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1. ERIKS operating companies

ECON ball valves are being delivered by several ERIKS operating companies on a worldwide basis. In this manual these will be referred to as 'ERIKS', the individual terms of delivery of the ERIKS operating company having executed the order are applicable.

2. Product description

The ECON ball valves are designed according to API 608 and ASME B16.34. Technical information about the ball valves can be found in our latest catalogue or see our website www.eriks.com and should be used in accordance with the applicable pressure-temperature rating as stated on this website.

Ball valves are provided with marking, according to MSS SP 25 and EN 19. The marking makes the identification of the valve easier and contains:

- size (inch)
- pressure rating class
- body and bonnet material marking
- ECON logo
- heat numbers
- tag plate

3. Requirements for maintenance staff

The staff assigned to assembly, operating and maintenance tasks should be qualified to carry out such jobs and in any circumstance, ensure personal safety

4. Transport and storage

Transport and storage should always be carried out with the ball complete open and the valves should be protected against external forces, influence and destruction of the painting layer as well. The purpose of the painting layer is to protect the valve against rust, during transport and storage. The valves should be stored in an unpolluted space and should also be protected against all atmospheric circumstances. There should be taken care of the temperature and humidity in the room, in order to prevent condensate formation.

5. Function

ECON ball valves are designed to stop the flow of a medium. The valve is closed by turning the lever clockwise; please don't use tools to increase the torque on the lever.

6. Application

The ECON ball valves are used in industrial systems such as steam, water, gasses and corrosive media. The valves are designed for standard operating conditions. For the use of extreme conditions e.g. aggressive or abrasive media, it is recommended to mention this at the ordering stage, to verify whether the valve is suitable. The installation designer is responsible for the valve selection, suitable for the working conditions. The valves are unsuitable, without written permission of an ERIKS company, to apply for hazardous media as referred into Regulation (EC) No 1272/2008.

7. Installation

During the assembly of the ball valves, the following rules should be observed:

- make sure before an assembly that the ball valves were not damaged during transport or storage.
- make sure that applied ball valves are suitable for the working conditions, medium used in the plant and the right system connections, according to pressure and temperature limits as per tag plate.
- take off dust caps if the valves are provided with them.
- the interior of the ball valve and pipeline must be free from foreign particles.
- the valve should be assembled in the pipeline in open position, for a correct functioning, the valve must be stress free connected to the pipeline, supports must be arranged to prevent any additional stress, caused by the weight of the valve or the pipeline.
- steam line systems should be designed to prevent water accumulation.
- install pipelines so that damaging transverse, excessive vibrations, bending and tensional forces are avoided.
- for easy operating, the free space around the lever shall be sufficient.
- before plant startup, especially after repairs carried out, flash out the pipeline, of course with fully opened position.
- don't leave the ball partly open (throttling operation), where the pressure drop and/or flow rate can bring damage to the valve seats and/or ball.
- don't open or close the ball valve too quickly, this might cause water hammering.

During the heating from room temperature, captured fluid between valve's body and ball (valve open) or fluid behind the backseat (valve closed) can expand and bring damage to the ball and the seats. We recommend to open and close the valve at intermediate temperatures of 20°C during the heating (e.g. at 40°C—60°C.....)

