



Industrie Service

CERTIFICATE

(Certificate of conformity with technical requirements in:)
API STANDARD 607 SEVENTH EDITION, JUNE 2016

Certificate No.:253291 Rev.1

Ref. Test report No.:253290 Rev.1

Name and postal address of manufacturer: **Antiwear (Suzhou) Industrial Intelligent Technology Co., Ltd.**
No.988, Yuexiu Road, Fenhui Economic Development Zone, PC: 215200, Suzhou City, Jiangsu Province, P. R. China

We hereby certify that the fire test on below valves have been conducted at the laboratory designated by manufacturer and witnessed by TÜV SÜD inspector according to requirements of API STANDARD 607 SEVENTH EDITION, JUNE 2016. The testing results of valves meet the requirements of API STANDARD 607 SEVENTH EDITION, JUNE 2016.

1. Description of Test Valve :

| | |
|---------------------------|---|
| Type of Test Valve | AB-2-T22-1500-RJ-01-C-16-W-C Ball Valve |
| Description of Test Valve | Ball Valve |
| Valve Size (NPS) | 2" |
| Pressure Rating (Class) | Class 1500 |
| Valve Body Material | ASTM A105 |

2. Qualified Range of Valves :

| | |
|--|------------------------------|
| Type | Ball Valves |
| Description of Valves | Ball Valves |
| Qualified Sizes (NPS) (according to API 607 Table 3) | 2" and below, 2 1/2", 3", 4" |
| Qualified Pressure Ratings(Class: Lb) (according to API 607 Table 4) | Class 1500, Class 2500 |
| Qualified Valve Material (according to API 607 7.2) | Ferritic |
| Remark: the technical data of tested valves see back of this certificate appendix 1. | |

This certificate is issued according to API STANDARD 607 SEVENTH EDITION, JUNE 2016, based upon the result of testing report on above mentioned test valve. The additional valve qualification shall be limited on similar valves of same basic design and construction as the test valves and of the same nonmetallic materials as the test valve in the seat-to-closure member seal, seat-to-body seal, stem seal, and body joint and seal according to API STANDARD 607 SEVENTH EDITION, JUNE 2016, Paragraph 7.

Shanghai, July 21, 2022
 (Place, date)

Chen
Guilin Chen
TÜV SÜD Industrie Service GmbH
 Westendstr.199
 80686 München Germany



Industrie Service

Appendix 1:

Certificate No.:253291 Rev.1

Ref. Test report No.:253290 Rev.1

Name and postal address of manufacturer: **Antiwear (Suzhou) Industrial Intelligent Technology Co., Ltd.**
No.988, Yuexiu Road, Fenhua Economic Development Zone, PC: 215200, Suzhou City, Jiangsu Province, P. R. China

Technical Data of Valve

1. **Type of Test Valve:** AB-2-T22-1500-RJ-01-C-16-W-C Ball Valve

2. **Description of Test Valve:** Ball Valve

3. **Details of Valve:**

| Valves Size (NPS) Material | 2" |
|---------------------------------|---------------------------------|
| Part Name | |
| Valve Body | ASTM A105 |
| Valve Bonnet | ASTM A105 |
| Ball | ASTM A182 F316 |
| Valve Seat | ASTM A182 F316 |
| Valve Stem | ASTM A564 630 |
| Packing Ring | Flexible Graphite |
| Pressure Ring | ASTM A376 316 |
| Nut | ASTM A194 2H |
| Bolt | ASTM A193 B7 |
| Gasket | ASTM A276 316+Flexible Graphite |
| Yoke | Q235 |
| Cladding Graphite Ring | Ni+Flexible Graphite |
| Stuffing Box | ASTM A105 |
| Bottom | ASTM A564 630 |
| Coupling | ASTM A182 F6a |
| Key | 45 Steel |
| Design Drawing No.: | 10020600 VER.1.0 |

Shanghai, July 21, 2022

(Place, date)

Chen Guilin

Guilin Chen

TÜV SÜD Industrie Service GmbH

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Test Report

(Valve fire test according to API STANDARD 607 SEVENTH EDITION, JUNE 2016.)

Certificate No. :253291 Rev.1
Test Report No.:253290 Rev.1

Applicant / Manufacturer: Antiwear (Suzhou) Industrial Intelligent Technology Co., Ltd.

