813	808	810	708	688		698
240	816	811	814	711	691		701
270	817	812	815	712	692		702
300	817	812	815	712	692		702
330	831	826	828	726	706		716
360	843	838	840	738	718		728
390	828	823	826	723	703		713
420	839	834	837	734	714		724
450	818	813	816	713	693		703
480	826	821	823	721	701		711
510	832	827	829	727	707		717
540	816	811	813	711	691		701
570	816	811	813	711	691		701
600	825	820	823	720	700		710
630	832	827	829	727	707		717
660	822	817	819	717	717		717
690	823	818	821	718	718		718
720	822	817	820	717	717		717
750	826	821	823	721	721		721
780	820	815	817	723	723		723
810	812	807	810	707	707		707
840	818	813	816	713	713		713
870	817	812	815	712	712		712
900	826	821	823	721	721		721
930	829	824	827	724	724		724
960	824	819	822	719	719		719
990	821	816	818	716	716		716
1020	819	814	817	714	714		714
1050	815	810	813	710	710		710
1080	815	810	813	710	710		710
1110	819	814	816	714	714		714
1140	827	822	824	722	722		722

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TIME Second	FLAME TEMPERATURE THERMOCOUPLE			CALORIMETERS CUBE TEMPERATURE			
	T1 (°C)	T2 (°C)	AVERAGE (°C)	C1 (°C)	C2 (°C)	C3 (°C)	AVERAGE (°C)
1170	824	819	822	719	719		719
1200	826	821	823	721	721		721
1230	818	813	815	713	713		713
1260	824	819	821	719	719		719
1290	821	816	819	716	716		716
1320	836	831	833	731	731		731
1350	847	842	845	742	742		742
1380	849	844	846	744	744		744
1410	861	856	859	756	756		756
1440	854	849	852	749	749		749
1470	847	842	844	742	742		742
1500	852	847	849	747	747		747
1530	832	827	829	727	727		727
1560	833	828	831	728	728		728
1590	842	837	840	737	737		737
1620	835	830	833	730	730		730
1650	832	827	829	727	727		727
1680	834	829	831	729	729		729
1710	835	830	833	730	730		730
1740	837	832	835	732	732		732
1770	833	828	830	728	728		728
1800	841	836	838	736	736		736
1590	824	819	822	719	719		719
1620	826	821	823	721	721		721
1650	818	813	815	713	713		713
1680	824	819	821	719	719		719
1710	821	816	819	716	716		716
1740	836	831	833	731	731		731
1770	847	842	845	742	742		742
1800	849	844	846	744	744		744

T1 & T2 Flame thermocouple
C1 & C2 & C3 Calorimeter cube

All tests have been performed in the factory of the :

- BMB Valve S.r.l. Via Arturo Toscanini 20020 Magnago (MI)

BHDT GmbH
 Quality Manager
 Mr. Gerhard Waltl

DNV GL
 Inspector
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9. TEST REPORT :
4.1-) Through-seat leakage during burn period (High Test Pressure)

- Leakage recorded	453 ml/min
- Max allowable Leakage	800 ml/min
- Results	SATISFACTORY

4.2-) External leakage (High Test Pressure) during burn and cool-down period (Valve in closed position)

- Leakage recorded	105 ml/min
- Max allowable Leakage	200 ml/min
- Results	SATISFACTORY

4.2-) Time taken to cool down the external surface of the valve to 100 °C 10 Minute Max.

- Valve Temperature at the end of the Test	94 °C
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4.3-) Through seat leakage (Low Test Pressure) after cool-down period

- Leakage recorded	// ml/min
- Max allowable Leakage	// ml/min
- Results	//

4.4-) External leakage (Low Test Pressure) after cool-down period (Valve in closed position)

- Leakage recorded	// ml/min
- Max allowable Leakage	// ml/min
- Results	//

4.6-) External leakage in fully open position after cool-down period (High Test Pressure)

- Leakage recorded	200 ml/min
- Max allowable Leakage	400 ml/min
- Results	SATISFACTORY

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10. CONCLUSIONS :

