



<input type="checkbox"/>	Interim
<input checked="" type="checkbox"/>	Final

**INSPECTION REPORT No.:JST/PR2/20160012W-005**

JST Job No: JST/PR2/20160012W

PROJECT: GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G PR2 performance testing	Ref:JST/PR2/20160012W
JST Client: SHANGHAI ***** CO.,LTD	P/o nr:N/A(client to JST)
Manufacturer: SHANGHAI ***** CO.,LTD	P/o nr:N/A(client to manufacturer)
Inspection requested by: SHANGHAI ***** CO.,LTD	

SUPPLY /SUBJECT OF INSPECTION	ITEM/TAG nr	QTY
GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G	073783	1PCS

DOCUMENTS OF REFERENCE : see continuation sheet for additional documents <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
Title	Reference No.	Rev.	Approved by	Date
Specification for Quality Management System Requirement for Manufacturing Organizations for the Petroleum and Natural Gas Industry.	6A-0741		American Petroleum Institute	2014.JULY~2017 MARCH
GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G PR2 performance testing schedule		JSTEOG2 01601	JST	2016.06

<p><b>INSPECTIONS:</b></p> <p><b>Inspection place &amp; date or period:</b>  <b>Inspection place:</b>                  Guangzhou, Guangdong, China (Mainland)  <b>Inspection date:</b>                  Inspector: Qin Zeming                  Date: 2016.06.4~2016.07.16</p> <p><b>Stage of inspection:</b></p> <p><input type="checkbox"/> Before manufacturing  <input type="checkbox"/> During manufacturing  <input checked="" type="checkbox"/> Final  <input type="checkbox"/> Packing</p> <p><b>Type of inspection:</b></p> <p><input checked="" type="checkbox"/> Pre-inspection meeting  <input checked="" type="checkbox"/> Witnessing tests  <input checked="" type="checkbox"/> Final inspection  <input checked="" type="checkbox"/> Document review  <input type="checkbox"/> Expediting &amp; vendor assessment  <input type="checkbox"/> Packing</p>	<p><b>Results of inspection:</b> <input checked="" type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory</p> <p><b>Non Conformities Reports(NCR):</b>                  NCR's issued during reported period:                  None                  List of outstanding NCR's:                  None</p> <p><b>Main conclusions &amp; Remarks:</b></p> <p>JST inspector Mr.Qin Zeming witnessed the PR2 performance testing of GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G which was manufactured by SHANGHAI ***** CO.,LTD.The details of witnessing testing including:                  Pre-inspection meeting;                  Documentation review;                  PR2 performance testing whole process witnessing;                  Visual inspection after the tested valve was disassembled.                  Conclusion: the results of GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G PR2 performance testing can be accepted.                  (for details see continuation sheet)</p> <p><b>Next visit scheduled:</b>                  Inspections is completed</p>
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**Description of the inspection carried out:****1.Introduction**

As per the request of SHANGHAI \*\*\*\*\* CO.,LTD,JST inspector Mr.Qin Zeming witnessed the PR2 performance testing of GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G which was manufactured by SHANGHAI \*\*\*\*\* CO.,LTD at the PR2 performance testing lab of Guangzhou JST Seals Technology Co.,Ltd. in Guangzhou City on the date as indicated in previous page respectively. See below for details:

**1.1 Attendees**

Name	Company	Position
Qin Zeming	Guangzhou JST Seals Technology Co.,Ltd.	Inspector
*****	SHANGHAI ***** CO.,LTD	Factory director
*****	SHANGHAI ***** CO.,LTD	Quality Manager
Huang Zhuwen	Guangzhou JST Seals Technology Co.,Ltd.	PR2 lab engineer
Qiu Zhibin	Guangzhou JST Seals Technology Co.,Ltd.	PR2 lab engineer

**1.2 JST scope of work**

- a. Pre-inspection meeting;
- b. Documentation review;
- c. PR2 performance testing whole process witnessing;
- d. Visual inspection after the tested valve was disassembled.

**1.3 The technical information of tested valve**

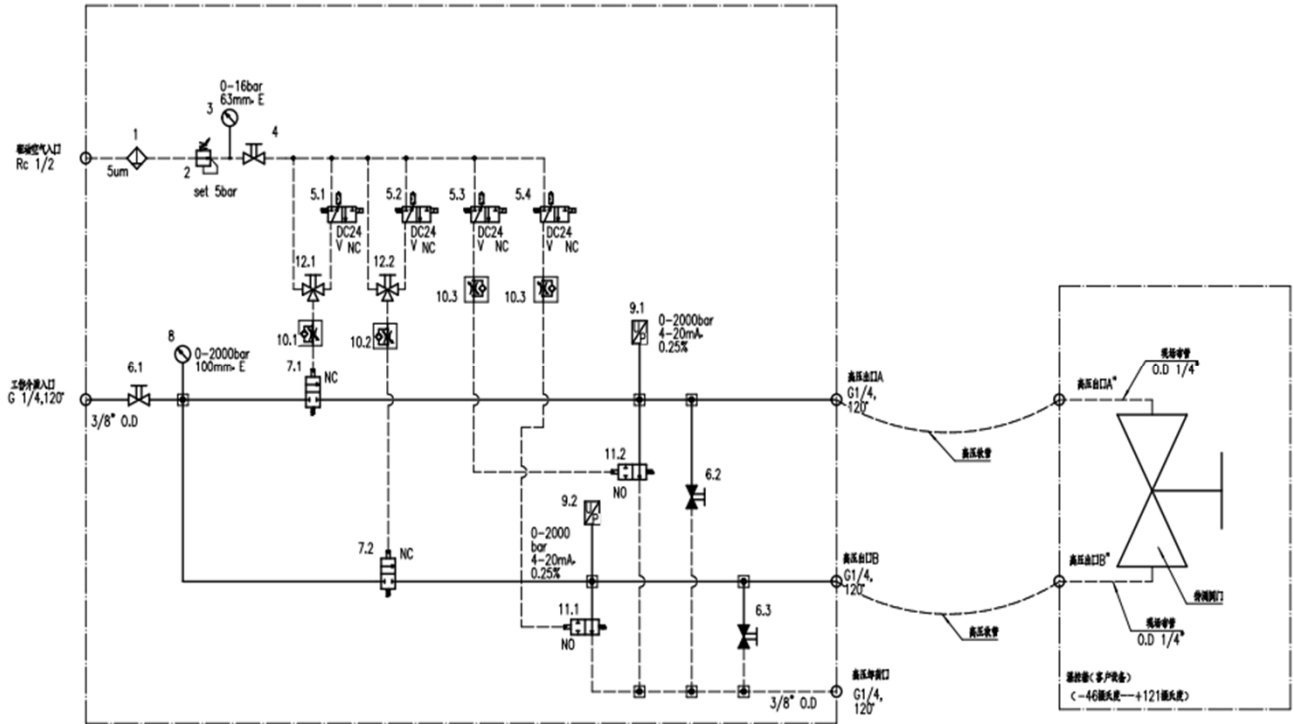
Valve Size	2-1/16	Specification Level:	PSL3G
Performance Level	PR2	Material Level:	EE-0.5
Temperature Level	LU(-46℃~121℃)	Pressure Level:	15000PSI
Non metallic materials	PF001(PTFE modified) and PK002 (PEEK) sealing ring		

**1.4 Testing system and testing tool**

All testing systems and testing tools for GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G of PR2 performance testing which belong to JST.The details of all testing systems and testing tools including:

- a.PR2 testing system;
- b.Gas seal test system;
- c.Pneumatic hydrostatic test system(250MPa);
- d.Various calliperska(The details are recorded in section 3.5).

PIC 1:PR2 testing system diagrammatic sketch



### 1.5. Notes

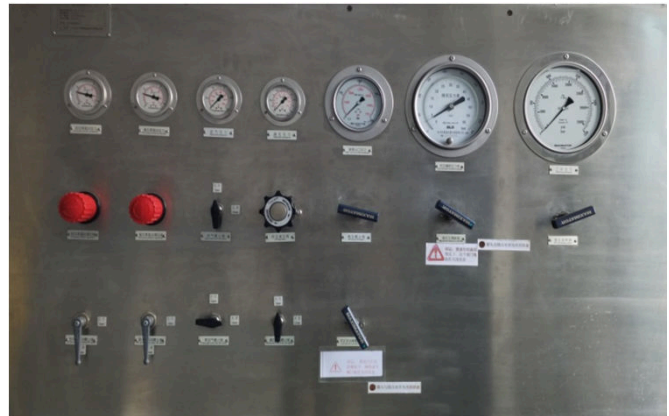
- a. The practical operation of GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G PR2 performance testing was performed by two PR2 lab engineers(Huang Zhuwen and Qiu Zhibin) of JST and JST inspector Qin Zeming witnessed the whole testing process.
- b. The testing procedures of GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G PR2 performance testing were performed according to the contents of JSTEOG201601 REV.A GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G PR2 performance testing schedule which was established by Guangzhou JST Seals Technology Co.,Ltd.JST inspector Qin Zeming verified that the contents of JSTEOG201601 REV.A GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G PR2 performance testing schedule comply with the requirements of "Annex F- Performance verification procedures" in API Spec 6A Specification for Wellhead and Christmas Tree Equipment 20th Edition.

## 1.6 Relevant pictures

PIC 2. Control device of PR2 testing system



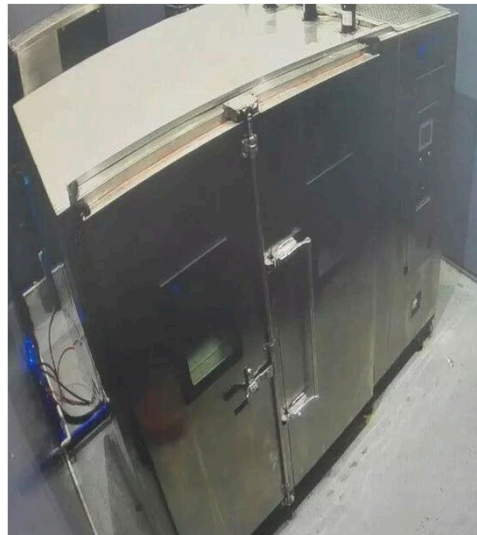
PIC 3. Control device of gas seal test system



PIC4. Test desk of PR2 testing system



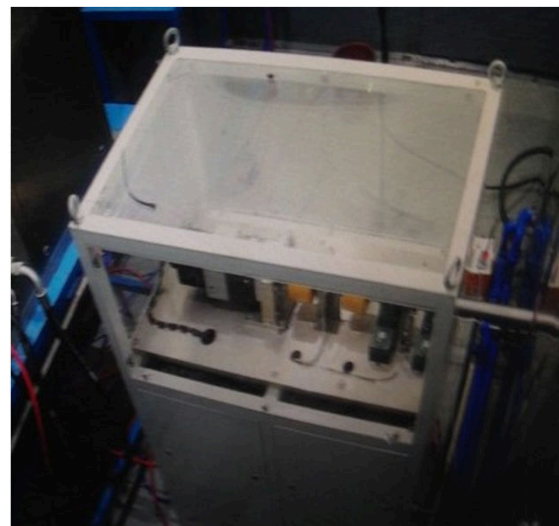
PIC5. Thermal insulation room of PR2 system



PIC6. Pneumatic hydrostatic test system(250MPa)



PIC7. Torque and cycle test system(0~500N)



## 2.Manufacturing Progress Status

- The tested GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G(Valve SN: 073783) has been manufactured;
- All documents of tested gate valve have been reviewed;
- The PR2 performance testing of tested gate valve has finished;
- After the tested valve was disassembled ,visual inspection for all parts of tested valve, layout inspection for main parts of tested valve and liquid penetrant examination(PT) for the pressure contact surfaces of tested valve's gate and seat have been carried out.

