TEST Report

Fire Type Test according to DIN EN ISO 10497
Report IBB-2464

This report confirms the successful testing of a representative valve in compliance with DIN EN ISO 10497, 2010, and API 607, 7th edition.

Manufacturer	Armature d.o.o. Koroska cesta 55 2366 Muta, SI	Friedrich Krombach GmbH Postfach 1130 57202 Kreuztal
	Crane Ningjin Valve Co. Jing Long St. 496 055550 Ningjin, China	Xomox Chihuahua S.A de C.V Juan Ruiz de Alarcón 313 31000 Chihuahua, Mexico
Test Valve	Krombach (R) TUFSEAT TM Performance Series with High Temperature Trim Metal Seated Ball Valve NPS 2 Class 150 Flange end connections, Gear operated Nominal bore: 2'' Pressure rating: Class 150 Body/Bonnet material: A216 WCB 1.0619 Stem material: A276 431 1.4057 Ball material: A182 F316L 1.4404 + coating Ball seal material: A182 F316L 1.4404 + coating Operation device: Gear with handwheel Drawing Number: 49 243 06 012	
Date of Testing	03 February 2021	
Test Report	5 pages	
Qualified sizes	DN 50 and below, DN 65, DN 80, DN 100 2'' and below, 2 ½'', 3'', 4''	
Qualified pressure ratings	Class 150, Class 300 PN 10, PN 16, PN 25, PN 40	
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, 7th 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. 14.5 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: 4 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): 11.05 am

Temperatures and pressure during burn period

Time	p	T_{Fire1}	T_{Fire2}	T_{Cal1}	T_{Cal2}
[s]	[barg]	[°C]	[°C]	[°C]	[°C]
.0	14.5	9.0	10.3	9.8	11.0
30.0	14.5	723.9	383.4	20.6	18.3
60.0	14.4	843.8	778.0	78.4	60.9
90.0	14.3	893.3	762.4	152.8	119.2
120.0	14.5	931.8	828.7	227.5	181.9
150.0	14.3	858.8	785.1	300.0	244.5
180.0	14.3	877.0	790.4	361.9	303.8
210.0	14.4	873.1	780.9	417.2	359.5
240.0	14.5	854.4	802.6	466.5	409.9
270.0	14.4	865.6	801.7	510.0	458.4
300.0	14.5	878.4	807.6	550.4	504.1
330.0	14.4	858.1	825.8	585.0	544.2
360.0	14.4	896.6	839.2	615.9	580.3
390.0	14.5	877.2	851.5	642.7	611.9
420.0	14.5	839.0	824.7	665.2	638.9
450.0	14.6	827.2	794.2	684.5	641.3
480.0	14.4	829.0	898.3	682.7	646.2
510.0	14.5	852.2	840.4	687.9	656.5
540.0	14.4	900.6	887.8	697.9	661.8

570.0	14.5	951.0	882.6	701.0	669.0
600.0	14.4	970.3	864.2	710.1	686.9
630.0	14.4	989.3	931.7	735.4	713.4
660.0	14.4	976.3	847.6	760.1	737.3
690.0	14.4	955.6	855.0	778.8	754.7
720.0	14.5	948.6	860.3	794.4	767.1
750.0	14.4	916.5	827.7	806.7	777.7
780.0	14.4	929.3	835.1	815.6	787.3
810.0	14.4	939.5	850.8	824.7	795.7
840.0	14.4	946.8	856.7	832.7	803.3
870.0	14.4	928.0	806.9	839.9	810.0
900.0	14.5	926.1	878.9	843.5	814.0
930.0	14.4	951.8	899.7	846.7	818.8
960.0	14.4	965.1	928.9	851.2	825.2
990.0	14.5	966.5	906.1	856.3	831.3
1020.0	14.4	956.1	844.4	861.8	836.8
1050.0	14.4	964.6	865.0	865.7	840.0
1080.0	14.6	932.0	897.3	869.2	843.4
1110.0	14.6	953.9	925.6	869.3	845.3
1140.0	14.5	965.4	907.5	873.5	847.6
1170.0	14.5	950.3	889.3	875.8	850.5
1200.0	14.4	931.8	913.7	875.3	851.0
1230.0	14.3	968.6	871.8	875.6	851.0
1260.0	14.4	927.3	920.7	875.5	849.8
1290.0	14.3	938.4	913.3	875.9	852.0
1320.0	14.3	937.3	942.4	876.9	853.0
1350.0	14.4	946.7	865.0	879.2	853.9
1380.0	14.4	950.3	822.4	881.9	852.3
1410.0	14.4	949.0	845.0	881.8	850.8
1440.0	14.4	945.1	897.0	880.9	849.7
1470.0	14.5	958.3	883.5	880.6	851.0
1500.0	14.5	914.6	800.5	882.7	851.7
1530.0	14.4	931.3	909.6	877.6	849.6
1560.0	14.4	956.2	891.8	877.5	851.1
1590.0	14.5	924.2	869.0	878.9	851.3
1620.0	14.6	937.2	866.6	878.0	850.5
1650.0	14.6	947.9	841.3	877.7	849.0
1680.0	14.6	941.4	863.1	877.0	848.5
1710.0	14.5	899.3	956.3	875.1	847.4
1740.0	14.4	900.3	910.7	876.9	849.0
1770.0	14.5	927.8	845.8	873.9	846.8
1800.0	14.5	911.1	960.8	870.4	845.9

Time required for valve to cool down to 100 °C: 6 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:	0,3	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:	0,4	1,0

Comments on the results

The test valve is a ball valve with the pressure relief system for the valve ball tested in valve inlet.

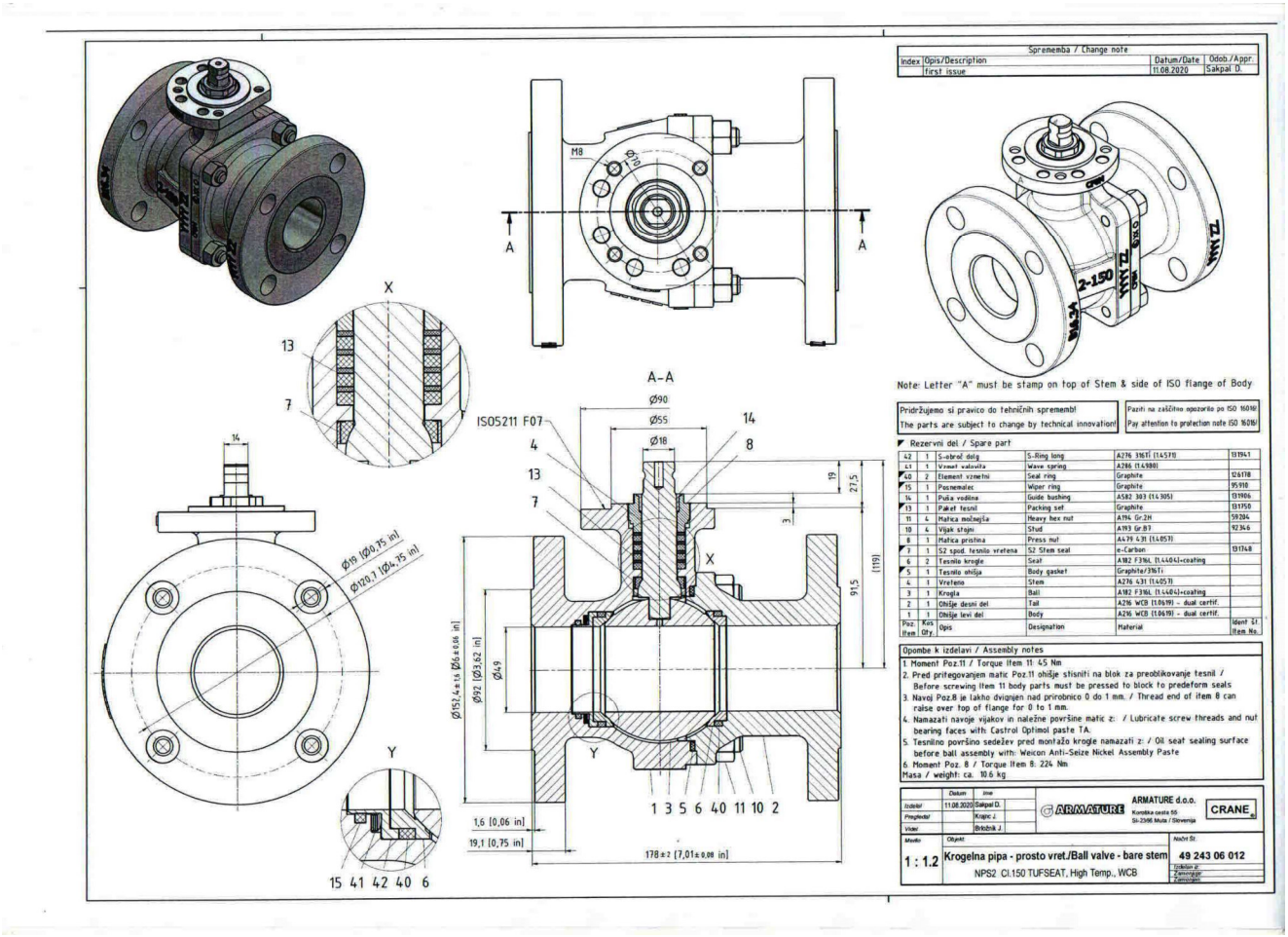
Conclusion

The test valve fulfilled the test requirements according to DIN EN ISO 10497, 2010, and API 607, 7th edition. Only allowable through-seat-leakages and external leakages were observed during the tests.

