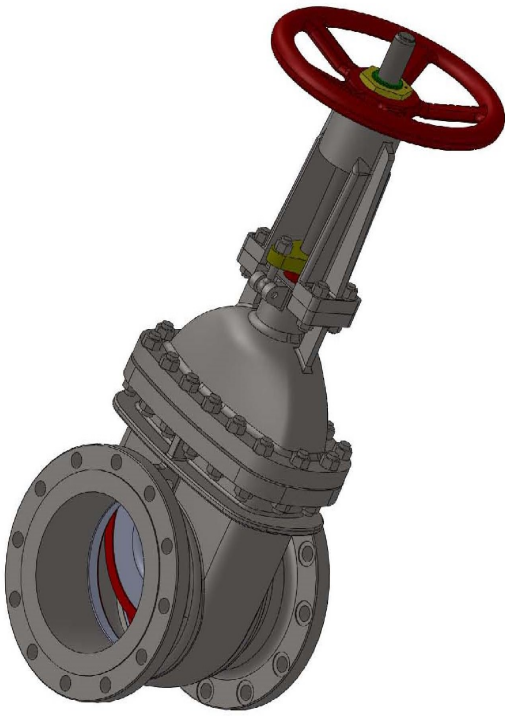
FANGZHENG VALVE GROUP CO.,LTD.

FZV/QR7.3-20-0

WEDGE GATE VALVE INSTALLATION, OPERATION AND MAINTENANCE MANUAL



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Document: Revision 3 August 2017

Wedge Gate Valve Usage Instruction

Ⅰ. Standard

Deaign, manufacture and test: API 600
Size: ASME B16.5　ASME B16.25
Face to face: ASME B16.10
Pres.&　temp. curve:　ASME B16.34 etc.
Anti-explosion requirement: NS-EN 13463-1，NS-EN 13463-5

Ⅱ. Application and selection principle

1. Application of wedge gate valves

Wedge gate valves, which are normally suitable for full opening and full closing, not for adjusting or controlling the flow rate.

Wedge gate valves are used in a wide variety of shut off applications, such as with high temp. and high pres. working service, deleterious, harmful and hazardous liquid, potential explosive gas, and the closures need long life sealing capability, etc..(Refer to the construction dwg, and material list) The anti-explosion marking is: ⟨Ex⟩ II2GDc.

Usually, a wedge gate valve is preferred in applications that require reliable sealing capability, with high pressure, high or low pressure differential, low noise, high temperature service and low temperature (cryogenic) service.　In such industries as electric power, petroleum refining, petro-chemical, offshore petroleum, municipal water projects and chemical.

Wedge gate valve material temp.range & Service used situation

Material	Temp.Range	Service used situation
A216 WCB	-29℃~425℃	Water, oil, nature gas, harmful liquid
A352 LCB	-46℃~345℃	Water, oil, nature gas, harmful liquid
A351 CF8M	-254℃~538℃	Nitric acid,acetic acid, nature gas, harmful liquid

（Test service temp.38℃）Normally used material design working pres. and test pressure(Unit:Mpa)

Material	Class150			Class300		
	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.
A216 WCB	1.96	2.20	3.0	5.11	5.65	7.70
A352 LCB	1.84	2.05	2.80	4.80	5.30	7.20
A351 CF8M	1.90	2.10	2.90	4.96	5.50	7.50

Material	Class600			Class900		
	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.
A216 WCB	10.21	11.25	15.4	15.32	16.85	23.0
A352 LCB	9.60	10.6	14.4	14.41	15.85	21.7
A351 CF8M	9.93	10.95	14.9	14.89	16.4	22.4

Material	Class1500			Class2500		
	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.
A216 WCB	25.53	28.1	38.3	42.55	46.85	63.9
A352 LCB	24.01	26.45	36.1	40.01	44.05	60.1
A351 CF8M	24.82	27.3	37.3	41.37	45.55	62.1

（Test service temp.38℃）Weld end material design working pres. and test pressure(Unit:Mpa)

Material	Class150			Class300		
	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.
A216 WCB	1.98	2.20	3.0	5.17	5.70	7.80
A352 LCB	2.0	2.20	3.0	4.80	5.30	7.20
A351 CF8M	1.98	2.20	3.0	5.17	5.70	7.80

Material	Class600			Class900		
	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.
A216 WCB	10.34	11.4	15.6	15.51	17.1	23.3
A352 LCB	9.6	10.6	14.4	14.41	15.85	21.7
A351 CF8M	10.34	11.4	15.6	15.51	17.1	23.3

Material	Class1500			Class2500		
	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.	Design working pres.	High pres. seal & backseat test pres.	Shell water pres.test pres.
A216 WCB	25.86	28.45	38.8	43.09	47.4	64.7
A352 LCB	24.01	26.45	36.1	40.01	44.05	60.1
A351 CF8M	25.86	28.45	38.8	43.09	47.4	64.7

