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### **1. Introduction**

In order to benefit from the excellent properties of the ECON high performance butterfly valves it is necessary to follow the instructions of this user manual carefully. For errors resulting from improper installation the manufacturer or distributor can't be held responsible. Consult the applicable standards for allowable flange dimensions. Dimensions, materials and applicability of these valves should be derived from the technical ECON datasheets and documentation. or see our website [www.eriks.com](http://www.eriks.com)

### **2. ERIKS operating companies**

ECON high performance butterfly valves are provided 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.

### **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**

The valve must be transported and stored dry and clean. In humid rooms, a drying material or heating must be used to avoid condensation. During transport and intermediate storage the high performance butterfly valve should not be outside a temperature range of -15°C and +30°C. The valve is supplied with the disc in a fully closed position.

### **5. Application**

The ECON butterfly valves are used for industrial systems gasses and liquids. 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.

### **6. Precautions to be taken prior to installation**

Please make sure that the valve intended for installation is suitable for the service conditions prevailing. The responsibility about the used fluids (corrosion resistance, pressure, temperature, etc.) lies by the user of the plant. Please consider that turbulences (i.e. created by piping bow) generate hydro dynamic forces increasing the operating torque of the valve. We recommend installing the valve minimum 5x DN after pipe fittings.

For safety, follow these cautions before installing, removing or disassembling your valve.

- Check if and what kind of medium is in the pipeline.
- Make sure that the system is depressurized.

- Use protective clothing and equipment to avoid injury.
- Keep hands and other body parts out of the valve.
- Always ensure that the valve is in the fully closed position before installation, removal or disassembly.
- Keep flange faces clean before installation in pipeline

Before installation of the valve into the piping system, visually inspect the valve to determine if any damage has occurred during shipping. Particularly, inspect the actuator, shaft, valve interior, valve body and flanges. For proper operation of the valves, the seat and disc seal must be undamaged and free of foreign material. If other than superficial damage is discovered, please contact your supplier immediately, indicating the location and extent of the damage found.

If it is necessary to clean the valve, use a soft cloth and mineral spirits, or an equivalent solvent. All rust preventives should be removed before installing your valve

There are no special tools required for installation and maintenance that are not commercially available. Any lifting devices used to move the valve into a desired position shall be of sufficient size to support the weight of the valve and actuator assembly. The nylon slings, secured around the valve bearing areas, are recommended to reduce the possibility of mechanical damage occurring to the valve body and actuator. (Fig. 2) The assembly should never be lifted by the actuator. Lifting areas on the actuator are for removal and installation of the actuator to the valve only.

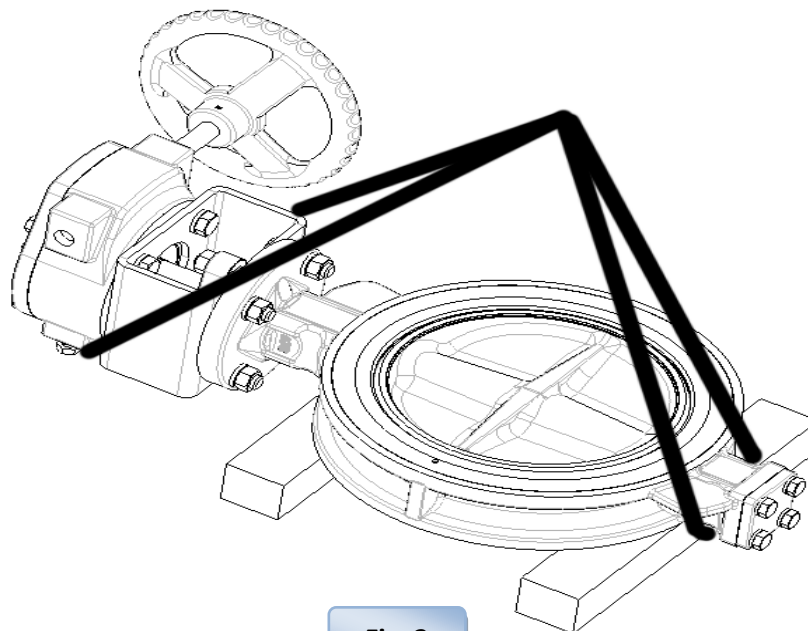


Fig. 2

**WARNING**

**NEVER** pass a lifting device through the valve port. Severe damage may occur.

**7. Installation**

The valve must be installed so that pipeline stresses are not transmitted to the valve body. Despite its solid manufacture, such stress may affect valve operation. If pipeline stresses are severe, they should be cushioned by expansion joints or compensators. If supports are necessary to carry the weight of the valve, they should only support the dead weight of the valve and should not serve as base points for the pipeline.

