



PROTOTYPE TEST ACC. ISO 15848-1

Client : B.F.E. S.r.L. Bonney Forge

Inspection date: 11/03/2016 Final Date

- The undersigned GUARAGNI Paolo, Surveyor of BUREAU VERITAS, acting within the scope of the general conditions which regulate the interventions of our company, did attend at request of Messrs. B.F.E. S.r.l. Bonney Forge to their works for the purpose of witnessing the Prototype Test according to :
- ISO 15848-1 Edition 2015

GLOBE VALVE

Valve size	Class
1"	2500 lbs

List of documents

Prototype Test Certificate N°: 002/16 4 pages

THE FOLLOWING TESTS WERE CARRIED OUT:

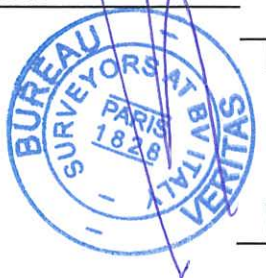
- 1) The valve was Tested at room & temperature (+ 650 °C / - 50 °C) according to
- ISO 15848-1 Edition 2015

ON THE BASIS OF THE RESULTS, THE ABOVE GLOBE VALVE SATISFACTORILY PASSED THE "PROTOTYPE TEST"

For further details of test arrangements and test results, see REPORT OF PROTOTYPE TEST N°: 002/16 4 pages

Date: 11.03.2016

BV STAMP



Issued by:
GUARAGNI P.

(name and signature)

Inspection Center: MILANO

Diffusion:

☒ Client




B.F.E. s.r.l.
BONNEY FORGE

Head Office * Sales Office

Forged Valve Plant

Via Tonale 70/A

24061 Albano S. Alessandro (BG) Italy

Phone 035/584.111 (16 linee r.a.)

PROTOTYPE TEST

ACC. TO ISO 15848-1 ed.2015

CERTIFICATE N°002/16
(date: 08-09-10-11/03/2016) PAG. 1 of 3

Valve size:	1" GLOBE VALVE ASTM A182 F316-H	
Model N°	25H 305	
Pressure rating:	Cl.2500	
Valve Tag:	-	
Stem dia.:	19 mm	
Gland packing type:	Drawing: BH8 Dimensions: 19x32,2 mm	
Packing material	GRAPHITE ECOSEAL®	
Gland nut torque:	Torque1: 34 Nm - Torque 2: 27 Nm	
Body-Bonnet gasket	Type: Spiral Wound Material: F316L+GRAFOIL Dimensions: Ø54x44 mm	
Stroke	27 mm	
Medium	Helium 99%	
Calibrated leak type :	Nominal value (Q ₀): 2.8 · 10 ⁻⁸ Date of calibration:(a): 21/11/2014 Temperature of calibration (t ₀): 23°C Loss for year: 1% N° : 90001054837	
INFICON TL8 16557		
Equipment:	Leybold Inficon UL200 Max. sensitivity vacuum mode: ≤ 5x10 ⁻¹¹ mlb x l/s Pump: Trivac D2,5- speed 3,2/3,6 m ³ x h ⁻¹	

CONVERSION FACTOR

In accordance to EN 1779 annex b:

$$2.5 \cdot 10^{-6} \text{ mbar l s}^{-1} = 2.5 \cdot 10^{-6} \text{ atm cm}^3 \text{ s}^{-1}$$

 For conversion in mg s⁻¹ · m⁻¹ circular:

$$1 \cdot 10^{-4} \text{ mg s}^{-1} \cdot \text{m}^{-1} \text{ circumference} = 1.76 \cdot 10^{-6} \text{ atm} \cdot \text{cm}^3 \cdot \text{s}^{-1} \cdot \text{mm stem diameter, as for ISO 15848-1 table C2}$$

TEST AT +650°C

PRELIMINARY TESTS AT THE ROOM TEMPERATURE (TEST 1)

Pres. (Bar)	Body temp. (°C)	Body-Bonnet Leakage (PPM)	Packing leakage (mb l/s)	Packing torque Nm	Handwheel Torque - Nm
413,7	Room. Temp.	5	2,8 x 10-6	Torque1: 34 Nm Torque 2: 27 Nm	63

MECHANICAL CYCLE TEST AT THE ROOM TEMPERATURE (TEST 2)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	Room temp.	3,0 x 10-6

