0 Introduction

These instructions are intended to assist users of BRAY PTFE-lined butterfly valves, Series 22/23 in fitting, operating and servicing valves.

Caution	Risks may arise and the manufacturer's warranty may become ineffective **should the following cautions and warnings not be respected.** The manufacturer is available for any queries; see Section 8 for addresses.

Note:
BRAY butterfly valves are also supplied with special linings (e.g. with a wear-resistant UHMPE lining). This directive shall not affect variants of the product.

1 Intended use

Once fitted between the flanges of a piping system, hand-operated, **PTFE-lined BRAY butterfly valves, Series 22/23** are solely intended for the purposes of shutting off fluids within the safe pressure and temperature limits, allowing and regulating flow. These butterfly valves are not recommended for fluids with more than a minor concentration of abrasive solids

These valves must be fitted between flanges in accordance with EN 1092-1 or EN 1759-1 and with seal faces in accordance with Form 1 or Form 2, which must be processed in a co-planar manner and aligned. Only with the authorisation of **BRAY ARMATUREN & ANTRIEBE** may other flanges and/or other seal face forms be used.

Danger to life	Valves with safe pressure/temperature ranges (ratings) which do not satisfy the operating purpose must not be used. The permissible range is stated in the **BRAY planning document B1008** – see Section 8 “Information”. It is absolutely vital that the manufacturer authorises pressures and temperatures which are not specified in the above planning document. **Ignoring this directive may put lives at risk and may also cause damage to the piping system.**
Caution	Under no circumstances is cavitation to be tolerated should a valve in continuous operations be used for control purposes.

2 Safety instructions

2.1 General safety instructions

The safety regulations for valves are the same as those for the piping system in which they are fitted. This instruction only contains those safety references which are also to be noted for valves.

2.2 Safety instructions for the operator

It is not the responsibility of the manufacturer and therefore, when using the valve, it is to be ensured that

⇒ the valve is only used in accordance with the purpose as described in Section 1.

Danger to life	It must be ensured that the materials selected for the valve parts in contact with the fluids are suitable for use with those fluids. The manufacturer accepts no liability for damage arising from the action of corroding fluids. **Ignoring this directive may put lives at risk and may also cause damage to the piping system.**

⇒ any gear operator subsequently installed on the valve is properly adapted to that valve and correctly adjusted in both limit positions of the valve - particularly in the closing position

⇒ the piping system has been professionally assembled and is regularly checked. The wall thickness of the valve body is to be dimensioned to the extent that the usual piping forces and torques in these kinds of professionally assembled pipes are allowed for

⇒ the valve is professionally assembled to the piping system

⇒ in this piping system the usual flow rates (e.g. 5m/s for liquids and 70 m/s for gases at approx. 1 bar) are not exceeded in continuous operations and that abnormal operating conditions such as oscillations, water shocks, cavitation and large concentrations of solids in the fluid -particularly abrasive ones – are clarified with the manufacturer

⇒ valves operating at temperatures of >50°C or <–10°C, together with the piping connections, are protected against contact

⇒ Where piping is subject to pressure, only qualified staff should operate and service the valve.

2.3 Specific types of risks

Danger to life	Before removing the valve from the pipe, the pressure in the pipe on both sides of the valve must be lowered to stop the fluid leaking uncontrollably. The bolting of both the body halves may only be slackened once the valve has been removed from the pipe.
Danger	*For valves to be used as end valves:* Under normal operations and particularly for gaseous, hot and/or hazardous fluids, **a blank flange** must be mounted **at the exposed connection end**. Otherwise the valve must be securely locked in the "CLOSED" position – in this case, the safe operating pressure (see nameplate) must be **reduced to 50%** for safety reasons.
Danger	A valve acting as an end of line valve and subject to pressure must always be opened with extreme care to prevent the **spraying fluid** from causing damage. Care is needed when closing an end of line valve: Please note that there is a risk of crushing between the valve disc and body!
Danger	Removing a valve from a pipe may involve fluid seeping from the pipe or valve. Any pipe transporting hazardous fluids or those injurious to health must be completely drained before the valve is removed. Caution is required in case of **residues which continue to flow from pockets**.

2.4 Designation of the butterfly valve

The following data is marked on the body or nameplate of every butterfly valve:

I.D.Tag	Designation	Comment
Manufacturer	**Bray**	For address see Section 8 “Information”
Series	**e.g.: 22**	See BRAY ident. sheets 22/23
Material	**e.g.: GGG 40**	Designation for the body material
DN	**DN (and numerical value)**	Numerical value in mm, e.g. DN200 or inches, e.g. 8“
PN	**PN** (and numerical value)	Numerical value in bar: dimensional standard for flange connection
Works No.:	**e.g. 113009**	
Year of manufacture:	**e.g. S2234**	The year of manufacture is encoded in the batch No.: The first digit is the end number of the year of manufacture S**2**234 **= 2002**
T max.	Numerical value in °C	= upper limit of the application
Conformity	**CE**	The manufacturer is to separately endorse conformity
Code	**0038**	"Quoted site" acc. to EU directive = Lloyds Register

Designations on body and nameplate must not be removed so that the valve can be identified at all times.