- All valves must be in fully closed position during installation or removal. It is not necessary to torque seat the valve, but the disc travel must be restricted to prevent damage.
- Please make sure that the valve is clean and that there is no foreign material inside the valve and pipe.
- The arrow on the valve body indicates the preferred flow direction. It also indicates the high pressure side of the valve, obtaining the best closure performance. During installation the best valve position must be determined in order to utilize this feature. This may not necessary be the common flow direction of the system (Fig.3)

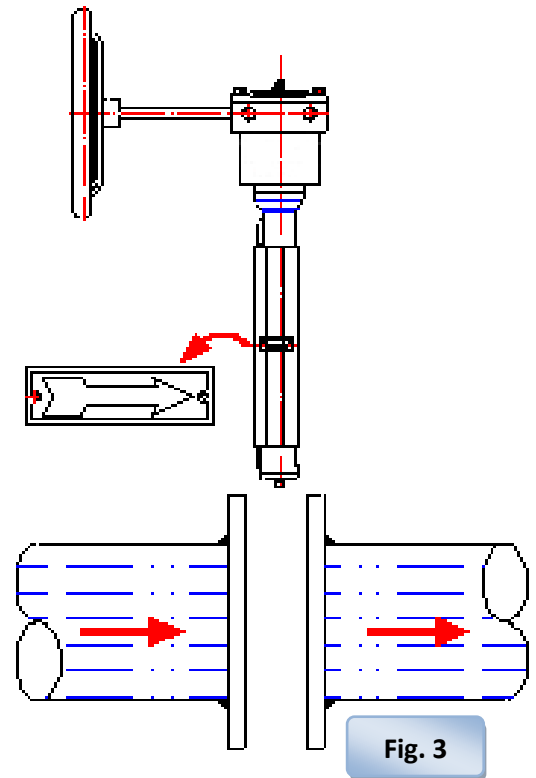


Fig. 3

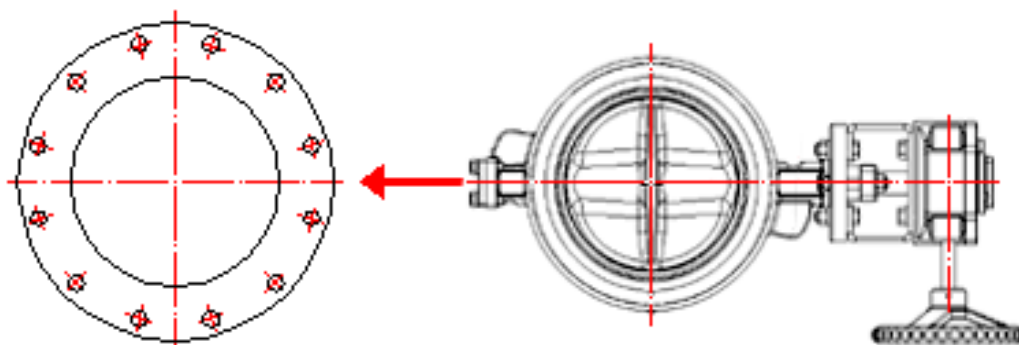
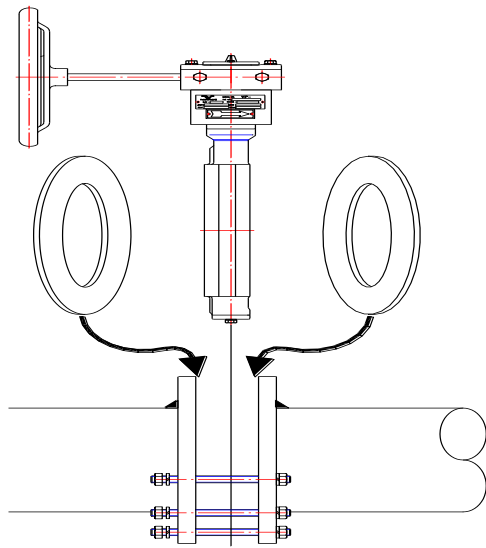
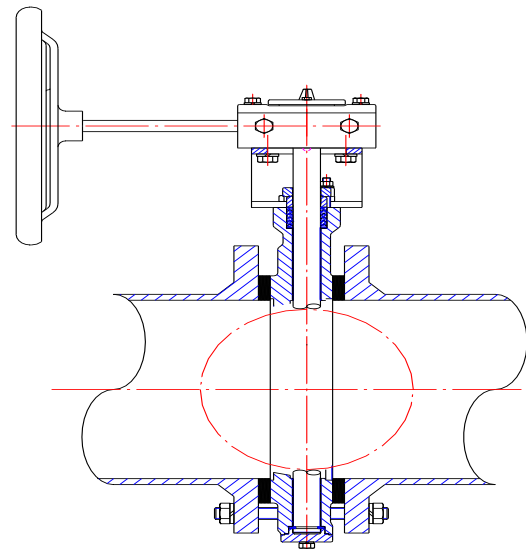


