Special Equipment Type-test Certificate

(Pressure-pipeline components)

Certificate No. TSX71002520231377

Manufacturer	Yantai Kingway Science & Technology Co., Ltd.
Registered address	No. 6 Beijing Middle Road, Yantai Economic and Technological Development Zone, Shandong, China
Manufacturing address	No. 6 Beijing Middle Road, Yantai Economic and Technological Development Zone, Shandong, China
Equipment category	Pressure-pipeline valves — metal valves
Product	Metal ball valve
Models	FCCV5-FWWA-600WMM06-OSTG FCCV5-FWWA-600WMM14-OSTG
Type-test reports	2023TSFM844; 2023TSFM845

Type testing confirms conformity with TSG D7002-2006, Type Test Rules for Pressure Piping Components.
This certificate covers ball valves with nominal pressure ≤PN10.0 MPa, nominal size ≤DN600 mm and service temperature −29°C to 350°C.

合肥通用机电产品检测院有限公司

国家泵阀产品质量检验检测中心

2023年9月7日

Hefei General Machinery & Electrical Products Inspection Institute Co., Ltd.
National Quality Inspection and Testing Center for Pump and Valve Products

07 September 2023

Special Equipment Type-test Certificate

(Pressure-pipeline components)

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合肥通用机电产品检测院有限公司

国家泵阀产品质量检验检测中心

2023 年 9 月 7 日

07 September 2023

Report No. 2023TSFM844

Special Equipment Type-test Report

Equipment type	Pressure-pipeline components
Equipment category	Metal valves
Product	Metal ball valve
Model	FCCV5-FWWA-600WMM06-OSTG
Applicant	Yantai Kingway Science & Technology Co., Ltd.
Manufacturer	Yantai Kingway Science & Technology Co., Ltd.
Test type	Type test

合肥通用机电产品检测院有限公司

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Hefei General Machinery & Electrical Products Inspection Institute Co., Ltd.
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Pressure-pipeline component type-test conclusion

Report No. 2023TSFM844

Applicant	Yantai Kingway Science & Technology Co., Ltd.		
Manufacturer	Yantai Kingway Science & Technology Co., Ltd.		
Registered / manufacturing address	No. 6 Beijing Middle Road, Yantai Economic and Technological Development Zone, Shandong, China		
Designer	Yantai Kingway Science & Technology Co., Ltd.		
Equipment	Metal ball valve	Sample model	FCCV5-FWWA-600WMM06-OSTG
Design date	March 2021	Drawing No.	RD088-01-00-A1
Product / batch No.	237760612847	Sampling date	18 August 2023
Sample / batch size	1 unit / 5 units	Samplers	Wang Xiaojun; Li Wei
Sampling organization	Hefei General Machinery & Electrical Products Inspection Institute Co., Ltd.		
Test basis	GB/T 12237-2021, Steel ball valves for petroleum, petrochemical and allied industries; TSG D7002-2006, Type Test Rules for Pressure Piping Components		
Design review	The design meets the safety-performance requirements of GB/T 12237-2021, Steel ball valves for petroleum, petrochemical and allied industries		
Test conclusion	Type-test results meet the specified requirements. Overall type-test result: PASS		
Remarks	—		

Test officer	郭XX	Date	2023.9.1
Review	张XX	Date	2023.9.1
Approval	吴XX	Date	2023.9.7

