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Industrie Service

CERTIFICATE

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

Certificate No.: 267051 Rev.1

Ref. Test report No.:267052 Rev.1

Name and postal address of manufacturer: **Antiwear (Suzhou) Industrial Intelligent Technology Co., Ltd.**
No.988, Yuexiu Road, Fenhu 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	TEB-ST-600-8-RF-NN Butterfly Valve
Description of Test Valve	Butterfly Valve
Valve Size (NPS)	8"
Pressure Rating (Class)	Class 600
Valve Body Material	ASTM A216 WCB

2. Qualified Range of Valves :

Type	Butterfly Valves
Description of Valves	Butterfly Valves
Qualified Sizes (NPS) *(according to API 607 Table 3)*	8" and larger
Qualified Pressure Ratings(Class) *(according to API 607 Table 4)*	Class600, Class800, Class 900
Qualified Valve Material	According to API 607 7.2
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.

TÜV SÜD Industrie Service GmbH

Shanghai, July 21, 2022
(Place, date)

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

Industrie Service

Appendix 1:

Certificate No.:267051 Rev.1

Ref. Test report No.:267052 Rev.1

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

Technical Data of Valve

1. Type of Test Valve: TEB-ST-600-8-RF-NN Butterfly Valve

2. Description of Test Valve: Butterfly Valve

3. Details of Valve:

Valves Size (NPS) / Material / Part Name	8"
Valve Body	ASTM A216 WCB+G36
Disc	ASTM A361 CF8M
Thrust Bearing	38CrMoAl+QPQ
Seal Ring	S31803+Flexible Graphite
Gasket	ASTM A276 304+Flexible Graphite
Valve Stem	ASTM A564 630
Packing	Flexible Graphite
Nut	ASTM A194 2H
Bolt	ASTM A193 B7
Pression Ring	ASTM A276 316
Spacer Ring	ASTM A276 304
Graphite Packing	Flexible Braided Graphite
Bearing	ASTM B150 QAL9-4
Design Drawing No.:	A4A400046

TÜV SÜD Industrie Service GmbH

Shanghai, July 21, 2022
(Place, date)

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Test Report

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

Certificate No. : 267051 Rev.1
Test Report No.:267052 Rev.1

Applicant / Manufacturer: Antiwear (Suzhou) Industrial Intelligent Technology Co., Ltd.
No.988, Yuexiu Road, Fenhu 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: December 30, 2019

Description of valves: TEB-ST-600-8-RF-NN Butterfly Valve
Size: 8"
Pressure Rating: Class 600
Drawing No.: A4A400046

Test Witnessed By: CHEN Guilin / TÜV SÜD Inspector

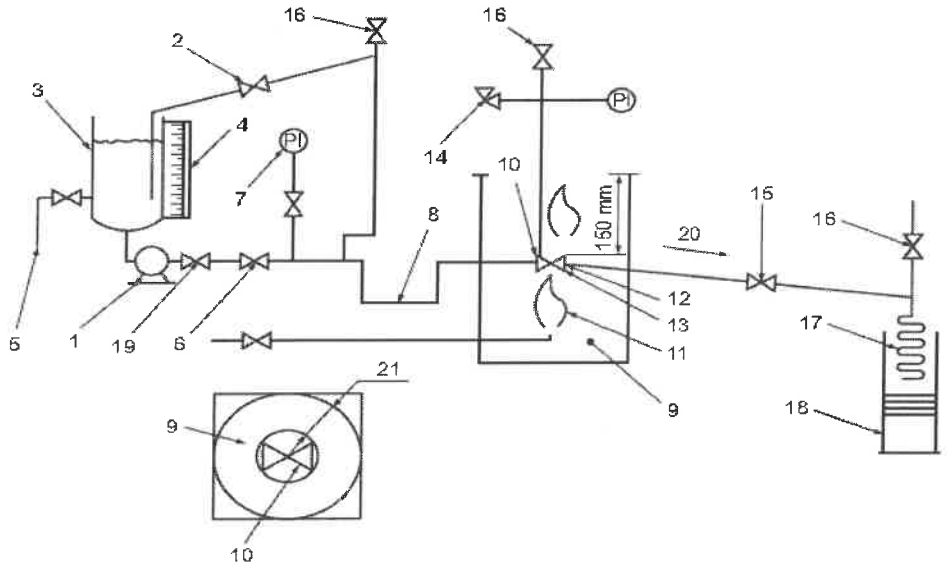
TÜV SÜD Industrie Service GmbH
Shanghai Office
Floor 3-13, No.151, Heng Tong Road,
Shanghai 200070 P.R.China

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

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	TEB-ST-600-8-RF-NN Butterfly Valve
Description of Valves	Butterfly Valve
Pressure Class	Class 600
Valve Size	8"
End to End	API609
Designed Standard	API609

   b) Details of technical data on test valve

Part Name	Materials
Valve Body	ASTM A216 WCB+G36
Disc	ASTM A361 CF8M
Thrust Bearing	38CrMoAl+QPQ
Seal Ring	S31803+Flexible Graphite
Gasket	ASTM A276 304+Flexible Graphite
Valve Stem	ASTM A564 630
Packing	Flexible Graphite
Nut	ASTM A194 2H
Bolt	ASTM A193 B7
Pression Ring	ASTM A276 316
Spacer Ring	ASTM A276 304
Graphite Packing	Flexible Braided Graphite
Bearing	ASTM B150 QAL9-4
Design Drawing No.:	A4A400046

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. A4A400046 and results found satisfactory. The mark was verified on valve as following:

ATV	8"	600	WCB
Manufacturer` Brand	Size	Class	Material

The sample valve was equipped with a worm gearbox.

5. Document Review:

The chemical and mechanical test report of castings 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, and a third one is positioned nearby the bottom cover.

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 14.4 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 14.4 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 7.7 MPa, then the fire ignited. The flame temperature reached 750°C within 2 minutes after ignition. The test pressure and temperature were maintained at 7.7MPa during the fire test. The temperature and pressure were recorded continuously by the operators. The system and test valve was cooled below 100°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:

Test result of fire test

Item	API 607 Required Value	Actual Value
Test Pressure (MPa)	7.7MPa	7.71 – 7.78 MPa
Test Temperature	750 - 1000 ℃	809.0 – 932.2℃
Through-valve leakage according to API 607 table 1	≤ 3200 ml / minute	8.6 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	≤ 800 ml / minute	1.8 ml / minute
Conclusion: the test result is satisfactory according to API 607.		

8. Low Test:

The test valve was cooled below 100℃ within 5 minutes after complete the fire test. The low pressure test was conducted according to API STANDARD 607 SEVENTH EDITION, JUNE 2016.Para. 6.4 and 5.6.15. The test result was recorded as below:

Test result of low pressure test

Item	API 607 Required Value	Actual Value
Test Pressure (MPa)	0.2 MPa	0.2 MPa
Test Temperature	30 ℃	
Test Time	5 minutes	
External Leakage	≤ 320 ml / minute	7.4 ml / minute
Conclusion: the test result is satisfactory according to API 607.		

9. Operational Test:

The test valve was cooled below 100℃ 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 7.7MPa 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 7.7MPa. 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)	7.7MPa	7.7MPa
Test Temperature	30 ℃	
Test Time	5 minutes	
External Leakage	≤ 200 ml / minute	0 ml / minute
Conclusion: the test result is satisfactory according to API 607.		

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Test Report No.:267052 Rev.1

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

Date: July 21, 2022

Annexes:

1) Copy of Drawing No. A4A400046;
2) Copy of Test Record of Fire Test No. 2019FM1211.