Herford, 03 February 2021

Dr.-Ing. T. Bäumer
GmbH

Mr. Dr. T. Bäumer
Consultant engineer


Sprememba / Change note
Index Opis/Description Datum/Date Odob./Appr.
first issue 11.08.2020 Sakpal D.
M8
A
A
X
13
7
A-A
ISO5211 F07
Ø90
Ø55
Ø18
14
8
4
13
7
19
27,5
3
X
91,5
(119)
Y
Ø92 (Ø3,62 in)
Ø64,9
1,6 [0,06 in]
19,1 [0,75 in]
178 ± 2 [7,01 ± 0,08 in]
1 3 5 6 40 11 10 2
Ø19 [Ø0,75 in]
Ø170,7 [Ø4,75 in]
14
Y
15 41 42 40 6
Note: Letter "A" must be stamp on top of Stem & side of ISO flange of Body
Pridržujemo si pravico do tehničnih sprememb!
The parts are subject to change by technical innovation!
Paziti na zaščitno opozorilo po ISO 16016
Pay attention to protection note ISO 16016
Rezervni del / Spare part
Poz. Item | Kos Qty. | Opis | Designation | Material | Ident. št. Item No.
42 | 1 | S-obroč dolg | S-Ring long | A276 316Ti (1.4571) | 131941
41 | 1 | Vzmet valovita | Wave spring | A286 (1.4980) |
40 | 2 | Element vznetni | Seal ring | Graphite | 126118
15 | 1 | Pocinmalec | Wiper ring | Graphite | 95910
14 | 1 | Puša vodilna | Guide bushing | A582 303 (1.4305) | 131986
13 | 1 | Paket tesnil | Packing set | Graphite | 131750
11 | 4 | Matica močnejša | Heavy hex nut | A194 Gr.2H | 59204
10 | 4 | Vijak stopni | Stud | A193 Gr.B7 | 92346
9 | 1 | Matica pritisna | Press nut | A479 431 (1.4057) |
7 | 1 | S2 spod. tesnilo vretena | S2 Stem seal | e-Carbon | 131748
6 | 2 | Tesnilo krogle | Seat | A182 F316L (1.4404)+coating |
5 | 1 | Tesnilo ohišja | Body gasket | Graphite/316Ti |
4 | 1 | Vretena | Stem | A276 431 (1.4057) |
3 | 1 | Krogla | Ball | A182 F316L (1.4404)+coating |
2 | 1 | Ohišje desni del | Tail | A216 WCB (1.0619) - dual certif. |
1 | 1 | Ohišje levi del | Body | A216 WCB (1.0619) - dual certif. |
Opombe k izdelavi / Assembly notes
1. Moment Poz.11 / Torque Item 11: 45 Nm
2. Pred pritegovanjem matic Poz.11 ohišje stisniti na blok za preoblikovanje tesnil / Before screwing item 11 body parts must be pressed to block to predeform seals
3. Navoj Poz.8 je lahko dvignjen nad prirobnico 0 do 1 mm. / Thread end of item 8 can raise over top of flange for 0 to 1 mm.
4. Namazati navoje vijakov in naležne površine matic z: / Lubricate screw threads and nut bearing faces with Castrol Optimol paste TA.
5. Tesnilno površino sedežev pred montažo krogle namazati z: / Oil seat sealing surface before ball assembly with: Weicon Anti-Seize Nickel Assembly Paste
6. Moment Poz. 8 / Torque Item 8: 224 Nm
Masa / weight: ca. 10.6 kg
Izdelal / Pregledal / Vizir
Datum / Ime
11.08.2020 Sakpal D.
Krajnc J.
Brložnik J.
ARMATURE d.o.o.
Kvedrova cesta 55
SI-2366 Muta / Slovenija
CRANE
Merilo 1 : 1.2
Objekt: Krogelna pipa - prosto vret./Ball valve - bare stem
NPS2 Cl.150 TUFSEAT, High Temp., WCB
Načrt št. 49 243 06 012
Izdelan dr. / Zamenjuje / Zamenjan

Dr.-Ing. T. Bäumer

Prüflabor - Ingenieurbüro – Prüfstände

TEST Certificate

Fire Type Test according to DIN EN ISO 10497
Report IBB-2464

This report confirms the successful testing of a representative valve in compliance with DIN EN ISO 10497, 2010, and API 607, 7th edition.

Manufacturer	Armature d.o.o. Koroska cesta 55 2366 Muta, SI	Friedrich Krombach GmbH Postfach 1130 57202 Kreuztal
	Crane Ningjin Valve Co. Jing Long St. 496 055550 Ningjin, China	Xomox Chihuahua S.A de C.V Juan Ruiz de Alarcón 313 31000 Chihuahua, Mexico
Test Valve	Krombach (R) TUFSEAT TM Performance Series with High Temperature Trim Metal Seated Ball Valve NPS 2 Class 150 Flange end connections, Gear operated Body/Bonnet material: A216 WCB 1.0619 Drawing Number: 49 243 06 012	
Date of Testing	03 February 2021	
Qualified sizes	DN 50 and below, DN 65, DN 80, DN 100 2'' and below, 2 ½'', 3'', 4''	
Qualified pressure ratings	Class 150, Class 300 PN 10, PN 16, PN 25, PN 40	
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, 7th edition	

Herford, 03 February 2021

Dr.-Ing. T. Bäumer
GmbH

Mr. Dr. T. Bäumer
Consultant engineer

TEST Report

Fire Type Test according to DIN EN ISO 10497
Report IBB-2400

This report confirms the successful testing of a representative valve in compliance with DIN EN ISO 10497, 2010, and API 607, 7th edition.

Manufacturer	Armature d.o.o. Koroska cesta 55 2366 Muta, SI	Friedrich Krombach GmbH Postfach 1130 57202 Kreuztal
	Crane Ningjin Valve Co. Jing Long St. 496 055550 Ningjin, China	Xomox Chihuahua S.A de C.V Juan Ruiz de Alarcón 313 31000 Chihuahua, Mexico
Test Valve	Krombach (R) TUFSEAT TM Performance Series with High Temperature Trim Metal Seated Ball Valve NPS 3 Class 150 Flange end connections, Gear operated Nominal bore: 3'' Pressure rating: Class 150 Body/Bonnet material: A216 WCB 1.0619 Stem material: A276 431 1.4057 Ball material: A182 F316L 1.4404 + coating Ball seal material: A182 F316L 1.4404 + coating Operation device: Gear with handwheel Drawing Number: 49 243 08 016	
Date of Testing	24 September 2020	
Test Report	5 pages	
Qualified sizes	DN 80, DN 100, DN 125, DN 150 3'', 4'', 5'', 6''	
Qualified pressure ratings	Class 150, Class 300 PN 10, PN 16, PN 25, PN 40	
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, 7th 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. 14.5 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: 4 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): 10.20 am

Temperatures and pressure during burn period

Time	p	T_{Fire1}	T_{Fire2}	T_{Cal1}	T_{Cal2}
[s]	[barg]	[°C]	[°C]	[°C]	[°C]
.0	14.6	23.3	26.8	32.6	31.7
30.0	14.5	713.1	691.6	50.2	43.8
60.0	14.5	804.4	732.4	116.5	90.1
90.0	14.6	819.8	780.0	198.7	165.4
120.0	14.6	843.2	810.8	281.0	241.7
150.0	14.6	853.7	829.7	356.9	310.2
180.0	14.6	874.7	826.9	424.2	390.7
210.0	14.5	873.7	797.9	445.0	430.4
240.0	14.6	864.5	780.2	465.2	459.6
270.0	14.6	871.9	798.3	484.5	478.0
300.0	14.6	861.9	848.3	503.2	495.4
330.0	14.6	864.7	830.9	521.2	512.4
360.0	14.6	873.0	819.3	538.0	529.6
390.0	14.6	877.6	803.5	553.8	546.1
420.0	14.5	867.9	836.3	568.9	561.2
450.0	14.5	856.0	855.0	582.9	575.7
480.0	14.6	846.5	853.8	596.0	590.1
510.0	14.5	843.1	824.6	608.2	604.5
540.0	14.6	876.7	792.3	619.7	618.1
570.0	14.6	877.8	777.9	630.5	631.1

