INSTALLATION, OPERATION AND MAINTENANCE MANUAL

REDUCED PORT 1-PIECE BALL VALVE

156RT / 166RT



TABLE OF CONTENTS

1. SAFETY INFORMATION 3

2. GENERAL PRECAUTIONS 3

2.1 Material Selection. 3

2.2 Fluid Thermal Expansion. 3

2.3 Hydrostatic Test 3

2.4 Liquids with High Fluid Velocity 4

2.5 Throttling Service 4

2.6 Static Electric Effect 4

3. STORAGE AND PREPARATION. 4

3.1 Storage. 4

3.2 Preparation. 5

4. INSTALLATION AND OPERATION 5

4.1 Installation. 5

4.2 Operation 5

4.3 Manual Operation 5

5. MAINTENANCE AND REPAIR. 6

5.1 Inspection and Maintenance 6

5.2 Troubleshooting 7

5.3 Stem Packing Replacement 8

5.4 Assembly 8

6. TECHNICAL PARAMETERS 9

6.1 Insert & Stem Nut Torque. 9

7. PRESSURE TEMPERATURE RATING 10

1. SAFETY INFORMATION

The following general safety notices supplement the specific warnings and cautions appearing elsewhere in this manual. They are recommended precautions that must be understood and applied during operation and maintenance of the equipment covered herein.

- Always wear proper personal protective equipment (PPE).
- Do not attempt to disassemble a valve while there is pressure in the line. Make sure both upstream and downstream pressure is removed. Disassemble with caution in the event all pressure has not been relieved.
- Prior to replacing packing rings remove all pressure from the valve.
- To prevent valve distortion, inefficient operation, or early maintenance problems, support piping on each side of the valve.
- Do not touch surface of high temperature valves.
- Valves are not to be used with unstable fluids.
- If provided, the locking device on the handle is to avoid improper use of the valve by unauthorized people. This can be locked with a padlock.

2. GENERAL PRECAUTIONS

2.1 MATERIAL SELECTION

The possibility of material deterioration in service and the need for periodic inspections is depended on the contained fluid. Carbide phase conversion to graphite, oxidation of ferrite materials, and decrease in ductility of carbon steels at low temperature (even in applications above 29°F) and susceptibility to inter-granular corrosion of austenitic materials or grain boundary attack of nickel-base alloys are among those items. Information about corrosion data is provided in this IOM, the user is requested to take attention or consideration to determine if the used materials are suitable for the application.

2.2 FLUID THERMAL EXPANSION

With the ball in closed condition, it is possible that the sealed cavity inside the valve body can be filled with liquid. If this liquid is not released, by partially opening the valve, and the valve is subject to a temperature increase, excessive pressure can occur inside the body. OVC Reduced Port 1-Piece Ball Valves have self-relieving pressure seats to prevent pressure build-up. The user is recommended to prevent a pressure build-up inside the valve exceeding the design pressure, by means of piping design, installation, or operation procedure.

2.3 HYDROSTATIC TEST

Before delivery, all valve bodies are tested 1.5 times the working pressure in open position. After installation, the pipeline system may be subject to a system test not to exceed the above mention pressure.

(**FOR EXAMPLE**: 1000 PSI is hydrostatic tested 1.5 X 1000 = 1500 PSI testing pressure)

2.4 LIQUIDS WITH HIGH FLUID VELOCITY

When ball valves must be operated frequently on liquids with very high velocity, a check shall be made with the valve distributor or manufacturer for appropriate advice to minimize the possibility of seat deformation, especially when working pressure and temperature is reaching maximum ranges.

2.5 THROTTLING SERVICE

Standard ball valves are generally not recommended for throttling service. The fluid flow can damage the leading edge of the ball and/or damage or deform the resilient ball seats causing leakage. High fluid velocity and/or the presence of solid particles in the media will reduce the lifetime of seat and ball during throttling applications.

2.6 STATIC ELECTRIC EFFECT

OVC Reduecd Port 1-Piece Ball Valves are provided with anti-static devices for ball-stem-body. When service conditions require electrical continuity to prevent static discharge, the user is responsible for specifying static grounding.

