

HIGH PERFORMANCE BUTTERFLY VALVE HP 111

CONTENTS

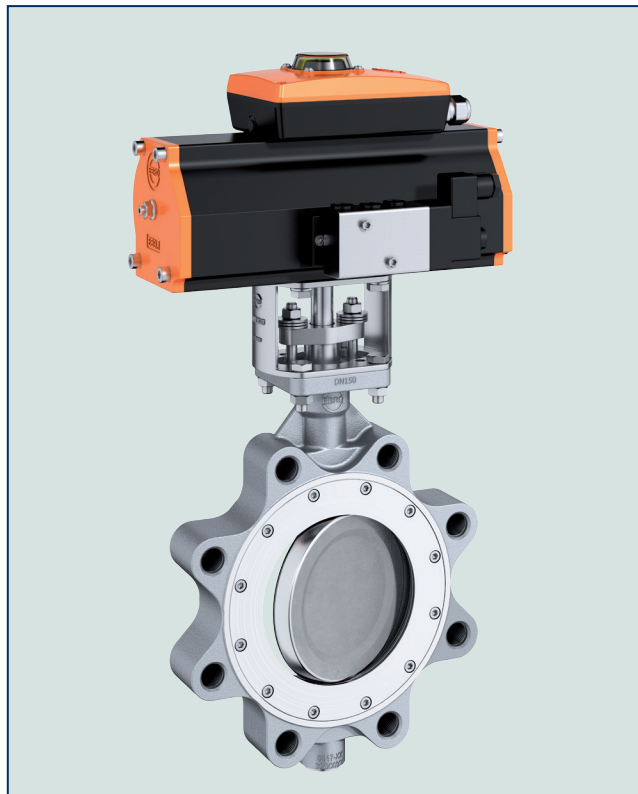
Data Sheet

Installation Instruction

Operating Instructions

Installation Supplement

High Pressure Risk
Checklist



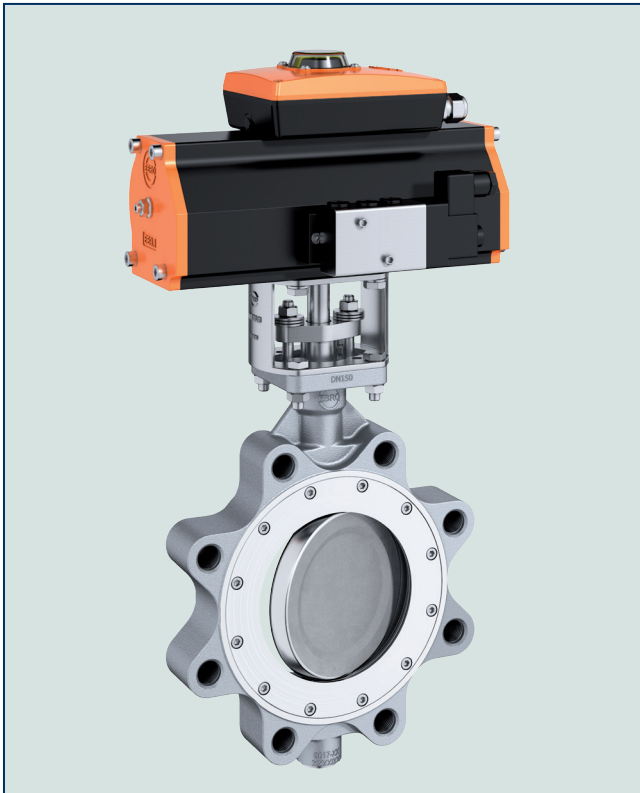
Lug type butterfly valve in double-eccentric construction. Reliable sealing even with extreme temperature and pressure conditions.

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HIGH PERFORMANCE BUTTERFLY VALVE HP 114



Lug type butterfly valve in double-eccentric construction. Reliable sealing even with extreme temperature and pressure conditions.

TECHNICAL DATA

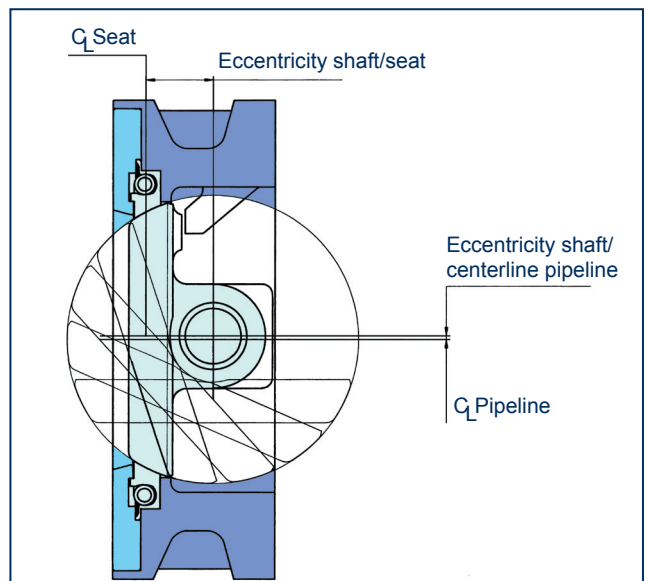
Nominal diameter:	DN 50 - DN 1200 Metallically up to DN 800 max. PN 16
Face-to-face:	EN 558 Series 20, optional Series 25 ISO 5752 Series 20 API 609 Table 1
Flange accommodation:	EN 1092 PN 10/16/25/40 (to DN 150) EN 1092 PN 10/16/25 (DN 200-DN 1200) ASME Class 150 AS 4087 PN16/21
Flange Surface Design:	EN 1092, Form A/B, ASME RF,FF
Top flange:	EN ISO 5211
Marking:	EN 19
Tightness check	Independent of flow-direction
- for R-PTFE seat:	EN 12266 (Leakage rate A)
- for Inconel seat:	EN 12266 (Leakage rate B) ISO 5208, Category 3
Temperature range:	-60°C to +600°C
Differential pressure:	≤ DN150 max. 40 bar > DN150 max. 25 bar
Vacuum:	up to 1mbar absolute

FEATURES

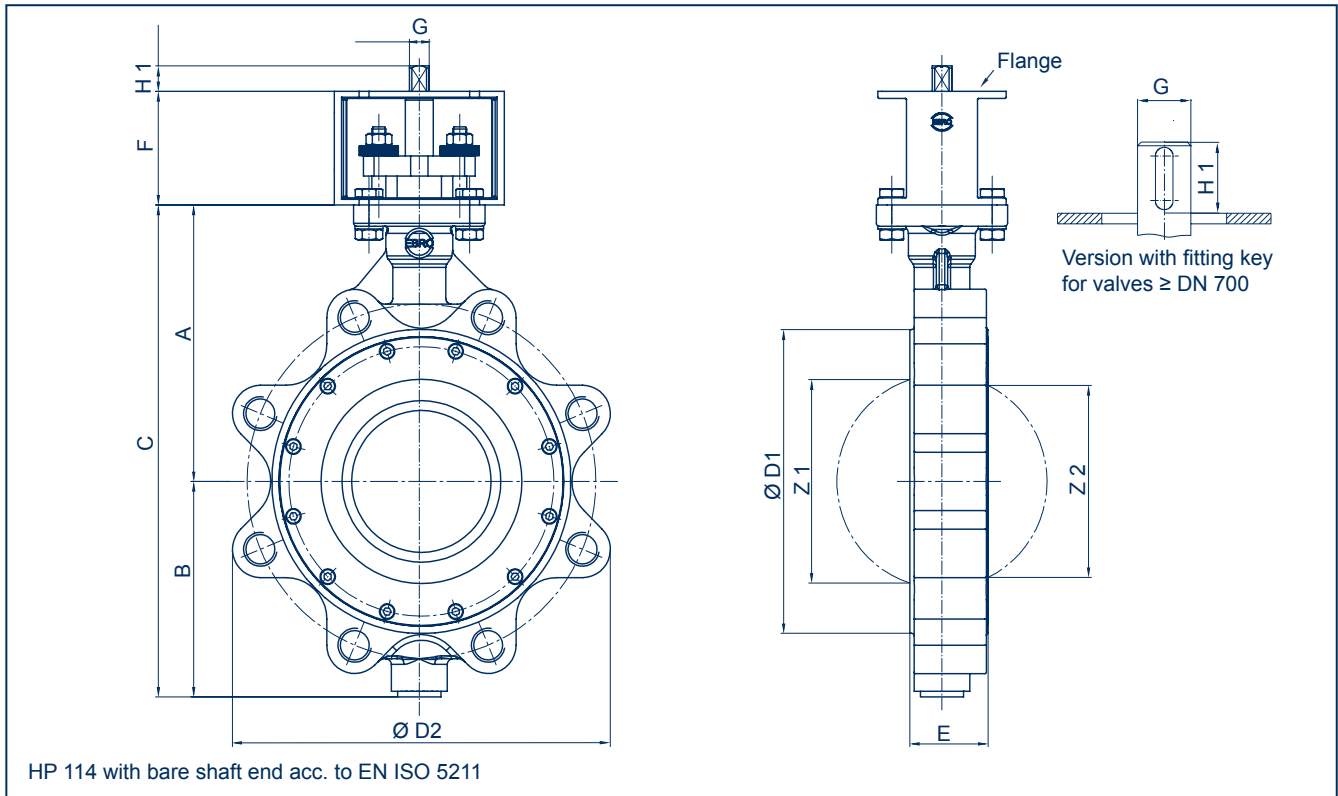
- Shut-off and control of gaseous and liquid media
- Disc has double-eccentric bearing
- Centering pieces can be used as installation aid
- Two seat ring systems available: R-PTFE and Inconel
- Seal variants:
 - soft-sealing (R-PTFE) max. 230°C
 - metallic sealing (Inconel) max. 600°C
 - fire safe (PTFE / Inconel) max. 200°C
- Maintenance-free
- Long service life, even at high switching frequencies
- Fire safe BS 6755 Part 2, API 607 5th Edition

GENERAL APPLICATIONS

- Chemical and petrochemical industries
- Hot water and steam systems
- District heat supply
- Vacuum systems
- Shipbuilding
- Gas process technology
- Food industry
- Heavy duty services



HIGH PERFORMANCE BUTTERFLY VALVE HP 114



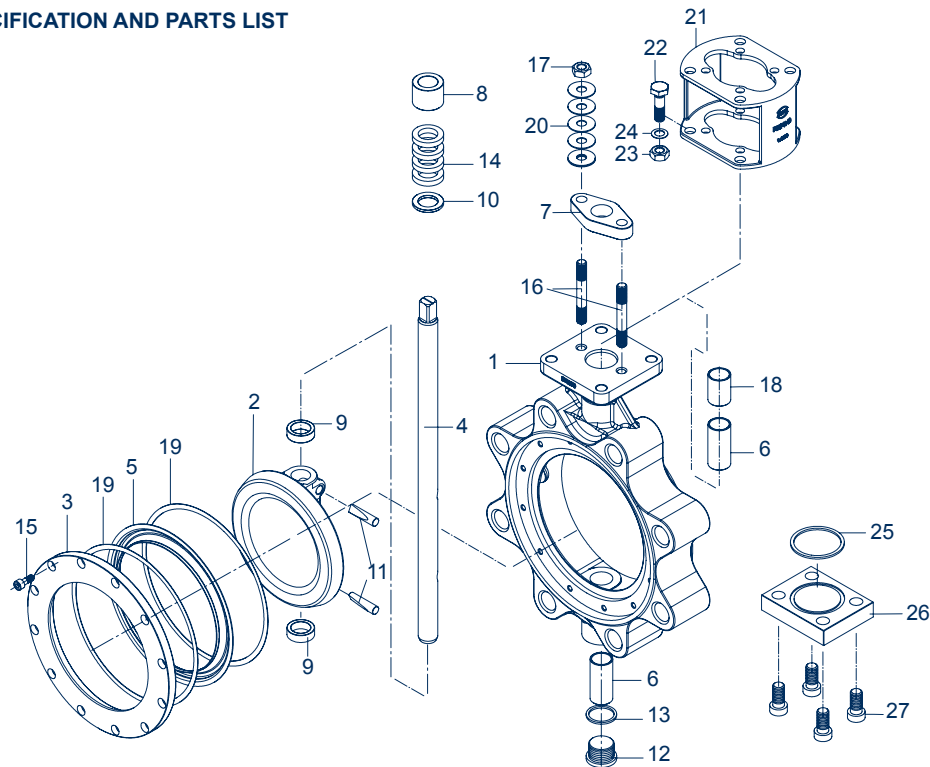
DN [mm]	Size [in]	Dimensions [mm]												Weight [kg]
		A	B	C	D1	D2	E	F	Flange	G	H1	Z1	Z2	
50-65	2-2½	133	99	232	112	180	43	80	F05/F07	12	15	41	-	7
80	3	142	113	255	138	200	46	80	F05/F07	12	15	71	54	10
100	4	158	124	282	160	235	52	80	F05/F07	12	15	94	82	14
125	5	181	140	321	192	260	56	80	F07/F10	14	18	115	105	18
150	6	195	154	349	216	295	56	80	F07/F10	14	18	144	135	21
200	8	225	191	416	270	356	60	80	F10/F12	17	18	187	181	33
250	10	268	222	490	326	425	68	80	F10/F12	22	23	235	229	49
300	12	300	255	555	378	480	78	90	F12	27	28	281	276	69
350	14	345	304	649	438	542	92	100	F14	27	28	323	316	104
400	16	375	339	714	488	606	102	100	F16	36	36	372	364	135
450	18	412	340	752	530	656	114	120	F16	36	36	427	427	174
500	20	425	399	824	593	716	127	120	F16	46	46	469	466	240
550	22	456	405	861	635	749	154	200	F25	46	46	526	526	268
600	24	490	468	958	692	834	154	200	F25	55	55	544	542	390
700	28	554	522	1076	820	916	165	200	F25	80	130	673	659	535
750	30	569	535	1104	857	965	165	200	F30	80	130	711	-	510
800	32	605	566	1171	902	1061	190	200	F30	90	130	748	736	570
900	36	660	637	1297	1006	1153	204	200	F30	100	145	847	833	800
1000	40	715	687	1402	1112	1298	216	200	F30	100	145	944	935	880
1200	48	815	789	1604	1328	1458	254	200	F35	110	185	1148	1175	1480