No.988, Yuexiu Road, Fenhua Economic Development Zone,

PC: 215200, Suzhou City, Jiangsu Province, P. R. China

Inspection body: TÜV SÜD Industrie Service GmbH

Floor 3-13, No.151, Heng Tong Road, Shanghai, P. R. China

Lab of test: Hefei General Machinery & Electrical Products Inspection Institute

Test Date: August 23, 2017

Description of valves: AB-2-T22-1500-RJ-01-C-16-W-C Ball Valve

Size: 2"

Pressure Rating: Class 1500

Drawing No.: 10020600 VER. 1.0

Test Witnessed By: CHEN Guilin / TÜV SÜD Inspector

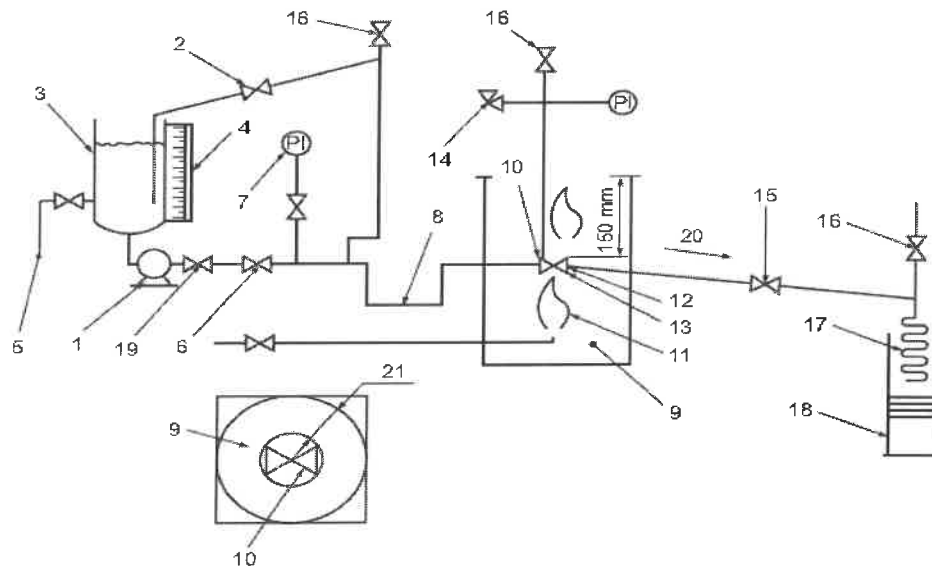
Test Report No.:253290 Rev.1

Inspection and Tests

1. Conformity of Equipment

The test equipment was verified by TÜV SÜD inspector according to requirements of API STANDARD 607 SEVENTH EDITION, JUNE 2016. Para.5.3 and found satisfactory. The detail arrangement of the fire-test equipment is shown below:

Figure 1. Typical Fire-Test System Using a Pump as the Pressure Source



a) Pump as pressure source

Key

| | | |
|--|--|-----------------------|
| 1. Pressure source | 10. Test valve mounted horizontally with stem in horizontal position | 19. Check valve |
| 2. Pressure regulator and relief | 11. Fuel gas supply and burner | 20. Slope |
| 3. Vessel for water | 12. Calorimeter cubes | 21. Clearance: 150 mm |
| 4. Calibrated sight gauge | 13. Flame environment and body thermocouples | |
| 5. Water supply | 14. Pressure gauge and relief valve | |
| 6. Shut-off valve | 15. Shut-off valve | |
| 7. Pressure gauge | 16. Vent valve | |
| 8. Piping arranged to provide vapor trap | 17. Condenser | |
| 9. Enclosure for test | 18. Container | |

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2. Calibration of measurement and test instrument

The measurement and test instrument have been properly calibrated such as pressure gauges, thermocouples, etc.

3. Technical Data of Test Valve:

a) Description of test valve

| | |
|-----------------------|---|
| Type of Test Valves | AB-2-T22-1500-RJ-01-C-16-W-C Ball Valve |
| Description of Valves | Ball Valve |
| Pressure Class | Class 1500 |
| Valve Size | 2" |
| Face to Face | ASME B16.10 |
| Designed Standard | API 6D |


b) Details of technical data on test valve

| Part Name | Materials |
|------------------------|----------------------------------|
| Valve Body | ASTM A105 |
| Valve Bonnet | ASTM A105 |
| Ball | ASTM A182 F316 |
| Valve Seat | ASTM A182 F316 |
| Valve Stem | ASTM A564 630 |
| Packing Ring | Flexible Graphite |
| Pressure Ring | ASTM A376 316 |
| Nut | ASTM A194 2H |
| Bolt | ASTM A193 B7 |
| Gasket | ASTM A276 316+Flexilble Graphite |
| Yoke | Q235 |
| Cladding Graphite Ring | Ni+Flexilble Graphite |
| Stuffing Box | ASTM A105 |
| Bottom | ASTM A564 630 |
| Couping | ASTM A182 F6a |
| Key | 45 Steel |
| Design Drawing No.: | 10020600 VER.1.0 |