Based on the Positive Results of the above mentioned tests,

we certify that the Valve in object is to be considered a

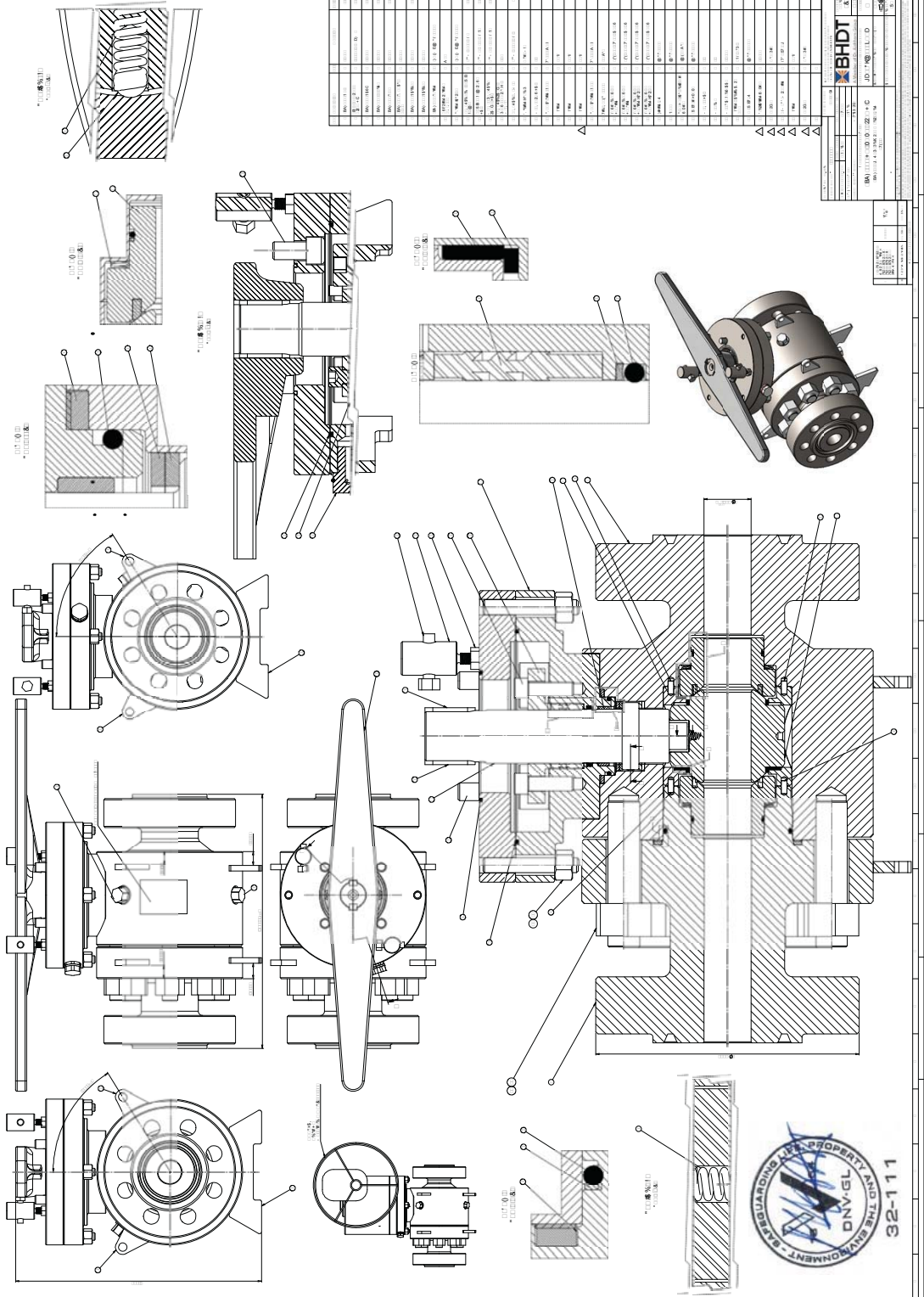
“FIRE-SAFE VALVE”