## 3.Documentation review

### 3.1 API certificates

Certificate Type	Certificate Number	Effective Date	Expiration Date	Review Status	Remark
	6A-0741	2014.07.25	2017.03.23		See PIC 8

### 3.2 Completion acceptance reports of PR2 testing system and gas seal test system

Testing System Type	Report Number	Issuance Date	Review Status	Remark
PR2 testing system	234750813095A	Aug-15	Acceptable	See PIC 9
Gas seal test system	234750813095A	Aug-15	Acceptable	See PIC 9
Pneumatic hydrostatic	234750813095A	Aug-15	Acceptable	See PIC 10

### 3.3 Fluid compatibility reports of non-metallic seals

Non-metallic Seal Type	Report Number	Issuance Date	Review Status	Remark
PK002(PEEK)	C3944/2	30thApril 2015	Passed	See PIC 11
PF001(PTFE modified)	C3944/3	30thApril 2015	Passed	See PIC 12

**Notes: Fluid compatibility tests of non-metallic seals were carried out by Element Hitchin(UK) according to the requirements of "F 1.13" in API Spec 6A.BC inspector Qin Zeming just reviewed the fluid compatibility reports.**

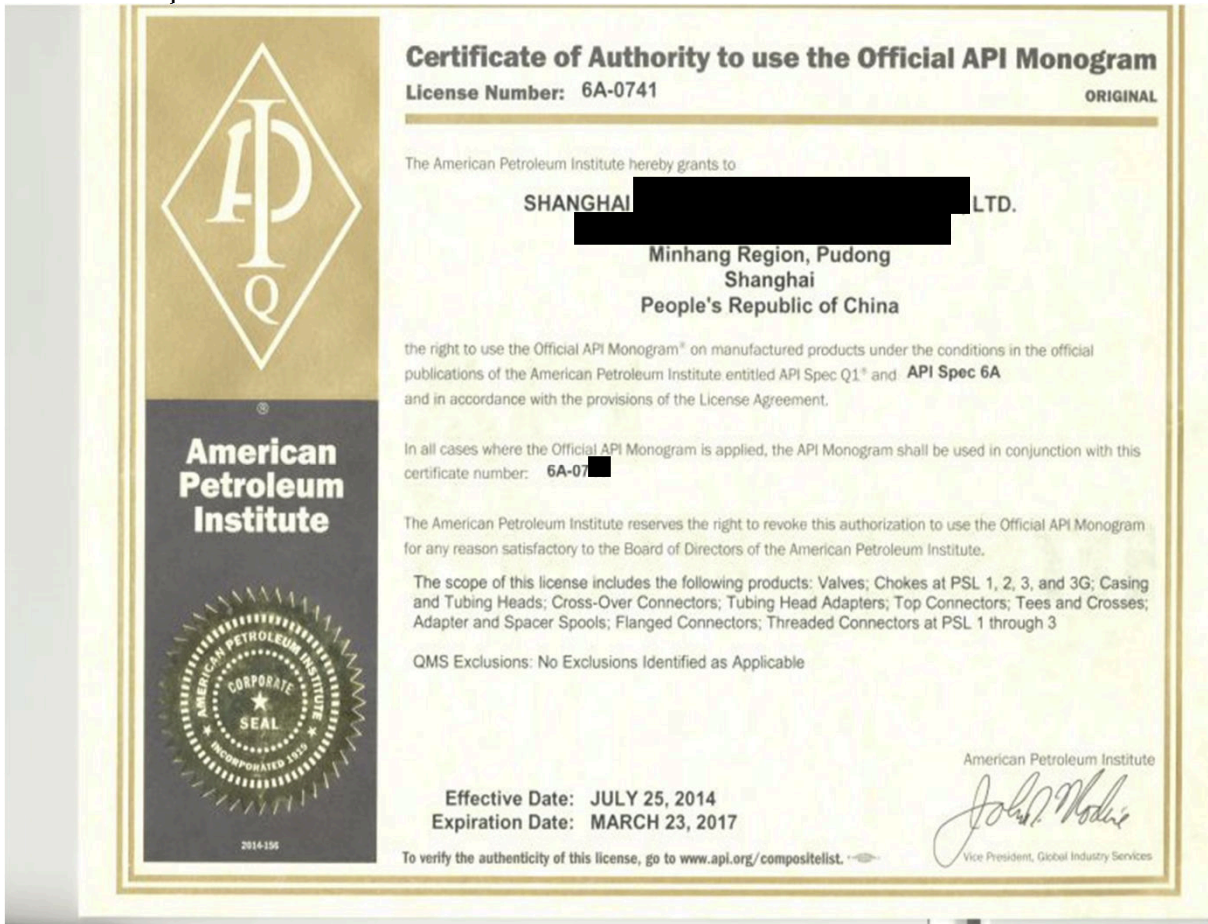
### 3.4 Calibration records of pressure /torque /temperature transducers and calipers

Device Name	Type	Device S/N	CAL Date	Review Status	Remark
Pressure transducer1	0-16bar	4131212614	Apr-16	Acceptable	
Pressure transducer2	0-16bar	4130937796	Apr-16	Acceptable	
Pressure transducer3	0-100bar	4130845914	Apr-16	Acceptable	
Pressure transducer4	0-2000bar	13001HVM	May-16	Acceptable	
Pressure transducer5	0-2000bar	13001HVT	May-16	Acceptable	
Pressure transducer6	0-1750bar	234750813069A	May-16	Acceptable	
Pressure transducer7	0-2500bar	151656512	May-16	Acceptable	
Pressure transducer8	0-700bar	5431189156	Apr-16	Acceptable	
Pressure transducer9	0-2500bar	151656515	May-16	Acceptable	
Pressure transducer10	0-250bar	4131057878	Apr-16	Acceptable	
Torque transducer		15050964	Apr-16	Acceptable	
Temperature transducer		154674	May-16	Acceptable	
Calliper 1	0-150mm	140872300	Jan-16	Acceptable	
Calliper 2	0-300mm	IB500607	Jul-15	Acceptable	
Calliper 3	0-600mm	5-7.14070185	Jun-16	Acceptable	
Calliper 4	0-25mm	034967	Aug-15	Acceptable	
Calliper 5	25-50mm	034752	Oct-15	Acceptable	
Calliper 6	50-100mm	032885	Oct-15	Acceptable	

Notes: About the calibration intervals of pressure transducer, the requirement of "7.2.2.3 Calibration intervals" in API Spec 6A is "Calibration intervals shall be a maximum of 3 months until recorded calibration history can be established by the manufacture and new longer intervals(3 months maximum increment) established".Guangzhou JST Seals Technology Co.,Ltd. has established recorded calibration history and new longer intervals(the maximum calibration intervals are 6 months)

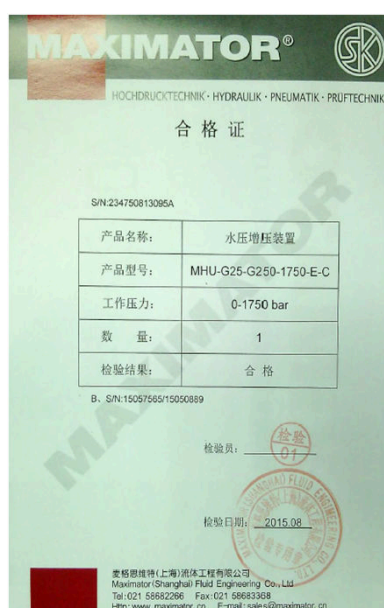
### 3.5 Relevant pictures

PIC 8.API Spec 6A Certificate




PIC 9.Completion acceptance report (PR2 testing system and Gas seal test system)

PIC 10.Completion acceptance report (Pneumatic hydrostatic test system)



PIC 11. Fluid compatibility report of PK002(issued by Element)




Qizhibin Date: 30<sup>th</sup> April 2015  
 Guangzhou JST Seals Technology Co.,Ltd. Author: Dr Michael Lewan  
 Building B, NO.716, Kaichuang Avenue Report Number: C39442  
 Guangzhou, China Client Reference: PO 2015021301  
 020-6684 3840 Ext 1963  
 qizhibin@jst-seals.com

**SOUR FLUID IMMERSION TESTING OF PK002 (PEEK)  
 ACCORDING TO API 6A**

Prepared by: Dr Michael Lewan Senior Scientist  
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Reviewed by: Dr Keyur Somani Senior Scientist  
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*Michael Lewan*



**1. RESULTS**

API 6A (ISO 10423 – F.1.13.5.2) does not provide guidelines as to what levels of change are acceptable for the different properties measured. As a guideline the acceptance criteria for the NORSOK M-710 standard has been used (Table 1.1).

**Table 1.1: API 6A Test fluid immersion test: NORSOK acceptance requirements**

Requirement	NORSOK M-710
Young's Modulus Change, %	
Elongation Change	±50
Max Stress change	
Volume Change	+25/-5
Visual inspection	As per standard

Visual inspection: The material shall show no tendency towards dissolution, cracking, blistering or physical deformation after immersion period.

Table 2.2 shows the changes in mass, volume and tensile properties measured after immersion for 160 hours at 200 °C.

**Table 2.2: Changes in mass, volume and tensile properties after immersion testing in hydrocarbon liquid phase**

Material	Mass uptake (%)	Volume swell (%)	Young's Modulus (%)	Max Stress (%)	Elong. at break (%)
PEEK (PK002)	1.81	4.47	+3.1	-10.2	+28.4

No damage or blistering was evident after the immersion test; the material was intact after the immersion test. Swelling was due to fluid absorption at test temperature.

The changes in volume, Young's modulus, max stress and elongation at break are all within the NORSOK acceptance criteria.

PIC 12. Fluid compatibility report of PF001(issued by Element)



Qizhibin Date: 30<sup>th</sup> April 2015  
 Guangzhou JST Seals Technology Co.,Ltd. Author: Dr Michael Lewan  
 Building B, NO.716, Kaichuang Avenue Report Number: C3944/3  
 Guangzhou, China Client Reference: PO 2015021301  
 020-6684 3840 Ext 1963  
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**SOUR FLUID IMMERSION TESTING OF PF001 (PTFE)  
 ACCORDING TO API 6A**

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*Michael Lewan*



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Material	Mass uptake (%)	Volume swell (%)	Young's Modulus (%)	Max Stress (%)	Elong. at break (%)
PTFE (PF001)	0.18	4.50	-8.7	-20.9	-0.94

No damage or blistering was evident after the immersion test; the material was intact after the immersion test. Swelling was due to fluid absorption at test temperature.

The changes in volume, Young's modulus, max stress and elongation at break are all within the NORSOK acceptance criteria.

**4.Details of inspection activities carried out with respect to scope of work (2016-06-06)**

**4.1 Pre-inspection meeting**

The pre-inspection meeting was held in JST on June.1, the attendees include Huang Zhuwen(JST), Qiu Zhibin(JST), Lu Jinqi, Chen He and Qin Zeming(JST). The attendees of SHANGHAI \*\*\*\*\* CO.,LTD provided all technical documents of tested gate valves for JST inspector Qin Zeming in the pre-inspection meeting, and an operation plan of PR2 performance testing was confirmed after discussion.

**4.2 API Spec 6A compliance test**

Following tests should be carried out according to the requirements of PSL3G in API Spec 6A prior to PR2 performance testing

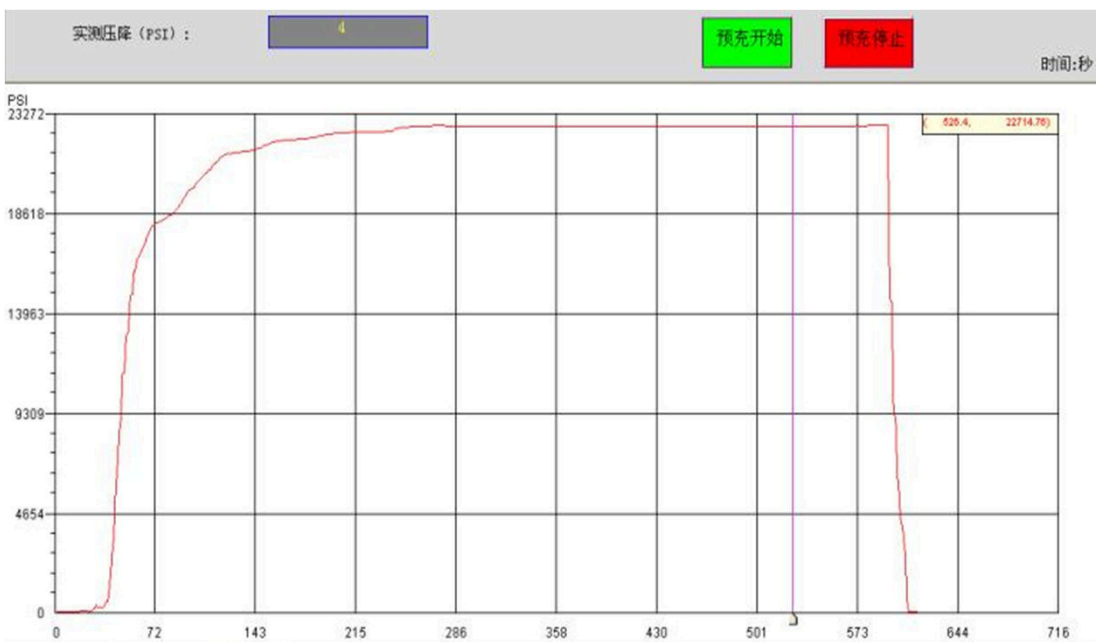
**a. Hydrostatic body test (2016-06-06)**

Testing medium	Water	Testing temperature	31.2°C
Testing procedure	1) One end of the valve is sealed with a blind flange, and the other end is connected with the pressure source. 2) Pressurize to test pressure 22500PSI; the primary pressure-holding period shall be a minimum of 3 min. 3) Reduce the pressure to zero. 4) Then pressurize to test pressure 22500PSI again, the secondary pressure-holding period shall be a minimum of 15 min.		
Acceptance criteria	Pressure changes observed on the pressure measuring device during the pressure-holding period should be less than 500PSI, no visible leakage during the holding period.		

**Testing Data Record and Conclusion**

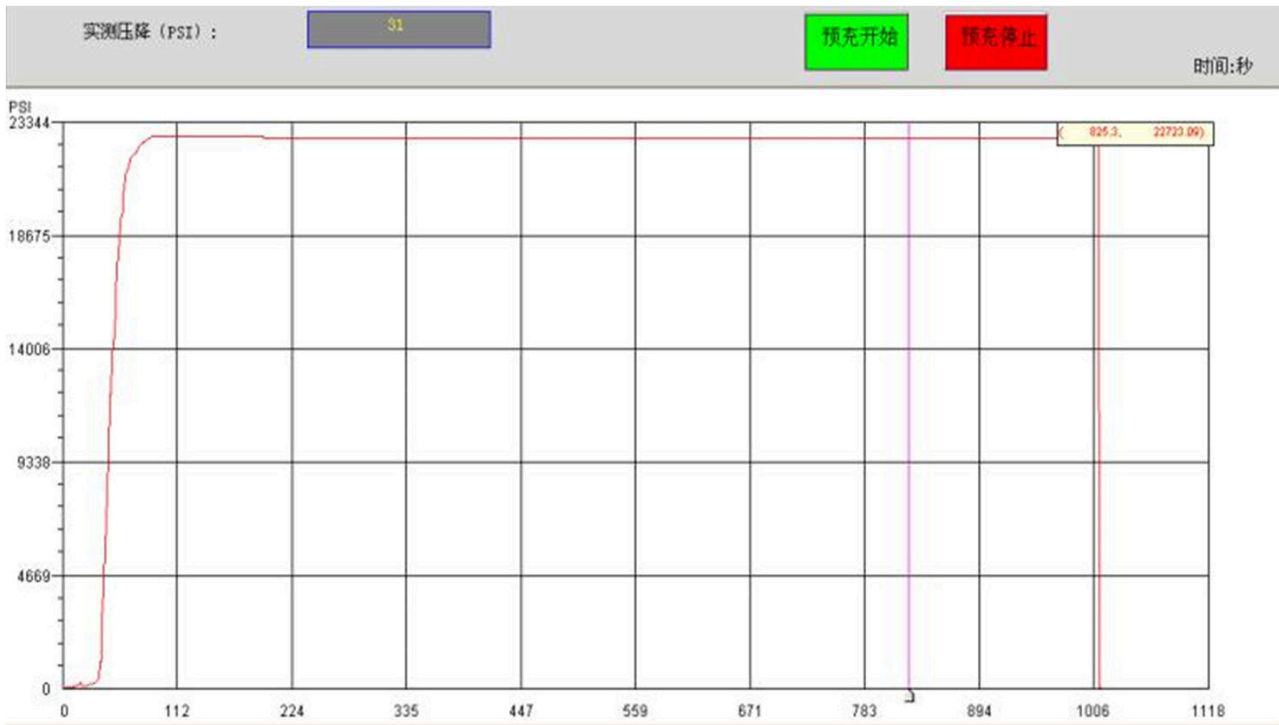
Primary pressure-holding            Pressure change:4PSI, and no visible leakage.  
 Secondary pressure-holding      Pressure change:31PSI, and no visible leakage.  
 Testing conclusion                The testing results can be accepted.

