0 Introduction

These instructions are intended to assist users of double-eccentric BRAY butterfly valves, Series 40/41 and 42/43 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.

1 Intended use

Once fitted on or between the flanges of a piping system, hand-operated, **double-eccentric BRAY butterfly valves, Series 40/41 and 42/43** 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 on or between flanges in accordance with EN 1092-1 or EN 1759-1 and with seal faces in accordance with Form B1 or Form B2, 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 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 body material, 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	Should a valve in continuous operations be used for control purposes, then the deployment limits in accordance with Planning Document **B-1023** are to be observed. Under no circumstances is cavitation to be tolerated.

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, temperature shocks, cavitation, wet steam with large concentrations of water 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	A gland seals off the valve stem. **The pressure in the pipe must be completely reduced** before the nuts at the packing gland are slackened or unscrewed – this prevents any fluid emerging from the gland.
Danger to life	Before unscrewing the screw plug or the cap at the body or 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.: 41**	See BRAY ident. sheets 40 to 43
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
Installation	**In the direction of arrow →**	Note Section 4.3 „Fitting into the Pipe“

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.

⇒ 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!

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.

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.**

⇒ 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.

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	**65**	**80**	**100**	**125**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**600**
NPS	**2,5”**	**3”**	**4”**	**5”**	**6”**	**8”**	**10”**	**12”**	**14”**	**16”**	**18”**	**20”**	**24”**
Ø D_i[mm]	52	74	96	124	150	200	250	300	332	378	434	485	586

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 inserted into the gap between the piping flanges with the disc in the closed position; otherwise damage could be sustained by the disc edge causing the valve to leak.

⇒ *The direction of flow is irrelevant when installing series 40/41 and 42/43 butterfly valves.*
To take advantage of the optimum function of the butterfly valve:
It is recommended that the valve be fitted so that an **arrow direction marked** on the valve is consistent with the direction **which the pressure exerts on a closed disc**. There is nothing to

stop this direction being counter to the direction of flow in the case of an opened butterfly valve!

⇒ 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 gland.

⇒ 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.
This distance must be not greater than is necessary so as to avoid any additional stress arising in the pipe when the flange connection is tightened.

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

Note	In view of the large nominal widths, series 40/41 and 42/43 butterfly valves need different bolt lengths to connect to mating flanges. For size and number of these flange bolts, see planning document **B-1023.**

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.

6 Normal operations and maintenance

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	Tighten flange or closure bolts *If the leakage still persists:*	***Pointer 1:*** *Maintenance parts are to be ordered*

or screw plug and body bonnets	Repair needed: Replace gasket. Please note Section 2.3 (Particular risks) and request maintenance parts and required instructions from **BRAY ARMATUREN & ANTRIEBE**.	*incorporating all nameplate details. Only BRAY original parts are to be fitted.*
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 the exchangeable gasket in the valve disc. Please note Section 2.3 “Particular risks” and request maintenance parts and required instructions from **BRAY ARMATUREN & ANTRIEBE**.	***Pointer 2:*** *If after dismantling it is 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 gland	Alternately tighten both nuts at the packing gland by a quarter turn clockwise in each instance. *If the leakage still persists:* Repair needed: Request maintenance parts and required instructions from **BRAY ARMATUREN & ANTRIEBE**. Please refer to Section 2.3 “Particular risks” *If the nuts at the gland have to be unscrewed or slackened (anti-clockwise):*  **Danger to life** to protect the operating staff from any risk, ensure that the pipe is depressurized beforehand. Refer to Section 2.3 „Particular risks“.	
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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Germany

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