3. STORAGE AND PREPARATION

3.1 STORAGE

3.1.1 TEMPORARY STORAGE

If valves are to be stored before installation, the following should be observed:

1. Keep the valves wrapped and protected as shipped from the manufacturer.
2. Do not remove the protective end covering until the valve is ready for installation. This will reduce the possibility of foreign material damaging internal valve components.
3. Valves stored outdoors should be positioned such that water does not accumulate in the valve body.

3.1.2 LONG TERM STORAGE

If the valves are to be stored more than one year, they should be prepared in the following manner:

1. Remove the packing and apply a preservative to the packing chamber.
2. Do not remove the protective end covering.
3. Valve which will remain in storage for an excessive period of time should have a preservative applied to the external surface.
4. Do not store the valves outdoors.

3.2 PREPARATION

1. Remove the plastic bag or valve end protection, if any.
2. Prior to shipment from the manufacturer, a preservative may have been applied to the inner body of the valve. This preservative maybe removed with a solvent.
3. The inside of the valve should be inspected and blown out with compressed air. Adjacent piping must be clean and free from debris to prevent damage to the valve.
4. To prevent valve distortion, inefficient operation, or early maintenance problems, support piping on each side of the valve.
5. Make sure the valve is positioned such that there is sufficient space so that the handle is easily and safely reached.
6. OVC Reduced Port 1-Piece Ball Valves can be installed in any position without regard for the direction of the flow, unless marked in the flow direction.
7. OVC Reduced Port 1-Piece Ball Valves are not designed for throttling and should be kept in the fully open or closed position. Should the valve be used in a partially open or closed position, the ball and seats may become eroded in a very short time. This may also cause a chatter noise in the line.

4. INSTALLATION AND OPERATION

4.1 INSTALLATION

FOR THREADED ENDS - Do not dismantle these valves before fitting; treat as a unit. Taper thread fittings should not be over-tightened. In some applications, threaded valves are back welded on site and these valves must be dismantled as per instruction for weld end valves.

4.2 OPERATION

OVC Reduced Port 1-Piece Ball Valves provide tight shut off when used under normal conditions and in accordance with pressure/temperature chart. If these valves are used in partially open (throttled) position seat life may be reduced. Any media which might solidify, crystallize or polymerize should not be allowed to stand in the ball valve cavities unless regular maintenance is provided.

4.3 MANUAL OPERATION

The basic type of handle fitted to all sizes of valve is sheet steel with integral stop. OVC Reduced Port 1-Piece Ball Valves have quarter-turn operation closing in a counter-clockwise direction. It is possible to see when the valve is open or closed by the position of the handle. When the handle is across the pipeline, the valve is closed.

5. MAINTENANCE AND REPAIR

5.1 INSPECTION AND MAINTENANCE

A periodic inspection and maintenance schedule should be established for each valve. The time frames given for the implementation of these schedules are to be used as a guide only in establishing routine inspection and maintenance schedules. Exact time periods for performing these procedures cannot be provided due to the unknown nature of the service conditions each valve is in.

5.1.1 PERIODIC INSPECTION

A periodic inspection should be performed on each unit. The time frame should be adjusted depending on usage and service conditions. An infrequently used unit may have more time between inspections than a valve in constant service.

A periodic inspection should include the following:

1. Open and close the valve. The actions should be smooth without any binding of the stem and ball through full travel.
2. If valve is in service and under pressure:
    - Check the stem packing for any leakage during the opening and closing action. If a leak is found, tighten the stem nut alternately with no more than a quarter-turn on it until the leak stop. If the leakage persists, see Section 5.2 - Troubleshooting.
    - Inspect the exterior of the valves for cleanliness. Remove any dirt, grime or oil from the valve body and caps.

5.1.2 POST INSPECTION

After completion of a periodic inspection, valves that are providing satisfactory service require no further disassembly or inspection. Should a valve be found which is not performing satisfactorily, see Section 5.2 - Troubleshooting.