**Curve Chart of Hydrostatic Body Test  
 Primary pressure-holding**





# Secondary pressure-holding



b.Hydrostatic seat test (2016-06-06)

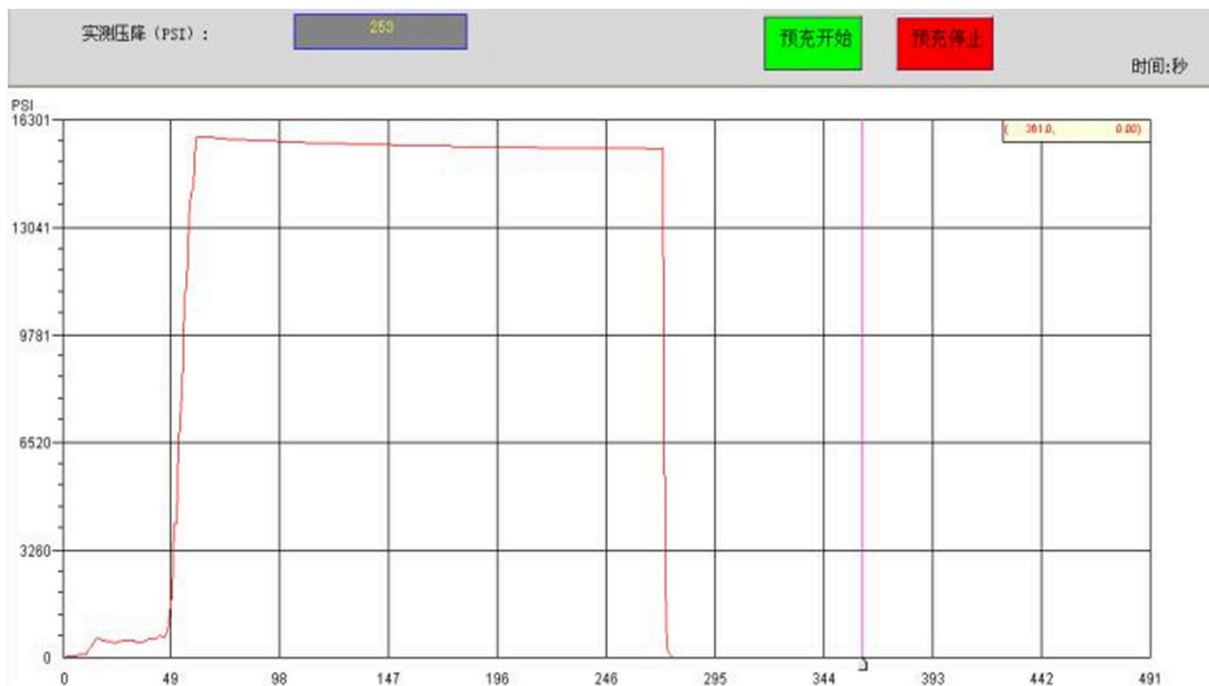
Testing medium	Water	Testing temperature	31.2°C
Testing procedure	1) The valve is closed , the valve's upstream side is connected with the pressure source, and the valve's downstream side is connected with the atmosphere. 2) Pressurize to test pressure 15000PSI; the primary pressure-holding period shall be a minimum of 3 min. 3)Reduce the pressure to zero. 4)Then pressurize to test pressure 15000PSI again, the secondary pressure-holding period shall be a minimum of 15 min. 5)Reduce the pressure to zero. 6)Then pressurize to test pressure 15000PSI again, the third pressure-holding period shall be a minimum of 15 min. 7)The test is just carried out on one direction of valve.		
Acceptance criteria	Pressure changes observed on the pressure measuring device during the pressure-holding period should be less than 500PSI,no visible leakage during the holding period.		

Testing Data Record and Conclusion

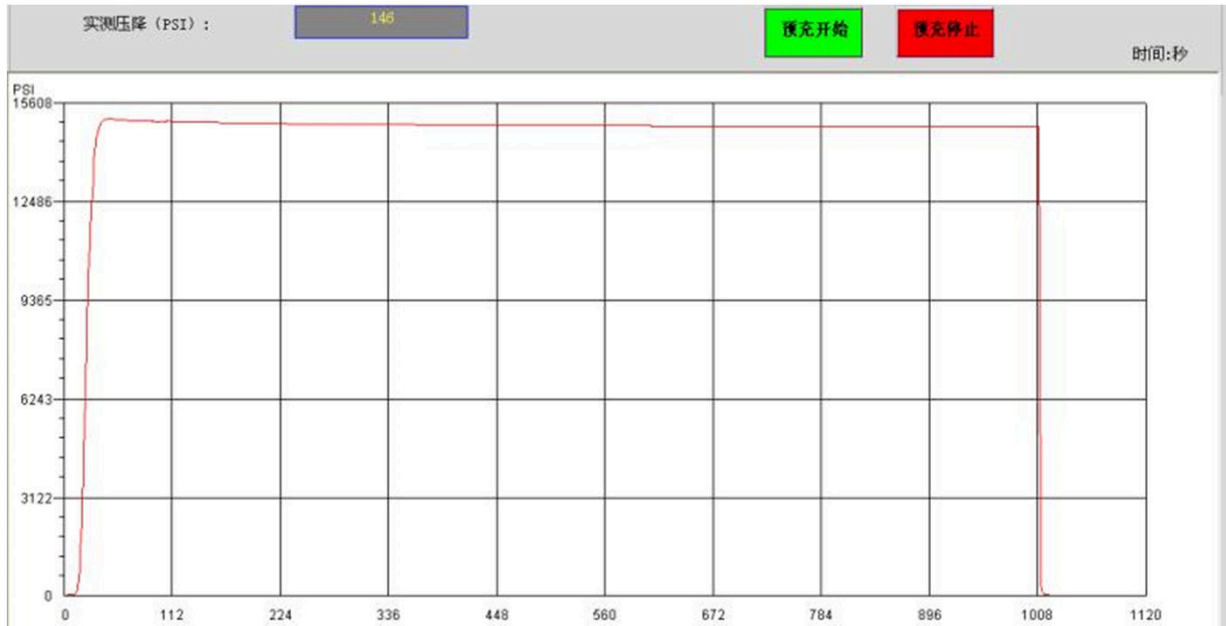
Primary pressure-holding            Pressure change:253PSI,and no visible leakage.  
 Secondary pressure-holding        Pressure change:146PSI,and no visible leakage.  
 Testing conclusion                    The testing results can be accepted.

Curve Chart of Hydrostatic Seat Test

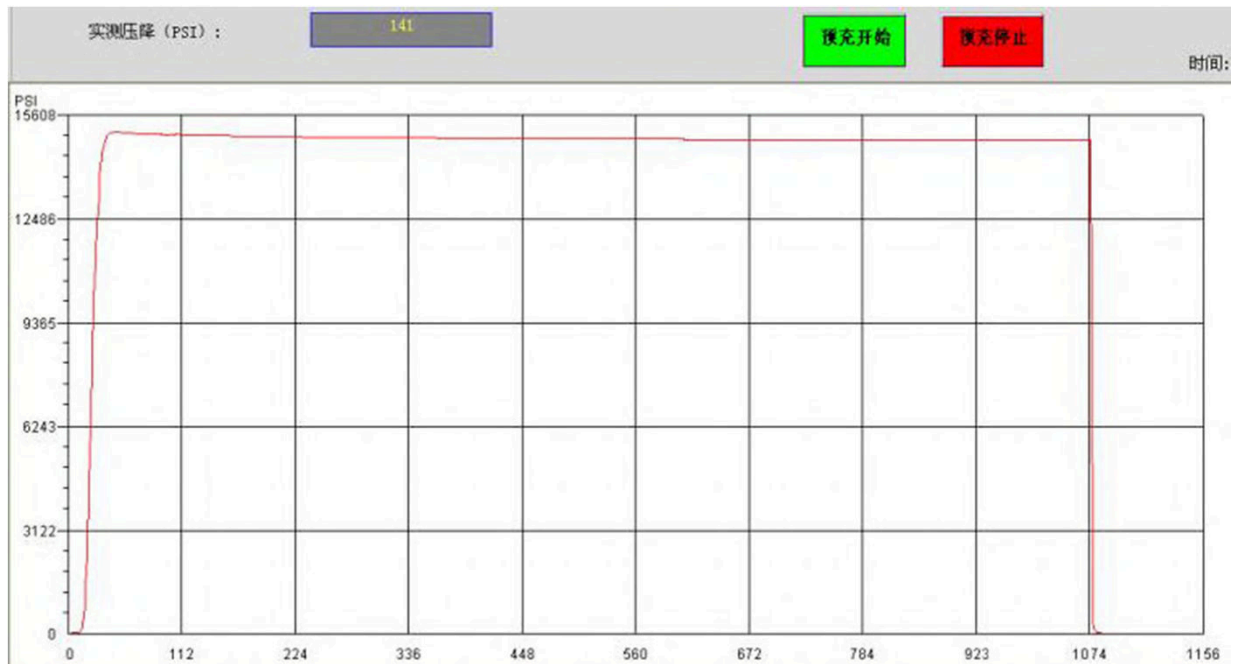
Primary pressure-holding



### Secondary pressure-holding



### The third pressure-holding



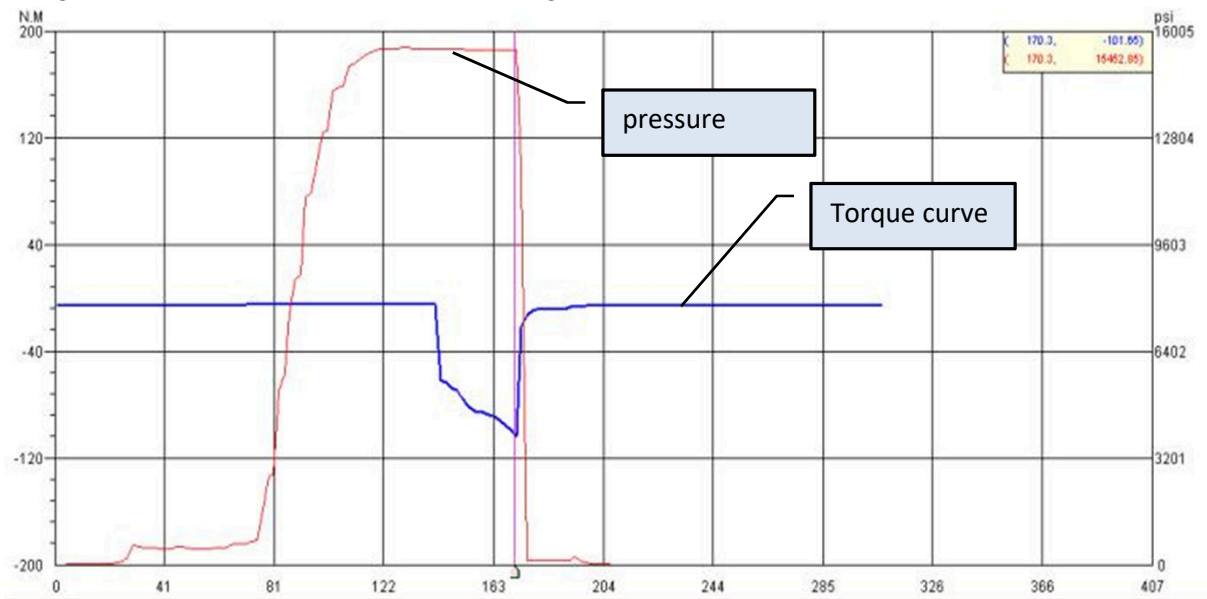
### 4.3 PR2 performance testing (2016-06-08)

a. The primary break-away force or torque measurement at room temperature

Testing medium	Water	Testing temperature	30.2°C
Testing procedure	1) The valve is closed . 2) The valve's upstream side hold rated working pressure 15000PSI, and the valve's downstream side is connected with the atmosphere. 3) Use the torque device to break away the valve, and record the torque values of breaking away moment and subsequent operating process.		
Acceptance criteria	The torque values of breaking away moment and operating process should not exceed 160 N.m in the normal condition ,and not exceed 260N.m in the special condition.		