2. Selection principle

1. In the conditions that require: a variety of valve fluid capability, low flow resistance, high flow capacity, and sealing in severe services.
2. With high temperature, high pressure service, such as high pressure steam and high temperature, high pressure oil product.
3. With low temperature (cryogenic) service, e.g.: liquid nitrogen, liquid hydrogen and liquid oxygen.
4. With low pressure, e.g.: municipal water project and sewage disposal treatment project.
5. Installation location: when there is limitation of height, the valve will be non-rising stem wedge gate, otherwise, rising stem will be selected.
6. Only for full open or full closed, throttling is not allowed with a wedge gate valve.

3. Wedge gate valve product range of FZV

TYPE	Class					
	Class150	Class300	Class600	Class900	Class1500	Class2500
WEDGE GATE	2″ ~48″	2″ ~32″	2″ ~32″	2″ ~14″	2″ ~12″	2″ ~12″
Design Std.	API 600					
Test Std.	API 600					

III. Installation

1. Preparation before and after assembly

1) The wrapping should be taken off carefully, the tag and nameplate should be checked according to the material, specification and list.
2) Attention should be paid to any warning attached to or packed with the valve.
3) The interior of the valve should be checked to ensure it is clean and without impurity or harmful corrosion, if so, the valve can be installed after cleaning.
4) Handwheel and actuator can not be used for lifting.
5) The valve conduit should be cleaned to remove the possible impurity caused after the valve installation and prevent the seal surface from damage.
6) Wedge gate valve can be installed in pipeline in either direction. However, the service of high class gate valve and low temp. valves with pressure relief system should be kept the same with the body flow direction. And attention should be paid whether the valve size and class are the same with the pipeline flanges.(Refer to the drawing attached No.1)
7) The sundries should be cleaned from the valves (including dust).
8) If specified, the earth conductor should be set around the support bolting holes, which leads the static from the valve onto the ground surface; if there is no support, the flanges should be connected by wire and the static from the wire and valves should be led out.

2. Installation of all kinds of connections

1. Installation of flanged valve and pipelines (connection size refers to attached drawings two, three and attached table)

1) The mating flange faces should be checked: if there is any possibility of causing leakage, the face should be refinished before installation.
2) The size of bolts and nuts, length and material should be checked to ensure they are suitable.
3) Ensure the gasket material and size comply with the requirement of ASME B16.5 和 ASME B16.20.

4) The gasket should be checked for defects or damage.

5) Lubricant shall be properly applied on the threads of bolting. During the assembly, the bolting shall be matched, to ensure smooth and parallel initial contact between flange and gasket. Bolting shall be tightened symmetrically, to avoid the distortion of the two flanges. Using a torque wrench is helpful to ensure the correct and symmetrical tightness of flange bolted connection. To install the valve on the initial pipeline, the parallel and symmetry of flange is quite important.

Note: If the bolting is bent and it shall be rejected and replaced. This is determined when the torque increases gradually for a while, maintains for a while, or increase a little when the bolting is under tightening.

2. Installation of welded end valves

The strength of the joint between pipe and valve shall not be lower than that of body. And the joint shall not have “gap” or weakness.

The weld joint of BW end should have completely penetrated and the thickness should be no less than wall thickness. There should not be defect on the weld joint. All welds should comply with any specification for the pipeline system constructions or some regulation within scope of jurisdiction, and the approved welding procedure. And they should be inspected according to the requirement for corresponding specification. The material marking of pipes and valve should be checked whether they are applied with the requirement stipulated.

1) The welded end surface, size and cleanliness should be checked and the factors that will obstruct assembly and welding capability need to be removed.
2) The welding parameter should be confirmed according to the assessed welding technics criterion.
3) The valve end and that of the pipe need to be checked whether they are aligned to assure the welding quality.
4) Spot welding should be used for alignment.
5) The welding joint will be cleaned and checked.
6) Welding repair should be proceeded according to the approved welding procedures.

Ⅳ. Testing and adjustment

At this time, the valve with adjustable stem sealing should be checked whether the packing are installed properly, and whether the packing gland is on the rough adjustment location. The added slide adjustment should be confirmed according to actual situation when the valve operation capability is checked and the system service pressure is introduced.

The observation can be proceed through opening-closing or closing -opening cycling operation. If no distinct problem,

the adjustment can be proceeded under the pressure at the time the sealing capability and operation capability are checked.

