

## Operations and Maintenance

### Manual metal seated Ball Valves

#### Type JBFM



#### **Generalities**

The following operation- and maintenance manual is valid for metal seated ball valves type JBFM. At correct assembly, maintenance and repair we guarantee a trouble-free function. If the operation- and maintenance manual is not followed correctly, the manufacturer is not responsible for the efficiency and safety of the valves.

The ball valves must not be operated above the limits and rules indicated in the different documents (e.g. operation rules, purchase documents, datasheets). Operation above the indicated limitations can damage the ball valve and finally destroy them.

The descriptions and rules included in this operation- and maintenance manual refer to standard types but apply at the same time for special designs and related constructions.

#### **This operation instruction does not consider:**

- Any possible accidents and interruptions which can arise by wrong assembly, operation or commissioning of the valves.
- Any safety rule in relation with the place where the ball valve is installed. The operator is responsible for the observation of the safety rules, also by the assembling staff.

The operation- and maintenance instructions for all other devices or parts of the plant linked to the ball valves have to be considered and checked, but is not subject in this manual.

This operation- and maintenance manual contains important information for the correct installation, operation, maintenance and commissioning of the designated valves.

This has to be read by qualified personnel and considered prior installation and operation of the plant. Not only the general safety instructions must be observed, but also all other rules and regulations in the following chapters.



**A non-observance of this warning can cause injuries to persons and defects of the machines, e.g.:**

**-Injuries caused by leaking valves (e.g. cold/hot, toxic, media content...)  
Improper use of the product characteristics during operation can permanently disturb the ball valve or even become unusable;**

#### **Remarks to the operation manual**

The safety instructions of this operation manual act to avoid any accident or injuries to persons

#### **Dangers which can result if safety instructions are not observed.**

If the safety instructions are not observed persons, environment and the valve itself can be damaged. Possibly the indemnity rights get lost.

#### **The non-observance of the safety instructions can cause dangers, e.g.:**

- Break down of important functions of the valve or the unit
- Failure of prescribed methods of commissioning and handling
- Danger to persons caused by electrical, mechanical and chemical impacts
- Damage to the environment caused by a leakage

### Working with safety consciousness

The safety instructions included in this document follow the national regulations for prevention of accidents of Switzerland. Further rules for the avoidance of accidents during operation as well as the compliance with work protection rules have to be considered and assured by the operator in the corresponding country.

### Safety instructions for the operator / user

Whenever some hot or cold valve parts could be touched, it may cause injuries.

It must be assured that the parts are constructed in a way that they are protected from contacts.

-The contact protection for moving parts (e.g. coupling) must not be taken during operation.

- Leakage (e.g. at stem, at gaskets) of dangerous medias (explosive, toxic, hot) has to be removed in a way that no danger to persons or environment is given.

Trouble- shooting must be started and failure has to be solved.

- Injuries by electrical energy have to be excluded (please consider the details of this subject in the local guidelines for the power supply companies).



**Valves for higher or lower temperatures (> 50 ° C or <0 ° C) are to protected against unintended contact (e.g. isolation) or at least to be indicated clearly with a warning sign.**

### Safety instructions for assembly, commissioning and maintenance

It must be secured that all assembly, commissioning and maintenance work is done by skilled staff under consideration of this operation- and maintenance manual.

Generally, any work at the valve is only allowed if the valve is cooled down and pressure-less. Additionally the evaporation temperature of the media must be lower than the temperature of all wetted parts of the valve.



**The opening of the valve under pressure can be deadly!**

Generally, any kind of work at the valves can only be done during plant shut-down. Valves which get in touch with health injuring media have to be decontaminated. Immediately after the work is done, all safety and protection devices have to be put in place again. Prior putting the valve into operation again, the rules of the chapter "Start- up/ Commissioning" have to be considered and followed.

### Re- assembly and source of spare parts

Any modification of the valves has to be accepted and agreed by the manufacturer. The use of original spare parts and accessories which are authorized by the manufacturer supports the function and safety. If any damage is caused by using other parts the indemnity and warranty can be refused.

### **Applicable range**

The described metal seated ball valves type JBFM in this manual include the following versions:

Sizes: DN15 up to DN200 (1/2" - 8")

Nominal pressure: PN16, PN40 and PN100 / ANSI cl.150, 300, 600

Seats: SS316/**Stellite**, hard chrome (**HCR**), Tungsten carbide (**TC**) and Chrome carbide (**CRC**)

Note the type designation at the nameplate!