600.0	14.6	876.7	787.5	640.5	643.5
630.0	14.5	892.7	765.9	650.1	655.1
660.0	14.6	899.1	762.3	659.0	666.3
690.0	14.4	891.0	818.4	667.1	676.7
720.0	14.5	858.9	787.6	674.8	686.5
750.0	14.6	818.7	772.9	681.8	695.6
780.0	14.6	818.1	794.1	687.5	703.4
810.0	14.5	852.2	793.5	692.4	710.5
840.0	14.6	847.1	774.3	697.6	717.3
870.0	14.5	839.1	765.8	702.0	723.1
900.0	14.5	852.7	767.3	706.1	728.8
930.0	14.6	855.1	770.5	710.0	734.2
960.0	14.7	821.7	785.7	714.0	739.1
990.0	14.6	828.7	785.5	717.3	743.7
1020.0	14.5	835.6	786.4	720.2	747.4
1050.0	14.5	842.4	781.7	722.6	750.6
1080.0	14.6	832.3	777.0	724.9	753.7
1110.0	14.6	810.5	768.0	727.0	757.0
1140.0	14.7	808.2	783.6	729.1	759.9
1170.0	14.6	812.3	779.5	730.8	762.2
1200.0	14.7	839.6	782.1	732.7	763.9
1230.0	14.7	844.0	798.3	734.0	765.3
1260.0	14.6	881.6	831.1	734.4	766.5
1290.0	14.7	837.6	787.3	738.4	769.7
1320.0	14.6	810.0	770.8	742.2	773.7
1350.0	14.6	804.6	784.0	744.5	777.1
1380.0	14.7	819.0	785.8	746.5	779.9
1410.0	14.6	818.0	777.9	748.0	782.0
1440.0	14.6	832.8	793.2	749.6	784.2
1470.0	14.7	855.6	798.0	752.8	786.3
1500.0	14.6	870.0	794.8	756.4	788.1
1530.0	14.6	879.2	787.1	760.6	790.1
1560.0	14.7	892.1	785.1	764.9	793.4
1590.0	14.6	885.6	796.4	768.9	797.1
1620.0	14.6	881.2	786.3	773.0	800.5
1650.0	14.6	863.7	812.0	777.3	803.3
1680.0	14.7	889.2	800.8	781.6	806.0
1710.0	14.7	896.3	778.4	785.3	809.4
1740.0	14.6	864.2	781.5	788.4	813.1
1770.0	14.6	853.3	776.8	791.0	815.9
1800.0	14.7	844.9	781.8	793.1	817.6

Time required for valve to cool down to 100 °C: 7 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:	0,1	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 a ball valve with the pressure relief system for the valve ball tested in valve inlet. Other valves of same valve type were tested with the pressure relief system in valve outlet.

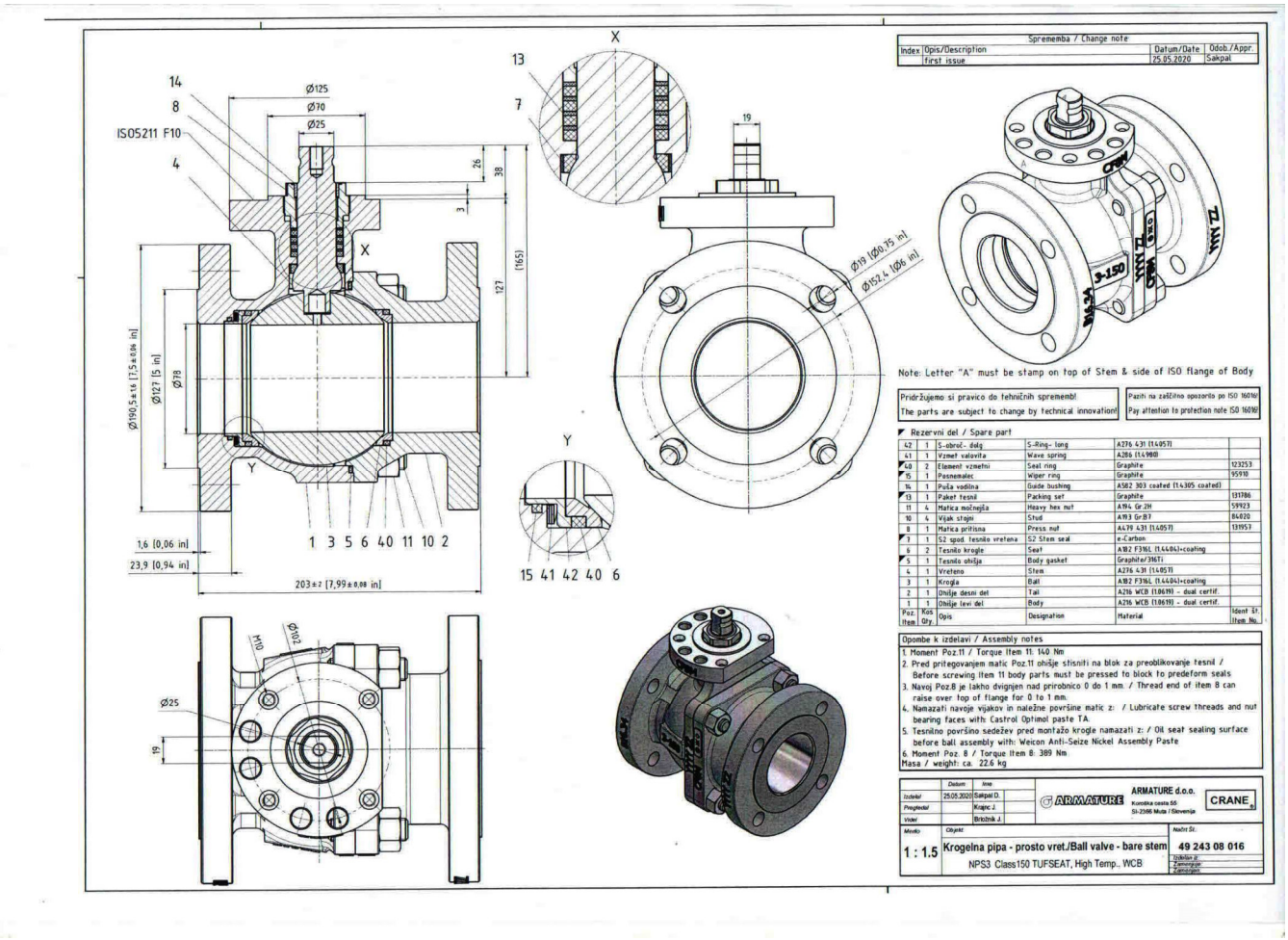
Conclusion

The test valve fulfilled the test requirements according to DIN EN ISO 10497, 2010, and API 607, 7th edition. Only allowable through-seat-leakages and external leakages were observed during the tests.

Herford, 24 September 2020

Dr.-Ing. T. Bäumer
GmbH

Mr. Dr. T. Bäumer
Consultant engineer


Sprememba / Change note
Index | Opis/Description | Datum/Date | Odob./Appr.
first issue | 25.05.2020 | Sakpal
Note: Letter "A" must be stamp on top of Stem & side of ISO flange of Body
Pridržujemo si pravico do tehničnih sprememb!
The parts are subject to change by technical innovation!
Pazili na zaščitno opozorilo po ISO 16016!
Pay attention to protection note ISO 16016!
Rezervni del / Spare part
Opombe k izdelavi / Assembly notes
1. Moment Poz.11 / Torque Item 11: 140 Nm
2. Pred pritegovanjem matic Poz.11 ohišje stisniti na blok za preoblikovanje tesnil / Before screwing Item 11 body parts must be pressed to block to predeform seals
3. Navoj Poz.8 je lahko dvignjen nad prirobnico 0 do 1 mm. / Thread end of item 8 can raise over top of flange for 0 to 1 mm.
4. Namazati navoje vijakov in naležne površine matic z: / Lubricate screw threads and nut bearing faces with: Castrol Optimol paste TA.
5. Tesnilno površino sedežev pred montažo krogle namazati z: / Oil seat sealing surface before ball assembly with: Wesco Anti-Seize Nickel Assembly Paste
6. Moment Poz. 8 / Torque Item 8: 389 Nm
Masa / weight: ca. 22.6 kg
ARMATURE d.o.o.
CRANE
1 : 1.5
Krogelna pipa - prosto vret./Ball valve - bare stem
NPS3 Class150 TUFSEAT, High Temp., WCB
49 243 08 016

Dr.-Ing. T. Bäumer

Prüflabor - Ingenieurbüro – Prüfstände

TEST Certificate

Fire Type Test according to DIN EN ISO 10497
Report IBB-2400

This report confirms the successful testing of a representative valve in compliance with DIN EN ISO 10497, 2010, and API 607, 7th edition.