Fig. 4

- Please install the valve stem horizontally (Fig.4), in order to prevent damage to the stem bearing of the valve by sediment that builds up around bottom of the pipe system.
- Install the valve and gaskets into the pipeline (Fig.5).



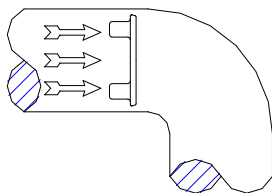
**Fig. 5**



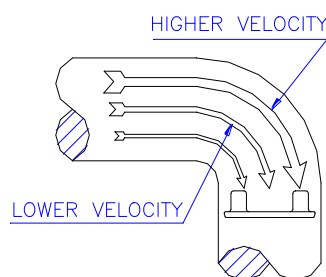
**Fig. 6**

- Make sure the valve will be perfectly centred between the pipe flanges, in order to prevent damaging the disc by interference with the pipe flange (Fig.6)
- The correct installation of butterfly valves connected to an elbow would be to align the stem position in order to have equal flow on each side of the shaft, minimizing dynamic torque on the valve disc. (Fig.7)

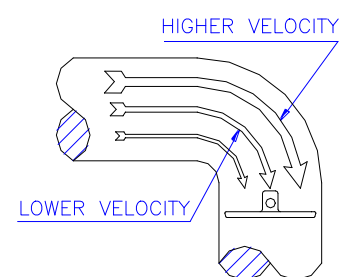
**Excellent**



**Good**



**No recommend**



**Fig. 7**

- Always use an extension tube between a wafer check valve and butterfly valve. Do never connect them directly. (Fig.8)

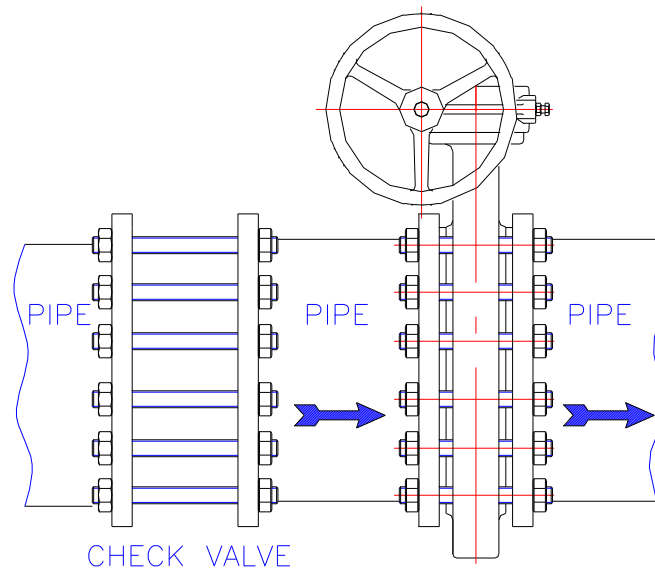
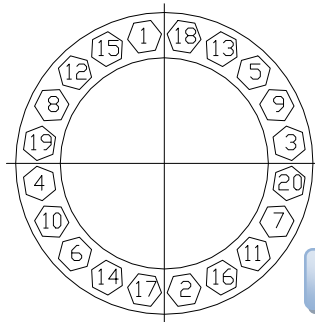