型式试验机构核准证号：

TS7610025-2025

检验检测专用章

2023 年 9 月 7 日

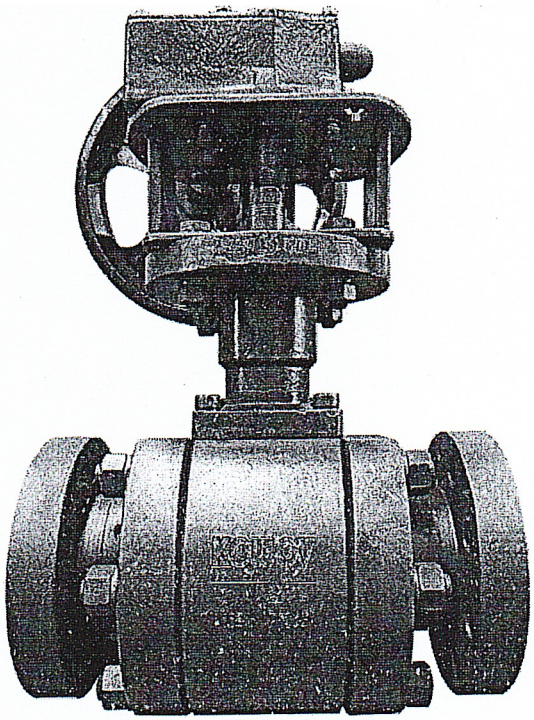
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Report issued: 07 September 2023

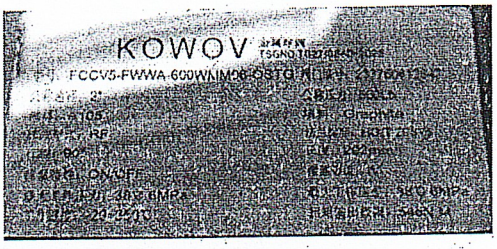
1. Main sample parameters

Report No. 2023TSFM844

No.	Parameter	Unit	Value
1	Nominal pressure PN	MPa	10.0 (Class600)
2	Nominal size DN	mm	50 (2″)
3	Design service temperature	°C	−29 to 350
4	Service medium	/	Gas; oil products
5	Body material	/	A105
6	Sealing-pair material	/	Seat F316+TCC; ball F316+TCC
7	Internal sealing materials	/	Body/bonnet: stainless-steel/graphite spiral-wound gasket Stem packing: flexible graphite
8	Maximum working differential pressure	MPa	6.0

Sample appearance and nameplate photographs





2. Design review

Report No. 2023TSFM844

Manufacturing standard	GB/T 12237-2021	Design standard	GB/T 12237-2021

No.	Design review item		Result	Remarks
1	Design document review	Completeness of design documents	Complete	/
2		Selection of design parameters	Meets standard	/
3		Strength / design calculations	Complete	/
4		Structural design in drawings	Meets standard	/
5		Product specifications and standards in drawings	Correct	/
6		Selection of main materials	Meets standard	/
7		Technical requirements in drawings	Complete	/
1	Process document review	Welding process	Conforms	/
2		Heat-treatment process	Conforms	/
3		Completeness of inspection and test items	Complete	/
4		Inspection and test acceptance requirements	Conforms	/

Conclusion: The design meets the safety-performance requirements of GB/T 12237-2021, Steel ball valves for petroleum, petrochemical and allied industries

Review	韩红兴	Date	2023.8.30	Check	冯玉林	Date	2023.9.1

3. Sample inspection and testing

Report No. 2023TSFM844

No.	Sample No.	Inspection / test	Result	Conclusion	Remarks
1	237760612847	Body surface	No defects observed	Pass	/
		Body markings	Trademark, nominal size, pressure class, material code and batch number; flow direction	Pass	/
		Shell test	No visible leakage or structural damage	Pass	/
		Liquid seat test	Forward: 0 drops/min	Pass	/
		Gas seat test	Forward: 0 bubbles/min	Pass	/
		Minimum body wall thickness	Meets standard	Pass	/
		Opening / closing under pressure	Normal opening and closing, without sticking or visible damage. Subsequent gas seat test: forward, 0 bubbles/min	Pass	/
		Body material chemistry (center and side bodies)	Matches the marked material grade	Pass	/

Conclusion: The inspected items meet GB/T 12237-2021 and TSG D7002-2006. See Section 4, Inspection data