STATIC TEST AT THE SELECTED TEST TEMPERATURE +650°C (TEST 3)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
105,5	+650	3,2 x 10-6

MECHANICAL CYCLE TEST AT THE SELECTED TEST TEMPERATURE +650°C (TEST 4)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	105,5	+650	3,5 x 10-6

INTERMEDIATE STATIC TESTS AT THE ROOM TEMPERATURE (TEST 5)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
413,7	Room temp.	3,9 x 10-6

MECHANICAL CYCLE TEST AT THE ROOM TEMPERATURE (TEST 2)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	Room temp.	4,1 x 10-6

STATIC TEST AT THE SELECTED TEST TEMPERATURE +650 °C (TEST 3)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
105,5	+650	4,5 x 10-6

MECHANICAL CYCLE TEST AT THE SELECTED TEST TEMPERATURE +650°C (TEST 4)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	105,5	+650	4,8 x 10-6

FINAL TEST AT THE ROOM TEMPERATURE (TEST 6)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Body-Bonnet Leakage (PPM)	Packing leakage (mb l/s)	Handwheel Torque Nm
5	413,7	Room temp.	9	6,3 x 10-6	61

POST TEST EXAMINATION

No visible damage or wear on stem packing area

TEST AT -50°C

PRELIMINARY TESTS AT THE ROOM TEMPERATURE (TEST 1)

Pres. (Bar)	Body temp. (°C)	Body-Bonnet Leakage (PPM)	Packing leakage (mb l/s)	Packing torque Nm	Handwheel Torque - Nm
413,7	Room. Temp.	12	2,5 x 10-6	Torque1: 34 Nm Torque 2: 27 Nm	61

MECHANICAL CYCLE TEST AT THE ROOM TEMPERATURE (TEST 2)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	Room temp.	2,4 x 10-6

STATIC TEST AT THE SELECTED TEST TEMPERATURE -50°C (TEST 3)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
413,7	-50	2,7 x 10-6

MECHANICAL CYCLE TEST AT THE SELECTED TEST TEMPERATURE -50°C (TEST 4)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	-50	2,8 x 10-6

INTERMEDIATE STATIC TESTS AT THE ROOM TEMPERATURE (TEST 5)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
413,7	Room temp.	3,2 x 10-6

MECHANICAL CYCLE TEST AT THE ROOM TEMPERATURE (TEST 2)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	Room temp.	3,4 x 10-6

STATIC TEST AT THE SELECTED TEST TEMPERATURE -50 °C (TEST 3)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
413,7	-50	3,5 x 10-6

MECHANICAL CYCLE TEST AT THE SELECTED TEST TEMPERATURE -50°C (TEST 4)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	-50	4,1 x 10-6

FINAL TEST AT THE ROOM TEMPERATURE (TEST 6)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Body-Bonnet Leakage (PPM)	Packing leakage (mb l/s)	Handwheel Torque Nm
5	413,7	Room temp.	24	4,8 x 10-6	63

POST TEST EXAMINATION

No visible damage or wear on stem packing area

ACCEPTANCE TIGHTNESS CLASS

	CLASS B
Body & Bonnet gasket seal	50 ppmv
Stuffing box stem seal	$< 10^{-4} \text{ (mg} \cdot \text{s}^{-1} \cdot \text{m}^{-1}\text{)}$ equivalent to $< 1,76 \cdot 10^{-6} \text{ (mbar} \cdot \text{l} \cdot \text{s}^{-1}\text{)}$

Maximum allowable tightness leakages based on actual dimensions of stuffing box packing seals with stem diameter 19 mm

	CLASS B
Stuffing box stem seal	$19 \cdot 1,76 \cdot 10^{-6} \text{ (mbar} \cdot \text{l} \cdot \text{s}^{-1}\text{)}$ $= 3,35 \cdot 10^{-5} \text{ (mbar} \cdot \text{l} \cdot \text{s}^{-1}\text{)}$

Conclusion: values observed qualify valve to:

TIGHTNESS CLASS:
 BH
 with NO packing re-tight

ENDURANCE CLASS:
 CO1 (205 cycles)

TEMPERATURE CLASS:
 -50°C / +650°C

Test conducted by: 	TPI by: 	Test approved by:
Date: 11/03/2016	Date: 11/03/2016	Date: 11/03/2016