DN 50 - DN 150 = PN 40
 DN 200 - DN 1000 = PN 25
 DN 1200 = PN10/16

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HIGH PERFORMANCE BUTTERFLY VALVE HP 114

MATERIAL SPECIFICATION AND PARTS LIST



Pts. 25-27:
Cover plate for
valve \geq DN 350

Pt.	Description	Material	Material No.	ASTM	Pt.c	Description	Material	Material No.	ASTM
1	Body				14	Shaft seal			
	Carbon Steel	GS-C25N	1.0619	WCB		PTFE			
	Stainless Steel	G-X5CrNiMo19-11-2	1.4408	CF8M		Graphite			
2	Disc				15	Hex.-socket screw			
	Stainless Steel	G-X5CrNiMo19-11-2	1.4408	CF8M		Stainless Steel	A4-70	1.4401	B8M
3	Clamping ring				16	Threaded pin			
	Stainless Steel	G-X5CrNiMo19-11-2	1.4408	CF8M		Stainless Steel	A2-70	1.4301	B 8
	Stainless Steel	X2CrNiMo17-12-2	1.4404	316 L	17	Hex. nut			
	Steel	St37-2	1.0037			Stainless Steel	A 2	1.4301	8
4	Shaft				18	Spacer sleeve			
	Stainless Steel	X4CrNiMo16-5-1	1.4418			Stainless Steel	X6CrNiMoTi17-12-2	1.4971	316 Ti
5	Seat ring				19	Graphite seal (for metal seat)			
	R-PTFE	PTFE-Compound				Graphite			
	Inconel	Inconel 625			20	Belleville spr. washer			
	FireSafe	PTFE/Inconel 625				Stainless Steel	X10CrNi18-8	1.4310	301 Ti
6	Shaft bearing				21	Bracket			
	Stainless Steel	X6CrNiMoTi17-12-2	1.4571 nitrite	316 Ti		Steel	St37-2 galvanized	1.0037	283-C
7	Gland flange				22	Hex. bolt			
	Stainless Steel	X5CrNi18-10	1.4301	304		Steel	St galvanized		CS
	Stainless Steel	G-X5CrNiMo19-11-2	1.4408	CF8M	23	Hex. nut			
8	Thrust collar					Steel	St galvanized		CS
	Stainless Steel	X5CrNi18-10	1.4301	304	24	Washer			
9	Bearing ring					Steel	St galvanized		CS
	Stainless Steel	X6CrNiMoTi17-12-2	1.4571 chr-pld	316 Ti	25	Seal			
10	Suppor. washer					Graphite			
	Stainless Steel	X6CrNiMoTi17-12-2	1.4571	316 Ti	26	Cover plate			
11	Taper pin					Steel	St37-2 galvanized	1.0037	283-C
	Stainless Steel	X4CrNiMo16-5-1	1.4418			Stainless Steel	G-X5CrNiMo19-11-2	1.4408	CF8M
12	Plug screw DIN 908				27	Hex.-socket screw			
	Stainless Steel	G-X5CrNiMo19-11-2	1.4408	CF8M		Stainless Steel	A2-70	1.4301	B 8
13	Seal				28	Centering piece			
	PTFE					Stainless Steel	X6CrNiMoTi17-12-2	1.4571	316 Ti
	Graphite				29	Countersunk screw			
						Stainless Steel	A 2	1.4301	SS
						Other materials upon request			

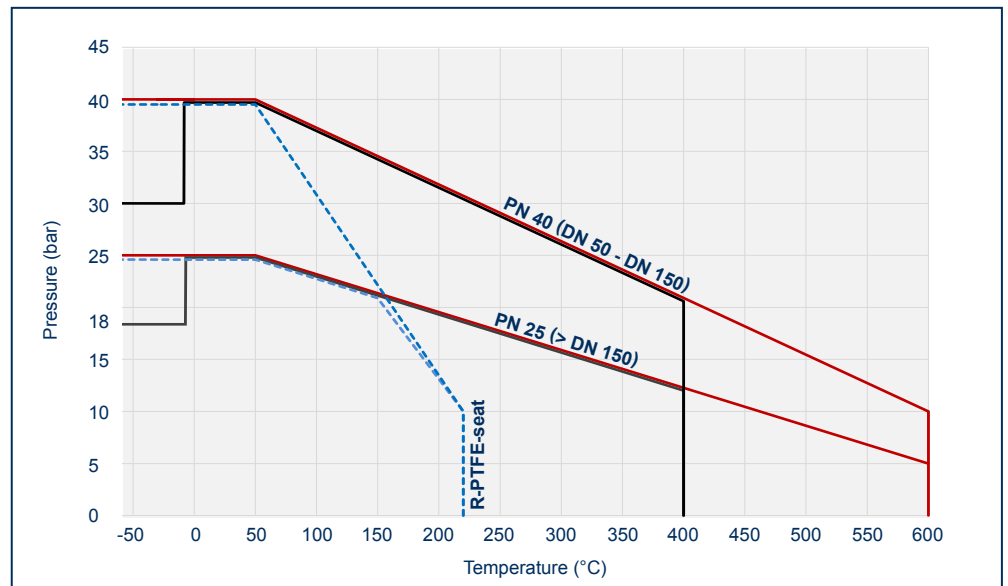
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HIGH PERFORMANCE BUTTERFLY VALVE HP 114

PRESSURE/TEMPERATURE DIAGRAM

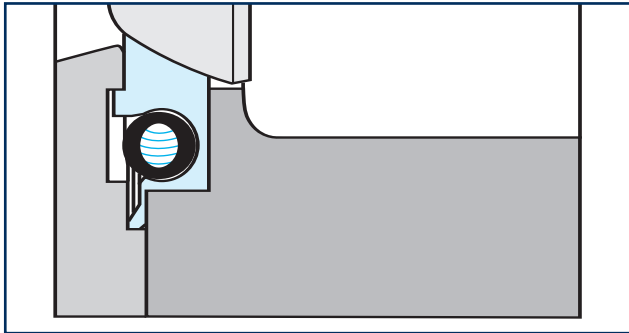
- Pressure control line for 1.0619 body material and metal seat
- Pressure control line for 1.4408 body material and metal seat
- - - Pressure control line for R-PTFE

The diagram illustrates the performance of the standard version of our valve type HP. Valves for higher pressure or deviating temperature are available upon request.



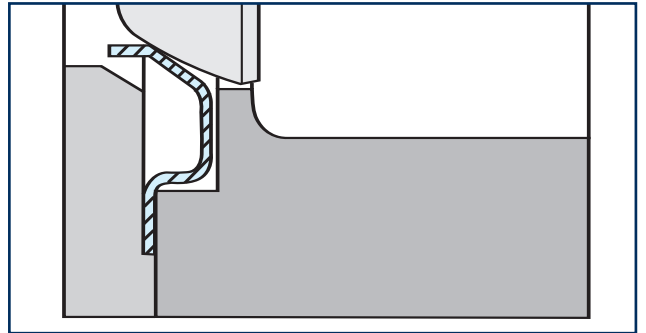
R-PTFE SEAT

The elasticity of the seat ring guarantees sealing according to EN 12266, Leakage Rate A (tight): Leak test with air. The constant test pressure corresponds to the permissible working pressure at 20 °C, not exceeding 6 bar.



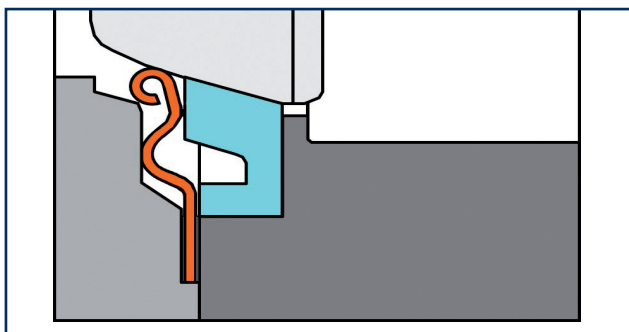
INCONEL

The seat ring made of Inconel and is extremely temperaturestable. Tightness according to EN 12266 Leakage Rate B (tight): Testing conditions corresponding to EN 12266, Leakage Rate B, but test media water.



FIRE SAFE SEAT

The combination of a PTFE and an Inconel seat ensures the sealing acc. to EN 12266 (Leakage Rate A) and a metal sealing acc. to API 607 5th edition after heat impact.



QUALITY FEATURES

HIGH PERFORMANCE VALVE HP 111

STRAIGHT THROUGH SHAFT

ensures maximum bending strength.

MAINTENANCE-FREE BEARING

For all nominal diameters maintenance free, overlong corrosion and temperature resistant bearings are used for exact centring of the valve discs.

FORCE-LOCKED CONNECTION

between disc and shaft. Low shear stresses thanks to tangentially arranged tapered pins.

INCONEL SEAT RING

The Inconel seat ring guarantees absolute tightness and compensates for wear. The seat ring can be replaced without disassembling the shaft and valve disc.