Review [signature] Date 2023.9.1 Check [signature] Date 2023.9.1

4. Inspection data

Report No. 2023TSFM844 Inspection: 30 Aug – 01 Sep 2023

No.	Inspection item	Technical requirements	Inspection data	Result
1	Body surface	No defects	No defects observed	Pass
2	Body markings	Trademark, nominal pressure / class, nominal size, body material code, heat or batch number, flow direction	Trademark, nominal size, pressure class, body material code, batch number, flow direction	Pass
3	Shell test	15.3 MPa; hold ≥2 min No visible leakage or structural damage	No visible leakage or structural damage	Pass
4	Liquid seat test	6.6 MPa; hold ≥2 min Leakage: 0 drops/min	Forward: 0 drops/min	Pass
5	Gas seat test	0.4–0.7 MPa; hold ≥2 min Leakage: 0 bubbles/min	Forward: 0 bubbles/min	Pass
6	Minimum body wall thickness	Flow passage: standard ≥5.9 mm; drawing ≥21.0 mm Center body: standard ≥8.7 mm; drawing ≥34.0 mm	Flow passage: 26.9 mm Center body: 34.3 mm	Pass
7	Opening / closing under pressure	Open at 6.0 MPa differential pressure; close at 6.0 MPa cavity pressure. 20 cycles, followed by a gas seat test. Normal operation, without sticking or visible damage. Gas leakage: 0 bubbles/min	Normal opening and closing, without sticking or visible damage. Subsequent gas seat test: forward, 0 bubbles/min	Pass

4. Inspection data

Report No. 2023TSFM844 Inspection: 30 Aug – 01 Sep 2023

No.	Inspection item	Technical requirements	Inspection data	Result
8	Body material chemistry (center and side bodies)	C ≤0.35%	0.20%	Pass
		S ≤0.040%	0.002%	
		Mn: 0.60–1.05%	0.95%	
		Si: 0.10–0.35%	0.25%	
		P ≤0.035%	0.010%	
		Cr ≤0.30%	0.06%	
		Mo ≤0.12%	0.01%	
		Ni ≤0.40%	0.01%	
		Cu ≤0.40%	0.01%	
		V ≤0.05%	0.003%	

Remarks:
1. Valve markings: nominal size 2″, Class600, body material A105
2. Maximum allowable working pressure at 38°C: 10.2 MPa
3. Design working differential pressure: 6.0 MPa
4. Center and side bodies have the same material batch number
5. Test ambient temperature: 25°C–30°C

Report notices

1. This is the conclusion report for type testing of pressure-pipeline components under the Type Test Rules for Pressure Piping Components

2. The report must be computer-printed or written legibly in ink. Alterations invalidate the report

3. The report requires inspection, review and approval signatures, the testing-body approval number, and an inspection or official seal. The pages must also bear a seal across the joins

4. Three copies: one for the applicant, one for the testing-body archive, and one for licensing purposes

5. The report is valid only for the tested sample

6. Any objection must be submitted in writing to the testing body within 15 working days after receipt of this report

Testing-body address: No. 888 Changjiang West Road, Shushan District, Hefei, Anhui 230031
Telephone: (0551) 65335599, 65335577, 65335566 Fax: 65325105

Report No. 2023TSFM845

Special Equipment Type-test Report

Equipment type	Pressure-pipeline components
Equipment category	Metal valves
Product	Metal ball valve
Model	FCCV5-FWWA-600WMM14-OSTG
Applicant	Yantai Kingway Science & Technology Co., Ltd.
Manufacturer	Yantai Kingway Science & Technology Co., Ltd.
Test type	Type test

合肥通用机电产品检测院有限公司

国家泵阀产品质量检验检测中心

Hefei General Machinery & Electrical Products Inspection Institute Co., Ltd.
National Quality Inspection and Testing Center for Pump and Valve Products

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Pressure-pipeline component type-test conclusion