Manufacturer	Armature d.o.o. Koroska cesta 55 2366 Muta, SI	Friedrich Krombach GmbH Postfach 1130 57202 Kreuztal
	Crane Ningjin Valve Co. Jing Long St. 496 055550 Ningjin, China	Xomox Chihuahua S.A de C.V Juan Ruiz de Alarcón 313 31000 Chihuahua, Mexico
Test Valve	Krombach (R) TUFSEAT TM Performance Series with High Temperature Trim Metal Seated Ball Valve NPS 3 Class 150 Flange end connections, Gear operated Body/Bonnet material: A216 WCB 1.0619 Drawing Number: 49 243 08 016	
Date of Testing	24 September 2020	
Qualified sizes	DN 80, DN 100, DN 125, DN 150 3'', 4'', 5'', 6''	
Qualified pressure ratings	Class 150, Class 300 PN 10, PN 16, PN 25, PN 40	
Test requirements	The tests were carried out strictly in accordance with DIN EN ISO 10497, 2010, and API 607, 7th edition	

Herford, 24 September 2020

Dr.-Ing. T. Bäumer
GmbH

Mr. Dr. T. Bäumer
Consultant engineer

TEST Report

Fire Type Test according to DIN EN ISO 10497
Report IBB-2402

This report confirms the successful testing of a representative valve in compliance with DIN EN ISO 10497, 2010, and API 607, 7th edition.

Manufacturer	Armature d.o.o. Koroska cesta 55 2366 Muta, SI	Friedrich Krombach GmbH Postfach 1130 57202 Kreuztal
	Crane Ningjin Valve Co. Jing Long St. 496 055550 Ningjin, China	Xomox Chihuahua S.A de C.V Juan Ruiz de Alarcón 313 31000 Chihuahua, Mexico
Test Valve	Krombach (R) TUFSEAT TM Performance Series with High Temperature Trim Metal Seated Ball Valve NPS 3 Class 150 Flange end connections, Gear operated Nominal bore: 3'' Pressure rating: Class 150 Body/Bonnet material: A351 CF8M 1.4408 Stem material: A276 431 1.4057 Ball material: A182 F316L 1.4404 + coating Ball seal material: A182 F316L 1.4404 + coating Operation device: Gear with handwheel Drawing Number: 49 243 08 004	
Date of Testing	24 September 2020	
Test Report	5 pages	
Qualified sizes	DN 80, DN 100, DN 125, DN 150 3'', 4'', 5'', 6''	
Qualified pressure ratings	Class 150, Class 300 PN 10, PN 16, PN 25, PN 40	
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, 7th 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. 14.5 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: 4 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): 02.25 pm

Temperatures and pressure during burn period

Time	p	T_{Fire1}	T_{Fire2}	T_{Cal1}	T_{Cal2}
[s]	[barg]	[°C]	[°C]	[°C]	[°C]
.0	14.3	19.9	22.9	20.2	28.2
30.0	14.3	603.8	651.8	29.0	33.5
60.0	14.4	798.3	771.8	83.2	74.5
90.0	14.4	817.3	808.9	156.7	130.7
120.0	14.3	832.0	833.8	232.2	191.7
150.0	14.4	893.5	852.6	308.9	254.8
180.0	14.4	915.1	843.6	382.3	319.2
210.0	14.4	917.4	823.3	448.0	380.3
240.0	14.3	853.1	762.7	505.9	437.0
270.0	14.3	857.7	844.3	554.0	486.4
300.0	14.4	804.7	797.9	594.7	530.8
330.0	14.4	876.6	841.6	627.3	569.3
360.0	14.5	899.6	874.5	657.8	603.2
390.0	14.4	948.7	859.0	684.4	633.2
420.0	14.4	829.5	852.1	707.1	658.8
450.0	14.3	894.8	834.8	725.8	680.2
480.0	14.3	956.5	835.2	743.4	696.9
510.0	14.4	933.8	850.8	760.6	707.9
540.0	14.5	883.3	824.9	775.5	720.1
570.0	14.5	870.7	831.0	785.3	732.1

600.0	14.3	890.1	834.9	796.0	742.5
630.0	14.5	882.0	837.0	803.3	751.7
660.0	14.4	863.8	857.6	807.6	758.8
690.0	14.5	874.3	856.9	812.5	764.2
720.0	14.5	845.3	842.2	814.0	768.4
750.0	14.4	835.5	864.8	814.1	771.2
780.0	14.4	868.1	874.9	814.1	773.6
810.0	14.3	820.0	803.4	816.6	774.8
840.0	14.3	783.8	823.6	813.6	774.6
870.0	14.4	809.2	842.3	812.3	773.3
900.0	14.4	842.5	871.3	808.4	771.7
930.0	14.3	833.2	861.9	807.7	769.0
960.0	14.4	801.8	779.2	808.3	768.7
990.0	14.3	794.3	831.3	804.9	766.3
1020.0	14.4	768.8	794.5	800.9	763.7
1050.0	14.3	796.5	785.5	798.3	763.0
1080.0	14.5	811.1	824.2	800.7	764.7
1110.0	14.5	827.7	864.4	799.6	765.8
1140.0	14.5	809.3	837.4	802.7	770.3
1170.0	14.5	813.0	829.4	801.1	769.6
1200.0	14.4	768.4	750.8	797.3	766.8
1230.0	14.3	873.6	848.3	792.9	765.0
1260.0	14.4	804.2	811.1	798.1	767.1
1290.0	14.4	775.9	795.2	798.2	763.0
1320.0	14.5	827.4	846.7	797.5	763.2
1350.0	14.4	851.9	889.4	803.2	768.7
1380.0	14.5	888.7	932.5	806.4	775.9
1410.0	14.5	847.8	884.9	813.1	782.5
1440.0	14.4	884.3	909.1	817.1	787.2
1470.0	14.4	837.3	884.0	823.4	792.8
1500.0	14.3	879.6	858.7	826.0	795.3
1530.0	14.3	859.8	841.6	831.0	797.7
1560.0	14.5	885.3	846.8	833.5	800.4
1590.0	14.3	895.5	868.3	835.6	800.0
1620.0	14.4	915.1	889.8	839.2	803.6
1650.0	14.4	915.0	877.5	844.4	807.8
1680.0	14.5	890.4	865.6	846.9	806.1
1710.0	14.4	850.0	890.3	848.8	807.8
1740.0	14.4	885.3	915.9	848.5	809.8
1770.0	14.5	844.3	872.7	847.9	810.3
1800.0	14.5	840.0	881.3	846.1	810.2

Time required for valve to cool down to 100 °C: 6 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:	0,1	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 a ball valve with the pressure relief system for the valve ball tested in valve outlet. Other valves of same valve type were tested with the pressure relief system in valve inlet.