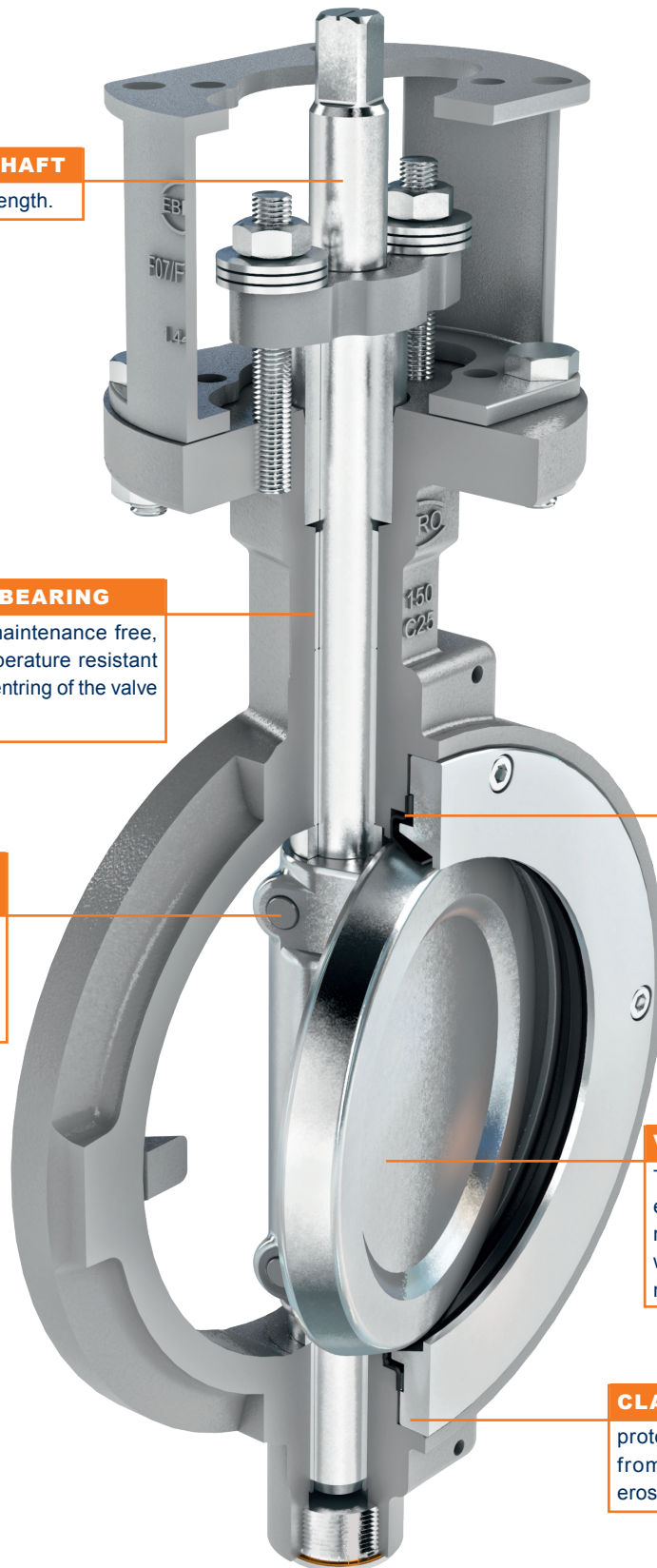
Alternative: R-PTFE or Fire-safe

VALVE DISC

The valve disc has a double eccentric bearing design, resulting in low torques and low wear. All sealing surfaces are machined.

CLAMPING RING

protects the seat ring from abrasion and erosion.



HIGH PERFORMANCE BUTTERFLY VALVE HP 114

TORQUE

- The values specified are based on the initial breakaway torque. (disc disengages from seat, torque then drops)

DN [mm]	Size [in]	Operating pressure							
		10 [bar]		16 [bar]		25 [bar]		40 [bar]	
		R-PTFE	Inconel	R-PTFE	Inconel	R-PTFE	Inconel	R-PTFE	Inconel
50-65	2-2½	27	35	28	42	30	58	31	66
80	3	28	55	30	65	34	90	38	100
100	4	51	90	61	100	80	120	93	140
125	5	63	150	83	172	95	220	125	285
150	6	125	170	136	220	168	300	220	360
200	8	205	350	260	430	280	505	-	-
250	10	485	505	550	620	600	860	-	-
300	12	584	740	700	970	855	1280	-	-
350	14	740	815	930	1050	1200	1370	-	-
400	16	1050	1530	1640	2240	2460	2900	-	-
450	18	1150	1700	1750	2500	2700	3500	-	-
500	20	1210	2010	1800	2760	2800	4260	-	-
550	22	3500	3750	4430	4550	6010	6800	-	-
600	24	4000	4500	4600	5740	6200	8080	-	-
700	28	5300	6000	6100	6800	8100	-	-	-
800	32	6400	8000	7400	9500	9800	-	-	-
900	36	7800	-	9000	-	12000	-	-	-
1000	40	9800	-	11300	-	15000	-	-	-
1200	48	14300	-	16500	-	22000	-	-	-

All values in Nm

K_V-VALUES

- The K_V-value [m³ per hour] is the flow of water at a temperature of 5°C to 30°C (41°F to 86°F) at Δp of 1 bar

- The K_V-values specified are based on tests carried out by the Delfter Hydraulics Laboratories, the Netherlands

- Permissible velocity of flow
V_{max} 4,5 m/s for liquids,
V_{max} 70 m/s for gases

- The throttle function is linear at an angle 30° to 70°

- Avoid cavitation!

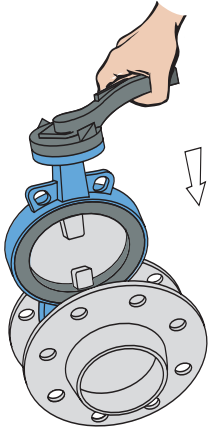
For further values, please contact our engineers.

DN [mm]	Size [in]	Opening angle α°							
		20°	30°	40°	50°	60°	70°	80°	90°
50-65	2 2½	1,3	6	15	18	19	21	22	23
80	3	7	30	50	68	82	97	113	115
100	4	22	60	97	119	164	199	223	251
125	5	45	100	152	195	256	346	452	493
150	6	63	109	162	250	391	588	814	845
200	8	96	168	301	509	742	1107	1581	1747
250	10	264	458	682	980	1421	2083	2882	2889
300	12	397	625	956	1368	1938	2778	3794	3940
350	14	460	720	1100	1650	2500	3400	4800	5400
400	16	550	870	1250	2000	3200	4800	6800	8080
450	18	730	1200	1800	3100	4600	6400	8400	10500
500	20	920	1600	2600	4100	6000	8500	12100	12800
550	22	1090	1950	3100	4600	7500	10200	14700	15300
600	24	1370	2250	3780	4950	9000	12500	17100	18500
700	28	1999	3182	4764	7738	11451	16283	22071	25000
800	32	2795	4450	6661	10821	16014	22770	30864	34960
900	36	3590	5715	8555	13898	20567	29243	39640	44900
1000	40	4677	7447	11147	18107	26796	38101	51646	58500
1200	48	7188	11444	17130	27826	41179	58552	79367	89900

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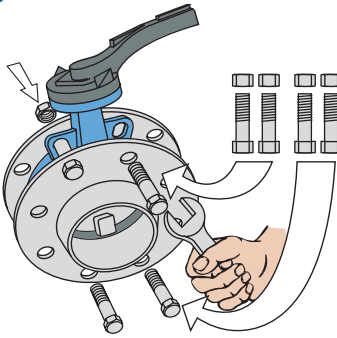
INSTALLATION INSTRUCTIONS

①



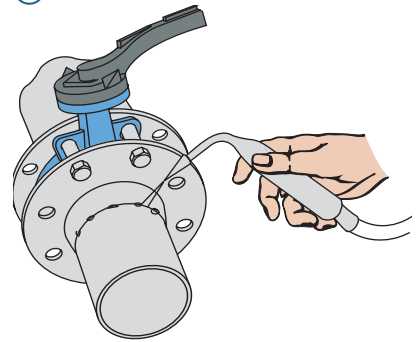
Place valve between the flanges.

②



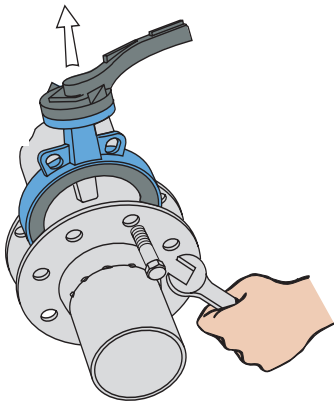
Align and fix loosely by means of four flange bolts and nuts.

③



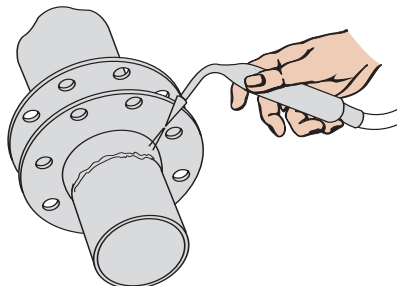
Spot weld pipe flanges to the pipe.

④



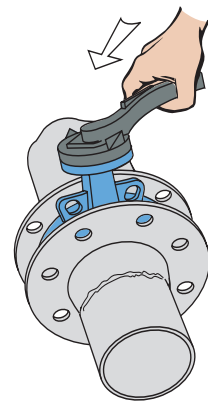
Remove the valve.

⑤



Weld flanges to the pipe.

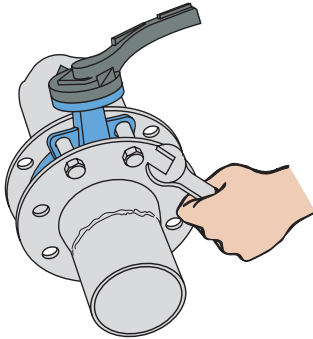
⑥



Let flanges cool down and re-install the valve. The valve must move easily between the flanges to prevent damage to the collar. Leave valve disc slightly open.

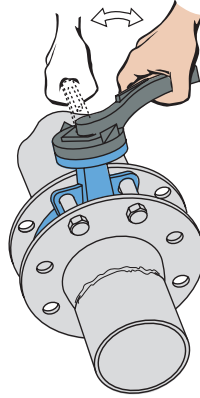
INSTALLATION INSTRUCTIONS

⑦



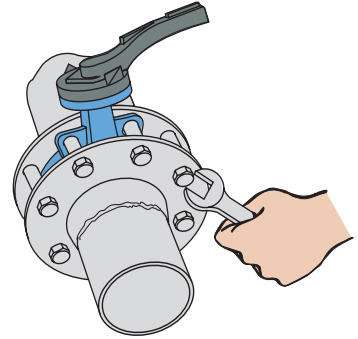
Align valve and fasten 4 flange bolts loosely.

⑧



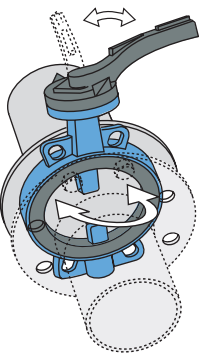
Open valve disc and check free movement.
Leave valve disc slightly open.

⑨

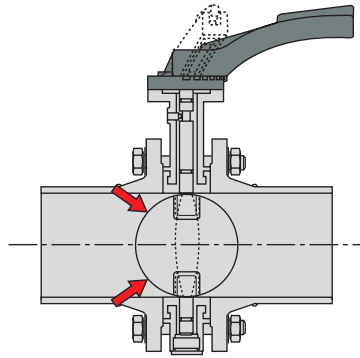


Fasten all flange bolts tightly and crosswise.

⑩



Check proper operation. Attention: make
sure disc does not hit the pipe.



High-Performance Butterfly Valves

HP Series

HP111



HP112



HP112-S



HP114



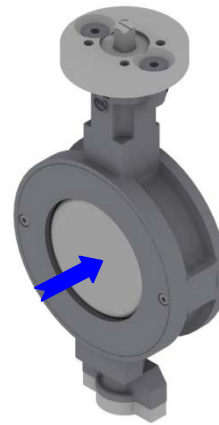
-E



-C



-L



Example representations, not all possible type variants are shown!

Mounting Instructions

with Operating Instructions and Technical Appendix

in accordance with EC Machinery Directive 2006/42/EC
in accordance with EC Pressure Equipment Directive
2014/68/EU

Translation of the original instruction - English version

Contents

	Page
<u>A) GENERAL</u>	<u>3</u>
A1 EXPLANATION OF SYMBOLS	3
A2 INTENDED USE	3
A3 IDENTIFICATION OF THE BUTTERFLY VALVE	4
A4 TRANSPORT AND STORAGE	4
<u>B) INSTALLATION OF THE VALVE IN THE PIPELINE / PRESSURE TEST</u>	<u>5</u>
B1 SAFETY INSTRUCTIONS FOR INSTALLATION	5
B2 PREREQUISITES FOR INSTALLATION IN THE PIPELINE	5
B3 INSTALLATION PROCEDURE	6
B4 PRESSURE TEST BEFORE/DURING COMMISSIONING	8
B5 ADDITIONAL INFORMATION: DISASSEMBLY OF THE VALVE	8
<u>C) OPERATING INSTRUCTIONS</u>	<u>9</u>
C1 SAFETY INSTRUCTIONS FOR OPERATION AND MAINTENANCE	9
C2 MANUAL OPERATION / AUTOMATIC OPERATION	9
C3 TROUBLESHOOTING	10
<u>D) TECHNICAL APPENDIX / PLANNING DOCUMENTS</u>	<u>11</u>
D1 TECHNICAL SPECIFICATION OF THE VALVE	11
D2 P/T RATINGS	11
D3 DRAWING / PARTS LIST	11
D4 SPARE PARTS	11
D5 FLANGE SCREWS FOR TYPES HP, HP-E AND VARIANTS	11
<u>DECLARATION IN ACCORDANCE WITH EC DIRECTIVES</u>	<u>12</u>

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A) General

A1 Explanation of symbols

Notes are indicated by the following symbols in these Instructions:

	Absolute prohibitionmust be complied with
 XXXXXX	Danger / Caution / Warning ... indicates a hazardous situation, which can result in death or severe injuries for people and/or damages in the pipe system.
	Note ... indicates an instruction that must be complied with.
	Information ... provides useful tips and recommendations

Failure to observe these notes, cautions and warnings could give rise to dangers and invalidate the manufacturer's warranty.