Fig. 8

- Flange connecting & bolting
  - Keep valve protection boards in place until the valve is being mounted in the pipe system.
  - Make sure the material and size of gaskets are suitable for the service. Check if the flange faces are clean and undamaged.
  - Check all bolts and nuts. They must be in undamaged condition.
  - Apply lubricant such as Molykote to all bolts and nuts before tightening them.
  - The pipe support(s) may now be required to be partially disengaged in order to make enough clearance to mount the valve and the flange gaskets.
  - The opposite connecting pipe flange face may not be further away than a 1/4 inch (6mm) from the valve flange face. If this distance is bigger, an alternate method, other than using the flange bolts, must be selected in order close the gap between the pipe flange and valve.
  - Tighten four of the flange bolts equally divided over the flange by a quarter turn at a time, until the flange touches the flange face of the valve. During this operation, it is advisable to continually check the distance between the flange faces. Tighten the bolts to approximately 25% of the final torque value (see table 1).
  - Inspect the remaining bolts and assure correct alignment. Tighten them to the same level as the first four bolts.
  - Complete the tightening of all flange bolts in minimal four steps by increasing the torque by every step, until the final torque value (table 1) has been reached. Tighten the bolts crosswise according to fig. 9
  - Test cycle the valve to be sure that the disc is not interfering with the pipe flange.



**Fig. 9**

Bolt tightening sequence

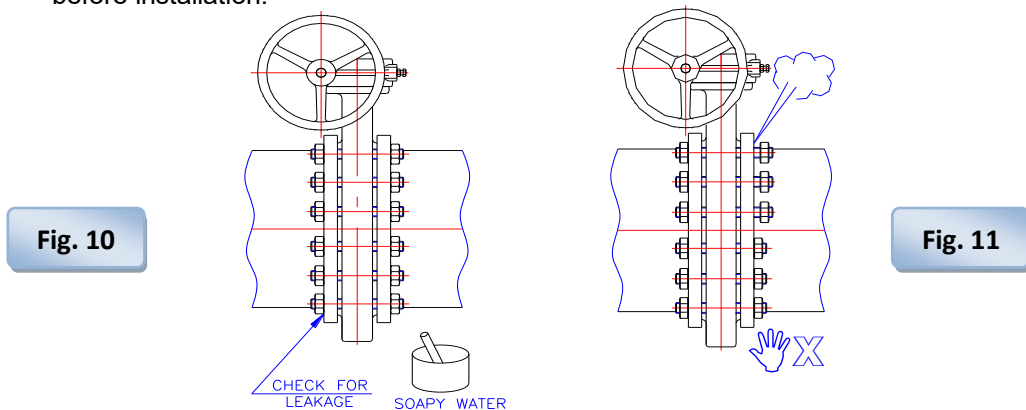
Bolt size	Torque	
	(ft-lb)	(Nm)
5/8" (M16)	110	150
3/4" (M20)	200	270
7/8" (M22)	320	434
1" (M26)	480	650
1-1/8" (M28)	600	815
1-1/4" (M32)	840	1140