8. Maintenance

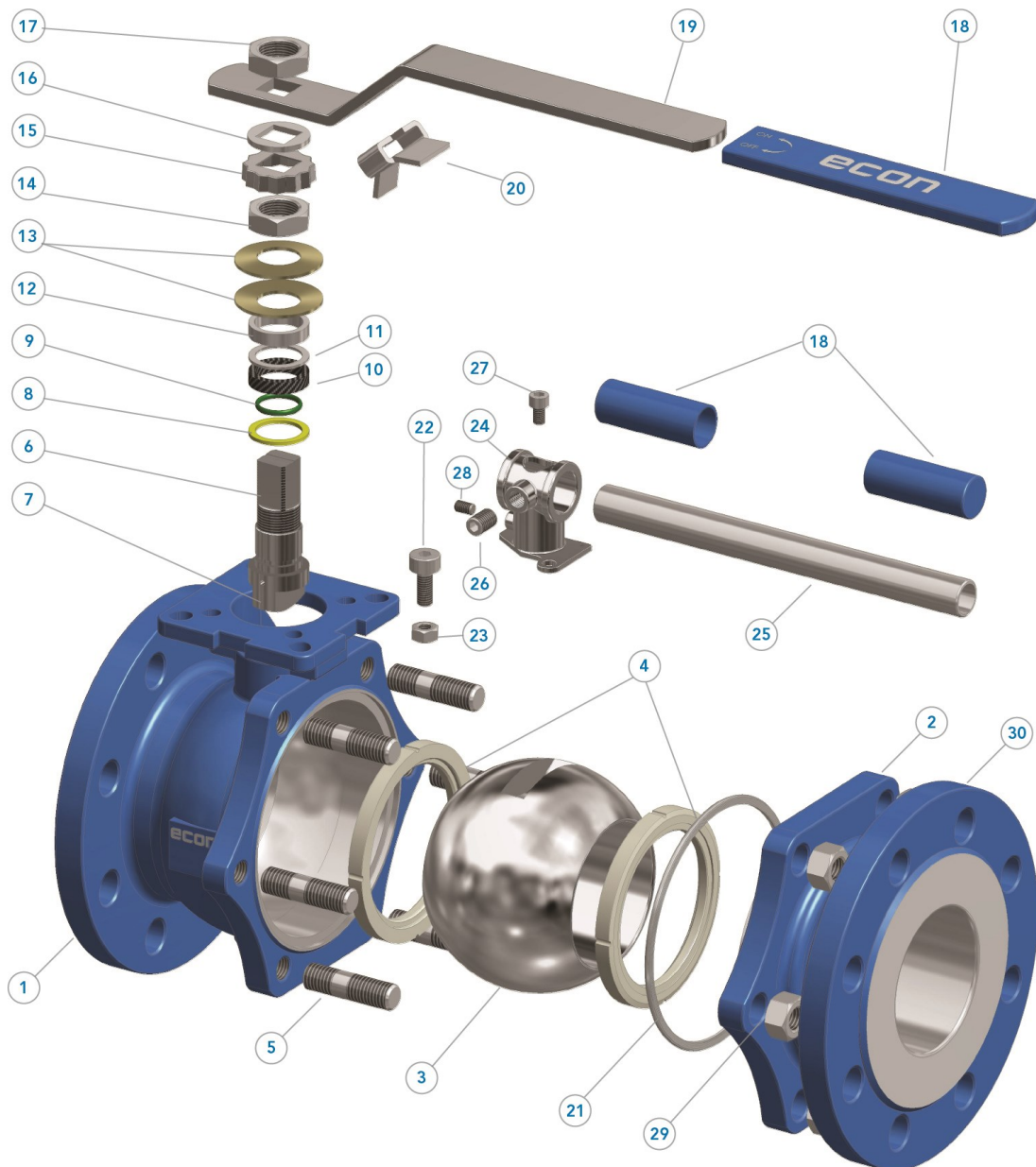
Before starting any service jobs, make sure that the medium supply to the pipeline is cut off, pressure was decreased to ambient pressure, the pipeline is completely cleaned and ventilated and the plant is cooled down. Always keep safety instructions in mind and take all personal safety precautions.

During maintenance, the following rules should be observed:

- keep always personal safety precautions in mind and always use appropriate protection e.g. clothing, masks, gloves etc.
 - be alert that the temperature still can be very high or low and can cause burns.
 - check the valve on all possible leaking possibilities.
 - dust, grease and medium residual, must be frequently cleaned of the valve body and all moving parts, such as stem to maintain all operating functions.
 - check if all bolts and nuts, are still fastened.
 - be alert that the ball valve can trap pressurized fluids in the ball cavity, when in closed position.
 - if required replace the stem seal, for safety reasons we recommend that the valves only can be overhauled when depressurized, drained and ventilated.
 - the thickness of body and bonnet must be checked to ensure safety operation at an interval of at least three months.
- 1) Re-tighten packing
 - Should a leakage occur at the gland packing, retighten the stem (gland) nut (14).
 - Take care that the stem nut (14) is not tighten too much, Normally the leakage can be stopped by simply turning the stem nut (14) by 30° to 60°. Or use the torque as mentioned in the table.
 - 2) Replacement of seats and seals.
 - A) Disassembly
 - Place the valve in half-open position and flush the line to remove any hazardous material from the valve body.

- Place the valve in close position, remove both counter flange bolts & nuts and lift the valve out of the line.
- Remove the handle nut (17), handle (19) or actuator set, stop-lock-cap (15), stem nut (14), Belleville washer (13), gland (12), bush (11) and gland packing (10).
- Remove the body bolt (5) or the stud/nut to allow the end cap (2) to be separated from the body (1), remove the body gasket (21).
- Make sure that the ball is in "Close" position, then the ball (3) can be taken out easily from the body, then take out the ball seats (4).
- Push the stem (6) down into the body cavity and remove it, then remove the O-ring (9) and the stem seal-ring (8) from the body.

Caution: Use care to avoid scratching the surface of stem and packing chamber.