A2 Intended use

The **HP series** of butterfly valves are intended for installation between flanges in a pipe system or with a welded joint on both sides, for the purpose of shutting off or conducting media within the permissible upper pressure and temperature limits, or regulating their flow.

The permissible upper pressure and temperature limits (depending on the housing material and the seat material) are identified with **TS** and **PS** on the valve typeplate (see section A3). Below these limits, the permissible <p/t rating> is described, depending on the housing material, in the planning documents in section D2I.

The valve may only be commissioned after noting the following documents:

- <Explanations in relation to EC directives> – see above
- These Mounting / Operating Instructions, which are enclosed with the delivery.

Use of the valve in a potentially  atmosphere is only permitted, if

► expressly indicated by the customer.

Failure to observe this <Intended use> constitutes gross negligence and releases the manufacturer, EBRO ARMATUREN, from its product liability.

A3 Identification of the butterfly valve

Every butterfly valve bears an identification with the following data on the housing or typeplate:

for	Identification	Comment
Manufacturer	EBRO ARMATUREN	Address, see page 2 <Contents>
Valve type	e.g.: HP111	(Housing identification) See overview on page 1
Conformity	e.g. CE (apply to PED)	Conformity with Pressure Equipment Directive 2014/68/EU
Identification no.	e.g. 0036 (apply to PED)	„Notified body according to EU-Directive = TÜV Süddeutschl.
Ident.-Nr.	e.g. 123456/012/001 *)	
DN	DN (and numerical value)	(Housing identification) e.g. DN80
Year of manufacturing	MM/JJ	
PN	e.g. PN 40	The required PN level of the mating flange
Max. permissible temp.	TS (and numerical value)	Numerical values for upper and lower operation limits
Max. permissible pressure	PS (and numerical value)	Numerical value in bars (at room temperature)
Material	e.g.: 1.0619	(Housing identification) Housing material
	e.g.: 1.4408	(On typeplate) Material of valve disc
	e.g.: 1.4418	(On typeplate) Material of stem
	e.g.: Inconel 625	(On typeplate) Material of replaceable seat ring

The typeplate must not be covered, so that the installed valve remains identifiable.

A4 Transport and storage

The following points must be noted for correct transport:

- Leave the valve in the factory packaging until use (mounting).
- Store the valve in closed rooms and protect from dirt and moisture.
- Stop of retention straps as per Figures 1 to 3,

- *Only type KOB (valve with loose seat ring):*

Transport is not permitted with the valve disc on the bottom, as shown in Figure 4



Do not suspend large valves from the gear or actuator!
Protect valve disc and flange sealing surfaces from damage

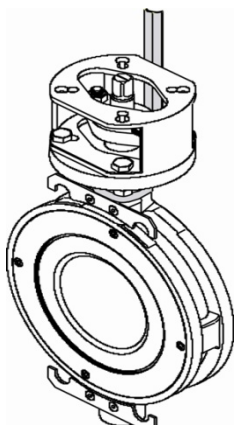


Figure 1

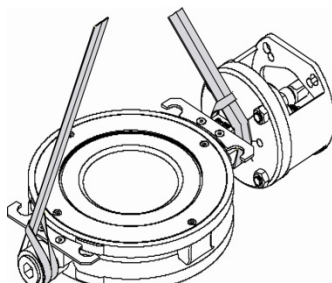


Figure 2

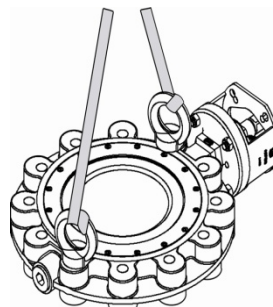


Figure 3

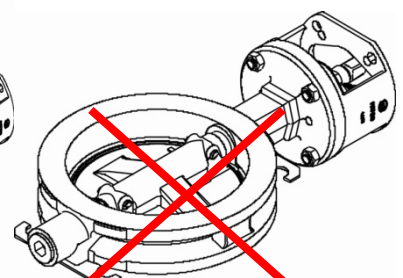


Figure 4



Valves supplied without actuator:

The valve disc is not protected against displacement. It must be transported in such a way that it cannot open from the closed position as a result of external influences (e.g. vibration).

B) Installation of the valve in the pipeline / pressure test

These Instructions contain safety information pertaining to foreseeable risks when installing the valve in a (pipe) system.

The user is responsible for supplementing the following information for other risks specifically related to the location. Fulfilment of all requirements for this system is assumed.

B1 Safety instructions for installation

- The installation of valves in the system may only be carried out by expert personnel. For the purposes of these Instructions, experts are persons who, on the basis of their training, technical knowledge and professional experience, can correctly assess and execute the tasks assigned to them, and can identify and eliminate potential dangers.
- The intended function of a valve after installation must comply with the <Intended use>, which is described in section A2.
- A valve which is not locked in (any) position with an actuator must not have pressure applied to it.
- The operation of an actuator which is mounted to a valve, is only permitted if the valve is enclosed on both sides by a pipe or equipment section – any prior operation entails a risk of crushing and is under the user's sole responsibility.
- A valve which externally terminates a pipe section under pressure as an <end fitting> must be protected by a blind cover, so that no external leaks can occur.

B2 Prerequisites for installation in the pipeline

- Only install butterfly valves whose pressure class and materials comply with the intended operating conditions. See relevant identification on typeplate (*section A3*)
- Generally the butterfly valve must either be equipped with a hand lever/gear handwheel or with an actuator and adjusted ready for operation.
A valve is only supplied without an actuator for subsequent retrofitting in special cases.
- A butterfly valve without visible transport damages should be left in the factory packaging during storage and transport, and only unpacked immediately before installation in the pipe section.



Caution

The inside of the housing is very finely machined, in order to ensure the tightness of the (closed) butterfly valve. It must be ensured that this surface is not damaged when handling during installation.

- Flanged valves must be installed on or between flanges as per EN 1092-1 or EN 1759-1, with sealing strips as per Form A or B1, which must be plane-parallel and aligned. The use of other flanges and/or other forms of sealing strip must have been confirmed in the order confirmation by the manufacturer, EBRO ARMATUREN.

- The inner width of the mating flange must leave sufficient space for the opened valve disc, so that the disc is not damaged when swiveling out, thus becoming unusable.
see technical data sheets
- All internal surfaces of the valve must be free from impurities – particularly hard/sharp particles. The pipe sections on both sides must also be clean: to flush a line with an installed valve, please observe note in section B3.



If impurities (welding beads, rust particles etc.) are not removed, the sealing surface in the housing could be damaged: the valve will become leaky and, at the worst, unusable.

- The butterfly valve is in (almost) closed position when delivered, and must also be installed like this, in order to protect the finely polished seat surface on the disc from damage.
- The ends of the pipeline must be aligned and have plane-parallel connection faces.



Flange seals are generally not included in the scope of supply of EBRO ARMATUREN:

Use flange seals as per EN1514-1, i.e. flat seal with form IBC or form FF with a thickness of approx. 1.5 - 2.0mm.

The tightening torques of the flange screws depend on the type and material of the flange seals. See *EBRO Factory Standard EW 1810*.

B3 Installation procedure

- Check valve and actuator for transport damages. Damaged butterfly valves or actuators must not be installed.
- The preferred installation position for the valve is with the butterfly valve stem horizontal. The gear should - if possible - not be positioned directly beneath the valve: leaks from the stuffing box could damage gear or actuator.
- Butterfly valves for installation between flanges must be carefully centered with the flange screws during installation. For flange screws, also see section D5.
- In the case of butterfly valves for welding in, it must be ensured that minimal heat is introduced into the housing, in order to protect it from deformation.
If necessary, welding should be carried out in sections with intermittent pauses.
- If in exceptional cases a valve is delivered without an actuator device, it must be installed in closed position and left like this until the actuator is retrofitted. The relevant installation instructions must be provided by the actuator manufacturer. The nominal torque must be adapted to the valve, and the setting of the "OPEN" and "CLOSED" end stops correctly adjusted.



Warning



It must be ensured that such a butterfly valve is not subjected to pressure before the actuator is mounted.

- Butterfly valves can be installed independently of the flow direction of the medium. But the direction of pressure in relation to the closed valve disc must be noted:




Warning


It must be ensured that butterfly valves, their additional external and internal parts, especially the valve seat and the bearings area, no significant exposure, impurities, sparks or exposed to any other damaging impacts or stresses.

	<p>In order to optimally utilise the function of the butterfly valve, the valve must be installed so that the pressure direction (direction exerted by the pressure in relation to a closed disc) matches the (blue) arrow direction in the photo on the title page. This direction can be opposed to the direction of flow when the butterfly valve is open.</p> <p><i>In the case of valves with arrow direction marked on the housing, this direction corresponds to the pressure direction!</i></p>
	<p><i>Valve with pneumatic <fail safe> actuator (with opening spring):</i></p> <p>A <fail safe> actuator with opening spring must be set to the closed position by means of an (alternative) compressed air connection for insertion between the mating flange. The installation instructions for the actuator must be observed and it must be ensured that the valve disc does not suddenly open unintentionally (risk of injury!).</p>



- After installation, the valve disc must be opened for flushing the line, so that the pipe section can be flushed clean before the valve is closed for the first time.

	<p>Before first closing, hard/abrasive impurities (welding beads, rust particles etc.) must be removed from the pipe section.</p>
---	---

- *For installation at the end of a pipe section:*

 Danger!	<p>If a butterfly valve is mounted as an end valve and subjected to pressure, it must be sealed with a blind flange in order to prevent physical injuries or damage to property in the event of leaks and/or unauthorised opening.</p>
---	--

- For connection of an actuator to the system-side control, the relevant manufacturer's instructions apply.

	<p>A gear or actuator is adjusted for the operating data specified in the order: The setting of the "CLOSED" end stop of a brand-new valve must not be changed unless the valve termination is leaky.</p>
 Note	<p>Only for butterfly valves with electric actuator It must be ensured that the actuator is switched off in the end positions by the position switch signal. A torque switch signal must be used for an error message. The fault must be eliminated as quickly as possible, see section C3 <Troubleshooting>. For further information, see Electric Actuator Instructions.</p>

- To conclude installation, a functional check must be carried out: a butterfly valve with lever or handwheel must permit easy operation for the full swivel angle with the application of normal manual force.
An actuator mounted to the butterfly valve must move smoothly into the <OPEN> and <CLOSED> positions in accordance with the marked control data and control commands.
- Incorrectly executed control commands can mean danger and cause damage in the pipe system. Visible functional faults must be eliminated before commissioning. Also see section C3 <Troubleshooting>

B4 Pressure test before/during commissioning

All butterfly valves are subjected to a final inspection ex-works by the manufacturer in accordance with EN12266-1.

The test conditions for the pipe section apply for performing a pressure test on a valve in the system – but with the following limitations:

- The test pressure of a valve must not exceed **the value 1.5x PS** (according to the valve typeplate). **The valve disc must be in the open position.**
- If a **closed butterfly valve is subjected to more than 1.1x PS**, there is a risk that internal parts of the valve will be overloaded. This must be avoided in all events.



As soon as the line is under pressure, the tightness of the stuffing box must be checked:

In the event of leaks:

Immediately tighten nuts on stuffing box alternately in small steps, until the leak stops – do not tighten nuts more than necessary!

B5 Additional information: Disassembly of the valve

The same safety regulations must be observed as for the (pipe) system and installation (see section B1).