**Table 1**

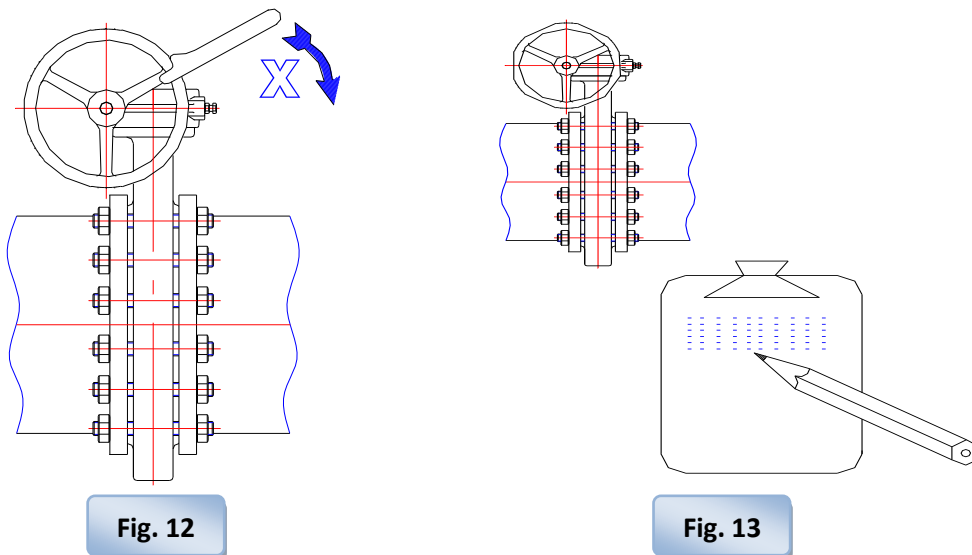
Actual torque shall depend on gasket type, consult your gasket supplier.

- Removal procedure
- To remove your valve from the pipeline, please follow these simple steps:
  - Ensure the valve is in the fully closed position.
  - Ensure that the system is depressurized.
  - Ensure the actuator is disconnected from the power or air supply.
  - Use protective clothing and equipment to prevent injury.
  - If your valve is equipped with a fail-open actuator, close the valve manually or dismantle the actuator from the valve and close the valve before removal from the pipe system.
  - Attach nylon slings to the body shoulders of the valve.
  - Remove the flange bolts.
- Caution
  - High performance valves are not suitable for media that contain solid particles, which could damage the valve seat.
  - Make sure the valve materials are resistant to the medium.
  - Make sure that the valve is suitable for the medium, medium pressure and temperature.
  - The medium temperature must be within a range of -29 ~ 210°C for PTFE seated valves and within a range of -29 ~ 500°C for fully Inconel seated valves.
  - The maximum working pressure may not be higher than the design pressure of the valve.
- Installation
  - Check what kind of medium is in the pipeline.
  - Make sure that the system is depressurized.
  - Make sure the arrow on the valve body, which shows the preferred flow direction of the valve, points into the flow direction.
  - Use protective clothing and equipment to avoid injury. Keep hands and other body parts out of the valve.

- **ALWAYS ENSURE THAT THE VALVE IS IN THE FULLY CLOSED POSITION BEFORE INSTALLATION, REMOVAL OR DISASSEMBLY.**
- Before installation of the valve into the pipe system visually inspect the valve to determine if any damage has occurred during shipping. Particularly, inspect the actuator, stem, valve interior, valve body and flanges. For proper operation of the valves, the seat and disc sealing surface must be undamaged. If other than superficial damage is discovered, contact your supplier immediately, indicating the location and extent of the damage found.
- All seats and seals must be free of damage, please change a new one if damaged.
- After installing the valve in the pipeline, check the flange connections for leakage by using compressed air and soapy water. (Fig.10)
- Make sure that the flange and valve faces and gaskets are clean and undamaged before installation.



- On service
  - Do not touch the valve body when it is in service.
  - Do not loosen flange bolts, valve bolts when valve is in service. (Fig.11)
  - The valve must be supported if pipeline vibration occurs, so that pipeline stresses are not transmitted to the valve and actuator.
  - Don't use an "F" wrench to operate the hand wheel or gear box. (Fig.12)



If there are problems which could not be eliminated during service, please contact your supplier and describe the valve and operation condition. (Fig.13)

## 8. Maintenance

Please notice that fluid residues inside the butterfly could be dangerous for humans and the environment. The butterfly valve must be handled accordingly and be cleaned carefully prior to the maintenance. Maintenance is made at the own risk of the user. Only original spare parts are to be used.