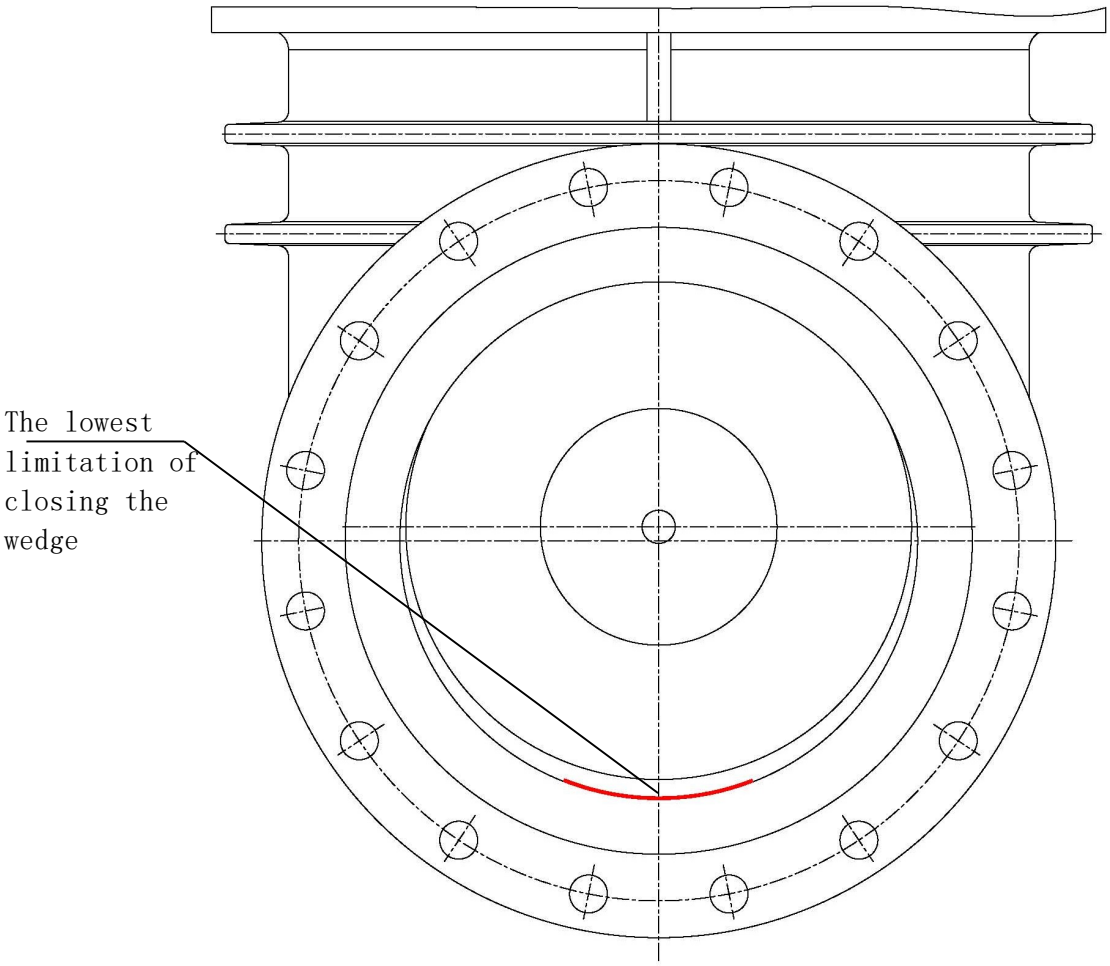
Ⅴ.Usage and maintenance

1. Gate valve is a kind of block valve that is used to getting through and cutting off the flow in the pipelines. It is used for fully opening or closing.
2. For manual operation, rotating the handwheel clockwise will close the valve. Turning CCW the valve will open.
3. In order to obtain the satisfying operational performance, manual operation should be careful and can not be too slow or too fast.
4. The mechanical noise and high pressure liquid noise may be the potential sign of severe accidents. The system project engineers, valve manufacturers or other experts should be invited to check the cause of this noise and measures will be taken if necessary.
5. The leakage of the stem sealing may be caused by the packing abrasion, which can be made up by screwing down the packing gland. The excessive screwing force may rise the stem friction, which will make the operation of the stem difficult and accelerate packing abrasion. If the packing need to be changed, and safety is considered, the valve pressure should be lowered before dismantling the gland. Repacking when the backseat is under the pressure is not allowed.
6. The sealing capability of the valves will be influenced by damage or normal abrasion. The valves used to often control the flow rate will have damage to their sealing capability and seal material. When the liquid is in cavitation erosion, the body and valve back pipeline will be damaged severely.
7. Reasonable measures should be carried out to prevent the reduction in valve performance caused by the mechanical damage, the corrosion by air contamination, chemical substance or wet air. Lubrication should be applied regularly to the thread, bearing or gear.