#### Testing Data Record and Conclusion

Breaking away moment Max.torque value is 101.55N.m.  
 Operating process Max.torque value <101.55 N.m.  
 Testing conclusion The testing results can be accepted.



b. Open/close cycling dynamic pressure test at room temperature (2016-06-28)

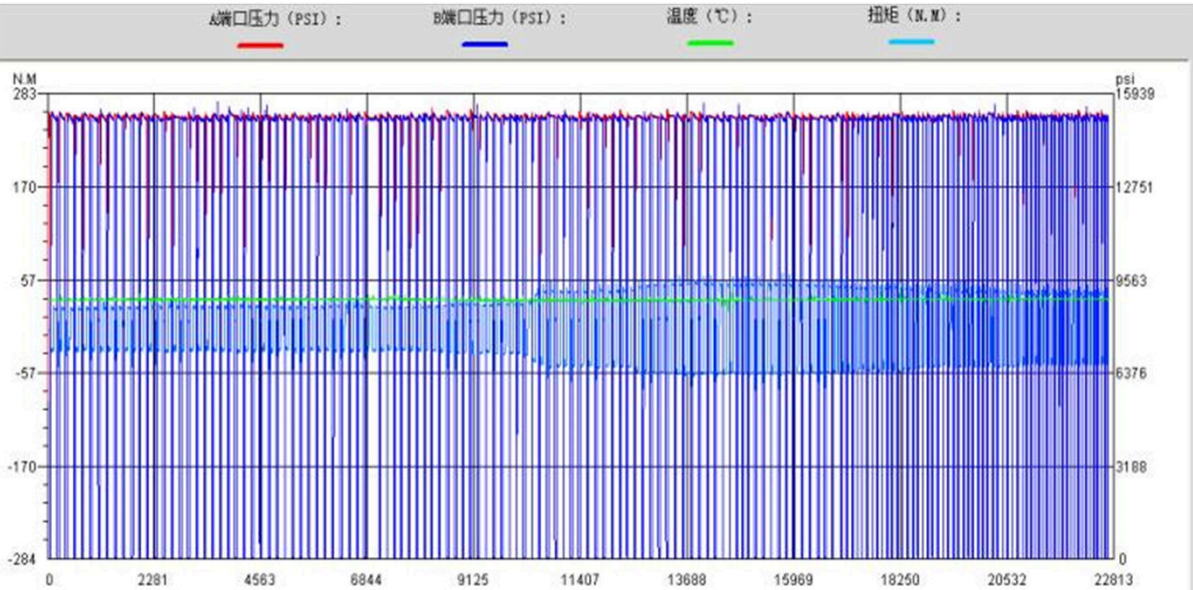
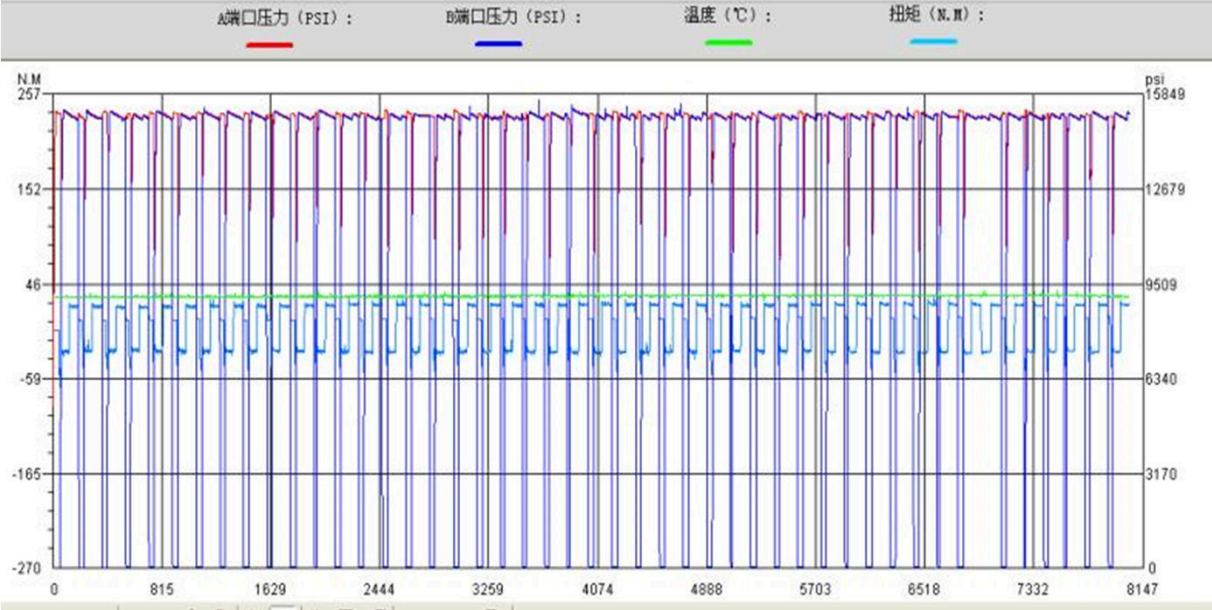
Testing medium	Water	Testing temperature	30.9°C
Testing procedure	1) One end of the valve is sealed with a blind flange, and the other end is connected with the pressure source. 2) The Initial state of valve is fully closed , the pressure of valve's one end is 145PSI or lower, and the pressure of valve's other end is rated working pressure(15000PSI). The opening stroke can be interrupted so as to adjusting the limited value of pressure which should not be less than 50% of rated working pressure( $\geq 7500$ PSI) until the valve is fully opened. 3) Slowly open the valve to fully open condition, the pressure in the entire process should not be less than 50% of rated working pressure( $\geq 7500$ PSI). 4) Slowly close the valve to fully closed condition, the pressure in the entire process should not be less than 50% of rated working pressure( $\geq 7500$ PSI). 5) The pressure of blind flange end should be released to below 145PSI after the valve is fully closed. 6) The above steps shall be repeated until a minimum of 160 open-and-close cycles have been carried out.		

Acceptance criteria	<p>The torque values of opening moment and operating process should not exceed 160 N.m in the normal condition ,and not exceed 260N.m in the special condition.</p> <p>Notes: The recording should start from the second open-and close cycle.</p>
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Testing Data Record and Conclusion

Opening moment                    Max.torque value is 83.9 N.m.  
 Operating process                Max.torque value <83.9N.m.  
 Testing conclusion                The testing results can be accepted.

Curve Chart of Open/close cycling dynamic pressure test at room temperature



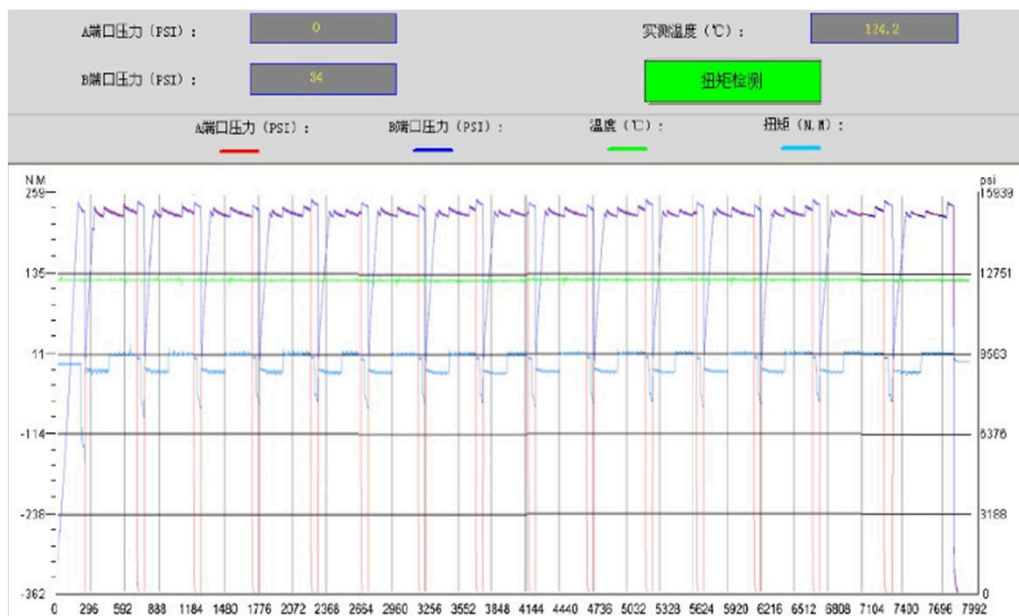
C.Open/close cycling dynamic pressure test at maximum rated temperature (2016-07-02)

Testing medium	Nitrogen
Testing temperature	124.2°C
Heating and thermal insulation method	Air circulation heating
Testing procedure	<p>1) Put the entire valve in the thermal insulation room.</p> <p>2) One end of the valve is sealed with a blind flange, and the other end is connected with the pressure source.</p> <p>3) Heat the valve to the maximum rated working temperature 121°C.</p> <p>4) The Initial state of valve is fully closed, the pressure of valve's one end is 145PSI or lower, and the pressure of valve's other end is rated working pressure(15000PSI). The opening stroke can be interrupted so as to adjusting the limited value of pressure which should not be less than 50% of rated working pressure(<math>\geq 7500</math>PSI) until the valve is fully opened.</p> <p>5) Slowly open the valve to fully open condition, the pressure in the entire process should not be less than 50% of rated working pressure(<math>\geq 7500</math>PSI).</p> <p>6) Slowly close the valve to fully closed condition, the pressure in the entire process should not be less than 50% of rated working pressure(<math>\geq 7500</math>PSI).</p> <p>7) The pressure of blind flange end should be released to below 145PSI after the valve is fully closed.</p> <p>8) The above steps shall be repeated until a minimum of 20 open-and-close cycles have been carried out.</p>
Acceptance criteria	<p>The torque values of opening moment and operating process should not exceed 160 N.m in the normal condition, and not exceed 260N.m in the special condition.</p> <p>Notes: The recording should start from the second open-and close cycle.</p>

Testing Data Record and Conclusion

Opening moment Max.torque value is 162.1 N.m.  
 Operating process Max.torque value < 89N.m.  
 Testing conclusion The testing results can be accepted.

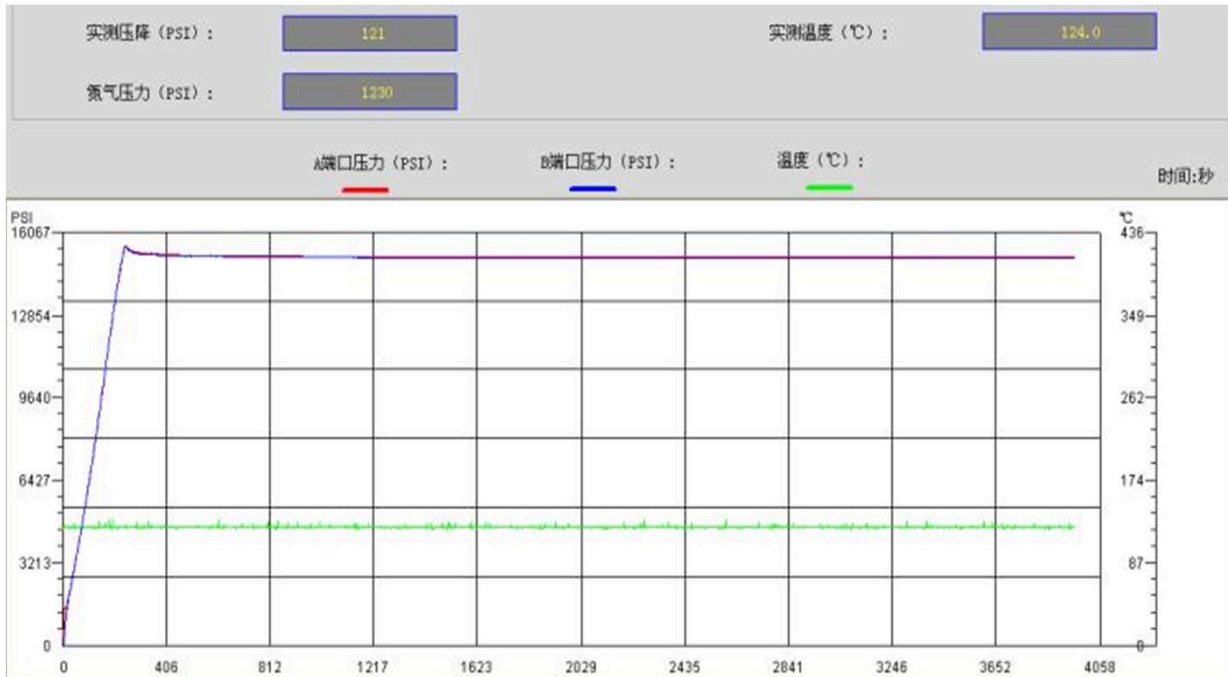
Curve Chart of Open/close cycling dynamic pressure test at maximum rated temperature



d. Gas body test at maximum rated temperature (2016-07-02)

Testing medium	Nitrogen
Testing temperature	124°C
Heating and thermal insulation method	Air circulation heating
Testing procedure	<ol style="list-style-type: none"> <li>1) Put the entire valve in the thermal insulation room.</li> <li>2) One end of the valve is sealed with a blind flange, and the other end is connected with the pressure source.</li> <li>3) Heat the valve to the maximum rated working temperature 121°C.</li> <li>4) Partially open the valve.</li> <li>5) The valve is pressurized to the rated working pressure 15000PSI.</li> <li>6) The pressure-holding period shall be a minimum of 60 min;the pressure of valve is not released at the end of pressure-holding period.</li> </ol>
Acceptance criteria	Pressure change observed on the pressure measuring device during the pressure-holding period should be less than 500PSI.
Testing Data Record and Conclusion	
Pressure change	121PSI.
Testing conclusion	The testing results can be accepted.