**BUREAU
VERITAS**

PROTOTYPE TEST ACC. ISO 15848-1

Client : B.F.E. S.r.L. Bonney Forge

Inspection date: 04/03/2016 Final Date

- The undersigned GUARAGNI Paolo, Surveyor of BUREAU VERITAS, acting within the scope of the general conditions which regulate the interventions of our company, did attend at request of Messrs. B.F.E. S.r.L. Bonney Forge to their works for the purpose of witnessing the Prototype Test according to :
- ISO 15848-1 Edition 2015

GATE VALVE

Valve size	Class
1"	2500 lbs

List of documents

Prototype Test Certificate N°: 001/16 4 pages

THE FOLLOWING TESTS WERE CARRIED OUT:

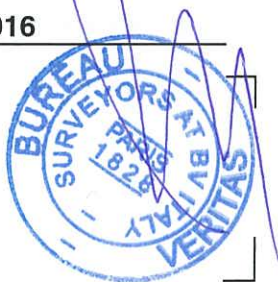
- 1) The valve was Tested at room & temperature (+ 650 °C / - 50 °C) according to
- ISO 15848-1 Edition 2015

ON THE BASIS OF THE RESULTS, THE ABOVE GATE VALVE SATISFACTORILY PASSED THE "PROTOTYPE TEST"

For further details of test arrangements and test results, see REPORT OF PROTOTYPE TEST N°: 001/16 4 pages

Date: 04.03.2016

BV STAMP ☐



Issued by:

GUARAGNI P.

(name and signature)

Inspection Center: MILANO

Diffusion:

☒ Client

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BONNEY FORGE

Head Office * Sales Office

Forged Valve Plant

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24061 Albano S. Alessandro (BG) Italy

Phone 035/584.111 (16 linee r.a.)

PROTOTYPE TEST ACC. TO ISO 15848-1 ed.2015

CERTIFICATE N°001/16
(date: 01-02-03-04/03/2016) PAG. 1 of 3

Valve size:	1" GATE VALVE ASTM A182 F316-H	
Model N°	25H 105	
Pressure rating:	Cl.2500	
Valve Tag:	-	
Stem dia.:	19 mm	
Gland packing type:	Drawing: BH8 Dimensions: 19x32,2 mm	
Packing material	GRAPHITE ECOSEAL®	
Gland nut torque:	Torque1: 34 Nm - Torque 2: 27 Nm	
Body-Bonnet gasket	Type: Spiral Wound Material: F316L+GRAFOIL Dimensions: Ø54x44 mm	
Stroke	25 mm	
Medium	Helium 99%	
Calibrated leak type :	Nominal value (Q ₀): 2.8 · 10 ⁻⁸ Date of calibration:(a): 21/11/2014 Temperature of calibration (t ₀): 23°C Loss for year: 1% N° : 90001054837	
INFICON TL8 16557		
Equipment:	Leybold Inficon UL200 Max. sensitivity vacuum mode: ≤ 5x10 ⁻¹¹ mlb x l/s Pump: Trivac D2,5- speed 3,2/3,6 m ³ x h ⁻¹	

CONVERSION FACTOR

In accordance to EN 1779 annex b:

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 For conversion in mg s⁻¹ · m⁻¹ circular:

$$1 \cdot 10^{-4} \text{ mg s}^{-1} \cdot \text{m}^{-1} \text{ circumference} = 1.76 \cdot 10^{-6} \text{ atm} \cdot \text{cm}^3 \cdot \text{s}^{-1} \cdot \text{mm stem diameter, as for ISO 15848-1 table C2}$$

TEST AT +650°C

PRELIMINARY TESTS AT THE ROOM TEMPERATURE (TEST 1)

Pres. (Bar)	Body temp. (°C)	Body-Bonnet Leakage (PPM)	Packing leakage (mb l/s)	Packing torque Nm	Handwheel Torque - Nm
413,7	Room. Temp.	4	2,5 x 10-6	Torque1: 34 Nm Torque 2: 27 Nm	52

MECHANICAL CYCLE TEST AT THE ROOM TEMPERATURE (TEST 2)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	Room temp.	2,7 x 10-6

STATIC TEST AT THE SELECTED TEST TEMPERATURE +650°C (TEST 3)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
105,5	+650	2,8 x 10-6

MECHANICAL CYCLE TEST AT THE SELECTED TEST TEMPERATURE +650°C (TEST 4)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	105,5	+650	3,0 x 10-6