according to

API 6FA Third Edition April 1999

BHDT GmbH
Quality Manager
Mr. Gerhard Waltl





No.	Part Name	Material	Quantity	Remarks
1	Handwheel	Steel	1	
2	Actuator Housing	Cast Iron	1	
3	Internal Shaft	Steel	1	
4	Seal Ring	NBR	1	
5	Bolt	Steel	4	M8 x 20
6	Washer	Steel	4	W8
7	Spring	Steel	1	Φ12 x 40
8	Pin	Steel	1	Φ6 x 20
9	Bracket	Steel	1	
10	Seal	NBR	2	
11	Cap Screw	Steel	2	M6 x 10
12	Washer	Steel	2	W6
13	Pin	Steel	2	Φ4 x 10
14	Bracket	Steel	1	
15	Seal	NBR	1	
16	Cap Screw	Steel	1	M6 x 10
17	Washer	Steel	1	W6
18	Pin	Steel	1	Φ4 x 10
19	Bracket	Steel	1	
20	Seal	NBR	1	
21	Cap Screw	Steel	1	M6 x 10
22	Washer	Steel	1	W6
23	Pin	Steel	1	Φ4 x 10
24	Bracket	Steel	1	
25	Seal	NBR	1	
26	Cap Screw	Steel	1	M6 x 10
27	Washer	Steel	1	W6
28	Pin	Steel	1	Φ4 x 10
29	Bracket	Steel	1	
30	Seal	NBR	1	
31	Cap Screw	Steel	1	M6 x 10
32	Washer	Steel	1	W6
33	Pin	Steel	1	Φ4 x 10
34	Bracket	Steel	1	
35	Seal	NBR	1	
36	Cap Screw	Steel	1	M6 x 10
37	Washer	Steel	1	W6
38	Pin	Steel	1	Φ4 x 10
39	Bracket	Steel	1	
40	Seal	NBR	1	
41	Cap Screw	Steel	1	M6 x 10
42	Washer	Steel	1	W6
43	Pin	Steel	1	Φ4 x 10
44	Bracket	Steel	1	
45	Seal	NBR	1	
46	Cap Screw	Steel	1	M6 x 10
47	Washer	Steel	1	W6
48	Pin	Steel	1	Φ4 x 10
49	Bracket	Steel	1	
50	Seal	NBR	1	

BHD	
No.	Part Name
1	Handwheel
2	Actuator Housing
3	Internal Shaft
4	Seal Ring
5	Bolt
6	Washer
7	Spring
8	Pin
9	Bracket
10	Seal
11	Cap Screw
12	Washer
13	Pin
14	Bracket
15	Seal
16	Cap Screw
17	Washer
18	Pin
19	Bracket
20	Seal
21	Cap Screw
22	Washer
23	Pin
24	Bracket
25	Seal
26	Cap Screw
27	Washer
28	Pin
29	Bracket
30	Seal
31	Cap Screw
32	Washer
33	Pin
34	Bracket
35	Seal
36	Cap Screw
37	Washer
38	Pin
39	Bracket
40	Seal
41	Cap Screw
42	Washer
43	Pin
44	Bracket
45	Seal
46	Cap Screw
47	Washer
48	Pin
49	Bracket
50	Seal



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Cert. No. DNV_GL-2017-BHDT_FTC-001-A

Client : BHDT GmbH - Werk-VI - Straße 52 - 8605 Kapfenberg - AT
 Location of test : BMB Valve S.r.l. - Via Arturo Toscanini 20020 Magnago (MI)
 Date of test : 14 April 2017

We hereby declare that,

at request of Messrs BHDT GmbH the undersigned GLIS Surveyor did attend at the Plant deputed for the tests BMB Valve S.r.l. located in Via Arturo Toscanini 20020 Magnago (MI) - ITALY on date 14 April 2017, for the purpose of witnessing the FIRE TEST on the following valve according to API 6FA Ed.1999.

***BALL VALVE SIDE ENTRY TRUNNI ON
 2" Class 2500lbs - Stainless Steel***

Enclosed is a sectional drawing of the valve under test complete with a list of materials :
 Drawing / Figure N° : KV50SZU0001_DNV

The following tests were carried out:

- 1-) The valve was subjected to full hydrostatic (water) and gas tests at ambient temperature with Satisfactory results.
 Tests were in accordance with API 6D 24th Edition 2014.
- 2-) The valve was fire tested according to API 6FA Ed.1999.
- 3-) The valve was completely disassembled and all components were found in good conditions with exception of the Soft Seat and Soft Seals that were damaged.
- 4-) Herewith attached and duly endorsed the following documents :
 Fire Test Report N° : KV50SZU0001_DNV
 Drawing / Figure N° : KV50SZU0001_DNV

CONCLUSION :

On the basis of test results the BALL VALVE SIDE ENTRY TRUNNI ON 2" Class 2500lbs - Stainless Steel passed satisfactorily the fire safe test.

Inspector Germanischer Lloyd
 (printed/signature/stamp)
 R. Mastantuono
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