- Maintenance technicians must be trained before doing any valve repair.
- Do not replace any gasket or seal if the pipeline is pressurized.
- Repainting the valve when it starts to corrode.
- If internal valve parts start to corrode, please check the resistance of this part to the medium and replace the part by a genuine part that is resistant.
- If the valve body is corroded heavily, please measure the thickness and check if it still can be used safely.
- Please check abrasion or wear of the stem, disc and seats and verify if they still can ensure a proper operation of the valve.
- Always check what kind of medium is in the pipe system. It might be dangerous for your health or the environment.
- Ensure that the pipe system is depressurized and that the medium temperature has reached a safe level.
  
- LUBRICATION SCHEDULE
  - We recommend your valve be inspected at least every three months to determine lubrication and other maintenance requirements under your specific service conditions.
  
- GLAND PACKING MAINTENANCE PROCEDURE
  - Routine maintenance of the gland packing consists of tightening the packing gland periodically. If leakage around the gland packing is discovered, first tighten the hex-nuts on the gland follower (more than 2/3 compression) as this may reduce packing life. If the leakage still persists, replace the packing according to the following procedure. (For clarity, the actuator and bracket are not shown in the following diagrams. It is not necessary to remove the actuator or bracket before performing this procedure).
    - In order to gain access to the packing, remove the gland follower and slide it up to the actuator. See Fig. 14 hereunder:

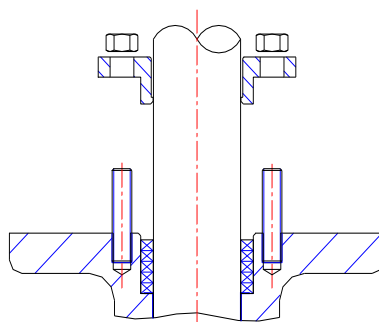


Fig. 14

- Remove the complete packing from the gland packing using a flexible screw hook. For gland packing that contain a lantern ring, use a puller with 10-32 threads to remove the lantern ring. Save the lantern ring for reuse, but discard the other packing material. Please replace the complete gland packing. It can either be made of graphite or PTFE.



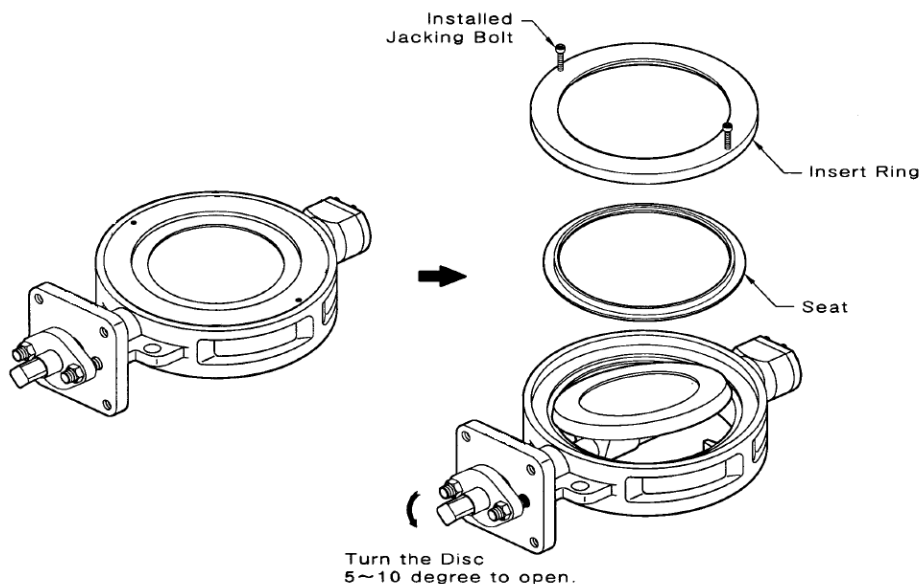
- Inspect the stem, bore of the gland packing and the gland follower. These surfaces should be relatively scratching free. If there is any damage, polish the surface to 32 rms finish. If any part has severe damage, contact your supplier.
- Install each new packing ring by using the gland follower to push each packing ring evenly into position. Stagger the splice-joints of each packing ring so they are as far as possible away from each other (see example above). Usually, rotating each ring until the splice is at 90° from the previous splice is sufficient.
- Install the gland follower and tighten it firmly. DO NOT compress the gland follower too much. Over-tightening may dramatically reduce the life of the packing and may increase the operating torque. The maximum torque of the gland nuts is mentioned in table 2.