INTERMEDIATE STATIC TESTS AT THE ROOM TEMPERATURE (TEST 5)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
413,7	Room temp.	3,3 x 10-6

MECHANICAL CYCLE TEST AT THE ROOM TEMPERATURE (TEST 2)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	Room temp.	3,8 x 10-6

STATIC TEST AT THE SELECTED TEST TEMPERATURE +650 °C (TEST 3)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
105,5	+650	3,7 x 10-6

MECHANICAL CYCLE TEST AT THE SELECTED TEST TEMPERATURE +650°C (TEST 4)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	105,5	+650	4,1 x 10-6

FINAL TEST AT THE ROOM TEMPERATURE (TEST 6)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Body-Bonnet Leakage (PPM)	Packing leakage (mb l/s)	Handwheel Torque Nm
5	413,7	Room temp.	7	5,5 x 10-6	53

POST TEST EXAMINATION

No visible damage or wear on stem packing area

TEST AT -50°C

PRELIMINARY TESTS AT THE ROOM TEMPERATURE (TEST 1)

Pres. (Bar)	Body temp. (°C)	Body-Bonnet Leakage (PPM)	Packing leakage (mb l/s)	Packing torque Nm	Handwheel Torque - Nm
413,7	Room. Temp.	9	2,0 x 10-6	Torque1: 34 Nm Torque 2: 27 Nm	51

MECHANICAL CYCLE TEST AT THE ROOM TEMPERATURE (TEST 2)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	Room temp.	2,1 x 10-6

STATIC TEST AT THE SELECTED TEST TEMPERATURE -50°C (TEST 3)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
413,7	-50	2,3 x 10-6

MECHANICAL CYCLE TEST AT THE SELECTED TEST TEMPERATURE -50°C (TEST 4)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	-50	2,5 x 10-6

INTERMEDIATE STATIC TESTS AT THE ROOM TEMPERATURE (TEST 5)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
413,7	Room temp.	2,7 x 10-6

MECHANICAL CYCLE TEST AT THE ROOM TEMPERATURE (TEST 2)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	Room temp.	3,2 x 10-6

STATIC TEST AT THE SELECTED TEST TEMPERATURE -50 °C (TEST 3)

Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
413,7	-50	3,4 x 10-6

MECHANICAL CYCLE TEST AT THE SELECTED TEST TEMPERATURE -50°C (TEST 4)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Packing leakage (mb l/s)
50	413,7	-50	3,9 x 10-6

FINAL TEST AT THE ROOM TEMPERATURE (TEST 6)

No. of Cycles	Pres. (Bar)	Body temp. (°C)	Body-Bonnet Leakage (PPM)	Packing leakage (mb l/s)	Handwheel Torque Nm
5	413,7	Room temp.	14	4,5 x 10-6	53

POST TEST EXAMINATION

No visible damage or wear on stem packing area

ACCEPTANCE TIGHTNESS CLASS

	CLASS B
Body & Bonnet gasket seal	50 ppmv
Stuffing box stem seal	$< 10^{-4} \text{ (mg} \cdot \text{s}^{-1} \cdot \text{m}^{-1}\text{)}$ equivalent to $< 1,76 \cdot 10^{-6} \text{ (mbar} \cdot \text{l} \cdot \text{s}^{-1}\text{)}$

Maximum allowable tightness leakages based on actual dimensions of stuffing box packing seals with stem diameter 19 mm

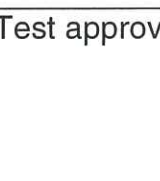
	CLASS B
Stuffing box stem seal	$19 \cdot 1,76 \cdot 10^{-6} \text{ (mbar} \cdot \text{l} \cdot \text{s}^{-1}\text{)}$ $= 3,35 \cdot 10^{-5} \text{ (mbar} \cdot \text{l} \cdot \text{s}^{-1}\text{)}$

Conclusion: values observed qualify valve to:

TIGHTNESS CLASS:
 BH
 with NO packing re-tight

ENDURANCE CLASS:
 CO1 (205 cycles)

TEMPERATURE CLASS:
 -50°C / +650°C

Test conducted by: B.F.E. S.r.L. BONNEY FORGE Via Tonale, 70/A 24061 ALBINO S. ALESSANDRO (BG) 	TPI by: 	Test approved by: 
Date: 04/03/2016	Date: 04/03/2016	Date: 04/03/2016