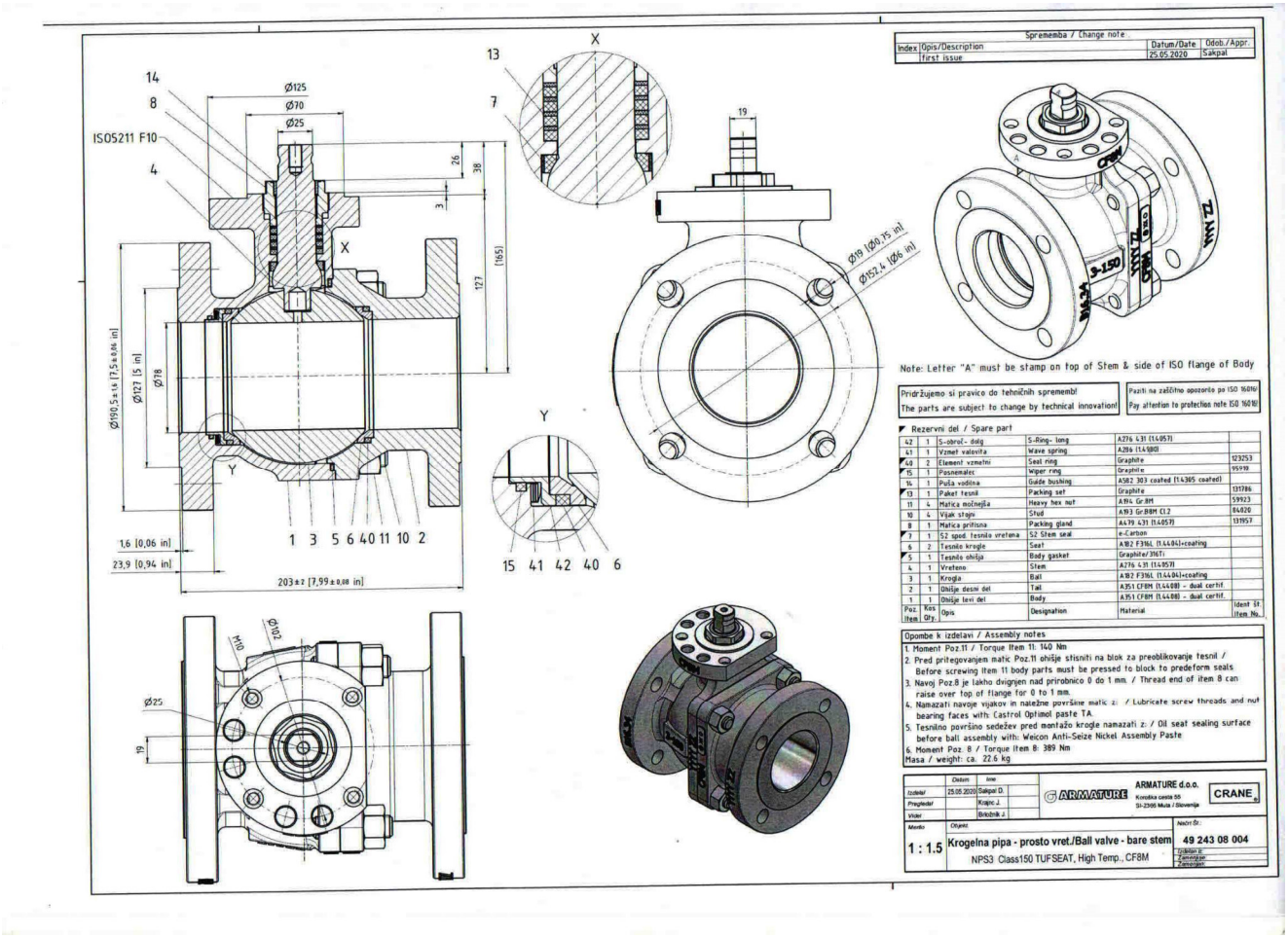
Conclusion

The test valve fulfilled the test requirements according to DIN EN ISO 10497, 2010, and API 607, 7th edition. Only allowable through-seat-leakages and external leakages were observed during the tests.

Herford, 24 September 2020

Dr.-Ing. T. Bäumer
GmbH

Mr. Dr. T. Bäumer
Consultant engineer


Sprememba / Change note
Index | Opis/Description | Datum/Date | Odob./Appr.
first issue | 25.05.2020 | Sakpal
Ø125
Ø70
Ø25
ISO5211 F10
Ø190,5 ± 1,6 [7,5 ± 0,06 in]
Ø127 [5 in]
Ø78
1,6 [0,06 in]
23,9 [0,94 in]
203 ± 2 [7,99 ± 0,08 in]
1 3 5 6 40 11 10 2
15 41 42 40 6
Ø19 [Ø0,75 in]
Ø152,4 [Ø6 in]
Note: Letter "A" must be stamp on top of Stem & side of ISO flange of Body
Pridržujemo si pravico do tehničnih sprememb!
The parts are subject to change by technical innovation!
Pazite na zaščitno opozorilo po ISO 16010
Pay attention to protection note ISO 16010
Rezervni del / Spare part
42 1 S-obroč- dolg S-Ring- long A276 431 (14057)
41 1 Vzmet valovita Wave spring A286 (14980)
40 2 Element vzmetni Seal ring Graphite 123253
15 1 Pisnemalec Wiper ring Graphite 95939
14 1 Puša vodilna Guide bushing A582 303 coated (14305 coated)
13 1 Paket tesnil Packing set Graphite 131786
11 4 Matica mošnjača Heavy hex nut A194 Gr.8M 59923
10 4 Vijak stopi Stud A193 Gr.B8M Cl.2 84020
8 1 Matica pritisna Packing gland A479 431 (14057) 131957
7 1 S2 spod. tesnilo vretena S2 Stem seal e-Carbon
6 2 Tesnilo krogle Seat A182 F316L (1.4404)+coating
5 1 Tesnilo ohišja Body gasket Graphite/316Ti
4 1 Vreteno Stem A276 431 (14057)
3 1 Krogla Ball A182 F316L (1.4404)+coating
2 1 Ohišje desni del Tail A351 CF8M (1.4408) - dual certif.
1 1 Ohišje levi del Body A351 CF8M (1.4408) - dual certif.
Poz. Item | Kos. Qty. | Opis | Designation | Material | Ident št. Item No.
Opombe k izdelavi / Assembly notes
1. Moment Poz.11 / Torque Item 11: 140 Nm
2. Pred pritegovanjem matic Poz.11 ohišje stisniti na blok za preoblikovanje tesnil / Before screwing Item 11 body parts must be pressed to block to predeform seals
3. Navoj Poz.8 je lahko dvignjen nad pribornico 0 do 1 mm. / Thread end of item 8 can raise over top of flange for 0 to 1 mm.
4. Namazati navoje vijakov in naležne površine matic z: / Lubricate screw threads and nut bearing faces with: Castrol Optimol paste TA
5. Tesnilno površino sedežev pred montažo krogle namazati z: / Oil seat sealing surface before ball assembly with: Weicon Anti-Seize Nickel Assembly Paste
6. Moment Poz. 8 / Torque Item 8: 389 Nm
Masa / weight: ca. 22,6 kg
Risbam
Izdelal 25.05.2020 Sakpal D.
Pregledal
Vodil
Kopec J.
Brkušnik J.
ARMATURE d.o.o.
Koroška cesta 55
SI-2366 Muta / Slovenija
CRANE
Merilo 1 : 1.5
Objekt
Krogelna pipa - prosto vret./Ball valve - bare stem
NPS3 Class150 TUFSEAT, High Temp., CF8M
Načrt št.:
49 243 08 004
Odobril ir.
Zamenjan
Zamenjan

Dr.-Ing. T. Bäumer

Prüflabor - Ingenieurbüro – Prüfstände

TEST Certificate

Fire Type Test according to DIN EN ISO 10497
Report IBB-2402

This report confirms the successful testing of a representative valve in compliance with DIN EN ISO 10497, 2010, and API 607, 7th edition.

Manufacturer	Armature d.o.o. Koroska cesta 55 2366 Muta, SI	Friedrich Krombach GmbH Postfach 1130 57202 Kreuztal
	Crane Ningjin Valve Co. Jing Long St. 496 055550 Ningjin, China	Xomox Chihuahua S.A de C.V Juan Ruiz de Alarcón 313 31000 Chihuahua, Mexico
Test Valve	Krombach (R) TUFSEAT TM Performance Series with High Temperature Trim Metal Seated Ball Valve NPS 3 Class 150 Flange end connections, Gear operated Body/Bonnet material: A351 CF8M 1.4408 Drawing Number: 49 243 08 004	
Date of Testing	24 September 2020	
Qualified sizes	DN 80, DN 100, DN 125, DN 150 3'', 4'', 5'', 6''	
Qualified pressure ratings	Class 150, Class 300 PN 10, PN 16, PN 25, PN 40	
Test requirements	The tests were carried out strictly in accordance with DIN EN ISO 10497, 2010, and API 607, 7th edition	

Herford, 24 September 2020

Dr.-Ing. T. Bäumer
GmbH

Mr. Dr. T. Bäumer
Consultant engineer

TEST Report

Fire Type Test according to DIN EN ISO 10497
Report IBB 2462

This report confirms the successful testing of a representative valve in compliance with DIN EN ISO 10497, 2010, and API 607, 7th edition.