Report No. 2023TSFM845

Applicant	Yantai Kingway Science & Technology Co., Ltd.		
Manufacturer	Yantai Kingway Science & Technology Co., Ltd.		
Registered / manufacturing address	No. 6 Beijing Middle Road, Yantai Economic and Technological Development Zone, Shandong, China		
Designer	Yantai Kingway Science & Technology Co., Ltd.		
Equipment	Metal ball valve	Sample model	FCCV5-FWWA-600WMM14-OSTG
Design date	March 2021	Drawing No.	RD088-02-00-A1
Product / batch No.	237761413412	Sampling date	18 August 2023
Sample / batch size	1 unit / 5 units	Samplers	Wang Xiaojun; Li Wei
Sampling organization	Hefei General Machinery & Electrical Products Inspection Institute Co., Ltd.		
Test basis	GB/T 12237-2021, Steel ball valves for petroleum, petrochemical and allied industries; TSG D7002-2006, Type Test Rules for Pressure Piping Components		
Design review	The design meets the safety-performance requirements of GB/T 12237-2021, Steel ball valves for petroleum, petrochemical and allied industries		
Test conclusion	Type-test results meet the specified requirements. Overall type-test result: PASS		
Remarks	—		

Test officer	郭亚平	Date	2023.9.1
Review	冯小林	Date	2023.9.1
Approval	吴磊	Date	2023.9.7

型式试验机构核准证号：

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检验检测专用章

2023 年 9 月 7 日

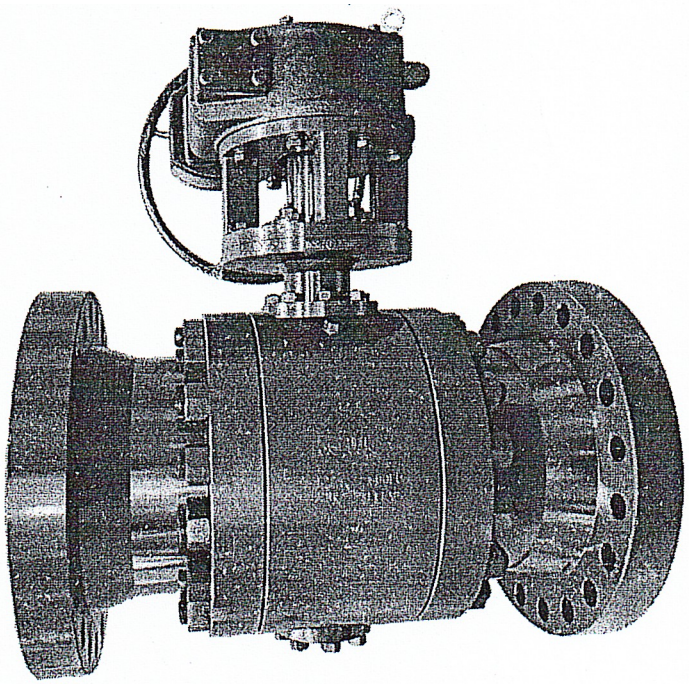
Testing-body approval No. TS7610025-2025
Report issued: 07 September 2023

1. Main sample parameters

Report No. 2023TSFM845

No.	Parameter	Unit	Value
1	Nominal pressure PN	MPa	10.0 (Class600)
2	Nominal size DN	mm	300 (12″)
3	Design service temperature	°C	−29 to 300
4	Service medium	/	Gas; oil products
5	Body material	/	A105
6	Sealing-pair material	/	Seat F51+TCC; ball F51+TCC
7	Internal sealing materials	/	Body/bonnet: stainless-steel/graphite spiral-wound gasket Stem packing: flexible graphite

Sample appearance and nameplate photographs





2. Design review

Report No. 2023TSFM845

Manufacturing standard	GB/T 12237-2021	Design standard	GB/T 12237-2021

No.	Design review item		Result	Remarks
1	Design document review	Completeness of design documents	Complete	/
2		Selection of design parameters	Meets standard	/
3		Strength / design calculations	Complete	/
4		Structural design in drawings	Meets standard	/
5		Product specifications and standards in drawings	Correct	/
6		Selection of main materials	Meets standard	/
7		Technical requirements in drawings	Complete	/
1	Process document review	Welding process	Conforms	/
2		Heat-treatment process	Conforms	/
3		Completeness of inspection and test items	Complete	/
4		Inspection and test acceptance requirements	Conforms	/