### **Intended usage**

Generally, Ball valves are stop valves for "Open / Close" - operation. The correct using and the correct design of the valves (e.g. body material, type of seat seal etc.) depend on the process conditions. Those must be clarified prior ordering and mounting into a plant with the supplier / manufacturer. Amended process conditions may lead to a different construction / design of the ball valve. The flow direction of type JBFM is always to be considered (flow arrow on the body)!

### **Inadmissible duty**

Safe operation is only guaranteed if the valve is mounted and used under the general regulations of these operating rules. The technical limits are shown in the technical documentation and must not be exceeded. Additionally the limitations are mentioned below:

### **Operating conditions**

Body material for DIN 1.0619 /WCB -29°C up to +425°C

Body material for DIN 1.4408/1.4435 /CF8/CF8M -29°C up to +500°C

It is important to note that the ball valves with a body material of 1.0619 / WCB must not be used for aggressive and corrosive media.

The operating temperatures depend on the seat materials.

The shown nominal pressure class (PN/class) must not be exceeded!

### **Hazardous areas**



The ball valve does not have an effective ignition source. In order to prevent an electrostatic charge, the ball valve has to be electrically connected to other system components. (ground wire).

## Torques

Torques (Nm) **without** safety factor (!) for bi-directional application, ball in **HCR** and seat in **Stellite**, in dependence to differential pressure ( $\Delta p$ )

NS nominal sizes		maximum torque/MAST for the stem material		differential pressure $\Delta p$ in bar														
				5	10	15	16	20	25	30	35	40	45	50	55	60	65	70
		SS630	A286															
DN15	1/2"	56	62	7	7	7	7	7	8	8	9	9	9	10	10	11		
DN20	3/4"	56	62	12	14	15	15	16	16	17	18	19	21	22	22	23		
DN25	1"	96	106	17	20	22	22	25	26	28	30	34	37	40	43	46		
DN40	1 1/2"	275	305	33	39	46	47	52	59	65	74	85	92	98				
DN50	2"	275	305	39	44	58	61	72	78	85	101	117	134	151				
DN65	2 1/2"	549	608	52	77	116	124	155	193	232	269							
DN80	3"	549	608	90	144	161	169	202	249	293	318							
DN100	4"	1237	1369	222	257	324	337	391	521	597	696							
DN150	6"	1916	2121	288	368	921	974	1185	1448									
DN200	8"	7781	8613	729	1164	1477	1594	2060	2643									

Torques (Nm) **without** safety factor (!) for bi-directional application, ball and seat **TC / CRC** coated, in dependence to differential pressure ( $\Delta p$ )

NS nominal sizes		maximum torque/MAST for the stem material		differential pressure $\Delta p$ in bar														
				5	10	15	16	20	25	30	35	40	45	50	55	60	65	70
		SS630	A286															
DN15	1/2"	56	62	9	10	10	10	12	12	13	13	14	16	17	18	19		
DN20	3/4"	56	62	16	18	19	19	19	20	21	23	24	26	29	30	32		
DN25	1"	96	106	22	26	30	30	33	36	39	46	52	54	58	60	62		
DN40	1 1/2"	275	305	58	70	94	100	116	125	140	156	173	190	206				
DN50	2"	275	305	66	90	113	121	156	180	203	230	258	286	313				
DN65	2 1/2"	549	608	84	144	182	194	218	276	314	353							
DN80	3"	549	608	146	212	234	250	283	342	394	445							
DN100	4"	1237	1369	295	328	440	469	553	662	772	881							
DN150	6"	1916	2121	364	464	1163	1241	1495	1838									
DN200	8"	7781	8613	954	1520	1933	2062	2696	3461									



The above torques are tested at 20°C and media water.

Other process conditions (higher temperatures, higher working pressures, abrasive, highly viscous media or vapors) require a separate interpretation. In this case please contact the manufacturer or bidder! The "preferred" direction of installation (here Bi-directional - note the flow direction arrow) must be observed! Wrong installation results in higher different torques and can affect the life cycle.

### Operation

Generally, ball Valves do not require and special operation rules.

Please pay attention at opening and closing of the ball valves in order to avoid pressure hammers which could cause injuries to persons and damages to the plant. Depending on the application and type of metal seat it will be necessary after a certain period of time to replace the ball and the seats due to wear (see chapter "Maintenance").