Curve Chart

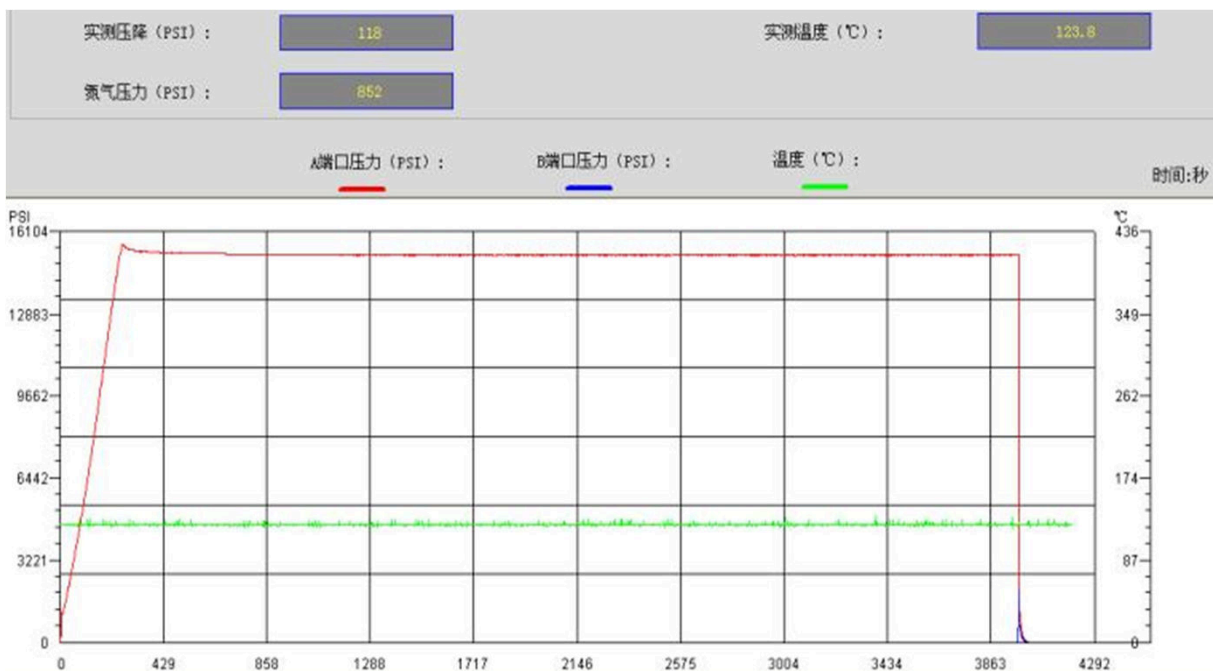


e. Gas seat test at Maximum rated temperature

(2016-07-02)

Testing medium	Nitrogen
Testing temperature	123.8°C
Heating and thermal insulation method	Air circulation heating
Testing procedure	<p>1) Close the valve at the end of "gas body test at maximum rated temperature 121°C"; the valve's upstream side holds rated working pressure 15000PSI, and the valve's downstream side releases pressure .</p> <p>2) The pressure-holding period shall be a minimum of 60 min.</p> <p>3) The test is just carried out on one direction of valve.</p>
Acceptance criteria	Pressure change observed on the pressure measuring device during the pressure-holding period should be less than 500PSI.
Testing Data Record and Conclusion	
Pressure change	118PSI.
Testing conclusion	The testing results can be accepted.

Curve Chart of Gas Body Test and Gas Seat Test at Maximum Rated Temperature

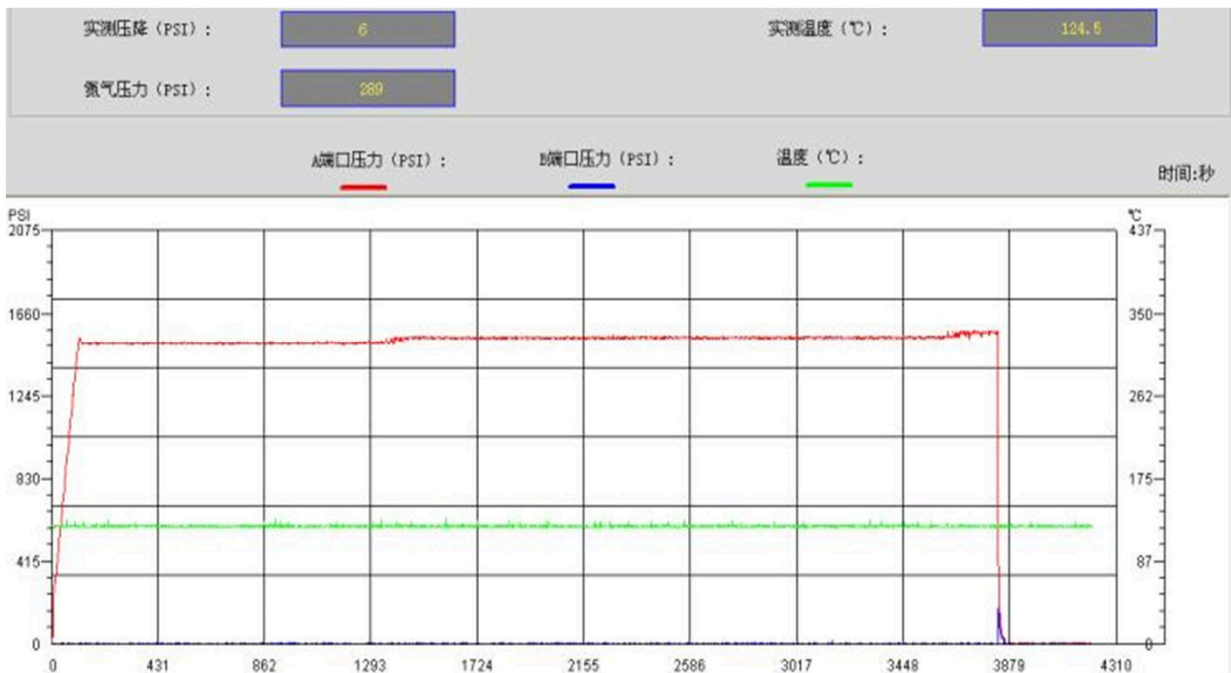




f. Low-pressure seat test at maximum rated temperature (2016-07-02)

Testing medium	Nitrogen		
Testing temperature	124.5°C		
Heating and thermal insulation method	Air circulation heating		
Testing procedure	1) Put the entire valve in the thermal insulation room. 2) Heat the valve to the maximum rated working temperature. 3) The valve holds a differential pressure of 5%~10% of the rated pressure(750~1500PSI):the pressure is exerted on the upstream side of the valve gate, and released from the downstream side. 4) The pressure-holding period shall be a minimum of 60 min. 5) The test is just carried out on one direction of valve.		
Acceptance criteria	Pressure change observed on the pressure measuring device during the pressure-holding period should be less than 5% of the testing pressure (37.5~75PSI).		
Testing Data Record and Conclusion			
Testing pressure	1500PSI	Pressure change	6PSI
Testing conclusion	The testing results can be accepted.		

Curve Chart of Low-pressure seat test at maximum rated temperature



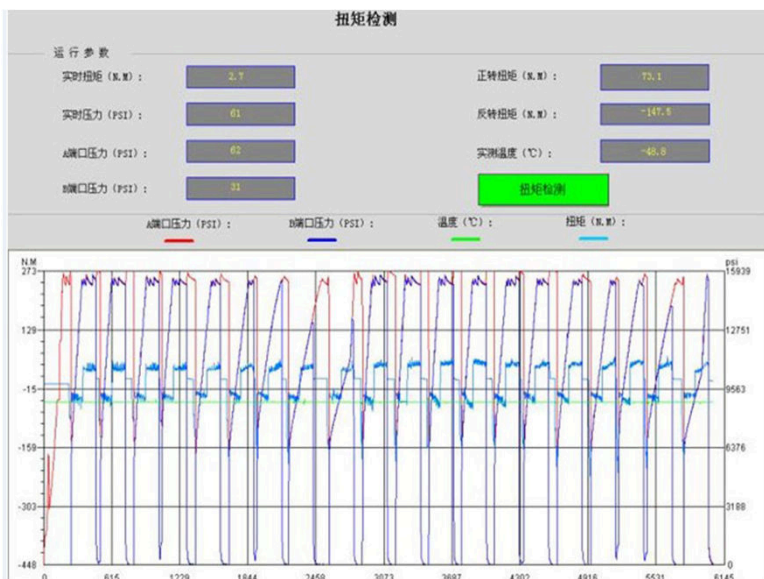
g. Open/close cycling dynamic pressure test at minimum rated temperature (2016-07-04)

Testing medium	Nitrogen
Testing temperature	-48.8°C
Cooling medium	Air
Testing procedure	<ol style="list-style-type: none"> <li>1) Put the entire valve in the thermal insulation room.</li> <li>2) One end of the valve is sealed with a blind flange, and the other end is connected with the pressure source.</li> <li>3) Cool the valve to the minimum rated working temperature -46°C.</li> <li>4) The Initial state of valve is fully closed, the pressure of valve's one end is 145PSI or lower, and the pressure of valve's other end is rated working pressure 15000PSI. The opening stroke can be interrupted so as to adjusting the limited value of pressure which should not be less than 50% of rated working pressure(<math>\geq 7500</math>PSI) until the valve is fully opened.</li> <li>5) Slowly open the valve to fully open condition, the pressure in the entire process should not be less than 50% of rated working pressure(<math>\geq 7500</math>PSI).</li> <li>6) Slowly close the valve to fully closed condition, the pressure in the entire process should not be less than 50% of rated working pressure(<math>\geq 7500</math>PSI).</li> <li>7) The pressure of blind flange end should be released to below 1.0MPa after the valve is fully closed.</li> <li>8) The above steps shall be repeated until a minimum of 20 open-and-close cycles have been carried out.</li> </ol>
Acceptance criteria	<p>The torque values of opening moment and operating process should not exceed 160 N.m in the normal condition, and not exceed 260N.m in the special condition.</p> <p>Notes: The recording should start from the second open-and close cycle.</p>

Testing Data Record and Conclusion

Opening moment	Max.torque value is 147.5 N.m.
Operating process	Max.torque value <135 N.m.
Testing conclusion	The testing results can be accepted.

Curve Chart of Open/close cycling dynamic pressure test at minimum rated temperature

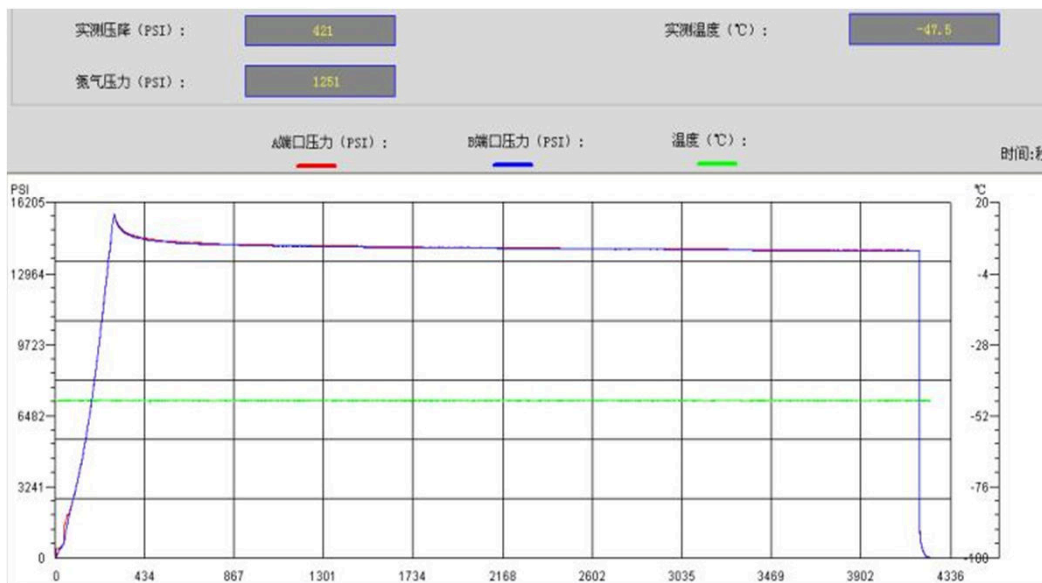


h. Gas body test at minimum rated temperature

(2016-07-06)

Testing medium	Nitrogen
Testing temperature	-47.5°C
Cooling medium	Air
Testing procedure	<ol style="list-style-type: none"> <li>1) Put the entire valve in the thermal insulation room.</li> <li>2) One end of the valve is sealed with a blind flange, and the other end is connected with the pressure source.</li> <li>3) Cool the valve to the minimum rated working temperature -46°C.</li> <li>4) Partially open the valve.</li> <li>5) The valve is pressurized to the rated working pressure 15000PSI.</li> <li>6) The pressure-holding period shall be a minimum of 60 min;the pressure of valve is not released at the end of pressure-holding period.</li> </ol>
Acceptance criteria	Pressure change observed on the pressure measuring device during the pressure-holding period should be less than 500PSI.
Testing Data Record and Conclusion	
Pressure change	421PSI.
Testing conclusion	The testing results can be accepted.

"Curve Chart of Gas Body Test and Gas Seat test at Minimum Rated Temperature" in the next section(Gas seat test at Minimum rated temperature).