Manufacturer	Armature d.o.o. Koroska cesta 55 2366 Muta, SI	Friedrich Krombach GmbH Postfach 1130 57202 Kreuztal
	Crane Ningjin Valve Co. Jing Long St. 496 055550 Ningjin, China	Xomox Chihuahua S.A de C.V Juan Ruiz de Alarcón 313 31000 Chihuahua, Mexico
Test Valve	Krombach (R) TUFSEAT TM Performance Series with High Temperature Trim Metal Seated Ball Valve NPS 8 Class 150 Flange end connections, Gear operated Nominal bore: 8'' Pressure rating: Class 150 Body/Bonnet material: A216 WCB 1.0619 Stem material: A276 Gr 431 1.4057 Ball material: A351 CF8M 1.4408 Ball seal material: A182 F316L 1.4404 + coating Operation device: Gear with handwheel Drawing Number: 49 243 12 012	
Date of Testing	20 January 2021	
Test Report	5 pages	
Qualified sizes	DN 200 and above 8'' and above	
Qualified pressure ratings	Class 150, Class 300 PN 10, PN 16, PN 25, PN 40	
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, 7th 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. 14.5 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): 02.10 pm

Temperatures and pressure during burn period

Time	p	T_{Fire1}	T_{Fire2}	T_{Cal1}	T_{Cal2}	T_{Cal3}
[s]	[barg]	[°C]	[°C]	[°C]	[°C]	[°C]
.0	14.5	11.2	12.6	11.2	12.2	12.0
30.0	14.5	602.4	432.9	19.0	15.7	19.1
60.0	14.4	835.9	626.2	75.3	46.7	64.0
90.0	14.4	854.2	788.8	159.0	94.2	132.4
120.0	14.5	859.0	798.1	244.2	147.8	200.0
150.0	14.5	844.4	785.7	322.6	204.7	264.8
180.0	14.5	933.0	801.1	393.9	264.2	327.4
210.0	14.5	919.8	785.4	463.9	325.7	387.4
240.0	14.5	914.8	779.1	523.5	382.4	437.7
270.0	14.4	904.0	849.0	573.0	437.9	486.4
300.0	14.5	918.5	871.6	614.5	493.3	529.9
330.0	14.5	936.9	898.7	648.1	544.6	568.9
360.0	14.4	902.0	839.9	681.8	588.3	602.0
390.0	14.5	931.9	835.6	712.0	621.0	624.6
420.0	14.5	973.7	844.7	741.8	652.5	647.2
450.0	14.4	968.5	898.3	765.0	682.3	671.2
480.0	14.6	946.8	808.7	787.9	707.8	693.9
510.0	14.6	933.9	833.5	806.9	729.1	712.1
540.0	14.5	935.5	840.5	821.1	747.1	728.9
570.0	14.6	976.2	847.4	834.1	762.3	742.6

600.0	14.5	963.6	835.1	848.0	770.5	751.3
630.0	14.4	924.5	896.3	856.6	777.6	759.5
660.0	14.5	971.5	849.5	862.6	787.2	771.6
690.0	14.6	920.1	821.5	877.4	795.0	782.5
720.0	14.5	959.1	823.2	872.6	795.9	782.3
750.0	14.6	928.4	836.7	875.6	800.4	787.1
780.0	14.6	946.2	830.3	877.0	804.8	790.2
810.0	14.5	888.8	854.0	879.6	805.7	792.7
840.0	14.4	932.2	845.8	879.3	806.2	793.1
870.0	14.6	933.0	838.5	880.6	808.1	794.9
900.0	14.5	868.8	791.3	890.3	807.0	799.3
930.0	14.6	901.3	839.8	869.6	804.2	789.6
960.0	14.5	919.8	870.0	869.5	805.7	790.1
990.0	14.6	950.0	788.3	872.3	807.9	795.2
1020.0	14.5	945.8	791.3	873.8	807.9	796.9
1050.0	14.5	936.6	815.0	879.2	809.0	800.2
1080.0	14.6	917.0	818.9	880.5	812.4	803.2
1110.0	14.5	944.1	828.9	880.3	810.5	803.6
1140.0	14.6	924.7	784.1	878.5	810.7	807.2
1170.0	14.6	952.7	819.8	879.2	813.1	809.1
1200.0	14.5	950.3	827.0	883.7	816.2	810.5
1230.0	14.6	924.3	806.9	881.7	813.1	809.4
1260.0	14.6	893.8	774.0	882.8	810.3	807.5
1290.0	14.5	902.5	794.2	875.2	808.5	805.2
1320.0	14.6	913.0	815.3	866.4	804.0	802.2
1350.0	14.6	869.3	822.7	863.2	801.2	800.5
1380.0	14.6	880.9	778.3	858.7	799.4	799.7
1410.0	14.5	920.1	818.9	853.1	798.0	798.3
1440.0	14.4	903.8	779.0	853.7	797.4	798.8
1470.0	14.5	893.3	790.0	848.8	793.7	793.8
1500.0	14.6	882.3	762.3	848.3	790.8	793.7
1530.0	14.5	878.2	772.0	842.6	787.4	792.5
1560.0	14.6	845.2	784.6	838.6	784.0	789.6
1590.0	14.5	848.1	779.9	827.7	782.0	790.1
1620.0	14.6	849.8	766.6	823.2	779.7	788.8
1650.0	14.5	871.4	758.3	817.9	779.1	788.6
1680.0	14.4	875.3	776.8	813.9	776.6	788.0
1710.0	14.4	836.8	792.3	813.2	775.3	788.6
1740.0	14.5	860.9	753.7	812.1	775.6	790.4
1770.0	14.4	849.8	759.5	809.4	773.4	786.0
1800.0	14.5	832.4	786.2	819.9	771.1	785.2

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]
Through-seat-leakage in burning phase:	0,8	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:	0,1	1,0

Comments on the results

The test valve is a symmetric Ball Valve. Because of the symmetry the tests were carried out only for one flow direction.

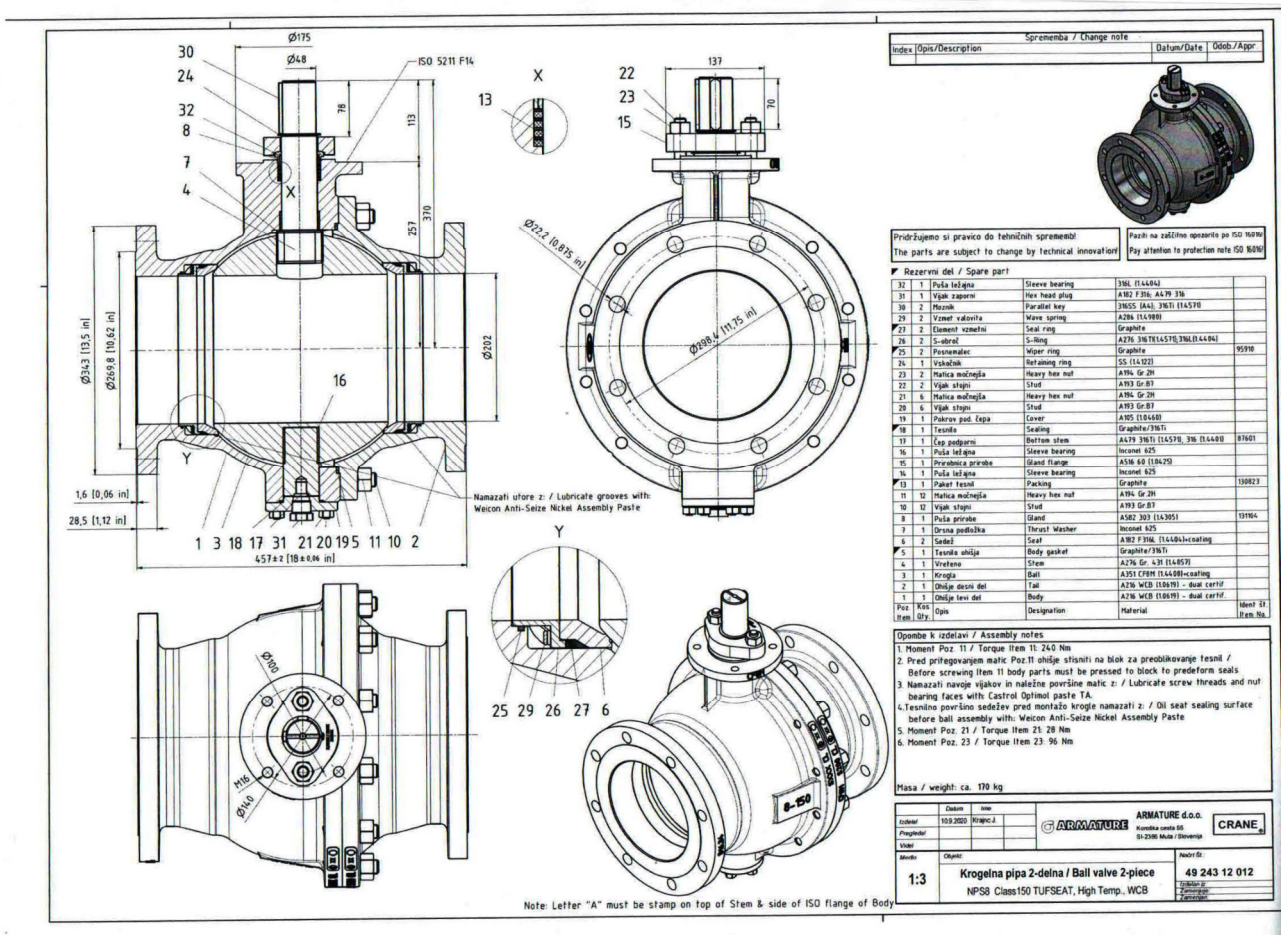
Conclusion

The test valve fulfilled the test requirements according to DIN EN ISO 10497, 2010, and API 607, 7th edition. Only allowable through-seat-leakages and external leakages were observed during the tests.