Abrasive media reduces always the life cycle of the seats and the ball.

Under certain circumstances, an adhesive media can completely stop the operation of the valve.

### Commissioning

Ball Valves do not require special instructions for commissioning. Air bubbles in the body should be removed (venting).

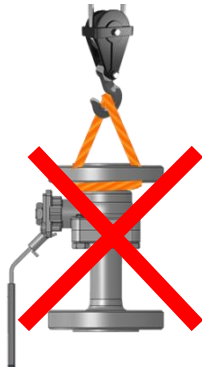
## Transport

The ball valves are delivered ready for operation.

Flanges are protected against mechanical damage with flange caps.

During transporting, make sure that the valves retain their mechanical protection by the flange caps.

The transport must take place with suitable transport boxes (e.g., wooden boxes). The ball valves must be secured in the transport boxes against crushing and tilting. Otherwise the valves may be damaged.



**WRONG**

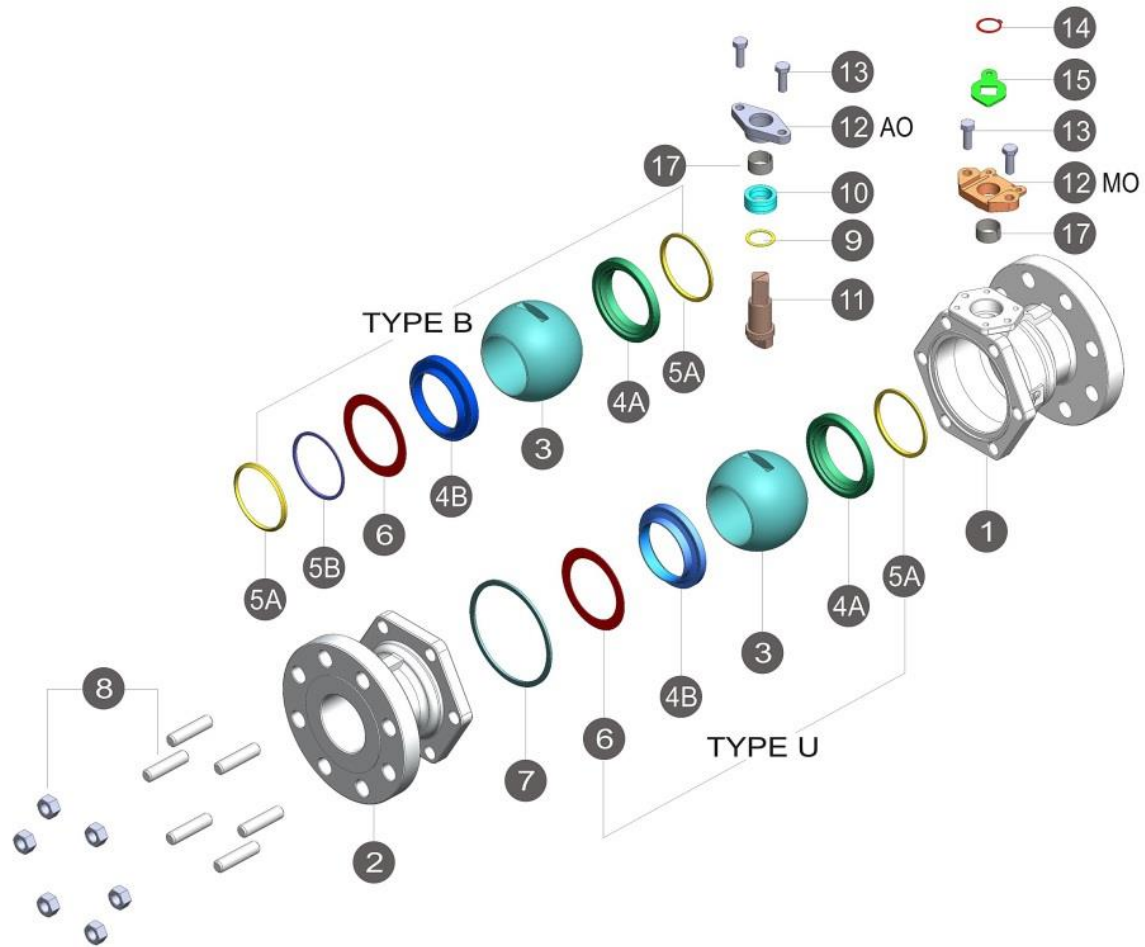


**CORRECT**

Aids for lifting and transport in the plant have to be installed always directly on the body of the valve. Preferably, the transport should be done in horizontal position. Head protection and safety shoes are mandatory!