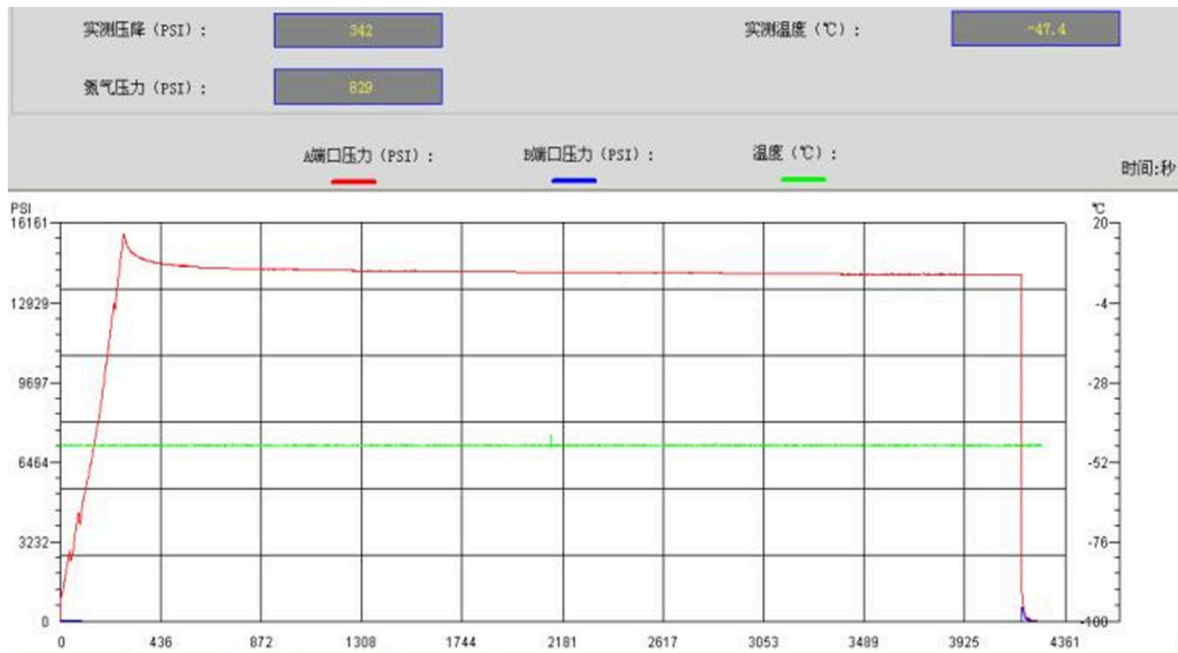


i. Gas seat test at Minimum rated temperature

(2016-07-07)

Testing medium	Nitrogen
Testing temperature	-47.4°C
Cooling medium	Air
Testing procedure	<p>1) Close the valve at the end of "gas body test at minimum rated temperature -46°C";the valve's upstream side holds rated working pressure 15000PSI,and the valve's downstream side releases pressure .</p> <p>2) The pressure-holding period shall be a minimum of 60 min.</p> <p>3) The test is just carried out on one direction of valve.</p>
Acceptance criteria	Pressure change observed on the pressure measuring device during the pressure-holding period should be less than 500PSI.
Testing Data Record and Conclusion	
Pressure change	342PSI.
Testing conclusion	The testing results can be accepted.

Curve Chart of Gas Body Test and Gas Seat Test at Minimum Rated Temperature

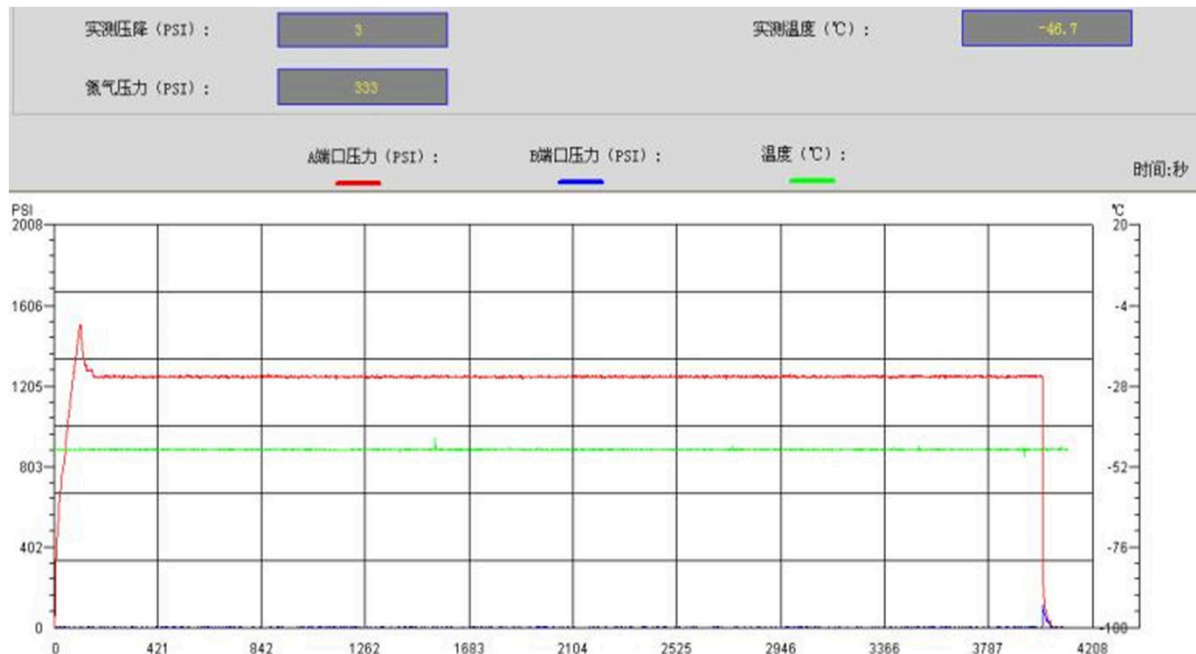


j. Low-pressure seat test at minimum rated temperature

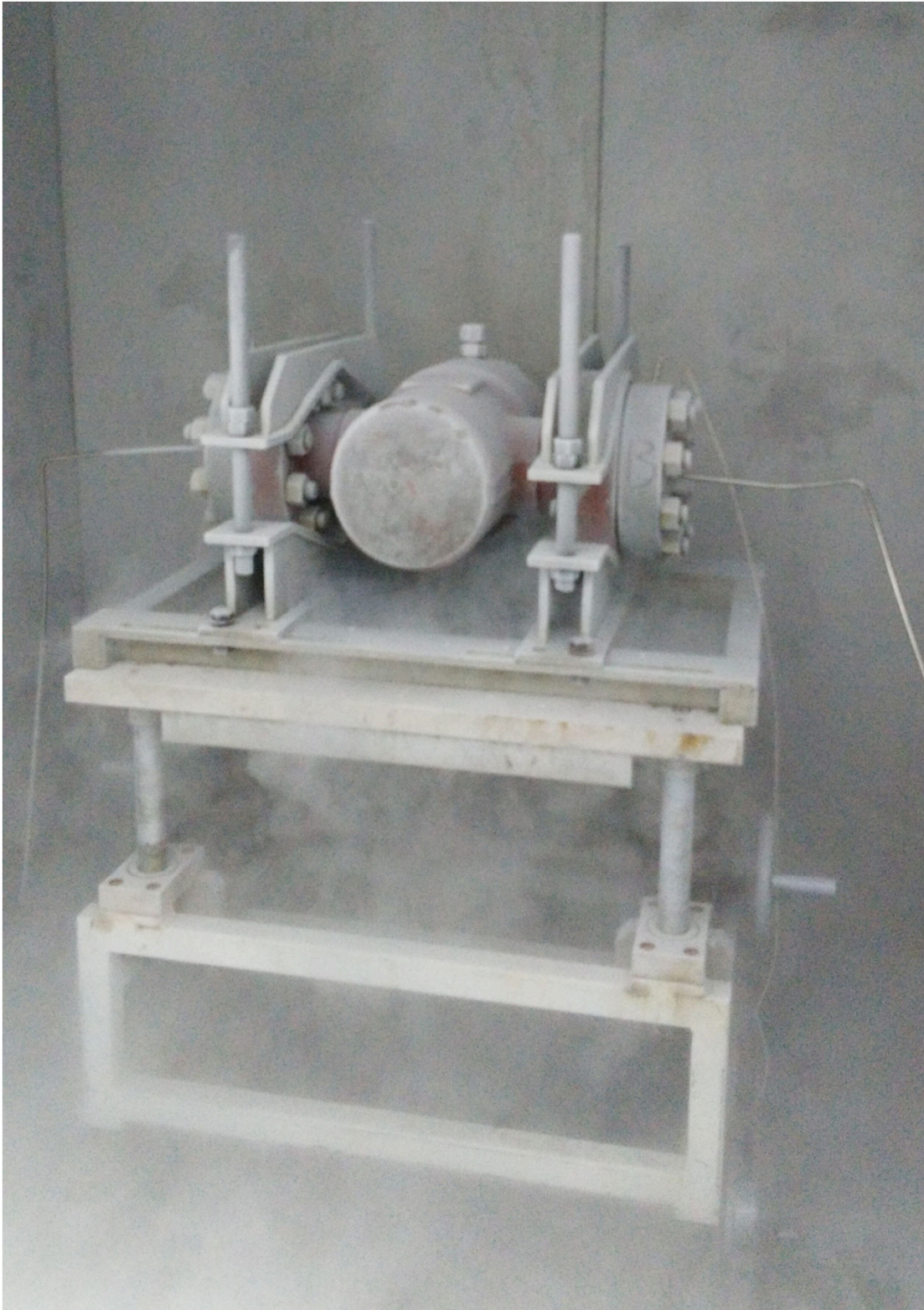
(2016-07-07)

Testing medium	Nitrogen		
Testing temperature	-46.7°C		
Cooling medium	Air		
Testing procedure	1) Put the entire valve in the thermal insulation room. 2) Cool the valve to the maximum rated working temperature -46°C. 3) The valve holds a differential pressure of 5%~10% of the rated pressure(750~1500PSI):the pressure is exerted on the upstream side of the valve gate, and released from the downstream side. 4) The pressure-holding period shall be a minimum of 60 min. 5) The test is just carried out on one direction of valve.		
Acceptance criteria	Pressure change observed on the pressure measuring device during the pressure-holding period should be less than 5% of the testing pressure (37.5~75PSI).		
Testing Data Record and Conclusion			
Testing pressure	1500PSI	Pressure change	3PSI
Testing conclusion	The testing results can be accepted.		

Curve Chart of Low-pressure seat test at minimum rated temperature



Valve picture after Min temperature test



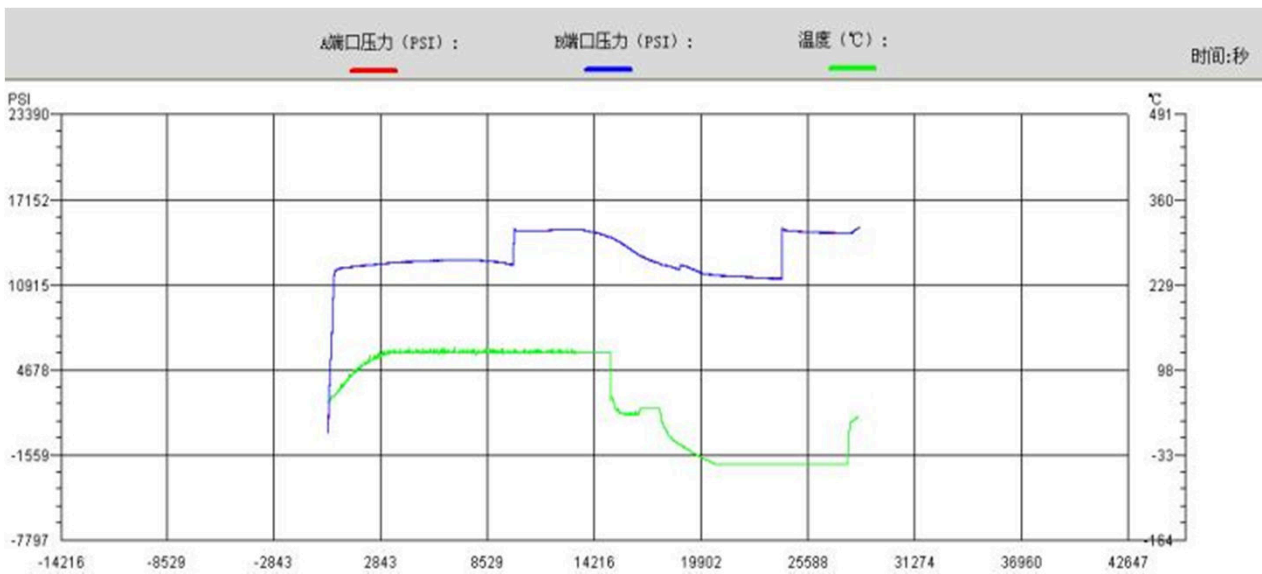
k.Body pressure/temperature cycles (2016-07-09)

Testing medium	Nitrogen	Cooling medium	Air
Thermal insulation method	Thermal insulation room		
Heating method	Air circulation heating		
Temperature cycle range	-46.7°C~124.4°C		
Testing procedure	Step 1	<p>1) The downstream side of valve is sealed with a blind flange, and the upstream side of valve is connected with the pressure source.</p> <p>2) Partially open the valve, and pressurize it to the rated working pressure 15000PSI at room temperature(121.0°C~132°C),the pressure of valve should be held in 50%~100% of testing pressure(7500~15000PSI) during the temperature raise.</p> <p>3) Shut off the pressure source under the testing pressure (15000PSI) and carry out pressure-holding test, the pressure-holding period shall be a minimum of 60 min.</p>	
	Step 2	<p>4) Cool the valve to the minimum rated working temperature(-46°C),and the pressure of valve should be held in 50%~100% of testing pressure(7500~15000PSI).</p> <p>5) Shut off the pressure source under the testing pressure (15000PSI) and carry out pressure-holding test, the pressure-holding period shall be a minimum of 60 min.</p> <p>6) Heat the valve to room temperature, the pressure of valve should be held in 50%~100% of testing pressure(7500~15000PSI) during the temperature raise.</p> <p>7) Release the pressure of valve.</p>	
	Step 3	<p>8) Heat the valve to the maximum rated working temperature(121.0°C~132°C) again.</p> <p>9) Pressurize the valve to the testing pressure (15000PSI),then shut off the pressure source and carry out pressure-holding test, the pressure-holding period shall be a minimum of 60 min.</p> <p>10) Release the pressure of valve.</p>	