- Check that the line is released, depressurised and drained.
- Close valve completely, remove flange screws. Spread flange with a tool.
- Remove the valve (do not damage the flange sealing surfaces when removing the valve) and store, ensuring that it is well protected. Protect the sealing surfaces.
- For attaching retention straps, note section A4.
- Type HP120 for welding in: the weld seam should be broken with minimal heat input. Actuator and mounting parts must be protected against damage from flying sparks (use covers!).

C) Operating instructions

According to MD 2006/42/EC, the system planner must compile a comprehensive risk analysis. The manufacturer, EBRO ARMATUREN provides the following documents for this purpose:

- These mounting and operating instructions,
- The declaration pertaining to EC directives provided at the end.



This manual contains safety instructions for foreseeable risks when using the valve for industrial applications.

The planner/operator is responsible for supplementing the following instructions for other risks, especially system-related risks.

C1 Safety instructions for operation and maintenance



Danger

- The functioning of a valve must comply with the <Intended use>, which is described in section A2.
- The operational conditions must conform to the identification on the typeplate of the butterfly valve.
- Essential work on the valve may only be carried out by expert personnel. For the purposes of this manual, experts are persons who, on the basis of their training, technical expertise and professional experience, can correctly assess and execute the tasks assigned to them, and can identify and eliminate potential dangers.
- The butterfly valve stem is sealed by a stuffing box. Before the nuts on the stuffing box gland are loosened or unfastened, the pressure **on both sides** of the valve must be completely relieved, so that no medium escapes from the stuffing box.
- When the pipe section is pressurised for the first time, the tightness of the stuffing box must be checked:
In the event of leaks:
Immediately tighten nuts on the stuffing box alternately in small steps until the leak stops - do not tighten nuts more than necessary!
- Before loosening a lock screw or a screw on the housing cover, or before removing the complete valve from the pipe, the **pressure in the system or pipe section on both sides of the valve** must be completely relieved, to prevent uncontrolled escape of the medium from the pipe.



Risk of crushing

- The operation of an actuator which is mounted to a valve is only permitted if the valve is enclosed on both sides by a pipe or equipment section – any prior actuation entails a risk of crushing and is under the user's sole responsibility.

C2 Manual operation / Automatic operation


A butterfly valve with manual operation closes by turning the lever or handwheel clockwise and opens in the opposite direction.

A butterfly valve with an actuator must be operated with the control signals. Butterfly valves which have been supplied with an actuator ex works are precisely adjusted ex works - this adjustment in the gear/actuator should not be adjusted as long as the valve is functioning perfectly.

The only maintenance required is visual inspection of the tightness of the stuffing box at appropriate time intervals – in the event of leaks, see section C3 <Troubleshooting>.

Butterfly valves that remain permanently in one position should be operated at regular intervals, in order to ensure freedom of motion.

C3 Troubleshooting

Type of fault	Measure
Leak at flange connection to pipe	Seal flange connection between housing and pipe: Follow instructions in Pipe Operating Manual.
Leak at stuffing box	<p>Tighten both nuts on the stuffing box gland alternately and in small steps of ¼ revolution each <u>clockwise</u>.</p> <p><i>If the leak cannot be eliminated by these means:</i> Repair necessary: Request spare parts and necessary instructions from EBRO ARMATUREN.</p> <p><i>If nuts on stuffing box gland must be loosened or unscrewed (<u>counterclockwise</u>!)</i></p> <div style="text-align: center;">  <p><u>Mortal danger</u></p> </div> <p>To protect the operating personnel from danger, make sure that the line is depressurised on both sides of the valve beforehand. Note section C1 <Safety instructions>.</p>
Leak in seat seal	<p>Check that the valve is 100% closed with full operating torque.</p> <p><i>If the valve still leaks in closed position:</i> Open/close valve under pressure several times.</p> <p><i>If valve still leaks:</i> Repair necessary: replace seat seal. Note information in section C1 <Safety instructions> and request spare parts and necessary instructions from EBRO ARMATUREN.</p>
Malfunction	<p>Remove valve (follow instructions in section B5 and C1 <Safety instructions>) and inspect.</p> <p><i>If the valve is damaged:</i> Repair necessary: Request spare parts and necessary instructions from Eurovalve UK Limited.</p>

In the event of repair, please refer to our service department:

E-Mail: sales@eurovalve.co.uk

D) Technical Appendix / Planning Documents

Note:

This Appendix is not an integral part of the Mounting and Operating Instructions and is only an excerpt from the catalogue documents of EBRO ARMATUREN for this valve type – if you require the complete catalogue, please see addresses in the Table of Contents.

D1 Technical specification of the valve

Butterfly valves of type <HP> conform to the following design standards:

► **EN 593: Butterfly valves with housing made from metallic materials**

D2 p/t ratings

Note: The following data for the permissible operating pressure depending on the operating temperature (excerpt from EN12516-1:2005 – standard assignment) apply for the permissible limit of the pressure/temperature assignment p/t of the complete valve (as part of the pipe).

1.0619 = Group 3E0						1.4408 = Group 14E0					
Type HP DN50-150		Type HP DN200-600		Type HP-E		Type HP DN50-150		Type HP DN200-600		Type HP-E	
Temperature [°C]	B 40 [bar]	Temperature [°C]	B 25 [bar]	Temperature [°C]	B20 [bar]	Temperature [°C]	B 40 [bar]	Temperature [°C]	B 25 [bar]	Temperature [°C]	B20 [bar]
RT	39.0	RT	24.4	RT	19.5	RT	38.8	RT	24.3	RT	19.4
50	37.2	50	23.2	50	18.6	50	36.9	50	23.1	50	18.5
100	34.1	100	21.3	100	17.1	100	33.2	100	20.7	100	16.6
150	31.7	150	19.8	150	15.8	150	29.9	150	18.7	150	15.0
200	28.4	200	17.8	200	14.2	200	27.5	200	17.2	200	13.7
250	26.0	250	16.2	250	13.0	250	25.6	250	16.0	250	12.8
300	23.5	300	14.7	300	11.8	300	24.1	300	15.0	300	12.0
350	21.9	350	13.7	350	11.0	350	22.7	350	14.2	350	11.4
375	21.6	375	13.5	375	10.8	375	22.4	375	14.0	375	11.2
400	21.1	400	13.2	400	10.6	400	21.8	400	13.6	400	10.9

For the <Tight closing (in the seat)> function, the max. permissible operating temperature is generally "capped" by the choice of a seat seal – this upper limit is marked on the typeplate and can be found in the EBRO Armaturen catalogue documents (as p/t rating chart). It is an empirical value, which takes account of lifetime, wear, degree of tightness etc.

D3 Drawing / Parts list

The drawings and typical parts lists assigned to the valves can be downloaded from the Eurovalve UK website

www.eurovalve.co.uk

D4 Spare parts

In the parts lists described under section **D3**, the spare parts are identified with the note "**(empfohlenes Ersatzteil / recommended spare part)**". Only genuine EBRO parts may be fitted. Spare parts and necessary instructions can be requested from Eurovalve UK.

D5 Flange screws for types HP, HP-E and variants

The flange screws assigned to the valves can be found in the factory standard sheets EW 1810 and EW 1820 ff.

www.eurovalve.co.uk

The manufacturer

EBRO ARMATUREN

declares that the valves

EBRO butterfly valves with a concentric and eccentric design

Series Z, F, M, T, TW, BE and series HP

are manufactured in accordance with the requirements of the following standards:

EN 593 :2011

Product standard for metallic butterfly valves

EN 13774 : 2013

Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar [valid only if used in gas distribution systems of series Z and F]

EN 12100 :2010

Safety of machinery - Basic concepts, general principles for design

The following product documents are available:

Planning documents, technical data sheets, catalogue pages

These products conform to the following directives:

Pressure Equipment Directive 2014/68 EU [valid if PED 2014/68 EU Article 4 c) or Article 4 d) (3) apply]

The valves conform to this directive. The conformity assessment procedure applied in accordance with Annex III of the Pressure Equipment Directive 2014/68/EU is

-
-

For Category I Module A
For Categories II and III Module H

Name of the notified body: TÜV Süd Industrie Service GmbH

Identification no. 0036

Machinery Directive 2006/42 EG (MRL) [valid if the valves are not being operated by hand.]

1. The products are an "incomplete machine" in the sense of article 2 g) of this directive
2. The table overleaf lists whether and how the requirements of this directive are fulfilled
3. This declaration is the mounting declaration in the sense of this directive

For conformity with the above-named directives, the following apply:


1. The user must comply with the <correct use> as defined in the "Original mounting and operating instructions" (BA 1.0-DGRL/MRL or BA 3.0-DGRL/MRL) included in the delivery and must follow all notices in these instructions. Failure to comply with these instructions can – in serious cases – release the manufacturer from product liability.
2. Commissioning of the valve (and, where applicable, the mounted actuator) is not permitted until conformity of the system in which the valve is installed with all the above-mentioned EC directives is declared by the person responsible. A specific declaration is included in delivery for the above-named actuator.
3. The manufacturer, EBRO ARMATUREN, has carried out and documented the required risk analyses. The employee responsible for making this documentation available is Mr Bernhard Mitschke of EBRO ARMATUREN.

Hagen, Juli 2016

gez. Lydia Bröer

CEO

The manufacturer	EBRO ARMATUREN
declares that the valve "EBRO butterfly valves in centric and eccentric design" conform to the following requirements:	
Requirement according to Appendix I of the Machinery Directive 2006/42/EC	
1.1.1, g) Intended use	See Mounting and Operating Instructions
1.1.2.,c) Warnings against misuse	See Mounting and Operating Instructions
1.1.2.,c) Protective equipment required	Exactly as for pipe section in which the valve is installed
1.1.2.,e) Accessories	No special tool required for replacing wearing parts
1.1.3 Components in contact with media	All materials in contact with media are specified in the type data sheet and in the order confirmation. The performance to a corresponding risk analysis by the user is required.
1.1.5 Handling	Fulfilled by the notes in the Mounting and Operating Instructions
1.2 and 6.2.11 Control	Under the user's responsibility, in coordination with the actuator instructions
1.3.2 Prevention of risk of breakage	For pressurised parts of the valve: certified by certificate of conformity with DGRL 2014/68/EU For functional parts: ensured by intended use of the actuator
1.3.4 Sharp corners and edges	Requirement fulfilled
1.3.7/8 Risk of injury from moving parts	Requirement fulfilled with intended use Maintenance and repair only permitted when the valve/actuator is stationary
1.5.1 – 1.5.3 Energy supply	Under the user's responsibility, also see actuator instructions
1.5.5 Exceeding of permissible temperature	See warning in Mounting and Operating Instructions, section <Intended use>
1.5.7 -Explosion	⚠ protection necessary. Must be expressly agreed in the purchase contract. In this case: Use only as marked on the valve
1.5.13 Emission of hazardous substances	Not applicable
1.6.1 Maintenance	See Operating Instructions. Clarify stocking of wearing parts with EBRO ARMATUREN.
1.7.3 Identification	Valve: According to Mounting Instructions. Actuator: According to Mounting Instructions.
1.7.4 Operating instructions	Necessary additions for the complete instructions for the <complete machine> are outlined in the Operating Instructions document, see section C of the Mounting and Operating Instructions
Requirement according to Appendix III	The valve is not a <complete machine>: no EC marking for conformity with MD
Requirements according to Appendix IV and Appendix VIII-XI	Not applicable
Requirement according to EN 12100:2010	
1. Field of application	The risk analysis for valve/actuator is prepared from the viewpoint of the <incomplete machine>. Product standard EN593: <Butterfly valves with metallic housing> with an actuator as per EN15714-2 or EN15714-3, Class A was used as basis for the analysis. The basis is, furthermore, industrial application and on average >20 years of experience in the use of the above-specified valve types, resulting in the notes and warnings in the above mentioned Mounting and Operating Instructions. <i>Note:</i> <i>It must be assumed that the user will perform a risk analysis for the pipe section including the valves used in it, specifically tailored to the operating case, in accordance with sections 4 to 6 of EN 12100 – such an analysis is not possible for the manufacturer EBRO ARMATUREN for standard valves.</i>
3.20, 6.1 Inherently safe design	The butterfly valves are manufactured in accordance with the principle of <inherently safe design>. <Intended use> is assumed.
Analysis in accordance with sections 4, 5 and 6	Experiences of malfunctions and misuse documented by the manufacturer within the scope of cases of damage (documentation according to ISO9001) have been used as the basis.
5.3 Limits of the machine	The demarcation of the incomplete machine has been made on the basis of the <intended use> of both the valve and the actuator
5.4 Decommissioning, disposal	Not in the manufacturer's area of responsibility
6.2.2 Geometrical factors	As valve and actuator enclose the functional parts during intended use, this section is not applicable.
6.3 Technical protective equipment	Only necessary for special actuators - see order confirmation
6.4.5 Operating instructions	As valves with actuators operate "automatically" according to the commands of the control, the operating instructions describe those aspects that are <valve-typical> and must be made available to the manufacturer of the (pipe) system
7 Risk analysis	The risk analysis performed has been carried out in accordance with Appendix VII, B) by the manufacturer EBRO ARMATUREN and is documented in accordance with MD Appendix VII B).