3 Transport and storage

Valves must be handled, transported and stored with all due care:

⇒ The valve must be transported and stored in its protective packing up to fitting.

⇒ All lifting accessories (ropes, belts) must be slung on the body of the butterfly valve – not on the gear operator.

Caution	*To protect the PTFE lining of the valve:* Only secure ropes or belts between the neck of the valve and hand lever/gear operator!

⇒ Before fitting, the valve must be stored indoors and protected from damaging effects such as dirt or moisture.

⇒ On no account must the PTFE lining of the flange seal to be damaged during transport or in storage. **Do not stack** the valves!

⇒ Valves with PTFE linings are delivered with the disc in the slightly opened position and must be stored as such. On no account is the valve to be operated.

Danger	*Valves delivered without hand lever or gear operator:* The valve disc is not secured against adjustment. Care must be taken to ensure that outside influences (e.g. jolting) do not cause it to open from the closed position.

4 Fitting in the pipe

4.1. General

The instructions for connecting pipes and similar pipe elements also apply to fitting valves in a pipe. The following instructions also apply to valves. Section 3 (above) is to be noted when transporting to the place of installation.

Caution	*The valve is lined with PTFE:* The valve must be handled with extreme care and the instructions for the flange connection must be observed.
Note	*The seal faces on the body of the butterfly valve are lined with PTFE.* Additional flange seals are generally not required. Those which are used must be encased and preferably have a PTFE coating. The mating flange must always have a smooth seal face in accordance with Form 1 or Form2 in accordance with Standard EN 1092 or Stock Finish in accordance with ANSI B 16.5. Other flange forms can be used but only with the agreement of the manufacturer.
Danger	*A gear operator is set for the operating data stated in the order.* The position of the "OPEN" and "CLOSED" end stops must not be changed without the manufacturer's consent.
Danger to life	Do not pressurise the line without a free-operating shaft being fitted to the valve. Retrofitting a gear operator calls for rated torque and the position of the "OPEN" and "CLOSED " final stops to be adjusted to the valve. **Ignoring this directive may put lives at risk and also cause damage in the piping system.**

4.2 Preparation for fitting

⇒ Ensure that only butterfly valves where the pressure class, coupling type and dimensions correspond to operative conditions are fitted. See valve designation.

Danger to life	Valves with safe pressure/temperature ranges (ratings) which do not satisfy the operating purpose MUST not be used. The PS and T_{max} deployment limits are specified on the nameplate of the butterfly valve. The permissible range is also described in the **BRAY planning document B-1023** – see Section 8 ”Information”. **Ignoring this directive could put lives at risk and also cause damage in the piping system.** If still in doubt, contact the manufacturer **BRAY ARMATUREN & ANTRIEBE.**
Caution	*Since valves with PTFE lining have to be particularly well protected before/during fitting:* The valve must be transported in its protective packing up to the place of installation and only there is it to be unpacked. The flange covers must only ever be removed before the valve is fitted.

⇒ Check valve for any transportation damage. Any damaged valves must not be fitted.

⇒ A functional test must be carried out before fitting commences. It is vital that the valve opens and closes properly. It is imperative that any identifiable malfunction be corrected before commissioning. See Section 7 “Troubleshooting”.

⇒ The mating flange of the pipe must be aligned and co-planar.

Note	Non-aligning / non-parallel coupling flanges could damage the valve lining
Danger	The internal clearance in the inside bore of the mating flange must be sufficient to allow the valve disc to open fully without damage to the disc edge. See Table 1.

DN	50	65	80	100	125	150	200	250	300
NPS	2“	2,5”	3”	4”	5”	6”	8”	10”	12”
Ø D_i[mm]	35	52	72	96	122	146	197	248	298

Table 1: Minimum requisite inside diameter D_i of the mating flange

⇒ Before fitting, both the valve and the attaching pipe must be cleaned of contaminants, particularly solid foreign matter, with all due care.

4.3 Fitting

Caution	The valve must be fitted with the disc in the slightly open position. On no account must the valve disc be allowed to protrude past the overall length of the valve – otherwise damage could be sustained by the disc edge causing the valve to leak.

⇒ Any flow direction is possible. The preferred installation position, however, is one with valve stem in the horizontal position. If possible, any gear unit should not be positioned directly underneath the valve as any potential leakage from the valve operating shaft may cause damage to the gear operator.

⇒ On fitting the valve into an already mounted pipe, the distance between the pipe flanges must be sufficient to avoid damage being incurred to any of the flange seal faces

⇒ Flange bolts are to be used to carefully centre the butterfly valve when being fitted.