	Step 4	11) Cool the valve to the minimum rated working temperature(-46° C). 12) Pressurize the valve to the testing pressure (15000PSI),then shut off the pressure source and carry out pressure-holding test, the pressure-holding period shall be a minimum of 60 min. 13) Release the pressure of valve. 14) Naturally heat the valve to room temperature.
Acceptance criteria	Pressure change observed on the pressure measuring device during the pressure-holding period should be less than 500PSI.	
Testing Data Record and Conclusion		
Pressure change	Step 1	142PSI
	Step 2	249PSI
	Step 3	75PSI
	Step 4	488PSI

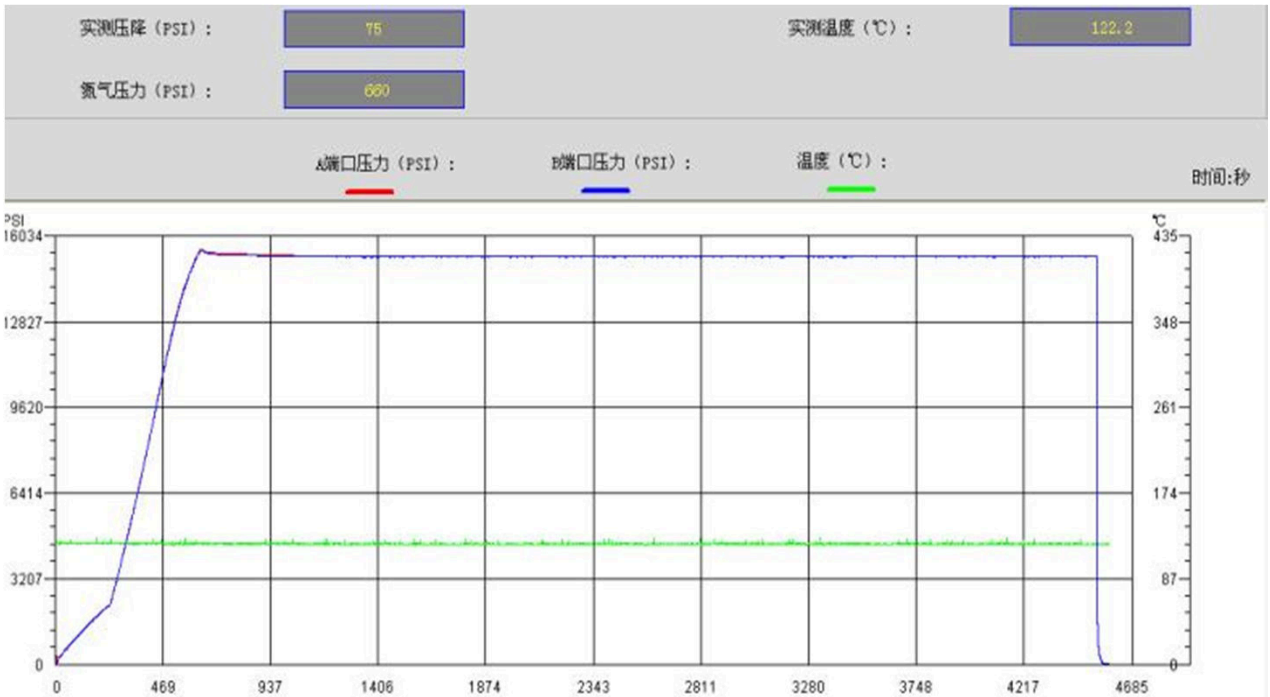
Curve Chart of Body Pressure/Temperature Cycles

Step 1 and Step 2

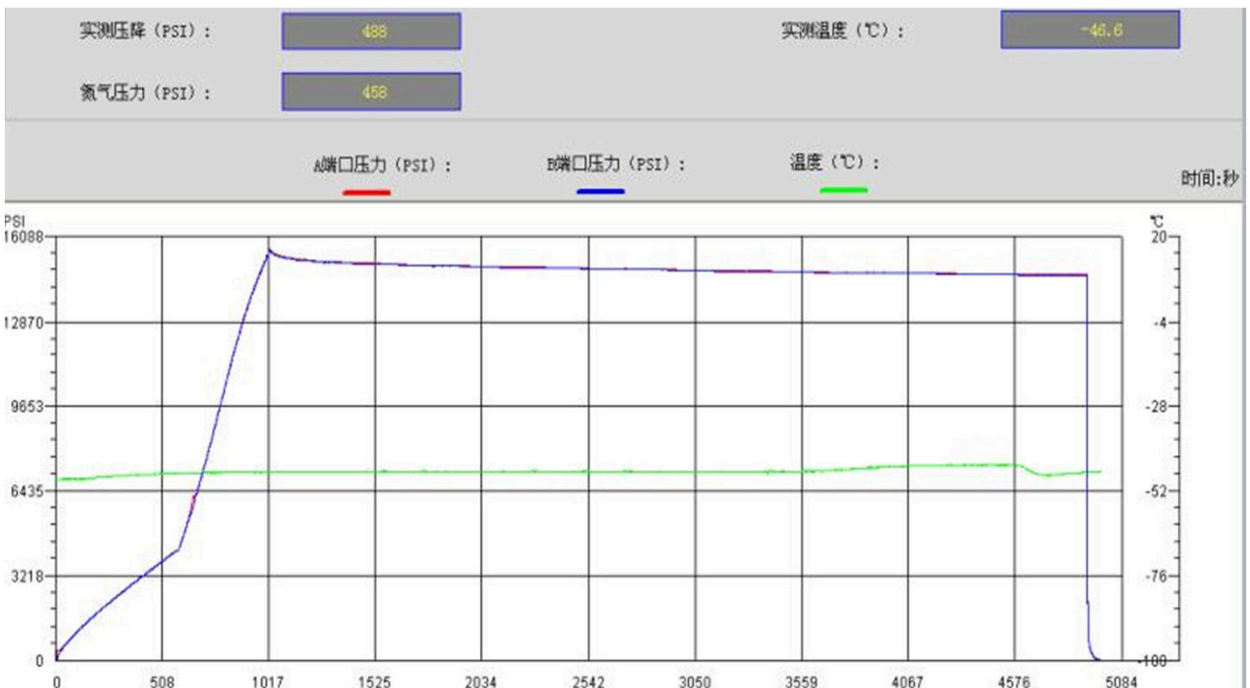




### Step 3

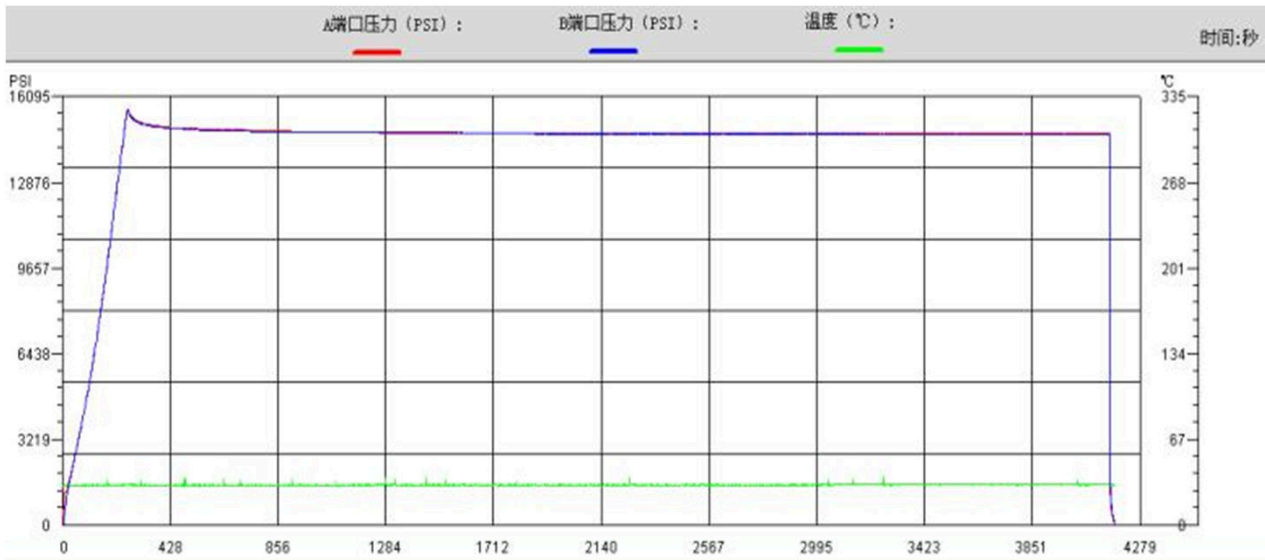


### Step 4

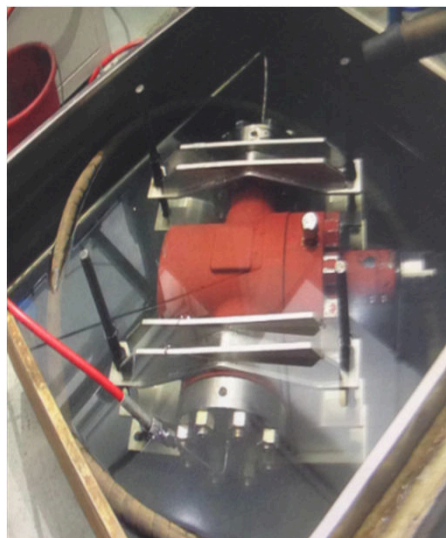


I.Body pressure holding test at room temperature (2016-07-11)

Testing medium	Nitrogen	Testing temperature	31.5°C
Testing procedure	1) Partially open the valve, and put the valve into a water bath. 2) Pressurized the valve to rated working pressure (15000PSI). 3) Carry out pressure-holding test, and the pressure-holding period shall be a minimum of 60 min. 4) The pressure of valve is not released at the end of pressure-holding period.		
Acceptance criteria	It can be accepted if no sustained bubbles are observed. If the leakage is observed, the leakage amount observed at the atmospheric pressure should be less than the following specified values in the specified pressure-holding period: Stem seal--60ml/h;Static seal(bonnet seal, end connection)--20ml/h.		
Testing Data Record and Conclusion			
Testing record	No sustained bubbles are observed.		
Testing conclusion	The testing results can be accepted.		

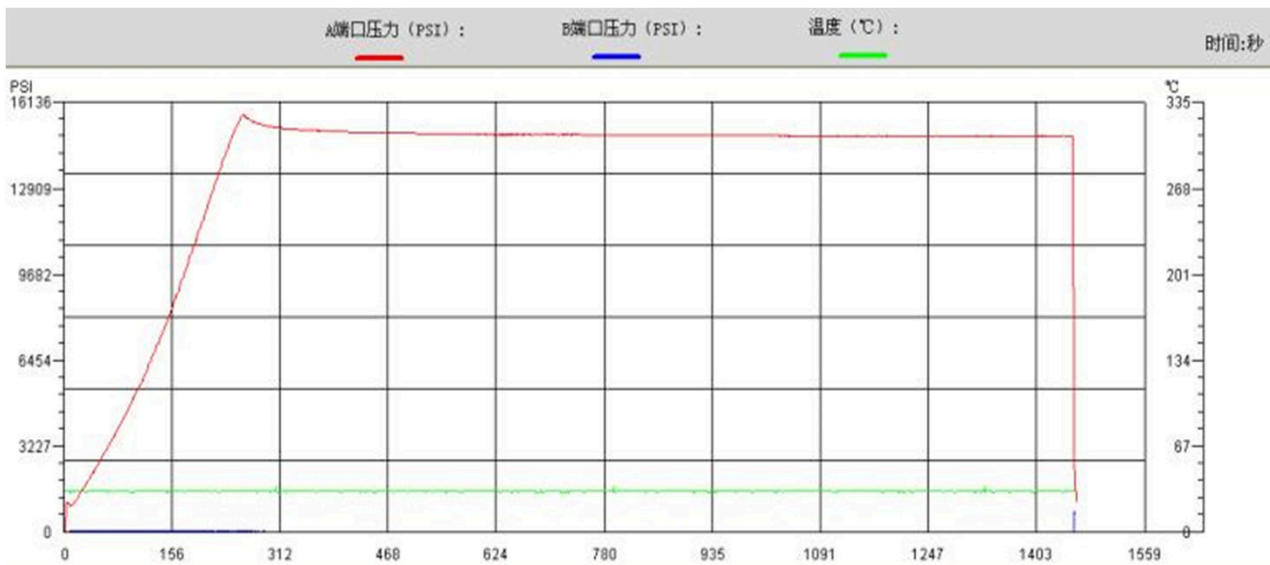


water bath



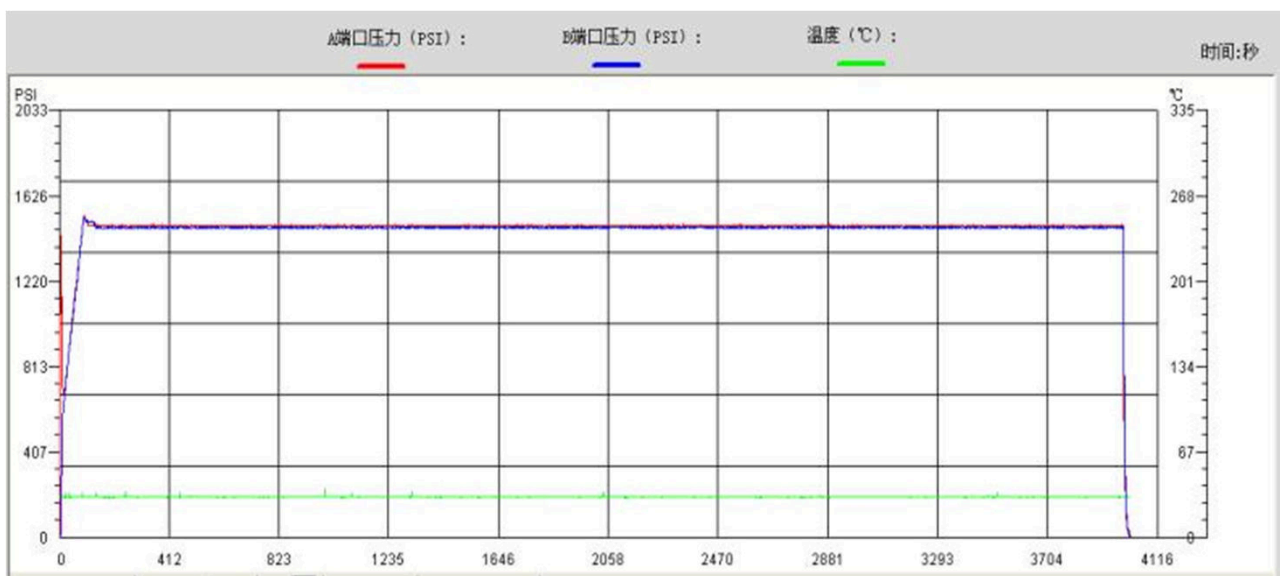
m.Gas seat test at room temperature (2016-07-11)