5.1.3 MAINTENANCE

Other than periodic inspection, no routine maintenance is required. Routine replacement of parts, such as gasket and packing, is not usually performed until required. Once in service, it may become apparent that these and other parts require repair or replacement due to usage and service conditions. A maintenance schedule should be developed taking these conditions into consideration. Parts can be replaced during a routine overhaul.

5.2 TROUBLESHOOTING

The following chart will cover the various problems which are common to most valves. The information provided will aid in isolating and correcting these problems.

PROBLEM	PROBABLE CAUSE	SOLUTION
LEAKAGE THROUGH THE STEM AND PACKING	• Stem nut is loose. • Packing is aged or failed. • Inadequate amount of packing rings. • Packing is hard and dry. • Spring washer is damaged. • Stem is damaged.	• Tighten stem nut. • Replace packing. • Install additional packing rings (see Section 5.3). • Replace with new packing (see Section 5.3). • Replace with new thrust washer. • Repair or replace as required.
PROBLEMS IN OPERATING VALVE	• Stem nut over wear. • Packing is exerting excessive force on the stem. • Stem is damaged. • Internal components may be damaged.	• Replace stem nut. • Check torque on stem nut. Properly loosen stem nut. • Repair or replace as required. • Disassemble the valve. Inspect ball, seat, and stem, and repair as needed.
SEAT LEAKAGE	• Valve is not properly seated. • Internal components (ball, seat, stem) are damaged or worn. • Leakage by foreign material.	• Check to see if the valve is fully closed. • Inspect internal components (ball, seat, and stem) and repair or replace as required. • Disassemble and clean the ball & seats, and repair or replace as required.

TABLE 1 - VALVE TROUBLESHOOTING

5.3 STEM PACKING REPLACEMENT

WARNING: To prevent injury, ensure that all pressure is removed from the valve both upstream and downstream before disassembly.

1. Check original tightness of valve operation. Remove stem nut, washer, handle, and gland nut. Clear the packing chamber.
2. Remove the existing or defective packing rings with a sharp tool or packing remover.
3. Examine the machined surfaces of the stem and packing chamber. Remove any scoriae or burrs with emory cloth or hand filing. Clean the stem with a solvent-soaked rag.
4. Install new packing. Install rings individually using a split ring spacer, compressing each ring by hand tightening the stem nut.
5. When packing chamber becomes filled with packing, reassemble the stem nut. Tighten the stem nut until stem nut begin to get tight. If gland travels more than the height of one packing ring into the packing chamber, insert one more ring and repeat Step 4 until the chamber is filled.
6. Compare valve operation to original tightness. If valve operation is considerably tighter than original operating tightness, back off one quarter-turn on the stem nut and re-check tightness.
7. Several hours after a repacked valve has been returned to service, inspect the packing area to ensure full compression, tight bolting, and no leakage. Should leakage occur, tighten the stem nut at quarter-turn increments until leakage stops.

5.4 ASSEMBLY

Assembly of the valve is the opposite of the dismantling process. The valve must be in closed position during the assembling of the body and returner, and the stopper must be located at the right place; otherwise, the open and close operation will be opposite.

6. TECHNICAL PARAMETERS

6.1 INSERT & STEM NUT TORQUE

NPS	DN	INSERT		STEM NUT	
		N-M	IN-LB	N-M	IN-LB
1/4”	8	3.9	34.7	0.6	5.2
3/8”	10	7.4	65.1	1	8.7
1/2”	15	10.8	95.4	1.5	13
3/4”	20	16.2	143.1	2	17.3
1”	25	54.9	485.7	3.4	30.4
1-1/4”	32	74.5	659.2	5.4	47.7
1-1/2”	40	78.4	693.9	6.9	60.7
2”	50	137.2	1214.3	7.4	65.1

OHIO VALVE COMPANY

PRESSURE TEMPERATURE RATING

166RT / 156RT / 266FTS / 256FTS / 366FW / 356FW / 366FT
356FT / 366FTXS / 356FTXS / 3L66RTDM / 3T66RTDM