⇒ The tightening torque of the flange bolts is to be limited to the value in accordance with Table 2. Otherwise, the PTFE lining at the flange could be damaged and thereby render the valve unusable. 10% higher tightening torques are only permissible if the flange connection is not seal-tight.

DN	50	65	80	100	125	150	200	250	300
NPS	2“	2 ½“	3“	4“	5“	6“	8“	10“	12“
Tightening torque [Nm]	40	40	48	53	62	68	75	102	150

Table 2: Permissible tightening torques M_d of the bolted connection of the mating flange

Note	The valve must be removed from the pipe when welding is being carried out on the attaching pipe flanges and must remain so until the pipe flange ends have cooled.

5 Testing the pressure of the pipe section

The valves have already been tested for their pressure levels by the manufacturer. Please note the following for pressure testing a pipe section with fitted valves:

⇒ Newly installed pipe systems are to be carefully flushed in order to wash out all foreign matter.

⇒ **Valve opened:** The test pressure must not to exceed the **1.5 value x (PN or PS)** (acc. to nameplate). *(PS = maximum permissible operating pressure)*

⇒ **Valve closed:** The test pressure must not to exceed the **1.1 value x (PN or PS)** (acc. to nameplate).

Section 7 “Troubleshooting” is to be consulted should a valve leak.

Caution	*To protect the PTFE lining of the body:* The test pressure of PTFE lined valves must always be restricted to **a maximum 16 bar.** The valve MUST not be closed. **A higher test pressure could render the valve unusable.**

Danger	*When a flange connection to the pipe with PTFE lining is not seal-tight:* Firstly tighten the flange connection at the torque in accordance with Section 4.3 “Fitting”. If necessary this torque can be raised by 10% - as described above. *If despite this the flange connection is still not seal-tight:* Slacken the flange connection. Check on the alignment of the flange connection and, if not adequate, correct accordingly. Check on seal faces at all flanges: **Damage to the lining necessitates replacing the valve and/or mating flange.**

6 Normal operations and maintenance

Since PTFE seals tend to yield, all flange connections at the valves must be tightened with the tightening torque in accordance with Table 2 after commissioning and once the operating temperature has been reached.

Normal manual strength is adequate for hand operation purposes; the use of extensions to raise the actuating torque is not permitted.

Note	*Butterfly valves with hand lever:* The position of the hand lever indicates the position of the valve: Hand lever at right angles to the pipe: **Valve closed,** Hand lever parallel to the pipe: **Valve opened.**
Danger to life	Opening and closing must be done smoothly and briskly in order to avoid any pressure surges and/or temperature shock in the piping system. **Ignoring this warning may cause serious harm to personnel or to the piping system.**

Regular maintenance on these valves is not necessary. There must be no leakage in evidence at a valve when the piping section is examined. If there is, then please refer to Section 7 “Troubleshooting”.

It is recommended that actuating valves remain permanently in the same position 3 to 4 times a year.

Danger	*A butterfly valve is not self-locking* The hand lever or the gear unit must not to be removed **when the butterfly valve is pressurized.**

7 Troubleshooting

Section 2 “Safety instructions” must be consulted when troubleshooting.

Danger	*When a valve is to be set up with piping containing hazardous fluids and has to be taken out of the system:* Those valve parts in contact with the fluids must be professionally decontaminated before repair commences.

Problem	Action	Comment
Leakage at a flange connection to the pipe	Tighten flange bolts **Caution** The permissible torque for tightening the flange bolts is limited. See Table 2 in Section 4.2: “Fitting”. *If despite this the leakage still persists:* Replace flange seal and/or valve	***Pointer 1:*** *Maintenance parts are to be ordered incorporating all nameplate details. Only BRAY original parts are to be fitted.* ***Pointer 2:*** *If after dismantling it is*

Leakage in the seat seal	Check whether the valve is 100% closed. *If the butterfly valve was closed under full torque yet is still not seal-tight:* Open and close valve a number of times under differential pressure. *If despite this the valve is still not seal-tight:* Repair needed: Replace PTFE lining of the body and/or valve disc. Please note Section 2.3 “Particular risks” and request maintenance parts and required instructions from **BRAY ARMATUREN & ANTRIEBE**.	*found that the product-contact parts as against the fluid are not resistant enough, then parts made of a suitable material are to be chosen.*
Leakage at the operating shaft	Repair needed: Replace operating shaft seal. Please note Section 2.3 “Particular risks” and request maintenance parts and required instructions from **BRAY ARMATUREN & ANTRIEBE**.	
Malfunction	Dismantle valve. Please note Section 2.3 “Particular risks” and inspect. *If parts of the valve are damaged:* Repair needed: Request maintenance parts and required instructions from **BRAY ARMATUREN & ANTRIEBE**.	

8 Additional information

This instruction, the **BRAY ident. Sheets** and more information can be obtained – also in other languages – from the following address:

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