Werksnorm EW: Works Standard EW:		1810		Blatt / sheet: 1 Seite/page: 1/2
		Max. Anzugsmomente in Nm für Flanschschrauben A -70 mit 450 N/mm², ab M24 / 7/8" mit 250 N/mm² ($\mu=0,12$)		
		max. torque for imperial fasteners material SS by 450 N/mm², above M24 / 7/8" by 250 N/mm² ($U=0,12$)		
Schraube / bolt	Schrauben mit Vollschaft	Bolt Size	Stud Bolts with UNC / 8UN thread	
(mm)	(z.B. DIN EN24014 "DIN931")	(Inch)	(Nm)	(ft lbf)
M10	31			
M12	53	1/2"	63	46
M16	127	5/8"	125	92
M20	247	3/4"	216	159
M24	237	7/8"	192	142
M27	346	1"	285	210
M30	473	1.1/8"	412	304
M33	635	1.1/4"	573	423
M36	818	1.3/8"	768	566

Schraube / bolt	Schrauben mit Dehnschaft / <i>reduced shaft</i> <i>Ts (operating temperature) > 300 °C</i>
(mm)	(z.B. DIN 2510)
M10	20
M12	36
M16	94
M20	180
M24	169
M27	246
M30	349
M33	465
M36	380

Das tatsächlich benötigte Anzugsdrehmoment kann, je nach Flanschdichtung, bei Verwendung eines anderen Schraubenwerkstoffes oder Schmiermittels, niedriger ausfallen !

The actually allowable locking torque can be less than the values shown in the table. This can depend on what gasket material, what bolt material or lubricant is used.

Hinweis: Bei Armaturen mit Flanschgewindebohrungen (z.B. "Lug"-Gehäuse) sollte die volle Gewindelänge ausgenutzt werden bzw. folgende min. Einschraublänge vorgesehen werden:


When use of tapped holes in the valve body is necessary (for example Lug-Type), the used thread reach should be at least:

Einschraublänge/thread reach $l_e = 1 \times d_{\text{Schraube/bolt}}$ (Stahl, Stahlguss, Sphäroguß/steel, steel casting, ductile iron)

Einschraublänge/thread reach $l_e = 1.25 \times d_{\text{Schraube/bolt}}$ (Gußeisen, Cu-Legierungen/iron casting, copper alloys)

Einschraublänge/thread reach $l_e = 2 \times d_{\text{Schraube/bolt}}$ (Al-Legierungen/aluminium alloys)

Rev. Revisionsgrund / reason of revision	Datum / date:	Bearbeiter/created by:	Geprüft/inspection date:	Prüfer/inspector
0-Erstellung / compilation	16.12.2008	Mitschke	16.12.2008	G. Kipp
1-Ergänzung / completion	29.01.2009	Mitschke	29.01.2009	G. Kipp

Werksnorm EW: Works Standard EW:		1810		Blatt / sheet: 2 Seite/page: 2/2
		Max. Anzugsmomente in Nm für Flanschschrauben A -70 mit 250 N/mm² (μ=0,12)		
		max. torque for imperial fasteners material SS by 250 N/mm² (U=0,12)		
Schraube / bolt	Schrauben mit Vollschaft	Bolt Size	Stud Bolts with UNC / 8UN thread	
(mm)	(z.B. DIN EN24014 "DIN931")	(Inch)	(Nm)	(ft lbf)
M39	1055	1.1/2"	1005	741
M42	1308	1.5/8"	1293	954
M45	1620	1.3/4"	1615	1191
M48	1970	1.7/8"	1998	1473
M52	2525	2"	2433	1794
M56	3150	2.1/4"	3500	2581
		2.1/2"	4813	3549

Schraube / bolt	Schrauben mit Dehnschaft / reduced shaft
(mm)	Ts (operating temperature) > 300 °C
	(z.B. DIN 2510)
M39	788
M42	963
M45	1225
M48	1475
M52	1888
M56	2350

Das tatsächlich benötigte Anzugsdrehmoment kann, je nach Flanschdichtung, bei Verwendung eines anderen Schraubenwerkstoffes oder Schmiermittels, niedriger ausfallen !

The actually allowable locking torque can be less than the values shown in the table. This can depend on what gasket material, what bolt material or lubricant is used.

Hinweis: Bei Armaturen mit Flanschgewindebohrungen (z.B. "Lug"-Gehäuse) sollte die volle Gewindelänge ausgenutzt werden bzw. folgende min. Einschraublänge vorgesehen werden:

When use of tapped holes in the valve body is necessary (for example Lug-Type), the used thread reach should be at least:

Einschraublänge/thread reach $l_e = 1 \times d_{\text{Schraube/bolt}}$ (Stahl, Stahlguss, Sphäroguß/steel, steel casting, ductile iron)

Einschraublänge/thread reach $l_e = 1.25 \times d_{\text{Schraube/bolt}}$ (Gußeisen, Cu-Legierungen/iron casting, copper alloys)

Einschraublänge/thread reach $l_e = 2 \times d_{\text{Schraube/bolt}}$ (Al-Legierungen/aluminium alloys)

Rev. Revisionsgrund / reason of revision	Datum / date:	Bearbeiter/created by:	Geprüft/inspection date:	Prüfer/inspector
0-Erstellung / compilation	16.12.2008	Mitschke	16.12.2008	G. Kipp
1-Ergänzung / completion	29.01.2009	Mitschke	29.01.2009	G. Kipp

HP114 Flansch-Schrauben / flange bolting

max. Anzugsmomente gem. EW 1810 beachten !
respect max. torque acc. EW 1810 !

Bei der Schraubenauswahl ist für den Gegenflansch die angegebene Flanschdicke und eine Flansch-Dichtungshöhe von 2 mm berücksichtigt, die tatsächliche vorhandene Flansch-, und Dichtungsdicke ist kundenseitig zu prüfen und die Schraubenlängen entsprechend anzupassen!

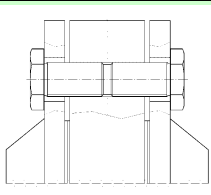
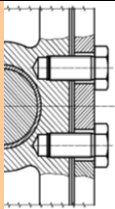
*selection of the bolts by allowance counter flange thickness as denoted and flange gasket thickness 2 mm,
the effectively existing flange-, and flange gasket thickness is to check by the customer and the bolt lenght proportionately customize*

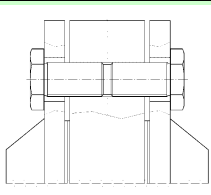
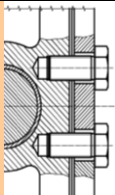
Längenmaße angegeben in mm

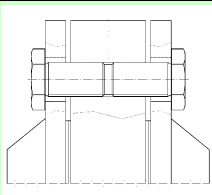
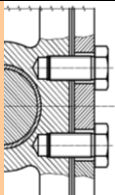
length dimensions specified in mm

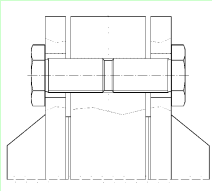
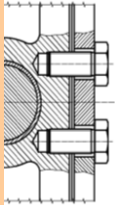
Zoll-Gewinde nach ASME B1.1-1989 UNC bis Gewinde 1"; Für Gewinde >1" gilt Steigung 8 UN / Inch thread acc. ASME B1.1-1989 UNC up to thread 1"; for thread >1" = 8 UN

DN	Size	Flanschanschluss / Flanged Connection	Einbaumaß Face - to - face	Verbindungsart Connection	Lochanzahl Number of Bolts	Gegen-Flanschdicke counter flange thickness	 Verbindungsart 4 / Connection 4 Schraube / screw	 Verbindungsart 5 / Connection 5 Schraube / screw
50	2"	PN 6	43	4	4	14	8 x M12 x 35	
50	2"	PN 10	43	4	4	18	8 x M16 x 40	
50	2"	PN 16	43	4	4	18	8 x M16 x 40	
50	2"	PN 25	43	4	4	20	8 x M16 x 40	
50	2"	PN 40	43	4	4	20	8 x M16 x 40	
50	2"	JIS 5K	43	4	4	14	8 x M12 x 35	
50	2"	JIS 10K	43	4	4	16	8 x M16 x 35	
50	2"	JIS 16K	43	4	8	16	16 x M16 x 35	
50	2"	ASME B16.5 cl. 150	43	4	4	19,1	8 x 5/8"- 11UNC x 40	
50	2"	ASME B16.5 cl. 300	43	4	8	22,4	16 x 5/8"- 11UNC x 45	
50	2"	AS 2129 - Table D	43	4	4	17	8 x M16 x 40	
50	2"	AS 2129 - Table E	43	4	4	19	8 x M16 x 40	
65	2 1/2"	PN 6	43	4	4	14	8 x M12 x 35	
65	2 1/2"	PN 10	43	4	4	18	8 x M16 x 40	
65	2 1/2"	PN 16	43	4	4	18	8 x M16 x 40	
65	2 1/2"	PN 25	43	4	8	22	16 x M16 x 45	
65	2 1/2"	PN 40	43	4	8	22	16 x M16 x 45	
65	2 1/2"	JIS 5K	43	4	4	14	8 x M12 x 35	
65	2 1/2"	JIS 10K	43	4	4	18	8 x M16 x 40	
65	2 1/2"	JIS 16K	43	4	8	18	16 x M16 x 40	
65	2 1/2"	ASME B16.5 cl. 150	43	4	4	22,4	8 x 5/8"- 11UNC x 45	
65	2 1/2"	ASME B16.5 cl. 300	43	4	8	25,4	16 x 3/4"- 10UNC x 45	
65	2 1/2"	AS 2129 - Table D	43	4	4	17	8 x M16 x 40	
65	2 1/2"	AS 2129 - Table E	43	4	4	19	8 x M16 x 40	
80	3"	PN 6	46	4	4	16	8 x M16 x 40	
80	3"	PN 10	46	4	8	20	16 x M16 x 40	
80	3"	PN 16	46	4	8	20	16 x M16 x 40	
80	3"	PN 25	46	4	8	24	16 x M16 x 45	
80	3"	PN 40	46	4	8	24	16 x M16 x 45	
80	3"	JIS 5K	46	4	4	14	8 x M16 x 35	
80	3"	JIS 10K	46	4	8	18	16 x M16 x 40	
80	3"	JIS 16K	46	4	8	20	16 x M20 x 40	
80	3"	ASME B16.5 cl. 150	46	4	4	23,9	8 x 5/8"- 11UNC x 45	
80	3"	ASME B16.5 cl. 300	46	4	8	28,4	16 x 3/4"- 10UNC x 50	
80	3"	AS 2129 - Table D	46	4	4	19	8 x M16 x 40	
80	3"	AS 2129 - Table E	46	4	4	19	8 x M16 x 40	