Herford, 20 January 2021

Dr.-Ing. T. Bäumer
GmbH

Mr. Dr. T. Bäumer
Consultant engineer


Sprememba / Change note
Index
Opis/Description
Datum/Date
Odob./Appr
Pridržujemo si pravico do tehničnih sprememb!
The parts are subject to change by technical innovation!
Pazili na zaščitno opozorilo po ISO 16016!
Pay attention to protection note ISO 16016!
Rezervni del / Spare part
Namazati utore z: / Lubricate grooves with: Weicon Anti-Seize Nickel Assembly Paste
Note: Letter "A" must be stamp on top of Stem & side of ISO flange of Body
Opombe k izdelavi / Assembly notes
1. Moment Poz. 11 / Torque Item 11: 240 Nm
2. Pred privijanjem matic Poz.11 ohišje stisniti na blok za preoblikovanje tesnil / Before screwing Item 11 body parts must be pressed to block to predeform seals
3. Namazati navoje vijakov in naležne površine matic z: / Lubricate screw threads and nut bearing faces with Castrol Optimol paste TA.
4. Tesnilno površino sedežev pred montažo krogle namazati z: / Oil seat sealing surface before ball assembly with: Weicon Anti-Seize Nickel Assembly Paste
5. Moment Poz. 21 / Torque Item 21: 28 Nm
6. Moment Poz. 23 / Torque Item 23: 96 Nm
Masa / weight: ca. 170 kg
ARMATURE d.o.o.
CRANE
1:3
Krogelna pipa 2-delna / Ball valve 2-piece
NPS8 Class150 TUFSEAT, High Temp., WCB
49 243 12 012

Dr.-Ing. T. Bäumer

Prüflabor - Ingenieurbüro – Prüfstände

TEST Certificate

Fire Type Test according to DIN EN ISO 10497
Report IBB 2462

This report confirms the successful testing of a representative valve in compliance with DIN EN ISO 10497, 2010, and API 607, 7th edition.

Manufacturer	Armature d.o.o. Koroska cesta 55 2366 Muta, SI	Friedrich Krombach GmbH Postfach 1130 57202 Kreuztal
	Crane Ningjin Valve Co. Jing Long St. 496 055550 Ningjin, China	Xomox Chihuahua S.A de C.V Juan Ruiz de Alarcón 313 31000 Chihuahua, Mexico
Test Valve	Krombach (R) TUFSEAT TM Performance Series with High Temperature Trim Metal Seated Ball Valve NPS 8 Class 150 Flange end connections, Gear operated Body/Bonnet material: A216 WCB 1.0619 Drawing Number: 49 243 12 012	
Date of Testing	20 January 2021	
Qualified sizes	DN 200 and above 8'' and above	
Qualified pressure ratings	Class 150, Class 300 PN 10, PN 16, PN 25, PN 40	
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, 7th edition	

Herford, 20 January 2021

Dr.-Ing. T. Bäumer
GmbH

Mr. Dr. T. Bäumer
Consultant engineer

TEST Report

Fire Type Test according to DIN EN ISO 10497
Report IBB-2460

This report confirms the successful testing of a representative valve in compliance with DIN EN ISO 10497, 2010, and API 607, 7th edition.

Manufacturer	Armature d.o.o. Koroska cesta 55 2366 Muta, SI	Friedrich Krombach GmbH Postfach 1130 57202 Kreuztal
	Crane Ningjin Valve Co. Jing Long St. 496 055550 Ningjin, China	Xomox Chihuahua S.A de C.V Juan Ruiz de Alarcón 313 31000 Chihuahua, Mexico
Test Valve	Krombach (R) TUFSEAT TM Performance Series with High Temperature Trim Metal Seated Ball Valve NPS 8 Class 150 Flange end connections, Gear operated Nominal bore: 8'' Pressure rating: Class 150 Body/Bonnet material: A351 CF8M 1.4408 Stem material: A276 Gr 431 1.4057 Ball material: A351 CF8M 1.4408 Ball seal material: A182 F316L 1.4404 + coating Operation device: Gear with handwheel Drawing Number: 49 243 12 004	
Date of Testing	20 January 2021	
Test Report	5 pages	
Qualified sizes	DN 200 and above 8'' and above	
Qualified pressure ratings	Class 150, Class 300 PN 10, PN 16, PN 25, PN 40	
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, 7th 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. 14.5 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): 10.05 am

Temperatures and pressure during burn period

Time	p	T_{Fire1}	T_{Fire2}	T_{Cal1}	T_{Cal2}	T_{Cal3}
[s]	[barg]	[°C]	[°C]	[°C]	[°C]	[°C]
.0	14.5	8.6	10.1	9.9	11.5	11.1
30.0	14.5	425.9	375.2	20.2	23.6	26.7
60.0	14.4	789.3	779.6	35.4	30.3	38.7
90.0	14.4	915.2	795.4	106.0	82.0	105.6
120.0	14.5	891.8	810.4	194.3	137.5	183.6
150.0	14.5	903.8	815.2	279.2	201.9	259.2
180.0	14.4	863.8	826.9	357.8	266.8	328.6
210.0	14.4	919.9	824.7	429.7	333.1	390.2
240.0	14.4	860.8	824.3	497.3	395.2	446.7
270.0	14.4	916.8	815.6	554.3	452.9	496.9
300.0	14.5	889.0	866.1	603.4	502.7	540.4
330.0	14.4	884.1	882.4	644.1	548.7	578.4
360.0	14.5	857.0	888.3	676.6	588.0	610.0
390.0	14.5	859.1	918.8	705.1	623.8	638.8
420.0	14.4	942.2	872.8	735.9	655.1	666.5
450.0	14.4	918.6	802.9	762.6	681.5	689.0
480.0	14.5	889.5	866.4	783.7	703.8	709.2
510.0	14.6	899.3	863.3	800.3	725.8	727.3
540.0	14.6	924.8	877.1	817.1	745.2	743.6
570.0	14.4	922.5	827.8	833.7	761.7	757.0

600.0	14.4	929.8	832.2	845.8	773.6	768.8
630.0	14.5	927.7	827.2	855.9	784.3	779.5
660.0	14.4	889.3	937.0	852.9	793.4	782.4
690.0	14.6	861.9	967.6	857.6	798.9	790.0
720.0	14.6	936.4	859.7	873.0	804.8	803.5
750.0	14.4	938.1	855.8	878.4	810.2	809.4
780.0	14.5	923.6	875.0	880.1	815.9	814.8
810.0	14.4	893.9	911.5	879.9	821.9	817.7
840.0	14.4	922.7	844.0	890.9	823.6	826.0
870.0	14.3	910.1	908.3	886.0	826.9	826.6
900.0	14.4	906.6	924.8	889.3	827.9	829.6
930.0	14.3	874.6	961.2	894.7	830.5	834.7
960.0	14.4	872.7	889.4	900.3	834.0	841.8
990.0	14.5	853.5	919.0	886.9	837.2	840.2
1020.0	14.4	872.6	976.0	884.5	839.6	844.3
1050.0	14.5	908.9	902.9	884.8	841.9	847.0
1080.0	14.5	894.3	898.2	892.1	844.4	851.9
1110.0	14.4	883.2	926.0	889.8	844.3	851.2
1140.0	14.5	899.0	913.3	893.5	844.8	854.3
1170.0	14.4	890.2	905.4	893.3	844.4	855.1
1200.0	14.4	893.6	870.4	895.2	842.6	856.8
1230.0	14.4	905.7	885.1	892.2	838.2	856.4
1260.0	14.4	891.7	868.7	896.3	837.7	857.9
1290.0	14.4	912.7	903.8	891.8	837.9	855.6
1320.0	14.4	915.8	846.8	896.6	839.2	858.2
1350.0	14.5	920.5	864.1	899.9	838.4	858.9
1380.0	14.5	933.8	822.4	899.4	837.8	858.0
1410.0	14.4	908.8	843.4	901.3	834.8	858.9
1440.0	14.4	920.1	831.4	897.5	833.2	857.4
1470.0	14.4	911.3	825.5	900.8	830.2	858.6
1500.0	14.4	893.2	829.6	897.8	825.7	856.6
1530.0	14.4	928.0	867.6	900.2	825.1	853.9
1560.0	14.5	940.5	875.4	899.4	828.3	855.2
1590.0	14.5	960.7	866.6	902.0	831.5	857.6
1620.0	14.4	922.8	868.3	906.2	834.5	861.4
1650.0	14.4	927.2	865.9	906.4	837.4	862.8
1680.0	14.5	925.6	882.2	903.1	838.4	863.4
1710.0	14.5	894.1	925.8	900.8	838.6	864.3
1740.0	14.6	940.7	832.2	899.3	840.5	864.7
1770.0	14.5	910.1	854.3	901.8	836.9	867.2
1800.0	14.4	942.3	863.6	902.0	838.6	864.3