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4. Visual and dimensional Check on Valve Specimen:

The specimen valve was chosen at random by the manufacturer in its workshop and submitted to the laboratory. The visual and dimensional check was performed according to drawing No. 10020600 VER.1.0 and results found satisfactory. The mark was verified on valve as following:

| | | | |
|---|-----------|-------------|-------------|
|  | <u>2"</u> | <u>1500</u> | <u>A105</u> |
| Manufacturer` Brand | Size | Class | Material |

The sample valve was equipped with a worm gearbox.

5. Document Review:

The chemical and mechanical test report of forgings was reviewed and found satisfactory. Also the inspection report of shell test, hydro seat test and air seat test were reviewed and found satisfactory.

6. Preparation before testing:

6.1 The thermocouples and calorimeters were installed properly according to Figure 1,2,3,4 in API 607.

Two thermocouples (part 13) are installed to measure flame temperature, one is located under valve body, another is located under valve stem, both within 1". Two calorimeters (part 12) are positioned to the same place as the thermocouples do.

6.2 The test system including test valve (part 10) was cleaned through by water before testing. All air was purged from test valve and testing system by water.

6.3 The test system was pressurized to 36.4 MPa after the test valve and system upstream of valve have been completely full of water and system downstream of the test valve have been completely empty of water. The system and test valve were carefully checked for leakage when the test pressure was held at 36.4 MPa. No leakage was found on system and test valve.

7. Fire Test:

The fire test was conducted according to API STANDARD 607 SEVENTH EDITION, JUNE 2016. Section 5. The pressure of the system upstream was kept 19.2 MPa, then the fire ignited. The flame temperature reached 750°C within 2 minutes after ignition. The test pressure and temperature were maintained at 19.2 MPa during the fire test. The temperature and pressure were recorded continuously by the operators. The system and test valve was cooled at 30°C within 5 minutes by shower nozzles after 30 minutes fire test. The loss of water weight in vessel was measured by weighing scale and water in calibrated container (part 18) were read and recorded. The test result is shown as below:

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Test result of fire test

| Item | API 607 Required Value | Actual Value |
|---|------------------------|-------------------|
| Test Pressure (MPa) | 19.2 MPa | 19.16 – 19.25 MPa |
| Test Temperature | 750 - 1000 °C | 822.5 – 903.1°C |
| Through-valve leakage according to API 607 table 1 | ≤ 800 ml / minute | 2.5 ml / minute |
| Total weight of water through valve seat during cooling down period | 0 ml | |
| Total time from fire test to cooling down | 35 Minutes | |
| External Leakage | ≤ 200 ml / minute | 1.9 ml / minute |
| Conclusion: the test result is satisfactory according to API 607. | | |

8. Operational Test:

The test valve was cooled at 30 °C within 5 minutes after complete the fire test. The operational test was conducted according to API STANDARD 607 SEVENTH EDITION, JUNE 2016.Para. 6.6 and 5.6.17. The upstream pressure was increased to 19.2MPa then the test valve was fully opened against the high test pressure differential to vent the piping and test valve body cavity to remove air or steam. The downstream shutoff valve was then closed and the system pressure was increased to and maintained at 19.2MPa. Then measured and recorded external leakage for a period of five minutes after valve was in the open position at high test pressure. The test result was recorded as below:

Test result of operational test

| Item | API 607 Required Value | Actual Value |
|---|------------------------|-----------------|
| Test Pressure (MPa) | 19.2 MPa | 19.2 MPa |
| Test Temperature | 30 °C | |
| Test Time | 5 minutes | |
| External Leakage | ≤ 50 ml / minute | 1.2 ml / minute |
| Conclusion: the test result is satisfactory according to API 607. | | |



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The undersigned, hereby declare that I have checked test valve and witnessed the fire test on the test valve according to API STANDARD 607 SEVENTH EDITION, JUNE 2016. The test result is satisfactory.

TÜV SÜD Industrie Service GmbH

Chen Guilin

A circular blue stamp of TÜV SÜD Industrie Service GmbH. The outer ring contains the text 'TÜV SÜD Industrie Service GmbH'. The inner circle contains the TÜV SÜD logo, which is a black octagon with 'TUV' and 'SÜD' inside.

CHEN Guilin

Date: July 21, 2022

Annexes:

- 1) Copy of Drawing No. 10020600 VER.1.0;
- 2) Copy of Test Record of Fire Test No. 2017FM660A.