DN	Size	Flanschanschluss / Flanged Connection	Einbaumaß Face - to - face	Verbindungsart Connection	Lochanzahl Number of Bolts	Gegen-Flanschkicke counter flange thickness	 Verbindungsart 4 / Connection 4 Schraube / screw	 Verbindungsart 5 / Connection 5 Schraube / screw
100	4"	PN 6	52	4	4	16	8 x M16 x 40	
100	4"	PN 10	52	4	8	20	16 x M16 x 45	
100	4"	PN 16	52	4	8	20	16 x M16 x 45	
100	4"	PN 25	52	4	8	24	16 x M20 x 50	
100	4"	PN 40	52	4	8	24	16 x M20 x 50	
100	4"	JIS 5K	52	4	8	16	16 x M16 x 40	
100	4"	JIS 10K	52	4	8	18	16 x M16 x 45	
100	4"	JIS 16K	52	4	8	22	16 x M20 x 45	
100	4"	ASME B16.5 cl. 150	52	4	8	23,9	16 x 5/8"- 11UNC x 50	
100	4"	ASME B16.5 cl. 300	52	4	8	31,8	16 x 3/4"- 10UNC x 55	
100	4"	AWWA C 207 cl. B + D	52	4	8	12,7	16 x 5/8"- 11UNC x 40	
100	4"	AWWA C 207 cl. E	52	4	8	23,8	16 x 5/8"- 11UNC x 50	
100	4"	AS 2129 - Table D	52	4	4	19	8 x M16 x 45	
100	4"	AS 2129 - Table E	52	4	8	22	16 x M16 x 45	
125	5"	PN 6	56	4	8	18	16 x M16 x 45	
125	5"	PN 10	56	4	8	22	16 x M16 x 50	
125	5"	PN 16	56	4	8	22	16 x M16 x 50	
125	5"	PN 25	56	4	8	26	16 x M24 x 55	
125	5"	PN 40	56	4	8	26	16 x M24 x 55	
125	5"	JIS 5K	56	4	8	16	16 x M16 x 45	
125	5"	JIS 10K	56	4	8	20	16 x M20 x 45	
125	5"	JIS 16K	56	4	8	22	16 x M22 x 50	
125	5"	ASME B16.5 cl. 150	56	4	8	23,9	16 x 3/4"- 10UNC x 50	
125	5"	ASME B16.5 cl. 300	56	4	8	35,1	16 x 3/4"- 10UNC x 60	
125	5"	AWWA C 207 cl. B + D	56	4	8	14,3	16 x 3/4"- 10UNC x 40	
125	5"	AWWA C 207 cl. E	56	4	8	23,8	16 x 3/4"- 10UNC x 50	
125	5"	AS 2129 - Table D	56	4	8	21	16 x M16 x 50	
125	5"	AS 2129 - Table E	56	4	8	22	16 x M16 x 50	
150	6"	PN 6	56	4	8	18	16 x M16 x 45	
150	6"	PN 10	56	4	8	22	16 x M20 x 50	
150	6"	PN 16	56	4	8	22	16 x M20 x 50	
150	6"	PN 25	56	4	8	28	16 x M24 x 55	
150	6"	PN 40	56	4	8	28	16 x M24 x 55	
150	6"	JIS 5K	56	4	8	18	16 x M16 x 45	
150	6"	JIS 10K	56	4	8	22	16 x M20 x 50	
150	6"	JIS 16K	56	4	12	24	24 x M22 x 50	
150	6"	ASME B16.5 cl. 150	56	4	8	25,4	16 x 3/4"- 10UNC x 50	
150	6"	ASME B16.5 cl. 300	56	4	12	36,6	24 x 3/4"- 10UNC x 65	
150	6"	AWWA C 207 cl. B + D	56	4	8	14,3	16 x 3/4"- 10UNC x 40	
150	6"	AWWA C 207 cl. E	56	4	8	25,4	16 x 3/4"- 10UNC x 50	
150	6"	AS 2129 - Table D	56	4	8	21	16 x M16 x 50	
150	6"	AS 2129 - Table E	56	4	8	22	16 x M20 x 50	

DN	Size	Flanschanschluss / Flanged Connection	Einbaumaß Face - to - face	Verbindungsart Connection	Lochanzahl Number of Bolts	Gegen-Flanschdicke counter flange thickness	 Verbindungsart 4 / Connection 4 Schraube / screw	 Verbindungsart 5 / Connection 5 Schraube / screw
200	8"	PN 6	60	4	8	20	16 x M16 x 50	
200	8"	PN 10	60	4	8	24	16 x M20 x 55	
200	8"	PN 16	60	4	12	24	24 x M20 x 55	
200	8"	PN 25	60	4	12	30	24 x M24 x 60	
200	8"	PN 40	60	4	12	34	24 x M27 x 65	
200	8"	JIS 5K	60	4	8	20	16 x M20 x 50	
200	8"	JIS 10K	60	4	12	22	24 x M20 x 50	
200	8"	JIS 16K	60	4	12	26	24 x M22 x 55	
200	8"	ASME B16.5 cl. 150	60	4	8	28,4	16 x 3/4"- 10UNC x 55	
200	8"	ASME B16.5 cl. 300	60	4	12	41,1	24 x 7/8"- 9UNC x 70	
200	8"	AWWA C 207 cl. B + D	60	4	8	14,3	16 x 3/4"- 10UNC x 45	
200	8"	AWWA C 207 cl. E	60	4	8	28,6	16 x 3/4"- 10UNC x 60	
200	8"	AS 2129 - Table D	60	4	8	22	16 x M16 x 50	
200	8"	AS 2129 - Table E	60	4	8	25	16 x M20 x 55	
250	10"	PN 6	68	4	12	22	24 x M16 x 55	
250	10"	PN 10	68	4	12	26	24 x M20 x 60	
250	10"	PN 16	68	4	12	26	24 x M24 x 60	
250	10"	PN 25	68	4	12	32	24 x M27 x 65	
250	10"	PN 40	68	4	12	38	24 x M30 x 70	
250	10"	JIS 5K	68	4	12	22	24 x M20 x 55	
250	10"	JIS 10K	68	4	12	24	24 x M22 x 55	
250	10"	JIS 16K	68	4	12	28	24 x M24 x 60	
250	10"	ASME B16.5 cl. 150	68	4	12	30,2	24 x 7/8"- 9UNC x 65	
250	10"	ASME B16.5 cl. 300	68	4	16	47,8	32 x 1"- 8UNC x 80	
250	10"	AWWA C 207 cl. B + D	68	4	12	17,0	24 x 7/8"- 9UNC x 50	
250	10"	AWWA C 207 cl. E	68	4	12	30,2	24 x 7/8"- 9UNC x 65	
250	10"	AS 2129 - Table C	68	4	8	25	16 x M20 x 60	
250	10"	AS 2129 - Table D	68	4	8	25	16 x M20 x 60	
250	10"	AS 2129 - Table E	68	4	12	25	24 x M20 x 60	
300	12"	PN 6	78	4	12	22	24 x M20 x 60	
300	12"	PN 10	78	4	12	26	24 x M20 x 65	
300	12"	PN 16	78	4	12	28	24 x M24 x 65	
300	12"	PN 25	78	4	16	34	32 x M27 x 70	
300	12"	PN 40	78	4	16	42	32 x M30 x 80	
300	12"	JIS 5K	78	4	12	22	24 x M20 x 60	
300	12"	JIS 10K	78	4	16	24	32 x M22 x 60	
300	12"	JIS 16K	78	4	16	30	32 x M24 x 65	
300	12"	ASME B16.5 cl. 150	78	4	12	31,8	24 x 7/8"- 9UNC x 70	
300	12"	ASME B16.5 cl. 300	78	4	16	50,8	32 x 1 1/8"- 8UN x 90	
300	12"	AWWA C 207 cl. B + D	78	4	12	17,5	24 x 7/8"- 9UNC x 55	
300	12"	AWWA C 207 cl. E	78	4	12	31,8	24 x 7/8"- 9UNC x 70	
300	12"	AS 4087 class 16	78	4	12	29	24 x M20 x 65	
300	12"	AS 2129 - Table D	78	4	12	25	24 x M20 x 65	
300	12"	AS 2129 - Table E	78	4	12	29	24 x M24 x 65	

DN	Size	Flanschanschluss / Flanged Connection	Einbaumaß Face - to - face	Verbindungsart Connection	Lochanzahl Number of Bolts	Gegen-Flanschdicke counter flange thickness	 Verbindungsart 4 / Connection 4 Schraube / screw	 Verbindungsart 5 / Connection 5 Schraube / screw
350	14"	PN 6	92	4	12	22	24 x M20 x 65	
350	14"	PN 10	92	4	16	26	32 x M20 x 70	
350	14"	PN 16	92	4	16	30	32 x M24 x 75	
350	14"	PN 25	92	4	16	38	32 x M30 x 85	
350	14"	PN 40	92	4	16	46	32 x M33 x 90	
350	14"	JIS 5K	92	4	12	24	24 x M22 x 70	
350	14"	JIS 10K	92	4	16	26	32 x M22 x 70	
350	14"	JIS 16K	92	4	16	34	32 x M30 x 80	
350	14"	ASME B16.5 cl. 150	92	4	12	35,1	24 x 1"- 8UNC x 80	
350	14"	AWWA C 207 cl. B + D	92	4	12	19,1	24 x 1"- 8UNC x 65	
350	14"	AWWA C 207 cl. E	92	4	12	34,9	24 x 1"- 8UNC x 80	
350	14"	AS 2129 - Table D	92	4	12	29	24 x M24 x 75	
350	14"	AS 2129 - Table E	92	4	12	32	24 x M24 x 75	
400	16"	PN 6	102	4	16	22	32 x M20 x 70	
400	16"	PN 10	102	4	16	26	32 x M24 x 75	
400	16"	PN 16	102	4	16	32	32 x M27 x 80	
400	16"	PN 25	102	4	16	40	32 x M33 x 90	
400	16"	PN 40	102	4	16	50	32 x M36 x 100	
400	16"	JIS 5K	102	4	16	24	32 x M22 x 75	
400	16"	JIS 10K	102	4	16	28	32 x M24 x 80	
400	16"	JIS 16K	102	4	16	38	32 x M30 x 90	
400	16"	ASME B16.5 cl. 150	102	4	16	36,6	32 x 1"- 8UNC x 85	
400	16"	AWWA C 207 cl. B + D	102	4	16	19,1	32 x 1"- 8UNC x 70	
400	16"	AWWA C 207 cl. E	102	4	16	36,5	32 x 1"- 8UNC x 85	
400	16"	AS 2129 - Table D	102	4	12	29	24 x M24 x 80	
400	16"	AS 2129 - Table E	102	4	12	32	24 x M24 x 80	
450	18"	PN 6	114	4 + 5	16	22	24 x M20 x 80	8 x M20 x 60
450	18"	PN 10	114	4 + 5	20	28	32 x M24 x 85	8 x M24 x 65
450	18"	PN 16	114	4 + 5	20	40	32 x M27 x 95	8 x M27 x 75
450	18"	PN 25	114	4 + 5	20	52	32 x M33 x 110	8 x M33 x 90
450	18"	JIS 5K	114	4 + 5	16	24	24 x M22 x 80	8 x M22 x 60
450	18"	JIS 10K	114	4 + 5	20	30	32 x M24 x 85	8 x M24 x 65
450	18"	JIS 16K	114	4 + 5	20	40	32 x M30 x 95	8 x M30 x 75
450	18"	ASME B16.5 cl. 150	114	4 + 5	16	39,6	24 x 1 1/8"- 8UN x 95	8 x 1 1/8"- 8UN x 75
450	18"	AWWA C 207 cl. B + D	114	4 + 5	16	19,1	24 x 1 1/8"- 8UN x 75	8 x 1 1/8"- 8UN x 55
450	18"	AWWA C 207 cl. E	114	4 + 5	16	39,7	24 x 1 1/8"- 8UN x 95	8 x 1 1/8"- 8UN x 75
450	18"	AS 2129 - Table D	114	4 + 5	12	32	16 x M24 x 90	8 x M24 x 70
450	18"	AS 2129 - Table E	114	4 + 5	16	35	24 x M24 x 90	8 x M24 x 70
500	20"	PN 6	127	4 + 5	20	24	32 x M20 x 85	8 x M20 x 65
500	20"	PN 10	127	4 + 5	20	28	32 x M24 x 90	8 x M24 x 70
500	20"	PN 16	127	4 + 5	20	44	32 x M30 x 100	8 x M30 x 85
500	20"	PN 25	127	4 + 5	20	48	32 x M33 x 110	8 x M33 x 90
500	20"	PN 40	127	4 + 5	20	57	32 x M39 x 120	8 x M39 x 100
500	20"	JIS 5K	127	4 + 5	20	24	32 x M22 x 85	8 x M22 x 65
500	20"	JIS 10K	127	4 + 5	20	30	32 x M24 x 90	8 x M24 x 70
500	20"	JIS 16K	127	4 + 5	20	42	32 x M30 x 100	8 x M30 x 85
500	20"	ASME B16.5 cl. 150	127	4 + 5	20	42,9	32 x 1 1/8"- 8UN x 100	8 x 1 1/8"- 8UN x 85
500	20"	AWWA C 207 cl. B + D	127	4 + 5	20	19,1	32 x 1 1/8"- 8UN x 80	8 x 1 1/8"- 8UN x 60
500	20"	AWWA C 207 cl. E	127	4 + 5	20	42,9	32 x 1 1/8"- 8UN x 100	8 x 1 1/8"- 8UN x 85
500	20"	AS 2129 - Table D	127	4 + 5	16	32	24 x M24 x 95	8 x M24 x 70
500	20"	AS 2129 - Table E	127	4 + 5	16	38	24 x M24 x 100	8 x M24 x 80