Testing medium	Nitrogen	Testing temperature	31.5°C
Testing procedure	<p>1) Close the valve at the end of "body pressure holding test at room temperature".</p> <p>2) The valve's upstream side hold rated working pressure 15000PSI,and the valve's downstream side is connected with the atmosphere.</p> <p>3) Carry out pressure-holding test, and the pressure-holding period shall be a minimum of 15 min.</p> <p>4) The test is just carried out on one direction of valve.</p> <p>5) Release the pressure of valve.</p>		
Acceptance criteria	<p>It can be accepted if no sustained bubbles are observed. If the leakage is observed, the leakage amount observed at the atmospheric pressure should be less than the following specified values in the specified pressure-holding period:                  Through hole--75ml/h;Stem seal--60ml/h;Static seal(bonnet seal, end connection)--20ml/h.</p>		
Testing Data Record and Conclusion			
Testing record	No sustained bubbles are observed.		
Testing conclusion	The testing results can be accepted.		



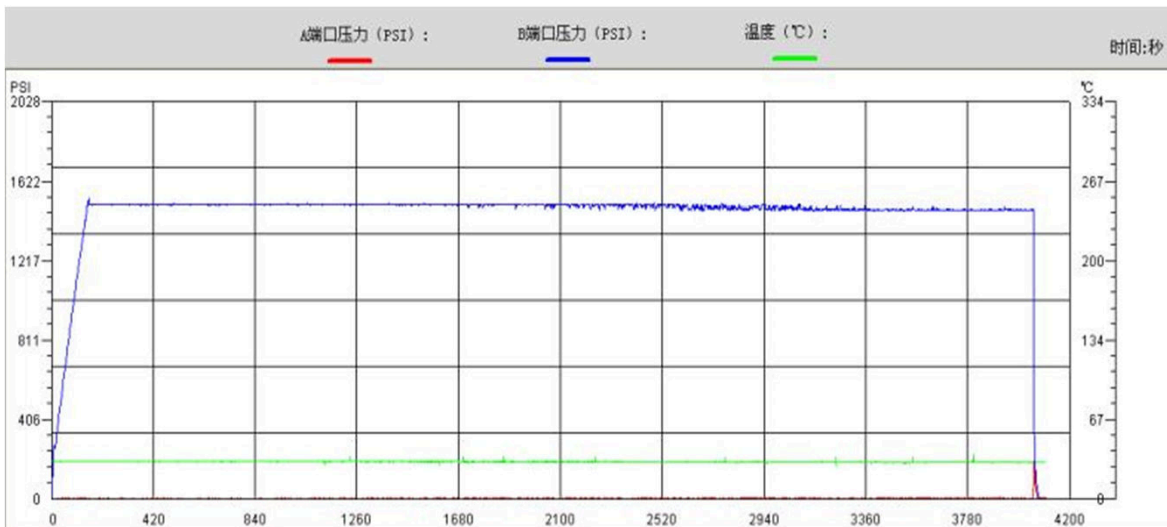
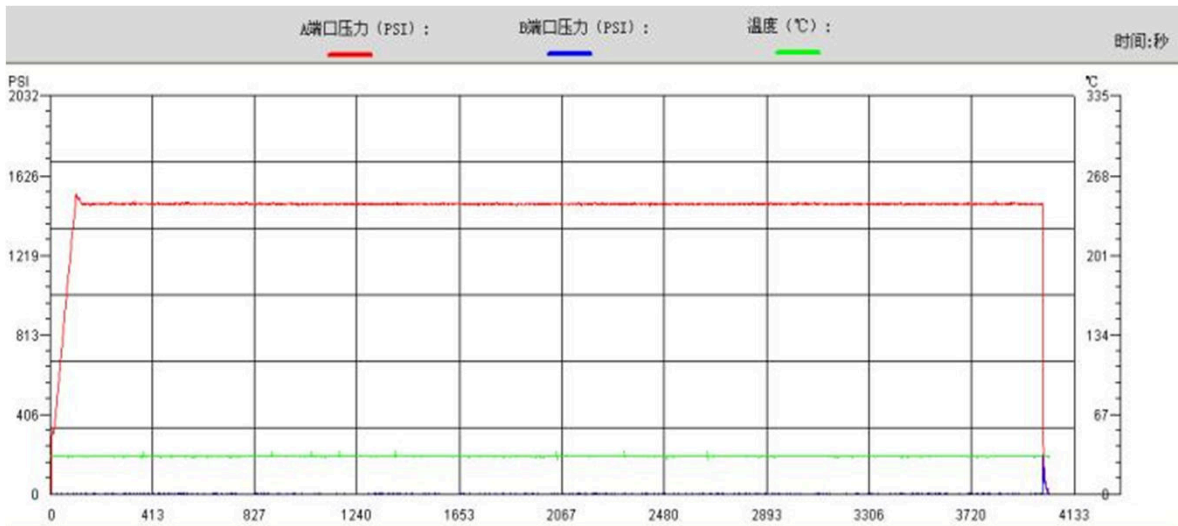
n. Body low-pressure holding test at room temperature (2016-07-11)

Testing medium	Nitrogen	Testing temperature	31.5°C
Testing procedure	1) Partially open the valve, and put the valve into a water bath. 2) Pressurized the valve to 5%~10% of the rated pressure(750~1500PSI). 3) Carry out pressure-holding test, and the pressure-holding period shall be a minimum of 60 min. 4) Release the pressure of valve.		
Acceptance criteria	It can be accepted if no sustained bubbles are observed. If the leakage is observed, the leakage amount observed at the atmospheric pressure should be less than the following specified values in the specified pressure-holding period: Through hole--75ml/h;Stem seal--60ml/h;Static seal(bonnet seal, end connection)--20ml/h.		
Testing Data Record and Conclusion			
Testing record	No sustained bubbles are observed.		
Testing conclusion	The testing results can be accepted.		



o. Low-pressure seat test at room temperature (2016-07-11)

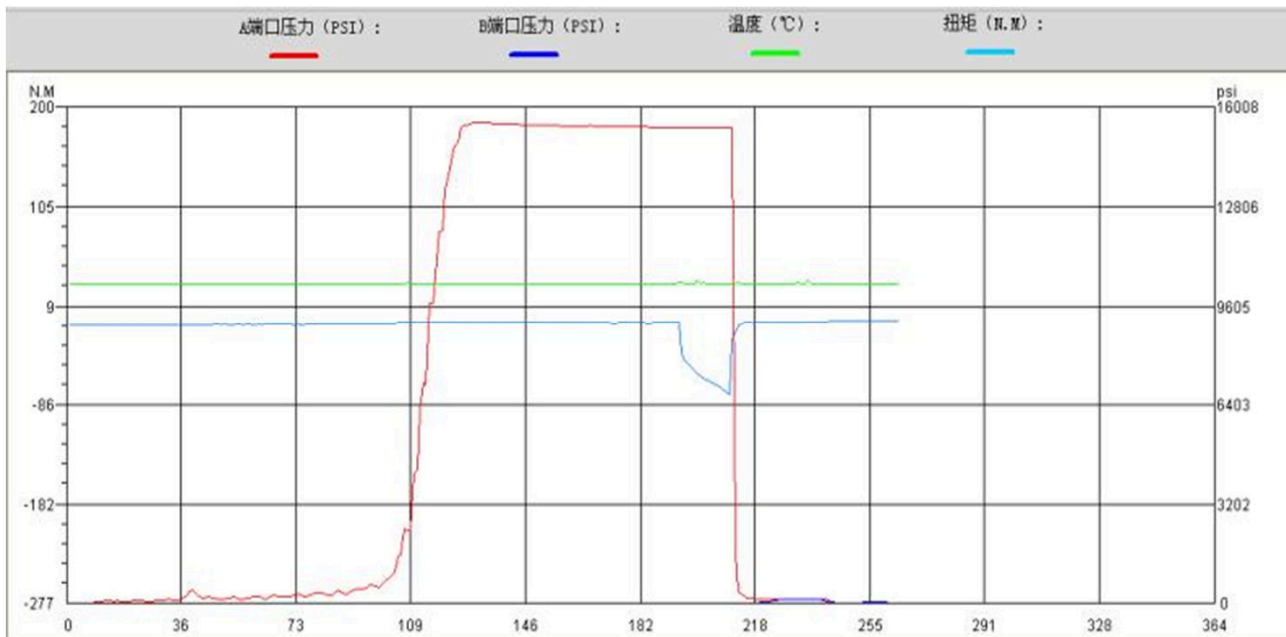
Testing medium	Nitrogen	Testing temperature	31.5°C
Testing procedure	1) Close the valve. 2) The valve shall be subjected to a differential pressure of no less than 5% nor more than 10% of the rated working pressure(750~1500PSI):the pressure is exerted in the valve's one side ,and the valve's other side is connected with the atmosphere. 3) Carry out pressure-holding test, and the pressure-holding period shall be a minimum of 60 min. 4) Release the pressure of valve. 5) The test should be carried out in two directions of valve.		
Acceptance criteria	It can be accepted if no sustained bubbles are observed. If the leakage is observed, the leakage amount observed at the atmospheric pressure should be less than the following specified values in the specified pressure-holding period: Through hole--75ml/h;Stem seal--60ml/h;Static seal(bonnet seal, end		
Testing Data Record and Conclusion			
Testing record of upstream side	No sustained bubbles are observed.		
Testing record of downstream side	No sustained bubbles are observed.		
Testing conclusion	The testing results can be accepted.		



p.Final force or torque measurement (2016-07-11)

Testing medium	Water	Testing temperature	30.2°C
Testing procedure	1) The valve is closed . 2) The valve's upstream side hold rated working pressure 15000PSI,and the valve's downstream side is connected with the atmosphere. 3) Use the torque device to break away the valve, and record the torque values of breaking away moment and subsequent operating process.		
Acceptance criteria	The torque values of breaking away moment and operating process should not exceed 160 N.m in the normal condition ,and not exceed 260N.m in the special condition.		

Testing Data Record and Conclusion	
Breaking away moment	Max.torque value is 77.2 N.m.
Operating process	Max.torque value < 77.2 N.m.
Testing conclusion	The testing results can be accepted.



q.Post-test examination

General Requirements		The tested valve shall be disassembled and inspected in clean and dustless environment.
Inspection content	Part 1	Review the written statement: the requirements of "F.1.6.5" in API Spec 6A are "The examination shall include a written statement that the product and component design does not contain defects to the extent that any performance requirement is not met".
	Part 2	Visual inspection :after the tested valve is disassembled, carry out visual inspection for all parts of the tested valve.
	Part 3	Layout inspection: after the tested valve is disassembled, measure the size of main parts of tested valve.
	Part 4	Liquid penetrant examination(PT):carry out PT for the pressure contact surfaces of tested valve's gate and seats.
Acceptance criteria	All inspection results should meet the requirements of API Spec 6A Specification for wellhead and Christmas Tree Equipment and GATE VALVE JFLS 2-1/16-15M EE-0.5 L-U PSL3G PR2 performance testing schedule.	
Inspection Record and Conclusion		
Inspection Record	Part 1	SHANGHAI ***** CO.,LTD provided a written statement for JST inspector Qin Zeming,and JST inspector Qin Zeming reviewed it.
	Part 2	No obvious appearance defect was found.
	Part 3	Personnel qualification certificate.
	Part 4	All inspection results can be accepted.
Relevant Pictures of Post-Test Examination		

Certificate of Quality Inspector



**5. Results of Inspection**

The result of this inspection is acceptable.

**6. Problems pending**

None.

**7.Photos on site**

Information on the body of tested valve

Gas seal tests(section 4.3--l,m,n,o)



**ANNEXES**  Yes  No

**Inspected by:**

Name: Qin Zeming    Signature:

Date of issue:

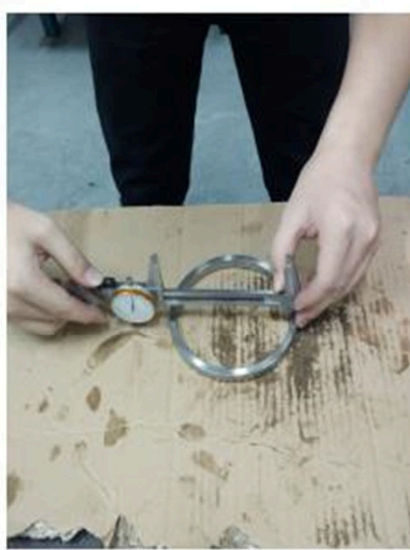
Inspection centre:JST Guangzhou

**Checked by:**

Name:XiongXiaoHong    Signature:



pre-test layout inspection



Check after experiment