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:	1,2	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 a symmetric Ball Valve. Because of the symmetry the tests were carried out only for one flow direction.

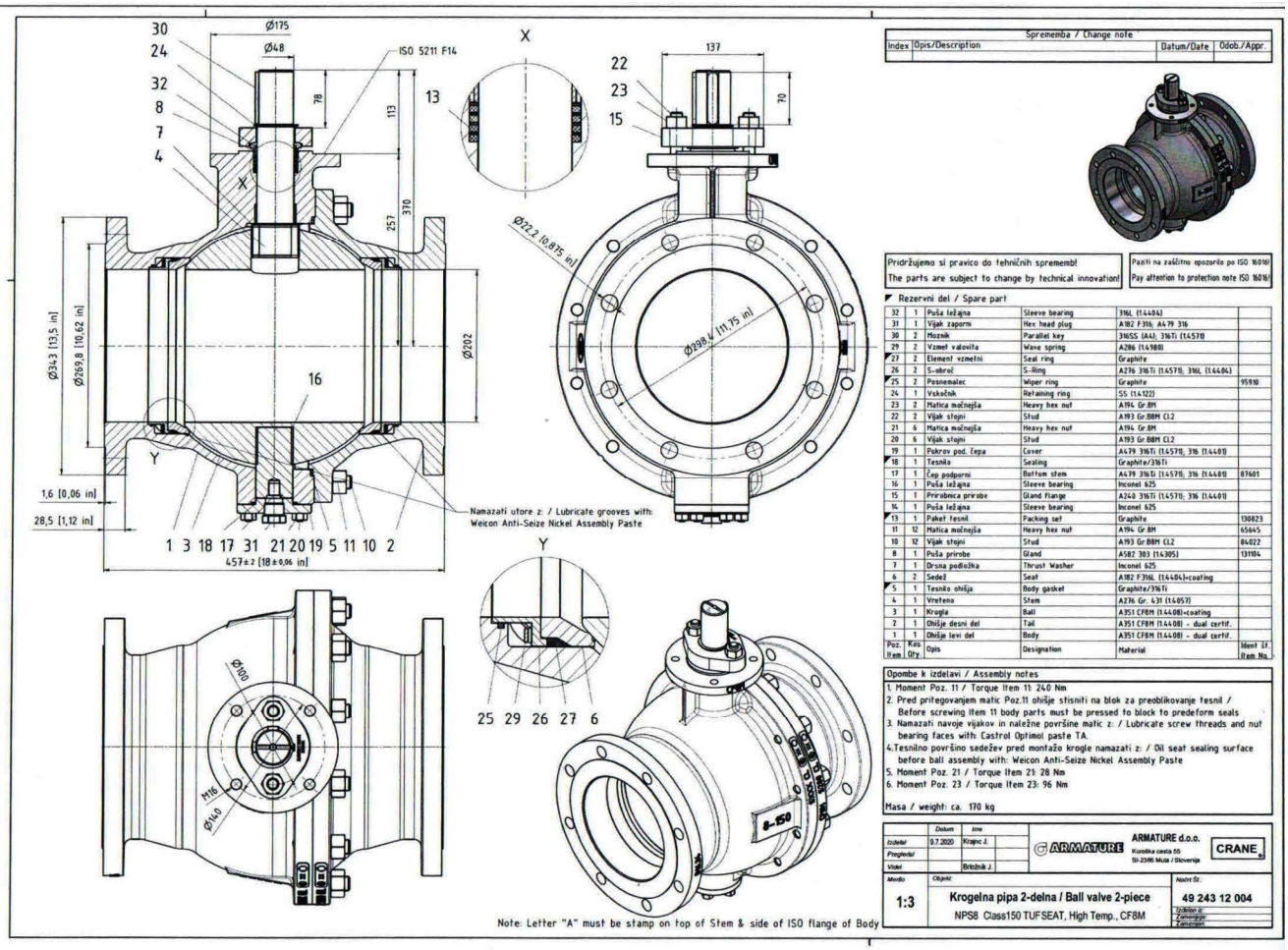
Conclusion

The test valve fulfilled the test requirements according to DIN EN ISO 10497, 2010, and API 607, 7th edition. Only allowable through-seat-leakages and external leakages were observed during the tests.

Herford, 20 January 2021

Dr.-Ing. T. Bäumer
GmbH

Mr. Dr. T. Bäumer
Consultant engineer


Spremememba / Change note
Index
Opis/Description
Datum/Date
Odob./Appr.
Pridržujemo si pravico do tehničnih sprememb!
The parts are subject to change by technical innovation!
Paziti na zaščitno opozorilo po ISO 16016!
Pay attention to protection note ISO 16016!
Rezervni del / Spare part
Opombe k izdelavi / Assembly notes
1. Moment Poz. 11 / Torque Item 11: 240 Nm
2. Pred pritegovanjem matic Poz.11 ohišje stisniti na blok za preoblikovanje tesnil / Before screwing Item 11 body parts must be pressed to block to predeform seals
3. Namazati navoje vijakov in naležne površine matic z: / Lubricate screw threads and nut bearing faces with: Castrol Optimol paste TA.
4. Tesnilno površino sedežev pred montažo krogle namazati z: / Oil seat sealing surface before ball assembly with: Weicon Anti-Seize Nickel Assembly Paste
5. Moment Poz. 21 / Torque Item 21: 28 Nm
6. Moment Poz. 23 / Torque Item 23: 96 Nm
Masa / weight: ca. 170 kg
ARMATURE d.o.o.
Koroška cesta 55
SI-2366 Muta / Slovenija
CRANE
1:3
Krogelna pipa 2-delna / Ball valve 2-piece
NPS8 Class150 TUFSEAT, High Temp., CF8M
49 243 12 004
Note: Letter "A" must be stamp on top of Stem & side of ISO flange of Body

Dr.-Ing. T. Bäumer

Prüflabor - Ingenieurbüro – Prüfstände

TEST Certificate

Fire Type Test according to DIN EN ISO 10497
Report IBB-2460

This report confirms the successful testing of a representative valve in compliance with DIN EN ISO 10497, 2010, and API 607, 7th edition.

Manufacturer	Armature d.o.o. Koroska cesta 55 2366 Muta, SI	Friedrich Krombach GmbH Postfach 1130 57202 Kreuztal
	Crane Ningjin Valve Co. Jing Long St. 496 055550 Ningjin, China	Xomox Chihuahua S.A de C.V Juan Ruiz de Alarcón 313 31000 Chihuahua, Mexico
Test Valve	Krombach (R) TUFSEAT TM Performance Series with High Temperature Trim Metal Seated Ball Valve NPS 8 Class 150 Flange end connections, Gear operated Body/Bonnet material: A351 CF8M 1.4408 Drawing Number: 49 243 12 004	
Date of Testing	20 January 2021	
Test Report	5 pages	
Qualified sizes	DN 200 and above 8'' and above	
Qualified pressure ratings	Class 150, Class 300 PN 10, PN 16, PN 25, PN 40	
Test requirements	The tests were carried out strictly in accordance with DIN EN ISO 10497, 2010, and API 607, 7th edition	

Herford, 20 January 2021

Dr.-Ing. T. Bäumer
GmbH

Mr. Dr. T. Bäumer
Consultant engineer