DN	Size	Flanschanschluss / Flanged Connection	Einbaumaß Face - to - face	Verbindungsart Connection	Lochanzahl Number of Bolts	Gegen-Flanschdicke counter flange thickness	 Verbindungsart 4 / Connection 4 Schraube / screw	 Verbindungsart 5 / Connection 5 Schraube / screw
550	22"	JIS 5K	154	4 + 5	20	32	32 x M24 x 110	8 x M24 x 85
550	22"	JIS 10K	154	4 + 5	20	42,0	32 x M30 x 120	8 x M30 x 95
550	22"	ASME B16.5 cl. 150	154	4 + 5	20	45,0	32 x 1 1/4"- 8UN x 120	8 x 1 1/4"- 8UN x 95
550	22"	AS 2129 - Table D	154	4 + 5	16	35,0	24 x M27 x 110	8 x M27 x 85
550	22"	AS 2129 - Table E	154	4 + 5	16	38	24 x M27 x 110	8 x M27 x 90
550	22"	AWWA C 207 cl. B + D	154	4 + 5	20	25,4	32 x 1 1/4"- 8UN x 100	8 x 1 1/4"- 8UN x 75
550	22"	AWWA C 207 cl. E	154	4 + 5	20	46,0	32 x 1 1/4"- 8UN x 120	8 x 1 1/4"- 8UN x 95
600	24"	PN 6	154	4 + 5	20	30	32 x M24 x 100	8 x M24 x 80
600	24"	PN 10	154	4 + 5	20	28	32 x M27 x 100	8 x M27 x 80
600	24"	PN 16	154	4 + 5	20	54	32 x M33 x 130	8 x M33 x 100
600	24"	PN 25	154	4 + 5	20	58	32 x M36 x 130	8 x M36 x 100
600	24"	JIS 5K	154	4 + 5	20	26	32 x M24 x 100	8 x M24 x 75
600	24"	JIS 10K	154	4 + 5	24	32	40 x M30 x 110	8 x M30 x 75
600	24"	JIS 16K	154	4 + 5	24	46	40 x M36 x 120	8 x M36 x 85
600	24"	ASME B16.5 cl. 150	154	4 + 5	20	47,8	32 x 1 1/4"- 8UN x 120	8 x 1 1/4"- 8UN x 100
600	24"	AWWA C 207 cl. B + D	154	4 + 5	20	25,4	32 x 1 1/4"- 8UN x 100	8 x 1 1/4"- 8UN x 75
600	24"	AWWA C 207 cl. E	154	4 + 5	20	47,8	32 x 1 1/4"- 8UN x 120	8 x 1 1/4"- 8UN x 100
600	24"	AS 2129 - Table C	154	4 + 5	16	41	24 x M27 x 110	8 x M27 x 90
600	24"	AS 2129 - Table D	154	4 + 5	16	35	24 x M27 x 110	8 x M27 x 85
600	24"	AS 2129 - Table E	154	4 + 5	16	41	24 x M30 x 110	8 x M30 x 90

BA 1.0 / 3.0 - DGRL/MRL

Risks checklist

C4.1 Checklist for risk of pressure

- Compliance with the <Intended use> - see section A2 - is a prerequisite for the prevention of risks when using the valve.
- The valve meets the requirements of the design standards <Butterfly valves with metal housing>, EN 593, which is harmonized with the PED 97/38/EC.



Danger!

The conformity of the butterfly valve with the PED 97/38/EC applies only to the "pressure-retaining envelope" (= housing) of the valve.
The use of a butterfly valve as end valve with only inflow-side mounting on a pressurized line is a risk that must be avoided by means of a blank flange on the outflow side or a comparable safeguard.
Locking of the drive unit alone only partially reduces the risk and is not sufficient.

- The identification of the valve is located on the name plate: A labelling sample is shown in section A3.
- The <p/t-Rating> according to the <Intended use> in section A2 and D2 is to be observed by the user. The upper pressure PS and temperature TS limits are also entered in the name plate of the valve. Therefore the nameplate on the valve must be permanently available during operation.
- For pressure test on pipe sections:
 - ▶ the test pressure can exceed the value PS acc. to the name plate, only with open valve disc, the max. admissible limit is 1.5 x PS,
 - ▶ and with closed valve disc the max. admissible limit is 1.1x PS



Higher test pressures can lead to permanent deformation or breakage of parts of the valve and make it inoperable.

- The risk of any kind of pressure surges must be covered by the user through appropriate selection of the design pressure PS.

only series HP, not relevant for centred, soft-seated valves

- The gland of the valve shaft () is the only part of the valve, which has to be maintained:*
 - ▶ during initial operation,
 - ▶ and then periodically at appropriate intervals

If leakage is detected, alternately pull tight the two nuts at the gland lid, ¼ of a turn at a time until the leakage stops - overtightening can interfere on the functioning of the valve.

In this periodic monitoring the tightness of bolted connections to the valve should be subject of a visual inspection.
- Repairs on the valve can be performed only
 - ▶ with depressurised and emptied pipe section,
 - ▶ with switched off power supply to the drive (if available),
 - ▶ and should be preferably carried out on a removed valve
 - ▶ if necessary, the valve must be cleaned and decontaminated beforehand.

C4.2 Risks checklist for operation

- The butterfly valve with hand lever must be quickly operable by hand forces according to EN12570 (formerly DIN 3230): A butterfly valve seals at the end stop of the closed position.
The use of higher forces in the closed position and/or the use of lever extension do not achieve better sealing. On the contrary, with locked valve disc damage to the internal parts can be caused.
- The end positions of the valve are adjusted at the factory for the positions OPEN and CLOSED - these settings should not be changed, if the valve is working properly.
- Risk of crushing: The actuation of the butterfly valve, which is not enclosed on both sides by a pipe or equipment section is prohibited. See warning in section C1.
- If a drive unit must be retrofitted, torque, direction of rotation, angle of activation and the setting of the end stops "OPEN" and "CLOSE" of the butterfly valve must be adapted.
In particular, retrofitted connecting parts (panel and adapter) with the drive shaft of the butterfly valve must be exactly aligned and a plane parallel mounting of the drive train to the butterfly valve must be ensured.

C4.3 Checklist for the risk of operating medium

- The choice of wetted materials must be coordinated in advance of the order between the buyer and EBRO-Armaturen.
- These materials used
 - ▶ are available for the user as type-related EBRO-planning documents (e.g. catalogue documents),
 - ▶ are stated in the EBRO order confirmation,
 - ▶ and the most important of these are listed on the name plate (see above) of the valve.
- The design of the <pressure piling case> (= housing, cover) contains in ferritic materials in accordance with the design standards of the valve a corrosion allowance of at least 1 mm, no surcharge on austenitic materials.
- Solids in the medium (even low percentage):
Can cause damage to the functional surfaces on the seat, bearing bushings and valve shaft:
Prefix sieves or filters the valve.
- Media that cause deposition on metallic surfaces may cause a malfunction at the seat and in the bearings of the valve - if necessary, the butterfly valve must be removed for cleaning.
In any case, the valve must be operated periodically and at appropriate time intervals.

C4.4 Checklist for risks arising from moving parts

- In general, all moving parts of the valve are covered
 - ▶ either by their housing,
 - ▶ or by the subsequent pipe
(even in manual mode),



Warning!

The valve may only be operated when installed between pipe sections on both sides in order to avert the danger of getting jammed between the butterfly disc and the housing.

C4.5 Flow rate risks checklist

- *The valve is designed for the usual speeds with water up to max. 4-5 m / s and with comparable dynamic pressure at the gaseous media.*



Higher speeds can produce vibrations of the functional parts and noise > 85dB and must be avoided - except for opening and closing operations at (for a short time) high differential pressure.

- *Filling and emptying of pipe sections:*
These functions must be carried out with a depressurized pipeline.



Caution

Already when emptying processed liquids or gases with pressures well below 1 bar (g) into the open, this occurs at high speeds, this risk may cause serious injuries to persons and serious damage to property.

- Choke/regular operation in intermediate position with opening α angle of the butterfly disc near the closed position (Range of 0 °C < α < 20 °C) is not approved for continuous operation, due to very high local velocities and erosion of the subsequent line in this area.
(Use of special valves).

C4.6 Information on risk from leaking seat of the valve

- The valve has been adjusted at the factory for the tight closing position, tested and delivered with the lowest possible <Leakage rate A, for liquids> according to EN 12266-1.



This adjustment is made at the end stop of the gear in CLOSED position.
The settings should not be changed as long as the valve is leak proofed.


- If a too high leakage rate is observed in the seat, then this needs to be fixed in the short term, to avoid <erosion> in the seating area of the valve (and if necessary also in the pipe cross section behind).
For measures see section above C3 <Troubleshooting>

C4.7 Information regarding the risks of operation

- Valves with actuator: The operating power must remain within the limits, which are marked in in name plate of the drive. Additional information: see instructions of the drive manufacturer.
- Valves with hand wheel/lever: In order not to overload the internal functional parts, only the hand forces specified in the EN 12570 are permitted: Extract from EN 12570:


Ø Hand wheel [mm]	100	125	160	200	250	315	400	500	630	720	800	1000
Length hand lever												
allowable hand force [N]	500	600	600	700	800	800	1000	1000	1000	1000	1000	1000

- The drive is flanged to the interface on the butterfly valve according to ISO 5211. It must be ensured at appropriate intervals that the screw connection is tightened so that there is no "slip" between valve and drive. This verification must be carried out especially for drives which operate the valve very often.
- Drives > 40 kg, which are installed on the valve side, must be supported by appropriate fasteners to keep away bending loads from the valve body.

	In order to close tightly a butterfly valve with electric drive, it must be controlled <u>path</u> -dependent. A signal of the torque switch indicates an excessive overload of the drive, e.g. due to an object that got stuck. Details are given in the drive manufacturer's instructions.
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C4.8 Information on other risks

- Mechanical loads:**
 - Valves are not "step ladders": External loads must be kept away from valve, actuator and accessories.
 - Additional pipeline loads amounting to $F = (\text{pipe cross-section} \times \text{design pressure of the system})$ are covered in any case by the stability of the housing. Significantly higher pipe loads must be in agreement with EBRO-Armaturen.
 - The valve is designed for a static load of the pipe line with pressure. Risks of stresses from earthquakes or vibrations from the pipe system are not covered.
- Surface temperatures > 40 °C and low temperatures:**
Where required, necessary insulation to protect the personnel is not in the responsibility and not supplied by the manufacturer EBRO-Armaturen.
- Corrosion protection of external surfaces:**
Unless agreed otherwise in writing, the valve is supplied from the factory with a primer coat and has to be protected in the same way as the pipe system.
- Abrasion - especially hard and sharp - solids in the medium:**
The functional surfaces on the seat, bearing bushes and shaft valves are damaged by such solids within a short time - especially at higher flow rates.
For what purposes use only special valves (for example, internal soft rubber).
- It is assumed that no decomposition of unstable fluids and no cavitation occur in the pipe section, not even in choke/continuous operation mode (see also limits in section C4.5).
- The valve does not emit hazardous substances within the meaning of Annex I, 1.5.14 of the MRL.
- The clear width of the counter flanges must leave sufficient space for the opened valve disc, so that they are not damaged when they move up and thus become unusable. The minimum diameter of the counter flanges or customer-side pipeline has to be determined and considered based on the dimension "Z" of the corresponding dimensioned drawing/data sheet.
- Each valve is marked with a note that refers to the mandatory required help of the operating instructions in printed form. It is not responsibility of the manufacturer EBRO-Armaturen to forward and put the assembly and operating instructions (and possibly required further copying) at the disposal of the operating staff.

	It is assumed that the assembly and operating instructions is available in the understandable language version for each operator for any handling of the valve, the actuator or the attachment parts.
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