Graphite Packing		
Screw Size	Max. Torque	
M8	11	Nm
M10	12	Nm
M12	14	Nm
M16	45	Nm
M20	65	Nm

**Table 2**

### 9. Replacement of the valve seat with insert ring

- Place the valve on a working bench or other suitable working surface with the drive shaft side of the valve up. Remove the actuator and actuator bracket from the valve.
- Open the disc of valve by turning the stem 5-10 degrees anti-clockwise.
- Unscrew the insert ring which has a bayonet locking device by turning the insert ring anti-clockwise, using 'jacking bolts'. See below picture.
- Remove the insert ring by lifting it up using the 'jacking bolt'. See below picture.
- Take out the seat. Be careful and prevent scratching, chopping or damaging the seat and clean dust or dirt on the seat assembly parts with an air blaster or smooth mop.
- Put the valve disc in the **OPEN** position, before putting in the new seat.
- Place the new seat and secure it by turning the existing insert ring 90 degrees clockwise.
- Refer to the below picture for disassembling of the insert ring & seat.
- When the assembly has been completed the flange facing of the insert ring will not fully align with the flange facing of the valve body. This is normal. During installation of the valve between the two pipeline flanges, the insert ring will slide into the final position.



### 10. Function test

Before the system is put into operation, it's recommended to do a function test. Therefore the valve must be opened and closed at least once in order to check that the disc doesn't touch the flanges and that the valve does close completely. If a pressure test of the complete piping system is being carried out, it is very important that the testing pressure is not higher than the nominal pressure of the valve. An overpressure may damage the valve.

### 11. Cleaning of the piping

When cleaning the piping system it is very important to assure that the cleaning products and devices are harmless for the valve. Not convenient products and devices might destroy the valve.

### 12. Removal

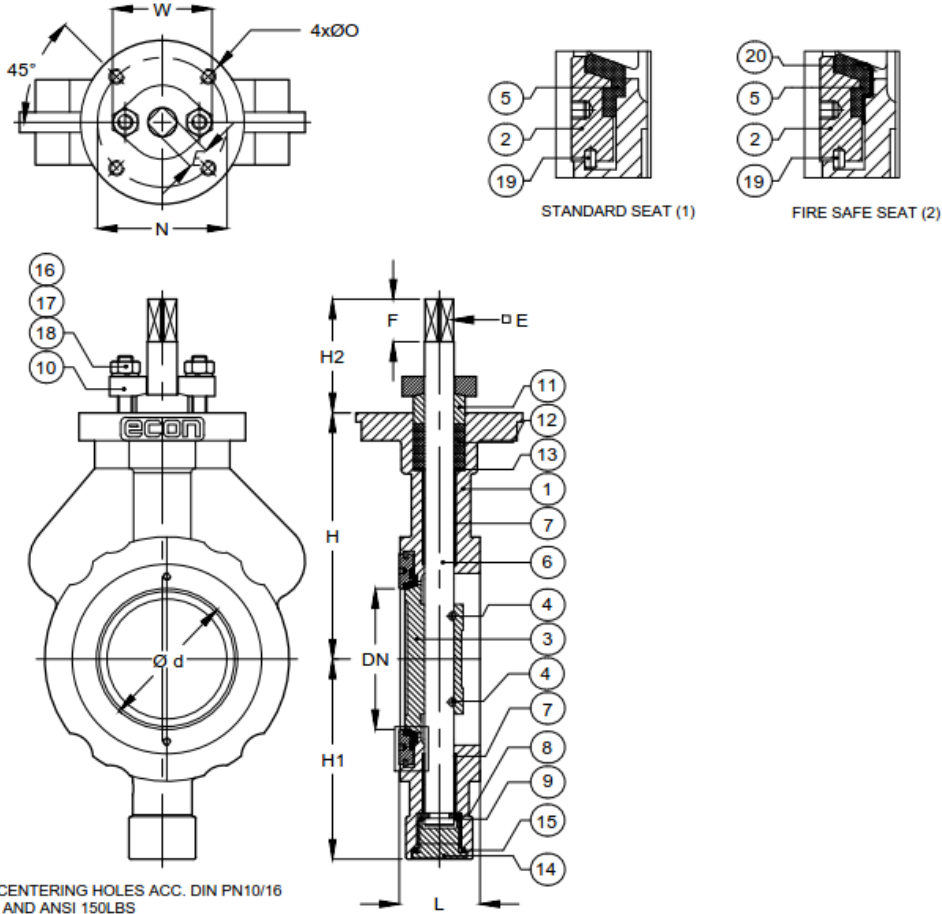
Before removing the valve from the pipe consider that dangerous fluids might leak. Corresponding measures of precaution have to be applied.