Ⅵ. Maintenance

Common faules	Causes	Prevention and trouble shooting
Body Gasket Leakage	1. Gasket bolting force is not adquate or there is no pre-tighten gap between the connection; 2. Gasket assembling is not proper or the force is not even. 3. Static seal surface and gasket are not clean	1. The bolting force should be equalized and a torque wrench may be used when necessary. There should be certain gap between the flange connection for the gasket. 2. The assembly of the gasket should be by even force, double gaskets and connected gaskets are not allowed. 3. The gasket should be cleaned and can not be dropped on the floor when assembled, and seal surface needs to be cleaned by kerosene.
Seat seal Leakage	1. Seal surface is not even. 2. Overlaying and heat treatment are not correct according to the specification. Defects such as abrasion due to the low hardness, corrosion due to the alloy element and cracks due to excessive inner stress are formed. 3. Abrasion of sealing surface is severe.	1. Things such as lapping tool, abrasive, emery cloth and sandpaper should be selected reasonably. Grinding methods should be correct. And PT should be proceeded after grinding. No defects such as dents, cracks and scratches are allowed. 2. Overlaying and heat treatment should be proceeded according to the rules and specification requirements. Inspection should be proceeded after sealing surface is machined and no defect influencing usage is allowed. 3. The procedures of above 1 and 2 need to be proceeded.
Packing Leakage	Packing abrasion or pre-tighten force is not adquate.	If the packing gets normal abrasion and there is adjustment allowance, the packing bolts should be tightened, otherwise, repacking should be proceeded without pressure.

VII Appendix.



THE FIRST DRAWING

1. BODY

2. SEAT

3. WEDGE

4. STEM

5. GASKET

10. BONNET

13. BACK SEAT

14. PACKING GASKET

17. PACKING GLAND

18. PACKING PLATE

19. STEM NUT

20. BEARING GLAND

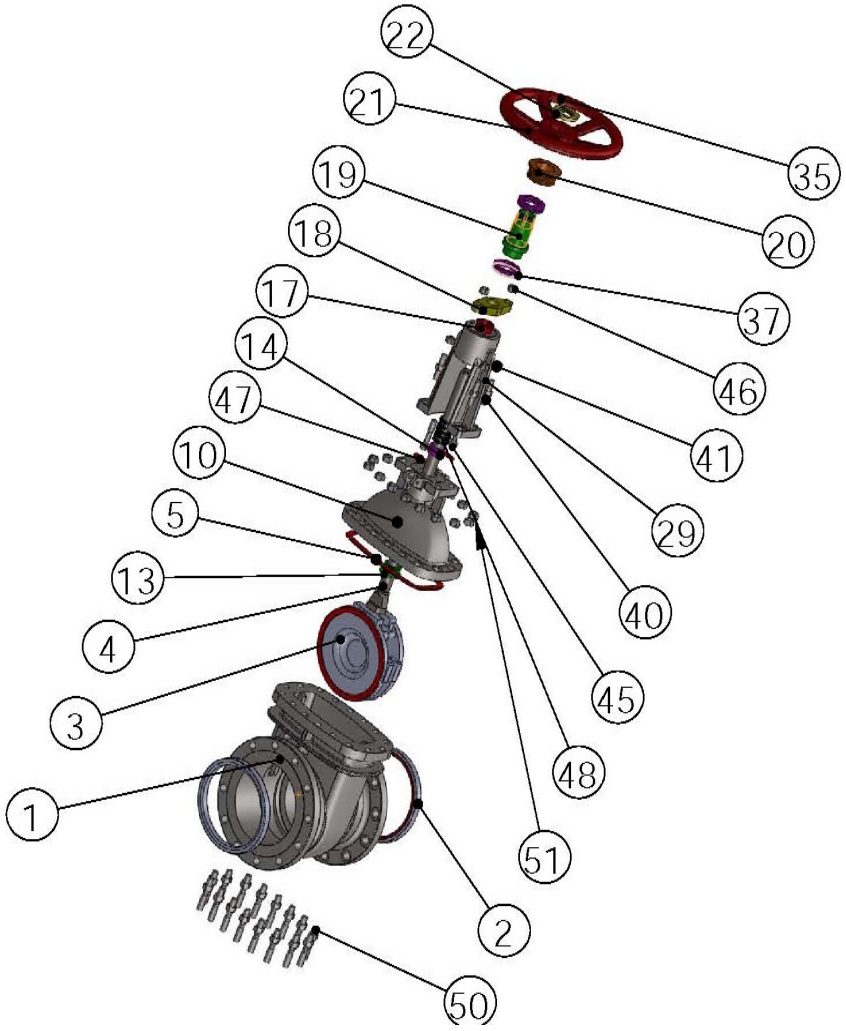
21. HANDWHELL

22. LOCKING NUT

29. YOKE

35. SCREW

37. BEARING



THE SECOND DRAWING

40. YOKE STUD

41. YOKE NUT

45. EYELET BOLT

46. NUT

47. CYLINDER PIN

48. PACKING

50. STUD

51. NUT