Conclusion: The design meets the safety-performance requirements of GB/T 12237-2021, Steel ball valves for petroleum, petrochemical and allied industries

Review	革东军	Date	2023.8.30	Check	马如林	Date	2023.9.1

3. Sample inspection and testing

Report No. 2023TSFM845

No.	Sample No.	Inspection / test	Result	Conclusion	Remarks
1	237761413412	Body surface	No defects observed	Pass	/
		Body markings	Trademark, nominal size, pressure class, material code and batch number	Pass	/
		Shell test	No visible leakage or structural damage	Pass	/
		Liquid seat test	Both directions: 0 drops/min	Pass	/
		Gas seat test	Both directions: 0 bubbles/min	Pass	/
		Minimum body wall thickness	Meets standard	Pass	/
		Opening / closing under pressure	Normal opening and closing, without sticking or visible damage. Subsequent gas seat test: both directions, 0 bubbles/min	Pass	/
		Body material chemistry (center and side bodies)	Matches the marked material grade	Pass	/
Conclusion: The inspected items meet GB/T 12237-2021 and TSG D7002-2006. See Section 4, Inspection data					
Review [signature] Date 2023.9.1			Check [signature] Date 2023.9.1		

4. Inspection data

Report No. 2023TSFM845 Inspection: 30 Aug – 01 Sep 2023

No.	Inspection item	Technical requirements	Inspection data	Result
1	Body surface	No defects	No defects observed	Pass
2	Body markings	Trademark, nominal pressure / class, nominal size, body material code, heat or batch number, flow direction	Trademark, nominal size, pressure class, body material code, batch number	Pass
3	Shell test	15.3 MPa; hold ≥15 min No visible leakage or structural damage	No visible leakage or structural damage	Pass
4	Liquid seat test	11.22 MPa; hold ≥5 min Leakage: ≤20 drops/min	Both directions: 0 drops/min	Pass
5	Gas seat test	0.4–0.7 MPa; hold ≥5 min Leakage: ≤40 bubbles/min	Both directions: 0 bubbles/min	Pass
6	Minimum body wall thickness	Flow passage: standard ≥16.0 mm; drawing ≥50.9 mm Center body: standard ≥24.3 mm; drawing ≥45.0 mm	Flow passage: 52.2 mm Center body: 45.1 mm	Pass
7	Opening / closing under pressure	Open at 10.2 MPa differential pressure; close at 10.2 MPa cavity pressure. 20 cycles, followed by a gas seat test. Normal operation, without sticking or visible damage. Gas leakage: ≤40 bubbles/min	Normal opening and closing, without sticking or visible damage. Subsequent gas seat test: both directions, 0 bubbles/min	Pass

4. Inspection data

Report No. 2023TSFM845 Inspection: 30 Aug – 01 Sep 2023

No.	Inspection item	Technical requirements	Inspection data	Result
8	Body material chemistry (center and side bodies)	C ≤0.35%	0.19%	Pass
		S ≤0.040%	0.008%	
		Mn: 0.60–1.05%	0.99%	
		Si: 0.10–0.35%	0.24%	
		P ≤0.035%	0.013%	
		Cr ≤0.30%	0.06%	
		Mo ≤0.12%	0.02%	
		Ni ≤0.40%	0.01%	
		Cu ≤0.40%	0.01%	
		V ≤0.05%	0.002%	

Remarks:
1. Valve markings: nominal size 12″, Class600, body material A105
2. Maximum allowable working pressure at 38°C: 10.2 MPa
3. Center and side bodies have the same material batch number
4. Test ambient temperature: 25°C–30°C

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