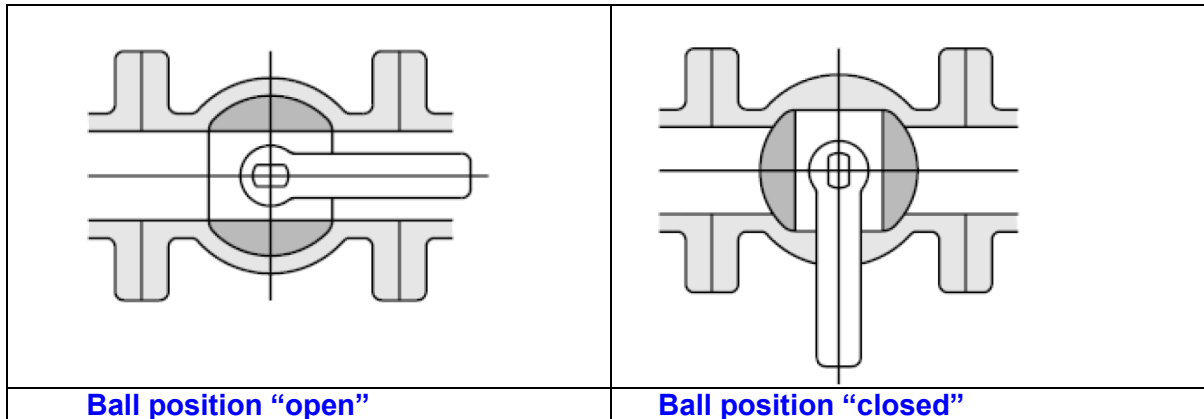
**Description / Parts / Materials**



NO.	PART NAME	execution <b>SM</b>			execution <b>SH</b>		
		-20°F - 661°F/ -20°C - 350°C			-20°F~797°F(-29°C~425°C)		-20°F~932°F(-29°C~500°C)
1	BODY	A216-WCB	A351-CF8	A351-CF8M	A216-WCB	A351-CF8	A351-CF8M
2	CAP	A216-WCB	ASTM A351-CF8	A351-CF8M	A216-WCB	ASTM A351-CF8	A351-CF8M
3	BALL	A351-CF8 + HCR <sup>(2)</sup>		A351-CF8M + HCR	A351-CF8 + TC <sup>(2)</sup> / CRC <sup>(2)</sup>		A351-CF8M + TC / CRC
4A	BODY SEAT	A351-CF8 + STELLITE®		A351-CF8M + STELLITE®	A351-CF8 + TC / CRC		A351-CF8M + TC / CRC
4B	CAP SEAT	A351-CF8 + STELLITE®		A351-CF8M + STELLITE®	A351-CF8 + TC / CRC		A351-CF8M + TC / CRC
5A	SEAT SEAL	GRAPHITE					
5B	SEAT RETAINER	A351-CF8		A351-CF8M	A351-CF8		A351-CF8M
6	SPRING	INCONEL® X-750					
7	BODY GASKET	316SS+GRAPHITE					
8	BOLT & NUT	A193-B7 & A194-7	A193-B8 & A194-8		A193-B7 & A194-7	A193-B8 & A194-8	
9	THRUST WASHER	METAL+HARD FACE					
10	GLAND PACKING	GRAPHITE					
		A564-630(HH1150)		A638-S66286	A638-S66286		
12	GLAND <sup>(1)</sup>	A351-CF8					
13	GLAND BOLT	STAINLESS STEEL					
14	SNAP CATCH (MO)	AISI 420					
15	TRAVEL STOP (MO)	A240-304					
16	HANDLE (MO)	A240-304(1/2"~1"), FCD45(1-1/2"~3"), FCD45+SGP(4" AND ABOVE)					
17	GLAND BEARING	A240-316+PTFE					
<b>Note :</b> (1) OPTION—AO : AUTOMAION, MO : MANUAL OPERATION					Acc. explosion drawing : <b>Type B</b> : both flowdirection (Bi-directional)		
(2) HCR=Hard Chrome TC=Tungsten Carbide CRC=Chrome Carbide					<b>Type U</b> : one site flowdirection (Uni-directional)		

## Storage

The connectors must be covered to prevent the penetration of dirt and dust (preferably with the delivered flange caps). The ball valves have to be stored dry and well ventilated in open ball position. For long-term storage, the valves must be y checked and cleaned periodically. Machined surfaces must be protected by appropriate aids against corrosion. The ball valves must be protected against influences of weather and environment.