B) Reassembly

- Reassembly process is reverse sequence of disassembly.
- Clean and inspect all parts, full replacement of all soft parts (seats and seals) are strongly recommended.

- Put the valve in the “open” position, otherwise the seats can be damaged.
- Tighten the body bolt (5) crosswise using the torque figure in Table 1.
- Tighten the stem nut (14) using the torque figures in Table 2.
- Cycle the valve slowly with gentle back and forth motion to build gradually to full quarter turn.
- If possible, test the valve before placing it back to line for service.

Table 1: Torque figures for body bolting nut tighten without lubricant.

Valve Size		Bolting	A193-B7		A193-B8*	
150LBS	300LBS	Specification	N.m	In.lb	N.m	In.lb
1/2"		5/16-18UNC-2A	12 ~ 19	106 ~ 167	12 ~ 17	106 ~ 152
3/4"						
1"		3/8-16UNC-2A	25 ~ 36	211 ~ 321	25 ~ 33	221 ~ 292
1 1/4"						
1 1/2"		1/2-13 UNC-2A	58 ~ 85	513 ~ 747	58 ~ 77	513 ~ 679
2"						
2 1/2"		9/16-12UNC-2A	84 ~ 122	740 ~ 1085	84 ~ 111	740 ~ 986
3"						
4"						
5"						
6"						
6"		5/8-11UNC-2A	116 ~ 169	1024 ~ 1503	116 ~ 154	1024 ~ 1366
5"						
8"		3/4-10UNC-2A	209 ~ 306	1847 ~ 2708	209 ~ 278	1847 ~ 2462
8"		7/8-9UNC-2A	339 ~ 497	3000 ~ 4400	339 ~ 452	3000 ~ 4000

*If A193-B8 is used without lubricant, the minimum tightening torque of the above given torque range is applicable. If lubricant is used, a 15% added to the above minimum tightening torque is recommended.

Table 2: Torque figures for stem nut tighten

Valve Size	N.m	In.lb
1/2"	8,0 ~ 9,0	71 ~ 89
3/4"	8,0 ~ 9,0	71 ~ 89
1"	10 ~ 13	89 ~ 115
1 1/4"	10 ~ 13	89 ~ 115
1 1/2"	16 ~ 19	142 ~ 168
2"	16 ~ 19	142 ~ 168
2 1/2"	22 ~ 25	195 ~ 221
3"	22 ~ 25	195 ~ 221
4"	29 ~ 32	257 ~ 283
5" – 6"	40 ~ 48	354 ~ 425
8"	62 ~ 72	550 ~ 637

9. Service and repair

All service and repair jobs should be carried out by authorized staff, using suitable tools and user shall use genuine valve packings, gaskets, bolts and nuts of the same size and material as the original one.

- welding repair and drilling of the valve is forbidden.
- it is forbidden to replace seats or seals when the valve is under pressure.
- before you replace seats or seals you have to clean the valve body on these areas.
- after replacement of seats or seals it is necessary to check the valve operation and tightness of all connections. Tightness test should be carried out.
- after installation, the valve should be checked and maintained periodically at least every 3 months, depending on the medium.

10. Troubleshooting

It is essential that the safety regulations are observed when identifying the fault.

Problem	Possible cause	Corrective measures
No flow	The ball valve is closed	Open the ball valve
	Dust caps were not removed	Remove dust caps
Little flow	Valve not completely open	Open valve completely
	Piping system clogged	Check piping system
Valve difficult to open	Stuffing box seal too tight	Slacken nut
	Wrong direction of rotation	Turn counter clockwise to open
	Ball seat damaged by foreign particles.	Replace the ball seats
	Pressure increase of medium in the dead space between ball and valve body	Cool down the valve
Leakage across the stem	Stuffing box gland slack	Tighten stuffing box gland, if necessary renew stuffing box packing
Leakage across valve seat	Valve not properly closed	Pull lever tight without tools
	Seat damaged by foreign particles	Replace the ball seats
	Medium contaminated	Clean valve and install dirt screen
Operating failure	Packing too tight	Loosen gland nut

11. Removal

All dismantled and rejected valves cannot be disposed with household waste. The valves are made of materials which can be re-used and should be delivered to designated recycling centers.

General warning:

General note for products which may be used for seawater:

Although our products can be used in seawater systems it should always be noted that, in case of installation in a piping system made of materials which are frequently used because of their excellent seawater resistance (e.g. Cunifer), large potential differences may occur possibly causing corrosion which could permanently damage the proper functioning and integrity of our product.

A combination of different materials should always be mentioned prior to the purchase of our products in order for us to give the best possible advice on a safe functioning.