### 13. Disposal

Please notice that some residues could remain in the inner of the valve and that they might be dangerous for people or the environment. Therefore, the butterfly valve has to be handled with the corresponding caution. After its use, the butterfly valve has to be disposed of according to the state of the art and under consideration of the environment.

**HIGH PERFORMANCE BUTTERFLY VALVE OF DUCTILE CAST IRON, ECON FIG.9830**

WAFERT TYPE, FLANGE CONNECTION PN10, PN16 AND ANSI 150LBS



- CENTERING HOLES ACC. DIN PN10/16 AND ANSI 150LBS

POS	NAME	MATERIAL
1	BODY	0.704 A536
2	SEAT CLAMPING RING	1.0037 283-C
3	DISC	1.4408 CF8M
4	TAPER PIN	1.4418 X4CrNiMo 16-5-1
5	SEAT RING	PTFE-R
6	SHAFT	1.4418 X4CrNiMo 16-5-1
7	BEARING BUSH	R-PTFE/316SS
8	RETAINING RING	1.4418 X4CrNiMo 16-5-1
9	DISTANCE RING	1.4418 X4CrNiMo 16-5-1
10	GLAND FLANGE	1.4408 CF8M
11	GLAND	1.4408 CF8M
12	GLAND PACKING	PTFE
13	PACKING RING	1.4418 X4CrNiMo 16-5-1
14	BOTTOM PLUG	1.4308 GX5CrNi 19-10
15	SEALING RING	PTFE
16	STUD BOLT	1.4301 A2-70
17	NUT	1.4301 A2-70
18	SPRING WASHER	1.4301 A2-70
19	LOCK PIN	1.4418 X4CrNiMo 16-5-1
20	SEAT RING	INCONEL 625

SIZE TABEL											
DN	PN	Ød	□E	F	H	H1	H2	L	ØN	ØO	W
50	16	45	12	23	108	91	62	43	70	M8	58
65	16	63.5	12	23	123	102	62	46	70	M8	58
80	16	76	12	23	133	108	62	46	70	M8	58
100	16	95	12	23	155	116	62	52	70	M8	58
125	16	120	17	26	175	155	65	56	102	M10	72
150	16	138	17	26	183	164	65	56	102	M10	72
200	10	190	19	35	218	195	82	60	125	M12	96
250	10	235	22	35	253	230	82	68	125	M12	96
300	10	266	27	45	278	260	92	78	140	M16	96

- F TO F DIMENSIONS ACC. TO EN 558, BASIC SERIES 20
- TOP-FLANGE ACC. TO ISO 5211
- DESIGN ACC. TO ASME/ANSI B16.34
- REPLACABLE SEAT RING
- DOUBLE EXCENTRIC DISC, ONE PIECE SHAFT

DATE: 26-01-2011	BRAND: <b>econ</b> <sup>®</sup>	<b>ERIKS</b> WWW.ERIKS.COM	DWG. Nr.: <b>9830</b>	
DRAWN BY: RTH	CHECKED BY: JBM		REV BY: JL	DATE REV: 04-09-2020