## Corrosion protection

### **Carbon steel valves**


Valves made of un- alloyed or low- alloyed cast steel in standard design are coated with a primer and a 2-components basic coating. The minimum film thickness is 50 µm. The trim parts as well as the inner surfaces are free of paint and coated with a temporary corrosion protection (e.g. oil) only. Machined flange facings have to be protected against outside influences with flange caps.

### **Stainless steel valves**

Valves made of stainless steel in standard will be delivered without any coating.

## Mounting and maintenance

### **General mounting instructions**

	<b>Prior mounting/revision, all affected devices, machines and/or plant parts must be shut- off. If needed, disconnect the devices, machines and/or plant parts. Check the real shut- off prior the work starts!</b>
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Put warning signs in place in order to avoid unintended commissioning of the devices, machines and/or plant parts.




Valves for oxygen use are additionally marked with "free of oil and grease". For this application it is necessary to note special installation rules. This has to be observed by the operator and the installation companies.




## Installation in the pipe

1. Prior installation, the pipe must be cleaned;
2. If necessary, the ball valves must be cleaned from dirt and dust
3. During installation in the pipeline, flanges of the pipeline must be exactly parallel to flange connection of the ball valve. In addition the direction-arrow must show into flow direction
4. Flange connection screws are tightened with a torque spanner. Tighten the screws in a crosswise sequence. The tightening torques are governed by the applicable standards (e.g. EN921-934 and ISO4732, 4032, 4017...)
5. Please consider that the ball valve is mounted in a released condition;
6. Ball valves can be mounted in horizontal and vertical pipelines.

	<p><b>The flange sealings are to be centered correctly. Please use allowed materials for the screws and nuts only. For a correct flange connection, please use all the flange holes for the assembly. The operator or the site mounting company is responsible for the professional installation.</b></p>
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	<p><b>The permitted pressure may not be exceeded! For a new installation or even after a maintenance all pipes have to be flushed and cleaned. Dirt, welding beads and other dirt particles could result in a malfunction, but at least result in a less powerful valve.</b></p>
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## Dismantling the ball valve

	 	<p><b>The valve must be cooled down and pressure-less! Opening the valve under pressure can be deadly! Head protection and protection glasses and safety shoes are mandatory!</b></p>
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Prior start of the disassembly of the ball valve out of the pipeline, it is necessary to release any pressure. Electrical components of the system have to be switched off or excluded from the system. The ball valve must be cleaned prior dismantling in case of application with dangerous media (e.g. toxic, caustic)

The cleaning must be confirmed on a separate form. This report must be attached with the valve. If the report is not available, it can be requested at Zuercher Technik AG.

1. Make sure that the valve is pressure-less and empty in the dead areas even behind the ball.
2. Move the ball in closed position.
3. Loosen the body screws of the two body parts with a suitable fit spanner!
4. Disconnect the two body parts carefully. Wear safety glasses!
5. Remove the seats and the ball.
6. Subsequently, loosen the nuts of the gland. Remove the stem and gland packing seals.



## **Assembly and Maintenance**

1. Prior assembly, please check availability of the appropriate original spare parts for this ball valve! Use only a new sealing kit
2. The disassembly has to be executed according to the procedure previously described!
3. Check and clean all parts in contact with the media!
4. After cleaning dry all parts with compressed air.
5. If necessary, replace the defective parts.
6. At re-assembly use new body sealing and be careful that the new body sealing is clean and free of any damages
7. Put the stem, gland packing and the ball into the body.
8. Fix and tighten the packing through the gland.
9. Connect and fix carefully both body parts.
10. Tighten screws and nuts only till tightness is achieved; The norms and rules of pipe and plant engineering has to be taken into account;
11. Torques of the body screws, nuts and bolts will also be in accordance of the applicable regulations and standards (e.g., EN 921-934 or ISO4732, 4032, 4017 ...).
12. Finally, the tightness and function of the ball valve has to be checked again.

## **Warranty**

Our general terms and conditions are valid.

If these are not available, it can be requested at Zuercher Technik AG or downloaded from [www.zuercher.com](http://www.zuercher.com).

## **Your contact**

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